APPENDIX I

Erosion and Sediment Control

ANNE ARUNDEL COUNTY
DEPARTMENT OF INSPECTIONS & PERMITS

2664 Riva Road
Annapolis,
MD 21401

GRADING PERMIT

BUILDING ADDRESS
389 BURNS CROSSING RD
SEVERN 21144

TAX ACC NBR: **400000093661**

SUBDIVISION: **MILLERSVILLE SNTRY LNDFL**

TAX MAP: **22**

BLOCK: **20** LOTS:

PARCEL: **0157** SECTION:

BLOCK(ST): AREA: **567.66**

DEED:

PROP DESC:

APPLICANT:

TENANT:

LOCATION:

======== CONTRACTOR ========

RESTRICTION:

COUNTY LICENSE:

STATE LICENSE:

LICENSEE:

PHONE:

========== OWNER ==========

ANNE ARUNDEL COUNTY
DEPT OF SANITATIONP O BOX 1831

PHONE:

Issue Date: **2014-09-10**

Application Date: **0001-01-01**

G02013304

TYPE	**GRADING PERMIT**
TYPE OF USE	**NON RESIDENTIAL**
PROPOSED WORK	**REV J ADDS SUBCELL 9.3, ETC... CONSTRUCT LANDFILL CELL 9 OF MILLERSVILLE LANDFILL * SOIL STOCKPILE/BORROW AREA REV G ADDS SUBCELL**

==== FLOOD ZONE ====

TIDE	**NO**
ZONE	**X**
ELEV	**0**
FLOOD MAP	**0**

========== LOT CHARACTERISTICS ==========

WATERFRONT LOT	**NO**
CRITICAL AREA	**NO**
FLOOD PLAIN	
STORMWATER MGMT TYPE	**NONE**

TOTAL NBR OF ACRES	**567.00**
COST OF WORK	**4200000**
BUILDING PERMIT NBR	
ZONING	**RA**
WATERSHED	**Severn River**
P.W. AGREEMENT	

A PERMIT UNDER WHICH NO WORK IS COMMENCED WITHIN ONE YEAR AFTER ISSUANCE SHALL EXPIRE. A PERMIT UNDER WHICH WORK IS COMMENCED WITHIN ONE YEAR SHALL BE CONSIDERED VALID IF CONSTRUCTION IS CONTINUOUS AND AT LEAST THIRTY-THREE & ONE-THIRD PERCENT OF THE WORK IS COMPLETED EACH CONSECUTIVE CALENDAR YEAR FROM THE DATE OF ISSUANCE. FORTY-EIGHT HOURS NOTICE IS REQUIRED FOR ALL INSPECTION REQUESTS.

THE OWNER HAS AGREED TO COMPLY WITH ALL APPLICABLE RULES AND REGULATIONS OF ANNE ARUNDEL COUNTY AND TO DO ONLY WORK SPECIFICALLY COVERED BY THIS PERMIT.

NOTE: NOTIFY THE SEDIMENT AND EROSION CONTROL SECTION AT LEAST FORTY-EIGHT HOURS PRIOR TO ANY WORK COMMENCING TO ARRANGE AN ON-SITE PRE-CONSTRUCTION MEETING.

INSPECTOR_____ FINAL_____

Director of Inspections and Permits

Application Date: **0001-01-01**

Issue Date: **2014-09-10**

EXISTING BUILDING PERMIT

G02013304

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ANNE ARUNDEL COUNTY, MARYLAND
DEPARTMENT OF PUBLIC WORKS

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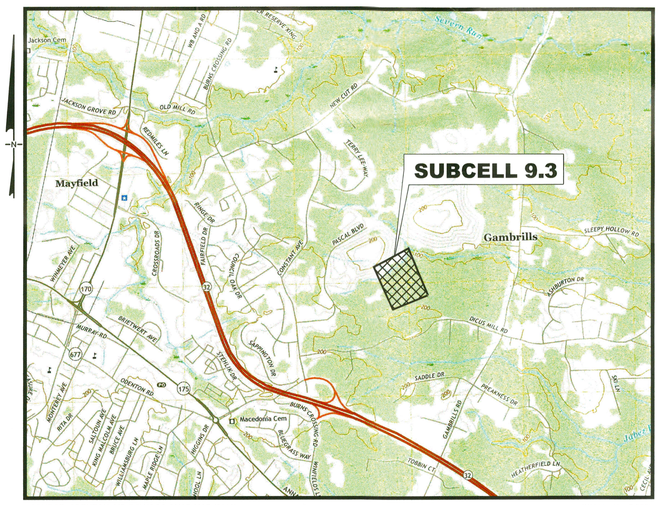
SUBCELL 9.3 CONSTRUCTION
MILLERSVILLE LANDFILL AND
RESOURCE RECOVERY FACILITY
JULY 2024

PROJECT NO. N578800
CONTRACT NO. N578801



SOURCE: ODENTON, MD 7.5' USGS QUAD MAP (2019)

SCALE: 1" = 2,000'

VICINITY MAP

LIST OF DRAWINGS

DWG.	SHT.	TITLE
G-1	1	COVER SHEET
G-2	2	EXISTING CONDITIONS-MILLERSVILLE FACILITY
G-3	3	EXISTING CONDITIONS - CELL 9
G-4	4	EXISTING CONDITIONS - SUBCELL 9.3
G-5	5	HIGHEST OBSERVED GROUNDWATER-ELEVATION PLAN
G-6	6	PROPOSED SITE DEVELOPMENT PLAN
G-7	7	CLEARING AND DEMOLITION PLAN
C-1	8	GRADING PLAN - EXCAVATION GRADES AND UNDERDRAIN SYSTEM
C-2	9	GRADING PLAN - TOP OF SUBBASE
C-3	10	GRADING PLAN - TOP OF PROTECTIVE COVER DRAINAGE LAYER
C-4	11	SUBCELL 9.3 CROSS SECTIONS
C-5	12	NORTH AND SOUTH PERIMETER ROAD
C-6	13	LINER DETAILS I
C-7	14	LINER DETAILS II
C-8	15	SUBCELL 9.2 AND 9.3 INTERCELL BERM LINER TIE-IN SEQUENCE
C-9	16	LEACHATE COLLECTION AND DETECTION SUMP AND RISER DETAILS I
C-10	17	LEACHATE COLLECTION AND DETECTION DETAILS II
C-11	18	LEACHATE GRAVITY MAIN DETAILS
C-12	19	STORMWATER MANAGEMENT DETAILS
C-12A	19A	AS-BUILT GRADES FOR POND 9-2
C-13	20	STOCKPILE AREA PLAN
C-14	21	PERIMETER ROAD
C-15	22	ROAD DETAILS
ES-1	23	EXISTING CONDITIONS - CELL 9
ES-2	24	PROPOSED CONDITIONS - CELL 9
ES-3	25	PROPOSED ENLARGED PLAN - I
ES-4	26	PROPOSED ENLARGED PLAN - II
ES-5	27	PROPOSED ENLARGED PLAN - III
ES-6	28	PROPOSED ENLARGED PLAN - IV
ES-7	29	PROPOSED ENLARGED PLAN - V
ES-8	30	PROPOSED ENLARGED PLAN - VI
ES-9	31	SEDIMENT AND EROSION CONTROL DETAILS
ES-10	32	SEDIMENT AND EROSION CONTROL NOTES
E-1	33	SITE PLAN & PARTIAL CONTROL BUILDING FLOOR PLAN
E-2	34	SUBCELL 9.3 PARTIAL SITE PLAN DETAILS & ELEVATIONS
E-3	35	POWER RISER DIAGRAM & SINGLE LINE DIAGRAM
E-4	36	DETAILS & SCHEDULES

SEQUENCE OF CONSTRUCTION

1. NOTIFY THE DEPARTMENT OF INSPECTIONS AND PERMITS (410-222-7780) AT LEAST 48 HOURS BEFORE COMMENCING WORK. WORK MAY NOT COMMENCE UNTIL THE PERMITTEE OR THE RESPONSIBLE PERSONNEL HAVE MET ON SITE WITH THE SEDIMENT AND EROSION CONTROL INSPECTOR TO REVIEW THE APPROVED PLANS.
2. MOBILIZE CONSTRUCTION EQUIPMENT TO THE SITE (1 WEEK).
3. PROVIDE SUBMITTALS, SHOP DRAWINGS, AND OPERATIONS MANUALS REQUIRED IN THE SPECIFICATIONS PURSUANT TO SECTION GP-5.04 OF THE ANNE ARUNDEL COUNTY STANDARD SPECIFICATIONS (1 WEEK).
4. CONSTRUCT OR INSTALL EROSION AND SEDIMENT CONTROL FEATURES, INCLUDING EARTH DIKES, STABILIZED CONSTRUCTION ENTRANCE, SILT FENCE, TREE PROTECTION FENCING, SEDIMENT TRAPS, AND EROSION AND SEDIMENT CONTROL RELATED CHANNELS (1 WEEK).
5. ONCE SEDIMENT CONTROLS HAVE BEEN INSTALLED, CONTACT THE INSPECTOR FOR APPROVAL OF SEDIMENT CONTROL INSTALLATION PRIOR TO COMMENCING WORK.
6. CONSTRUCT AND MAINTAIN TEMPORARY HAUL ROADS (1 WEEK).
7. INSTALL STORMWATER TACK-ON BERM ON WESTERN FACE OF SUBCELL 9.2 WASTE FILLING.
8. CLEAR AND GRUB DESIGNATED AREAS (2 WEEKS).
9. STRIP AND STOCKPILE TOPSOIL AT DESIGNATED AREAS (1 WEEK).
10. EXCAVATE, HAUL, AND STOCKPILE EXCESS CUT FROM CELL CONSTRUCTION AND ACCESS ROADS TO THE DESIGNATED STOCKPILE AREAS. CONTRACTOR SHALL CAREFULLY SEGREGATE MATERIALS INTO CLAYS SUITABLE FOR LOW-PERMEABILITY LINER CONSTRUCTION, AND STRUCTURAL FILL (12 WEEKS).
11. CONSTRUCT PERIMETER BERM AND PERIMETER ROAD AROUND THE SOUTHERN AND WESTERN SIDES OF CELL 9. THIS WORK CAN BE PERFORMED LATER IN THE PROJECT WITH APPROVAL FROM THE COUNTY (8 WEEKS).
12. FURNISH AND INSTALL UNDERDRAIN SYSTEM, TYING IT INTO THE EXISTING UNDERDRAIN FOR SUBCELL 9.2 (2 WEEKS).
13. PREPARE FINISHED SUBGRADE SURFACE FOR COMPACTED CLAY LINER INSTALLATION (1 WEEK).
14. CONSTRUCT COMPACTED CLAY LINER AND ANCHOR TRENCHES FOR GEOSYNTHETICS INSTALLATION (3 WEEK).
15. FURNISH AND CONSTRUCT THE GEOSYNTHETICS COMPONENTS OF THE COMPOSITE LINER SYSTEM (6 WEEKS).
16. PROPERLY CONSTRUCT AND BACKFILL ANCHOR TRENCHES (1 WEEK).
17. FURNISH AND INSTALL LEACHATE COLLECTION AND DETECTION SYSTEMS AND PROTECTIVE COVER MATERIALS (2 WEEKS).
18. FURNISH AND INSTALL LEACHATE RISERS, VAULTS, GRAVITY HEADER PIPE, AND MECHANICAL PUMPING SYSTEMS AND TIE IN TO EXISTING LEACHATE REMOVAL SYSTEM (3 WEEKS).
19. CONSTRUCT STORMWATER CHANNELS (2 WEEKS).
20. FURNISH, INSTALL, AND ANCHOR TEMPORARY TARPING OVER THE LEACHATE COLLECTION/PROTECTIVE COVER LAYER (1 WEEK).
21. FURNISH AND CONSTRUCT THE ELECTRICAL SYSTEM EXTENSIONS REQUIRED TO CONNECT TO THE EXISTING ELECTRICAL SYSTEMS (2 WEEKS).
22. SEED AND ESTABLISH PERMANENT VEGETATION ON DISTURBED AREAS DESIGNATED FOR VEGETATION (1 WEEK).
23. REMOVE ACCUMULATED SEDIMENT IN POND 9-2 TO DESIGN ELEVATIONS AT BOTH FOREBAYS AND CENTER SECTION (1 WEEK).
24. SEDIMENT CONTROLS SHALL BE REMOVED WITH INSPECTOR'S APPROVAL AFTER THE SITE IS 95% STABILIZED, EITHER VEGETATIVELY OR MECHANICALLY (1 WEEK).

SITE NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF ANNE ARUNDEL COUNTY, MARYLAND DEPARTMENT OF THE ENVIRONMENT, AND MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.
2. THE CONTRACTOR SHALL NOTIFY ANNE ARUNDEL COUNTY DEPARTMENT OF UTILITIES, CONSTRUCTION MANAGEMENT DIVISION, 410-222-7573, FIVE DAYS PRIOR TO STARTING WORK.
3. THE CONTRACTOR IS TO NOTIFY THE FOLLOWING UTILITIES OR AGENCIES AT LEAST FIVE DAYS BEFORE STARTING WORK INDICATED ON THESE DRAWINGS:

MISS UTILITY	1-800-257-7777
VERIZON TELEPHONE COMPANY	410-725-9976
AT&T CABLE LOCATION DIVISION	410-393-3553
B.G.&E. CO. CONTRACTOR SERVICES	410-850-4620
B.G.&E. CO. UNDERGROUND DAMAGE CONTROL	410-787-4620
STATE HIGHWAY ADMINISTRATION	410-545-0300

4. ANY DAMAGE THAT OCCURS TO THE PUBLIC RIGHT-OF-WAYS, PAVING, OR EXISTING UTILITIES SHALL BE CORRECTED BY THE CONTRACTOR AND AT THE CONTRACTOR'S EXPENSE.
5. ALL AREAS DISTURBED ON SITE SHALL BE STABILIZED WITH PERMANENT SEED AND MULCH IN ACCORDANCE WITH THE PLANS APPROVED BY THE ANNE ARUNDEL COUNTY SOIL CONSERVATION DISTRICT. IF DISTURBED AREA DOES NOT HAVE ANY TOPSOIL (I.E. BORROW AREA), CONTRACTOR SHALL ADD 4 INCHES OF TOPSOIL BEFORE ADDING SEED AND MULCH.
6. EARTHWORK QUANTITIES ARE ESTIMATED SOLELY FOR THE PURPOSE OF CALCULATING FEES FOR PROCESSING PERMITS. THE CONTRACTOR SHALL PROCESS THEIR OWN QUANTITIES FOR ORDERING MATERIALS.
7. ALL WORK SHALL COMPLY WITH ALL APPLICABLE REVISIONS OF THE "STANDARDS AND SPECIFICATIONS FOR SOIL SEDIMENT CONTROL IN DEVELOPING AREAS" ISSUED BY THE U.S. DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE.
8. EXISTING UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEYS AND AVAILABLE RECORD DRAWINGS. APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN FOR THE CONTRACTORS INFORMATION. CONTRACTOR SHALL LOCATE EXISTING UTILITIES IN ADVANCE OF CONSTRUCTION ACTIVITIES AND PROVIDE HORIZONTAL AND VERTICAL LOCATIONS TO THE SITE ENGINEER. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND TO MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED DUE TO CONTRACTOR'S OPERATION SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.

STANDARD RESPONSIBILITY NOTES

I (WE) CERTIFY THAT:

A. ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE IN ACCORDANCE WITH THIS SEDIMENT AND EROSION CONTROL PLAN, AND FURTHER, AUTHORIZE THE RIGHT OF ENTRY FOR PERIODIC ON-SITE EVALUATION BY THE ANNE ARUNDEL SOIL CONSERVATION (AASCD) BOARD OF SUPERVISORS OR THEIR AUTHORIZED AGENTS.

B. ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE FROM THE MARYLAND DEPARTMENT OF THE ENVIRONMENT'S APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT.

RESPONSIBLE PERSONNEL ON SITE: _____

C. IF APPLICABLE, THE APPROPRIATE ENCLOSURE WILL BE CONSTRUCTED AND MAINTAINED ON SEDIMENT BASIN(S) INCLUDED IN THIS PLAN. SUCH STRUCTURE(S) WILL BE IN COMPLIANCE WITH THE ANNE ARUNDEL COUNTY CODE.

2. THE DEVELOPER IS RESPONSIBLE FOR THE ACQUISITION OF ALL EASEMENTS, RIGHT, AND/OR RIGHTS-OF-WAY THAT MAY BE REQUIRED FOR THE SEDIMENT AND EROSION CONTROL PRACTICES, STORMWATER MANAGEMENT PRACTICES AND THE DISCHARGE OF STORMWATER ONTO OR ACROSS ADJACENT OR DOWNSTREAM PROPERTIES INCLUDED IN THE PLAN.
3. FOR INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT AND/OR TEMPORARY STABILIZATION PER THE AASCD VEGETATIVE ESTABLISHMENT SHALL BE COMPLETED WITHIN THREE CALENDAR DAYS FOR THE SURFACE OF ALL CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES AND ALL SLOPES GREATER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1); AND SEVEN DAYS FOR ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
4. THE GRADING AND SEDIMENT CONTROL APPROVAL ON THIS PLAN EXTENDS ONLY TO THOSE AREAS WITHIN THE LIMITS OF DISTURBANCE.
5. THE APPROVAL OF THIS PLAN FOR SEDIMENT AND EROSION CONTROL DOES NOT RELIEVE THE DEVELOPER/CONSULTANT FROM COMPLYING WITH FEDERAL, STATE OR COUNTY REQUIREMENTS PERTAINING TO ENVIRONMENTAL ISSUES.
6. THE DEVELOPER MUST REQUEST THAT THE SEDIMENT AND EROSION CONTROL INSPECTOR APPROVE WORK COMPLETED IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN, THE GRADING OR BUILDING PERMIT, AND THE ORDINANCE.
7. ALL MATERIAL SHALL BE TAKEN TO A SITE WITH AN APPROVED SEDIMENT AND EROSION CONTROL PLAN.
8. FIRST PHASE INSPECTION AND APPROVAL OF THE SEDIMENT AND EROSION CONTROL INSPECTOR SHALL BE REQUIRED UPON COMPLETION OF THE INSTALLATION OF EROSION AND SEDIMENT CONTROLS PRIOR TO PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THE INITIAL APPROVAL BY THE SEDIMENT AND EROSION CONTROL INSPECTOR IS GIVEN. INSPECTION AND PERMITS MAY ALSO REQUIRE THAT AN INSPECTION AND CERTIFICATION OF THE INSTALLATION OF SEDIMENT CONTROL ALSO BE PERFORMED BY A DESIGN PROFESSIONAL PRIOR TO CONSTRUCTION COMMENCING.
9. APPROVAL FROM THE INSPECTOR MUST BE REQUESTED ON FINAL STABILIZATION OF ALL SITES PRIOR TO REMOVAL OF SEDIMENT AND EROSION CONTROLS.
10. EXISTING TOPOGRAPHY MUST BE FIELD VERIFIED BY RESPONSIBLE PERSONNEL TO THE SATISFACTION OF THE SEDIMENT CONTROL INSPECTOR PRIOR TO COMMENCING WORK.

DocuSigned by: David C. Braun 7/31/2024 | 15:41 EDT

SIGNATURE OF DEVELOPER/OWNER — DATE

David C. Braun — Engineer Administrator

PRINT NAME: — TITLE:

ADDRESS: ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS
2662 RIVA ROAD
ANNAPOLIS, MARYLAND 21401

CONSULTANT'S CERTIFICATE

"THE DEVELOPER'S PLAN TO CONTROL SILT AND EROSION IS ADEQUATE TO CONTAIN THE SILT AND EROSION ON THE PROPERTY COVERED BY THE PLAN. I CERTIFY THAT THIS PLAN OF EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THIS SITE, AND WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ANNE ARUNDEL SOIL CONSERVATION DISTRICT PLAN SUBMITTAL GUIDELINES AND THE CURRENT MARYLAND STANDARDS AND SPECIFICATIONS FOR SEDIMENT AND EROSION CONTROL. I HAVE REVIEWED THIS EROSION AND SEDIMENT CONTROL PLAN WITH THE OWNER/DEVELOPER."

SIGNATURE Meena Viswanath MD P.E. LICENSE # 57584 DATE 7/31/2024

MD LAND SURVEYOR LICENSE # _____ DATE _____

NAME (PRINT) MEENA VISWANATH FIRM NAME GEOSYNTEC CONSULTANTS

ADDRESS 10211 WINCOPIN CIRCLE, 4TH FLOOR, COLUMBIA, MD 21044 USA

SITE TABULATION
TAX ACCOUNT # 04-000-00093661
TAX MAP: 22 GRID: 20 PARCEL: 157

EXISTING ZONING: RA
PROPOSED USE: LANDFILL
TOTAL SITE ACREAGE: 567.66 AC.
DEED REFERENCE: 0203/0049

100 YEAR FLOODPLAIN: NONE WITHIN LOD
MAP NO: 24003C 0133 E, 0131E
TIDAL/NON-TIDAL WETLANDS: NONE WITHIN LOD
STEEP SLOPES: NO NATURAL WITHIN LOD

CUT CU. YDS.: 744,000 C.Y.
FILL CU. YDS.: 136,000 C.Y.

LOD AREA: 115.5 AC

OWNER:

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS
2662 RIVA ROAD
ANNAPOLIS, MD 21401
TELEPHONE: (410) 222-7500

ENGINEER:

MEENA VISWANATH, P.E.
GEOSYNTEC CONSULTANTS
10211 WINCOPIN CIRCLE, FLOOR 4
COLUMBIA, MARYLAND 21044
PHONE: 410-381-4333

Approved
AUG 16 2024
AASCD
Anne Arundel Soil Conservation District
Sediment and Erosion Control Approval
District Manager — 8/15/24 Date
Reviewer — 8-16-24 Date
AASCD # 612-21 Pond #
GP #

PREPARED FOR:
ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS
2662 RIVA ROAD
ANNAPOLIS, MARYLAND 21401
PHONE: (410) 222-7500

PREPARED BY:
GEOSYNTEC CONSULTANTS
10211 WINCOPIN CIRCLE
4TH FLOOR
COLUMBIA, MD 21044
PHONE: (410) 381-4333

PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

LICENSE No. 57584

EXPIRATION DATE 29 APRIL 2025

STATE OF MARYLAND — MEENA L. VISWANATH — 57584 — PROFESSIONAL ENGINEER

SIGNATURE Meena Viswanath

7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-001

Geosyntec consultants
engineers | scientists | innovators
10211 WINCOPIN CIRCLE
4TH FLOOR
COLUMBIA, MD 21044
410.381.4333

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED DATE	BY	APPROVED: DATE	APPROVED: DATE		
		DocuSigned by: 8/4/2024 | 22:02 EDT BE4B7314D32409... CHIEF ENGINEER	DocuSigned by: 7/31/2024 | 11:56 EDT 59E6744658B84... PROJECT MANAGER	SCALE: NOTED	PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
		APPROVED: DATE	APPROVED: DATE	DRAWN BY: BW	
		DocuSigned by: 7/31/2024 | 15:41 EDT David C. Braun ASSISTANT CHIEF ENGINEER	DocuSigned by: 8/1/2024 | 12:16 EDT Thomas Evans CHIEF RIGHT-OF-WAY	CHECKED BY: MLV	
				DRAWING NO.: G-1 OF G-7	TITLE: COVER SHEET
				SHEET NO.: 1 OF 36	
				PROJECT NO.: ME2241	

P:\odd\PROJECTS\M\millersville\me2241 - subcell 9.3\CADD\01 - construction rev\DRAWINGS\SHEETS\2241-001.dwg - 31-Jul-24 - 11:26 AM

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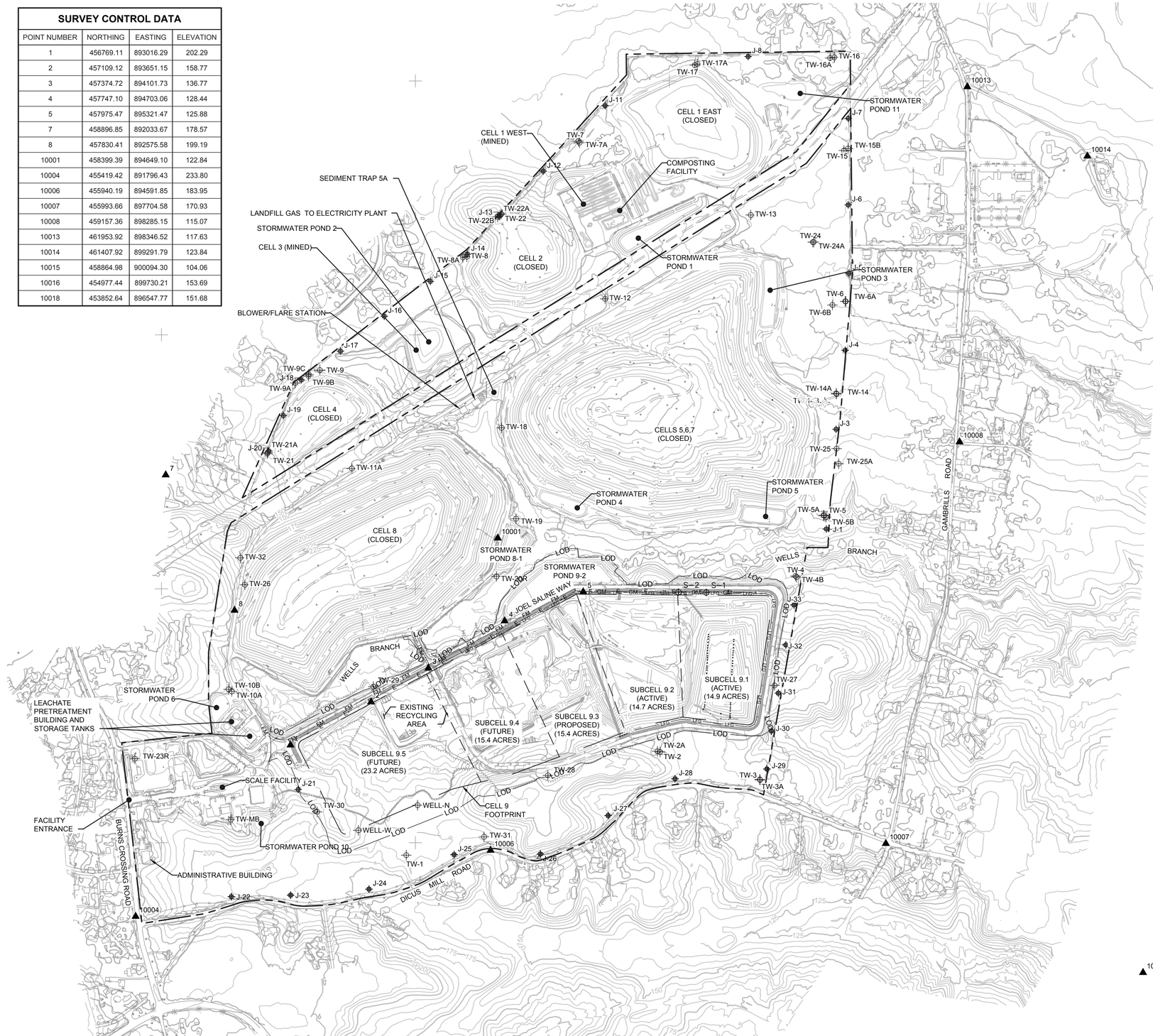
SURVEY CONTROL DATA

POINT NUMBER	NORTHING	EASTING	ELEVATION
1	456769.11	893016.29	202.29
2	457109.12	893651.15	158.77
3	457374.72	894101.73	136.77
4	457747.10	894703.06	128.44
5	457975.47	895321.47	125.88
7	458896.85	892033.67	178.57
8	457830.41	892575.58	199.19
10001	458399.39	894649.10	122.84
10004	455419.42	891796.43	233.80
10006	455940.19	894591.85	183.95
10007	455993.66	897704.58	170.93
10008	459157.36	898285.15	115.07
10013	461953.92	898346.52	117.63
10014	461407.92	899291.79	123.84
10015	458864.98	900094.30	104.06
10016	454977.44	899730.21	153.69
10018	453852.64	896547.77	151.68



LEGEND

- PROPERTY BOUNDARY
- 190 EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- TW-19 GROUNDWATER MONITORING WELLS
- J-25 GAS PROBES
- S-1 SENTRY WELLS
- ▲10007 SURVEY CONTROL POINT
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- LOD LIMITS-OF-DISTURBANCE

GENERAL NOTES:

1. GENERAL TOPOGRAPHIC MAP FROM AERIAL SURVEY CONDUCTED ON 29 DECEMBER 2022 BY BAI GROUP, LLC OF STATE COLLEGE, PENNSYLVANIA. TOPOGRAPHIC MAP WITHIN SUBCELL 9.3, 9.4, AND 9.5 FROM AERIAL SURVEY CONDUCTED ON 9 JANUARY 2023 BY PRECISION SURVEY AND MAPPING, LLC, OF SHALLOTTE, NORTH CAROLINA.
2. HORIZONTAL COORDINATES CORRESPOND TO THE MARYLAND STATE PLANE ZONE (1900) OF 1927 (NAD27); VERTICAL DATUM IS THE 1929 NATIONAL GEODETIC VERTICAL DATUM (NGVD29).
3. THE EXISTING UTILITIES SHOWN WERE OBTAINED FROM THE BEST AVAILABLE RECORDS LISTED BELOW:
   A. LEACHATE FORCEMAIN AND GRAVITY MAIN: SUBMITTAL 17-095R3 ENTITLED "CELL 9 FORECEMAIN & SUBCELLS 9.1 & 9.2 GRAVITY MAIN AS-BUILT DRAWINGS" BY ALLAN MYERS, INC. DATED 08 FEBRUARY 2017.
   B. ELECTRICAL LINES: SUBMITTAL 17-094R2 ENTITLED "CELL 9 ELECTRIC DUCT BANK AS-BUIILT DRAWINGS" BY ALLAN MYERS, INC. DATED 09 FEBRUARY 2017.
   C. LANDFILL GAS HEADER: SUBMITTAL 17-093R3 ENTITLED "CELL 9 LANDFILL GAS HEADER AS-BUILT DRAWINGS" BY ALLAN MYERS, INC. DATED 09 FEBRUARY 2017.
   D. LANDFILL GAS PROBES: SUBMITTAL 22-103 ENTITLED "LFG PROBE AS-BUILT DRAWING" BY ALLAN MYERS, INC. DATED 12 SEPTEMBER 2016.
   E. MONITORING WELLS: CADD FILE ENTITLED "SITE MAP.DWG" FROM SCS ENGINEERING (NO DATE).
   F. LANDFILL GAS HEADER SOUTH OF SUBCELL 9.2: DRAWING ENTITLED "LANDFILL GAS HEADER AS-BUILT" BY ALLAN MYERS, INC. DATED APRIL 2022.
4. SUBCELLS 9.1 AND 9.2 ARE ACTIVE LANDFILLING AREAS AND SUBCELL 9.3 AND 9.4 ARE ACTIVE BORROW AREAS; GRADES IN THESE LOCATIONS WILL DIFFER FROM EXISTING GRADES SHOWN ON THIS DRAWING SET AT THE TIME OF CONSTRUCTION.
5. THE LIMITS OF CLEARING SHOWN ON THESE PLANS IS WITHIN THE LIMITS OF CLEARING SHOWN ON THE 2014 FOREST CONSERVATION PLAN. FUTURE DEVELOPMENT OF THE SITE THAT TAKES PLACE OUTSIDE OF THE LIMITS OF DISTURBANCE SHOWN ON THESE PLANS MAY BE SUBJECT TO FOREST CONSERVATION REQUIREMENTS.
6. CONTRACTOR SHALL REMOVE AND SALVAGE TOPSOIL PRIOR TO EXCAVATING IN VIRGIN AREAS. SALVAGED TOPSOIL SHALL BE STOCKPILED AT A LOCATION DESIGNATED BY OWNER.
7. STARTING WHEN SOIL EXCAVATION BEGINS, CONTRACTOR SHALL TRANSPORT GENERAL FILL MATERIAL TO THE SUBCELL 9.2 AREA FOR USE AS DAILY COVER AT A LOCATION DESIGNATED BY OWNER. QUANTITY OF SOIL TO BE TRANSPORTED TO SUBCELL 9.2 IS 5,000 CY/MONTH OVER A PERIOD OF 6 MONTHS, FOR A TOTAL OF 30,000 CUBIC YARDS.
8. CONSTRUCTION TRAFFIC AND ACTIVITIES SHALL NOT IMPEDE OWNER'S LANDFILL OPERATIONS. CONTRACTOR SHALL COORDINATE WITH OWNER SHOULD ANY ACTIVITIES REQUIRE TEMPORARY INTERRUPTION OF VEHICULAR ACCESS, LANDFILL GAS MANAGEMENT, GROUND WATER MONITORING, OR LEACHATE MANAGEMENT ACTIVITIES. ACTIVITIES INCLUDE BUT ARE NOT LIMITED TO DAILY LANDFILLING AND RECYCLING, YARD WASTE COMPOSTING, ENVIRONMENTAL MONITORING, OPERATING A LANDFILL GAS TO ELECTRICITY FACILITY AND POST CLOSURE CARE ON CLOSED LANDFILL CELLS.
9. TRACKED HEAVY EQUIPMENT IS PROHIBITED FROM TRAVEL ON OR ACROSS PAVED SITE ROADWAYS.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAILY REMOVAL OF ALL DUST AND MUD ON ALL THE ROADS USED BY CONTRACTOR FOR ARRIVING, LEAVING AND HAULING WITHIN THE JOB SITE (REGARDLESS OF SOURCE) AND AS DIRECTED BY THE ENGINEER, CM/I FIRM OR ANNE ARUNDEL COUNTY INSPECTOR.
11. CONSTRUCTION ACCESS SHALL BE THROUGH THE LANDFILL ENTRANCE AT 389 BURNS CROSSING ROAD.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING BURIED UTILITIES WITHIN THE LIMITS OF CONSTRUCTION THROUGH TEST PITTING OR OTHER METHOD.
13. EXISTING LANDFILL GAS UTILITY SHOWN ON THE NORTH SIDE OF CELL 9 INCLUDES A 2-INCH AIR LINE COLLOCATED WITH THE 6-INCH LANDFILL GAS HEADER.

0 400' 800'
SCALE IN FEET

STATE OF MARYLAND — MELISSA VIVANETH — 57584 — PROFESSIONAL ENGINEER
SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-002

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ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED		APPROVED: DATE	APPROVED: DATE	SCALE: 1" = 400'	PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
DATE	BY	DocuSigned by: 8/4/2024 | 22:02 EDT — CHIEF, ENGINEER	DocuSigned by: 1/2024 | 11:56 EDT — CHIEF, BUREAU OF ...	DRAWN BY: BW	
		APPROVED: DATE	APPROVED: DATE	CHECKED BY: MLV	
		DocuSigned by: 7/31/2024 | 15:41 EDT — CHIEF, POLICY AND ...	DocuSigned by: '4 | 12:15 EDT — CHIEF, ...	DRAWING NO.: G-2 OF G-7	TITLE: EXISTING CONDITIONS-MILLERSVILLE FACILITY
				SHEET NO.: 2 OF 36	
				PROJECT NO.: ME2241	

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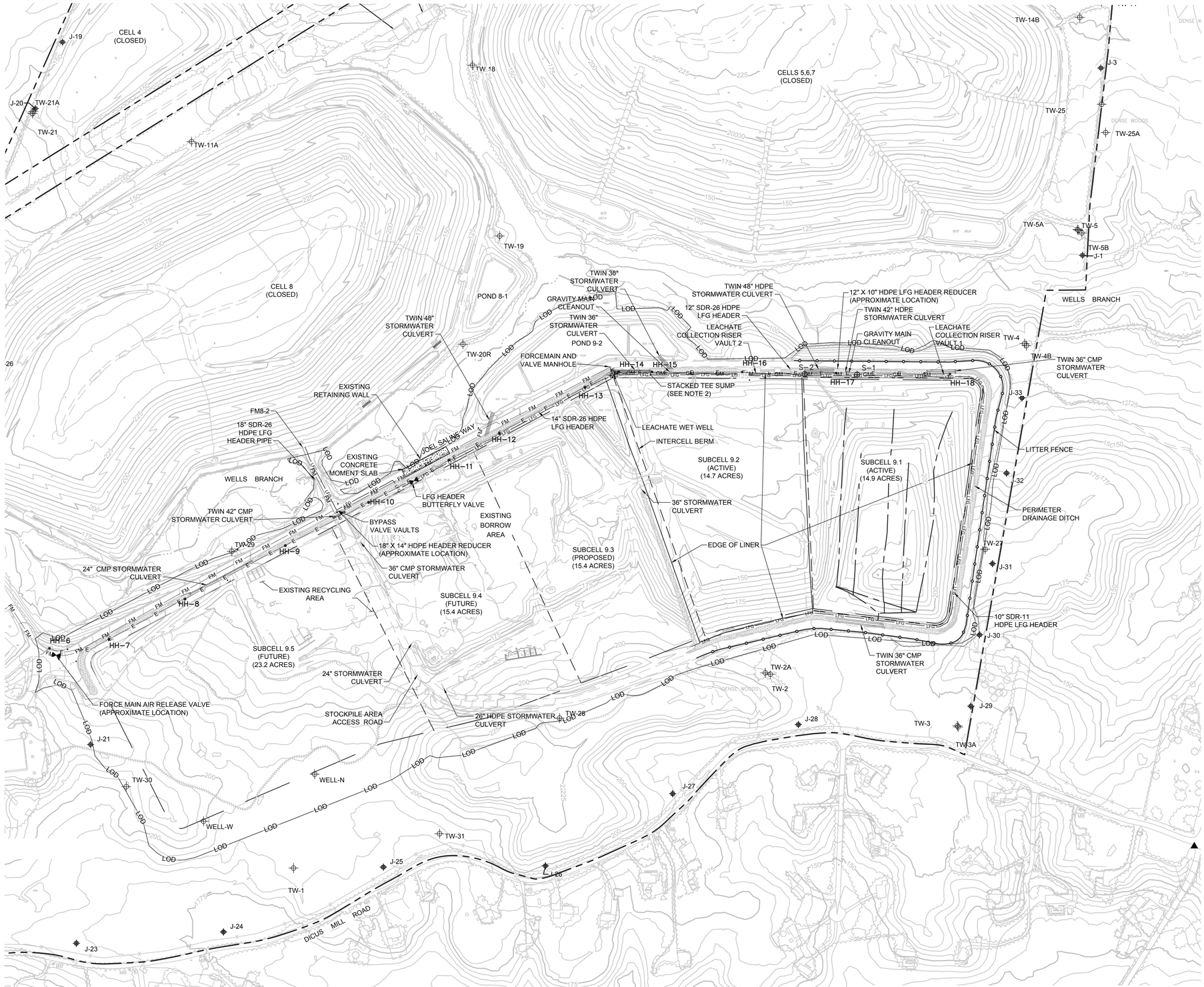

LEGEND

- PROPERTY BOUNDARY
- EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- E — ELECTRIC DUCT BANK (22" X 16")
- FM — LEACHATE FORCE MAIN (4" X 8" DUAL CONTAINMENT PIPE)
- LFG — LANDFILL GAS HEADER
- GM — LEACHATE GRAVITY MAIN (8" X 12" DUAL CONTAINMENT PIPE)
- TW-19 — GROUNDWATER MONITORING WELLS
- J-25 — GAS PROBES
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- LITTER FENCE
- EDGE OF LINER
- LANDFILL GAS HORIZONTAL COLLECTORS AND LATERALS
- HH-15 — ELECTRICAL HANDHOLE
- EXISTING CONCRETE MOMENT SLAB
- S-1 — SENTRY WELLS
- LOD — LIMITS-OF-DISTURBANCE

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. THE STACKED TEE SUMP ON THE LFG HEADER IS ALSO THE REDUCER BETWEEN THE 14-IN AND 12-IN HEADER SECTIONS.
3. CONTRACTOR RESPONSIBLE FOR PROTECTING EXISTING LANDFILL FEATURES, SUCH AS WELLS AND PROBES, AND THE EXISTING UTILITIES.

0 200' 400'
SCALE IN FEET

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STATE OF MARYLAND — NEENA VISVANATH — 37584 — PROFESSIONAL ENGINEER
SIGNATURE
7/31/2024
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DATE: JULY 2024
FILE NO.: 2241-003

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ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED	
DATE	BY

APPROVED: DATE
DocuSigned by: 8/4/2024 | 22:02 EDT
BBAB7314D032400...
CHIEF ENGINEER

APPROVED: DATE
DocuSigned by: 7/31/2024 | 11:56 PDT
0F5F57444B38484...
PROJECT MANAGER

APPROVED: DATE
DocuSigned by: 7/31/2024 | 15:41 EDT
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R

APPROVED: DATE
DocuSigned by: 8/1/2024 | 12:18 EDT
75A0157DE43E4D8...
CHIEF HIGHWAYS

SCALE:	1" = 200'
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	G-3 OF G-7
SHEET NO.:	3 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: EXISTING CONDITIONS - CELL 9

Docusign Envelope ID: 7E24C6D7-91F4-4129-A15E-3B231801329D

EXISTING RETAINING WALL
EXISTING CONCRETE MOMENT SLAB
EXISTING TWIN 48" STORMWATER CULVERT
14" SDR-26 HDPE LFG HEADER
FORCEMAIN AND VALVE MANHOLE
LEACHATE WET WELL HH–14
TWIN 48" STORMWATER CULVERTS
LFG HEADER BUTTERFLY VALVE
HH–11
HH–12
HH–13
HH–15
8" BLIND FLANGE INSTALLED ABOVE GRADE
8" BLIND FLANGE INSTALLED ABOVE GRADE
8" BLIND FLANGE INSTALLED ABOVE GRADE
GRAVITY MAIN CLEANOUT
STACKED TEE SUMP (SEE NOTE 2)

EXISTING STOCKPILE AREA

SUBCELL 9.4 (FUTURE) (15.4 ACRES)

SUBCELL 9.3 (PROPOSED) (15.4 ACRES)

SUBCELL 9.2 (ACTIVE) (14.7 ACRES)

UNDERDRAIN TIE-IN
N:457619.8390
E:895353.8640
INVERT ELEVATION: 113.49 FT-MSL

SOLID UNDERDRAIN PIPE

EXISTING 36" STORMWATER CULVERT

UNDERDRAIN SYSTEM

EDGE OF LINER

INTERCELL BERM

18" STORMWATER CULVERT

LFG TIE-IN
N: 456828.740
E: 895590.412
INVERT ELEVATION: 199.13

LEGEND

- PROPERTY BOUNDARY
- 190 EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- E ELECTRIC LINE
- FM LEACHATE FORCE MAIN
- LFG LANDFILL GAS HEADER
- GM LEACHATE GRAVITY MAIN
- TW–19 GROUNDWATER MONITORING WELLS
- J–25 GAS PROBES
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- EXISTING UNDERDRAIN SYSTEM
- LITTER FENCE
- EXISTING GUARDRAIL
- EDGE OF LINER
- HH–15 ELECTRICAL HANDHOLE
- LFG PIPE BLIND FLANGE (ABOVE GROUND)
- LOD LIMITS-OF-DISTURBANCE

NOTES:
1. SEE SHEET 2 FOR GENERAL NOTES.
2. THE STACKED TEE SUMP ON THE LFG HEADER IS ALSO THE REDUCER BETWEEN THE 14-IN AND 12-IN HEADER SECTIONS.

0 60' 120'
SCALE IN FEET

STATE OF MARYLAND — MELISSA WISNIEWSKI — 57584 — PROFESSIONAL ENGINEER
SIGNATURE 7/31/2024 DATE

DATE: JULY 2024
FILE NO.: 2241-004

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REVISED DATE	BY

APPROVED: DATE — DocuSigned by: 8/4/2024 | 22:02 EDT — 8BAB7314D02400... — CHIEF ENGINEER
APPROVED: DATE — DocuSigned by: 7/31/2024 | 11:56 PDT — 0F5F5744483849... — PROJECT MANAGER
APPROVED: DATE — DocuSigned by: 7/31/2024 | 15:41 EDT — C0E3DE1728C5440... — CHIEF, BUREAU OF WAT
APPROVED: DATE — DocuSigned by: 8/1/2024 | 12:18 EDT — 75A0157E6E43E4D8... — CHIEF, BUREAU OF ENGINEERING

SCALE:	1" = 60'
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	G-4 OF G-7
SHEET NO.:	4 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: EXISTING CONDITIONS - SUBCELL 9.3

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N

LEGEND

- PROPERTY BOUNDARY
- EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- SPOT ELEVATION
- PROPOSED GRADES CONTOUR (FEET-MSL)
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- TW-19 GROUNDWATER MONITORING WELLS
- J-25 GAS PROBES
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- 80 GROUNDWATER CONTOUR
- LOD LIMITS-OF-DISTURBANCE

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. WITHIN SUBCELL 9.3, PROPOSED GRADES SHOWN REPRESENT TOP OF SUBGRADE.
3. GROUNDWATER ELEVATIONS USED TO PRODUCE THE CONTOURS SHOW ON THIS SHEET ARE THE HIGHEST RECORDED LEVEL FOR EACH INDIVIDUAL WELL OR PIEZOMETER MEASURED ON A MONTHLY BASIS FROM MARCH 2022 THROUGH FEBRUARY 2023.
4. GROUNDWATER DATA WAS RECEIVED FROM ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS, BUREAU OF WASTE MANAGEMENT SERVICES.
5. WELLS TW-6B, TW-14B AND TW-26 ARE NOT MONITORED MONTHLY, THEREFORE NO DATA IS INCLUDED FOR THOSE THREE WELLS IN THIS DRAWING.
6. WELL READINGS ARE ONLY SHOWN FOR WELLS IN ZONE 3 FOR WHICH DATA WAS AVAILABLE.

0 150' 300'
SCALE IN FEET

STATE OF MARYLAND — MICHAEL VISVARDIS — 37584 — PROFESSIONAL ENGINEER

SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-005

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ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED DATE	BY

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APPROVED: DATE — DocuSigned by: 1/2024 | 11:56 PDT — PROJECT MANAGER
APPROVED: DATE — DocuSigned by: 7/31/2024 | 15:41 EDT — CHIEF BUREAU OF WASTE
APPROVED: DATE — DocuSigned by: 1/2024 | 12:15 PDT — R

SCALE:	1" = 150'
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	G-5 OF G-7
SHEET NO.:	5 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: HIGHEST OBSERVED GROUNDWATER-ELEVATION PLAN

P:\cadd\PROJECTS\MillersvilleLandfill\me2241 - subcell 9.3\CADD\01 - construction rev\DRAWINGS\SHEETS\2241-005.dwg - 31-Jul-24 - 11:28 AM

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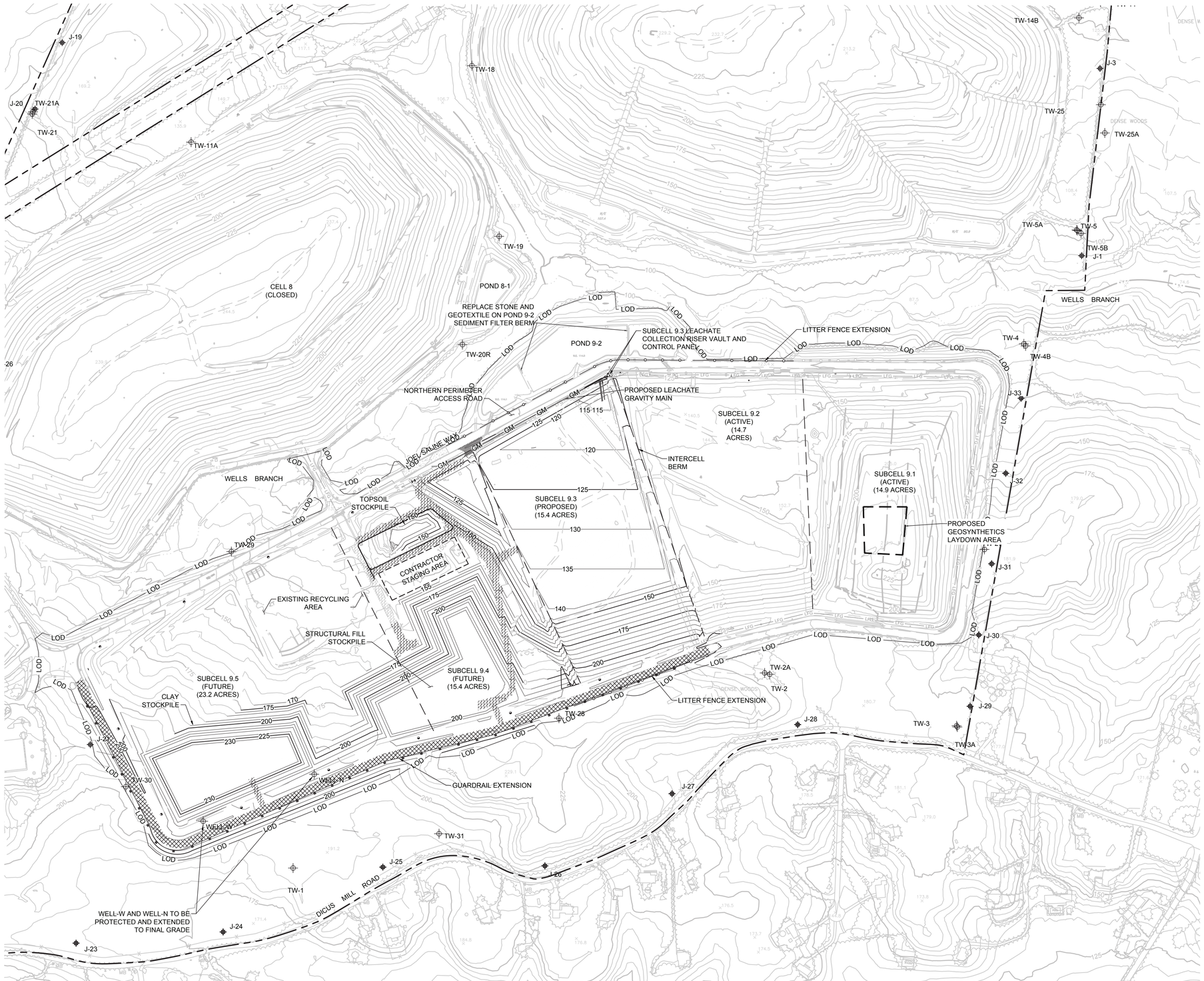

LEGEND

- PROPERTY BOUNDARY
- EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- SPOT ELEVATION
- PROPOSED CONTOUR (FEET-MSL)
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- LANDFILL GAS HEADER
- CELL 9 FOOTPRINT
- SUBCELL 9.2 LINER LIMITS
- SUBCELL BOUNDARIES
- EXISTING LITTER FENCE
- PROPOSED LITTER FENCE
- EXISTING GUARDRAIL
- PROPOSED GUARDRAIL
- EXISTING EDGE OF LINER
- PROPOSED EDGE OF LINER
- ELECTRICAL HANDHOLE
- PERIMETER ROAD (ASPHALT MILLINGS)
- STOCKPILE AREA HAUL ROAD (ON-SITE RUBBLE)
- SUBCELL 9.3 NORTHERN ACCESS CROSSING (PAVED)
- LOD — LIMITS-OF-DISTURBANCE

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED PRIOR TO ALL OTHER CONSTRUCTION ACTIVITIES.
3. WORK TO BE PERFORMED UNDER THIS CONTRACT INCLUDES BUT IS NOT LIMITED TO:
   3.A. A 15-ACRE LANDFILL CELL AND ASSOCIATED BERMS, STORMWATER DRAINAGE FEATURES, AND LEACHATE COLLECTION AND MANAGEMENT FEATURES;
   3.B. AN UNDERDRAIN SYSTEM;
   3.C. INSTALLATION OF LEACHATE COLLECTION RISER VAULT 3 AND PUMPS AND ASSOCIATED ELECTRICAL/MECHANICAL WORK;
   3.D. CELL 9 PERIMETER ROAD, BERM AND DITCH.
4. THE EXISTING LEACHATE TRANSMISSION SYSTEM WILL BE MODIFIED TO ACCOMMODATE LEACHATE COLLECTED FROM SUBCELL 9.3 (SEE SHEETS 10 AND 16-18).
5. THE EXISTING UNDERDRAIN SYSTEM WILL BE MODIFIED TO ACCOMMODATE GROUNDWATER COLLECTED FROM UNDER SUBCELL 9.3 (SEE SHEET 8).
6. GRADING SHOWN FOR SUBCELLS 9.1 AND 9.2 WILL DIFFER BASED ON WASTE FILLING OPERATIONS.
7. WITHIN SUBCELL 9.3, PROPOSED GRADES SHOWN REPRESENT TOP OF PROTECTIVE COVER.

0 200' 400'
SCALE IN FEET

STATE OF MARYLAND — MELISSA L. WISNIEWSKI — 37584 — PROFESSIONAL ENGINEER

SIGNATURE

7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-006

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DATE	BY	DocuSigned by: 8/4/2024 | 22:02 EDT — 8BABB7314D032400... CHIEF ENGINEER	DocuSigned by: 7/31/2024 | 11:56 PDT — 0F5F5744B538484... PROJECT MANAGER	SCALE: 1" = 200'	PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
		APPROVED: DATE	APPROVED: DATE	DRAWN BY: BW	
		DocuSigned by: /2024 | 15:41 EDT — C0E3DE1728C5440...	DocuSigned by: :4 | 12:18 EDT — 75A0157E6A3E4D8...	CHECKED BY: MLV	
		CHIEF ENGINEER	CHIEF FACILITIES OFFICER	DRAWING NO.: G-6 OF G-7	TITLE: PROPOSED SITE DEVELOPMENT PLAN
				SHEET NO.: 6 OF 36	
				PROJECT NO.: ME2241	

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

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POND 8-1

POND 9-2

TW-20R

FM8-2

WELLS BRANCH

TW-29

HH-6

HH-7

J-21

TW-30

PROTECT - TO REMAIN IN PLACE

WELL-W

PROTECT - TO REMAIN IN PLACE

WELL-N

PROTECT - TO REMAIN IN PLACE

TW-1

J-24

J-25

TW-31

TW-28

JOEL SALINE WAY

REMOVE EXISTING SEDIMENT TRAPS (SEE NOTE 2)

EXISTING CONCRETE MOMENT SLAB

TWIN 48" STORMWATER CULVERT

TWIN 36" HDPE STORMWATER CULVERT

LEACHATE WET WELL

REMOVE AND SALVAGE 36" STORMWATER CMP (SEE NOTE 3)

TWIN 42" STORMWATER CMP

24" STORMWATER CULVERT

EXISTING RECYCLING AREA

REMOVE AND SALVAGE STOCKPILED DRAINAGE PIPES (SEE NOTE 3)

REMOVE AND SALVAGE EXISTING STOCKPILE AREA HAUL ROAD (SEE NOTE 5)

EXISTING BORROW AREA

SUBCELL 9.3 (PROPOSED)

SUBCELL 9.4 (FUTURE)

REMOVE AND SALVAGE 36" STORMWATER CULVERT (SEE NOTE 3)

REMOVE STORMWATER CHANNEL AND SALVAGE RIP-RAP (SEE NOTES 3 AND 7)

SUBCELL 9.5 (FUTURE)

REMOVE AND SALVAGE STOCKPILE DRAINAGE PIPES (SEE NOTES 3)

REMOVE AND SALVAGE EXISTING STOCKPILE AREA HAUL ROAD (SEE NOTE 5)

REMOVE AND SALVAGE 24" HDPE STORMWATER CULVERT (SEE NOTE 3)

REMOVE STORMWATER CHANNEL AND SALVAGE RIP-RAP (SEE NOTES 3 AND 7)

REMOVE AND SALVAGE RETAINING WALL AND RELOCATE STOCKPILED ITEMS PER OWNER'S DIRECTION

REMOVE AND SALVAGE 26" HDPE STORMWATER CULVERT (SEE NOTE 3)

REMOVE SECTIONS OF STOCKPILE AREA ACCESS ROAD AND SALVAGE ROAD MATERIALS (SEE NOTE 4)

TREES TO BE CLEARED (SEE NOTE 6)

LOD

N

LEGEND

- PROPERTY BOUNDARY
- 190 EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- E ELECTRIC DUCT BANK (22" X 16")
- FM LEACHATE FORCE MAIN (4" X 8" DUAL CONTAINMENT PIPE)
- LFG LANDFILL GAS HEADER
- GM LEACHATE GRAVITY MAIN (8" X 12" DUAL CONTAINMENT PIPE)
- TW–19 GROUNDWATER MONITORING WELLS
- J–25 GAS PROBES
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- LITTER FENCE
- EDGE OF LINER
- LANDFILL GAS HORIZONTAL COLLECTORS AND LATERALS
- HH–15 ELECTRICAL HANDHOLE
- EXISTING CONCRETE MOMENT SLAB
- EXISTING RIPRAP
- EXISTING STOCKPILE AREA ACCESS ROAD (ASPHALT MILLINGS)
- EXISTING STOCKPILE AREA HAUL ROAD (RUBBLE)
- EDGE OF TREE REMOVAL
- LOD LIMITS-OF-DISTURBANCE

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. CONTRACTOR SHALL REMOVE SEDIMENT TRAP AFTER EXCAVATION IS DEEP ENOUGH THAT TRAP IS NO LONGER FUNCTIONAL.
3. SALVAGE ALL CHANNEL RIPRAP AND CULVERTS REMOVED DURING CONSTRUCTION. STOCKPILE WHERE DIRECTED BY OWNER.
4. SALVAGE ASPHALT MILLINGS FROM EXISTING STOCKPILE AREA ACCESS ROAD AND STOCKPILE FOR RE-USE WHERE DIRECTED BY OWNER.
5. SALVAGE RUBBLE FROM EXISTING STOCKPILE AREA HAUL ROAD AND STOCKPILE FOR RE-USE WHERE DIRECTED BY OWNER.
6. A. CLEAR AND GRUB WOODED AREA TO THE LIMITS SHOWN.

   B. ONLY REMOVE TOPSOIL FROM THE AREAS THAT WILL BE REGRADED FOR STOCKPILE AREA CONSTRUCTION.

   C. REVEGETATE THE REMAINING AREA THAT WAS CLEARED AND GRUBBED BUT STILL HAS TOPSOIL.
7. RIPRAP FROM DEMOLISHED DRAINAGE CHANNELS SHALL BE CLEANED MECHANICALLY TO THE SATISFACTION OF THE ENGINEER AND REINSTALLED IN PROPOSED DRAINAGE CHANNELS. ANY REMAINING RIPRAP SHALL BE STOCKPILED WHERE DIRECTED BY OWNER.

0 100' 200'
SCALE IN FEET

STATE OF MARYLAND — MELISSA L. WISWELL — 37584 — PROFESSIONAL ENGINEER

SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-003.1

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ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED DATE	BY

APPROVED: DATE — DocuSigned by: Melissa Wiswell — 8BA8731 4DC03400... — 8/4/2024 | 22:02 EDT — CHIEF ENGINEER

APPROVED: DATE — DocuSigned by: Dave Mewirf — 0F9F5744B53B494... — 8/1/2024 | 11:56 EDT — PROJECT MANAGER

APPROVED: DATE — DocuSigned by: David C. Brown — C0E3DE1728C5440... — 8/1/2024 | 15:41 EDT — R

APPROVED: DATE — DocuSigned by: Thomas Burke III — 75A01576E43E4D8... — 8/4 | 12:18 EDT — CHIEF, BUREAU OF WAT

SCALE:	1" = 200'
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	G-7 OF G-7
SHEET NO.:	7 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: CLEARING AND DEMOLITION PLAN

Docusign Envelope ID: 7E24C6D7-91F4-4129-A15E-3B231801329D

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PERIMETER BERM AND ANCHOR TRENCH (3 / C-6)

LEACHATE DETECTION AND COLLECTION RISER TRENCH (4 / C-9)

LEACHATE DETECTION AND COLLECTION SUMP (2 / C-9)

TEMPORARY STORMWATER SUMP

UNDERDRAIN TIE-IN (NOTE 5)
N:457619.8390
E:895353.8640
INVERT ELEVATION: 113.49 FT-MSL

6"Ø SOLID HDPE SDR-11 PIPE AT 1% SLOPE (4 / C-6)

STORMWATER TACK-ON BERM (SEE NOTE 4) (3 / C-12)

TERMINATE WITH BLIND FLANGE AND BACKUP RING WITH STAINLESS STEEL BOLTS

SUBCELL 9.3
(PROPOSED)
(15.4 ACRES)

FLANGE CONNECTION (3 / C-7)

6"Ø SOLID HDPE SDR-11 PIPE (4 / C-6)

SUBCELL 9.4
(FUTURE)
(15.4 ACRES)

SUBCELL 9.3 AND 9.4 INTERCELL BERM AT STORMWATER DIVERSION BERM (2 / C-7)

6"Ø PERFORATED HDPE SDR-11 PIPE (SEE NOTE 3) (5 / C-6)

INTERCELL BERM TIE-IN (SEE NOTE 2) (1-4 / C-8)

SUBCELL 9.3 AND 9.4 INTERCELL BERM LINER TEMPORARY TERMINATION (1 / C-7)

CELL 9 BOUNDARY

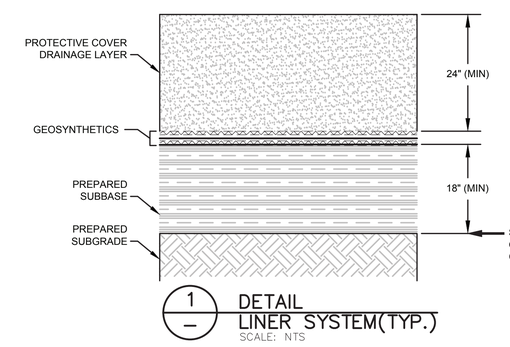
PERIMETER BERM AND ANCHOR TRENCH (3 / C-6)

CONSTRUCTION CONTROL POINTS			
POINT ID	NORTHING	EASTING	ELEVATION
C1	457957.5617	895269.9913	123.7
C2	456874.8449	895652.9005	202.8
C3	456780.2865	895411.5851	209.9
C4	456677.5263	895133.9037	210.5
C5	457646.3280	894683.4944	128.2
C6	457869.9460	895239.3335	107.9

N

LEGEND

- EXISTING TOPOGRAPHY GRADE CONTOUR (FEET-MSL)
- PROPOSED EXCAVATION GRADE CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- PROPOSED UNDERDRAIN PIPE (APPROXIMATE LOCATION)
- AS-BUILT UNDERDRAIN PIPE
- PZ3 — EXISTING PIEZOMETER SEE NOTE 8
- SPOT ELEVATION
- RIPRAP
- FM — EXISTING FORCEMAIN
- E — EXISTING ELECTRIC LINE
- LFG — EXISTING LANDFILL GAS HEADER
- GM — EXISTING GRAVITY MAIN
- SUBCELL BOUNDARIES
- LOD — LIMITS-OF-DISTURBANCE



1 / – DETAIL
LINER SYSTEM(TYP.)
SCALE: NTS

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. GRADES SHOWN FOR INTERCELL TIE-IN REPRESENT AS-BUILT FROM SUBCELL 9.2. CONTRACTOR SHALL REMOVE EXISTING COVER SOILS TO UNCOVER LINER TIE-IN.
3. NORTHERN LIMIT OF PERFORATED UNDERDRAIN IS INTENDED TO INTERCEPT THE LIMITS OF THE UPPERMOST SAND LAYER FOLLOWING SUBGRADE EXCAVATION. FINAL LOCATION MAY BE ADJUSTED DURING CONSTRUCTION TO INTERCEPT PERCHED WATER WHERE OBSERVED.
4. PRIOR TO SUBCELL 9.3 EXCAVATION, INSTALL STORMWATER TACK-ON BERM WITH MIN. 1% SLOPE ALONG WESTERN FACE OF SUBCELL 9.2 WASTE FILLING TO DIVERT WATER AWAY FROM SUBCELL 9.3 EXCAVATION. THE HEIGHT OF THE WESTERN FACE OF SUBCELL 9.2 WASTE GRADES WILL VARY AND MAY BE AS HIGH AS 50 FT.
5. EXISTING TERMINATION OF UNDERDRAIN SYSTEM IS A BLIND FLANGE AND BACKUP RING WITH STAINLESS STEEL BOLTS.
6. REFER TO SHEET 10 FOR THE LOCATION OF THE LEACHATE COLLECTION TRENCHES AND DETAIL 2 ON SHEET 13 FOR LOCAL ADJUSTMENTS TO SUBGRADE ALONG THOSE TRENCHES.

0 60' 120'
SCALE IN FEET

STATE OF MARYLAND — STEVEN L. VISWANATH — 57558 — PROFESSIONAL ENGINEER
SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-07

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APPROVED: DATE — DocuSigned by: 8/1/2024 | 12:18 EDT — 75A0157DE436E4D8... — CHIEF, BUREAU OF WASTE MANAGEMENT

SCALE:	1" = 60'
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	C-1 OF C-15
SHEET NO.:	8 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION
MILLERSVILLE LANDFILL AND
RESOURCE RECOVERY FACILITY

TITLE: GRADING PLAN - EXCAVATION
GRADES AND UNDERDRAIN SYSTEM

Docusign Envelope ID: 7E24C6D7-91F4-4129-A15E-3B231801329D

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PERIMETER BERM AND ANCHOR TRENCH — 3 C-6

LEACHATE DETECTION AND COLLECTION RISER TRENCH — 4 C-9

109.4 SUMP EL.

LEACHATE DETECTION AND COLLECTION SUMP — 2 C-9

STORMWATER TACK-ON BERM (SEE NOTE 4) — 3 C-12

SUBCELL 9.3 AND 9.4 INTERCELL BERM AT STORMWATER DIVERSION BERM (SEE NOTE 3) — 2 C-7

INTERCELL BERM TIE-IN (SEE NOTE 2) — 1-4 C-8

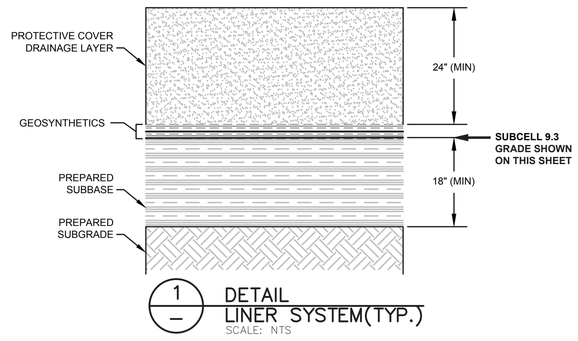
SUBCELL 9.3 AND 9.4 INTERCELL BERM LINER TEMPORARY TERMINATION — 1 C-7

PERIMETER BERM AND ANCHOR TRENCH — 3 C-6

N

LEGEND

- EXISTING TOPOGRAPHY GRADE CONTOUR (FEET-MSL)
- PROPOSED TOP OFSUBBASE CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- RIPRAP
- FM — EXISTING FORCEMAIN
- E — EXISTING ELECTRIC LINE
- LFG — EXISTING LANDFILL GAS HEADER
- GM — EXISTING GRAVITY MAIN
- SUBCELL BOUNDARIES
- EDGE OF LINER
- LOD — LIMITS-OF-DISTURBANCE



1 — DETAIL
LINER SYSTEM(TYP.)
SCALE: NTS

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. GRADES SHOWN ADJACENT TO SUBCELL 9.2 TIE INTO SUBCELL 9.2 AS-BUILT CONTOURS. CONTRACTOR SHALL REMOVE EXISTING COVER SOILS TO UNCOVER LINER TIE-IN.
3. SEE DETAIL 2 ON SHEET 14 FOR STORMWATER DIVERSION MODIFICATIONS AT THE INTERCELL BERM BETWEEN 9.3 AND 9.4.
4. PRIOR TO SUBCELL 9.3 EXCAVATION, INSTALL STORMWATER TACK-ON BERM WITH MIN. 1% SLOPE ALONG WESTERN FACE OF SUBCELL 9.2 WASTE FILLING TO DIVERT WATER AWAY FROM SUBCELL 9.3 EXCAVATION.
5. REFER TO SHEET 10 FOR THE LOCATION OF THE LEACHATE COLLECTION TRENCHES AND DETAIL 2 ON SHEET 13 FOR LOCAL ADJUSTMENTS TO SUBGRADE ALONG THOSE TRENCHES.

0 60' 120'
SCALE IN FEET

STATE OF MARYLAND — MELANIE VISWANATH — 57584 — PROFESSIONAL ENGINEER

SIGNATURE

7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-08

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410.381.4333

ANNE ARUNDEL COUNTY
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APPROVED: DATE — DocuSigned by: 1/2024 | 11:56 PDT — PROJECT MANAGER
APPROVED: DATE — DocuSigned by: /2024 | 15:41 EDT — CHIEF, BUREAU OF R
APPROVED: DATE — DocuSigned by: 2024 | 12:18 PDT — CHIEF, BUREAU OF

SCALE:	1" = 60'
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	C-2 OF C-15
SHEET NO.:	9 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: GRADING PLAN - TOP OF SUBBASE

Docusign Envelope ID: 7E24C6D7-91F4-4129-A15E-3B231801329D

PROPOSED 2x48"x48" CULVERTS C-2(SEE NOTE 4)

PROPOSED 2x30"x36" CULVERTS C-9(SEE NOTE 4)

PROPOSED 2x24"x36" CULVERTS, C-1 (SEE NOTE 4)

113.4 SUMP EL.

2 C-9 LEACHATE DETECTION AND COLLECTION SUMP

EDGE OF TEMPORARY TARP 5 C-12

2 C-6 LEACHATE COLLECTION LATERAL PIPE AND LEACHATE DETECTION SWALE AT BASE OF SUBCELL

3 C-12 STORMWATER TACK-ON BERM (SEE NOTE 3)

2 C-7 SUBCELL 9.3 AND 9.4 INTERCELL BERM AT STORMWATER DIVERSION BERM (SEE NOTE 3)

DIVERTED STORMWATER

PROPOSED 2x24"x36" CULVERTS C-O (SEE NOTE 4)

1-4 C-8 INTERCELL BERM TIE-IN (SEE NOTE 2)

2 C-12 LINER FLOOR STORMWATER DIVERSION BERM

DIVERTED STORMWATER

DIVERTED STORMWATER

1 C-7 1 - SUBCELL 9.3 AND 9.4 INTERCELL BERM LINER TEMPORARY TERMINATION

STORMWATER CHANNEL 3 & 4 1 C-12

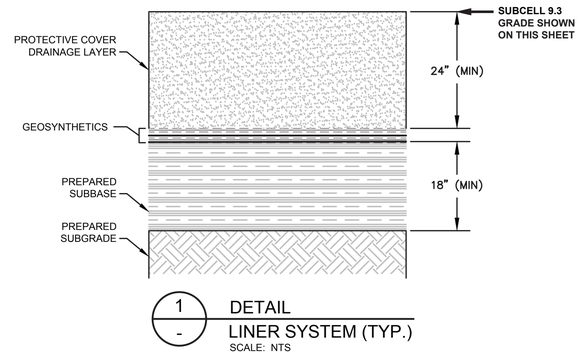
1 C-10 CLEANOUT SUPPORT AND PIPE (TYP)

PERIMETER BERM AND ANCHOR TRENCH 3 C-6

N

LEGEND

- EXISTING TOPOGRAPHY GRADE CONTOUR (FEET-MSL)
- PROPOSED TOP OF COVER CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- TEMPORARY STORMWATER DIVERSION BERM
- LEACHATE COLLECTION PIPE
- LITTER FENCE
- RIPRAP
- SUBCELL BOUNDARIES
- TEMPORARY TARP
- HH-17 ELECTRIC HANDHOLE
- CLEANOUT SUPPORT
- LEACHATE COLLECTION PIPE AND DETECTION SWALE
- LOD LIMITS-OF-DISTURBANCE



1 - DETAIL
LINER SYSTEM (TYP.)
SCALE: NTS

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. TIE TO SUBCELL 9.2 AS SHOWN ON SHEET 15. CONTRACTOR SHALL REMOVE EXISTING COVER SOILS AND TIE-IN TO EXISTING LINER SYSTEM.
3. PRIOR TO SUBCELL 9.3 EXCAVATION, INSTALL STORMWATER TACK-ON BERM WITH MIN. 1% SLOPE ALONG WESTERN FACE OF SUBCELL 9.2 WASTE FILLING TO DIVERT WATER AWAY FROM SUBCELL 9.3 EXCAVATION.
4. SEE DRAWING ES-10 FOR CULVERT SCHEDULE TABLE.

0 60' 120'
SCALE IN FEET

STATE OF MARYLAND — MARK L. VISNAUSKAS — 27584 — PROFESSIONAL ENGINEER

SIGNATURE

7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-09

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APPROVED: DATE — DocuSigned by: 7/31/2024 | 12:18 EDT — R...

SCALE: 1" = 60'
DRAWN BY: BW
CHECKED BY: MLV
DRAWING NO.: C-3 OF C-15
SHEET NO.: 10 OF 36
PROJECT NO.: ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: GRADING PLAN - TOP OF PROTECTIVE COVER DRAINAGE LAYER

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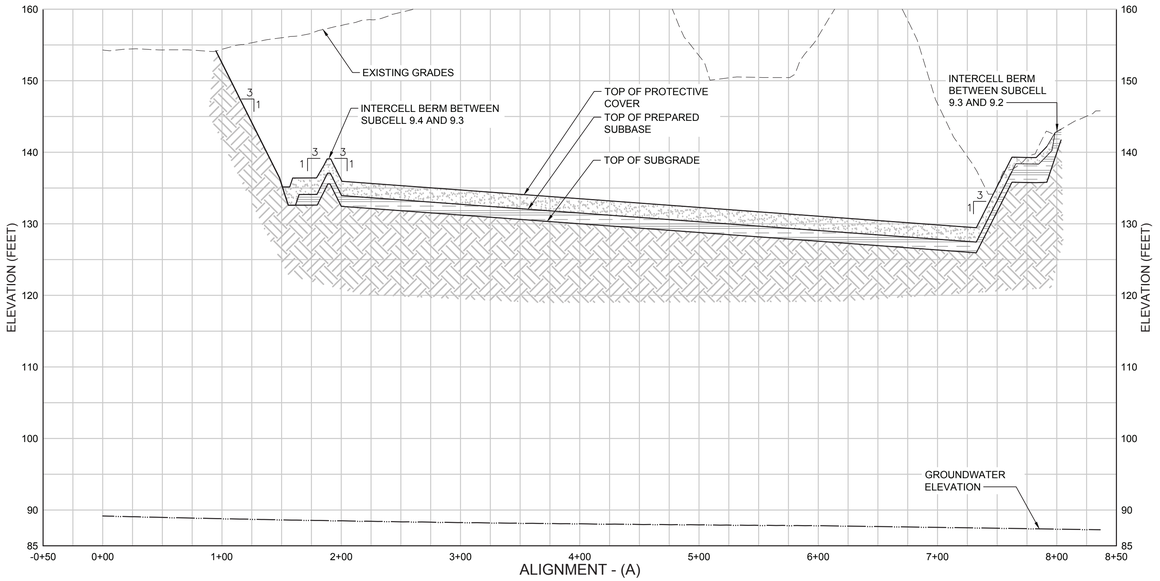
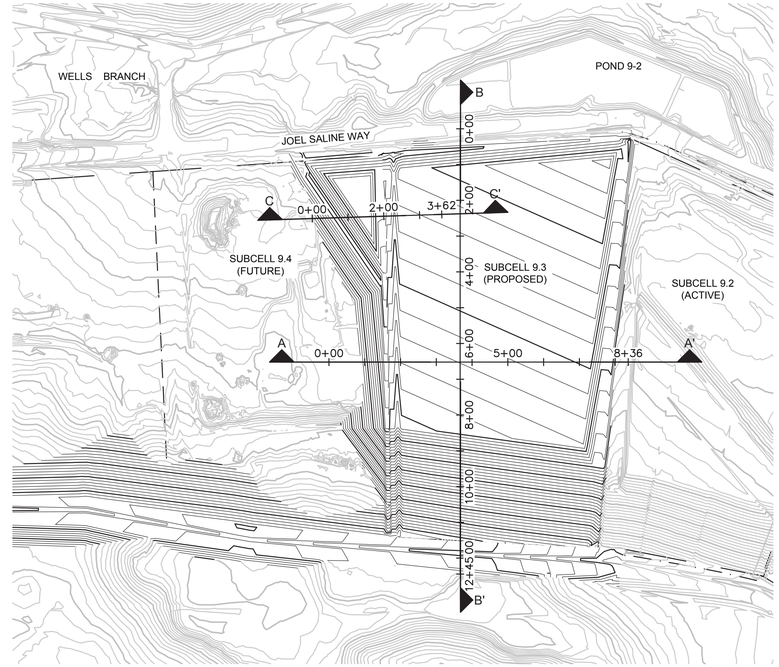


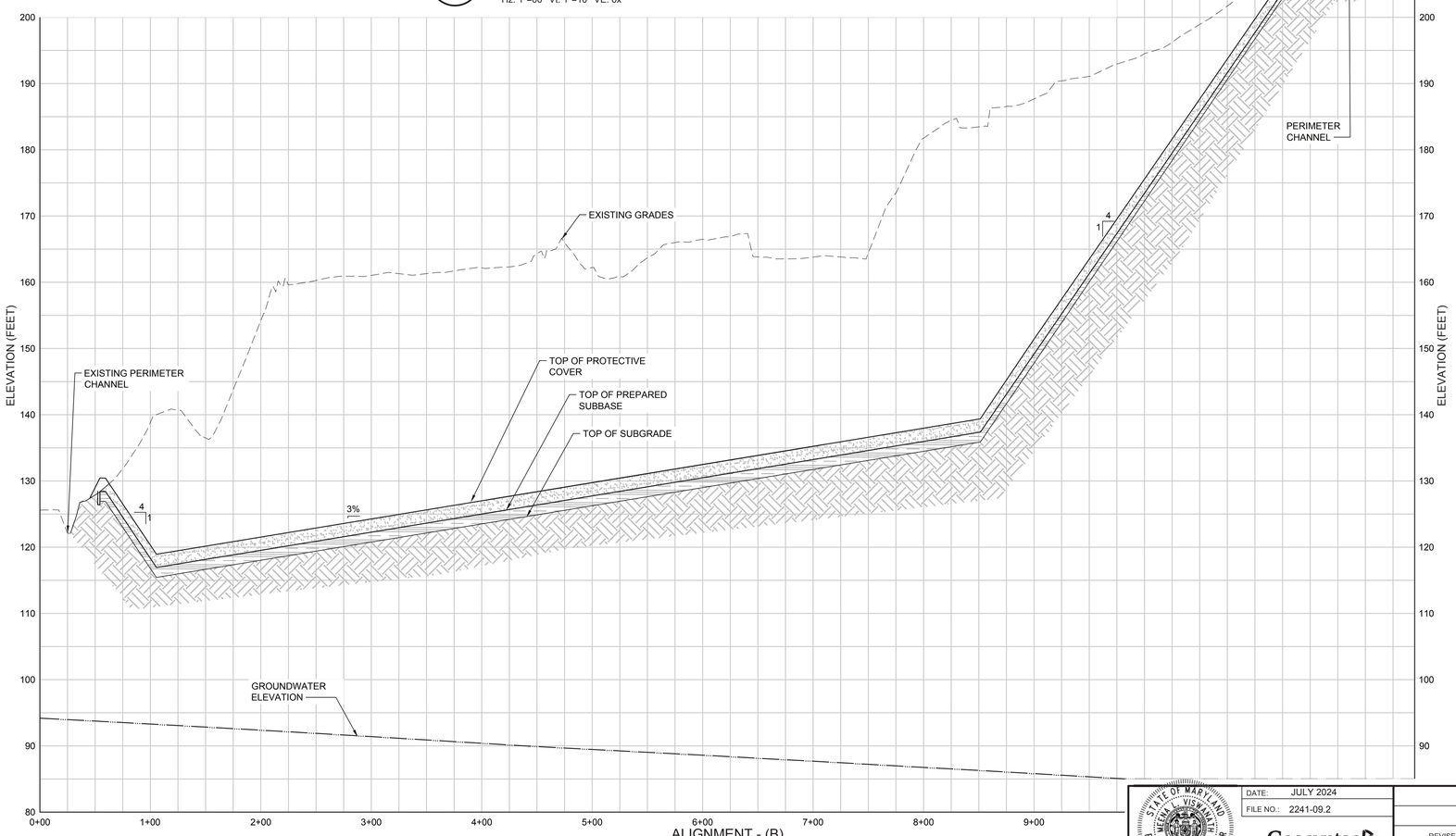
A
-
PROFILE

SCALE:
Hz. 1"=60' Vt. 1"=10' VE. 6x



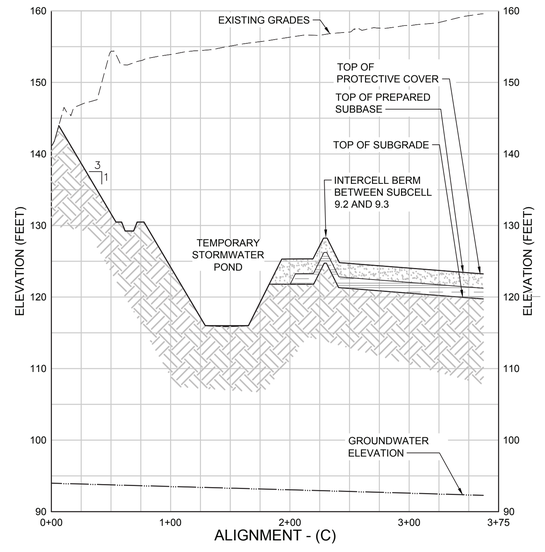
CROSS SECTION LOCATION PLAN

SCALE: 1"=200'



B
-
PROFILE

SCALE:
Hz. 1"=60' Vt. 1"=10' VE. 6x



C
-
PROFILE

SCALE:
Hz. 1"=60' Vt. 1"=10' VE. 6x

0 60' 120'
HORIZONTAL SCALE: 1"=60'

0 10' 20'
VERTICAL SCALE: 1"=10'

STATE OF MARYLAND
MICHAEL L. VISWANATH
37584
PROFESSIONAL ENGINEER

SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-09.2

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PROJECT MANAGER

APPROVED: DATE
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CHIEF, BUREAU OF ENGINEERING

APPROVED: DATE
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CHIEF, BUREAU OF WASTE MANAGEMENT

SCALE:	1" = 150'
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	C-4 OF C-15
SHEET NO.:	11 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: SUBCELL 9.3 CROSS SECTIONS

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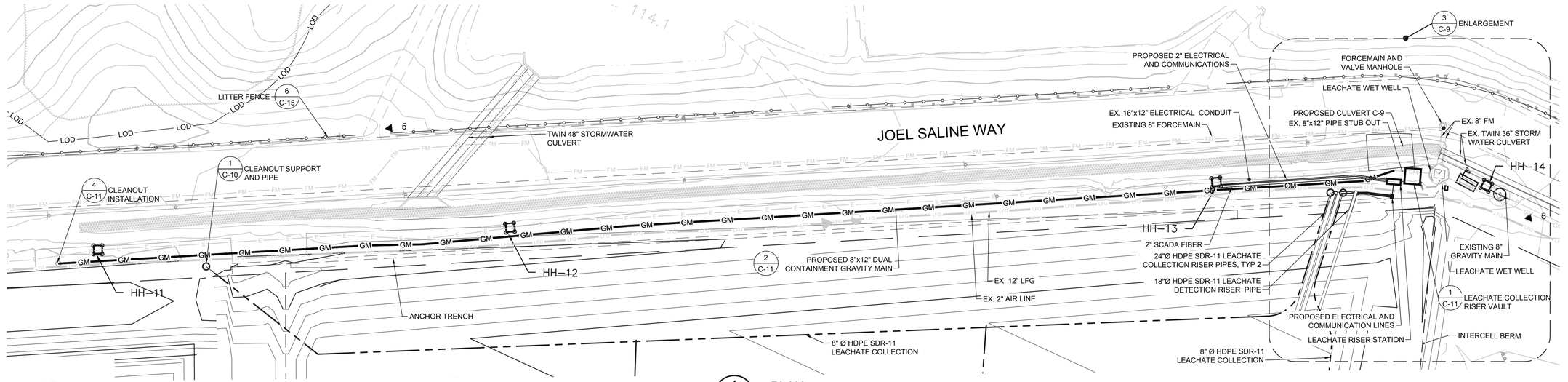
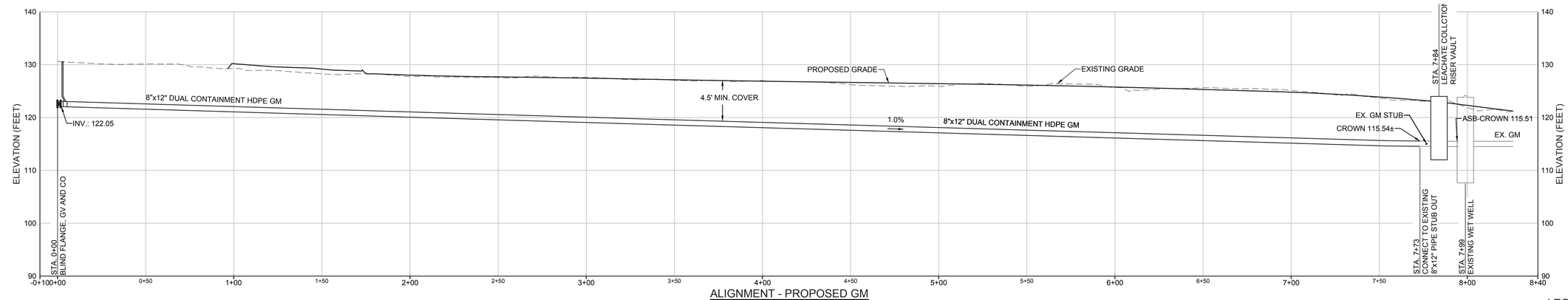
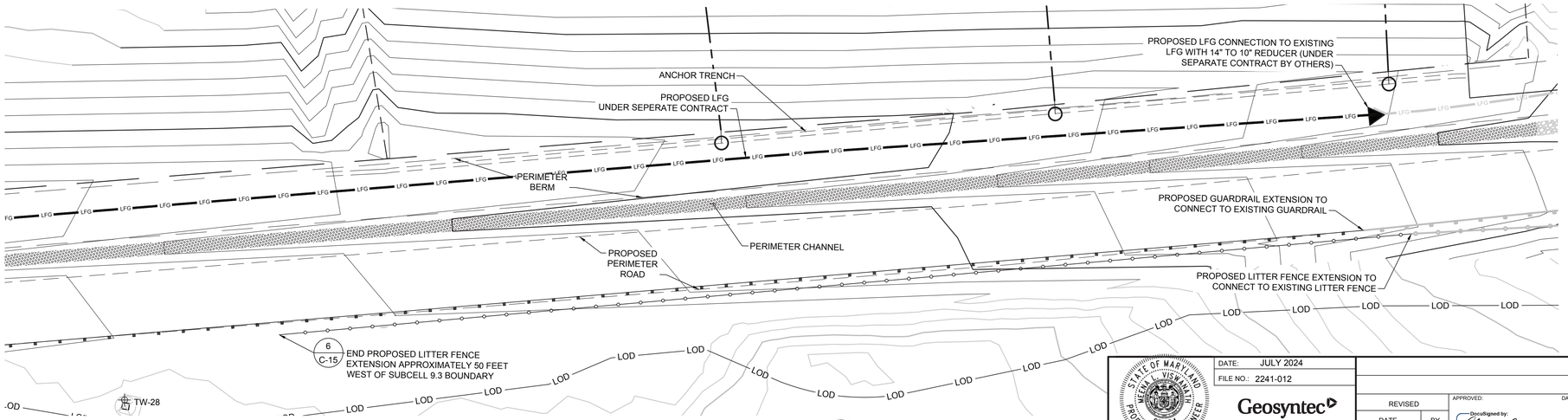


1 / - PLAN
PERIMETER BERM NORTH
SCALE: 1" = 30'



ALIGNMENT - PROPOSED GM
HORIZONTAL: 1" =30'
VERTICAL: 1" =10'



2 / - PLAN
PERIMETER BERM SOUTH
SCALE: 1" = 30'

0 30' 60'
SCALE IN FEET

LEGEND

- PROPERTY BOUNDARY
- 190 EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- PROPOSED TOP OF COVER CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- E ELECTRIC DUCT BANK (22"x16")
- FM LEACHATE FORCE MAIN (4"x8" DUAL CONTAINMENT PIPE)
- LFG LANDFILL GAS HEADER
- GM LEACHATE GRAVITY MAIN (8"x12" DUAL CONTAINMENT PIPE)
- TW–19 GROUNDWATER MONITORING WELLS
- J–25 GAS PROBES
- P3 EXISTING PIEZOMETER
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- LITTER FENCE
- HH–15 ELECTRICAL HANDHOLE
- LOD LIMITS-OF-DISTURBANCE

NOTES:
1. WITHIN SUBCELL 9.3, PROPOSED GRADES SHOWN REPRESENT TOP OF PROTECTIVE COVER.

STATE OF MARYLAND — MELISSA L. VISNAUSKAS — 37584 — PROFESSIONAL ENGINEER
SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-012

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APPROVED: DATE — DocuSigned by: 2024 | 12:18 EDT — 75A0151956E4E4D8... — CHIEF, DIV. OF UTILITY AND WAST

SCALE:	NOTED
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	C-5 OF C-15
SHEET NO.:	12 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: NORTH AND SOUTH PERIMETER ROAD

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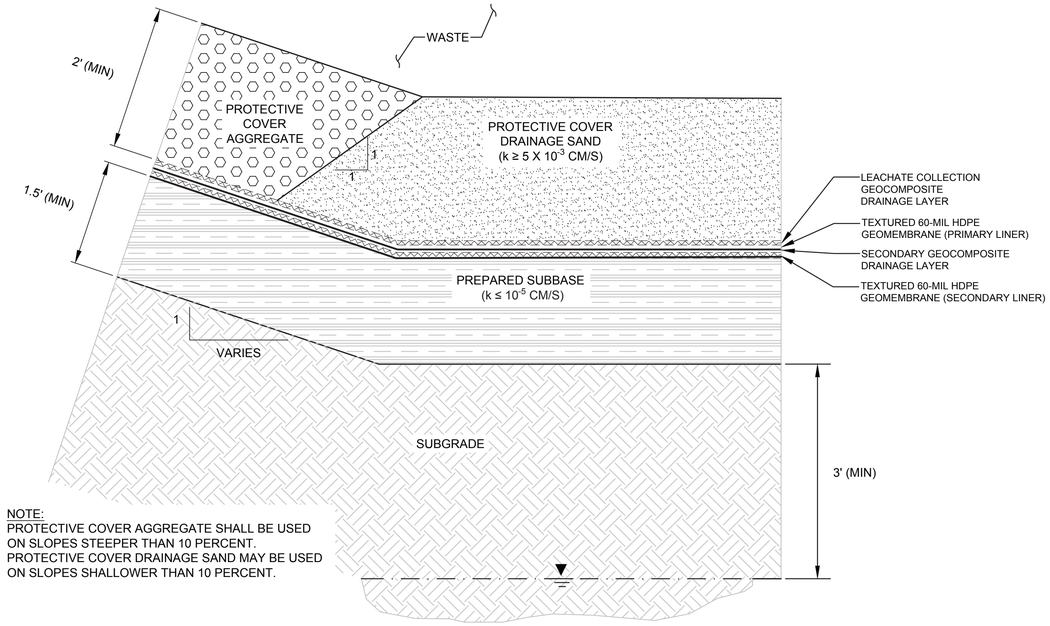
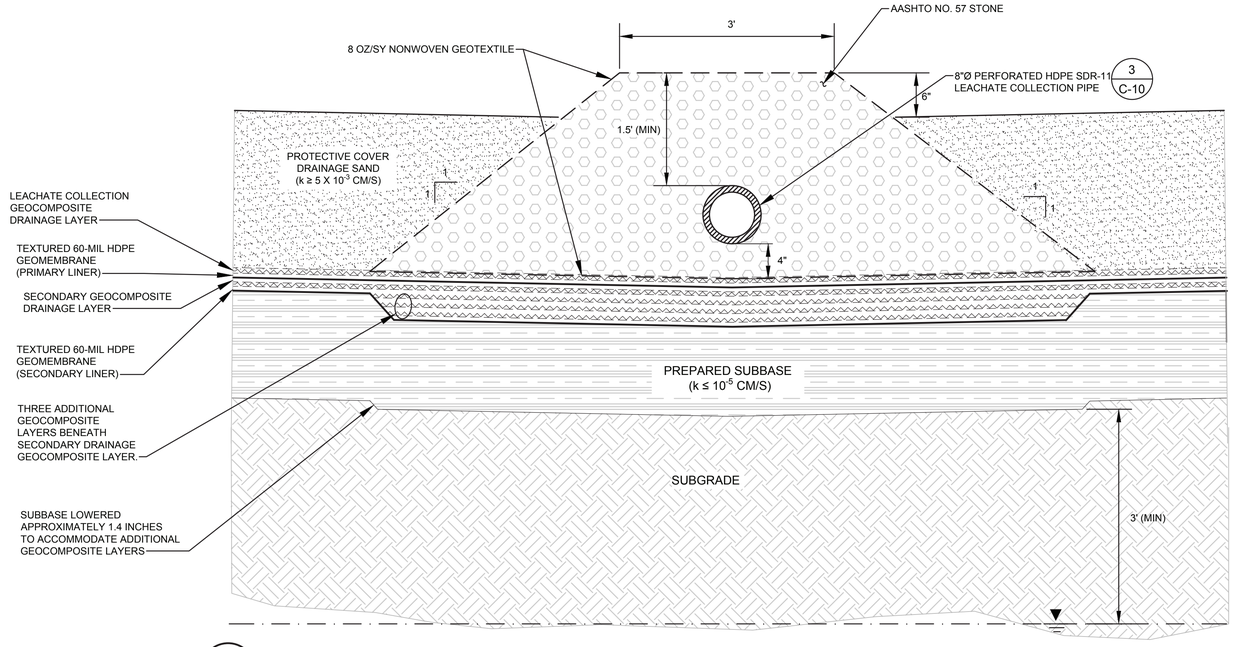
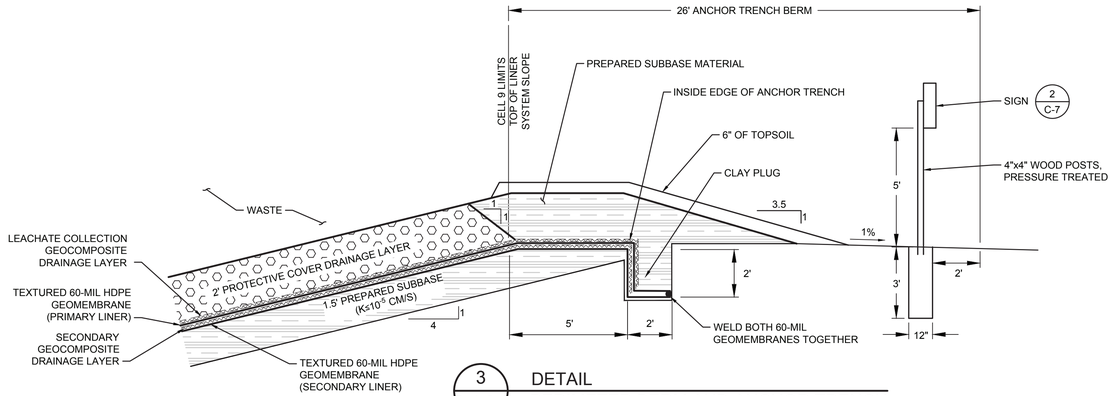


NOTE:
PROTECTIVE COVER AGGREGATE SHALL BE USED ON SLOPES STEEPER THAN 10 PERCENT. PROTECTIVE COVER DRAINAGE SAND MAY BE USED ON SLOPES SHALLOWER THAN 10 PERCENT.

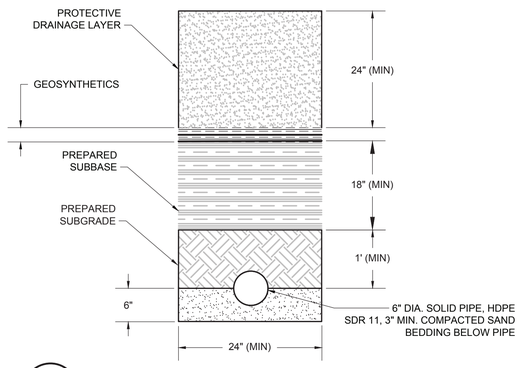
1 / C-5 DETAIL
LINER SYSTEM
SCALE: NTS



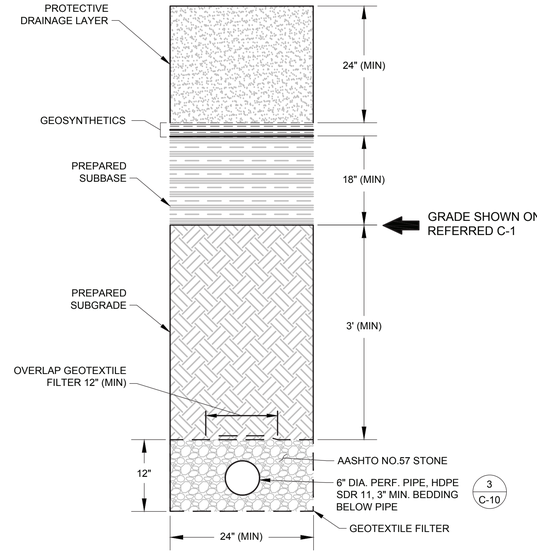
2 / C-3 DETAIL
LEACHATE COLLECTION LATERAL PIPE AND LEACHATE DETECTION SWALE AT BASE OF SUBCELL
SCALE: NTS



3 / C-1,2,3 DETAIL
PERIMETER BERM AND ANCHOR TRENCH
SCALE: NTS



4 / C-1 DETAIL
UNDERDRAIN CROSS SECTION - SOLID PIPE (TYP.)
SCALE: NTS



5 / C-1 SECTION
UNDERDRAIN CROSS SECTION - PERFORATED PIPE (TYP.)
SCALE: NTS

STATE OF MARYLAND — ELENA VISWANATH — 57584 — PROFESSIONAL ENGINEER
SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-012.1

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		APPROVED: DATE	APPROVED: DATE
		DocuSigned by: 7/31/2024 | 15:41 EDT — C0E3DE1728C5440...	DocuSigned by: 8/1/2024 | 12:18 EDT — 75A0157DE43E4D8... CHIEF, HIGHWAYS

SCALE:	NOTED
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	C-6 OF C-15
SHEET NO.:	13 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: LINER DETAILS I

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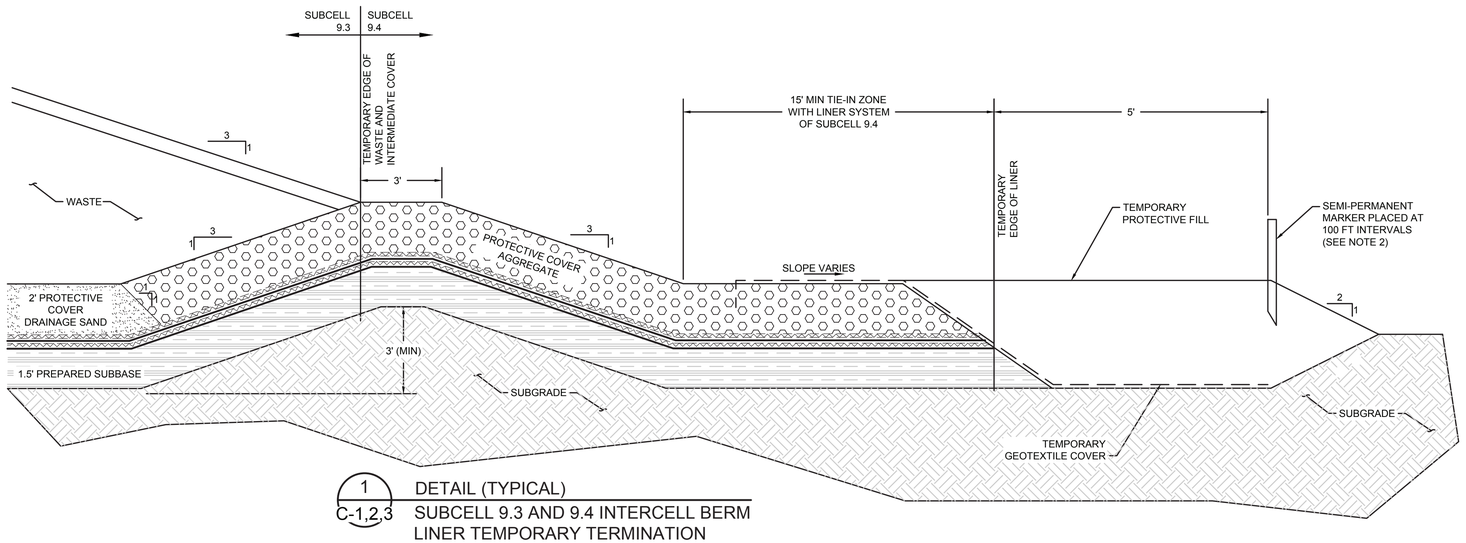
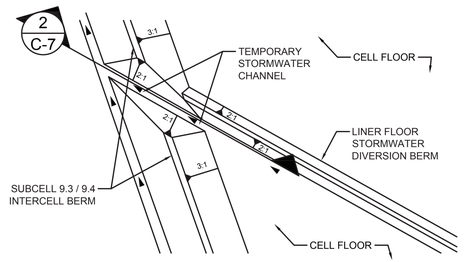
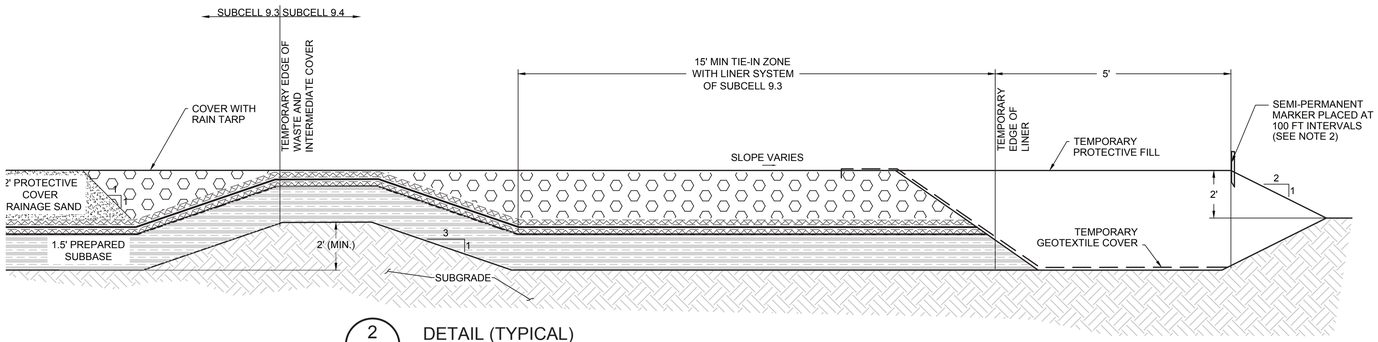


1 C-1,2,3 DETAIL (TYPICAL)
SUBCELL 9.3 AND 9.4 INTERCELL BERM
LINER TEMPORARY TERMINATION
SCALE: NTS

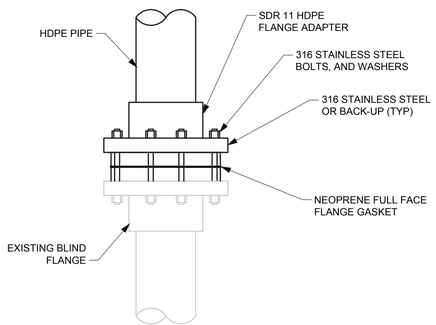


4 ES-3 DETAIL (TYPICAL)
TEMPORARY STORMWATER OUTLET
SCALE: NTS



2 C-1,2,3 DETAIL (TYPICAL)
SUBCELL 9.3 AND 9.4 INTERCELL BERM AT
STORMWATER DIVERSION BERM
SCALE: NTS

5 C-6 DETAIL
SIGN DETAIL AND VERBIAGE
SCALE: NTS (NOTES 5, 6, 7, AND 8)



3 C-1 DETAIL
FLANGE CONNECTION
SCALE: NTS

NOTE:
1. GEOSYNTHETICS ARE EXAGGERATED FOR CLARITY.
2. SEMI-PERMANENT MARKER SHALL BE WOODEN OR FIBERGLASS STAKES, INSTALLED NO MORE THAN 100 FEET APART, AND AT EVERY CORNER OR SIGNIFICANT CHANGE DIRECTION PER THE MDE REFUSE DISPOSAL PERMIT.
3. GEOMEMBRANE FLAP SHALL BE ANCHORED 1 FT DEEP INTO EASTERN EDGE OF INTERCELL BERM.
4. GRADES SHOWN AT THE TEMPORARY STORMWATER OUTLET REPRESENT TOP OF PROTECTIVE COVER.
5. SIGN MATERIAL SHALL BE MANUFACTURED FROM ALUMINUM PER ASTM B209, WITH A MINIMUM THICKNESS OF 0.08".
6. SIGN MATERIAL SHALL BE PAINTED WITH A WEATHER RESISTANT COATING IN ACCORDANCE WITH SIGN MANUFACTURER RECOMMENDATIONS.
7. SIGN HARDWARE BOLT, NUTS, WASHER SHALL BE GALVANIZED STEEL IN ACCORDANCE WITH ASTM B695 AND B696.
8. SIGN SHALL BE MOUNTED ON 4"x4" PRESSURE TREATED WOOD POST WITH 12" DIAMETER CONCRETE BASE, 3 FOOT MINIMUM DEPTH IN GROUND.

STATE OF MARYLAND — VISWANATH — 37584 — PROFESSIONAL ENGINEER
SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-015.1

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CHECKED BY:	MLV
DRAWING NO.:	C-7 OF C-15
SHEET NO.:	14 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION
MILLERSVILLE LANDFILL AND
RESOURCE RECOVERY FACILITY

TITLE: LINER DETAILS II

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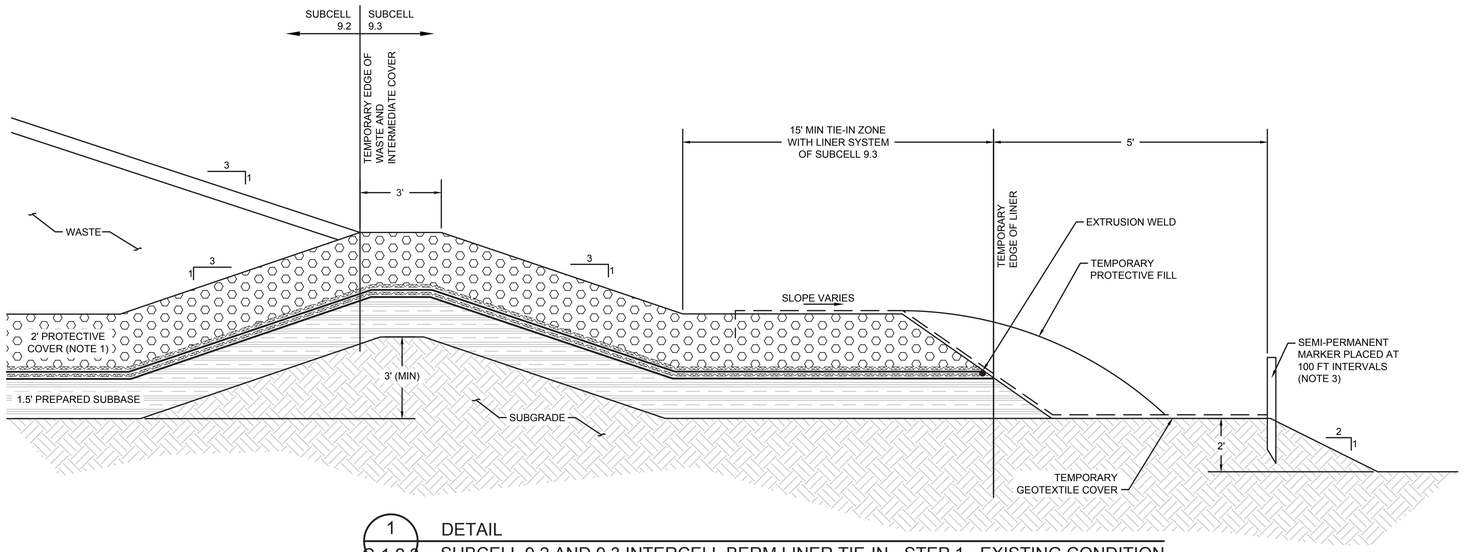
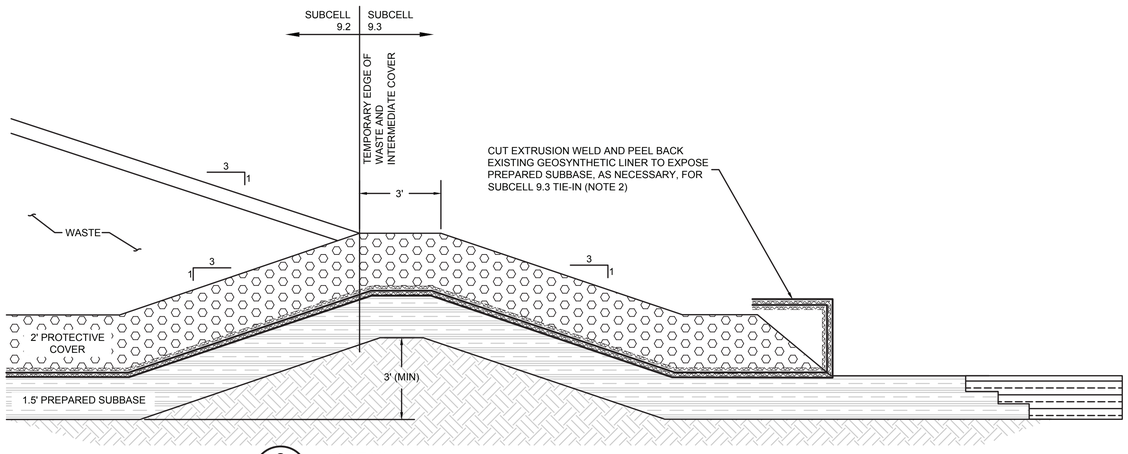


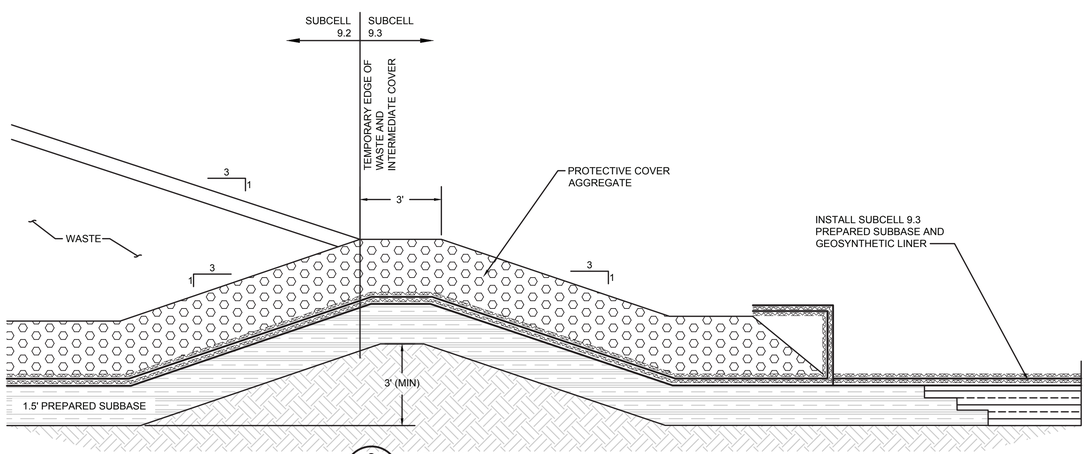
1 DETAIL
C-1,2,3 SUBCELL 9.2 AND 9.3 INTERCELL BERM LINER TIE-IN - STEP 1 - EXISTING CONDITION

SCALE: NTS



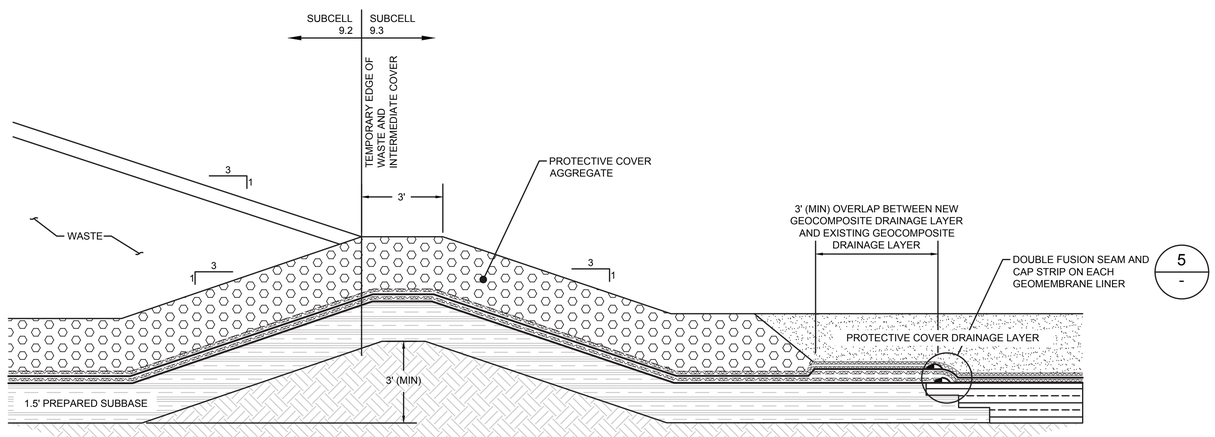
2 DETAIL
C-1,2,3 SUBCELL 9.2 AND 9.3 INTERCELL BERM LINER TIE-IN - STEP 2

SCALE: NTS



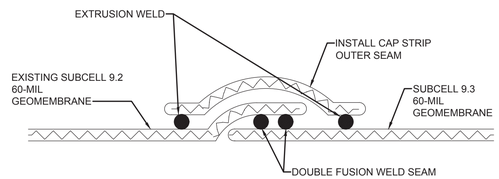
3 DETAIL
C-1,2,3 SUBCELL 9.2 AND 9.3 INTERCELL BERM LINER TIE-IN - STEP 3

SCALE: NTS



4 DETAIL
C-1,2,3 SUBCELL 9.2 AND 9.3 INTERCELL BERM LINER TIE-IN - STEP 4 - FINAL CONDITION

SCALE: NTS



5 DETAIL
15 GEOMEMBRANE TIE-IN SEAM

SCALE: NTS

NOTE:
1. EXISTING 2' OF PROTECTIVE COVER MATERIAL CONSIST OF AASHTO NO.57 STONE.
2. CONTRACTOR SHALL CONFIRM ADEQUATE THICKNESS (1.5FT) OF SUBBASE AT TIE-IN LOCATION.
3. SEMI-PERMANENT MARKER SHALL BE WOODEN OR FIBERGLASS STAKES, INSTALLED NO MORE THAN 100 FEET APART, AND AT EVERY CORNER OR SIGNIFICANT CHANGE DIRECTION PER THE MDE REFUSE DISPOSAL PERMIT.

STATE OF MARYLAND · NEENA L. VISWANATH · 37584 · PROFESSIONAL ENGINEER

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7/31/2024
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DATE: JULY 2024
FILE NO.: 2241-015

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APPROVED: DATE — DocuSigned by: 7/31/2024 | 15:41 EDT — David O. Brown — C0E3DE1728C5440... — CHIEF, BUREAU OF WAST...
APPROVED: DATE — DocuSigned by: 7/31/2024 | 11:55 EDT — Steve Mencarini — DF6F5744453B464... — PROJECT MANAGER
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CHECKED BY:	MLV
DRAWING NO.:	C-8 OF C-15
SHEET NO.:	15 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION
MILLERSVILLE LANDFILL AND
RESOURCE RECOVERY FACILITY

TITLE: SUBCELL 9.2 AND 9.3 INTERCELL
BERM LINER TIE-IN SEQUENCE

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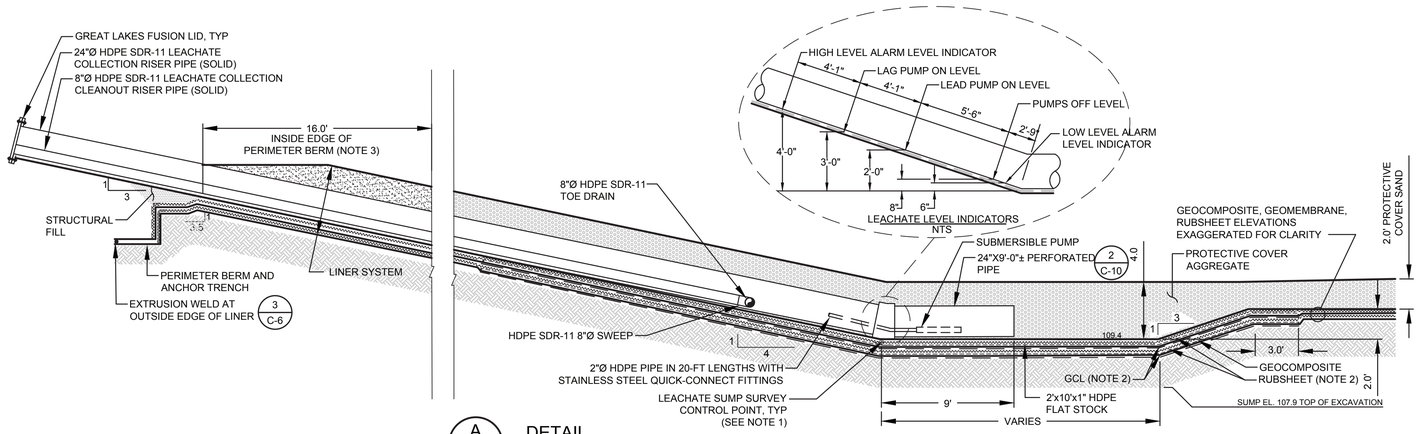
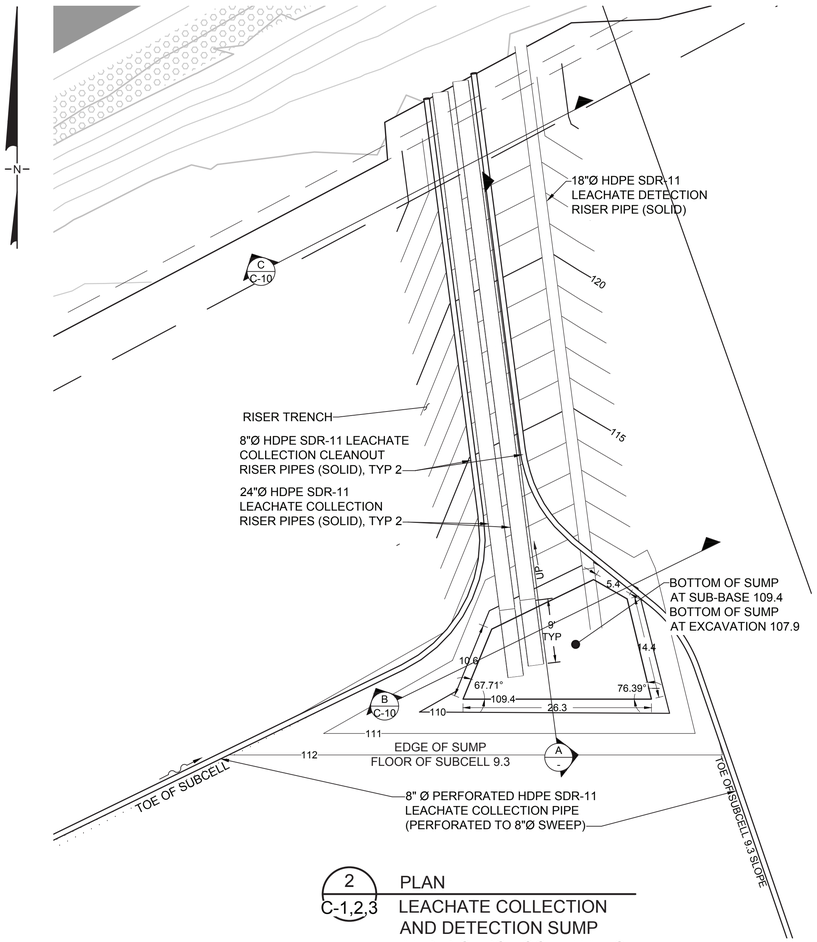


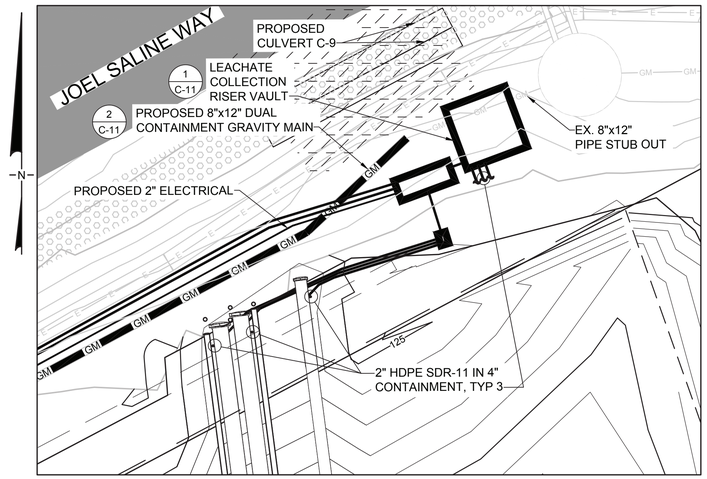
A / C-9 DETAIL
A - LEACHATE COLLECTION SUMP AND RISER PIPES

SCALE: NTS



2 / C-1,2,3 PLAN
LEACHATE COLLECTION AND DETECTION SUMP AND RISERS - SCHEMATIC

SCALE:1" = 10'

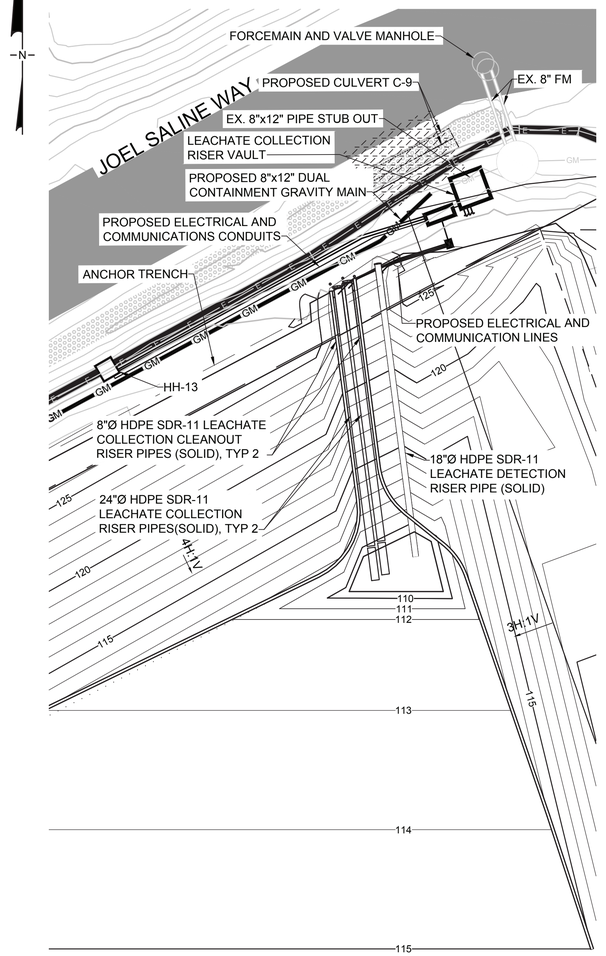


3 / - PLAN
LEACHATE COLLECTION AND DETECTION SUMP AND RISERS

SCALE: 1" = 10'

LEGEND

PROPOSED ACCESS SURFACE



4 / C-1,2 DETAIL
LEACHATE COLLECTION SUMP AND RISERS 3

SCALE: 1" = 20'

NOTE:

1. THE SURVEY CONTROL POINT FOR THE LEACHATE SUMP IS LOCATED AT THE PROJECTION OF THE TOP OF PREPARED SUBBASE IN THE CELL AREA AND THE BASE OF THE LINER SYSTEM ON THE CELL SLOPES.
2. THE PRIMARY AND SECONDARY GEOMEMBRANES IN THE SUMP SHALL BE UNDERLAIN BY A GEOSYNTHETIC CLAY LINER (GCL) AND RUBSHEET AS SHOWN. GCL AND RUBSHEET SHALL BE TERMINATED THREE HORIZONTAL FEET BEYOND THE TOP OF THE SUMP.
3. END LEACHATE COLLECTION SUMP GRAVEL AND PROTECTIVE COVER SOIL APPROXIMATELY 16 FEET HORIZONTALLY FROM INSIDE EDGE OF PERIMETER BERM. COVER END OF PIPE TRENCH WITH GEOTEXTILE. FOR REMAINDER OF RISER PIPE TRENCH, PROVIDE SUBBASE SOIL AROUND RISER PIPES. PROVIDE GEOTEXTILE WRAP AROUND RISER PIPES. PROVIDE GEOTEXTILE WRAP AROUND SUBBASE SOIL IN RISER PIPE TRENCH.
4. RISER PIPES MAY NEED TO BE TEMPORARILY SUPPORTED UNTIL PROTECTIVE COVER MATERIAL IS INSTALLED TO PREVENT LATERAL MOVEMENT OF THE PIPES ALONG THE SLOPE.
5. CONTOURS SHOWN REPRESENT TOP OF SUBBASE.

STATE OF MARYLAND — MELINDA VIVIANNA WERNER — 37584 — PROFESSIONAL ENGINEER

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DEPARTMENT OF PUBLIC WORKS

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DRAWING NO.:	C-9 OF C-15
SHEET NO.:	16 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: LEACHATE COLLECTION AND DETECTION SUMP AND RISER DETAILS I

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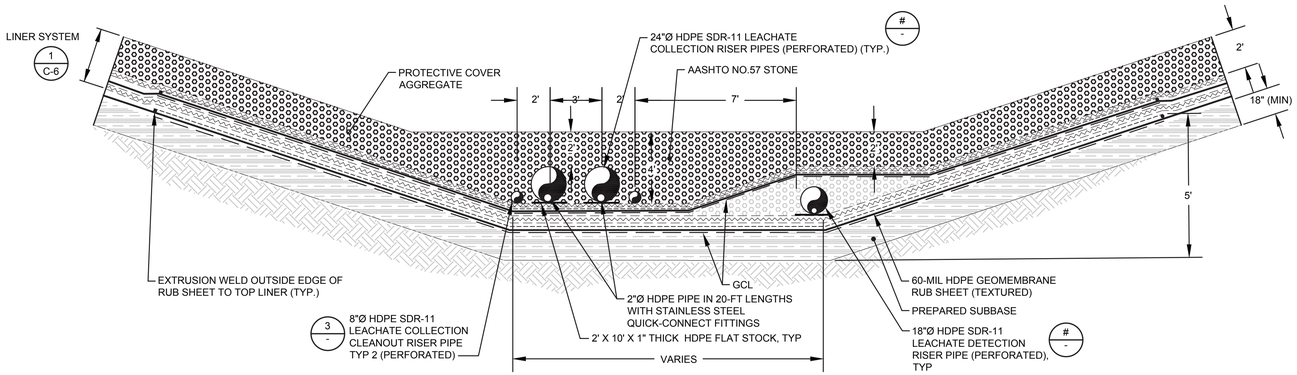
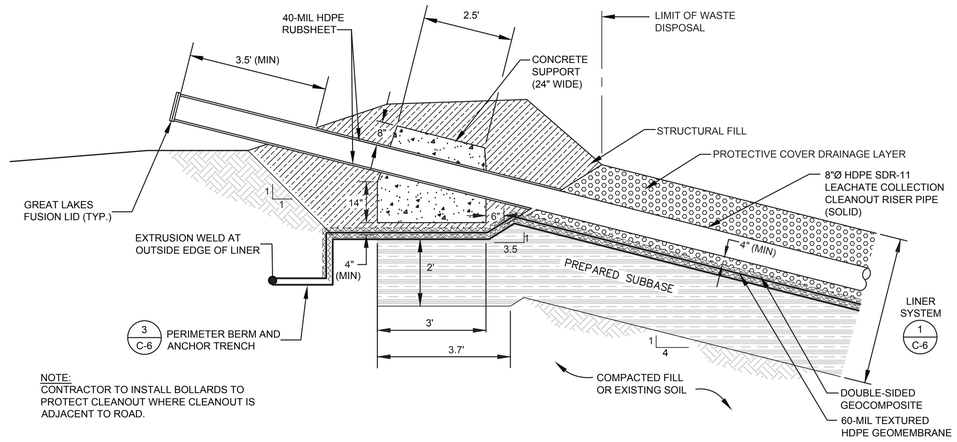


B / C-9 SECTION
LEACHATE COLLECTION DETECTION SUMP

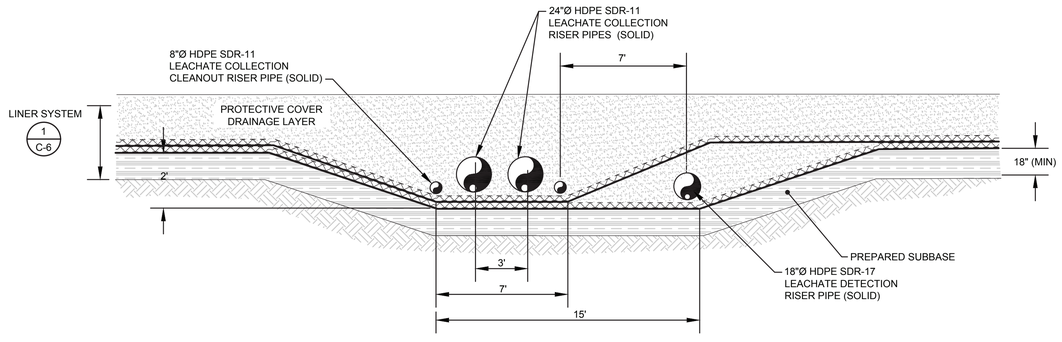
SCALE: NTS



NOTE:
CONTRACTOR TO INSTALL BOLLARDS TO PROTECT CLEANOUT WHERE CLEANOUT IS ADJACENT TO ROAD.

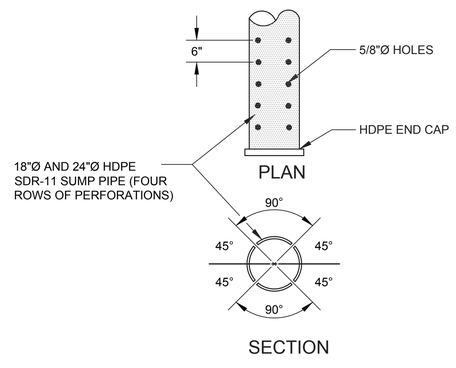
1 / C-3 DETAIL
CLEANOUT SUPPORT AND PIPE

SCALE: NTS



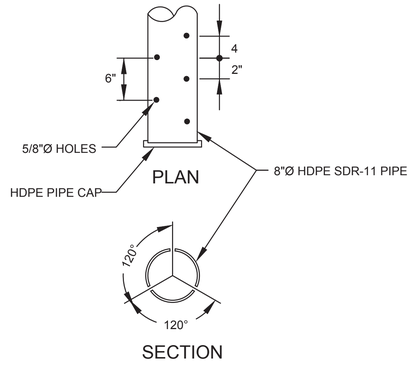
C / C-9 SECTION
LEACHATE COLLECTION - DETECTION RISER

SCALE: NTS



2 / C-5 DETAIL
PERFORATION FOR SUMP PIPES

SCALE: NTS



3 / C-5 DETAIL
8-IN DIA HDPE SDR-17 LEACHATE COLLECTION PIPE

(SEE NOTE)
SCALE: NTS

NOTE:
THIS DETAIL SHALL BE APPLIED TO THE LEACHATE COLLECTION PIPES AND TO THE PERFORATED UNDERDRAIN PIPES.

STATE OF MARYLAND — MICHAEL L. VISNIAUSKAS — 37584 — PROFESSIONAL ENGINEER

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DATE: JULY 2024
FILE NO.: 2241-013.1

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CHIEF ENGINEER

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PROJECT MANAGER

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DRAWING NO.:	C-10 OF C-15
SHEET NO.:	17 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: LEACHATE COLLECTION AND DETECTION DETAILS II

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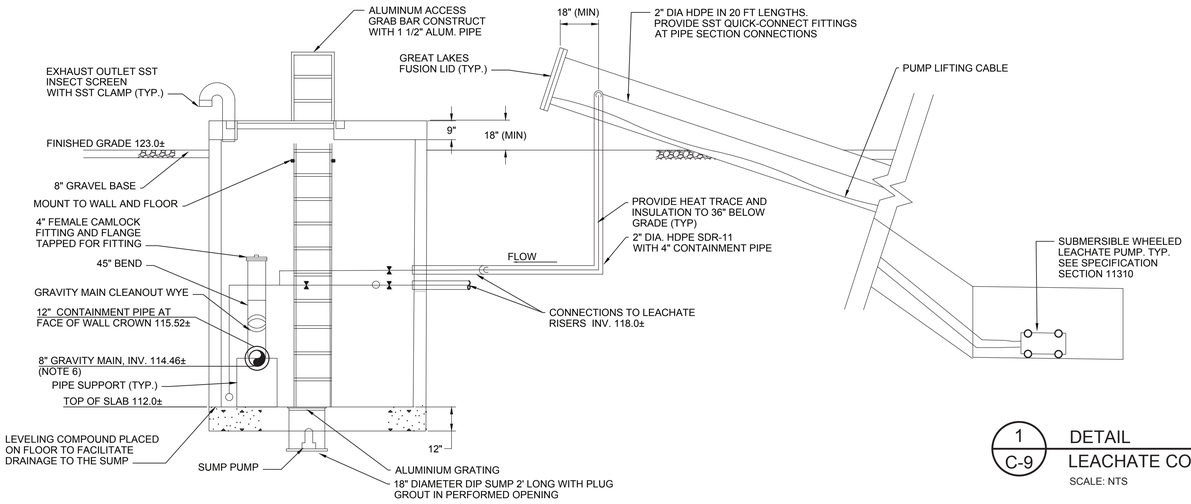
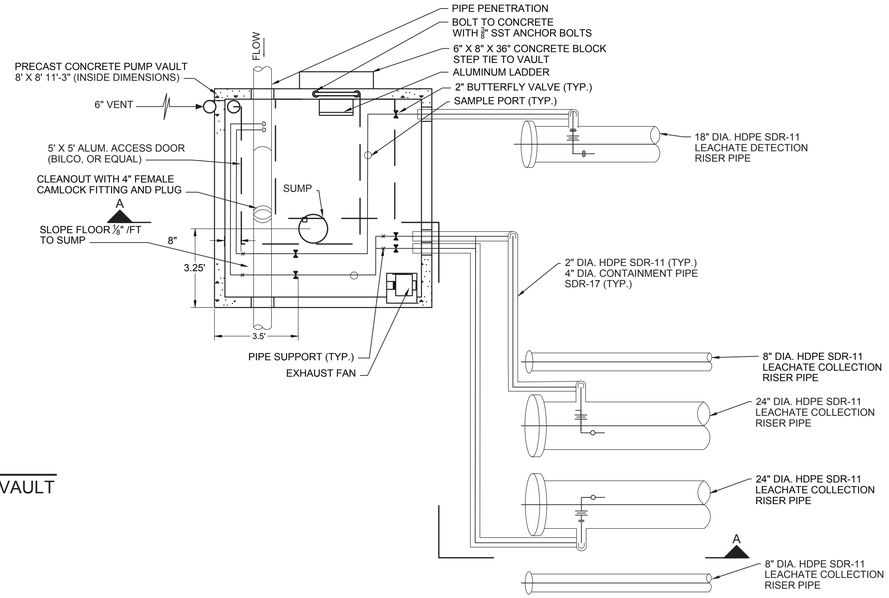
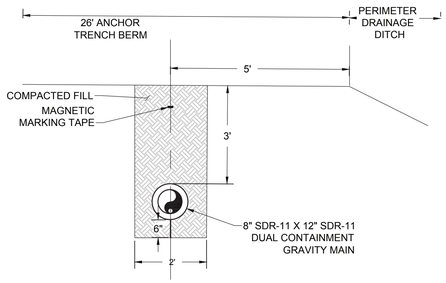


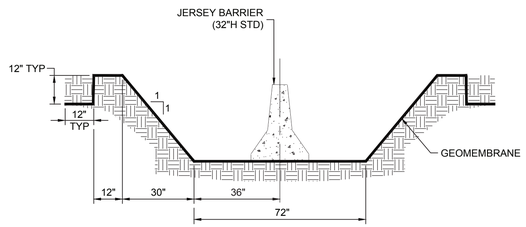
SECTION A-A

1 / C-9 DETAIL
LEACHATE COLLECTION RISER VAULT
SCALE: NTS

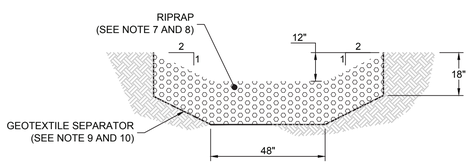




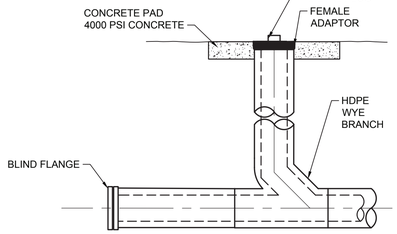
2 / C-5 DETAIL
LEACHATE COLLECTION GRAVITY MAIN DETAIL
SCALE: NTS



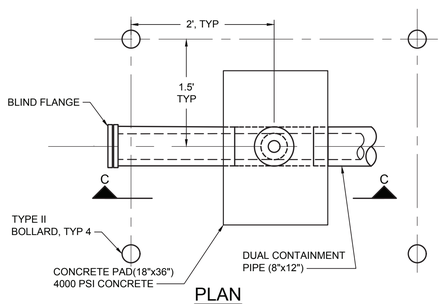
3 / 20 SECTION - TYPICAL
STORMWATER CHANNELS 1 AND 2



5 / 20 DETAIL
STORMWATER CHANNEL 3
SCALE: NTS



SECTION C-C



PLAN

4 / C-5 DETAIL
CLEANOUT INSTALLATION
SCALE: NTS

NOTES:

1. PROVIDE AND INSTALL SUMP PUMP. PIPE TO GRAVITY MAIN WITH TUBING AS DEFINED IN NOTE 3. PROVIDE QUICK CONNECT COUPLINGS AND VALVE AT TIE-IN TO GRAVITY MAIN.
2. INSTALL FLOOD DETECTION UNIT WITHIN SUMP SO THAT BOTTOM OF PROBE IS 6" ABOVE SUMP FLOOR AND PROBE LIES ALONG SUMP WALL. MOUNT WITH SST HARDWARE.
3. FLEXIBLE TUBING (2") TO CONSIST OF ELASTOMETRIC TUBING WITH REINFORCEMENT OF HIGH TENSILE STRENGTH TEXTILE AND WIRE HELIX TUBING SHALL BE RATED FOR 100 PSI SERVICE AND 10' Hg VACUUM. MATERIALS SHALL BE SUITABLE FOR LEACHATE SERVICE MINIMUM BEND RADIUS = 4.0 INCHES. GATES RUBBER CO. SUPET-VAC #307079 OR EQUAL.
4. PROVIDE AND INSTALL 8" GRAVEL BASE BETWEEN VAULT, RISER PIPE AND CONTROL PANEL AND VAULT CONTROL PANEL, AND ACCESS ROAD. SLOPE FROM RISER PIPE TO ACCESS ROAD FOR DRAINAGE.
5. RISER PIPES AND VAULT ARE CLASS 1 DIVISION 2 HAZARDOUS LOCATIONS. PROVIDE AND INSTALL ELECTRICAL EQUIPMENT AS REQUIRED BY THE NATIONAL ELECTRIC CODE (NEC 2023).
6. ELEVATIONS OF GRAVITY MAIN ARE FOR EXISTING PIPE. CONTRACTOR TO VERIFY ELEVATIONS OF EXISTING GRAVITY MAIN PRIOR TO INSTALLATION OF VAULT.
7. RIP RAP IN DRAINAGE CHANNEL SHALL BE 18 INCHES THICK AND CONFORM TO MSHA CLASS I SIZING. RIPRAP FROM DEMOLISHED DRAINAGE CHANNELS SHALL BE CLEANED AND REINSTALLED IN PROPOSED DRAINAGE CHANNEL. CONTRACTOR SHALL PROVIDE ADDITIONAL RIPRAP, AS NECESSARY, TO CONSTRUCT PERIMETER ACCESS ROAD, IF THE QUANTITY OF RIPRAP IS INSUFFICIENT.
8. RIPRAP CANNOT BE WASHED IN THE SITE'S STORMWATER PONDS OR IN ANYWAY THAT COULD CAUSE STORMWATER SEDIMENT IMPACTS.
9. GEOTEXTILE SEPARATOR SHALL UNDERLAY ALL RIP RAP USED FOR CULVERT PROTECTION AND STORMWATER CHANNELS.
10. GEOTEXTILE SEPARATOR SHALL BE A WOVEN GEOTEXTILE.

STATE OF MARYLAND — MELISSA L. VISWANATH — 37584 — PROFESSIONAL ENGINEER
SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-017.1

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410.381.4333

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

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APPROVED: DATE — DocuSigned by: 7/31/2024 | 11:56 EDT — 0F6F5744483848A... — PROJECT MANAGER
APPROVED: DATE — DocuSigned by: /2024 | 15:41 EDT — C0E3DE1728C5440... — CHIEF, ENGINEERING
APPROVED: DATE — DocuSigned by: 2024 | 12:18 EDT — 75A51E5BE83E4D8... — CHIEF, ADMINISTRATION

SCALE:	NOTED
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	C-11 OF C-15
SHEET NO.:	18 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: LEACHATE GRAVITY MAIN DETAILS

P:\cadd\PROJECTS\W\millersville\me2241 – subcell 9.3\CADD\01 – construction rev\DRAWINGS\SHEETS\2241-017.1.dwg – 31-Jul-24 – 11:36 AM

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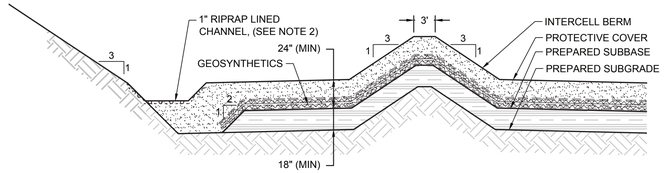
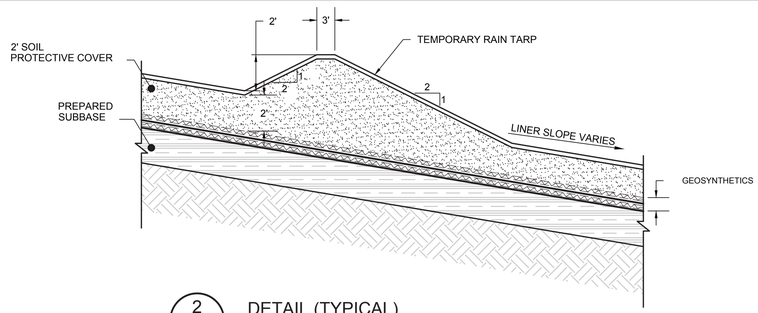
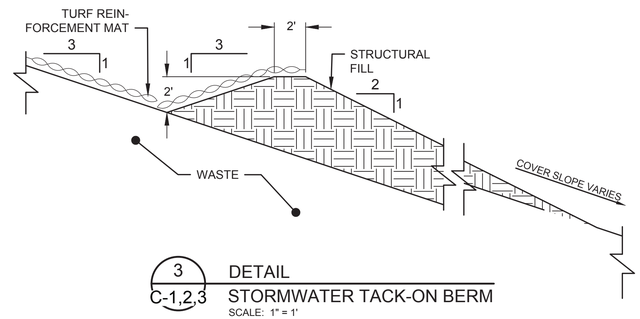


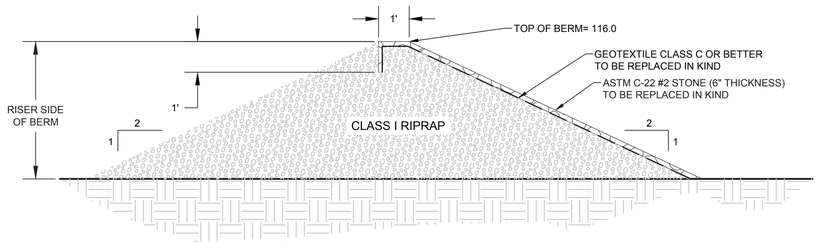
1 / C-3 DETAIL
STORMWATER CHANNEL 3 & 4
SCALE: NTS



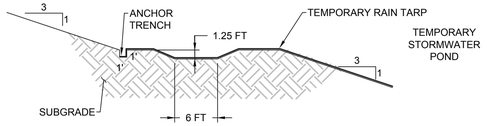
2 / C-3 DETAIL (TYPICAL)
LINER FLOOR STORMWATER DIVERSION BERM
SCALE: NTS



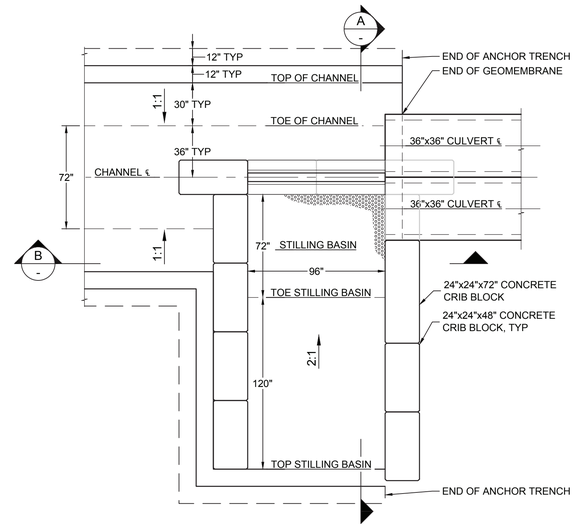
3 / C-1,2,3 DETAIL
STORMWATER TACK-ON BERM
SCALE: 1" = 1'



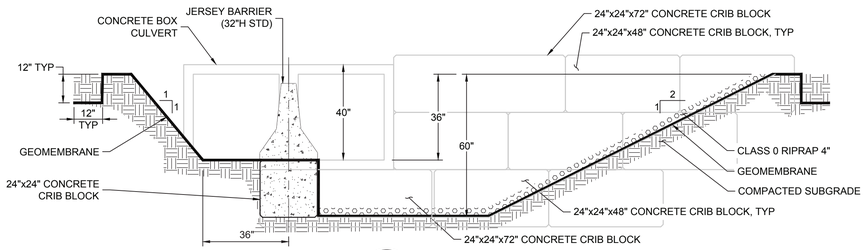
4 / C-12A DETAIL
SEDIMENT FILTER BERM
SCALE: NTS



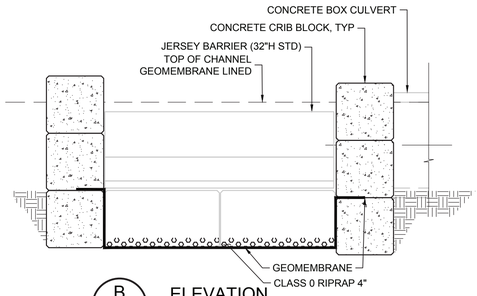
5 / C-4 DETAIL
RAIN TARP TERMINATION WEST OF STORMWATER BASIN
SCALE: NTS



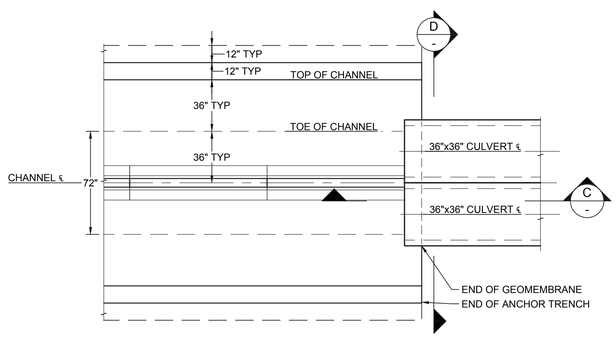
6 / C-13 DETAIL PLAN
STILLING BASIN
SCALE: NTS



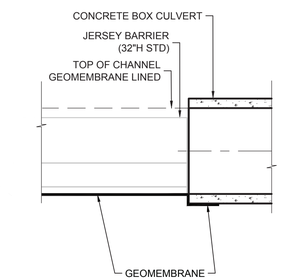
A / - SECTION
STILLING BASIN
PERPENDICULAR TO CHANNEL
SCALE: NTS



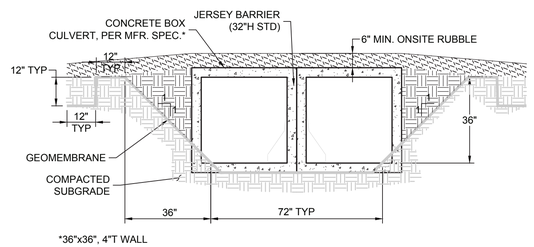
B / - ELEVATION
STILLING BASIN
PARALLEL TO CHANNEL
SCALE: NTS



7 / C-13 DETAIL PLAN
TYPICAL CULVERT CROSSING
SCALE: NTS



C / - ELEVATION
JERSEY BARRIER AND CULVERT
PARALLEL TO CHANNEL
SCALE: NTS



*36"x36", 4"T WALL

D / - SECTION
TYPICAL CULVERT CROSSING
PERPENDICULAR TO CHANNEL
SCALE: NTS

NOTES:

1. GEOSYNTHETICS ARE EXAGGERATED FOR CLARITY.
2. IN CHANNEL 4, REPLACE RIPRAP LINING WITH GEOMEMBRANE LINING ANCHORED ON EITHER SIDE OF CHANNEL.
3. RIP RAP CANNOT BE WASHED IN THE SITE'S STORMWATER PONDS OR IN ANY WAY THAT COULD CAUSE STORMWATER SEDIMENT IMPACTS.
4. GEOTEXTILE SEPARATOR SHALL UNDERLAY ALL RIP RAP USED FOR CULVERT PROTECTION AND STORMWATER CHANNELS.
5. GEOTEXTILE SHALL BE A WOVEN GEOTEXTILE.

STATE OF MARYLAND — MELISSA WISNIEWSKI — 37584 — PROFESSIONAL ENGINEER

SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-112

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ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

SCALE:	NOTED
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	C-12 OF C-15
SHEET NO.:	19 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: STORMWATER MANAGEMENT DETAILS

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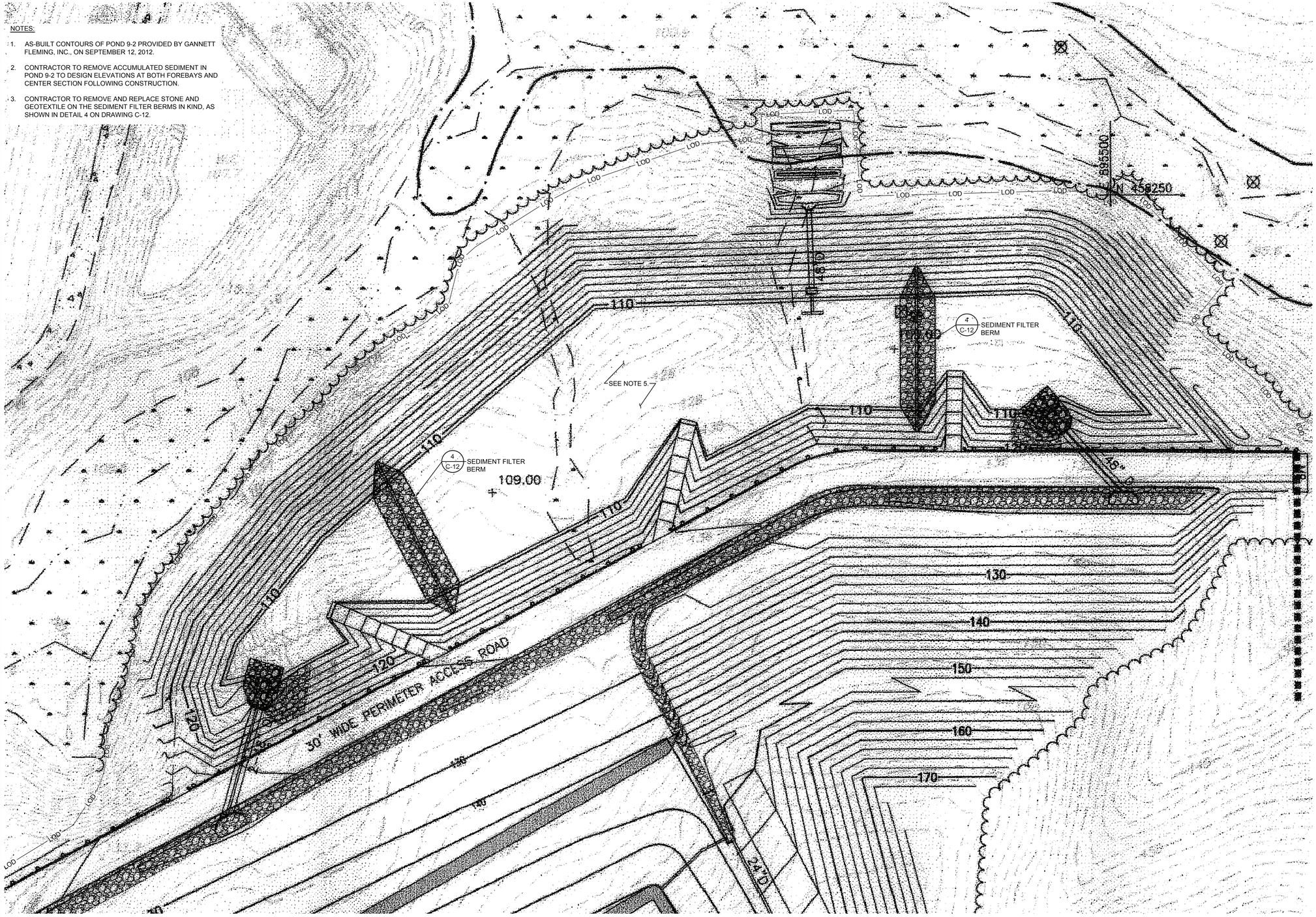
NOTES:

1. AS-BUILT CONTOURS OF POND 9-2 PROVIDED BY GANNETT FLEMING, INC., ON SEPTEMBER 12, 2012.
2. CONTRACTOR TO REMOVE ACCUMULATED SEDIMENT IN POND 9-2 TO DESIGN ELEVATIONS AT BOTH FOREBAYS AND CENTER SECTION FOLLOWING CONSTRUCTION.
3. CONTRACTOR TO REMOVE AND REPLACE STONE AND GEOTEXTILE ON THE SEDIMENT FILTER BERMS IN KIND, AS SHOWN IN DETAIL 4 ON DRAWING C-12.



N

0 40' 80'
SCALE IN FEET

SEDIMENT AND EROSION CONTROL PLAN
ANNE ARUNDEL SOIL CONSERVATION DISTRICT
SHEET NO. 9 OF 48

STATE OF MARYLAND — MELISSA VISWANATH — 57584 — PROFESSIONAL ENGINEER

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DEPARTMENT OF PUBLIC WORKS

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DATE	BY	DocuSigned by: '4/2024 | 22:02 EDT 8BAB7314D032400... CHIEF, ENGINEER	DocuSigned by: 7/31/2024 | 11:56 EDT Dave Meurer 0F0F5744483d464... PROJECT MANAGER	DRAWN BY: BW	
		APPROVED: DATE	APPROVED: DATE	CHECKED BY: MLV	
		DocuSigned by: ./2024 | 15:41 EDT David C. Brown C0E3DE1728C5440...	DocuSigned by: '4 | 12:15 EDT Thomas Burke III 75A5157E6A3E4D8... CHIEF, BUREAU OF WAST	DRAWING NO.: C-12A OF C-15 SHEET NO.: 19A OF 36 PROJECT NO.: ME2241	TITLE: AS-BUILT GRADES FOR POND 9-2

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WELLS BRANCH

JOEL SALINE WAY

PROPOSED 2x24' x36" CULVERTS C-1 (SEE NOTE 3)

SEDIMENT TRAP #1 (SEE ES DRAWINGS)

SEDIMENT TRAP #2 (SEE ES DRAWINGS)

NORTHERN HAUL ROAD CROSSING — 2 / C-15

PROPOSED 2x48"x48" CULVERTS C-2 (SEE NOTE 3)

PROPOSED 2x36" CULVERTS C-9 (SEE NOTES 3 AND 5)

TOPSOIL STOCKPILE

PROPOSED 2x36"x36" CULVERTS C-7 AND C-8 (SEE NOTE 3) — 7 / C-12

EXISTING RECYCLING AREA

5 / C-12 CHANNEL 4

3 / C-15 STOCKPILE AREA HAUL ROAD

5 / ES-9 PIPE SLOPE DRAIN

PROPOSED 2x24"x36" CULVERTS C-0 (SEE NOTE 3)

PROPOSED 2x36"x36" CULVERTS C-5 AND C-6 (SEE NOTE 3) STILLING BASIN — 6 / C-12

CONTRACTOR STAGING AREA

CHANNEL 2 — 3 / C-11

PROPOSED 2x36"x36" CULVERTS C-3 AND C-4 (SEE NOTE 3) — 7 / C-12

CHANNEL 1 — 3 / C-11

SUBCELL 9.3 (PROPOSED)

SUBCELL 9.5 (FUTURE)

SEDIMENT TRAP #4 (SEE ES DRAWINGS)

PIPE SLOPE DRAIN — 5 / ES-9

PIPE SLOPE DRAIN — 5 / ES-9

70' ROAD TURNAROUND — 3 / C-15

SUBCELL 9.4 (FUTURE)

5 / C-11 CHANNEL 3

STOCKPILE HAUL ROAD

SEDIMENT TRAP #3 (SEE ES DRAWINGS)

CLAY STOCKPILE

STRUCTURAL FILL STOCKPILE

PROPOSED TWIN 36" CULVERTS C-10 (SEE NOTE 3)

1 / C-15 EXPANDED PERIMETER ROAD AND BERM

LOD

3H:1V

4H:1V

2H:1V

1.0%

3.0%

LEGEND

- CONTOUR (FEET-MSL)
- PROPOSED GRADE CONTOUR
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- RIPRAP
- FM — EXISTING FORCEMAIN
- A — EXISTING AIR LINE
- E — EXISTING ELECTRIC LINE
- LFG — EXISTING LANDFILL GAS HEADER
- GM — EXISTING GRAVITY MAIN
- EDGE OF LINER
- STOCKPILE AREA HAUL ROAD (ON-SITE RUBBLE)
- SUBCELL 9.3 NORTHERN HAUL ROAD CROSSING (ASPHALT PAVING)
- LOD — LIMITS-OF-DISTURBANCE

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. GRADES SHOWN WITHIN SUBCELL 9.3 REPRESENT TOP OF PROTECTIVE COVER.
3. SEE DRAWING ES-10 FOR CULVERT SCHEDULE TABLE.
4. STOCKPILE SLOPE DRAINS MUST BE CONSTRUCTED INCREMENTALLY AS STOCKPILE IS FILLED TO EACH BENCH.
5. STOCKPILE LOCATIONS AND SIZES CONCEPTUAL BASED ON ANTICIPATED VOLUMES OF SOILS TO BE EXCAVATED. ACTUAL STOCKPILES MAY VARY DEPENDING ON MATERIALS. STORMWATER BENCHES SHALL BE CONSTRUCTED EVERY 30 VERTICAL FEET AND DIRECTED TO PIPE SLOPE DRAINS.
6. ALL SOIL STOCKPILES SHALL BE VEGETATIVELY STABILIZED PER SPECIFICATION IN DRAWING ES-10.

0 100' 200'
SCALE IN FEET

STATE OF MARYLAND — MELISSA VISWANATH — 37584 — PROFESSIONAL ENGINEER

SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-017

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APPROVED: DATE — DocuSigned by: 8/4 | 12:15 AM — 75A5157E6E4E4DB... — DIRECTOR, DPW

SCALE:	NOTED
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	C-13 OF C-15
SHEET NO.:	20 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: STOCKPILE AREA PLAN

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POND 8-1

POND 9-2

WELLS BRANCH

FM8-2

EXISTING 18" SDR-26 HDPE LFG HEADER PIPE

LFG HEADER BUTTERFLY VALVE

LITTER FENCE VEHICLE ACCESS OPENING, TYP

14" SDR-26 HDPE LFG HEADER

14"x12" REDUCER

JOEL SALINE WAY

HH-6

HH-7

HH-8

HH-9

HH-10

HH-11

HH-12

HH-13

BYPASS VALVE VAULTS

MATCH EXISTING ASPHALT MILLINGS ROAD
N 456687.03
E 893030.19
EL. 200.0

EXISTING RECYCLING AREA

SUBCELL 9.3 (PROPOSED)

SUBCELL 9.4 (FUTURE)

SUBCELL 9.5 (FUTURE)

LANDFILL GAS HEADER TO BE INSTALLED UNDER SEPARATE CONTRACT

EXTEND WELL-N AND WELL-W TO FINAL PERIMETER BERM GRADE (SEE NOTE 2)

WELL-W

WELL-N

1 C-15 EXPANDED PERIMETER ROAD AND BERM

GUARDRAIL

LITTER FENCE

MATCH EXISTING ASPHALT MILLINGS ROAD
N 456817.63
E 895672.19
EL. 202.0

LEGEND

- PROPERTY BOUNDARY
- 190 EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- SPOT ELEVATION
- 190 PROPOSED PERIMETER BERM CONTOUR (FEET-MSL)
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- LFG LANDFILL GAS HEADER
- CELL 9 FOOTPRINT
- SUBCELL 9.2 LINER LIMITS
- SUBCELL BOUNDARIES
- EXISTING LITTER FENCE
- PROPOSED LITTER FENCE
- EXISTING GUARDRAIL
- PROPOSED GUARDRAIL
- HH-15 ELECTRICAL HANDHOLE
- LOD LIMITS-OF-DISTURBANCE

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. EXTEND WELL 2' MINIMUM ABOVE PERIMETER BERM GRADE. INSTALL 3" CONCRETE SLAB AND PROTECTIVE STEEL CASING WITH LOCKING CAP OVER WELL CASING.

0 100' 200'
SCALE IN FEET

STATE OF MARYLAND · VISWANATH · 37584 · PROFESSIONAL ENGINEER

SIGNATURE

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CHIEF, BUR'U OF WAT

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DocuSigned by: 024 | 12:18 PDT
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DRAWING NO.:	C-14 OF C-15
SHEET NO.:	21 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: PERIMETER ROAD

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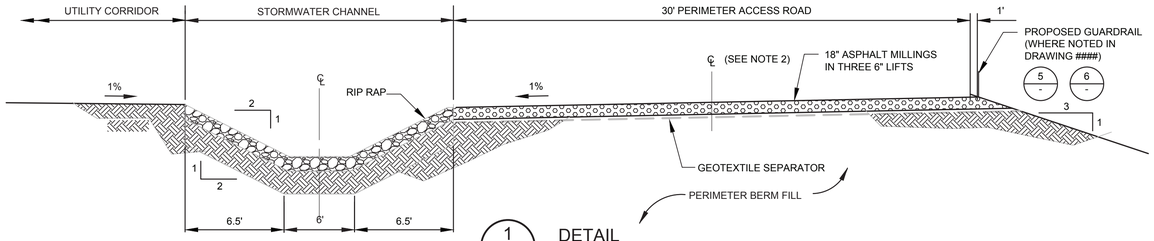
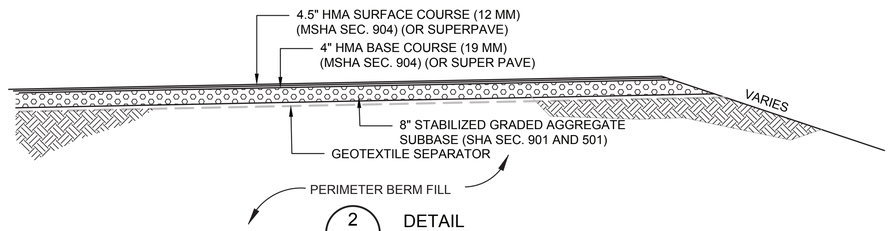
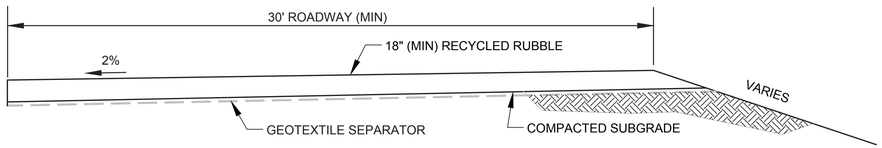


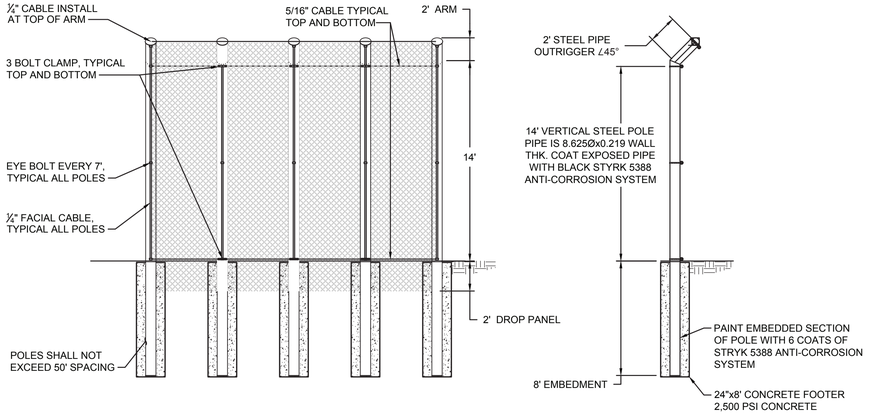
1 / C-14 DETAIL
PERIMETER ACCESS ROAD TYPICAL
(SEE NOTES 1, 2)
SCALE: NTS



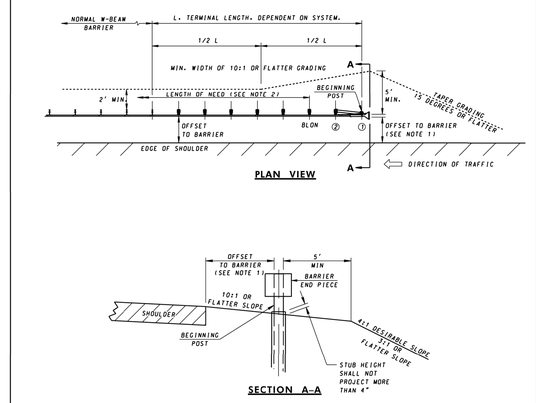
2 / C-13 DETAIL
NORTHERN HAUL ROAD CROSSING
(NOTE)
SCALE: NTS
XREF:



3 / C-13 DETAIL
STOCKPILE ACCESS ROAD
(SEE NOTES)
SCALE: NTS



6 / C-5 DETAIL
LITTER FENCE
SCALE: 1" = 1'



NOTES

1. WHEN THE TRAFFIC BARRIER POST IS PLACED LESS THAN 4' FROM THE EDGE OF SHOULDER/PAVEMENT, THE END TREATMENT SHALL BE FLARED AT A RATE OF 25:1 OVER THE FULL LENGTH AND ON A STRAIGHT LINE.
2. AN EFFECTIVE LON OF 34' SHALL BE INCLUDED IN THE END TREATMENT PAYMENT.
3. SYSTEM MUST BE INSTALLED AT A HEIGHT OF 31".
4. FOR DELINEATION, SEE STANDARD NO. 605.14.
5. THIS SCHEMATIC DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. SEE MDOT SHA QPL FOR APPROVED SYSTEMS THAT ARE 2016 MASH COMPLIANT.

SPECIFICATION 606	CATEGORY CODE ITEMS

APPROVED — DIRECTOR - OFFICE OF HIGHWAY DEVELOPMENT

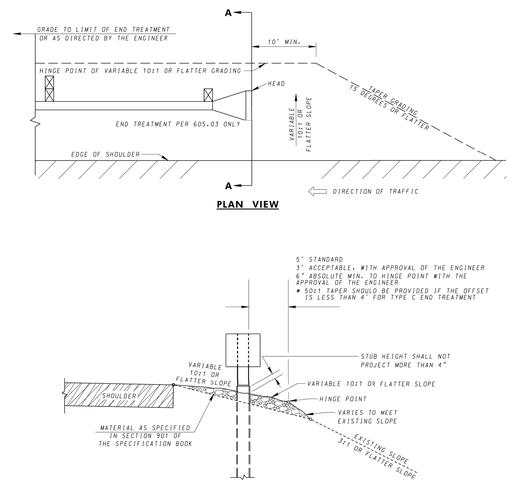
APPROVAL SHA REVISIONS		APPROVAL FEDERAL HIGHWAY ADMINISTRATION	
APPROVAL	11-10-99	APPROVAL	7-2-99
REVISED	1-10-17	REVISED	12-1-16
REVISED	9-20-19	REVISED	8-15-19
REVISED	3-16-22	REVISED	2-24-22

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
TRAFFIC BARRIER W-BEAM ONE-SIDED END TREATMENT (TYPE C)

STANDARD NO. MD 605.03

4 / C-14 DETAIL
TYPE C TRAFFIC BARRIER END TREATMENT
SCALE: NTS



NOTES

1. SURFACE ADJUSTMENT SHALL BE STABILIZED WITHIN 48 HOURS OR PER STABILIZATION REQUIREMENTS OF CONTRACT DOCUMENTS, WHICHEVER IS LESS.
2. FOR USE ON RESURFACE, REHABILITATION, AND RESTORATION PROJECTS ONLY.

SPECIFICATION 606	CATEGORY CODE ITEMS

APPROVED — DIRECTOR - OFFICE OF HIGHWAY DEVELOPMENT

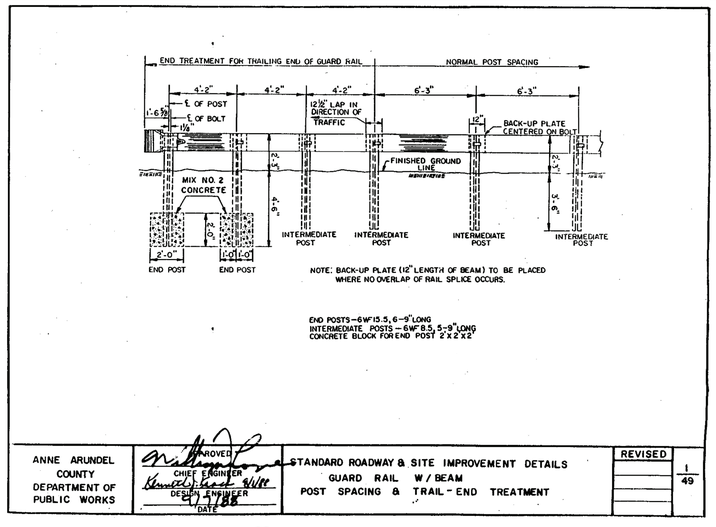
APPROVAL SHA REVISIONS		APPROVAL FEDERAL HIGHWAY ADMINISTRATION	
APPROVAL	11-10-99	APPROVAL	7-2-99
REVISED	2-10-04	REVISED	3-31-04
REVISED	9-20-19	REVISED	8-15-19
REVISED		REVISED	

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
SHOULDER GRADING ADJUSTMENT FOR TRAFFIC BARRIER END TREATMENT (3 R TYPE WORK)

STANDARD NO. MD 605.04

5 / C-14 DETAIL
GRADING ADJUSTMENT FOR 3 R TYPE WORK
SCALE: NTS

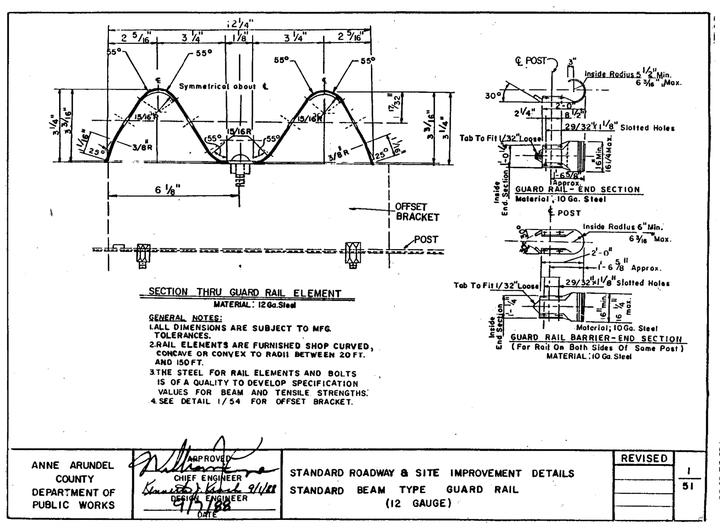


Published: 01/01 Revised:

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED CHIEF ENGINEER / DESIGN ENGINEER DATE 9/1/88	STANDARD ROADWAY & SITE IMPROVEMENT DETAILS GUARD RAIL W/BEAM POST SPACING & TRAIL-END TREATMENT	REVISED	1 / 49

VII-50 of 66

7 / C-14 DETAIL
GUARD RAIL WITH BEAM
SCALE: NTS



Published: 01/01 Revised:

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED CHIEF ENGINEER / DESIGN ENGINEER DATE 9/1/88	STANDARD ROADWAY & SITE IMPROVEMENT DETAILS STANDARD BEAM TYPE GUARD RAIL (12 GAUGE)	REVISED	1 / 51

VII-52 of 66

8 / C-14 DETAIL
STANDARD BEAM TYPE GUARD RAIL.
SCALE: NTS

NOTES:

1. GEOTEXTILE SEPARATOR SHALL BE WOVEN GEOTEXTILE AND SHALL UNDERLAY ALL MATERIALS USED FOR ROAD CONSTRUCTION.
2. ELEVATIONS OF THE ACCESS ROAD SHOWN ON THE PLAN DRAWINGS CORRESPOND TO THE CENTERLINE OF THE ACCESS ROAD. THE CONTRACTOR SHALL TAKE THIS INTO ACCOUNT IN LAYOUT OF THE PERIMETER BERM.
3. RUBBLE FROM THE DEMOLISHED STOCKPILE AREA ACCESS ROAD SHALL BE CLEANED MECHANICALLY TO THE SATISFACTION OF THE ENGINEER AND REINSTALLED IN THE PROPOSED STOCKPILE AREA ACCESS ROAD. CONTRACTOR SHALL USE SALVAGED RUBBLE AND OWNER-FURNISHED CRUSHED RUBBLE TO CONSTRUCT STOCKPILE AREA ACCESS ROAD.

STATE OF MARYLAND — MELISSA VISINTAINER — 57584 — PROFESSIONAL ENGINEER
SIGNATURE 7/31/2024 DATE

DATE: JULY 2024
FILE NO.: 2241-331

Geosyntec consultants
engineers | scientists | innovators
10211 WINCOPIN CIRCLE
4TH FLOOR
COLUMBIA, MD 21044
410.381.4333

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED DATE	BY

APPROVED: DocuSigned by: 8/4/2024 | 22:02 EDT — 8BA8B731AD032400... CHIEF ENGINEER
APPROVED: DocuSigned by: 1/2024 | 11:56 PDT — DF6F1744A538484... PROJECT MANAGER: Dave Mewirth
APPROVED: DocuSigned by: 7/31/2024 | 15:41 EDT — C0E3DE1728C5440... DATE
APPROVED: DocuSigned by: 8/4 | 12:16 EDT — 75A515TE4E364DB... CHIEF ENGINEER

SCALE:	NOTED
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	C-15 OF C-15
SHEET NO.:	22 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: ROAD DETAILS

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TW-11A
TW-32
TW-26
TW-18
CELL 8
(CLOSED)
CELLS 5,6,7
(CLOSED)
TW-19
POND 8-1
EXISTING TWIN 48"
STORMWATER CULVERT
TW-20R
TW-10B
TW-10A
POND 9-2
WELLS BRANCH
ES-7
ES-5
ES-3
EXISTING TWIN 42"
STORMWATER CULVERT
TW-29
JOEL SALINE WAY
EXISTING TWIN 48" STORM
WATER CULVERT
EXISTING TWIN 42" STORM
WATER CULVERT
EXISTING
RECYCLING AREA
TWIN 20" STORM
WATER CULVERTS
EXISTING SEDIMENT
TRAPS
INTERCELL BERM
EXISTING
- BORROW -
AREA
J-21
SUBCELL 9.5
(FUTURE)
SUBCELL 9.4
(FUTURE)
SUBCELL 9.3
(PROPOSED)
SUBCELL 9.2
(ACTIVE)
TW-4
TW-4B
EXISTING 36" STORM
WATER CULVERT
TWIN 36"
STORMW ER
CULVERT
J-33
TW-30
EXISTING 24"
STORMWATER CULVERTS
STOCKPILE AREA
ACCESS ROAD
EXISTING 18"
STORMWATER CULVERT
EDGE OF
LINER
SUBCELL 9.1
(ACTIVE)
LITTER F CE
J-32
WELL-W
WELL-N
TW-28
PERIMETER
DRAINAGE DITCH
TW-27
J-31
ES-8
ES-6
ES-4
TW-2A
TW-1
TW-2
J-23
J-24
J-25
TW-31
J-30
DICUS MILL ROAD
J-28
J-27
J-26
TW-3
J-29
TW-3A

LEGEND

- PROPERTY BOUNDARY
- CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- E — ELECTRIC DUCT BANK (22" X 16")
- FM — LEACHATE FORCE MAIN (4" X 8" DUAL CONTAINMENT PIPE)
- LFG — LANDFILL GAS HEADER
- GM — LEACHATE GRAVITY MAIN (8" X 12" DUAL CONTAINMENT PIPE)
- A — AIR LINE (2" HDPE PIPE)
- TW-19 — GROUNDWATER MONITORING WELLS
- J-25 — GAS PROBES
- PZ1 — EXISTING PIEZOMETER
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- LITTER FENCE
- EDGE OF LINER
- HH–15 — ELECTRIC HANDHOLE
- EXISTING STORMWATER CULVERT
- RIPRAP CHANNEL
- STORMWATER FLOW DIRECTIONS
- A-1 — EXISTING EARTH DIKE
- HAUL ROAD PATH
- LOD — LIMITS-OF-DISTURBANCE

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.

0 200' 400'
SCALE IN FEET

STATE OF MARYLAND
MELISSA VISWANATH
57584
PROFESSIONAL ENGINEER
SIGNATURE
7/31/2024
DATE

Geosyntec consultants
engineers | scientists | innovators
10211 WINCOPIN CIRCLE
4TH FLOOR
COLUMBIA, MD 21044
410.381.4333

DATE: JULY 2024
FILE NO.: 2241–E&S–EXST

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED DATE	BY

APPROVED: DATE — DocuSigned by: 8/4/2024 | 22:02 EDT — 8BAB7314DD32400... — CHIEF ENGINEER
APPROVED: DATE — DocuSigned by: 1/2024 | 11:56 PDT — DFSF5744483648A... — PROJECT MANAGER
APPROVED: DATE — DocuSigned by: 7/31/2024 | 15:41 EDT — C0E3DE1728C5440... — R
APPROVED: DATE — DocuSigned by: :4 | 12:18 PDT — 75A0157E6E43E4D8... — CHIEF, HIGHWAYS, WATER

SCALE: NOTED
DRAWN BY: BW
CHECKED BY: MLV
DRAWING NO.: ES-1 OF ES-10
SHEET NO.: 23 OF 36
PROJECT NO.: ME2241

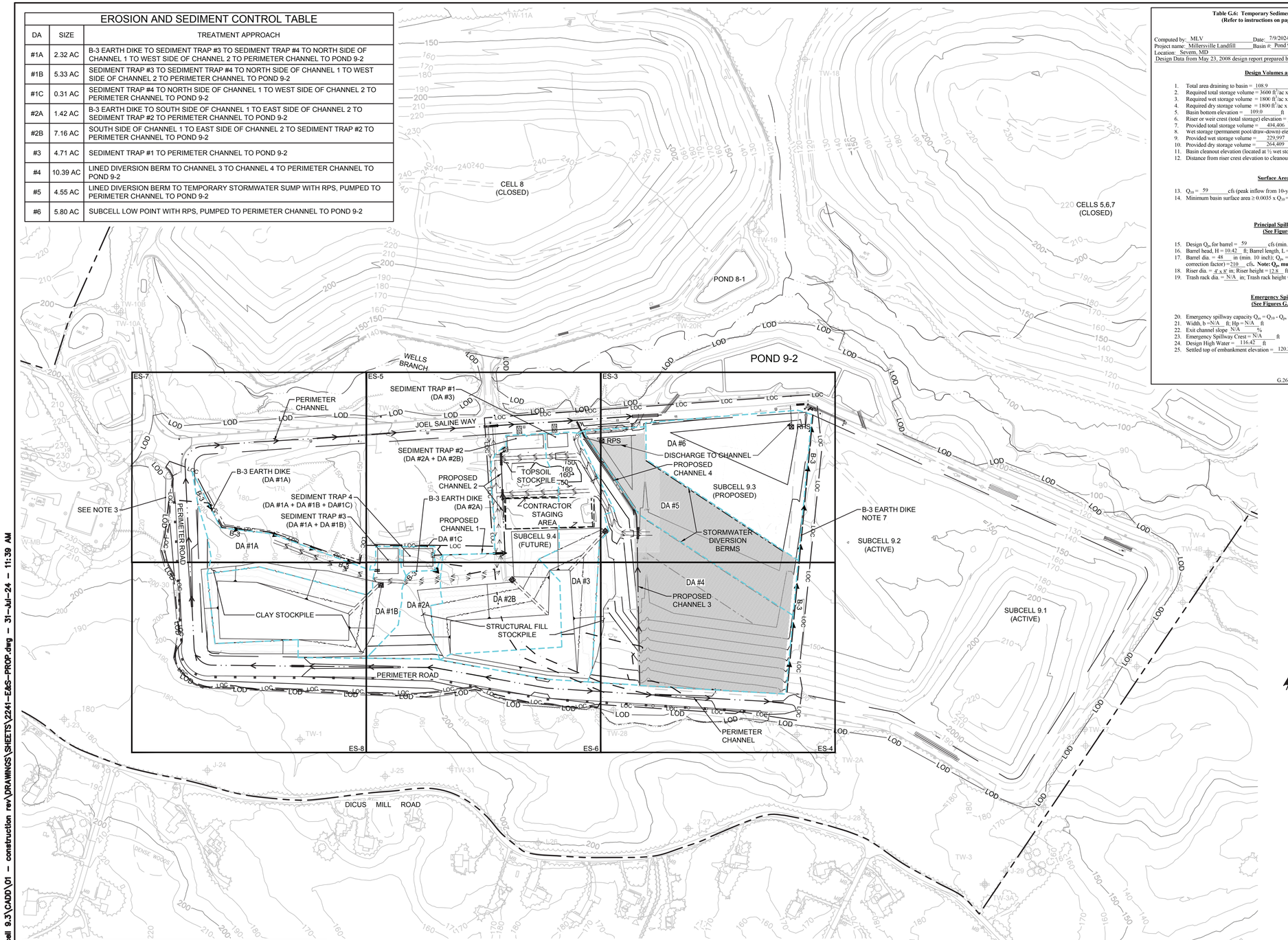
PROJECT: SUBCELL 9.3 CONSTRUCTION
MILLERSVILLE LANDFILL AND
RESOURCE RECOVERY FACILITY

TITLE: EXISTING CONDITIONS - CELL 9

Docusign Envelope ID: 7E24C6D7-91F4-4129-A15E-3B231801329D

EROSION AND SEDIMENT CONTROL TABLE

DA	SIZE	TREATMENT APPROACH
#1A	2.32 AC	B-3 EARTH DIKE TO SEDIMENT TRAP #3 TO SEDIMENT TRAP #4 TO NORTH SIDE OF CHANNEL 1 TO WEST SIDE OF CHANNEL 2 TO PERIMETER CHANNEL TO POND 9-2
#1B	5.33 AC	SEDIMENT TRAP #3 TO SEDIMENT TRAP #4 TO NORTH SIDE OF CHANNEL 1 TO WEST SIDE OF CHANNEL 2 TO PERIMETER CHANNEL TO POND 9-2
#1C	0.31 AC	SEDIMENT TRAP #4 TO NORTH SIDE OF CHANNEL 1 TO WEST SIDE OF CHANNEL 2 TO PERIMETER CHANNEL TO POND 9-2
#2A	1.42 AC	B-3 EARTH DIKE TO SOUTH SIDE OF CHANNEL 1 TO EAST SIDE OF CHANNEL 2 TO SEDIMENT TRAP #2 TO PERIMETER CHANNEL TO POND 9-2
#2B	7.16 AC	SOUTH SIDE OF CHANNEL 1 TO EAST SIDE OF CHANNEL 2 TO SEDIMENT TRAP #2 TO PERIMETER CHANNEL TO POND 9-2
#3	4.71 AC	SEDIMENT TRAP #1 TO PERIMETER CHANNEL TO POND 9-2
#4	10.39 AC	LINED DIVERSION BERM TO CHANNEL 3 TO CHANNEL 4 TO PERIMETER CHANNEL TO POND 9-2
#5	4.55 AC	LINED DIVERSION BERM TO TEMPORARY STORMWATER SUMP WITH RPS, PUMPED TO PERIMETER CHANNEL TO POND 9-2
#6	5.80 AC	SUBCELL LOW POINT WITH RPS, PUMPED TO PERIMETER CHANNEL TO POND 9-2



RIPRAP OUTLET SEDIMENT TRAP ST-III

TRAP NO.	1	2	3	4	
DRAINAGE AREA - INITIAL					ACRES
DRAINAGE AREA - INTERIM					ACRES
DRAINAGE AREA - FINAL	4.71	10.39	7.65	7.96	ACRES
WET STORAGE REQUIRED	25,434	56,106	41,310	42,984	CU FT
WET STORAGE PROVIDED	12,024	24,778	29,036	29,144	CU FT
EXISTING GROUND ELEVATION AT OUTLET (WET STORAGE ELEVATION)	135	134.5	158	158	FT
TRAP BOTTOM ELEVATION	131	130.5	154	154	FT
TRAP BOTTOM DIMENSIONS	63x34	126x32	86x68	104x56	FTxFT
DEPTH OF OUTLET (a)	1.5	2.0	2.0	2.0	FT
BOTTOM WIDTH OF OUTLET (b)	10.0	12.0	12.0	12.0	FT
CLEANOUT ELEVATION	132.0	131.5	155.0	155.0	FT
TOP OF EMBANKMENT ELEVATION	137.5	137.5	161.0	161.0	FT
SIDE SLOPE	2:1	2:1	2:1	2:1	H:V RATIO
EMBANKMENT TOP WIDTH	5.0	5.0	4.0	4.0	FT
OUTLET PROTECTION - LENGTH	41	41	21	16	FT
OUTLET PROTECTION - DEPTH	19	19	19	19	IN

NOTES:

1. CONTRACTOR RESPONSIBLE FOR PROTECTING EXISTING LANDFILL FEATURES, SUCH AS WELLS AND PROBES, AS WELL AS THE EXISTING UTILITIES.
2. GRADES ON THIS PLAN ARE ABOVE THE 100 YEAR FLOODPLAIN.
3. LIMIT OF DISTURBANCE SHOWN FOR ENTIRE CELL 9 FOR PERMITTING PURPOSES.
4. EROSION AND SEDIMENT CONTROLS ARE OF A CRITICAL NATURE ON THIS PROJECT DUE TO THE SENSITIVITY OF THE RECEIVING WATERS. ENGINEERING SHALL HAVE SOLE AUTHORITY TO ISSUE STOP WORK AUTHORITY BASED ON CONDITION OF EROSION AND SEDIMENT CONTROLS.
5. STOCKPILE LOCATIONS AND SIZES CONCEPTUAL BASED ON ANTICIPATED VOLUMES OF SOILS TO BE EXCAVATED. ACTUAL STOCKPILES MAY VARY DEPENDING ON MATERIALS. STORMWATER BENCHES SHALL BE CONSTRUCTED EVERY 30 VERTICAL FEET AND DIRECTED TO PIPE SLOPE DRAINS.
6. ALL SOIL STOCKPILES SHALL BE VEGETATIVELY STABILIZED PER SPECIFICATION IN DRAWING ES-10.
7. SUBCELL 9.2 / 9.3 INTERFACE NOTE: EXISTING TOPOGRAPHY AS SHOWN ON THIS PLAN IS NOT INTENDED TO BE A REFLECTION OF CURRENT CONDITIONS, AS SUBCELL 9.2 IS CURRENTLY AN ACTIVE WASTE FILLING AREA AND LANDFILL OPERATIONS ARE INHERENTLY DYNAMIC. THE INTENT OF THE B-3 EARTH DIKE ALONG THIS INTERFACE IS TO DIVERT RUNOFF FROM THE EAST AWAY FROM 9.3 CONSTRUCTION THROUGHOUT THE PROCESS OF SUBCELL 9.3 CONSTRUCTION. THIS BERM WILL REQUIRE ONGOING MODIFICATION AND MAINTENANCE AS NEEDED TO ACHIEVE THIS. NO ATTEMPT HAS BEEN MADE TO JUSTIFY A DESIGN FOR THE CHARACTERISTICS OF THIS BERM, OTHER THAN TO SPECIFY A TYPE B-3 EARTH DIKE.
8. SEDIMENT TRAP 4 IS INTENDED AS A SECONDARY TREATMENT FOR SEDIMENT TRAP3 EFFLUENT, WHICH CONTAINS CLAY LADEN RUNOFF FROM THE CLAY STOCKPILE AREA.

Table G.6: Temporary Sediment Basin Design Data Sheet
(Refer to instructions on pages G.27 through G.29)

Computed by: MLV Date: 7/9/2024 Checked by: HH Date: 8/1/2024
Project name: Millersville Landfill Basin #: Pond 9-2
Location: Severn, MD
Design Data from May 23, 2008 design report prepared by Gannett Fleming

Design Volumes and Elevations

1. Total area draining to basin = 108.9 acres (ac)
2. Required total storage volume = 3600 ft³/ac x 108.9 ac drainage area = 392,040 ft³
3. Required wet storage volume = 1800 ft³/ac x 108.9 ac drainage area = 196,020 ft³
4. Required dry storage volume = 1800 ft³/ac x 108.9 ac drainage area = 196,020 ft³
5. Basin bottom elevation = 109.0 ft
6. Riser or weir crest (total storage) elevation = 115.8 ft
7. Provided total storage volume = 494,406 ft³
8. wet storage (permanent pool/draw-down) elevation 111.45 ft
9. Provided wet storage volume = 229,997 ft³
10. Provided dry storage volume = 264,409 ft³
11. Basin cleanout elevation (located at ½ wet storage depth) = 110.45 ft
12. Distance from riser crest elevation to cleanout elevation = 5.35 ft

Surface Area Design

13. Q_{10} = 59 cfs (peak inflow from 10-yr, 24-hr storm event; attach computations)
14. Minimum basin surface area ≥ 0.0035 x Q_{10} = 0.2 ac ≤ 0.2 ac
    required provided

Principal Spillway (Q_{Pr})
(See Figure G.1)

15. Design Q_{Pr} for barrel = 59 cfs (min. 10% of Q_{10}) *Design Qpr =Q10 because there is no emergency spillway*
16. Barrel head, H = 10.42 ft; Barrel length, L = 64 ft
17. Barrel dia. = 48 in (min. 10 inch); Q_{Pr} = 208 (Q from Table G.7 or G.8) x 1.01 (length correction factor) =210 cfs. **Note: Q_{Pr} must equal or exceed Design Q_{Pr}**
18. Riser dia. = 4' x 8' in; Riser height = 12.8 ft; Riser head (h) = 0.6 ft
19. Trash rack dia. = N/A in; Trash rack height = N/A in *Trash racks on all 4 sides of riser*
    Trash Rack 1 10.1 x 4.01
    Trash Rack 2 4.68 x 4.01
    Trash Rack 3 10.1 x 4.01
    Trash Rack 4 4.68 x 4.01

Emergency Spillway (Q_{Es})
(See Figures G.3 and G.4)

20. Emergency spillway capacity Q_{Es} = Q_{10} - Q_{Pr} = - =N/A cfs
21. Width, b =N/A ft; Hp = N/A ft *No emergency spillway*
22. Exit channel slope N/A %
23. Emergency Spillway Crest = N/A ft
24. Design High Water = 116.42 ft
25. Settled top of embankment elevation = 120.2 ft

G.26

Table G.6: Temporary Sediment Basin Design Data Sheet (continued)

Anti-Seep Collar Design (If Required)
(See Figures G.5 and G.6)

26. y = 13.4 ft; z = 3 :1; pipe slope = 0.6 %; Ls = 64 ft
27. Use N/A collars, ft x ft in. square; projection = ft
    No seep collars installed because the sediment basin will eventually be converted into a stormwater basin. A filter diaphragm was installed in place of seep collars, in accordance with the guidance in Figure G.5

Draw-Down Device
(See Table G.10 and Details G-2-6 and G-2-7)

28. Q_{dd} = 5.445 cfs
29. Calculated A_o = 0.664 ft²
30. Calculated d_o = 11.03 in
31. Maximum diameter from Table G.10 = 15 in
32. Design d_o = smaller of line 30 or line 31 = 11.03 in
33. Draw-down device pipe diameter = 15 in
34. Minimum A_o = total area of perforations = $4A_o$ = 2.66 ft²
35. Perforation diameter = 3/4" in
36. Minimum number of perforations = 866
37. Number of longitudinal rows = 24
38. Perforated pipe length = 18 ft
39. Actual A_o = ~~0.0031~~ x (line 37 ÷ 0.5 ft) x (line 38) = 2.68 ft² (must be ≥ line 34)
    0.0031 ft²

Baffle Board Design
(See Detail G-2-4)

40. A = surface area at wet storage elevation = 8,712 ft²
41. Effective width, W_e = (A/2)² = 66 ft
42. Flow length from inflow point to outlet = 200 ft
43. If line 42 is less than W_e x 2, provide baffle boards to lengthen flow path
44. Effective flow length, L_e = L_1 + L_2 + L_3 = ____ ft (must be ≥ W_e x 2 = ____ ft)
    Baffle boards not needed

G.27

NOTE: THE MAIN SEDIMENT CONTROL FEATURE OF THE ENTIRE CELL 9 AREA IS POND 9-2, TO THE NORTHEAST OF SUBCELL 9.3. POND 9-2 IS A SEDIMENT BASIN DESIGNED TO PROVIDE SEDIMENT CONTROL AND TREATMENT THROUGHOUT THE CONSTRUCTION AND OPERATIONAL LIFETIME FOR ALL OF CELL 9. GIVEN THE SENSITIVITY OF THE RECEIVING WATERS, THE SIDEMENT TRAPS AND REMOVABLE PUMPING STATIONS SHOWN IN THE EROSION AND SEDIMENT CONTROL PLANS FOR SUBCELL 9.3 ARE INTENDED TO PROVIDE AN ADDITIONAL LAYER OF TREATMENT PRIOR TO POND 9-2. SINCE THE SEDIMENT TRAPS SERVE AS A SUPPLEMENTAL LAYER OF TREATMENT BEYOND WHAT IS REQUIRED BY STATE AND LOCAL REGULATIONS, DRAINAGE AREAS OF SEVERAL OF THE TRAPS ARE LARGER THAN MARYLAND DESIGN GUIDELINES.

LEGEND

- CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- TW–19 GROUNDWATER MONITORING WELLS
- J–25 GAS PROBES
- P–3 EXISTING PIEZOMETER
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- E ELECTRIC LINE
- LFG LANDFILL GAS HEADER
- GM LEACHATE GRAVITY MAIN
- A AIR LINE
- LITTER FENCE
- TREE PROTECTION FENCE LINE (SNOW FENCE OR EQUAL)
- LIMIT OF CLEARING AND GRUBBING
- A-2 EARTH DIKE
- STORMWATER FLOW DIRECTIONS
- STORMWATER DIVERSION BERM
- AREA TO BE COVERED WITH TEMPORARY RAIN TARP
- RPS REMOVABLE PUMPING STATION (7 / ES-9)
- LOD LIMIT OF DISTURBANCE
- DRAINAGE AREA DELINEATION
- PROPOSED CHANNEL
- PROPOSED STORMWATER CULVERT (SEE DRAWING ES-8 FOR CULVERT SCHEDULE)
- LOC LIMIT OF CONSTRUCTION
- HAUL ROAD PATH
- SSF SUPER SILT FENCE (8 / ES-9)

0 200' 400'
SCALE IN FEET

STATE OF MARYLAND — MICHAEL VISVARDI — 37594 — PROFESSIONAL ENGINEER
SIGNATURE 7/31/2024 DATE

DATE: JULY 2024
FILE NO.: 2241-E&S-PROP

Geosyntec consultants
engineers | scientists | innovators
10211 WINCOPIN CIRCLE
4TH FLOOR
COLUMBIA, MD 21044
410.381.4333

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED DATE	BY

APPROVED: DocuSigned by: [signature] 7/4/2024 | 22:02 EDT — CHIEF ENGINEER
APPROVED: DocuSigned by: [signature] 1/2024 | 11:56 PDT — PROJECT MANAGER
APPROVED: DocuSigned by: [signature] ./2024 | 15:41 EDT — R
APPROVED: DocuSigned by: [signature] 7/2024 | 12:18 PDT — CHIEF, BUREAU OF WAT...

SCALE: NOTED
DRAWN BY: BW
CHECKED BY: MLV
DRAWING NO.: ES-2 OF ES-10
SHEET NO.: 24 OF 36
PROJECT NO.: ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
TITLE: PROPOSED CONDITIONS - CELL 9

P:\eadd\PROJECTS\M_millersville\me2241 – subcell 9.3\CADD\01 – construction rev\DRAWINGS\SHEETS\2241-E&S-PROP.dwg – 31-Jul-24 – 11:39 AM

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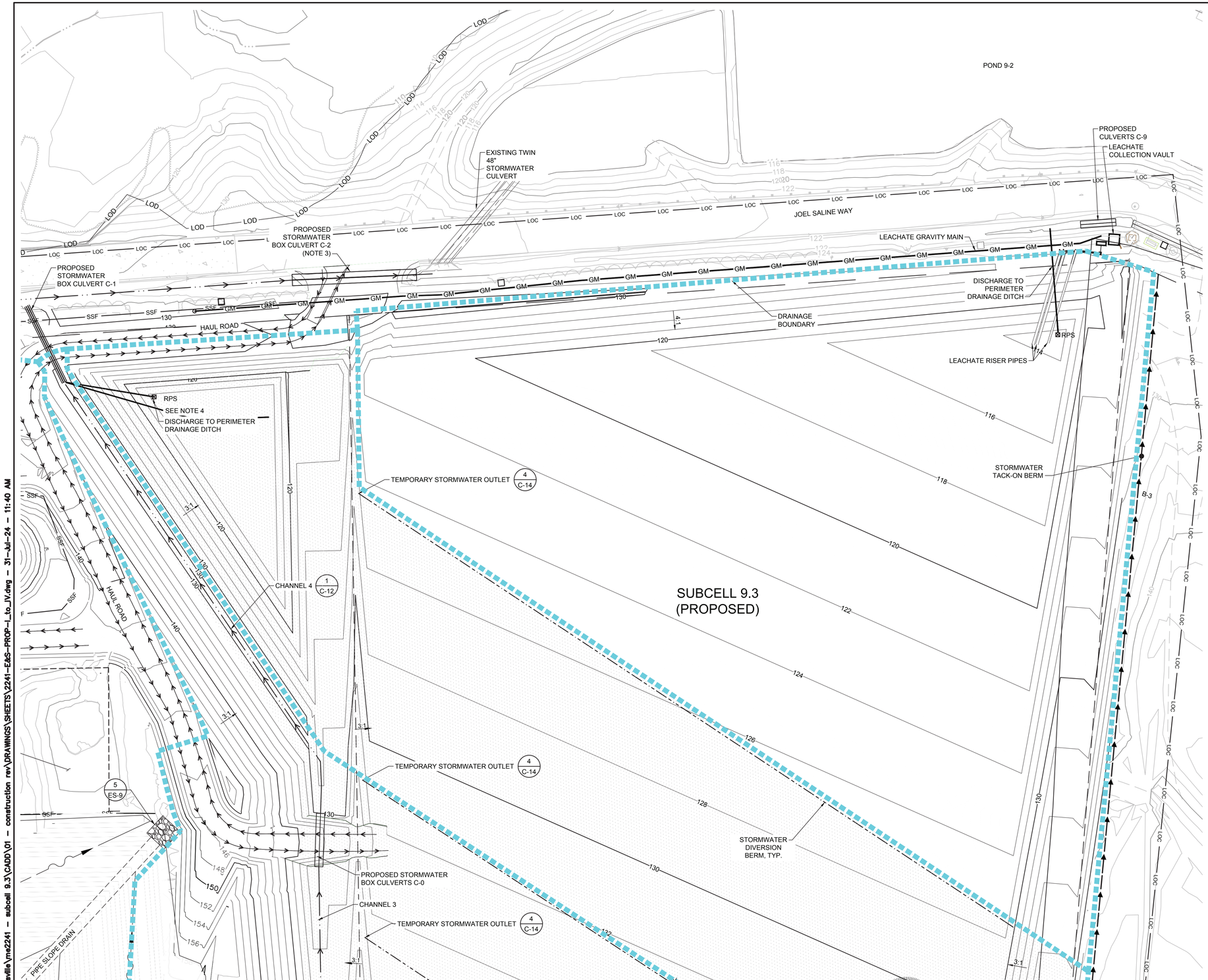

LEGEND

- CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
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- GRAVEL DRIVE
- TREELINE
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- TW–19 GROUNDWATER MONITORING WELLS
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- P–3 EXISTING PIEZOMETER
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- E ELECTRIC LINE
- LFG LANDFILL GAS HEADER
- GM LEACHATE GRAVITY MAIN
- A AIR LINE
- LITTER FENCE
- TREE PROTECTION FENCE LINE (SNOW FENCE OR EQUAL)
- LIMIT OF CLEARING AND GRUBBING
- EARTH DIKE
- A-2 STORMWATER FLOW DIRECTIONS
- STORMWATER DIVERSION BERM
- AREA TO BE COVERED WITH TEMPORARY RAIN TARP
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- DRAINAGE AREA DELINEATION
- PROPOSED CHANNEL
- PROPOSED STORMWATER CULVERT (SEE DRAWING ES-8 FOR CULVERT SCHEDULE)
- LOC LIMIT OF CONSTRUCTION
- HAUL ROAD PATH
- SSF SUPER SILT FENCE (8 / ES-9)

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. SEE SHEET ES-10 FOR GENERAL EROSION AND SEDIMENT CONTROL NOTES.
3. REMOVE RIPRAP FROM EXISTING PERIMETER CHANNEL PRIOR TO INSTALLATION OF BOX CULVERT
4. RPS TO BE USED IN TEMPORARY STORMWATER BASING AND SUBCELL 9.3 PRIOR TO INSTALLATION OF RAIN TARP FOLLOWING RAIN TARP INSTALLATION, A TRASH PUMP WILL BE USED TO REMOVE WATER. TRASH PUMP WILL BE REMOVED FROM SUBCELL 9.3 ONCE LEACHATE COLLECTION SYSTEM IS FULLY CONNECTED AND OPERATIONAL.
5. STOCKPILE LOCATIONS AND SIZES CONCEPTUAL BASED ON ANTICIPATED VOLUMES OF SOILS TO BE EXCAVATED. ACTUAL STOCKPILES MAY VARY DEPENDING ON MATERIALS. STORMWATER BENCHES SHALL BE CONSTRUCTED EVERY 30 VERTICAL FEET AND DIRECTED TO PIPE SLOPE DRAINS.
6. ALL SOIL STOCKPILES SHALL BE VEGETATIVELY STABILIZED PER SPECIFICATION IN DRAWING ES-10.
7. SUBCELL 9.3 CONSTRUCTION INCLUDES EXCAVATION TO DESIGN GRADES, INSTALLATION OF UNDERDRAIN PIPING, PREPARATION OF SUBGRADE, CONSTRUCTION OF COMPACTED CLAY LINER, AND INSTALLATION OF LEACHATE COLLECTION AND DETECTION SYSTEM AND PROTECTIVE COVER MATERIALS.

0 40' 80'
SCALE IN FEET

P:\cadd\PROJECTS\MillersvilleLandfill\me2241 – subcell 9.3\CADD\01 – construction rev\DRAWINGS\SHEETS\2241-E&S-PROP-I_to_IV.dwg – 31-Jul-24 – 11:40 AM

STATE OF MARYLAND — MELVIN L. VISWANATH — 27584 — PROFESSIONAL ENGINEER

SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-E&S-PROP-I_to_IV

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10211 WINCOPIN CIRCLE
4TH FLOOR
COLUMBIA, MD 21044
410.381.4333

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED	
DATE	BY

APPROVED: DATE — DocuSigned by: 8/4/2024 | 22:02 EDT — CHIEF ENGINEER
APPROVED: DATE — DocuSigned by: 1/2024 | 11:56 PDT — PROJECT MANAGER
APPROVED: DATE — DocuSigned by: 7/31/2024 | 15:41 EDT — R
APPROVED: DATE — DocuSigned by: 2024 | 12:18 PDT — CHIEF, HIGHWAY, WATER

SCALE:	NOTED
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	ES-3 OF ES-10
SHEET NO.:	25 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: PROPOSED ENLARGED PLAN - I

Docusign Envelope ID: 7E24C6D7-91F4-4129-A15E-3B231801329D

P:\cadd\PROJECTS\MillersvilleLandfill\me2241 – subcell 9.3\CADD\01 – construction rev\DRAWINGS\SHEETS\2241-E&S-PROP-I_to_IV.dwg – 31–Jul–24 – 11:40 AM

TEMPORARY STORMWATER OUTLET C-14

PIPE SLOPE DRAIN

STORMWATER DIVERSION BERMS, TYP.

STORMWATER TACK-ON BERM

SUBCELL 9.3 (PROPOSED)

SUBCELL 9.2 (ACTIVE)

CHANNEL 3

DRAINAGE BOUNDARY

LIMITS OF CLEARING AND GRUBBING

PERIMETER ROAD

END PROPOSED LITTER FENCE EXTENSION APPROXIMATELY 50 FEET WEST OF SUBCELL 9.3 BOUNDARY

PROPOSED GUARDRAIL EXTENSION TO CONNECT TO EXISTING GUARDRAIL

PROPOSED LITTER FENCE EXTENSION TO CONNECT TO EXISTING LITTER FENCE

TW-28

TW-2

N

LEGEND

- CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- TW–19 GROUNDWATER MONITORING WELLS
- J–25 GAS PROBES
- P–3 EXISTING PIEZOMETER
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- E ELECTRIC LINE
- LFG LANDFILL GAS HEADER
- GM LEACHATE GRAVITY MAIN
- A AIR LINE
- LITTER FENCE
- TREE PROTECTION FENCE LINE (SNOW FENCE OR EQUAL)
- LIMIT OF CLEARING AND GRUBBING
- EARTH DIKE
- A-2 STORMWATER FLOW DIRECTIONS
- STORMWATER DIVERSION BERM
- AREA TO BE COVERED WITH TEMPORARY RAIN TARP
- RPS REMOVABLE PUMPING STATION (7 / ES-9)
- LOD LIMIT OF DISTURBANCE
- DRAINAGE AREA DELINEATION
- PROPOSED CHANNEL
- PROPOSED STORMWATER CULVERT (SEE DRAWING ES-8 FOR CULVERT SCHEDULE)
- LOC LIMIT OF CONSTRUCTION
- HAUL ROAD PATH
- SSF SUPER SILT FENCE (8 / ES-9)

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. SEE SHEET ES-10 FOR GENERAL EROSION AND SEDIMENT CONTROL NOTES.
3. STOCKPILE LOCATIONS AND SIZES CONCEPTUAL BASED ON ANTICIPATED VOLUMES OF SOILS TO BE EXCAVATED. ACTUAL STOCKPILES MAY VARY DEPENDING ON MATERIALS. STORMWATER BENCHES SHALL BE CONSTRUCTED EVERY 30 VERTICAL FEET AND DIRECTED TO PIPE SLOPE DRAINS.
4. ALL SOIL STOCKPILES SHALL BE VEGETATIVELY STABILIZED PER SPECIFICATION IN DRAWING ES-10.
5. SUBCELL 9.3 CONSTRUCTION INCLUDES EXCAVATION TO DESIGN GRADES, INSTALLATION OF UNDERDRAIN PIPING, PREPARATION OF SUBGRADE, CONSTRUCTION OF COMPACTED CLAY LINER, AND INSTALLATION OF LEACHATE COLLECTION AND DETECTION SYSTEM AND PROTECTIVE COVER MATERIALS.

0 40' 80'
SCALE IN FEET

STATE OF MARYLAND — MELISSA L. VISNAUSKAS — 57584 — PROFESSIONAL ENGINEER

SIGNATURE

7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-E&S-PROP-I_to_IV

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COLUMBIA, MD 21044
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REVISED DATE	BY

APPROVED: DATE — DocuSigned by: 8/4/2024 | 22:02 EDT — 9B4B7314DD3409... — CHIEF ENGINEER

APPROVED: DATE — DocuSigned by: 7/31/2024 | 11:56 EDT — 0F9F5744452840A... — PROJECT MANAGER

APPROVED: DATE — DocuSigned by: ./2024 | 15:41 EDT — C0E3DE1728C5440... R — CHIEF, BUREAU OF WATER

APPROVED: DATE — DocuSigned by: Thomas Barta III 2024 | 12:18 EDT — 75A015706E43E4D8... — CHIEF, BUREAU OF WASTE

SCALE:	NOTED
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	ES-4 OF ES-10
SHEET NO.:	26 OF 36
PROJECT NO.:	ME2241

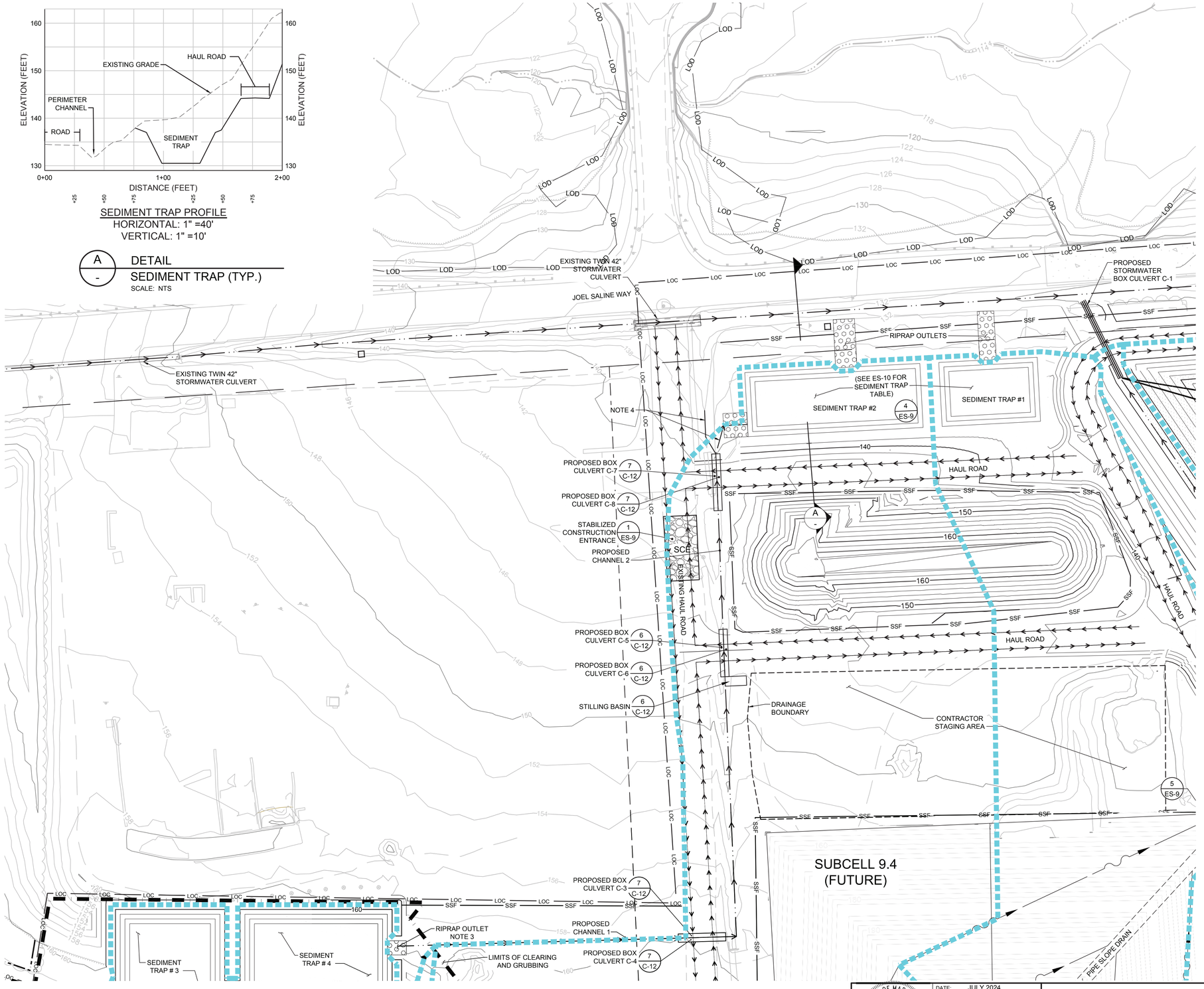
PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: PROPOSED ENLARGED PLAN - II

Docusign Envelope ID: 7E24C6D7-91F4-4129-A15E-3B231801329D

SEDIMENT TRAP PROFILE
HORIZONTAL: 1" =40'
VERTICAL: 1" =10'

A / - DETAIL
SEDIMENT TRAP (TYP.)
SCALE: NTS



LEGEND

- CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- TW–19 GROUNDWATER MONITORING WELLS
- J–25 GAS PROBES
- P–3 EXISTING PIEZOMETER
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- E ELECTRIC LINE
- LFG LANDFILL GAS HEADER
- GM LEACHATE GRAVITY MAIN
- A AIR LINE
- LITTER FENCE
- TREE PROTECTION FENCE LINE (SNOW FENCE OR EQUAL)
- LIMIT OF CLEARING AND GRUBBING
- A-2 EARTH DIKE
- STORMWATER FLOW DIRECTIONS
- STORMWATER DIVERSION BERM
- AREA TO BE COVERED WITH TEMPORARY RAIN TARP
- RPS REMOVABLE PUMPING STATION (7 / ES-9)
- LOD LIMIT OF DISTURBANCE
- DRAINAGE AREA DELINEATION
- PROPOSED CHANNEL
- PROPOSED STORMWATER CULVERT (SEE DRAWING ES-8 FOR CULVERT SCHEDULE)
- LOC LIMIT OF CONSTRUCTION
- HAUL ROAD PATH
- SSF SUPER SILT FENCE (8 / ES-9)

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. SEE SHEET ES-10 FOR GENERAL EROSION AND SEDIMENT CONTROL NOTES.
3. ROCK OUTLET PROTECTION SHALL BE ADDED IN ACCORDANCE WITH STANDARD DETAIL D-4-1-A (DETAIL 6 ON SHEET ES-9).
4. DIVERT RIGHT SIDE OF CHANNEL 2 TO DISCHARGE INTO SEDIMENT TRAP.
5. STOCKPILE LOCATIONS AND SIZES CONCEPTUAL BASED ON ANTICIPATED VOLUMES OF SOILS TO BE EXCAVATED. ACTUAL STOCKPILES MAY VARY DEPENDING ON MATERIALS. STORMWATER BENCHES SHALL BE CONSTRUCTED EVERY 30 VERTICAL FEET AND DIRECTED TO PIPE SLOPE DRAINS.
6. ALL SOIL STOCKPILES SHALL BE VEGETATIVELY STABILIZED PER SPECIFICATION IN DRAWING ES-10.

0 40' 80'
SCALE IN FEET

STATE OF MARYLAND · MELANIE VISMARA · 57584 · PROFESSIONAL ENGINEER
SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-E&S-PROP-I_to_IV

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APPROVED: DATE — DocuSigned by: 7/4/2024 | 22:02 EDT — BBAB731AD032400... — CHIEF ENGINEER
APPROVED: DATE — DocuSigned by: 8/1/2024 | 11:56 PDT — DF5F5744A838488... — PROJECT MANAGER
APPROVED: DATE — DocuSigned by: 8/2/2024 | 15:41 EDT — C0E3DE1728C5440... — CHIEF, BUR. OF SOLID WASTE
APPROVED: DATE — DocuSigned by: 8/2/2024 | 12:18 PDT — 75A5157BE4E4D4B... — CHIEF, BUR. OF WATER

SCALE:	NOTED
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	ES-5 OF ES-10
SHEET NO.:	27 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: PROPOSED ENLARGED PLAN - III

P:\cadd\PROJECTS\W\millersville\me2241 – subcell 9.3\CADD\01 – construction rev\DRAWINGS\SHEETS\2241-E&S-PROP-I_to_IV.dwg – 31-Jul-24 – 11:41 AM

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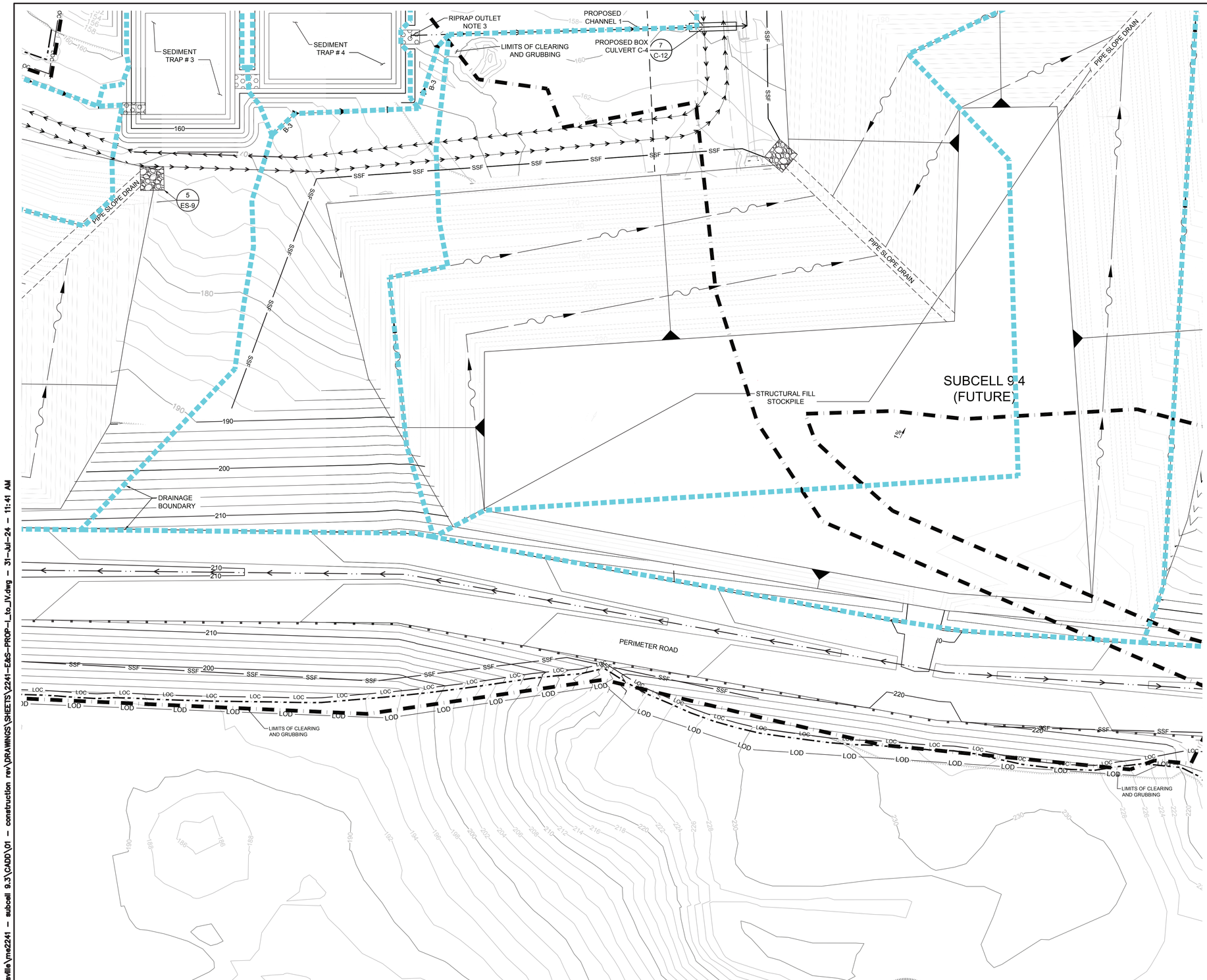

LEGEND

- CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- TW–19 GROUNDWATER MONITORING WELLS
- J–25 GAS PROBES
- P–3 EXISTING PIEZOMETER
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARIES
- E ELECTRIC LINE
- LFG LANDFILL GAS HEADER
- GM LEACHATE GRAVITY MAIN
- A AIR LINE
- LITTER FENCE
- TREE PROTECTION FENCE LINE (SNOW FENCE OR EQUAL)
- LIMIT OF CLEARING AND GRUBBING
- A-2 EARTH DIKE
- STORMWATER FLOW DIRECTIONS
- STORMWATER DIVERSION BERM
- AREA TO BE COVERED WITH TEMPORARY RAIN TARP
- RPS REMOVABLE PUMPING STATION (7 / ES-9)
- LOD LIMIT OF DISTURBANCE
- DRAINAGE AREA DELINEATION
- PROPOSED CHANNEL
- PROPOSED STORMWATER CULVERT (SEE DRAWING ES-8 FOR CULVERT SCHEDULE)
- LOC LIMIT OF CONSTRUCTION
- HAUL ROAD PATH
- SSF SUPER SILT FENCE (8 / ES-9)

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. SEE SHEET ES-10 FOR GENERAL EROSION AND SEDIMENT CONTROL NOTES.
3. ROCK OUTLET PROTECTION SHALL BE ADDED IN ACCORDANCE WITH STANDARD DETAIL D-4-1-A (DETAIL 6 ON SHEET ES-9).
4. STOCKPILE LOCATIONS AND SIZES CONCEPTUAL BASED ON ANTICIPATED VOLUMES OF SOILS TO BE EXCAVATED. ACTUAL STOCKPILES MAY VARY DEPENDING ON MATERIALS. STORMWATER BENCHES SHALL BE CONSTRUCTED EVERY 30 VERTICAL FEET AND DIRECTED TO PIPE SLOPE DRAINS.
5. ALL SOIL STOCKPILES SHALL BE VEGETATIVELY STABILIZED PER SPECIFICATION IN DRAWING ES-10.

0 40' 80'
SCALE IN FEET

STATE OF MARYLAND — MEENA VISWANATH — 37584 — PROFESSIONAL ENGINEER

SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-E&S-PROP-I_to_IV

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COLUMBIA, MD 21044
410.381.4333

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APPROVED: DATE — DocuSigned by: 7/31/2024 | 11:56 PDT — DF3F57444B3B484... — PROJECT MANAGER
APPROVED: DATE — DocuSigned by: /2024 | 15:41 EDT — C0E3DE1728C6440... — R
APPROVED: DATE — DocuSigned by: 8/4 | 12:18 PDT — 75A015760E43E4D8... — CHIEF, BUREAU OF WAT

SCALE:	NOTED
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	ES-6 OF ES-10
SHEET NO.:	28 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: PROPOSED ENLARGED PLAN - IV

P:\cadd\PROJECTS\MillersvilleLandfill\me2241 – subcell 9.3\CADD\01 – construction rev\DRAWINGS\SHEETS\2241-E&S-PROP-I_to_IV.dwg – 31-Jul-24 – 11:41 AM

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N

LEGEND

- CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
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- HAUL ROAD PATH
- SSF SUPER SILT FENCE (8 / ES-9)

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. SEE SHEET ES-10 FOR GENERAL EROSION AND SEDIMENT CONTROL NOTES.

0 40' 80'
SCALE IN FEET

STATE OF MARYLAND — MICHAEL VINCENT NEMETH — 57584 — PROFESSIONAL ENGINEER

SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-E&S-PROP-I_to_IV

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REVISED		APPROVED: DATE	APPROVED: DATE	SCALE: NOTED	PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
DATE	BY	DocuSigned by: '4/2024 | 22:02 EDT BB4B7314D532400... CHIEF ENGINEER	DocuSigned by: 1/2024 | 11:56 PDT 0F5F5744483848... PROJECT MANAGER	DRAWN BY: BW	
				CHECKED BY: MLV	
		APPROVED: DATE	APPROVED: DATE	DRAWING NO.: ES-7 OF ES-10	TITLE: PROPOSED ENLARGED PLAN - V
		DocuSigned by: ./2024 | 15:41 EDT C0E3DE1728C5440... R	DocuSigned by: '4 | 12:18 PDT 75A2157B5E43E4D8... CHIEF ENGINEER	SHEET NO.: 29 OF 36	
				PROJECT NO.: ME2241	

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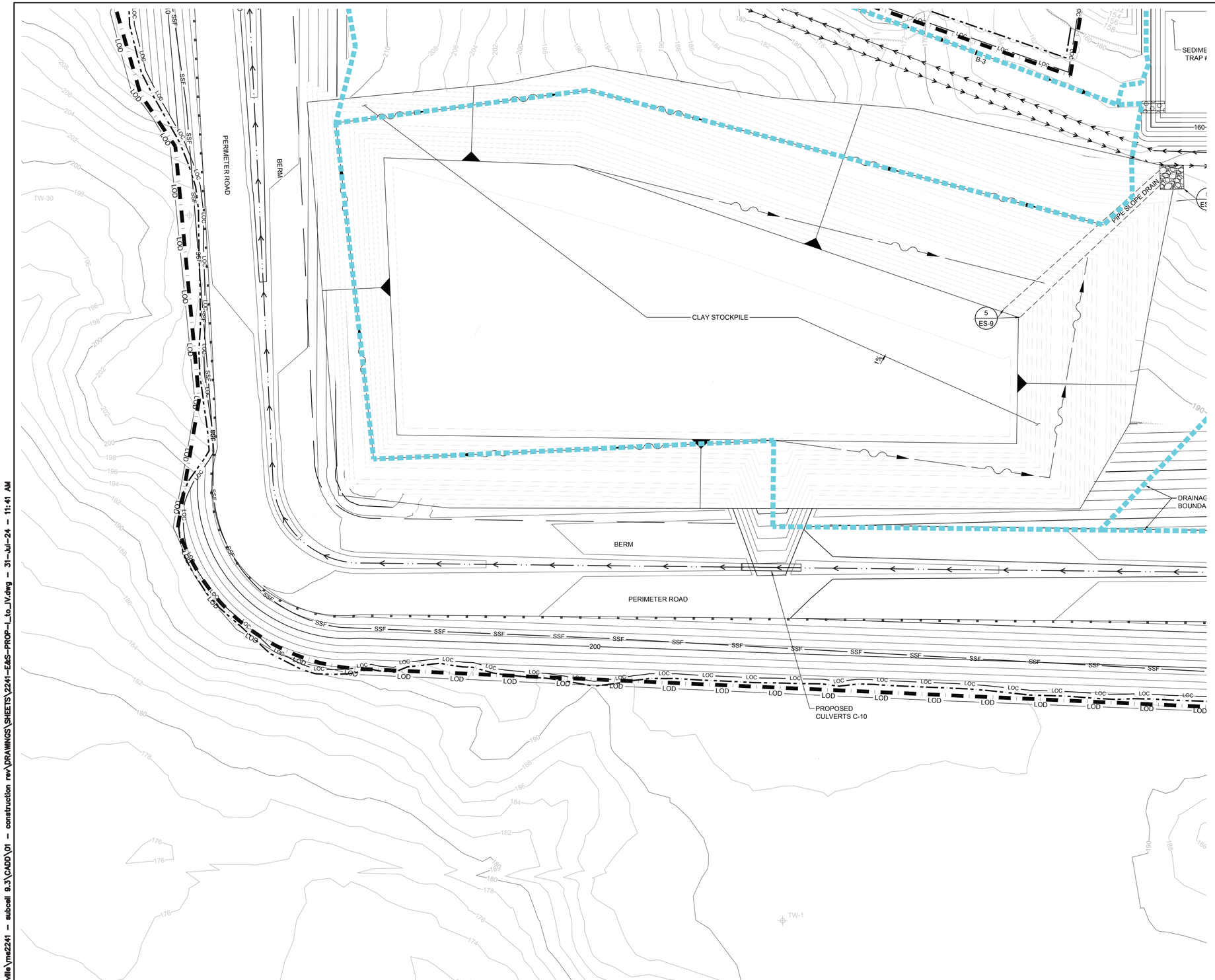

LEGEND

- CONTOUR (FEET-MSL)
- SPOT ELEVATION
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
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- LITTER FENCE
- TREE PROTECTION FENCE LINE (SNOW FENCE OR EQUAL)
- LIMIT OF CLEARING AND GRUBBING
- EARTH DIKE
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- STORMWATER DIVERSION BERM
- AREA TO BE COVERED WITH TEMPORARY RAIN TARP
- RPS REMOVABLE PUMPING STATION (7 / ES-9)
- LOD LIMIT OF DISTURBANCE
- DRAINAGE AREA DELINEATION
- PROPOSED CHANNEL
- PROPOSED STORMWATER CULVERT (SEE DRAWING ES-8 FOR CULVERT SCHEDULE)
- LOC LIMIT OF CONSTRUCTION
- HAUL ROAD PATH
- SSF SUPER SILT FENCE (8 / ES-9)

NOTES:

1. SEE SHEET 2 FOR GENERAL NOTES.
2. SEE SHEET ES-10 FOR GENERAL EROSION AND SEDIMENT CONTROL NOTES.
3. STOCKPILE LOCATIONS AND SIZES CONCEPTUAL BASED ON ANTICIPATED VOLUMES OF SOILS TO BE EXCAVATED. ACTUAL STOCKPILES MAY VARY DEPENDING ON MATERIALS. STORMWATER BENCHES SHALL BE CONSTRUCTED EVERY 30 VERTICAL FEET AND DIRECTED TO PIPE SLOPE DRAINS.
4. ALL SOIL STOCKPILES SHALL BE VEGETATIVELY STABILIZED PER SPECIFICATION IN DRAWING ES-10.

0 40' 80'
SCALE IN FEET

STATE OF MARYLAND — MELISSA L. VIVANETTI — 57584 — PROFESSIONAL ENGINEER

SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-E&S-PROP-I_to_IV

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COLUMBIA, MD 21044
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ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED DATE	BY

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APPROVED: DATE — DocuSigned by: 7/2024 | 15:41 EDT — C0E3DE1728C5440... — R
APPROVED: DATE — DocuSigned by: 7/2024 | 12:18 PDT — 75A2157956E4E4D8... — CHIEF, BUREAU OF WAST

SCALE: NOTED
DRAWN BY: BW
CHECKED BY: MLV
DRAWING NO.: ES-8 OF ES-10
SHEET NO.: 30 OF 36
PROJECT NO.: ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: PROPOSED ENLARGED PLAN - VI

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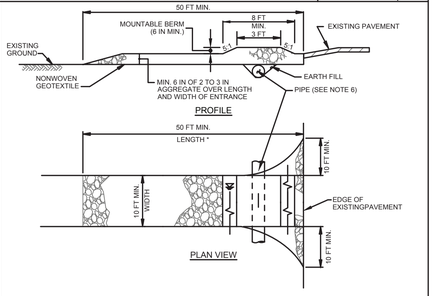
DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE

STANDARD SYMBOL: SCE



CONSTRUCTION SPECIFICATIONS

1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE, MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

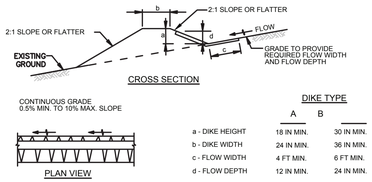
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

1 DETAIL ES-2 — DETAIL STABILIZED CONSTRUCTION ENTRANCE

DETAIL C-1 EARTH DIKE

STANDARD SYMBOL: PLACE DESIGNATION (e.g. A-1) ON FLOW CHANNEL SIDE OF DIKE.



DIKE TYPE

	A	B
a - DIKE HEIGHT	18 IN MIN.	30 IN MIN.
b - DIKE WIDTH	24 IN MIN.	36 IN MIN.
c - FLOW WIDTH	4 FT MIN.	6 FT MIN.
d - FLOW DEPTH	12 IN MIN.	24 IN MIN.

FLOW CHANNEL STABILIZATION

A-1	SEED WITH STRAW MULCH AND TACK. (NOT ALLOWED FOR CLEAR WATER DIVERSION.)
A-2/B-2	SEED WITH SOIL STABILIZATION MATTING OR LINE WITH SOD.
A-3/B-3	4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE PRESSED INTO SOIL A MINIMUM OF 7 INCHES AND FLUSH WITH GROUND.

CONSTRUCTION SPECIFICATIONS

1. REMOVE AND DISPOSE OF ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SO AS NOT TO INTERFERE WITH PROPER FUNCTION OF EARTHDIKE.
2. EXCAVATE OR SHAPE EARTH DIKE TO LINE, GRADE, AND CROSS SECTION AS SPECIFIED. BANK PROJECTIONS OR OTHER IRREGULARITIES ARE NOT ALLOWED.
3. COMPACT FILL.
4. CONSTRUCT FLOW CHANNEL ON AN UNINTERRUPTED, CONTINUOUS GRADE, ADJUSTING THE LOCATION DUE TO FIELD CONDITIONS AS NECESSARY TO MAINTAIN POSITIVE DRAINAGE.
5. PROVIDE OUTLET PROTECTION AS REQUIRED ON APPROVED PLAN.
6. STABILIZE EARTH DIKE WITHIN THREE DAYS OF INSTALLATION. STABILIZE FLOW CHANNEL FOR CLEAR WATER DIVERSION WITHIN 24 HOURS OF INSTALLATION.
7. MAINTAIN LINE, GRADE, AND CROSS SECTION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS, AND MAINTAIN POSITIVE DRAINAGE. KEEP EARTH DIKE AND POINT OF DISCHARGE FREE OF EROSION, AND CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.
8. UPON REMOVAL OF EARTH DIKE, GRADE AREA FLUSH WITH EXISTING GROUND. WITHIN 24 HOURS OF REMOVAL STABILIZE DISTURBED AREA WITH TOPSOIL, SEED, AND MULCH, OR AS SPECIFIED ON APPROVED PLAN.

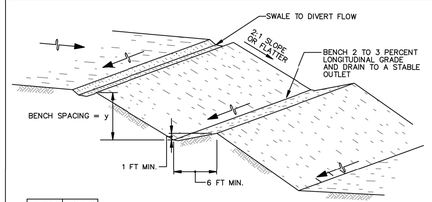
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

2 DETAIL ES-2 — DETAIL EARTH DIKE

DETAIL B-3-1 BENCHING

STANDARD SYMBOL: BENCHING



SLOPE	y (MAX.)
2:1	20 FT
3:1	30 FT
4:1	40 FT

CONSTRUCTION SPECIFICATIONS

1. USE FILL MATERIAL FREE OF BRUSH, RUBBISH, ROCKS, LOGS, STUMPS, BUILDING DEBRIS, AND OTHER OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
2. DO NOT INCORPORATE FROZEN, SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS INTO FILL SLOPES OR STRUCTURAL FILLS. DO NOT PLACE FILL ON A FROZEN FOUNDATION.
3. PLACE ALL FILL IN LOOSE LIFTS NOT TO EXCEED 8 INCHES AND THEN COMPACT.
4. COMPACT ALL FILLS AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, OR OTHER RELATED PROBLEMS. COMPACT FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES, CONDUITS, ETC., IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
5. HANDLE SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION IN ACCORDANCE WITH SECTION H-2 SUBSURFACE DRAINS OR OTHER APPROVED METHODS.
6. MAINTAIN LINE, GRADE, AND CROSS SECTION OF BENCHING. STABILIZE IN ACCORDANCE WITH THE 3/7 DAY STABILIZATION CRITERIA OR AS SPECIFIED ON THE APPROVED EROSION AND SEDIMENT CONTROL PLAN. INSTALLATION OF EROSION CONTROL MATTING MAY BE NECESSARY IN BENCH/SWALE INVERTS. CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.
7. KEEP ALL BENCHES FREE OF SEDIMENT DURING ALL PHASES OF DEVELOPMENT.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

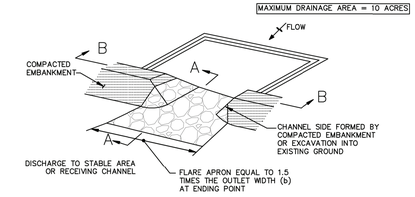
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

B.7

3 DETAIL ES-2 — DETAIL BENCHING

DETAIL G-1-3 RIPRAP OUTLET SEDIMENT TRAP ST-III

STANDARD SYMBOL: ST-III



a - DEPTH OF OUTLET
b - BOTTOM WIDTH OF OUTLET

1 OF 3

CONSTRUCTION SPECIFICATIONS

1. CONSTRUCT TRAP IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE AVOIDED.
2. CLEAR, GRUB, AND STRIP ANY VEGETATION AND ROOT MAT FROM THE AREA UNDER THE EMBANKMENT AND TRAP BOTTOM.
3. USE FILL MATERIAL FREE OF ROOTS, WOODY VEGETATION, OVERSIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL FOR THE EMBANKMENT.
4. CONSTRUCT TOP OF EMBANKMENT 1 FOOT MINIMUM ABOVE TOP OF RIPRAP OUTLET. COMPACT THE EMBANKMENT BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
5. MAKE ALL CUT AND FILL SLOPES 2:1 OR FLATTER.
6. PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, OVER THE BOTTOM AND SIDES OF OUTLET AND APRON PRIOR TO PLACEMENT OF RIPRAP. OVERLAP SECTIONS OF GEOTEXTILE AT LEAST 1 FOOT WITH THE SECTION NEARER TO THE TRAP PLACED ON TOP. EMBED GEOTEXTILE AT LEAS' 6 INCHES INTO EXISTING GROUND AT ENTRANCE OF OUTLET CHANNEL.
7. USE CLEAN CLASS 1 RIPRAP PLACED 19 INCHES IN DEPTH FOR THE OUTLET AND APRON. USE OF RECYCLED CONCRETE EQUIVALENT IS ACCEPTABLE.
8. CONSTRUCT AND MAINTAIN THE OUTLET ACCORDING TO APPROVED PLAN, AND IN SUCH A MANNER THAT EROSION AT OR BELOW THE OUTLET DOES NOT OCCUR.
9. STABILIZE THE EMBANKMENT AND INTERIOR SLOPES WITH SEED AND MULCH. STABILIZE POINTS OF CONCENTRATED INFLOW AS SHOWN ON APPROVED PLAN.
10. REMOVE SEDIMENT AND RESTORE TRAP TO ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO CLEANOUT ELEVATION (25% OF WET STORAGE DEPTH). DEPOSIT REMOVED SEDIMENT IN AN APPROVED AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE. KEEP POINTS OF INFLOW AND OUTFLOW AS WELL AS INTERIOR OF THE TRAP FREE FROM EROSION AND REMOVE ACCUMULATED DEBRIS. MAINTAIN EMBANKMENTS TO CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION. REMOVE ANY TREES, BRUSH, OR OTHER WOODY VEGETATION GROWING ON EMBANKMENT OR NEAR PRINCIPAL SPILLWAY. MAINTAIN LINE, GRADE, AND CROSS SECTION.
11. WHEN DEWATERING TRAP, PASS THE REMOVED WATER THROUGH AN APPROVED SEDIMENT CONTROL PRACTICE.
12. UPON REMOVAL, GRADE AND STABILIZE THE AREA OCCUPIED BY TRAP.

2 OF 3

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

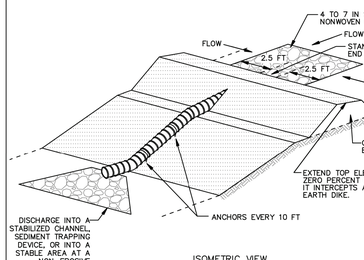
G.16 G.17

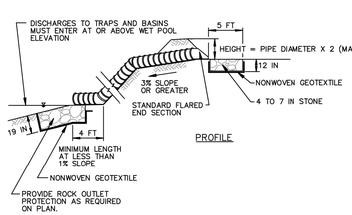
4 DETAIL ES-2 — DETAIL SEDIMENT TRAP ST-III

DETAIL D-1 PIPE SLOPE DRAIN

STANDARD SYMBOL: PSD — 12

DESIGNATION PSD-12 REFERS TO 12 IN PIPE SLOPE DRAIN.





1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

D.3

DETAIL D-1 PIPE SLOPE DRAIN

STANDARD SYMBOL: PSD — 12

DESIGNATION PSD-12 REFERS TO 12 IN PIPE SLOPE DRAIN.

CONSTRUCTION SPECIFICATIONS

1. THE HEIGHT OF THE EARTH DIKE MUST BE AT LEAST 2 TIMES THE PIPE DIAMETER MEASURED FROM THE INVERT OF THE PIPE. EXTEND THE TOP ELEVATION OF DIKE AT ZERO PERCENT GRADE UNTIL IT INTERCEPTS THE TOP OF THE ADJOINING EARTH DIKE.
2. FLEXIBLE PIPE IS PREFERRED, HOWEVER, CORRUGATED METAL PIPE OR EQUIVALENT PVC PIPE CAN BE USED. ALL CONNECTIONS MUST BE WATERTIGHT.
3. ATTACH A FLARED END SECTION TO THE INLET END OF PIPE WITH A WATERTIGHT CONNECTION. AT THE INLET OF THE PIPE SLOPE DRAIN, INSTALL 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE PLACED 12 INCHES IN DEPTH ON NONWOVEN GEOTEXTILE AND EXTEND OUT 5 FEET FROM THE INLET IN ALL DIRECTIONS.
4. PROVIDE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, UNDER THE BOTTOM AND ALONG SIDES OF ALL RIPRAP.
5. SECURELY ANCHOR THE PIPE SLOPE DRAIN (PSD) TO THE SLOPE. SPACE THE ANCHORS EVERY 10 FEET.
6. HAND TAMP THE SOIL AROUND AND UNDER THE PIPE AND END SECTION IN 4 INCH LIFTS TO THE TOP OF THE EARTH DIKE.
7. UPON COMPLETING INSTALLATION OF THE PSD, STABILIZE ASSOCIATED DISTURBANCES WITH SEED, MULCH, AND TACK.
8. INSTALL OUTLET PROTECTION AS SPECIFIED ON APPROVED PLAN.
9. KEEP POINTS OF INFLOW AND OUTFLOW FREE OF EROSION. MAINTAIN WATER TIGHT CONNECTIONS AND POSITIVE DRAINAGE. REMOVE ACCUMULATED SEDIMENT AND DEBRIS.

2 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

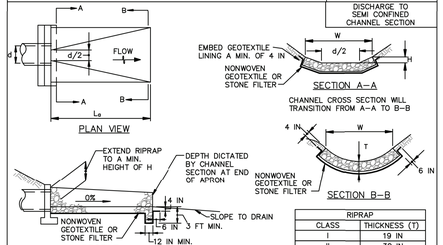
D.4

5 DETAIL ES-2 — DETAIL PIPE SLOPE DRAIN

DETAIL D-4-1-A ROCK OUTLET PROTECTION I

STANDARD SYMBOL: ROP1

DISCHARGE TO SEMI CONFINED CHANNEL SECTION



RIPRAP	
CLASS	THICKNESS (T)
I	19 IN
II	32 IN
III	46 IN

CONSTRUCTION SPECIFICATIONS

1. RIPRAP AND STONE MUST CONFORM TO THE SPECIFIED CLASS.
2. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, AND PROTECT FROM PUNCTURING, CUTTING, OR TEARING. REPAIR ANY DAMAGE OTHER THAN AN OCCASIONAL SMALL HOLE BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. PROVIDE A MINIMUM OF ONE FOOT OVERLAP FOR ALL REPAIRS AND FOR JOINING TWO PIECES OF GEOTEXTILE TOGETHER.
3. PREPARE THE SUBGRADE FOR GEOTEXTILE OR STONE FILTER (⅜ TO 1½ INCH STONE FOR 6 INCH MINIMUM DEPTH) AND RIPRAP TO THE REQUIRED LINES AND GRADES. COMPACT ANY FILL REQUIRED IN THE SUBGRADE TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL.
4. EXTEND GEOTEXTILE AT LEAST 6 INCHES BEYOND EDGES OF RIPRAP AND EMBED AT LEAST 4 INCHES AT SIDES OF THE RIPRAP.
5. CONSTRUCT RIPRAP OUTLET TO FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. PLACE STONE FOR RIPRAP OUTLET IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENOUS WITH THE SMALLER STONES AND SPALLS FILLING THE VOIDS BETWEEN THE LARGER STONES. PLACE RIPRAP IN A MANNER TO PREVENT DAMAGE TO THE STONE FILTER BLANKET OR GEOTEXTILE. HAND PLACE TO THE EXTENT NECESSARY.
6. WHERE NO ENDWALL IS USED, CONSTRUCT THE UPSTREAM END OF THE APRON SO THAT THE WIDTH IS TWO TIMES THE DIAMETER OF THE OUTLET PIPE, AND EXTEND THE STONE UNDER THE OUTLET BY A MINIMUM OF 18 INCHES.
7. CONSTRUCT APRON WITH 0% SLOPE ALONG ITS LENGTH AND WITHOUT OBSTRUCTIONS. PLACE STONE SO THAT IT BLENDS IN WITH EXISTING GROUND.
8. MAINTAIN LINE, GRADE, AND CROSS SECTION. KEEP OUTLET FREE OF EROSION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. AFTER HIGH FLOWS INSPECT FOR SCOUR AND DISLODGED RIPRAP. MAKE NECESSARY REPAIRS IMMEDIATELY.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

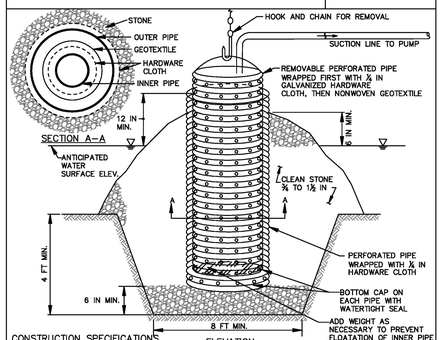
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

D.20

6 DETAIL ES-2 — DETAIL ROCK OUTLET PROTECTION

DETAIL F-1 REMOVABLE PUMPING STATION

STANDARD SYMBOL: RPS



CONSTRUCTION SPECIFICATIONS

1. USE CORRUGATED METAL OR PLASTIC PIPE WITH 1 INCH DIAMETER PERFORATIONS 6 INCHES ON CENTER.
2. USE A MINIMUM 12 INCH DIAMETER INNER PIPE WITH AN OUTER PIPE A MINIMUM 6 INCHES LARGER IN DIAMETER. BOTTOM OF EACH PIPE MUST BE CAPPED WITH WATERTIGHT SEAL.
3. WRAP EACH PIPE WITH ½ INCH GALVANIZED HARDWARE CLOTH. ON INNER PIPE WRAP NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, OVER THE HARDWARE CLOTH.
4. EXCAVATE 8 FEET X 8 FEET X 4 FEET DEEP PIT FOR PIPE PLACEMENT. PLACE CLEAN ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE, 6 INCHES IN DEPTH PRIOR TO PIPE PLACEMENT.
5. SET TOP OF INNER AND OUTER PIPES MINIMUM 12 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION (OR RISER CREST ELEVATION WHEN DEWATERING A BASIN).
6. BACKFILL PIT AROUND THE OUTER PIPE WITH ¾ TO 1½ INCH CLEAN STONE OR EQUIVALENT RECYCLED CONCRETE AND EXTEND STONE A MINIMUM OF 6 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION.
7. DISCHARGE TO A STABLE AREA AT A NONEROSIVE RATE.
8. A REMOVABLE PUMPING STATION REQUIRES FREQUENT MAINTENANCE. IF SYSTEM CLOGS, PULL OUT INNER PIPE AND REPLACE GEOTEXTILE. KEEP POINT OF DISCHARGE FREE OF EROSION.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

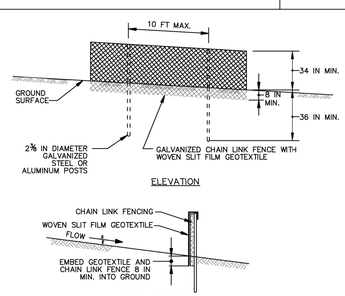
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

F.3

7 DETAIL ES-2 — DETAIL REMOVABLE PUMPING STATION

DETAIL E-3 SUPER SILT FENCE

STANDARD SYMBOL: SSF



CONSTRUCTION SPECIFICATIONS

1. INSTALL 2¾ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
2. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2⅜ INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HUG RINGS.
3. FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
4. WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
5. EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
6. PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
7. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL CHAIN LINK FENCING AND GEOTEXTILE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

F.7

8 DETAIL ES-2 — DETAIL SILT FENCE

STATE OF MARYLAND — MELISSA L. VISWAT — 37584 — PROFESSIONAL ENGINEER

SIGNATURE

7/31/2024

DATE

DATE: JULY 2024

FILE NO.: 2241-E&S-DetailsNotes

Geosyntec consultants

engineers | scientists | innovators

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4TH FLOOR
COLUMBIA, MD 21044
410.381.4333

REVISED		APPROVED: DocuSigned by: [signature] 8BAB7314DD324D0... CHIEF ENGINEER 7/4/2024 | 22:02 EDT	APPROVED: DocuSigned by: [signature] 0F5F5744483B484... PROJECT MANAGER 7/31/2024 | 11:56 PDT
DATE	BY	APPROVED: DocuSigned by: [signature] C0E3DE1728C5440... 7/31/2024 | 15:41 EDT	APPROVED: DocuSigned by: [signature] 75A0157DE43E4DB... CHIEF HIGHWAY ADMINISTRATOR 8/1/2024 | 12:18 PDT

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

SCALE:	1" = 200'
DRAWN BY:	BW
CHECKED BY:	MLV
DRAWING NO.:	ES-9 OF ES-10
SHEET NO.:	31 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: SEDIMENT AND EROSION CONTROL DETAILS

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B-3 STANDARDS AND SPECIFICATIONS FOR LAND GRADING

Definition
Reshaping the existing land surface to provide suitable topography for building facilities and other site improvements.

Purpose
To provide erosion control and vegetative establishment for extreme changes in grade.

Conditions Where Practice Applies
Earth disturbances or extreme grade modifications on steep or long slopes.

Design Criteria
The grading plan should be based on the incorporation of building designs and street layouts that fit and utilize existing topography and desirable natural surroundings to avoid extreme grade modifications. Information submitted must provide sufficient topographic surveys and soil investigations to determine limitations that must be imposed on the grading operation related to slope stability, adjacent properties, drainage patterns, measures for water removal, and vegetative treatment, etc.

Many jurisdictions have regulations and design procedures already established for land grading that must be followed. The plan must show existing and proposed contours for the area(s) to be graded including practices for erosion control, slope stabilization, and safe conveyance of runoff (e.g., waterways, lined channels, reverse benches, grade stabilization structures). The grading/construction plans are to include the phasing of these practices and consideration of the following:

1. Provisions to safely convey surface runoff to storm drains, protected outlets or stable water courses to ensure that surface runoff will not damage slopes or other graded areas.
2. Cut and fill slopes, stabilized with grasses, no steeper than 2:1. (Where the slope is to be mowed, the slope should be no steeper than 3:1, but 4:1 is preferred because of safety factors related to mowing steep slopes.) Slopes steeper than 2:1 require special design and stabilization considerations to be shown on the plans.
3. Benching per Detail B-3-1 whenever the vertical interval (height) of any 2:1 slope exceeds 20 feet; for 3:1 slopes, when it exceeds 30 feet; and for 4:1 slopes, when it exceeds 40 feet. Locate benches to divide the slope face as equally as possible and to convey the water to a stable outlet. Soils, seeps, rock outcrops, etc. are to be taken into consideration when designing benches.

   a. Provide benches with a minimum width of six feet for ease of maintenance.
   b. Design benches with a reverse slope of 6:1 or flatter to the toe of the upper slope and with a minimum of one foot in depth. Grade the longitudinal slope of the bench between 2 percent and percent, unless accompanied by appropriate design and computations.
   c. The maximum allowable flow length within a bench is 800 feet unless accompanied by appropriate design and computations.

4. Diversion of surface water from the face of all cut and fill slopes using earth dikes or swales. Convey surface water down slope using a designed structure, and:

   a. Protect the face of all graded slopes from surface runoff until they are stabilized.
   b. Do not subject the slope's face to any concentrated flow of surface water such as from natural drainage ways, graded swales, downspouts, etc.
   c. Protect the face of the slope by special erosion control materials to include, but not be limited to, approved vegetative stabilization practices, riprap or other approved stabilization methods.

5. Serrated slope as shown in Detail B-3-2. The steepest allowable slope for ripable rock is 1.5:1. For non-rock surfaces, the slopes are to be 2:1 or flatter. These steps will weather and act to hold moisture, lime, fertilizer and seed thus producing a much quicker and longer lived vegetative cover and better slope stabilization.
6. Subsurface drainage provisions. Provide subsurface drainage where necessary to intercept seepage that would otherwise adversely affect slope stability or create excessively wet site conditions.
7. Proximity to adjacent property. Slopes must not be created close to property lines without adequate protection against sedimentation, erosion, slippage, settlement, subsidence, or other related damages.
8. Quality of fill material. Fill material must be free of brush, rubbish, logs, stumps, building debris, and other objectionable material. Do not place frozen materials in the fill nor place the fill material on a frozen foundation.
9. Stabilization. Stabilize all disturbed areas structurally or vegetatively in compliance with Section B-4 Standards and Specifications for Stabilization Practices.

Maintenance
The line, grade, and cross section of benching and serrated slopes must be maintained. Benches and serrated slopes must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization.

B-4 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION

Definition
Using vegetation as cover to protect exposed soil from erosion.

Purpose
To promote the establishment of vegetation on exposed soil.

Conditions Where Practice Applies
On all disturbed areas not stabilized by other methods. This specification is divided into sections on incremental stabilization; soil preparation, soil amendments and topsoiling; seeding and mulching; temporary stabilization; and permanent stabilization.

Effects on Water Quality and Quantity
Stabilization practices are used to promote the establishment of vegetation on exposed soil. When soil is stabilized with vegetation, the soil is less likely to erode and more likely to allow infiltration of rainfall, thereby reducing sediment loads and runoff to downstream areas.

Planting vegetation in disturbed areas will have an effect on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, percolation, and groundwater recharge. Over time, vegetation will increase organic matter content and improve the water holding capacity of the soil and subsequent plant growth.

Vegetation will help reduce the movement of sediment, nutrients, and other chemicals carried by runoff to receiving waters. Plants will also help protect groundwater supplies by assimilating those substances present within the root zone.

Sediment control practices Must remain in place during grading, seedbed preparation, seeding, mulching, and vegetative establishment.

Adequate Vegetative Establishment
Inspect seeded areas for vegetative establishment and make necessary repairs, replacements, and reseedings within the planting season.

1. Adequate vegetative stabilization requires 95 percent groundcover.
2. If an area has less than 40 percent groundcover, restabilize following the original recommendations for lime, fertilizer, seedbed preparation, and seeding.
3. If an area has between 40 and 94 percent groundcover, over-seed and fertilize using half of the rates originally specified.
4. Maintenance fertilizer rates for permanent seeding are shown in Table B.6.

B-4-1 STANDARDS AND SPECIFICATIONS FOR INCREMENTAL STABILIZATION

Definition
Establishment of vegetative cover on cut and fill slopes.

Purpose
To provide timely vegetative cover on cut and fill slopes as work progresses.

Conditions Where Practice Applies
Any cut or fill slope greater than 15 feet in height. This practice also applies to stockpiles.

Criteria:
A. Incremental Stabilization – Cut Slopes

1. Excavate and stabilize cut slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all cut slopes as the work progresses.
2. Construction sequence example (refer to figure b.1):
   a. Construct and stabilize all temporary swales or dikes that will be used to convey runoff around the excavation.
   b. Perform phase 1 excavation, prepare seedbed, and stabilize.
   c. Perform phase 2 excavation, prepare seedbed, and stabilize. overseed phase 1 areas as necessary.
   d. Perform final phase excavation, prepare seedbed, and stabilize. overseed previously seeded areas as necessary.

Note: Once excavation has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

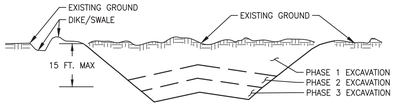


FIGURE B.1 INCREMENTAL STABILIZATION – CUT

B. Incremental Stabilization – Fill Slopes

1. Construct and stabilize fill slopes in increments not to exceed 15 feet in height. prepare seedbed and apply seed and mulch on all slopes as the work progresses.
2. Stabilize slopes immediately when the vertical height of a lift reaches 15 feet, or when the grading operation ceases as prescribed in the plans.
3. At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
4. Construction sequence example (Refer to figure B.2):
   a. Construct and stabilize all temporary swales or dikes that will be used to divert runoff around the fill. Construct silt fence on low side of fill unless other methods shown on the plans address this area.
   b. At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
   c. Place phase 1 fill, prepare seedbed, and stabilize.
   d. Place phase 2 fill, prepare seedbed, and stabilize.
   e. Place final phase fill, prepare seedbed, and stabilize. overseed previously seeded areas as necessary.

NOTE: Once the placement of fill has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

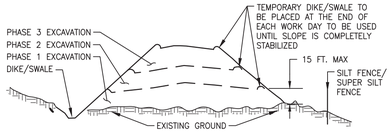


FIGURE B.2 INCREMENTAL STABILIZATION – FILL

B-4-2 STANDARDS AND SPECIFICATIONS FOR SOIL PREPARATION, TOPSOILING, AND SOIL

Definition: The process of preparing the soils to sustain adequate vegetative stabilization.
Purpose: To provide a suitable soil medium for vegetative growth.

Conditions Where Practice Applies:
Where vegetative stabilization is to be established.

Criteria:
A. Soil Preparation

1. Temporary stabilization
   a. Seedbed preparation consists of loosening soil to a depth of 3 to 5 inches by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened, it must not be rolled or dragged smooth but left in the roughened condition, slopes 3:1 or flatter are to be tracked with ridges running parallel to the contour of the slope.
   b. Apply fertilizer and lime as prescribed on the plans.
   c. Incorporate lime and fertilizer into the top 3 to 5 inches of soil by disking or other suitable means.

2. Permanent stabilization
   a. A soil test is required for any earth disturbance of 5 acres or more. The minimum soil conditions required for permanent vegetative establishment are:
      i. Soil ph between 6.0 and 7.0.
      ii. Soluble salts less than 500 parts per million (PPM). Soil contains less than 40 percent clay but enough fine grained material(greater than 30 percent silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception: if lovegrass will be planted, then a sandy soil (less than 30 percent silt plus clay) would be acceptable.
      iii. Soil contains 1.5 percent minimum organic matter by weight.
      iv. Soil contains sufficient pore space to permit adequate root penetration.
   b. Application of amendments or topsoil is required if on-site soils do not meet the above conditions.
   c. Graded areas must be maintained in a true and even grade, as specified on the approved plan, then scarified or otherwise loosened to a depth of 3 to 5 inches.
   d. Apply soil amendments as specified on the approved plan or as indicated by the results of a soil test.
   e. Mix soil amendments into the top 3 to 5 inches of soil by disking or other suitable means. RAke lawn areas to smooth the surface, remove largeobjects like stones and branches, and ready the area for seed application. Loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface where site conditions will not permit normal seedbed preparation. Track slopes 3:1 or flatter with tracked equipment leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. leave the top 1 to 3 inches of soil loose and friable. Seedbed loosening may be unnecessary on newly disturbed areas.

PROPOSED CHANNEL AND DIKE SCHEDULE					
ID	SIDE SLOPE	DEPTH	BOTTOM WIDTH	SLOPE	COVER TYPE
1	1:1	3	6	1.0%	GEOMEMBRANE LINING
2	1	3	6	4.0%	GEOMEMBRANE LINING
3	2:1	1	4	2.3%	RIPRAP LINED
4	2:1	1.25	6	0.3%	GEOMEMBRANE LINING

NOTES:
1. CHANNELS 1 AND 2 SHALL BE CONSTRUCTED PER SECTION 3 ON DRAWING C-11.
2. CHANNEL 3 SHALL BE CONSTRUCTED PER DETAIL 5 ON DRAWING C-11.
3. CHANNEL 4 SHALL BE CONSTRUCTED PER DETAIL 5 ON DRAWING C-12.

B-4-2 continued...

B. Topsoiling

1. Topsoiling is placed over prepared subsoil prior to establishment of permanent vegetation. The purpose is to provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low PH, materials toxic to plants, and/or unacceptable soil gradation.
2. Topsoil salvaged from an existing site may be used provided it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the soil survey published by USDA-NRCS.
3. Topsoiling is limited to areas having 2:1 or flatter slopes where:
   a. the texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
   b. the soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
   c. the original soil to be vegetated contains material toxic to plant growth.
   d. the soil is so acidic that treatment with limestone is not feasible.
4. Areas having slopes steeper than 2:1 require special consideration and design.
5. Topsoil specifications: soil to be used as topsoil must meet the following criteria:
   a. Topsoil must be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand. other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Topsoil must not be a mixture of contrasting textured subsoils and must contain less than 5 percent by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1½ inches in diameter.
   b. Topsoil must be free of noxious plants or plant parts such as bermuda grass, quack grass, johnson grass, nut sedge, poison ivy, thistle, or others as specified.
   c. Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.
6. Topsoil application
   a. Erosion and sediment control practices must be maintained when applying topsoil.
   b. Uniformly distribute topsoil in a 5 to 8 inch layer and lightly compact to a minimum thickness of 4 inches. spreading is to be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any remaining soil exposed or resulting from topsoiling or other operations must be corrected in order to prevent the formation of depressions or water pockets.
   c. Topsoil must not be placed if the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed preparation

C. Soil amendments (Fertilizer and lime specifications)
1. Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas of 5 acres or more. soil analysis may be performed by a recognized private or commercial laboratory. soil samples taken for engineering purposes may also be used for chemical analyses.
2. Fertilizers must be uniform in composition, free flowing and suitable for accurate application by appropriate equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. fertilizers must all be delivered to the site fully labeled according to the applicable laws and must bear the name, trade name or trademark and warranty of the producer.
3. Lime materials must be ground limestone (Hydrated or burnt lime may be substituted except when hydroseeding) which contains at least 50 percent total oxides (Calcium Oxide plus Magnesium Oxide). Limestone must be ground to such fineness that at least 50 percent will pass through a #100 mesh sieve and 98 to 100 percent will pass through a #20 mesh sieve.
4. Lime and fertilizer are to be evenly distributed and incorporated into the top 3 to 5 inches of soil by disking or other suitable means.
5. Where the subsoil is either highly acidic or composed of heavy clays, spread ground limestone at the rate of 4 to 8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil.

B-4-4 STANDARDS AND SPECIFICATIONS FOR TEMPORARY STABILIZATION

Definition:
To stabilize disturbed soils with vegetation for up to 6 months.
Purpose:
To use fast growing vegetation that provides cover on disturbed soils.
Conditions Where Practice Applies:
Exposed soils where ground cover is needed for a period of 6 months or less. for longer duration of time, permanent stabilization practices are required.

Criteria:
1. Select one or more of the species or seed mixtures listed in table b.1 for the appropriate plant hardiness zone (from figure B.3), and enter them in the temporary seeding summary below along with application rates, seeding dates and seeding depths. if this summary is not put on the plan and completed, then table B.1 plus fertilizer and lime rates must be put on the plan.
2. For sites having soil tests performed, use and show the recommended rates by the testing agency. soil tests are not required for temporary seeding.
3. When stabilization is required outside of a seeding season, apply seed and mulch or straw mulch alone as prescribed in section B-4-3.A.1.B and maintain until the next seeding season.

TEMPORARY SEEDING SUMMARY						
SEED MIXTURE (HARDINESS ZONE 7A) FROM TABLE 26					FERTILIZER RATE (10–10–10)	LIME RATE
No.	Species	Application rate(lb/ac)	Seeding Dates	Seeding Depths		
1	Annual Ryegrass	40	3/1–5/31 8/1–10/15	surface	436 lb/ac (10lb/1000sf)	2 tons/ac. (90lb/1000sf)
2	Barley	96	3/1–5/31 8/1–10/15	surface		
3	Foxtail Millet	30	5/16–7/31	surface		

plot

SEED MIXTURE (HARDINESS ZONE 6B) FROM TABLE 25					FERTILIZER RATE (10–20–20)			LIME RATE
No.	Species	Application Rates(lb/ac)	Seeding Dates	Seeding Depths	N	P205	K20	
1	SWITCH GRASS CREEPING RED FESCUE PARTRIDGE PEA	10 15 4	3/1–5/15 AND 8/15–10/15	1/12" TO 1/4"	45 lb/ac (1.0 lb/ 1000sf.)	90 lb/ac (2.0 lb/ 1000sf.)	90 lb/ac (2.0 lb/ 1000sf.)	2 tons/ac (90.0 lb/ 1000sf.)
2	BIG BLUESTEM INDIAN GRASS LITTLE BLUESTEM CREEPING RED FESCUE PARTRIDGE PEA	m	3/1–5/15 AND 8/15–10/15	1/12" TO 1/4"				
3	DEER TOUNGE CREEPING RED FESCUE VIRGINIA WILD RYE	15 20 10	3/1–5/15 AND 8/15–10/15	1/12" TO 1/4"				

CULVERT SCHEDULE					
CULVERT ID	SIZE (LxD) OR (Lx(WxH))	INVERT IN	INVERT OUT	SLOPE	MATERIAL (SEE NOTE 1 AND 2)
C-0	100' x 12" Ø x 6	132.60	130.25	2.35%	REINFORCE CONCRETE BOX CULVERTS
C-1	100' x 18" Ø x 8	129.20	129.00	0.25%	REINFORCE CONCRETE BOX CULVERTS
C-2	80' x (4' x 4') x 2	124.00	123.00	2.00%	REINFORCE CONCRETE BOX CULVERTS
C-3	40' x 18" Ø x 5	155.62	154.02	1.00%	REINFORCE CONCRETE BOX CULVERTS
C-4	40' x 18" Ø x 5	155.62	154.02	1.00%	REINFORCE CONCRETE BOX CULVERTS
C-5	40' x 18" Ø x 5	145.00	145.40	4.00%	REINFORCE CONCRETE BOX CULVERTS
C-6	40' x 18" Ø x 5	145.00	145.40	4.00%	REINFORCE CONCRETE BOX CULVERTS
C-7	40' x 18" Ø x 5	145.00	139.40	4.00%	REINFORCE CONCRETE BOX CULVERTS
C-8	40' x 18" Ø x 5	141.00	139.40	4.00%	REINFORCE CONCRETE BOX CULVERTS
C-9	30' x 36" Ø x 2	119.62	119.57	0.17%	ADS N-12 DUAL WALL - HDPE PIPE
C-10	50' x 36" Ø x 2	206.73	205.75	1.96%	ADS N-12 DUAL WALL - HDPE PIPE

NOTES:
1. ALL HDPE PIPES SHALL HAVE AT LEAST ONE FOOT OF COVER.
2. CONTRACTOR SHALL INSTALL THE PIPES PER MANUFACTURER RECOMMENDATIONS.

B-4-8 STANDARDS AND SPECIFICATIONS FOR STOCKPILE AREA

Definition:
A mound or pile of soil protected by appropriately designed erosion and sediment control measures,
Purpose:
To provide a designated location for the temporary storage of soil that controls the potential for erosion, sedimentation, and changes to drainage patterns.
Conditions Where Practice Applies:
Stockpile areas are utilized when it is necessary to salvage and store soil for later use.

Criteria:
1. The stockpile location and all related sediment control practices must be clearly indicated on the erosion and sediment control plan.
2. The footprint of the stockpile must be sized to accommodate the anticipated volume of material and based on a side slope ratio no steeper than 2:1. Benching must be provided in accordance with Section B-3 Land Grading.
3. Runoff from the stockpile area must drain to a suitable sediment control practice.
4. Access the stockpile area from the upgrade side.
5. Clear water runoff into the stockpile area must be minimized by use of a diversion device such as an earth dike, temporary swale or diversion fence. Provisions must be made for discharging concentrated flow in a non-erosive manner.
6. Where runoff concentrates along the toe of the stockpile fill, an appropriate erosion/sediment control practice must be used to intercept the discharge.
7. Stockpiles must be stabilized in accordance with the 3/7 day stabilization requirement as well as Standard B-4-1 Incremental Stabilization and Standard B-4-4 Temporary Stabilization.
8. If the stockpile is located on an impervious surface, a liner should be provided below the stockpile to facilitate cleanup. Stockpiles containing contaminated material must be covered with impermeable sheeting.

Maintenance
The stockpile area must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization. Side slopes must be maintained at no steeper than a 2:1 ratio. The stockpile area must be kept free of erosion. If the vertical height of a stockpile exceeds 20 feet for 2:1 slopes, 30 feet for 3:1 slopes, or 40 feet for 4:1 slopes, benching must be provided in accordance with Section B-3 Land Grading.

2018 VEGETATIVE ESTABLISHMENT

Following initial soil disturbances or redisturbance, permanent or temporary stabilization shall be completed within three calendar days for the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes greater than 3 horizontal to 1 vertical (3:1) and seven days for all other disturbed or graded areas on the project site.

1. Permanent Seeding:

   A. Soil Tests: Lime and fertilizer will be applied per soil tests results for sites greater than 5 acres. Soil tests will be done at completion of initial rough grading or as recommended by the sediment control inspector. Rates and analyses will be provided to the grading inspector as well as the contractor.

      Occurrence of acid sulfate soils (grayish black color) will require covering with a minimum of 12 inches of clean soil with 6 inches minimum capping of top soil. No stockpiling of material is allowed. If needed, soil tests should be done before and after a 6–week incubation period to allow oxidation of sulfates.

      The minimum soil conditions required for permanent vegetative establishment are:

      a. Soil pH shall be between 6.0 and 7.0.
      b. Soluble salts shall be less than 500 parts per million (ppm).
      c. The soil shall contain less than 40% clay but enough fine grained material (> 30% silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception is if lovegrass or sericia lespedeza is to be planted, then a sandy soil (< 30% silt plus clay) would be acceptable.
      d. Soil shall contain 1.5% minimum organic matter by weight.
      e. Soil must contain sufficient pore space to permit adequate root penetration.
      f. If these conditions cannot be met by soils on site, adding topsoil is required in accordance with the Standard and Specification for Soil Preparation, Topsoiling and Soil Amendments from the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control or amendments made as recommended by a certified agronomist.

   B. Seedbed Preparation: Area to be seeded shall be loose and friable to a depth of at least 3–5 inches. The top layer shall be loosened by raking, disking or other acceptable means before seeding occurs. For sites less than 5 acres, apply 100 pounds dolomitic limestone and 21 pounds of 10–10–10 fertilizer per 1,000 square feet. Harrow or disk lime and fertilizer into the soil to a depth of at least 3–5 inches on slopes flatter than 3:1.

   C. Seeding: Apply 5–6 pounds per 1,000 square feet of tall fescue between February 1 and April 30 or between August 15 and October 31. Apply seed uniformly on a moist firm seedbed with a cyclone seeder, cultipacker seeder or hydroseeder (slurry includes seeds and fertilizer, recommended on steep slopes only). Maximum seed depth should be ¼ inch in clayey soils and ½ inch in sandy soils when using other than the hydroseeder method. Irrigate where necessary to support adequate growth until vegetation is firmly established. If other seed mixes are to be used, select from Table B.3 and B.5 of the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control.

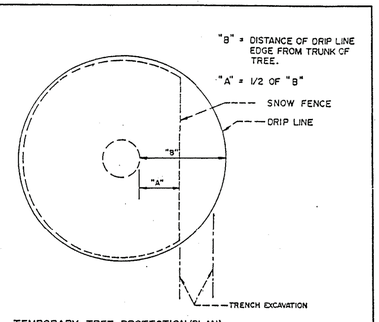
   D. Mulching: Mulch shall be applied to all seeded areas immediately after seeding. During the time periods when seeding is not permitted, mulch shall be applied immediately after grading. Mulch shall be unrotted, unchopped, small grain straw applied at a rate of 2 tons per acre or 90 pounds per 1,000 square feet (2 bales). Apply mulch to achieve a uniform distribution and depth so that the soil surface is not exposed. If a mulch–anchoring tool is used, apply 2.5 tons per acre. Mulch materials shall be relatively free of all kinds of weeds and shall be completely free of prohibited noxious weeds. Spread mulch uniformly, mechanically or by hand, to a depth of 1–2 inches.

2018 VEGETATIVE ESTABLISHMENT continued...

   E. Securing Straw Mulch: Straw mulch shall be secured immediately following mulch application to minimize movement by wind or water. The following methods are permitted:

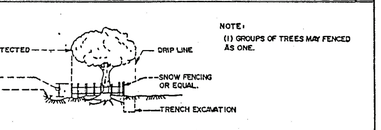
      i. Use a mulch–anchoring tool which is designed to punch and anchor mulch into the soil surface to a minimum depth of 2 inches. This is the most effective method for securing mulch, however, it is limited to relatively flat areas where equipment can operate safely.
      ii. Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight of 750 pounds per acre. If mixed with water, use 50 pounds of wood cellulose fiber per 100 gallons of water.
      iii. Liquid binders may be used. Apply at higher rates at the edges where wind catches mulch, such as in valleys and on crests of slopes. The remainder of the area should appear uniform after binder application. Binders listed in the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control or approved equal shall be applied at rates recommended by the manufacturers.
      iv. Lightweight plastic netting may be used to secure mulch. The netting will be stapled to the ground according to manufacturer's recommendations.

2. Temporary Seeding:
   Lime: 100 pounds of dolomitic limestone per 1,000 square feet.
   Fertilizer: 15 pounds of 10–10–10 per 1,000 square feet.
   Seed: Perennial rye – 0.92 pounds per 1,000 square feet (February 1 through April 30 or August 15 through October 31).
   Millet – 0.92 pounds per 1,000 square feet (May 1 through August 15).
   Mulch: Same as 1 D and E above.
3. No fills may be placed on frozen ground. All fill is to be placed in approximately horizontal layers, each layer having a loose thickness of not more than 8 inches. All compaction requirements are in accordance to Anne Arundel County Standard Specifications for Construction as well as the AA County Design Manual and Standard details. Fills for pond embankments shall be compacted as per MD–378 Construction Specifications. All other fills shall be compacted sufficiently so as to be stable and prevent erosion and slippage.
4. Permanent Sod:
   Installation of sod should follow permanent seeding dates. Seedbed preparation for sod shall be as noted in section (B) above. Permanent sod is to be tall fescue, state approved sod; lime and fertilizer per permanent seeding specifications and lightly irrigate soil prior to laying sod. Sod is to be laid on the contour with all ends tightly abutting. Joints are to be staggered between rows. Water roll or tamp sod to insure positive root contact with the soil. All slopes steeper than 3:1, as shown, are to be permanently sodded or protected with an approved erosion control netting. Additional watering for establishment may be required. Sod is not to be installed on frozen ground. Sod shall not be transplanted when moisture content (dry or wet) and/or extreme temperature may adversely affect its survival. In the absence of adequate rainfall, irrigation should be performed to ensure establishment of sod.
5. Mining Operations:
   Sediment control plans for mining operations must include the following seeding dates and mixtures:
   For seeding dates of February 1 through April 30 and August 15 through October 31, use seed mixture of tall fescue at the rate of 2 pounds per 1,000 square feet and sericea lespedeza at the minimum rate of 0.5 pounds per 1,000 square feet.
6. Topsoil shall be applied as per the Standard and Specifications for Soil Preparation, Topsoiling, and Soil Amendments from the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control.
7. Use of these Vegetative Establishment Specifications does not preclude the permittee or contractor from meeting all of the requirements set forth in the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control.
8. Stockpiles:
   A. Stockpiles shall not exceed a max slope of 2:1.
   B. Temporary stabilize stockpiles per the vegetative stabilization specifications above or cover stockpile with plastic tarp and anchor at end of work day. All stockpiles shall be permanently stabilized at the end of the project with a minimum of 4" of topsoil cover and vegetative stabilization.



TEMPORARY TREE PROTECTION (PLAN)

NOTE: FENCING SHALL BE PLACED AT THE DRIP LINE OF TREES TO BE PROTECTED DURING CONSTRUCTION EXCEPT ON THE SIDE OF THE UTILITY TRENCHING. FENCING SHALL NOT BE PLACED CLOSER TO THE TREE THAN 1/2 THE TOTAL DISTANCE FROM THE TREE TO THE LIMITS OF THE TREE'S DRIP LINE. THIS MODIFICATION SHALL BE ALLOWED TO ACCOMODATE TRENCHING ONLY AND NOT TO ALLOW ADDITIONAL WORKING SPACE.



TEMPORARY TREE PROTECTION DETAIL
TO BE USED DURING CONSTRUCTION

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

APPROVED
CHIEF, BUREAU OF ENGINEERING
DESIGN ENGINEER
DATE

STANDARD LANDSCAPING DETAILS
TREE PROTECTION DETAILS

REVISED

L 2

Published: 01/01 Revised:

STATE OF MARYLAND — STEVEN VISINTAINER — 57584 — PROFESSIONAL ENGINEER
SIGNATURE
7/31/2024
DATE

DATE: JULY 2024
FILE NO.: 2241-E&S-DetailsNotes

Geosyntec consultants
engineers | scientists | innovators
10211 WINCOPIN CIRCLE
4TH FLOOR
COLUMBIA, MD 21044
410.381.4333

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED		APPROVED: DATE	APPROVED: DATE	SCALE: NTS	PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
DATE	BY	DocuSigned by: '4/2024 | 22:02 EDT CHIEF ENGINEER	DocuSigned by: 7/31/2024 | 11:56 EDT PROJECT MANAGER	DRAWN BY: BW	
		APPROVED: DATE	APPROVED: DATE	CHECKED BY: MLV	
		DocuSigned by: 7/31/2024 | 15:41 EDT	DocuSigned by: 7/31/2024 | 12:18 EDT	DRAWING NO.: ES-10 OF ES-10	TITLE: SEDIMENT AND EROSION CONTROL NOTES
		CHIEF, BUREAU OF ENGINEERING	CHIEF, BUREAU OF WAT	SHEET NO.: 32 OF 36	
				PROJECT NO.: ME2241	

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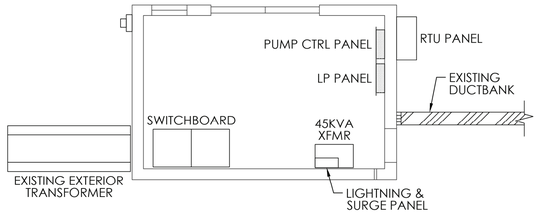

1 / E-1 EXISTING CONTROL/POWER BUILDING FLOOR PLAN

NO SCALE

CELLS 5,6,7 (CLOSED)

CELL 8 (CLOSED)

POND 8-1

POND 9-2

GRAVITY MAIN CLEANOUT

LEACHATE COLLECTION RISER VAULT 2

FORCEMAIN AND VALVE MANHOLE

HH-14 HH-15 HH-16 HH-17 HH-18

STACKED TEE SUMP

REFER TO ENLARGED PARTIAL SITE PLAN 1/E-2 FOR WORK IN THIS AREA

HH-13

LEACHATE WET WELL

JOEL SALINE WAY

HH-11 HH-12

WELLS BRANCH

SUBCELL 9.3 (PROPOSED)

SUBCELL 9.2 (ACTIVE)

SUBCELL 9.1 (ACTIVE)

HH-10

EDGE OF LINER

HH-9

SUBCELL 9.4 (FUTURE)

EXISTING RECYCLING AREA

LEACHATE PRETREATMENT BUILDING AND STORAGE TANKS

HH-6 HH-7 HH-8

REFER TO DETAIL 1/E-1 FOR PARTIAL CONTROL/POWER BUILDING FLOOR PLAN AT SWITCHBOARD

SUBCELL 9.5 (FUTURE)

DENSE WOODS

TW-4

TW-4B

J-33

J-22

DICUS MILL ROAD

SCALE FACILITY

2 / E-1 PARTIAL SITE PLAN - SUBCELL 9.3

SCALE: 1" = 200'-0"

0 200' 400'

SCALE IN FEET

GENERAL NOTES

(NOT REFERENCED ON DRAWINGS)

1. ALL CONDUIT ABOVE GRADE SHALL BE PVC COATED RIGID STEEL. TRANSITION TO UG PVC CONDUIT 24" BELOW GRADE.
2. MAINTAIN A MINIMUM OF 48" CLEARANCE BETWEEN CONDUITS/DUCTBANK AND LFG PIPING.
3. NEW UNDERGROUND ELECTRIC SERVICES SHALL NOT ENCROACH ON THE CELL LIMIT/DESIGN TOE OF LANDFILL. REFER TO LEGEND & ABBREVIATIONS FOR SITE PLAN DESIGNATIONS.
4. SCADA SYSTEM SHALL MONITOR HIGH LEVEL ALARM FLOAT ONLY. FINAL SCADA SYSTEM CONNECTIONS, PROGRAMMING AND I/O INTERFACE TO EXISTING PLC BY OTHERS OR BY ALLOWANCE.

LEGEND & ABBREVIATIONS

	CELL LIMIT
190	EXISTING GRADE CONTOUR (FEET-MSL)
230	PERMITTED FINAL GRADE CONTOUR (FEET-MSL)
	DESIGN TOE OF LANDFILL
	EXISTING STRUCTURE / BUILDING
	EXISTING FENCE
	EXISTING RETAINING WALL
	EXISTING PAVED ROAD
	EXISTING GRAVEL DRIVE
	EXISTING GUARDRAIL
	EXISTING TREELINE
E	EXISTING ELECTRIC LINE
T T	EXISTING TELECOMMUNICATION LINE
LC	EXISTING GRAVITY LEACHATE HEADER
	EXISTING LEACHATE FORCEMAIN
U	EXISTING UNDERDRAIN LINE
G	EXISTING GAS LINE
LFG	EXISTING LFG TRANSMISSION LINE
	EXISTING WIRING AND/OR EQUIPMENT TO REMAIN, OR PROVIDED BY OTHERS
DP-3	NEW WIRING AND/OR EQUIPMENT, ARROW INDICATES HOMERUN, LETTERS DENOTE CIRCUIT
	NEW WIRING RUN UNDERGROUND
A / B	EQUIPMENT REFERENCE SYMBOL
	CONNECT NEW TO EXISTING
S ,S3	SWITCH: SINGLE POLE, 3-WAY
	CIRCUIT BREAKER
	DISCONNECT SWITCH : POLES & AMPACITY AS NOTED
	STARTER: SIZE & TYPE AS NOTED
	DUPLEX CONVENIENCE RECEPTACLE MOUNTED 18" A.F.F.-U.N.O.
J	JUNCTION BOX ; SURFACE MOUNTED, FLUSH MOUNTED
2	MOTOR AND MOTOR OUTLET: NUMBER DENOTES HORSEPOWER OR WATTS IF GREATER THAN 50
	TRANSFORMER
AG	ABOVE GRADE
HH	HANDHOLE
LFG	LANDFILL GAS
MTD	MOUNTED
PNL	PANEL
SPD	SURGE PROTECTIVE DEVICE:
TYP.	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VIF	VERIFY IN FIELD
W/	WITH
WP	WEATHERPROOF
XFMR	TRANSFORMER

SITE NOTES

(NOT REFERENCED ON DRAWINGS)

1. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTORS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
2. CONTRACTOR SHALL OBTAIN THE SERVICES OF AN INDEPENDENT TESTING COMPANY, WHO SHALL BE RESPONSIBLE FOR THE IDENTIFICATION AND LOCATION OF ALL SITE UTILITIES IN THE AREA OF EXCAVATION OR DRILLING. NO ADDITIONAL COMPENSATION SHALL BE GIVEN FOR REPAIRS REQUIRED FOR DAMAGES TO EXISTING SITE UTILITIES.
3. CONTRACTOR SHALL IMMEDIATELY REPAIR, AT NO ADDITIONAL COST TO THE OWNER, ANY DAMAGE DURING EXCAVATION/ BACKFILLING, OR BORING TO EXISTING SITE UTILITIES.

N

STATE OF MARYLAND EDWARD T. FAYDA 25529 PROFESSIONAL ENGINEER

SIGNATURE

08-08-2023

DATE

DATE: AUGUST 2023

FILE NO.: E-1

FAYDA ENGINEERING & ENERGY SOLUTIONS, LLC
801 W. Newport Pike,
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Tel: 302-999-1060
Fax: 302-999-1053
www.FaydaEES.com
FE&ES COMM. NO: 22-1531

ANNE ARUNDEL COUNTY

DEPARTMENT OF PUBLIC WORKS

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APPROVED: DATE — DocuSigned by: /2024 | 15:41 EDT — C0E3DE1728C5440... — R

APPROVED: DATE — DocuSigned by: 024 | 12:18 PDT — 75A01576E43E4D8... — CHIEF, HWPT-I/C-WAT

SCALE:	AS NOTED
DRAWN BY:	MG
CHECKED BY:	EF
DRAWING NO.:	E-1 OF E-4
SHEET NO.:	33 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: SITE PLAN & PARTIAL CONTROL BUILDING FLOOR PLAN

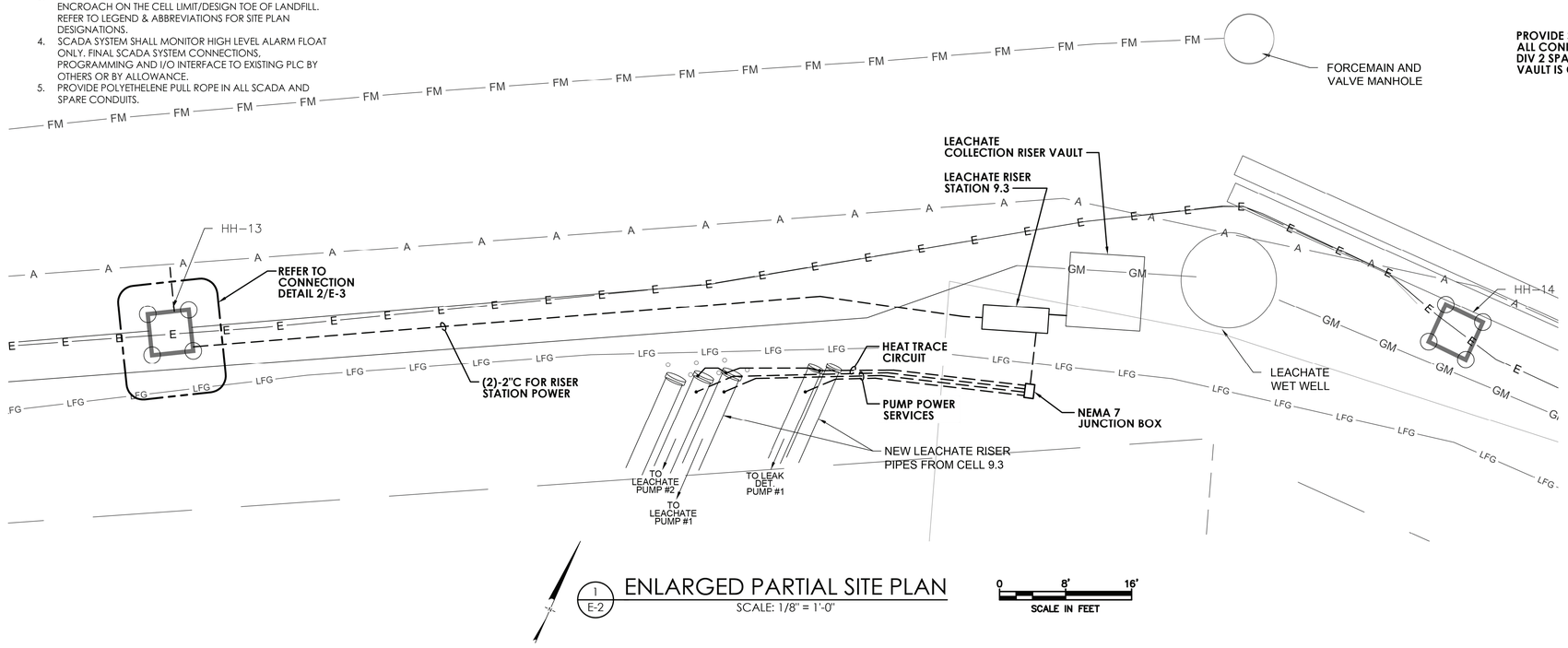
Docusign Envelope ID: 7E24C6D7-91F4-4129-A15E-3B231801329D

GENERAL NOTES
(NOT REFERENCED ON DRAWINGS)

1. ALL CONDUIT ABOVE GRADE SHALL BE PVC COATED RIGID STEEL. TRANSITION TO UG PVC CONDUIT 24" BELOW GRADE.
2. MAINTAIN A MINIMUM OF 48" CLEARANCE BETWEEN CONDUITS/DUCTBANK AND LFG PIPING.
3. NEW UNDERGROUND ELECTRIC SERVICES SHALL NOT ENCROACH ON THE CELL LIMIT/DESIGN TOE OF LANDFILL. REFER TO LEGEND & ABBREVIATIONS FOR SITE PLAN DESIGNATIONS.
4. SCADA SYSTEM SHALL MONITOR HIGH LEVEL ALARM FLOAT ONLY. FINAL SCADA SYSTEM CONNECTIONS, PROGRAMMING AND I/O INTERFACE TO EXISTING PLC BY OTHERS OR BY ALLOWANCE.
5. PROVIDE POLYETHELENE PULL ROPE IN ALL SCADA AND SPARE CONDUITS.

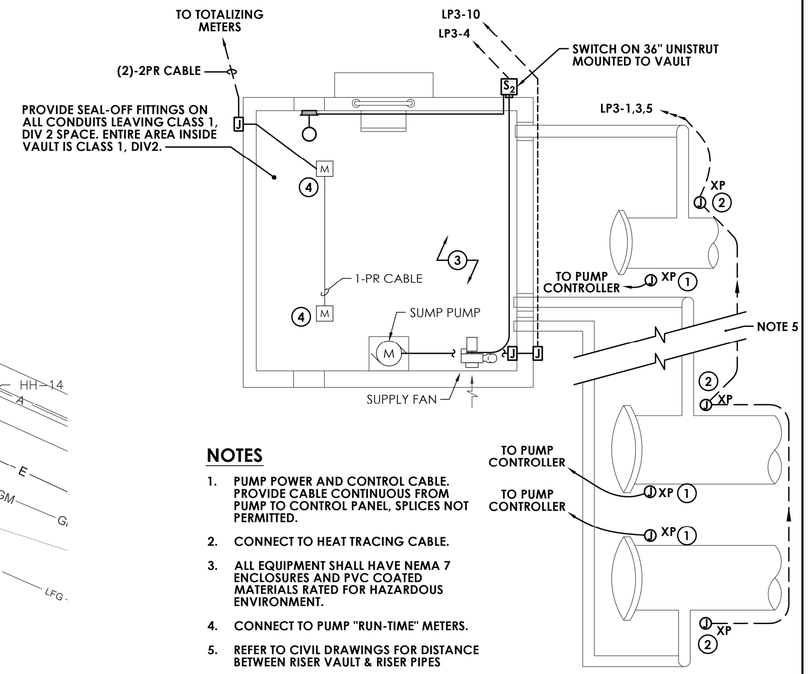
SHEET NOTES

1. ALL WIREWAYS SHALL BE PROVIDED WITH 4" DIAMETER STAINLESS STEEL VENTILATING SCREEN ON EACH END OF WIREWAY.



1 / E-2 ENLARGED PARTIAL SITE PLAN
SCALE: 1/8" = 1'-0"

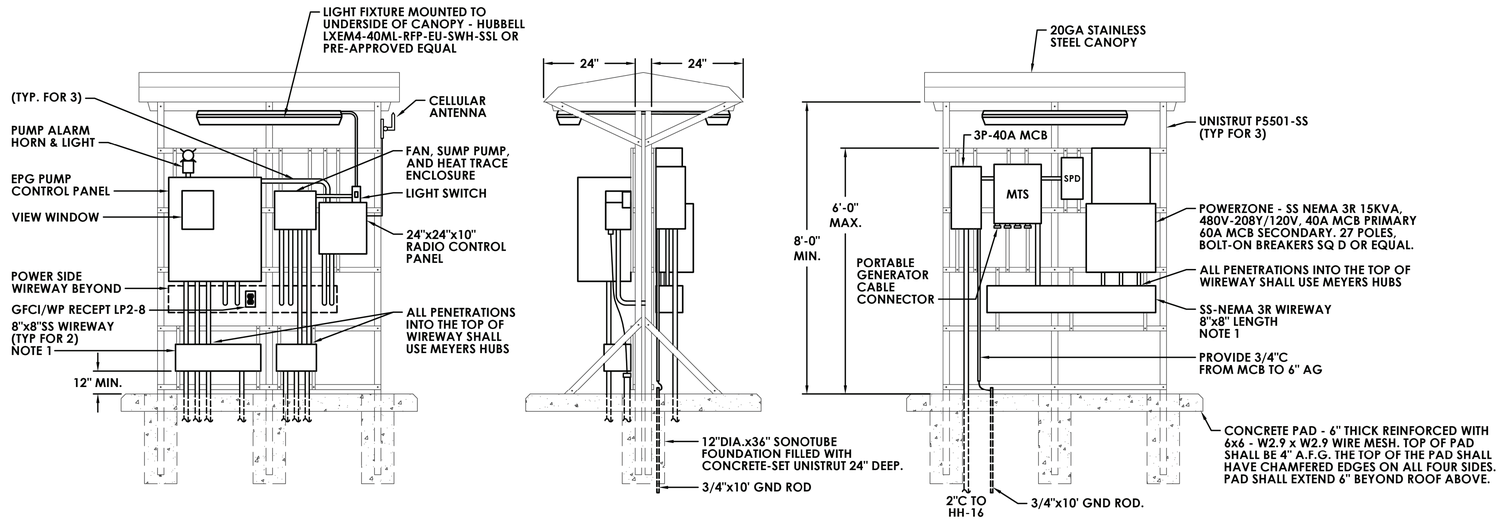
0 8' 16'
SCALE IN FEET



NOTES

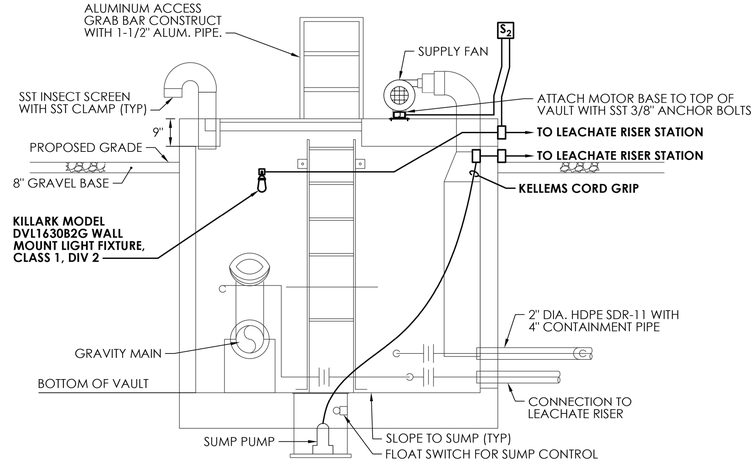
1. PUMP POWER AND CONTROL CABLE. PROVIDE CABLE CONTINUOUS FROM PUMP TO CONTROL PANEL, SPLICES NOT PERMITTED.
2. CONNECT TO HEAT TRACING CABLE.
3. ALL EQUIPMENT SHALL HAVE NEMA 7 ENCLOSURES AND PVC COATED MATERIALS RATED FOR HAZARDOUS ENVIRONMENT.
4. CONNECT TO PUMP "RUN-TIME" METERS.
5. REFER TO CIVIL DRAWINGS FOR DISTANCE BETWEEN RISER VAULT & RISER PIPES

3 / E-2 LEACHATE COLLECTION RISER VAULT PLAN
NO SCALE



FRONT (CONTROL SIDE) SIDE REAR (POWER SIDE)

2 / E-2 LEACHATE RISER STATION 9.3 ELEVATIONS
NO SCALE



4 / E-2 LEACHATE COLLECTION RISER VAULT SECTION
NO SCALE

STATE OF MARYLAND — EDWARD PAYDA — 25328 — PROFESSIONAL ENGINEER
SIGNATURE
08-08-2023
DATE

FAYDA ENGINEERING & ENERGY SOLUTIONS, LLC
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FE&ES COMM. NO: 22-1531

DATE: AUGUST 2023
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SCALE:	AS NOTED
DRAWN BY:	MG
CHECKED BY:	EF
DRAWING NO.:	E-2 OF E-4
SHEET NO.:	34 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: SUBCELL 9.3 PARTIAL SITE PLAN, DETAILS & ELEVATIONS

Docusign Envelope ID: 7E24C6D7-91F4-4129-A15E-3B231801329D

GENERAL NOTES
(NOT REFERENCED ON DRAWINGS)

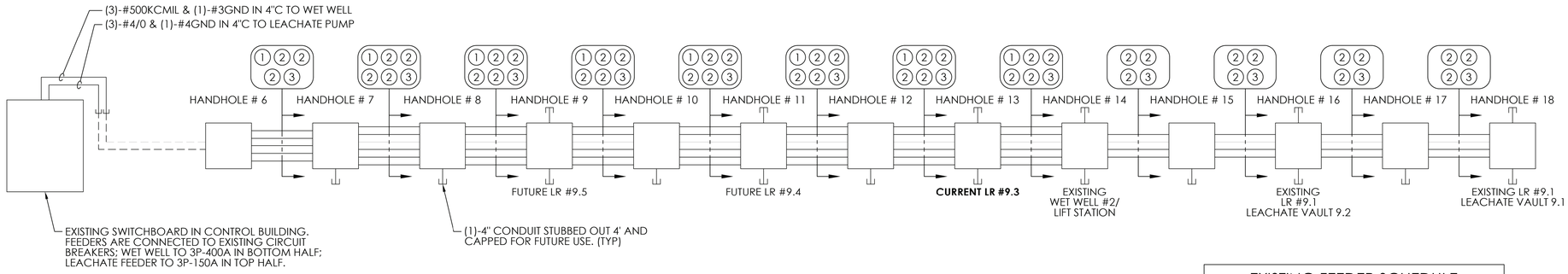
1. ALL CONDUIT ABOVE GRADE SHALL BE PVC COATED RIGID STEEL. TRANSITION TO UG PVC CONDUIT 24" BELOW GRADE.
2. MAINTAIN A MINIMUM OF 48" CLEARANCE BETWEEN CONDUITS/DUCTBANK AND LFG PIPING.
3. NEW UNDERGROUND ELECTRIC SERVICES SHALL NOT ENCROACH ON THE CELL LIMIT/DESIGN TOE OF LANDFILL. REFER TO LEGEND & ABBREVIATIONS FOR SITE PLAN DESIGNATIONS.
4. SCADA SYSTEM SHALL MONITOR HIGH LEVEL ALARM FLOAT ONLY. FINAL SCADA SYSTEM CONNECTIONS, PROGRAMMING AND I/O INTERFACE TO EXISTING PLC BY OTHERS OR BY ALLOWANCE.

ARC FLASH NOTES

1. EACH NEW PANELBOARD, ENCLOSED CIRCUIT BREAKER & ELECTRICAL DISTRIBUTION APPARATUS SHALL BE PROVIDED WITH AN ARC FLASH LABEL INDICATING THE AVAILABLE ENERGY, SAFETY ZONE & EQUIPMENT PROTECTION REQUIRED. CONTRACTOR SHALL PREPARE AN ARC FLASH SAFETY STUDY, IN ADDITION TO THE COORDINATION & SHORT CIRCUIT STUDY AS PART OF THIS CONTRACT. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

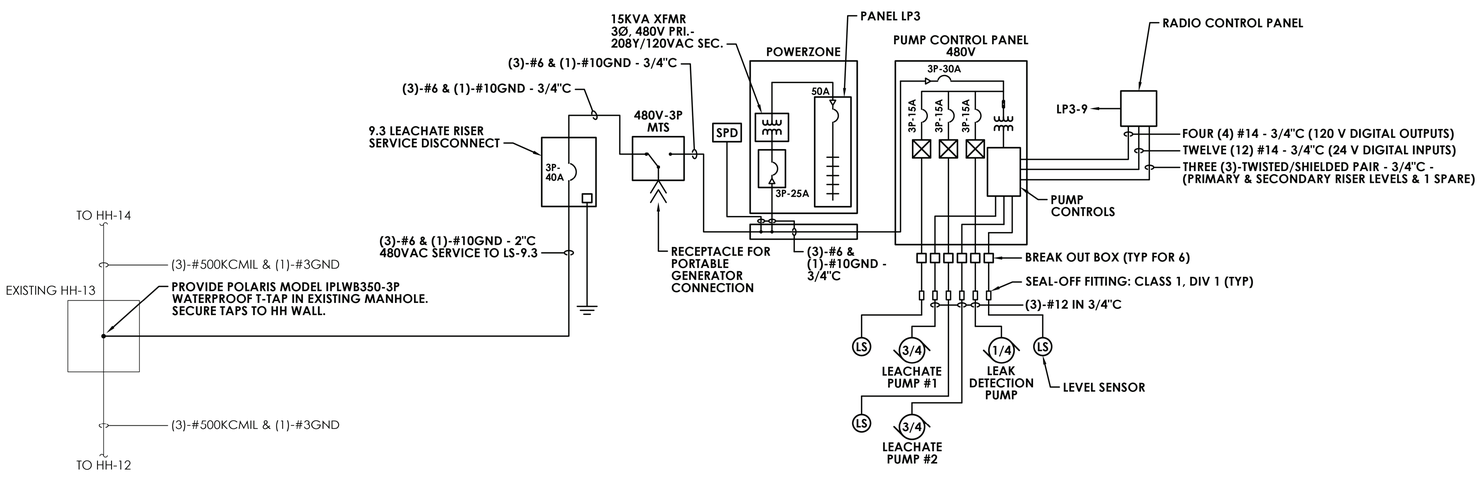
SHORT CIRCUIT, COORDINATION & ARC FLASH NOTES

1. CONTRACTOR SHALL PROVIDE ALL FIELD INFORMATION INCLUDING BUT NOT LIMITED TO PANELBOARD DATA, FEEDER SIZE AND LENGTH & ALL OTHER RELATIVE INFORMATION TO THE ENGINEER PREPARING THE STUDY (UNDER THEIR CONTRACT) WHO WILL PERFORM THE SHORT CIRCUIT COORDINATION & ARC FLASH STUDY. ONCE STUDY IS COMPLETE, CONTRACTOR TO MAKE ALL FINAL CIRCUIT BREAKER ADJUSTMENTS TO MATCH THE STUDY & APPLY ALL ARC FLASH LABELS TO THE DISTRIBUTION EQUIPMENT.
2. CONTRACTOR SHALL VERIFY FEEDER SIZES THAT ARE SHOWN ON THE EXISTING FEEDER SCHEDULE AND PROVIDE THIS INFORMATION TO THE POWER SYSTEM STUDY ENGINEER.



1 E-3 EXISTING POWER RISER DIAGRAM
NO SCALE

EXISTING FEEDER SCHEDULE		
ID	DESCRIPTION	CONDUIT SIZE (INCHES)
1	(3)-#500KCMIL & (1)-#3GND	4"
2	SPARE	4"
3	(3)-#4/0 & (1)-#4GND	4"



2 E-3 LEACHATE STATION 9.3 SINGLE LINE DIAGRAM
NO SCALE

STATE OF MARYLAND
EDWARD PAYDA
2020
PROFESSIONAL ENGINEER
SIGNATURE
08-08-2023
DATE

FAYDA ENGINEERING & ENERGY SOLUTIONS, LLC
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CHECKED BY:	EF
DRAWING NO.:	E-3 OF E-4
SHEET NO.:	35 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: POWER RISER DIAGRAM & SINGLE LINE DIAGRAM

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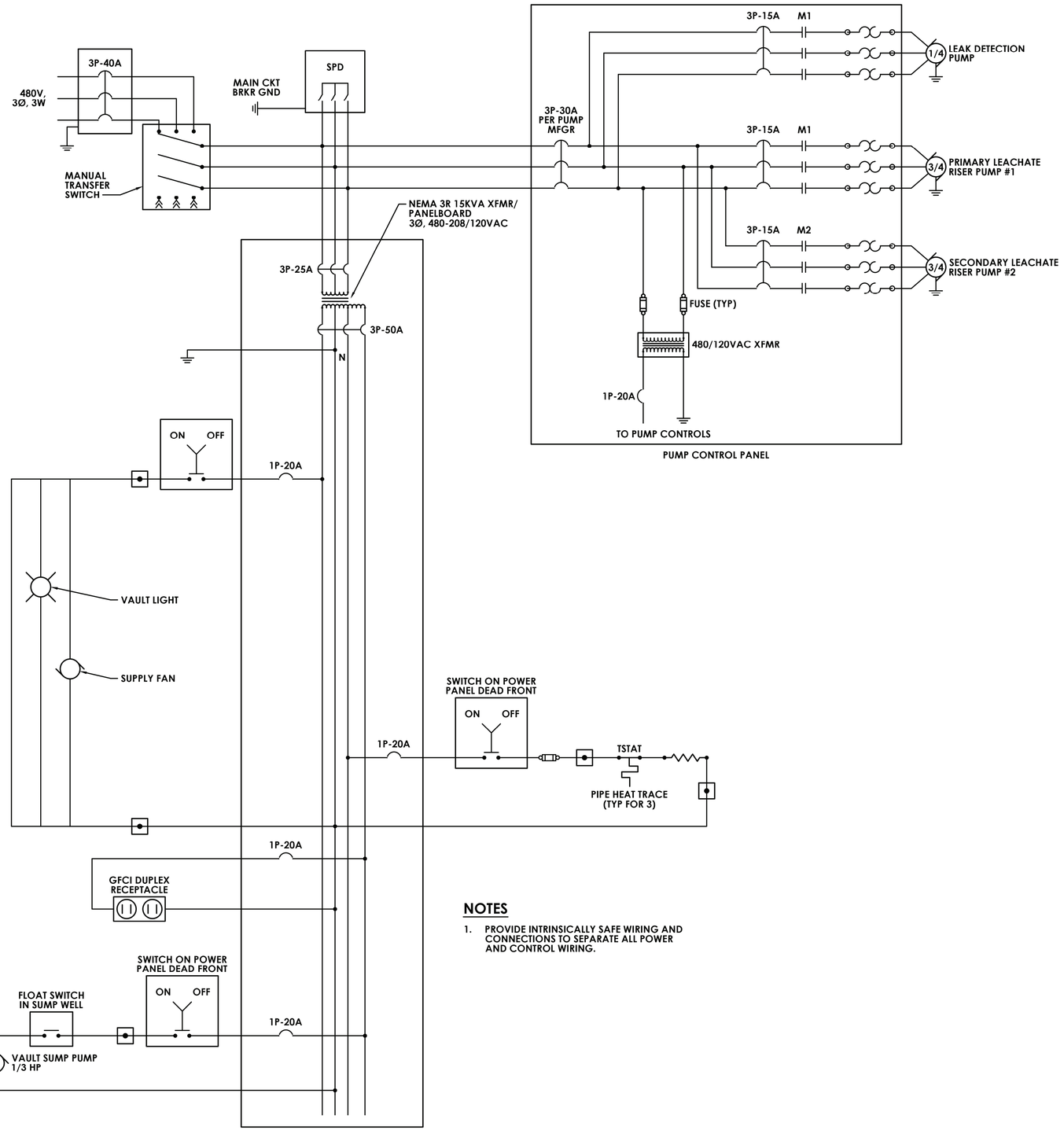


NOTES

1. PROVIDE INTRINSICALLY SAFE WIRING AND CONNECTIONS TO SEPARATE ALL POWER AND CONTROL WIRING.

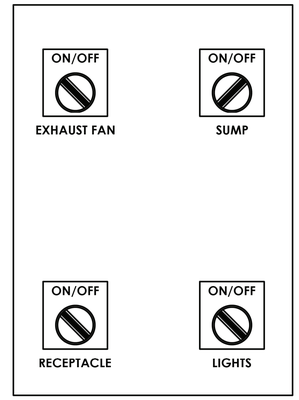
1 E-4 POWER PANEL ELECTRICAL SCHEMATIC
NO SCALE

SCHEDULE FOR POWER PANEL: LP3

GENERAL PANEL DATA:
208Y/120VAC, 3Phase, 4Wire
50A - MAIN CIRCUIT BREAKER
24 CIRCUIT 10 KAIC
SURFACE MOUNTED

CKT. No.:	LOAD SERVED TYPE OF LOAD	KVA PHASE A	KVA PHASE B	KVA PHASE C	CIRCUIT PROTECTOR VOLTS	CIRCUIT PROTECTOR CKT BRKR.	WIRING DATA
1	HEAT TRACE	-			120	1P-20A 30mA GFP	#12
3	HEAT TRACE		-		120	1P-20A 30mA GFP	#12
5	HEAT TRACE			-	120	1P-20A 30mA GFP	#12
7	STRIP HEATER	-			120	1P-20A	#12
9	SCADA CONTROL PANEL		-		120	1P-20A	#12
11	SPARE			-	120	1P-20A	-
13	SPACE	-			-	-	-
15	SPACE		-		-	-	-
17	SPACE			-	-	-	-
19	SPACE	-			-	-	-
21	SPACE		-		-	-	-
23	SPACE			-	-	-	-

WIRING DATA	CIRCUIT PROTECTOR CKT BRKR.	CIRCUIT PROTECTOR VOLTS	KVA PHASE A	KVA PHASE B	KVA PHASE C	LOAD SERVED TYPE OF LOAD	CKT. No.:
#12	1P-20A	120	-			METERING	2
#12	1P-20A	120		-		VAULT SUPPLY FAN & LIGHT	4
-	1P-20A	120			-	SPARE	6
#12	1P-20A	120	-			GFCI DUPLEX RECEPT.	8
#12	1P-20A	120		-		VAULT SUMP PUMP	10
-	1P-20A	120			-	SPARE	12
-	-	-	-			SPACE	14
-	-	-		-		SPACE	16
-	-	-			-	SPACE	18
-	-	-	-			SPACE	20
-	-	-		-		SPACE	22
-	-	-			-	SPACE	24



HINGED DEAD-FRONT SUB-PANEL
FOR MOUNTING CONTROL DEVICES

2 E-4 EXHAUST FAN/SUMP CONTROL PANEL
NO SCALE

STATE OF MARYLAND EDWARD FAYDA 22009 PROFESSIONAL ENGINEER
SIGNATURE
08-08-2023
DATE

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SHEET NO.:	36 OF 36
PROJECT NO.:	ME2241

PROJECT: SUBCELL 9.3 CONSTRUCTION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: DETAILS & SCHEDULES

Geosyntec
consultants

APPENDIX J

Construction Quality Assurance (CQA)

Prepared for:

Anne Arundel County Department of Public Works
Heritage Office Complex
2662 Riva Road, Fourth Floor
Annapolis, Maryland 21401

MILLERSVILLE LANDFILL RESEOURCE RECOVERY FACILITY – CELL 9 EXPANSIONSION CONSTRUCTION QUALITY ASSURANCE PLAN

Millersville Landfill and Resource Recovery Facility
Severn, Anne Arundel County, Maryland

Prepared by:

Geosyntec consultants

10211 Wincopin Circle, 4th Floor
Columbia, Maryland 21044

Geosyntec Project Number: ME1418A

TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 Purpose of the Construction Quality Assurance Plan 1
1.2 Construction Quality Assurance and Construction Quality Control 1
1.3 Applicable References 1

2. PROJECT PERSONNEL 2

2.1 Overview 2
2.2 Owner 2
2.3 Project Manager, Department of Public Works – Bureau of Engineering 2
2.4 Disposal and Maintenance Manager, Department of Public Works – Bureau of Waste Management Services 2
2.5 Engineer 2
2.6 Contractor 2
2.7 Geosynthetics Manufacturer 2
2.8 Geosynthetics Installer 3
2.9 Surveyor 3
2.10 CQA Consultant 3
2.10.1 Overview 3
2.10.2 CQA Managing Engineer 4
2.10.3 CQA Site Manager 4
2.10.4 CQA Monitors 6
2.11 Soils CQA Laboratory 7
2.12 Geosynthetics CQA Laboratory 7
2.13 CQA Surveyor 7

3. PROJECT MEETINGS 9

3.1 Overview 9
3.2 Progress Meetings 10
3.3 Problem or Work Deficiency Meetings 10

4. CQA SURVEYING 11

5. DOCUMENTATION 12

5.1 Overview 12
5.2 Daily Recordkeeping 12
5.2.1 Overview 12
5.2.2 Memorandum of Discussion with Contractor or Installer 12

5.2.3 Monitoring Logs and Test Data Sheets....13
5.2.4 Construction Problem and Solution Data Sheets....13
5.3 Photographic Documentation....14
5.4 Design and/or Technical Specifications Changes....14
5.5 Progress Reports....14
5.6 Final Report....15

6. EROSION AND SEDIMENT CONTROLS....16

6.1 Overview....16
6.2 Preconstruction Qualifying of Material Sources....16
6.3 Field Evaluation/Monitoring of Construction Techniques....16
6.4 Deficiencies, Problems, and Repairs....17

7. EARTHWORK....18

7.1 Overview....18
7.2 Preconstruction Qualifying of Material Sources....18
7.3 Conformance Testing....18
7.4 Field Evaluation/Monitoring of Construction Techniques....18
7.5 Field Testing of Work Products....19
7.5.1 Routine Field Testing....19
7.5.2 Compacted Clay Liner Testing....20
7.5.3 Structural Fill Testing....21
7.5.4 Protective Cover Testing....21
7.5.5 Special Testing....22
7.6 Deficiencies, Problems, and Repairs....22

8. GEOMEMBRANE....24

8.1 Overview....24
8.2 Preconstruction Qualifying of Material Sources....24
8.3 Conformance Testing....24
8.4 Geomembrane Monitoring....26
8.5 Deficiencies, Problems, and Repairs....27
8.6 Electric Leak Location Survey....27

9. GEOSYNTHETIC CLAY LINER....29

9.1 Overview....29
9.2 Preconstruction Qualifying of Material Sources....29
9.3 GCL Conformance Testing....29
9.4 GCL Monitoring....30

9.5 Deficiencies, Problems, and Repairs 32

10. GEOTEXTILE 33

10.1 Overview 33
10.2 Geotextile Conformance Testing 33
10.3 Geotextile Monitoring 34
10.4 Deficiencies, Problems, and Repairs 35

11. GEOCOMPOSITE 37

11.1 Overview 37
11.2 Preconstruction Qualifying of Material Sources 37
11.3 Conformance Testing 37
11.4 Geocomposite Monitoring 39
11.5 Deficiencies, Problems, and Repairs 40

12. HDPE PIPE AND FITTINGS 41

12.1 Overview 41
12.2 Preconstruction Qualifying of Material Sources 41
12.3 HDPE Pipe and Fittings Monitoring 41
12.4 Conformance Testing 42
12.5 Performance Testing of Work Products 42
12.6 Deficiencies, Problems, and Repairs 42

13. MECHANICAL AND ELECTRICAL SYSTEMS 43

13.1 Overview 43
13.2 Preconstruction Qualifying of Equipment and Systems 43
13.3 Mechanical and Electrical System Monitoring 43
13.4 Performance Testing of Work Products 44
13.5 Deficiencies, Problems, and Repairs 44

FIGURE

Figure 1: Lines of Communication

1. INTRODUCTION

1.1 Purpose of the Construction Quality Assurance Plan

This Construction Quality Assurance Plan (CQA Plan) establishes the construction quality assurance monitoring and documentation activities that will be implemented during construction of the liner and cover system and related facilities (erosion control structures, leachate transmission systems, perimeter berm, access roads, etc.) for Cell 9 (Project) at Millersville Landfill and Resource Recovery Facility (MLFRRF), located in Severn, Anne Arundel County, Maryland (Site). The purpose of the CQA Plan is to provide specific procedures that will be followed by CQA personnel in order to assure the Anne Arundel County Bureau of Waste Management Services (the Owner) that the construction was performed in accordance with the Drawings and Technical Specifications. This CQA Plan does not address design guidelines, installation specifications, or selection of soils, geomembrane, and other geosynthetic components.

1.2 Construction Quality Assurance and Construction Quality Control

This CQA Plan is a site-specific document which addresses the following: (i) CQA personnel responsibilities and authorities; (ii) monitoring and testing activities that will be performed during construction; and (iii) CQA documentation requirements. In the context of this document, Construction Quality Assurance and Construction Quality Control are defined as follows:

- Construction Quality Assurance (CQA) refers to means and actions employed by the CQA personnel to assure conformity of the construction with the requirements of the Drawings, Technical Specifications, and CQA Plan. CQA is provided by a consultant who is independent of the Owner, Contractor, Manufacturer, and Geosynthetics Installer.
- Construction Quality Control (CQC) refers to those actions taken by the Contractor, Manufacturers, or Suppliers, including their designated representatives, to ensure that the materials and workmanship meet the requirements of the Drawings, Technical Specifications, CQA Plan, and all components of the Contract Documents.

1.3 Applicable References

Organizations whose standards are referenced in the CQA Plan and Technical Specifications include: (i) American Association of State Highway and Transportation Officials (AASHTO); (ii) American National Standards Institute (ANSI); (iii) American Society for Testing and Materials (ASTM); (iv) American Water Works Association (AWWA); (v) Federal Highway Administration (FHWA); (vi) Geosynthetic Research Institute (GRI); (vii) Maryland Department of Transportation (MDOT); (viii) Occupational Safety and Health Administration (OSHA); and (ix) Plastics Pipe Institute (PPI).

2. PROJECT PERSONNEL

2.1 Overview

The project organization chart depicting the key roles and lines of communication for the Project is presented in Figure 1. The duties and responsibilities of the CQA individuals identified in Figure 1 are described below.

2.2 Owner

In this CQA Plan and Technical Specifications, the term "Owner" refers specifically to Anne Arundel County.

2.3 Project Manager, Department of Public Works – Bureau of Engineering

The Project Manager is the official representative of the Owner (i.e., Owner's Representative) and is responsible for the coordination and management of activities associated with construction of the Project.

2.4 Disposal and Maintenance Manager, Department of Public Works – Bureau of Waste Management Services

The Disposal and Maintenance (D&M) Manager is the official representative of the Bureau of Waste Management Services and is responsible for the coordination and management of activities associated with the landfill.

2.5 Engineer

The Engineer is the firm that prepared the Drawings, Technical Specifications, and CQA Plan for the Project. Geosyntec Consultants (Geosyntec) of Columbia, Maryland, is the Engineer for the Project.

2.6 Contractor

The Contractor is responsible for constructing the prescribed design in accordance with the Drawings and Technical Specifications. The Contractor may retain the services of specialty subcontractors (e.g., material suppliers, Geosynthetics Manufacturer, Geosynthetics Installer). The Contractor must have experience in successful geosynthetic installation, piping installation, and general earthwork, and shall have current local, state, and federal licenses as appropriate.

2.7 Geosynthetics Manufacturer

The Geosynthetics Manufacturer is the firm or firms responsible for the production and delivery of geosynthetics (i.e., geomembrane, geocomposite, geotextile, etc.) to be used on this Project and

its delivery to the Site. The Geosynthetics Manufacturer(s) must be able to provide sufficient production capacity and qualified personnel to meet the project schedule. The Geosynthetics Manufacturer(s) must be approved by the Project Manager and Engineer, in accordance with the requirements of the Technical Specifications.

2.8 Geosynthetics Installer

The Geosynthetics Installer is responsible for performing all aspects of the geosynthetics installation. The Geosynthetics Installer may also be responsible for specialized construction tasks (e.g., field construction of pipe boots). The Geosynthetics Installer shall be trained and qualified to install the geosynthetics proposed for this Project. The Geosynthetics Installer, in particular, must be approved and/or licensed by the various Geosynthetics Manufacturer(s) for installation of the various geosynthetic components. Further, the Geosynthetics Installer must be approved by the Project Manager and Engineer. The qualifications required of the Geosynthetics Installer are listed in the Technical Specifications.

2.9 Surveyor

The Surveyor must be a registered Land Surveyor in the State of Maryland, independent from the Owner and the Contractor. However, the Surveyor will be a subcontractor of the Contractor. The Surveyor is responsible for construction layout and producing as-built documentation (record drawings) for the Project. The qualifications required of the Surveyor and surveying requirements are provided in the Technical Specifications.

2.10 CQA Consultant

2.10.1 Overview

The CQA Consultant is a party, independent from the Owner, the Contractor, the Manufacturer(s), and the Geosynthetics Installer. The CQA Consultant will be a team of individuals who are experienced in the provision of CQA services for similar projects. The CQA team will include the CQA Managing Engineer and CQA Soils and Geosynthetics Monitor.

The CQA team must meet the minimum experience and qualifications described for each position below. In addition, the entire CQA team shall be comprised of individuals employed by the same company as the CQA Managing Engineer. Subcontracting of CQA personnel (i.e., CQA soils or CQA geosynthetics technician) to companies other than that of the CQA Managing Engineer is not allowed.

Field and laboratory testing are to be performed in accordance with applicable standards and specifications. The CQA Consultant is also responsible for issuing a final report to WMS after the completion of work for the Project.

2.10.2 CQA Managing Engineer

The CQA Managing Engineer will lead the CQA team. Minimum experience and qualifications for the CQA Managing Engineer are as follows:

- Registered Professional Engineer in the State of Maryland
- Experience with at least five previous landfill construction projects

The CQA Managing Engineer will review clarifications and changes that may affect the design and will serve as technical reviewer of the final report. He or she will also be directly accessible to the Project Manager, Engineer, and CQA personnel for technical direction during construction.

Other responsibilities of the CQA Managing Engineer include

- being familiar with the Drawings, Technical Specifications, and CQA Plan;
- attending the preconstruction meetings, progress meetings, and any resolution meetings when requested;
- administering the CQA program (i.e., assigning and managing all CQA personnel, reviewing all field reports, and providing engineering review of all CQA-related issues);
- providing quality control of the CQA personnel, including site visits;
- reviewing all changes to the Drawings, Technical Specifications, and CQA Plan; and
- preparing the final report, including a review of the as-built record drawings provided by the Contractor, with assistance from the CQA Site Manager.

2.10.3 CQA Site Manager

The CQA Site Manager will lead field oversight activities and will supervise the CQA soils and geosynthetics monitors. Minimum experience and qualifications for the CQA Site Manager are as follows:

- CQA experience with at least five previous landfill construction projects
- CQA experience with at least 5,000,000 square feet (ft^2) of geomembrane and 10,000,000 ft^2 of overall geosynthetics installation
- Certification in radiological safety and nuclear moisture/density gauge operation.

The responsibilities and duties of the CQA Site Manager include

- acting as the on-site (resident) representative of the CQA Consultant;
- evaluating conformance of materials and construction with the requirements of the Drawings and Technical Specifications;

- familiarizing the CQA Monitors with the Site and CQA requirements for the Project;
- reporting any unresolved deviations from the CQA Plan to the Engineer and/or Project Manager;
- managing the daily activities of the CQA Monitors;
- attending the CQA-related meetings (e.g., resolution, preconstruction, daily, weekly);
- assisting the Project Manager in preparing documentation for Requests for Information (RFI) or other clarifications to the Drawings and/or Technical Specifications;
- administering the CQA program (i.e., assigns and manages CQA personnel, reviews field reports, and provides review of CQA-related issues);
- regularly communicating with the Contractor to ensure timely delivery of as-built survey information;
- reviewing the as-built survey information submitted by the Contractor;
- verifying the calibration and condition of all CQA equipment;
- reviewing all CQA Monitors' daily reports and logs;
- reporting to the Project Manager and logging in his or her daily reports and relevant observations reported by the CQA Monitors;
- preparing his own daily and weekly reports;
- overseeing the collection and shipping of laboratory test samples;
- reviewing and reporting results of all laboratory testing;
- periodically checking stockpile or borrow pit sources for variability of the soils, and ensuring that conformance testing is performed;
- reviewing the work for the Contractor's equipment operators, to ensure that care is taken to protect other portions of the work;
- establishing additional test requirements beyond those required in the CQA Plan, when necessary;
- reviewing all Supplier, Manufacturer, and Installer certifications, when necessary;
- reviewing the Geosynthetics Installer's personnel qualifications for conformance with those pre-approved for work on-site;
- noting any on-site activities that could result in damage to the geosynthetics;
- designating a senior CQA Monitor to act on his behalf whenever he is absent from the Site while operations are on-going; and

- preparing the final report with the CQA Managing Engineer.

2.10.4 CQA Monitors

The duties of the CQA Soil Monitor(s) and CQA Geosynthetics Monitor(s) are assigned by the CQA Site Manager and include monitoring, logging, and/or documenting associated earthwork construction and geosynthetics installation. Minimum experience and qualifications for the CQA Soils Monitor(s) are as follows:

- Experience with at least two previous landfill construction projects
- Certification in radiological safety and nuclear moisture/density gauge operation

Minimum experience and qualifications for the CQA Geosynthetics Monitor(s) are as follows:

- Experience with at least two previous landfill construction projects
- Experience with at least 1,000,000 square feet (ft^2) of geomembrane and 2,000,000 ft^2 of overall geosynthetics installation

Note that the CQA Soils and Geosynthetics Monitors(s) duties can be performed by the same person, provided they are qualified.

The duties to be performed and activities to be monitored by the CQA Soils Monitor(s) specifically include:

- observing and documentation of soil delivery, stockpiling, and placement;
- observing and documentation of soil moisture content and moisture conditioning, if required;
- observing and documentation of collection of soil samples for laboratory testing;
- testing the in-situ moisture and density of compacted earthen materials;
- observing and documentation of operations to protect completed areas before the covering materials are placed;
- examining of the soil surfaces for signs of excessive wetting, desiccation, or other disturbance prior to placement of any other cover materials; and
- observing and documentation of scarification, rewetting, recompaction, or proof rolling required to repair deteriorated areas.

The duties to be performed and activities to be monitored by the CQA Geosynthetics Monitors include, for all geosynthetics:

- observing and documentation of material delivery;

- observing and documentation of material unloading and on-site transport and storage;
- observing and documentation of all geosynthetic placement operations;
- observing and documentation of all joining and/or seaming operations;
- observing and documentation of condition of panels as placed;
- sampling for conformance testing by the Geosynthetics CQA Laboratory;
- marking samples for conformance testing; and
- observing and documentation of repair operations.

2.11 Soils CQA Laboratory

The Soils CQA Laboratory will have experience in the physical testing of soils and concrete, and be familiar with, and properly equipped to perform the geotechnical testing required by the CQA Plan. The Soils CQA Laboratory must be certified by the American Association of State Highway and Transportation Officials (AASHTO).

2.12 Geosynthetics CQA Laboratory

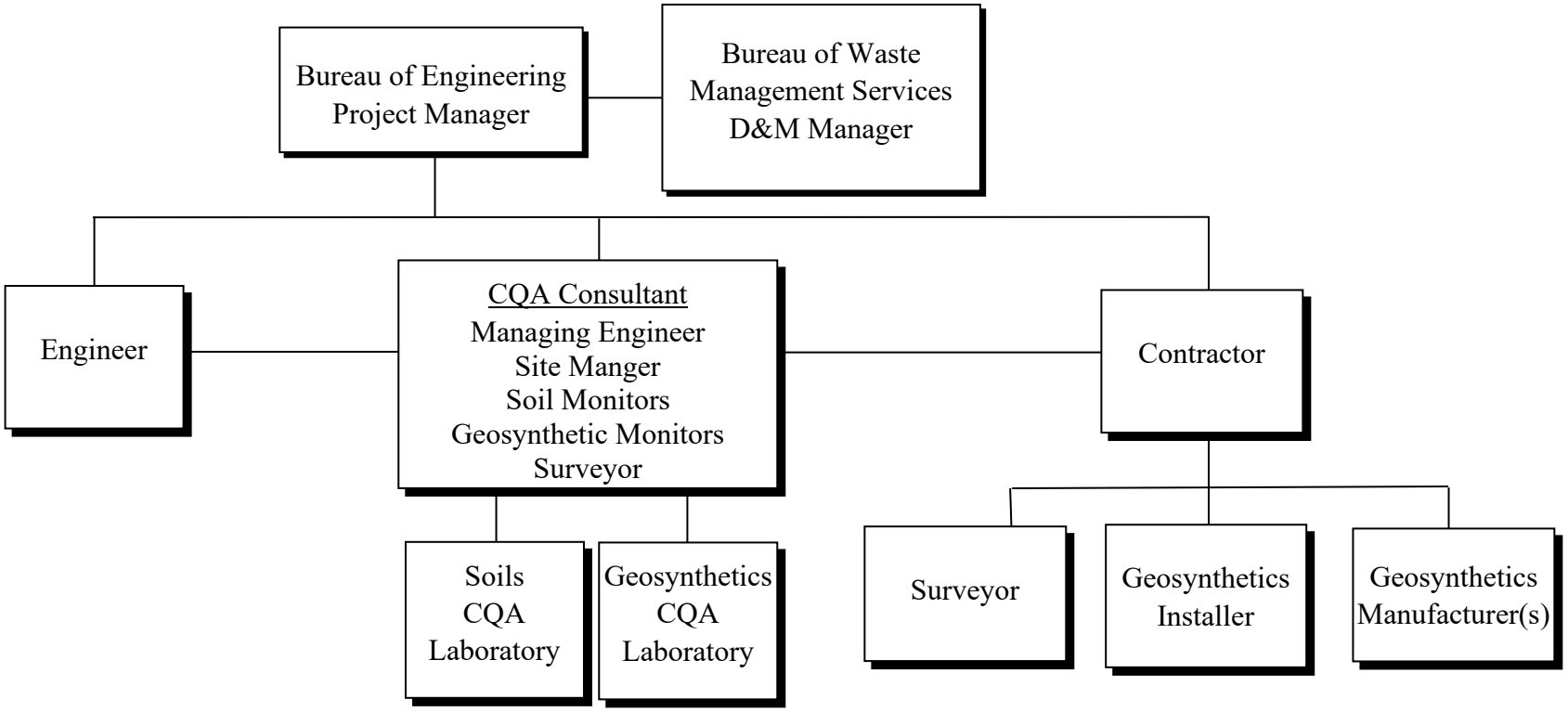
The Geosynthetics CQA Laboratory will have experience in testing the types of geosynthetics to be used on the Project, and be familiar with, and properly equipped to perform the testing required by the CQA Plan. The Geosynthetics CQA Laboratory must be certified by the Geosynthetic Research Institute (GRI).

2.13 CQA Surveyor

A CQA Surveyor will be a Professional Land Surveyor registered in the State of Maryland and employed by a well-established surveying firm. The Surveyor will provide survey data to verify as-built documentation of the Contractor's work. Responsibilities of the CQA Surveyor are presented in Section 4 of this CQA Plan.

FIGURE 1

LINES OF COMMUNICATION
MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
ANNE ARUNDEL COUNTY, MARYLAND



3. PROJECT MEETINGS

3.1 Overview

Meetings with key project personnel are necessary to assure a high degree of quality during construction, and promote clear, open channels of communication. Therefore, preconstruction meetings for the major portions of the construction are essential for the success of the Project. Preconstruction meetings will be held prior to all major construction components of the Project including, but not be limited to mobilization and geosynthetics installation. These meetings and bi-weekly progress meetings are described below.

The preconstruction meeting should include discussion of the following activities:

- reviewing the responsibilities of each party;
- confirming the lines of authority and communication;
- communicating to all parties any relevant documents;
- reviewing critical design details of the Project;
- addressing any appropriate modifications to the Drawings or Technical Specifications so that the fulfillment of design or performance standards can be achieved;
- establishing an understanding by the parties of the CQA Plan, and CQA and CQC procedures to be followed during the Project;
- establishing work area security and safety protocol in accordance with the Owner's and the Contractor's health and safety plans;
- describing soil borrow source locations;
- establishing soil stockpiling locations;
- confirming the methods for documenting and reporting, and for distributing documents and reports;
- confirming acceptance and approval process for task completion prior to schedule sequence advancement; and
- establishing procedures for processing applications for payment.

Items discussed during the preconstruction meeting will be documented by a person designated at the beginning of the meeting, and minutes will be transmitted to all parties within one week of the meeting.

3.2 Progress Meetings

A progress meeting (via teleconference or at the Site) will be held bi-weekly during construction between the CQA Site Manager, the Contractor, and the Project Manager. The CQA Managing Engineer and Engineer will participate in the bi-weekly meetings when appropriate. Current progress, planned activities for the upcoming week, and any new business or revisions to the work will be discussed at this meeting. Minutes of the progress meetings will be recorded by a member of the CQA team and will document in the meeting minutes any problems, decisions, or questions arising at this meeting. Any matters requiring action which are raised in this meeting will be reported to the appropriate parties. Minutes of weekly progress meetings will be distributed to each party present at the meeting and other designated parties and will be transmitted to all parties within three days of the meeting.

Informal daily progress meetings will be held between the CQA Site Manager and the Contractor prior to the start of work or following the completion of work. The purpose of these meetings will be to review the previous day's activities, review the upcoming day's activities, and identify any needs or potential construction problems.

3.3 Problem or Work Deficiency Meetings

Special meetings will be held by the Project Manager when and if problems or deficiencies are present or judged likely to occur. At a minimum, these meetings will be attended by the Contractor, the Project Manager, and CQA Site Manager. The purpose of these meetings will be to define and resolve the problem or work deficiency as follows:

- define and discuss the problem or deficiency;
- review alternative solutions; and
- implement an action plan to resolve the problem or deficiency.

Items discussed during these meetings will be documented by the Project Manager, and if deemed necessary, minutes will be transmitted to the appropriate parties.

4. CQA SURVEYING

CQA Surveying of lines and grades may be performed during construction to independently verify the work for the Contractor, as requested by the Project Manager and/or CQA Consultant. CQA surveying will be performed in situations where the Project Manager, Owner, or CQA Consultant require additional, independent verification that the surveys performed by the Contractor's surveyor are accurate and representative of the conditions that the CQA Consultant has observed in the field. The overall responsibilities of the Contractor's Surveyor are described in Section 01721 of the Technical Specifications. When employed, the CQA Surveyor will use permanent control monuments at the Site as well as temporary survey control established by the Contractor's Surveyor during construction. The CQA Consultant will coordinate the CQA Surveyor's field work for all aspects of construction, as needed.

The scope of CQA surveying may include, but not necessarily be limited to:

- verifying the horizontal and vertical coordinates of selected construction control points;
- verifying the grades and elevations of the liner system;
- verifying layer thickness, especially of soil components of the liner system;
- verifying information regarding the horizontal alignment and vertical profile of leachate-collection pipes, leachate transmission piping, site drainage features, etc.; and
- providing sufficient survey information of interim conditions such that, if requested by the Project Manager, material quantities can be calculated.

It will be the responsibility of the CQA personnel and the CQA Surveyor to coordinate the CQA surveying work such that areas are promptly surveyed, interim results are reviewed, and approval is granted for the Contractor to proceed with subsequent work in the areas. The CQA Site Manager will report any nonconformance or inconsistencies to the Project Manager and Contractor promptly to minimize delays in the construction.

5. DOCUMENTATION

5.1 Overview

An effective CQA Plan depends largely on recognition of all construction activities that should be monitored, and on assigning responsibilities for the monitoring of each activity. This is most effectively accomplished and verified by the documentation of quality assurance activities. The CQA Consultant will document that the quality assurance requirements have been addressed and satisfied.

The CQA Site Manager will provide the CQA Managing Engineer and Project Manager with signed descriptive remarks, data sheets, and logs to verify that the monitoring activities have been performed. The CQA Site Manager will also maintain at the job site a complete file of the Drawings, Technical Specifications, CQA Plan, checklists, test procedures, daily logs, and other pertinent documents.

5.2 Daily Recordkeeping

5.2.1 Overview

Standard reporting procedures will include preparation of a daily CQA report which, at a minimum, will consist of: (i) field notes; (ii) CQA monitoring logs and testing data sheets; and (iii) construction problem and solution summary sheets. This information will be regularly submitted to and reviewed by the Project Manager and/or Engineer.

5.2.2 Memorandum of Discussion with Contractor or Installer

The CQA Site Manager will prepare a memorandum (i.e., daily field report) each day, summarizing their discussions with the Contractor and/or Geosynthetics Installer and construction operations, as well as CQA activities. Daily field reports will also be prepared by each member of the CQA Consultant team. At a minimum, the daily field report will include the following information:

- arrival and departure time of CQA personnel;
- field time charges for all CQA personnel;
- weather conditions (temperature, sky conditions, precipitation, etc.);
- a detailed description of worked performed;
- equipment in each work area, including subcontractors;
- decisions made regarding acceptance of work, and/or corrective actions to be implemented for instances of substandard quality;

- delivery of off-site materials received, including quality control documentation; and
- receipt of laboratory testing delivered to CQA personnel on-site.

5.2.3 Monitoring Logs and Test Data Sheets

Monitoring logs and test data sheets will be prepared daily when construction activities involve placement of soils or geosynthetics installation. At a minimum, these logs and data sheets will include the following information:

- an identifying sheet number for cross referencing and document control;
- date, project name, location, and other identification;
- a reduced-scale site plan or hand sketch showing the approximate location of work areas and test locations;
- descriptions and locations of on-going construction;
- descriptions and specific locations of areas, or units, of work being tested and/or observed and documented;
- locations where tests and samples were taken;
- a summary of test results;
- calibrations or recalibrations of test equipment, and actions taken as a result of recalibration;
- decisions made regarding acceptance of units of work, and/or corrective actions to be taken in instances of substandard quality; and
- identification of the CQA Site Manager and/or the CQA Monitor(s).

5.2.4 Construction Problem and Solution Data Sheets

Construction problem and solution data sheets describing special construction situations will be cross-referenced with specific observation logs and testing data sheets, and must include the following information, when available:

- an identifying sheet number for cross-referencing and document control;
- a detailed description of the situation or deficiency;
- the location and probable cause of the situation or deficiency;
- how and when the situation or deficiency was found or located;
- documentation of the response to the situation or deficiency;

- final results of any responses; and
- any measures taken by the Contractor to prevent a similar situation from occurring in the future.

The CQA Project Manager and Engineer will be made aware of any significant recurring non-conformance with the Technical Specifications. The Project Manager and/or Engineer will then evaluate the cause of the non-conformance and recommend, if appropriate, changes in procedures or Technical Specifications. These changes will be submitted to the Engineer for approval. When this type of evaluation is made, the results will be documented, and any revision to procedures or Technical Specifications will be approved by the Project Manager and Engineer.

A summary of the supporting data sheets, along with final testing results and the CQA Site Manager's approval of the work, will be required upon completion of construction in which the construction situation, deficiency and/or defect was satisfactorily repaired and completed.

5.3 Photographic Documentation

Photographs will be taken in order to provide a pictorial record of work progress, problems, and mitigation activities. A photo log will be prepared by the CQA Consultant and presented to the Project Manager upon completion of the Project. As appropriate, photographs may be incorporated into daily field logs to cross-reference observations with testing data and/or construction problems and resolutions.

5.4 Design and/or Technical Specifications Changes

Changes to the design and/or Technical Specifications may be required during construction. In such cases, the CQA Site Manager will notify the Project Manager and Engineer. Design and/or Technical Specifications changes will be made only with the written agreement of the Project Manager and Engineer and will take the form of addenda to the Contract Documents.

5.5 Progress Reports

If a specific construction project is anticipated to have a very long schedule (i.e., more than one construction season), or is particularly complicated, as the request of the Project Manager, the CQA Consultant will prepare monthly summary progress reports. As a minimum, this report will include the following information:

- the date, project name, location, and other information;
- a summary of work activities during the progress reporting period;
- a summary of construction situations, deficiencies, and/or defects occurring during the progress reporting period;

- a summary of test results, failures and retests; and
- the signature of the CQA Project Manager and/or Engineer.

5.6 Final Report

At the completion of the work, the CQA Consultant will submit to the Project Manager a signed and sealed final report. The final report will certify: (i) that the work has been performed in substantial compliance with the Drawings, Technical Specifications, and CQA Plan; (ii) physical sampling and testing, except as properly authorized, have been performed at the appropriate frequencies; and (iii) that the summary document provides the necessary supporting documentation.

At a minimum, this final report will include: (i) a narrative of construction activities; (ii) observation logs and testing data sheets including sample location plans; (iii) construction problems and solutions data sheets; (iv) changes from the design and Technical Specifications; (v) record drawings; (vi) photographic log; and (vii) a summary statement sealed and signed by a Professional Engineer registered in the State of Maryland.

The record drawings will include scale drawings depicting the location of the construction and details pertaining to the extent of construction (e.g., depths, plan dimensions, elevations, soil component thickness, etc.). All surveying and base maps required for development of the record drawings will be prepared the Contractor's Surveyor in accordance with Section 01721 of the Technical Specifications. The CQA Consultant will include these record drawings as part of the final report.

6. EROSION AND SEDIMENT CONTROLS

6.1 Overview

This section of the CQA Plan addresses the CQA program to be implemented with regard to erosion and sediment controls.

6.2 Preconstruction Qualifying of Material Sources

Prior to construction, the Contractor will be required to provide the Project Manager and/or Engineer with the quality control information and certification from the supplier(s) of temporary seed, mulches or matting, and silt fence required in Section 02370 of the Technical Specifications.

The Project Manager and/or Engineer will examine all of the suppliers' certifications to verify that the property values listed on the certifications meet or exceed the Technical Specifications, and that proper and complete documentation has been provided by the Contractor for the temporary and permanent erosion and sedimentation materials that will be used at the Site. The Project Manager will report any deviations from the above requirements to the Contractor prior to approving installation of the materials.

6.3 Field Evaluation/Monitoring of Construction Techniques

The CQA personnel will observe the Contractor's work activities and will verify that, prior to initiating work in any given area, temporary erosion and sediment controls, as required in the Drawings and Technical Specifications have been installed. The CQA personnel will routinely verify that the Contractor keeps the site free from excessive sediment and in as neat a condition as possible. This includes the project area, haul roads, borrow areas, stockpile areas, and the entrance area to the facility. The CQA personnel will verify that the Contractor selects the appropriate erosion and sediment controls from the latest edition of the *Maryland Standards and Specifications for Soil Erosion and Sediment Control*.

The CQA personnel will perform weekly inspections of the Contractor's temporary erosion and sediment controls and will perform an inspection of the controls within one working day of any rain event exceeding 1 inch. The Contractor may accompany these inspections. Following the inspections, the CQA personnel will communicate to the Contractor what temporary erosion and sediment control features require repair or maintenance.

The CQA personnel will verify that stockpiles are located as shown on the Drawings or as approved by the Project Manager, and that the Contractor has installed and is frequently maintaining all erosion and sedimentation control measures around these areas, as required in the Technical Specifications.

6.4 Deficiencies, Problems, and Repairs

The CQA personnel will report any deficiencies and noncompliance in the erosion and sedimentation controls to the Contractor. The extent of the deficiencies will be evaluated by observations, review of records, or other means deemed appropriate by the CQA Consultant and/or Project Manager. The Contractor will promptly correct any deficiency to the satisfaction of the CQA Consultant, or as directed by the Project Manager.

7. EARTHWORK

7.1 Overview

This section of the CQA Plan addresses the CQA program to be implemented with regard to general earthwork. General earthwork consists of placement and compaction of all soil or aggregate components of the work.

7.2 Preconstruction Qualifying of Material Sources

Prior to construction with any given soil or aggregate material, the CQA Consultant will receive test results from the Contractor for a sample of each material taken from the proposed source. The CQA Consultant will review the test results to ensure that each material meets the requirements of the Technical Specifications. Results of the preconstruction tests may be counted toward the conformance testing frequency requirements, provided the results meet the specified material properties. The CQA Consultant may also request that the Contractor provide a sample of each material for additional testing, if further preconstruction qualification testing by the CQA Consultant is warranted.

If a preconstruction qualifying sample fails to meet the requirements of the Technical Specifications, then the CQA Consultant will notify the Contractor. Use of the material will not be allowed until the material is pre-qualified by further tests. Additional tests, if necessary, will be performed by the Contractor at the request of the Project Manager and/or CQA Consultant.

7.3 Conformance Testing

During construction, a conformance testing program will be implemented by the CQA Consultant to verify that the physical properties of the earthwork materials meet the specified material properties. The CQA Consultant will obtain soil samples for conformance testing from the borrow source, on-site stockpiles, or from trucks as they unload material in the work area. Conformance sampling and laboratory testing of soil and aggregate will be performed in accordance with the Technical Specifications.

If a sample fails a conformance test, then the CQA Consultant will notify the Contractor and use of the material represented by that sample will not be allowed. Additional tests will be performed by the CQA Consultant as directed by the Project Manager, or the Contractor will use material from a different source.

7.4 Field Evaluation/Monitoring of Construction Techniques

The CQA Consultant will monitor and document the earthwork activities. Monitoring the construction work for the earthwork materials will include the following:

- verifying soils are visually consistent with established soil classifications, particle sizes, and moisture content.
- monitoring the thickness of lifts as loosely placed and after being compacted;
- documenting the type of construction equipment and methods used to place and compact the material;
- observing the action of the compaction and heavy hauling equipment on the construction surface (i.e., penetration, pumping, cracking, etc.) to detect inadequate compaction;
- verifying that proper equipment and methods are used to place soil or aggregate over geosynthetic components of the liner system or final cover system, and that wrinkles or excess tensile stresses to underlying geosynthetics are minimized; and
- verify that only low-ground pressure equipment traverses over lined areas unless an approved thickness of protective soil is first placed.

7.5 Field Testing of Work Products

7.5.1 Routine Field Testing

Conformance field testing (primarily density and moisture content testing) of placed/compacted earthwork materials will be performed by the CQA Consultant during construction to confirm that the requirements of the Technical Specifications are met. Conformance field testing will be performed according to test methods provided in the Technical Specifications. The CQA Consultant will select the test locations. Sampling locations for field testing will be selected by the CQA Consultant based on a grid system. The location of routine in-place density tests will be selected randomly within the grid system.

Moisture/density testing will be performed primarily using a nuclear gauge (in accordance with ASTM D 3017 and ASTM D 2922). The CQA Consultant will perform several oven moisture content tests (ASTM D 2216) on any given material at the outset of construction to evaluate requirements for moisture offsets (if any) for the nuclear gauge. Additional oven moisture tests will be performed during construction if soils are highly variable or other issues indicate that regular evaluation for moisture correction may be necessary for accurate nuclear density testing. The CQA Consultant will also verify the dry density calibration of the nuclear gauge at least once per soil source during construction using methods such as sand cone (ASTM D 1556) and/or drive cylinder (ASTM D 2937) density testing.

The CQA Consultant will be responsible for submitting enough samples to the Soils CQA Laboratory to meet the minimum testing frequency. It is also the responsibility of the CQA Consultant to monitor placement and compaction of soil in the liner system anchor trench. The CQA Consultant will verify that the backfilling and compaction techniques do not damage the geosynthetics in or near the anchor trench and that good compaction techniques are used (i.e., soils

are placed in multiple lifts, is not excessively wet or dry, with adequate compactive effort). Moisture and density testing of the backfill in the anchor trench is not required.

7.5.2 Compacted Clay Liner Testing

CQA monitoring activities specific to the Compacted Clay Liner include:

- monitoring excavation and proof-rolling activities prior to Compacted Clay Liner construction to verify that the subbase does not pump or rut excessively;
- recording field density and moisture content measurements and test location on test logs to verify uniform achievement of compaction parameters within the pre-qualification window described in Section 02055 of the Technical Specification;
- monitoring the compaction procedures to verify that the final surface is compacted, smooth, and uniform;
- obtaining undisturbed samples of the Compacted Clay Liner for laboratory hydraulic conductivity testing (i.e., Shelby tubes);
- monitoring procedures used to protect the finished surface from desiccation or erosion; and
- documenting weather conditions and verifying that construction proceeds only during weather conditions that will not cause completed areas to be damaged, contribute to areas of non-compliance in construction, or impede CQA efforts.

Prior to placing each lift of the Compacted Clay Liner, the preceding lift of compacted soil will be scarified to a depth no greater than 3-inches to promote bonding between lifts. Proposed scarification depth needs to be approved by the Engineer.

Hydraulic conductivity samples will be taken such that the Shelby tube is inserted into the Compacted Clay Liner normal (i.e., perpendicular) to the plane of the constructed surface. Perforations that must be filled will include, but not be limited to, the following:

- nuclear density test probe locations;
- sand cone or drive cylinder test locations; and
- hydraulic conductivity (Shelby tube) sampling locations.

Unless otherwise noted in the Technical Specifications, or as directed by the Design Engineer, all perforations of the Compacted Clay Liner by probe or Shelby tube will be backfilled with either Compacted Clay Liner soils or a sand mixture containing a minimum of a ten percent bentonite powder. The repair soils will be compacted in-place with a tamping rod, hammer, or hand tamper, depending on the size of the perforation.

7.5.3 Structural Fill Testing

CQA monitoring activities specific to the Structural Fill include:

- monitoring excavation and proof-rolling activities prior to Structural Fill construction to verify that the subbase does not pump or rut excessively;
- recording field density and moisture content measurements and test location on test logs to verify uniform achievement of compaction parameters;
- monitoring the compaction procedures to verify that the final surface is compacted, smooth, and uniform;
- monitoring procedures used to protect the finished surface from desiccation or erosion; and
- documenting weather conditions and verifying that construction proceeds only during weather conditions that will not cause completed areas to be damaged, contribute to areas of non-compliance in construction, or impede CQA efforts.

Prior to placing each lift of the Structural Fill, the preceding lift of compacted soil will be scarified to a depth no greater than 3-inches to promote bonding between lifts. Proposed scarification depth needs to be approved by the Engineer.

7.5.4 Protective Cover Testing

CQA monitoring activities specific to the Protective Cover include:

- monitoring the placement of Protective Cover to verify that excessive wrinkling in underlying geosynthetics is not created;
- monitoring the equipment used to place Protective Cover to ensure that appropriate low-ground pressure equipment is used as required in Section 02075 of the Technical Specifications;
- monitoring the thickness of haul roads within the cell to ensure minimum thicknesses are maintained for areas with heavy traffic volumes;
- confirming the final thickness of Protective Cover meets the minimum required in the Drawings either through hand depth checks, survey data, or a combination thereof;
- monitoring procedures used to protect the finished surface from desiccation or erosion; and
- documenting weather conditions and verifying that construction proceeds only during weather conditions that will not cause completed areas to be damaged, contribute to areas of non-compliance in construction, or impede CQA efforts.

Protective Cover shall be placed in a single lift to the minimum depth required.

7.5.5 Special Testing

A special testing frequency will be used at the discretion of the CQA Consultant when initial testing or visual observations of construction performance indicate a potential problem. Additional testing for suspected areas will be considered when:

- the compactor rollers slip during compaction operations;
- the lift thickness is greater than specified;
- the material is at a highly variable moisture content;
- dirt-clogged rollers are used to compact the material;
- the materials properties are highly variable;
- the degree of compaction is doubtful; or
- as directed by the CQA Consultant or Project Manager.

During construction, the frequency of testing may also be increased in the following situations:

- adverse weather conditions;
- breakdown of equipment;
- at the start and finish of grading;
- if the material initially fails to meet compaction requirements; or
- the work area is reduced.

7.6 Deficiencies, Problems, and Repairs

If a deficiency or noncompliance is discovered, then the CQA Consultant will promptly evaluate the extent and nature of the defect. The extent of the deficient area will be evaluated by additional tests, observations, a review of records, or other means deemed appropriate (e.g., proof-rolling by the Contractor).

After defining the extent and nature of a defect, the CQA Consultant will notify the Contractor, and at times, the Project Manager, to schedule appropriate retests after the work deficiency is corrected.

At locations where the field testing indicates densities below the requirements of the Technical Specifications, the failing area will be reworked. For the Compacted Clay Liner, where the field testing indicates the moisture content is above or below the requirements, the area will be scarified, moisture-conditioned, and recompacted. Alternatively, at the CQA Consultant and Project

Manager's option, undisturbed samples of in-place material will be obtained and hydraulic conductivity testing will be performed as appropriate.

If a specification criterion cannot be met, or unusual weather conditions hinder work, then the CQA Consultant will develop and present to the Project Manager or Engineer suggested alternative solutions for approval. All retests recommended by the CQA Consultant must verify that the deficiency has been corrected before additional work is performed by the Contractor in the area of the deficiency.

8. GEOMEMBRANE

8.1 Overview

This section of the CQA Plan addresses the CQA program to be implemented with regard to installation of the high-density polyethylene (HDPE) geomembrane. Detailed geomembrane installation requirements are presented in Section 02075 of the Technical Specifications. The geomembrane will be supplied and installed by the Geosynthetics Installer under direct contract with the Contractor.

8.2 Preconstruction Qualifying of Material Sources

Prior to construction, the Geosynthetics Installer will provide the CQA Consultant with the quality control information and certifications from the Geosynthetics Manufacturer required in Section 02075 of the Technical Specifications.

The CQA Consultant will examine the Geosynthetics Manufacturer's certifications to verify that the property values listed on the manufacturer's certifications meet or exceed the Technical Specifications and that proper and complete documentation has been provided by the Geosynthetics Installer for all geomembrane used at the Site. The CQA Consultant will report any deviations from the above requirements to the Geosynthetics Installer prior to approving installation of the geomembrane.

8.3 Conformance Testing

Conformance sampling of the geomembrane may be performed by the CQA Consultant either at the manufacturing facility or upon delivery of the rolls to the Site, as requested by the Project Manager. The CQA Consultant will obtain samples and forward them to the Geosynthetics CQA laboratory for testing to evaluate whether the material meets the requirements of the Technical Specifications and the Geomembrane Manufacturer's list of certified properties.

Conformance samples will be taken by the CQA Consultant across the entire width of the roll and will not include the first 3 feet of material. Unless otherwise specified, samples will be 3-feet long by the roll width. Samples will be taken at a minimum frequency of one sample per 200,000 ft^2 with a minimum of one sample per lot. Conformance tests will be performed in accordance with laboratory test methods presented in Section 02075 of the Technical Specifications.

The CQA Consultant will mark the machine direction on the samples with an arrow and affix a label, tag, or otherwise mark each sample with the following information:

- date sampled;
- project number;

- lot/batch number and roll number;
- conformance sample number; and
- CQA personnel identification.

The CQA Consultant will review all CQA and MQC conformance test results before approving deployment of the geomembrane. Any nonconformance of the material's physical properties will be promptly reported to the Geosynthetics Installer. The following procedure will apply whenever a geomembrane sample fails a conformance test performed by the CQA Consultant:

- The Geosynthetics Installer will be required to replace all of the rolls of geomembrane within the lot/batch from which the nonconforming sample was obtained.
- Alternatively, if the Geosynthetics Installer, Geosynthetics Manufacturer, and the Project Manager all agree, the CQA Consultant will obtain additional conformance samples from the closest numerical roll on both sides of the roll from which the failing sample was obtained. If these two samples pass the conformance test requirements, the failing roll will be removed and the rest of the lot/batch is approved for deployment. If either of these samples fails to meet the requirements, then the roll with the additional failing sample will be removed and samples will be collected from the five numerically closest untested rolls on both sides of the failed samples and tested by the CQA Consultant. If these ten samples pass the above conformance tests, then the rest of the lot/batch is approved for deployment. If any of these samples fail, then all rolls from the lot/batch will be rejected.

During conformance testing, the CQA Consultant will also verify that the Geosynthetics Manufacturer has identified all rolls of geomembrane with the following information:

- name of manufacturer;
- product identification;
- thickness;
- lot number;
- batch number;
- roll number; and
- roll dimensions.

The CQA Consultant will record the above information for each roll delivered to the Site using a Material Inventory Log form for the geomembrane.

8.4 Geomembrane Monitoring

The CQA Consultant will monitor geomembrane installation. Specific monitoring activities include, but are not limited to:

- review the required submittals to verify that the resin used to manufacture the geomembrane and the geomembrane itself meet the requirements of Section 02075 of the Technical Specifications;
- collecting conformance samples of the geomembrane at the manufacturing facility or after delivered to the Site and forwarding the samples to an approved off-site testing laboratory for testing;
- collecting and reviewing the Geosynthetics Manufacturers' quality control (MQC) documentation to verify that the certifications comply with the requirements of the Technical Specifications;
- tracking inventory of the geomembrane rolls delivered to the Site;
- observing geomembrane rolls that had been delivered to the Site to observe whether the materials had been damaged during transportation and, if damaged, marking damaged locations for repair or replacement;
- observe and document material unloading and on-site transport and storage;
- reviewing and evaluating laboratory CQA conformance test results for the geomembrane to verify that the test results met the requirements of the Technical Specifications;
- monitoring deployment and installation of geomembrane and marking locations for replacement or repair;
- monitoring overlapping of adjacent geomembrane panels;
- monitoring geomembrane trial seaming operations and field testing of trial seams (both fusion and extrusion);
- monitoring geomembrane production seaming operations (both fusion and extrusion);
- monitoring nondestructive testing (both air pressure and vacuum) of geomembrane seams and repairs;
- selecting geomembrane destructive seam sample locations, monitoring sample collection, distributing samples to the Geosynthetics Installer and Owner, and destructively testing the samples at an approved off-site laboratory to verify compliance with the requirements of the Technical Specifications and CQA Plan;
- monitoring repairs to portions of the geosynthetics that were observed to have defects or that failed the criteria for destructive or nondestructive testing;

- observe and document repair operations;
- note on-site activities that could result in damage to the geomembrane; and
- monitoring placement of the geosynthetics in the anchor trench.

8.5 Deficiencies, Problems, and Repairs

The CQA Consultant will report to the Geosynthetics Installer any unresolved deficiencies in the underlying subgrade prior to geomembrane placement and will not approve of geomembrane deployment until the geomembrane deficiencies are resolved to the satisfaction of the CQA Consultant and in accordance with the Technical Specifications.

The CQA Consultant will verify that any holes or tears in the geomembrane are repaired in accordance with the Technical Specifications.

The CQA Consultant will document deficiencies or noncompliance with the specified requirements. The extent of deficiencies will be evaluated by observations, a review of records, or other means deemed appropriate by the CQA Consultant. The Geosynthetics Installer will correct the deficiency to the satisfaction of the CQA Consultant. If a Technical Specification criterion cannot be met, or unusual weather conditions hinder work, then the CQA Consultant will develop and present to the Project Manager and Engineer suggested alternative solutions for approval. All retests or subsequent re-evaluations recommended by the CQA Consultant must verify that the deficiency has been corrected before any additional work is performed by the Geosynthetics Installer in the area of the deficiency.

8.6 Electric Leak Location Survey

The Contractor is required to retain a third-party specialty leak location inspection company to perform an electric leak location (ELL) survey on the secondary and primary geomembrane in accordance with Section 02290 of the Technical Specifications. ELL shall consist of the arc test method in accordance with ASTM D-7953 for the secondary geomembrane and the dipole method for leak location with earth materials covering the primary geomembrane in conformance with ASTM D-7007. The CQA Consultant will observe document construction procedures required to ensure an accurate survey, including:

- electrical isolation of the geomembrane from subgrade soils;
- use of a specialty electrical isolation wedge during fusion welding; and
- adequate moisture is maintained within protective cover soils to support ELL.

Results from the ELL survey shall be documented by the leak location inspector and provided to the CQA Consultant for inclusion with the Final CQA Report.

The CQA Consultant shall review the result of the ELL survey with the leak location inspector and mark locations of suspected damage in the field. The CQA Consultant shall observe uncovering of the geosynthetics, perform a visual review for damage, and shall document the size and extent of damage identified. Repairs shall be completed and documented in accordance with the Technical Specifications and this CQA Plan.

9. GEOSYNTHETIC CLAY LINER

9.1 Overview

This section of the CQA Plan addresses the CQA program to be implemented with regard to the installation of the geosynthetic clay liner (GCL). Detailed GCL installation requirements are presented in Section 02072 of the Technical Specifications. The GCL will be supplied and installed by the Contractor and/or Geosynthetics Installer under direct contract with the Contractor.

9.2 Preconstruction Qualifying of Material Sources

Prior to construction, the Geosynthetics Installer will provide the CQA Consultant with the quality control information and certifications from the Geosynthetics Manufacturer required in Section 02072 of the Technical Specifications.

The CQA Consultant will examine the Geosynthetics Manufacturer's certifications to verify that the property values listed on the manufacturer's certifications meet or exceed the Technical Specifications and that proper and complete documentation has been provided by the Geosynthetics Installer for all GCL used at the Site. The CQA Consultant will report any deviations from the above requirements to the Geosynthetics Installer prior to approving installation of the GCL.

9.3 GCL Conformance Testing

Conformance sampling of the GCL may be performed by the CQA Consultant either at the manufacturing plant or upon delivery of rolls to the Site, as requested by the Project Manager. The CQA Consultant will obtain samples and forward them to the Geosynthetics CQA Laboratory for testing to evaluate whether the material meets the requirements of the Technical Specifications and the manufacturer's list of certified properties.

Conformance samples will be taken by the Geosynthetic CQA across the entire width of the roll and will not include the first 3 ft. along the length of the roll. Unless otherwise specified, samples will be 3-ft. long by the full roll width. The CQA Consultant will mark the machine direction on the samples with an arrow and affix a label, tag, or otherwise mark each sample with the following information:

- date sampled;
- project number;
- lot/batch number and roll number;
- conformance sample number; and
- CQA Consultant personnel identification.

Conformance samples will be taken at a minimum frequency of one sample per 200,000 ft^2 with a minimum of one sample per lot. Conformance tests will be performed in accordance with laboratory test methods presented in Section 02072 of the Technical Specifications. All conformance test results will be reviewed by the CQA Consultant before installation of the GCL. Any nonconformance of the material's physical properties will be promptly reported to the Geosynthetic Installer. The following procedure will apply whenever a GCL sample fails a conformance test performed by the CQA Consultant.

- The Geosynthetic Installer will be required to replace all of the rolls of GCL within the batch from which the sample that is not in conformance with the specifications was obtained.
- Alternatively, if the Geosynthetic Installer, GCL Manufacturer and the Project Manager all agree, then the CQA Consultant will obtain additional conformance samples from the closest numerical roll on both sides of the roll from which the failing sample was obtained. These two samples must pass the conformance tests specified above. If either of these samples fails to meet the requirements, samples will be collected from the five numerically closest untested rolls on both sides of the failed sample and tested by the Geosynthetics CQA Laboratory. These ten samples must pass the above conformance tests. If any of these samples fail, then a sample from every roll of GCL from the batch/lot on-site and maybe conformance tested by the CQA Consultant for the failing property test.

During conformance testing, the CQA Consultant will also verify that the GCL manufacturer has identified all rolls of GCL with the following information:

- name of manufacturer;
- product identification;
- lot number;
- batch number;
- roll number; and
- roll dimensions.

The CQA Consultant will record all of the above information for each roll delivered to the Site using a Material Inventory Log form for the GCL.

9.4 GCL Monitoring

The CQA Consultant will monitor unloading and storage of the GCL. During unloading and storage, the Contractor and/or the Geosynthetics Installer will be required to keep the GCL off

the ground and protect the GCL from direct sunlight, precipitation or other inundation, excessive heat or cold, mud, dirt, dust, puncture, cutting, or any other damaging or deleterious conditions. To that effect, the Technical Specifications require that the GCL rolls be shipped and stored in opaque and watertight wrappings.

The CQA Consultant will observe rolls upon delivery at the Site and any deviation from the above requirements will be reported to the Geosynthetic Installer. Any damaged rolls will be rejected by the CQA Consultant and the Project Manager and be repaired or replaced by the Geosynthetic Installer.

The Geosynthetic Installer will be required to handle and deploy all GCL in such a manner as to ensure the GCL is not damaged. Prior to GCL deployment directly on the subgrade, the CQA Consultant will observe the area, and will confirm that the soil subgrade surface has been fully approved by the Geosynthetic Installer. During installation, the CQA Consultant will verify compliance including but not be limited to:

- immediately prior to GCL placement, the underlying subgrade is free of moisture or obstructions that could potentially damage the GCL;
- if applicable, the GCL is installed with the correct orientation (i.e., with the correct side up);
- efforts are made to keep the GCL placed to minimize the presence of wrinkles in the GCL, and if necessary, the GCL is positioned by hand after being unrolled to minimize wrinkles;
- excessive amounts of bentonite do not ravel out along the edges of the GCL;
- care is taken by the Geosynthetic Installer not to entrap stones, soil, dust, or moisture that could damage the GCL;
- in the presence of wind, the GCL is weighted with sandbags (or equivalent ballast weight approved by the CQA Consultant), and that sandbags remain until replaced with the overlying geomembrane;
- a visual examination of the GCL is performed over the entire surface, after installation, to verify that no potentially harmful foreign objects, such as needles or tools, are present;
- prior to geomembrane deployment, the CQA Consultant grants approval for the GCL to be covered;
- verify that any holes or tears in the GCL are repaired in accordance with the Technical Specifications, and that care is taken by the Contractor and/or Geosynthetic Installer to remove any soil or other material, which may have penetrated the torn GCL;
- no more GCL is deployed during each day than can be covered by the end of the day with seamed geomembrane; and

- the GCL is not left exposed for longer than the maximum allowable period (as set forth in the Technical Specifications) after placement unless the Engineer approves a longer exposure period.

The CQA Consultant will verify that the GCL panels are overlapped as required in the Technical Specifications. The CQA Consultant will also confirm that the Engineer is made aware of any end-to-end GCL seams on slopes, and that any special overlapping or connecting methods required by the Engineer are implemented by the Geosynthetic Installer.

The CQA Consultant will verify that the Geosynthetics Installer places the geomembrane on top of the GCL such that:

- the GCL and underlying materials are not damaged;
- wrinkles are minimized;
- excess tensile stresses are not produced in the GCL; and
- the geomembrane extends at least 2 ft. beyond the underlying GCL, and the leading edge of the geomembrane has adequately ballast to avoid wind uplift and reduce the likelihood of surface water running under the geomembrane and hydrating the GCL

9.5 Deficiencies, Problems, and Repairs

The CQA Consultant will report to the Geosynthetics Installer any unresolved deficiencies in the underlying materials prior to GCL placement and will not approve of GCL deployment until the deficiencies are resolved to the satisfaction of the CQA Consultant and in accordance with the Technical Specifications.

The CQA Consultant will verify that any holes or tears in the GCL are repaired in accordance with the Technical Specifications, and that care is taken by the Contractor to prevent hydration of the GCL before protective cover is placed.

The CQA Consultant will document deficiencies or noncompliance with the specified requirements and report them to the Geosynthetics Installer. The extent of deficiencies will be evaluated by observations, a review of records, or other means deemed appropriate by the CQA Consultant. The Geosynthetics Installer will correct the deficiency to the satisfaction of the CQA Consultant. If a Technical Specification criterion cannot be met, or unusual weather conditions hinder work, then the CQA Consultant will develop and present to the Project Manager and Engineer suggested alternative solutions for approval. All retests or subsequent re-evaluations recommended by the CQA Consultant must verify that the deficiency has been corrected before any additional work is performed by the Geosynthetics Installer in the area of the deficiency.

10. GEOTEXTILE

10.1 Overview

This section of the CQA Plan addresses the CQA program to be implemented with regard to the installation of the geotextile. Detailed geotextile installation requirements are presented in Section 02071 of the Technical Specifications. The geotextile will be supplied and installed by the Contractor and/or Geosynthetics Installer under direct contract with the Contractor.

10.2 Geotextile Conformance Testing

Conformance sampling of the geotextile will be performed by the CQA Consultant upon delivery of rolls to the Site, unless otherwise directed by the Project Manager. The CQA Consultant will obtain samples and forward them to the Geosynthetics CQA Laboratory for testing to evaluate whether the material meets the requirements of the Technical Specifications and the manufacturer's list of certified properties.

Conformance samples will be taken by the CQA Consultant across the entire width of the roll and will not include the first 3 feet of material. Unless otherwise specified, samples will be 3-feet long by the roll width. The CQA Consultant will mark the machine direction on the samples with an arrow and affix a label, tag, or otherwise mark each sample with the following information:

- date sampled;
- project number;
- lot/batch number and roll number;
- conformance sample number; and
- CQA Consultant personnel identification.

Conformance samples will be taken at a minimum frequency of one sample per 200,000 ft^2 with a minimum of one sample per lot. Conformance tests will be performed in accordance with laboratory test methods presented in Section 02071 of the Technical Specifications.

All conformance test results will be reviewed by the CQA Consultant before installation of the geotextile. Any nonconformance of the material's physical properties will be promptly reported to the Contractor and/or Geosynthetics Installer. The following procedure will apply whenever a geotextile sample fails a conformance test performed by the CQA Consultant.

- The Contractor and/or Geosynthetics Installer will be required to replace all of the rolls of geotextile within the lot/batch from which the non-conforming sample was obtained.

- Alternatively, if the Contractor and/or Geosynthetics Installer, Geosynthetics Manufacturer, and the Project Manager all agree, then the CQA Consultant will obtain additional conformance samples from the closest numerical roll on both sides of the roll from which the failing sample was obtained. If these two samples pass the conformance tests specified above, the failing roll will be removed, and the rest of the lot/batch is approved for deployment. If either of these samples fails to meet the requirements, then the roll with the additional failing sample will be removed and samples will be collected from the five numerically closest untested rolls on both sides of the failed sample and tested by the Geosynthetics CQA Laboratory. If these ten samples pass the above conformance tests, then the rest of the lot/batch is approved for deployment. If any of these samples fail, then all rolls from the lot/batch will be rejected.

During conformance testing, the CQA Consultant will also verify that the Geosynthetics Manufacturer has identified all rolls of geotextile with the following information:

- name of manufacturer;
- product identification;
- lot number;
- batch number;
- roll number; and
- roll dimensions.

The CQA Consultant will record all of the above information for each roll delivered to the Site using a Material Inventory Log form for the geotextile.

10.3 Geotextile Monitoring

The CQA Consultant will monitor geotextile installation. Specific monitoring activities include, but are not limited to:

- review the required submittals to verify that the geotextile meets the requirements of Section 02071 of the Technical Specifications;
- collecting conformance samples of the geotextile at the manufacturing facility or after delivered to the Site and forwarding the samples to an approved off-site testing laboratory;
- collecting and reviewing the MQC documentation to verify that the certifications comply with the requirements of the Technical Specifications;
- tracking inventory of the geotextile rolls delivered to the Site;

- observing geotextile rolls that had been delivered to the Site to observe whether the materials had been damaged during transportation and, if damaged, marking damaged locations for repair or replacement;
- observe and document material unloading and on-site transport and storage;
- reviewing and evaluating laboratory CQA conformance test results for the geotextile to verify that the test results met the requirements of the Technical Specifications;
- immediately prior to geotextile placement, the subgrade is free of sharp protrusions or other obstructions that could potentially damage the geotextile;
- in the presence of wind, the geotextile is weighted with sandbags (or equivalent ballast weight approved by the CQA Consultant), and that sandbags remain until replaced with an overlying layer;
- efforts are made to minimize the presence of wrinkles in the geotextile, and if necessary, the geotextile is positioned by hand after being unrolled to minimize wrinkles;
- a visual examination of the geotextile is performed over the entire surface, after installation, to verify that no potentially harmful foreign objects, such as needles or tools, are present; and
- the geotextile is not left exposed for longer that the maximum allowable period (as set forth in the Technical Specifications) after placement unless a longer exposure period is approved by the Engineer.

The CQA Consultant will verify that the Contractor places all soil and aggregate materials on top of the geotextile such that:

- the geotextile and underlying materials are not damaged;
- wrinkles are minimized; and
- excess tensile stresses are not produced in the geotextile.

10.4 Deficiencies, Problems, and Repairs

The CQA Consultant will report to the Geosynthetics Installer any unresolved deficiencies in the underlying materials prior to geotextile placement and will not approve of geotextile deployment until the material deficiencies are resolved to the satisfaction of the CQA Consultant and in accordance with the Technical Specifications.

The CQA Consultant will verify that any holes or tears in the geotextile are repaired in accordance with the Technical Specifications, and that care is taken by the Contractor to remove any soil or other materials which may have penetrated the torn geotextile.

The CQA Consultant will document deficiencies or noncompliance with the specified requirements. The extent of deficiencies will be evaluated by observations, a review of records, or other means deemed appropriate by the CQA Consultant. The Geosynthetics Installer will correct the deficiency to the satisfaction of the CQA Consultant. If a Technical Specification criterion cannot be met, or unusual weather conditions hinder work, then the CQA Consultant will develop and present to the Project Manager and Engineer suggested alternative solutions for approval. All retests or subsequent re-evaluations recommended by the CQA Consultant must verify that the deficiency has been corrected before any additional work is performed by the Geosynthetics Installer in the area of the deficiency.

11. GEOCOMPOSITE

11.1 Overview

This section of the CQA Plan addresses the CQA program to be implemented with regard to the geocomposite component of the liner and cover systems. Detailed geocomposite installation requirements are presented in Section 02078 of the Technical Specifications. The geocomposite will be supplied and installed by the Geosynthetics Installer under direct contract with the Contractor.

11.2 Preconstruction Qualifying of Material Sources

Prior to construction, the Geosynthetics Installer will provide the CQA Consultant with the quality control information and certifications from the Geosynthetics Manufacturer required in Section 02078 of the Technical Specifications.

The CQA Consultant will examine the Geosynthetics Manufacturer's certifications to verify that the property values listed on the manufacturer's certifications meet or exceed the Technical Specifications and that proper and complete documentation has been provided by the Geosynthetics Installer for all geocomposite used at the Site. The CQA Consultant will also verify that the manufacturer of the non-woven geotextile component(s) of the geocomposite provides certification that the geotextile is continuously inspected for the presence of needles using a metal detector during the manufacturing process. The CQA Consultant will report any deviations from the above requirements to the Geosynthetics Installer prior to approving installation of the geocomposite.

11.3 Conformance Testing

Conformance sampling of the geocomposite may be performed by the CQA Consultant either at the manufacturing plant or upon delivery of rolls to the Site, as requested by the Project Manager. The CQA Consultant will obtain samples and forward them to the Geosynthetics CQA Laboratory for testing to evaluate whether the material meets the requirements of the Technical Specifications and the manufacturer's list of certified properties.

Conformance samples will be taken by the CQA Consultant across the entire width of the roll and will not include the first 3 feet along the length of the roll. Unless otherwise specified, samples will be 3-feet long by the full roll width. The CQA Consultant will mark the machine direction on the samples with an arrow and affix a label, tag, or otherwise mark each sample with the following information:

- date sampled;
- project number;

- lot/batch number and roll number;
- conformance sample number; and
- CQA Consultant personnel identification.

Conformance samples will be taken at a minimum frequency of one sample per 200,000 ft^2 with a minimum of one sample per lot. Conformance tests will be performed in accordance with laboratory test methods presented in Section 02078 of the Technical Specifications. All conformance test results will be reviewed by the CQA Consultant before installation of the geocomposite. Any nonconformance of the material's physical properties will be promptly reported to the Geosynthetics Installer. The following procedure will apply whenever a geocomposite sample fails a conformance test conducted by the Geosynthetics CQA Laboratory.

- The Geosynthetics Installer will be required to replace all of the rolls of geocomposite within the batch from which the sample that is not in conformance with the specifications was obtained.
- Alternatively, if the Contractor and/or Geosynthetics Installer, Geosynthetics Manufacturer, and the Project Manager all agree, the CQA Consultant will obtain additional conformance samples from the closest numerical roll on both sides of the roll from which the failing sample was obtained. If these two samples pass the conformance tests specified above, the failing roll will be removed, and the rest of the lot/batch is approved for deployment. If either of these samples fails to meet the requirements, the additional failing roll will be removed, and samples will be collected from the five numerically closest untested rolls on both sides of the failed samples and tested by the Geosynthetics CQA Laboratory. If these ten samples pass the above conformance tests, the rest of the lot/batch is approved for deployment. If any of these samples fail, then all rolls in the lot/batch will be rejected.

During conformance testing, the CQA Consultant will also verify that the Geosynthetics Manufacturer has identified all rolls of geocomposite with the following information:

- name of manufacturer;
- product identification;
- lot number;
- batch number;
- roll number; and
- roll dimensions.

The CQA Consultant will record all of the above information for each roll delivered to the Site using a Material Inventory Log form for the geocomposite.

11.4 Geocomposite Monitoring

During unloading and storage, the Contractor and/or the Geosynthetics Installer will be required to keep the geocomposite off the ground and protect the geocomposite from direct sunlight, precipitation or other inundation, excessive heat or cold, mud, dirt, dust, puncture, cutting, or any other damaging or deleterious conditions. To that effect, the Technical Specifications require that the geocomposite rolls be shipped and stored in opaque and watertight wrappings.

The CQA Consultant will observe rolls upon delivery at the Site and any deviation from the above requirements will be reported to the Geosynthetics Installer. Any damaged rolls will be rejected by the Project Manager and CQA Consultant and required to be repaired or replaced by the Geosynthetics Installer.

The Geosynthetics Installer will be required to handle and deploy all geocomposite in such a manner as to ensure the geocomposite is not damaged. The CQA Consultant will verify compliance with the following:

- immediately prior to geocomposite placement, the underlying geomembrane surface is free of moisture or obstructions that could potentially damage the geocomposite;
- in the presence of wind, the geocomposite is weighted with sandbags (or equivalent ballast weight approved by the CQA Consultant), and that sandbags remain until replaced with the overlying protective cover soil layer;
- efforts are made to minimize the presence of wrinkles in the geocomposite, and if necessary, the geocomposite is positioned by hand after being unrolled to minimize wrinkles;
- care is taken by the Geosynthetics Installer not to entrap stones, soil, dust, or moisture that could damage or cause clogging to the geocomposite;
- a visual examination of the geocomposite is carried out over the entire surface, after installation, to verify that no potentially harmful foreign objects, such as needles or tools, are present; and
- the geocomposite is not left exposed for longer than the maximum allowable period (as set forth in the Technical Specifications) after placement unless a longer exposure period is approved by the Engineer.

The CQA Consultant will verify that the components of the geocomposite (i.e., geotextile-geonet-geotextile) are sewn, joined, and/or overlapped to like-components in adjacent geocomposite panels, as required in the Technical Specifications.

The CQA Consultant will verify that the Contractor and/or Geosynthetics Installer places soil or geosynthetic materials on top of geocomposite such that:

- the geocomposite and underlying materials are not damaged;
- wrinkles are minimized; and
- excess tensile stresses are not produced in the geocomposite.

11.5 Deficiencies, Problems, and Repairs

The CQA Consultant will report to the Geosynthetics Installer any unresolved deficiencies in the underlying geomembrane prior to geocomposite placement and will not approve of geocomposite deployment until the geomembrane deficiencies are resolved to the satisfaction of the CQA Consultant and in accordance with the Technical Specifications.

The CQA Consultant will verify that any holes or tears in the geocomposite are repaired in accordance with the Technical Specifications, and that care is taken by the Contractor to remove any soil or other materials, which may have penetrated the torn geocomposite.

The CQA Consultant will document deficiencies or noncompliance with the specified requirements and report them to the Geosynthetics Installer. The extent of deficiencies will be evaluated by observations, a review of records, or other means deemed appropriate by the CQA Consultant. The Geosynthetics Installer will correct the deficiency to the satisfaction of the CQA Consultant. If a Technical Specification criterion cannot be met, or unusual weather conditions hinder work, then the CQA Consultant will develop and present to the Project Manager and Engineer suggested alternative solutions for approval. All retests or subsequent re-evaluations recommended by the CQA Consultant must verify that the deficiency has been corrected before any additional work is performed by the Geosynthetics Installer in the area of the deficiency.

12. HDPE PIPE AND FITTINGS

12.1 Overview

This section of the CQA Plan addresses the CQA program to be implemented with regard to installation of HDPE pipe and fittings for the leachate collection and transmissions systems. Items in this section include the HDPE pipe, fittings, and associated accessories.

12.2 Preconstruction Qualifying of Material Sources

The leachate collection and transmission systems will include perforated and solid-wall HDPE collection pipes and fittings. The pipes and fittings must be prequalified as described below. Prior to the shipment of the HDPE pipes and fittings to the Site, the Contractor will be required to provide the CQA Consultant the quality control information and certifications from each manufacturer as required in Section 02081 of the Technical Specifications.

The CQA Consultant will examine the HDPE pipe and fittings delivered to verify that complete documentation has been provided by the Contractor for all HDPE pipe, fittings, and pipe-accessories used at the Site. If, during preconstruction qualifying, any of the HDPE piping, fittings, and/or accessories fails to meet the requirements of the Drawings and Technical Specifications, the CQA Consultant will notify the Contractor. Use of the material will not be allowed until the material is prequalified by further tests or otherwise accepted by the Engineer.

12.3 HDPE Pipe and Fittings Monitoring

The CQA Consultant will verify that the HDPE pipe and fittings are stored on clean level ground, free of conditions which could damage the pipe; and where necessary (e.g., due to muddy or sloping ground conditions) the pipe is stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.

During construction, the CQA Consultant will verify compliance with the following:

- the perforated pipe has the proper amount, correct size, and spacing of perforations, and that the perforations are oriented properly after the pipe is installed;
- handling of the pipe is conducted in such a manner that the pipe is not damaged;
- ropes, fabric, or rubber-protected slings and straps are used when handling pipe;
- pipe or fittings are not dropped onto rocky or unprepared ground or into trenches or dragged over sharp objects;
- the subgrade surface is firm and free of debris;

- crushed aggregate for the leachate collection and transmission systems are carefully placed under and around the pipe in accordance with the Drawings and Technical Specifications;
- pipe segments are not brought into position until preceding lengths have been bedded and secured in its final position;
- pipe sections are properly joined using procedures recommended by the manufacturer and/or allowed for in the Technical Specifications;
- joints are stable and in secure condition prior to and after backfilling;
- blocking is not used under the pipe unless pre-approved by the Engineer; and
- placement of backfill over the pipe is conducted in lifts meeting the requirements of the Technical Specifications, and in a manner that will not damage the pipe.

12.4 Conformance Testing

Material conformance testing of the HDPE pipes will not be required unless aspects of the prequalifying information are deficient or suspect, or if requested by the Engineer. If deemed necessary by the Project Manager, the Contractor will remove a minimum 3-foot-long section of pipe and deliver it to the Geosynthetics CQA Laboratory for testing to evaluate whether the pipe meets the required properties of the Technical Specifications. The conformance test requirements will be determined at that time by the Project Manager and/or Engineer.

12.5 Performance Testing of Work Products

The CQA Consultant will verify that the Contractor has performed the applicable pre-testing procedures required in Section 02081 of the Technical Specifications prior to initiating any hydrostatic or low-pressure air testing of the solid HDPE pipes during installation. The CQA Consultant will monitor the Contractor's activities associate with all testing activities and will confirm that the Contractor follows the procedures required in the specifications. The CQA Consultant will either record the test results or will observe the Contractor recording the results and review the results upon submittal by the Contractor.

12.6 Deficiencies, Problems, and Repairs

The CQA Consultant will report any deficiencies or noncompliance in the construction to the Contractor. The extent of deficiencies will be evaluated by observations, review of records, or other means deemed appropriate by the Project Manager and Engineer.

The Contractor will correct the deficiency to the satisfaction of the Project Manager and Engineer. All retests or subsequent re-evaluations recommended by the CQA Consultant must verify that the deficiency has been corrected before any additional work is performed by the Contractor in the area of the deficiency.

13. MECHANICAL AND ELECTRICAL SYSTEMS

13.1 Overview

This section of the CQA Plan addresses the CQA program to be implemented with regard to installation of mechanical and electrical systems for the Project.

13.2 Preconstruction Qualifying of Equipment and Systems

The electrical and mechanical systems must be prequalified as described below. Prior to shipment of the electrical and mechanical systems to the Site, the Contractor will be required to provide the Project Manager and/or Engineer the quality control information, shop drawings, and/or certifications from the manufacturers as required in the Drawings and Technical Specifications

The Project Manager will verify that each piece of equipment is consistent with requirements of the Drawings and Technical Specifications. The Project Manager and/or Engineer will also review the information associated with submittals and shop drawing including, but not be limited to:

- manufacturer's literature and catalog cut sheets of all proposed equipment;
- certified outline dimension drawings;
- electrical wiring and control diagrams;
- piping and/or duct work;
- performance data;
- location of equipment;
- sleeves and chases;
- installation instructions; and
- operating and maintenance instructions.

If any of the mechanical and electrical systems fails to meet the requirements of the Drawings and Technical Specifications, the Project Manager and/or Engineer will notify the Contractor. Use of the equipment and/or systems will not be allowed until the equipment and mechanical and electrical systems are accepted by the Project Manager and/or Engineer.

13.3 Mechanical and Electrical System Monitoring

The CQA Consultant will verify that the mechanical and electrical systems are installed in accordance with the Drawings and Technical Specifications, and to the satisfaction of the Project Manager and Engineer.

13.4 Performance Testing of Work Products

The CQA Consultant will verify that the Contractor has performed the applicable performance and startup tests for the electrical and mechanical systems in accordance with the Drawings and Technical Specifications. The CQA Consultant will either record the test results or will observe the Contractor recording the results and review the results upon submittal by the Contractor.

13.5 Deficiencies, Problems, and Repairs

The CQA Consultant will report any deficiencies or noncompliance in the construction to the Contractor. The extent of deficiencies will be evaluated by observations, review of records, or other means deemed appropriate by the Project Manager and Engineer. The Contractor shall repair any deficiencies or noncompliant work to the satisfaction of the Project Manager and Engineer.

Geosyntec
consultants

APPENDIX K
Environmental Monitoring Plan

January 27, 2025

CERTIFIED MAIL
Return Receipt Requested

Stephen Krajcsik
Millersville Municipal Landfill
Solid Waste Operations Administrator
389 Burns Crossing Road
Severn MD 21144

Dear Stephen Krajcsik:

The Maryland Department of the Environment (MDE) has received the updated Environmental Monitoring Plan (EMP) for the Millersville Landfill and Resource Recovery Facility, prepared by SCS Engineers, with the latest revision dated January 23, 2025.

The EMP notes that geological logs or well construction diagrams could not be located for the following monitoring wells: RW-P171-1, RW-P109, RW-P161, RW-P165, RW-P440, RW-P441, RW-P584, TW-6A, and TW-9. MDE recommends locating the tags and logs for these wells and including them as an addendum in future EMP updates.

MDE approves the revised EMP dated January 23, 2025, as submitted. If you have any questions regarding this matter, please contact Nicholas Zahn at *Nicholas.zahn@maryland.gov* or section head Dr. Binyam Woldemichael, at *binyam.woldemichael@maryland.gov*. Both can be reached by calling 410-537-3315.

Sincerely,

Andrew Grenzer, Chief
Solid Waste Operations Division

cc: Jennifer Robb. Vice President, SCS Engineers
Rick Kessler, Director, Land and Materials Administration (LMA)
Brian Coblentz, Chief, Compliance Division, Solid Waste Program, LMA

Environmental Monitoring Plan

Millersville Landfill and Resource Recovery Facility
Refuse Disposal Permit 2022-WMF-0240

ANNE ARUNDEL COUNTY
MARYLAND
Department of Public Works
Bureau of Waste Management Services
389 Burns Crossing Road
Severn, MD 21144

SCS ENGINEERS

02211047.18 Task 1 | January 23, 2025

296 Victory Road
Winchester, VA 22602

Signature/Certification Sheet

Author:

I certify that I have prepared this report in accordance with industry standards and practices, and that the information contained herein is truthful and accurate to the best of my knowledge.

Name: Logan A. Howard, Senior Project Professional

Signature:

Date: January 23, 2025

Reviewer and Qualified Groundwater Scientist Certification:

I certify that I have reviewed this report in accordance with industry standards and practices, and that the information contained herein is truthful and accurate to the best of my knowledge.

Name: Jennifer S. Robb, Vice President

Signature:

Date: January 23, 2025

Table of Contents

Section Page

1.0 Forward 1
2.0 Introduction 2
2.1 Groundwater and Surface Water Regulatory Requirements 2
2.2 Landfill Gas Monitoring Regulatory Requirements 3
2.3 Leachate Monitoring Permit Requirements 4
2.4 Stormwater Monitoring Permit Requirements 5
3.0 Site Conditions 6
3.1 Site Location and Description 6
3.2 Climatological Setting 6
3.3 Geologic Setting 6
3.4 Site Hydrogeology 7
3.5 Landfill Development History 7
3.6 Groundwater Monitoring History 8
3.7 Landfill Gas Monitoring History 12
4.0 Groundwater and Surface Water Monitoring Program 15
4.1 Groundwater and Surface Water Monitoring System 15
4.1.1 COMAR Groundwater Well Network 15
4.1.2 Subtitle D Groundwater Well Network 16
4.1.3 Cell 9 Subcell 9.2 Sentry Monitoring Well Network 17
4.1.4 Eastern Boundary Groundwater Well Network 17
4.1.5 Southern Boundary Groundwater Well Network 18
4.1.6 Additional Groundwater Monitoring Wells 19
4.1.7 Surface Water Monitoring Network 19
4.2 Groundwater Montioring Well Operations and Maintenance 19
4.2.1 Monitoring Well Installation Procedures 19
4.2.1.1 Monitoring Well Installation Method 20
4.2.1.2 Monitoring Well Survey 21
4.2.1.3 Monitoring Well Development 22
4.2.1.4 Aquifer Testing 22
4.2.2 Monitoring Well Maintenance 22
4.2.2.1 Visual Observations 22
4.2.2.2 Well Re-Development 22
4.2.2.3 Well Replacement 23
4.2.2.4 Well Abandonment 23
4.2.2.5 Dedicated Groundwater Sampling System 23
4.3 Groundwater and Surface Water Monitoring Plans 23
4.3.1 Groundwater Monitoring 24
4.3.2 Surface Water Monitoring 25
4.4 Sampling Procedures 26
4.4.1 Equipment Selection and Calibration 26

4.4.2 Static Water Level Determination 26
4.4.3 Bottle Kit Preparation 27
4.4.4 Monitoring Well Purging Procedures 27
4.4.5 Sample Collection Procedures 28
4.4.5.1 Groundwater Monitoring Wells 28
4.4.5.2 Drinking Water Supply Wells 29
4.4.5.3 Surface Water 29
4.4.5.4 PFAS 29
4.4.6 Sample Documentation 30
4.4.7 Sample Bottle Labeling 30
4.4.8 Field Logs 30
4.4.9 Chain-of-Custody 30
4.5 Quality Assurance/Quality Control 31
4.5.1 Atmospheric Contamination 31
4.5.2 Decontamination Procedures 32
4.5.3 Quality Control Sampling 32
4.6 Laboratory Analysis 32
4.7 Groudnwater Data Evaluation 33
4.7.1 Evaluation of Zone 3 Groundwater Elevation Data 33
4.7.2 Data Validation 34
4.7.3 Data Screening 34
4.7.3.1 Treatment of Non-Detects in Background Data 34
4.7.3.2 Outlier Analysis 34
4.7.4 Inter-Well Statistical Analysis 35
4.7.4.1 Pooling Upgradient/Background Data 35
4.7.4.2 Assessing Data Distribution 35
4.7.4.3 Calculating and Comparing to Upper Prediction Limits 35
4.7.5 Responses to Inter-Well Exceedances 36
4.7.6 Comparison to Groundwater Protection Standards 36
4.7.7 Trend Analysis 37
4.7.8 Surface Water Data Evaluation 37
4.8 Notifications and Reporting 38
4.8.1 Response to Groundwater Protection Standard Exceedances 38
4.8.2 Drinking Water Supply Well Monitoring Notifications 38
4.8.3 Semi-Annual Monitoring Reports 39
5.0 Underdrain Monitoring Program 40
5.1 Subcell 8.8 40
5.2 Cell 9 40
6.0 Landfill Gas Monitoring Program 41
6.1 Monitoring System 41
6.2 Monitoring Procedures 41
6.3 Notifications and Reporting 43
7.0 Leachate Monitoring Program 44
7.1 Refuse Disposal Permit Monitoring Requirements 44

7.2 Wastewater Discharge Permit Monitoring Requirements 44
7.2.1 Monitoring Requirements 44
7.2.2 Sample Documentation 45
7.2.3 Effluent Limitations 45
7.2.4 Annual Reporting 45
7.2.5 Reporting of Non-Compliance with Discharge Limitations/Slug Loadings/Upsets 46
7.3 Additional Voluntary Monitoring 46
8.0 Stormwater Monitoring Program 48
8.1 Stormwater Monitoring Locations 49
8.2 Visual and Benchmark Monitoring Procedures 49
8.2.1 Visual Monitoring Procedures 50
8.2.2 Benchmark Monitoring Procedures 51
8.3 Record Keeping and Reporting 51
8.3.1 General Requirements 51
8.3.2 Responses to Benchmark Monitoring Results 52
8.3.2.1 Data Not Exceeding Benchmarks 52
8.3.2.2 Data Exceeding Benchmarks 52
9.0 References 1

List of Tables

Table 1. COMAR Groundwater Monitoring Well Network 16
Table 2. Subtitle D Groundwater Monitoring Well Network 17
Table 3. Eastern Boundary Groundwater Well Networks 18
Table 4. Groundwater Monitoring Plans 24
Table 5. Surface Water Monitoring Plan 25
Table 6. Indicator Parameter Stabilization Criteria 27
Table 7. Subcell 8.8 Underdrain Monitoring Plan 40
Table 8. Stormwater Monitoring Locations 49

List of Figures

Figure 1. Topographic Quadrangle Map
Figure 2. Geologic Map of Anne Arundel County
Figure 3. Site Map
Figure 4. Zone 3 Groundwater Contour Map – May 2024
Figure 5. Groundwater Well and Surface Water Monitoring Location Map
Figure 6. Landfill Gas Monitoring Location Map
Figure 7. Stormwater Monitoring Location Map

List of Appendices

Appendix A	Table A-1. Historical Volatile Organic Compound Summary – COMAR Wells Table A-2. Historical Volatile Organic Compound Summary – Eastern Boundary Zone 3 Table A-3. Historical Volatile Organic Compound Summary – Eastern Boundary Zone 4
Appendix B	Groundwater Well Network Summary Geologic Boring Logs and Well Construction Diagrams
Appendix C	Groundwater, Surface Water, and Underdrain Analytical Parameters Additional Subcell 8.8 Underdrain Analytical Parameters
Appendix D	Groundwater Level Measurement Log Sample Label Daily Field Log Well Sampling/Micropurge Log Drinking Water Supply Well Sample Log Surface Water Sample Log Custody Seal Chain of Custody Form
Appendix E	Landfill Gas Monitoring Probe Network Summary Landfill Gas Management System - Extraction Well and Probe Locations Landfill Gas Monitoring Probe Construction Details
Appendix F	Landfill Gas Monitoring Probe Sample Log
Appendix G	Leachate Analytical Parameters
Appendix H	Stormwater Quarterly Visual Monitoring Form Inspection Checklists Annual Reporting Form

List of Acronyms

AIM	Additional Implementation Measures
AMSL	Above Mean Sea Level
BG&E	Baltimore Gas and Electric
CFR	Code of Federal Regulations
COMAR	Code of Maryland Regulations
°F	degrees Fahrenheit
EMP	Environmental Monitoring Plan
EPA	Environmental Protection Agency
EPA-MCL	Environmental Protection Agency-Maximum Contaminant Level

EPA-RSL	Environmental Protection Agency-Regional Screening Level
ERM	Environmental Resources Management, Inc.
ft, AMSL	feet, Above Mean Sea Level
ftbgs	feet below ground surface
GIR	Groundwater Investigation Report
GPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LEL	Lower Explosive Limit
LFG	Landfill Gas
LFGCCS	Landfill Gas Collection and Control System
MDE	Maryland Department of the Environment
MDL	Method Detection Limit
mg/L	milligrams per liter
mL/min	milliliters per minute
MLFRRF	Millersville Landfill and Resource Recovery Facility
MSW	Municipal Solid Waste
mV	milliVolts
NPDES	National Pollutant Discharge Elimination System
NTU	Nephthelometric Turbidity Unit
PCE	Tetrachloroethene
PQL	Practical Quantitation Limit
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RDP	Refuse Disposal Permit
SIC	Standard Industrial Classification
SIO	Substantially Identical Outfall
SSI	Statistically significant increase
s.u.	standard units
SWM	Stormwater Management
SWPPP	Stormwater Pollution Prevention Plan
ug/L	micrograms per liter
USGS	United States Geological Survey
VOC	Volatile Organic Compound

WDP	Wastewater Discharge Permit
WMF	Waste Management Facility
WMS	Waste Management Services

1.0 FORWARD

This Environmental Monitoring Plan (EMP) for the Millersville Landfill and Resource Recovery Facility (MLFRRF) submitted by the Anne Arundel County (County) Department of Public Works' Bureau of Waste Management Services is an update to the EMP developed by SCS Engineers (SCS, September 2018). This revision includes, but is not limited to, updating the groundwater and landfill gas (LFG) monitoring networks and updating stormwater monitoring and leachate requirements. This Plan also addresses comments provided by the Maryland Department of the Environment (MDE) in letters dated January 2, 2024 to incorporate changes in monitoring and reporting requirements to analyze for six per- and polyfluoroalkyl substances (PFAS), and May 15, 2024 to incorporate various completed activities such as data collection and submission for the Cell 8 underdrain well TW-26R, the Cell 9 underdrain and the Cell 9 sentry wells S1 and S2 along with other changes.

The MLFRRF is owned and operated by the County. It is the only active municipal solid waste (MSW) landfill in Anne Arundel County. The landfill consists of nine waste disposal cells. Initial landfilling activities began at the MLFRRF in the mid-1970s. Cell 1-East, Cell 2, Cell 4, and Cells 5 through 7 (henceforth referred to as Cells 567) are separate unlined disposal areas. In the mid-1990's, these areas were closed and capped with a final cover system, including a geomembrane cap and LFG collection system. Consequently, these areas are not governed by the 40 Code of Federal Regulations (CFR) Part 258 monitoring requirements as the cells ceased accepting waste prior to the effective date of these regulations[1].

MSW in Cell 3 and Cell 1-West was excavated and relocated into Cell 8 in 1994 and 1997, respectively. The Cell 8 and Cell 9 disposal areas were re-permitted per new state and federal municipal solid waste facility criteria, including a double-liner system with leachate collection and detection systems, in the early 1990's. Therefore, Cells 8 and 9 are governed by 40 CFR 258.

This EMP is based on the MDE requirements of Code of Maryland Regulations (COMAR) Title 26, 40 CFR Part 258, various permits for the MLFRRF, and previous monitoring events and investigations. The primary objective of the monitoring program is to evaluate whether conditions potentially adverse to public health and the environment have been created. This EMP replaces the previous document.

[1] 1. Per 40 CFR Part 258.1(c), these Criteria do not apply to MSWLF units that do not receive waste after October 9, 1991 (i.e., Cell 1-East, Cell 1-West, Cell 2, Cell 3 and Cell 4).

2. Per 40 CRF Part 258.1(d)(4) MSWLF units that receive waste after October 9, 1991 but stop receiving waste before October 9, 1993 are exempt from the requirements of this Part 258, except the final cover requirement specified in para. 258.60(a) (i.e., Cells 567).

2.0 INTRODUCTION

This EMP was prepared to describe the groundwater, surface water, LFG, leachate, and stormwater monitoring programs at the MLFRRF. This EMP is a revision to the EMP that was revised for the County by SCS Engineers (SCS) in September 2018. The EMP complies with COMAR 26.04.07.08(B), 26.04.07.09(F), 40 CFR 258, the MLFRRF Refuse Disposal Permit (reissued in November 2022), the MLFRRF General Stormwater Discharge Permit (reissued in August 2023), and guidelines established by MDE (MDE, 2024).

The purpose of the EMP is twofold: (1) to provide MDE with a description of the procedures and techniques used to evaluate the groundwater, surface water, leachate, LFG, and stormwater monitoring data to facilitate compliance with MDE's and the Environmental Protection Agency's (EPA's) environmental monitoring and permit requirements; and (2) to provide a guidance manual to assist the County with the collection of groundwater, surface water, leachate, LFG, and stormwater samples at the MLFRRF. The following sub-sections provide a brief overview of the regulations that govern each of the monitoring programs at the MLFRRF.

2.1 GROUNDWATER AND SURFACE WATER REGULATORY REQUIREMENTS

MDE has specific regulations pertaining to groundwater and surface water monitoring at landfill facilities. These regulations are contained in the COMAR 26.04.07. According to COMAR 26.04.07.08 (B) 17, landfill operating plans and specifications are required to include a system for routinely monitoring the quality of the waters of the state around and beneath the MLFRRF including the location and types of monitoring stations, and methods of construction of monitoring wells.

The MLFRRF Refuse Disposal Permit (2022-WMF-0240) requires that pollution control, monitoring, and measurement devices be installed, maintained, and sampled in accordance with approved plans and specifications, and with MDE approval, as necessary. Among the permit requirements are sampling, analysis, data evaluation, and reporting for monitoring wells and surface water on a semi-annual basis.

The components of the groundwater and surface water monitoring program presented in this EMP comply with the requirements of 40 CFR Part 258 and COMAR 26.04.07. The regulations included in 40 CFR Part 258 apply to those portions of the landfill that received waste after the effective date of these regulations, while the state COMAR regulations apply to those portions of the landfill that stopped receiving waste prior to the effective date of the 40 CFR 258 regulations. The major provisions of the groundwater and surface water monitoring program are:

- An adequate number of groundwater monitoring wells at the MLFRRF to monitor the upper-most water-bearing unit, which is an aquifer designated as Zone 3.
- The establishment of background water quality, a point of compliance, and the designation of specific regulated wells to monitor that point.
- The establishment of surface water sample locations along a stream that flows through the facility.

- Consistent groundwater and surface water sampling and analytical procedures to facilitate the collection of representative groundwater and surface water quality data for the MLFRRF.

- A statistical program to evaluate groundwater and surface water quality changes at the MLFRRF.

- Establish action(s) to be taken if statistically significant increases occur.

- Establish reporting requirements; and

- The County has included off-site monitoring wells downgradient of MLFRRF for monitoring Zone 3 and the next deepest water-bearing zone, designated as Zone 4. Zone 4 is separated from Zone 3 by a confining bed consisting of dry, thick, dense, low-permeability clay.

2.2 LANDFILL GAS MONITORING REGULATORY REQUIREMENTS

The operating criteria for explosive gas control contained in 40 CFR Part 258 relate to the monitoring of methane gas concentrations, the frequency of monitoring, and the reporting of methane levels exceeding the maximum levels allowed in the regulations. In general, 40 CFR 258 require the following for gas monitoring at landfill facilities:

- The concentration of methane gas generated by the landfill should not exceed 25 percent of the lower explosive limit (LEL) in facility structures (excluding LFG control or recovery system components).

- The concentration of methane gas generated by the landfill should not exceed the LEL at the facility property boundary.

- The minimum frequency of gas monitoring should be quarterly.

- If excessive methane gas concentrations are detected, the County must take the necessary steps immediately to ensure protection of human health and to notify MDE within 24 hours of the exceedance.

- Within seven days of the detection of excessive methane gas concentrations, the gas level detected, and a description of the steps taken to protect human health should be placed in the operating record.

- Resample a gas monitoring probe within 30 days of the detection of excessive methane gas concentrations; and

- Within 60 days of a confirmed measurement of excessive methane gas concentrations, a landfill gas Investigation and Remediation Plan (IRP), which describes the nature and extent of the problem and proposed remedial procedures, should be implemented and MDE should be notified.

On June 12, 2023, MDE published its final regulation promulgated under COMAR 26.11.42 addressing the control of methane emissions from MSW landfills in the state. The new regulation

implements regulatory requirements for MSW landfills, which include surface emission monitoring, detecting and repairing landfill gas leaks, recordkeeping and reporting requirements, and installing and operating emission control systems based upon the regulatory applicability. Key provisions of the rule include:

- The rule applies to active and closed MSW landfills that have accepted waste after 11/8/1987 and that have a design capacity greater than or equal to 2,750,000 tons and 3,260,000 cubic yards, and active and closed MSW landfills that have accepted waste after 12/31/1993 that have less than 2,750,000 tons or 3,260,000 cubic yards of waste but greater than 450,000 tons of waste in place.

- By September 10, 2023, applicable landfills must prepare an initial waste-in-place report, calculate their methane generation rate, and submit a report to MDE.

- Closed or inactive landfills, or closed inactive areas of an active MSW landfill, which have commenced installation of solar panels or arrays on or before 1/1/2024 are exempt from the rule if they meet certain requirements.

- MSW landfills with a calculated methane generation rate greater than 8,548 tons per year must install a GCCS.

- MSW landfills with a calculated methane generation rate between 732 tons per year and 8,548 tons per year can either install a GCCS or evaluate surface methane emission rate, the results of which would determine if a GCCS is required.

- If required, landfills must operate the GCCS for a minimum of 15 years and until the point that the methane generation rate has reduced to below 732 tons per year.

- Specific requirements for the use of control devices such as enclosed or open flares. The use of open flares is permitted only until 1/1/2025 unless MDE approves its use in writing. The rule includes minimum control requirements for devices and initial and annual source testing.

- Evaluation of surface methane emission rates through both instantaneous (500 ppm) and integrated (25 ppm) monitoring requirements and standards.

- Leak monitoring and standards (500 parts per million by volume) for GCCS components that contain LFG and are under positive pressure.

2.3 LEACHATE MONITORING PERMIT REQUIREMENTS

Various leachate monitoring in lined disposal areas is required by the MLFRRF's Wastewater Discharge Permit and Refuse Disposal Permit as outlined below.

- Wastewater Discharge Permit: Annual sampling of leachate for analysis of various constituents listed in the permit. Monitoring results are reported annually in December.

- Refuse Disposal Permit: Except for a leachate collection system relying solely on free gravity drainage to prevent leachate from ponding on the cell floor, the level of leachate in the leachate collection system shall be monitored a minimum of twice each operating

day except Sundays and holidays. Commencing on the day that solid waste is received at the landfill, the permittee shall monitor the quantity of leachate and other contaminated liquids collected every calendar month. Results are to be included in each semi-annual report on water quality.

2.4 STORMWATER MONITORING PERMIT REQUIREMENTS

Stormwater discharged from the MLFRRF is governed by the Maryland General Stormwater Discharge Permit (NPDES Permit No. 20SW1304). Sample collection, reporting, and monitoring are established in the general permit and described herein.

3.0 SITE CONDITIONS

The site conditions are presented in this section to provide an understanding of the hydrogeology and environmental setting at MLFRRF. The following information has been updated as appropriate based on recent studies and activities associated with the MLFRRF.

3.1 SITE LOCATION AND DESCRIPTION

The MLFRRF is located approximately 1-mile due east of Fort George Meade and approximately 1 mile northwest of Millersville in northern Anne Arundel County, Maryland. The MLFRRF is in the Odenton, Maryland Quadrangle of the United States Geological Survey (USGS) *7.5-minute* topographic map presented as **Figure 1**, at a latitude of approximately N39°5'30" and a longitude of approximately E76°40'00". The MLFRRF occupies 567.66 acres. An intermittent stream, Wells Branch, flows across the MLFRRF generally from west to east, becoming a perennial stream at the eastern site boundary. The stream continues to flow to the east until meeting Severn Run which, in turn, eventually flows into the Severn River. Stormwater on the very southern portion of the site drains to the Jabez Branch, which also flows to Severn Run.

The MLFRRF is divided into two sections by a 120 feet wide Baltimore Gas and Electric (BG&E) right-of-way that is oriented generally west to east across the northern part of the site. The northern half of the site has been developed, and landfilling activities in this area of the site are complete. The southern half of the site is the location of the present and future landfilling activities. Elevations at the site range from a low of about 80 feet above mean sea level (ft, AMSL) at the east property boundary along the intermittent stream banks, to a high of about 240 ft, AMSL at the south and west property boundaries.

3.2 CLIMATOLOGICAL SETTING

Anne Arundel County is in the humid temperate climatic belt of the eastern part of the United States and lies entirely in the Coastal Plain physiographic province. Its weather is characterized by warm summers and relatively mild winters. The long-term normal annual rainfall for the Upper Southern Climatic Division of Maryland is 42.35 inches. Mean precipitation is evenly distributed during the year with no month or season particularly wet or dry. Although monthly precipitation varies from year to year, for most months precipitation values fall between three and four inches (Mack, 1962). Based on data for Annapolis, which is located approximately 15 miles southeast of the MLFRRF site, temperatures generally range between 35°F and 77°F. The average annual temperature is 56 °F (Mack, 1962).

3.3 GEOLOGIC SETTING

The MLFRRF is in the Coastal Plain of Maryland. According to the 1968 Geologic Map of Maryland, formations in the vicinity of the landfill include the Magothy formation and the formations of the Potomac Group. A geologic map is included as **Figure 2**. The Magothy formation is characterized by loose, white, lignitic sands and white to orange-brown sub-rounded quartzose gravels ranging in thickness from zero to 15 feet.

The Potomac Group ranges in thickness from zero to 400 feet and contains the Raritan and Patapsco Formations, Arundel Clay, and the Patuxent Formation. The Raritan and Patapsco Formations are characterized by gray, brown, and red silts and clay cross-bedded by sub-rounded

clayey sands with some minor amounts of gravel. The Arundel Clay contains dark gray and maroon clays with abundant iron carbonate conglomerates. The Patuxent Formation contains white, light gray to orange-brown clayey sands with sub-rounded quartz gravels cross-bedded with pale gray silts and clays.

3.4 SITE HYDROGEOLOGY

Based on previous site investigations and off-site well installations, four water-bearing zones have been identified up to a depth of 300 feet below ground surface (ftbgs). The zones, identified as Zone 1 through 4, are in order of increasing depth below ground surface. Zone 1 consists mostly of fluvial sands characterized by the Magothy Formation and is limited to the southern and southwestern portions of the site. Zone 2 contains a silt-clay layer with intermittent and disconnected shallow sand layers. Zone 3 is a uniform sand layer, approximately 25 feet below Zone 2 in the southern portion of the MLFRRF. Zone 4 contains uniform sands like those in Zone 3 but is confined by a silt-clay layer approximately 40 to 60 feet in depth.

The groundwater within Zone 1 occurs as an unconfined aquifer and is highly dependent on precipitation. Zone 1 forms seeps (i.e., surface flows or springs) approximately 160 ft, AMSL, discharge as an unnamed tributary to Wells Branch located between Cells 8 and 9. Groundwater in Zone 2 is affected by precipitation as well as seeps from Zone 1 and is discontinuous across the site. General groundwater flow direction in Zone 2 mimics the site topography, flowing towards Wells Branch from areas of higher elevation.

The confined to semi-confined groundwater of Zone 3, considered the upper-most aquifer, generally flows east to northeast and is recharged from Zone 2 in the vicinity of Wells Branch and between Cells 2 and 4 in the northern-most section of the site. Near Cell 9, groundwater flows within the Zone 3 aquifer to the south-southeast towards Dicus Mill Road. The withdrawal of drinking water within the Zone 3 aquifer may be influencing the direction of groundwater flow south of Cell 9. Groundwater in Zone 4, the Upper Patapsco Aquifer, is confined to semi-confined by a silt-clay layer and generally flows in a southeastern direction.

As detailed in Section 11 of this EMP, LFG migration is also related to the site hydrogeology. Groundwater acts as a barrier to LFG migration and the highest concentrations of combustible gas are potentially measured within the unsaturated zones. The LFG monitoring probes in the network are installed in the unsaturated zones at the MLFRRF.

3.5 LANDFILL DEVELOPMENT HISTORY

The MLFRRF is located on a 567.66-acre parcel of land on Burns Crossing Road in Millersville, Maryland. The landfill consists of nine waste disposal cells totaling approximately 269 acres in area. Initial landfilling activities began in the mid-1970s.

Cell 1-East, Cell 2, Cell 4, and Cells 567 are separate unlined disposal areas. In the mid-1990s, these areas were closed and capped with a final cover system, including geomembrane caps and LFG collection systems. MSW in Cell 3 and Cell 1-West was excavated and relocated into Cell 8 in 1994 and 1997, respectively.

In the early 1990s, the Cell 8 and Cell 9 disposal areas were re-permitted in accordance with new federal and State municipal solid waste facility criteria. New requirements included composite liner systems with leachate collection and detection systems. In June 1992, the County began

construction of the initial subcells of Cell 8 (Subcells 8.1 through 8.4), with subsequent subcells constructed as necessary to ensure uninterrupted disposal capacity. The phased placement of waste within the Cell 8 is outlined below.

- Subcell 8.1: January 1994
- Subcell 8.2: June 1993
- Subcell 8.3: March 1994
- Subcell 8.4: October 1992
- Subcell 8.5: March 1996
- Subcell 8.6: September 1997
- Subcell 8.7: May 2006
- Subcell 8.8: June 2008

Cell 8 ceased accepting waste in October 2017 and final closure was completed in June 2019. The capping system upgrades for Cells 5, 6, and 7 began on August 27, 2019 and were completed on January 22, 2020. The County completed construction of the initial subcell of the Cell 9 disposal area (Subcell 9.1) in October 2016, with initial placement of waste in January 2017. Waste placement is currently active in combination with Subcell 9.2. Subcell 9.2 construction began in February 2020 and was completed in March 2021. Subcell 9.2 began accepting waste on March 25, 2021. Subcell 9.3 design and construction documents were completed in early 2024 with construction expected to begin in late 2024. The Cell 9 disposal area will continue to be constructed in phases and is projected to last until about 2048. Currently, the County is pursuing an MDE permit modification for a vertical expansion of Cell 9 which, if approved, will increase the site life beyond 2060. The landfill disposal areas and supporting infrastructures are shown in **Figure 3**.

3.6 GROUNDWATER MONITORING HISTORY

Throughout the development of the site, the County has monitored groundwater quality with a system of monitoring wells. Twenty-six groundwater monitoring wells were installed in 1975 prior to initiating landfilling activities at the site. MDE collected groundwater quality samples from the wells two or three times per year. The samples were analyzed primarily for inorganic constituents (i.e., pH, nitrate, specific conductance, chlorides, chemical oxygen demand, and metals).

In 1985, MDE began analyzing the groundwater samples for various organic constituents. Groundwater quality samples obtained from Test Well 11 (i.e., TW-11) had low, measurable concentrations of volatile organic compounds (VOCs). The County initiated actions to investigate the nature and extent of the groundwater contamination around TW-11. The investigation included the installation of 11 G-series piezometers (i.e., Piezometers G-1, G-2, G-4 through G-11, and G-13).

Based on the results of the groundwater investigation and expanded site monitoring needs, nine groundwater monitoring wells were installed (Geosyntec, 1990(b)) after installation of the G-series piezometers. The nine monitoring wells (i.e., TW-4B, TW-8A, TW-9A, TW-10A, TW-15B, TW-17, TW-18, TW-19, TW-20) were initially sampled in November 1989, and VOCs were only detected in the groundwater sample from TW-10A. The VOC detections in TW-10A were caused by an accident when a submersible pump was being lowered into the well. No VOCs were detected in the groundwater samples from TW-10A after the initial sample.

During the next regular sampling event in April 1990, VOC detections were identified in the groundwater sample from well TW-18A. A Hydropunch® groundwater study was performed in the vicinity of TW-18. As a part of the Hydropunch® study near TW-I8, six piezometers were installed (i.e., Piezometers H-8, H-8A, H-8B, H-9, H-9A, and H-9B).

On April 10, 1992, analyses performed on groundwater samples collected from residential groundwater supply wells north of the MLFRRF had measured concentrations of tetrachloroethene

(PCE). To investigate these detections and evaluate whether the landfill was the source of the PCE, the County conducted a groundwater study along the north property boundary of the site (GeoSyntec, 1992(c)). During the groundwater study, the K-series piezometers were installed (i.e., Piezometers K--1 through K-27) as well as new groundwater monitoring wells [i.e., TW-5B, TW-7A, TW-9B, TW-9C, TW-16A, TW-17A, TW-21, TW-21A, TW-22 (i.e., K-8), TW-22A (i.e., K-8A), and TW-22B (i.e., K-8B)].

During the same time as the north property boundary groundwater study, the following items related to groundwater monitoring at the site were performed:

- Five piezometers were installed near the septic tank drain field and underground storage tank in the western portion of the site (i.e., Piezometers L-1 through L-5).
- Groundwater monitoring wells that were dry or non-functional due to vandalism were abandoned (TW-1A, TW-4A, TW-10, TW-12A, TW-13A, and TW-15A).
- TW-11 was abandoned because it was in the footprint of Subcell 4 of Cell 8; and
- TW-11A was installed across the road from the former location of TW-11.

A series of additional wells and piezometers were installed at various locations across the landfill in 1994 to evaluate water quality in certain areas of the site. This investigation included the installation of upgradient well TW-23, 10 downgradient PW-series wells, and 19 N-series piezometers. It was concluded from the investigation that VOCs were present in both Zone 2 and Zone 3 in the vicinity of Cells 5, 6, and 7. Two of the PW-series wells were eventually incorporated into the monitoring well network and re-designated as wells TW-25 and TW-25A. Two additional monitoring wells (TW-24 and TW-24A) were installed in April 1995 to enhance the downgradient monitoring well network along the eastern boundary of the site.

Also completed in 1994 was the Eastern Boundary Groundwater Investigation (Stearns & Wheler, 1995). The investigation included sampling and analysis of eight monitoring wells along the eastern site boundary (TW-5, TW-5B, TW-6, TW-14, TW-15, TW-15B, TW-16, and TW-16A); four off-site Zone 3 monitoring wells installed on residential Parcels 9, 440, 417, and 106; and six residential supply wells east of the site along Gambrills Road. The eastern boundary investigation detected low levels of VOCs in both on-site and off-site monitoring wells and traces of VOCs in multiple sampling events in three of the six residential supply wells.

In addition, the Zone 3 residential wells at Parcels 417, 440, 441, and 584 were replaced in 1995 with new Zone 4 wells. The Zone 3 wells for these parcels were converted to monitoring wells (designated as RW-series) and added to the landfill's monitoring program.

In 2001, the County retained ERM to perform a comprehensive assessment of groundwater quality conditions along the northern and eastern boundaries of the landfill (ERM 2001, 2002). ERM concluded that Zone 3 groundwater quality along the northern boundary showed negligible, if any, impacts from the landfill. ERM also concluded that the data demonstrated that groundwater quality along the northern boundary had been improving since the County implemented corrective measures (i.e., relocating waste or closing and capping cells) in 1995-1996.

ERM's 2002 assessment of groundwater quality data for the eastern boundary confirmed previous findings which indicated that trace levels of VOCs have migrated off-site to the east-northeast in Zone 3. Notably, however, the data indicates that confirmed and validated VOCs have not been detected in any residential well above EPA-Maximum Contaminant Levels (EPA-MCLs) or

Groundwater Protection Standards (GPS). ERM's assessment of groundwater data also concluded that Zone 4 has not been impacted by the landfill.

In the fall 2003, the County converted the Zone 3 residential supply well at Parcel 264 to monitoring well RW-P264. Monitoring well MW-P4 was installed in the spring 2005 to allow monitoring of groundwater quality in Zone 3 east of the MLFRRF. Zone 3 monitoring well RW-P417 was abandoned in spring 2005 due to the presence of Zone 3 monitoring well MW-P417 on Parcel 417.

In the summer of 2008, a digital high-resolution pan-and-tilt video camera was used to assess the integrity of the well casing and identification of the screened interval of the unknown depth supply well at Parcel 171 (P-171-1). The existing supply well (P171-1) was assessed to be in good condition and was converted to a Zone 3 monitoring well (RW-P171). The existing Zone 4 supply well on Parcel 171 (P171-2) was abandoned in May 2009. In lieu of installing an additional Zone 3 monitoring well between the landfill and Parcel 165, the existing supply well on Parcel 165 was converted to a Zone 3 monitoring well (RW-P165) in July 2009, and a new Zone 4 residential supply well was installed by the County.

In May 2009, two additional Zone 4 monitoring wells were installed along the eastern boundary of the site (TW-6B and TW-14B) and a permanent sampling pump was installed in existing Zone 4 well TW-16A. This provided four Zone 4 monitoring wells along the eastern boundary (TW-4B, TW-6B, TW-14B and TW-16A).

In February 2010, Zone 3 monitoring well TW-20 was decommissioned and replaced with Zone 3 well TW-20R. This was necessary because well TW-20 was located within the footprint of Stormwater/Sediment Pond 9-2, which was constructed in 2010.

In 2012 and 2013, the County installed four new groundwater monitoring wells (TW-27, TW-28, TW-29, and TW-30) to supplement the existing groundwater monitoring network associated with the Cell 9 disposal area.

Since 2002, the County has replaced a total of 22 Zone 3 residential supply wells with Zone 4 supply wells along the eastern boundary; 10 in the spring 2002, two in the fall 2003, one in the spring 2006, one in the fall 2006, one in the spring 2008, one in the summer 2009, one in the fall 2011, one in the winter 2013, one in the fall 2014, and two in the summer 2015. Although none of these residential wells had exceedances above an EPA-MCL or GPS, the County installed the new Zone 4 wells consistent with its highly protective good-neighbor policy. The County continues to offer replacement of any Zone 3 well impacted by site-related constituents with a new Zone 4 well regardless of whether the concentrations exceeded the EPA-MCL or GPS or was required under the Water Supply Contingency Plan.

Between October 2010 and May 2012, the County produced a nine-volume history of the groundwater issue with the submission of the 2010 Assessment of Corrective Measures (ACM) Report on October 1, 2010. An addendum to the ACM was submitted to MDE on May 22, 2012 in response to comments provide by MDE in a letter dated April 10, 2012. This work summarized the history of previous investigations, implemented corrective measures, summary of groundwater and surface water monitoring results, risk assessment, fate and transport evaluation, and institutional controls which remain in force. To date MDE has not approved the May 2012 addendum which proposed Monitoring Natural Attenuation (MNA). MNA is currently the sole corrective as part of the ACM.

In 2015, the County initiated an investigation (henceforth known as the southern boundary investigation) into the detection of VOCs in groundwater monitoring wells located in the vicinity of Cell 8 and along the southern boundary of planned Cell 9. A Work Plan was prepared and submitted to MDE in December 2015 outlining proposed investigative activities which included: a groundwater flow direction evaluation, potential human receptor evaluation, Cell 8 investigation, and preliminary alternate source evaluation. Select activities associated with this investigation are discussed further below.

In late 2015, a potential human health receptor evaluation was initiated in response to the detection of VOCs in on-site groundwater monitoring wells (TW-1 and TW-28) located along the southern boundary of the MLFRRF and Dicus Mill Road. In cooperation with the Anne Arundel County Department of Health, 21 drinking water supply wells located within 1,000 feet of TW-1 and TW-28 were identified. The initial sampling of the 21-drinking water supply well locations took place in May, August, and October 2016. Each drinking water supply well sample was analyzed for 50 VOCs, 22 metals, and 11 general chemistry parameters.

In June and July 2016, three groundwater monitoring wells (TW-10B, TW-31, and TW-32) were installed as a component of the southern boundary investigation. To evaluate the direction of groundwater flow within the Zone 3 aquifer and assess the upgradient Zone 3 aquifer conditions, a deeper upgradient monitoring well (TW-10B) was installed in the vicinity of existing Zone 3 groundwater monitoring well TW-10A. An additional monitoring well (TW-31) was installed approximately midway between existing wells TW-1 and TW-28, to further evaluate the direction of groundwater flow within the Zone 3 aquifer along the southern property boundary. To further evaluate the direction of groundwater flow within Zone 3 and assess the upgradient Zone 3 aquifer conditions, an additional upgradient monitoring well (TW-32) was installed approximately 1,000 feet north of TW-10A and west of Cell 8.

A Groundwater Investigation Report (GIR) (SCS, 2017) was prepared and submitted to MDE in April 2017 documenting the performance of the southern boundary investigative activities. In summary, the GIR concluded the following:

- Near Cell 9, groundwater flows within the Zone 3 aquifer to the south-southeast towards Dicus Mill Road. The withdrawal of drinking water within the Zone 3 aquifer may be influencing the direction of groundwater flow south of Cell 9.

- Cell 8 is an unlikely source of the VOC detections south of Cell 8 and Cell 9.

- The quantifiable detection of VOCs is limited to Zone 3 groundwater monitoring wells TW-1, TW-28, and TW-29 and drinking water supply wells at 1367 Dicus Mill Road, 1373 Dicus Mill Road, 1375 Dicus Mill Road, and 1377 Dicus Mill Road. No VOCs were detected at concentrations above their respective human health standards.

- The County will continue to monitor the Zone 3 drinking water supply wells on an annual basis and offer replacement wells in the deeper Zone 4 without cost to homeowners affected by landfill-related VOCs.

- Although the source of the VOC detections cannot be specifically identified, legacy land uses from decades ago are the most likely contributors to the groundwater quality issues in this area. No additional delineation activities are currently planned.

- Groundwater will continue to be monitored in accordance with the MLFRRF's EMP to ensure continued protection of human health and the environment.

In July 2017, annual monitoring of the Zone 3 drinking water supply wells associated with the southern boundary investigation was performed. VOCs were detected in the Zone 3 drinking water supply wells at 1363 and 1371 Dicus Mill Road and confirmed with an additional round of monitoring in September 2017. In response to the confirmed VOC detections, the County offered to replace the existing Zone 3 drinking water supply wells at 1363 and 1371 Dicus Mill Road with Zone 4 drinking water supply wells. Consistent with the County's Good Neighbor Policy, from 2018 to 2024, the County has replaced or is in the process of replacing Zone 3 drinking water supply wells with Zone 4 drinking water supply wells along its southern boundary at 1361, 1365, 1367, 1369, 1373, 1375, and 1377 Dicus Mill Road, and 1718, 1721, 1722, 1724, 1726, 1728, and 1730 Saddle Drive.

In a letter dated June 2, 2021, MDE accepted the County's recommendation to leave any potential remnants of piezometers PZ-1, PZ-7, and PZ-8 within the footprint of subcell 9.2 with the conditions outlined below. The installation of the sentry wells (S-1 and S-2) was completed on August 8, 2021 and the initial round of sampling was completed on September 14, 2021.

- The County to install two (2) "sentry" monitoring wells along the subcell 9.2 perimeter berm.
- The sentry wells shall be completed within the upper Patapsco aquifer (approx. elevation 80-90 ft, AMSL – to be determined by field observation).
- The County monitors the sentry wells semi-annually for the 40 CFR, Part 258 – Appendix I parameters.
- The sentry wells to be completed for initial sampling during the Fall 2021 semi-annual sampling event.
- The wells shall be identified as "sentry wells" and not "compliance wells" and are not subject to 40 CFR 258.53(g) – Statistical Analysis.

3.7 LANDFILL GAS MONITORING HISTORY

LFG monitoring probes were originally installed in February 1992 at the MLFRRF. Additional probes were added in 2016 to monitor for potential LFG migration along the eastern and southern property boundary near Cell 9. The site has 68 LFG monitoring probes at 30 distinct locations.

In addition to the perimeter LFG monitoring network, the site operates an LFG collection and control system (LFGCCS) that consists of a network of vertical extraction wells and horizontal collectors. LFG collected from the vertical extraction wells and horizontal collectors is routed through interconnecting lateral and header piping to a main blower station. LFG is then directed to the landfill flares and/or the LFG-to-energy (LFGE) plant for combustion. The LFGCCS is expanded as needed as the landfill grows and to meet applicable regulatory requirements, and as otherwise necessary to meet the system operational objectives.

An LFG collection and control system compliant with the New Source Performance Standards (NSPS) was activated in May 1996. The existing LFG collection system currently includes a series of vertical

extraction wells, horizontal collectors, and extraction piping located in the closed Cell 1, Cell 2, Cell 4, Cell 567, Cell 8, and the active Cell 9. Expansion of the LFG collection system occurs regularly.

An interim gas management system for Cell 8 was approved by MDE on June 24, 1998, and was installed and activated on April 14, 1999. The interim system consisted of a series of connections to the existing leachate collection system gravity header of Subcells 8.1 through 8.6 (those areas of Cell 8 with waste greater than 5 years old) and modifications to the leachate risers and manholes to prevent air intrusion into the LFG collection system. The interim system was expanded in October 2002.

To augment LFG collection from the interim system, the County installed a total of 6 vertical extraction wells in Cell 8 in August 2004. Four (4) additional wells were installed and activated in January 2007. Further expansion of the Cell 8 gas collection system occurred in 2010, 2013, and 2018. Because the County operates an NSPS-compliant LFG collection system in Cell 8, the interim gas management system was no longer required to be operated. However, elements of the interim LFG collection system remained in place and were operated as necessary to enhance LFG collection from the Cell 8 gas collection system.

Expansion of the Cell 8 LFG collection system occurred regularly, as follows:

- Three (3) horizontal collectors (HC8-1, HC8-2, and HC8-3) and one vertical extraction well (EW8-11) were constructed in the fall of 2010 in Subcells 8.5 and 8.7.

- Three (3) horizontal collectors (HC8-5, HC8-7 and HC8-9) and one (1) vertical landfill gas well (EW8-12) were installed on Subcell 8.8 in June 2013; connections to the active gas collection system for these collectors were finalized in July 2013. An additional three (3) horizontal collectors (HC 8-4, HC 8-6, and HC 8-8) were installed in June 2013 and connected to the active gas collection system in July 2014.

- Three (3) vertical extraction wells (EW 8-13, EW 8-14, and EW 8-15) were installed in June 2013, with connections to the active gas collection system for these wells finalized on June 29, 2013.

- Twenty-four (24) new vertical extraction wells were installed in Cell 8 and nine (9) horizontal collectors were decommissioned as part of LFGCCS upgrades to Cell 8 conducted from January to May 2018 as part of the Cell 8 closure project.

Expansion of the Cell 9 LFGCCS has occurred as follows:

- Three (3) new horizontal collectors located in Subcell 9.1 (HC9-1, HC9-2 and HC9-3) were added to the LFGCCS in April 2021.

- Two (2) new horizontal collectors located in Subcell 9.1 (HC9-4 and HC9-5) were added to the LFGCCS in November 2021.

- Three (3) new horizontal collectors located in Subcell 9.2 (HC9-6, HC9-7 and HC9-8) were added to the LFGCCS in December 2023.

The current LFGCCS in Cells 1, 2, 4, 567, 8 and 9 consists of the following:

- Cell 1: 4 active horizontal collectors.

- Cell 2: 7 active extraction wells.
- Cell 4: 2 active horizontal collectors; 7 active extraction wells.
- Cell 567: 33 active extraction wells.
- Cell 8: 39 active extraction wells; and.
- Cell 9: 8 active horizontal collectors.

Landfill gas collected via the active gas collection system is routed to two LFG control devices for destruction, as follows:

- LFG Specialties enclosed ground flare which was first installed in 1997 and refurbished in 2017; and

- LFG Specialties open utility flare installed in 2012.

The County employs a contractor to perform LFG operations and monitoring activities for the LFGCCS and blower/flare station. In addition to the LFG control devices, LFG is delivered to the Millersville Landfill Gas-to-Electricity (LFGE) Facility, a separately owned, operated and permitted facility commissioned in 2012. The LFGE facility combusts LFG to produce electricity in two Caterpillar G3520C lean-burn reciprocating internal combustion (IC) engine/generator sets.

4.0 GROUNDWATER AND SURFACE WATER MONITORING PROGRAM

This section of the EMP documents procedures and instructions necessary to implement a groundwater and surface water monitoring program for the MLFRRF. In accordance with Part F.1 of the landfill's RDP, this plan was prepared in accordance with COMAR) 26.04.07.08 B (17), 40 CFR 258, and guidelines established by MDE.

4.1 GROUNDWATER AND SURFACE WATER MONITORING SYSTEM

In accordance with COMAR 26.04.07.08.B.(17), the EMP must outline a system for routinely monitoring the quality of the waters of Maryland around and beneath the MLFRRF, including the location and types of monitoring stations, and the methods of construction of monitoring wells. In accordance with COMAR 26.04.09.F, MDE may require the County to periodically collect and analyze groundwater or surface water at the MLFRRF. In accordance with 40 CFR 258.51, the MLFRRF must maintain a groundwater monitoring network capable of yielding groundwater samples from the upper-most aquifer that represent the quality of background groundwater that has not been affected by a release from the waste management unit and represents the quality of groundwater downgradient of the waste management unit boundary. Downgradient and upgradient monitoring well placement within the upper-most aquifer was based on the knowledge of the following:

- The confined to semi-confined groundwater of Zone 3 is considered the upper-most aquifer.
- In May 2024, static water level measurements were collected from the MLFRRF's on-site Zone 3 groundwater monitoring wells. The static water level measurements of each groundwater monitoring well were used to calculate the elevation of the groundwater, which was then used to create a groundwater contour map and establish groundwater flow direction. A groundwater contour map based on the May 2024 measurements is included as **Figure 4**.
- Zone 3 is recharged from Zone 2 in the vicinity of Wells Branch and between Cells 2 and 4 in the northernmost section of the site.
- The Zone 3 aquifer flows east to northeast in the vicinity of Cells 1, 2, 4, 567, and 8. There is a minor component of flow to the southeast towards Wells Branch within the Zone 3 aquifer in the vicinity of the southern portion of Cell 8.
- Near Cell 9, groundwater flows within the Zone 3 aquifer to the south-southeast towards Dicus Mill Road. The withdrawal of drinking water within the Zone 3 aquifer may be influencing the direction of groundwater flow south of Cell 9.

4.1.1 COMAR Groundwater Well Network

The regulations included in 40 CFR Part 258 apply to those portions of the landfill that received waste after the effective date of these regulations, while the state COMAR regulations apply to those portions of the landfill that stopped receiving waste prior to the effective date. Cells 1, 2, and 4 were closed in the 1990's. Therefore, a separate monitoring network has been established for Cells 1, 2, and 4 and is referred to as the COMAR network.

The groundwater monitoring well network for Cells 1, 2, and 4 has been sampled on a semi-annual basis for over 25 years. As noted in Section 2, Cells 1, 2, and 4 have been closed for over 25 years. The COMAR network was modified based on one or more of the following criteria:

- **Horizontal Well Spacing:** Eliminated redundant monitoring of wells located less than 20 feet from each other. These wells were reclassified as water level only wells.
- **Vertical Well Spacing:** Eliminated redundant monitoring of different depth intervals of the same aquifer and only monitoring the deepest section of the aquifer. These wells were reclassified as water level only wells.
- **No VOC detections :** Wells with no consistent VOC detections within the last 10 years were classified as water level only wells. See **Table A-1** in **Appendix A** for historical VOC summary table.

The well network changes are summarized on **Table 1**. The well locations are shown on **Figure 5**.

Table 1. COMAR Groundwater Monitoring Well Network

2009 EMP Well/Probe IDs	2024 EMP Well/Probe IDs
Semi-Annual Monitoring: TW-7, TW-7A, TW-8, TW-8A, TW-9B, TW-9C, TW-15, TW-15B, TW-16, TW-17, TW-17A, TW-21, TW-22, TW-22A, and TW-22B	Water Levels Only (Semi-Annual)*: TW-7, TW-8A, TW-9C, TW-16, TW-17A, TW-15B, TW-22A, and TW-22B
	Semi-Annual Monitoring:
	Background: TW-21
	Compliance: TW-7A, TW-8, TW-9B, TW-15, TW-17, and TW-22

*These wells are included in the list of additional groundwater monitoring wells (see Section 4.1.6) for the MLFRRF.

4.1.2 Subtitle D Groundwater Well Network

The regulations included in 40 CFR Part 258 (i.e., the Subtitle D regulations) apply to those portions of the landfill that received waste after the effective date of the regulations. Cell 8 began operation in October 1992 and Cell 9 began operation in January 2017 and are both considered part of the Subtitle D monitoring network. Cells 567 stopped receiving waste prior to October 9, 1993 and, therefore, only the closure portion of Subtitle D applies to these cells. Nonetheless, since Cells 567 are located downgradient of Cell 8 they are monitored as part of a multi-unit monitoring system in accordance with 40 CFR Part 258.51(a)(2)(b). The monitoring network for Cells 567, 8, and 9 is referred to as the Subtitle D network and is summarized below.

This network has been revised to address gaps in the well network coverage and current understanding of groundwater flow direction. The well network changes are summarized on **Table 2.** below. The well locations are shown on **Figure 5**.

Table 2. Subtitle D Groundwater Monitoring Well Network

2009 EMP Well/Probe IDs	2024 EMP Well/Probe IDs
Background Wells: MW-10A and TW-23 (TW-23R)	Background Wells: TW-10A and TW-32
Compliance Wells: TW-4, TW-4B, TW-5, TW-5A, TW-6, TW-14, TW-14A, TW-19, TW-20 (TW-20R), TW-24, TW-24A, TW-25, TW-25A, TW-27, TW-28, TW-29, and TW-30	Compliance Wells: TW-1, TW-2A, TW-3, TW-4, TW-4B, TW-5, TW-5A, TW-6, TW-14, TW-14A, TW-19, TW-20R, TW-24, TW-24A, TW-25, TW-25A, TW-27, TW-28, TW-29, TW-30, and TW-31

TW-1, TW-2A, and TW-3 were designated as on-site non-regulated monitoring wells in the November 2009 EMP. These wells have been designated as Subtitle D monitoring wells due to the construction of Cell 9.

Former Subtitle D compliance well TW-20 was abandoned and replaced by TW-20R, due to TW-20's location within the stormwater pond for Cell 9. Former Subtitle D background well TW-23 was damaged, abandoned, and replaced by TW-23R. TW-23R was removed from the Subtitle D network and replaced with TW-32, but is maintained to help describe groundwater flow. TW-23R remains available if needed to help assess groundwater quality in the future. TW-23R is included in the list of additional groundwater monitoring wells (see Section 4.1.6) for the MLFRRF.

4.1.3 Cell 9 Subcell 9.2 Sentry Monitoring Well Network

In response to leaving in place potential remnants of piezometers PZ-1, PZ-7, and PZ-8 within the waste footprint Cell 9 Subcell 9.2, two sentry monitoring wells were installed along the perimeter berm for Subcell 9.2. The wells (S-1 and S-2) were completed within the Zone 3 aquifer. The well locations are shown in **Figure 5**. The data from these wells is intended to be used to evaluate the effectiveness of the Subcell 9.2 liner system.

4.1.4 Eastern Boundary Groundwater Well Network

As discussed in Section 3, decades ago VOCs were detected at concentrations above the EPA's Maximum Contaminant Levels (EPA-MCLs) in groundwater monitoring wells along the eastern boundary of the MLFRRF property. Monitoring wells were installed along the eastern boundary to delineate the presence of VOCs vertically and horizontally. New Zone 4 drinking water supply wells were installed to replace the Zone 3 drinking water supply wells where VOC detections were confirmed. In addition, selected Zone 3 drinking water supply wells were either converted to monitoring wells or abandoned.

The groundwater monitoring well network for the eastern boundary has been sampled on a semi-annual basis for over 25 years. Based on the previous 10 years of VOC data (see **Tables A-2** and **A-3** in **Appendix A** for historical VOC summary table), the monitoring well network has been revised and structured with two classifications: annual monitoring and semi-annual monitoring. The well network changes are summarized on **Table 3.** below. The well locations are shown on **Figure 5**.

Table 3. Eastern Boundary Groundwater Well Networks

2009 EMP Well/Probe IDs	2024 EMP Well/Probe IDs
Eastern Boundary Groundwater Monitoring Well Network	
Zone 3 Semi-Annual Monitoring: MW-P4, MW-P9, MW-P106, MW-P417, MW-P440, RW-P109, RW-P165, RW-P171, RW-P109, RW-P165, RW-P171 (aka RW-P171-1), RW-P264, RW-P440, RW-P441, and RW-P584 Zone 4 Semi-Annual Monitoring: TW-5B, TW-6B, TW-14B, and TW-16A	Zone 3 Annual Monitoring: MW-P4 and RW-P171-1 Zone 3 Semi-Annual Monitoring: MW-P9, MW-P106, MW-P417, MW-P440, RW-P109, RW-P165, RW-P264, RW-P440, RW-P441, and RW-P584 Zone 4 Annual Monitoring: TW-5B, TW-6B, TW-14B, and TW-16A
Eastern Boundary Drinking Water Well Network	
Zone 3 Semi-Annual Monitoring: P-108, P-169, P-277, P-383, P-412 Zone 4 Biennial Monitoring: P-109-Z4, P-106-Z4, P-161-Z4, P-162-Z4, P-164-Z4, P-165-Z4, P-166-Z4, P-168-Z4, P-257-Z4, P-261-Z4, P-264-Z4, P-323-Z4, P-359-Z4, P-440-Z4, P-441-Z4, P-478-Z4, P-584-Z4, and P-585-Z4 Zone 4 Annual Monitoring: P-417-Z4 Zone Unknown Semi-Annual Monitoring: P-145	Zone 4 Biennial Monitoring: P-109-Z4, P-145-Z4, P-161-Z4, P-162-Z4, P-164-Z4, P-165-Z4, P-166-Z4, P-168-Z4, P-169-Z4, P-257-Z4, P-261-Z4, P-264-Z4, P-277-Z4, P-323-Z4, P-359-Z4, P-383-Z4, P-412-Z4, P-417-Z4, P-440-Z4, P-441-Z4R, and P-478-Z4

Monitoring wells with consistent low level (< laboratory's quantitation limit) VOC detections over the last 10 years were classified as annual monitoring wells. Monitoring wells with consistent VOC detections above the laboratory's quantitation limit over the last 10 years were classified as semi-annual monitoring wells. Zone 3 drinking water supply well located on Parcel 108 and Zone 4 drinking water supply wells located on Parcels 160, 584, and 585 are currently not in use, thus these wells were not included in the network for routine monitoring.

4.1.5 Southern Boundary Groundwater Well Network

As discussed in Section 3, the County performed a southern boundary investigation to address concerns with the detection of VOCs in groundwater monitoring wells located in the vicinity of Cell 8 and along the southern boundary of Cell 9. Drinking water supply wells within the Zone 3 and 4 aquifers along the southern boundary were identified with the help of the Anne Arundel County Department of Health and monitored as a part of the investigation. The County has installed 15 Zone 4 drinking water supply wells to replace existing Zone 3 drinking water supply wells. Three of the Zone 3 drinking water supply wells were converted to monitoring wells and the other 12 were abandoned. The wells associated with the Southern Boundary Well Network are summarized below. The approximate locations of the existing wells are shown in **Figure 5**.

- **Zone 3 Monitoring Wells:** 1367 MW-Z3, 1377 MW-Z3, and 1722 MW-Z3
- **Zone 3 Drinking Water Wells:** 200 RW-Z3, 202 RW-Z3, 1353 RW-Z3, 1359 RW-Z3, 1417 RW-Z3, 1437 RW-Z3, 1439 RW-Z3, 1441 RW-Z3, 1711 RW-Z3, 1712 RW-Z3, 1714 RW-Z3, 1716 RW-Z3, 1308 RW-Z3, and 1312 RW-Z3

- **Zone 4 Drinking Water Wells:** 1361 DMR-Z4, 1363 DMR-Z4, 1365 DMR-Z4, 1367 DMR-Z4, 1369 DMR-Z4, 1371 DMR-Z4, 1373 DMR-Z4, 1375 DMR-Z4, 1377 DMR-Z4, 1718 SD-Z4, 1721 SD-Z4, 1722 SD SD-Z4, 1724 SD-Z4, 1726 SD-Z4, 1728 SD-Z4 and 1730 SD-Z4

4.1.6 Additional Groundwater Monitoring Wells

Additional wells installed within the Zone 1&2, Zone 3, and Zone 4 aquifers in the vicinity of Cells 1, 2, 4, 567, 8, and 9 are maintained should they be needed to help describe groundwater flow or assess groundwater quality in the future. These additional wells are listed below along with their aquifer classification. The well locations are shown in **Figure 5**.

- **On-Site Zone 1&2:** TW-2, TW-3A, TW-6A, TW-9A, TW-11A, and TW-21A
- **On-Site Zone 3:** TW-10B, TW-12, TW-13, TW-18, TW-23R, TW-N (aka WELL-N), and TW-W (aka WELL-W)
- **Off-Site Zone 3:** RW-P564 and RW-P161
- **On-Site Zone 4:** TW-9

4.1.7 Surface Water Monitoring Network

Wells Branch flows from west to east across the site, receiving precipitation, surface runoff, and groundwater discharge from Zone 2. Zone 2 underlies portions of the site directly below the waste management units, thus surface water from Wells Branch monitors the only other means besides seepage into Zone 3 by which landfill related constituents might reasonably be expected to migrate off-site in an aqueous state. Therefore, three locations (SW-1, SW-2, and SW-3) along Wells Branch are sampled as a component of the monitoring network for compliance with state and federal regulations and the MLFRRF Refuse Disposal Permit (RDP). The surface water sample locations are shown in **Figure 5**.

4.2 GROUNDWATER MONTIORING WELL OPERATIONS AND MAINTENANCE

The following well installation procedures will be implemented for new groundwater monitoring wells. Each new and existing well be subject to the maintenance procedures described herein.

4.2.1 Monitoring Well Installation Procedures

Monitoring well construction and design will incorporate techniques and materials in accordance with COMAR 26.04.04, 40 CFR 258.51, the landfill's RPD, and United States Environmental Protection Agency (EPA) guidance documents (EPA, 1992 & 1993), MDE well specifications (MDE, 2003). In addition to well drilling and construction, well installation procedures include surveying, development, and aquifer testing (optional) which are described in the following sub-sections.

4.2.1.1 Monitoring Well Installation Method

In accordance with COMAR 26.04.04.03, a monitoring well will be constructed and installed by a State-licensed well driller and *"a well may not be constructed until the Approving Authority* (Anne Arundel County, Department of Health) *has issued a permit to the well driller."* As stated in COMAR 26.04.04.06.B (1), *"issuance of a well construction permit shall consist of a written permit and a durable well identification tag."* The permit will state pertinent information and requirements applicable to the specific well including the information listed below.

- Name, business address, and license number of the well driller.
- Location of the proposed well.
- Purpose of the well construction.
- Special conditions or authorizations under COMAR 26.04.04.
- Expiration date.

A permit will be valid for a period of six months from the date of issuance by the Anne Arundel County Health Department. Upon written request by the well driller before the expiration date and on forms provided by the Anne Arundel County Health Department, this time limit may be extended by six-month increments.

In accordance with COMAR 26.04.04.06.B (3), *"the well driller, immediately after completion of the well, shall attach to the well the identification tag furnished by the Approving Authority. This tag shall be fastened to the well casing approximately six inches above finished grade by means of a 1/2-inch stainless steel band or other strapping device approved by the Approving Authority. Devices which use a screw-type tightening mechanism are not acceptable. For wells where a pitless adapter is not used, the tag may be permanently attached or fastened to a concrete base where this base completely surrounds the casing. If the identification tag is removed from the well by a licensed well driller, plumber, or pump installer during later work on the well, it shall be replaced by the person so removing it in the proper position and manner."*

Well borings will be advanced into the subsurface using hollow-stem auger, mud rotary, air rotary methods, or other appropriate method. Drilling equipment will be kept decontaminated between well installations.

The well will be constructed with a two, four, or six-inch diameter, flush-threaded, schedule 40 PVC screen and riser. The well screen will have a 0.02-inch factory slot and be 10 feet in length, unless the hydrogeologic conditions warrant or necessitate the use of a longer well screen for adequate detection monitoring.

The filter pack material will be clean, silica filter sand (#2). When placing the sand into the borehole, a minimum of six inches of the sand will be placed under the bottom of the well screen. In addition, the filter pack will extend to a minimum of two feet above the top of the well screen. A bentonite pellet seal, with a minimum of two feet in thickness, will be placed above the sand. The well annulus between the bentonite and the concrete apron will be filled with cement grout or bentonite. Steel surface casings, concrete aprons, and locking caps will be installed to secure and protect the well.

The following items will be observed and recorded by the field technician during monitoring well installation.

- Date/time of construction
- Filter pack material and size

- Drilling Method and drilling fluid used, if any
- Borehole and well casing diameter
- Casing materials
- Screen materials and design
- Casing and screen joint type
- Screen size/length
- Length of filter pack
- Sealant materials
- Length of sealant
- Surface seal design and construction
- Type of protective well cap
- Drilling and lithologic logs

Based on the drilling logs for the existing monitoring wells and historical knowledge of the site, it is assumed the existing wells were installed by the hollow-stem auger or mud rotary method. Additional well construction details for the existing monitoring wells can be found on their respective geologic boring log and/or well construction diagram included in **Appendix B**. Tables summarizing selected details for existing groundwater monitoring wells and drinking water supply wells which are a part of the MLFRRF groundwater monitoring network is included in **Appendix B**. Geologic logs or well construction diagrams were not able to be located for the following monitoring wells: RW-P171-1, RW-P109, RW-P-161, RW-P165, RW-P440, RW-P441, RW-P584, TW-6A, and TW-9.

In accordance with COMAR 26.04.04.08, a Well Completion Report will be submitted to the Anne Arundel County Health Department on a form provided by said Anne Arundel County Health Department no later than 45 days after completion of construction. The information required by the Well Completion Report includes, but is not limited to, the following items:

- A site map showing the location of the well on the parcel of property with distances in feet from property boundaries sufficiently accurate to readily identify the location.

- Boring Log: Each formation penetrated, its depth, color, thickness, and whether it is water-bearing.

  – For wells in sedimentary formations, information will be given concerning grain size (e.g., gravel, coarse sand, fine sand, or clay) and other characteristics which appear different or outstanding.

  – For wells in rock formations, the major color of the rock will be indicated, including grains or stringers of assorted color or material, if present. The log will describe whether the rock is extremely hard or can be broken easily, the degree to which the rock is fractured or broken, and other characteristics which appear different or outstanding.

4.2.1.2 Monitoring Well Survey

Once installed, the northing, easting, latitude, and longitude, and top of PVC casing elevation for each monitoring well will be surveyed to ±0.01-foot accuracy and each well will be marked with a unique identification number. The network summary table included in **Appendix B** shows the northing and easting orientation and the elevation of the top of the PVC casing for each existing groundwater monitoring well.

4.2.1.3 Monitoring Well Development

Upon completion of installation of a new groundwater monitoring well, each well will be developed in accordance with the MDE well specifications (MDE, 2003) to remove residual sediment from the well screen, improve the yield, and provide more representative samples from the aquifer. Wells will be developed using air lifting, bailing/over-pumping and surging, or other appropriate techniques. During development, measurements of pH, conductivity, temperature, turbidity, and color and sediment load of the groundwater may be recorded.

4.2.1.4 Aquifer Testing

Rising and/or falling head aquifer (aka slug) testing may be performed to establish aquifer properties. During aquifer testing, a sealed PVC slug is inserted into the well to cause the water level to rise. A water level meter or pressure transducer/data logger measures the falling head. After the water level has recovered to at least 90% of the original static water level, the slug is removed, and the rebound of the water (rising head) is measured in the same manner as the falling head test. Bouwer and Rice (Fetter, 1994), Hvorslev (Fetter, 1994), or KGS Model (Hyder, 1994) methods, as implemented in the Aqtesolv software, are used to analyze the raw data and to calculate the hydraulic conductivity at the well.

4.2.2 Monitoring Well Maintenance

Nonfunctioning monitoring wells will be replaced or repaired upon recognition of damage or nonperformance, but well repair or replacement will be coordinated with MDE for approval prior to initiating the action.

4.2.2.1 Visual Observations

During each monitoring event, the field technician will visually observe the groundwater monitoring well for evidence of damage. Cracks in the steel surface casings or concrete aprons will be noted and subsequently repaired, if needed. Rusty hinges and padlocks will also be repaired. Should a locking cap be broken or missing, a replacement will be provided. If significant water accumulates within the stick-up cover, drainage holes may be drilled through the steel casing.

Each well will be re-marked with its unique identification number should it become indiscernible. Vegetative overgrowth posing an access or workspace problem around a monitoring well will be mowed. The application of chemicals (herbicide, pesticide, etc.) to control weeds and insects should be avoided.

4.2.2.2 Well Re-Development

Upon installation, each well is initially developed to improve the yield and provide more representative samples from the aquifer. However, over time, debris (sand, silt, clay, etc.) may accumulate within the well. The well will be re-developed as described in Section 5.1.3 should this occur.

4.2.2.3 Well Replacement

A well which has incurred damage beyond repair, does not produce an adequate water column for sampling, or does not otherwise perform in accordance with state and federal regulations, will be replaced before the next anticipated monitoring event. MDE will be notified and provided with an opportunity for approval prior to the replacement activities.

4.2.2.4 Well Abandonment

Wells may be abandoned following the post-closure monitoring period or if a monitoring well is damaged beyond repair, contains excessive sediment within the well screen, or consistently does not provide an adequate water column for purging and sampling. Wells will be abandoned in accordance with COMAR 24.04.04.11 as described below.

1. The well will be checked to assess that it is free of debris to its entire depth.

2. The filter pack, screen, and riser will be abandoned in place by filling the well with bentonite-cement slurry placed to within two feet of the proposed (i.e., re-graded) surface by tremie-tube methods.

3. The surface protective casing will be removed, and the site will be re-graded, as necessary.

In accordance with COMAR 24.04.04.11.D(3), well abandonment will be performed by a well driller licensed by the Maryland State Board of Well Drillers or under the supervision of a master well driller or a representative of MDE or the Anne Arundel County Health Department. MDE will be notified in advance of the intent to decommission a well or piezometer. If necessary, permits will be obtained from the Anne Arundel County Health Department before a well is abandoned. In accordance with COMAR 24.04.04.11.D (6), an Abandoned Well Report will be submitted to the Anne Arundel County Health Department within 30 days of completion.

4.2.2.5 Dedicated Groundwater Sampling System

Monitoring wells containing a dedicated groundwater sampling system includes a bladder pump, associated tubing, and well cap for the collection of groundwater samples. Should the groundwater sampling system operate abnormally or cease to operate altogether, it will be removed from the well, examined, and repaired. If necessary, a PFAS-free replacement system will be procured and installed.

4.3 GROUNDWATER AND SURFACE WATER MONITORING PLANS

Consistent with more than two decades of historic practice at the MLFRRF, the semi-annual sampling events will be conducted in the spring (March – May) and fall (September – November) timeframes. The annual groundwater monitoring well events will be conducted each Spring (March – May). The annual drinking water well sampling events will be conducted during the 2nd semi-annual monitoring period (July – December). The biennial drinking water well sampling events will be conducted during the 1st semi-annual monitoring period (January – June). The monitoring plans for each groundwater monitoring network are outlined in the following subsections. The surface water and underdrains monitoring plans are also detailed in the following subsections.

4.3.1 Groundwater Monitoring

The monitoring locations, sampling frequency, and required parameter lists associated with each groundwater monitoring network are summarized in **Table 1**. The Subtitle D network is currently monitored in accordance with the Assessment Monitoring Program of 40 CFR 258.55. In the future, the County may request to monitor only a subset of wells for Appendix II constituents during assessment monitoring as allowed under 40 CFR 258.55 (b). A list of the specific RDP Table I and II parameters are included in **Appendix C**.

Table 4. Groundwater Monitoring Plans

Well IDs	Monitoring Frequency	Monitoring Parameter/ Parameter Group(s)
COMAR GROUNDWATER WELL NETWORK		
Additional Wells (8): TW-7, TW-8A, TW-9C, TW-16, TW-17A, TW-15B, TW-22A, and TW-22B	Semi-Annual	Water Levels
Background Well (1): TW-21 **Compliance Wells (6):** TW-7A, TW-8, TW-9B, TW-15, TW-17, and TW-22	Semi-Annual	RDP Table II Elements, RDP Table II Indicator Parameters, RDP Table I VOCs and PFAS, Additional VOCs*
SUBTITLE D GROUNDWATER WELL NETWORK		
Background Wells (2): TW-10A and TW-32 **Compliance Wells (21):** TW-1, TW-2A, TW-3, TW-4, TW-4B, TW-5, TW-5A, TW-6, TW-14, TW-14A, TW-19, TW-20R, TW-24, TW-24A, TW-25, TW-25A, TW-27, TW-28, TW-29, TW-30, and TW-31	Semi-Annual	RDP Table II Elements, RDP Table II Indicator Parameters, RDP Table I VOCs and PFAS, Additional VOCs*
SUBCELL 9.2 SENTRY NETWORK		
2 Wells: S-1 and S-2	Semi-Annual	40 CFR 258 Appendix I
EASTERN BOUNDARY GROUNDWATER WELL NETWORK		
MONITORING WELLS		
Off-Site Zone 3 (3 Wells): MW-P4 and RW-P171-1 **On-Site Zone 4 (4 Wells):** TW-5B, TW-6B, TW-14B, and TW-16A	Annual	RDP Table II Indicator Parameters, RDP Table I VOCs and PFAS, Additional VOCs*
Off-Site Zone 3 (9 Wells): MW-P9, MW-P106, MW-P417, RW-P440, RW-P109, RW-P165, RW-P264, RW-P441, and RW-P584	Semi-Annual	RDP Table II Indicator Parameters, RDP Table I VOCs and PFAS, Additional VOCs*

Table 4. Groundwater Monitoring Plans

Well IDs	Monitoring Frequency	Monitoring Parameter/ Parameter Group(s)
EASTERN BOUNDARY GROUNDWATER WELL NETWORK		
DRINKING WATER SUPPLY WELLS		
Zone 4 (22 Wells): P-109-Z4, P-145-Z4, P-160-Z4, P-161-Z4, P-162-Z4, P-164-Z4, P-165-Z4, P-166-Z4, P-168-Z4, P-169-Z4, P-257-Z4, P-261-Z4, P-264-Z4, P-277-Z4, P-323-Z4, P-359-Z4, P-383-Z4, P-412-Z4, P-417-Z4R, P-440-Z4R, P-441-Z4R, and P-478-Z4	Biennial	RDP Table I VOCs and Additional VOCs*
SOUTHERN BOUNDARY GROUNDWATER WELL NETWORK		
Zone 3 Monitoring Wells (3): 1367 MW-Z3, 1377 MW-Z3, and 1722 MW-Z3	Semi-Annual	Cobalt, Lead, RDP Table I VOCs and PFAS, and Additional VOCs*
SOUTHERN BOUNDARY GROUNDWATER WELL NETWORK		
Zone 3 Drinking Water Wells (14): 200 RW-Z3, 202 RW-Z3, 1353 RW-Z3, 1359 RW-Z3, , 1417 RW-Z3, 1437 RW-Z3, 1439 RW-Z3, 1441 RW-Z3, 1711 RW-Z3, 1712 RW-Z3, 1714 RW-Z3, 1716 RW-Z3, 1308 RW-Z3, and 1312 RW-Z3	Annual	Cobalt, Lead, RDP Table I VOCs, and Additional VOCs*
Zone 4 Drinking Water Wells (16): 1361 DMR-Z4, 1363 DMR-Z4, 1365 DMR-Z4, 1367 DMR Z4, 1369 DMR-Z4, 1371 DMR-Z4, 1373 DMR-Z4, 1375 DMR-Z4, 1377 DMR-Z4, 1718 SD Z4, 1721 SD-Z4, 1722 SD SD-Z4, 1724 SD-Z4, 1726 SD-Z4, 1728 SD-Z4 and 1730 SD-Z4	Biennial	Cobalt, Lead, RDP Table I VOCs, and Additional VOCs*

*The additional VOCs include dichlorodifluoromethane and dichlorfluoromethane.

4.3.2 Surface Water Monitoring

The monitoring locations, sampling frequency, and required parameter lists associated with the surface water monitoring program are summarized in **Table 5.** A list of the specific parameters for each monitoring plan are included in **Appendix C.**

Table 5. Surface Water Monitoring Plan

Location IDs	Monitoring Frequency	Monitoring Parameter Group(s)
3 Locations: SW-1, SW-2, and SW-3	Semi-Annual	RDP Table II Elements[1], RDP Table II Indicator Parameters, RDP Table I VOCs and PFAS, and Additional VOCs[2]

1. Table II Elements are required to be sampled as dissolved metals.(COMAR 26.08.02.03-2-F.1)
2. The additional VOCs include dichlorodifluoromethane and dichlorfluoromethane

4.4 SAMPLING PROCEDURES

Samples will be collected and handled in accordance with the landfill's RDPs and EPA guidance documents (EPA, 2001, 2002 & 2010). In accordance with the landfill's RDPs, a qualified groundwater scientist will oversee groundwater sample collection as performed by qualified environmental technicians.

4.4.1 Equipment Selection and Calibration

Equipment to be utilized for sampling purposes will meet the requirements of this Plan and analytical methods. Sample collection devices will be carefully chosen to minimize the potential for altering the quality of the sample. Stainless steel and HDPE are preferred materials, although PVC and other similar materials are considered sufficient for the analysis described herein.

Field instruments will be calibrated for accurate readings. Calibrations will be conducted with approved standards and in accordance with the manufacturer-supplied manuals for each instrument.

4.4.2 Static Water Level Determination

As stated in Part III.E.1 of the MLFRRF RDP, water elevations in the existing monitoring wells and piezometers shall be measured monthly for the purposes of evaluating if groundwater elevations have risen to encroach upon any existing or proposed cell floors. If this occurs, the bottom elevations of subsequently constructed cells shall be raised. The only remaining cell with pending liner construction is Cell 9, thus monthly groundwater level measurements need only be measured from the following groundwater monitoring wells.

- Monthly Zone 3 Water Level Wells (16): TW-1, TW-2A, TW-3, TW-4, TW-4B, TW-10A, TW-10B, TW-20R, TW-27, TW-28, TW-29, TW-30, TW-31, TW-32, WELL-N, and WELL-W.

In accordance with 40 CFR 258.53 (d), groundwater elevations in wells that monitor the same waste management area will be measured within a period short enough to avoid temporal variations in groundwater flow, which could preclude an accurate assessment of the groundwater flow rate and direction. Therefore, static water level measurements will be collected from the Zone 3 groundwater monitoring well listed below within the same day during each semi-annual monitoring event prior to purging and sampling procedures.

- Semi-Annual Zone 3 Water Level Wells:
  - On-Site Wells (45): TW-1, TW-2A, TW-3, TW-4, TW-4B, TW-5, TW-5A, TW-6, TW-7, TW-7A, TW-8, TW-8A, TW-9B, TW-9C, TW-10A, TW-10B, TW-12, TW-13, TW-14, TW-14A, TW-15, TW-15B, TW-16, TW-17, TW-17A, TW-18, TW-19, TW-20R, TW-21, TW-22, TW-22A, TW-22B, TW-23R, TW-24, TW-24A, TW-25, TW-25A, TW-27, TW-28, TW-29, TW-30, TW-31, TW-32, WELL-N, and WELL-W
  - Off-Site Wells (15): MW-P4, MW-P9, MW-P106, MW-P417, MW-P440, RW-P109, RW-P165, RW-P171-1, RW-P264, RW-P440, RW-P441, RW-P584, 1367 MW-Z3, 1377 MW-Z3, and 1722 MW-Z3

Water level measurements will be made using an electronic water level probe, referenced to the top of the PVC well casing, measured to ± 0.01 foot. The static water level measurements of each groundwater monitoring well are used to calculate the elevation of the groundwater, which is then used to create a groundwater contour map and establish groundwater flow direction. A sample groundwater level measurement log is included in **Appendix D**.

4.4.3 Bottle Kit Preparation

A sample collection bottle kit will be prepared from the sample parameter list by the laboratory in accordance with approved sample analysis methods. The sample kit will be stored in clean laboratory-provided coolers for transport to the site.

4.4.4 Monitoring Well Purging Procedures

Well purging procedures begin upon arrival at the well. The time of arrival and atmospheric and well conditions will be recorded. The water column will be calculated using the difference between the total well depth from the top of PVC casing and the depth to water from top of PVC casing. In addition, the water volume within the well will be calculated using the depth to water, total well depth, and well diameter.

Clean, disposable nitrile gloves will be worn, and appropriate measures will be taken to reduce the opportunity for surface soils and other sources of potential constituents of concern from encountering the purging equipment. To properly evacuate stagnant water from the monitoring wells, the wells will be purged at a low flow rate between 100 milliliters per minute (mL/min) and 500 mL/min. The purge rate will be monitored by using a graduated container to measure the rate and volume of water being removed. The total volume purged and the time at which purging is terminated will be recorded on the purge log. If a well has an extremely low yield, it will be evacuated to dryness once, although purging to dryness will be avoided by reducing the purge rate. Dry wells and low recharge rates will be noted in the field observations.

During the evacuation period, dissolved oxygen, oxidation-reduction potential, pH, specific conductivity, temperature, and turbidity will be measured at regular intervals of two to five minutes. Purge water appearance and odor (if any) will be noted and recorded at each interval. Purging will continue until three successive measurements of the indicator parameters meet the stabilization criteria shown on **Table 3**. If stabilization does not occur, the well will be purged for a minimum of two hours or until one well volume has been removed.

Table 6. Indicator Parameter Stabilization Criteria

Indicator Parameter	Stabilization Range
Dissolved Oxygen (DO)	< 0.5 mg/L or +/- 10% (when DO is > 0.5 mg/L)
Oxidation-Reduction Potential	+/- 10 mV
pH	+/- 0.1 s.u.
Specific Conductivity	+/- 3%
Temperature	+/- 3%

Table 6. Indicator Parameter Stabilization Criteria

Indicator Parameter	Stabilization Range
Turbidity	< 10 NTU or +/- 10% (when turbidity is > 10 NTUs)

mg/L = milligram per Liter
mV = millivolt
NTU = Nephelometric Turbidity Unit
s.u. = standard unit

Purge water from wells exhibiting constituent levels above the corresponding Groundwater Protection Standard during previous sampling events will be collected and treated with a granular activated carbon filter, disposed of as leachate, or otherwise properly disposed. Purge water from other wells will be discharged to the ground surface.

4.4.5 Sample Collection Procedures

The following subsections present sample collection procedures for groundwater, drinking water, and surface water. The following procedures apply to each media.

- The samples will be transferred directly from the sampling device (if used) into a container that has been specifically prepared for the preservation and storage of water samples for the specific analytical parameters.
- Sample containers are to be filled in order of the parameter sensitivity to volatilization.
- Samples will be stored in a clean, iced cooler immediately after sample collection and secured and tracked using chain-of-custody procedures as specified by the contract laboratory.

4.4.5.1 Groundwater Monitoring Wells

Sampling will occur upon completion of the purging procedures as described in the previous section. In low yield formations where the well has been purged dry, samples will be collected when recovery is complete. Recovery is deemed complete when the well has recovered at least 80% of the drawdown created by the purging or when the well has recovered for at least two hours after purging ceased. The well will be sampled within twenty-four hours of purging completion. If a monitoring well consistently will not supply adequate water for sampling, the condition of the well will be investigated and may be considered for replacement and/or exclusion from the sampling program.

If non-dedicated sampling equipment is utilized, the wells will be sampled beginning with the upgradient wells followed by downgradient monitoring wells. If sampling is conducted utilizing only dedicated sampling equipment, the sampling order of the monitoring wells is left to the discretion of the field personnel.

4.4.5.2 Drinking Water Supply Wells

Drinking water supply well samples will be collected directly from an outside faucet (unless otherwise requested by the homeowner) after purging for a minimum of 15 minutes. After purging, turbidity, pH, specific conductivity, and temperature of the water are measured and recorded. The field personnel will continue to monitor these parameters until three consistent readings are obtained. If possible, obtain three consistent readings after the 15-minute purge. (EPA, 2001)

Samples will be collected in new, laboratory-provided sampling containers with the appropriate volume and preservatives needed as specified by the selected analytical method. Samples will be stored in a clean, iced cooler immediately after sample collection and secured and tracked using chain-of-custody procedures as specified by the contract laboratory. Field personnel will wear nitrile gloves during sampling activities.

4.4.5.3 Surface Water

Surface water sampling will be conducted beginning with the downstream sample location followed by the upstream sample location. At the time of sample collection, dissolved oxygen, oxidation-reduction potential, pH, specific conductance, and turbidity will be measured and recorded. The sample for dissolved elements (aka. metals) analysis will be filtered in the field using a 0.45-micron filter.

A surface water sample may be collected directly into the sample container when the center of the surface water is safely accessible by wading or other means. If wading, the sampler will face upstream and collect the sample with limited to no sediment disturbance. The sampler will be careful not to displace the preservative from the pre-preserved sample container. If wading may cause the re-suspension of bottom deposits, a scoop may be used to reach the center of the water body to collect the surface water sample.

4.4.5.4 PFAS

Due to the extremely broad use of PFAS constituents in common products, there is concern regarding the introduction (i.e., cross-contamination) of PFAS during sampling. Extensive sampling precautions will be taken to ensure the absence of contamination while in the field. As a minimum, the following precautions are recommended (Enthalpy, 2018; ITRC 2023):

- The sampler will avoid the use of cosmetics, lotions, sunscreens, and insect repellents.
- No treated clothing such as waterproof, water resistant or stain resistant will be allowed.
- No packaged food products will be in the vicinity of the groundwater monitoring well while PFAS sampling is taking place.
- The sampler will wear well-washed cotton clothing and powderless nitrile gloves.
- Sampling containers provided by the lab will be made of polypropylene and PFAS free.
- Alconox or PFAS free water will be used to decontaminate equipment.

- Permanent markers are not to be used for labelling of sample containers.

4.4.6 Sample Documentation

Sample documentation includes sample bottle labels, field logs, and chain-of-custody forms which are described in the following subsections. Sample labels, field logs, and chain-of-custody forms are included in Appendix D.

4.4.7 Sample Bottle Labeling

The sample containers will be laboratory certified bottles and properly labeled for identification including the following information.

- Sample ID
- Date and Time
- Sample Type – grab or composite
- Analysis Parameter(s)/Method
- Preservative
- Sampler(s)
- Sample Matrix

4.4.8 Field Logs

Field technicians will maintain field logs documenting information pertaining to field activities. The field notes will be reviewed to verify that the monitoring requirements of this Monitoring Plan are met and to identify unusual circumstances which may affect the implementation of the Monitoring Plan. The field logs will document the following:

- Personnel
- Site Name/Location
- Date of Sampling Event
- Climatic Conditions
- Well Identification
- Casing/Well Diameter
- Well Depth/Depth to Water
- Water Column in Feet
- Arrival/Departure Time
- Volume of One Well Volume
- Total Volume Purged
- Purge/Discharge Rate
- Well Evacuation Method
- Sampling Equipment
- Time of Sample Collection
- Comments on Sampling Event
- Field Analysis Data and Methods
- Purge Start/Completion Time

4.4.9 Chain-of-Custody

Sample transport and handling will be strictly controlled to reduce the opportunity of the samples to be tampered with. Chain-of-Custody control for the samples will consist of the following:

- Sample containers will be securely placed in coolers (iced) and will remain in the continuous possession of the field technician until the transfer of the samples to the laboratory.

- If the samples leave the possession of the sampling crew, the sample containers or coolers will be individually sealed to reduce the opportunity for disruption/tampering of the samples during transportation.

- Upon delivery to the laboratory, samples will be given unique laboratory sample numbers and recorded into a logbook indicating the client, well number, and date and time of delivery. The laboratory director or his/her designee will sign the Chain-of-Custody form(s) and formally receive the samples. The field technician and laboratory director will work together to maintain proper refrigeration of the samples.

- The Chain-of-Custody document will contain the following information:

  - Client Name
  - Client Project Name
  - Client Contact
  - Client Address
  - Client Phone/Email
  - Sampler(s) Name and Signature
  - Sample ID(s)
  - Date Collected
  - Time Collected
  - Type of Container and Preservative
  - Number of Containers
  - Sample Matrix
  - Sample Type - Grab or Composite
  - Analysis Parameter(s)/Method

4.5 QUALITY ASSURANCE/QUALITY CONTROL

The following quality assurance and quality control measures will be taken to facilitate the collection of a groundwater and surface water samples representative of water quality at the background and compliance wells, surface water monitoring locations, sumps, and underdrains.

4.5.1 Atmospheric Contamination

In the event of rain and/or other adverse conditions, steps must be taken to protect the monitoring well, sampling bottles, and sampling equipment. Vehicle exhaust, particulates (i.e., dust and plant fallout), rain, or other potential constituents of concern must not be allowed to encounter the samples. When maneuvering to the monitoring well site by vehicle, efforts will be made to approach the well from downwind and to park the vehicle downwind of the well. The vehicle's engine will not be running near the well. If necessary, clean plastic sheeting will be placed around the monitoring well as well as on the working surface where sample containers or equipment may make contact.

In the event the field technician observes a situation (see examples below) that, in his/her judgment, could compromise the validity of the sampling or the health and safety of personnel, the field technician will immediately cease sampling and contact the field supervisor.

- Inclement weather
- Dust or particulate from plants or equipment.
- Mowing in proximity of monitoring well
- Spraying of chemicals
- Dramatic changes in water quality (muddy or dry well)

The field supervisor will contact the project manager who will decide to continue sampling or terminate the event. If the field supervisor terminates a sampling event, the re-sampling will be rescheduled and completed within 30 days of the original sampling event.

4.5.2 Decontamination Procedures

Equipment used for drilling, development, sampling, and other activities associated with on-site work will be decontaminated before and after performance of the activity. Non-dedicated equipment will be thoroughly cleaned between wells in the manner outlined below. The decontamination fluids will be managed and disposed of in accordance with the COMAR. Disposable items will be disposed of as solid waste in an approved, permitted facility.

- Rinse with tap water.
- Wash with a non-phosphate laboratory detergent and tap water.
- Rinse with deionized/distilled water.
- Allow to air dry.

4.5.3 Quality Control Sampling

Field quality control (QC) may involve the collection and analysis of two types of QC blanks (trip and field blanks) to verify that the sample collection and handling processes have not impaired the quality of the samples.

- **Trip Blank** – Trip blanks are prepared for VOC analysis via SW (Solid Waste)-846 Methods 8011 and 8260. Laboratory personnel fill one of each sample bottle with distilled/deionized water and transport them to the site. Trip blanks are prepared immediately prior to the sampling event and transported with the empty bottle kits. Field personnel handle them like a sample, they remain un-opened, are transported in the sample cooler, and are returned to the laboratory for analysis. A trip blank is used to indicate potential contamination due to migration of volatile organic compounds from the air on-site or in the sample shipping containers, through the septum or around the lid of the sampling vials and into the sample.

- **Field Blank** – The field blank is a sample of deionized/distilled water, which is taken to the field and used as rinse water for sampling equipment. The field blank is prepared like the actual samples and returned to the laboratory for identical analysis. A field blank is used to evaluate if certain field sampling or cleaning procedures result in cross-contamination of site samples or if atmospheric contamination has occurred.

Field and laboratory quality assurance/quality control (QA/QC) may also involve the collection and analysis of duplicate field samples. These samples are collected at a rate of one per sample event. Duplicates are two separate samples collected independently in such a manner that they equally represent the medium at a given time and location. Co-located samples provide intra-laboratory precision information for the entire measurement system, including sample collection, homogeneity, handling, shipping, storage, preparation, and analysis.

4.6 LABORATORY ANALYSIS

Typically, sample analyses will be completed within 30 days after receipt by the contract laboratory. Once completed and reviewed, the project manager will be alerted to problems with the analysis results and the potential need for re-sampling. Re-sampling will occur within 30 days of issuance of the laboratory analytical results in question.

The laboratory's QA/QC Manual will be used to maintain the integrity of the data. For 40 CFR 258 Appendix I and II parameters, analyses will be conducted in accordance with the methods presented in EPA SW-846 Test Methods for Evaluating Solid Waste (as updated). In addition, a qualified independent laboratory certified for water quality analysis by the Maryland Department of Health and Mental Hygiene or certification which is otherwise acceptable to MDE will perform the sample analysis.

Upon receipt by the laboratory, samples, including the blanks, will be assigned a unique laboratory identification number, and inspected for integrity and consistency with information entered on the Chain-of-Custody document. The samples will also be evaluated for proper preservation or, in the case of volatile organic samples, inspected for lack of air bubbles in the sample vials. Deviations from applicable protocol will be noted on the Chain-of-Custody document. If possible, missing, broken, or improperly preserved samples will be replaced within 30 days from the date that the deviation is first noted.

While awaiting analysis, samples will be stored in a secure location under the appropriate method of preservation (i.e., refrigeration). If a method-prescribed holding time is exceeded, the project manager will be alerted, and the sample may be discarded and replaced at the discretion of the project manager.

Analytical results will be reported relative to both a limit of detection and limit of quantitation. LOD and LOQ values are parameter, method, and matrix specific. Sub-LOD results will be reported as not detected. Results equal to or above the LOD value but below the LOQ value will be reported as estimated values. Results equal to or greater than the LOQ value will be reported without estimation.

If such a method is available, analytical methods are selected to yield LOQ values that are equal to or below the facility's GPS values that are based on the EPA-MCL, and the Practical Quantitation Limit (PQL) value listed in the landfill's RDPs.

4.7 GROUDNWATER DATA EVALUATION

In accordance Part III.F.2.h of the MLFRRF RDP, "a qualified groundwater scientist or professional shall evaluate the results and advise the permittee of any changes in water quality or any exceedances of the State and federal Maximum Contaminant Level (MCL), Action Level, or other health standard." The following data evaluations have been selected based on the requirements outlined landfill's RDP and 40 CFR 258.53(g) – (i). Statistical tests will be performed using significance levels of 95% or 99% (i.e., a false positive rate of 5% or 1%).

4.7.1 Evaluation of Zone 3 Groundwater Elevation Data

The static groundwater surface elevations obtained prior to each sampling event will be used to calculate the rate of groundwater flow and create groundwater contour maps illustrating the direction of groundwater flow within the Zone 3 aquifer. Groundwater elevations will be compared to previous historical data to evaluate seasonal fluctuations observed at the site. Groundwater flow and elevation information will then be utilized to evaluate whether the requirements for locating the monitoring wells continue to be satisfied. If it is assessed that the depths, location, or number of wells is insufficient to meet regulatory requirements, new well locations will be submitted to MDE for approval prior to installation.

4.7.2 Data Validation

To identify analytical data that may not represent valid results, data from the monitoring events are validated in accordance with EPA guidance (EPA, 1992 & 2020). Data flagged with a "J" qualifier indicates the quantitation of the parameter is less than the laboratory's PQL but greater than the laboratory's MDL; thus, the concentration is considered estimated.

If the reported concentration of a parameter in a groundwater or surface water sample is less than five times the concentration detected in the trip blank, field blank, and/or method blank for the same parameter and monitoring event, the groundwater/surface water concentration will be flagged with a "B" qualifier. If the reported concentration of a common lab contaminant parameter in a groundwater or surface water sample is less than ten times the concentration detected in the trip blank, field blank, and/or method blank for the same parameter and monitoring event, the groundwater/surface water concentration will also be flagged with a "B" qualifier. B qualified detections are considered not validated as the detection may be anomalous due to sampling, laboratory, or transportation errors.

4.7.3 Data Screening

Prior to the performance of the inter-well and trend analyses, each data set will be screened for outliers and assessments will be made as to the treatment of non-detects and duplicate samples. Duplicate concentrations were averaged with the original sample concentrations to form an independent data point before statistical analyses were performed.

4.7.3.1 Treatment of Non-Detects in Background Data

The amount of data below the detection limits plays a key role in selecting the appropriate statistical evaluation method. A general guideline is as follows:

- If greater than 0% but fewer than 25% of the values are "not detected", the non-detect results are replaced with the laboratory's LOD divided by two.
- If more than 25%, but less than 50% of the values are reported as "not detected", the non-detect results are adjusted using the Aitchison's Method.
- If 50% or greater of the data are reported as "not detected", the non-detect results are replaced with the LOD and a non-parametric statistical method is utilized.

If the laboratory's LOD is unknown but the laboratory's LOQ is known, the laboratory's LOQ is utilized as the laboratory's LOD for statistical evaluation purposes. If the laboratory's LOD and LOQ are unknown, the non-detect data is not included in the data set for statistical evaluation purposes.

4.7.3.2 Outlier Analysis

Outlier analysis will be performed to identify reported values that may be anomalous and bias various statistical analyses. The identification of an outlier may be the result of fluctuations in aquifer geochemistry, a release from the landfill, changes in laboratory analytical method or LODs/LOQs, errors during sampling or laboratory analysis, etc.

The test for outliers consists of comparing the historical analytical results for each parameter within each well. The Dixon's test is performed for small data sets (i.e., n $\leq$ 25). The Rosner's test is performed for large data sets (i.e., n > 25). The Discordance Test is performed to test if a single extreme value is an outlier.

4.7.4 Inter-Well Statistical Analysis

In accordance with Part.III.F.3 of the landfill's RDPs and 40 CFR 258.53, inter-well statistical analysis will be conducted to evaluate if compliance well 40 CFR 258 Appendix II parameter detections are potentially due to the waste management unit and assess if the Subtitle D portions of the landfill will be monitored in accordance with the Detection or Assessment monitoring program. The inter-well statistical analysis process involves:

- Establishing Upgradient Data Set for Upper Prediction Limit (UPL) Calculation
- Assessing Data Distribution of Upgradient Data Set
- Calculating and comparing to UPLs

4.7.4.1 Pooling Upgradient/Background Data

Inter-well statistical analysis is performed for validated Appendix II 40 CFR 258 (listed on Table 3 of this EMP) parameter detections identified in the Subtitle compliance wells for the semi-annual monitoring events. To compare the compliance well parameter detections to the UPL, a UPL is calculated for each parameter utilizing historical data from upgradient wells TW-10A, TW-10B, TW-23, TW-23R, and/or TW-32.

The upgradient data set must contain at least eight results for the calculation of a parametric UPL and at least 13 results for the calculation of a non-parametric UPL. Data from the upgradient wells identified as outliers will not be included in the data set to preserve the power of the test to detect a potential release from the landfill. In addition, parameter results from the upgradient wells flagged with a "B" qualifier will not be included in the data set to preserve the power of the test to detect a potential release from the landfill.

4.7.4.2 Assessing Data Distribution

The distribution of each upgradient data set with less than 50% non-detects is established to select the appropriate UPL calculation method. The Shapiro-Francia test is performed to establish data distribution for data sets with more than 50 data points. The Shapiro-Wilks test is performed to establish data distribution for data sets with less than 50 data points. Data sets with greater than 50% non-detects are not subjected to a data distribution evaluation as the UPL is set to the non-parametric UPL.

4.7.4.3 Calculating and Comparing to Upper Prediction Limits

A parametric UPL is calculated for upgradient data sets in which the distribution of the data is normal and there are less than 50% non-detects in the data set. A non-parametric UPL is calculated for upgradient data sets in which the distribution of the data is non-normal or there are greater than 50% non-detects in the data set. If the UPL is less than the laboratory's current PQL, the UPL is set to the laboratory's current PQL.

Validated Appendix II 40 CFR 258 (listed on Table 3 of this EMP) parameter detections identified in the compliance monitoring wells for each semi-annual monitoring event are directly compared to the UPL.

4.7.5 Responses to Inter-Well Exceedances

If an inter-well exceedance is identified for a compliance well monitored in accordance with the assessment monitoring program, the inter-well exceedance will be presented in the corresponding Semi-Annual Monitoring Report. If an inter-well exceedance is identified for a compliance well monitored in accordance with the detection monitoring program, the inter-well exceedance will be presented in the corresponding Semi-Annual Monitoring Report and the well will be monitored in accordance with the Assessment Monitoring Program for future monitoring events or an Alternate Source Demonstration (ASD) may be performed.

Once each Appendix II parameter is below background levels for two consecutive full Appendix II sampling events in the assessment compliance wells, MDE will be notified in the corresponding Semi-Annual Monitoring Report, and the background and compliance wells will be monitored in accordance with the Detection Monitoring Program.

4.7.6 Comparison to Groundwater Protection Standards

In accordance with 40 CFR 258.55 (d) (4), site-specific groundwater protection standards are established as outlined below for Appendix II 40 CFR 258 parameters listed on RDP Table I and II, previously detected 40 CFR 258 Appendix II parameters, and six PFAS constituents.

1. If an EPA-MCL exists for a given parameter and the inter-well statistical analysis background UPL does not exceed the EPA-MCL, the GPS is set to the EPA-MCL.

2. If the background UPL for a given parameter is greater than the EPA-MCL, the background UPL is chosen as the GPS.

3. If an EPA-MCL does not exist (not promulgated) and the background UPL does not exceed the Cleanup Standard (Cleanup STD) listed on Table I and II provided by MDE in a letter dated January 2, 2024, the GPS is set to the Cleanup STD.

4. For Appendix II parameters not included on Table I or II provided by MDE in a letter dated January 2, 2024, the GPS was set to the EPA-MCL. If an EPA-MCL does not exist (not promulgated) and the background UPL does not exceed the EPA Regional Screening Level (EPA-RSL), the GPS is set to the EPA-RSL.

The current GPS value for each Appendix II parameter is shown in **Appendix C.** If a GPS value is modified as the result of a revision to an EPA-MCL, Cleanup STD, background UPL, EPA-RSL, an updated GPS list will be placed in the landfill's EMP, and the new value will be used for subsequent comparisons of monitoring data.

In accordance with 40 CFR 258, validated and quantified Appendix II parameter detections will be subjected to a direct comparison to GPS within 30 days of final issuance of the associated laboratory's certificate of analysis. Validated and quantified PFAS detections will also be subjected to a direct comparison to GPS within 30 days of final issuance of the associated laboratory's certificate of analysis. If a GPS exceedance is noted during the value-to-value comparison for a parameter, a

verification sample may be collected and results from the verification sample will be compared to the GPS in a value-to-value comparison if the comparison is completed within 30 days of the initial sampling event.

Three additional independent groundwater samples may be collected for the suspect parameter to perform a statistical comparison to GPSs (Cleanup STD, EPA-RSL, or EPA-MCL based values only). The statistical comparison entails pooling the last four independent results (within the same compliance period) for the suspect parameter at the same well and calculating the lower confidence limit (LCL) utilizing an alpha level no less than 0.05. The LCL value is compared to the GPS to establish compliance.

4.7.7 Trend Analysis

In accordance with Part III.F.3 of the MLFRRF RDP, the semi-annual report on water quality must include a time-series analysis of the monitoring data. The discussion should emphasize historical trends in the monitoring data. To comply with this permit requirement, trend analysis may be performed on select monitoring data. Trend analysis may be performed by at least one of the following methods.

- The **Mann-Kendall Trend Test** uses the relative magnitudes of the data to compute an "S" value which is computed as the sum of positive differences minus the sum of negative differences between successive elements of the data. A large positive "S" value, when evaluated in conjunction with a pre-specified level of confidence, indicates a statistically significant upward trend whereas a large negative "S" value indicates a significant downward trend.

- The **Sen's Slope Estimator** is a nonparametric method for linear regression that chooses the median slope among the lines through pairs of two-dimensional sample points. By taking the median pair wise slope instead of the mean, extreme pair wise slopes, perhaps due to one or more outliers or other errors, are ignored and have negligible impact on the final slope estimator.

- The **Time-Series Plots** are linear plots that consist of parameter concentration versus sample date. The time-series plots also include a linear trend line and a line for the corresponding GPS.

4.7.8 Surface Water Data Evaluation

Validated and quantified Table I and II parameter detections will be subjected to a direct comparison to Maryland's Numerical Criteria for Toxic Substances (NCTS), if available. Validated and quantified PFAS detections will also be subjected to a direct comparison to GPS. If a NCTS exceedance is noted during the value-to-value comparison for a parameter, a verification sample may be collected and results from the verification sample will be compared to the NCTS in a value-to-value comparison if the comparison is completed within 30 days of the initial sampling event. NCTS values are included in **Appendix C**. Additionally, a comparison of upstream to downstream samples may be performed.

4.8 NOTIFICATIONS AND REPORTING

4.8.1 Response to Groundwater Protection Standard Exceedances

In accordance with the Part III.F.2.j of the landfill's RDP, *"If analytical results from samples collected from any sources associated with the landfill or surrounding properties exceed MCL, Action Level, or other health standard for the first time, the permittee must notify the Department in writing within 24 hours of receipt of the analytical data detecting this occurrence. Thereafter, if there are any significant increases above the MCL, Action Level, or other health standard, the permittee must notify the Department in writing within 24 hours of receipt of the analytical data detecting this occurrence."*

In accordance with the Part III.F.2.k of the landfill's RDP, *"Upon detection of the exceedance of an MCL, Action Level or other health standard for the first time, the monitoring point(s) in which the standard was exceeded must be immediately re-sampled to verify the initial detection. This re-sampling must occur as soon as possible, and no later than 30 days following receipt of the analytical data by the permittee or the qualified groundwater scientist or professional who is reviewing the analytical data which indicated the exceedance. If the permittee accepts the initial sampling result as a valid result, then the permittee can elect not to resample the monitoring point(s)."*

In accordance with 40 CFR 258.55 (g), one of following actions are required if Appendix II 40 CFR 258 parameters are detected in compliance wells at statistically significant levels above the GPS.

- May demonstrate that a source other than a landfill caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in ground-water quality. A report documenting this demonstration must be certified by a qualified ground-water scientist or approved by MDE and placed in the operating record. If a successful demonstration is made the monitoring must continue in accordance with the assessment monitoring program pursuant to 40 CFR 258.55. Until a successful demonstration is made, an assessment of corrective measures must be initiated in accordance with 40 CFR 258.55(g).

- Must characterize the nature and extent of the release by installing additional monitoring wells, as necessary. Must install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well in accordance with 40 CFR 258.55(d)(2). Must notify people who own the land or reside on the land that directly overlies any part of the plume of contamination if contaminants have migrated off-site if indicated by sampling of wells in accordance with 40 CFR 258.55 (g)(1). Must initiate an assessment of corrective measures as required by 40 CFR 255.56 within 90 days.

4.8.2 Drinking Water Supply Well Monitoring Notifications

Property owners will be provided with the monitoring results following completion of each drinking water supply well sampling event. The report will contain a summary of sampling activities, a summary of the laboratory analytical results, and a summary of changes (if any). Each report will be

submitted to MDE and the Anne Arundel County Department of Health in accordance with long-standing practice.

4.8.3 Semi-Annual Monitoring Reports

In accordance with the MLFRRF RDP, semi-annual groundwater and surface water monitoring reports shall be submitted to MDE within 90 days of the close of every first and third calendar quarters. The alternative semi-annual report schedule is as follows: semi-annual reports will be submitted to MDE within 120 days of the close of every first and third calendar quarters. Each report will contain, at a minimum, the following:

- Signature page signed by a qualified groundwater scientist.
- Facility name and brief site history
- Copy of laboratory's certificate of analysis including the dated signature page.
- Summary and interpretative discussion of analyses of the chemical quality of groundwater from the monitoring wells and surface water monitoring points.
- Monthly water level measurements and calculated groundwater elevations from groundwater monitoring wells associated with Cell 9.
- Data for each well summarized and presented in a time-series format. The data for each well will be presented in a spreadsheet so that the water quality data for each parameter for each well can be observed simultaneously.
- The results of data evaluations performed as described in Section 4.7.
- Site map illustrating most recent topographic contours, locations of the groundwater monitoring wells, and corresponding groundwater contours for the Zone 3 aquifer.

5.0 UNDERDRAIN MONITORING PROGRAM

In accordance with the MLFRRF RDP, underdrains associated with Subcell 8.8 and Cell 9 of the MLFRRF are monitored on a routine basis. Monitoring and reporting requirements for each underdrain system are provided in the following subsections.

5.1 SUBCELL 8.8

In accordance with the MLFRRF RDP and the Monitoring Plan for the Subcell 8.8 Underdrain at the MLRRF (Environmental Resources Management, Inc., May 9, 2005), samples are collected semi-annually from monitoring well TW-26R and analyzed for the parameters identified in the Monitoring Plan for the Subcell 8.8 Underdrain at the Millersville Landfill and the same parameters as the Subtitle D Groundwater Well Network. The monitoring location, sampling frequency, and required parameter lists associated with the Subcell 8.8 underdrain monitoring program are summarized in **Table 7**. Lists of the specific parameters are included in **Appendix C**.

Table 7. Subcell 8.8 Underdrain Monitoring Plan

Location ID	Monitoring Frequency	Monitoring Parameter Groups
TW-26R	Semi-Annual	Table 1 of Subcell 8.8 Underdrain Monitoring Plan, RDP Table II Elements, RDP Table II Indicator Parameters, RDP Table I VOCs and PFAS, and Additional VOCs*

* The additional VOCs include dichlorodifluoromethane and dichlorfluoromethane

In accordance with the MLFRRF RDP, operation of the Subcell 8.8 Underdrain shall not cause the annual average (geometric mean) concentration of a parameter analyzed to exceed the established EPA-MCL. If an exceedance of an EPA-MCL occurs, then a verification sampling event will be performed within 21 days to verify the result. If the verification event verifies the exceedance, Part II - Page 2 of 2 RDP then the contingency plan stipulated in B.3 of the RDP will be implemented to address the groundwater quality.

Based on the level and nature of the exceedance, the contingency plan recommendation could be for no action, continued monitoring or a plan to implement measures to protect public health and the environment from an adverse impact from the underdrain operation, if site monitoring indicates the potential for such impacts. The contingency plan shall be submitted to MDE within 60 days of the confirmed exceedance.

5.2 CELL 9

In accordance with a letter from MDE dated October 9, 2015, the County was required to establish a sampling point for the Cell 9 underdrain. Samples from the underdrain shall be sampled for parameters on Tables I and II of the RDP. At least four samples were collected for background water quality before waste placement in Cell 9. The Cell 9 underdrain sampling point is sampled and analyzed during semi-annual monitoring events when discharging.

6.0 LANDFILL GAS MONITORING PROGRAM

6.1 MONITORING SYSTEM

The LFG monitoring probe network at the MLFRRF consists of 68 monitoring probes in 30 boreholes. The boreholes are designated J-1 through J-33 in **Figure 6**. (Note: Designations J-2, J-9, and J-10 were not used.) The probes are located along the northern, eastern, and southern property boundaries in the areas adjacent to the landfill cells. Due to the hydrologic conditions and existing landfill activities at the site, it was not necessary to locate LFG monitoring probes on the western property boundary. The LFG monitoring probes in the network were located based on the following criteria outlined in the Subtitle D regulations:

- Soil conditions.
- The hydrogeologic and hydraulic conditions surrounding the landfill.
- The locations of facility structures and property boundaries.

In compliance with the Subtitle D regulations, the following elements of design were incorporated into the gas monitoring network at the MLFRRF. The depths and other relevant features of the gas monitoring probes are on the table and figure included in **Appendix E**. Additional construction details for the existing monitoring probes can be found on their respective as-built included in **Appendix E**.

- LFG monitoring probes are located approximately 20 feet from the property fence.
- Where practical, the LFG monitoring probes screens extend below the estimated seasonal low groundwater table.
- In selected boreholes, more than one LFG monitoring probe was installed so that multiple sand zones could be monitored separately.
- In the northeast corner of the site (i.e., between LFG monitoring probes J-7 and J-12), only a few gas monitoring probes were installed as the soils in this area consist of red and blue clays which do not promote LFG migration; the exception is LFG monitoring probe J-11, where a surficial sand is known to exist.
- LFG monitoring probes were closely spaced between landfill Cell 2 and Cell 4, as dry layers of sand that intersect the refuse are present in this area. Also, these cells are close to the property boundary.
- Buildings at the MLFRRF are not in areas where LFG is expected to migrate.

6.2 MONITORING PROCEDURES

Monitoring for methane gas migration is conducted on a quarterly basis. Monitoring personnel will record the following information during monitoring:

- Weather information (i.e., barometric pressure and temperature).
- Calibration information
- Monitoring dates and times
- Name(s) of sampling personnel and company.

- Equipment used for monitoring.

Via the use of a gas analyzer, the following measurements will be recorded at each methane gas monitoring probe:

- Methane concentration (percent volume in air, or percent of the lower explosive limit)
- Oxygen, carbon dioxide, and balance gas concentration
- Condition of monitoring well
- Static pressure

Concentrations of gases at the monitoring probes will be measured using the following sampling procedures. A sample LFG monitoring probe sampling log is included in **Appendix F**. The actual form used to record data may vary or involve electronic data collection. LFG well monitoring procedures will generally be as follows:

1. The instrument will be calibrated per the manufacturer's recommendations, typically at a minimum of once for each day of use, and calibration readings will be recorded.
2. The instrument will be turned on prior to connection to the quick connect sampling port of the probe. Once connected to the probe, the static pressure will be measured prior to any pumping.
3. The instrument's sampling pump will be started, and readings will be observed and recorded. Typically, two probe volumes will be pumped and purged prior to recording measurements. Gas concentrations will be recorded once conditions reach steady-state or when two well volumes have flowed through the instrument.
4. Close and reseal the monitoring well.

Although not required, during quarterly monitoring of the LFG monitoring probes on-site structures may be monitored with a gas analyzer capable of detecting explosive gases to 100 parts per million. Field personnel will walk through the building monitoring the potential locations of LFG infiltration into the building (e.g., floor/perimeter wall interface and floor penetrations). Monitoring procedures will generally be as follows:

- Prepare a gas monitoring report form. Calibrate and prepare the meter for monitoring per manufacturer recommendations.
- Enter the area to be tested in a manner that will minimize disturbance of the air in the area to be monitored. If confined spaces exist, confined space procedures must be followed. Areas to be monitored include:
  - Enclosed areas such as closets and cabinets
  - Bases of vertical walls
  - Floor drains, grates, pipe penetrations, electrical outlets, and conduits
  - Cracks in flooring or slabs
- Continue to take the sample until the reading on the instrument is stable and read and record the concentration of measured gases.

- Indicate the results and location on the report form. If methane is detected, note whether potential for sparking exists near the location of the detection. Dangerous conditions will be reported to site personnel.

- Return the area to its original condition. Where applicable, close vents, access ports, or covers.

6.3 NOTIFICATIONS AND REPORTING

Quarterly monitoring results of the probes and on-site structures will be recorded on a semi-annual monitoring report and submitted to the MDE every six months, at a minimum. These monitoring reports will include an evaluation of the data and the status of compliance with COMAR 26.04.07.03 B (9). In addition, a copy of the most current topographic map depicting the location of the LFG monitoring probes will be included in each semi-annual report.

If methane concentrations exceed 25% of the LEL in facility structures, excluding gas control or recovery system components, or exceed the LEL at the property boundary, immediate action shall be taken to protect human health from potentially explosive conditions. MDE shall be notified as soon as a methane concentration of more than 25% of the LEL is detected in the facility structures, excluding gas control or recovery system components, or when it exceeds the LEL at the property boundary.

Within 60 days after detection of the exceedance, an investigation and remediation plan (IRP) shall be prepared and submitted to MDE. The IRP must include the following:

- The frequency and lateral and vertical extent of methane migration.

- Potential causes of the increase in gas concentrations, such as landfill operational conditions, gas control system failure or upset, climatic conditions, or closure activity.

- Remedial action to be taken based on the cause, extent, and nature of the methane migration.

- Schedule for implementation of the remediation.

If approved by MDE, the IRP will be implemented immediately with changes to the plan or schedule reasonably required by MDE.

7.0 LEACHATE MONITORING PROGRAM

7.1 REFUSE DISPOSAL PERMIT MONITORING REQUIREMENTS

In accordance with Part III.D.6 of the MLFRRF RDP, except for a leachate collection system relying solely on free gravity drainage to prevent leachate from ponding on the cell floor, the level of leachate in the leachate collection system shall be monitored a minimum of twice each operating day except Sundays and holidays. The data shall be recorded and initialized by the person performing the monitoring. Results are to be submitted to MDE semi-annually.

In accordance with Part III.D.8 of the MLFRRF RDP, the County shall monitor the quantity of leachate and other contaminated liquids collected monthly. Results are to be submitted to MDE semi-annually. The semi-annual monitoring report shall include:

- The volume of leachate or other contaminated liquid collected monthly. Quantities shall be reported in gallons or cubic feet.
- The method used to measure the quantities of leachate coming from the leachate collection systems.
- The volume of liquid discharged to a sanitary sewer. Quantities shall be reported in gallons or cubic feet.
- The volume of liquid disposed of by any means other than that specified in (c). Quantities shall be reported in gallons or cubic feet.
- The results of chemical analyses performed on the collected liquid.
- The estimated total amount of cumulative precipitation received at the landfill is based on local climatological data. Quantities shall be reported in inches and the source of the data shall be stated in the report.

In accordance with MDE's January 2, 2024 letter, the landfill's leachate will be sampled on a semi-annual basis for the analysis of six PFAS constituents beginning with the performance of the 2nd semi-annual 2024 monitoring event. A list of the specific PFAS parameters is included in **Appendix C.** Monitoring results will be provided in the semi-annual monitoring report prepared to document groundwater and surface water monitoring activities outlined in Section 4.

7.2 WASTEWATER DISCHARGE PERMIT MONITORING REQUIREMENTS

7.2.1 Monitoring Requirements

Direct discharge of leachate to the sanitary sewer is regulated by the Anne Arundel County Department of Public Works' Bureau of Utility Operations Wastewater Pre-Treatment Program and requires a Wastewater Discharge Permit (WDP). The permittee shall monitor its wastewater discharges subject to regulation under Part 2 of the MLFRRF WDP to ascertain compliance with the

applicable limitations. Monitoring shall be conducted annually sometime between September 15 and December 14.

Sampling will be conducted for three consecutive days and will produce a set of data for each day. The monitoring shall consist of the sampling and analysis of the regulated wastewater for the pollutants listed in **Appendix G**. The sampling point is "01 -The leachate effluent holding tank."

Samples shall be collected in accordance with 40 CFR 136 and EPA Guidelines #600/4-82-029. Composite samples shall be collected over a 24-hour period if the discharge occurs over a 24-hour period. If the period of discharge is less than 24 hours, the samples shall be collected over the period of discharge in one working day. At a minimum, the composites should consist of equal volume collected in two-hour intervals. Petroleum based grease and oil, cyanide, and purgeable volatile organics shall be collected by a grab sample. LEL and pH monitoring must be performed on-site using portable meters. Laboratory analysis of samples collected shall be performed in accordance with 40 CFR Part 136.

7.2.2 Sample Documentation

For each measurement of sample taken pursuant to the requirements of the MLFRRF WDP, the following information shall be recorded:

- The exact place, type, date, and time of sampling.
- The date(s) the analyses were performed.
- The person(s) who performed the analyses.
- The analytical techniques or methods used; and
- The results of the required analyses.
- The minimum detection limit of each analysis.

7.2.3 Effluent Limitations

Wastewater discharged by the County to the sewer system shall meet the wastewater discharge standards shown in **Appendix G** as established by the Pretreatment Program and MDE. If sampling and analysis shows violation(s) a notification to the Pretreatment Manager must be made within 24 hours of the violation being discovered. If the violation(s) occurs on the third day of monitoring, then the sampling and analysis for the parameter(s) in violation must be repeated. Re-sample results must be reported to the Pretreatment Manager within 30 days of the discovery of the violation(s).

7.2.4 Annual Reporting

Monitoring results shall be summarized and reported to the Pretreatment Manager, together with copies of the original laboratory report, no later than December 15 for the period of July 1 to December 14. The monitoring report must also include flow information detailing the average wastewater flow using gallons per day.

If the County monitors a pollutant more frequently than required by the MLFRRF WDP, the results of such monitoring shall be submitted to the Pretreatment Manager. Reports shall be signed and sworn to by a principal executive officer, or designee. Each monitoring report will include flow information detailing the average wastewater flow using gallons per day. Reports submitted pursuant to this permit shall include the following certification statement.

"I certify under penalty of law that this document and attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Reports shall be submitted to:

Pretreatment Program Manager
Anne Arundel County
Department of Public Works
445-A Maxwell Frye Road
Millersville, Maryland 21108

7.2.5 Reporting of Non-Compliance with Discharge Limitations/Slug Loadings/Upsets

The Pretreatment Manager shall be notified within 24 hours of the County becoming aware of any violation including any daily maximum or minimum effluent limitation, slug loading, or upsets. Within five days the County shall provide the Pretreatment Manager with the following information in writing:

- Description of the non-complying discharge, slug loading, or upset.
- Cause of non-complying discharge, slug loading, or upset.
- Anticipated time the condition of non-complying discharge, slug loading, or upset is expected to continue or, such condition has been corrected, the duration of the period.
- Steps taken by the permittee to reduce and eliminate the non-complying discharge, slug loading, or upset.
- Steps to be taken by the permittee to prevent recurrence of the condition of noncomplying discharge, slug loading, or upset; and
- A description of the accelerated or additional monitoring by the permittee to determine the nature of the non-complying discharge, slug loading, or upset.

7.3 ADDITIONAL VOLUNTARY MONITORING

Annual leachate monitoring may be conducted for each active subcell in Cell 9. Leachate samples will be obtained from the primary riser structure for each discrete subcell. In addition, annual leachate monitoring may continue for the closed Cell 8 subcells (cap construction completed June 2019), however, monitoring may be discontinued in the future, based on leachate volume and/or quality. The parameters to be analyzed will be the same as the Subtitle D groundwater monitoring program as outlined in Section 4.

An annual data monitoring report may be prepared. The data will be compared to the historical data collected annually to ascertain any changes in leachate quality over time. The data will be presented in tabular form. This is a self-imposed monitoring program, thus monitoring reports will not be submitted to regulatory agencies.

8.0 STORMWATER MONITORING PROGRAM

The MLFRRF operates under the State of Maryland's General Discharge Permit for Stormwater Associated with Industrial Activities, Permit No. 20-SW. This permit authorizes the discharge of stormwater associated with industrial activities into the waters of the state. Per the permit, the County developed a Stormwater Pollution Prevention Plan (SWPPP) for the site, which was approved by MDE. A summary of the stormwater monitoring requirements under the Permit 20-SW and the approved SWPPP are summarized below:

- The Recycling Center is designed to allow residents to easily drop off household solid waste as well as many recyclable materials at one location. This area is not intended for commercial drop-off since there are no scales or fees. The Recycling Center includes designated areas for the collection of used oil, used antifreeze, used batteries, metal items, waste latex paint, used appliances/white goods (appliances/white goods are staged for liquid refrigerant removal by a licensed technician prior to recycling), electronics, other recyclables, used tires, and bulk trash. The Recycling Center also includes multiple closed-top compactors (electric trash/recycling containers).

- The Leachate Pretreatment and Storage Facility, including Leachate Storage Tanks, are located within a lined containment area southeast of Stormwater Management (SWM) Pond 6. Stormwater collected in the lined containment area for the two 350,000-gallon Leachate Storage Tanks is inspected and sampled prior to discharge to a rip-rap channel leading to Wells Branch.

- The Maintenance/Warehouse/Entrance Area includes the Administration Building, the Cardboard Recycling Facility, the Maintenance and Warehouse buildings, and the Main Haul Road.

- Closed Landfill Cells and Compost Area: The closed landfills consist of five cells: Cell 1 East, Cell 2, Cell 4, Cells 567, and Cell 8. Cells 1 East, 2 and 4 are located north of the BG&E right-of-way. Cells 567 is in the center of the site south of the BG&E right-of-way. Cell 8 is located near the entrance to the facility, southwest of Cells 567. The Compost Area is located north of Cells 567.

- Active Landfill Cell 9: Cell 9 is located on the southern portion of the facility. The County completed construction of the initial subcell of the Cell 9 disposal area (Subcell 9.1) in December 2016, with initial placement of waste in January 2017. The Cell 9 disposal area will be constructed in phases and is projected to last beyond 2047. A soil stockpile/borrow area and a sedimentation/SWM pond have also been constructed at this location.

These industrial activities are categorized by Standard Industrial Classification (SIC) and/or Activity Code as outlined below. These SIC/Activity codes establish the stormwater monitoring requirements for the facility.

- Sector C (SIC Code 2875), Subsector C1 (Agricultural Chemicals (includes composting))

- Sector L (SIC Code 4953/Activity Code LF), Subsector L1 (Landfills with a refuse disposal permit) and Subsector L2 (Landfills with a refuse disposal permit, excludes closed areas)

- Sector N (SIC Code 5093), Subsector N2 (Source-Separated Recycling Facility)

- Sector AD.a, Activity Code DPW (Department of Public Works Maintenance Facility)

8.1 STORMWATER MONITORING LOCATIONS

Most of the stormwater runoff at MLFRRF property is conveyed via overland flow to engineered conveyances, including drainage swales, catch basins, and stormwater management (SWM) facilities. Ultimately, these features discharge into Jabez Branch or Wells Branch, with the divide between the two running along the north side of Cell 9.

Site drainage measures consist of a combination of curbing, culverts, and other diversionary structures. Implementation of these management methods controls on-site erosion and sediment and minimizes suspended solids in stormwater. The areas of industrial activity, associated stormwater management structures, and associated outfall are summarized in **Table 4** and illustrated on **Figure 7**.

Table 8. Stormwater Monitoring Locations

Industrial Activities within Drainage Area	SWM ID	SWM Type	Associated Outfall ID
Closed Cell 1 East	SWM Pond #1	Wet Pond	Outfall #1
Closed Cell 2 and 4	SWM Pond #2	Infiltration Pond	n/a
Closed Cells 567	SWM Pond #3	Wet Pond	Outfall #3
Closed Cells 567	SWM Pond #4	Wet Pond	Outfall #4
Closed Cells 567	SWM Pond #5	Wet Pond	Outfall #5
Recycling Center	SWM Pond #6	Wet Pond	Outfall #6
Closed Cell 8	SWM Pond #8-1	Wet Pond	Outfall #8
Active Cell 9	SWM Pond #9-2	Wet Pond	Outfall #9
Maintenance/Warehouse Area	SWM Pond #10	Bioretention Pond	Outfall #10
Laydown Storage/Compost Area	SWM Pond #11	Pocket Pond	Outfall #11
Administration Parking Lot	Infiltration Trench	Infiltration	n/a
Untreated Area	Leachate Area and Haul Road	n/a	n/a
Untreated Area	Main Entrance Area	n/a	n/a

8.2 VISUAL AND BENCHMARK MONITORING PROCEDURES

As outlined in Part V.A, B, and C of the MLFRRF NPDES Permit, the County must perform and document a visual examination of stormwater discharges associated with industrial activities on a quarterly basis. Samples must be taken during a period of measurable discharge. Samples collected for visual examination are not required to be collected consistent with 40 CFR 136 procedures but should be collected in such a manner that the samples are representative of the stormwater discharge.

Sampling is not required during adverse weather conditions, which are those that are dangerous or create inaccessibility for personnel, such as local flooding, high winds, or electrical storms, or situations that otherwise make sampling impractical, such as drought or extended frozen conditions. When adverse weather conditions prevent the collection of samples during the quarter, a substitute sample must be taken during the next qualifying storm event. Documentation of the rationale for no visual assessment for the quarter must be included in the monitoring records.

Stormwater monitoring must be performed by collecting a grab sample during the first 30 minutes of the discharge. If it is not practicable to take the sample during the first 30 minutes, the sample may be taken during the first three hours of discharge provided that the facility explains why a grab sample during the first 30 minutes was impracticable.

8.2.1 Visual Monitoring Procedures

A stormwater sample shall be collected from each outfall, except for the substantially identical outfalls (SIOs). For the SIOs, quarterly visual assessments of the discharge at just one of the outfalls is required. As indicated in the Part V.B.6. of the MLFRRF NPDES Permit (see language below), visual assessments must be performed on rotating basis of each substantially identical outfall throughout the period of the coverage under the MLFRRF NPDES Permit.

> *Part V.B.6: Substantially identical outfalls: If your facility has two or more outfalls that you believe discharge substantially identical effluents, as documented in Part III.C.5.b, you may benchmark monitoring of the discharge at just one of the outfalls and report that the results also apply to the substantially identical outfall(s) provided that you perform benchmark monitoring on a rotating basis of each substantially identical outfall throughout the period you are required to under this permit. If stormwater contamination is identified through benchmark monitoring performed at a substantially identical outfall, you must assess and modify your control measures as appropriate for each outfall represented by the monitored outfall.*

The visual examination must be done during normal working hours, where practicable, and when considerations for safety and feasibility allow. If no storm event resulted in runoff from the facility during a monitoring quarter, the facility is excused from visual monitoring for that quarter provided that visual waiver documentation is included with the monitoring records indicating that no runoff occurred.

Visual samples may be taken during any precipitation event (except in areas subject to snow) where there is a measurable discharge. In areas subject to snow, at least one quarterly visual assessment must capture snowmelt discharge. The assessment shall identify the date when the sample was taken.

The visual examination must document observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution. The examination must be conducted in a well-lit area. No laboratory analytical tests are required to be performed on the samples. Where practicable, the same individual should conduct the collection and examination of discharges for the length of the permit term. The Quarterly Visual Monitoring Form and instructions for completing the form are included in **Appendix H** and can also be found in the MLFRRF NPDES Permit.

8.2.2 Benchmark Monitoring Procedures

A stormwater sample shall be collected from each outfall, except for the SIOs. For the SIOs, quarterly benchmark monitoring of the discharge at just one of the outfalls is required. Benchmark monitoring must be performed on rotating basis of each substantially identical outfall throughout the period of the coverage under the MLFRRF NPDES Permit.

The sampling and analytical methods used must conform to procedures for the analysis of potential pollutants as identified in 40 CFR 136 - "Guidelines Establishing Test Procedures for the Analysis of Pollutants". The benchmark monitoring requirements and benchmark limits for each outfall are listed in the Stormwater Pollution Prevention Plan (SWPPP).

Samples (except snowmelt samples) must be collected from measurable discharge resulting from a storm event that occurs at least 72 hours from the previously measurable storm event. The 72-hour storm interval is waived when the preceding measurable storm did not yield a measurable discharge, or if the County is able to document that less than a 72-hour interval is representative of local storm events during the sampling period. In the case of snowmelt, the monitoring must be performed at a time when a measurable discharge occurs at the site.

For each monitoring event, except snowmelt monitoring, the date and duration (in hours) of the rainfall event, rainfall total (in inches) for that rainfall event, and time (in days) since the previous measurable storm event must be identified. For snowmelt monitoring, the date of the sampling event must be identified.

Benchmark values are not viewed as effluent limitations; therefore, an exceedance of a benchmark value does not constitute a violation of the permit. However, an exceedance indicates that modifications to the SWPPP may be necessary. In addition, the exceedance of a benchmark value may identify facilities that would be more appropriately covered under an individual or alternative general permit where more specific pollution prevention controls could be required.

8.3 RECORD KEEPING AND REPORTING

8.3.1 General Requirements

The visual monitoring forms and benchmark monitoring results shall be maintained with the SWPPP along with quarterly routine site inspections (see forms in **Appendix H**) and an annual comprehensive site inspection (see forms in **Appendix H**). The County must summarize and submit benchmark monitoring information electronically using NetDMR (www.epa.gov/netdmr). For each visual and benchmark monitoring event, the County must record the following information for each sample.

- The exact place, date, and time of sampling or measurement.
- The person(s) who performed the sampling or measurement.
- The dates and times the analyses were performed.
- The person(s) who performed the analyses.
- The analytical techniques or methods used.
- The results of the required analysis.

8.3.2 Responses to Benchmark Monitoring Results

8.3.2.1 Data Not Exceeding Benchmarks

In accordance with Part V.B.2 of the MLFRRF NPDES Permit, waivers from benchmark monitoring are available to facilities whose discharges are below benchmark values provided the following conditions are met.

- After four monitoring quarters, if the annual average for any parameter does not exceed the benchmark, the County has fulfilled the monitoring requirements for that parameter for the permit term. For averaging purposes, use a value of zero for any individual sample parameter, analyzed using procedures consistent with Part V.B.1 of the MLFRRF NPDES Permit, which is determined to be less than the method detection limit. For sample values that fall between the method detection level and the quantitation limit (i.e., a confirmed detection but below the level that can be reliably quantified), use a value halfway between zero and the quantitation limit. A request to the department may be submitted to discontinue benchmark monitoring by performing the following.

  – Entering the data for the parameters in NetDMR.
  – Requesting the Department's Permit Program to verify your calculation.
  – Receiving confirmation from the Department.

On October 29, 2024, a benchmark monitoring termination request was submitted to MDE for the following benchmark monitoring requirements for the remainer of 20-SW permit term as no yearly average benchmark exceedances were identified for these outfalls under the first year of monitoring under 20-SW. MDE approved the termination request in a letter dated November 13, 2024.

- Outfall #1: Nitrate + Nitrite Nitrogen, Total Lead, Total Zinc, Phosphorus, and Total Suspended Solids
- Outfalls #3, #4, #5, and #8: Total Suspended Solids
- Outfall #9: Total Suspended Solids and Total Iron
- Outfall#11: Nitrate + Nitrite Nitrogen, Total Lead, Total Zinc, and Phosphorus

8.3.2.2 Data Exceeding Benchmarks

If any of the following events in Parts IV.B.1, IV.B.2, or IV.B.3 of the MLFRRF NPDES Permit occur, the County must follow the response procedures described in those parts, called additional implementation measures (AIM)" There are multiple AIM levels: AIM Benchmark Action Level 1 through Benchmark Action Level 3. The County is required to respond to different AIM levels which prescribe increasingly robust responses depending on the nature, duration, and magnitude of the benchmark exceedance.

At any point or Benchmark Action Level of AIM, the below exceptions from AIM requirements and additional benchmark monitoring below may apply. The County must still review the stormwater control measures, SWPPP, and other on-site activities to determine if actions or modifications are necessary or appropriate. Refer to Part IV.B.4 of the MLFRRF NPDES Permit for exceptions from AIM requirements.

- Natural Background Pollutant Levels
- Run-on
- Due to abnormal event

9.0 REFERENCES

Anne Arundel County Department of Public Works. Anne Arundel County Waste Management Services Millersville Landfill and Resource Recovery Facility Wastewater Discharge Permit. (as updated).

Barcelona, Michael J. and Robert W. Puls. Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures. EPA Groundwater Issue. EPA/540/S-95/504. April 1996.

Century Engineering, Inc. Millersville Sanitary Landfill Operational Plans. July 1975

Code of Federal Regulations. Part 136 and 258. 2018.

Code of Maryland Regulations. Title 26. 2018.

Enthalpy Analytical. Field Sampling Guidelines. Version 9. 2018.

Environmental Resources Management, Inc. Assessment of Corrective Measures (ACM) for the Millersville Landfill and Resource Recovery Facility in Accordance with 40 CFR Part 258.56. May 2012.

Environmental Resources Management, Inc. Monitoring Plan for the Subcell 8.8 Underdrain at the Millersville Landfill and Resource Recovery Facility. May 2005.

Environmental Resources Management, Inc. Northern Boundary Update Report for the Anne Arundel County Millersville Landfill and Resource Recovery Facility. July 2001.

Environmental Resources Management, Inc. Final Groundwater Evaluation for the Eastern Boundary, and Assessment and Selection of Corrective Measures for the Anne Arundel County Millersville Landfill and Resource Recovery Facility. November 2002.

Environmental Resources Management, Inc. Environmental Monitoring Plan Update. November 2009.

Fetter, C. W. "Chapter 7 Ground-Water Flow to Wells." Applied Hydrogeology. 3rd ed. New York: Macmillan College, 1994.

GeoSyntec Consultants (formerly GeoServices Inc. Consulting Engineers). Millersville Sanitary Landfill Water Well Survey. March 1990(b).

GeoSyntec Consultants. Millersville Sanitary Landfill North Property Boundary Ground-Water Study Report. November 1992(c).

Mack, F.K. Ground-Water Supplies for Industrial and Urban Development in Anne Arundel County. Bulletin No. 26, Maryland Department of Natural Resources, Department of Geology, Mines, and Water Resources. 1962, 90p.

Maryland Department of the Environment. Anne Arundel County Department of Public Works Millersville Municipal Landfill and Resource Recovery Facility Refuse Disposal Permit No. 2022-WMF-0240. November 2022.

Maryland Department of the Environment. Millersville Landfill & Resource Recovery Facility General Permit for Discharge from Stormwater Associated with Industrial Activities Discharge Permit No. 20-SW NPDES No. MDR001304. August 2023.

Maryland Department of the Environment. Solid Waste Program. Investigation and Remediation Section. A Checklist for Environmental Monitoring Plan (EMP) for Landfills in MD. May 13, 2024.

Maryland Department of the Environment Waste Management Administration. Specifications for the Design and Construction of Groundwater Monitoring Wells at Solid Waste Disposal Facilities. Updated 2/25/03.

SCS Engineers. Environmental Monitoring Plan Update. September 2018

SCS Engineers. Groundwater Investigation Report. April 2017.

Stearns & Wheler. Eastern Boundary Groundwater Investigation. January 1995 (Revised April 1995).

United States Environmental Protection Agency. Guidance for Data Usability in Risk Assessment (Part A-14). April 1992.

United States. Environmental Protection Agency. Office of Resource Conservation and Recovery. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance. R-09-007 ed. Vol. EPA 530. March 2009.

United States. Environmental Protection Agency. Office of Solid Waste. RCRA Groundwater Monitoring: Draft Technical Guidance. November 1992.

United States. Environmental Protection Agency. Quality Assurance Unit Environmental Protection Agency Region 1. Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells. EQASOP-GW 001. Revised January 19, 2010.

United States Environmental Protection Agency. Office of Superfund Remediation and Technology Innovation. National Functional Guidelines for Inorganic Superfund Methods Data Review. November 2020.

United States Environmental Protection Agency. Office of Superfund Remediation and Technology Innovation. National Functional Guidelines for Organic Superfund Methods Data Review. November 2020.

United States. Environmental Protection Agency. Region 4. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual. November 2001.

United States. Environmental Protection Agency. Solid Waste and Emergency Response. Solid Waste Disposal Facility Criteria, Technical Manual. EPA 530-R-93-017. November 1993.

United States. Environmental Protection Agency. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods Compendium (SW-846). July 2014.

Yeskis, Douglas and Bemard Zavala. Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers. EPA Ground Water Forum Issue Paper. EPA 542-S-02-001. May 2002.

Figures

1. Topographic Quadrangle Map
2. Geologic Map of Anne Arundel County
3. Site Map
4. Zone 3 Groundwater Contour Map – May 2024
5. Groundwater Well and Surface Water Monitoring Location Map
6. Landfill Gas Monitoring Location Map
7. Stormwater Monitoring Location Map

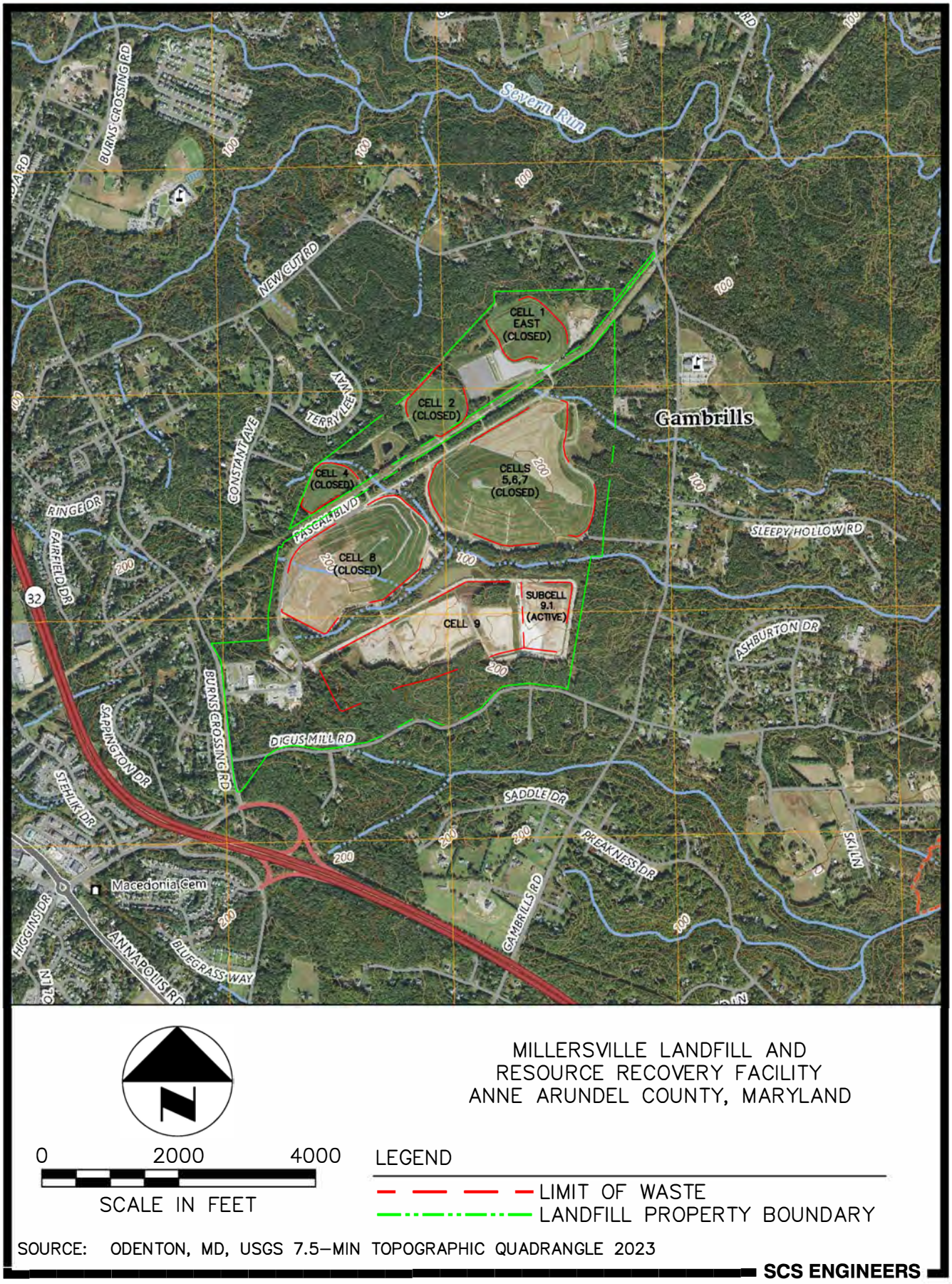


FIGURE 1 - TOPOGRAPHIC QUADRANGLE MAP

Figure 2. Geologic Map of Anne Arundel County

STATE OF MARYLAND

MARYLAND GEOLOGICAL SURVEY
KENNETH N. WEAVER, DIRECTOR

GEOLOGIC MAP OF ANNE ARUNDEL COUNTY

By

John D. Glaser

1976

Scale 1:62500
1 0 1 2 3 4 Miles
1/2 0 1 2 3 4 5 Kilometers

Numbered ticks indicate the 10,000 foot Maryland State Grid
The last three digits of the grid numbers are omitted
Datum is mean sea level

INDEX OF MARYLAND COUNTIES

THE JOHNS HOPKINS HOSPITAL
LIBRARY
MAR 18 1991
MAP COLLECTION

SITE

EXPLANATION

QUATERNARY — HOLOCENE

af — Artificial Fill

Heterogeneous unstratified materials including sand, gravel, clay, slag, construction debris, and dredge spoil. Only major fill areas have been mapped, most of these adjacent to the shoreline.

Qal — Alluvium

Interbedded sand, silt-clay, and subordinate gravel. Alluvium comprises very heterogeneous sediments with poorly-sorted muddy sand and silt the dominant lithologies. Organic matter, including leaves, branches, and logs, is a common component. In places, thin peats occur. Color generally tan, brown, or gray, depending upon amount of organic debris and dark minerals such as glauconite. Dark-gray organic muds are prevalent in tidal marsh areas. Beach sands are generally well-sorted, fine to medium-grained pale quartzose sands, in places quartz-glauconite sands.

Qal underlies the flood plains of rivers and streams as well as tidal marsh areas along the Bay and its estuaries. Much of this sediment is soft and water-saturated due to perennially high water-table levels. The composition of the alluvium in a given stream valley reflects the source materials; thus, alluvial sand tends to be glauconitic where the depositing stream heads in one of the greensand units such as the Aquia or Nanjemoy Formations. Similarly, gravel in the floodplain deposits of large streams like the Patapsco and Patuxent Rivers, which head in the Piedmont, may be compositionally diverse and contain clasts of crystalline rock, chiefly mafic. Tidal marsh areas are best developed along the Bay shoreline in the southern third of the County, as are localized sandy beaches. All of the sediments mapped as Qal are of relatively recent origin, most of them deposited within the past 10,000 yrs.

Thickness 3-15 feet.

Qta — Talbot Formation

Interbedded sand, silt, and clay; lower portion contains pebbly sand or gravel in places. Sand in the Talbot Formation is generally clayey or silty, poorly-sorted, and commonly contains glauconite in areas south of the Severn River. Color mostly pale-gray, tan or buff, varying to dark-gray where rich in organic matter. In places, thin peat beds occur, as do black, highly organic clays rich in plant debris, including fossil cypress stumps.

The Talbot Formation underlies low flat areas bordering the Bay and the shores of the larger estuaries, most of these at 20 ft, or less in elevation but rising to 80 ft, in places along their inner margins. The tip of Broad Neck and the wide lowland between West River and Herring Bay are the most extensive of these areas. Much of the Talbot is a graded sequence with the coarser materials concentrated in the basal portion and an upper silt-clay unit. The silt-clay unit provides the surficial sediment over most of the Talbot lowlands bordering the Bay. Drainage is poor and in places swampy conditions prevail. Good outcrops of the Talbot are scarce. In recent years, widespread shoreline protection by bulkheads, revetments, and the like has effectively eliminated excellent exposures formerly visible at Bodkin Point, Gibson Island, Greenbury Point, and Bay Ridge. Radiocarbon dating of organic materials contained in the Talbot in Harford County indicates a minimum age of 35,000 yrs. Moreover, the composition of the fossil flora suggest deposition during interglacial conditions; thus the Talbot is probably Sangamonian or older, perhaps mid-Pleistocene in age.

Thickness 3-35 feet.

Qtp — Patuxent River Terraces

Interbedded sand and gravel; lesser amounts of silt-clay; gravel concentrated in lower portion. Gravel predominantly quartzose but containing cobbles and boulders of mostly mafic rock; boulders may reach 4 ft. in diameter. Sediment color tan, brown, gray, or mottled. Limonite-cemented conglomerate ledges locally common. Sand glauconitic in places. Silt-clay beds thin and discontinuous. Dark-gray, organic silt-clay rare. Sand predominantly clean, fairly well-sorted, but becoming clayey in upper portions of terraces.

The Patuxent River terrace deposits vary considerably in thickness from place to place along the river valley, but in general, maximum thicknesses are attained in the lower terraces close to the river and thinning occurs in the direction of the valley wall. The average thickness is close to 25 ft. Gravel amounts decline downstream as does average pebble size. Sand and gravel beds generally exhibit cross-bedding or parallel bedding and are only rarely massive. Plant and insect fossils have been found at several points in the terraces, notably near Conaways and southeast of Hardesty in Prince Georges County. At present, the Patuxent River terrace deposits are the single most important source of construction sand and gravel in the County. In the absence of diagnostic fossils, the exact time of terrace deposition is not known; they are doubtless Pleistocene and perhaps as old as Sangamonian.

Thickness 3-60 feet.

Qt — Terrace Deposits

Interbedded sand, gravel, and silt-clay. Heterogeneous materials including quartz gravel; quartz gravel with crystalline rock clasts; well-sorted to poorly-sorted quartz and glauconitic sand, clayey sand, and pebbly sand; and subordinate amounts of silt-clay. Bedding chiefly lenticular or massive. Color tan, buff, gray, or reddish-brown.

The major deposits mapped as Qt include extensive areas of medium to coarse sand, pebbly sand, and gravel along the south wall of the Patapsco River Valley and on adjacent uplands to 200 ft, in elevation. These ancient river sediments reach 45 ft, in thickness in places, and are predominantly coarse with isolated boulders of both quartzose and mafic country rock. The terrace remnants between 40 and 80 ft, in elevation above the inner Talbot margin on Broad Neck are mostly medium to coarse grained and containing cobbles and boulders of Appalachian sandstones and siltstones as well as various crystalline rock types. Fine sand and mottled silt-clay make up the uppermost portions of the Terrace Deposits. The terraces on Broad Neck and probably the isolated remnant capping the hill just east of Fresh Pond were very likely deposited by the ancestral Susquehanna River during a high sea-level episode of the Pleistocene. The remaining deposits mapped under Qt comprise a number of small terraces flanking minor streams in the County. The most extensive of these are associated with Lyons Creek and Stockett's Run.

Thickness 3-40 feet.

Tb — Brandywine Formation

Sand, pebbly sand, and gravel, capped in places by several feet of sandy loam. Sand moderately well-sorted, medium to coarse-grained, but interbedded with clayey sand. Pebbles wholly quartzose, maximum 6 in, in diameter, Color tan to orange-brown, carying to reddish-brown where permeated with limonite,

The Brandywine has an extremely limited distribution in Anne Arundel County, capping several narrow ridge crests in the southernmost portion of the area and two isolated hilltops a few miles to the north. The thickest section (approx. 40 ft.) in the County underlies the crest of Mariott Hill near Harwood. Based on degree of weathering and topographic position, the Brandywine is generally accorded a Pliocene age, but since diagnostic fossils have not been found, the age of the unit remains uncertain,

Thickness 3-40 feet.

TERTIARY — PLIOCENE

TERTIARY — MIOCENE

Tc — Calvert Formation

Chiefly fine-grained sand, silt, and diatomaceous silt. Basal beds contain much poorly-sorted medium sand overlain by a 3-to 10-ft. bed of highly diatomaceous silt. Exceptionally, as in Fairhaven Bluffs, the diatomaceous bed thickens to as much as 40 ft. The upper beds of the Calvert consist of variably clayey, very fine to fine-grained quartz sand and silt. Color olive-green to olive-brown where unweathered, fading to pale-brown or dirty buff in weathered outcrops. Bedding massive with abundant burrow-mottling; impressions of mollusks common.

The Calvert Formation crops out at the surface over a large portion of the County, nearly the entire southern third, yet good exposures are not common. The best exposure is Fairhaven Bluffs on the Bay where about 30 ft. of the lower Calvert can be seen. Most of the Calvert seen in Anne Arundel County belongs to the Fairhaven Member, probably a restricted marine basin deposit, of early middle Miocene age.

Thickness 3-150 feet.

TERTIARY — EOCENE

Tn — Nanjemoy Formation

Glauconitic sand, silt, and silty clay. Sand fine to medium-grained, clayey, poorly-sorted, and containing variable amounts of glauconite (up to 50% of sediment). Beds or lenses of dark-gray silty clay are interbedded with the more typical sand. Color dark greenish-gray to bluish-green where unweathered, pale-brown or mottled brown and yellow in weathered outcrops. Bedding massive or thick-bedded with conspicuous burrow-mottling. Molluscan fossils, chiefly Venericardia, common in places,

Exposures of the Nanjemoy Formation can most commonly be seen in the area lying between the South and the Rhode Rivers, and in a number of tributaries to the Patuxent River in the southern portion of the County. The sands tend to coarsen upward through the section with a parallel increase in sorting due to declining amounts of silt-clay. The upper Nanjemoy contains numerous thin lenses of pale-brown clay which are conspicuously riddled with burrows. Fossils are relatively common throughout, and in places are concentrated in thick shell beds composed almost entirely of the thick-shelled clam, Venericardia potapacoensis. Lithology, texture, and fauna indicate that the Nanjemoy Formation originated on the marginal shelf in relatively shallow water. It is middle-Eocene (Nanjemoy glauconites have been dated at 47,6 ± 1,8 m.y.) and probably correlative with the late Wilcox-early Claiborne rocks of the Gulf Coast section.

Thickness 3-100 feet.

Tm — Marlboro Clay

Plastic clay with silt partings and minor lenses. Clay finely-laminated, or thick-bedded to massive; silt massive, laminated, or rarely, ripple cross-laminated. Upper portion of clay laced with cylindrical burrows filled with glauconitic sand. Clay color silvery-gray in uppermost and lowermost several feet of unit, pale-red to reddish-brown in middle portion. Silt buff or dirty white, micaceous. Macrofauna rare, limited to tiny mollusks, mostly in gray clay.

The Marlboro Clay is poorly exposed in Anne Arundel County because it is thin and readily covered by slumped overlying sediments. Outcrops are most numerous in the vicinity of the South River, particularly on the south side. The upper and lower contacts are sharp, but the upper is much disrupted by burrows. Soils developed on the Marlboro are thin and commonly contain abundant small flat clay chips. The precise depositional environment of the Marlboro is uncertain; the bulk of the faunal evidence and the sedimentary structures indicate very shallow water, perhaps an intertidal mud flat environment. The Marlboro is lower Eocene, probably of Sabine age.

Thickness 2-20 feet.

Ta — Aquia Formation

Glauconitic sand, clean to moderately clayey, and calcareous sandstone. Well-sorted, medium-grained sand dominant but fine or coarse-grained in places. Color dark gray-green or olive-green where unweathered, "salt and pepper" sand where moderately weathered, and rusty brown with abundant limonite crusts and pods where deeply weathered. Bedding massive or thick-bedded with abundant burrow mottling. Highly fossiliferous in places with large oysters and Turritella dominant. Glauconite proportions variable, rarely exceeding 50% of the sediment.

The Aquia is at the surface over a considerable portion of the mid-County including most of Broad and South Necks. Outcrops are numerous and spectacular in bluffs facing the lower Severn and South Rivers where as much as 80 ft. of Aquia is exposed in continuous section. Much of the Aquia, particularly in the northeastern part of the outcrop belt, is deeply weathered (to depths as great as 70 ft.) to a limonitic rusty sand in which considerable glauconite has been oxidized and shells leached. Boulders and blocks of reddish-brown sandstone are abundant in the soil zone and litter the surface in spots. Below the South River, beds or pods of shelly calcareous sandstone up to 5 ft. thick are common. The Aquia sands accumulated in very shallow marine waters on the inner shelf and record a regressive cycle. K-Ar dates obtained from Aquia glauconite samples in nearby Prince Georges County indicate ages of 56,7 + 2,2 m.y. for the basal sands and 51,9 + 2,0 m.y. for the top of the unit; thus deposition straddled the Paleocene-Eocene boundary.

Thickness 3-180 feet.

PALEOCENE

Brightseat Formation

Sand, variably clayey, predominantly fine-grained, poorly-sorted, variably glauconitic. Color dark gray to dark greenish-gray where fresh, pale-gray to tan in weathered outcrops. In places, the basal Brightseat contains some medium to coarse sand with granules, small pebbles, phosphatic clasts, and scattered fish teeth. The proportions of glauconite in the unit range up to 25%, but are generally much less; molluscan casts are present but uncommon.

The Brightseat is lithologically similar to the overlying lower Aquia Formation, and in most areas, the contact is gradational, marked by coarsening of the sand and an increase in glauconite content. Consequently, the two units are only separable where mapped in considerable detail, a condition not met over most of the County; thus they are here mapped together. Good outcrops of the Brightseat can be seen in the banks of several small streams tributary to the Patuxent River southwest of Staples Corner, and in the Round Bay area of the Severn River. The Brightseat is thought to have accumulated on the inner sublittoral shelf during early Paleocene time.

Thickness 3-65 feet.

CRETACEOUS — UPPER CRETACEOUS

Kmo — Monmouth Formation
Matawan Formation

Sand, very fine to fine-grained, poorly to moderately well-sorted, variably glauconitic; and micaceous clayey silt. Color dark gray to olive-black where fresh, buff to pinkish-gray in weathered outcrops. Generally thick-bedded to massive with abundant burrow mottling; molds and casts of shells common in places. Large (to 6 ft. diam.) lobate or ellipsoidal siderite concretions present in upper part of section.

The Matawan and Monmouth Formations are lithologically similar and not readily separable in the outcrop; thus they are here indicated by a single map pattern. Further work may show, that for all practical purposes, a single unit only is mappable over most of the County. The best exposures occur in the North River Valley, along Bacon Ridge Branch and its tributaries, on the Severn in the vicinity of Round Bay, and along the north shore of the Magothy east to Gibson Island. The basal unit (Matawan), in disconformable contact with the underlying Magothy Fm., is 6 to 12 ft. of poorly-sorted, fine to medium-grained quartz sand with admixed coarse sand and granules. This is succeeded by a similar thickness of heavily glauconitic (as much as 50%) clayey sand, overlain by as much as 45 ft. of fine clayey quartz sand and dense clayey silt (Monmouth). The combined Matawan-Monmouth unit in Anne Arundel County is of latest Cretaceous age (Upper Campanian thru Maestrichtian). Lithologic packaging, texture, and mineralogy point to the continental shelf as the site of deposition for these sediments.

Thickness 3-55 feet.

Km — Magothy Formation

Sand, fine to coarse-grained, interstratified with silt-clay and subordinate pebbly sand or gravel. Quartz sand predominant (80% or more of unit), mostly fine to medium-grained, well-sorted to very muddy, lignitic in some beds, commonly sugary in appearance. Cross-bedded, laminated, lenticular, or rarely massive and thick-bedded. Color white to pale-gray. Sand interbedded, particularly northeast of the Severn River, with closely-interlaminated dark gray silt-clay and very fine sand or silt, dense chocolate or dark gray clay, or massive, dark gray silt-clay with abundant carbonaceous debris. Pyrite aggregates common in silt-clay. Updip exposures of the Magothy show considerable fine to medium gravel, pebbly sand, and coarse sand, with ferruginous staining and partial cementation. Silt-clay beds in the Magothy have yielded a diverse paleoflora with angiosperms dominant. Faunal remains have not been found in Anne Arundel County; however, a poorly-preserved molluscan assemblage was collected in gray Magothy silt in adjacent Prince Georges County (Bowie Landfill).

The Magothy Formation appears at the surface in a dissected belt which crosses northern Anne Arundel County from the vicinity of Pinehurst southwest to the Patuxent River. In general, the unit is about 60 ft, thick in outcrop and thickens downdip to 150 ft. in the vicinity of Annapolis. Good exposures are not numerous; partial sections can be seen at Fresh Pond, along the north shore of the Magothy at Broad Creek and North Ferry Point, on the Severn northwest of Round Bay, and in several sand-gravel pits on Towsers Branch near Conaways. The letter exposures are particularly revealing of the updip fluvial facies of the Magothy. Ferruginous cementation is common in this facies, and large blocks of ironstone conglomerate litter the outcrop southeast of Odenton, a few miles west of Elvaston. In addition to fluvial sedimentation, the Magothy Formation records a complex of shoreline environments including coastal lagoon, tidal channel, and shoreface. The age of the Magothy is currently thought to be Santonian (Late Cretaceous), based on pollen assemblages.

Thickness 3-150 feet.

LOWER CRETACEOUS

Kps — Sand-gravel facies
Kpc — Silt-clay facies

Potomac Group

Sand-gravel facies

Interbedded quartz sand, pebbly sand, gravel, and subordinate silt-clay. Sand wholly quartzose, fine to coarse-grained, poorly to well-sorted, clean to very muddy. Color white, buff, red-brown, to vari-colored. Pebbles chiefly vein quartz and quartzite with some sandstone and chert interstratified with much subordinate white, buff, gray, or red silt-clay in thin lenticular beds. Sand-gravel cross-bedded or flat-bedded, rarely massive. Fining-upward cycles common. Silt-clay lenses massive or rarely laminated. Ferruginous concretions and limonite-cemented pods or ledges common.

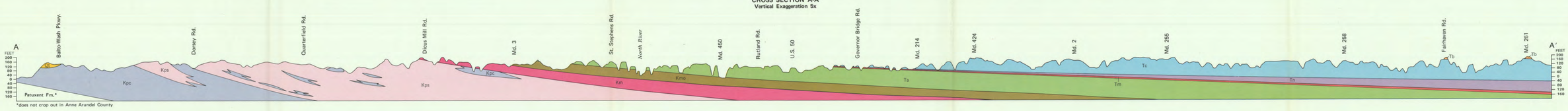
Silt-clay facies

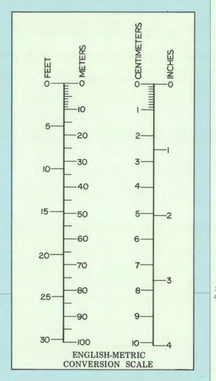
Clay, silt, and subordinate fine to medium-grained muddy sand. Color red, tan, gray, buff, or mottled. Silt-clay generally massive and thick-bedded, compact and "tough"; includes sandy clay, laminated silt-clay, and nearly pure, plastic, kaolinitic clay. Sand lenses typically composed of poorly-sorted quartz sand with much interstitial silt-clay; sand cross-bedded, flat-bedded, or massive. Pebbly in places. Anastomosing ironstone layers and siderite concretions common,

The outcrop belt of the Potomac Group occupies nearly the entire northern third of Anne Arundel County, and exposures are numerous in road and railway cuts, construction excavations, and stream banks. As here mapped, two lithologic units are recognized: the sand-gravel facies and the silt-clay facies. Couched in terms of the classical Potomac Group stratigraphy, the sand-gravel facies encompasses sandy portions of the Patapsco Formation whereas the silt-clay facies includes both the Arundel Clay and silt-clay in the Patapsco. The present map units were adopted when separation of the Arundel and Patapsco clays proved impractical at the map scale utilized, and secondarily, to facilitate lithologic subdivision of the Patapsco. Previous geologic maps of the County show stream valleys along the Anne Arundel-Howard County boundary occupied by the Patuxent Formation, the lowest unit of the Potomac Group. However, these areas are actually blanketed by Quaternary Alluvium or Terrace Deposits, and are so mapped. Typical Arundel Clay is comprised of "tough" dark-gray to maroon clay; such clays can be seen at a number of localities within the belt of silt-clay facies paralleling the northwestern border of the County. Passing eastward and upsection, Potomac Clay is predominantly red, buff, or red-gray mottled, and contains considerable sand and silt. Moreover, it is frequently interbedded with or grades laterally into lenticular bodies of fine-grained muddy sand. The upper beds of the Potomac Group are primarily sand and minor gravel with thin lenses of white or pale-gray clay. Gravel is always a minor component in the Potomac Group section of the County and is concentrated in the lower portion of the unit. At several places in the upper Potomac sands, notably at Lipins Corner, Elvaston, and Sunnyside School, concentrations of large, opaline-cemented quartzite blocks occur in the soil zone. Based on heavy-mineral assemblages and textural parameters, the blocks appear to be relics from the eroded Magothy Formation and may record a selectively-lithified Magothy shoreline sand. Fossils in the Potomac Group of Anne Arundel County are limited to plant remains (lignitized stems and twigs, leaf and frond impressions, pollen, etc.) and extremely rare dinosaur bones. Pollen zonation by several workers agrees in assigning a mid-early Cretaceous (Aptian-Albian) age to the Potomac Group outcropping in the County. The sediments were deposited in a complex of river floodplain-back swamp environments.

Thickness 50-1600 feet.

CROSS SECTION A-A'
Vertical Exaggeration 5x





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1976

Williams & Heintz Map Corporation, Washington, D.C. 20027

0 700 1400

SCALE IN FEET

LEGEND

TOPOGRAPHIC CONTOUR (FT, AMSL)
LIMIT OF WASTE
LANDFILL PROPERTY BOUNDARY

FT, AMSL = FEET, ABOVE MEAN SEA LEVEL

NOTES:

1. BASE MAP OBTAINED FROM BAI GROUP, INC.
2. TOPOGRAPHY WS PREPARED BY PHOTOGRAMETRIC SURVEY IN JANUARY 2024.
3. SURVEY BASED ON MARYLAND NAD 1927 (HORIZONTAL DATUM) AND NAVD 1929 (VERTICAL DATUM).

CELL 1 EAST (CLOSED)
COMPOSTING PAD
CELL 2 (CLOSED)
TERRY LEE WAY
CELL 4 (CLOSED)
LFGE FACILITY
CELLS 5,6,7 (CLOSED)
SUBCELL 8.2
SUBCELL 8.4
SUBCELL 8.1
SUBCELL 8.6
CELL 8 (CLOSED)
SUBCELL 8.3
SUBCELL 8.8
SUBCELL 8.5
SUBCELL 8.7
WELL'S BRANCH
STORMWATER POND
SUBCELL 9.2 (ACTIVE)
SUBCELL 9.1 (ACTIVE)
SUBCELL 9.3 (FUTURE)
CELL 9 (ACTIVE)
SUBCELL 9.4 (FUTURE)
SUBCELL 9.5 (FUTURE)
LEACHATE STORAGE TANKS
LEACHATE PRETREATMENT PLANT
CENTRAL RECYCLING CENTER
VICOLI CT
MONTECRISTO CT
PAPER RECOVERY FACILITY
SCALEHOUSE
MAINTENANCE BUILDING
WAREHOUSE
BURNS CROSSING ROAD
ADMINISTRATIVE OFFICE
ROMEO LN
PICUS MILL ROAD
UNNAMED TRIBUTARY OF JABEZ BRANCH
GAMBRILLS ROAD
MUSTANG COURT
KS COURTON
ANTRIM CT
FERONIA CT
ALGONK CT
VISTA DR

NO.	REVISION	DATE

SHEET TITLE: SITE MAP

PROJECT TITLE: ENVIRONMENTAL MONITORING PLAN

CLIENT: MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
ANNE ARUNDEL COUNTY
MILLERSVILLE, MARYLAND

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
11260 ROGER BACON DRIVE - RESTON, VA 20190
PH. (703) 471-6150 FAX: (703) 471-6676

PROJ. NO. 02211047
DES. BY:
DRN. BY: LAH
CHK. BY: JSR
QA/QC BY:
APP. BY:

CADD FILE:

DATE: 12/05/24

SCALE: AS SHOWN

DRAWING NO. 3 of 7

G:\VA\02211047 AA Millersville LF GW\FIGURES\EMP\2024\3 – Site Map.dwg

LEGEND

- TOPOGRAPHIC CONTOUR (FT, AMSL)
- LIMIT OF WASTE
- LANDFILL PROPERTY BOUNDARY

- COMAR BACKGROUND WELL
- COMAR COMPLIANCE WELL
- SUBTITLE D BACKGROUND WELL
- SUBTITLE D COMPLIANCE WELL
- EASTERN BOUNDARY ZONE 3 ANNUAL MONITORING WELL
- EASTERN BOUNDARY ZONE 3 SEMI-ANNUAL MONITORING WELL
- SOUTHERN BOUNDARY ZONE 3 DRINKING WATER SUPPLY WELL
- SOUTHERN BOUNDARY ZONE 3 MONITORING WELL
- ADDITIONAL ZONE 3 MONITORING WELL

- 96.14 GROUNDWATER CONTOUR (FT, AMSL)
- 80 GROUNDWATER ELEVATION (FT, AMSL)
- GROUNDWATER FLOW DIRECTION

FT, AMSL = FEET, ABOVE MEAN SEA LEVEL

NOTES:

1. BASE MAP OBTAINED FROM BAI GROUP, INC.
2. TOPOGRAPHY WAS PREPARED BY PHOTOGRAMETRIC SURVEY IN JANUARY 2024.
3. SURVEY BASED ON MARYLAND NAD 1927 (HORIZONTAL DATUM) AND NAVD 1929 (VERTICAL DATUM).
4. GROUNDWATER CONTOURS WERE GENERATED USING THE SURFER SURFACE MAPPING SYSTEM SOFTWARE VIA THE KRIGING GRIDDING METHOD AND ALTERED UTILIZING PROFESSIONAL JUDGEMENT.
5. THE GROUNDWATER ELEVATIONS FROM RW-P440, TW-4B, TW-5A, TW-7A, TW-8A, TW-9C, TW-10A, TW-14A, TW-15A, TW-17, TW-22A, TW-22B, TW-24A, TW-25A, AND TW-N WERE NOT UTILIZED IN THE GENERATION OF THE GROUNDWATER CONTOURS.

0 800 1600

SCALE IN FEET

Q:\V\02211047 AA Millersville LF GW\FIGURES\EMP\2024\4 - Zone 3 GWCont Map.dwg

CELL 1 EAST (CLOSED)
CELL 2 (CLOSED)
CELL 3 (CLOSED)
CELL 4 (CLOSED)
CELL 5,6,7 (CLOSED)
CELL 8 (CLOSED)
CELL 9 (ACTIVE)
COMPOSTING PAD
SUBCELL 8.1
SUBCELL 8.2
SUBCELL 8.3
SUBCELL 8.4
SUBCELL 8.5
SUBCELL 8.6
SUBCELL 8.7
SUBCELL 9.1 (ACTIVE)
SUBCELL 9.2 (ACTIVE)
SUBCELL 9.3 (FUTURE)
SUBCELL 9.4 (FUTURE)
SUBCELL 9.5 (FUTURE)
WELL'S BRANCH
UNNAMED TRIBUTARY OF JABEZ BRANCH
CENTRAL RECYCLING CENTER
LEACHATE STORAGE TANKS
LEACHATE PRETREATMENT PLANT
PAPER RECOVERY FACILITY
SCALEHOUSE
MAINTENANCE BUILDING
WAREHOUSE
ADMINISTRATIVE OFFICE
BENFIELD ROAD
BURNS CROSSING ROAD
CRAIN HIGHWAY
VICOLI CT
ROMEO LN
VICOLI HILL ROAD
BENFIELD ROAD
MUSTANG COURT
COLTSFOOT COURT
SUDLEY MANOR DR
ASHBURTON DR
ANTRIM DR
VERONA CT
VISTA DR
TOWNSHIP ROAD
MUSTANG COURT
SUDLEY MANOR DR
ASHBURTON DR
ANTRIM DR
VERONA CT
VISTA DR

NO.	REVISION	DATE

SHEET TITLE: ZONE 3 GROUNDWATER CONTOUR MAP - MAY 2024

PROJECT TITLE: ENVIRONMENTAL MONITORING PLAN

CLIENT: MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
ANNE ARUNDEL COUNTY
MILLERSVILLE, MARYLAND

SCS ENGINEERS
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PROJ. NO. 02211047 | DSN. BY: | DWN. BY: AH | CHK. BY: JSR | D/A RVW BY: | PRF. BY:

CADD FILE:

DATE: 01/16/25

SCALE: AS SHOWN

DRAWING NO. 4 of 7

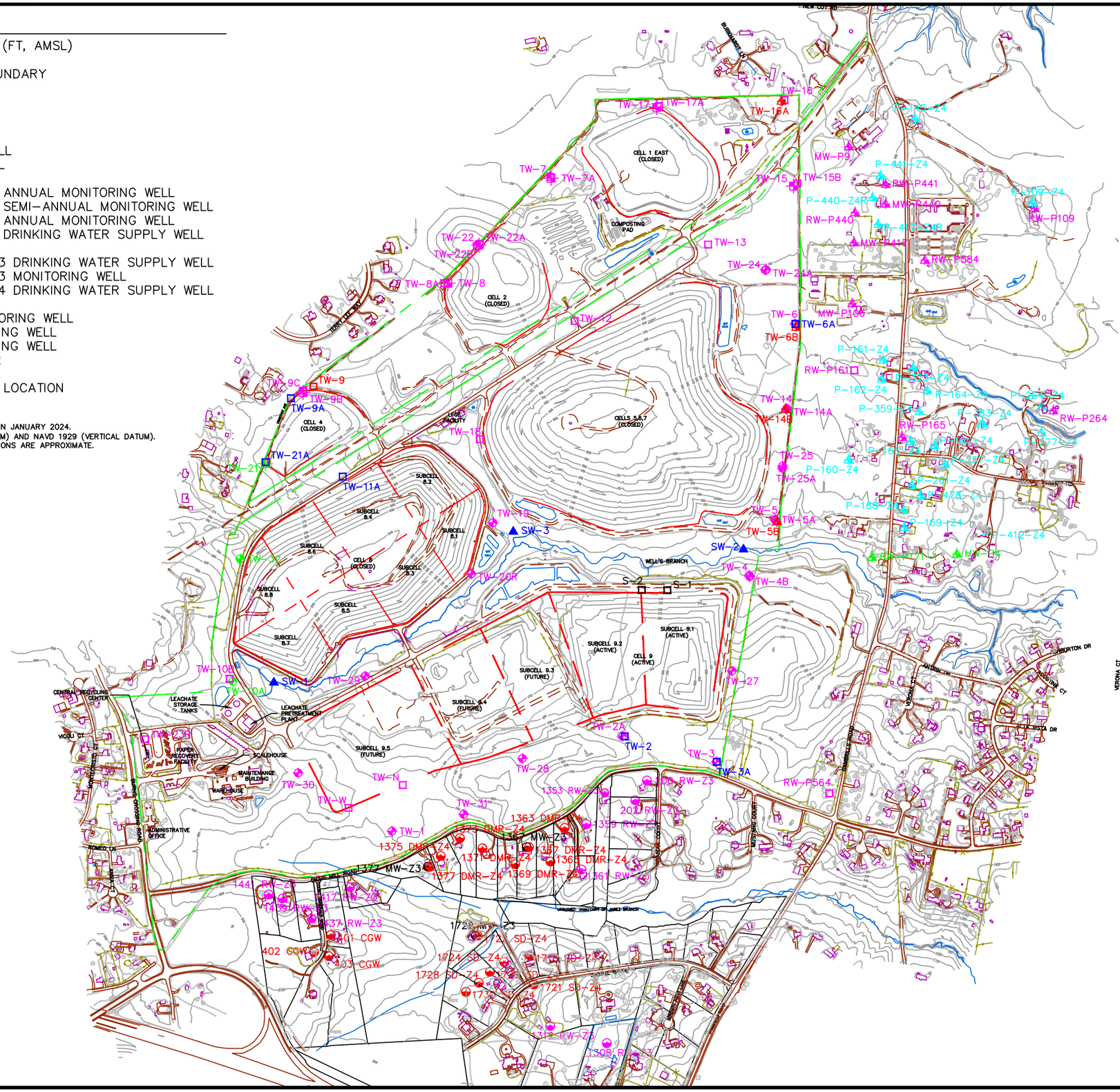
LEGEND

- TOPOGRAPHIC CONTOUR (FT, AMSL)
- LIMIT OF WASTE
- LANDFILL PROPERTY BOUNDARY

- COMAR BACKGROUND WELL
- COMAR COMPLIANCE WELL
- SUBTITLE D BACKGROUND WELL
- SUBTITLE D COMPLIANCE WELL
- EASTERN BOUNDARY ZONE 3 ANNUAL MONITORING WELL
- EASTERN BOUNDARY ZONE 3 SEMI-ANNUAL MONITORING WELL
- EASTERN BOUNDARY ZONE 4 ANNUAL MONITORING WELL
- EASTERN BOUNDARY ZONE 4 DRINKING WATER SUPPLY WELL
- SOUTHERN BOUNDARY ZONE 3 DRINKING WATER SUPPLY WELL
- SOUTHERN BOUNDARY ZONE 3 MONITORING WELL
- SOUTHERN BOUNDARY ZONE 4 DRINKING WATER SUPPLY WELL
- ADDITIONAL ZONE 1&2 MONITORING WELL
- ADDITIONAL ZONE 3 MONITORING WELL
- ADDITIONAL ZONE 4 MONITORING WELL
- SENTRY WELL – SUBCELL 9.2
- SURFACE WATER MONITORING LOCATION

FT, AMSL = FEET, ABOVE MEAN SEA LEVEL

NOTES:
1. BASE MAP OBTAINED FROM BAI GROUP, INC.
2. TOPOGRAPHY WAS PREPARED BY PHOTOGRAMETRIC SURVEY IN JANUARY 2024.
3. SURVEY BASED ON MARYLAND NAD 1927 (HORIZONTAL DATUM) AND NAVD 1929 (VERTICAL DATUM).
4. SOUTHERN BOUNDARY DRINKING WATER SUPPLY WELL LOCATIONS ARE APPROXIMATE.



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SCALE IN FEET

Q:\F\0221047 AA Millersville LF GW\FIGURES\EMP\2024\5 - GW-Surface Water Map.dwg

NO.	REVISION	DATE

SHEET TITLE: GROUNDWATER WELL AND SURFACE WATER MONITORING LOCATION MAP

PROJECT TITLE: ENVIRONMENTAL MONITORING PLAN

CLIENT: MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
ANNE ARUNDEL COUNTY
MILLERSVILLE, MARYLAND

SCS ENGINEERS
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PROJ. NO. 02211047.18 | DWN. BY: LAH | QA/QC BY: | APP. BY:
DSN. BY: | CHK. BY: JSR

CADD FILE: GW-SW

DATE: 01/23/25

SCALE: AS SHOWN

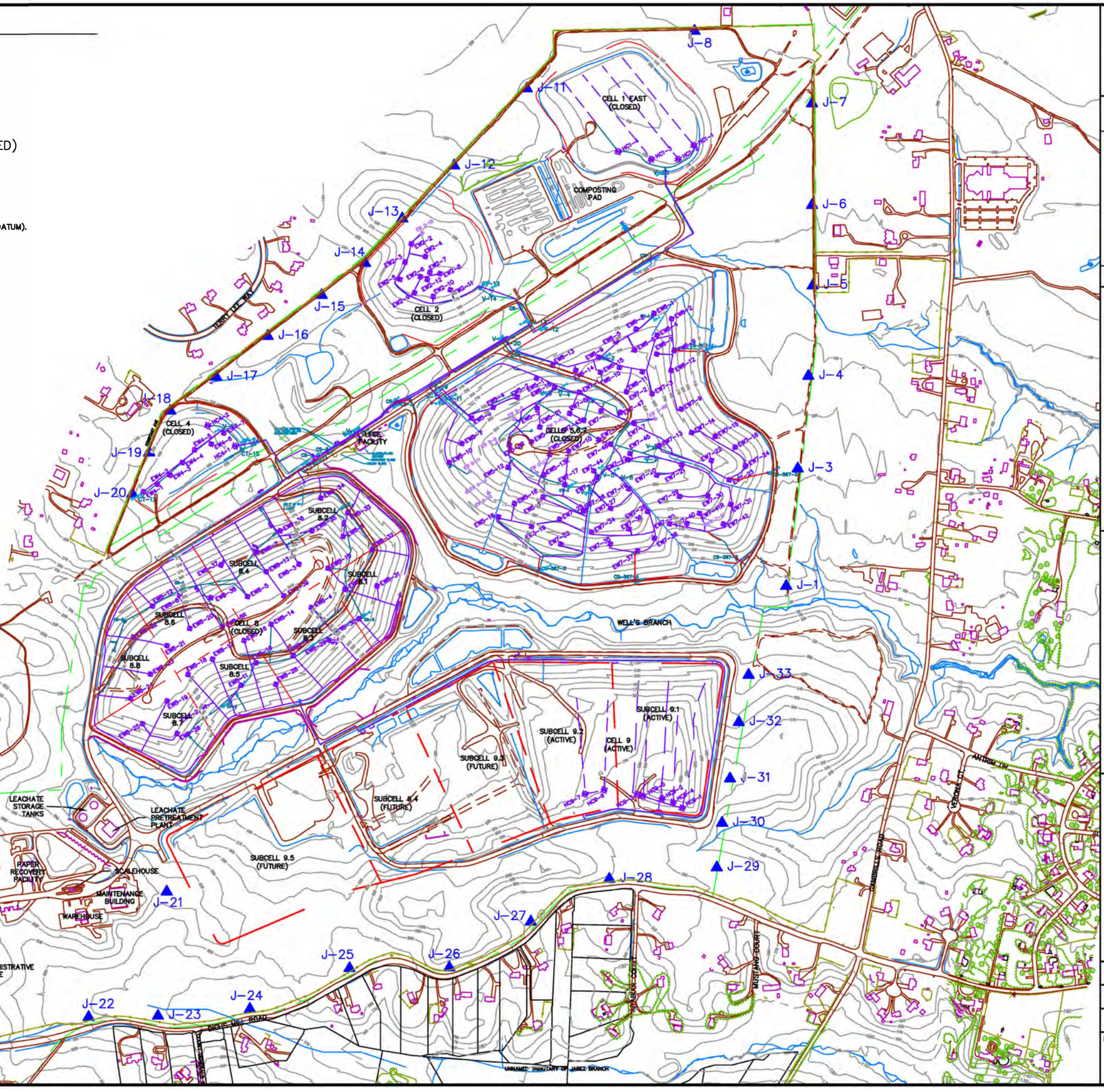
DRAWING NO. 5 of 7

LEGEND

- TOPOGRAPHIC CONTOUR (FT, AMSL)
- LIMIT OF WASTE
- LANDFILL PROPERTY BOUNDARY
- LANDFILL GAS MONITORING PROBE
- LANDFILL GAS EXTRACTION WELL
- LANDFILL GAS EXTRACTION WELL (DECOMMISSIONED)
- LANDFILL GAS HORIZONTAL COLLECTOR

FT, AMSL = FEET, ABOVE MEAN SEA LEVEL

NOTES:
1. BASE MAP BASED ON RECORD DRAWINGS FROM BAI GROUP, INC. AND SCS ENGINEERS.
2. TOPOGRAPHY IS BASED ON PHOTOGRAMETRIC SURVEY DATA COLLECTED IN JANUARY 2024.
3. SURVEY BASED ON MARYLAND NAD 1983 (HORIZONTAL DATUM) AND NAVD 1983 (VERTICAL DATUM).



NO.	REVISION	DATE

SHEET TITLE: LANDFILL GAS MONITORING LOCATION MAP

PROJECT TITLE: ENVIRONMENTAL MONITORING PLAN

CLIENT: MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
ANNE ARUNDEL COUNTY
MILLERSVILLE, MARYLAND

SCS ENGINEERS
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PROJ. NO. 02211047
DSC. BY: JSR
DWG. BY: JSR/JWS
CHK. BY: JSR
APP. BY:

CADD FILE:

DATE: 12/5/24

SCALE: AS SHOWN

DRAWING NO. 6 of 7

C:\VA\02211047 AA Millersville LF GW\FIGURES\EMP\6 - LFG Map.dwg

LEGEND

TOPOGRAPHIC CONTOUR (FT, AMSL)
LIMIT OF WASTE
LANDFILL PROPERTY BOUNDARY

STORMWATER OUTFALL

FT, AMSL = FEET, ABOVE MEAN SEA LEVEL

NOTES:
1. BASE MAP OBTAINED FROM BAI GROUP, INC.
2. TOPOGRAPHY WAS PREPARED BY PHOTOGRAMETRIC SURVEY IN JANUARY 2024.
3. SURVEY BASED ON MARYLAND NAD 1927 (HORIZONTAL DATUM) AND NAVD 1929 (VERTICAL DATUM).

0 600 1200
SCALE IN FEET

CELL 1 EAST (CLOSED)
CELL 2 (CLOSED)
CELL 4 (CLOSED)
CELL 8 (CLOSED)
CELLS 5,6,7 (CLOSED)
CELL 9 (ACTIVE)
COMPOSTING PAD
LFGE FACILITY
SUBCELL 8.1
SUBCELL 8.2
SUBCELL 8.3
SUBCELL 8.4
SUBCELL 8.5
SUBCELL 8.6
SUBCELL 8.7
SUBCELL 9.1 (ACTIVE)
SUBCELL 9.2 (ACTIVE)
SUBCELL 9.3 (FUTURE)
SUBCELL 9.4 (FUTURE)
SUBCELL 9.5 (FUTURE)
SWM POND #1
SWM POND #2
SWM POND #3
SWM POND #4
SWM POND #5
SWM POND #6
SWM POND #8-1
SWM POND #9-2
SWM POND #10
OUTFALL #1
OUTFALL #3
OUTFALL #4
OUTFALL #5
OUTFALL #6
OUTFALL #8
OUTFALL #9
OUTFALL #10
OUTFALL #11
WELLS BRANCH
LEACHATE STORAGE TANKS
LEACHATE PRETREATMENT PLANT
CENTRAL RECYCLING CENTER
PAPER RECOVERY FACILITY
SCALEHOUSE
MAINTENANCE BUILDING
WAREHOUSE
JENNY LEE WAY
VICOLI CT
MONTE CRISTO CT
BURNS CROSSING
ANTRIM DR
DAMSELLS POINT

NO.	REVISION	DATE

SHEET TITLE: STORMWATER MONITORING LOCATION MAP

PROJECT TITLE: ENVIRONMENTAL MONITORING PLAN

CLIENT: MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
ANNE ARUNDEL COUNTY
MILLERSVILLE, MARYLAND

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
11260 ROGER BACON DRIVE - RESTON, VA 20190
PH. (703) 471-6150 FAX (703) 471-6676

PROJ. NO. 02211047
DSK. BY:
DWG. BY: LAH
CHK. BY: JSR
QA/QC BY:
APP. BY:

CADD FILE:

DATE: 12/05/24

SCALE: AS SHOWN

DRAWING NO. 7 of 7

G:\V\02211047 AA Millersville LF GW\FIGURES\EMP\2024\V7 – Stormwater Map.dwg

Appendix A

Table A-1. Historical Volatile Organic Compound Summary – COMAR Wells
Table A-2. Historical Volatile Organic Compound Summary – Eastern Boundary Zone 3 Monitoring Wells
Table A-3. Historical Volatile Organic Compound Summary – Eastern Boundary Zone 4 Monitoring Wells

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
1,1-Dichloroethane	March-2014	---	---	---	---	---	---	**0.5 J**	**2.87**	---	---	---	---	---	---	**0.86 J**	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	---	---	1
	October-2014	---	---	---	---	---	---	**0.67 J**	**1.03**	---	---	---	---	---	---	**0.42 J**	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	---	---	1
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.19	1
		---	---	---	---	---	---	**0.5 J**	**1.71**	ND	ND	ND	ND	ND	ND	**0.34 J**	0.3	1
	October-2015	ND	ND	ND	ND	ND	ND	**0.74 J**	**2.23**	ND	ND	ND	ND	ND	ND	ND	0.3	1
	May-2016	ND	ND	ND	ND	ND	ND	**0.5 J**	**1.6**	ND	ND	ND	ND	ND	ND	**0.3 J**	0.1	1
	October-2016	ND	**0.1 J**	ND	ND	ND	ND	**0.5 J**	**2.2**	ND	ND	ND	ND	ND	ND	**0.4 J**	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	**0.4 J**	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	**0.6 J**	**1.9**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	**0.5 J**	**1.6**	ND	ND	ND	ND	**0.5 J**	**0.2 J**	**0.6 J**	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.14	1
	May-2018	---	---	ND	---	---	---	ND	**2**	ND	ND	ND	ND	ND	ND	ND	0.14	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	**1.9**	ND	ND	ND	ND	ND	ND	ND	0.14	1
	April-2019	ND	ND	ND	ND	ND	ND	**1**	**2**	ND	ND	ND	ND	ND	ND	ND	0.19	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	**1.6**	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	---	---	---	---	---	---	---	**1.5**	---	---	---	---	---	---	**0.6 J**	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	---	---	1
	April-2021	---	---	---	---	---	---	**0.368 J**	**1.23**	---	---	---	---	---	---	**0.152 J**	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	---	---	1
	October-2021	---	---	---	---	---	---	---	**1 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	---	---	---	---	---	---	---	**0.6 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	---	---	---	---	---	**0.6 J**	---	---	---	---	---	---	---	---	---
		---	---	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	---	---	---	---	---	---	**0.5 J**	**0.5 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	---	---	---	---	---	---	**0.59**	**0.84**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
1,2-Dichloropropane	March-2014	---	---	---	---	---	---	---	**0.34 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.22	1
		---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	**0.26 J**	ND	ND	ND	ND	ND	ND	ND	0.25	1
	May-2016	ND	ND	ND	ND	ND	ND	ND	**0.2**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	**0.2 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	**0.2 J**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	ND	**0.2 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.2	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.43	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
1,4-Dichlorobenzene	March-2014	---	---	---	---	---	---	---	**0.52 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.19	1
		---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	**0.31 J**	ND	ND	ND	ND	ND	ND	ND	0.3	1
	May-2016	ND	ND	ND	ND	ND	ND	ND	**0.2**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	**0.3 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	**0.2 J**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	ND	**0.2 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.19	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	---	---	---	---	---	---	---	**0.131 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5
		---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
2-Butanone	March-2014	---	**0.82 J**	---	---	---	---	---	---	---	**0.96 J**	---	---	---	---	---	---	---
		ND	---	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	---	5
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.67	5
		---	---	---	---	---	---	ND	ND	ND	**1.3 J**	ND	ND	ND	ND	ND	0.79	5
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.79	2
	May-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	5
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.3 J**	**1.2 J**	**1.3 J**	ND	ND	ND	1	5
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	1	5
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	1	5
	September-2017	---	---	**1.2 J**	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	5
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	1	5
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.27	5
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27	5
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27	5
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3	5
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	5
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	5
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	10
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
4-Methyl 2-pentanone	March-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.37	5
		---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.47	5
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.47	2
	May-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	5
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	**11**	ND	ND	ND	ND	ND	1	5
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	1	5
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.4 J**	ND	---	---	---	---	1	5
	September-2017	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	5
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	1	5
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.31	5
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.31	5
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.31	5
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.39	5
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	5
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	5
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	10
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Acetone	March-2014	---	**1.63 J**	**1.59 J**	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		ND	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	October-2014	---	---	**1.8 J**	---	---	---	---	---	---	---	---	---	---	---	**1.11 J**	---	---
		ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	5
	April-2015	---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.94	5
		ND	ND	**1.94 J**	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.99	5
	October-2015	ND	ND	**1.7 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.94	2
	May-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	**3.2**	ND	ND	ND	ND	ND	3	5
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	**22**	ND	ND	ND	ND	ND	3	5
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	3	5
	May-2017	ND	ND	**4 J**	ND	ND	ND	ND	ND	ND	**7.9**	ND	---	---	---	---	3	5
	September-2017	---	---	**5.2**	---	---	---	ND	ND	ND	**4.4 J**	ND	ND	ND	ND	ND	3	5
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	3	5
	April-2018	**4.7 J,B**	**1.8 J,B**	---	**3.7 J,B**	**2 J,B**	**2.1 J,B**	---	---	---	---	---	---	---	---	---	0.6	5
	May-2018	---	---	**5.5**	---	---	---	**4 J,B**	**4 J,B**	**2.3 J,B**	**3.6 J,B**	**6.5 B**	**2.5 J,B**	**2.9 J,B**	**3 J,B**	ND	0.6	5
	October-2018	**1.5 J,B**	**1.7 J,B**	**1.8 J,B**	**2 J,B**	**2.6 J**	ND	ND	**2.9 J**	**4.4 J**	**2.5 J,B**	**3 J,B**	**3 J,B**	**3.3 J,B**	**2.6 J,B**	**4.9 J,B**	0.6	5
	April-2019	**1.6 J,B**	ND	ND	ND	**2.6 J,B**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	5
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	5
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	5
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	50
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Benzene	March-2014	---	---	---	---	---	---	---	**1.34**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.16	1
		---	---	---	---	---	---	ND	**0.7 J**	ND	ND	ND	ND	ND	ND	ND	0.28	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	**0.82 J**	ND	ND	ND	ND	ND	ND	ND	0.28	1
	May-2016	ND	ND	ND	ND	ND	ND	ND	**0.5 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	**0.6 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	**0.1 J**	ND	ND	ND	ND	ND	ND	**0.4 J**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	ND	**0.4 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.11	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Carbon disulfide	March-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	---	---	**0.58 J**	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.42	1
		ND	ND	**0.45 J**	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.43	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.42	2
	May-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.4	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	0.4	1
	September-2017	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.4	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.22	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Chloroethane	March-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.34	1
		---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	1
	October-2015	ND	ND	ND	**0.56 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	1
	May-2016	ND	ND	ND	ND	ND	ND	ND	**0.1**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	**0.1 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	**0.1 J**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.22	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.35	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Chloroform	March-2014	---	**0.24 J**	---	---	---	**0.21 J**	---	**0.27 J**	**0.19 J**	---	---	**0.4 J**	**0.17 J**	**0.35 J**	---	---	---
		ND	---	ND	ND	ND	---	ND	---	---	ND	ND	---	---	---	ND	---	1
	October-2014	---	**0.34 J**	---	---	---	**0.23 J**	---	**1**	---	---	---	**0.3 J**	**0.25 J**	**0.36 J**	---	---	---
		ND	---	ND	ND	ND	---	ND	---	ND	ND	ND	---	---	---	ND	---	1
	April-2015	ND	**0.23 J**	ND	**0.19 J**	ND	**0.16 J**	---	---	---	---	---	---	---	---	---	0.15	1
		---	---	---	---	---	---	ND	**0.38 J**	ND	ND	ND	ND	ND	ND	ND	0.32	1
	October-2015	ND	**0.35 J**	ND	ND	ND	ND	ND	**1.47**	ND	ND	ND	**0.36 J**	ND	ND	ND	0.32	1
	May-2016	ND	**0.3 J**	ND	ND	**0.1 J**	**0.2 J**	**0.1 J**	**0.6**	**0.1**	ND	ND	**0.4 J**	**0.3 J**	**0.2 J**	ND	0.1	1
	October-2016	ND	**0.3 J**	ND	**0.1 J**	**0.1 J**	**0.3 J**	**0.1 J**	**0.5 J**	**0.2 J**	ND	ND	**0.4 J**	**0.2 J**	**0.4 J**	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	**0.4 J,B**	**0.2 J,B**	**0.4 J,B**	ND	0.1	1
	May-2017	ND	**0.3 J,B**	ND	ND	**0.2 J,B**	**0.5 J,B**	**0.1 J,B**	**0.2 J,B**	**0.2 J,B**	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	**0.1 J**	**0.3 J**	**0.2 J**	ND	ND	**0.5 J**	**0.1 J**	**0.5 J**	ND	0.1	1
	October-2017	ND	**0.3 J**	---	ND	**0.2 J**	**0.6 J**	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.21	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	---	**0.13 J**	---	---	---	**0.324 J**	---	**0.123 J**	---	---	---	**0.416 J**	**0.401 J**	**0.252 J**	**0.129 J**	---	---
		ND	---	ND	ND	ND	---	ND	---	ND	ND	ND	---	---	---	---	---	5
	October-2021	---	---	---	---	---	---	---	**0.8 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	---	---	---	---	---	---	---	**0.6 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	---	---	---	---	---	---	---	**1.1**	---	---	---	---	---	**0.5 J**	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	---	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	---	---	---	---	---	**0.6 J**	---	---	---	---	---	---	---	---	---
		---	---	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	---	---	---	---	---	---	---	**0.9 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Chloromethane	March-2014	**0.37 J,B**	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	---	---	**0.64 J,B**	**0.38 J,B**	---	---	---	---	---	---	---	**0.49 J,B**	**0.37 J,B**	**0.4 J,B**	---	---	---
		ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	---	---	ND	---	1
	April-2015	---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.35	1
		ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.37	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.35	1
	May-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.1**	**0.6 J**	ND	ND	ND	0.2	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.2	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	0.2	1
	September-2017	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.2	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.22	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	2.5
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
cis-1,2-Dichloroethene	March-2014	---	---	---	---	---	---	---	**1.02**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.21	1
		---	---	---	---	---	---	ND	**0.55 J**	ND	ND	ND	ND	ND	ND	ND	0.3	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	**0.61 J**	ND	ND	ND	ND	ND	ND	ND	0.3	1
	May-2016	ND	ND	ND	ND	ND	ND	ND	**0.5 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	**0.5 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	**0.4 J**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	ND	**0.4 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.12	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.24	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Dichlorodifluoromethane	March-2014	---	**0.42 J**	---	**1.21**	**0.31 J**	**0.34 J**	**0.85 J**	**4.14**	---	---	---	---	---	---	**0.32 J**	---	---
		ND	---	ND	---	---	---	---	---	ND	ND	ND	ND	ND	ND	---	---	1
	October-2014	---	**0.6 J**	---	**1.45**	**0.35 J**	**0.34 J**	**0.73 J**	**1.87**	---	---	---	---	---	---	---	---	---
		ND	---	ND	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	**0.34 J**	ND	**1.13**	**0.32 J**	ND	---	---	---	---	---	---	---	---	---	0.31	1
		---	---	---	---	---	---	**0.69 J**	**2.42**	ND	ND	ND	ND	ND	ND	ND	0.35	1
	October-2015	ND	ND	ND	**0.64 J**	ND	ND	**0.43 J**	**1.48**	ND	ND	ND	ND	ND	ND	ND	0.35	1
	May-2016	ND	**0.4 J**	ND	**0.9 J**	**0.4 J**	**0.3 J**	**0.6 J**	**2.2**	ND	ND	ND	ND	ND	**0.2 J**	**0.2 J**	0.1	1
	October-2016	ND	**0.3 J**	ND	**0.9 J**	**0.3 J**	**0.2 J**	**0.6 J**	**2.8**	ND	ND	ND	ND	ND	**0.2 J**	**0.1 J**	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	**0.2 J**	**0.1 J**	0.1	1
	May-2017	ND	**0.3 J**	ND	**0.5 J**	**0.2 J**	**0.2 J**	**0.8 J**	**2.5**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	**0.6 J**	**2.5**	ND	ND	ND	ND	**0.6 J**	**0.4 J**	**0.2 J**	0.1	1
	October-2017	ND	**0.2 J**	---	**0.5 J**	**0.2 J**	**0.2 J**	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.23	1
	May-2018	---	---	ND	---	---	---	**2.1**	**5**	ND	ND	ND	ND	ND	ND	ND	0.23	1
	October-2018	ND	ND	ND	**1.1**	ND	ND	**1.2**	**3.1**	ND	ND	ND	ND	ND	ND	ND	0.23	1
	April-2019	ND	ND	ND	**1**	ND	ND	**2.1**	**3.9**	ND	ND	ND	ND	ND	ND	ND	0.24	1
	September-2019	ND	ND	ND	**1.3**	ND	ND	ND	**2.7**	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	---	---	---	**0.8 J**	---	---	**0.7 J**	**2.8**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	---	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	---	**0.481 J**	---	**0.518 J**	---	---	**0.463 J**	**1.76 J**	---	---	---	---	---	---	---	---	---
		ND	---	ND	---	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	5
	October-2021	---	---	---	---	---	---	---	**2.1**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	---	---	---	---	---	---	**0.8 J**	**1.3**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	---	---	---	---	---	---	**0.8 J**	**1.4**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	---	---	---	---	---	**1.2**	---	---	---	---	---	---	---	---	---
		---	---	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	---	---	---	---	---	---	**1 J**	**1.2**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	---	---	---	---	---	---	**1.2**	**1.7**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Dichlorofluoromethane	March-2014	---	---	---	---	---	---	**0.57 J**	**2.7**	---	---	---	---	---	---	**0.27 J**	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	---	---	1
	October-2014	---	---	---	---	---	---	**0.76 J**	---	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.26	1
	October-2015	ND	ND	ND	ND	ND	ND	**0.78 J**	**1.87**	ND	ND	ND	ND	ND	ND	ND	0.26	1
	May-2016	ND	ND	ND	ND	ND	ND	**0.6 J**	**1.6**	ND	ND	ND	ND	ND	ND	ND	0.2	1
	October-2016	ND	ND	ND	ND	ND	ND	**0.6 J**	**2.4**	ND	ND	ND	ND	ND	ND	ND	0.2	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.2	1
	May-2017	ND	ND	ND	ND	ND	ND	**0.6 J**	**1.8**	ND	ND	ND	---	---	---	---	0.2	1
	September-2017	---	---	ND	---	---	---	**0.6 J**	**1.6**	ND	ND	ND	ND	**0.6 J**	**0.2 J**	**0.2 J**	0.2	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.2	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.14	1
	May-2018	---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	0.14	1
		---	---	---	---	---	---	ND	**1.6**	ND	ND	ND	ND	ND	ND	ND	0.23	1
	October-2018	ND	ND	ND	ND	ND	ND	**1.3**	**1.9**	ND	ND	ND	ND	ND	ND	ND	0.14	1
	April-2019	ND	ND	ND	ND	ND	ND	**2.1**	**1.9**	ND	ND	ND	ND	ND	ND	ND	0.49	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	---	---	---	---	---	---	---	**0.7 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	---	---	---	---	---	---	**0.419 J**	**0.881 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	5
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	---	---	---	---	---	---	**0.5 J**	---	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	---	---	---	---	---	---	**0.76**	---	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Methylene chloride	March-2014	---	---	---	---	---	---	---	**3.24**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	---	---	---	---	---	---	ND	**1.97**	ND	ND	ND	ND	ND	ND	ND	0.5	1
		ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.55	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	**1.68**	ND	ND	ND	ND	ND	ND	ND	0.5	1
	May-2016	ND	ND	ND	ND	ND	ND	ND	**1.6**	ND	ND	ND	ND	ND	ND	ND	0.2	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	**1.6**	ND	ND	ND	ND	ND	ND	ND	0.2	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.2	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	**1.4**	ND	ND	ND	---	---	---	---	0.2	1
	September-2017	---	---	ND	---	---	---	ND	**1.1**	ND	ND	ND	ND	ND	ND	ND	0.2	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.2	1
	April-2018	ND	**1.2 B**	---	**1.4 B**	ND	ND	---	---	---	---	---	---	---	---	---	0.16	1
	May-2018	---	---	ND	---	---	---	**1.2 B**	**1.9 B**	ND	**1 B**	**1.5 B**	**1.1 B**	ND	ND	ND	0.16	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	**1.6**	ND	ND	**1 B**	**1.4 B**	ND	ND	**1.9 B**	0.16	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	**1**	ND	ND	ND	ND	ND	ND	ND	0.3	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	**0.583 J,B**	**0.507 J,B**	**0.551 J,B**	**0.538 J,B**	---	**0.561 J,B**	**0.611 J,B**	**0.641 J,B**	---	---	---	---	---	---	**0.438 J,B**	---	---
		---	---	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	---	---	5
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Methyl-t-butyl ether	March-2014	---	---	---	**0.13 J**	**0.34 J**	**0.55 J**	---	---	---	---	---	**0.29 J**	---	**0.19 J**	---	---	---
		ND	ND	ND	---	---	---	ND	ND	ND	ND	ND	---	ND	---	ND	---	1
	October-2014	---	---	---	---	**0.38 J**	**0.69 J**	---	---	---	---	---	---	---	**0.14 J**	---	---	---
		ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	ND	---	1
	April-2015	ND	ND	ND	ND	**0.29 J**	**0.37 J**	---	---	---	---	---	---	---	---	---	0.13	1
		---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	October-2015	ND	ND	ND	ND	**0.4 J**	**0.48 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	May-2016	ND	ND	ND	ND	**0.3 J**	**0.4 J**	ND	ND	ND	ND	ND	**0.1 J**	ND	**0.1 J**	ND	0.1	2
	October-2016	ND	ND	ND	ND	**0.3 J**	**0.4 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	2
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	2
	May-2017	**0.1 J**	ND	ND	ND	**0.5 J**	**0.6 J**	ND	ND	ND	ND	ND	---	---	---	---	0.1	2
	September-2017	---	---	ND	---	---	---	ND	ND	ND	ND	ND	**0.1 J**	ND	ND	ND	0.1	2
	October-2017	ND	ND	---	ND	**0.4 J**	**0.4 J**	---	---	---	---	---	---	---	---	---	0.1	2
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.16	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.16	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.16	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	---	---	---	---	**0.455 J**	**0.51 J**	---	---	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	---	---	---	---	---	**0.6 J**	---	---	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	---	---	---	---	**0.5 J**	**0.6 J**	---	---	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	---	---	---	---	**0.6 J**	---	---	---	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
m/p-Xylene	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.29	1
		---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.46	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.46	2
	May-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.28	2
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28	2
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28	2
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.33	2
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	2
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
o-Xylene	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.17	1
		---	---	---	---	---	---	ND	**0.33 J**	ND	ND	ND	ND	ND	ND	ND	0.24	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	**0.46 J**	ND	ND	ND	ND	ND	ND	ND	0.24	1
	May-2016	ND	ND	ND	ND	ND	ND	ND	**0.2**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	**0.2 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	**0.1 J**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	ND	**0.2 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.22	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Tetrachloroethene	March-2014	---	**0.2 J**	---	---	**0.21 J**	---	**0.68 J**	**3.53**	---	---	---	---	**0.23 J**	---	**0.15 J**	---	---
		ND	---	ND	ND	---	ND	---	---	ND	ND	ND	ND	---	ND	---	---	1
	October-2014	---	**0.38 J**	---	---	**0.19 J**	---	**0.84 J**	**1.01**	---	---	---	---	---	---	---	---	---
		ND	---	ND	ND	---	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	**0.22 J**	ND	ND	**0.19 J**	ND	---	---	---	---	---	---	---	---	---	0.13	1
		---	---	---	---	---	---	**0.6 J**	**1.76**	ND	ND	ND	ND	ND	ND	ND	0.37	1
	October-2015	ND	ND	ND	ND	ND	ND	**0.61 J**	**2.25**	ND	ND	ND	ND	ND	ND	ND	0.37	1
	May-2016	ND	**0.2 J**	ND	ND	**0.2 J**	**0.2 J**	**0.6 J**	**1.8**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	**0.2 J**	ND	ND	**0.2 J**	**0.2 J**	**0.5 J**	**2**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	**0.1 J**	ND	0.1	1
	May-2017	ND	**0.2 J**	ND	ND	**0.3 J**	**0.2 J**	**0.7 J**	**1.9**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	**0.5 J**	**1.8**	ND	ND	ND	ND	**0.4 J**	**0.2 J**	**0.1 J**	0.1	1
	October-2017	ND	**0.1 J**	---	ND	**0.2 J**	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.17	1
	May-2018	---	---	ND	---	---	---	ND	**1.5**	ND	ND	ND	ND	ND	ND	ND	0.17	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	**1.2**	ND	ND	ND	ND	ND	ND	ND	0.17	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	**1.2**	ND	ND	ND	ND	ND	ND	ND	0.28	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	**1**	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	---	---	---	---	---	---	---	**0.7 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	---	---	---	---	---	---	---	**1.02**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	---	---	---	---	---	---	---	**0.8 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	---	---	---	---	---	---	---	**0.8 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	---	---	---	---	---	---	---	**0.9 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	---	---	---	---	---	**0.8 J**	---	---	---	---	---	---	---	---	---
		---	---	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	---	---	---	---	---	---	---	**0.7 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	---	---	---	---	---	---	---	**0.5**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Trichloroethene	March-2014	---	---	---	---	---	---	**0.22 J**	**1.34**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	---	---	---	---	---	---	---	**0.31 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.19	1
		---	---	---	---	---	---	ND	**0.71 J**	ND	ND	ND	ND	ND	ND	ND	0.27	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	**0.88 J**	ND	ND	ND	ND	ND	ND	ND	0.27	1
	May-2016	ND	ND	ND	ND	ND	ND	**0.2 J**	**0.7**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	**0.1 J**	**0.7 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	**0.2 J**	**0.6 J**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	**0.1 J**	**0.6 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.15	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	---	---	---	---	---	---	---	**0.254 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Trichlorofluoromethane	March-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.23	1
		---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27	1
	May-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	**0.1 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.18	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-1. Historical Volatile Organic Compound Summary - COMAR Wells

Well ID		TW-7	TW-7A	TW-8	TW-8A	TW-9B	TW-9C	TW-15	TW-15B	TW-16	TW-17	TW-17A	TW-21	TW-22	TW-22A	TW-22B	MDL	
Parameter	Monitoring Event	Concentration (ug/L)															(ug/L)	RL (ug/L)
Vinyl chloride	March-2014	---	---	---	---	---	---	---	**1.05**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.23	1
		---	---	---	---	---	---	ND	**0.55 J**	ND	ND	ND	ND	ND	ND	ND	0.32	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	**0.46 J**	ND	ND	ND	ND	ND	ND	ND	0.32	1
	May-2016	ND	ND	ND	ND	ND	ND	ND	**0.5 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	**0.6 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	**0.5 J**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	ND	**0.4 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1
	April-2018	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.36	1
	May-2018	---	---	ND	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.36	1
	October-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.36	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.33	1
	September-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	1
	October-2019	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2023	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
	May-2023	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5
Xylenes	March-2014	---	---	---	---	---	---	---	**0.8 J**	---	---	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.29	1
		---	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.46	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	**0.46 J**	ND	ND	ND	ND	ND	ND	ND	0.46	2
	May-2016	ND	ND	ND	ND	ND	ND	ND	**0.2**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	**0.2 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	April-2017	---	---	---	---	---	---	---	---	---	---	---	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	**0.1 J**	ND	ND	ND	---	---	---	---	0.1	1
	September-2017	---	---	ND	---	---	---	ND	**0.2 J**	ND	ND	ND	ND	ND	ND	ND	0.1	1
	October-2017	ND	ND	---	ND	ND	ND	---	---	---	---	---	---	---	---	---	0.1	1

--- = not applicable or available

B = Parameter was detected at a concentration less than 5 or 10 (common lab contaminants only) times the concentration detected in the field/trip/method blank. Detection is not validated.

J = Qualifier used if quantitation of parameter is equal to or less than the MDL but greater than the RL. Concentration is considered to be estimated and not validated.

MDL = laboratory's Method Detection Limit

ND = Not Detected

RL = laboratory's Reporting Limit

ug/L = micrograms per liter

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
1,1,1-Trichloroethane	March-2014	---	ND	ND	---	---	ND	---	ND	---	---	---	ND	---	1
	April-2014	ND	---	---	ND	ND	---	ND	---	ND	ND	ND	---	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.3	1
	April-2016	---	ND	---	ND	ND	ND	ND	ND	---	ND	---	ND	0.1	1
	May-2016	ND	---	**0.1 J**	---	---	---	---	---	ND	---	ND	---	0.1	1
	October-2016	ND	ND	**0.1 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	ND	0.1	1
	October-2017	ND	---	**0.1 J**	ND	ND	---	ND	---	ND	ND	ND	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.52	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.52	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
1,1-Dichloroethane	March-2014	---	**1.36**	---	---	---	**1.91**	---	---	---	---	---	**5.01**	---	---
		---	---	**9**	---	---	---	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	**4.08**	**0.32 J**	---	**1.54**	---	**1.61**	**1.4**	**2.12**	---	---	---
		ND	---	---	---	---	---	---	---	---	---	---	---	---	1
	October-2014	---	**1.33**	---	**4.15**	---	**1.99**	**1.76**	---	**1.65**	**1.12**	**2.01**	**4.26**	---	---
		ND	---	**0.58 J**	---	ND	---	---	ND	---	---	---	---	---	1
	April-2015	ND	**1.11**	**3.43**	**3.01**	**1.09**	**1.7**	**1.7**	ND	**1.6**	ND	**1.74**	**3.91**	0.19	1
	October-2015	ND	**1.27**	**2.18**	**3.12**	**1.56**	**2.31**	**2.01**	ND	**1.85**	---	**2.07**	**4.74**	0.3	1
	April-2016	---	**1.3**	---	**2.5**	**0.2 J**	**2.1**	**2**	ND	---	**0.8 J**	---	**4.2**	0.1	1
	May-2016	ND	---	**3.6**	---	---	---	---	---	**1.7**	---	**1.5**	---	0.1	1
	October-2016	ND	**1.2**	**5.1**	**2.1**	ND	**2.3**	**2**	ND	**1.8**	**1.4**	**1.8**	**3.4**	0.1	1
	May-2017	ND	**1.1**	**4.5**	**2.3**	ND	**2.7**	ND	ND	**2.2**	**1.7**	**1.7**	**3.7**	0.1	1
	September-2017	---	**1.3**	---	---	---	**2.5**	---	ND	---	---	---	**3.4**	0.1	1
	October-2017	ND	---	**5**	**1.2**	ND	---	**2.3**	---	**1.9**	**1.2**	**1.8**	---	0.1	1
	April-2018	ND	**1.6**	**3.6**	ND	ND	**2.3**	**3.1**	ND	**3**	**1.8**	**2**	**3.9**	0.14	1
	November-2018	ND	ND	ND	ND	**1.1**	**1.1**	**2.8**	ND	**2.3**	ND	ND	**1.7**	0.14	1
	April-2019	ND	**1**	ND	ND	ND	**1**	**2.3**	ND	**2.4**	**1.3**	**1.3**	**2.8**	0.19	1
	October-2019	ND	**1.1**	ND	**1.7**	ND	ND	**3**	ND	**3.1**	ND	ND	**3.3**	---	1
	April-2020	ND	ND	**1.9**	**2.1**	ND	ND	**2.5**	ND	**2.3**	**1.2**	ND	**3**	1	1
	October-2020	---	**1 J**	**2.9**	**0.6 J**	---	**0.9 J**	**3.1**	---	**2.7**	**1.4**	**0.7 J**	**3.3**	0.5	1
		ND	---	---	---	ND	---	---	ND	---	---	---	---	---	1
	April-2021	---	**0.818 J**	**1.64**	**0.309 J**	---	**1 J**	**3.16**	---	**3.02**	**0.512 J**	**0.332 J**	**2.64**	---	---
		ND	---	---	---	ND	---	---	ND	---	---	---	---	---	1
	October-2021	---	**1.1**	**2.8**	**1.2**	---	**1.4**	**4**	---	**3.9**	**1.2**	**1.1**	**3.1**	---	---
		ND	---	---	---	ND	---	---	ND	---	---	---	---	---	1
	May-2022	---	**0.7 J**	**1.9**	**1.1**	---	**1.1**	**3.1**	---	**3**	**1.1**	**0.6 J**	**1.7**	---	---
		ND	---	---	---	ND	---	---	ND	---	---	---	---	---	1
	November-2022	---	**1 J**	**2.9**	---	---	**0.9 J**	**3**	---	**3.3**	**1.2**	**0.8 J**	**2.8**	---	---
		ND	---	---	ND	ND	---	---	ND	---	---	---	---	---	1
	May-2023	---	**0.6 J**	**2.9**	---	---	**0.9 J**	**3**	---	**3.9**	**0.6 J**	**0.5 J**	**2.1**	---	---
		ND	---	---	ND	ND	---	---	ND	---	---	---	---	---	1
	November-2023	---	**0.8 J**	**2.6**	---	---	**1.1**	**2.8**	---	**3.1**	**1.3**	**0.9 J**	**3**	---	---
		ND	---	---	ND	ND	---	---	ND	---	---	---	---	---	1
	May-2024	---	**0.78**	**2.1**	---	**1.3**	**1.1**	**3.5**	---	**4.2**	---	**0.84**	**3.7**	---	---
		ND	---	---	ND	---	---	---	ND	---	ND	---	---	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
1,1-Dichloroethene	March-2014	---	ND	**0.27 J**	---	---	ND	---	ND	---	---	---	ND	---	1
	April-2014	ND	---	---	ND	ND	---	ND	---	ND	ND	ND	---	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.29	1
	April-2016	---	ND	---	ND	ND	ND	ND	ND	---	ND	---	**0.1 J**	0.1	1
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	ND	---	0.1	1
	October-2016	ND	ND	**0.1 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	**0.1 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	ND	0.1	1
	October-2017	ND	---	**0.2 J**	ND	ND	---	ND	---	ND	ND	ND	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
1,2-Dichloroethane	March-2014	---	ND	ND	---	---	ND	---	ND	---	---	---	ND	---	1
	April-2014	ND	---	---	ND	ND	---	ND	---	ND	ND	ND	---	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.23	1
	April-2016	---	ND	---	ND	ND	ND	**0.1 J**	ND	---	ND	---	ND	0.1	1
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	ND	---	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	**0.2 J**	ND	ND	ND	ND	**0.1 J**	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	ND	0.1	1
	October-2017	ND	---	ND	ND	ND	---	**0.2 J**	---	ND	ND	ND	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
1,2-Dichloropropane	March-2014	---	ND	ND	---	---	ND	---	ND	---	---	---	ND	---	1
	April-2014	ND	---	---	ND	ND	---	ND	---	ND	ND	ND	---	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.25	1
	April-2016	---	**0.1 J**	---	ND	ND	ND	ND	ND	---	ND	---	**0.1 J**	0.1	1
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	ND	---	0.1	1
	October-2016	ND	ND	**0.1 J**	ND	ND	ND	ND	ND	ND	ND	ND	**0.1 J**	0.1	1
	May-2017	ND	ND	**0.1 J**	ND	ND	**0.1 J**	ND	ND	ND	ND	ND	**0.1 J**	0.1	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	**0.1 J**	0.1	1
	October-2017	ND	---	**0.1 J**	ND	ND	---	ND	---	ND	ND	ND	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.43	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
1,4-Dichlorobenzene	March-2014	---	---	---	---	---	---	---	---	---	---	---	**0.32 J**	---	---
		---	ND	**0.54 J**	---	---	ND	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	**0.29 J**	---	---	---	---	---	---	**0.35 J**	---	---	---
		ND	---	---	---	ND	---	ND	---	ND	ND	---	---	---	1
	October-2014	---	---	---	**0.28 J**	---	---	---	---	---	---	**0.26 J**	**0.3 J**	---	---
		ND	ND	ND	---	ND	ND	ND	ND	ND	ND	---	---	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.3	1
	April-2016	---	ND	---	**0.2 J**	ND	**0.1 J**	ND	ND	---	ND	---	**0.2 J**	0.1	1
	May-2016	ND	---	**0.2 J**	---	---	---	---	---	ND	---	**0.1 J**	---	0.1	1
	October-2016	ND	ND	**0.2 J**	**0.1 J**	ND	**0.1 J**	ND	ND	ND	ND	**0.2 J**	**0.2 J**	0.1	1
	May-2017	ND	ND	**0.2 J**	**0.2 J**	ND	**0.1 J**	ND	ND	ND	ND	**0.2 J**	**0.2 J**	0.1	1
	September-2017	---	ND	---	---	---	**0.1 J**	---	ND	---	---	---	**0.2 J**	0.1	1
	October-2017	ND	---	**0.2 J**	**0.1 J**	ND	---	ND	---	ND	ND	**0.3 J**	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Acetone	March-2014	---	ND	ND	---	---	ND	---	ND	---	---	---	ND	---	5
	April-2014	ND	---	---	ND	ND	---	ND	---	ND	ND	ND	---	---	5
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.99	5
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.94	5
	April-2016	---	ND	---	ND	ND	ND	ND	ND	---	ND	---	ND	3	5
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	ND	---	3	5
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	5
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	5
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	ND	3	5
	October-2017	ND	---	ND	ND	ND	---	ND	---	ND	ND	ND	---	3	5
	April-2018	**2.8 J,B**	**4.5 J,B**	**2.7 J,B**	**4.6 J,B**	**4.1 J,B**	**3.9 J,B**	**4.3 J,B**	**3.7 J,B**	**3.2 J,B**	**4.3 J,B**	**4.5 J,B**	**4.2 J,B**	0.6	5
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6	5
	April-2019	**2.4 J,B**	ND	**1.9 J,B**	ND	ND	**2.2 J,B**	ND	**2.2 J,B**	**2.2 J,B**	**2.2 J,B**	ND	**2.1 J,B**	1.6	5
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	5
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	5
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	50
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Benzene	March-2014	---	---	---	---	---	---	---	---	---	---	---	**0.37 J**	---	---
		---	ND	**0.41 J**	---	---	ND	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	**0.32 J**	---	---	---	---	---	---	**0.17 J**	---	---	---
		ND	---	---	---	ND	---	ND	---	ND	ND	---	---	---	1
	October-2014	---	---	---	**0.31 J**	---	---	---	---	---	---	**0.17 J**	**0.34 J**	---	---
		ND	ND	ND	---	ND	ND	ND	ND	ND	ND	---	---	---	1
	April-2015	ND	ND	ND	**0.23 J**	ND	ND	ND	ND	ND	ND	ND	**0.32 J**	0.16	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	**0.31 J**	0.28	1
	April-2016	---	ND	---	**0.2 J**	ND	**0.2 J**	ND	ND	---	ND	---	**0.3 J**	0.1	1
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	**0.1 J**	---	0.1	1
	October-2016	ND	ND	**0.1 J**	**0.1 J**	ND	**0.2 J**	ND	ND	ND	**0.1 J**	ND	**0.2 J**	0.1	1
	May-2017	ND	ND	**0.1 J**	**0.1 J**	ND	**0.2 J**	ND	ND	ND	**0.1 J**	ND	**0.3 J**	0.1	1
	September-2017	---	ND	---	---	---	**0.2 J**	---	ND	---	---	---	**0.2 J**	0.1	1
	October-2017	ND	---	**0.1 J**	ND	ND	---	ND	---	ND	**0.1 J**	ND	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Chloroethane	March-2014	---	ND	**0.36 J**	---	---	ND	---	ND	---	---	---	ND	---	1
	April-2014	ND	---	---	ND	ND	---	ND	---	ND	ND	ND	---	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.34	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.4	1
	April-2016	---	ND	---	ND	ND	ND	ND	ND	---	ND	---	ND	0.1	1
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	ND	---	0.1	1
	October-2016	ND	ND	**0.2 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	**0.1 J**	ND	ND	**0.1 J**	ND	ND	ND	ND	ND	ND	0.1	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	ND	0.1	1
	October-2017	ND	---	**0.2 J**	ND	ND	---	ND	---	ND	ND	ND	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.35	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	5
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Chloroform	March-2014	---	**0.26 J**	---	---	---	**0.28 J**	---	**0.48 J**	---	---	---	---	---	---
		---	---	ND	---	---	---	---	---	---	---	---	ND	---	1
	April-2014	**0.26 J**	---	---	---	**0.31 J**	---	**0.2 J**	---	**0.25 J**	**0.85 J**	**0.17 J**	---	---	---
		---	---	---	ND	---	---	---	---	---	---	---	---	---	1
	October-2014	**0.36 J**	**0.3 J**	---	---	**0.91 J**	**0.32 J**	**0.29 J**	**0.51 J**	**0.24 J**	**0.91 J**	---	---	---	---
		---	---	ND	ND	---	---	---	---	---	---	ND	ND	---	1
	April-2015	**0.23 J**	**0.22 J**	ND	ND	**0.71 J**	**0.25 J**	**0.2 J**	**0.43 J**	**0.24 J**	**0.86 J**	**0.15 J**	ND	0.15	1
	October-2015	ND	ND	ND	ND	**0.89 J**	ND	ND	**0.5 J**	ND	---	ND	ND	0.32	1
	April-2016	---	**0.2 J**	---	ND	**0.5 J**	**0.3 J**	**0.2 J**	**0.5 J**	---	**1.1**	---	**0.1 J**	0.1	1
	May-2016	**0.3 J**	---	ND	---	---	---	---	---	**0.2 J**	---	**0.2 J**	---	0.1	1
	October-2016	**0.3 J**	**0.2 J**	**0.1 J**	ND	**0.3 J**	**0.3 J**	**0.2 J**	**0.5 J**	**0.2 J**	**0.9 J**	**0.2 J**	ND	0.1	1
	May-2017	**0.3 J,B**	**0.2 J,B**	**0.1 J,B**	ND	**0.5 J,B**	**0.3 J,B**	ND	**0.5 J,B**	**0.3 J,B**	**0.9 J,B**	**0.2 J,B**	**0.1 J,B**	0.1	1
	September-2017	---	**0.2 J**	---	---	---	**0.2 J**	---	**0.5 J**	---	---	---	**0.1 J**	0.1	1
	October-2017	**0.4 J**	---	**0.2 J**	ND	**0.5 J**	---	**0.3 J**	---	**0.2 J**	**0.8 J**	**0.1 J**	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.1**	ND	ND	0.21	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	**0.5 J,B**	ND	ND	ND	**0.5 J,B**	ND	ND	**0.5 J,B**	**0.7 J,B**	**0.5 J,B**	ND	ND	0.5	1
	April-2021	**0.404 J**	---	---	---	**0.383 J**	---	**0.292 J**	**0.405 J**	**0.464 J**	**1.09 J**	---	---	---	---
		---	ND	ND	ND	---	ND	---	---	---	---	ND	ND	---	5
	October-2021	**0.6 J,B**	---	---	---	**1.6**	---	---	**0.5 J**	**0.9 J**	**0.7 J,B**	---	---	---	---
		---	ND	ND	ND	---	ND	ND	---	---	---	ND	ND	---	1
	May-2022	---	---	---	---	**0.7 J**	---	---	---	**0.8 J**	**0.7 J**	---	---	---	---
		ND	ND	ND	ND	---	ND	ND	ND	---	---	ND	ND	---	1
	November-2022	---	---	---	---	---	---	---	---	**0.8 J**	**1.7**	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	ND	---	---	ND	ND	---	1
	May-2023	**0.5 J**	---	---	---	---	---	---	---	**0.7 J**	**1.2**	---	---	---	---
		---	ND	ND	ND	ND	ND	ND	ND	---	---	ND	ND	---	1
	November-2023	**0.5 J**	---	---	---	---	---	---	---	**0.7 J**	---	---	---	---	---
		---	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	---	1
	May-2024	**0.6**	---	---	---	---	---	---	---	**0.71**	---	---	---	---	---
		---	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Chloromethane	March-2014	---	ND	ND	---	---	ND	---	ND	---	---	---	ND	---	1
	April-2014	ND	---	---	ND	ND	---	ND	---	ND	ND	ND	---	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.37	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.35	1
	April-2016	---	ND	---	ND	ND	ND	ND	ND	---	ND	---	ND	0.2	1
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	ND	---	0.2	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	**0.3 J**	ND	ND	ND	0.2	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	ND	0.2	1
	October-2017	ND	---	ND	ND	ND	---	ND	---	ND	ND	ND	---	0.2	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	2.5
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
cis-1,2-Dichloroethene	March-2014	---	**0.25 J**	---	---	---	**0.8 J**	---	---	---	---	---	**3.16**	---	---
		---	---	**3.44**	---	---	---	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	**1.89**	---	---	---	---	**0.22 J**	**0.31 J**	**0.33 J**	---	---	---
		ND	---	---	---	ND	---	ND	---	---	---	---	---	---	1
	October-2014	---	**0.24 J**	---	**1.94**	---	**0.9 J**	---	---	**0.22 J**	**0.34 J**	**0.4 J**	**2.55**	---	---
		ND	---	**0.21 J**	---	ND	---	ND	ND	---	---	---	---	---	1
	April-2015	ND	**0.25 J**	**1.16**	**1.5**	**0.44 J**	**0.84 J**	**0.23 J**	ND	**0.22 J**	ND	**0.34 J**	**2.36**	0.21	1
	October-2015	ND	ND	**0.68 J**	**1.27**	**0.78 J**	**1.28**	ND	ND	ND	---	**0.35 J**	**2.74**	0.3	1
	April-2016	---	**0.2 J**	---	**1.1**	**0.1 J**	**1.6**	**0.3 J**	ND	---	**0.5 J**	---	**3**	0.1	1
	May-2016	ND	---	**1.5**	---	---	---	---	---	**0.3 J**	---	**0.4 J**	---	0.1	1
	October-2016	ND	**0.2 J**	**1.6**	**0.9 J**	ND	**1.9**	**0.3 J**	ND	**0.3 J**	**0.9 J**	**0.5 J**	**2.1**	0.1	1
	May-2017	ND	**0.2 J**	**1.5**	**0.8 J**	ND	**1.7**	ND	ND	**0.2 J**	**0.9 J**	**0.4 J**	**2.3**	0.1	1
	September-2017	---	**0.2 J**	---	---	---	**2**	---	ND	---	---	---	**2.1**	0.1	1
	October-2017	ND	---	**1.6**	**0.3 J**	ND	---	**0.3 J**	---	**0.3 J**	**0.8 J**	**0.5 J**	---	0.1	1
	April-2018	ND	ND	**1.5**	ND	ND	**1.5**	ND	ND	ND	**1.2**	ND	**2**	0.12	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.4**	0.24	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.5**	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.4**	1	1
	October-2020	ND	ND	**1.1**	ND	ND	ND	**0.6 J**	ND	ND	**0.7 J**	ND	**1.5**	0.5	1
	April-2021	---	---	**0.588 J**	---	---	**0.302 J**	**0.728 J**	---	**0.343 J**	**0.134 J**	---	**0.886 J**	---	---
		ND	ND	---	ND	ND	---	---	ND	---	---	ND	---	---	1
	October-2021	---	---	**1**	---	---	---	**1 J**	---	---	---	---	**1 J**	---	---
		ND	ND	---	ND	ND	ND	---	ND	ND	ND	ND	---	---	1
	May-2022	---	---	**0.9 J**	---	---	---	**0.9 J**	---	---	---	---	**0.5 J**	---	---
		ND	ND	---	ND	ND	ND	---	ND	ND	ND	ND	---	---	1
	November-2022	---	---	**1.3**	---	---	---	**1**	---	---	**0.5 J**	---	**0.9 J**	---	---
		ND	ND	---	ND	ND	ND	---	ND	ND	---	ND	---	---	1
	May-2023	---	---	**1.8**	---	---	---	**0.9 J**	---	**0.6 J**	---	---	**0.8 J**	---	---
		ND	ND	---	ND	ND	ND	---	ND	---	ND	ND	---	---	1
	November-2023	---	---	**1.4**	---	---	---	**0.9 J**	---	---	---	---	**1.2**	---	---
		ND	ND	---	ND	ND	ND	---	ND	ND	ND	ND	---	---	1
	May-2024	---	---	**0.68**	---	---	---	**1**	---	**0.63**	---	---	**1.2**	---	---
		ND	ND	---	ND	ND	ND	---	ND	---	ND	ND	---	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Dichlorodifluoromethane	March-2014	---	**2.3**	---	---	---	**3.84**	---	---	---	---	---	**10.6**	---	---
		---	---	**8.47**	---	---	---	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	**5.88**	**1.48**	---	**3.11**	---	**3.3**	**4.18 J**	**5.54 J**	---	---	---
		ND	---	---	---	---	---	---	---	---	---	---	---	---	1
	October-2014	---	**2.09**	---	**3.11**	---	**2.95**	**2.5**	---	**2.27**	**2.39**	**3.67**	**7.23**	---	---
		ND	---	**0.51 J**	---	ND	---	---	ND	---	---	---	---	---	1
	April-2015	ND	**2**	**3.11**	**3.5**	**2.3**	**2.86**	**2.72**	ND	**2.64**	ND	**3.41**	**6.98**	0.31	1
	October-2015	ND	**1.47**	**1.17**	**1.72**	**1.42**	**1.8**	**1.64**	ND	**1.61**	---	**2.18**	**3.83**	0.35	1
	April-2016	---	**1.9**	---	**2.2**	**0.4 J**	**3**	**2.9**	ND	---	**1.4**	---	**6.4**	0.1	1
	May-2016	ND	---	**3.8**	---	---	---	---	---	**2.6**	---	**2.7**	---	0.1	1
	October-2016	ND	**1.5**	**5.5**	**2.1**	**0.3 J**	**3.4**	**3.4**	ND	**3**	**2.3**	**3.5**	**4.9**	0.1	1
	May-2017	ND	**1.5**	**4.4**	**1.8**	**0.3 J**	**3.2**	**0.4 J**	ND	**3**	**2.2**	**2.9**	**5.6**	0.1	1
	September-2017	---	**1.7**	---	---	---	**3.3**	---	ND	---	---	---	**5.1**	0.1	1
	October-2017	ND	---	**6.4**	**1.3**	**0.5 J**	---	**4.8**	---	**3.2**	**2**	**3.7**	---	0.1	1
	April-2018	ND	**3.4**	**6.4**	ND	**1.8**	**5.5**	**8**	ND	**7.3**	**3.6**	**5.4**	**9**	0.23	1
	November-2018	ND	ND	ND	ND	ND	**1.5**	**3.8**	ND	**3.2**	ND	**1.6**	**2.3**	0.23	1
	April-2019	ND	**1.4**	ND	ND	ND	**2.1**	**4**	ND	**4**	**1.9**	**2.8**	**5**	0.24	1
	October-2019	ND	**1.2**	ND	**2.8**	ND	**2.5**	**5.4**	ND	**6.3**	**1.1**	**2.6**	**5.7**	---	1
	April-2020	ND	ND	**2.5**	**2.7**	ND	**1.7**	**4.3**	ND	**3.9**	**1.3**	**1.3**	**4.8**	1	1
	October-2020	ND	**1.4**	**3.3**	**1.3**	ND	**2.5**	**6.4**	ND	**6**	**2**	**1.9**	**6.2**	0.5	1
	April-2021	---	**0.806 J**	**1.35 J**	---	---	**1.27 J**	**3.94 J**	---	**4.29 J**	**0.433 J**	**0.412 J**	**2.74 J**	---	---
		ND	---	---	ND	ND	---	---	ND	---	---	---	---	---	5
	October-2021	---	**1.5**	**2.3**	**1.4**	---	**2.5**	**6.3**	---	**6.4**	**1.4**	**2.2**	**4.4**	---	---
		ND	---	---	---	ND	---	---	ND	---	---	---	---	---	1
	May-2022	---	**1.3**	**1.2**	**1.6**	---	**2.6**	**7**	---	**7.1**	**1.6**	**1.9**	**3.1**	---	---
		ND	---	---	---	ND	---	---	ND	---	---	---	---	---	1
	November-2022	---	**1.5**	**1.6**	**0.6 J**	---	**2**	**5.4**	---	**6**	**1**	**1.8**	**3.7**	---	---
		ND	---	---	---	ND	---	---	ND	---	---	---	---	---	1
	May-2023	---	**0.6 J**	**1.3**	---	---	**1.4**	**4**	---	**5.7**	**0.6 J**	**1**	**2.3**	---	---
		ND	---	---	ND	ND	---	---	ND	---	---	---	---	---	1
	November-2023	---	**1 J**	**1**	---	---	**1.8**	**4.5**	---	**5.4**	**1.4**	**2**	**3.8**	---	---
		ND	---	---	ND	ND	---	---	ND	---	---	---	---	---	1
	May-2024	---	**0.79**	**0.93**	---	**1.1**	**1.8**	**5**	---	**6**	---	**1.5**	**3.8**	---	---
		ND	---	---	ND	---	---	---	ND	---	ND	---	---	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Dichlorofluoromethane	March-2014	---	**1.65**	---	---	---	**2.52**	---	---	---	---	---	**8.31**	---	---
		---	---	**11.6**	---	---	---	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	**5.01**	**0.29 J**	---	**2.41**	---	**3.41**	**1.92**	**1.91**	---	---	---
		ND	---	---	---	---	---	---	---	---	---	---	---	---	1
	October-2014	---	**1.73**	---	**4.78**	---	**2.61**	**2.7**	---	**3.23**	**1.52**	**1.8**	**6.15**	---	---
		ND	---	**0.76 J**	---	ND	---	---	ND	---	---	---	---	---	1
	April-2015	ND	**1.26**	ND	**3.08**	ND	ND	**2.47**	ND	**2.76**	ND	ND	**4.91**	0.26	1
	October-2015	ND	**1.47**	**2.59**	**2.86**	**1.57**	**2.21**	**2.81**	ND	ND	---	**1.32**	**5.33**	0.26	1
	April-2016	---	**1.8**	---	**2.7**	ND	**2.9**	**3.3**	ND	---	**0.9 J**	---	**5.7**	0.2	1
	May-2016	ND	---	**4.7**	---	---	---	---	---	**3.4**	---	**1.3**	---	0.2	1
	October-2016	ND	**1.5**	**6.6**	**2.2**	ND	**3.2**	**3.6**	ND	**3.8**	**1.6**	**1.5**	**4.6**	0.2	1
	May-2017	ND	**1.3**	**5.4**	**2.2**	ND	**3.5**	**0.3 J**	ND	**4.2**	**1.7**	**1.3**	**4.6**	0.2	1
	September-2017	---	**1.6**	---	---	---	**3.3**	---	ND	---	---	---	**4.4**	0.2	1
	October-2017	ND	---	**6.3**	**1.2**	ND	---	**4.2**	---	**4.3**	**1.4**	**1.5**	---	0.2	1
	April-2018	ND	**1.6**	**3.8**	ND	ND	**2.7**	**5**	ND	**5**	**1.6**	**1.4**	**4.5**	0.14	1
	November-2018	ND	ND	ND	ND	**0.96 J**	ND	ND	ND	ND	ND	ND	**2.1**	0.14	1
	April-2019	ND	**1.4**	ND	ND	ND	**1.3**	**4.1**	ND	**4.9**	**1.2**	**1.1**	**3.8**	0.49	1
	October-2019	ND	ND	ND	**1.2**	ND	ND	**3.2**	ND	**3.6**	ND	ND	**2.5**	---	1
	April-2020	ND	ND	**1.3**	**1.4**	ND	ND	**2.9**	ND	**2.5**	ND	ND	**2.2**	1	1
	October-2020	ND	**0.9 J**	**2.3**	ND	ND	**0.7 J**	**3.8**	ND	**3.5**	**0.8 J**	ND	**2.6**	0.5	1
	April-2021	---	**0.982 J**	**1.71 J**	**0.229 J**	---	**1.01 J**	**5.51**	---	**5.38**	**0.398 J**	**0.223 J**	**2.5 J**	---	---
		ND	---	---	---	ND	---	---	ND	---	---	---	---	---	5
	October-2021	---	**0.9 J**	**2**	**0.6 J**	---	**0.9 J**	**5**	---	**4.6**	**0.6 J**	**0.5 J**	**2.3**	---	---
		ND	---	---	---	ND	---	---	ND	---	---	---	---	---	1
	May-2022	---	**0.6 J**	**1.2**	**0.5 J**	---	**0.7 J**	**3.7**	---	**3.6**	**0.6 J**	---	**1.1**	---	---
		ND	---	---	---	ND	---	---	ND	---	---	ND	---	---	1
	November-2022	---	**0.7 J**	**1.8**	---	---	**0.7 J**	**4**	---	**4.1**	**0.7 J**	---	**2**	---	---
		ND	---	---	ND	ND	---	---	ND	---	---	ND	---	---	1
	May-2023	---	**0.5 J**	**1.7**	---	---	**0.6 J**	**4.1**	---	**4**	---	---	**1.3**	---	---
		ND	---	---	ND	ND	---	---	ND	---	ND	ND	---	---	1
	November-2023	---	**0.6 J**	**1.5**	---	---	**0.8 J**	**3.8**	---	**4**	**0.6 J**	---	**2.2**	---	---
		ND	---	---	ND	ND	---	---	ND	---	---	ND	---	---	1
	May-2024	---	**0.74**	**1.3**	---	**0.79**	**0.87**	**5.4**	---	**6.2**	---	---	**3.2**	---	---
		ND	---	---	ND	---	---	---	ND	---	ND	ND	---	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
m/p-Xylene	March-2014	---	ND	**0.31 J**	---	---	ND	---	ND	---	---	---	ND	---	1
	April-2014	ND	---	---	ND	ND	---	ND	---	ND	ND	ND	---	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.29	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.46	1
	April-2016	---	ND	---	ND	ND	ND	ND	ND	---	ND	---	ND	0.1	1
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	ND	---	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	ND	0.1	1
	October-2017	ND	---	ND	ND	ND	---	ND	---	ND	ND	ND	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28	2
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28	2
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.33	2
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	2
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Methylene chloride	March-2014	---	---	---	---	---	---	---	---	---	---	---	**0.58 J**	---	---
		---	ND	**3.21**	---	---	ND	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	**2.02**	---	---	---	---	---	---	---	---	---	---
		ND	---	---	---	ND	---	ND	---	ND	ND	ND	---	---	1
	October-2014	---	---	---	**2.03**	---	---	---	---	---	---	---	---	---	---
		ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	**0.78 J**	**1.74**	ND	ND	ND	ND	ND	ND	ND	ND	0.55	1
	October-2015	ND	ND	ND	**1.4**	ND	ND	ND	ND	ND	---	ND	ND	0.5	1
	April-2016	---	**0.4 J**	---	**1.5**	ND	ND	ND	ND	---	ND	---	**0.4 J**	0.2	1
	May-2016	ND	---	**0.7 J**	---	---	---	---	---	ND	---	**0.2 J**	---	0.2	1
	October-2016	ND	**0.3 J**	**1.5**	**0.9 J**	ND	ND	ND	ND	ND	ND	ND	**0.3 J**	0.2	1
	May-2017	ND	ND	**1.1**	**1**	ND	ND	ND	ND	ND	ND	ND	**0.3 J**	0.2	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	**0.3 J**	0.2	1
	October-2017	ND	---	**1.1**	**0.7 J**	ND	---	ND	---	ND	ND	ND	---	0.2	1
	April-2018	**1.1 B**	**1.3 B**	**1.5 B**	**1.5 B**	ND	**1.3 B**	**1.3 B**	**1.6 B**	**1.2 B**	**1.4 B**	**1.6 B**	**1.7 B**	0.16	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.16	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	April-2021	---	---	**0.608 J,B**	---	---	---	---	---	**0.543 J,B**	---	---	---	---	---
		ND	ND	---	ND	ND	ND	ND	ND	---	ND	ND	ND	---	5
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Methyl-t-butyl ether	March-2014	---	ND	ND	---	---	ND	---	ND	---	---	---	ND	---	1
	April-2014	---	---	---	**0.16 J**	---	---	**0.17 J**	---	---	---	---	---	---	---
		ND	---	---	---	ND	---	---	---	ND	ND	ND	---	---	1
	October-2014	---	---	---	**0.13 J**	---	---	**0.21 J**	---	---	---	---	**0.13 J**	---	---
		ND	ND	ND	---	ND	ND	---	ND	ND	ND	ND	---	---	1
	April-2015	ND	ND	ND	ND	ND	ND	**0.17 J**	ND	ND	ND	ND	ND	0.13	1
	October-2015	ND	ND	ND	ND	ND	ND	**0.26 J**	ND	ND	---	ND	ND	0.22	1
	April-2016	---	ND	---	**0.1 J**	ND	ND	**0.2 J**	ND	---	ND	---	**0.1 J**	0.1	2
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	ND	---	0.1	2
	October-2016	ND	ND	ND	ND	ND	ND	**0.2 J**	ND	ND	ND	ND	**0.1 J**	0.1	2
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	2
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	ND	0.1	2
	October-2017	ND	---	ND	ND	ND	---	**0.2 J**	---	ND	ND	ND	---	0.1	2
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.16	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.16	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	1
	April-2021	---	---	---	---	---	---	**0.202 J**	---	**0.164 J**	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	ND	---	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
o-Xylene	March-2014	---	ND	ND	---	---	ND	---	ND	---	---	---	ND	---	1
	April-2014	ND	---	---	ND	ND	---	ND	---	ND	ND	ND	---	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.24	1
	April-2016	---	ND	---	ND	ND	ND	ND	ND	---	ND	---	ND	0.1	1
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	ND	---	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	ND	0.1	1
	October-2017	ND	---	ND	ND	ND	---	ND	---	ND	ND	ND	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	1
	April-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Tetrachloroethene	March-2014	---	**1.9**	---	---	---	**1.9**	---	---	---	---	---	**6.17**	---	---
		---	---	**4.64**	---	---	---	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	**3.17**	**0.31 J**	---	**0.61 J**	---	**0.74 J**	**1.23**	**1.9**	---	---	---
		ND	---	---	---	---	---	---	---	---	---	---	---	---	1
	October-2014	---	**2.06**	---	**3.24**	---	**2.05**	**0.78 J**	---	**0.91 J**	**1.17**	**2.22**	**6.23**	---	---
		ND	---	**0.5 J**	---	ND	---	---	ND	---	---	---	---	---	1
	April-2015	ND	**1.51**	**1.81**	**2.04**	**0.77 J**	**1.41**	**0.75 J**	ND	**0.65 J**	ND	**1.32**	**4.3**	0.13	1
	October-2015	ND	**1.43**	**1.11**	**1.49**	**0.7 J**	**1.41**	**0.66 J**	ND	**0.74 J**	---	**1.34**	**3.9**	0.37	1
	April-2016	---	**1.6**	---	**1.4**	ND	**1.6**	**0.8 J**	ND	---	**0.5 J**	---	**4.5**	0.1	1
	May-2016	ND	---	**2.1**	---	---	---	---	---	**0.8 J**	---	**1.4**	---	0.1	1
	October-2016	ND	**1.3**	**2.2**	**1.2**	ND	**1.8**	**1 J**	ND	**0.9 J**	**0.7 J**	**1.3**	**3.3**	0.1	1
	May-2017	ND	**1.2**	**1.8**	**1.1**	ND	**1.7**	ND	ND	**1**	**0.7 J**	**1.2**	**3.6**	0.1	1
	September-2017	---	**1.4**	---	---	---	**1.7**	---	ND	---	---	---	**3.4**	0.1	1
	October-2017	ND	---	**2.1**	**0.5 J**	ND	---	**1.1**	---	**1.1**	**0.6 J**	**1.2**	---	0.1	1
	April-2018	ND	**1.3**	**1.4**	ND	ND	**1.2**	**1.3**	ND	**1.3**	ND	ND	**2.7**	0.17	1
	November-2018	ND	ND	ND	ND	ND	ND	**1.3**	ND	**1.1**	ND	ND	**1.3**	0.17	1
	April-2019	ND	**1.1**	ND	ND	ND	ND	**1.3**	ND	**1.2**	ND	ND	**2.5**	0.28	1
	October-2019	ND	ND	ND	ND	ND	ND	**1.5**	ND	**1.6**	ND	ND	**2.2**	---	1
	April-2020	ND	**1.1**	**1.2**	ND	ND	ND	**1.9**	ND	**1.1**	ND	ND	**2.6**	1	1
	October-2020	ND	**0.5 J**	**0.6 J**	ND	ND	ND	**1**	ND	**0.7 J**	ND	ND	**1.4**	0.5	1
	April-2021	---	**1.13**	**0.622 J**	---	---	**0.823 J**	**2.39**	---	**2.27**	---	---	**2.34**	---	---
		ND	---	---	ND	ND	---	---	ND	---	ND	ND	---	---	1
	October-2021	---	**0.9 J**	**0.8 J**	---	---	**0.7 J**	**2.4**	---	**1.6**	---	---	**1.8**	---	---
		ND	---	---	ND	ND	---	---	ND	---	ND	ND	---	---	1
	May-2022	---	**0.9 J**	**0.7 J**	---	---	**0.8 J**	**2.7**	---	**2**	---	**0.5 J**	**1.3**	---	---
		ND	---	---	ND	ND	---	---	ND	---	ND	---	---	---	1
	November-2022	---	**1 J**	**1 J**	---	---	**0.8 J**	**2.5**	---	**2**	---	**0.7 J**	**1.9**	---	---
		ND	---	---	ND	ND	---	---	ND	---	ND	---	---	---	1
	May-2023	---	**0.9 J**	**1**	---	---	**0.7 J**	**2.5**	---	**3**	---	---	**1.9**	---	---
		ND	---	---	ND	ND	---	---	ND	---	ND	ND	---	---	1
	November-2023	---	**0.8 J**	**0.8 J**	---	---	**0.7 J**	**1.9**	---	**2.4**	---	**0.5 J**	**1.7**	---	---
		ND	---	---	ND	ND	---	---	ND	---	ND	---	---	---	1
	May-2024	---	**0.84**	**1**	---	---	**0.72**	**2.2**	---	**3.4**	---	---	**1.9**	---	---
		ND	---	---	ND	ND	---	---	ND	---	ND	ND	---	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Trichloroethene	March-2014	---	**0.61 J**	---	---	---	**2.16**	---	---	---	---	---	**5.89**	---	---
		---	---	**2.81**	---	---	---	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	**3.31**	---	---	**0.24 J**	---	**0.39 J**	**0.55 J**	**0.6 J**	---	---	---
		ND	---	---	---	ND	---	---	---	---	---	---	---	---	1
	October-2014	---	**0.58 J**	---	**3.37**	---	**2.57**	**0.32 J**	---	**0.47 J**	**0.65 J**	**0.91 J**	**4.83**	---	---
		ND	---	**0.35 J**	---	ND	---	---	ND	---	---	---	---	---	1
	April-2015	ND	**0.46 J**	**1.36**	**2.35**	**0.7 J**	**2.46**	**0.28 J**	ND	**0.37 J**	ND	**0.63 J**	**3.56**	0.19	1
	October-2015	ND	**0.51 J**	**0.91 J**	**1.78**	**1.05**	**2.99**	**0.29 J**	ND	**0.36 J**	---	**0.69 J**	**3.54**	0.27	1
	April-2016	---	**0.5 J**	---	**1.4**	**0.2 J**	**3.7**	**0.3 J**	ND	---	**0.6 J**	---	**3.9**	0.1	1
	May-2016	ND	---	**1.5**	---	---	---	---	---	**0.4 J**	---	**0.6 J**	---	0.1	1
	October-2016	ND	**0.4 J**	**1.5**	**1.3**	ND	**4.2**	**0.4 J**	ND	**0.5 J**	**1.2**	**0.8 J**	**2.8**	0.1	1
	May-2017	ND	**0.4 J**	**1.2**	**1.1**	ND	**4**	ND	ND	**0.5 J**	**1.3**	**0.6 J**	**3**	0.1	1
	September-2017	---	**0.5 J**	---	---	---	**4**	---	ND	---	---	---	**2.6**	0.1	1
	October-2017	ND	---	**1.5**	**0.4 J**	ND	---	**0.4 J**	---	**0.5 J**	**1**	**0.7 J**	---	0.1	1
	April-2018	ND	ND	**1.5**	ND	ND	**3.2**	ND	ND	ND	**1.6**	ND	**2.6**	0.15	1
	November-2018	ND	ND	ND	ND	**0.96 J**	**2.3**	ND	ND	ND	ND	ND	**0.99 J**	0.15	1
	April-2019	ND	ND	ND	ND	ND	**1.5**	ND	ND	ND	ND	ND	**1.8**	0.22	1
	October-2019	ND	ND	ND	ND	ND	**1.4**	ND	ND	ND	ND	ND	**1.5**	---	1
	April-2020	ND	ND	ND	ND	ND	**1.1**	ND	ND	ND	ND	ND	**1.8**	1	1
	October-2020	ND	ND	**0.8 J**	ND	ND	**1 J**	**0.5 J**	ND	**0.5 J**	**0.6 J**	ND	**1.3**	0.5	1
		ND	ND	---	ND	ND	---	---	ND	---	---	ND	---	---	1
		ND	---	---	ND	ND	---	---	ND	---	---	ND	---	---	1
		ND	---	---	ND	ND	---	---	ND	---	---	ND	---	---	1
	October-2021	---	---	**0.7 J**	---	---	**1.1**	**0.6 J**	---	**0.7 J**	---	---	**1 J**	---	---
		ND	ND	---	ND	ND	---	---	ND	---	ND	ND	---	---	1
	May-2022	---	---	**0.6 J**	---	---	**1.2**	**0.7 J**	---	**0.7 J**	**0.6 J**	---	**0.6 J**	---	---
		ND	ND	---	ND	ND	---	---	ND	---	---	ND	---	---	1
	November-2022	---	---	**0.7 J**	---	---	**1.1**	**0.6 J**	---	**0.7 J**	**0.6 J**	---	**1 J**	---	---
		ND	ND	---	ND	ND	---	---	ND	---	---	ND	---	---	1
	May-2023	---	---	**0.8 J**	---	---	**1**	**0.8 J**	---	**0.8 J**	---	---	**0.9 J**	---	---
		ND	ND	---	ND	ND	---	---	ND	---	ND	ND	---	---	1
	November-2023	---	---	**0.6 J**	---	---	**1.1**	**0.6 J**	---	**0.8 J**	**0.5 J**	---	**0.9 J**	---	---
		ND	ND	---	ND	ND	---	---	ND	---	---	ND	---	---	1
	May-2024	---	---	---	---	---	**0.99**	**0.66**	---	**1**	---	---	**1**	---	---
		ND	ND	ND	ND	ND	---	---	ND	---	ND	ND	---	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Trichlorofluoromethane	March-2014	---	---	---	---	---	**0.29 J**	---	---	---	---	---	**0.74 J**	---	---
		---	ND	**0.92 J**	---	---	---	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	**0.26 J**	---	---	**0.4 J**	---	**0.43 J**	**0.23 J**	**0.35 J**	---	---	---
		ND	---	---	---	ND	---	---	---	---	---	---	---	---	1
	October-2014	---	---	---	---	---	---	**0.38 J**	---	**0.36 J**	---	---	**0.6 J**	---	---
		ND	ND	ND	ND	ND	ND	---	ND	---	ND	ND	---	---	1
	April-2015	ND	ND	**0.51 J**	ND	ND	ND	**0.36 J**	ND	**0.31 J**	ND	ND	**0.53 J**	0.23	1
	October-2015	ND	ND	ND	ND	ND	ND	**0.36 J**	ND	**0.28 J**	---	ND	**0.42 J**	0.27	1
	April-2016	---	**0.2 J**	---	**0.1 J**	ND	**0.3 J**	**0.4 J**	ND	---	ND	---	**0.5 J**	0.1	1
	May-2016	ND	---	**0.6 J**	---	---	---	---	---	**0.4 J**	---	**0.2 J**	---	0.1	1
	October-2016	ND	**0.1 J**	**0.7 J**	**0.1 J**	ND	**0.3 J**	**0.5 J**	ND	**0.5 J**	ND	**0.2 J**	**0.4 J**	0.1	1
	May-2017	ND	ND	**0.5 J**	ND	ND	**0.3 J**	ND	ND	**0.5 J**	**0.1 J**	**0.1 J**	**0.2 J**	0.1	1
	September-2017	---	**0.2 J**	---	---	---	**0.3 J**	---	ND	---	---	---	**0.4 J**	0.1	1
	October-2017	ND	---	**0.8 J**	ND	ND	---	**0.6 J**	---	**0.5 J**	ND	**0.2 J**	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	**0.5 J**	ND	ND	ND	0.5	1
	April-2021	---	---	---	---	---	---	**0.429 J**	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	---	5
	October-2021	---	---	---	---	---	---	**0.6 J**	---	**0.6 J**	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	ND	---	ND	ND	ND	---	1
	May-2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2022	---	---	---	---	---	---	**0.5 J**	---	---	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	---	---	---	---	---	---	---	---	**0.57**	---	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Vinyl chloride	March-2014	---	---	---	---	---	---	---	---	---	---	---	**0.23 J**	---	---
		---	ND	ND	---	---	ND	---	ND	---	---	---	---	---	1
	April-2014	---	---	---	---	---	---	---	---	---	**0.32 J**	**0.33 J**	---	---	---
		ND	---	---	ND	ND	---	ND	---	ND	---	---	---	---	1
	October-2014	---	---	---	---	---	---	---	---	---	**0.46 J**	**0.28 J**	---	---	---
		ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	ND	---	1
	April-2015	ND	ND	ND	ND	**0.37 J**	ND	ND	ND	ND	ND	ND	ND	0.23	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.32	1
	April-2016	---	ND	---	**0.1 J**	ND	ND	ND	ND	---	**0.1 J**	---	**0.2 J**	0.1	1
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	**0.1 J**	---	0.1	1
	October-2016	ND	ND	**0.1 J**	ND	ND	ND	ND	ND	ND	**0.2 J**	ND	**0.1 J**	0.1	1
	May-2017	ND	ND	**0.1 J**	**0.1 J**	ND	ND	ND	ND	ND	**0.3 J**	ND	**0.1 J**	0.1	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	**0.1 J**	0.1	1
	October-2017	ND	---	**0.1 J**	ND	ND	---	ND	---	ND	**0.2 J**	ND	---	0.1	1
	April-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.36	1
	November-2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.36	1
	April-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.33	1
	October-2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2**	ND	ND	---	1
	April-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.1**	ND	ND	1	1
	October-2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.9**	ND	ND	1	1
	April-2021	---	---	---	---	---	---	---	---	---	**0.867 J**	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	1
	October-2021	---	---	---	---	---	---	---	---	---	**1.7**	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	1
	May-2022	---	---	---	---	---	---	---	---	---	**1.1**	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	1
	November-2022	---	---	---	---	---	---	---	---	---	**1.9**	---	---	---	---
		ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	1
	May-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	November-2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	May-2024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.5

Table A-2. Historical Volatile Organic Compound Summary - Eastern Boundary Zone 3 Monitoring Wells

Well ID		MW-P4	MW-P9	MW-P106	MW-P417	MW-P440	RW-P109	RW-P165	RW-P171-1	RW-P264	RW-P440	RW-P441	RW-P584	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)												(ug/L	(ug/L
Xylenes	March-2014	---	ND	**0.31 J**	---	---	ND	---	ND	---	---	---	ND	---	1
	April-2014	ND	---	---	ND	ND	---	ND	---	ND	ND	ND	---	---	1
	October-2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1
	April-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.29	1
	October-2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	0.46	1
	April-2016	---	ND	---	ND	ND	ND	ND	ND	---	ND	---	ND	0.1	1
	May-2016	ND	---	ND	---	---	---	---	---	ND	---	ND	---	0.1	1
	October-2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1
	September-2017	---	ND	---	---	---	ND	---	ND	---	---	---	ND	0.1	1
	October-2017	ND	---	ND	ND	ND	---	ND	---	ND	ND	ND	---	0.1	1

--- = not applicable or available

B = Parameter was detected at a concentration less than 5 or 10 (common lab contaminants only) times the concentration detected in the field/trip/method blank. Detection is not validated.

J = Qualifier used if quantitation of parameter is equal to or less than the MDL but greater than the RL. Concentration is considered to be estimated and not validated.

MDL = laboratory's Method Detection Limit

ND = Not Detected

RL = laboratory's Reporting Limit

ug/L = micrograms per liter

Table A-3. Historical Volatile Organic Compound Summary
Eastern Boundary Zone 4 Well Network

Well ID		TW-14B	TW-16A	TW-5B	TW-6B	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)				(ug/L)	(ug/L)
Acetone	March-2014	ND	ND	---	ND	---	5
	April-2014	---	---	ND	---	---	5
	October-2014	ND	ND	ND	ND	---	5
	April-2015	ND	ND	---	---	0.94	5
		---	---	ND	ND	0.99	5
	October-2015	---	ND	---	---	0.94	2
	November-2015	ND	---	ND	ND	0.99	5
	May-2016	ND	ND	ND	ND	3	5
	July-2016	---	---	---	ND	3	5
	October-2016	ND	ND	ND	ND	3	5
	May-2017	ND	ND	ND	ND	3	5
	September-2017	ND	ND	---	ND	3	5
	October-2017	---	---	ND	---	3	5
	May-2018	**3 J,B**	**3.6 J,B**	ND	ND	0.6	5
	October-2018	ND	**3.4 J**	**2.8 J,B**	**1.5 J,B**	0.6	5
	April-2019	**2 J,B**	ND	**2.1 J,B**	ND	1.6	5
	September-2019	ND	ND	ND	ND	---	5
	October-2020	ND	ND	ND	ND	---	5
	April-2021	ND	ND	ND	ND	---	50
	October-2021	---	---	**6.5**	---	---	---
		ND	ND	---	ND	---	5
	April-2022	ND	ND	ND	ND	---	5
	October-2022	ND	ND	ND	ND	---	5
	April-2023	---	---	ND	ND	---	5
	May-2023	ND	ND	---	---	---	5
	October-2023	ND	---	ND	ND	---	5
	November-2023	---	ND	---	---	---	5
	May-2024	ND	ND	ND	ND	---	5

Table A-3. Historical Volatile Organic Compound Summary
Eastern Boundary Zone 4 Well Network

Well ID		TW-14B	TW-16A	TW-5B	TW-6B	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)				(ug/L)	(ug/L)
Chloroform	March-2014	ND	ND	---	ND	---	1
	April-2014	---	---	**0.16 J**	---	---	1
	October-2014	ND	ND	**0.18 J**	ND	---	1
	April-2015	---	---	ND	ND	0.15	1
		ND	ND	---	---	0.32	1
	October-2015	---	ND	---	---	0.32	1
	November-2015	ND	---	ND	ND	0.15	1
	May-2016	ND	**0.1**	**0.1 J**	ND	0.1	1
	July-2016	---	---	---	ND	0.1	1
	October-2016	ND	**0.1 J**	**0.1 J**	ND	0.1	1
	May-2017	ND	**0.1 J,B**	**0.1 J,B**	ND	0.1	1
	September-2017	ND	ND	---	ND	0.1	1
	October-2017	---	---	**0.1 J**	---	0.1	1
	May-2018	ND	ND	ND	ND	0.21	1
	October-2018	ND	ND	ND	ND	0.21	1
	April-2019	ND	ND	ND	ND	0.2	1
	September-2019	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	---	1
	April-2021	---	**0.123 J**	---	---	---	---
		ND	---	ND	ND	---	5
	October-2021	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	---	1
	April-2023	---	---	ND	ND	---	1
	May-2023	ND	ND	---	---	---	1
	October-2023	ND	---	ND	ND	---	1
	November-2023	---	ND	---	---	---	1
	May-2024	ND	ND	ND	ND	---	0.5

Table A-3. Historical Volatile Organic Compound Summary
Eastern Boundary Zone 4 Well Network

Well ID		TW-14B	TW-16A	TW-5B	TW-6B	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)				(ug/L)	(ug/L)
Dichlorodifluoromethane	March-2014	ND	ND	---	ND	---	1
	April-2014	---	---	ND	---	---	1
	October-2014	ND	ND	ND	ND	---	1
	April-2015	---	---	ND	ND	0.31	1
		ND	ND	---	---	0.35	1
	October-2015	---	ND	---	---	0.35	1
	November-2015	ND	---	ND	ND	0.31	1
	May-2016	ND	ND	ND	**0.2 J**	0.1	1
	July-2016	---	---	---	**0.3 J**	0.1	1
	October-2016	ND	ND	ND	**0.3 J**	0.1	1
	May-2017	ND	ND	ND	**0.2 J**	0.1	1
	September-2017	ND	ND	---	**0.3 J**	0.1	1
	October-2017	---	---	ND	---	0.1	1
	May-2018	ND	ND	ND	ND	0.23	1
	October-2018	ND	ND	ND	ND	0.23	1
	April-2019	ND	ND	ND	ND	0.24	1
	September-2019	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	---	5
	October-2021	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	---	1
	April-2023	---	---	ND	ND	---	1
	May-2023	ND	ND	---	---	---	1
	October-2023	ND	---	ND	ND	---	1
	November-2023	---	ND	---	---	---	1
	May-2024	ND	ND	ND	ND	---	0.5

Table A-3. Historical Volatile Organic Compound Summary
Eastern Boundary Zone 4 Well Network

Well ID		TW-14B	TW-16A	TW-5B	TW-6B	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)				(ug/L)	(ug/L)
Methylene chloride	March-2014	ND	ND	---	ND	---	1
	April-2014	---	---	ND	---	---	1
	October-2014	ND	ND	ND	ND	---	1
	April-2015	ND	ND	---	---	0.5	1
		---	---	ND	ND	0.55	1
	October-2015	---	ND	---	---	0.5	1
	November-2015	ND	---	ND	ND	0.55	1
	May-2016	ND	ND	ND	ND	0.2	1
	July-2016	---	---	---	ND	0.2	1
	October-2016	ND	ND	ND	ND	0.2	1
	May-2017	ND	ND	ND	ND	0.2	1
	September-2017	ND	ND	---	ND	0.2	1
	October-2017	---	---	ND	---	0.2	1
	May-2018	ND	**1.2 B**	ND	ND	0.16	1
	October-2018	ND	ND	**1.2 B**	ND	0.16	1
	April-2019	ND	ND	ND	ND	0.3	1
	September-2019	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	---	1
	April-2021	---	---	**0.705 J,B**	---	---	---
		ND	ND	---	ND	---	5
	October-2021	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	---	1
	April-2023	---	---	ND	ND	---	1
	May-2023	ND	ND	---	---	---	1
	October-2023	ND	---	ND	ND	---	1
	November-2023	---	ND	---	---	---	1
	May-2024	ND	ND	ND	ND	---	0.5

Table A-3. Historical Volatile Organic Compound Summary
Eastern Boundary Zone 4 Well Network

Well ID		TW-14B	TW-16A	TW-5B	TW-6B	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)				(ug/L)	(ug/L)
Tetrachloroethene	March-2014	ND	ND	---	ND	---	1
	April-2014	---	---	ND	---	---	1
	October-2014	ND	ND	ND	ND	---	1
	April-2015	---	---	ND	ND	0.13	1
		ND	ND	---	---	0.37	1
	October-2015	---	ND	---	---	0.37	1
	November-2015	ND	---	ND	ND	0.13	1
	May-2016	ND	ND	ND	**0.1 J**	0.1	1
	July-2016	---	---	---	**0.1 J**	0.1	1
	October-2016	ND	ND	ND	**0.1 J**	0.1	1
	May-2017	ND	ND	ND	ND	0.1	1
	September-2017	ND	ND	---	**0.2 J**	0.1	1
	October-2017	---	---	ND	---	0.1	1
	May-2018	ND	ND	ND	ND	0.17	1
	October-2018	ND	ND	ND	ND	0.17	1
	April-2019	ND	ND	ND	ND	0.28	1
	September-2019	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	---	1
	April-2023	---	---	ND	ND	---	1
	May-2023	ND	ND	---	---	---	1
	October-2023	ND	---	ND	ND	---	1
	November-2023	---	ND	---	---	---	1
	May-2024	ND	ND	ND	ND	---	0.5

Table A-3. Historical Volatile Organic Compound Summary
Eastern Boundary Zone 4 Well Network

Well ID		TW-14B	TW-16A	TW-5B	TW-6B	MDL	RL
Parameter	Monitoring Event	Concentration (ug/L)				(ug/L)	(ug/L)
Toluene	March-2014	ND	ND	---	ND	---	1
	April-2014	---	---	ND	---	---	1
	October-2014	ND	ND	ND	ND	---	1
	April-2015	---	---	ND	ND	0.13	1
		ND	ND	---	---	0.22	1
	October-2015	---	ND	---	---	0.22	1
	November-2015	ND	---	ND	ND	0.13	1
	May-2016	ND	ND	ND	ND	0.1	1
	July-2016	---	---	---	ND	0.1	1
	October-2016	ND	ND	ND	ND	0.1	1
	May-2017	ND	ND	ND	ND	0.1	1
	September-2017	**0.2 J**	ND	---	ND	0.1	1
	October-2017	---	---	**0.2 J**	---	0.1	1
	May-2018	ND	ND	ND	ND	0.17	1
	October-2018	ND	ND	ND	ND	0.17	1
	April-2019	ND	ND	ND	ND	0.2	1
	September-2019	ND	ND	ND	ND	---	1
	October-2020	ND	ND	ND	ND	---	1
	April-2021	ND	ND	ND	ND	---	1
	October-2021	ND	ND	ND	ND	---	1
	April-2022	ND	ND	ND	ND	---	1
	October-2022	ND	ND	ND	ND	---	1
	April-2023	---	---	ND	ND	---	1
	May-2023	ND	ND	---	---	---	1
	October-2023	ND	---	ND	ND	---	1
	November-2023	---	ND	---	---	---	1
	May-2024	ND	ND	ND	ND	---	0.5

--- = not applicable or available

B = Parameter was detected at a concentration less than 5 or 10 (common lab contaminants only) times the concentration detected in the field/trip/method blank. Detection is not validated.

J = Qualifier used if quantitation of parameter is equal to or less than the MDL but greater than the RL. Concentration is considered to be estimated and not validated.

MDL = laboratory's Method Detection Limit

ND = Not Detected

RL = laboratory's Reporting Limit

ug/L = micrograms per liter

Appendix B

Groundwater Well Network Summary
Geologic Boring Logs and Well Construction Diagrams

Groundwater Monitoring Well Network Summary

Well Network	Sample Frequency	Water Level Frequency	Aquifer Zone	Well ID	Northing	Easting	Top of PVC Casing Elevation (ft, AMSL)	Ground Elevation (ft, AMSL)	Well Diameter (in)	Screen Interval (ft)	Well Depth (ft)
COMAR Background	Semi-Annual	Semi-Annual	3	TW-21	459062.88	892835.57	158.92	156.81	4	83-93	96
COMAR Compliance	Semi-Annual	Semi-Annual	3	TW-15	461449.10	897375.22	117.11	115.36	6	74-89	89
COMAR Compliance	Semi-Annual	Semi-Annual	3	TW-17	462125.40	896200.80	132.10	130.20	4	50-65	65
COMAR Compliance	Semi-Annual	Semi-Annual	3	TW-22	460942.23	894670.06	189.11	187.14	4	135-145	148
COMAR Compliance	Semi-Annual	Semi-Annual	3	TW-7A	461516.20	895291.90	127.68	126.20	4	54.5-74.5	76
COMAR Compliance	Semi-Annual	Semi-Annual	3	TW-8	460613.96	894405.41	139.59	138.24	6	89-104	104
COMAR Compliance	Semi-Annual	Semi-Annual	3	TW-9B	459674.68	893158.65	133.85	131.88	4	76-81	83
COMAR Compliance	Water Level Only	Semi-Annual	3	TW-15B	461467.17	897407.67	116.42	115.18	4	52-67	67
COMAR Compliance	Water Level Only	Semi-Annual	3	TW-22A	460950.23	894680.21	188.25	186.21	4	100-120	120
COMAR Compliance	Water Level Only	Semi-Annual	3	TW-22B	460927.42	894651.95	189.70	187.79	4	67-77	77
COMAR Compliance	Water Level Only	Semi-Annual	3	TW-9C	459686.19	893159.30	133.93	131.47	4	61-71	74
Subtitle D Background	Semi-Annual	Monthly	3	TW-10A	457191.55	892555.25	194.60	192.43	4	110-120	130.05
Subtitle D Background	Semi-Annual	Monthly	3	TW-32	458243.56	892620.75	175.94	174.86	4	110-120	122.74
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-1	455902.14	893924.41	193.44	191.86	6	157-172	174.1
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-20R	458113.75	894606.68	124.95	123.27	4	35-45	45
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-27	457280.14	896847.26	182.96	180.98	4	140-160	160.26
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-28	456527.28	895044.48	208.95	206.92	4	174-194	196.4
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-29	457235.13	893693.78	143.55	141.94	4	102-122	124.05
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-2A	456720.07	895906.67	197.78	195.85	6	160-175	175
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-3	456498.30	896711.90	180.24	178.70	6	143-158	160
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-30	456402.61	893117.41	220.83	218.53	4	165-185	185
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-31	456047.10	894540.60	188.52	186.80	4	150-170	171.2
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-4	458101.54	896995.73	112.47	110.89	6	79-94	96
Subtitle D Compliance	Semi-Annual	Monthly	3	TW-4B	458090.89	896998.89	113.49	111.48	4	31-46	46
Subtitle D Compliance	Semi-Annual	Semi-Annual	3	TW-14	459536.03	897316.47	123.19	121.58	6	86-101	101
Subtitle D Compliance	Semi-Annual	Semi-Annual	3	TW-14A	459531.08	897320.37	123.36	121.81	6	50-55	57
Subtitle D Compliance	Semi-Annual	Semi-Annual	3	TW-19	458553.85	894791.83	119.10	118.19	4	27-42	42
Subtitle D Compliance	Semi-Annual	Semi-Annual	3	TW-24	460727.90	897132.80	109.21	108.00	4	62-72	72
Subtitle D Compliance	Semi-Annual	Semi-Annual	3	TW-24A	460728.70	897140.60	108.68	107.70	4	39-49	49
Subtitle D Compliance	Semi-Annual	Semi-Annual	3	TW-25	459040.71	897281.19	117.55	115.70	4	81.5-91.5	91.5
Subtitle D Compliance	Semi-Annual	Semi-Annual	3	TW-25A	459021.98	897281.05	117.00	114.55	4	49-59	59
Subtitle D Compliance	Semi-Annual	Semi-Annual	3	TW-5	458580.60	897215.80	104.67	103.30	6	78-93	93
Subtitle D Compliance	Semi-Annual	Semi-Annual	3	TW-5A	458577.07	897220.01	105.47	103.12	6	44-49	49
Subtitle D Compliance	Semi-Annual	Semi-Annual	3	TW-6	460265.20	897388.00	107.44	105.40	6	47-62	62
Subcell 9.2 Sentry	Semi-Annual	Semi-Annual	---	S-1	457970.76	896290.85	130.05	---	4	40-50	50
Subcell 9.2 Sentry	Semi-Annual	Semi-Annual	---	S-2	457973.07	896070.89	130.22	---	4	50-60	60
Eastern Boundary	Annual	Annual	3	MW-P4	---	---	103.31	---	4	95-105	105
Eastern Boundary	Annual	Annual	3	RW-P171-1	---	---	---	---	4	55-60	60.5
Eastern Boundary	Annual	Annual	4	TW-14B	459526.83	897306.48	123.28	122.00	4	215-235	235
Eastern Boundary	Annual	Annual	4	TW-16A	462177.00	897270.90	117.09	115.00	4	134-154	154
Eastern Boundary	Annual	Annual	4	TW-5B	458561.78	897234.96	104.08	102.09	4	190-220	223
Eastern Boundary	Annual	Annual	4	TW-6B	460233.62	897397.08	107.19	105.00	4	200-220	220

Groundwater Monitoring Well Network Summary

Well Network	Sample Frequency	Water Level Frequency	Aquifer Zone	Well ID	Northing	Easting	Top of PVC Casing Elevation (ft, AMSL)	Ground Elevation (ft, AMSL)	Well Diameter (in)	Screen Interval (ft)	Well Depth (ft)
Eastern Boundary	Semi-Annual	Semi-Annual	3	MW-P106	---	---	107.62	---	4	40-50	50
Eastern Boundary	Semi-Annual	Semi-Annual	3	MW-P417	---	---	112.75	---	4	55-65	65
Eastern Boundary	Semi-Annual	Semi-Annual	3	MW-P440	---	---	115.25	---	4	55-65	65
Eastern Boundary	Semi-Annual	Semi-Annual	3	MW-P9	---	---	112.32	---	4	70-80	80
Eastern Boundary	Semi-Annual	Semi-Annual	3	RW-P109	---	---	130.48	---	4	---	136
Eastern Boundary	Semi-Annual	Semi-Annual	3	RW-P165	---	---	---	---	4	124-129	129
Eastern Boundary	Semi-Annual	Semi-Annual	3	RW-P264	---	---	87.88	---	4	80-90	90
Eastern Boundary	Semi-Annual	Semi-Annual	3	RW-P440	---	---	117.11	---	4	63-68	68
Eastern Boundary	Semi-Annual	Semi-Annual	3	RW-P441	---	---	117.59	---	4	67-72	72
Eastern Boundary	Semi-Annual	Semi-Annual	3	RW-P584	---	---	---	---	4	70-75	75
Southern Boundary	Semi-Annual	Semi-Annual	3	1367 MW-Z3	---	---	---	---	4	145-150	150
Southern Boundary	Semi-Annual	Semi-Annual	3	1377 MW-Z3	---	---	---	---	4	145-150	150
Southern Boundary	Semi-Annual	Semi-Annual	3	1722 MW-Z3	---	---	---	---	---	145-150	150
Additional Off-Site	Water Level Only	Semi-Annual	3	RW-P161	---	---	105.36	---	4	---	70
Additional Off-Site	Water Level Only	Semi-Annual	3	RW-P564	456223.33	897682.99	176.31	---	4	153-160	160
Additional On-Site	Water Level Only	Monthly	3	TW-10B	457208.29	892528.58	195.96	193.81	4	150-170	172.6
Additional On-Site	Water Level Only	Monthly	3	Well-N	456295.41	894016.46	195.48	193.65	4	125-170	153
Additional On-Site	Water Level Only	Monthly	3	Well-W	456098.36	893550.67	203.57	201.93	4	135-155	155
Additional On-Site	Water Level Only	Semi-Annual	3	TW-12	460285.11	895493.91	142.14	140.68	4	94-109	109
Additional On-Site	Water Level Only	Semi-Annual	3	TW-13	460942.28	896640.78	117.54	116.18	6	63-78	80
Additional On-Site	Water Level Only	Semi-Annual	3	TW-16	462185.29	897298.21	114.95	113.27	6	53-63	63
Additional On-Site	Water Level Only	Semi-Annual	3	TW-17A	462133.16	896219.71	131.59	129.69	4	84-94	98
Additional On-Site	Water Level Only	Semi-Annual	3	TW-18	459267.72	894678.07	128.28	125.84	4	32-47	47
Additional On-Site	Water Level Only	Semi-Annual	3	TW-23R	456687.87	891801.75	239.16	238.33	4	172-189	184.95
Additional On-Site	Water Level Only	Semi-Annual	3	TW-7	461525.80	895284.10	131.58	130.50	6	81-96	96
Additional On-Site	Water Level Only	Semi-Annual	3	TW-8A	460610.41	894374.17	139.80	137.70	4	46-61	61
Additional On-Site	---	---	4	TW-9	459719.43	893248.91	131.32	130.00	6	148-163	163
Additional On-Site	---	---	1 & 2	TW-11A	458947.27	893500.23	138.59	137.12	4	17-32	34
Additional On-Site	---	---	1 & 2	TW-2	456714.06	895927.62	197.70	195.41	6	84-99	99
Additional On-Site	---	---	1 & 2	TW-21A	459071.74	892838.73	159.77	157.48	4	50-70	70
Additional On-Site	---	---	1 & 2	TW-3A	456495.18	896715.69	181.51	178.42	6	53-58	58
Additional On-Site	---	---	1 & 2	TW-6A	460259.93	897392.88	106.39	104.12	6	8-13	15
Additional On-Site	---	---	1 & 2	TW-9A	459621.34	893054.54	131.36	130.34	4	6-16	16

--- = not applicable or available

ft = feet

ft, AMSL = feet, Above Mean Sea Level

in = inches

Notes:

1. Survey information provided by BAI Group Inc.
2. Screen intervals and well depth are measured from the ground surface and obtained from well logs or the Monitoring Well Classification Scheme (Table 2) included in the November 2009 Environmental Mo

Drinking Water Well Summary

Well Network	Sample Frequency	Aquifer Zone	Well ID	Northing	Easting	Top of PVC Casing Elevation (ft, AMSL)	Ground Elevation (ft, AMSL)	Well Diameter (in)	Screen Interval (ft)	Well Depth (ft)
Eastern Boundary	Biennial	4	P-109-Z4	---	---	128.69	---	4	200-215	136
Eastern Boundary	Biennial	4	P-145-Z4	---	---	---	---	4	---	---
Eastern Boundary	Biennial	4	P 160 Z4	---	---	119.99	---	4	255-260; 240-245; 210-220	260
Eastern Boundary	Biennial	4	P-161-Z4	---	---	105.62	---	4	258-273	273
Eastern Boundary	Biennial	4	P-162-Z4	---	---	107.25	---	4	241-256	256
Eastern Boundary	Biennial	4	P-164-Z4	---	---	109.54	---	4	255-270	270
Eastern Boundary	Biennial	4	P-165-Z4	---	---	---	---	4	322-332	340
Eastern Boundary	Biennial	4	P-166-Z4	---	---	---	---	4	285-305	305
Eastern Boundary	Biennial	4	P-168-Z4	---	---	---	---	4	294-314	314
Eastern Boundary	Biennial	4	P-169-Z4	---	---	---	---	---	---	---
Eastern Boundary	Biennial	4	P-257-Z4	---	---	109.18	---	4	278-293	293
Eastern Boundary	Biennial	4	P-261-Z4	---	---	112.75	---	4	257-272	272
Eastern Boundary	Biennial	4	P-264-Z4	---	---	---	---	4	---	---
Eastern Boundary	Biennial	4	P-277-Z4	---	---	---	---	4	340-355	355
Eastern Boundary	Biennial	4	P-323-Z4	---	---	106.50	---	4	250-265	265
Eastern Boundary	Biennial	4	P-359-Z4	---	---	104.97	---	4	242-257	257
Eastern Boundary	Biennial	4	P-383-Z4	---	---	---	---	---	---	---
Eastern Boundary	Biennial	4	P-412-Z4	---	---	---	---	4	300-320	320
Eastern Boundary	Biennial	4	P-417-Z4	---	---	---	---	4	197-182	197
Eastern Boundary	Biennial	4	P-440-Z4	---	---	---	---	4	198-183	198
Eastern Boundary	Biennial	4	P-441-Z4R	---	---	---	---	4	285-305	305
Eastern Boundary	Biennial	4	P-478-Z4	---	---	---	---	4	105-110	110
Southern Boundary	Annual	3	200 RW-Z3	---	---	---	---	4	142-49	149
Southern Boundary	Annual	3	202 RW-Z3	---	---	---	---	4	139-146	146
Southern Boundary	Annual	3	1353 RW-Z3	---	---	---	---	---	---	---
Southern Boundary	Annual	3	1359 RW-Z3	---	---	---	---	---	---	---
Southern Boundary	Annual	3	1417 RW-Z3	---	---	---	---	4	155-160	160
Southern Boundary	Annual	3	1437 RW-Z3	---	---	---	---	4	173-180	180
Southern Boundary	Annual	3	1439 RW-Z3	---	---	---	---	4	220-230	230
Southern Boundary	Annual	3	1441 RW-Z3	---	---	---	---	---	---	---
Southern Boundary	Annual	3	1711 RW-Z3	---	---	---	---	---	---	---
Southern Boundary	Annual	3	1712 RW-Z3	---	---	---	---	---	---	---
Southern Boundary	Annual	3	1714 RW-Z3	---	---	---	---	---	---	---
Southern Boundary	Annual	3	1716 RW-Z3	---	---	---	---	---	---	---
Southern Boundary	Annual	3	1308 RW-Z3	---	---	---	---	---	---	---
Southern Boundary	Annual	3	1312 RW-Z3	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1361 DMR-Z4	---	---	---	---	4	135-140	140
Southern Boundary	Biennial	4	1363 DMR-Z4	---	---	---	---	4	139-132	139
Southern Boundary	Biennial	4	1365 DMR-Z4	---	---	---	---	4	129-138	138

Drinking Water Well Summary

Well Network	Sample Frequency	Aquifer Zone	Well ID	Northing	Easting	Top of PVC Casing Elevation (ft, AMSL)	Ground Elevation (ft, AMSL)	Well Diameter (in)	Screen Interval (ft)	Well Depth (ft)
Southern Boundary	Biennial	4	1367 DMR-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1369 DMR-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1371 DMR-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1373 DMR-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1375 DMR-Z4	---	---	---	---	4	141-146	146
Southern Boundary	Biennial	4	1377 DMR-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1718 SD-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1721 SD-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1722 SD-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1724 SD-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1726 SD-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1728 SD-Z4	---	---	---	---	---	---	---
Southern Boundary	Biennial	4	1730 SD-Z4	---	---	---	---	---	---	---

--- = not applicable or available

ft = feet

ft, AMSL = feet, Above Mean Sea Level

in = inches

Notes:

1. Survey information provided by BAI Grc

2. Screen intervals and well depth are measured from the ground surface and obtained from well logs or the Monitoring Well Classification Scheme (Table 2) included in the November 2009 Environmental Monitoring Plan.

R-131 (7-77) EMERGENCY NO. (If any) –

B 1 4196 SEQUENCE NO. (WRA USE ONLY)
2 3 (SEQ. NO.) 6
THIS NUMBER IS TO BE PUNCHED COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MARYLAND 21401
APPLICATION FOR PERMIT TO DRILL WELL

WRA PERMIT NUMBER AA 74 3259
FILL IN THIS FORM COMPLETELY

DATE RECEIVED (WRA USE ONLY) JUN 24 1981

OWNER Chaney (COL 15 LAST NAME) George (FIRST NAME COL. 34)
STREET OR RFD 898 Coachway (COL 36 – COL. 55)
POST OFFICE Annapolis, MD 21401 (COL 57 – COL. 76)

1 CONTINUED (2 3 (SEQ. NO.) 6)

DRILLER INFORMATION

DATE 6-9-81 LICENSE NUMBER 136 (77 80)
H.J. Greer Drilling Co., Inc.
FIRST NAME DRILLER LAST NAME
SIGNATURE Harold J. Greer

2 (2 3 (SEQ. NO.) 6)

WELL INFORMATION

MAXIMUM PUMPING RATE (GALLONS PER MINUTE) 10 (8 12)
AVERAGE DAILY QUANTITY NEEDED (GALLONS PER DAY) 500 (14 20)

USE FOR WATER (CIRCLE APPROPRIATE BOX)

(D) HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
F FARMING, AGRICULTURE, IRRIGATION
I INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOVERNMENT.
M MUNICIPAL WATER SUPPLY
P PRIVATE WATER COMPANY
} MUST HAVE STATE HEALTH DEPT. APPROVAL
T TEST

APPROXIMATE DEPTH OF WELL 120 FEET (24 28)
APPROXIMATE DIAMETER OF WELL 4" (NEAREST INCH)

METHOD OF DRILLING USED (CIRCLE APPROPRIATE METHOD)

BORED (OR AUGERED) JETTED DRIVEN
AIR-ROTARY AIR-PERCUSSION (ROTARY) (HYDRAULIC ROTARY)
CABLE REVERSE-ROTARY DRIVE-POINT
OTHER (DESCRIBE)

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)

(N) THIS WELL WILL NOT REPLACE AN EXISTING WELL
Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
D THIS WELL WILL DEEPEN AN EXISTING WELL
PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE)
(41 52)

NOT TO BE FILLED IN BY DRILLER (WRA USE ONLY)

APPROPRIATION PERMIT NUMBER (G A P) (54 63) ENGINEER REVIEW DISTRICT NO. (65)
FORCE GM (WRITE INITIALS IN BOX) (67 68)
CONDITIONS A E N S G W Q C L U: AA-74-3259 (70 71 72 73 74 75 76 77 78 79)

3 CONTINUED (SEQ. NO.) 6
41 S STATE HEALTH (CIRCLE BOX)
DATE MO. 06 DAY 16 YR. 81 (43 48)

HEALTH DEPARTMENT APPROVAL

COUNTY NAME Co COUNTY NO. 02
APPROVED BY

5 (2 3 (SEQ. NO.) 6) SPECIAL CONDITIONS 8-63 (WRA USE ONLY)

B 3 (1 2 3 (SEQ. NO.) 6)

LOCATION OF WELL

COUNTY Anne Arundel (8 (DO NOT ABBREVIATE COUNTY NAME) 21)
SUBDIVISION Kadan (23 42)
SECTION (44 46) LOT 5 (48 50)
NEAREST TOWN Gambrills (52 71)
MILES FROM TOWN (ENTER 0 IF IN TOWN) 1 (73 76 77 78) (M I)

B 4 (1 2 3 (SEQ. NO.) 6)

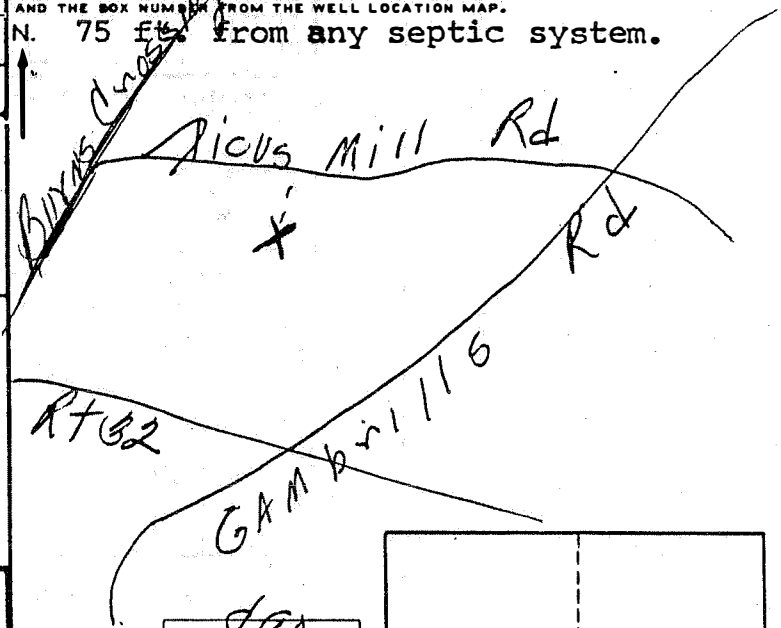
DIRECTION FROM TOWN (CIRCLE APPROPRIATE BOX)

(N) NORTH E EAST NE NORTHEAST SE SOUTHEAST
S SOUTH W WEST NW NORTHWEST SW SOUTHWEST
(8 9)

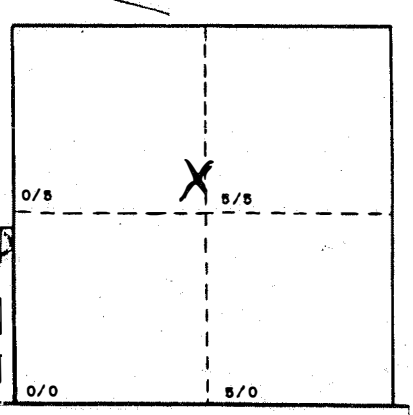
NEAR WHAT ROAD 1367 Dicus Mill Rd. (11 30)
ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX) NORTH (N) 32 SOUTH (S) 32 EAST (E) 32 WEST (W) 32
DISTANCE FROM ROAD (ENTER DISTANCE AND CIRCLE APPROPRIATE BOX) 140 (34 37) (F T) (M I) 38 39

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS, ROADS AND STREAMS WITH NORTH IN THE DIRECTION OF THE ARROW, AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION OR STREAM CROSSING SHOWN ON THE SKETCH. ALSO SHOW BY MEANS OF AN "X", THE WELL LOCATION IN THE BOX BELOW AND THE BOX NUMBER FROM THE WELL LOCATION MAP.

N. 75 ft. from any septic system.



BOX NUMBER E 890 N 460



NORTH COORDINATE 456000 (50 51 52 53 54 55)
EAST COORDINATE 893000 (57 58 59 60 61 62 63)
ELEVATION WELL HEAD (65 66 67 68)

1 8382 SEQUENCE NO. (WRA USE ONLY)

S NUMBER IS TO BE PUNCHED OLS. 3-6 ON ALL CARDS) 1367 DMR

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL IS COMPLETED

COUNTY NUMBER S 004576

e Received A use only) 5 1981

DATE WELL COMPLETED 7-23-81 (07 23 81)

Depth of Well 150 ft. (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-24-32

NER Chaney (last name) George (first name)

REET OR RFD 898 Coachway TOWN Annapolis, MD 21401

BDIVISION Radan 1367 Dicus Mill Rd. SECTION LOT 5

WELL LOG (Not required for driven wells)

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

SCRIPTION (Use itional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown sand	0	20	
Gravel	20	45	
Red clay	45	80	
White clay	80	100	
Red clay	100	120	
Brown sand	120	150	x

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] no [N]

TYPE OF GROUTING MATERIAL

CEMENT [C M] BENTONITE CLAY [B C]

NO. OF BAGS 4 NO. OF POUNDS 400

GALLONS OF WATER 300

DEPTH OF GROUT SEAL (to nearest foot)

from 3 ft. to 45 ft.

(enter 0 if from surface)

CASING RECORD

casing types - insert appropriate code below

[S T] STEEL [C O] CONCRETE [P L] PLASTIC [O T] OTHER

MAIN CASING TYPE	Nominal diameter top(main)casing (nearest inch)	Total depth of main casing (nearest foot)
P L	4"	145

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD

screen type or openhole - insert appropriate code below

[S T] STEEL [B R] BRASS, BRONZE [H O] OPEN HOLE [P L] PLASTIC [O T] OTHER

C 2 (seq. no.)

EACH SCREEN		DEPTH (nearest ft.)	
1	P L	145	150
2			
3			

SLOT SIZE 0.30

DIAMETER OF SCREEN 2 (NEAREST INCH)

from to

GRAVEL PACK

IF WELL DRILLED WAS FLOWING WELL CIRCLE BOX [F]

C 3 (seq no)

PUMPING TEST

HOURS PUMPED (nearest hour) 1

PUMPING RATE (gal. per min. to nearest gal.) 15

METHOD USED TO MEASURE PUMPING RATE air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 80

WHEN PUMPING 90

TYPE OF PUMP USED (for test)

[A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet [S] submersible

PUMP INSTALLED

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX) YES [Y] NO [N]

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE: (A, C, J, P, R, S, T, O) [S]

CAPACITY:

GALLONS PER MINUTE (to nearest gallon) 10

PUMP HORSE POWER .33

PUMP COLUMN LENGTH (nearest ft) 100

CASING HEIGHT (circle appropriate box and enter casing height)

[+] above LAND SURFACE [—] below

1 (nearest foot)

CIRCLE APPROPRIATE BOX

[A] A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

[E] ELECTRIC LOG OBTAINED

[C] TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLERS IDENT. NO. 136

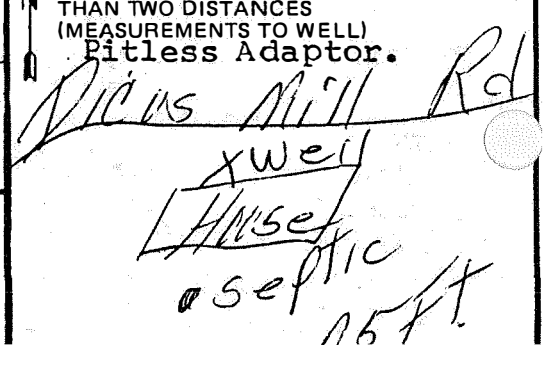
DRILLERS SIGNATURE Harold Greer

MUST MATCH SIGNATURE ON APPLICATION

HJ Greer Drilling Co.

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



WRA USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

4000-9002-0695

EMERGENCY/TEMP. NO. IF ANY

1 2518 SEQUENCE NO. (OEP USE ONLY)

THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS) APR 2 3 1983

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please print or type

OEP PERMIT NUMBER AA-81-1592
fill in this form completely

Received 04 08 83 (OEP Use Only)

OWNER INFORMATION
Chaney George
Last Name 15 Owner 34 Name

3777 Dicus Mill Rd.
36 Street or RFD 55

Gambrills Md 21054
Town 57 State 76 Zip

1 Continued

DRILLER INFORMATION
John E. Greer 337
Driller's Name 77 License No. 80

H.J. Greer Drilling Co., Inc.
Firm Name

P.O. Drawer A
Address

Gambrills, MD 21054
Signature Date 4/7/83

2 WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.) 10
AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY) 500

USE FOR WATER (CIRCLE APPROPRIATE BOX)
- D — HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- F — FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)
- INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)
- P — PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE HEALTH DEPARTMENT APPROVAL)
- T — TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

APPROXIMATE DEPTH OF WELL 120 FEET

APPROXIMATE DIAMETER OF WELL 4" NEAREST INCH

METHOD OF DRILLING (circle one)
BORED (OR AUGERED) JETTED JETTED & DRIVEN
AIR ROTARY AIR PERCUSSION ROTARY (HYDRAULIC ROTARY)
CABLE REVERSE ROTARY DRIVE POINT
other ROTARY

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)
- N — THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y — THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- S — THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- D — THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE)

Not to be filled in by driller (OEP USE ONLY)

APPROP. PERMIT NUMBER GAP

FORCE LT WRITE INITIALS IN BOX

PERMIT No. AA-81-1592

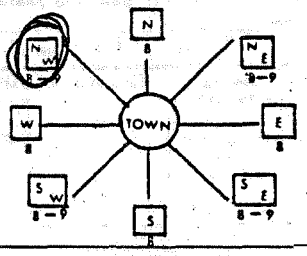
5 SPECIAL CONDITIONS 8—63

B 3 LOCATION OF WELL

COUNTY Anne Arundel
SUBDIVISION Kaden
SECTION LOT 10
NEAREST TOWN Gambrills
MILES FROM TOWN (enter 0 if in town) 1.1 M I

B 4

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)



1377 Dicus Mill Rd.
NEAR WHAT ROAD

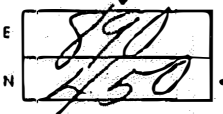
ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX) NORTH N, WEST W, 32, EAST E, SOUTH S

75 DISTANCE FROM ROAD F T M I
(CIRCLE APPROPRIATE BOX)

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

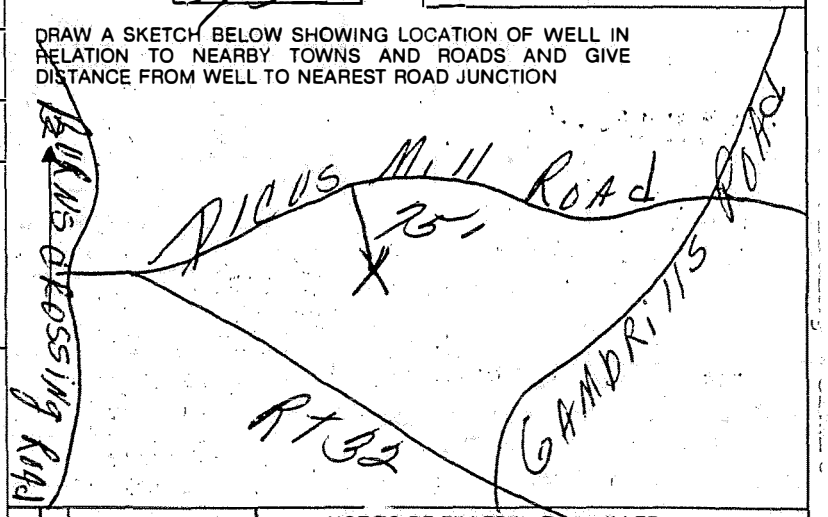
SOURCES OF DRILLING WATER
1. Well drillers well
2. drillers
3.

WRITE THE BOX NUMBER FROM THE MAP HERE



000 000

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



B 4

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Anne Arundel 02
COUNTY NAME COUNTY NO.

OEP SIGNATURE

STATE HEALTH CIRCLE BOX S

DATE ISSUED 04 14 83

CO SIGNATURE

NORTH GRID 455 000 EAST GRID 0893 000

EXPIRES

11 8619 — SEQUENCE NO. (OEP USE ONLY)

THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

Date Received (OEP use only)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

DATE WELL COMPLETED 05/18/83

Depth of Well 150 ft. (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-01-1592

OWNER Chaney George (last name / first name)

STREET OR RFD 1377 Dicus Mill Rd. TOWN Gambrills, MD 21054

SUBDIVISION Raden SECTION LOT 10

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water
Brown clay	0	11	
Brown sand	11	23	
White clay	23	60	
Fine brown sand & gravel	60	85	
White clay	85	105	
Fine brown sand	105	130	
Medium brown sand	130	150	x

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) — (Y) N

TYPE OF GROUTING MATERIAL

CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS 2 NO. OF POUNDS 100

GALLONS OF WATER 50

DEPTH OF GROUT SEAL (to nearest foot)

from 3 ft. to 25 ft.

(enter 0 if from surface)

CASING RECORD
casing types — insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top(main)casing (nearest inch)	Total depth of main casing (nearest foot)
P L	4"	145

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below

[ST] STEEL [BR] BRASS, BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (seq. no.)

EACH SCREEN		DEPTH (nearest ft.)	
1	P L	145	150
2			
3			

SLOT SIZE 0.30 2 ____ 3 ____

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from ____ to ____

IF WELL DRILLED WAS FLOWING WELL CIRCLE BOX [F]

C 3 (seq no)

PUMPING TEST
HOURS PUMPED (nearest hour) 1

PUMPING RATE (gal. per min. to nearest gal.) 15

METHOD USED TO MEASURE PUMPING RATE air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 90

WHEN PUMPING 100

TYPE OF PUMP USED (for test)

[A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet (S) submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX) — (Y) N

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE: (A, C, J, P, R, S, T, O)) [S]

CAPACITY:

GALLONS PER MINUTE (to nearest gallon) 10

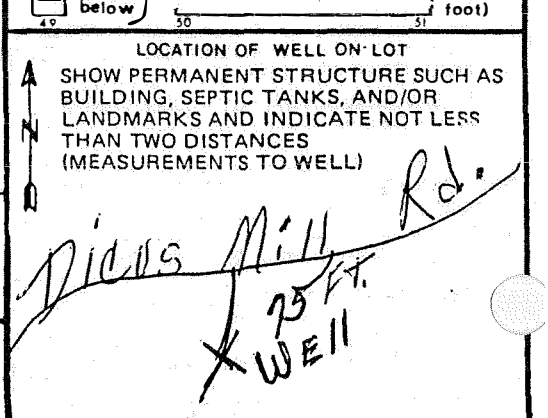
PUMP HORSE POWER .5

PUMP COLUMN LENGTH (nearest ft.) 125

CASING HEIGHT (circle appropriate box and enter casing height)

(+) above / (−) below LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



CIRCLE APPROPRIATE BOX
[A] A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

[E] ELECTRIC LOG OBTAINED

[P] TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 331

DRILLERS SIGNATURE MUST MATCH SIGNATURE ON APPLICATION

WD Greer Drilling Co.

SITE SUPERVISOR (sign of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY
(NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

[ ] TELESCOPE CASING [ ] LOG INDICATOR OTHER DATA

C 1 | 9985 | SEQUENCE NO. (DENV USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY
DATE Received: 07 12 93

DATE WELL COMPLETED: 06 11 93

Depth of Well (TO NEAREST FOOT): 150

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-BB-1965

OWNER: Riva Construction Company (last name / first name)
STREET OR RFD: 1722 Saddle Drive TOWN: Gambrills
SUBDIVISION: Britton Woods SECTION: 3 LOT: 12

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown Sand + Rock Layer	0	12	
Brown Sand	12	23	
Red clay	23	55	
Gravel	55	60	
Red Clay	60	110	
Tan + White Sand	110	150	✓

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): YES (Y) NO (N)
TYPE OF GROUTING MATERIAL
CEMENT [C M] BENTONITE CLAY [B C]
NO. OF BAGS 4 NO. OF POUNDS 100
GALLONS OF WATER
DEPTH OF GROUT SEAL (to nearest foot)
from 0 ft. TOP to 10 ft. BOTTOM (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
[S T] STEEL [C O] CONCRETE [P L] PLASTIC [O T] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	113

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below
[S T] STEEL [B R] BRASS BRONZE [H O] OPEN HOLE [P L] PLASTIC [O T] OTHER

EACH SCREEN	screen type	DEPTH (nearest ft.)
1	PL	113 to 150
2		
3		

SLOT SIZE: 020
DIAMETER OF SCREEN: 2 (NEAREST INCH)

GRAVEL PACK from 130 to 150
IF WELL DRILLED WAS FLOWING WELL INSERT "F" IN BOX 68

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W Q
TELESCOPE CASING | LOG INDICATOR | OTHER DATA

RECEIVED

C 3 — PUMPING TEST
HOURS PUMPED (nearest hour): 3
PUMPING RATE (gal. per min. to nearest gal.): 35
METHOD USED TO MEASURE PUMPING RATE: Timed Flow
WATER LEVEL (distance from land surface)
BEFORE PUMPING: SP
WHEN PUMPING: 15
TYPE OF PUMP USED (for test)
[A] air [P] piston [T] turbine
[C] centrifugal [R] rotary [O] other (describe below)
[J] jet [S] submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: 5
CAPACITY: GALLONS PER MINUTE (to nearest gallon): 10
PUMP HORSE POWER: 5
PUMP COLUMN LENGTH (nearest ft.): 110
CASING HEIGHT (circle appropriate box and enter casing height)
(+) above (−) below LAND SURFACE: 1 (nearest foot)

CIRCLE APPROPRIATE LETTER
A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 027

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

COUNTY NC

C 1 | 4387 — SEQUENCE NO. (MDE USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS) MW-P4

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 15 DAYS AFTER WELL IS COMPLETED

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY

DATE WELL COMPLETED MM 02 DD 27 YY 05

Depth of Well 105 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-05-1274

OWNER Bob Schart (last name / first name)
STREET OR RFD 1329 Sleepy Hollow Rd. TOWN Severn
SUBDIVISION Aurora Hills SECTION LOT MW-P4

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Top Soil	0	1	
Fine to coars sand	1	6	
Hard red clay	6	17	
Gray & white clay	17	68	
Fine to med sand w/ some layers	68	78	
Hard red clay	78	96	
Fine to coarse sand w/ lay.clay	96	105	
Hard red clay	105	130	

NUMBER OF UNSUCCESSFUL WELLS 0

WELL HYDROFRACTURED yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE

DRILLERS LIC. NO. M 90-5-1-71
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)
LIC. NO. — — D — — —

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] no [N]
TYPE OF GROUTING MATERIAL (Circle one)
CEMENT [CM] BENTONITE CLAY [BC]
NO. OF BAGS 10 NO. OF POUNDS 940
GALLONS OF WATER 50
DEPTH OF GROUT SEAL (to nearest foot)
from 0 TOP ft. to 80 BOTTOM ft.
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	96

OTHER CASING (if used)

	diameter inch	depth (feet) from	to
EACH CASING			

SCREEN RECORD
screen type or open hole — insert appropriate code below
[ST] STEEL [BR] BRASS/BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

DEPTH (nearest ft.)

		from	to
EACH SCREEN	1 PL	95	105
	2		
	3		

SLOT SIZE 1 .020 2 — 3 —
DIAMETER OF SCREEN — (NEAREST INCH)

GRAVEL PACK from 80 to 105
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E,R,O,S.) W Q
TELESCOPE CASING — LOG INDICATOR — OTHER DATA

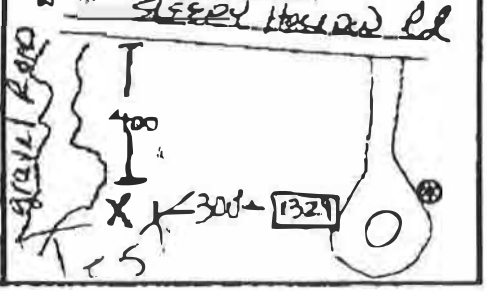
PUMPING TEST
HOURS PUMPED (nearest hour) 4
PUMPING RATE (gal. per min.) 50
METHOD USED TO MEASURE PUMPING RATE 5 gal
WATER LEVEL (distance from land surface)
BEFORE PUMPING 44 ft.
WHEN PUMPING 64 ft.

TYPE OF PUMP USED (for test)
[A] air [P] piston [T] turbine
[C] centrifugal [R] rotary [O] other (describe below)
[J] jet [S] submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. S
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 5
PUMP HORSE POWER 1/4
PUMP COLUMN LENGTH (nearest ft.) 100
CASING HEIGHT (circle appropriate box and enter casing height) [+] above [−] below LAND SURFACE 2 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



DENV-CR00 DRILLER

Project Name: E. Boundary Study

Job No. 2870.14

Start
Date 8/18/94 Time 0945
Finish
Date 8/19/94 Time 1000

Stearns and Wheler

Environmental
Engineers and Scientists

Boring ID: MW P9

Drilling Company: Connelly & Assoc.

Driller: T. Connelly

S&W Inspector: DO

Drill Rig Type: CME

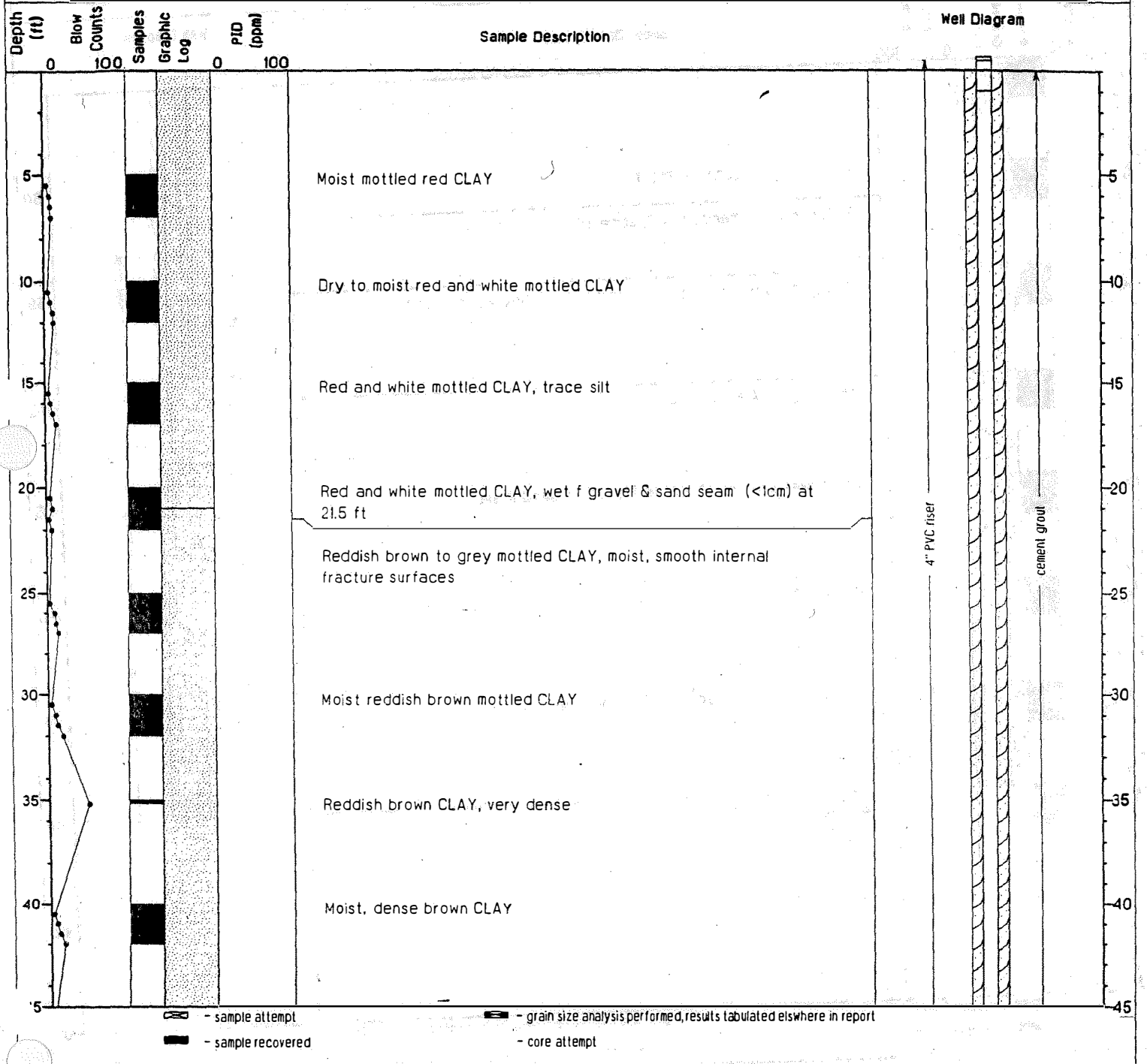
Drilling Method: HSA

Weather: M sunny, 85f

Elevation
n/a

X coord: feet
Y coord: feet

Groundwater Observations
Time : 1600
Date : 8/18/94
Casing Depth: 60'
Boring Depth: 60'
Water Depth : 60'



- sample attempt
- sample recovered
- grain size analysis performed, results tabulated elswhere in report
- core attempt

Descriptions in log have been generalized for clarity of presentation. Significant changes in lithology have been noted. Original well logs are available from Stearns and Wheler files.

Project Name: E. Boundary Study

Job No. 2870.14

Start Date 8/18/94 Time 0945

Finish Date 8/19/94 Time 1000

Stearns and Wheler

Environmental Engineers and Scientists

Boring ID: MW P9

Drilling Company: Connelly & Assoc.

Driller: T. Connelly

S&W Inspector: DO

Drill Rig Type: CME

Drilling Method: HSA

Weather: M sunny, 85f

Elevation n/a

X coord: feet

Y coord: feet

Groundwater Observations

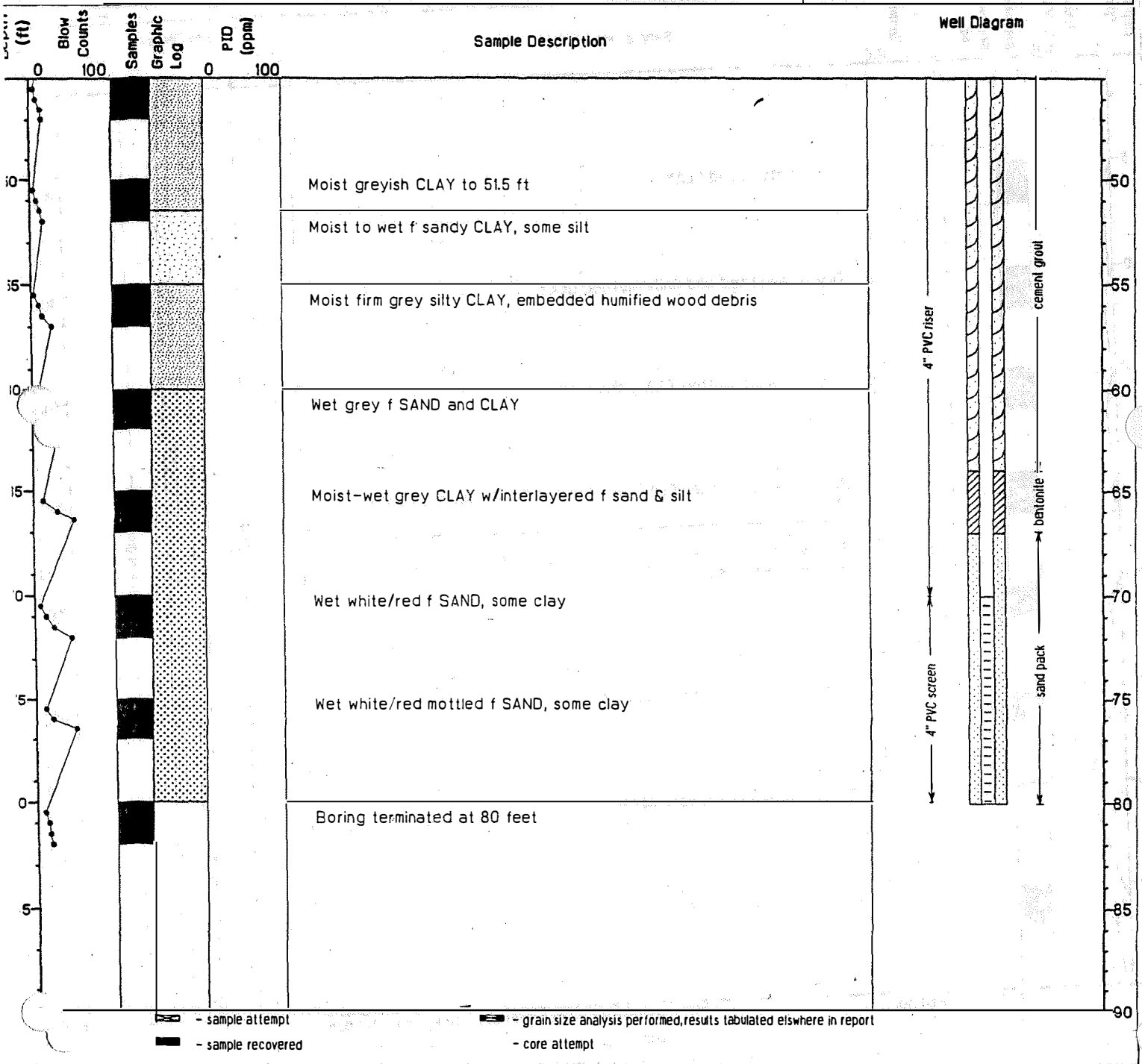
Time : 1800

Date : 8/18/94

Casing Depth: 60'

Boring Depth: 60'

Water Depth : 60'



Descriptions in log have been generalized for clarity of presentation. Significant changes in lithology have been noted. Original well logs are available from Stearns and Wheler files.

Project Name: Eastern Boundary Study

Job No. 2870

Start
Date 9/7/94 Time 1045
Finish
Date 9/7/94 Time 1400

Stearns and Wheler

Environmental
Engineers and Scientists

Boring ID: MW P106

Drilling Company: Conelly Associates

Driller:

S&W Inspector: DO

Drill Rig Type: CME

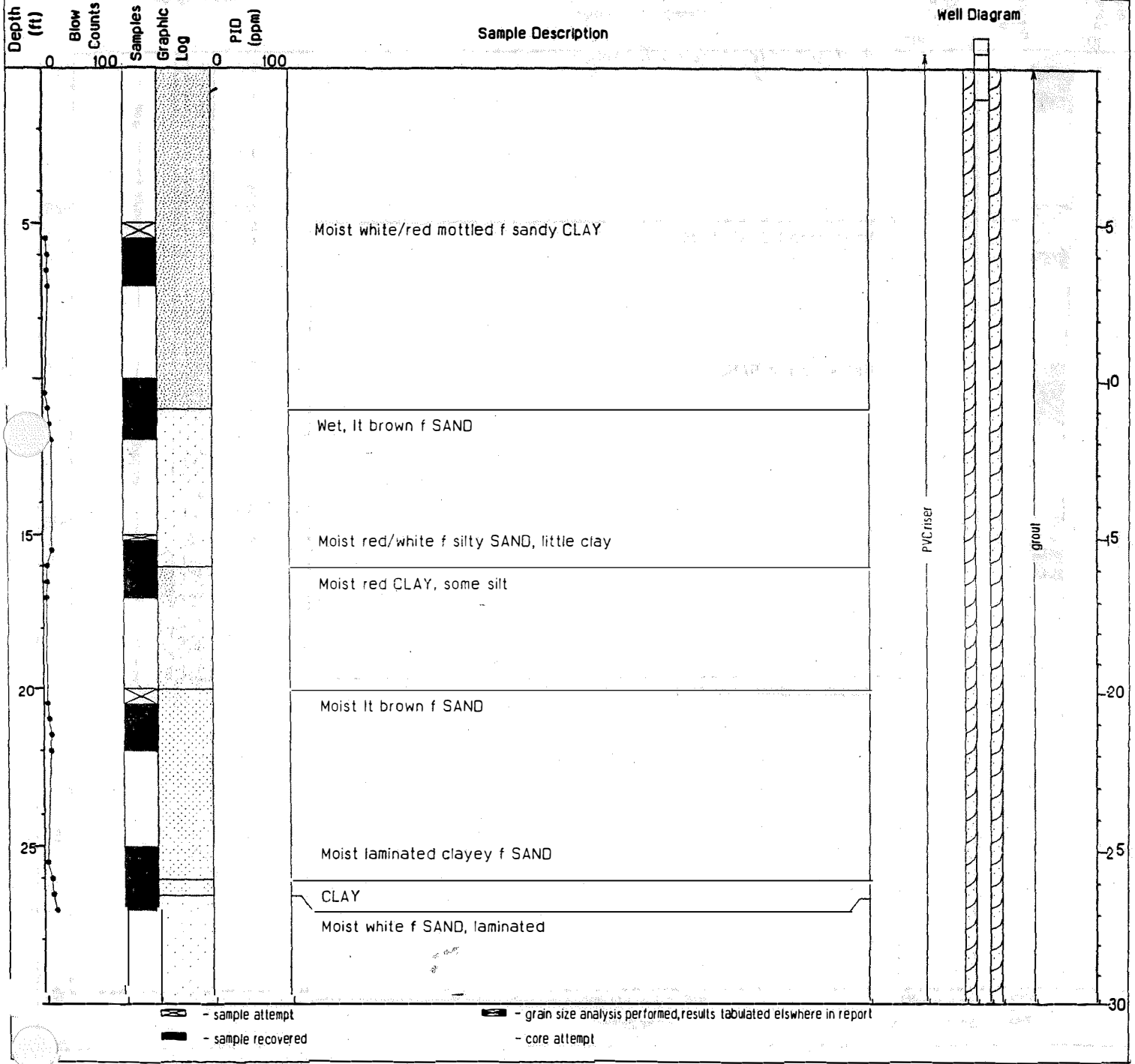
Drilling Method: HSA

Weather: p/cloudy, 75F

Elevation

X coord: feet
Y coord: feet

Groundwater Observations
Time : 1200
Date : 9/7/94
Casing Depth: 40
Boring Depth: 40
Water Depth : 40



Descriptions in log have been generalized for clarity of presentation. Significant changes in lithology have been noted. Original well logs are available from Stearns and Wheler files.

Project Name: [illegible]

Job No. 2870

Start
Date 9/7/94 Time 1045
Finish
Date 9/7/94 Time 1400

Stearns and Wheler

Environmental
Engineers and Scientists

Boring ID: MW P106

Drilling Company: Conelly Associates
Driller:
S&W Inspector: DO
Drill Rig Type: CME
Drilling Method: HSA

Weather: p/doudy, 75F

Elevation

X coord: feet
Y coord: feet

Groundwater Observations
Time : 1200
Date : 9/7/94
Casing Depth: 40
Boring Depth: 40
Water Depth : 40

(ft)	Blow Counts	Samples	Graphic Log	PID (ppm)	Sample Description	Well Diagram
0	0 100			0 100	Moist layered red/white f SAND, some silt	
					Moist white f SAND, tr silt	PVC riser, grout, bentonite
					Wet white f-m SAND	PVC screen, sand pack
50					Boring terminated at 50 ft	
55						
60						

- sample attempt
- sample recovered
- grain size analysis performe dresults tabulated elswhere in report
- core attempt

Descriptions in log have been generalized for clarity of presentation. Significant changes in lithology have been noted. Original well logs are available from Stearns and Wheler files.

Project Name: [illegible] Boundary Study

Job No. 2870.14

Start
Date 8/19/94 Time 1110
Finish
Date 8/22/94 Time 1400

Stearns and Wheler

Environmental
Engineers and Scientists

Boring ID: MW P417

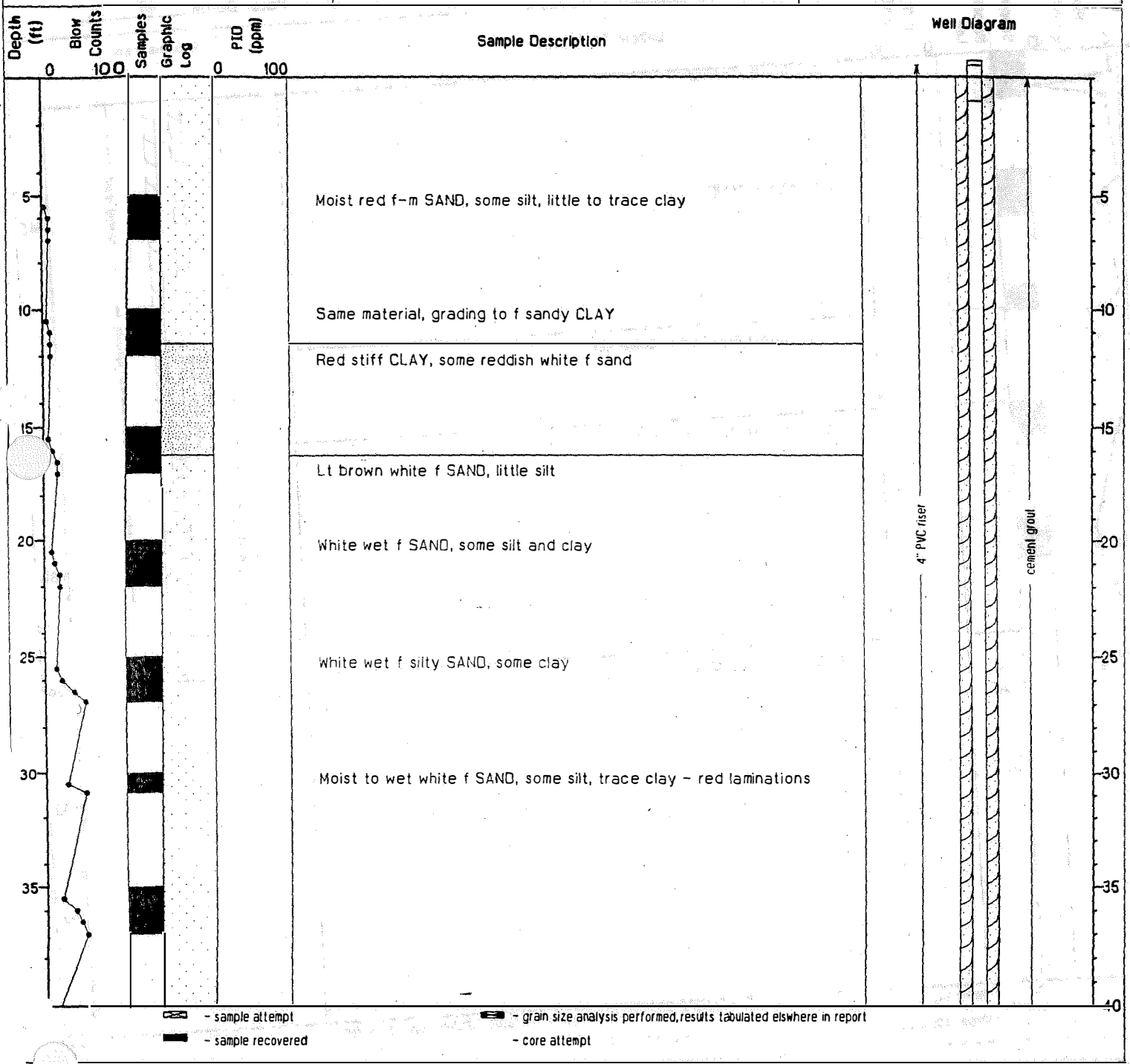
Drilling Company: Connelly & Assoc.
Driller: T. Connelly
S&W Inspector: DO
Drill Rig Type: CME
Drilling Method: HSA

Weather: M sunny, 85f

Elevation
n/a

X coord: feet
Y coord: feet

Groundwater Observations
Time : 1030
Date : 8/22/94
Casing Depth: 45'
Boring Depth: 45'
Water Depth : 45'



- sample attempt
- sample recovered
- grain size analysis performed, results tabulated elswhere in report
- core attempt

Descriptions in log have been generalized for clarity of presentation. Significant changes in lithology have been noted. Original well logs are available from Stearns and Wheler files.

Project Name: E. Boundary Study

Job No. 287 014

Start Date 8/19/94 Time 1110

Finish Date 8/22/94 Time 1400

Stearns and Wheler

Environmental
Engineers and Scientists

Boring ID: MW P417

Drilling Company: Connelly & Assoc.

Driller: T. Connelly

S&W Inspector: DO

Drill Rig Type: CME

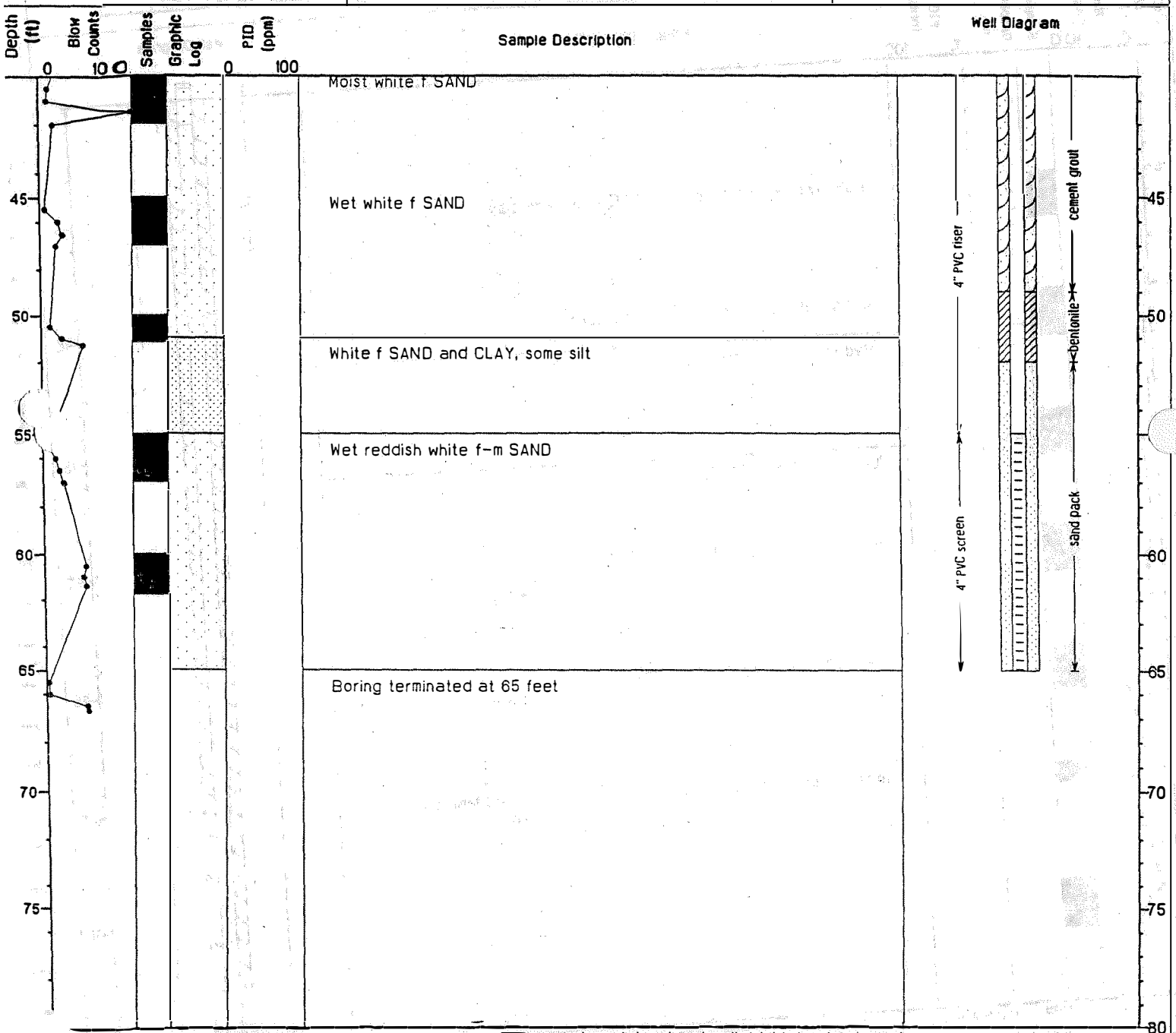
Drilling Method: HSA

Weather: M sunny, 85f

Elevation
n/a

X coord: feet
Y coord: feet

Groundwater Observations
Time : 1030
Date : 8/22/94
Casing Depth: 45'
Boring Depth: 45'
Water Depth : 45'



- sample attempt
- sample recovered
- grain size analysis performed, results tabulated elswhere in report
- core attempt

Descriptions in log have been generalized for clarity of presentation. Significant changes in lithology have been noted. Original well logs are available from Stearns and Wheler files.

Job No. 2870.14

Start
Date 8/22/94 Time 1445
Finish
Date 8/23/94 Time 1300

Stearns and Wheler

Environmental
Engineers and Scientists

Boring ID: MW P440

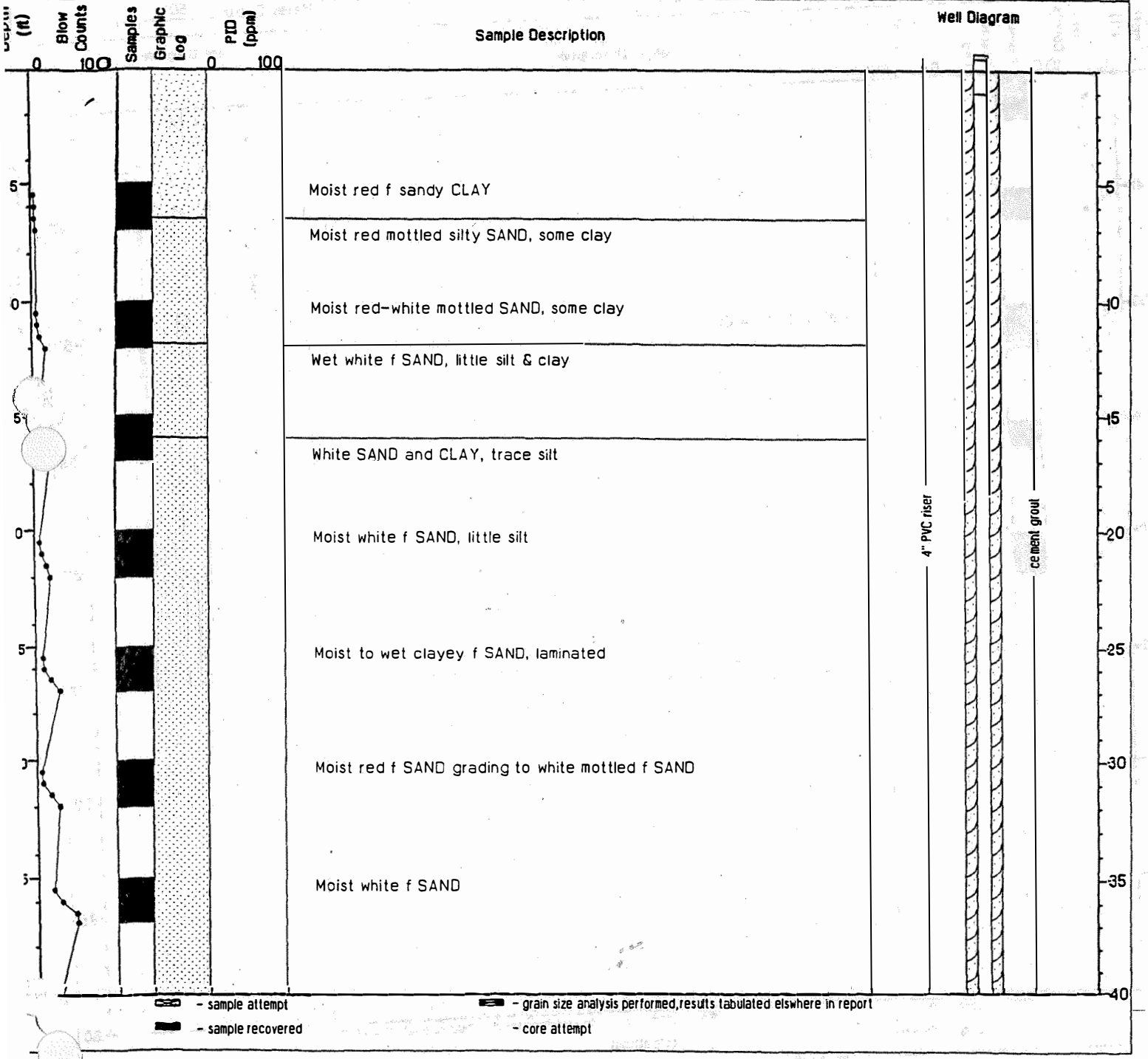
Drilling Company: Connelly & Assoc.
Driller: T. Connelly
S&W Inspector: DO
Drill Rig Type: CME
Drilling Method: HSA

Weather: M sunny, 85f

Elevation
n/a

X coord: feet
Y coord: feet

Groundwater Observations
Time : 0900
Date : 8/23/94
Casing Depth: 50'
Boring Depth: 50'
Water Depth : 50'



Descriptions in log have been generalized for clarity of presentation. Significant changes in lithology have been noted. Original well logs are available from Stearns and Wheler files.

Project Name: E. Boundary Study

Job No. 2870.14

Start
Date 8/22/94 Time 1445

Finish
Date 8/23/94 Time 1300

Stearns and Wheler

Environmental
Engineers and Scientists

Boring ID: MW P440

Drilling Company: Connelly & Assoc.

Driller: T. Connelly

S&W Inspector: DO

Drill Rig Type: CME

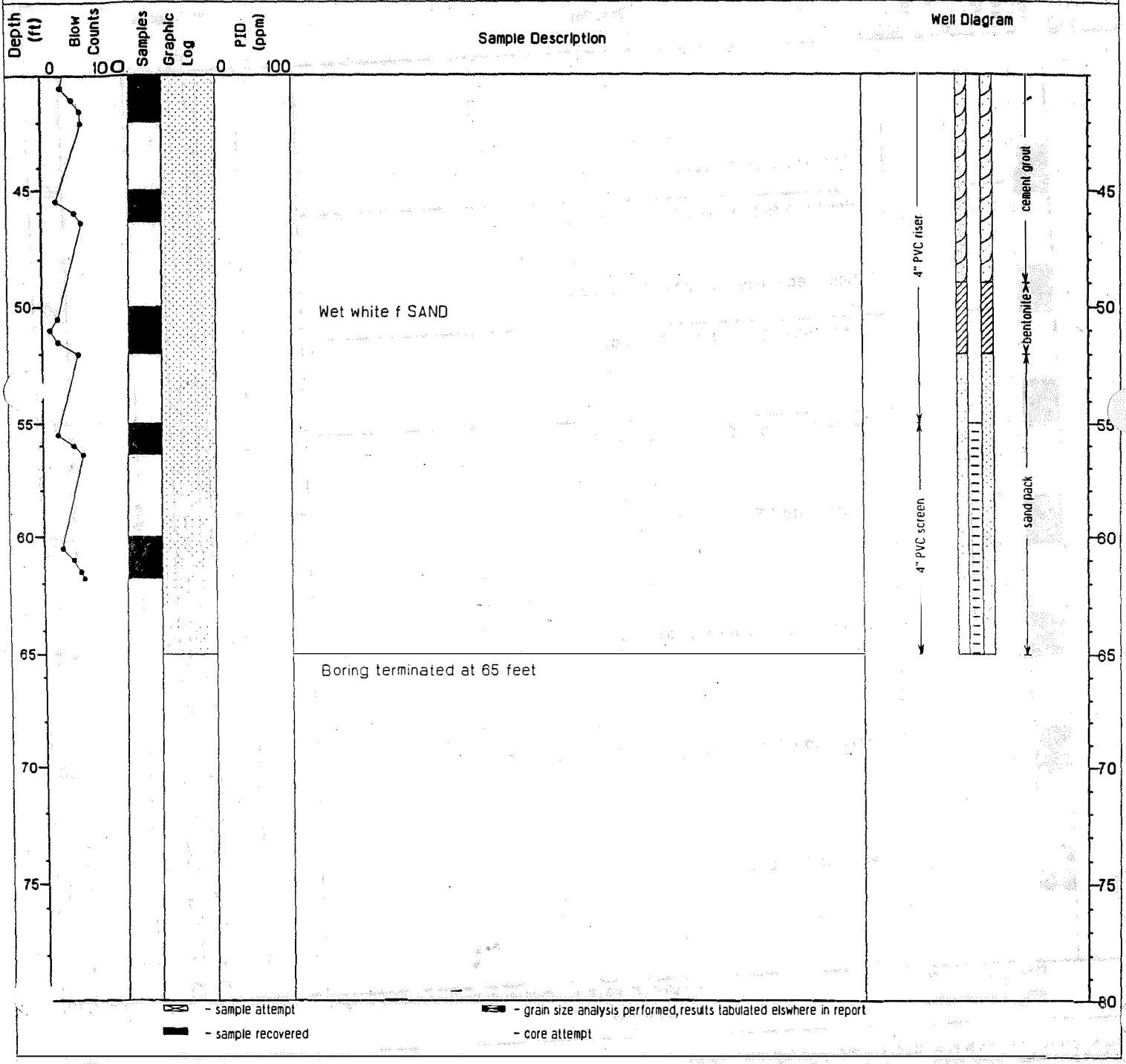
Drilling Method: HSA

Weather: M sunny, 85f

Elevation
n/a

X coord: feet
Y coord: feet

Groundwater Observations
Time : 0900
Date : 8/23/94
Casing Depth: 50'
Boring Depth: 50'
Water Depth : 50'



- sample attempt
- sample recovered
- grain size analysis performed, results tabulated elswhere in report
- core attempt

Descriptions in log have been generalized for clarity of presentation. Significant changes in lithology have been noted. Original well logs are available from Stearns and Wheler files.

C 1 7285 SEQUENCE NO (OEP USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 07

DATE Received DEC 7 1983

DATE WELL COMPLETED 092683

Depth of Well 160 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-S1-83-06

OWNER DICKINSON ⇒ HEFFNER (last name)

STREET OR RFD BOX 291

TOWN BALTO, MD. 21240

SUBDIVISION AURUA HILLS SECTION — LOT 1

P-564

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
W. SAND & ROCK LAYERS	0	40	
WHITE CLAY	40	52	
ROCK "HARD"	52	53	
HARD RED CLAY	53	110	
THIN ROCK LAYERS & W CLAY MIX & W. W. SAND	110	140	
COARSE W. SAND	140	160	✓

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) (Y) N

TYPE OF GROUTING MATERIAL

CEMENT (CM) BENTONITE CLAY BC

NO. OF BAGS 10 NO. OF POUNDS 940

GALLONS OF WATER 50

DEPTH OF GROUT SEAL (to nearest foot) from 3 ft (Top) to 45 ft (Bottom) (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	153

OTHER CASING (if used) EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below

ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C 2

	DEPTH (nearest ft.)	
EACH SCREEN 1	PL	153 to 160
2		
3		

SLOT SIZE .020

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from 140 to 160

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

CIRCLE APPROPRIATE LETTER
A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 268

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W/Q

TELESCOPE CASING LOG INDICATOR OTHER DATA

C 3

PUMPING TEST
HOURS PUMPED (nearest hour) 9

PUMPING RATE (gal. per min. to nearest gal.) 35

METHOD USED TO MEASURE PUMPING RATE STALED FLOW

WATER LEVEL (distance from land surface)

BEFORE PUMPING 90

WHEN PUMPING 100

TYPE OF PUMP USED (for test)

A air P piston T turbine

C centrifugal R rotary O other (describe below)

J jet S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) (YES) NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10

PUMP HORSE POWER 3/4

PUMP COLUMN LENGTH (nearest ft.) 143

CASING HEIGHT (circle appropriate box and enter casing height) (+) above (−) below LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

C 1 | 74446 — SEQUENCE NO. (MDE USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY
DATE Received MM DD YY: ____

DATE WELL COMPLETED: MM 8 DD 5 YY 21

Depth of Well: 60 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 20 - 0635

OWNER: Anne Arundel County Bureau of Waste Management (last name / first name)

WELL SITE ADDRESS: 389 Burns Crossing Rd TOWN: Severn

SUBDIVISION: Millersville Landfill SECTION: ____ LOT: ____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Brown Silty Clay	0	5	
Brown Sand w Silt + Clay	5	8	
Dk Brn Silty Sand	8	14	
Lt Brn Clayey Sand	14	20	
Lt Brn Silty Sand	20	26	
Lt Brn Clayey Sand	26	28	
Lt Brn Silty Sand	28	38	
Yellow-Brn Sand	38	58	✓
Lt Brn Clayey Sand	58	60	✓

S-2 (W-1)

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes Y / no N

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M G D 027

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: M G D 067

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y / no N

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT CM — BENTONITE CLAY BC

NO. OF BAGS: 5 NO. OF POUNDS: 250

GALLONS OF WATER: ~~175~~ 15

DEPTH OF GROUT SEAL (to nearest foot)

from 0 ft. (TOP) to 45 ft. (BOTTOM)

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL — CO CONCRETE — PL PLASTIC — OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL	4	50

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	depth (feet) to

SCREEN RECORD
screen type or open hole — insert appropriate code below

ST STEEL — BR BRASS BRONZE — HO OPEN HOLE — PL PLASTIC — OT OTHER

EACH SCREEN	C 2	DEPTH (nearest ft.)	
1	PL	50	60
2			
3			

SLOT SIZE 1: 0.010 2: ____ 3: ____

DIAMETER OF SCREEN: 4 (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

from	to
45	60

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T ____ (E.R.O.S.) ____ W Q ____

TELESCOPE CASING ____ LOG INDICATOR ____ OTHER DATA ____

C 3 — PUMPING TEST

HOURS PUMPED (nearest hour): ____

PUMPING RATE (gal. per min.): ____

METHOD USED TO MEASURE PUMPING RATE: ____

WATER LEVEL (distance from land surface)

BEFORE PUMPING: ____ ft.

WHEN PUMPING: ____ ft.

TYPE OF PUMP USED (for test)

A air — P piston — T turbine — C centrifugal — R rotary — O other (describe below) — J jet — S submersible

PUMP INSTALLED

DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES / NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29.

CAPACITY: GALLONS PER MINUTE (to nearest gallon): ____

PUMP HORSE POWER: ____

PUMP COLUMN LENGTH (nearest ft.): ____

CASING HEIGHT (circle appropriate box and enter casing height)

+ above / – below LAND SURFACE: 2.5 (nearest foot)

LATITUDE 39.090505

LONGITUDE 76.661198

(DEFAULT COORD. WGS 84)

Pursuant to §10-624 of the State Govt. Article of the Maryand Code personal info. requested on this form is used in processing this form pursuant to COMAR 26.04.04. Failure to provide the info. may result in this form not being processed. You have the right to inspect, amend, or correct this form. The Maryland Department of the Environment is subject to the Maryland Public Information Act. This form may be made available on the Internet via MDE's website and is subject to inspection or copying, in whole or in part, by the pulic and other governmental agencies, if not protected by federal or state law.

MDE/WMA/PER.071

ORIGINAL Monitoring Well W-1

C 1 | 74447 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY
DATE Received MM DD YY (8–13)

DATE WELL COMPLETED: MM 8 DD 5 YY 21 (15–20)

Depth of Well: 50 (TO NEAREST FOOT) (22–26)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-20-0636 (28–37)

OWNER: Anne Arundel County Bureau of Waste Management (last name / first name)

WELL SITE ADDRESS: 389 Burns Crossing Rd TOWN: Severn

SUBDIVISION: Millersville Landfill SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Brn Clay	0	5	
Lt Brn Sand w/ Silt	5	17	
Lt Brn Sand w/ clay	17	18	
Lt Brn Sand w/ Silt	18	20	
Lt Brn Sand w/ clay	20	22	
Lt Brn Sand w/ Silt	22	45	
Silty Clay	45	47	✓
Brn Sand w/ clay	47	50	✓
S-1 (W-2)			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLER'S I.C. NO.: MGD027

DRILLER'S SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: MGD027

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS: 4 NO. OF POUNDS: 200

GALLONS OF WATER: 12

DEPTH OF GROUT SEAL (to nearest foot)

from 0 (48–52) TOP ft. to 35 (54–58) BOTTOM ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60–61)	4 (63–64)	40 (66–70)

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	depth (feet) to

SCREEN RECORD
screen type or open hole — insert appropriate code below

[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (1–2)

DEPTH (nearest ft.)

EACH SCREEN			
1	PL (8–9)	40 (11–15)	50 (17–21)
2	(23–24)	(26–30)	(32–36)
3	(38–39)	(41–45)	(47–51)

SLOT SIZE 1: 0.010 2: 3:

DIAMETER OF SCREEN: 4 (56–60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

from	to
35	50

(68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3 (1–2)

PUMPING TEST
HOURS PUMPED (nearest hour): 8 9

PUMPING RATE (gal. per min.): (11–15)

METHOD USED TO MEASURE PUMPING RATE:

WATER LEVEL (distance from land surface)

BEFORE PUMPING: (17–20) ft.

WHEN PUMPING: (22–25) ft.

TYPE OF PUMP USED (for test)

[A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES [NO]

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon): (31–35)

PUMP HORSE POWER: (37–41)

PUMP COLUMN LENGTH (nearest ft.): (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)

[+] above [–] below (49) LAND SURFACE

3 (nearest foot) (50–51)

LATITUDE 39.090509

LONGITUDE 76.659886

(DEFAULT COORD. WGS 84)

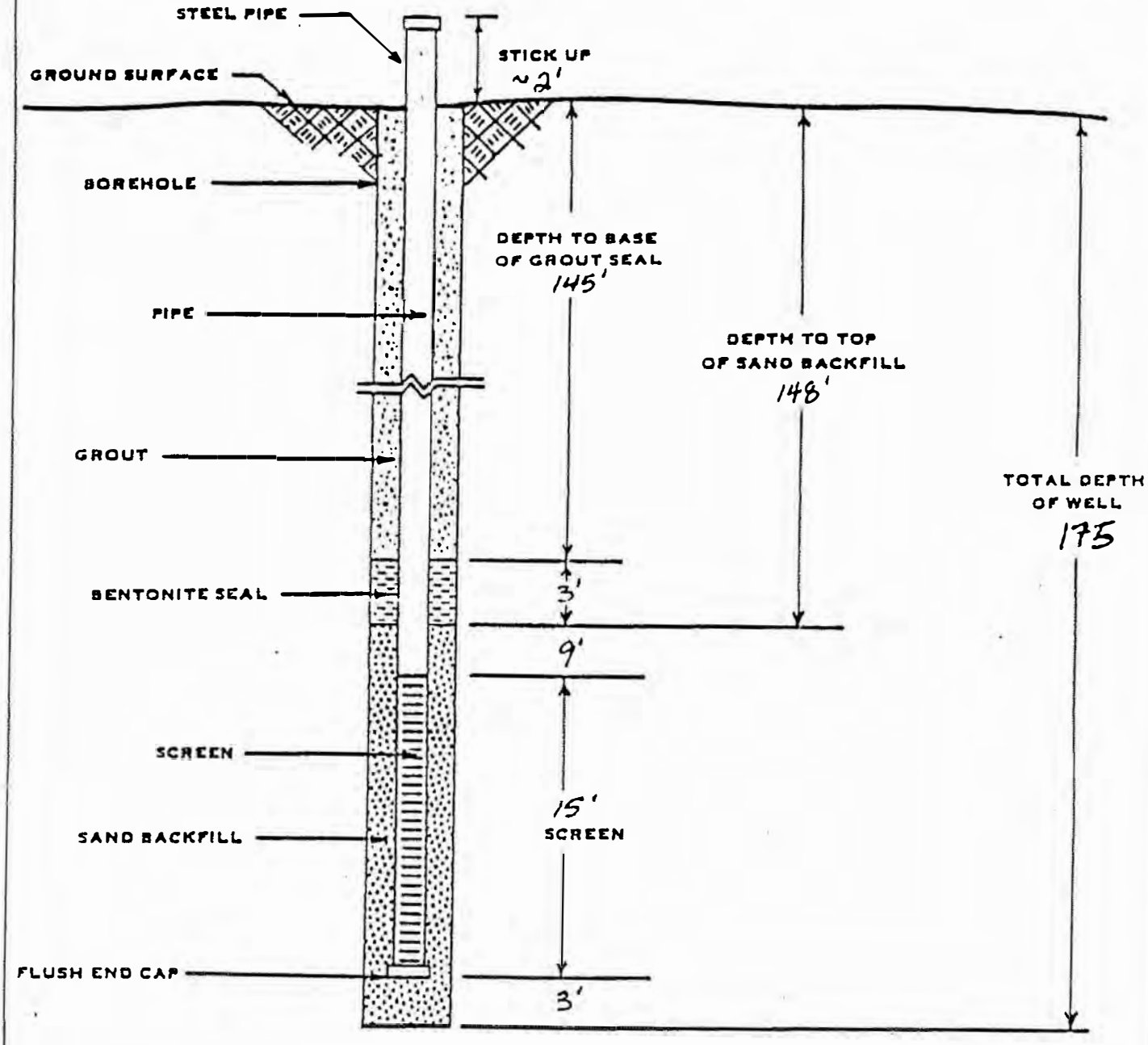
Pursuant to §10-624 of the State Govt. Article of the Maryand Code personal info. requested on this form is used in processing this form pursuant to COMAR 26.04.04. Failure to provide the info. may result in this form not being processed. You have the right to inspect, amend, or correct this form. The Maryland Department of the Environment is subject to the Maryland Public Information Act. This form may be made available on the Internet via MDE's website and is subject to inspection or copying, in whole or in part, by the pulic and other governmental agencies, if not protected by federal or state law.

MDE/WMA/PER.071

ORIGINAL Monitoring Well W-2

NOTE: All "TW" wells have
6-inch steel casing and
6-inch stainless steel screen
(0.20 - 0.25 inch slots)

TEST WELL (TW) 1
Installed 8 MAR 75
Water Level 56'
Water Elevation



TYPE II

MONITORING WELL

GEOSERVICES INC.
CONSULTING ENGINEERS

FIGURE NO.	
PROJECT NO.	P1160
DOCUMENT NO.	
PAGE NO.	

12354

March 8, 1975

04 1176

Anne Arundel County

Millersville Sanitary Landfill

DESCRIPTION	FEET FROM	FEET TO	WATER
brown sand	0	9	
sandstone & gravel	9	14	
fine to med. coarse brown sand	14	21	
white clay	21	24	
fine tan sand	24	29	
gravel	29	44	
red clay	44	65	
med. course tan sand	65	71	
course tan sand	71	95	x
course sand & few streaks clay	95	114	
white & red clay	114	120	
white red clay & streaks gravel	120	145	
hard brown clay	145	148	
brown white clay & streaks gravel	148	160	
clean med. course white sand	160	172	x
white & red clay	172	179	

60

5640

380

0 185

56

160 of air lines

4 157

2

115 172

185 175

55° 47' 00"

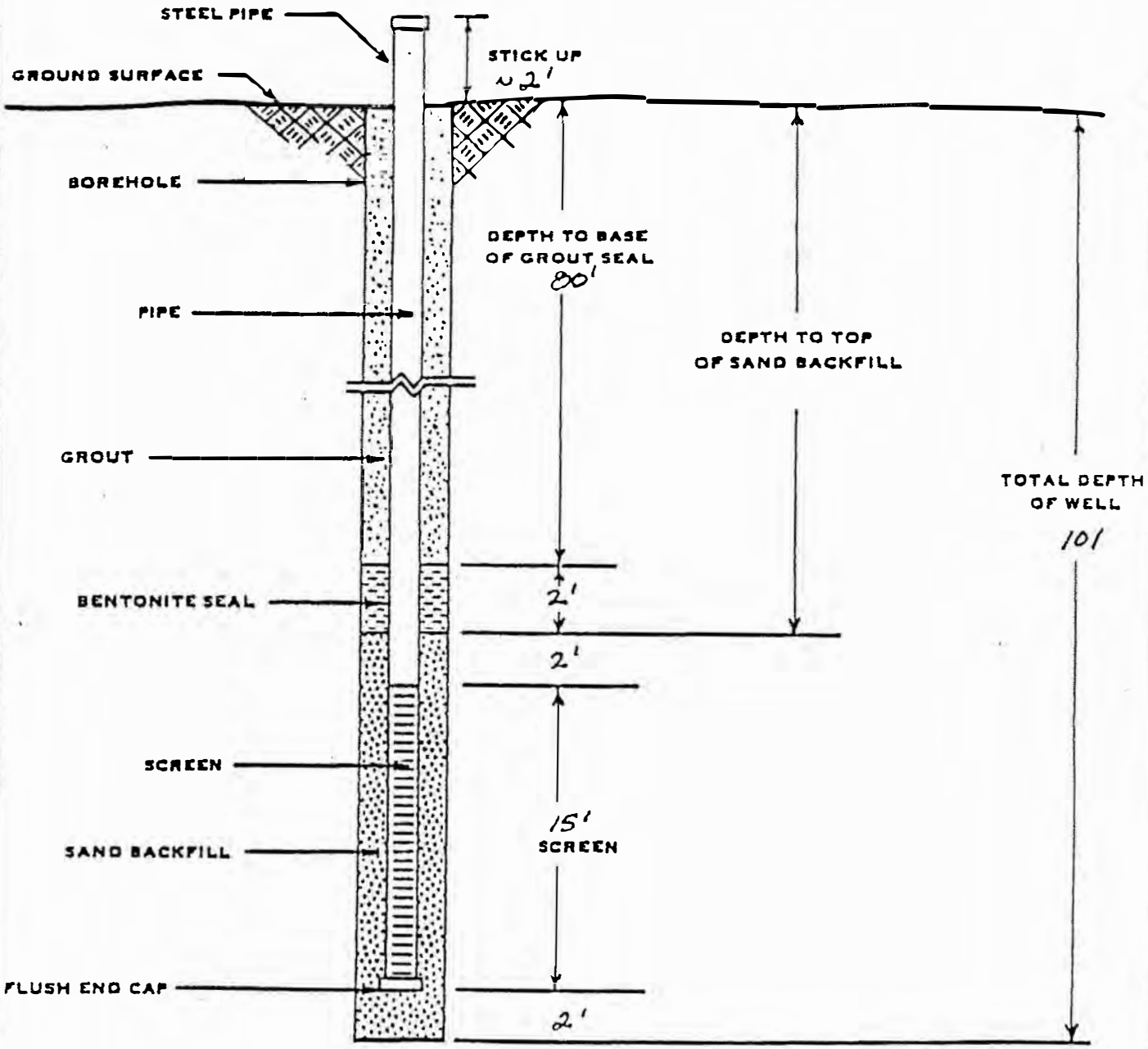
CIRCLE APPROPRIATE DRIVER

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL REQUIREMENTS STATED ON THIS ABOVE DESCRIBED PERMIT TO DRILL SAID WELL AND THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE, TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DRILLER'S NAME Conrad J. Kittinger

SIGNATURE

TW 2
Installed 24 Jan 75
Water Level 60'
Water Elev.



TYPE II

MONITORING WELL

NOTE: well completion report has errors

GEOSERVICES INC.

CONSULTING ENGINEERS

FIGURE NO.	
PROJECT NO.	P1160
DOCUMENT NO.	
PAGE NO.	

C 1 2365

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

(THIS NUMBER IS TO BE PUNCHED IN COLS. 2-6 ON ALL CARDS)

DATE RECEIVED (WRA USE ONLY) 03675

DATE WELL COMPLETED Jan. 24, 1975

DEPTH OF WELL 99 (TO NEAREST FOOT)

PERMIT NO. (FROM "PERMIT TO DRILL WELL") AA-713-73787

DRILLERS IDENTIFICATION NO. 26

OWNER Anne Arundel County

STREET OR RFD Millersville Sanitary Landfill - POST OFFICE Gambrills, Md.

WELL LOG

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	WATER BEARING
yellow clay	0	5	
gray clay	5	16	
sand stone & gravel	16	18	
course gravel	18	25	
course brown sand	25	31	
white clay	31	41	
med course tan sand	41	59	
white clay	59	61	
brown sand	61	99	x
white clay	99	105	
white & yellow clay	105	113	
brown sand	113	122	
white clay	122	134	
sand	134	137	
white clay & streaks sand	137	165	
fine tan sand	165	170	
red & white clay	170	176	
hard red clay	176	180	

WELL DESCRIPTION

GROUTING RECORD
WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): (T) YES (N) NO

TYPE OF GROUTING MATERIAL (CIRCLE BOX): (CM) CEMENT (BC) BENTONITE CLAY

NO. OF BAGS 40 NO. OF POUNDS 3760

GALLONS OF WATER 200

DEPTH OF GROUT SEAL (TO NEAREST FOOT)

FROM 0 FT. TO 80 FT.

(ENTER 0 IF FROM SURFACE)

CASING RECORD
CASING TYPES (INSERT APPROPRIATE CODE BELOW): (ST) STEEL (CO) CONCRETE (PL) PLASTIC (OT) OTHER

MAIN CASING TYPE	NOMINAL DIAMETER OF MAIN CASING (NEAREST INCH)	TOTAL DEPTH OF MAIN CASING (NEAREST FOOT)
S T	6	84

OTHER CASING (IF USED)

EACH CASING	DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD
SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): (ST) STEEL (OW) SAND OR GRAVEL WALL (WO) OPEN HOLE (PL) PLASTIC (OT) OTHER

C 2

EACH SCREEN	SCREEN TYPE	DEPTH (NEAREST WHOLE FOOT) FROM	TO
1	S T	84	99
2			
3			

SLOT SIZE 1. 020 2. ___ 3. ___

DIAMETER OF SCREEN 6 (NEAREST INCH)

GRAVEL PACK FROM 69 TO 101

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX (F)

WRA USE ONLY - NOT TO BE FILLED IN BY DRILLER

(T) SCREEN CASING (T) LOG INDICATOR (T) (P) OTHER DATA AVAILABLE

C 3

PUMPING TEST
HOURS PUMPED (TO NEAREST HOUR) 3

PUMPING RATE GALLONS PER MINUTE (TO NEAREST GALLON) 2

METHOD USED TO MEASURE PUMPING RATE estimated

WATER LEVEL (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING 60 (NEAREST FOOT)

WHEN PUMPING 2 (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX FOR PUMPING TEST): (A) AIR (P) PISTON (T) TURBINE (C) CENTRIFUGAL (R) ROTARY (O) OTHER (DESCRIBE BELOW) (J) JET (S) SUBMERSIBLE

PUMP INSTALLED
TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE): ___

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): (Y) YES (N) NO

CAPACITY:

GALLONS PER MINUTE (TO NEAREST GALLON) ___

PUMP HORSE POWER ___

PUMP COLUMN LENGTH (NEAREST FOOT) ___

CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT)
(+) ABOVE (-) BELOW LAND SURFACE 2 (NEAREST FOOT)

CIRCLE APPROPRIATE BOXES
(A) IF WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

(E) IF ELECTRIC LOG OBTAINED

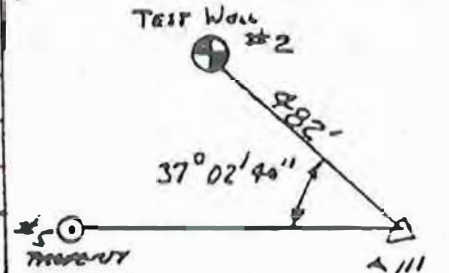
(P) IF WELL CONVERTED TO OBSERVATION WELL TEST

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED IN THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLER'S NAME (PLEASE PRINT) Conrad J. Zittinger

SIGNATURE Conrad J. Zittinger

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, ROAD OR OTHER LAND MARKS AND INDICATE BY (X) LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).

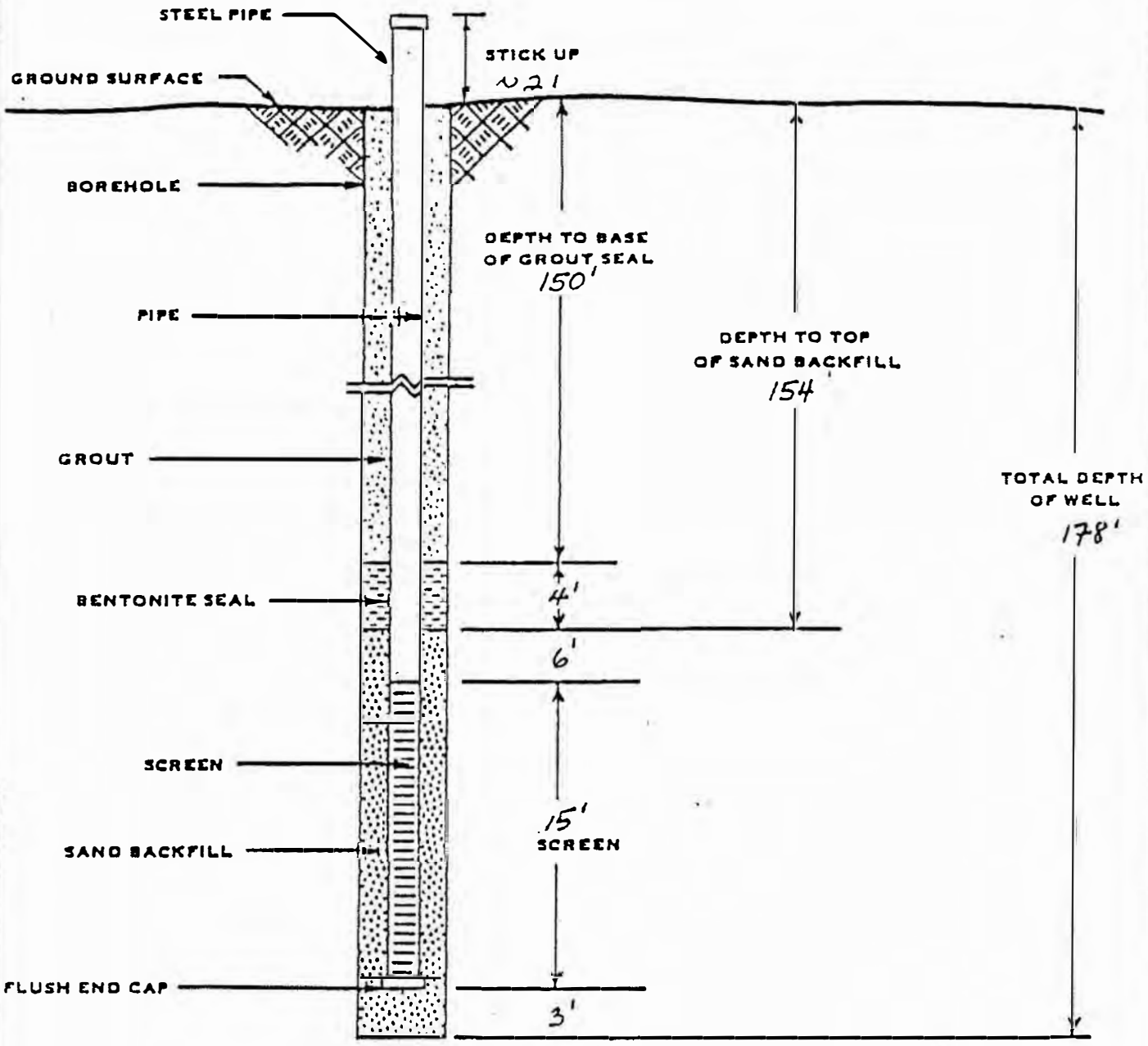


Millersville OW-2

TW-2

ORIGINAL

TW2A
Installed 25Mar 75
Water Level 107'
Water Elevation



TYPE II

MONITORING WELL

GEOSERVICES INC.

CONSULTING ENGINEERS

FIGURE NO.	
PROJECT NO.	P1160
DOCUMENT NO.	
PAGE NO.	

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

C 1 5618 — THIS NUMBER IS TO BE PUNCHED IN COLS. 1-6 ON ALL CARDS

THIS REPORT MUST BE SUBMITTED WITHIN 60 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED — FOR USE ONLY: March 25, 1975

DATE WELL COMPLETED: 03 29 75

DEPTH OF WELL: 175 (TO NEAREST FOOT)

PERMIT NO. FROM PERMIT TO DRILL WELL: AA-23-43 11

DRILLERS IDENTIFICATION NO.: 26

OWNER (LAST NAME): Anne Arundel county

STREET OR R.F.D.: Millersville, Sanitary Landfill

POST OFFICE (CODE NAME): Millersville, Md. 21108

WELL DESCRIPTION

WELL LOG — STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION	FROM	TO	WATER BEARING
Yellow silty clay	0	5	
gray clay	5	16	
sandstone gravl	16	19	
gravel & sand	19	21	
gravel & clay	21	60	
pink, whiteclay	60	64	
fine sand & streaks of clay	64	55	
course tan sand streaks clay	55	60	
med. course tan sand	60	75	
white clay	75	81	
med tan sand	81	84	
white clay	84	88	
fine tan sand	88	91	
white clay	91	103	
fine tan sand & streaks wh. clay	103	125	
wh. clay & red streaks	125	137	
fine tan sand	137	140	
white clay	140	147	
clean tan sand	147	159	
white clay	159	161	
clean fine to med. course tan sand	161	175	x
red & white clay	175	178	

GROUTING RECORD
WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE CODE): Y / N

TYPE OF GROUTING MATERIAL (CIRCLE CODE): C / M

AMOUNT: 60

BENTONITE USED: B / C

5640

NO. OF BAGS ____ NO. OF POUNDS ____

NO. OF GALLONS OF WATER: 300

DEPTH OF GROUT SEAL (TO NEAREST FOOT): FROM 0 FT. TO 150 FT. (FROM LAND SURFACE)

CASING RECORD
CASING TYPES (INSERT APPROPRIATE CODE BELOW): S STEEL / C CONCRETE / P PLASTIC / O OTHER

MAIN CASING TYPE	NOMINAL DIAMETER OF MAIN CASING (TO NEAREST INCH)	TOTAL DEPTH OF MAIN CASING (NEAREST FOOT)
S T	6	160

OTHER CASING (IF USED)

	DIAMETER (INCHES)	DEPTH (FEET) FROM	TO

SCREEN RECORD
SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): S STEEL / B BRASS OR BRONZE / H OPEN HOLE / P PLASTIC / O OTHER

C 2

DEPTH (NEAREST WHOLE FOOT)

EACH SCREEN		FROM	TO
1	S T	160	175
2			
3			

SLOT SIZE 1. 020 2. ____

DIAMETER OF SCREEN: 6 (NEAREST INCH)

GRAVEL PACK: FROM 154 TO 178

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX: F

HDA USE ONLY (NOT TO BE FILLED IN BY DRILLER): TELESCOPE CASING / INSULATOR / OTHER DATA AVAILABLE

CIRCLE APPROPRIATE BOXES
A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E — ELECTRIC LOG OBTAINED

P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL REGULATIONS ADOPTED PURSUANT TO ARTICLE 96A AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLER'S NAME: Conrad J. Zittinger

SIGNATURE: Conrad J. Zittinger

C 3

PUMPING TEST
HOURS PUMPED (TO NEAREST HR.): 5

PUMPING RATE (GALLONS PER MINUTE TO NEAREST GALLON): 15

METHOD USED TO MEASURE PUMPING RATE: estimated

WATER LEVEL (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING: 107 (NEAREST FOOT)

WHEN PUMPING: 140 of air line (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX OR SPECIFY BELOW): A AIR / B PISTON / T TURBINE / C CENTRIFUGAL / M IMPELLER / O OTHER (SPECIFY BELOW) / J JET / S SUBMERSIBLE

PUMP INSTALLED
TYPE OF PUMP INSTALLED (INSERT APPROPRIATE LETTER FROM BOX AT RIGHT OR SPECIFY BELOW): ____

CYLINDER SIZE (INCHES): ____ (CIRCLE APPROPRIATE BOX): Y / N

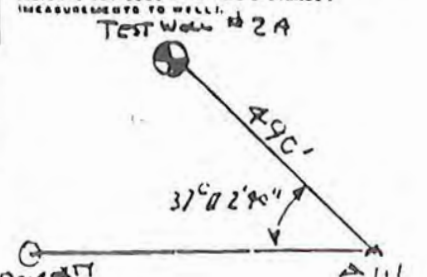
CAPACITY: GALLONS PER MINUTE (TO NEAREST GALLON) ____

PUMP MOTOR POWER: ____

PUMP COLUMN LENGTH (NEAREST FOOT): ____

CASING HEIGHT
(CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT): + ABOVE / − BELOW LAND SURFACE: 2 (NEAREST FOOT)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).

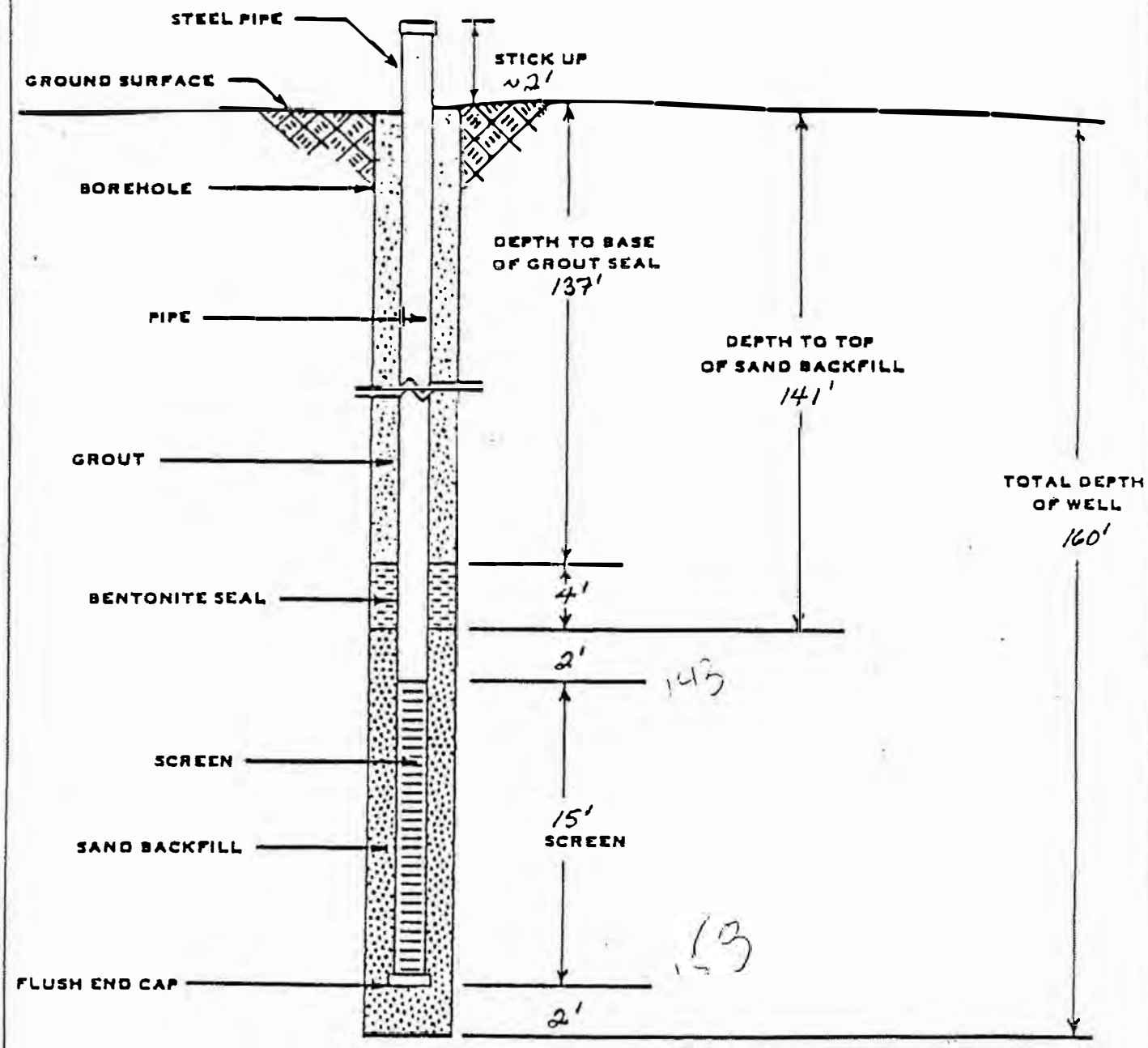


Millersville OW-2A

TW-2A

ORIGINAL

TW 3
Installed 5 May 75
Water Level 90'
Water Elevation



TYPE II

MONITORING WELL

GEOSERVICES INC.

CONSULTING ENGINEERS

FIGURE NO.	
PROJECT NO.	P1160
DOCUMENT NO.	
PAGE NO.	

C 1 2364

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED (FOR USE ONLY): 06 16 75

DATE WELL COMPLETED: 5-5-75

DEPTH OF WELL: 158 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-73-3788

DRILLERS IDENTIFICATION NO.: 26

OWNER: Anne Arundel County (LAST NAME)

STREET OR R.F.D.: Millersville Sanitary Landfill

POST OFFICE: Millersville, Md., 21108 (FIRST NAME)

WELL DESCRIPTION

WELL LOG

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLORS, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
yellow silty sand	0	6	
coarse brown sand & gravel	6	16	
fine brown sand & gravel	16	28	
sandrock	28	29	
fine brown sand	29	35	
white clay	35	40	
course tan sand	40	58	
hard white clay	58	76	
strks. clay & sand	76	78	
fine to med. course white sand	78	90	
hard red & white clay	90	124	
thin strks. sand & hard clay	124	131	
course sand & strks. clay	131	135	
white clay	135	139	
course sand and gravel	139	158	X
white clay	158	162	

GROUTING RECORD
WELL WAS GROUTED (CIRCLE APPROPRIATE CODE): (Y) N

TYPE OF GROUTING MATERIAL (CIRCLE CODE): (C M) CEMENT; BENTONITE CLAY (B C)

NO. OF BAGS: 65 NO. OF POUNDS: 6,110

GALLONS OF WATER: 325

DEPTH OF GROUT SEAL (TO NEAREST FOOT)

FROM: 0 FT. TO: 137 FT.

(ENTER 0 IF FROM SURFACE)

CASING RECORD
CASING TYPE (INSERT APPROPRIATE CODE BELOW): (S T) STEEL; (C O) CONCRETE; (P L) PLASTIC; (O T) OTHER

MAIN CASING TYPE: S T

NOMINAL DIAMETER OF MAIN CASING (NEAREST INCH): 6

TOTAL DEPTH OF MAIN CASING (NEAREST FOOT): 143

OTHER CASING (IF USED)

BACK CASING	DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD
SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): (S T) STEEL; (B R) BRASS OR BRONZE; (H O) OPEN HOLE; (P L) PLASTIC; (O T) OTHER

C 2

DEPTH (NEAREST WHOLE FOOT)

SCREEN	TYPE	FROM	TO
1	S T	143	158
2			
3			

SLOT SIZE 1. .020 2. 3.

DIAMETER OF SCREEN: 6 (NEAREST INCH)

GRAVEL PACK: FROM 141 TO 160

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX: (F)

USA USE ONLY (NOT TO BE FILLED IN BY DRILLER): TELESCOPE CASING; LOG INDICATOR; OTHER DATA AVAILABLE

C 3

PUMPING TEST
HOURS PUMPED (TO NEAREST HOUR): 6

PUMPING RATE (GALLONS PER MINUTE TO NEAREST GALLON): 12

METHOD USED TO MEASURE PUMPING RATE: estimated

WATER LEVEL (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING: 90 (NEAREST FOOT)

WHEN PUMPING: 158' air line (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE CODE FOR PUMPING TEST): (A) AIR; (P) PISTON; (T) TURBINE; (C) CENTRIFUGAL; (R) ROTARY; (O) OTHER (DESCRIBE BELOW); (J) JET; (S) SUBMERSIBLE

PUMP INSTALLED
TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE): A, C, J, P, R, S, T, O

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): (Y) N

CAPACITY:

GALLONS PER MINUTE (TO NEAREST GALLON):

PUMP HORSE POWER:

PUMP COLUMN LENGTH (NEAREST FOOT):

CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT)
(+) ABOVE; (−) BELOW LAND SURFACE: 2 (NEAREST FOOT)

CIRCLE APPROPRIATE BOXES
(A) A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

(E) ELECTRIC LOG OBTAINED

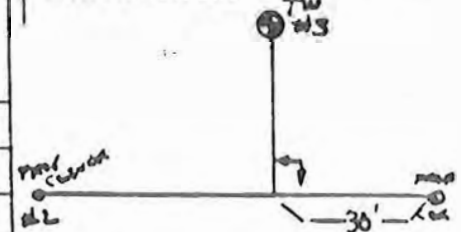
(P) TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLERS NAME (PLEASE PRINT): Conrad J. Metzger

SIGNATURE: Conrad J. Metzger

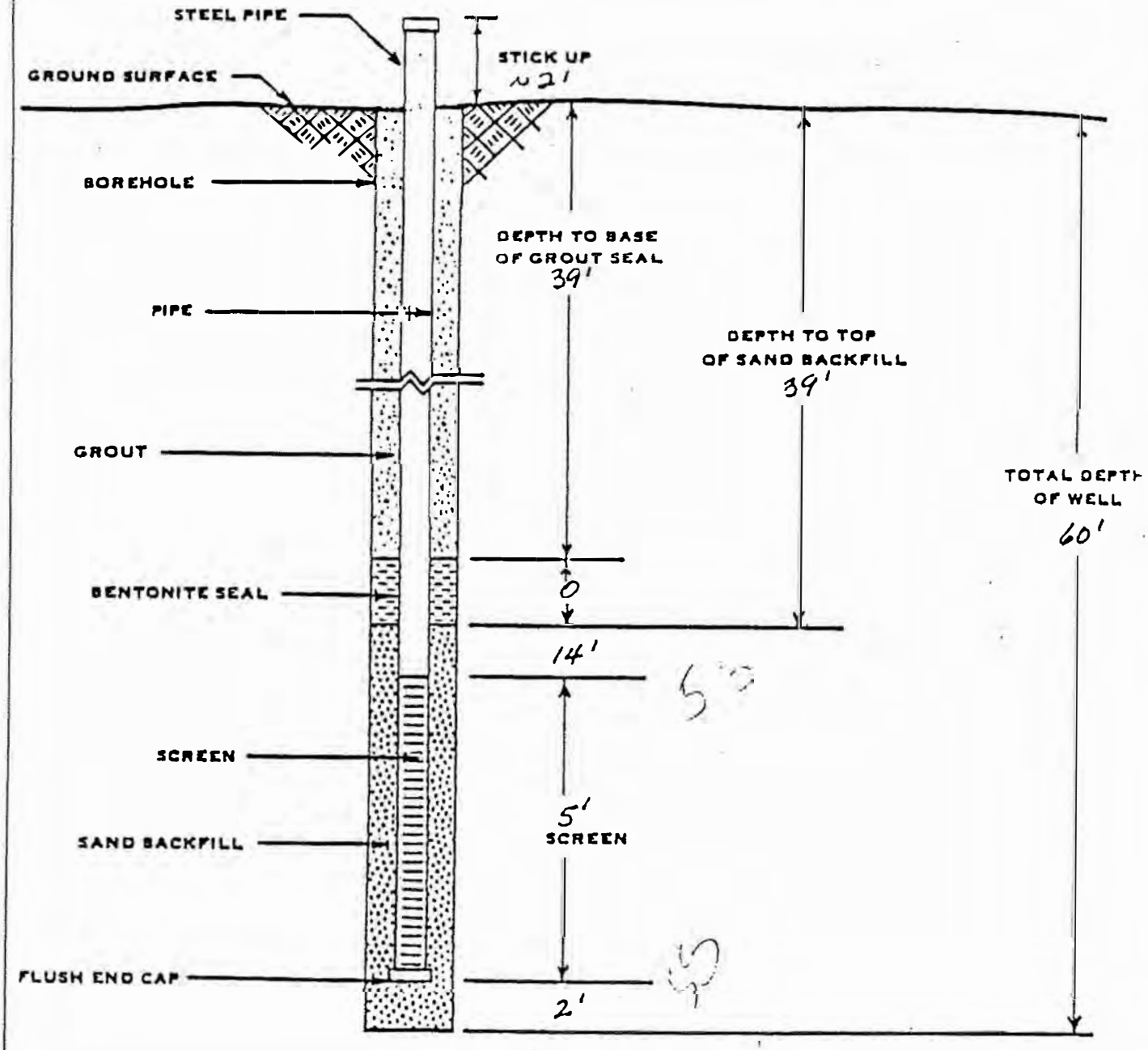
LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).



Millersville OW-3

TW-3

TW3A
Installed 27 June 75
Water Level 46'



TYPE II

MONITORING WELL

GEOSERVICES INC.

CONSULTING ENGINEERS

FIGURE NO.	
PROJECT NO.	P1160
DOCUMENT NO.	
PAGE NO.	

C 11 4197

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED (WRA USE ONLY) 071875

DATE WELL COMPLETED 6-27-75 (0627 75)

DEPTH OF WELL 58 (NEAREST FOOT)

PERMIT OR FROJECT NUMBER AA-283-74(R)

DRILLERS IDENTIFICATION NO. 26

OWNER (LAST NAME) Anne Arundel County (FIRST NAME)

STREET OR RFD Millersville Sanitary Landfill POST OFFICE Millersville, Md. 21108

WELL DESCRIPTION

STATE THE # OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
coarse br. sand & gravel	0	9	
fine to coarse brown sand	9	16	
white & yellow clay	16	17	
coarse brown sand	17	36	
white clay	36	40	
clean coarse tan sand	40	46	
white clay	46	47	
clean coarse tan sand	47	53	X
hard white clay	56	60	

GROUTING RECORD
WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX) Y N

TYPE OF GROUTING MATERIAL (CIRCLE ONE) CEMENT C M BENTONITE B G

NO. OF BAGS 23 NO. OF LBS. 2162

AMT. OF WATER 115

DEPTH OF GROUT SEAL FROM 0 TO 39

CASING RECORD
S T 6 53

OTHER CASING (IF USED)

SCREEN RECORD
P L 53 58

SCREEN SLOT SIZE .020

DIAMETER OF SCREEN 6

39 60

PUMPING TEST
HOURS PUMPED (TO NEAREST HOUR) 0

PUMPING RATE (GALLONS PER MINUTE TO NEAREST GALLON) 0

WATER LEVEL: RECORD 45

WHEN PUMPING 0

TYPE OF PUMP USED

PUMP INSTALLED

CASING HEIGHT

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES SUCH AS BUILDINGS, SEPTIC TANKS AND OR DRIVELAND ROADS. INDICATE NOT LESS THAN TWO DISTANCE MEASUREMENTS TO WELL

N W E S

CIRCLE APPROPRIATE BOXES
IF WELL WAS ABANDONED AND SEALED WHEN THIS WAS FIRST COMPLETED

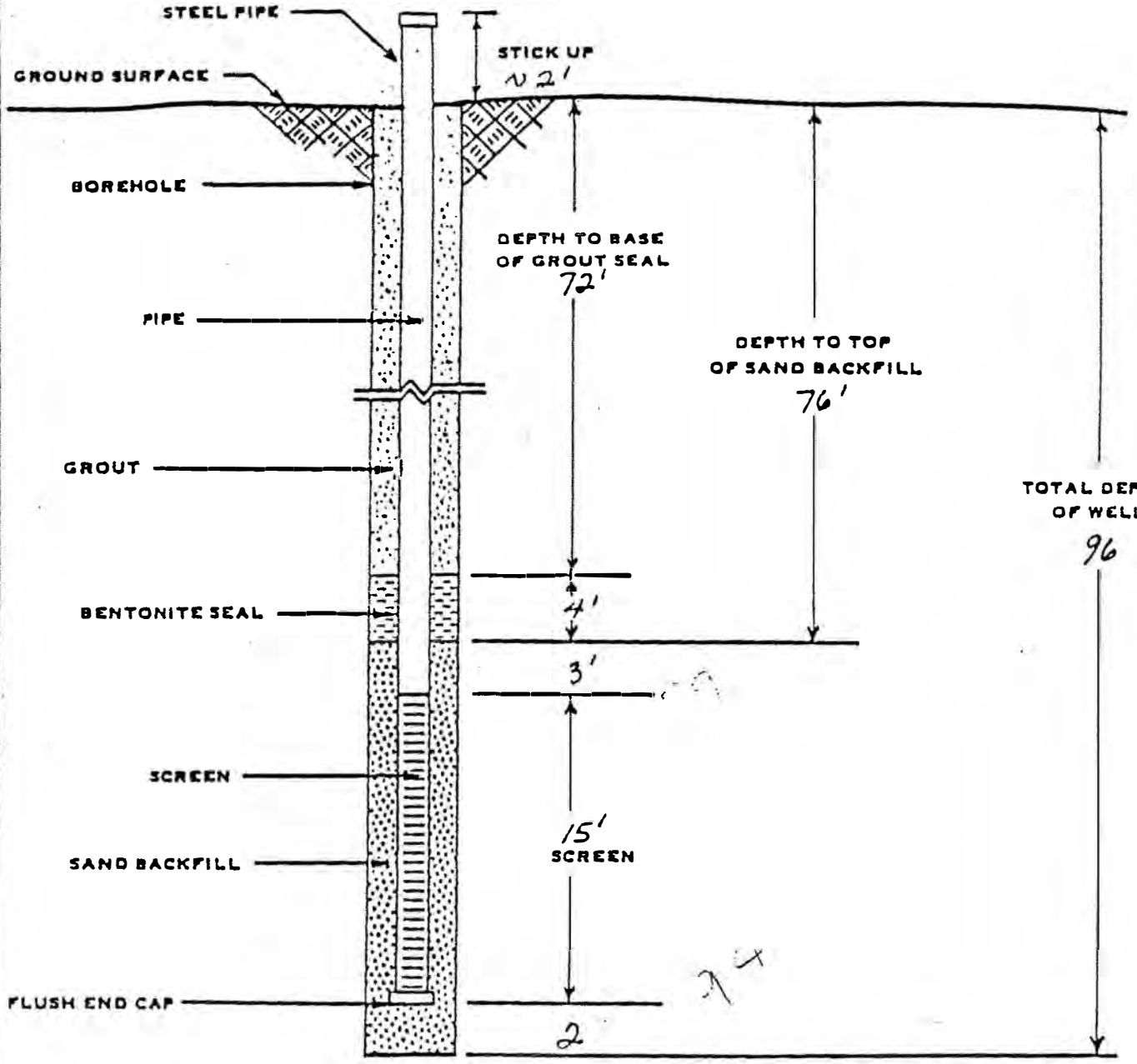
WITHDRAWAL WELL CONVERTED TO PRODUCTION WELL

Millersville OW-3

TW-3A

ORIGINAL

TW 4
Installed 18 June 75
Water Level 24'
Water Elevation



TYPE II

MONITORING WELL

GeoServices Inc.

CONSULTING ENGINEERS

FIGURE NO.	
PROJECT NO.	P1160
DOCUMENT NO.	
PAGE NO.	

Sub 216 6/71

C 1 2363 — (SEQ. NO.)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED (WRA USE ONLY) 07 24 75 / 07 07 75

DATE WELL COMPLETED 6-18-75 / 06/18/75

DEPTH OF WELL 96 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-173-3787

DRILLERS IDENT. 26

OWNER Anne Arundel County (LAST NAME / FIRST NAME)

STREET OR R.F.D. Millersville Sanitary Landfill — POST OFFICE Millersville, Md.

WELL DESCRIPTION

WELL LOG

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	KIND OF WATER (IF BEARING)
fine silty br.sand	0	11	
coarse br. sand, gravel & streaks sandstone	11	18	
white clay	18	19	
clean med. tan sand	19	24	
white clay	24	25	
clean coarse tan sand	25	35	
white clay	35	36	
coarse tan sand	36	39	
white clay	39	41	
sand	41	44	
white clay & few strks. sand	44	51	
fine tan sand	51	70	
white clay	70	72	
fine tan sand	72	74	
white clay	74	75	
fine tan sand	75	76	
white clay	76	80	
fine to med. tan sand	80	90	X
white clay	90	92	
fine tan sand	92	94	X
hard white clay	94	100	

T

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX) Y / N

TYPE OF GROUTING MATERIAL (CIRCLE BOX) CEMENT (C M) BENTONITE CLAY (B C)

NO. OF BAGS 43 NO. OF POUNDS 4042

GALLONS OF WATER 215

DEPTH OF GROUT SEAL (TO NEAREST FOOT) FROM 0 FT. TO 72 FT. (CENTER OF FROM SURFACE)

CASING RECORD

CASING TYPES (INSERT APPROPRIATE CODE BELOW): ST STEEL; CO CONCRETE; PL PLASTIC; OT OTHER

MAIN CASING TYPE	NOMINAL DIAMETER (OF MAIN CASING) (NEAREST INCH)	TOTAL DEPTH OF MAIN CASING (NEAREST FOOT)
S T.	6	79

OTHER CASING (IF USED)

EACH CASING	DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): ST STEEL; GR GRAVEL OR SQUEEZE; HO OPEN HOLE; PL PLASTIC; OT OTHER

C 2

DEPTH (NEAREST WHOLE FOOT) FROM / TO

EACH SCREEN		FROM	TO
1	S T	79	94
2			
3			

SLOT SIZE 1. 020 2. ____ 3. ____

DIAMETER OF SCREEN 6 (NEAREST INCH)

GRAVEL PACK FROM 76 TO 96

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX P

WRA USE ONLY (NOT TO BE FILLED IN BY DRILLER): TELESCOPE CASING; LOG INDICATOR; STRATA LOG AVAILABLE

C 3

PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR) 0

PUMPING RATE (GALLONS PER MINUTE TO NEAREST GALLON) 0

METHOD USED TO MEASURE PUMPING RATE 0

WATER LEVEL (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING 24 (NEAREST FOOT)

AFTER PUMPING None (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX) FOR PUMPING TEST None

A AIR; D PISTON; T TURBINE; C CENTRIFUGAL; R ROTARY; O OTHER (DESCRIBE BELOW); J JET; S SUBMERSIBLE

PUMP INSTALLED

TYPE OF PUMP INSTALLED (APPROPRIATE LETTER IN BOX - SEE ABOVE: A, C, J, P, R, S, T, O)

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX) Y / N

CAPACITY: GALLONS PER MINUTE TO NEAREST GALLON

PUMP HORSE POWER

PUMP COLUMN LENGTH (NEAREST FOOT)

CASING HEIGHT

(CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT) + ABOVE / − BELOW LAND SURFACE 2 (NEAREST FOOT)

CIRCLE APPROPRIATE BOXES

A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

T THIS WELL CONVERTED TO PRODUCTION WELL

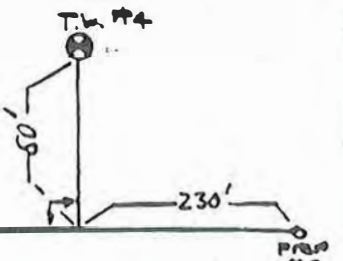
I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLER'S NAME (PLEASE PRINT) Conrad J. Zittlinger

SIGNATURE [signature]

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).



Millersville OW-4

TW-4

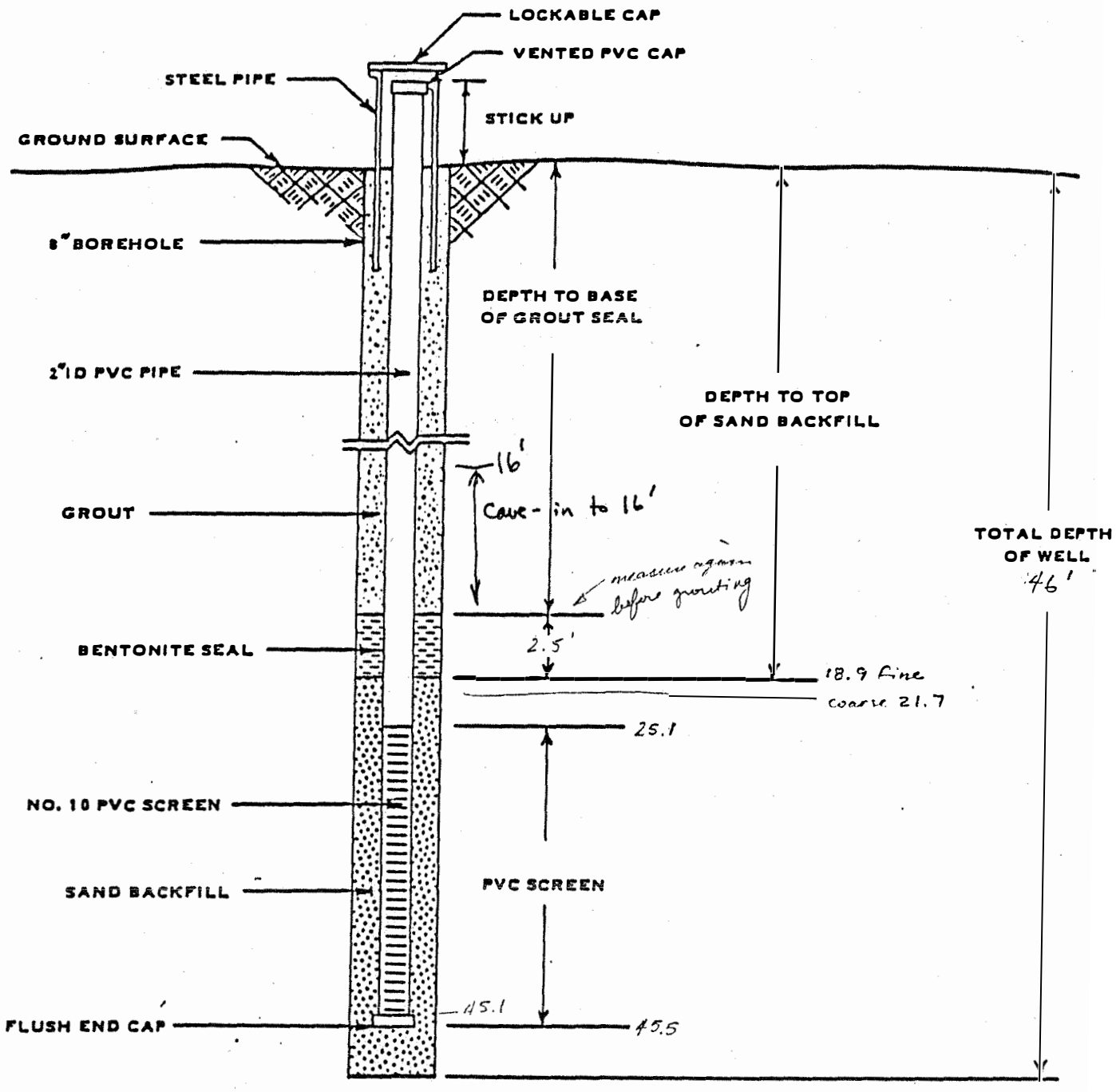
ORIGINAL

GEOSERVICES INC. JOB NAME: 6B13/Millersville LF JOB NO.: P1160

BY: JCW DATE: 25 Oct 89 SHEET: 1 OF 1

TYPE II MONITORING WELL

TW4B



GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW4B SHEET 1 OF 2

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 110 ft above sea level datum (est.)

DRILLING METHOD AND EQUIPMENT 6 1/4" I.D. auger boring; split spoon sampling 2' every 5'

DATES: START 24 Oct 89 FINISH 25 Oct 89 WATER LEVEL 29'6" W.L. DATE 25 Oct 89 LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
110	0	0-2'		1	0-0-0-1 (0) (0's from weight of hammer)	0-2': silty sand, fine and medium-grained, yellowish-brown, moist, (SM)		
105	5	5-7'		1.6	2-4-5-7 (9)	2-11.4': well graded sand, some silt and 1/4" gravel, yellowish brown, moist, (SW)		
100	10	10-12'		2	14-22-31-40 (53)	11-4-16.6': silty sand, fine, very pale brown striated with reddish yellow, dry to moist, (SM)		
95	15	15-17'		2	11-13-13-13 (26)	15.7': 1/2" band of dark red sandstone 16.6-25': poorly-graded sand, medium, reddish-yellow with 1-2" bands of yellow and very pale brown, dry to 21.5', moist 21.5-25', (SP)		TV: 12, 12 PP: 3.5, 4.5+
90	20	20-22'		2	8-23-31-42 (54)			10/25/89 resume drilling from 40'. Pulled plug out of hole the previous night. On 10/25/89 water is standing in auger at 29' 8".
85	25	25-27'		2	11-34-39-53 (73)	25-30.2': poorly-graded medium sand with some silt, reddish-yellow banded with yellow and very pale brown, some 1-2' bands of fat clay (white, CH), moist, (SP)		Terminate boring 46'

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW4B SHEET 2 OF 2

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 110 ft above sea level datum (est.)

DRILLING METHOD AND EQUIPMENT 6 1/4" I.D. auger boring; split spoon sampling 2' every 5'

DATES: START 24 Oct 89 FINISH 25 Oct 89 WATER LEVEL 29'6" W.L. DATE 25 Oct 89 LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
80	30	30-32'		2	12-21-38-68 (59)	30.2-35.8': poorly-graded fine to medium sand becoming coarser with depth, reddish-yellow, wet to saturated, (SP)		
75	35	35-37'		2	13-20-46-54/4" (66)	35.8-36.2': fat clay, firm to hard consistency, white, fairly dry, (CH) 36.2-40.8': poorly-graded medium to coarse sand (reddish-yellow), with interbedded layers of fat clay (white, CH), wet to saturated, (SP)		TV: 12, 12 tsf PP: 3.5, 4.5+ tsf
70	40	40-42'		2	9-19-50-50/3"	40.8-44': silty fine sand with come clay, with thin horizontal striations of brownish yellow, wet, (SM)		25 Oct 89 resume drilling from 40'. Pulled plug out of hole the previous night. On 25 Oct 89 water is standing in auger at 29' 8".
65	45					44-46': elastic silt with fine sand, light gray, fairly dry (MH)		Terminate boring 46'

TW-5 Well Information

John Gilman
Business Development
Sales

A.C. Schultes
INFLUENT

A.C. Schultes
of Maryland, Inc.
8221 Cloverleaf Drive
Millersville, Maryland 21108

(410) 841-6710 Direct
(410) 841-6711 Fax
JohnG@ACSchultes.net
www.ACSchultes.com

Tag:	AA-73-3786
INSTALLED	6/6/1975
Address	LANDFILL
City	
State	
Zip Code	
Driller	CZ ENT
Est. GPM Produced	
Use for water SIM	
Drill Method	
WAPID	
Replace	
Subdivision	
Section Lot	
Nearest Town	
Town Distance	
Direction	
Road Name	
Distance	
Tax Map	
Block	
Parcel	
N_Grid 83	
E_Grid	
Latitude	
Longitude	
Completion	

Total Depth	93
Grouted	YES
Grout Type	CEMENT
Grout Top	0'
Grout Bottom	70'
Casing Type	STEEL
Casing Diameter	6"
Casing Depth	78'
Casting Height	
Screen Type	S.S
Screen Top	78'
Screen Bottom	93'
Screen Diameter	6"
Hrs Pumped	
Pumping Rate	
Level Before	
Level During	
Test Pump Type	AIR
Pump Installed	
Capacity	
Pump Hp	
Column Length	

John Gilman
Business Development
Sales

A.C. Schultes
INFLUENT T[illegible]

A.C. Schultes
of Maryland, Inc.
8221 Cloverleaf Drive
Millersville, Maryland 21108

(410) 841-6710 Direct
(410) 841-6711 Fax
JohnG@ACSchultes.net
www.ACSchultes.com

TW-5A Well Information

Tag: AA-73-4652

INSTALLED 6/25/1975

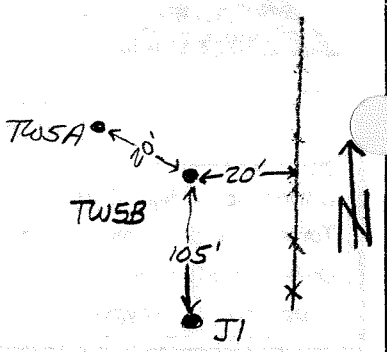
Address	LANDFILL
City	
State	
Zip Code	
Driller	C2 ENT.
Est. GPM Produced	
Use for water SIM	
Drill Method	
WAPID	
Replace	
Subdivision	
Section Lot	
Nearest Town	
Town Distance	
Direction	
Road Name	
Distance	
Tax Map	
Block	
Parcel	
N_Grid 83	
E_Grid	
Latitude	
Longitude	
Completion	

Total Depth	49'
Grouted	YES
Grout Type	CEMENT
Grout Top	0'
Grout Bottom	37'
Casing Type	STEEL
Casing Diameter	6"
Casing Depth	44'
Casting Height	
Screen Type	PLASTIC
Screen Top	44'
Screen Bottom	49'
Screen Diameter	6"
Hrs Pumped	
Pumping Rate	
Level Before	
Level During	
Test Pump Type	AIR
Pump Installed	
Capacity	
Pump Hp	
Column Length	

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Status: (check one)
☒ Well Installed
☐ Plugged & Abdnd.
☐ _____

Borehole Location Sketch Map



Drilling Co.: A.C. Schultes of Delaware Rig: Failing 1250
Method & Tools: Mud Rotary (Table Drive)
Driller: [illegible] De Roche Supervisor: J. Rouner / H. Gill
Hole Diameter: See Comments Ground Elev.: 102.3 ft ☐ Surveyed ☒ Estimated
Site: Millersville Proj. No.: GE 3200 - 450
Boring: TW5B Page: 1 of 5 Date: 16-24 Jun 92

Top (Depth) ☒ Feet ☐ Meters	Description	Graphic Log	Depth Scale	Comments
	GRAVELLY SAND (ps, vfg-mp, sa qtz, tr fsp).			1200, 16Jun92: Boring begun; 7.5 in bit; native mud.
5.0	CLAY, semi-fat, tough, moderate reddish brown (10R4/6) with laminations and mottles of dark yellowish orange (10YR6/6), very light gray (N8), and grayish pink (5R8/2);		5	
	@15ft: becoming mainly very light gray (N8) and leaner;		10	
	@20ft: becoming mainly pale reddish brown (10R5/4) and fatter;		15	
	@30ft: gradually becoming mostly very light gray (N8) to yellowish gray (5Y8/1), becoming leaner		20	
			25	
			30	
			35	@40ft: Mud very thick.

Fig. 2—Plain—p1. Proj.No.: GE3200-450 Site: Millersville Page 1 of 5 Boring: TW5B

Boring: TW5B Page 2 of 5 Site: Millersville Proj.No.: GE3200

Top (Depth)	Description	Graphic Log	Depth Scale	Comments
	@40ft: grading into...			@40ft: thinned mud; mud still rather thick.
42	FINE SAND (vfg, ws; srqtz, tr fsp, tr garnet); gradually coarsening downward into...		45	
	@47ft: FINE SAND (fg-mg, ws)		50	
	@54ft: becoming finer downward		55	
	@57ft: very thin bed of limonitic sandstone; sharp base.			
57	CLAY, lean, little silt; yellowish gray (5Y8/1).		60	
	@61ft: grading into...			
63	FINE SAND (vfg ws); grading into...			
65	SILTY CLAY, lean; yellowish gray (5Y8/1)		65	
69	FINE SAND (fg-mg, ws, sa-sr, tr vvr qtz, tr fsp, tr garnet)		70	
			75	
	@77-78.5ft: two medium beds of CLAY, lean, little silt; one bed pale red (10R6/2) with streaks of dark yellowish orange (10YR6/6); the other bed yellowish gray (5Y8/1).		80	@80ft: thinned mud
	@87ft: very thin bed of limonitic sandstone		85	
87	CLAY, lean, yellowish gray (5Y8/1)			

Boring: TW5B Page 2 of 5 Site: Millersville Proj.No.: GE3200 File—Plain—p.2

Boring: TW5B Page 3 of 5 Site: Millersville Proj.No.: GE3200-450

Top (Depth)	Feet / Meters	Description	Graphic Log	Depth Scale	Comments
91		Interbedded SAND and CLAY, pale red. brn. (10R5/4) and yelgray (5Y8/1); coarsening downward into...			
94		FINE SAND (fg-mg, ms); limmite cement, coarsens downward; sharp base		95	@94ft: moderately hard drilling.
96		CLAY, semi-fat, interlaminated moderate red (5R4/6), bright orange red (10R5/7); grayish orange pink (10R8/2).			@96ft: very hard drilling 1450, 16Jun92: Boring suspended @100ft.
102		FINE SAND (vfg-fg), hard, possibly weakly cemented, mod. red. brn. (10R4/6)		100 105	17Jun92: Reamed borehole, 12.5 in bit; set 8in casing to 97ft. 18Jun92: cemented casing (62 sx). 22Jun92: Flushed casing; boring resumed @100ft.
105.5		CLAY, semi-fat, mod. red. brn (10R4/6) and very light gray (N8) with nodules of very dark red (5R2/6);			@102-131ft: Resistivity and SP logs indicate moderate permeability.
110		SAND		110	
111.5		SILT @113ft: medium bed of SAND			
115		FINE SAND (vfg-mg, sa-sr qtz); @117ft: fining downward into...		115	
118		FINING DOWNWARD SEQUENCE: FINE SAND (vfg-fg, sa-sr qtz, tr fsp, tr hematite nodules), light brown (5YR6/4); cyclically interbedded with thin to thick beds of SILT and CLAY; SAND abundance decreases and CLAY abundance increases with depth. grading into...		125 130	
131		CLAY, moderate red (5R4/6) & light gray (N7), some moderate yellowish brown (10YR5/4) and some moderate brown (5YR3/4).		135	
136		SILTY SAND (vfg); some interbeds of Clay; Coarsens downward, sharp base.			

ng—Plain—p.2 File
Proj.No.: GE3200-450
Site: Millersville
Page 3 of 5
Boring: TW5B

Top (Depth)	Description	Graphic Log	Depth Scale	Comments
142	CLAY, very tough, semi-fai; laminated moderate reddish brown (10 R4/6), and very light gray (N8), with large nodules, and lumps of pale red (10R 6/2) and very dark red (5 R2/6)		145 150	
	@154ft: gradually and uniformly becoming coarser; some beds of SILT; grading into...		155 160	@160ft: mud very thick
173	COARSENING DOWNWARD SEQUENCE: Cyclically interbedded CLAY, SILT, and FINE SAND; Sand content increases, and clay content decreases with depth.		165 170	23 Jun 92: Boring suspended @170ft. 24 Jun 92: Boring resumed; mud very thick.
	@170ft: becoming hard; probably limonitic Sandstone with interbedded Clay and Silt		175	
178	FINE SAND (vfg-mg, sr qtz, tr fsp, tr limonitic nodules). some very thin beds of iron oxide scattered throughout. gradually coarsens downward		180 185	@180ft: mud very thick; thinned mud; new mud really clean.

Boring: TW 5B Page 5 of 5 Site: Millersville Proj.No.: GE3200-450

Top (Depth)	Feet / Meters	Description	Graphic Log	Depth Scale	Comments
		@195-197 ft: Interbedded SAND and CLAY dark reddish brown (10 R 3/4) and light gray (N7)		195	@195ft: borehole taking much water.
				200	
				205	
				210	
				215	
				220	
222		CLAY, dark reddish brown (10 R 3/4), some light gray (N7), very tough, hard.			24 Jun 92: Boring terminated @ 223; finished borehole; set well: 4 in PVC (Sch 40) screen (0.020" slot) 220-190 ft; gravel to 178 ft; med. granular bentonite to top.
		Total Depth: 223 ft		225	
				230	
				235	

TW-6 Well Information

John Gilman
Business Development
Sales

A.C. Schultes
of Maryland, Inc.
8221 Cloverleaf Drive
Millersville, Maryland 21108

(410) 841-6710 Direct
(410) 841-6711 Fax
JohnG@ACSchultes.net
www.ACSchultes.com

Tag:	AA-73-3785
	INSTALLED 6/3/1975
Address	LANDFILL
City	
State	
Zip Code	
Driller	CZ ENT
Est. GPM Produced	
Use for water SIM	
Drill Method	
WAPID	
Replace	
Subdivision	
Section Lot	
Nearest Town	
Town Distance	
Direction	
Road Name	
Distance	
Tax Map	
Block	
Parcel	
N_Grid 83	
E_Grid	
Latitude	
Longitude	
Completion	

Total Depth	62'
Grouted	YES
Grout Type	CEMENT
Grout Top	0'
Grout Bottom	40'
Casing Type	STEEL
Casing Diameter	6"
Casing Depth	47'
Casting Height	
Screen Type	S.S.
Screen Top	47'
Screen Bottom	62'
Screen Diameter	6"
Hrs Pumped	
Pumping Rate	
Level Before	
Level During	
Test Pump Type	AIR
Pump Installed	
Capacity	
Pump Hp	
Column Length	

Technical Data

A.A. Co. Waste Management
Millersville Landfill
Well #6B
AA-95-4953

ACSM Job #H5703

Table of Contents

1. Well Permit

2. Well Completion Report

3. Well "As Built"

4. Drillers Log

5. Electric Log

C 1 | 8360 | SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT

FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER DR

ST/CO USE ONLY
DATE Received MM DD YY
8 13

DATE WELL COMPLETED MM DD YY
15 2 10 20

Depth of Well 22 220 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA - 75 - 4953
28 29 30 31 32 33 34 35 36 37

OWNER Anne Arundel Co. (last name / first name)

STREET OR RFD 300 Dunn Crossing Rd. TOWN Severn, MD

SUBDIVISION Millersville SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Topsoil	0	1	
red/white clay	1	18	
fine/med sand	18	67	
red/white caly	67	136	
fine sand & red clay	136	147	
fine/med sand w/strks red clay	147	220	

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED yes Y 44 | no N 44

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M __ D __ __ __ 517

DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __ __ D __ __ __

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y 44 | no N 44

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT CM (45 46) BENTONITE CLAY BC (45 46)

NO. OF BAGS 30 NO. OF POUNDS 1500

GALLONS OF WATER 750

DEPTH OF GROUT SEAL (to nearest foot)

from 0 (48 TOP 52) ft. to 180 (54 BOTTOM 58) ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL | CO CONCRETE | PL PLASTIC | OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	8 (63 64)	130 (66 70)

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to
PL	4	0	200

SCREEN RECORD
screen type or open hole — insert appropriate code below

ST STEEL | BR BRASS BRONZE | HO OPEN HOLE | PL PLASTIC | OT OTHER

C 2 (1 2)

DEPTH (nearest ft.)

EACH SCREEN			
1 (8 9)	PL (11)	200 (15 17)	220 (21)
2 (23 24)	(26)	30 (32)	36
3 (38 39)	(41)	45 (47)	51

SLOT SIZE 1 020 2 ____ 3 ____

DIAMETER OF SCREEN 4 (56 60) (NEAREST INCH)

from 180 to 220

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING | LOG INDICATOR | OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) 6 (8 9)

PUMPING RATE (gal. per min.) 50 (11 15)

METHOD USED TO MEASURE PUMPING RATE 5 gal.

WATER LEVEL (distance from land surface)

BEFORE PUMPING 59 (17 20) ft.

WHEN PUMPING 109 (22 25) ft.

TYPE OF PUMP USED (for test)

A air (27) | P piston (27) | T turbine (27)
C centrifugal (27) | R rotary (27) | O other (describe below) (27)
J jet (27) | S submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. S (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 5 (31 35)

PUMP HORSE POWER 3 (37 41)

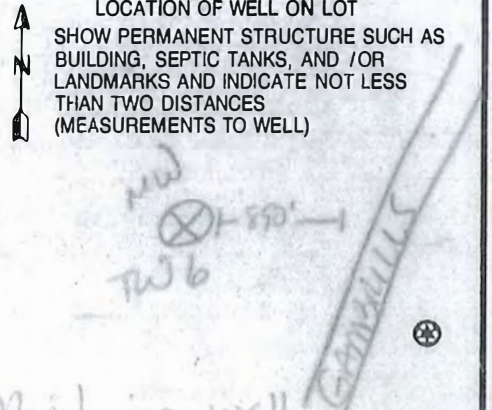
PUMP COLUMN LENGTH (nearest ft.) 180 (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)

+ (49) above | – (49) below — LAND SURFACE

2 (50 51) (nearest foot)

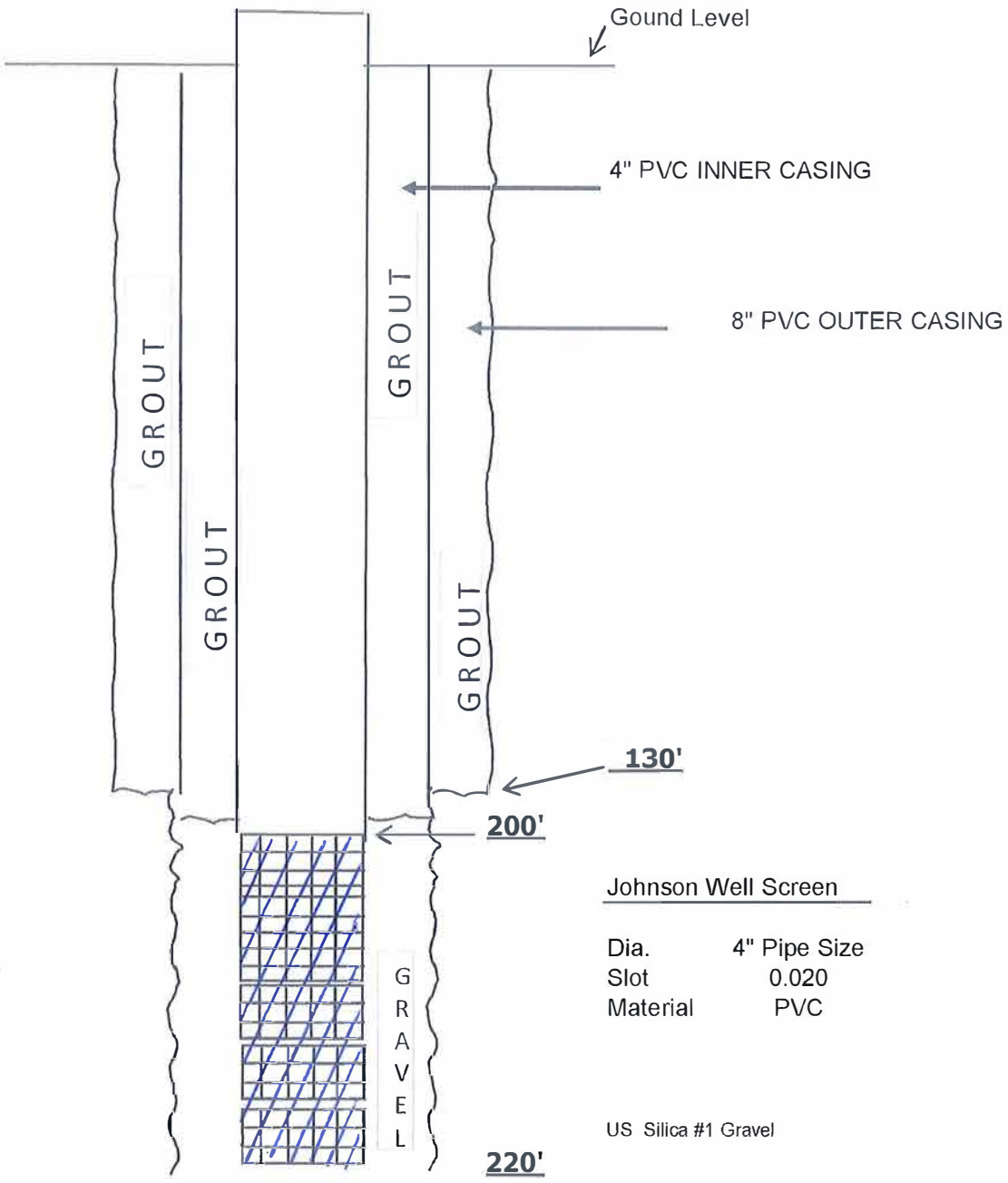
LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



DRILLER

DENV-CR00

ANNE ARUNDEL CO.
Millersville Landfill
AA-95-4953
Well 6B
ACSM Job# H5703



A.C. SCHULTES OF MARYLAND, INC.
24 Old South River Road Edgewater, MD 21037

Telephone 410-841-6710
Fax # 410-841-6711

Driller's Log

Water Well Contractors

CUSTOMER: AA CO. JOB H5703

ADDRESS: 389 Burns Crossing DATE 2/2/10

LOCATION: Millersville Landfill PERMIT NO. AA-95-4953

GROUND

2'

200'

CASING

TOTAL DEPTH 220'

SCREEN

20'

FEET FROM GROUND SURFACE 0 TO	WELL LOG
0-1	topsoil
1-18	red & white clay
18-67	fine to medium sand
67-136	red & white clay
136-147	fine to medium red clay
147-220	fine to medium sand w/streaks of red clay

WELL NO. TW6B	DIAMETER OF WELL 4"	DEPT. OF WELL 220'
HOURS PUMPED 6	SLOT SIZE .020	TYPE OF CASING PVC F&J
CAPACITY GPM 50	DRILLING MACHINE NO. C8-15	LENGTH OF CASING 200'
STATIC LEVEL 59	DRILLER Melson	DISTANCE TO TOP OF SCREEN 200'
PUMPING LEVEL 109	GRAVEL 25 of #1	TYPE SCREEN PVC F&J
SPECIFIC CAPACITY 1	31 BAGS OF Bentonite	SIZE OF SCREEN 4"
PUMPED WITH air	DATE WELL COMPLETED 2/2/10	OUTER CASING SIZE 8" F&J
DEPTH OF GROUT 180-0	DRILLER'S HELPER Barnette	OUTER CASING DEPTH 130'
DEPTH GRAVEL PACKED 220-180		

#5703

AA-95-4953 6B

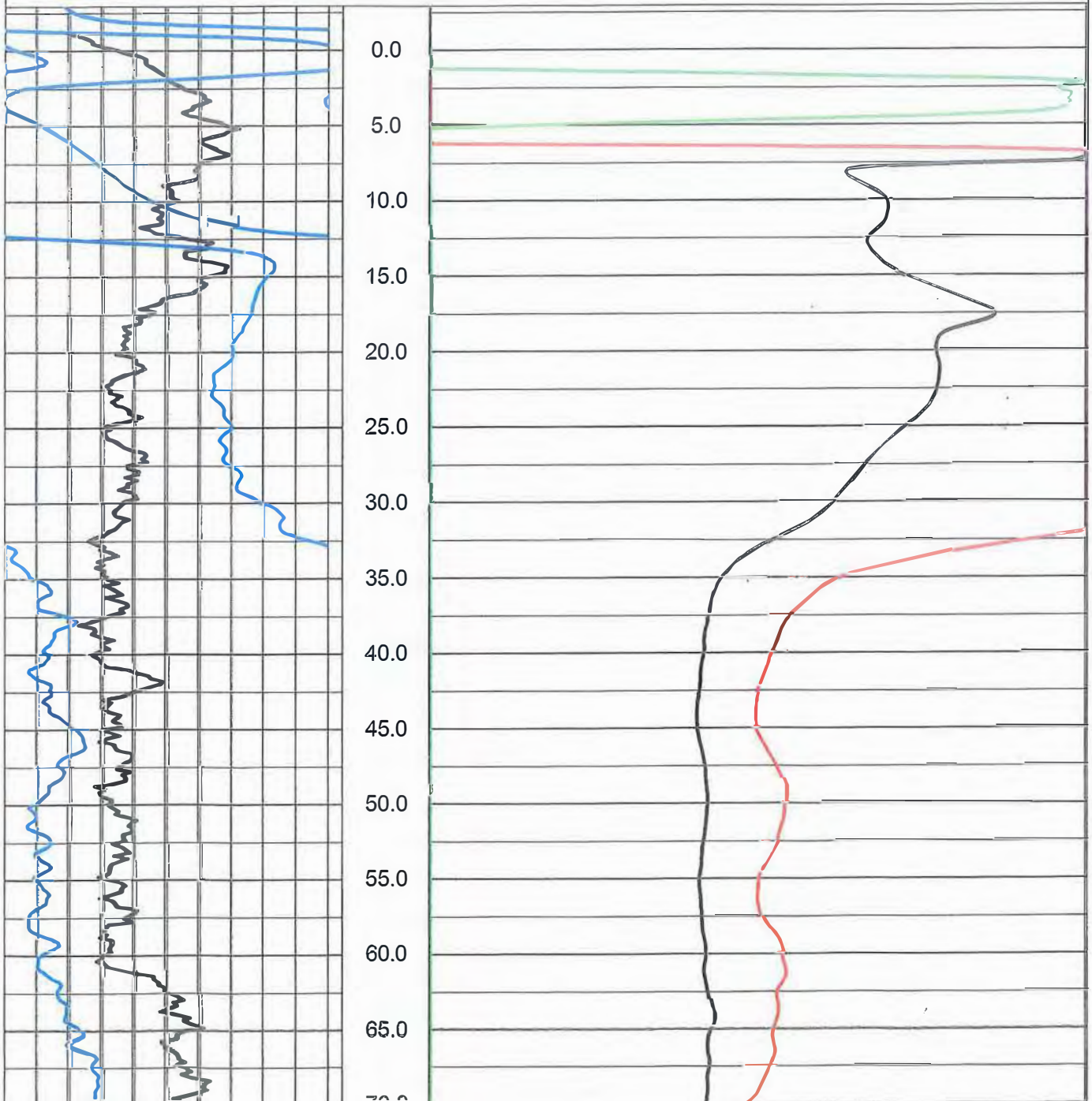
Earth Data Incorporated
131 Comet Drive, Centreville, MD 21617
Phone: (410) 758-8160 / Facsimile (410) 758-8168
www.earthdatainc.com

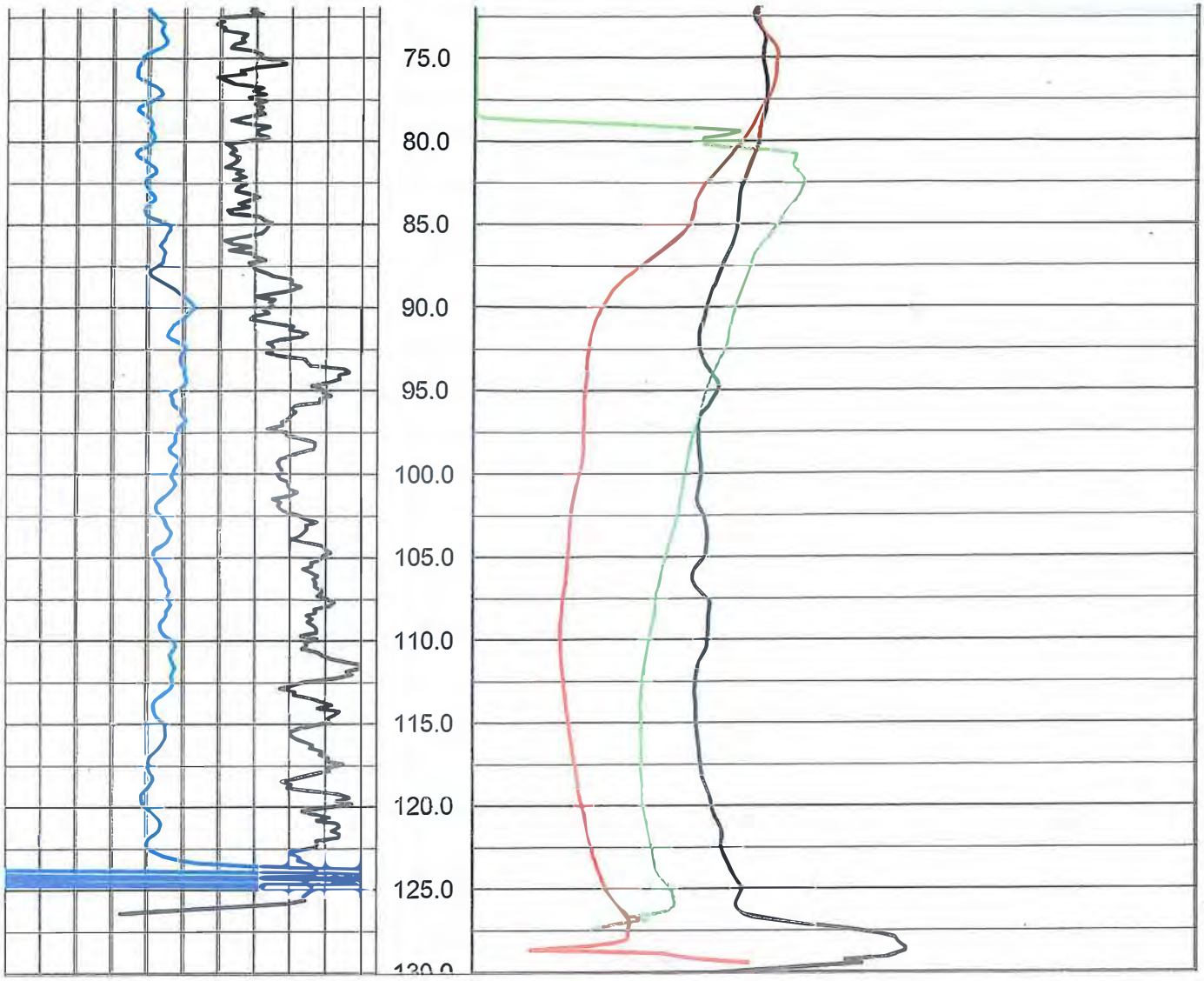
WELL I.D.
TW 6-B

Logging Date: 1-28-2010
Logging Speed: 205 ft/min x Up Down
BOC: NA **TD:** 129

Project: Anne Arundel County Millersville Landfill
Client: A.C. Schultes of Maryland
Location: Millersville Landfill
Bit Size: 8"
Fluid Type: Mud Based Water
GPS: N??° ????' W0??° ????'
Casing Material: NA
EDI Job No.: 4150A
Technician: M. Williams
Witness: R. Melson, D.Raines

Gamma	Depth	SPR
0 cps 100	1in:10ft	0 Ohm-m 2000
SP		R16
-100 mV 100		0 Ohm-m 2000
		R64
		0 Ohm-m 2000




75.0
80.0
85.0
90.0
95.0
100.0
105.0
110.0
115.0
120.0
125.0

TW-7 Well Information

John Gilman
Business Development
Sales

A.C. Schultes of Maryland, Inc.
8221 Cloverleaf Drive
Millersville, Maryland 21108

(410) 841-6710 Direct
(410) 841-6711 Fax
JohnG@ACSchultes.net
www.ACSchultes.com

Tag:	AA-73-7384
	INSTALLED 5/3/1975
Address	LANDFILL
City	
State	
Zip Code	
Driller	CZ ENT.
Est. GPM Produced	
Use for water SIM	
Drill Method	
WAPID	
Replace	
Subdivision	
Section Lot	
Nearest Town	
Town Distance	
Direction	
Road Name	
Distance	
Tax Map	
Block	
Parcel	
N_Grid 83	
E_Grid	
Latitude	
Longitude	
Completion	

Total Depth	96'
Grouted	YES
Grout Type	CEMENT
Grout Top	0'
Grout Bottom	74'
Casing Type	STEEL
Casing Diameter	6"
Casing Depth	81'
Casting Height	
Screen Type	S.S.
Screen Top	81'
Screen Bottom	96'
Screen Diameter	6"
Hrs Pumped	
Pumping Rate	
Level Before	
Level During	
Test Pump Type	AIR
Pump Installed	
Capacity	
Pump Hp	
Column Length	

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia

Identification: TW7A **Page** 1 **of** 2

Site: Millersville Landfill Proj. No.: GE3200-450

Client: Anne Arundel County / Northern Boundary Study

Boring Log

Date Started: 4 May 1992 Date Finished: 4 May 1992

Status: Ground-Water Monitoring Well

Total Depth: 76 ft Bit Diameter: 8.75 in.

Drilling Co.: A.C. Schultes of Delaware

Tools / Method: Mud Rotary (Kelly Drive)

Driller: Ken DeRoche Drilling Rig: Failing 1250

Supervisor: J. Raymer Reviewer: S. Shugart

Ground Elev.: 126 ft. Datum: 1929 Gen.Adj.Dat.

Horiz.: N: 461,514.2 ft E: 895,292.3 ft

Survey Company: Greenhorne & O'Mara

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
126.0		CLAY, semi-fat, moderate reddish brown with streaks of very pale orange and very light gray;			1000, 4 May 92: Boring begun; ground swampy . Conductivity of water supply: 85 µmhos/cm @19°C.
				5	@5ft: Circulation sample.
120.0		@6.0ft: thin bed containing ironstone (limonite-cemented silt and very fine sand) nodules;			
				10	@10ft: Circulation sample. @10ft: Conductivity of drilling mud: 42 µmhos/cm @17°C.
110.5		@15.5–18.0ft: very thick bed of SILTY CLAY, lean.		15	@15ft: Circulation sample.
				20	@20ft: Circulation sample.
104.0	22.0	SILT; cyclically interbedded with FINE SAND, and SILTY CLAY; most contacts gradational;			@22ft: Thinned mud; Conductivity of thinned drilling mud: 39 µmhos/cm @19°C.
102.0		@24.0–25.0ft: SILTY FINE SAND (vfg); sharp top; fines downward;		25	@25ft: Circulation sample.
99.0		@27–29.5ft: SILTY FINE SAND; sharp top; gradually fines downward;			
				30	@30ft: Circulation sample.
95.0		@31.0ft: medium bed of SILTY CLAY;			
92.0		@33.0–34.0ft: medium bed of hard CLAY; grading downward into...			
91.0		@34.0–36.0ft: SILTY FINE SAND, with thin interbeds of white clay;		35	@35ft: Circulation sample.
89.0		@37.0ft: medium bed of SILTY CLAY, white.			

Ident.: TW7A Site: Millersville Landfill Proj. No.: GE3200-450 Page 2 of 2

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
86.5		@39.5–42.0ft: FINE SAND.			@40ft: Circulation sample; conductivity of drilling mud before thinning: 31 µmhos/cm @19°C; thinned drilling mud.
82.0		@44.0–45.0ft: CLAY, white;		45	@45ft: Circulation sample.
80.0		@46.0–47.0ft: FINE SAND (fg);			
76.0	50.0	FINE SAND; thinly interbedded and interlaminated with white clay;		50	
73.0		@53.0ft: medium bed of CLAY, white;			
74.0		@54.0ft: gradually fining downward; grading into…		55	@55ft: Circulation sample.
70.0	56.0	SILT;			
68.7	57.3	sharp base. FINE SAND (fg);		60	@60ft: Circulation sample; conductivity of the drilling mud before thinning: 21 µmhos/cm @19°C; thinned drilling mud.
65.5		@60.5ft: medium bed of white CLAY;		65	@65ft: Circulation sample.
				70	@70ft: Circulation sample.
				75	@75ft: Circulation sample.
50.2	75.8	CLAY, white.			1200, 4 May 92: Boring terminated @76ft; conductivity of the drillling mud before thinning: 32 µmhos/cm @20°C; thinned mud; Ran logs (gamma ray, SP, resistivity); clays swelling @10–20ft.
50.0		**Total Depth: 76ft.**			Set well: 20ft screen, 74.5–54.5ft; 0.5ft bottom plug (sediment trap).
					Well materials: 4in. sch.40 PVC; 0.020in. slotted screen.
				80	76.0–75.0 ft: Cave in; 75.0–49.0 ft: Filter sand (no.1 Morie) (8sx); 49.0–27.0 ft: Medium granular bentonite (5sx); 27.0–03.0 ft: Cement (5sx)
					7 May 92: Well developed by airlift method. 18 Jun 92: Well redeveloped by swab and pump method.
				85	

TW-8 Well Information

John Gilman
Business Development
Sales

A.C. Schultes
of Maryland, Inc.
8221 Cloverleaf Drive
Millersville, Maryland 21108

(410) 841-6710 Direct
(410) 841-6711 Fax
JohnG@ACSchultes.net
www.ACSchultes.com

Tag: AA-73-3783

INSTALLED IN 2/21/1975

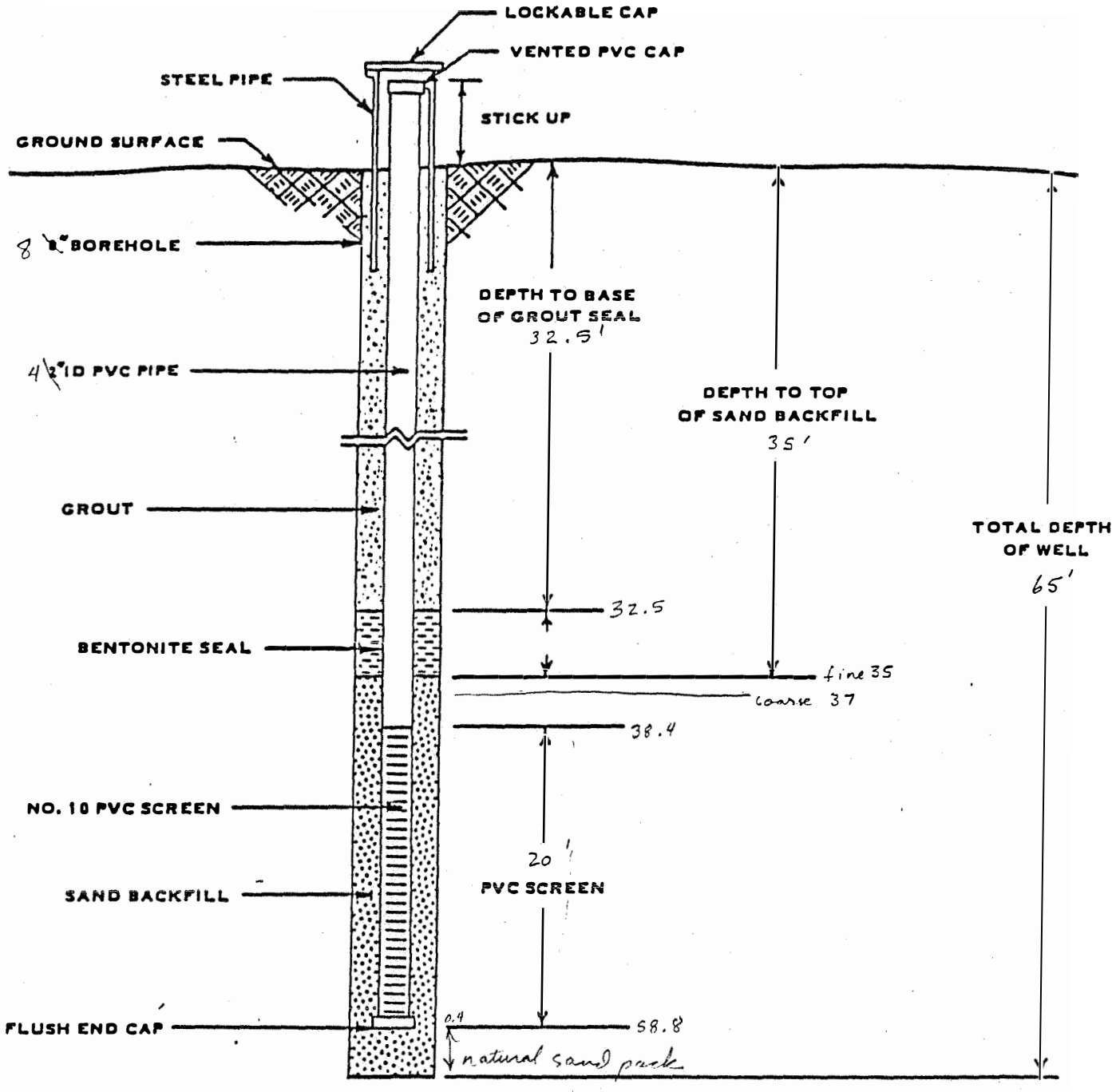
Address	LANDFILL
City	
State	
Zip Code	
Driller	CZ ENT
Est. GPM Produced	
Use for water SIM	
Drill Method	
WAPID	
Replace	
Subdivision	
Section Lot	
Nearest Town	
Town Distance	
Direction	
Road Name	
Distance	
Tax Map	
Block	
Parcel	
N_Grid 83	
E_Grid	
Latitude	
Longitude	
Completion	

Total Depth	104'
Grouted	YES
Grout Type	CEMENT
Grout Top	0'
Grout Bottom	64'
Casing Type	STEEL
Casing Diameter	6"
Casing Depth	89'
Casting Height	
Screen Type	S.S.
Screen Top	89'
Screen Bottom	104'
Screen Diameter	6"
Hrs Pumped	
Pumping Rate	
Level Before	
Level During	
Test Pump Type	AIR
Pump Installed	
Capacity	
Pump Hp	
Column Length	

GEOSERVICES INC. JOB NAME: Millersville Landfill JOB NO.: P1160

BY: JCW DATE: 15 Oct 89 SHEET: 1 OF 1

TYPE II MONITORING WELL TW 8A



GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW8A SHEET 1 OF 2

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 140 ft above sea level datum (est.)

DRILLING METHOD AND EQUIPMENT 6 1/4" I. D. auger boring, split spoon sampling 2' every 5'

DATES: START 9 Oct 89 FINISH 11 Oct 89 WATER LEVEL 95' W.L. DATE 11 Oct 89 LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
140	0	0-2'		1.6	2-3-8-10 (11)	0-2': well-graded (to medium grain size) sand with silt, dark yellowish-brown, fairly dry, (SW-SM)		
135	5	5-7'		1.8	3-7-7-6 (14)	2-8': poorly-graded medium sand with some clay (<10%), pale brown, moist, (SP)		
130	10	10-12'		2	4-8-10-11 (18)	8-14': well-graded sand, light reddish-brown becoming lighter with depth, nearly saturated, (SW)		
125	15	15-17'		2		14-20.5': poorly-graded fine to medium sand with some clay, yellow mottled with white with horizontal bands of fine silty sand (weak red), moist, (SP)		
120	20	20-22'		2	6-21-52-45/4" (73)	20.5-25': poorly graded medium and fine sand, mottled and hroizontal banding of white, yellowish-brown and weak red, moist to saturated, (SP)		perched water is at 23'
115	25	25-27'		2	8-12-30-29 (42)	25-30.9': poorly-graded medium sand, white mottled with yellow, saturated, (SP)		
110	30	30-32'		1.7	10-23-30-27 (53)	30.9-31.1': fat clay, white, stiff, moist, (CH)		
105	35	35-37'		1.5	13-34-54-46/3" (88)	31.1-33': poorly-graded sand, medium grain size, white mottled with yellow, saturated, (SP)		
100	40	40-42'		1.1	20-56-44/3" (100+)	33-41': poorly-graded coarse sand (light yellowish-brown) with lenses of fat, stiff clay (white), saturated, (SP)		
95	45					41-56': poorly-graded fine and medium sand, very pale brown with brownish-yellow mottling, moist to saturated from 44.2-44.6 ft band of brown SP, slight cohesion from 44.6-45 ft, (SP)		ground water is at 45'
90	50	50-52'			14-29-63-35/3" (92)			

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW8A SHEET 2 OF 2

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 140 ft above sea level datum (est.)

DRILLING METHOD AND EQUIPMENT 6 1/4" I. D. auger boring, split spoon sampling 2' every 5'

DATES: START 9 Oct 89 FINISH 11 Oct 89 WATER LEVEL 45' W.L. DATE 11 Oct 89 LOGGER JCW

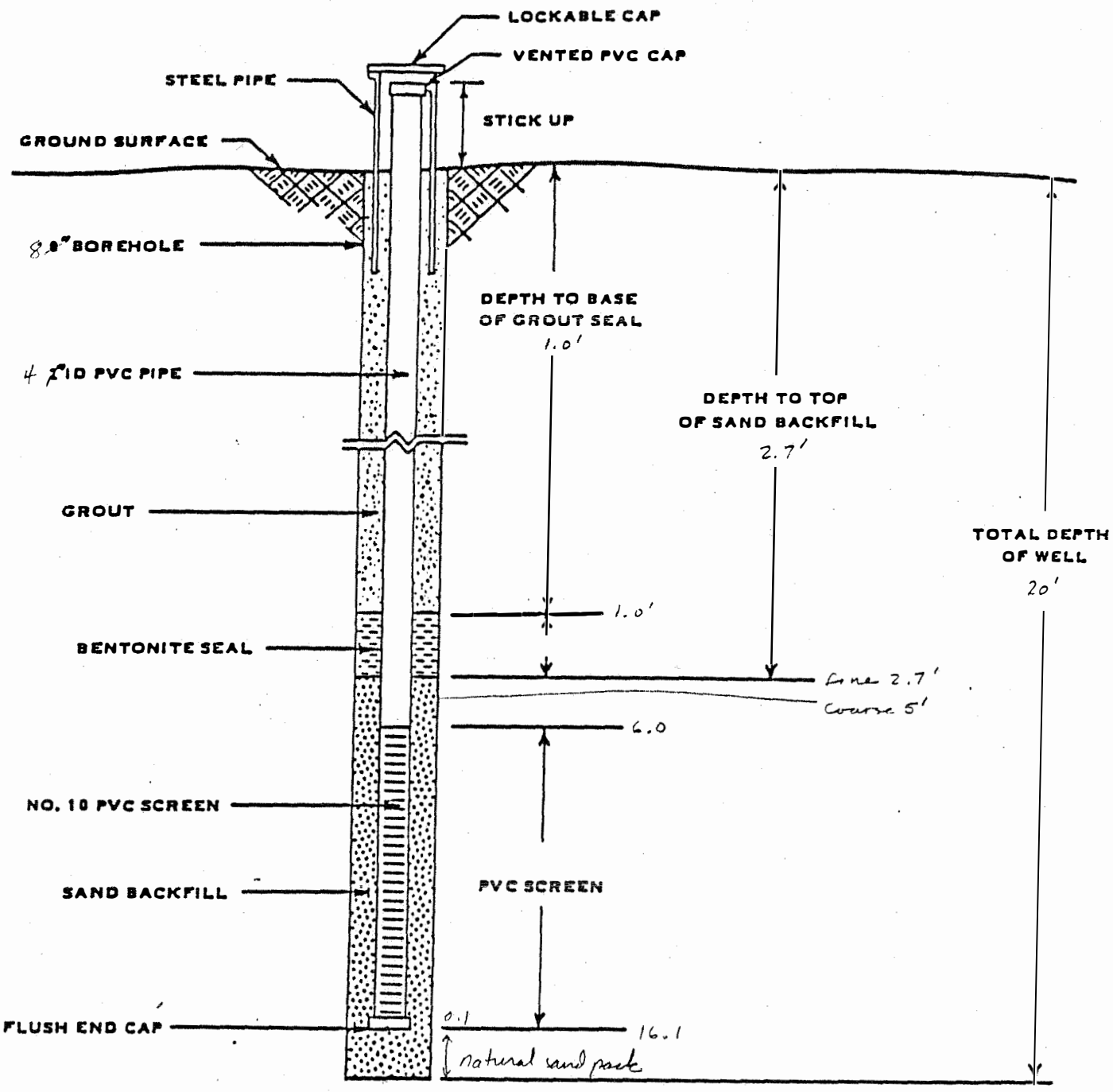
ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
85	55	55-57'		2	18-66-34/2" (100+)	56-61.4': well-graded sand, very pale brown with brownish-yellow mottling, saturated, (SW)		
80	60	60-62'		2	7-56-44/3" (100+)	61.4-65': poorly-graded coarse to medium sand, brownish-yellow, saturated, (SP)		
75	65							Boring terminated 65'

GEOSERVICES INC. JOB NAME: Millersville Landfill JOB NO.: P1160

BY: JCW DATE: 17 Oct 89 SHEET: 1 OF 1

TYPE II MONITORING WELL

TW9A



GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW9A SHEET 1 OF 1

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 135 ft above sea level datum (est)

DRILLING METHOD AND EQUIPMENT 6 1/4" I.D. auger boring, split spoon sampling 2' every 5'

DATES: START 16 Oct 89 FINISH 16 Oct 89 WATER LEVEL 7.2 ft W.L. DATE 17 Oct 89 LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
135	0	0-2'		1.6	1-1-3-5 (4)	0-1.0': medium to fine silty or clayey sand; light yellowish brown; moist, (SM/SC) 1.0-4.0': clayey sand; light gray mottled with yellowish brown, moist, (SC) 4.0-6.0': well graded sand, yellowish brown, moist, (SW)		
130	5	5-7'		2	8-9-10-12 (19)	6.0-6.4': clayey sand; dark grayish brown, moist, (SC) 6.4-11.6': well-graded sand with silt and and some 1/4-1/2" gravel to about 7.5', brownish yellow, saturated, (SW-SM)		
125	10	10-12'		2	4-3-4-3 (7)	11.6-12': fat sandy clay, grayish brown, soft consistency, moist (CH) 12-16.5': well-graded sand, brownish-yellow, saturated, (SW)		
120	15	15-17'		2	5-3-7-12 (10)	16.5-22': fat clay, red, firm to hard consistency, fairly dry, (CH)		16.5-17': TV: 5.5, 6.0 tsf PP: 2.6, 2.2, 2.5 tsf
115	20	20-22'		2	5-14-24-46 (38)	Terminate boring 22' (6 1/4" auger to 20')		20-22': TV: 16.3, 15.0, 16.5 tsf PP: 4.5+, 4.5+, 4.5+ tsf

GEOSYNTEC CONSULTANTS
5950 Live Oak Parkway, Suite 330
Norcross, Georgia

Identification: TW9B **Page** 1 of 2
Site: Millersville Landfill Proj. No.: GE3200-450
Client: Anne Arundel County / Northern Boundary Study

Boring Log

Date Started: 19 May 1992 Date Finished: 19 May 1992
Status: Ground-Water Monitoring Well
Total Depth: 83 ft Bit Diameter: 8.5 in.

Drilling Co.: A.C. Schultes of Delaware
Tools / Method: Mud Rotary (Kelly Drive)
Driller: Ken DeRoche Drilling Rig: Failing 1250
Supervisor: J. Raymer Reviewer: S. Shugart

Ground Elev.: 131.5 ft. Datum: 1929 Gen.Adj.Dat.
Horiz.: N: 459,677.1 ft E: 893,156.9 ft
Survey Company: Greenhorne & O'Mara

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
131.5		FINE SAND (fg-mg), grayish orange;			1400, 19 May 92: Boring begun.
				5	@5ft: Circulation sample.
125.0		@6ft: becoming finer downward; grading into...			
122.5	9.0	SILTY CLAY, lean, moderate yellowish brown and very light gray; becoming finer and fatter downward;		10	@10ft: Circulation sample.
120.5		@11ft: becoming FAT CLAY, bluish gray, soft, swelling;			@11–14ft: Fat clay swelling around drill rods, creating collars and restricting mud circulation; this interval reamed several times during drilling.
117.5	14.0	FINE SAND (fg-mg, sr qtz; tr cg, wr qtz & fsp) grayish orange; coarsening downward;		15	@15ft: Circulation sample.
113.0	18.5	SILTY CLAY, lean, white and pale yellowish orange; soft.			
112.0	19.5	MEDIUM-COARSE SAND (mg-cg, sa-a qtz, tr garnet, tr fsp; vcg-vfp, very angular qtz, little chert, tr fsp); coarsening downward;		20	@20ft: Circulation sample.
109.5		@22ft: clay content increasing, probably mud clasts;			
107.5	24.0	sharp base. CLAY, semi-fat, hard, moderate reddish brown with streaks of white; rare ironstone nodules;		25	@25ft: Circulation sample.
		gradually becoming less-oxidized downward;			
103.5		@28ft: becoming moderate yellowish brown;		30	@30ft: Circulation sample.
96.5		@35ft: becoming medium gray;		35	@35ft: Circulation sample.

Ident.: TW9B Site: Millersville Landfill Proj. No.: GE3200-450 Page 2 of 2

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
91.5		@40ft: becoming with a little lignite;			@40ft: Circulation sample.
				45	@45ft: Circulation sample.
85.5		@46ft: becoming dark bluish gray;			
82.5		@49ft: becoming gradually coarser downward; becoming silty;		50	@50ft: Circulation sample.
78.5	53.0	PERMEABLE SILT (coarse silt to vfg); coarsening downwards; grading into...			
				55	@55ft: Circulation sample.
75.5	56.0	FINE SAND (fg-mg, sa qtz, tr garnet); gradually coarsening downward;			
73.0		@58.5–59.5ft: SILTY CLAY, lean, white to light yellowish gray;		60	@60ft: Circulation sample; thinned mud.
				65	@65ft: Circulation sample.
				70	@70ft: Circulation sample.
59.0	72.5	CLAY, lean, white with streaks of moderate red.			
57.5	74.0	MEDIUM SAND.		75	@75ft: Circulation sample.
				80	@80ft: Circulation sample.
48.5	83.0	SANDSTONE, ilmonite-cemented, very hard.			1500, 19 May 92: Boring terminated @83ft; thinned mud; Ran logs (gamma ray, SP, resistivity);
		Total Depth: 83ft.			Set well: 5ft screen, 81–76ft; footer 82–81ft.
				85	Well materials: 4in. sch.40 PVC; 0.020in. slotted screen.
					83–82 ft: Cave in. 82–75 ft: Filter sand (no.1 Morie) (2.5sx); 75–50 ft: Medium granular bentonite (7sx); 50 ft up: Cement.

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia

Identification: TW9C **Page** 1 **of** 2
Site: Millersville Landfill Proj. No.: GE3200-450
Client: Anne Arundel County / Northern Boundary Study

Boring Log

Date Started: 27 May 1992 Date Finished: 27 May 1992
Status: Ground-Water Monitoring Well
Total Depth: 73 ft Bit Diameter: 8.5 in.

Drilling Co.: A.C. Shultes of Delaware
Tools / Method: Mud Rotary (Kelly Drive)
Driller: Ken DeRoche Drilling Rig: Failing 1250
Supervisor: J. Raymer Reviewer: S. Shugart

Ground Elev.: 131.5 ft. Datum: 1929 Gen.Adj.Dat.
Horiz.: N: 459,688.1 ft E: 893,158.4 ft
Survey Company: Greenhorne & O'Mara

Elev. (ft-msl)	Top (ft)	Description	Comments
131.5		FINE SAND (fg-mg), grayish orange;	1400, 19 May 92: Boring begun.
125.5		@6ft: becoming finer downward; grading into...	
122.5	9.0	SILTY CLAY, lean, moderate yellowish brown and very light gray; becoming finer and fatter downward;	
120.5		@11ft: becoming FAT CLAY, bluish gray, soft, swelling;	@11–14ft: Fat clay swelling around drill rods, creating collars and restricting mud circulation; this interval reamed several times during drilling.
117.5	14.0	FINE SAND (fg-mg, sr qtz; tr cg, wr qtz & fsp) grayish orange; coarsening downward;	
113.0	18.5	SILTY CLAY, lean, white and pale yellowish orange; soft.	
112.0	19.5	MEDIUM-COARSE SAND (mg-cg, sa-a qtz, tr garnet, tr fsp; vcg-vfp, very angular qtz, little chert, tr fsp); coarsening downward;	
109.5		@22ft: clay content increasing, probably mud clasts; sharp base.	
107.5	24.0	CLAY, semi-fat, hard, moderate reddish brown with streaks of white; rare ironstone nodules; gradually becoming less-oxidized downward;	
103.5		@28ft: becoming moderate yellowish brown;	
96.5		@35ft: becoming medium gray;	@35ft: Circulation sample.

Graphic Log — Scale (ft): 5, 10, 15, 20, 25, 30, 35

Elev. (ft-msl)	Top (ft)	Description	Comments
91.5		@40ft: becoming with a little lignite;	
85.5		@46ft: becoming dark bluish gray;	
82.5		@49ft: becoming gradually coarser downward; becoming silty;	@50ft: Circulation sample.
78.5	53.0	PERMEABLE SILT (coarse silt lov fg); coarsening downwards; grading into...	@55ft: Circulation sample.
75.5	56.0	FINE SAND (fg-mg, sa qtz, tr garnet); gradually coarsening downward;	
73.0		@58.5–59.5ft: SILTY CLAY, lean, white to light yellowish gray;	@60ft: Circulation sample; thinned mud.
			@65ft: Circulation sample.
			@70ft: Circulation sample.
59.0	72.5	CLAY, lean, white with streaks of moderate red.	1300, 27 May 92: Boring terminated @73ft; thinned mud; reamed borehole three times due to collaring @12ft.
58.5		**Total Depth: 73ft.**	1430: Set well: 10ft screen, 71–61ft; footer 72–71ft.
			Well materials: 4in. sch.40 PVC; 0.020in. slotted screen.
			73–72 ft: Cave in. 72–56 ft: Filter sand (no.1 Morie) (5sx); 56–45 ft: Medium granular bentonite (5sx); 45 ft up: Cement.

Graphic Log

Scale (ft): 45, 50, 55, 60, 65, 70, 75, 80, 85

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW10A SHEET 1 OF 5

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 190 ft above sea level datum (est)

DRILLING METHOD AND EQUIPMENT 3 1/4" I.D. auger boring to 125'; 8" bit wash boring 125-140'; split spoons 2' every 5'

DATES: START 18 Oct 89 FINISH 20 Oct 89 WATER LEVEL _____ W.L. DATE _____ LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
190	0	0-2'		1.4	2-3-3-3 (6)	0-2': fine to medium silty sand, strong brown, moist, infrequent pieces of 1/2" siltstone gravel, (SM) 2-7.5': poorly-graded 1/4" gravel with sand and silt; fine fraction is strong brown, fairly dry, (GP-GM)		18 Oct 89: water in TW10 is 87.9 ft
185	5	5-7'		2	13-18-21-23 (39)	7.5-11.7': lean clay with some silt, hard consistency, dry, white mottled with dark reddish brown and yellowish brown, (CL)		
180	10	10-12'		2	5-9-13-14 (22)	11.7-13': fine silty sand, yellow, dry, (SM) 13-17': well-graded sand, yellowish brown, moist, (SW)		10-11': TV 17.5, 18.0 tsf PP: sample is too dry; crumbles
175	15	15-17'		2	5-6-7-7 (13)	17-21.2': poorly-graded coarse to medium sand, yellowish-brown, saturated, (SP)		Hit perched wated at 16.5'
170	20	20-22'		2	1-2-6-12 (8)	21.2-23': coarse to medium clayey sand with some interbedded white clay layers, yellowish-brown, moist to saturated, (SC) 23-28'; fat clay with some silt and some interbedded silt layers, white mottled with dusky red, soft consistency, moist, (CH)		
165	25	25-27'		2	3-2-5-6 (7)	28-40': fat clay, white with infrequent dusty red mottling; hard to firm consistency, moist, thin (1/16-1/8') horizontal striations of dusty red silt, increasing number of silt layers with depth, (CH)		25-26': TV: 7.5, 7.5 tsf PP: 2.3, 1.8 tsf
160	30	30-32'		2	6-8-13-15 (21)			31-32': TV: 7, 6.5, 6.8 tsf PP: 3.0, 3.3, 3.5 tsf
155	35	35-37'		2	6-8-11-18			36-37': TV: 4.5, 5.0 tsf PP: 2.0, 2.9, 1.8 tsf

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW10A SHEET 2 OF 5

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 190 ft above sea level datum (est)

DRILLING METHOD AND EQUIPMENT 3 1/4" I.D. auger boring to 125'; 8" bit wash boring 125-140'; split spoons 2' every 5'

DATES: START 18 Oct 89 FINISH 20 Oct 89 WATER LEVEL _____ W.L. DATE _____ LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
150	40	40-42'		2	17-14-21-28 (35)	40-43': fine silty sand with some horizontal layers of CL silty clay, white banded with dusky red and yellow mottling from 42', dry, (SM) 43-46.5': fat clay, white mottled with dusky red and yellow, hard to firm consistency, fairly dry, (CH)		
145	45	45-47'		2	5-12-30-46 (39)	46.5-47': fine silty sand, white and dusky red horizontally banded, moist, (SM) 47-51.3': fat clay with some fine sand, hard consistency, white with infrequent yellow and dusky red bands, dry to moist, (CH)		50-51': TV: 8.0, 7.0, 7.2 tsf PP: 3.5, 3.5, 3.0 tsf
140	50	50-52'		2	10-14-25-58 (39)	51.3-65': poorly-graded fine and medium sand, horizontally banded with reddish-yellow, white and weak red; moist; (SP)		
135	55	55-57'			26-54-46/3" (100+)			
130	60	60-62'		1.7	37-61-39/4" (100+)			
125	65	65-67'		1.5	30-47-53/4" (100+)	65-70.2': well-graded sand up to coarse grain size, horizontally banded with reddish-yellow and white and weak red, moist to saturated, (SW)		

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW1OA SHEET 3 OF 5

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 190 ft above sea level datum (est)

DRILLING METHOD AND EQUIPMENT 3 1/4" I.D. auger boring to 125'; 8" bit wash boring 125-140'; split spoons 2' every 5'

DATES: START 18 Oct 89 FINISH 20 Oct 89 WATER LEVEL _____ W.L. DATE _____ LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
120	70	70-72'		2	7-10-19-28 (29)	70.2-73': fat clay with some streaks of SP poorly-graded fine to medium white sand, white, dry to moist, hard consistency, (CH) 73-80': coarse to medium clayey sand with some streaks of white CH fat clay and SP fine to medium sand, yellow and white and weak red banded, moist, (SC)		71-72': TV: 6.2, 7.7, 7.1 tsf PP: 3.8, 3.8, 3.0 tsf
115	75	75-77'		2	10-43-23-26 (66)			
110	80	80-82'		1.6	25-41-59 (100+)	80-90': poorly-graded medium sand, 1-2" horizontal banding of weak red and yellow-brown and very pale brown, slightly moist becoming wet at 85', (SP)		
105	85	85-87'		1.3	25-35-38-41 (73)			
100	90	90-92'		2	15-15-28-35 (43)	90-95': poorly-graded medium sand with some interbedded SC clayey sand (white), and CL silty lean clay, horizontal banding of weak red and yellow brown and very pale brown, wet, (SP)		
95	95	95-97'		2	11-14-13-19	95-115': poorly-graded fine sand with some clay and some interbedded SC clayey sand, very pale brown with some weak red and white stripes, wet, saturated below 100' (SP)		

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW10A SHEET 4 OF 5

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 190 ft above sea level datum (est)

DRILLING METHOD AND EQUIPMENT 3 1/4" I.D. auger boring to 125'; 8" bit wash boring 125-140'; split spoons 2' every 5'

DATES: START 18 Oct 89 FINISH 20 Oct 89 WATER LEVEL _____ W.L. DATE _____ LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
90	100	100-102'		2.3				at 100' sampling rods dropped from 30' to embed 28", no blow counts could be obtained
85	105	105-107'		2	4-16-32-47 (48)			
80	110	110-112'		1.2	24-38-33-45 (71)			19 Oct 89 begin drilling from 112 ft; water is at 94' after we pull rods
75	115	115-117'		2	24-40-41-59/5 1/2" (81)	115-117': poorly-graded fine to medium sand, horizontal banding of weak read and brownish yellow and white, saturated, (SP)		
70	120	120-122'		1.5	31-69/5" (100+)	117-125': interbedded poorly-graded fine to medium sand and poorly-graded gravel; horizontal banding of weak red and brownish-yellow and white, saturated, (SP/GP)		First 6" was cave-in; did not begin counting blows until 6"
65	125	125-127'		1.1	43-57/5" (100+)	125-131.4': poorly-graded coarse and medium sand with poorly-graded (4-10 mm) subrounded pebbles, light brown sand, saturated, (SP/GP)		Because of cave-in, begin wash boring at 125' on 10/20/89

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW10A SHEET 5 OF 5

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 190 ft above sea level datum (est)

DRILLING METHOD AND EQUIPMENT 3 1/4" I.D. auger boring to 125'; 8" bit wash boring 125-140'; split spoons 2' every 5'

DATES: START 18 Oct 89 FINISH 20 Oct 89 WATER LEVEL _____ W.L. DATE _____ LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
60	130	130-132'		1.4	22-46-54/5" (100+)	131.4-137': well-graded sand with interbedded poorly-graded gravel, red, saturated, (SW/GP)		
55	135					137-142': fat clay, reddish-brown mottled with white, soft to firm consistency, (CH)		
50	140 142'	140-142		2	18-34-35-50 (69)			141-142': TV: 8.8, 9.0, 9.5 tsf PP: 3.8, 2.9, 4.5+ tsf Terminate boring 142' (wash boring to 140')

SCS ENGINEERS
Environmental Consultants
11260 Roger Bacon Drive
Reston, Virginia 20190-5282
703 471-6150 FAX 703 471-6676

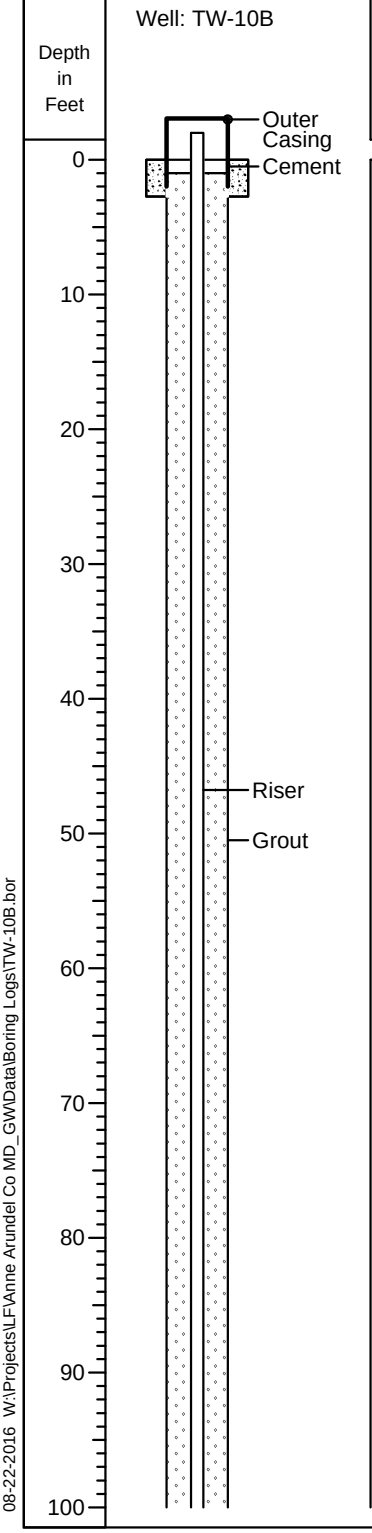
Millersville Landfill &
Resource Recovery Facility
Severn, Maryland
Project No. 02211047.08

WELL CONSTRUCTION
Date Start/Complete : 06-07-16/06-16-16
Hole Diameter : 8.0 inch
Drilling Method : Mud Rotary
WELL CASING
Material : Sch. 40 PVC
Diameter : 4" ID
Joints : threaded
Screen Opening : 0.020" slot
Sand Pack : #1 silica

TW-10B

Log Prepared By : SCS Engineers

Drilling Contractor : A.C. Schultes
Latitude : 39.088417
Longitude : 76.673725



Sample	USCS	GRAPHIC	DESCRIPTION
1	SM		dark brown SILTY SAND, fine to medium grained. gravels 2-8'
2	SM		fine grained, no gravels, some white and red clay
	SP		yellow and brown SAND, coarse grained
3	SW		tan SAND, medium to coarse grained, some white clay, trace red clay
4	CH		red CLAY, dense
	SM		tan SILTY SAND, some white clay
5	CH		white and red, some yellow CLAY, dense
	SW		tan SAND, medium to fine grained
6	CS		white SANDY CLAY, fine grained some gravels
	SP		white to tan SAND, fine grained, trace gravels
7	SW		tan SAND, fine to medium grained
	CH		white CLAY, trace medium to fine grained sand
8	SC		light brown SAND, fine to coarse grained, with white clay and trace red clay
9	SW		light brown SAND, fine to medium grained
10			

CH = Fat Clay
CS = Sandy Clay
SC = Clayey Sand
SM = Silty Sands
SP = Poorly Graded Sands
SW = Well Graded Sand

Borehole drilled using 8" bit to a depth of 179' below grade. Well installed to a depth of 170' below grade using 20' of screen. Samples collected every 10' to 140' below grade, then samples collected every 5'.

Well development was conducted on the following dates and times via the air jetting method with the following observances:
06-08-16, 14:40-15:00: light red and turbid; 15:45-16:00: light red and turbid.
06-09-16, 07:30-12:30: light red, silty and swirly at beginning. Mostly clear with no sand by 08:20.

08-22-2016 W:\Projects\LF\Anne Arundel Co MD_GW\Data\Boring Logs\TW-10B.bor

SCS ENGINEERS
Environmental Consultants
11260 Roger Bacon Drive
Reston, Virginia 20190-5282
703 471-6150 FAX 703 471-6676

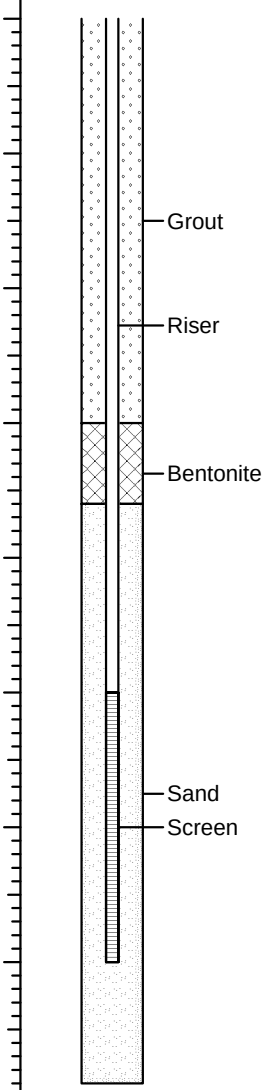
Millersville Landfill &
Resource Recovery Facility
Severn, Maryland
Project No. 02211047.08

WELL CONSTRUCTION
Date Start/Complete : 06-07-16/06-16-16
Hole Diameter : 8.0 inch
Drilling Method : Mud Rotary
WELL CASING
Material : Sch. 40 PVC
Diameter : 4" ID
Joints : threaded
Screen Opening : 0.020" slot
Sand Pack : #1 silica

TW-10B

Log Prepared By : SCS Engineers

Drilling Contractor : A.C. Schultes
Latitude : 39.088417
Longitude : 76.673725



Sample	USCS	GRAPHIC	DESCRIPTION	REMARKS
11			red and white SANDY CLAY layer 107-107.5' red and white SANDY CLAY layer 109-109.5'	
12			some coarse sands trace red and white clay	
13				
14	SW			
15			medium to coarse grained red and white clay 142-143'	
16				
17			white clay 152-152.5'	
18			white clay 156-156.5' white clay 158.5-160' becoming fine grained, less coarse grained	
19			red and white clay 163-165'	
20			red clay, dense 166-166.5'	
21	CH		red CLAY, dense, trace white	
22				

END OF BORING = 179'

08-22-2016 W:\Projects\LF\Anne Arundel Co MD_GW\Data\Boring Logs\TW-10B.bor

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia

Boring Log

Identification: TW11A **Page** 1 **of** 1

Site: Millersville Landfill Proj. No.: GE3200-450

Client: Anne Arundel County / Northern Boundary Study

Date Started: 8 June 1992 Date Finished: 8 June 1992

Status: Ground-Water Monitoring Well

Total Depth: 34 ft Bit Diameter: 6.5 in.

Drilling Co.: A.C. Schultes of Delaware

Tools / Method: Hollow-Stem Augers (6.25in ID) w/ SPT

Driller: Jeff DeCarlo Drilling Rig: CME75

Supervisor: J. Raymer Reviewer: S. Shugart

Ground Elev.: 135 ft. Datum: 1929 Gen.Adj.Dat.

Horiz.: N: 458,947.5 ft E: 893,551.5 ft

Survey Company: Greenhorne & O'Mara

Elev. (ft-msl)	Top (ft)	Description	SPT Blows/6"	Run	Rec.	Comments
135.0		(CL-ML) SILTY CLAY and CLAYEY SILT, yellowish gray.				0930, 8 Jun 92: Boring begun.
			02-03-03-04	1	2.0'	
			03-04-05-07	2	2.0'	
128.5	6.5	(ML) SILT, very pale orange.	05-06-06-07	3	2.0'	
127.1	7.9	(MH) CLAYEY SILT, very light gray; a few thin beds of (ML) SILT.	02-04-05-08	4	2.0'	@8.0ft: Silt dry.
			03-05-06-07	5	2.0'	
			04-06-06-08	6	2.0'	
122.0		@13.0ft: medium bed of (SP) SAND (vfg).				
			03-04-07-10	7	2.0'	@15ft: Sand dry.
120.0	15.0	(SP) FINE SAND (vfg, ws), very pale orange and very pale purple;				
			02-04-05-06	8	2.0'	
			01-04-06-08	9	2.0'	
			01-02-06-08	10	2.0'	
113.0		@22.0ft: begins to gradually coarsen downward; becoming completely very pale orange;	03-04-05-05	11	2.0'	@22ft: Sand wet.
			01-02-05-05	12	2.0'	
			00-01-02-02	13	2.0'	
108.0		@27.0ft: becoming (mg);				
			00-00-01-01	14	2.0'	
106.0		@29.0ft: becoming MEDIUM SAND (cg, ms);				
105.0		@30.0ft: becoming finer;	00-01-02-02	15	2.0'	
103.0	32.0	(CL-CH) CLAY, semi-fat, red.	04-08-11-13	16	2.0'	
101.0		**Total Depth: 34ft.**				1440, 8 Jun 92: Boring terminated @34 ft;
						Set well: 15ft screen, 32–17ft.
						Well materials: 4in. sch.40 PVC, 0.020in. slot screen;
						34–32 ft: Cave in; 32–15 ft: Filter sand (no.1 Morie); 15–10 ft: Medium granular bentonite; 10–03 ft: Cement.

Graphic Log / Scale (ft): 5, 10, 15, 20, 25, 30, 35

DNR 137

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION
TAWES OFFICE BUILDING, ANNAPOLIS, MARYLAND

TW-12

PERMIT TO DRILL WELL

ISSUE DATE- 10/29/74
MO DA YR

PERMIT NUMBER- AA-73-3779

ISSUED TO DRILLER-

Zittinger

LAYNE ATLANTIC CO
P O BOX 185
GLEN BURNIE MD 21061

DRILLER
ID. NUMBER- 26

THE ABOVE NAMED DRILLER IS HEREBY AUTHORIZED TO DRILL A WELL TO BE OWNED BY-

MILLERSVILLE SANIT
ANNE ARUNDEL CO
MILLERSVILLE MD21108

THIS WELL IS TO BE LOCATED IN ANNE ARUNDEL COUNTY, NEAR THE TOWN OF MILLERSVILLE

THE WATER IS TO BE USED FOR TEST PURPOSES.

THIS WELL WILL NOT REPLACE ANOTHER WELL.

uncancelled

CANCELLED

SPECIAL CONDITIONS

FAILURE TO COMPLY WITH THE FOLLOWING CONDITIONS WILL CAUSE THIS PERMIT TO BECOME NULL AND VOID

NONE.

THE ABOVE CONDITIONS FROM CODES ON APPLICATION

THIS PERMIT IS VALID UNTIL 04/29/75. A WELL COMPLETION REPORT MUST BE SUBMITTED TO THE DEPARTMENT WITHIN 30 DAYS AFTER COMPLETION OF THE WELL

HERBERT M. SACHS
DIRECTOR, MARYLAND
WATER RESOURCES
ADMINISTRATION

This permit is not cancelled it has been transferred to Conrad Zittinger 12-3-74

ENTERED 1 12 28.

Water well AA-73-3777

WRA COPY

ONR-131 (7/73) EMERGENCY NO. (If any) —

B 1 2122 SEQUENCE NO. (WRA USE ONLY)
1 2 3 (SEQ. NO.) 6
(THIS NUMBER TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MARYLAND 21401
APPLICATION FOR PERMIT TO DRILL WELL

WRA PERMIT NUMBER: AA-73-3779
FILL IN THIS FORM COMPLETELY

DATE RECEIVED (WRA USE ONLY)

TW-12

102374

OWNER: A.A. Co. — Millersville Sanitary Landfill
COL 10 LAST NAME — FIRST NAME COL. 34

STREET OR RFD: Ann Arundel Co. Rt.
COL 30 COL. 60

POST OFFICE: Millersville, Md. 21108
COL 07 COL. 70

8-13

B 1 CONTINUED
1 2 3 (SEQ. NO.) 6

DRILLER INFORMATION

DATE: 10-17-74 LICENSE NUMBER: 026 (77 00)

FIRST NAME: Conrad DRILLER LAST NAME: Zeffzeer

SIGNATURE: Conrad G. Zeffzeer

B 2
1 2 3 (SEQ. NO.) 6

WELL INFORMATION

MAXIMUM PUMPING RATE (GALLONS PER MINUTE): 10 (5 12)

AVERAGE DAILY QUANTITY NEEDED (GALLONS PER DAY): 10 (14 20)

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- D HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- F FARMING, AGRICULTURE, IRRIGATION
- I INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOVERNMENT
- M MUNICIPAL WATER SUPPLY
- P PRIVATE WATER COMPANY
  (MUST HAVE STATE HEALTH DEPT. APPROVAL)
- T TEST #12

22

APPROXIMATE DEPTH OF WELL: 100' FEET (24 28)

APPROXIMATE DIAMETER OF WELL: 6" (NEAREST INCH)

METHOD OF DRILLING USED (CIRCLE APPROPRIATE METHOD)

BORED (OR AUGERED)	JETTED	DRIVEN
AIR-ROTARY	AIR-PERCUSSION	(ROTARY (HYDRAULIC ROTARY))
CABLE	REVERSE-ROTARY	DRIVE-POINT

30-37

OTHER (DESCRIBE)

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)

- N THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- D THIS WELL WILL DEEPEN AN EXISTING WELL
  PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE)

39

(41 02)

NOT TO BE FILLED IN BY DRILLER (WRA USE ONLY)

APPROPRIATION PERMIT NUMBER: O A P (04 00)

ENGINEER REVIEW DISTRICT NO. (00)

FORCE: U V (WRITE INITIALS IN BOX) (07 00)

CONDITIONS: A C N D G W Q C L U (70 71 72 73 74 75 76 77 78 79)

B 4 CONTINUED
1 2 3 (SEQ. NO.) 6

HEALTH DEPARTMENT APPROVAL

41 D STATE HEALTH (CIRCLE BOX)

COUNTY NAME: AA COUNTY NO.: 02

DATE: MO. 10 DAY 24 YR. 74 (50 45)

APPROVED BY:

B 3
1 2 3 (SEQ. NO.) 6

LOCATION OF WELL

COUNTY: Anne Arundel (0 21)
(DO NOT ABBREVIATE COUNTY NAME)

SUBDIVISION (20 42)

SECTION (44 46) LOT (48 50)

NEAREST TOWN: Millersville (52 71)

MILES FROM TOWN (ENTER 0 IF IN TOWN): 4 (73 74) M I

B 4
1 2 3 (SEQ. NO.) 6

DIRECTION FROM TOWN (CIRCLE APPROPRIATE BOX)

N NORTH	E EAST	N E NORTHEAST	S E SOUTHEAST				
S SOUTH	W WEST	N W NORTHWEST	S W SOUTHWEST				

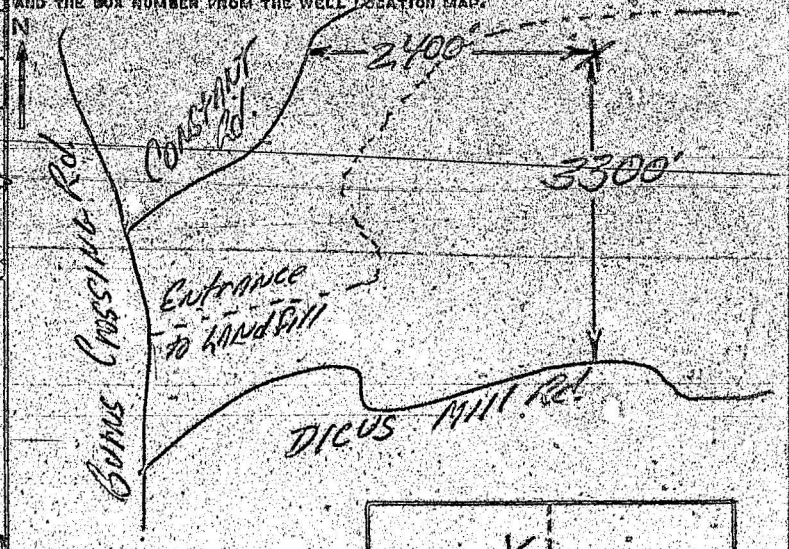
(8 9)

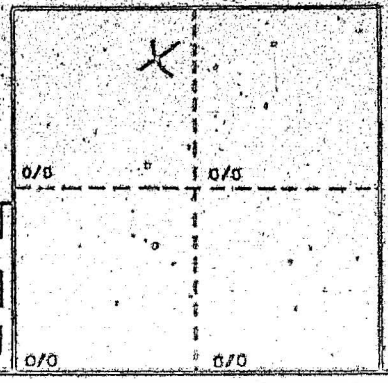
NEAR WHAT ROAD: Constant (11)

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH (N) SOUTH (S) EAST (E) WEST (W) (32 32 32 32)

DISTANCE FROM ROAD (ENTER DISTANCE AND CIRCLE APPROPRIATE BOX): 2400' (34 37) F T M I (38 39)

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWN, ROADS AND STREAMS WITH NORTH IN THE DIRECTION OF THE ARROW, AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION OR STREAM CROSSING SHOWN ON THE SKETCH. ALSO SHOW, BY MEANS OF AN "X", THE WELL LOCATION IN THE BOX BELOW AND THE BOX NUMBER FROM THE WELL LOCATION MAP.





BOX NUMBER: E 890 N 450

NORTH COORDINATE: 455000 (00 01 02 03 04 05)

EAST COORDINATE: 089000 (07 08 09 10 11 12)

ELEVATION AT WELL HEAD (FEET): (00 00 00 00)

B 5 PERSONAL CONTROL DATA (OPTIONAL)
1 2 3 (SEQ. NO.) 6

(60 80)

MAP NO.

ENTERED 1 13 28

BHR 214 0/71

C 1 2354 — SEQUENCE NO. (GRAUSE ONLY) — (SEQ. NO.) — (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 OF "L" CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER **TW-12**

DATE RECEIVED (WRA USE ONLY) 030675 6-13

DATE WELL COMPLETED 02 19 75 (18 20)

DEPTH OF WELL 109 (22 * (TO NEAREST FOOT) 28)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-73-3779 (20 29 30 31 32 33 34 35 36 37)

DRILLERS IDENTIFICATION NO. 26

OWNER Anne Arundel County

STREET OR RFD Millersville Sanitary Landfill (LAST NAME)

POST OFFICE Millersville, Md. 21108 (FIRST NAME)

WELL DESCRIPTION

WELL LOG

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER CARRING
brown clay	0	2	
red & white clay	2	11	
white & red clay	11	38	
white clay & sand streaks	38	49	
fine to med. tan sand	49	88	
white clay & streaks sand	88	99	
fine brown sand	99	109	X
white & red clay & sandstone	109	114	
red & little white clay	114	122	

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX) Y (44) N (44)

TYPE OF GROUTING MATERIAL (CIRCLE BOX)* CEMENT C M (45 46) BENTONITE CLAY B C (45 46)

NO. OF BAGS 40 NO. OF POUNDS 3760

GALLONS OF WATER 200

DEPTH OF GROUT SEAL (TO NEAREST FOOT)

FROM 0 (48) FT. TO 86 (52 54) FT. (58)

(ENTER 0 IF FROM SURFACE)

CASING RECORD

CASING TYPES (INSERT APPROPRIATE CODE BELOW): S T STEEL; C O CONCRETE; P L PLASTIC; O T OTHER

MAIN CASING TYPE	NOMINAL DIAMETER FOR (MAIN) CASING (NEAREST INCH)	TOTAL DEPTH OF MAIN CASING (NEAREST FOOT)
S T (60 61)	6 (63 64)	94 (66 70)

OTHER CASING (IF USED)

EACH CASING

DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): S T STEEL; B R BRASS OR BRONZE; H O OPEN HOLE; P L PLASTIC; O T OTHER

stainless

C 2 (1 2 3 (SEQ. NO.) 6)

EACH SCREEN

		DEPTH (NEAREST WHOLE FOOT) FROM	TO
1	S T (8 9)	94 (11 15)	109 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1. .025 2. 3.

DIAMETER OF SCREEN 6 (56 60) (NEAREST INCH)

GRAVEL PACK FROM 92 TO 111

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX (66) F

WRA USE ONLY (NOT TO BE FILLED IN BY DRILLER) (E.R.D.S.)

(70) TELESCOPE CASING; (72) LOG INDICATOR; (74 75 76) OTHER DATA AVAILABLE

CIRCLE APPROPRIATE BOXES

A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO test WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLERS NAME (PLEASE PRINT) Conrad J. Zittinger

SIGNATURE Conrad J. Zittinger

C 3 (1 2 3 (SEQ. NO.) 6)

PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR) 3 (8 9)

PUMPING RATE (GALLOND PER MINUTE TO NEAREST GALLON) 1/2 (11 15)

METHOD USED TO MEASURE PUMPING RATE estimated

WATER LEVEL: (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING 50 (17 20) (NEAREST FOOT)

WHEN PUMPING 52 (22 26) (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX) (FOR PUMPING TEST)

A AIR (27); P PISTON (27); T TURBINE (27); C CENTRIFUGAL (27); R ROTARY (27); O OTHER (DESCRIBE BELOW) (27); J JET (27); S SUBMERSIBLE (27)

swab

PUMP INSTALLED

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX — SEE ABOVE) (29)

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX) YES Y; NO N

CAPACITY:

GALLONS PER MINUTE (TO NEAREST GALLON) (31 35)

PUMP HORSE POWER (37 41)

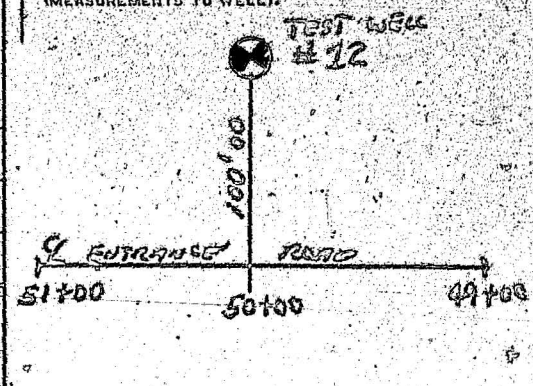
PUMP COLUMN LENGTH (NEAREST FOOT) (43 47)

CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT)

+ ABOVE; − BELOW LAND SURFACE 2 (49 50) (NEAREST FOOT) (51)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).



DNR 137

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION
TAWES OFFICE BUILDING, ANNAPOLIS, MARYLAND

TW-13

PERMIT TO DRILL WELL

ISSUE DATE- 04/08/75 MO DA YR	PERMIT NUMBER- AA-73-4312

ISSUED TO DRILLER-

CONRAD ZITTINGER
579 CENTER DR.
SEVERNA PARK MD 21146

DRILLER ID. NUMBER- 26

THE ABOVE NAMED DRILLER IS HEREBY AUTHORIZED TO DRILL A WELL TO BE OWNED BY-

MILLERSVILLE SAN
ANNE ARUNDEL CO
MILLERSVILLE MD21108

THIS WELL IS TO BE LOCATED IN ANNE ARUNDEL COUNTY, NEAR THE TOWN OF MILLERSVILLE

THE WATER IS TO BE USED FOR TEST PURPOSES.

THIS WELL WILL NOT REPLACE ANOTHER WELL.

SPECIAL CONDITIONS

FAILURE TO COMPLY WITH THE FOLLOWING CONDITIONS WILL CAUSE THIS PERMIT TO BECOME NULL AND VOID

NONE.

THE ABOVE CONDITIONS FROM CODES ON APPLICATION

THIS PERMIT IS VALID UNTIL 10/08/75. A WELL COMPLETION REPORT MUST BE SUBMITTED TO THE DEPARTMENT WITHIN 30 DAYS AFTER COMPLETION OF THE WELL

HERBERT M. SACHS
DIRECTOR, MARYLAND
WATER RESOURCES
ADMINISTRATION

WRA COPY

EMERGENCY NO. (If any) –

B 1 2134 — SEQUENCE NO. (WRA USE ONLY)
1 2 3 (SEQ. NO.) 6
(THIS NUMBER IS TO BE ENTERED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MARYLAND 21401
APPLICATION FOR PERMIT TO DRILL WELL

WRA PERMIT NUMBER **TW-13**

FILL IN THIS FORM COMPLETELY

DATE RECEIVED (WRA USE ONLY) 4 6 15

OWNER A.A. Co. Millersville Sanitary Landfill
COL 15 LAST NAME — FIRST NAME — COL. 34

STREET OR RFD Anne Arundel County
COL 36 — COL. 55

POST OFFICE Millersville, Md. 21108
COL 57 — COL. 76

8-13

B 1 CONTINUED (1 2 3 SEQ. NO. 6)

DRILLER INFORMATION

DATE March 14, 1975 — LICENSE NUMBER 26 (77–80)

Conrad J. Zittlinger
FIRST NAME — DRILLER — LAST NAME

SIGNATURE Conrad J. Zittlinger

B 2 (1 2 3 SEQ. NO. 6)

WELL INFORMATION

MAXIMUM PUMPING RATE (GALLONS PER MINUTE) 0 (8–12)

AVERAGE DAILY QUANTITY NEEDED (GALLONS PER DAY) 0 (14–20)

USE FOR WATER (CIRCLE APPROPRIATE BOX)

22
- D HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- F FARMING, AGRICULTURE, IRRIGATION
- I INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOVERNMENT
- M MUNICIPAL WATER SUPPLY
- P PRIVATE WATER COMPANY

} MUST HAVE STATE HEALTH DEPT. APPROVAL

- T TEST #13A

APPROXIMATE DEPTH OF WELL 80 FEET (24–28)

APPROXIMATE DIAMETER OF WELL 6 (NEAREST INCH)

METHOD OF DRILLING USED (CIRCLE APPROPRIATE METHOD)

BORED (OR AUGERED)	JETTED	DRIVEN
30-37 AIR-ROTARY	AIR-PERCUSSION	ROTARY (HYDRAULIC ROTARY)
CABLE	REVERSE-ROTARY	DRIVE-POINT

OTHER (DESCRIBE)

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)

39
- N THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- D THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) (41–52)

NOT TO BE FILLED IN BY DRILLER (WRA USE ONLY)

APPROPRIATION PERMIT NUMBER C A P (54–63) — ENGINEER REVIEW DISTRICT NO. (65)

FORCE CW (WRITE INITIALS IN BOX) (67 68) — CONDITIONS A E N S G W Q C L U (70 71 72 73 74 75 76 77 78 79)

B 4 CONTINUED (1 2 3 SEQ. NO. 6)

41 S STATE HEALTH (CIRCLE BOX)

HEALTH DEPARTMENT APPROVAL

AA — COUNTY NAME — 02 — COUNTY NO.

DATE MO. 03 DAY 26 YR. 75 (43–48)

JM — APPROVED BY

B 5 (1 2 3 SEQ. NO. 6) — SPECIAL CONDITIONS 8-83 (WRA USE ONLY) (8–63)

B 3 LOCATION OF WELL (1 2 3 SEQ. NO. 6)

COUNTY Anne Arundel (8–21) (DO NOT ABBREVIATE COUNTY NAME)

SUBDIVISION (25–42)

SECTION (44–46) — LOT (48–50)

NEAREST TOWN Millersville (52–71)

MILES FROM TOWN (ENTER 0 IF IN TOWN) 0 (73–76) M I (77 78)

B 4 DIRECTION FROM TOWN (CIRCLE APPROPRIATE BOX) (1 2 3 SEQ. NO. 6)

N NORTH	E EAST	N E NORTHEAST	S E SOUTHEAST
S SOUTH	W WEST	N W NORTHWEST	S W SOUTHWEST

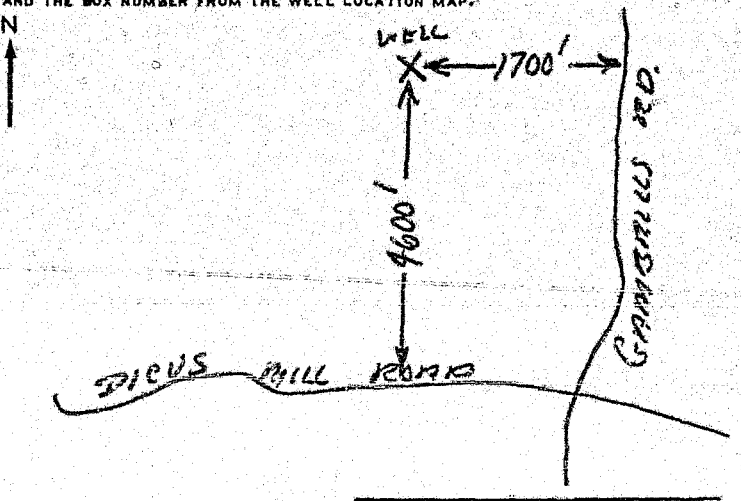
(8) (6) (6–9) (8 9)

NEAR WHAT ROAD Gambrills (11–30)

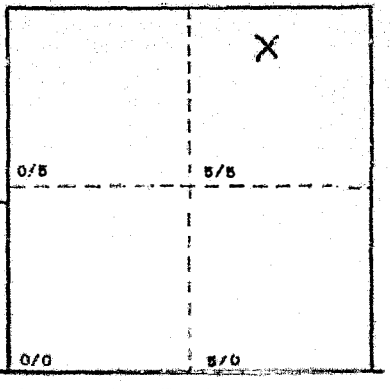
ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH N (32) — SOUTH S (32) — EAST E (32) — WEST W (32)

DISTANCE FROM ROAD (ENTER DISTANCE AND CIRCLE APPROPRIATE BOX) 1700 (34–37) F T M I (38 39)

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWN ROADS AND STREAMS WITH NORTH IN THE DIRECTION OF THE ARROW, AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION OR STREAM CROSSING SHOWN ON THE SKETCH. ALSO SHOW, BY MEANS OF AN "X", THE WELL LOCATION IN THE BOX BELOW AND THE BOX NUMBER FROM THE WELL LOCATION MAP.



BOX NUMBER E 890 N 450



NORTH COORDINATE 455000 (50–55)

EAST COORDINATE 0895000 (57–63)

ELEVATION AT WELL HEAD (FEET) (65–68)

ORIGINAL

WRA 214 8/71

C | 1 | 5619 — SEQUENCE NO. (WRA USE ONLY) — (SEQ. NO.) — (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-8 ON ALL CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED (WRA USE ONLY) 4 24 7

DATE WELL COMPLETED: April 2, 1975 — 04 02 75

DEPTH OF WELL: 78 (TO NEAREST FOOT)

TW-13

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-23-43/2

DRILLERS IDENTIFICATION NO.: 26

OWNER: Anne Arundel County

STREET OR RFD: Millersville Sanitary Landfill — POST OFFICE: Millersville, Md. 21108

WELL DESCRIPTION

WELL LOG

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
Yellow sand	0	2	
red clay	2	12	
pink & white clay	12	18	
white clay &few streaks sand	18	21	
fine to med. course tan sand	21	34	
white clay	34	44	
fine tan sand	44	59	
white clay,few streaks sand	59	70	
fine tan sand	70	78	x
sand rock	78	79	
white clay	79	80	

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): YES (Y) NO (N)

TYPE OF GROUTING MATERIAL (CIRCLE BOX): CEMENT (C M) BENTONITE CLAY (B C)

NO. OF BAGS: 25 NO. OF POUNDS: 2350

GALLONS OF WATER: 125

DEPTH OF GROUT SEAL (TO NEAREST FOOT): FROM 0 FT. TO 61 FT. (ENTER 0 IF FROM SURFACE)

CASING RECORD

CASING TYPES (INSERT APPROPRIATE CODE BELOW): STEEL (S T), CONCRETE (C O), PLASTIC (P L), OTHER (O T)

MAIN CASING TYPE	NOMINAL DIAMETER TOP (MAIN) CASING (NEAREST INCH)	TOTAL DEPTH OF MAIN CASING (NEAREST FOOT)
S T	6	63

OTHER CASING (IF USED)

EACH CASING

DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): STEEL (S T), BRASS OR BRONZE (B R), OPEN HOLE (H O), PLASTIC (P L), OTHER (O T)

C | 2 (SEQ. NO.)

EACH SCREEN — DEPTH (NEAREST WHOLE FOOT)

	TYPE	FROM	TO
1	S T	63	78
2			
3			

SLOT SIZE 1: 020 2. ____ 3. ____

DIAMETER OF SCREEN: 6 (NEAREST INCH)

GRAVEL PACK: FROM 64 TO 80

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX: 68

WRA USE ONLY (NOT TO BE FILLED IN BY DRILLER)

70	72 (E.R.O.G.)	74 75 76
TELESCOPE CASING	LOG INDICATOR	OTHER DATA AVAILABLE

CIRCLE APPROPRIATE BOXES

A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E — ELECTRIC LOG OBTAINED

P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLERS NAME (PLEASE PRINT): Conrad J. Zittinger

SIGNATURE: Conrad J. Zittinger

C | 3 (SEQ. NO.)

PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR): 3

PUMPING RATE (GALLONS PER MINUTE TO NEAREST GALLON): 20

METHOD USED TO MEASURE PUMPING RATE: estimated

WATER LEVEL: (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING: 35 (NEAREST FOOT)

WHEN PUMPING: 75 of air line (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX) (FOR PUMPING TEST)

A AIR — P PISTON — T TURBINE — C CENTRIFUGAL — R ROTARY — O OTHER (DESCRIBE BELOW) — J JET — S SUBMERSIBLE

PUMP INSTALLED

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX — SEE ABOVE: A, C, J, P, R, S, T, O)

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES (Y) NO (N)

CAPACITY:

GALLONS PER MINUTE (TO NEAREST GALLON)

PUMP HORSE POWER

PUMP COLUMN LENGTH (NEAREST FOOT)

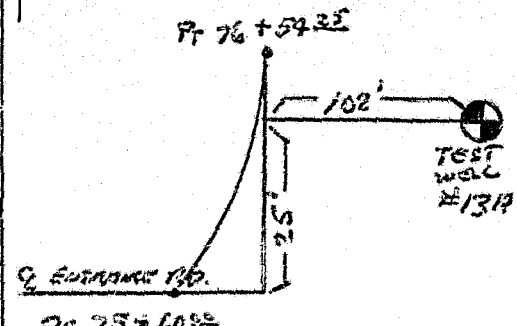
CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT)

(+) ABOVE / (−) BELOW LAND SURFACE: 2 (NEAREST FOOT)

LOCATION OF WELL ON LOT

N

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).



ORIGINAL

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401

WELL COMPLETION REPORT

FILL IN THIS FORM COMPLETELY

DATE RECEIVED: 6-30-75

DEPTH OF WELL: 55

PERMIT NO. FROM "DRILLER TO DRILL WELL": AA-179-75

ENGINEER IDENTIFICATION NO.: 26

OWNER: Anne Arundel County

STREET OR R.F.D.: Millersville Sanitary Landfill

POST OFFICE: Millersville, Md., 21108

TW-14

WELL LOG

DESCRIPTION OF FORMATIONS PENETRATED	FROM	TO	WATER BEARING
silty tan sand	0	7	
red & white clay	7	9	
white, yellow, & pink clay, sandy	9	11	
hard white & pink clay	11	12	
red, white, yellow clay	12	14	
red, purple, & white clay	14	19	
brown, white, & yellow clay	19	30	
white & some pink clay	30	47	
fine to med. tan sand	47	61	X

SEALING RECORD

NEAT AND CEMENT GROUTED (CIRCLE APPROPRIATE BOX)

NEW: N | REPLACEMENT: R

SEALING PLAN: C | D

NO. OF BAGS: 30

NO. OF GALLONS: 2020

GALLONS OF WATER: 150

DEPTH OF GROUT SEAL (TO NEAREST FOOT)

FROM: 0 FT. TO: 42 FT.

CASING RECORD

CASING TYPE (INSERT APPROPRIATE BOX CODE)

STEEL: S | CONCRETE: C

PLASTIC: P | OTHER: O

CASING TYPE	NOMINAL DIAMETER (TO NEAREST INCH)	TOTAL LENGTH OF MAIN CASING (TO NEAREST FOOT)
S | T	6	50

OTHER CASING (IF USED)

CASING TYPE	DIAMETER (INCHES)	DEPTH (FEET) FROM	TO

SCREEN RECORD

SCREEN TYPE (INSERT APPROPRIATE CODE BELOW)

STEEL: S | WIRE WOUND: W | SLOTTED: SL

BRONZE: B | OTHER: O

C | 2

DEPTH (NEAREST WHOLE FOOT) FROM

P | L | 50 | 25

SLOT SIZE: 020

DIAMETER OF SCREEN: 6

GRAVEL PACK: 46 TO 57

IF WELL YIELD HAS A SALT CONTENT OVER 250 MG/L CHLORIDES, CIRCLE BOX: F

PUMPING TEST

C | 3

TEST NO.: 1

HOURS PUMPED (TO NEAREST HOUR): 2

PUMPING RATE (GALLONS PER MINUTE OR GALLONS PER HOUR): 2

METHOD USED TO MEASURE PUMPING RATE: estimated

WATER LEVEL (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING: 38 FEET

WHILE PUMPING: 61' of air line FEET

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX)

A | P | T

C | R | O

J | S

PUMP INSTALLED

TYPE OF PUMP (CIRCLE APPROPRIATE BOX OR WRITE LETTER IN BOX — SEE ABOVE): S

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): Y | N

CAPACITY: GALLONS PER MINUTE OR GALLONS PER HOUR

PUMP HORSE POWER

SETTING (DEPTH BELOW LAND SURFACE)

CASING HEIGHT

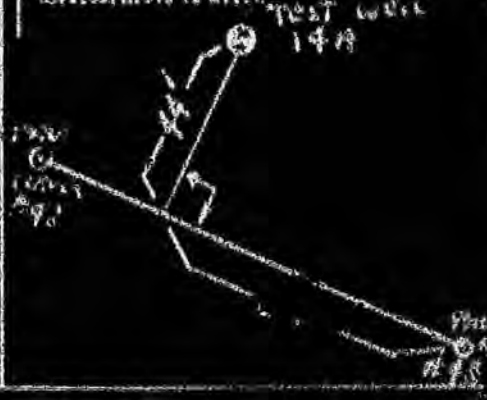
(CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT)

ABOVE: A | BELOW: B

CASING HEIGHT: 2 FEET

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, DRIVES, ROADS, ETC. IN RELATION TO WELL. INDICATE NOT LESS THAN TWO DISTANCES TO WELL.



CIRCLE APPROPRIATE BOXES

A | WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E | ELECTRIC JOB COMPLETED

W | THIS WELL CONVERTED TO INJECTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL REGULATIONS GOVERNING THE ABOVE-DESCRIBED "REPORT OF WATER WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLER'S NAME: Conrad J. Zitzinger

SIGNATURE: [signature]

WRA USE ONLY (NOT TO BE FILLED IN BY DRILLER)

PRELIMINARY CARD | OLD INFORMATION | WATER BASIN AVAILABLE

ORIGINAL

TW-14A Well Information

John Gilman
Business Development
Sales

A.C. Schultes of Maryland, Inc.
8221 Cloverleaf Drive
Millersville, Maryland 21108

(410) 841-6710 Direct
(410) 841-6711 Fax
JohnG@ACSchultes.net
www.ACSchultes.com

Tag: AA-73-3891

INSTALLED 6/5/1975

Address	LANDFILL
City	
State	
Zip Code	
Driller	
Est. GPM Produced	
Use for water SIM	
Drill Method	
WAPID	
Replace	
Subdivision	
Section Lot	
Nearest Town	
Town Distance	
Direction	
Road Name	
Distance	
Tax Map	
Block	
Parcel	
N_Grid 83	
E_Grid	
Latitude	
Longitude	
Completion	

Total Depth	101'
Grouted	YES
Grout Type	CEMENT
Grout Top	0'
Grout Bottom	75'
Casing Type	STEEL
Casing Diameter	6"
Casing Depth	86'
Casting Height	
Screen Type	STEEL
Screen Top	86'
Screen Bottom	101'
Screen Diameter	6"
Hrs Pumped	
Pumping Rate	
Level Before	
Level During	
Test Pump Type	AIR
Pump Installed	
Capacity	
Pump Hp	
Column Length	

A.C. Schultes
INFLUENT TO EFFLUENT

Technical Data

AA Co. Waste Management
Millersville Landfill
Well #14B
AA-95-4954

ACSM JOB #H5703

Established in 1921

Serving your needs in the Mid-Atlantic Region

A.C SCHULTES, INC.
664 S. Evergreen Avenue
Woodbury, NJ 08096
(856) 845-5656
(856) 845-1335 FAX

A.C. SCHULTES OF MARYLAND, INC.
24 Old South River Road
Edgewater, MD 21037
(410) 841-6710
(410) 841-6711 FAX

A.C. SCHULTES OF CAROLINA, INC.
3887 S. NC 41
Wallace, NC 28466
(910) 285-7465
(910) 285-6501 FAX

A.C. SCHULTES OF DELAWARE, INC.
16289 Sussex Highway
Bridgeville, DE 19933
(302) 337-8254
(302) 337-8234 FAX

A.C. SCHULTES OF FLORIDA, INC.
11865 Highway 41 South
Gibsonton, FL 33534
(813) 741-3010
(813) 741-3170 FAX

Technical Data

A.A. Co. Waste Management
Millersville Landfill
Well #14B
AA-95-4954

ACSM Job #H5703

Table of Contents

1. Well Permit

2. Well Completion Report

3. Well "As Built"

4. Drillers Log

5. Electric Log

EMERGENCY/TEMP NO. IF ANY (AA-0711-2002)

B 1 8872 — SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please type

STATE PERMIT NUMBER: AA-95-4954

fill in this form completely

Date Received (APA): 11/30/01

OWNER INFORMATION

Anne Arundel County
Last Name / Owner / First Name

3 & 9 Burns Crossing Rd
Street or RFD

Severn MD 21144
Town / State / Zip

DRILLER INFORMATION

David B. Hartman MD D 517
Driller's Name / License No.

A.C. Schultes of MD Inc
Firm Name

34 Old South River Rd
Address

Del Natt
Signature / Date

B 2 WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.): -NA-

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): -NA-

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- [D] DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- [F] FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION
- [I] INDUSTRIAL, COMMERICIAL, DEWATERING
- [P] PUBLIC WATER SUPPLY WELL
- [T] TEST, OBSERVATION, MONITORING
- [G] GEO-THERMAL

APPROXIMATE DEPTH OF WELL: 200 FEET

APPROXIMATE DIAMETER OF WELL: 8x4 DBL NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered) — JETTED — Jetted & DRIVEN
AIR-ROTary — AIR-PERcussion — ROTARY (Hydraulic Rotary)
CABLE — REVerse-ROTary — DRIVE-POINT
other

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)

- [N] THIS WELL WILL NOT REPLACE AN EXISTING WELL
- [Y] THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- [S] THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- [D] THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE): ___-___-___-___

Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER: ------G---

PERMIT No. AA-95-4954

B 3 LOCATION OF WELL

Anne Arundel
COUNTY

Millersville Manor
SUBDIVISION

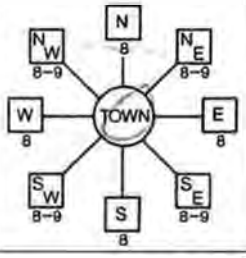
SECTION ____ LOT ____

Severn
NEAREST TOWN

MILES FROM TOWN (enter 0 if in town): 4 M

B 4

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)



Gambrills Rd
NEAR WHAT ROAD

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)

NORTH N / WEST W / 32 / E EAST / S SOUTH

DISTANCE FROM ROAD: 900 FT (ENTER FT OR MI)

TAX MAP: 32 BLK: 2C PARCEL: 157

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Anne Arundel — COUNTY NAME — 02 — COUNTY NO.

STATE SIGNATURE _____ INSERT S →

DATE ISSUED 12/11/01 — CO SIGNATURE — EXP. DATE 12/11/10

NORTH GRID 457 000 — EAST GRID 0495 000

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

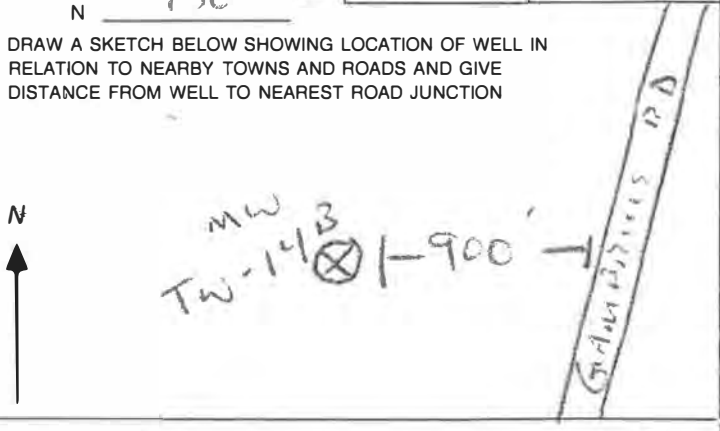
SOURCES OF DRILLING WATER
1. TANKER
2.
3.

WRITE THE BOX NUMBER FROM THE MAP HERE

E 540

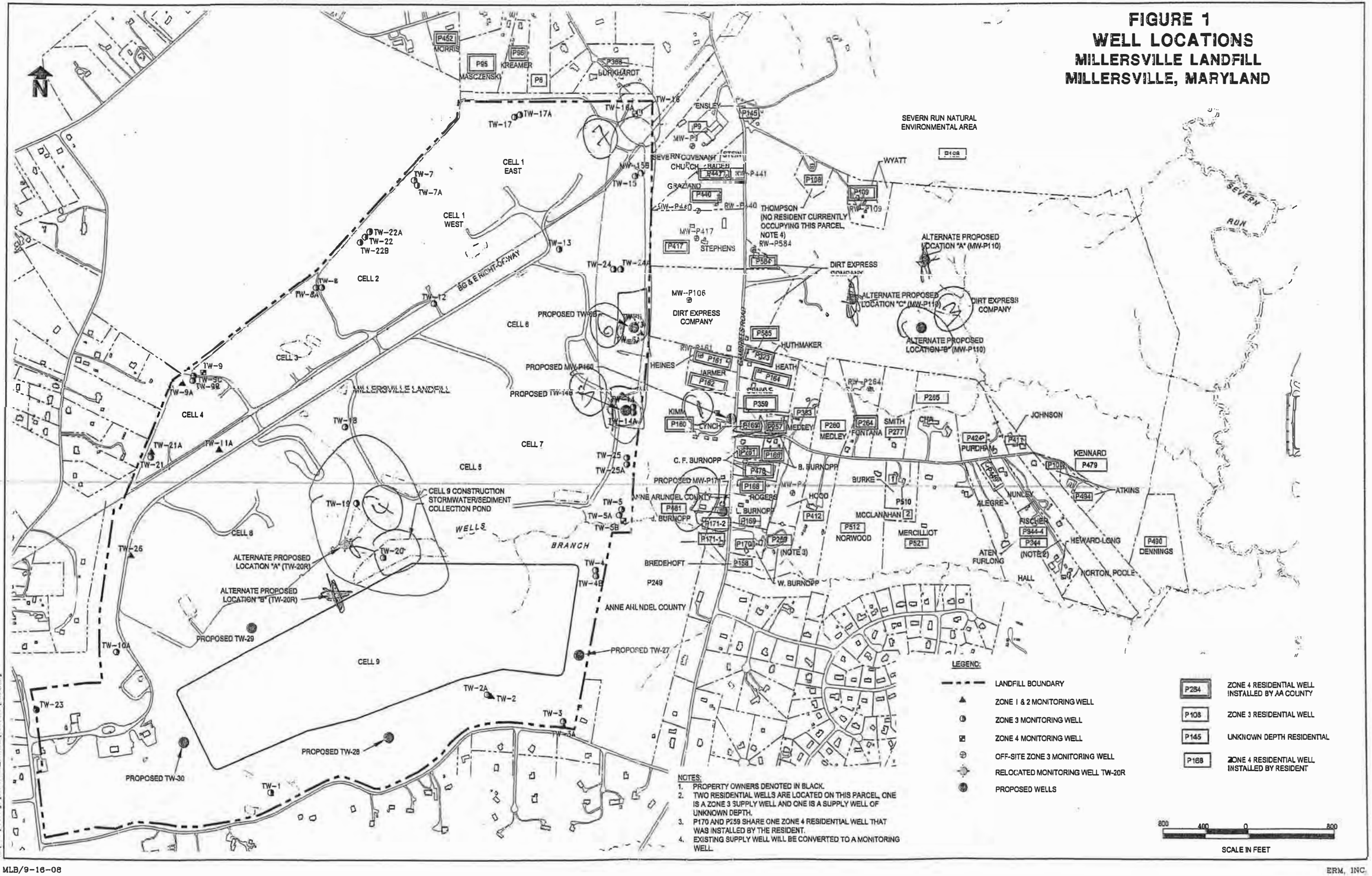
N 450

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



SPECIAL CONDITIONS
NOTE - APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED

FIGURE 1
WELL LOCATIONS
MILLERSVILLE LANDFILL
MILLERSVILLE, MARYLAND



G:\CAD\Drawings\Millersville_Landfill\0053413\V4206.dwg

MLB/9-16-08

ERM, INC.

C 1 | 8361 — SEQUENCE NO. (MDE USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY — DATE Received (MM DD YY): ____

DATE WELL COMPLETED (MM DD YY): 1 21 10

Depth of Well: 235 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 95 - 4154

OWNER: Anne ARundell Co.
STREET OR RFD: 389 Burns Crossing Rd. TOWN: Severn, MD
SUBDIVISION: Millersville Landfill SECTION: ____ LOT: ____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
topsoil	0	1	
red/white clay w.fine sand	1	69	
fine/med sand w/some clay	69	102	
red clay	102	110	
fine/med sand	1101	119	
red/white clay	119	191	
fine/coarse sand w/some strks clay	191	240	

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26. 04.04"WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M D 517

DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: D

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] no [N]

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS: 35 NO. OF POUNDS: 1750

GALLONS OF WATER: 875

DEPTH OF GROUT SEAL (to nearest foot)

from 0 ft. (TOP) to 190 ft. (BOTTOM)

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	8	145

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to
PL	4	0	215

SCREEN RECORD
screen type or open hole — insert appropriate code below

[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2

DEPTH (nearest ft.)

EACH SCREEN		
1 PL	215	235
2		
3		

SLOT SIZE 1 .020 2 ____ 3 ____

DIAMETER OF SCREEN: 4 (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68	from	to
	190	235

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

TELESCOPE CASING | LOG INDICATOR | OTHER DATA

C 3

PUMPING TEST
HOURS PUMPED (nearest hour): 6

PUMPING RATE (gal. per min.): 50

METHOD USED TO MEASURE PUMPING RATE: 5 gal

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 70 ft.

WHEN PUMPING: 120 ft.

TYPE OF PUMP USED (for test)

[A] air [P] piston [T] turbine
[C] centrifugal [R] rotary [O] other (describe below)
[J] jet [S] submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29: S

CAPACITY: GALLONS PER MINUTE (to nearest gallon): 5

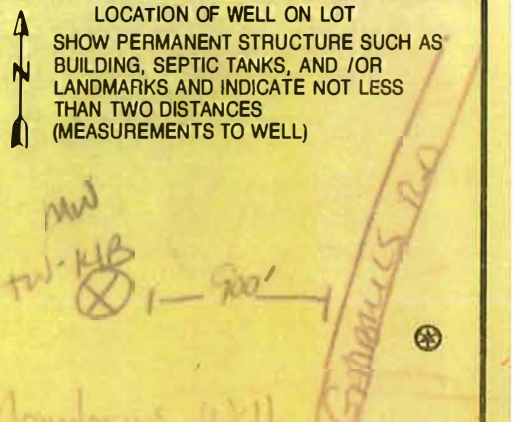
PUMP HORSE POWER: ____

PUMP COLUMN LENGTH (nearest ft.): 180

CASING HEIGHT (circle appropriate box and enter casing height)

[+] above / [−] below LAND SURFACE: 2 (nearest foot)

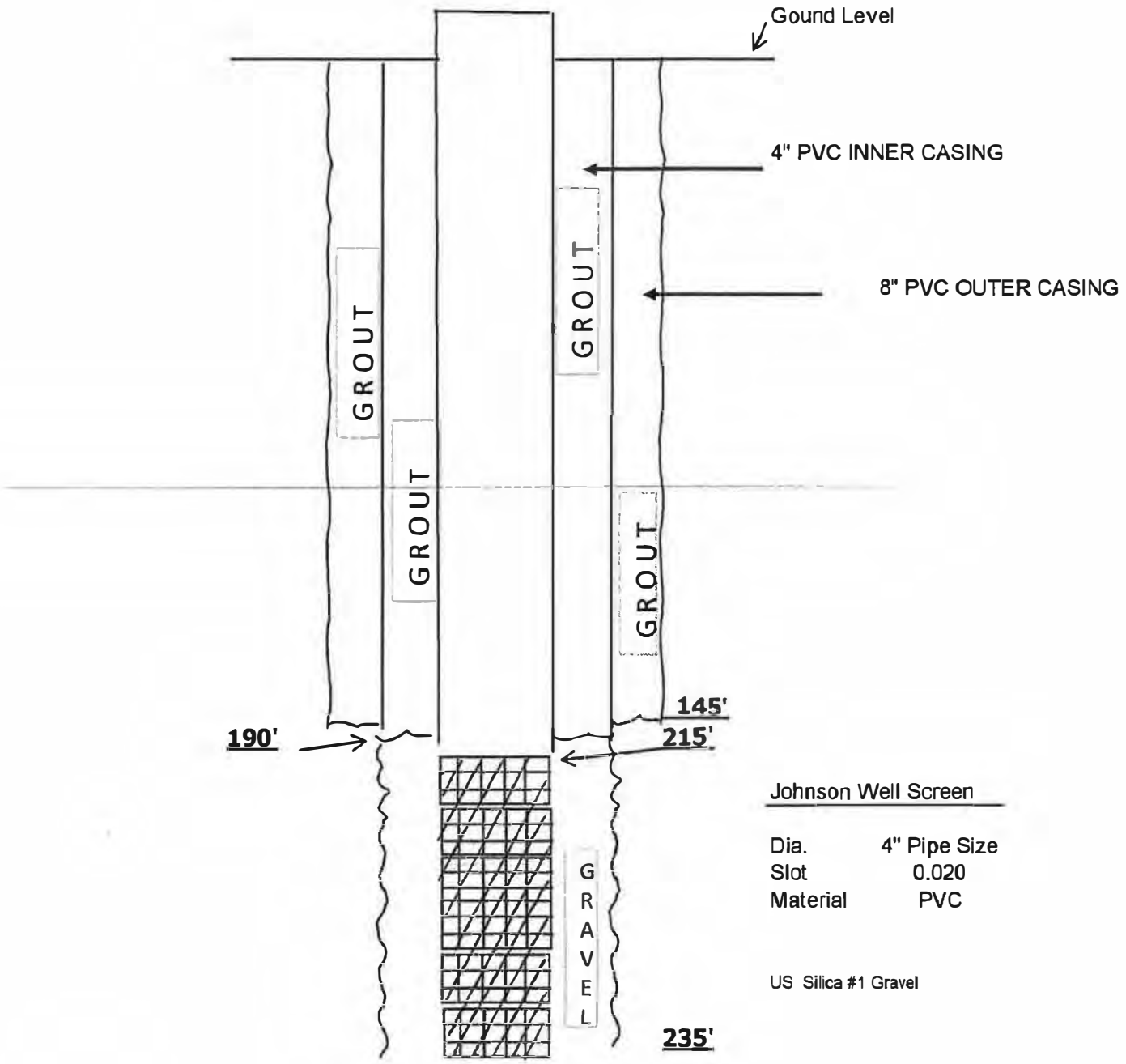
LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



DENV-CR00

DRILLER

ANNE ARUNDEL CO.
Millersville Landfill
AA-95-4954
Well 14B
ACSM Job# H5703



Telephone 410-841-6710
Fax # 410-841-6711

A.C. SCHULTES OF MARYLAND, INC.
24 Old South River Road Edgewater, MD 21037

Driller's Log — Water Well Contractors

CUSTOMER: AA CO. JOB H5703

ADDRESS: 389 Burns Crossing DATE 1/21/10

LOCATION: Millersville Landfill PERMIT NO. AA-95-4954

		FEET FROM GROUND SURFACE 0 TO	WELL LOG
GROUND	2'	0-1	topsoil
		1-69	red & white clay w/fine sand
		69-102	fine to medium sand w/some clay
		102-110	red clay
		110-119	fine to medium sand
		119-191	red & white clay
		191-240	fine to coarse sand w/some streaks of clay
	215'		
TOTAL DEPTH 235'	CASING		
	20		
SCREEN			

WELL NO. TW 14B	DIAMETER OF WELL 4"	DEPT. OF WELL 235'
HOURS PUMPED 6	SLOT SIZE .20	TYPE OF CASING PVC FJ
CAPACITY GPM 50	DRILLING MACHINE NO. CF-15	LENGTH OF CASING 215'
STATIC LEVEL 70'	DRILLER Melson	DISTANCE TO TOP OF SCREEN 215'
PUMPING LEVEL 120	GRAVEL 30 of #1	TYPE SCREEN PVC FJ
SPECIFIC CAPACITY 1	35 BAGS OF Benseal	SIZE OF SCREEN 4"
PUMPED WITH air	DATE WELL COMPLETED 1/21/10	OUTER CASING SIZE 8" FJ
DEPTH OF GROUT 190-0	DRILLER'S HELPER Barnett	OUTER CASING DEPTH 145'
DEPTH GRAVEL PACKED 190-240		

AA 95 4954 14B

Earth Data Incorporated
131 Comet Drive, Centreville, MD 21617
Phone: (410) 758-8160 / Facsimile (410) 758-8168
www.earthdatainc.com

WELL I.D.
TW-14B

Logging Date: 1/14/10
Logging Speed: 25 ft/min x Up Down
BOC: NA **TD:** 143.7'

Project: A.C. Schultes of Maryland/Millersville Landfill
Bit Size: 12" **EDI Job No.:** 4150

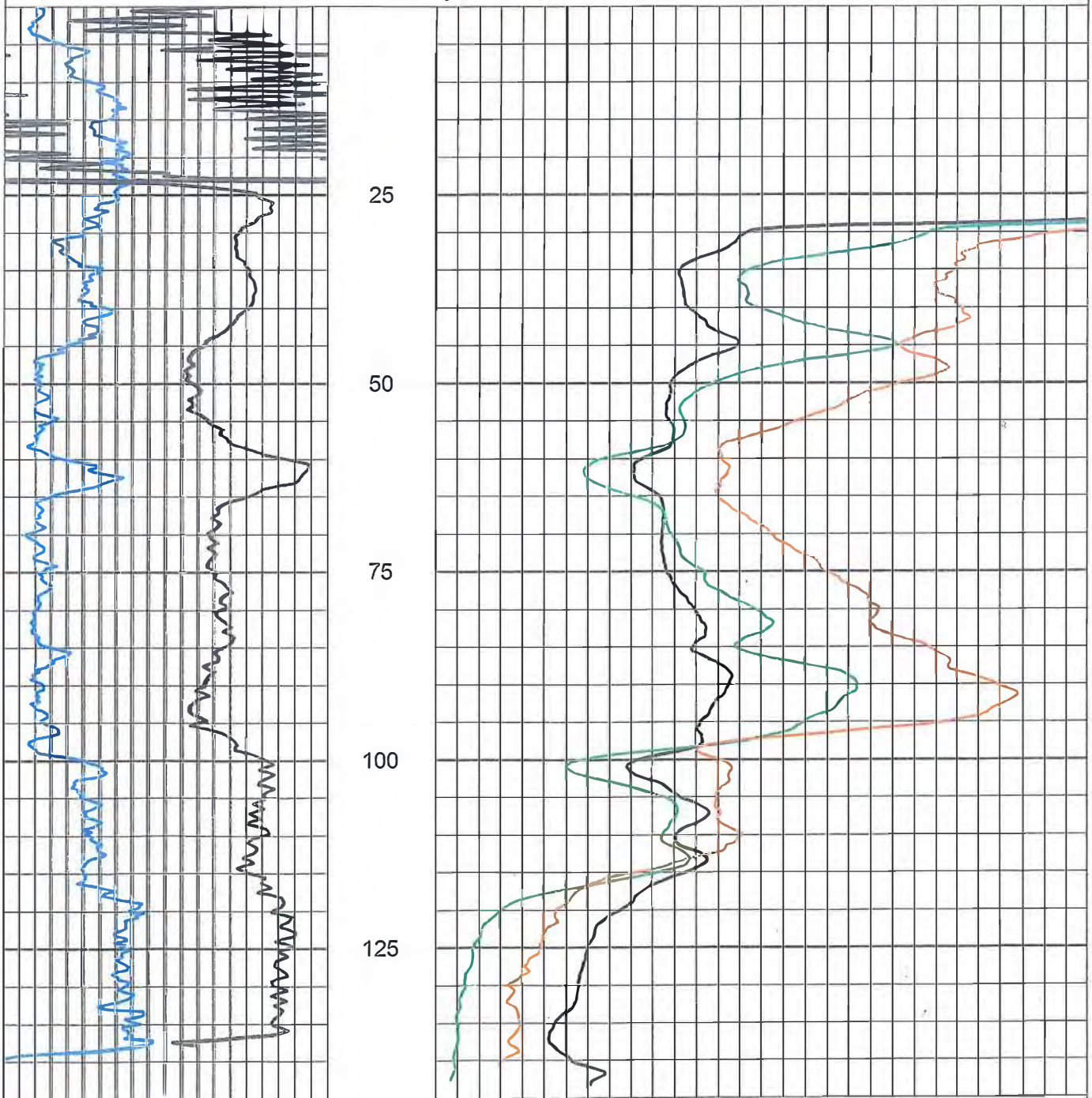
Client: A.C. Schultes of Maryland
Fluid Type: Mud Based Water **Technician:** JKrewson

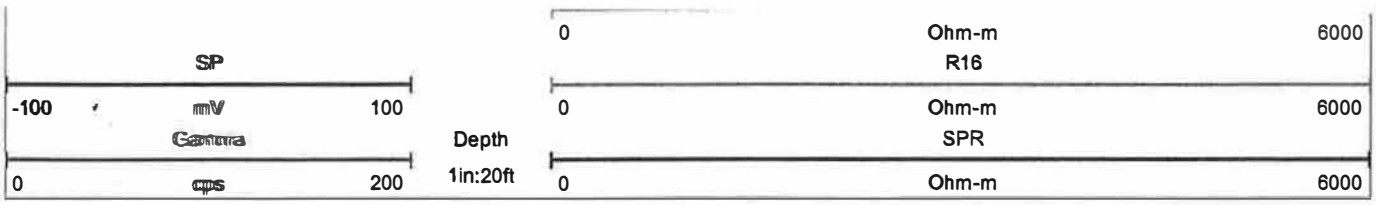
Location: Severn, MD
GPS: N39° 05.680' W076° 39.403' **Casing Material:** NA **Witness:** Randall Melson

Gamma
0 cps 200
SP
-100 mV 100

Depth
1in:20ft

SPR
0 Ohm-m 6000
R16
0 Ohm-m 6000
R64
0 Ohm-m 6000




SP
-100
mV
100
Gamma
0
cps
200
Depth
1in:20ft
0
Ohm-m
6000
R16
0
Ohm-m
6000
SPR
0
Ohm-m
6000

John Gilman
Business Development
Sales

A.C. Schultes of Maryland, Inc.
8221 Cloverleaf Drive
Millersville, Maryland 21108

(410) 841-6710 Direct
(410) 841-6711 Fax
JohnG@ACSchultes.net
www.ACSchultes.com

TW-15 Well Information

Tag: AA-73-3889

INSTALLED 3/4/1975

Address	LANDFILL
City	
State	
Zip Code	
Driller	CZ ENT.
Est. GPM Produced	
Use for water SIM	
Drill Method	
WAPID	
Replace	
Subdivision	
Section Lot	
Nearest Town	
Town Distance	
Direction	
Road Name	
Distance	
Tax Map	
Block	
Parcel	
N_Grid 83	
E_Grid	
Latitude	
Longitude	
Completion	

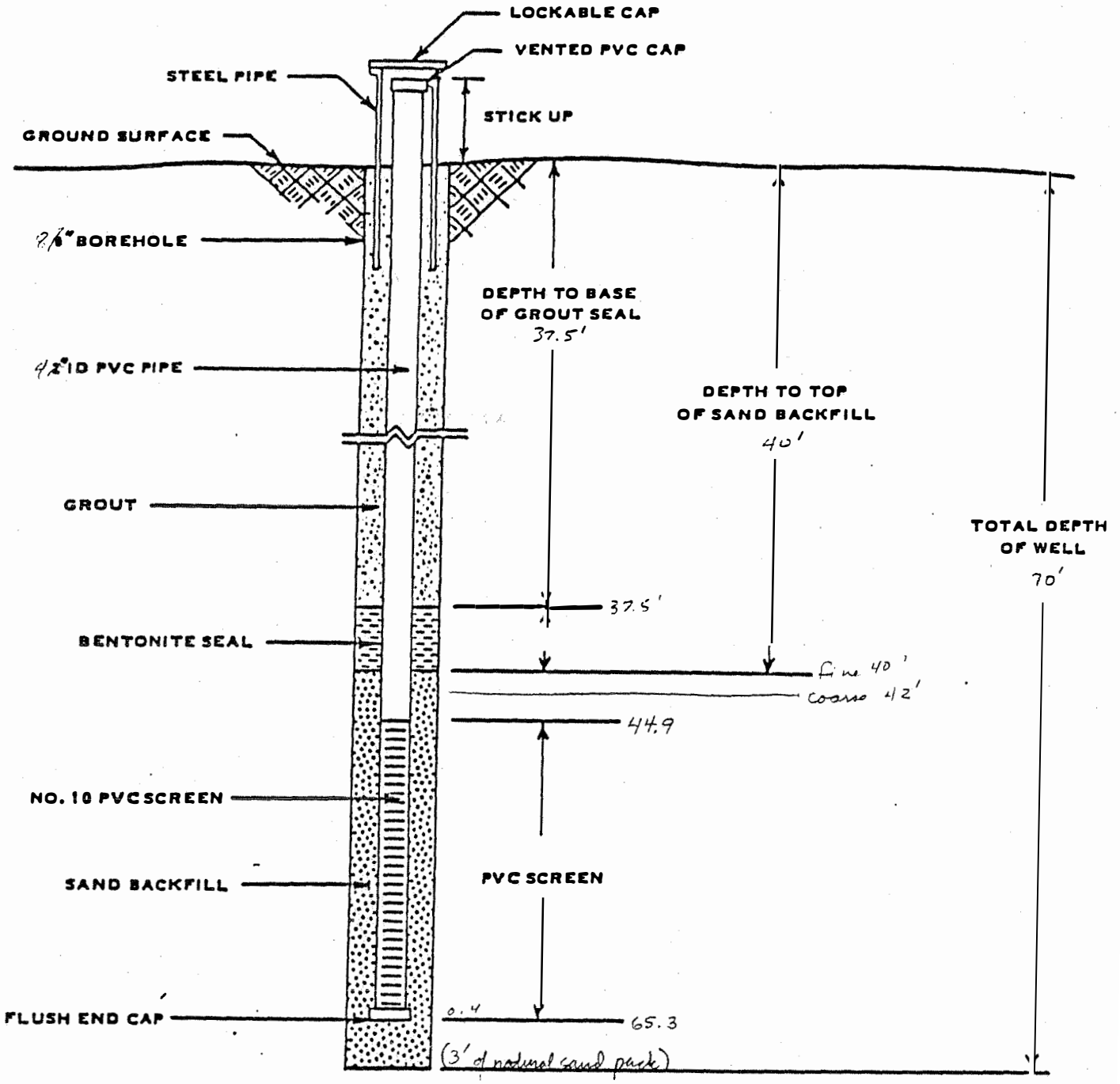
Total Depth	89'
Grouted	YES
Grout Type	CEMENT
Grout Top	0'
Grout Bottom	65'
Casing Type	STEEL
Casing Diameter	6"
Casing Depth	74'
Casting Height	
Screen Type	S.S.
Screen Top	74'
Screen Bottom	89'
Screen Diameter	6"
Hrs Pumped	
Pumping Rate	
Level Before	
Level During	
Test Pump Type	AIR
Pump Installed	
Capacity	
Pump Hp	
Column Length	

GEOSERVICES INC. JOB NAME: Millersville Landfill JOB NO.: P1160

BY: JCW DATE: 7 Oct 89 SHEET: 1 OF 1

TYPE II MONITORING WELL

TW15B



GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW15B SHEET 1 OF 3

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 115 ft above sea level datum (est.)

DRILLING METHOD AND EQUIPMENT 6 1/4" I.D. auger boring, split spoon sampling 2' every 5'

DATES: START 6 Oct 89 FINISH 7 Oct 89 WATER LEVEL 52' W.L. DATE 7 Oct 89 LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
115	0	0-2'		2	4-5-7 (9)	0-0.3': organic topsoil 0.3-1.0': sandy lean clay, medium sand, yellowish-red, moist, (CL) 1.0-5.7': lean clay, yellowish red, fairly dry, (CL)		1-2': TV: 7, 8.5, 8.5 tsf PP: 2.4,
110	5	5-7'			25-23-15 (48)	5.7-7.5': poorly-graded medium sand, moist, subrounded, red mottled with pink, (SP) 7.5-11.6': fat silty clay, fairly dry, mottled red and pink and brownish-yellow, (CH)		
105	10	10-12'		2	14-21-67 (35)	11.6-16.2': poorly-graded fine silty sand with some clay, moist, white mottled with yellowish brown and red, (SP-SM)		10-11': TV: 16.3, 15.5, 15.0 tsf PP: 4.5+ tsf
100	15	15-17'		2	31-40-99 (71)	16.2-20.8': poorly-graded fine silty sand, moist, reddish-yellow mottled with light red, (SP-SM)		
95	20	20-22'		2	31-36-99 (67)	20.8-25': low plasticity sandy silt, fine sand, fairly dry, light gray with thin (2 mm) horizontal bands of brownish-yellow, (ML)		
90	25	25-27'		2	14-69-136 (83)	25-31': low plasticity silt with fine sand, light gray mottled with light reddish brown, fairly dry, (ML)		

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER	SHEET	OF
P1160	TW15B	2	3

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 115 ft above sea level datum (est.)

DRILLING METHOD AND EQUIPMENT 6 1/4" I.D. auger boring, split spoon sampling 2' every 5'

DATES: START 6 Oct 89 FINISH 7 Oct 89 WATER LEVEL 52' W.L. DATE 7 Oct 89 LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
85	30	30-32'		1.7	10-38-93 (48)	31-33': low plasticity sandy silt, fine sand, fairly dry, light gray with thin horizontal bands of brownish-yellow, (ML) 33-42': poorly-graded fine silty sand, fairly dry, light gray, (SP-SM)		
80	35			2	55-100- (100+)			
75	40							
70	45	45-47'		2	21-40-38-60 (78)	48-49': fine clay silty sand, moist, very pale brown, (SC/SM)		
65	50	50-52'		2	13-21-45-55/4 (66)	49-70': well-graded sand up to medium grain size, moist, 0.5-2" horizontal bedding planes of brownish yellow and white and light reddish brown, (SW)		
60	55	55-57'		2	11-15-28-37 (43)			

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW15B SHEET 3 OF 3

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 115 ft above sea level datum (est.)

DRILLING METHOD AND EQUIPMENT 6 1/4" I.D. auger boring, split spoon sampling 2' every 5'

DATES: START 6 Oct 89 FINISH 7 Oct 89 WATER LEVEL 52' W.L. DATE 7 Oct 89 LOGGER JC.W

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
55	60	60-62'		2	48-45-80 (100+)	at 61.5': 1/2" band of cemented sandstone, dark yellowish brown.		Last split spoon sample taken from 60-62'.
50	65							
45	70							Terminate boring at 70'.

TW-16 Well Information

John Gilman
Business Development
Sales

A.C. Schultes
of Maryland, Inc.
8221 Cloverleaf Drive
Millersville, Maryland 21108

(410) 841-6710 Direct
(410) 841-6711 Fax
JohnG@ACSchultes.net
www.ACSchultes.com

Tag:	AA-73-3890
	INSTALLED 2/25/1975
Address	LANDFILL
City	
State	
Zip Code	
Driller	CZ ENT.
Est. GPM Produced	
Use for water SIM	
Drill Method	
WAPID	
Replace	
Subdivision	
Section Lot	
Nearest Town	
Town Distance	
Direction	
Road Name	
Distance	
Tax Map	
Block	
Parcel	
N_Grid 83	
E_Grid	
Latitude	
Longitude	
Completion	

Total Depth	63'
Grouted	YES
Grout Type	CEMENT
Grout Top	0'
Grout Bottom	42'
Casing Type	STEEL
Casing Diameter	6"
Casing Depth	47'
Casting Height	
Screen Type	S.S.
Screen Top	47'
Screen Bottom	63'
Screen Diameter	6"
Hrs Pumped	
Pumping Rate	
Level Before	
Level During	
Test Pump Type	AIR
Pump Installed	
Capacity	
Pump Hp	
Column Length	

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia

Identification: TW16A **Page** 1 of 4

Site: Millersville Landfill Proj. No.: GE3200-450

Client: Anne Arundel County / Northern Boundary Study

Boring Log

Date Started: 8 June 1992 Date Finished: 10 June 1992

Status: Ground-Water Monitoring Well

Total Depth: 154.5 ft Bit Diameter: see comments

Drilling Co.: A.C. Schultes of Delaware

Tools / Method: Mud Rotary (Kelly Drive)

Driller: Ken DeRoche Drilling Rig: Failing 1250

Supervisor: J. Raymer Reviewer: S. Shugart

Ground Elev.: 113 ft. Datum: 1929 Gen.Adj.Dat.

Horiz.: N: 462,179.3 ft E: 897,273.9 ft

Survey Company: Greenhorne & O'Mara

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
113.0		CLAY, semi-fat, moderate reddish brown with streaks of white;			1000, 8 Jun 92: Boring begun, 6.75in. bit.
108.0		@5ft: gradually becoming darker;		5	
				10	
				15	
				20	
				25	
				30	
				35	

Ident.: TW16A Site: Millersville Landfill Proj. No.: GE3200-450 Page 2 of 4

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
				45	
65.0	48.0	SILTSTONE, limonite cemented.			
66.0	49.0	FINE SAND, (fg-mg), moderate orange-red and pale yellowish orange; some very thin beds of CLAY, yellow;		50	
				55	
56.5		@56.5–57ft: SANDSTONE, limonite cement;			
				60	@60ft: Thinned mud.
51.0		@62ft: clay content gradually increasing			
				65	
47.0	66.0	SILTY FINE SAND (vfg); some thin beds of SILTY CLAY; cyclically fining downward into...			
				70	
40.0		@73–74ft: CLAY, lean, white.			
39.0	74.0	FINE SAND; some very thin beds of white clay;		75	
				80	
33.0		@80ft: becoming weakly cemented with limonite.			
30.5	82.5	CLAY, semi-fat, moderate reddish brown with streaks of white.			
				85	1345, 8 Jun 92: Boring suspended @85ft. 0730–1400,9 Jun 92: Reamed borehole to 85ft with 12.5in. bit. 1400–1500: set surface casing (8in. sch.40 PVC) to 85ft. 1500–1730: pressure grouted casing with 35sx cement. 1145, 10 Jun 92: Boring resumed @85ft; 7.25in. bit.
24.0		@89–90ft: SILTY CLAY, soft, white; gradually coarsening doward; grading into...			

Ident.: TW16A Site: Millersville Landfill Proj. No.: GE3200-450 Page 3 of 4

Elev. (ft-msl)	Top (ft)	Description	Comments
			@90ft: Circulation sample.
21.5	91.5	FINE SAND, weakly cemented with limonite; some laminations of clay; clay content decreasing downward;	
19.0		@94ft: becoming finer downward; clay content increasing; grading into...	
		95	@95ft: Circulation sample.
15.0	98.0	CLAYEY SILT.	
14.0	99.0	FINE SAND (vfg).	
		100	@100ft: Circulation sample.
11.5	101.5	CLAYEY SILT.	
8.5	104.5	FINE SAND (vfg); some very thin to thin interbeds of white clay.	
		105	@105ft: Circulation sample.
5.0	108.0	CLAYEY SILT.	
		110	@110ft: Circulation sample.
0.5	112.5	FINE SAND (vfg); some very thin to thin interbeds of white clay; very gradually and cyclically coarsening downward;	
-1.0		@114.0ft: thin bed of SILTY CLAY, white;	
		115	@115ft: Circulation sample.
-3.5		@116.5ft: thin bed of SILTY CLAY, white;	
-6.0		@119.0ft: thin bed of SILTY CLAY, white;	
		120	@120ft: Circulation sample.
-9.0	122.0	SILT.	
-11.0	124.0	MEDIUM SAND; coarsening downward;	
		125	@125ft: Circulation sample.
-13.5	126.5	sharp base. SILT.	
-16.0	129.0	FINE SAND (vfg); some very thin to thin interbeds of white clay; sequence coarsens downward, clay content decreases downward;	
		130	@130ft: Circulation sample.
		@133.5ft: becoming (mg), clay-free; sharp base.	
-21.5	134.5	SILT; coarsening downward into...	
		135	@135ft: Circulation sample.
-23.0	136.0	FINE SAND (mg), rapidly coarsens downward;	
-25.0	138.0	sharp base.. SILT;	

Ident.: TW16A Site: Millersville Landfill Proj. No.: GE3200-450 Page 4 of 4

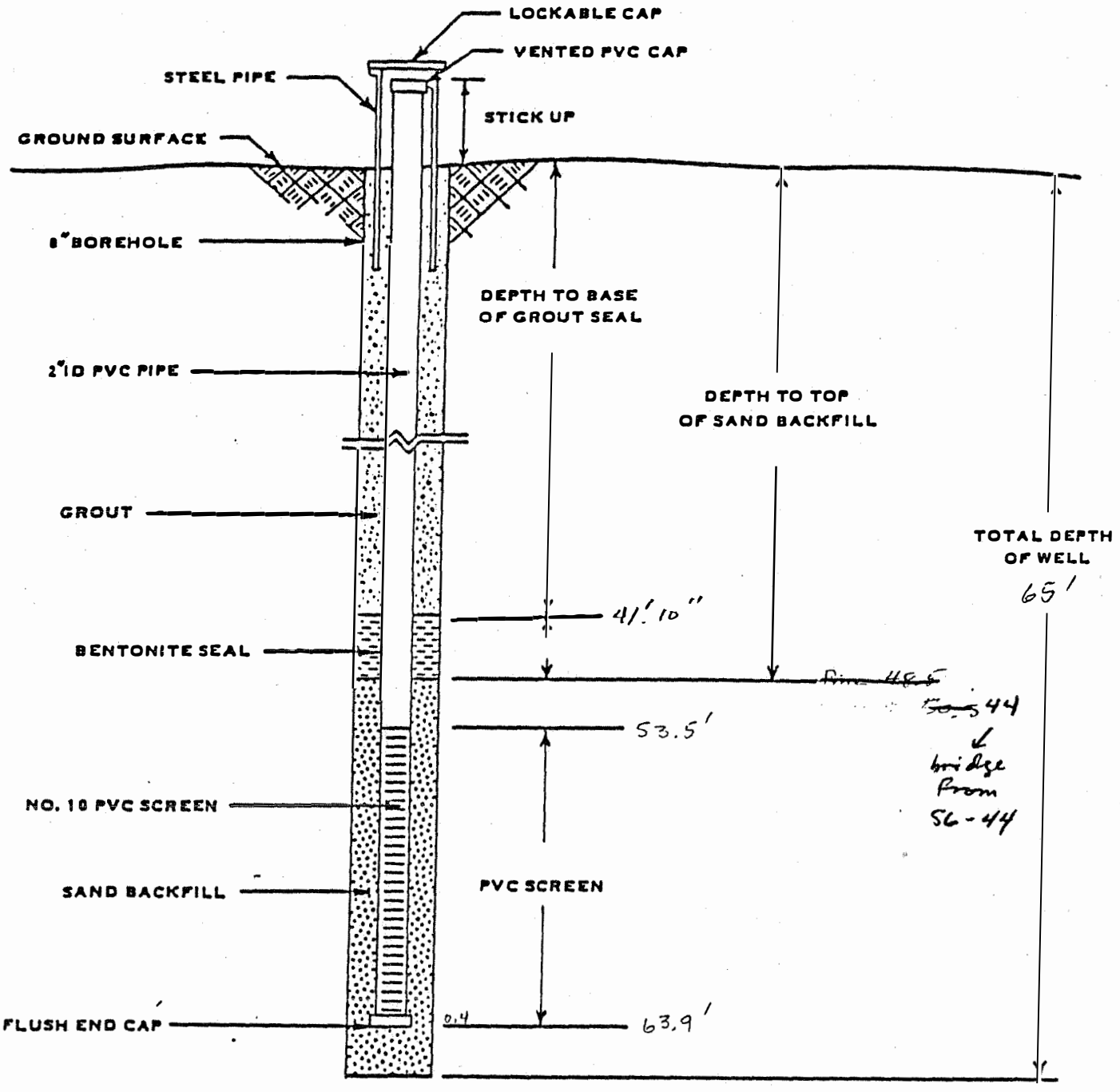
Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
					@140ft: Circulation sample.
		grading into...			
-29.0	142.0	SILTY FINE SAND (vfg) with abundant lamintations of clay; coarsening downward; clay content decreasing downward; grading into...		145	@145ft: Circulation sample.
-33.5	146.5	MEDIUM SAND, coarsening downward; clay content increasing downward, probably mud clasts.		150	@150ft: Circulation sample.
-44.0	154.0	CLAY, hard.			@154.5ft: Circulation sample.
-44.5		**Total Depth: 154.5ft.**		155	1400, 10 Jun 92: Boring terminated @154.5ft; thinned mud. 1400–1600: Ran logs (gramma ray, SP, resistivity). 1600–1700: Set well: 20ft screen, 153–133ft; footer 153.5–153ft. Well materials: 2in. sch.40 PVC; 0.020in. slotted screen; 154.5–153.5 ft: Cave in; 153.5–120.0 ft: Filter sand (no.1 Morie) (7sx); 120.0 ft–up: Medium granular bentonite (32sx).
				160	
				165	
				170	
				175	
				180	
				185	

GEOSERVICES INC. JOB NAME: Millersville Landfill JOB NO.: P1160

BY: JCW DATE: 5Oct89 SHEET: 1 OF 1

TYPE II MONITORING WELL

TW17



GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW17 SHEET 1 OF 3

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 130 ft above sea level datum (est.)

DRILLING METHOD AND EQUIPMENT 3/4" I.D. auger boring; CME continuous sampling

DATES: START 4 Oct 89 FINISH 4 Oct 89 WATER LEVEL 54.5' W.L. DATE 5 Oct 89 LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
130	0	Run 1 0-5'		5		0-0.6': well-graded clayey sand with some silt, moist, (SW) 0.6-1.7': lean clay with some silt, strong brown mottled with light gray, dry, (CL) 1.7-2.1': lean clay with ome silt; strong brown mottled with light gray, dry, (CL) 2.1-10.8': lean clay with some silt, red mottled with light gray and decreasing strong brown with depth,dry, stiff, (CL)		Run 1: TV: 18.8, 17.5 tsf PP: 4.5+ tsf
125	5	Run 2 5-10'		5				Run 2: TV: 17.5, 17.5 tsf PP: 4.5+ tsf
120	10	Run 3 10-15'		5		10.8-14.0': lean clay with silt, red mottled with light gray and strong brown and black; small amount (<5%) fine to medium sand, stiff, dry, (CL) 14.0-15.0': lean clay with some silt, red mottled with light gray and strong brown mottled with black to 14.5 ft, stiff, dry, (CL)		
115	15	Run 4 15-20'		5		15.0-28.1': lean clay with some silt, evenly mottled red and light gray, stiff, dry, (CL)		Run 4: TV: 20.8, 21.8 tsf PP: 4.5+ tsf All broken surfaces in Run 4 are oriented at 45°
110	20	Run 5 20-25'		5				
105	25	Run 6 25-30'		5		28.1-29': lean clay with some silt, gray still, dry, (CL) 29-30.5': lean clay with some silt, red and light gray (evenly mottled), stiff, dry, (CL)		Run 6: TV: 20.0, 20.8 tsf

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW17 SHEET 2 OF 3

PROJECT GB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 130 ft (est.)

DRILLING METHOD AND EQUIPMENT 3 1/4" I.D. auger boring; CME continous sampling

DATES: START 4 Oct 89 FINISH 4 Oct 89 WATER LEVEL 54.5' W.L. DATE 5 Oct 89 LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
		INTERVAL	TYPE & NUMBER	REC. (FT)	(N)	SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL		DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
100	30	Run 7 30-35'		5		30.5-35': lean clay with some silt, reddish brown mottled with gray and dark yellowish brown, stiff, dry, (CL)		
95	35	Run 8 35-40'		2.3		35-44.7': lean clay with silt, reddish brown mottled with gray and dark yellowish brown, fairly soft, slightly moist, (CL)		Run 8: TV: 15.3, 15.0, 15.3 tsf PP: 3.5, 3.6, 3.9 tsf
90	40	Run 9 40-45'		5		44.7-50': silty lean clay (40% silt, 60% clay), dark gray, hard, dry, (CL)		Run 9: TV: 17.0, 18.3 tsf PP: 4.2, 4.5+, 4.5+ tsf
85	45	Run 10 45-50'						Run 10: TV: 22.5+, 22.5+, 22.5+ tsf PP: 4.5+, 4.5+, 4.5+ tsf
80	50	Run 11 50-55'		5		50-55': silty lean clay, gray, very hard, partially cemented, dry, increasing silt content with depth, (CL)		
75	55	Run 12 55-60'		5		55-57.4': high plasticity clayey silt, cemented, gray, dry, (MH) 58-58.1': poorly-graded gravel (1/2"), sandstone, saturated, (GP)		At 58'auger refused, took split spoon sample from 58-59' then continued to auger

GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW17 SHEET 3 OF 3

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 130 ft (est.)

DRILLING METHOD ANO EQUIPMENT 3 1/4" I.D. auger boring; CME continous sampling

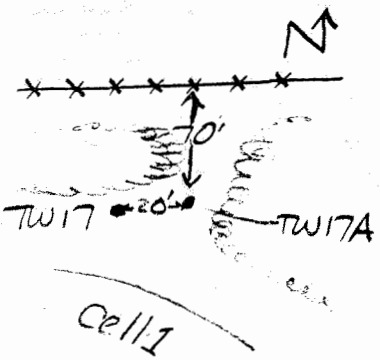
DATES: START 4 Oct 89 FINISH 4 Oct 89 WATER LEVEL 54.5' W.L. DATE 5 Oct 89 LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTER-VAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYM-BOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
						58.1-59.3': well-graded silty sand with some clay lenses, yellowish brown mottled with light gray, saturated, (SW-SM) 59.3-65': poorly-graded medium sand with silt, saturated, white mottled with yellow, (SP-SM)		Confined aquifer in Run 13: water level in well rises to about 54.5'.
70	60	Run 13 60-65'		5		44.7-50': silty lean clay (40% silt, 60% clay), dark gray, hard, dry, (CL)		
65	65							Boring terminated 65'

GEOSYNTEC CONSULTANTS
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Status: (check one)
☒ Well Installed
☐ Plugged & Abdnd.
☐ _____

Borehole Location Sketch Map



Drilling Co.: A.C. Schultes of Delaware Rig: Failing 1250
Method & Tools: Mud Rotary (Rotary table rig 2¾" rods)
Driller: Ben DeRoche Supervisor: J. Raymer
Hole Diameter: 8 3/4" Ground Elev.: _____ ☐ Surveyed ☒ Estimated
Site: Millersville Proj. No.: GE3073-42.1
Boring: TW17A Page: 1 of 3 Date: 1- May 92

Top (Depth) ☒ Feet ☐ Meters	Description	Graphic Log Depth Scale	Comments
	CLAY, tough, moderate reddish brown (10R4/6) with some very light gray (N8) and rare dark yellowish orange (10YR6/6);		0800, 1 May 92: Boring begun; $U_{watersupply}$ = 70 µmhos @16°C.
	@10ft: gradually becoming darker, with some grayish red (10R4/2) and brownish gray (5YR4/1)		
	@30ft: becoming brownish gray (5YR4/1) and medium gray (N5) with a trace of lignite		
			@40ft: circulate; U_m = 51 µmhos/cm at 15°C.

Boring: TU17A Page 2 of 3 Site: Millersville Proj.No.: GE3073-42.1

Top (Depth)	□ Feet □ Meters	Description	Graphic Log	Depth Scale	Comments
		@40ft: becoming dark gray (N3) and brownish gray (5YR 3/1)			@40ft: thinned mud; V_m = 42 µmhos/cm at 15°C.
		@42ft: becoming softer, dark olive gray (5B 3/1) with some lignite		45	@45ft: circulation sample.
		@50ft: becoming siltier downwards, lignite content increasing		50	
				55	@55ft: circulation sample.
56.3		SILT, dark gray, some clay, coarsens downward			@56.3ft: harder drilling.
		@58ft: med. bed of ironstone (Redox front); becoming mod. red. brn (10R 4/6), pale yel. or. (10YR 8/6), and v. pale or. (10YR 8/2)		60	@60ft: circulation sample; V = 42 µmhos/cm
		@59.5ft: thin bed of ironstone; then coarsens downward into...			
62		FINE SAND (fg-mg, ws, sr qtz, tr fsp);		65	@62ft: circulate, thinned mud.
				70	
		Possible thin layer of gravel (fp, wr qtz) at base.			
72.5		SILTY CLAY, white (N9) with a few laminations of mod. red. brn (10R 4/6) silt;		75	
		@73.9ft: thin bed sand; then clay content increasing to 75ft;			
		@77ft: becoming coarser downward; grading into clayey silt, yel gray (5Y 8/1);			
		@80ft: grading into interlaminated (?) sand and silt		80	
		@83ft: becoming softer, coarsening downward into...			
85		MEDIUM SAND (mg-cg, wr-sa qtz, tr fsp), coarsening downward into...		85	

Boring: TW17A Page 3 of 3 Site: Millersville Proj.No.: GE3073-42.1

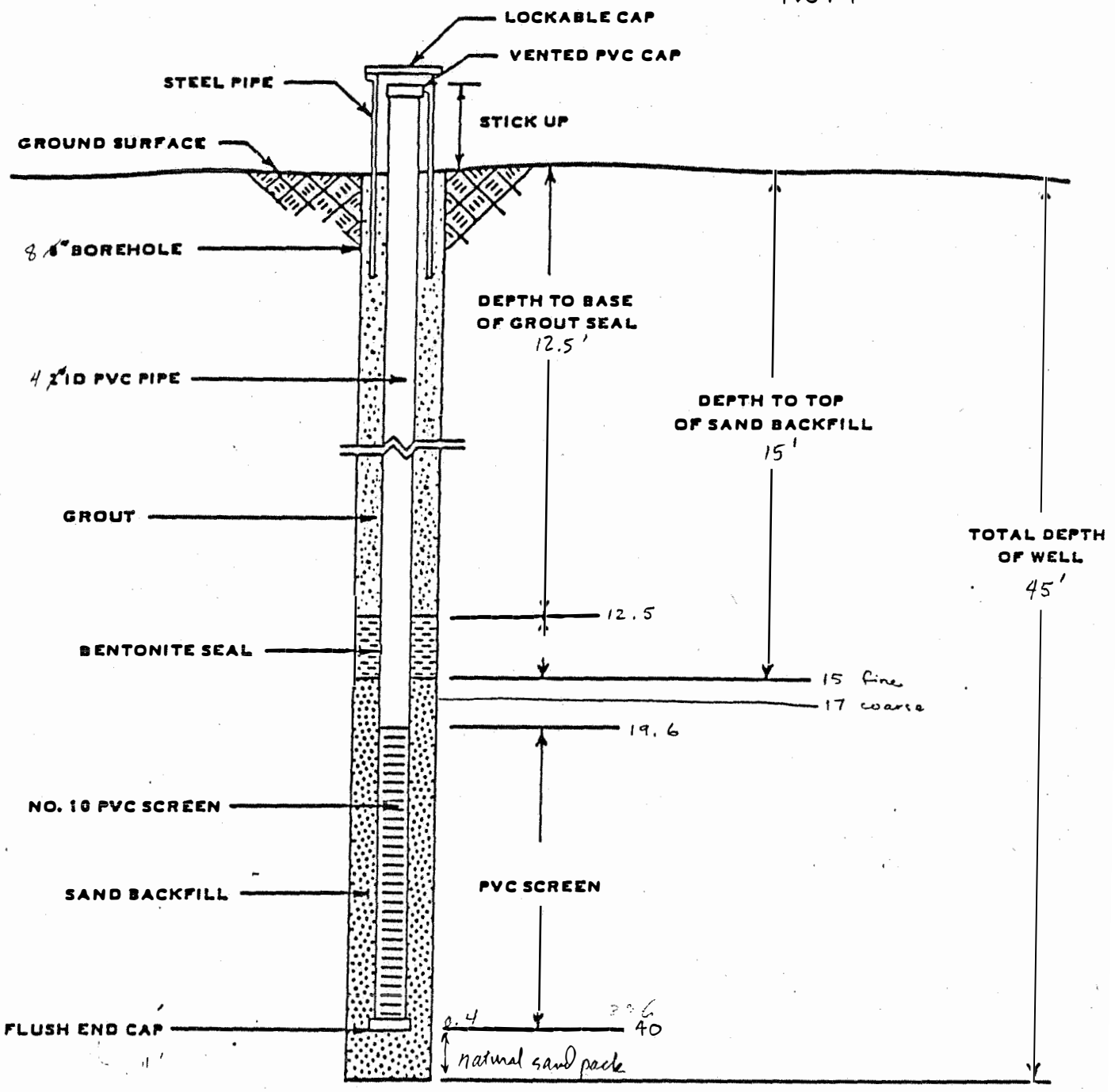
Top (Depth) □ Feet □ Meters	Description	Graphic Log	Depth Scale	Comments
	@90ft: COARSE SAND (mg-vfp, wr-a qtz, little fsp, tr garnet(?); angular grains are vel vfp).			
94.5	sharp base. CLAY, hard, mod. red. or. (10 R 6/6) and mod. red. (5 R 4/6).		95	1210, 1 May 92: Boring terminated @ 96 ft; U_m = 40 μmhos/cm at 17°C; thinned mud; U_m = 38 μmhos at 16.5°C;
	T.D. -- 98 ft		100	1230: Ran electric & gamma ray logs; 1430: attempted to set well; clays swelled at 30 ft; pulled well. 1630: shut down for evening. 0830, 2 May 92: Reamed borehole to 8 3/4 in to 98 ft deep; set well (4 in diameter, Sch. 40 flush-joint PVC) -- 95-94 ft Sump 94-84 ft screen (0.020 in slot) set annular materials -- 98-97 cave in 97-79 gravel (Morie #1, 8½ sx) 79-46 granular bentonite (10 sx) 46-4 cement (7 sx) 4-0 concrete pad

GEOSERVICES INC. JOB NAME: Millersville JOB NO.: P1160

BY: JCW DATE: 8 Oct 89 SHEET: 1 OF 1

TYPE II MONITORING WELL

TW19



GEOSERVICES INC. CONSULTING ENGINEERS

BORING LOG

PROJECT NUMBER	BORING NUMBER
P1160	TW19 SHEET 1 OF 1

PROJECT GBB/Millersville Landfill LOCATION Anne Arundel Co., MD

DRILLING Law Engineering ELEVATION 110 ft above sea level datum (est.)

DRILLING METHOD AND EQUIPMENT 6 1/4" I.D. auger boring, split spoon sampling 2' every 5'

DATES: START 8 Oct 89 FINISH 8 Oct 89 WATER LEVEL 25' W.L. DATE 8 Oct 89 LOGGER JCW

ELEV (FT)	DEPTH BELOW GROUND (FT)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE REC. (FT)	STANDARD PENETRATION TEST RESULTS (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
110	0	0-2'		1.4	1-1-1-1 (2)	0-3': well-graded sand up to medium grain size, brownish-yellow, moist, (SW)		
						3-5.2': well-graded sand with clay, moist, brownish-yellow mottled with white, (SW-SC)		
105	5	4-6'		2	2-2-6-10 (8)	5.2-9.7': low plasticity silt with clay, white and brownish yellow mottled, moist, some clay lenses, decreasing white mottling with depth, (ML)		
100	10	9-11'		1.9	2-3-7-8 (10)	9.7-10.5': fat silty clay, very slippery when wet, light gray mottled with light yellowish brown, moist, (CH)		
95	15	14-16'		2	6-9-10-7	10.5-10.7': poorly-graded fine sand with silt, brownish-yellow, fairly dry, (SP-SM)		
						14.6-19': well-graded sand, subangular, brownish-yellow, dry, (SW)		
90	20	19-21'		2	6-7-12-13	19-20': high plasticity clayey silt, light gray, moist, (MH)		
85	25	24-26'		2	4-8-25-46	20-23': poorly-graded fine to medium sand with silt, moist, light gray with some 1" thick interbedded layers of high plasticity silt, (SP-SM)		Water at 24'
80	30	29-31'		2	2-12-35-54	23-34.8': well-graded sand with silt, moist, 1-3" thick horizontal bedding of yellow and light gray, wet, (SW-SM)		
						34.8-45': well-graded sand, subrounded, saturated, weak red, (SW)		
75	35	34-36'		2	17-40-34-50			
70	40	39-41'		1	65-35/2"			
65	45							Boring terminated 45'

Technical Data

A.A. Co. Waste Management
Millersville Landfill
Well #TW 20R
AA-95-4981

ACSM Job #H5709

Table of Contents

1. Well Permit

2. Well Completion Report

3. Well "As Built"

4. Drillers Log

5. Electric Log

C 1 | 8386 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY _____ (8–13)

DATE WELL COMPLETED MM DD YY 3 5 10 (15–20)

Depth of Well 45 (22–26) (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA - 15 - 4941 (28–37)

OWNER Anne Arundel Co. (last name / first name)

STREET OR RFD 320 Dunne Crossing Rd. TOWN Severn

SUBDIVISION Millersville Landfill SECTION NW 22 Pk 30 LOT Par 0152

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Topsoil	0	1	
Clay	1	22	
Sand w/some clay	22	70	

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED (yes Y / no N)

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M D

DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: D

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y (44) / no N (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT CM (45 46) BENTONITE CLAY BC (45 46)

NO. OF BAGS 12 NO. OF POUNDS 600

GALLONS OF WATER 300

DEPTH OF GROUT SEAL (to nearest foot)

from 0 (48–52 TOP) ft. to 30 (54–58 BOTTOM) ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL; CO CONCRETE; PL PLASTIC; OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60–61)	4 (63–64)	35 (66–70)

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below

ST STEEL; BR BRASS BRONZE; PL PLASTIC; HO OPEN HOLE; OT OTHER

C 2 (1–2)

DEPTH (nearest ft.)

EACH SCREEN				
1	30 (8–9)	35 (11–15)	45 (17–21)	
2				
3				

SLOT SIZE 1 .020 2 ____ 3 ____

DIAMETER OF SCREEN 4 (56–60) (NEAREST INCH)

	from	to
GRAVEL PACK	30	45
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68		(68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING; LOG INDICATOR; OTHER DATA

C 3 (1–2)

PUMPING TEST
HOURS PUMPED (nearest hour) 6 (8–9)

PUMPING RATE (gal. per min.) 3 (11–15)

METHOD USED TO MEASURE PUMPING RATE 5 gal.

WATER LEVEL (distance from land surface)

BEFORE PUMPING 30 (17–20) ft.

WHEN PUMPING 40 (22–25) ft.

TYPE OF PUMP USED (for test)

A air (27); P piston (27); T turbine (27); C centrifugal (27); R rotary (27); O other (describe below) (27); J jet (27); S submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. S (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 5 (31–35)

PUMP HORSE POWER 1/3 (37–41)

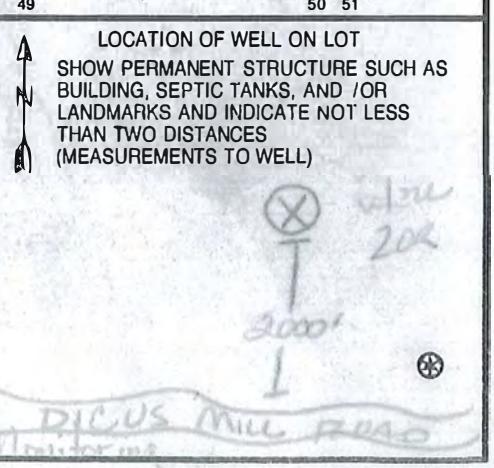
PUMP COLUMN LENGTH (nearest ft.) 42 (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)

+ (49) above / – (49) below LAND SURFACE

2 (50–51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



DENV-CR00

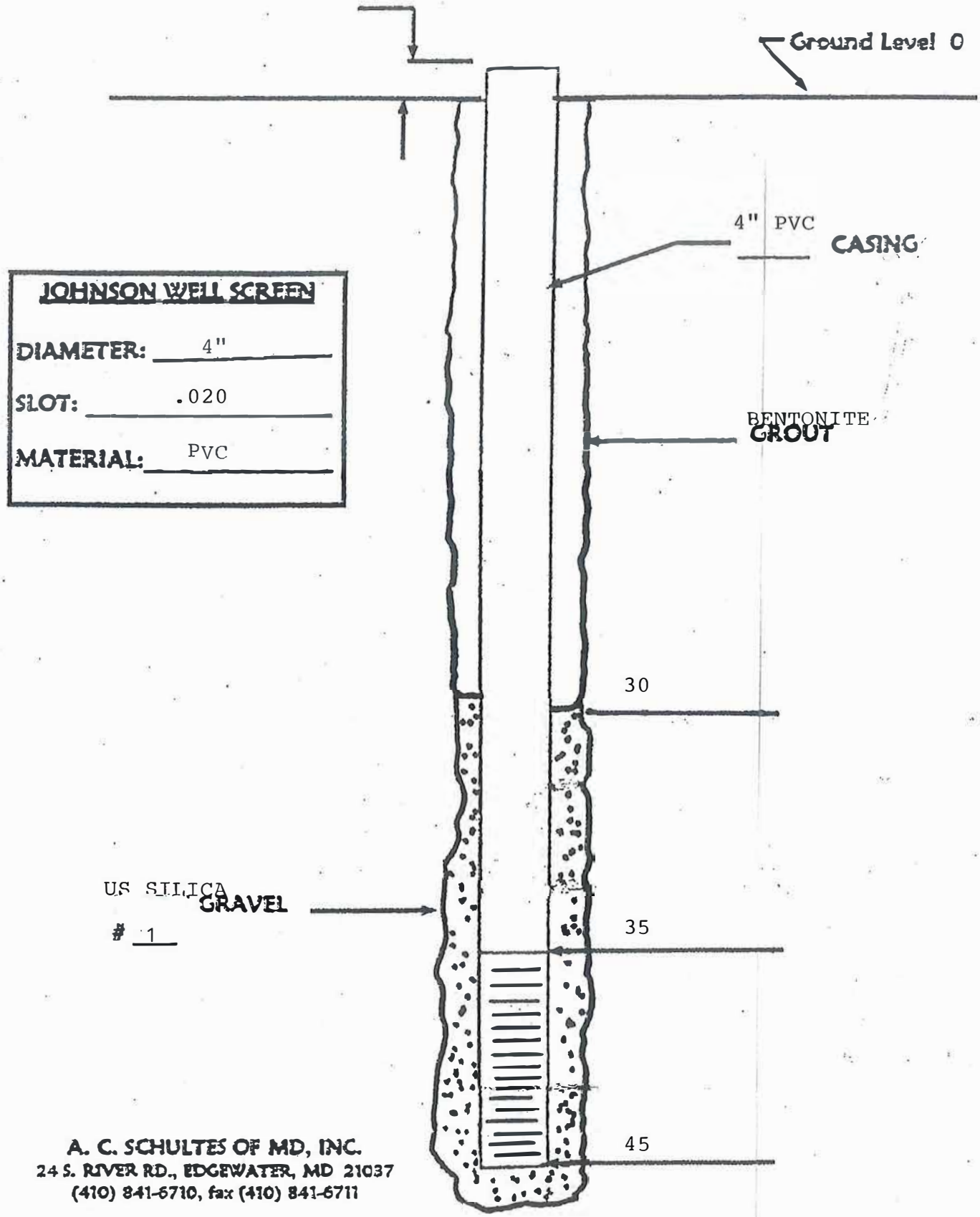
DRILLER

Anne Arundel Co.
Millersville Landfill

SINGLE CASED WELL

with 1 screen sections

AA-95-4981
TW 20R



A. C. SCHULTES OF MD, INC.
24 S. RIVER RD., EDGEWATER, MD 21037
(410) 841-6710, fax (410) 841-6711

Through the Augers

Earth Data Incorporated
131 Comet Drive, Centreville, MD 21617
Phone: (410) 758-8160 / Facsimile (410) 758-8168
www.earthdatainc.com

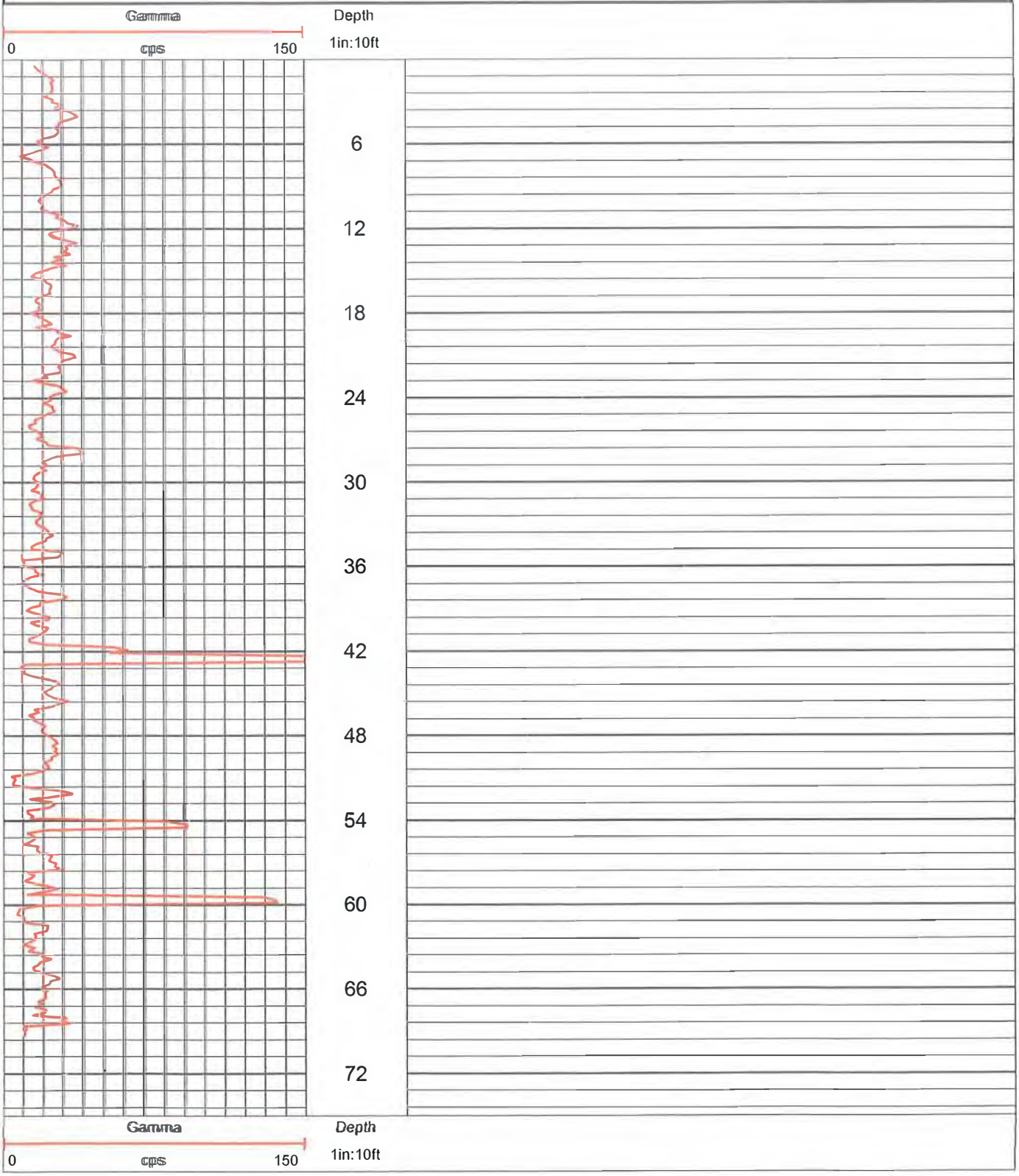
WELL I.D.
TW-20R

Logging Date: 2/4/10
Logging Speed: 20 ft/min x Up Down
BOC: NA **TD:** 79.88'

Project: A.C. Schultes of Maryland/Millersville Landfill Geo Logs
Bit Size: 8" Hollow Stem Auger
EDI Job No.: 4150-B

Client: A.C. Schultes of Maryland
Fluid Type: Open Air
Technician: JKrewson

Location: Severn, MD
GPS: N39° 05.457' W076° 39.978'
Casing Material: NA
Witness: Randall Melson



open hole

Earth Data Incorporated
131 Comet Drive, Centreville, MD 21617
Phone: (410) 758-8160 / Facsimile (410) 758-8168
www.earthdatainc.com

WELL I.D. TW-20R

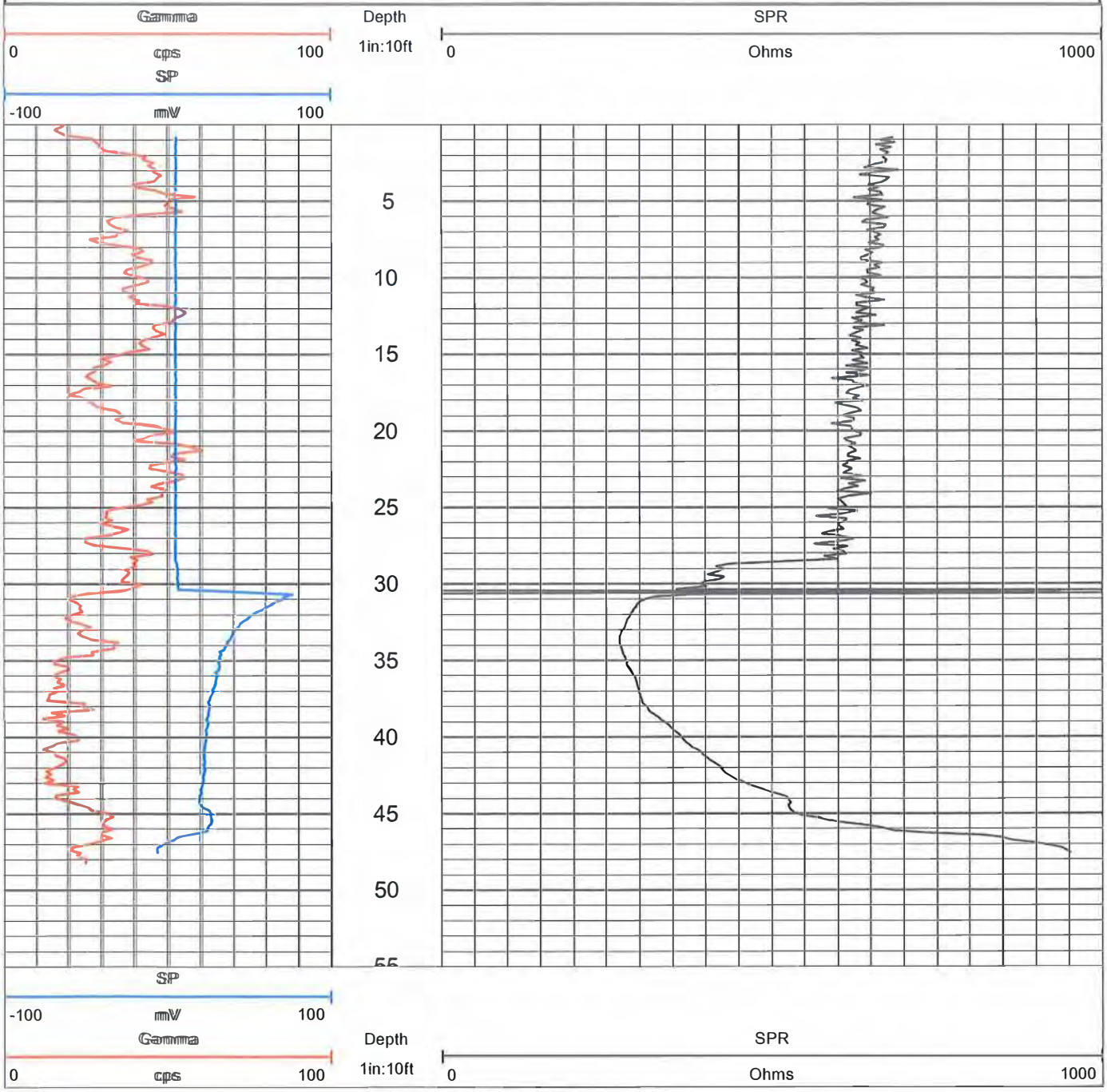
Logging Date: 2/4/10
Logging Speed: 20 ft/min x Up Down
BOC: NA **TD:** 48.9'

Project: A.C. Schultes of Maryland/Millersville Landfill Geo Logs
Bit Size: 8" Hollow Stem Auger
EDI Job No.: 4150-B

Client: A.C. Schultes of Maryland
Fluid Type: Water (SWL@30')
Technician: JKrewson

Location: Severn, MD
GPS: N39° 05.457' W076° 39.978'
Casing Material: NA
Witness: Randall Melson

Notes: Static Water Level was at 30'. No augers in hole



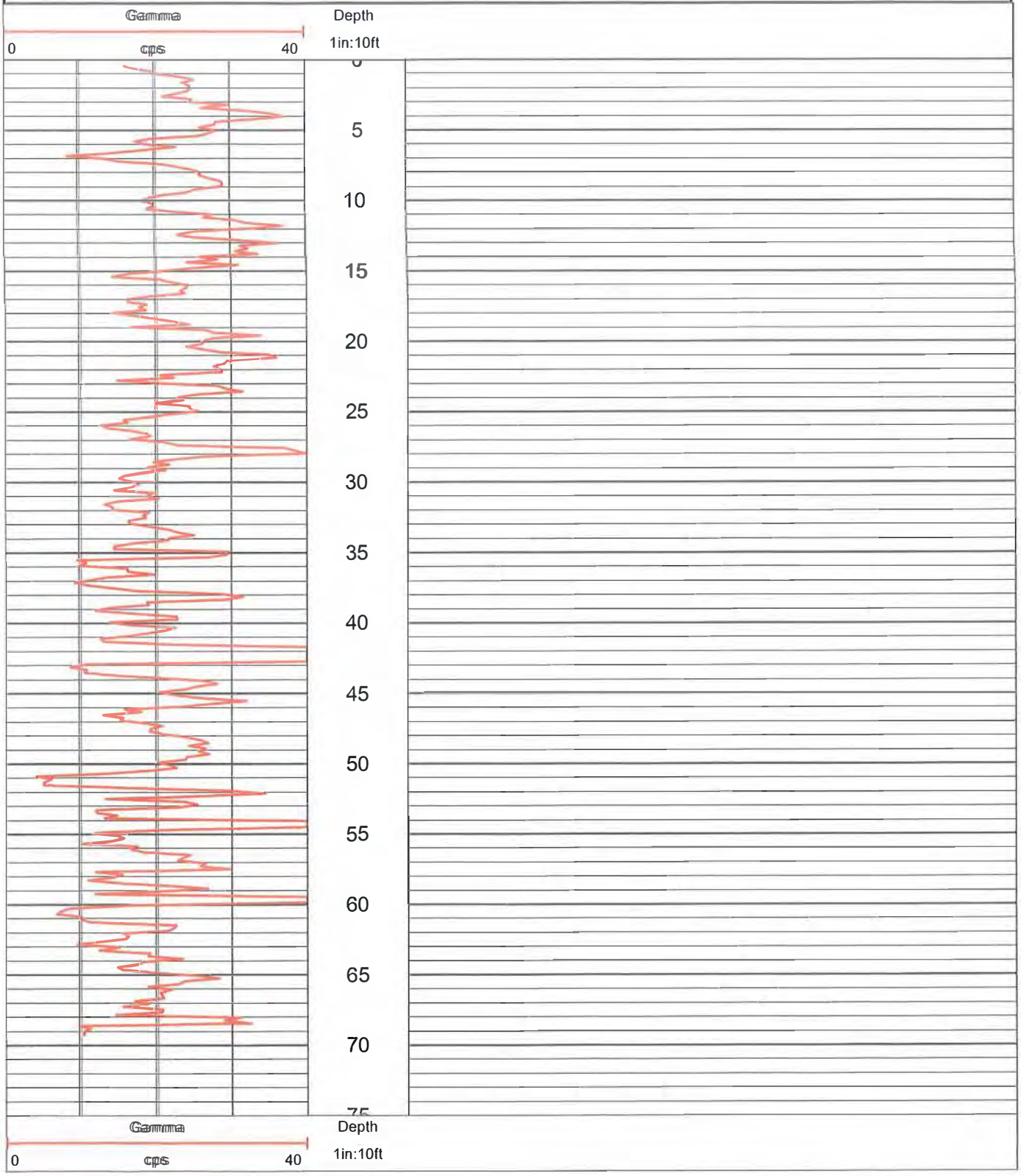
Through the Augers

Earth Data Incorporated
131 Comet Drive, Centreville, MD 21617
Phone: (410) 758-8160 / Facsimile (410) 758-8168
www.earthdatainc.com

WELL I.D.
TW-20R

Logging Date: 2/4/10
Logging Speed: 20 ft/min x Up Down
BOC: NA **TD:** 79.88'

Project: A.C. Schultes of Maryland/Millersville Landfill Geo Logs
Client: A.C. Schultes of Maryland
Location: Severn, MD
Bit Size: 8" Hollow Stem Auger
Fluid Type: Open Air
GPS: N39° 05.457' W076° 39.978'
Casing Material: NA
EDI Job No.: 4150-B
Technician: JKrewson
Witness: Randall Melson



GEOSYNTEC CONSULTANTS
5950 Live Oak Parkway, Suite 330
Norcross, Georgia

Identification: TW21 **Page** 1 **of** 3
Site: Millersville Landfill Proj. No.: GE3200-450
Client: Anne Arundel County / Northern Boundary Study

Boring Log

Date Started: 16 May 1992 Date Finished: 16 May 1992
Status: Ground-Water Monitoring Well
Total Depth: 96 ft Bit Diameter: 8.5 in.

Drilling Co.: A.C. Schultes of Delaware
Tools / Method: Mud Rotary (Kelly Drive)
Driller: Ken DeRoche Drilling Rig: Failing 1250
Supervisor: J. Raymer Reviewer: S. Shugart

Ground Elev.: 156 ft. Datum: 1929 Gen.Adj.Dat.
Horiz.: N: 459,065.3 ft E: 892,833.2 ft
Survey Company: Greenhorne & O'Mara

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
156.0		*Magothy Formation:* FINE to MEDIUM SAND (fg-cg, ms), light brown.			0810, 16 May 92: Boring begun; conductivity of the water supply: 65 µmhos/cm @15°C.
				5	@5ft: Circulation sample.
149.0	7.0	*Patapsco Formation:* SILTY CLAY, lean, white; interbedded with very thin to medium beds of FINE SAND (vfg); sequence gradually and cyclically coarsens downward;			
146.0		@10.0–11.5ft: FINE SAND (vfg-fg, ws, sr-r qtz); top and base both gradational;		10	@10ft: Circulation sample.
141.0	15.0	Coarsening downward sequence: SILT at the top, steadily grading downward into SILTY SAND and SAND; entire sequence contains clay lamination that become less abundant downward;		15	@15ft: Circulation sample.
		grading into...		20	@20ft: Circulation sample; conductivity of the drilling mud before thinning: 62 µmhos/cm @15°C; thinned mud.
135.5	20.5	FINE SAND (fg, sr qtz), very pale orange and grayish orange pink.			
				25	@25ft: Circulation sample; borehole taking much water.
				30	@30ft: Circulation sample.
122.0		@34ft: gradually becoming interlaminated with silt and clay		35	@35ft: Circulation sample.

Elev. (ft-msl)	Top (ft)	Description	Comments
			@40ft: Circulation sample; conductivity of the drilling mud: 53 µmhos/cm @15°C.
			45 @45ft: Circulation sample.
108.5		@47.5ft: medium bed of CLAY, white.	
106.0		@50 ft: sand becoming pale yellowish orange;	50
			55 @55ft: Circulation sample.
97.0		@59ft: Sequece becoming coarser downward;	
			60 @5ft: Circulation sample; borehole continuing to take much water; conductivity of the drilling mud: 52 µmhos/cm @15°C.
			65 @65ft: Circulation sample.
91.0		@65ft: Thick bed of CLAYEY SILT;	
93.0		@67ft: Sequence becoming gradually finer downwards;	
			70 @70ft: Circulation sample.
85.0		@71ft: Medium bed of SILTY CLAY, white;	
83.0		@73ft: Medium bed of SILTY CLAY, pink;	
			75 @75ft: Circulation sample.
80.0	76.0	SILTY CLAY, white with streaks of grayish red;	
76.0		@80ft: becoming coarser downwards;	80 @80ft: Circulation sample; conductivity of the drilling mud: 70 µmhos/cm @15°C.
74.0	82.0	MEDIUM SAND (mg-vcg), little limonitic cement; coarsening downwards.	
			85 @86ft: Circulation sample.

Ident.: TW21 Site: Millersville Landfill Proj. No.: GE3200-450 Page 3 of 3

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
				95	@90ft: Circulation sample.
60.0	96.0	SANDSTONE, limonite cement.			1030, 16 May 92: Boring terminated @96ft; bottom-hole circulation sample thinned mud; 1045: Ran logs (gamma ray, SP, resistivity).
		Total Depth: 96ft.			1130: Set well: 10ft of screen, 93–83ft; 1ft bottom plug, 94–93ft.
					Well materials: 4in. sch.40 PVC, 0.020in. slotted screen;
				100	96–94 ft: Cave in; 94–79 ft: Filter sand (no.1 Morie) (7sx); 79–35 ft: Medium granular bentonite (14sx); 35–03 ft: Cement.
					21 May 92: Developed well by airlift method.
					26 Jun 92: Redeveloped well by swab and pump method.
				105	
				110	
				115	
				120	
				125	
				130	
				135	

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia

Identification: TW21A **Page** 1 **of** 2

Site: Millersville Landfill Proj. No.: GE3200-450

Client: Anne Arundel County / Northern Boundary Study

Boring Log

Date Started: 16 May 1992 Date Finished: 16 May 1992

Status: Ground-Water Monitoring Well

Total Depth: 71 ft Bit Diameter: 8.5 in.

Drilling Co.: A. C Schultes of Delaware

Tools / Method: Mud Rotary (Kelly Drive)

Driller: Ken DeRoche Drilling Rig: Failing 1250

Supervisor: J. Raymer Reviewer: S. Shugart

Ground Elev.: 157 ft. Datum: 1929 Gen.Adj.Dat.

Horiz.: N: 459,073.9 ft E: 892,836.6 ft

Survey Company: Greenhorne & O'Mara

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
157.0		*Magothy Formation:* FINE to MEDIUM SAND (fg-cg, ms), light brown.		5	1330, 16 May 92: Boring begun; Note: See the log for TW21 for data regarding samples and geophysical logging; no differences were noted during drilling between TW21 and TW21A.
149.0	7.0	*Patapsco Formation:* SILTY CLAY, lean, white; interbedded with very thin to medium beds of FINE SAND (vfg); sequence gradually and cyclically coarsens downward;		10	
147.0		@10.0--11.5ft: FINE SAND (vfg-fg, ws, sr-r qtz); top and base both gradational;		15	
141.0	15.0	Coarsening downward sequence: SILT at the top, steadily grading downward into SILTY SAND and SAND; entire sequence contains clay lamination that become less abundant downward;		20	
135.5	20.5	grading into... FINE SAND (fg, sr qtz), very pale orange and grayish orange pink.		25	
		@34ft: gradually becoming interlaminated with silt and clay		30	
				35	

Ident.: TW21A Site: Millersville Landfill Proj. No.: GE3200-450 Page 2 of 2

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
109.5		@47.5ft: medium bed of CLAY, white.		45	
107.0		@50 ft: sand becoming pale yellowish orange;		50	
98.0		@59ft: Sequence becoming coarser downward;		55	
92.0		@65ft: Thick bed of CLAYEY SILT;		60	
90.0		@67ft: Sequence becoming gradually finer downwards;		65	
86.0		**Total Depth: 71ft.**		70	1400, 16 May 92: Boring terminated @71ft; thinned mud; 1430: Set well: 10ft of screen, 70–50ft; 1ft bottom plug, 71–70ft. Well materials: 4in. sch.40 PVC, 0.020in. slotted screen; 71–45 ft: Filter sand (no.1 Morie) (8sx); 45–35 ft: Medium granular bentonite (14sx); 35–03 ft: Cement (12sx). 21 May 92: Developed well by airlift method. 26 Jun 92: Redeveloped well by swab and pump method.
				75	
				80	
				85	

GEOSYNTEC CONSULTANTS
5950 Live Oak Parkway, Suite 330
Norcross, Georgia

Identification: TW22 (K-8) Page 1 of 4
Site: Millersville Landfill Proj. No.: GE3200-450
Client: Anne Arundel County / Northern Boundary Study

Boring Log

Date Started: 28 May 1992 Date Finished: 2 June 1992
Status: Ground-Water Monitoring Well
Total Depth: 148 ft Bit Diameter: see notes

Drilling Co.: A.C. Schultes of Delaware
Tools / Method: Mud Rotary (Kelly Drive)
Driller: Ken DeRoche Drilling Rig: Failing 1250
Supervisor: J. Raymer Reviewer: S. Shugart

Ground Elev.: 187 ft. Datum: 1929 Gen.Adj.Dat.
Horiz.: N: 460,942.4 ft E: 894,669.7 ft
Survey Company: Greenhorne & O'Mara

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
186.0		FINE SAND (fg-mg); coarsens downward;			1430, 28 May 92: Boring began; 7.5in bit; Quick Gel added to drilling water to prevent landfill gas from Cell 2 from circulating upward. Samples of fine sands and silts very poor due to thick drilling mud. Compare with J13 for more detail.
				5	
179.0	8.0	GRAVELLY SAND (mg-fp, few cp, ps); coarsening downward to 12ft.			
				10	
175.0	12.0	FINE SAND, fining downward, becoming interbedded with clay;			@12ft: slower drilling.
173.0	14.0	grading into... SILT, light yellowish gray, with some dark yellowish gray, and some grayish pink.		15	
168.0	19.0	CLAY, light gray		20	@20ft: Hole caving in from above; probably large gravels.
165.0	22.0	SILT, pale red.		25	
161.0	26.0	CLAY, red.			@26ft: Clay difficult to cut
157.0	30.0	SILT.		30	
				35	
151.5	35.5	FINE SAND.			
149.5	37.5	CLAY.			

TW-22 (K-8)

Ident.: ~~TW22B (K8B)~~ Site: Millersville Landfill Proj. No.: GE3200-450 Page 2 of 4

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
146.5	40.5	FINE SAND.			
144.0	43.0	CLAY.			@44ft: Mud very thick, poor recovery of cuttings; (Mud kept thick and heavy to prevent gas from circulating up.)
142.5	44.5	FINE SAND.		45	
				50	
				55	
				60	@59ft: Thinned mud somewhat.
				65	
				70	
115.0	72.0	SILTY CLAY, light gray with a little yellow orange pink.		75	
		@80.0ft: becoming red and white CLAY.		80	1650, 28 May 92: Boring suspended @79ft. 0900-1230, 29 May 92: Reamed borehole to 12.5in. 1230-1300: Ran logs (gamma ray, SP, resistivity). 1300-1500: Set 8in. surface casing to 78ft. 1530-1830: Cemented surface casing with 36sx cement. 0800-0900, 2 June 92: Flushed surface casing with clean water. 0900: Boring resumed @79 ft; 7.5in. bit.
104.0	83.0	FINE to MEDIUM SAND, grayish orange, some grains with limonitic coatings; rare laminations of white CLAY.		85	@85ft: Circulation sample.
					@90ft: Circulation sample.

TW-22 (K-8)

Ident.: ~~TW22B (K8B)~~ Site: Millersville Landfill Proj. No.: GE3200-450 Page 3 of 4

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
				95	@95ft: Circulation sample.
				100	@100ft: Circulation sample.
				105	@105ft: Circulation sample.
				110	@110ft: Circulation sample.
				115	@115ft: Circulation sample. @115-118ft: Slower drilling.
				120	@120ft: Circulation sample.
64.0	123.0	SILTY CLAY, grayish orange pink;			
				125	@125ft: Circulation sample.
		@127.0ft: gradually becoming coarser downward;			@127ft: Harder drilling.
58.0	129.0	sharp base. ~~FINE SAND; gradually coarsening downward.~~			
				130	@130ft: Circulation sample.
				135	@135ft: Circulation sample.
					@140ft: Circulation sample.

Ident.: TW22 (K8) Site: Millersville Landfill Proj. No.: GE3200-450 Page 4 of 4

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
		@144.0-144.5ft: limonitic sandstone.		145	@145ft: Circulation sample.
41.5	145.5	CLAY, moderate reddish orange.			
39.0		**Total Depth: 148ft.**			@148ft: Circulation sample. 1130, 2 Jun 92: Boring terminated @148ft; borehole taking much water. 1130-1230: Ran logs (gamma ray, SP, resistivity, fluid resistivity, temperature); 1230: Set well; screen @145-135ft. Well material: 4in. sch. 40 PVC, 0.020in. slot screen. 148 - 147 ft: Cave in. 147 - 130 ft: Filter sand (no. 1 Morie) (4sx). 130 - 004 ft: Medium granular bentonite (32sx). 11 Jun 92: Well developed using swab and electric submersible pump.
				150	
				155	
				160	
				165	
				170	
				175	
				180	
				185	

EMERGENCY/TEMP NO. IF ANY

B 1 | 9930 | SEQUENCE NO. (DP USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please print or type

STATE PERMIT NUMBER: AA-88-7686
fill in this form completely

Date Received (APA): 04/06/92 (02)

OWNER INFORMATION
ANNE ARUNDEL COUNTY
Last Name — Owner — First Name
MILLERSVILLE LANDFILL
Street or RFD
MILLERSVILLE MD 21144
Town — State — Zip

DRILLER INFORMATION
TIMOTHY PARKS — MWD 506
Driller's Name — License No.
A.C. SCHULTES OF DELAWARE, INC.
Firm Name
P.O. BOX 188, BRIDGEVILLE, DE 19933
Address
Signature — 4/2/92 Date

WELL INFORMATION
APPROX. PUMPING RATE (GAL. PER MIN.): N/A
AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): N/A

USE FOR WATER (CIRCLE APPROPRIATE BOX)
- D — HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- F — FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)
- I — INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)
- P — PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE HEALTH DEPARTMENT APPROVAL)
- **T** — TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT) — GAS MONITORING WELL

APPROXIMATE DEPTH OF WELL: 30 FEET

APPROXIMATE DIAMETER OF WELL: 4" ~~ID BORE HOLE~~ NEAREST INCH

METHOD OF DRILLING (circle one)
BORED (or Augered) — JETTED — Jetted & DRIVEN
AIR-ROTary — AIR-PERcussion — ROTARY (Hydraulic Rotary)
CABLE — REVerse-ROTary — DRive-POINT
other: HYDROPUNCH

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)
- **N** — THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y — THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- S — THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- D — THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENDED (IF AVAILABLE)

Not to be filled in by driller (OEP USE ONLY)
APPROP. PERMIT NUMBER: GAP
FORCE: LR (WRITE INITIALS IN BOX) PERMIT No. AA-88-7686

SPECIAL CONDITIONS

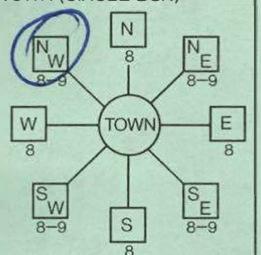
B 3 — LOCATION OF WELL

TW-22

ANNE ARUNDEL — 8 COUNTY
23 SUBDIVISION
SECTION — LOT
MILLERSVILLE — 52 NEAREST TOWN
MILES FROM TOWN (enter 0 if in town): 2 MI

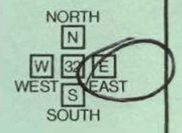
B 4

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)



BURNS CROSSING — NEAR WHAT ROAD

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)

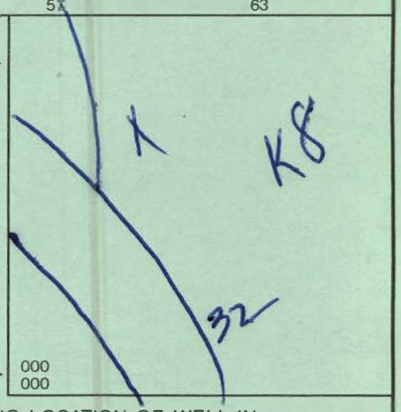


DISTANCE FROM ROAD: 2000
ENTER FT or MI: FT

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

COUNTY NAME: AA — COUNTY NO.: 02
STATE SIGNATURE — INSERT S
DATE ISSUED: 04/07/92 — L Rose — CO SIGNATURE — EXP. DATE
NORTH GRID: 457000 — EAST GRID: 089400

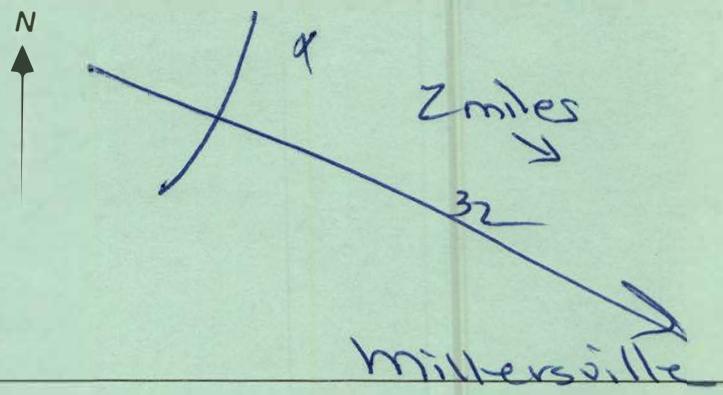
SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X



SOURCES OF DRILLING WATER
1.
2.
3.

WRITE THE BOX NUMBER FROM THE MAP HERE
E 890
N 450
000 000

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



ORIGINAL

C 1 | 0474 | SEQUENCE NO. (DENV USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

-ST/CO USE ONLY
DATE Received FEB 1 9 1993

DATE WELL COMPLETED 06 02 92

Depth of Well 146 (TO NEAREST FOOT)

TW-22

K8

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-818-7686

OWNER Anne Arundel Co.

STREET OR RFD Millersville Landfill (last name) (first name) TOWN Millersville

SUBDIVISION ____ SECTION ____ LOT ____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Topsoil	0	1	
Sand w/gravel	1	14	
Yellow+White Sand w/Clay	14	44	
Fine Tan Sand	44	72	
Red+White Clay	72	83	
Fine Med. Tan Sand	83	90	
Fine-Med. Sand	90	123.8	
White+Yellow Clay	123.8	129	
Med. Tan Sand	129	144	
Hard Layer	144	144.6	
Orange Red Clay	144.6	148	

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y no N

TYPE OF GROUTING MATERIAL

CEMENT CM BENTONITE CLAY BC

NO. OF BAGS 32 NO. OF POUNDS 1600

GALLONS OF WATER 800

DEPTH OF GROUT SEAL (to nearest foot)

from 0 ft. to 130 ft. (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

STEEL ST | CONCRETE CO | PLASTIC PL | OTHER OT

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	8	78

OTHER CASING (if used) — EACH CASING

	diameter inch	depth (feet) from	to
PL	4	78	136

SCREEN RECORD
screen type or open hole insert appropriate code below

STEEL ST | BRASS BR | BRONZE | OPEN HOLE HO | PLASTIC PL | OTHER OT

C 2

EACH SCREEN	DEPTH (nearest ft.)	
1	PL 136	146
2		
3		

SLOT SIZE 020

DIAMETER OF SCREEN 4 (NEAREST INCH)

GRAVEL PACK from 130 to 146

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

C 3

PUMPING TEST
HOURS PUMPED (nearest hour)

PUMPING RATE (gal. per min. to nearest gal.)

METHOD USED TO MEASURE PUMPING RATE

WATER LEVEL (distance from land surface)

BEFORE PUMPING

WHEN PUMPING

TYPE OF PUMP USED (for test)

A air | P piston | T turbine | C centrifugal | R rotary | O other (describe below) | J jet | S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE:

CAPACITY: GALLONS PER MINUTE (to nearest gallon)

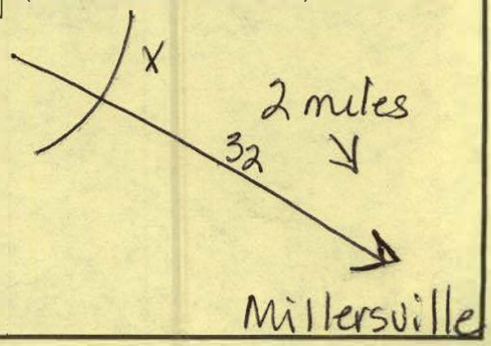
PUMP HORSE POWER

PUMP COLUMN LENGTH (nearest ft.)

CASING HEIGHT (circle appropriate box and enter casing height)

+ above / − below LAND SURFACE 3 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



CIRCLE APPROPRIATE LETTER

A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE

DRILLERS IDENT. NO. 506

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION) Jim Parker

SITE SUPERVISOR (sign if driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (TELESCOPE CASING) | (E.R.O.S.) (LOG INDICATOR) | W Q (OTHER DATA)

ORIGINAL

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia

Identification: TW22A (K8A) Page 1 of 3

Site: Millersville Landfill Proj. No.: GE3200-450

Client: Anne Arundel County / Northern Boundary Study

Boring Log

Date Started: 3 June 1992 Date Finished: 4 June 1992

Status: Doubly Cased Ground-Water Monitoring Well

Total Depth: 120 ft Bit Diameter: see notes

Drilling Co.: A.C. Schultes of Delaware

Tools / Method: Mud Rotary (Kelly Drive)

Driller: Ken DeRoche Drilling Rig: Failing 1250

Supervisor: J. Raymer Reviewer: S. Shugart

Ground Elev.: 186 ft. Datum: 1929 Gen.Adj.Dat.

Horiz.: N: 460,950.4 ft E: 894,680.2 ft

Survey Company: Greenhorne & O'Mara

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
186.0		FINE SAND (fg-mg), grayish orange; coarsens downward;		5	1100, 3 Jun 92: Boring began; 7.25in bit. Offset boring, see K8 for more detail. Quick Gel added to drilling water in order to control circulation of landfil gas emanating from Cell 2.
178.0	8.0	CLAY, red and white.		10	
				15	
				20	
				25	
				30	
				35	
150.0		@36ft: medium bed of GRAVELLY SAND.			

Elev. (ft-msl)	Top (ft)	Description	Comments
143.0	43.0	FINE to MEDIUM SAND, very pale orange to grayish orange.	
114.0	72.0	SILTY CLAY, very light gray with streaks of moderate red.	1300: Boring suspended @73ft. 1300-1700: Reamed borehole to 73ft with 12.5in bit. 1700-1930, 3 Jun 92: Set 8in. surface casing (sch.40 PVC); grouted with 32sx of cement. 0930-1030, 4 Jun 92: Flushed casing with new water. 1100: Boring resumed with 7.25in bit.
106.0		@80.0ft: becoming red and white CLAY.	
103.0	83.0	FINE to MEDIUM SAND, grayish orange, some grains with limonitic coatings; rare laminations of white CLAY.	

Graphic Log

Scale (ft)

45

50

55

60

65

70

75

80

85

Ident.: TW22A (K8A) Site: Millersville Landfill Proj. No.: GE3200-450 Page 3 of 3

Elev. (ft-msl)	Top (ft)	Description	Graphic Log	Scale (ft)	Comments
				95	
				100	
				105	
				110	
				115	
66.0		**Total Depth: 120ft.**		120	1230, 4 Jun 92: Boring terminated @120ft; 1230–1300: Set well; screen 120–100 ft. Well materials: 4in. sch. 40 PVC, 0.020in. slot screen. 120–95 ft: Filter sand (no.1 Morie). 95–05 ft: Medium granular bentonite. 11 Jun 92: Well developed using swab and electric submersible pump.
				125	
				130	
				135	

EMERGENCY/TEMP NO. IF ANY

B 1 · 9823 SEQUENCE NO. (DP USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please print or type

STATE PERMIT NUMBER: AA-88-7502
fill in this form completely

Date Received (APA): 02 19 92 (03)

OWNER INFORMATION
ANNE ARUNDEL COUNTY
Last Name / Owner / First Name
MILLERS VILLE LAN DFILL
Street or RFD
MILLERS VILLE MD 21144
Town / State / Zip

DRILLER INFORMATION
MWD
Timothy Parks
Driller's Name
5 0 6 License No.
A. C. Schultes of Delaware, Inc.
Firm Name
P.O. Box 188, Bridgeville, DE 19933
Address
Timothy Parks 2/12/92
Signature / Date

LOCATION OF WELL
TW-22B
ANNE ARUNDEL
COUNTY
SUBDIVISION
SECTION LOT
MILLERSVILLE
NEAREST TOWN
MILES FROM TOWN (enter 0 if in town): 2 MI

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)
NW N NE W TOWN E SW S SE

BURNS CROSSING
NEAR WHAT ROAD

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)
NORTH W 32 E WEST EAST SOUTH

2000 DISTANCE FROM ROAD
ENTER FT or MI: FT

WELL INFORMATION
APPROX. PUMPING RATE (GAL. PER MIN.): n/a
AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): n/a

USE FOR WATER (CIRCLE APPROPRIATE BOX)
- D HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- F FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)
- I INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)
- P PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE HEALTH DEPARTMENT APPROVAL)
- T X TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT) GAS MONITORING WELL

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

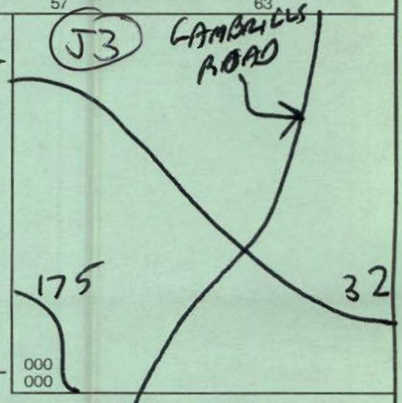
AA — COUNTY NAME
02 — COUNTY NO.
STATE SIGNATURE
INSERT S
DATE ISSUED 02 19 92
Kerry Esposito — CO SIGNATURE
EXP. DATE
NORTH GRID 456000
EAST GRID 089200

APPROXIMATE DEPTH OF WELL: 30 FEET

APPROXIMATE DIAMETER OF WELL: 4" ~~ID Bore Hole~~ NEAREST INCH

METHOD OF DRILLING (circle one)
BORED (or Augered) JETTED Jetted & DRIVEN
AIR-ROTary AIR-PERcussion ROTARY (Hydraulic Rotary)
CABLE REVerse-ROTary DRive-POINT
other

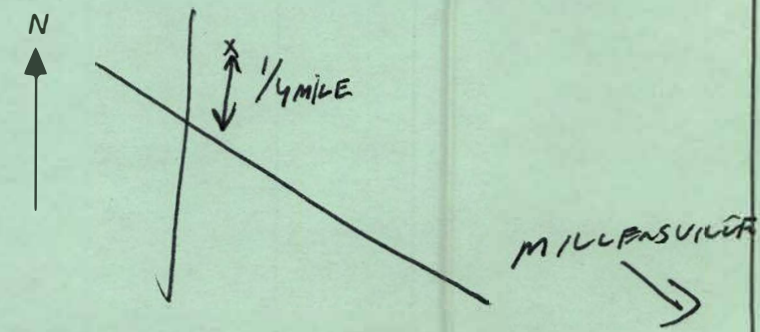
SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X



SOURCES OF DRILLING WATER
1. n/a
2.
3.

WRITE THE BOX NUMBER FROM THE MAP HERE
E 890
N 450

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)
- N X THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- D THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENDED (IF AVAILABLE)

Not to be filled in by driller (OEP USE ONLY)

APPROP. PERMIT NUMBER: GAP
FORCE KT (WRITE INITIALS IN BOX) PERMIT No. AA-88-7502

SPECIAL CONDITIONS

ORIGINAL

C 1 | 7590 | SEQUENCE NO. (DENV USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER **TW-22B**

ST/CO USE ONLY
DATE Received FEB X 9 1993

DATE WELL COMPLETED 06 12 92

Depth of Well 77 (TO NEAREST FOOT)

K&B

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA - 88 - 7502

OWNER ANNE ARUNDEL CO.
STREET OR RFD MILLERSVILLE LANDFILL (last name) (first name) TOWN MILLERSVILLE
SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Fine Sand	0	16	
Silt	16	37	
Fine Sand	37	42	
Silty Clay	42	52	
Fine Sand	52	71.5	
Clay	71.5	75.5	
Silty Clay	75.5	77	

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y no N
TYPE OF GROUTING MATERIAL
CEMENT CM BENTONITE CLAY BC
NO. OF BAGS 4 NO. OF POUNDS 400
GALLONS OF WATER 24
DEPTH OF GROUT SEAL (to nearest foot)
from 5 ft. TOP to 48 ft. BOTTOM (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	67

OTHER CASING (if used) EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below
ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C 2

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	67	77
2			
3			

SLOT SIZE 020
DIAMETER OF SCREEN 4 (NEAREST INCH)

GRAVEL PACK from 64 to 77
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

C 3

PUMPING TEST
HOURS PUMPED (nearest hour)
PUMPING RATE (gal. per min. to nearest gal.)
METHOD USED TO MEASURE PUMPING RATE
WATER LEVEL (distance from land surface)
BEFORE PUMPING
WHEN PUMPING

TYPE OF PUMP USED (for test)
A air P piston T turbine C centrifugal R rotary O other (describe below) J jet S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE:
CAPACITY: GALLONS PER MINUTE (to nearest gallon)
PUMP HORSE POWER
PUMP COLUMN LENGTH (nearest ft.)
CASING HEIGHT (circle appropriate box and enter casing height) + above – below LAND SURFACE 2 (nearest foot)

CIRCLE APPROPRIATE LETTER
A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
P TEST WELL CONVERTED TO PRODUCTION WELL

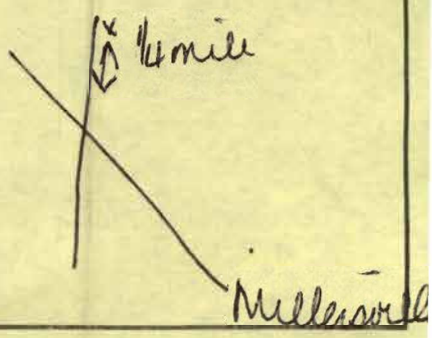
I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE

DRILLERS IDENT. NO. 506

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)
Jim Parks/dg

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W Q
TELESCOPE CASING | LOG INDICATOR | OTHER DATA

ORIGINAL

A.C. Schultes
INFLUENT TO EFFLUENT
OVER 90 YEARS
EST. 1921

TECHNICAL DATA
ANNE ARUNDEL COUNTY
MILLERSVILLE LANDFILL
JOB # H6715
WELL PERMIT # AA-13-0563
WELL # 23R
06/09/14

Established in 1921

Serving your needs in the Mid-Atlantic Region

A.C SCHULTES, INC.
664 S. Evergreen Avenue
Woodbury, NJ 08096
(856) 845-5656
(856) 845-1335 FAX

A.C. SCHULTES OF MARYLAND, INC.
8221 Cloverleaf Dr.
Millersville , MD 21108
(410) 841-6710
(410) 841-6711 FAX

A.C. SCHULTES OF CAROLINA, INC.
3887 S. NC 41
Wallace, NC 28466
(910) 285-7465
(910) 285-6501 FAX

A.C. SCHULTES OF DELAWARE, INC.
16289 Sussex Highway
Bridgeville, DE 19933
(302) 337-8254
(302) 337-8234 FAX

A.C. SCHULTES OF FLORIDA
11865 Highway 41 South
Gibsonton, FL 33534
(813) 741-3010
(813) 741-3170 FAX

TECHNICAL DATA
ANNE ARUNDEL COUNTY
MILLERSVILLE LANDFILL
JOB # H6715
WELL PERMIT # AA-13-0563
WELL # 23R
06/09/14

Table of Contents

1. Well Permit
2. Well Completion Report
3. Well "As Built"
4. Electric Log

EMERGENCY/TEMP NO. IF ANY 9100-0007-3661

B 1 | 24731 | SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please type

STATE PERMIT NUMBER AA-13-0563

fill in this form completely

Date Received (APA) 4/9/14

OWNER INFORMATION

Anne Arundel County
Last Name — Owner — First Name

3 1 4 Town Center Road
Street or RFD

Millersville MD 21144
Town — State — Zip

DRILLER INFORMATION

Travis D. Hartman MD D 17
Driller's Name — License No.

A.C. Schultes of MD, Inc.
Firm Name

8321 Clairmont Dr. Millersville
Address

Signature — Date 4/8/14

B 2 WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.) - N.A. -

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY) - N.A. -

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- [D] DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- [F] FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)
- [I] INDUSTRIAL, COMMERCIAL, DEWATERING
- [P] PUBLIC WATER SUPPLY WELL
- [T] TEST, OBSERVATION, MONITORING
- [O] OPEN LOOP GEOTHERMAL
- [C] CLOSED LOOP GEOTHERMAL

APPROXIMATE DEPTH OF WELL 200 FEET

APPROXIMATE DIAMETER OF WELL 4" NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered) — JETTED — Jetted & DRIVEN
AIR-ROTary — AIR-PERcussion — ROTARY (Hydraulic Rotary)
CABLE — REVerse-ROTary — DRive-POINT
other

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)

- [N] THIS WELL WILL NOT REPLACE AN EXISTING WELL
- [Y] THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- [S] THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- [D] THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE)

Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER ----G---

PERMIT No. AA-13-0563

B 3 LOCATION OF WELL

AA. Co
COUNTY

Millersville Landfill
SUBDIVISION

SECTION — LOT

Millersville
NEAREST TOWN

B 4

SOURCES OF DRILLING WATER
1.
2.
3.

399 Evans Crossing
STREET ADDRESS

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)
NORTH [N] WEST [W] [E] EAST [S] SOUTH

120 DISTANCE FROM ROAD FT
ENTER FT OR MI

TAX MAP: 32 BLK: 20 PARCEL 167

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

AA — 02
COUNTY NAME — COUNTY NO.

STATE SIGNATURE — INSERT S

DATE ISSUED 4/9/14 — CO SIGNATURE — EXP. DATE 4/9/15

PROPOSED LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES SUCH AS BUILDINGS, SEPTIC SYSTEM, ROADS AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCE MEASUREMENTS TO WELL

SPECIAL CONDITIONS
NOTE: APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED

Monitoring Well

MDE/WMA/PER 071

C 1 25398 — SEQUENCE NO. (MDE USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY
DATE Received: DD YY

DATE WELL COMPLETED: MM 06 DD 09 YY 14

Depth of Well: 182 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-13-0563

OWNER (last name) Anne Arundel County (first name)

WELL SITE ADDRESS 389 Burns Crossing Rd. TOWN Millersville

SUBDIVISION Millersville Landfill SECTION TM22 Bk 2C LOT Parcel 1057

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Topsoil	0	1	
Fine to coarse sand w/some pea gravel	1	35	
Pea gravel w/ coarse sand	35	73	
Red Clay	73	150	
Med sand w/ some streaks of clay	150	200	

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes (Y) no (N)

CIRCLE APPROPRIATE LETTER
- (A) A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- (E) ELECTRIC LOG OBTAINED
- (P) TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE

DRILLERS LIC. NO.: MW D5 1 7

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: — — D — — —

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes (Y) no (N)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT (CM) BENTONITE CLAY (BC)

NO. OF BAGS 23 NO. OF POUNDS 1150

GALLONS OF WATER 575

DEPTH OF GROUT SEAL (to nearest foot)

from 0 (TOP) ft. to 167 (BOTTOM) ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

(ST) STEEL (CO) CONCRETE (PL) PLASTIC (OT) OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL	4	172

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below

(ST) STEEL (BR) BRASS BRONZE (HO) OPEN HOLE (PL) PLASTIC (OT) OTHER

DEPTH (nearest ft.)

EACH SCREEN		from	to
1	PL	172	182
2			
3			

SLOT SIZE 1 .020 2 ___ 3 ___

DIAMETER OF SCREEN 4 (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

from	to
167	190

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

TELESCOPE CASING | LOG INDICATOR | OTHER DATA

PUMPING TEST
HOURS PUMPED (nearest hour) 6

PUMPING RATE (gal. per min.) 20

METHOD USED TO MEASURE PUMPING RATE: 5 gal

WATER LEVEL (distance from land surface)

BEFORE PUMPING 140 ft.

WHEN PUMPING 160 ft.

TYPE OF PUMP USED (for test)

(A) air (P) piston (T) turbine (C) centrifugal (R) rotary (O) other (describe below) (J) jet (S) submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): (YES) NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29: S

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 5

PUMP HORSE POWER 1/3

PUMP COLUMN LENGTH (nearest ft.) 170

CASING HEIGHT (circle appropriate box and enter casing height)

(+) above (–) below LAND SURFACE

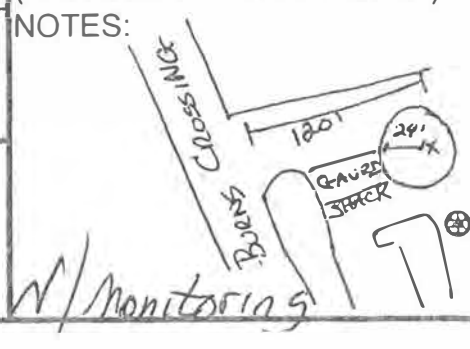
2 (nearest foot)

LATITUDE 39.086964

LONGITUDE 76.676335

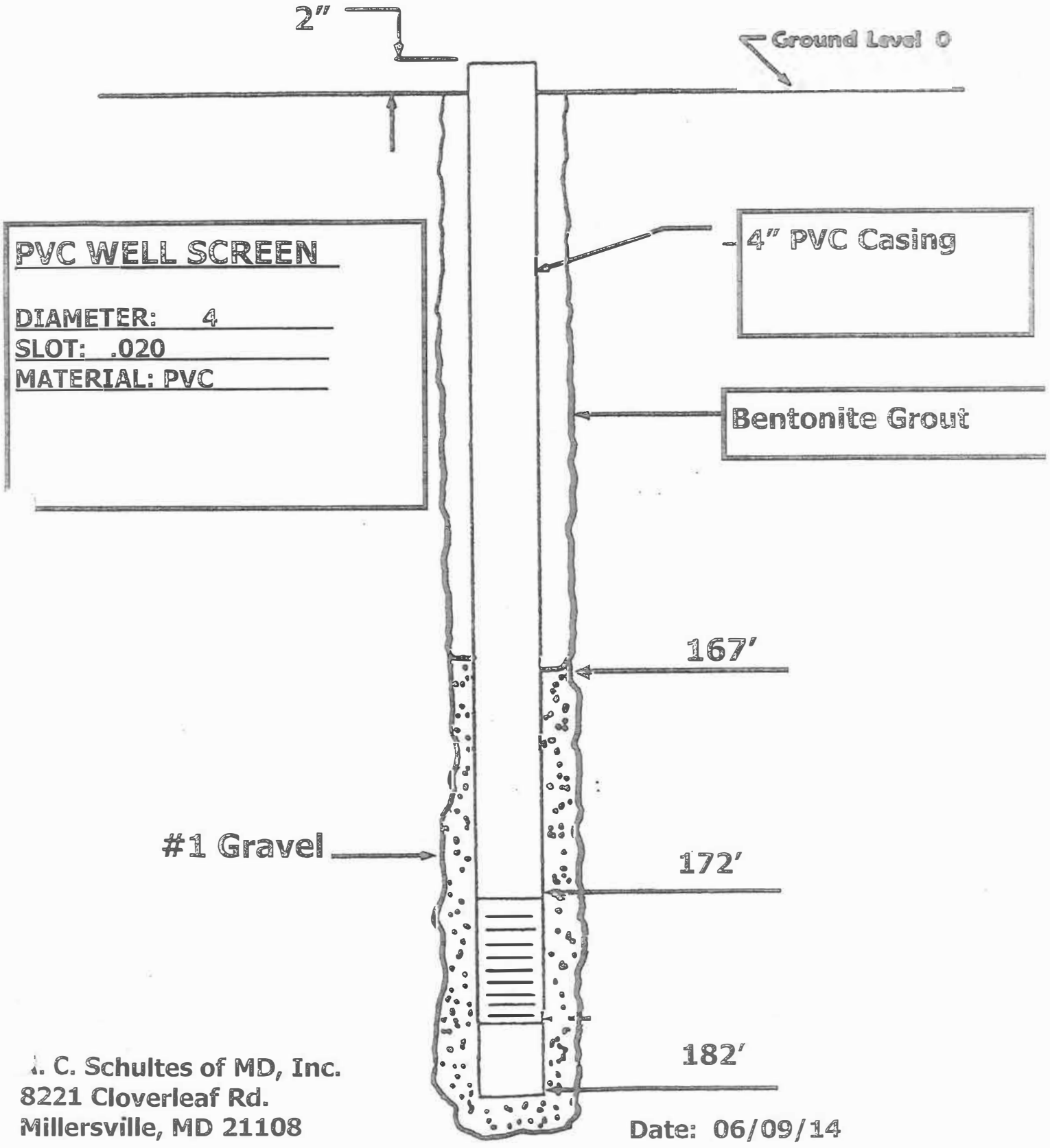
(DEFAULT COORD. WGS 84)

NOTES:



SINGLE CASED WELL

Anne Arundel County
Millersville Landfill
H6715



J. C. Schultes of MD, Inc.
8221 Cloverleaf Rd.
Millersville, MD 21108

Date: 06/09/14

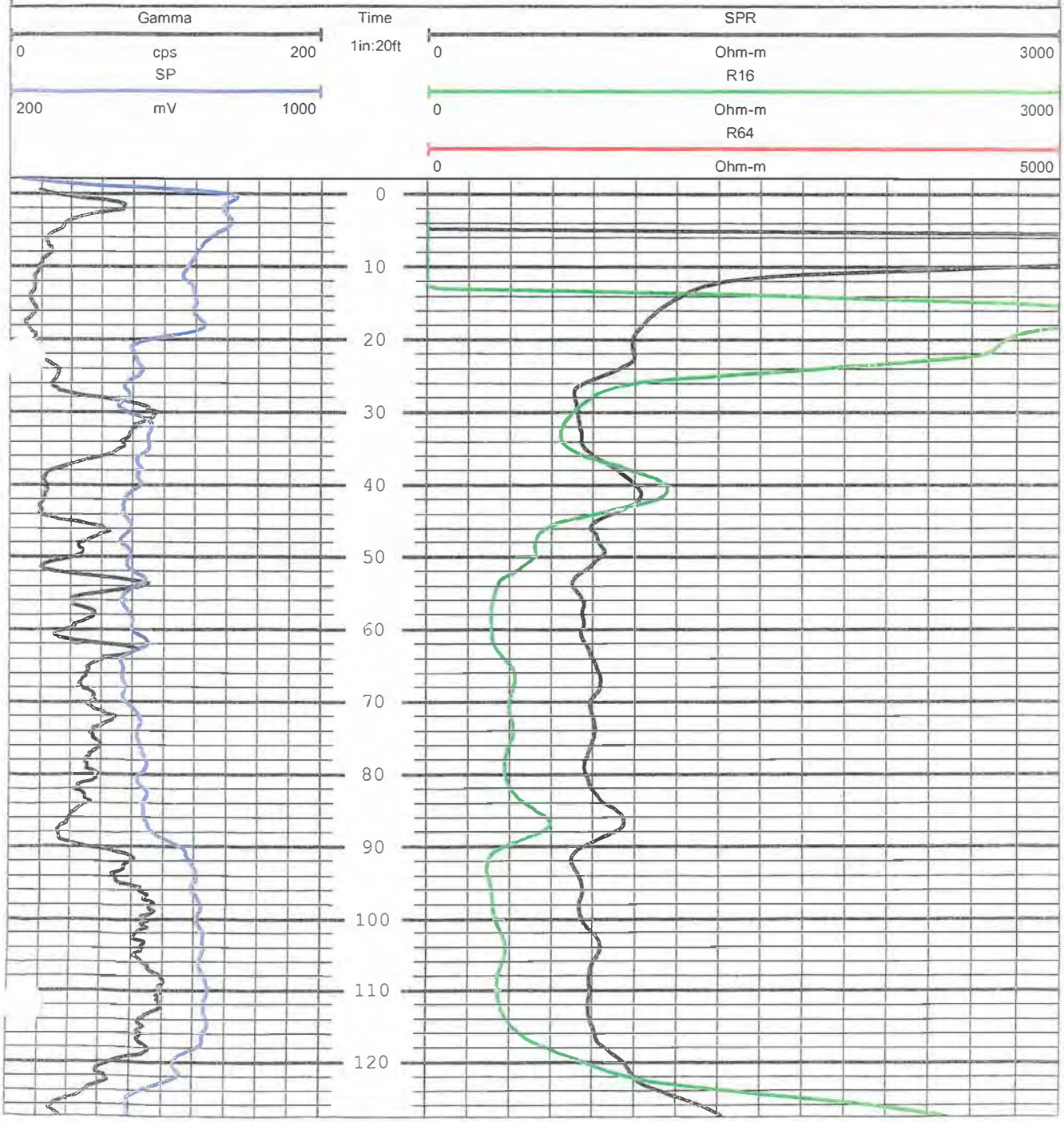
Earth Data Incorporated
131 Comet Drive, Centreville, MD 21617
Phone: (410) 758-8160 / Facsimile (410) 758-8168
www.earthdatainc.com

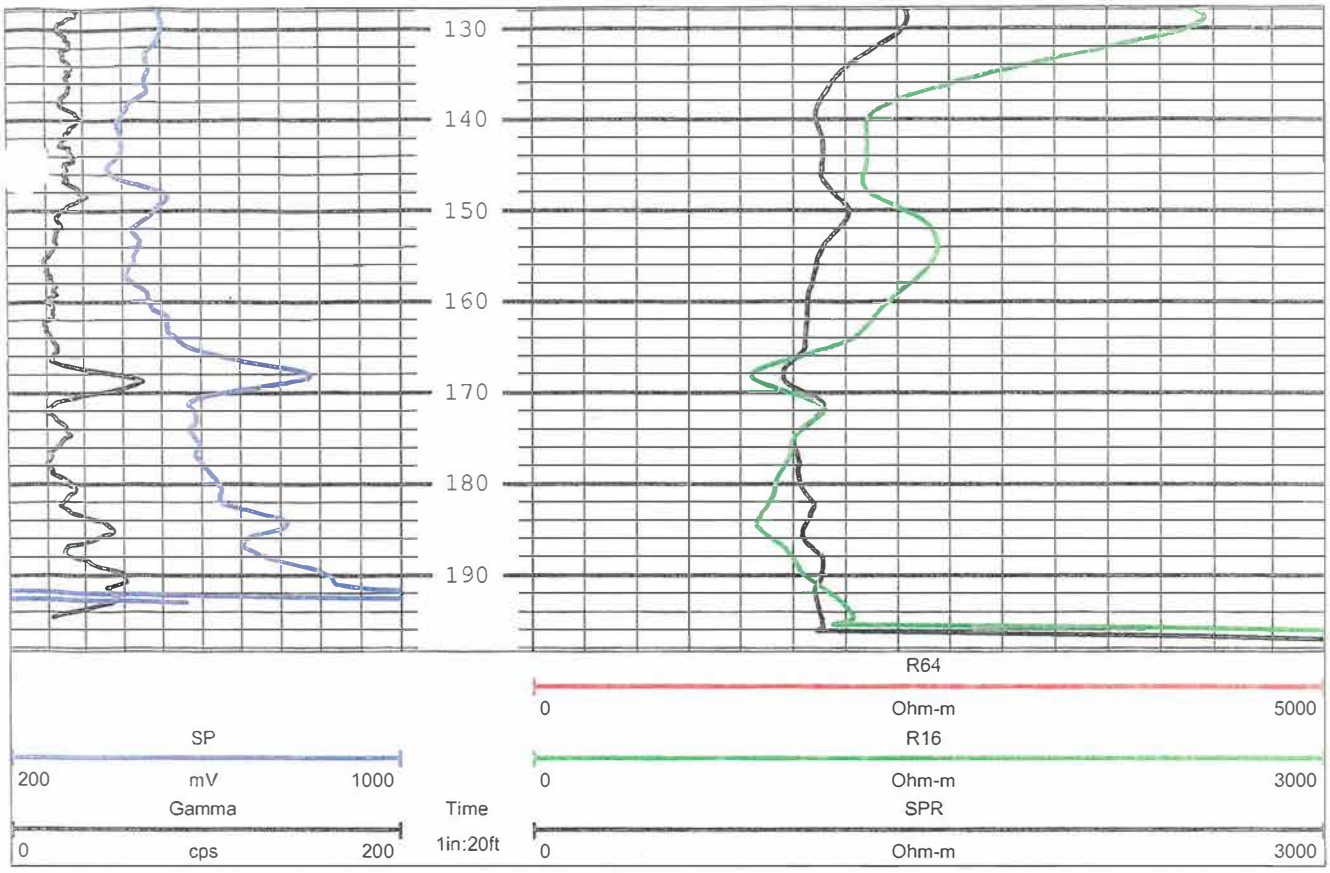
WELL I.D.
MW 23-R

Logging Date: *6-04-2014*
Logging Speed: *17 ft/min* x **Up** Down
BOC: *N/A* **TD:** *199'*

Project:	*ACS-MD Millersville Landfill*	**Bit Size:**	*8.75"*	**EDI Job No.:**	*4669*
Client:	*A.C. Schultes of MD*	**Fluid Type:**	*Mud Based Water*	**Technician:**	*M. Williams/ J. Forrest*
Location:	*Millersville Landfill Recycle Center*	**LAT:** *39.08701° N* **LONG:** *076.67631° W*		**Casing Material:** *N/A*	**Witness:** *R. Melson, ACS-MD*

Notes: *Ref. = ground surface.*




130
140
150
160
170
180
190
R64
0
Ohm-m
5000
SP
200
mV
1000
R16
0
Ohm-m
3000
Gamma
0
cps
200
Time
1in:20ft
SPR
0
Ohm-m
3000

John Gilman
Business Development
Sales

A.C. Schultes of Maryland, Inc.
8221 Cloverleaf Drive
Millersville, Maryland 21108

(410) 841-6710 Direct
(410) 841-6711 Fax
JohnG@ACSchultes.net
www.ACSchultes.com

TW-24 Well Information

INSTALLED 4/14/1995

Tag: AA-93-0577

Address	LANDFILL
City	
State	
Zip Code	
Driller	CONNELLY
Est. GPM Produced	
Use for water SIM	
Drill Method	
WAPID	
Replace	
Subdivision	
Section Lot	
Nearest Town	
Town Distance	
Direction	
Road Name	
Distance	
Tax Map	
Block	
Parcel	
N_Grid 83	
E_Grid	
Latitude	
Longitude	
Completion	

Total Depth	72'
Grouted	YES
Grout Type	CEMENT
Grout Top	0'
Grout Bottom	60'
Casing Type	PLASTIC
Casing Diameter	4"
Casing Depth	62'
Casting Height	
Screen Type	PLASTIC
Screen Top	62'
Screen Bottom	72'
Screen Diameter	4"
Hrs Pumped	
Pumping Rate	
Level Before	
Level During	
Test Pump Type	NOTHING
Pump Installed	
Capacity	
Pump Hp	
Column Length	

C 1 | 5004 | SEQUENCE NO. (DENV USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER

ST/CO USE ONLY
DATE Received

DATE WELL COMPLETED: 03/30/94

Depth of Well: 70 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-92-1028

OWNER

STREET OR RFD Burns Crossing Road (last name / first name) TOWN Millersville

SUBDIVISION Millersville Landfill SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Fill Dirt	0	2	
Sand	2	5	
Red & White Clay	5	25	
White Clay	25	30	
White Sand	30	55	
Clay Streaks			
Hard White Clay	55	62	
Brown Sand	62	73	

CIRCLE APPROPRIATE LETTER

A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO.

DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box) yes (Y) no (N)

TYPE OF GROUTING MATERIAL

CEMENT (CM) BENTONITE CLAY (BC)

NO. OF BAGS 5 NO. OF POUNDS 500

GALLONS OF WATER 30

DEPTH OF GROUT SEAL (to nearest foot)

from 0 ft. to 20 ft. (enter 0 if from surface)

CASING RECORD

casing types insert appropriate code below

(ST) STEEL (CO) CONCRETE (PL) PLASTIC (OT) OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	65

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD

screen type or open hole — Insert appropriate code below

(ST) STEEL (BR) BRASS BRONZE (HO) OPEN HOLE (PL) PLASTIC (OT) OTHER

C 2

SCREEN	TYPE	DEPTH (nearest ft.) from	to
1	PL	65	70
2			
3			

SLOT SIZE 1 .020 3

DIAMETER OF SCREEN 4 (NEAREST INCH)

GRAVEL PACK from to

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

OEP USE ONLY
(NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

70 TELESCOPE CASING 72 LOG INDICATOR 74 75 76 OTHER DATA

C 3

PUMPING TEST

HOURS PUMPED (nearest hour) 2

PUMPING RATE (gal. per min. to nearest gal.) 8

METHOD USED TO MEASURE PUMPING RATE

WATER LEVEL (distance from land surface)

BEFORE PUMPING 30

WHEN PUMPING 30

TYPE OF PUMP USED (for test)

(A) air (P) piston (T) turbine (C) centrifugal (R) rotary (O) other (describe below) (J) jet (S) submersible

PUMP INSTALLED

DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES (NO)

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE:

CAPACITY: GALLONS PER MINUTE (to nearest gallon)

PUMP HORSE POWER

PUMP COLUMN LENGTH (nearest ft.)

CASING HEIGHT (circle appropriate box and enter casing height)

(+) above (−) below LAND SURFACE (nearest foot)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

N

TW-24A

ORIGINAL

Telephone 410/841-6710
Fax # 410-841-6711

A.C. SCHULTES OF MARYLAND, INC.

24-26 SOUTH RIVER ROAD EDGEWATER, MARYLAND 21037

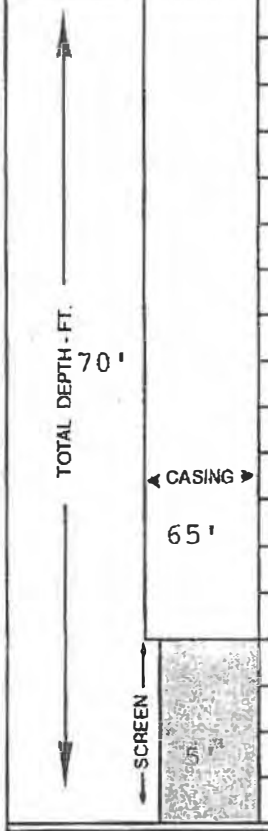
Permit #: AA-92-1028

Water Well Contractors

CUSTOMER Environmental Exploration JOB 2667

ADDRESS Burns Crossing Road DATE

LOCATION Millersville Landfill



FEET FROM GROUND SURFACE 0 TO.....	WELL LOG
0 - 2	Fill Dirt
2 - 5	Sand
5 - 25	Red & White Clay
25 - 30	White Clay
30 - 55	White Sand Clay Streaks
55 - 62	Hard White Clay
62 - 73	Brown Sand

WELL NO. TW-24A	DIAMETER OF WELL 4"	DEPT. OF WELL 70'
HRS. PUMPED 2	SLOT SIZE .020	TYPE OF CASING PVC
CAPACITY G.P.M. 8	DRILLING MACHINE NO. Failing 1250	LENGTH OF CASING 65'
STATIC LEVEL 30'	DRILLER K. Jacob	DISTANCE TO TOP OF SCREEN 65'
PUMPING LEVEL -	GRAVEL #1 Morie	TYPE SCREEN PVC
SPECIFIC CAPACITY -	BAGS OF CLAY 17	SIZE OF SCREEN 4"
PUMPED WITH Air	DATE WELL COMPLETED 3/30/94	
DEPTH OF CLAY GROUT 20'-68'	DRILLER'S HELPER W. Clegg	
DEPTH GRAVEL PACKED 68'-71'		

Cement = 0'-20'

WELL DRILLER'S SIGNATURE

EMERGENCY/TEMP NO. IF ANY

B 1 | 09470 | SEQUENCE NO. (DP USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please print or type

STATE PERMIT NUMBER: AA-92-1038
fill in this form completely

Date Received (APA): 940204

14 OWNER INFORMATION
Last Name: MILLERSVILLE | First Name: CANTEEN
Street or RFD: 389 BENS CROSS, RT
Town: MILLERSVILLE | State: MD | Zip: 21108

DRILLER INFORMATION
Driller's Name: GREGORY W. CISCER | License No.: 441
Firm Name: ENVIRONMENTAL EXPLORATION INC.
Address: 274-2A TYSON DR. WINCHESTER, VA 22603
Signature: [signature] | Date: 01-20-94

B 2 WELL INFORMATION
APPROX. PUMPING RATE (GAL. PER MIN.):
AVERAGE DAILY QUANTITY NEEDED (GAL PER DAY):

USE FOR WATER (CIRCLE APPROPRIATE BOX)
- D — HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- F — FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)
- I — INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)
- P — PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE HEALTH DEPARTMENT APPROVAL)
- T — TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

APPROXIMATE DEPTH OF WELL: 110 FEET

APPROXIMATE DIAMETER OF WELL: 4 NEAREST INCH

METHOD OF DRILLING (circle one)
BORED (or Augered) | JETTED | Jetted & DRIVEN
AIR-ROTary | AIR-PERcussion | ROTARY (Hydraulic Rotary)
CABLE | REVerse-ROTary | DRive-POINT
other: MUD ROTARY

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)
- N — THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y — THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- S — THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- D — THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE):

Not to be filled in by driller (OEP USE ONLY)
APPROP. PERMIT NUMBER: GAP
FORCE (WRITE INITIALS IN BOX): BD | PERMIT No.: AA-92-1038

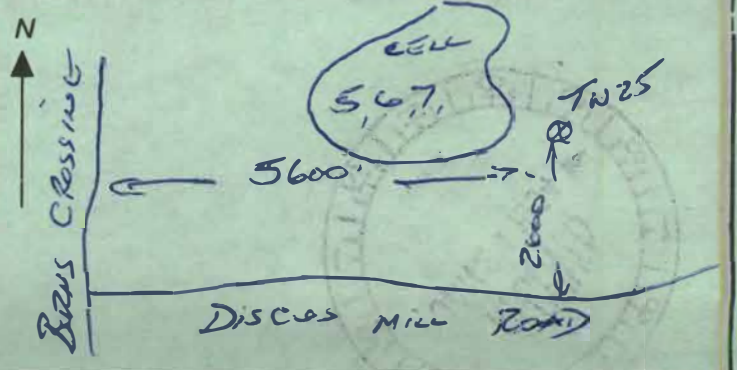
B 3 LOCATION OF WELL
TW-25
8 COUNTY: ANNE ARUNDEL
23 SUBDIVISION: MILLERSVILLE
SECTION: | LOT:
52 NEAREST TOWN: ODENTON
MILES FROM TOWN (enter 0 if in town): 2 MI

B 4
DIRECTION OF WELL FROM TOWN (CIRCLE BOX): N, NW, NE, W, TOWN, E, SW, S, SE
NEAR WHAT ROAD: DISCUS MILL ROAD
ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH, WEST, EAST, SOUTH
DISTANCE FROM ROAD: 2600
ENTER FT or MI:

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL
COUNTY NAME: AA | COUNTY NO.: 02
STATE SIGNATURE: | INSERT S
DATE ISSUED: 940204 | CO SIGNATURE: | EXP. DATE:
NORTH GRID: 95900 | EAST GRID: 089700

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X
SOURCES OF DRILLING WATER
1. POTABLE
2.
3.
WRITE THE BOX NUMBER FROM THE MAP HERE
E 897
N 459
000 000 X

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



SPECIAL CONDITIONS

ORIGINAL

C 1 3157 — SEQUENCE NO. (DENV USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02 — TW-25

ST/CO USE ONLY
DATE Received APR 2 0 1994

DATE WELL COMPLETED 03/29/94

Depth of Well 99 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-92-1038

OWNER MILLERSVILLE LANDFILL
STREET OR RFD 389 last name BURNS CROSSING RD first name TOWN MILLERSVILLE
SUBDIVISION SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
SILTY SAND	0	2	
FI TO CO SAND	2	5	
FINE SAND	5	8	
YEL GRY SILT	8	14.5	
WHT RED CLAY	14.5	16.5	
RED & GRY CLAY	16.5	25	
HARD SILT	25	30	
CLAYEY SANDY GRAVEL SILT	30	37.5	
CLAYEY FI SAND	37.5	48	
FI CLEAN SAND	48	64	✓
WHT TO RED SILT	64	67.5	
WHITE CLAY	67.5	70	
FINE SAND	70	77.5	✓
SILTY SAND	77.5	80	
FINE SAND	80	92	
GRAVELLY CO SAND	92	95.5	
WHITE CLAY	95.5	98.5	
HARD RED CLAY	98.5	99	

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. MND-441
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) — YES (Y) NO (N)
TYPE OF GROUTING MATERIAL
CEMENT (CM) BENTONITE CLAY (BC)
NO. OF BAGS 12 NO. OF POUNDS 1128
GALLONS OF WATER 96
DEPTH OF GROUT SEAL (to nearest foot)
from 0 ft. (TOP) to 65 ft. (BOTTOM) (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
STEEL (ST) CONCRETE (CO) PLASTIC (PL) OTHER (OT)

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	89

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below
STEEL (ST) BRASS BRONZE (BR) OPEN HOLE (HO) PLASTIC (PL) OTHER (OT)

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	89	99
2			
3			

SLOT SIZE 1 .020 2 3
DIAMETER OF SCREEN 4 (NEAREST INCH)

GRAVEL PACK from 65 to 99
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (70) TELESCOPE CASING — (E.R.O.S.) (72) LOG INDICATOR — W Q (74 75 76) OTHER DATA

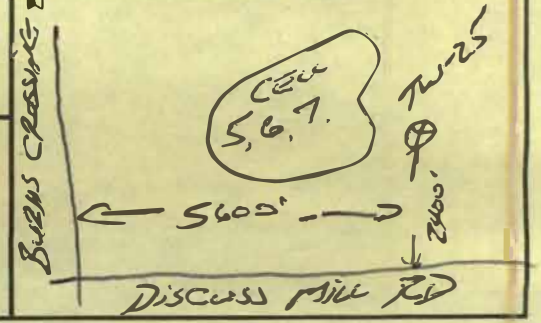
C 3

PUMPING TEST
HOURS PUMPED (nearest hour) 1
PUMPING RATE (gal. per min. to nearest gal.) 7
METHOD USED TO MEASURE PUMPING RATE
WATER LEVEL (distance from land surface)
BEFORE PUMPING 7
WHEN PUMPING

TYPE OF PUMP USED (for test)
A air — P piston — T turbine
C centrifugal — R rotary — O other (describe below)
J jet — S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) — YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE:
CAPACITY: GALLONS PER MINUTE (to nearest gallon)
PUMP HORSE POWER
PUMP COLUMN LENGTH (nearest ft.)
CASING HEIGHT (circle appropriate box and enter casing height) above (+) / below (−) LAND SURFACE 2 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



ORIGINAL

B 1 09471 SEQUENCE NO. (DP USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please print or type

STATE PERMIT NUMBER AA-92-1037
fill in this form completely

Date Received (APA) 9 4 0 2 0 4 13

OWNER INFORMATION
MILLERSVILLE CANDLE
15 Last Name Owner First Name 34
389 BURNS CROSSING
36 Street or RFD 55
MILLERSVILLE MD 21108
57 Town 70 State 72 Zip 76

DRILLER INFORMATION
GREGORY W. CISLER 441
Driller's Name 77 License No. 80
ENVIRONMENTAL EXPLORATION INC
Firm Name
274-2F TYSON DR WINCHESTER VA 22603
Address
Signature 01-20-94
Date

WELL INFORMATION
APPROX. PUMPING RATE (GAL. PER MIN.) 8 12
AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY) 14 20

USE FOR WATER (CIRCLE APPROPRIATE BOX)
- D HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- F FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)
- 22 I INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)
- P PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE HEALTH DEPARTMENT APPROVAL)
- (T) TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

APPROXIMATE DEPTH OF WELL 70 FEET (24–28)

APPROXIMATE DIAMETER OF WELL 4 NEAREST INCH

METHOD OF DRILLING (circle one)
(BORED (or Augered)) JETTED Jetted & DRIVEN
30 37 AIR-ROTary AIR-PERcussion ROTARY (Hydraulic Rotary)
CABLE REVerse-ROTary DRive-POINT
other

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)
- (N) THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- 39 S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- D THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENDED (IF AVAILABLE) 41 52

Not to be filled in by driller (OEP USE ONLY)
APPROP. PERMIT NUMBER 54 G A P 63
FORCE BD WRITE INITIALS IN BOX 67 68
PERMIT No. AA-92-1037 70 71 72 73 74 75 76 77 78 79

LOCATION OF WELL
TW-25A
ANNE ARUNDEL
8 COUNTY 21
MILLERSVILLE
23 SUBDIVISION 42
SECTION 44 48 LOT 48 50
ODENTON
52 NEAREST TOWN 71
MILES FROM TOWN (enter 0 if in town) 2.1 M I
73 76 77 78

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)
N 8; NW 8–9; NE 8–9; W 8; TOWN; E 8; SW 8–9; S 8; SE 8–9

DISCUS MILL ROAD
11 NEAR WHAT ROAD 30

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)
NORTH N; WEST W; 32 E EAST; S SOUTH

34 2600 37 DISTANCE FROM ROAD
ENTER FT or MI FT 38 39

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

AA COUNTY NAME 02 COUNTY NO

STATE SIGNATURE INSERT S 41

DATE ISSUED 9 4 0 2 0 4 43 48 CO-SIGNATURE EXP. DATE

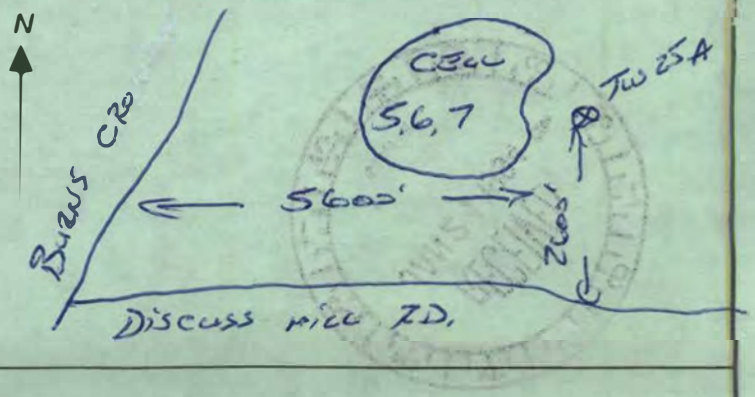
NORTH GRID 4 5 9 0 0 0 50 55
EAST GRID 0 8 9 7 0 0 0 57 63

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

SOURCES OF DRILLING WATER
1. POTABLE
2.
3.

WRITE THE BOX NUMBER FROM THE MAP HERE
E 897
N 459
000 000

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



SPECIAL CONDITIONS

ORIGINAL

C 1 | 3156 | SEQUENCE NO. (DENV USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02 | TW-25A

ST/CO USE ONLY
DATE Received APR 2 1992
DATE WELL COMPLETED 03 16 94
Depth of Well 59 (TO NEAREST FOOT)
PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-92-1037

OWNER MILLERSVILLE LANDFILL
STREET OR RED 389 last name BURNS CROSSING RD first name TOWN MILLERSVILLE
SUBDIVISION SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
SILTY SAND	0	2	
FILTO CO SAND	2	5	
RED WHITE CLAY	5	8	
YELLOW SILT	8	10	
FINE SAND	10	11	
WHT & RED CLAY	11	16.5	
V.FINE SAND	16.5	17.5	
RED & GREY CLAY	17.5	25	
HARD SILT	25	28.5	
CLAY	28.5	30	
CLAYEY SAND W/ GRAVEL	30	32.5	
SILT	32.5	37	
FINE SAND W/ STREAKS OF CLAY	37.5	48	
FINE SAND	48	61	✓

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT. AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. MWD-441
DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y (44) no N (44)
TYPE OF GROUTING MATERIAL
CEMENT CM (45 46) BENTONITE CLAY BC (45 46)
NO. OF BAGS 9 NO. OF POUNDS 387
GALLONS OF WATER 56
DEPTH OF GROUT SEAL (to nearest foot)
from 0 (48) ft. TOP (52) to 44 (54) ft. BOTTOM (58)
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
ST STEEL | CO CONCRETE | PL PLASTIC | OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60 61)	4 (63 64)	49 (66 70)

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below
ST STEEL | BR BRASS BRONZE | HO OPEN HOLE | PL PLASTIC | OT OTHER

C 2

	TYPE	DEPTH (nearest ft.)	
1	PL (8 9)	49 (11 15)	59 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

EACH SCREEN
SLOT SIZE 1 .020 2 3
DIAMETER OF SCREEN 4 (56 60) (NEAREST INCH)
from to
GRAVEL PACK
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

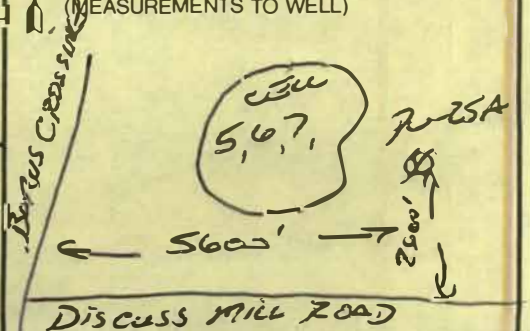
OEP USE ONLY
(NOT TO BE FILLED IN BY DRILLER)
T (70) TELESCOPE CASING | (E.R.O.S.) (72) LOG INDICATOR | W Q (74 75 76) OTHER DATA

C 3

PUMPING TEST
HOURS PUMPED (nearest hour) 1 (8 9)
PUMPING RATE (gal. per min. to nearest gal.) (11 15)
METHOD USED TO MEASURE PUMPING RATE
WATER LEVEL (distance from land surface)
BEFORE PUMPING 1 (17 20)
WHEN PUMPING 1 (22 25)
TYPE OF PUMP USED (for test)
A air (27) | P piston (27) | T turbine (27)
C centrifugal (27) | R rotary (27) | O other (describe below) (27)
J jet (27) | S submersible (27)

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: (29)
CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31 35)
PUMP HORSE POWER (37 41)
PUMP COLUMN LENGTH (nearest ft.) (43 47)
CASING HEIGHT (circle appropriate box and enter casing height)
4 (49) above | – (49) below — LAND SURFACE 2 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



ORIGINAL

SCS ENGINEERS
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Millersville Landfill &
Resource Recovery Facility
Severn, Maryland
Project No. 02211047.03

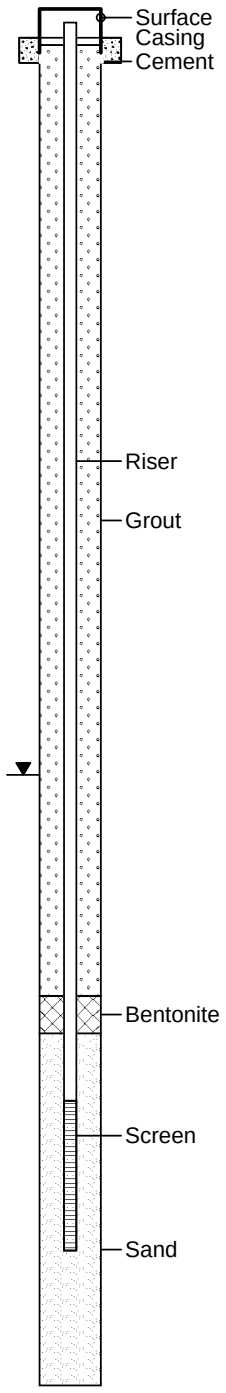
WELL CONSTRUCTION

Date Start/Complete	: 08-30-12/09-04-12
Hole Diameter	: 6.25/10.25 inch
Drilling Method	: Mud Rotary
WELL CASING	
Material	: Sch. 40 PVC
Diameter	: 4" ID
Joints	: threaded
Screen Opening	: 0.020" slot
Sand Pack	: #1 silica

LOG OF BORING TW-27

Log Prepared By	: K. Day - SCS Engineers
Date Log Prepared	: 10-11-12
Drilling Contractor	: A.C. Schultes
Northing	:
Easting	:

Well: TW-27
Elev.:



Depth in Feet	Sample	USCS	GRAPHIC	DESCRIPTION	REMARKS
0				Topsoil	CH = Fat Clay CS = Sandy Clay GM = Silty Gravel SC = Clayey Sand SM = Silty Sand SW = Well-Graded Sand
5	1	GM		quartzose GRAVELS and red-orange, fine to medium grained SILTY SAND	
10	2	SM			
15		SC		orange-brown, fine to medium grained SILTY SAND	Borehole over-drilled with 10.25-inch drill bit to a depth of 162'
20	3			yellow and tan CLAYEY SAND	
25	4	SW		brown, fine to medium grained SAND	Well installed to a depth of 160.26' below grade using 20' of screen.
30	5	SC		brown, fine to medium grained SAND, trace red and white CLAY	
35	6	CH		red and white CLAY	Well Development conducted on 9-5-12. Development production rate = 5 gallons/minute. Purged water was red-orange with high sediment initially. After 3 hours of development, purged water was clear with little sediment.
40	7				
45	8				
50	9	SC		brown, fine-grained SAND, trace white CLAY	
55	10	CH		white CLAY	
60	11				
65	12	SW		brown, fine-grained SAND	
70	13				
75	14				
80	15	CS		white CLAY, trace red CLAY, and brown, fine grained SAND	
85	16				
90	17				
95	18	SW		brown, fine-grained SAND	
100	19	SC		brown, fine-grained SAND, trace white CLAY	
105	20				
110	21	SW		brown, fine-grained SAND	
115	22	SC		brown, fine-grained SAND, trace white CLAY	
120	23				
125	24	CH		red, white, purple, and tan CLAY, traces of gravel	
130	25				
135	26				End of boring = 180'
140					
145					
150					
155					
160					
165					
170					
175					
180					

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Millersville Landfill &
Resource Recovery Facility
Severn, Maryland
Project No. 02211047.03

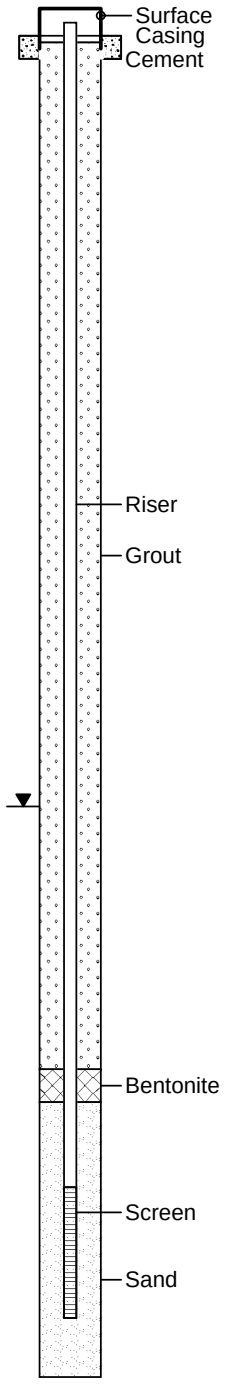
WELL CONSTRUCTION

Date Start/Complete	: 09-07-12/09-11-12
Hole Diameter	: 6.25/8.75 inch
Drilling Method	: Mud Rotary
WELL CASING	
Material	: Sch. 40 PVC
Diameter	: 4" ID
Joints	: threaded
Screen Opening	: 0.020" slot
Sand Pack	: #1 silica

LOG OF BORING TW-28

Log Prepared By	: K. Day - SCS Engineers
Date Log Prepared	: 10-12-12
Drilling Contractor	: A.C. Schultes
Northing	:
Easting	:

Well: TW-28
Elev.:



Depth in Feet	Sample	USCS	GRAPHIC	DESCRIPTION	REMARKS
0–5	1	CM		Topsoil; orange-brown to tan-gray SILTY CLAY, trace fine grained, SAND	CH = Fat Clay CM = Silty Clay GC = Clayey Gravel GP = Poorly Graded Gravel QU = Quartzite/Quartzose SC = Clayey Sand SW = Well-Graded Sand
5–30	2, 3	GP		fine to medium grained SAND and well graded quartzose GRAVEL	
30–35	4	GC		tan and white CLAY, trace quartzose GRAVELS	Borehole over-drilled with 8.75-inch drill bit to a depth of 195'
35–40		QU		hard, iron-stained quartzose with poorly graded quartzose GRAVEL layers	
40–70	5, 6, 7	GP		fine to medium grained SAND, trace quartzose GRAVEL	Well installed to a depth of 194.16' below grade using 20' of screen.
70–80	8	GC		red and white CLAY, trace quartzose GRAVELS	Well Development conducted on 9-12-12. Development production rate = 20 gallons/minute. Purged water was red-orange with high sediment initially. After 2.5 hours of development, purged water was clear with no sediment.
80–90	9	SW		brown, fine to medium grained SAND	
90–145	10–18	GC		red and white CLAY, trace quartzose GRAVELS	
145–155	19, 20	SC		brown, fine grained SAND, trace red and white CLAY	
155–160	21	CH		white CLAY	
160–180	22–25	SW		brown, fine grained SAND	
180–190	26–29	SC		brown, fine grained SAND, trace white CLAY; trace red and white CLAY	
190–205	30, 31	GC		red and white CLAY, trace quartzose GRAVELS, intermittent quartzose layers	End of boring = 205'

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Resource Recovery Facility
Severn, Maryland
Project No. 02211047.03

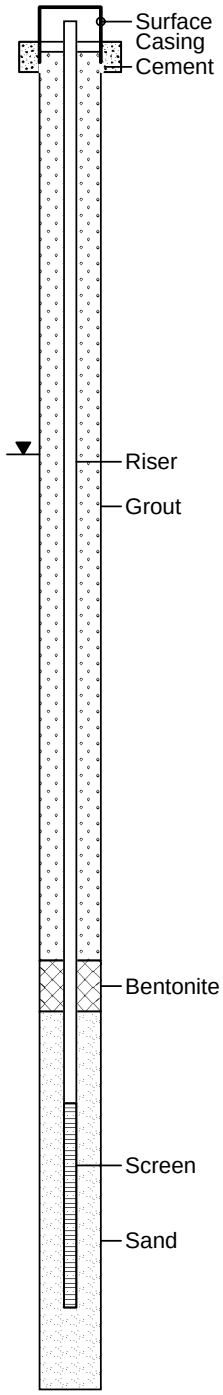
WELL CONSTRUCTION

Date Start/Complete	: 09-14-12/09-17-12
Hole Diameter	: 6.25/8.75 inch
Drilling Method	: Mud Rotary
WELL CASING	
Material	: Sch. 40 PVC
Diameter	: 4" ID
Joints	: threaded
Screen Opening	: 0.020" slot
Sand Pack	: #1 silica

LOG OF BORING TW-29

Log Prepared By	: K. Day - SCS Engineers
Date Log Prepared	: 10-12-12
Drilling Contractor	: A.C. Schultes
Northing	:
Easting	:

Well: TW-29
Elev.:



Depth in Feet	Sample	USCS	GRAPHIC	DESCRIPTION	REMARKS
0				Topsoil	CH = Fat Clay CS = Sandy Clay SC = Clayey Sand SW = Well-Graded Sand
5	1	SW		brown, fine grained SAND	
10		CH		mostly white CLAY medium grained sandstone fragments	
15	2	SW		brown, fine grained, SAND	Borehole over-drilled with 8.75-inch drill bit to a depth of 122'
20	3	SC		brown, fine grained SAND and white CLAY	Well installed to a depth of 122.28' below grade using 20' of screen.
25	4				
30	5	CH		gray CLAY, trace red and white CLAY	Well Development conducted on 9-18-12. Development production rate = 20 gallons/minute. Purged water was red-orange with high sediment initially. After 2.5 hours of development, purged water was clear with no sediment.
35	6				
40	7				
45	8	CS		gray and white CLAY, trace fine grained SAND	
50	9	SW		brown, fine grained SAND	
55	10	SC		brown, fine grained SAND, trace white CLAY	
60	11	SW		brown, fine grained SAND	
65	12				
70	13				
75	14			hard sandstone layer	
80	15	CH		red CLAY, trace white CLAY	
85	16				End of boring = 132'
90					
95					
100					
105					
110					
115					
120					
125					
130					

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Project No. 02211047.03

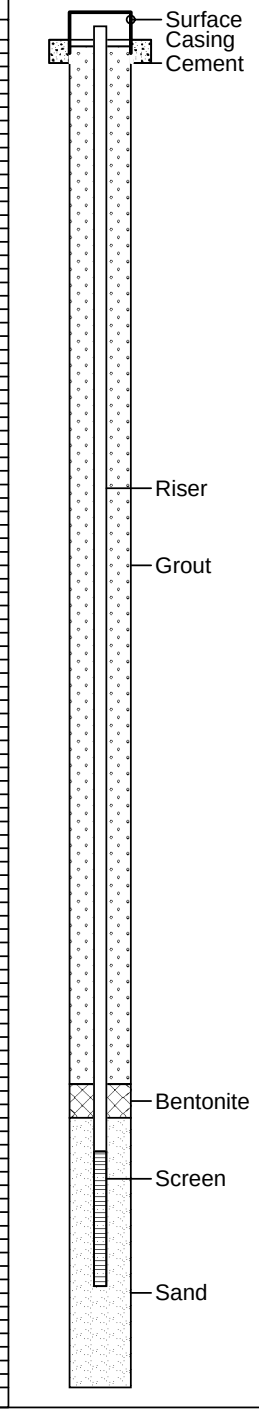
WELL CONSTRUCTION

Date Start/Complete	: 03-19-13/03-26-13
Hole Diameter	: 8.75 inch
Drilling Method	: Mud Rotary
WELL CASING	
Material	: Sch. 40 PVC
Diameter	: 4" ID
Joints	: threaded
Screen Opening	: 0.020" slot
Sand Pack	: #1 silica

LOG OF BORING TW-30

Log Prepared By	: J. Robb - SCS Engineers
Date Log Prepared	: 04-25-2013
Drilling Contractor	: A.C. Schultes
Northing	:
Easting	:

Well: TW-30
Elev.:



Depth in Feet	Sample	USCS	GRAPHIC	DESCRIPTION	REMARKS
0	1			Topsoil	CH = Fat Clay CS = Sandy Clay SC = Clayey Sand SW = Well-Graded Sand
10	2	SC		brown-yellow, fine grained SANDY CLAY	
20	3				
	4	GM		yellowish brown SANDY SILT, with silty quartzose GRAVELS and traces of white CLAY	Well installed to a depth of 185' below grade using 20' of screen.
30	5				
40	6			quartzose GRAVELS and traces of white CLAY	
	7				Well Development conducted on 3-22-13 & 3/23/13. Development production rate = 20 gallons/minute. Purged water was red-orange with high sediment initially. After 2.5 hours of development, purged water was clear with no sediment.
50	8	GC		red CLAY red CLAY and GRAVEL	
60	9	CH		red CLAY with traces of white CLAY	
70	10				
80	11	SC		reddish brown CLAYEY SAND SANDY CLAY	
90	12				
100	13				
110	14			alternating SAND & CLAY layers	
120	15				
130	16	CH		reddish brown CLAY with some SAND	
140	17				
150	18	SW		reddish brown SAND	
160	19				
170	20			reddish brown SAND	
180	21				
190	22				End of boring = 200'
200					

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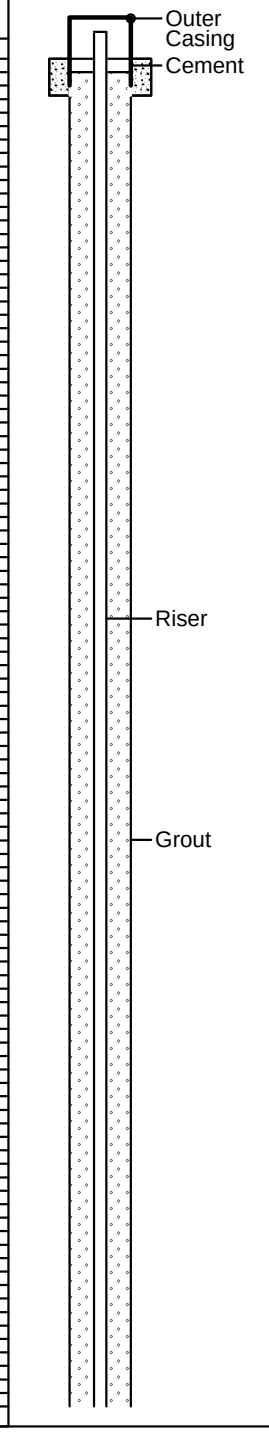
Millersville Landfill &
Resource Recovery Facility
Severn, Maryland
Project No. 02211047.08

WELL CONSTRUCTION
Date Start/Complete : 07-19-16/07-25-16
Hole Diameter : 8.0 inch
Drilling Method : Mud Rotary
WELL CASING
Material : Sch. 40 PVC
Diameter : 4" ID
Joints : threaded
Screen Opening : 0.020" slot
Sand Pack : #1 silica

TW-31

Log Prepared By : SCS Engineers

Drilling Contractor : A.C. Schultes
Latitude : 39.085086
Longitude : 76.666331



Depth in Feet	Sample	USCS	GRAPHIC	DESCRIPTION
0				Topsoil
	1	SP		orange-brown SAND, fine grained
10				brown and black SAND, medium to fine grained
	2	SW		dark red, quartzose layer to 19'
20				white, tan, and orange SAND, fine to coarse grained
	3	SC		white CLAYEY SAND
		SW		white, tan, and orange SAND, fine to coarse grained
30				white, tan, and orange CLAYEY SAND, fine to coarse grained, traces of dark red gravel, white clay
	4	SC		
40				
	5			red CLAY, trace white, cohesive
50				increasing white clay, cohesive
	6	CH		
60				dense red and white CLAY, traces of sand in red clay, cohesive
	7			
70				red, white SANDY CLAY, fine grained, cohesive, less dense
	8			
80		CS		
	9			
90				red, white, some orange-brown striated CLAY, trace very fine grained sand, cohesive
	10	CH		
100				

CH = Fat Clay
CS = Sandy Clay
SC = Clayey Sand
SP = Poorly Graded Sand
SW = Well Graded Sand

Borehole drilled using 8" bit to a depth of 184' below grade. Well installed to a depth of 170' below grade using 20' of screen. Samples collected every 10'.

Well development was conducted on the following dates and times via the air jetting method with the following observances:
07-21-16, 8:05-8:50: dark red and turbid. 8:50-11:00: clearing up, less red; 11:00-12:00: mostly clear, slightly cloudy, no color, no sand; 12:00-12:05: clear, no sand, no color.
07-22-16, Well development performed for 2 hours by A.C. Schultes, not overseen by SCS.

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Millersville Landfill &
Resource Recovery Facility
Severn, Maryland
Project No. 02211047.08

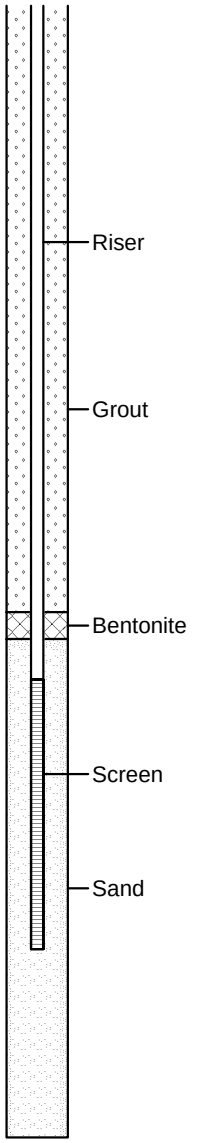
WELL CONSTRUCTION
Date Start/Complete : 07-19-16/07-25-16
Hole Diameter : 8.0 inch
Drilling Method : Mud Rotary
WELL CASING
Material : Sch. 40 PVC
Diameter : 4" ID
Joints : threaded
Screen Opening : 0.020" slot
Sand Pack : #1 silica

TW-31

Log Prepared By : SCS Engineers

Drilling Contractor : A.C. Schultes
Latitude : 39.085086
Longitude : 76.666331

Well: TW-31



Depth in Feet	Sample	USCS	GRAPHIC	DESCRIPTION	REMARKS
100					
110	11	CH		no sand	
120	12				
130	13	CS		red, white, and orange-brown striated SANDY CLAY, very fine grained sand more fine grained sand	
140	14				
150	15			fine to medium grained sand, traces of gravel dense layer 142-142.5' dense layer 143-143.5' fine to medium grained sand	
160	16				
170	17			trace dark red sandstone gravel red, some white and orange-brown clay, very fine grained sands, trace gravel	
180	18	CH		red clay, very dense	
190	19				
200				END OF BORING 184'	

08-22-2016 W:\Projects\LF\Anne Arundel Co MD_GW\Data\Boring Logs\TW-31.bor

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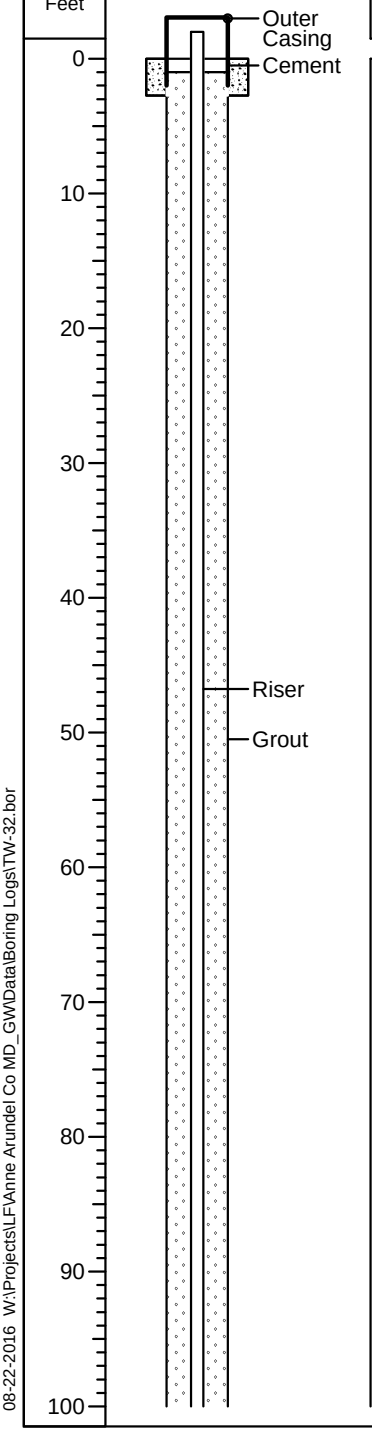
Severn, Maryland
Project No. 02211047.08

WELL CONSTRUCTION
Date Start/Complete : 06-13-16/06-16-16
Hole Diameter : 8.0 inch
Drilling Method : Mud Rotary
WELL CASING
Material : Sch. 40 PVC
Diameter : 4" ID
Joints : threaded
Screen Opening : 0.020" slot
Sand Pack : #1 silica

TW-32

Log Prepared By : SCS Engineers

Drilling Contractor : A.C. Schultes
Latitude : 39.091385
Longitude : 76.673297



Sample	USCS	GRAPHIC	DESCRIPTION	REMARKS
1	GW		sandy GRAVEL, some silt	CH = Fat Clay CS = Sandy Clay GW = Well Graded Gravels SC = Clayey Sand SW = Well Graded Sand
2			some clay	Borehole drilled using 8" bit to a depth of 184' below grade. Well installed to a depth of 170' below grade using 10' of screen. Samples collected every 10'.
3	CS		gray, SANDY CLAY, some gravel	
4			less gravel	Well development was conducted on the following dates and times via the air jetting method with the following observances: 06-14-16, 12:45-14:15: red and turbid at beginning, light brown and cloudy at 14:00. 06-15-16, 07:45-12:05: clear, no color, no sand.
5				
6				
7	CH		gray, CLAY, some sand	
8			red striations	
9	CS		white, red, and yellow striated SANDY CLAY, stiff, tan, fine grained sands	
10			white, no striations dense layer at 93' dense layer at 96'	

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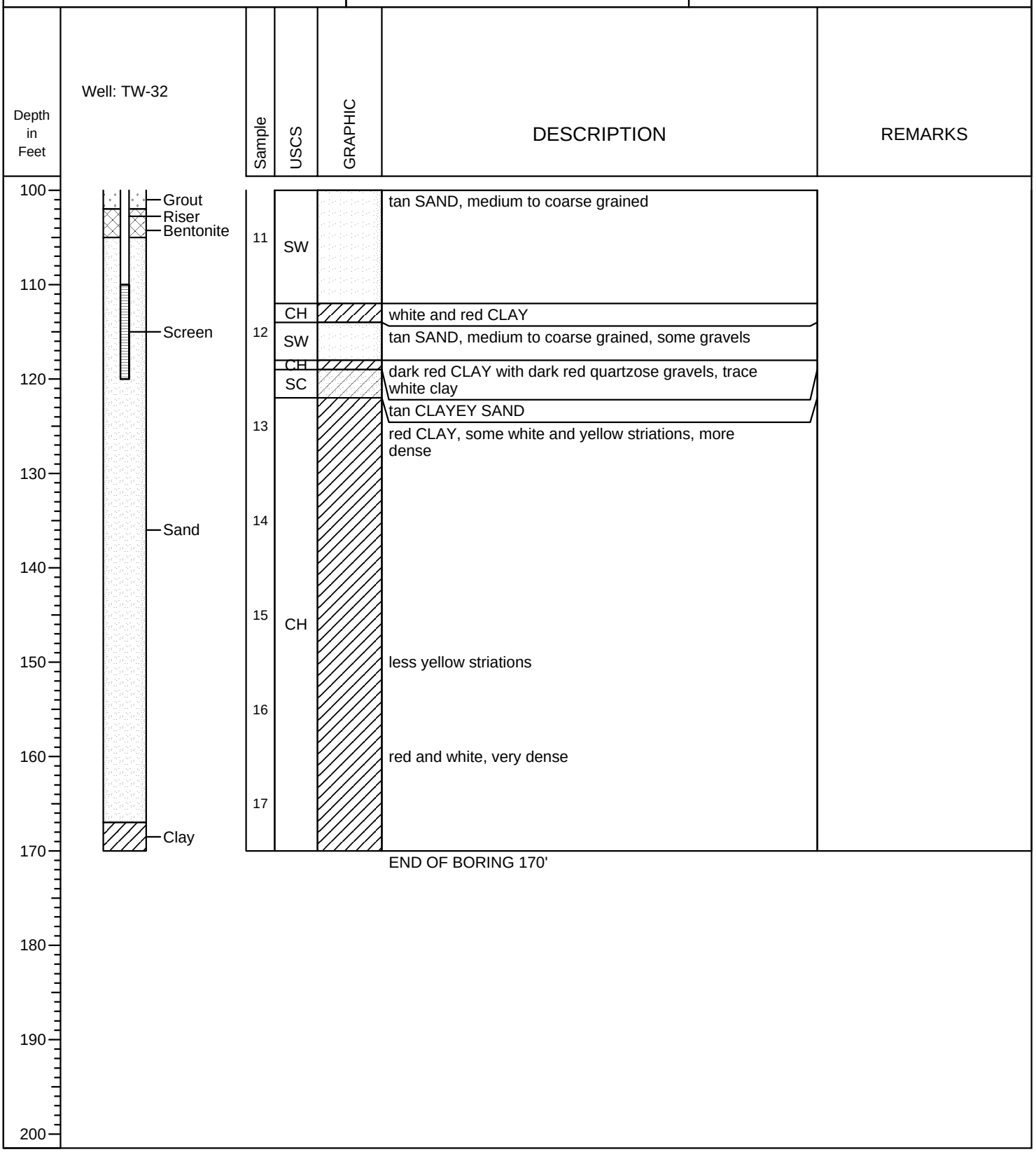
Severn, Maryland
Project No. 02211047.08

WELL CONSTRUCTION
Date Start/Complete : 06-13-16/06-16-16
Hole Diameter : 8.0 inch
Drilling Method : Mud Rotary
WELL CASING
Material : Sch. 40 PVC
Diameter : 4" ID
Joints : threaded
Screen Opening : 0.020" slot
Sand Pack : #1 silica

TW-32

Log Prepared By : SCS Engineers

Drilling Contractor : A.C. Schultes
Latitude : 39.091385
Longitude : 76.673297



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C1 04385 (MDE USE ONLY)

WELL-N

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY DATE Received MM DD YY

DATE WELL COMPLETED MM DD YY: 9/19/07

Depth of Well: 150 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 95 - 3080

OWNER: AA County (last name) 0000-0706-2702 (first name)

STREET OR RFD: 389 Burns Cressing Road TOWN: Severn

SUBDIVISION: Millersville Landfill SECTION: TM 22 BK 20 LOT: Par 0157

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Med to coarse sand	0	10	
Med to coarse sand w/small gravel	10	14	
Hard cemented sand w/some white clay	14	20	
Med to coarse sand w/multi colored clay	20	68	
Fine to med sand w/clay	68	80	
Fine to med sand w/clay layers	80	130	
Fine to med sand	130	155	
Clay	155	170	

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes (Y) no (N)

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: MWD517

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __D___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes (Y) no (N)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT (CM) BENTONITE CLAY (BC)

NO. OF BAGS 4 NO. OF POUNDS 376

GALLONS OF WATER 24

DEPTH OF GROUT SEAL (to nearest foot)

from 0 ft. (TOP) to 125 ft. (BOTTOM)

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

(ST) STEEL (CO) CONCRETE (PL) PLASTIC (OT) OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL	4	130

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	depth (feet) to

SCREEN RECORD
screen type or open hole — insert appropriate code below

(ST) STEEL (BR) BRASS BRONZE (PL) PLASTIC (HO) OPEN HOLE (OT) OTHER

C2

DEPTH (nearest ft.)

EACH SCREEN		from	to
1	PL	130	150
2			
3			

SLOT SIZE 1 .020 2 ____ 3 ____

DIAMETER OF SCREEN 4 (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68	from	to
	125	170

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

70 ____ TELESCOPE CASING

72 ____ LOG INDICATOR

74 75 76 OTHER DATA

C3

PUMPING TEST
HOURS PUMPED (nearest hour): 6

PUMPING RATE (gal. per min.): 5.

METHOD USED TO MEASURE PUMPING RATE: 5 Gallon

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 114 ft.

WHEN PUMPING: 124 ft.

TYPE OF PUMP USED (for test)

(A) air (P) piston (T) turbine

(C) centrifugal (R) rotary (O) other (describe below)

(J) jet (S) submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES (NO)

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29.

CAPACITY: GALLONS PER MINUTE (to nearest gallon)

PUMP HORSE POWER

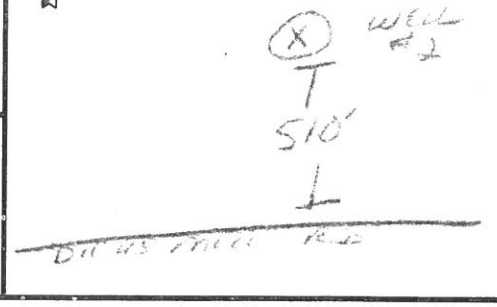
PUMP COLUMN LENGTH (nearest ft.)

CASING HEIGHT (circle appropriate box and enter casing height)

(+) above (–) below LAND SURFACE

2 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



DENV-CR97

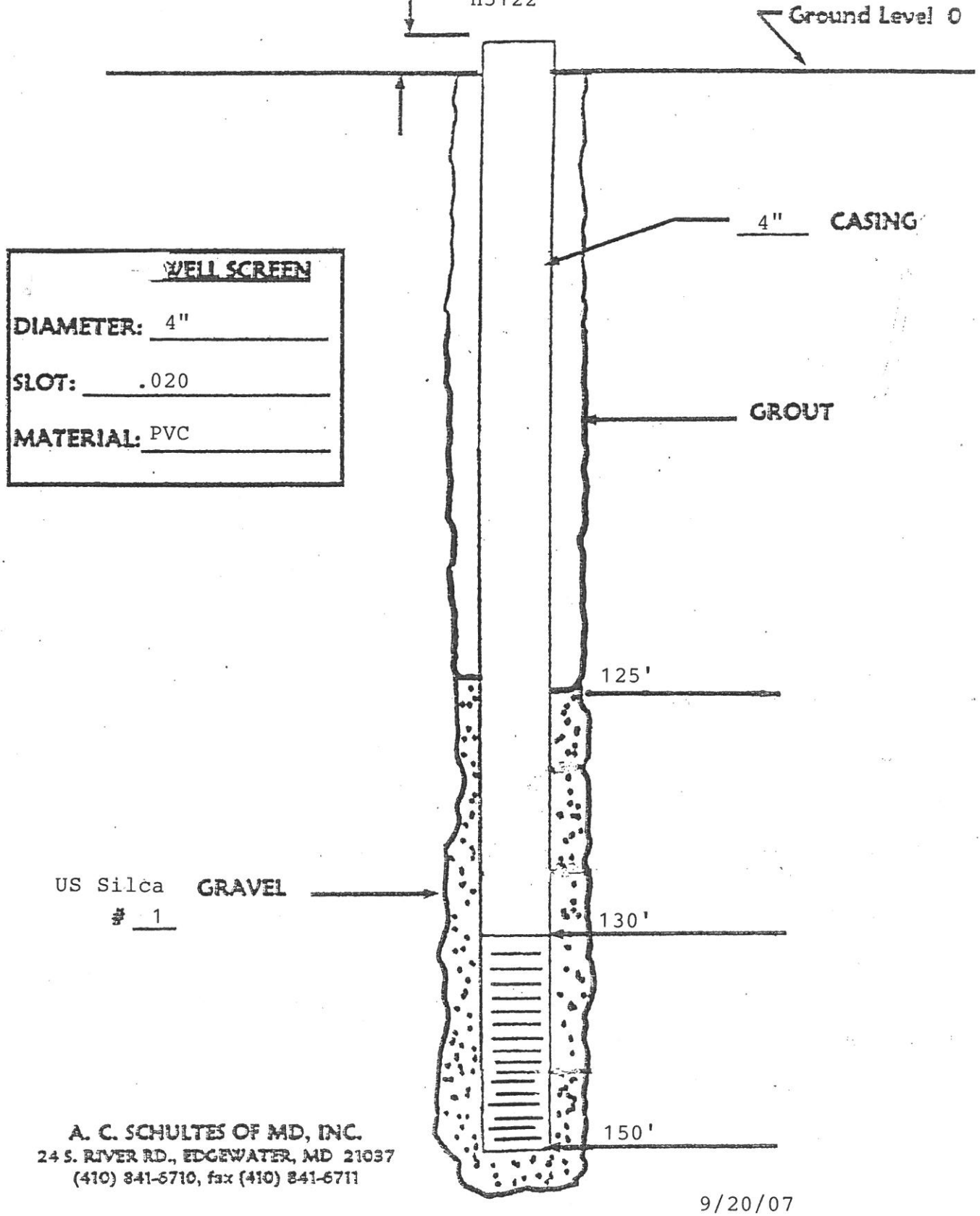
⑤ OWNER

SINGLE CASED WELL

with 1 screen sections

Well-N

A.A. Co.
Millersville Landfill
AA-95-3020
H5122



WELL SCREEN

DIAMETER: 4"

SLOT: .020

MATERIAL: PVC

US Silca GRAVEL
1

A. C. SCHULTES OF MD, INC.
24 S. RIVER RD., EDGEWATER, MD 21037
(410) 841-6710, fax (410) 841-6711

9/20/07

Well-N

A.C. SCHULTES OF MARYLAND, INC.
24 Old South River Road Edgewater, MD 21037
Telephone 410-841-6710
Fax # 410-841-6711

Driller's Log

Water Well Contractors

CUSTOMER: A.A. County JOB: H5122

ADDRESS: Burns Crossing Rd. Severn MD DATE: 9/12/07

LOCATION: Millersville Landfill PERMIT NO. AA-95-3080

		FEET FROM GROUND SURFACE	WELL LOG
GROUND		0-10	Medium to coarse sand
	CASING	10-14	Medium to coarse sand w/small gravel
		14-20	Hard cemented sand w/some white clay
		20-68	Medium to coarse sand w/multi colored clay
		68-80	Fine to medium sand w/clay
		80-130	Fine to medium sand w/ clay layers
		130-155	Fine to medium sand
		155-170	Clay
130" TOTAL DEPTH			
	SCREEN 20		

WELL NO, 2	DIAMETER OF WELL 4"	DEPT. OF WELL 150'
HOURS PUMPED 6	SLOT SIZE .020	TYPE OF CASING PVC
CAPACITY GPM 5	DRILLING MACHINE NO.	LENGTH OF CASING 130'
STATIC LEVEL 114'	DRILLER T. Schultes	DISTANCE TO TOP OF SCREEN 130'
PUMPING LEVEL 124'	GRAVEL #2 29 bags	TYPE SCREEN PVC
SPECIFIC CAPACITY .2	4 BAGS OF Bensen/Grout	SIZE OF SCREEN 4"
PUMPED WITH Air	DATE WELL COMPLETED 9/12/07	OUTER CASING SIZE
DEPTH OF GROUT 125-0	DRILLER'S HELPER	OUTER CASING DEPTH
DEPTH GRAVEL PACKED 165-125		

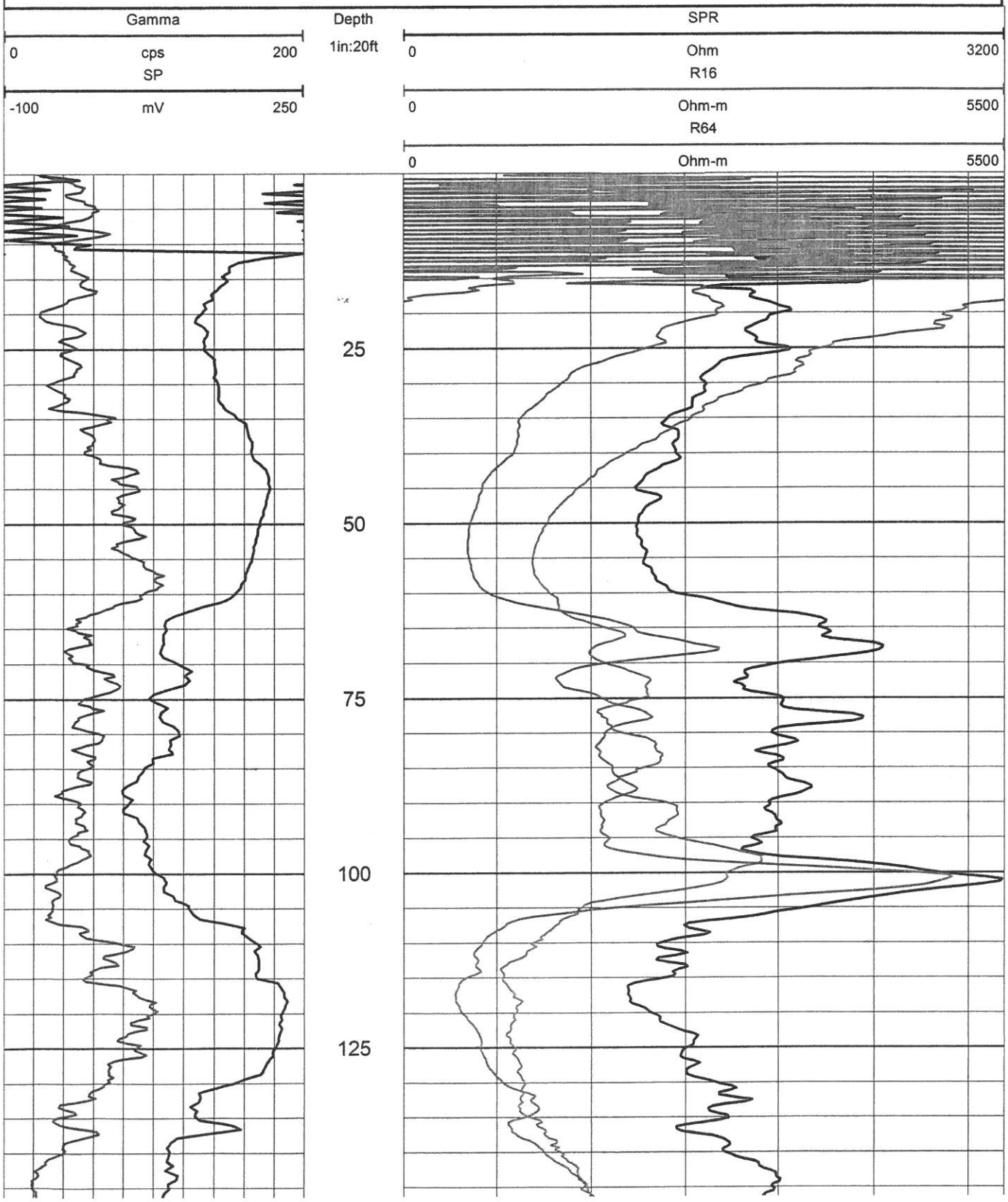
Well-N

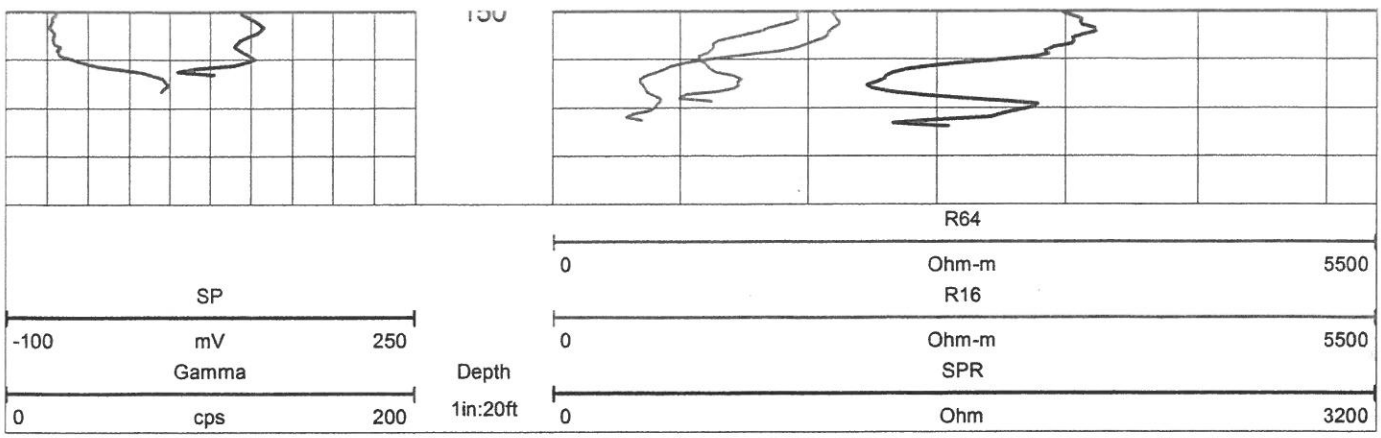
Earth Data Incorporated
131 Comet Drive, Centreville, MD 21617
Phone: (410) 758-8160 / Facsimile (410) 758-8168
www.earthdatainc.com

WELL I.D.
Pilot Hole #2

Logging Date: *9/13/07*
Logging Speed: *20'/min* x **Up** **Down**
BOC: *NA* **TD:** *160'*

Project:	*A.C. Schultes/Millersville Landfill Geo Logs*	**Bit Size:**	*8"*	**EDI Job No.:**	*3797*
Client:	*AC Schultes of MD*	**Fluid Type:**	*Mud Based Water*	**Technician:**	*JKrewson*
Location:	*Millersville, MD*	**Casing Material:**	*NA*	**Witness:**	*Tim@Schultes*




150
R64
0
Ohm-m
5500
SP
R16
-100
mV
250
0
Ohm-m
5500
Gamma
Depth
SPR
0
cps
200
1in:20ft
0
Ohm
3200

Well-N

C 1 | 04388 (MDE USE ONLY)

WELL-W

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY DATE Received MM DD YY

DATE WELL COMPLETED: MM 9/20/07 YY

Depth of Well: 155 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 95 - 3072

OWNER AA County 0000-0706-2702 (last name / first name)

STREET OR RFD 389 Burns Crossing Road TOWN Severn

SUBDIVISION Millersville Landfill SECTION TM 22; Bk 20 LOT Par 0157

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Small to med gravel to med sand	0	11	
Med to coarse sand w/some clay	11	40	
Fine sand w/ multi colored clay	40	55	
Fine to med sand w/red clay	55	100	
Clay w/some sand layers	100	130	
Red clay some sand	130	145	
Med to coarse sand	145	155	
Clay	155	162	

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes [Y] no (N)

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- (E) — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M W D 5 1 7

DRILLERS SIGNATURE (MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __ D ___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes (Y) no (N)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT (CM) BENTONITE CLAY [BC]

NO. OF BAGS 4 NO. OF POUNDS 375

GALLONS OF WATER 24

DEPTH OF GROUT SEAL (to nearest foot)

from 0 ft. TOP to 130 ft. BOTTOM

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL	4	135

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below

[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 — DEPTH (nearest ft.)

EACH SCREEN

		DEPTH from	DEPTH to
1	PL	135	155
2			
3			

SLOT SIZE 1 .020 2 ____ 3 ____

DIAMETER OF SCREEN 4 (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68	from	to
	130	162

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

70 TELESCOPE CASING 72 LOG INDICATOR 74 75 76 OTHER DATA

C 3

PUMPING TEST
HOURS PUMPED (nearest hour) 6

PUMPING RATE (gal. per min.) 5 •

METHOD USED TO MEASURE PUMPING RATE 5 Gallon

WATER LEVEL (distance from land surface)

BEFORE PUMPING 104 ft.

WHEN PUMPING 114 ft.

TYPE OF PUMP USED (for test)

[A] air [P] piston [T] turbine

[C] centrifugal [R] rotary [O] other (describe below)

[J] jet [S] submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES (NO)

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29.

CAPACITY: GALLONS PER MINUTE (to nearest gallon)

PUMP HORSE POWER

PUMP COLUMN LENGTH (nearest ft.)

CASING HEIGHT (circle appropriate box and enter casing height)

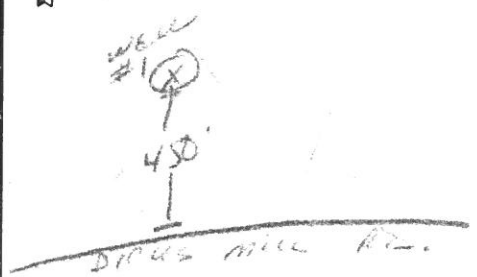
(+) above LAND SURFACE

(–) below

2 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

N



DENV-CR97

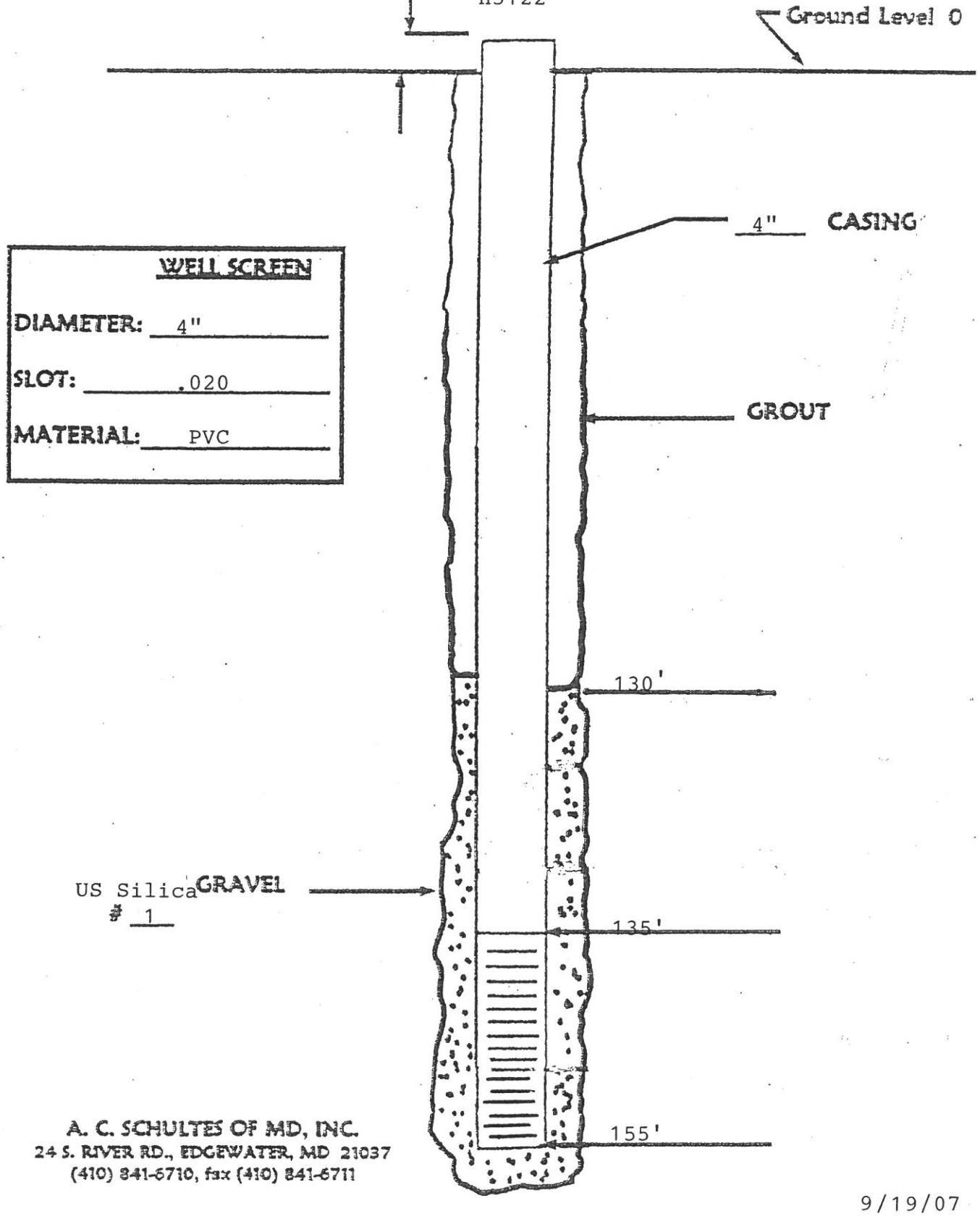
⑤ OWNER

Well-W

SINGLE CASED WELL

with 1 screen sections

A.A. Co.
Millersville Landfill
AA-95-3072
H5122



A. C. SCHULTES OF MD, INC.
24 S. RIVER RD., EDGEWATER, MD 21037
(410) 841-6710, fax (410) 841-6711

9/19/07

Well-W

A.C. SCHULTES OF MARYLAND, INC.
24 Old South River Road Edgewater, MD 21037
Telephone 410-841-6710
Fax # 410-841-6711

Driller's Log

Water Well Contractors

CUSTOMER: A.A. County JOB: H5122

ADDRESS: Burns Crossing Rd. Severn MD DATE: 9/14/07

LOCATION: Millersville Landfill PERMIT NO. AA-95-3072

		FEET FROM GROUND SURFACE	WELL LOG
GROUND		0-11	Small to medium gravel to medium sand
	CASING	11-40	Medium to coarse sand w/ some clay
		40-55	Fine Sand w/multi colored clay
		55-100	Fine to medium sand w/red clay
		100-130	Clay w/some sand layers
		130-145	Red clay some sand
		145-155	Medium to coarse sand
		155-162	Clay
135' TOTAL DEPTH			
	SCREEN		
	20		

WELL NO. 1	DIAMETER OF WELL 4"	DEPT. OF WELL 155'
HOURS PUMPED 6	SLOT SIZE .020	TYPE OF CASING PVC
CAPACITY GPM 5	DRILLING MACHINE NO.	LENGTH OF CASING 135'
STATIC LEVEL 104'	DRILLER T. Schultes	DISTANCE TO TOP OF SCREEN 135'
PUMPING LEVEL 114'	GRAVEL #2 20 Bags	TYPE SCREEN PVC
SPECIFIC CAPACITY .2	4 BAGS OF Bensen/Grout	SIZE OF SCREEN 4"
PUMPED WITH Air	DATE WELL COMPLETED 9/13/07	OUTER CASING SIZE
DEPTH OF GROUT 130-0	DRILLER'S HELPER Barnett	OUTER CASING DEPTH
DEPTH GRAVEL PACKED 162-130		

Well-W

Earth Data Incorporated
131 Comet Drive, Centreville, MD 21617
Phone: (410) 758-8160 / Facsimile (410) 758-8168
www.earthdatainc.com

WELL I.D.
Pilot Hole

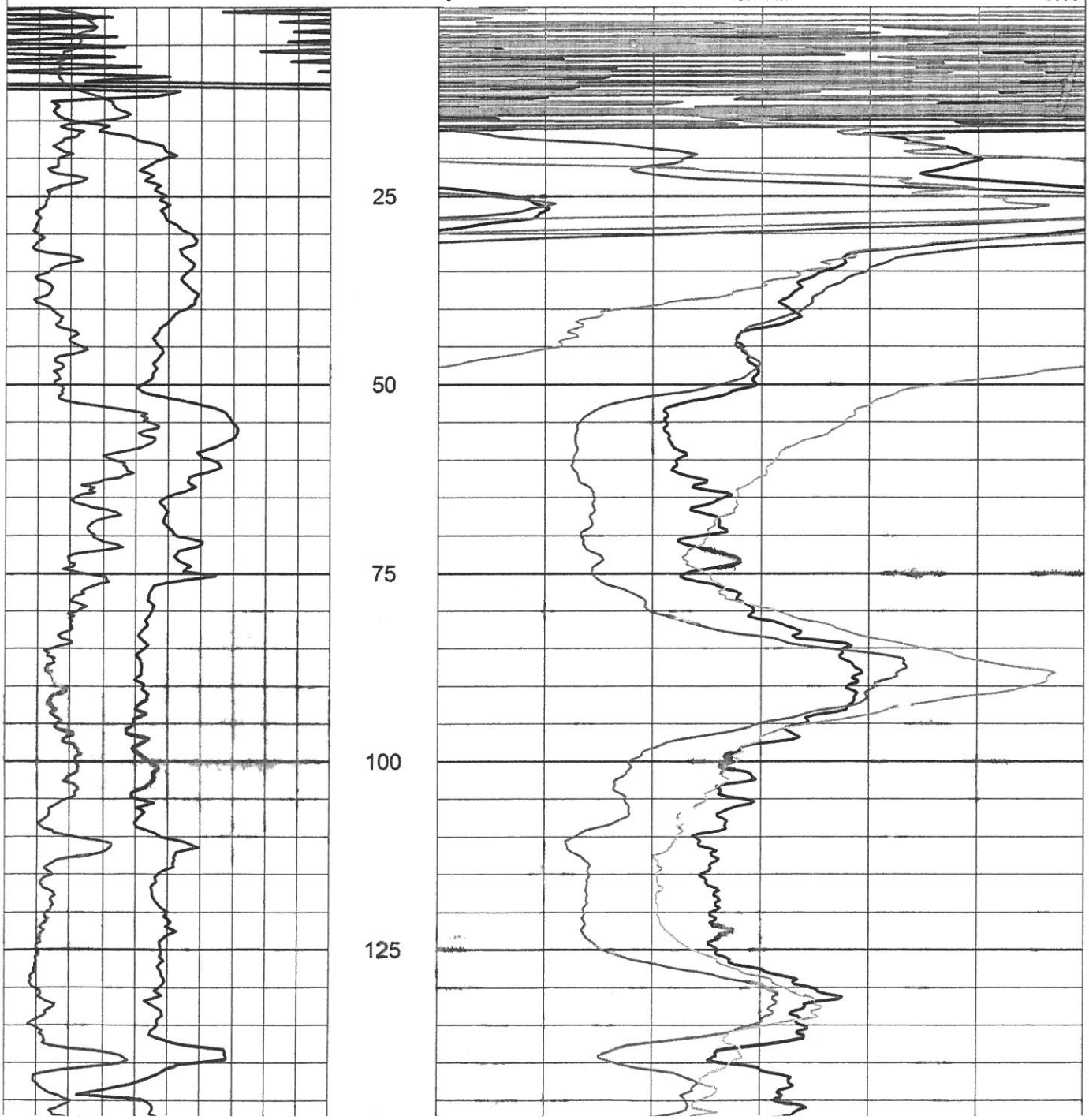
Logging Date: 9/11/07
Logging Speed: 20'/min x **Up** **Down**
BOC: NA **TD:** 165'

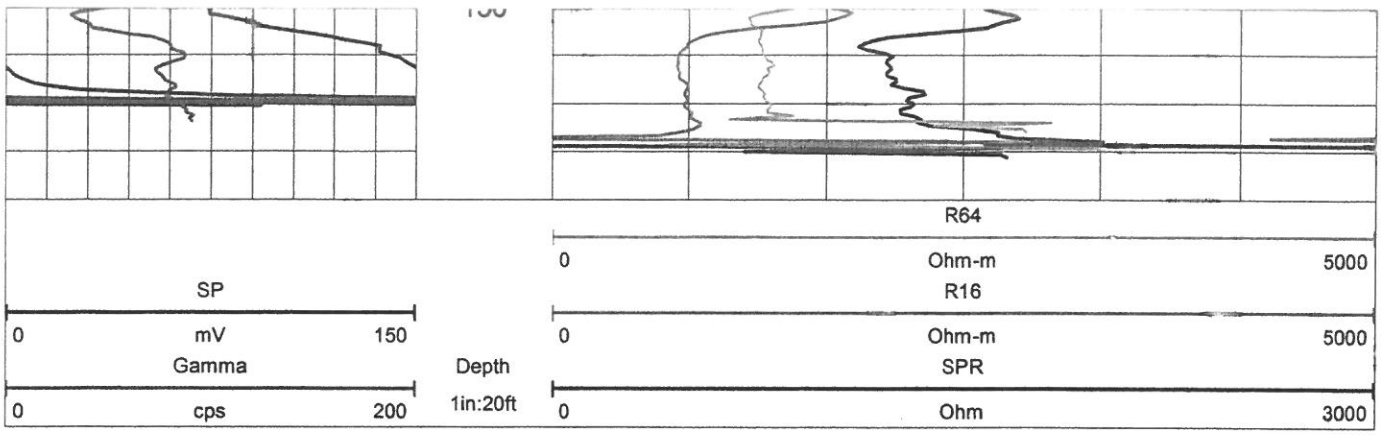
Project: AC Schultes/Millersville Landfill
Client: AC Schultes of MD
Location: Millersville, MD
Bit Size: 8"
Fluid Type: Mud Based Water
Casing Material: NA
EDI Job No.: 3797
Technician: JKrewson
Witness: Tim@Schultes

Gamma
0 cps 200
SP
0 mV 150

Depth
1in:20ft

SPR
0 Ohm 3000
R16
0 Ohm-m 5000
R64
0 Ohm-m 5000





Well-W

SET SCREEN 130 - 150
PER ERM

Appendix C

Groundwater, Surface Water, and Underdrain Analytical Parameters
Additional Subcell 8.8 Underdrain Analytical Parameters

Groundwater, Surface Water, and Underdrain Analytical Parameters
MDE MONITORING PARAMETERS - TABLE I

Volatile Organic Compound Monitoring Parameters	Units	PQL	MCL	NCTS	Cleanup STD
Acetone	µg/L	5.0			1400
Acrylonitrile	µg/L	5.0		0.51	
Benzene	µg/L	1.0	5.0	22	5.0
Bromochloromethane	µg/L	1.0			
Bromomethane	µg/L	1.0			0.75
2-Butanone	µg/L	5.0			560
Carbon disulfide	µg/L	1.0			81
Carbon tetrachloride	µg/L	1.0	5.0	2.3	5.0
Chlorobenzene	µg/L	1.0	100	130	100
Chloroethane	µg/L	1.0			
Chloromethane	µg/L	1.0			19
1,2-Dibromo-3-chloropropane; (DBCP)	µg/L	0.04	0.2		0.20
1,2-Dibromoethane; (EDB)	µg/L	0.04	0.05		0.050
Dibromomethane	µg/L	1.0			
1,2-Dichlorobenzene	µg/L	1.0	600	420	
1,4-Dichlorobenzene	µg/L	1.0	75	63	
trans-1,4-Dichloro-2-butene	µg/L	5.0			
1,1-Dichloroethane	µg/L	1.0			2.8
1,2-Dichloroethane	µg/L	1.0	5.0	3.8	5.0
1,1-Dichloroethene	µg/L	1.0	7.0	330	7.0
cis-1,2-Dichloroethene	µg/L	1.0	70		70
trans-1,2-Dichloroethene	µg/L	1.0	100	140	100
Methylene chloride	µg/L	1.0	5.0	46	5.0
Methyl *tert*-butyl ether; (MTBE)	µg/L	2.0			20
1,2-Dichloropropane	µg/L	1.0	5.0	5.0	5.0
trans-1,3-Dichloropropene	µg/L	1.0			
cis-1,3-Dichloropropene	µg/L	1.0			
Ethylbenzene	µg/L	1.0	700	530	700
2-Hexanone	µg/L	5.0			
Iodomethane	µg/L	1.0			
4-Methyl-2-pentanone	µg/L	5.0			630
Styrene	µg/L	1.0	100		100
1,1,1,2-Tetrachloroethane	µg/L	1.0			
1,1,2,2-Tetrachloroethane	µg/L	1.0		1.7	0.076
Tetrachloroethene; (PCE)	µg/L	1.0	5.0	6.9	5.0
Toluene	µg/L	1.0	1000	1300	1000
1,1,1-Trichloroethane	µg/L	1.0	200	200	200
1,1,2-Trichloroethane	µg/L	1.0	5.0	5.9	5.0
Trichloroethene; (TCE)	µg/L	1.0	5.0	25	5.0
Trichlorofluoromethane; (CFC-11)	µg/L	1.0			
1,2,3-Trichloropropane	µg/L	1.0			
Vinyl acetate	µg/L	1.0			
Vinyl chloride	µg/L	1.0	2.0	0.25	2.0
o-Xylene	µg/L	1.0	10,000		10,000
m-+*p*-Xylenes	µg/L	1.0	(total)		
Bromodichloromethane	µg/L	1.0			80
Dibromochloromethane	µg/L	1.0	80	80	80
Bromoform	µg/L	1.0	(total)	(total)	80
Chloroform	µg/L	1.0			80

PQL = Practical Quantitation Limit
MCL = Maximum Contaminant Level
NCTS = Numerical Criteria for Toxic Substances in Surface Waters
Cleanup STD = MDE Cleanup Standards for Groundwater (for Assessment Monitoring)
µg/L = microgram per liter (parts per billion, ppb)

MDE MONITORING PARAMETERS - TABLE I (cont.)

Per- and Polyfluoroalkyl Substances (PFAS)	Units	PQL	MCL	HI MCL[1]	HBWC
Perfluorooctanoic acid (PFOA)	ng/L	4.0	4.0		
Perfluorooctanesulfonic acid (PFOS)	ng/L	4.0	4.0		
Perfluorononanoic acid (PFNA)	ng/L	4.0	10	1.0 (unitless)	10
Perfluorohexanesulfonic acid (PFHxS)	ng/L	3.0	10		10
Hexafluoropropylene oxide dimer acid (HFPO-DA; GenX)	ng/L	5.0	10		10
Perfluorobutanesulfonic acid (PFBS)	ng/L	3.0			2000

PQL = Practical Quantitation Limit (Method 1633)
MCL = Maximum Contaminant Level
HI MCL = Hazard Index MCL (Mixture of two or more: PFNA, PFHxS, HFPO-DA, and PFBS)
HBWC = Health-Based Water Concentrations
ng/L = nanogram per liter (parts per trillion, ppt)

Note:
1 – A running annual average hazard index value greater than 1.0 is a violation of the HI MCL. Hazard Index level for two or more of four PFAS as a mixture: PFNA, PFHxS, HFPO-DA, and PFBS.
Formula: Hazard Index Value = ((PFNA ng/L)/(10 ng/L)) + ((PFHxS ng/L)/(10 ng/L)) + (GenX ng/L)/(10 ng/L)) + ((PFBS ng/L)/(2000 ng/L))

To calculate the Hazard Index, follow the steps:

1. Step 1. Divide the measured concentration of HFPO-DA(GenX) by its health-based value of 10 ppt.
2. Step 2. Divide the measured concentration of PFBS by its health- based value of 2000 ppt.
3. Step 3. Divide the measured concentration of PFNA by its health-based value of 10 ppt.
4. Step 4. Divide the measured concentration of PFHxS by its health-based value of 10 ppt.
5. Step 5. Add the ratios from steps 1, 2, 3 and 4 together using the Health Index Value
6. Step 6. Compliance with the Hazard Index MCL is determined by a running annual average. To determine the running annual average, repeat steps 1-5 for each sample collected in the past year and calculate the average of these Hazard Index results.
7. Step 7. If the running annual average Hazard Index is greater than the MCL of 1, it is a violation of the Hazard Index MCL

For Reference: Understanding the Final PFAS National Primary Drinking Water Regulation Hazard Index Maximum Contaminant Level:
https://www.epa.gov/system/files/documents/2024-04/pfas-npdwr_fact-sheet_hazard-index_4.8.24.pdf

MDE MONITORING PARAMETERS - TABLE II

Elements & Indicator Monitoring Parameters	Units	PQL	MCL / SMCL	NCTS[1]	Cleanup STD
Total Antimony	µg/L	2	6	5.6	6.0
Total Arsenic	µg/L	2	10	0.18	10
Total Barium	µg/L	10	2000	1000	2000
Total Beryllium	µg/L	2	4	4.0	4.0
Total Cadmium	µg/L	4	5	0.25	5.0
Total Calcium*	µg/L	80			
Total Chromium	µg/L	10	100	100	100
Total Cobalt*	µg/L	10			
Total Copper+	µg/L	10	1300 (AL)	9	1300
Total Iron**	µg/L	5	300		1400
Total Lead	µg/L	2	15 (AL)	2.5	15
Total Magnesium*	µg/L	4			
Total Manganese**	µg/L	10	50		43
Total Mercury	µg/L	0.2	2	0.77	2.0
Total Nickel+	µg/L	11	100	52	39
Total Potassium*	µg/L	390			
Total Selenium	µg/L	35	50	5	50
Total Silver**	µg/L	10	100	3.2	9.4
Total Sodium*	µg/L	200			
Total Thallium	µg/L	2	2	0.24	2.0
Total Vanadium*	µg/L	10			8.6
Total Zinc**	µg/L	10	5000	120	600
Alkalinity*	mg/L	1.0			
Ammonia (as N)*	mg/L	1.0		See note[2]	
Chemical oxygen demand*	mg/L	10			
Chloride**	mg/L	0.39	250		
Hardness*	mg/L	0.50			
Nitrate (as N)	mg/L	0.06	10		
pH**	SU	0.1	6.5-8.5		
Specific conductance*	µS/cm	1.0			
Sulfate**	mg/L	0.38	250		
Total dissolved solids**	mg/L	10	500		
Turbidity	NTU	0.11	5		

Primary MCL
* = No MCL
* *= Secondary MCL
+ = No MCL but recommended level by EPA

PQL = Practical Quantitation Limit
MCL = Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
NCTS = Numerical Criteria for Toxic Substances in Surface Waters
Cleanup STD = MDE Cleanup Standards for Groundwater (for Assessment Monitoring)
AL = Action Level
µg/L = microgram per liter (parts per billion, ppb)
mg/L = milligram per liter (parts per million, ppm)
µS/cm = microsiemens per centimeter
NTU = Nephelometric Turbidity Unit
SU = Standard Unit (logarithmic unit)

Note:
1 - Per COMAR 26.08.02.03-2F(1) - The metals shall be measured as dissolved metal …
2 - See COMAR 26.08.02.03-2 for ammonia

Additional Subcell 8.8 Underdrain Analytical Parameters

Parameter	Analytical Method	Federal Maximum Contaminant Level (mg/L)
	Laboratory Analyses	
Volatile Organics		
Benzene	SW846 8260B	0.005
Ethylbenzene	SW846 8260B	0.7
Methylene Chloride	SW846 8260B	0.005
Toluene	SW846 8260B	1
Trichloroethylene	SW846 8260B	0.005
Xylenes (total)	SW846 8260B	10
Pesticides & Herbicides		
Chlordane	SW846 8081A	0.002
2, 4-D	SW846 8151A	0.07
Simazine	SW846 8141A	0.004
Inorganics		
Fluoride	EPA 340.2	4
Nitrate Nitrogen	EPA 353.2	10
Nitrite Nitrogen	EPA 353.2	1
Microorganisms		
Total Coliforms	SM 9223	5% positive
Disinfection Byproducts		
Total Trihalomethanes	SW846 8260B	0.08
	Field Parameters	
pH	Electronic Meter	---
Temperature	Electronic Meter	---
Specific conductivity	Electronic Meter	---

Appendix D

Groundwater Level Measurement Log
Sample Label
Daily Field Log
Well Sampling/MicroPurge Log
Drinking Water Supply Well Sample Log
Surface Water Sample Log
Custody Seal
Chain-of-Custody Form

Groundwater Level Measurement Log

Project Name:	Project Number:
Date	Task:

Well Number	Time	Depth to Water (ft)	Depth to Bottom (ft)	Water Column Thickness (ft)	Top of Casing Elevation (ft,AMSL)	Groundwater Elevation (ft,AMSL)	Remarks

SAMPLE

Field Personnel: _____

Checked By: _____

SAMPLE LABEL

PROJECT NAME

SAMPLE ID	**SAMPLE DATE**
SAMPLED BY	**SAMPLE TIME**
PRESERVATIVE	**_____ GRAB** **_____ COMPOSITE**

ANALYSIS REQUESTED

DAILY FIELD LOG

Project Name:		**Project Number:**	
		Task:	**Labor Code:**
Project Manager:		**Field Personnel:**	
Date:	**Vehicle:**	**Miles Billed:**	**Travel Time:**
Weather:			

Labor	Hours	Equipment	Materials

Work Completed:

SAMPLE

Prepared By:	**Review By:**

Well Sampling/MicroPurge Log

Project Name:	**Water Column Thickness (ft):**
Well ID:	**Date:**
Well Diameter (in):	**1 Well Volume (gal):**
Total Well Depth (ft):	**Purging Time Initiated:**
Depth to Pump Inlet (ft):	**Purging Time Completed:**
Depth to Water (ft):	**Total Volume Purged (gal):**

WELL PURGING RECORD

Time	Volume Purged (gal)	Dissolved Oxygen (mg/L)	pH (s.u.)	Specific Conductance (uS/cm)	ORP (mV)	Temperature (oC)	Turbidity (NTU)	Comments (water color, odor, pump used, sediment, cloudy, etc.)

SAMPLE

GROUNDWATER SAMPLING RECORD

Sample Number	Collection Time	Parameter	Container	Preservative

Samples Shipped By: _____ Laboratory: _____

Sampler(s): _____ Reviewed By: _____

Drinking Water Supply Well Sample Log

Project Name:	**Samplers (s):**
Project Number:	**Task:**

Location ID	Sample Date	Sample Time	Temperature (°C)	pH (s.u.)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Comments (water color, odor, sediment, cloudy, etc.)

SAMPLE

Parameter	Container	Preservative

Samples Shipped By: _____ Laboratory: _____

Checked By: _____

Surface Water Sample Log

Project Name:	**Sampler(s):**
Project Number:	**Task:**

SURFACE WATER SAMPLES

Location ID	Sample Date	Sample Time	Temperature (^{o}C)	pH (s.u.)	ORP (mV)	Specific Conductivity (uS/cm)	D.O (mg/L)	Turbidity (NTU)	Observations

Sample

SURFACE WATER SAMPLING RECORD

Parameter		Container		Preservative

Samples Shipped By: _____ Laboratory: _____

Checked By: _____

CUSTODY SEAL

DATE _____

SIGNATURE _____

SAMPLE

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be complete accurately.

Section A	Section B	Section C	Page: Of
Required Client Information:	**Required Project Information:**	**Invoice Information:**	
Company:	Report To:	Attention:	
Address:	Copy To:	Company Name:	
	PN #:	Address:	Regulatory Agency
Email to:	Purchase Order No.	Pace Quote Reference:	
Phone:	Client Project ID:	Pace Project Manager:	State / Location
Requested Due Date/TAT:	Container Order Number:	Pace Profile#:	

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9/,-) Sample ids must be unique	Matrix / CODE Drinking Water DW Water WT Waste Water WW Product P Soil/Solid SL Oil OL Wipe WP Air AR Other OT Tissue TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analysis Filtered (Y/N): Y/N	Analyses Test	Residual Chlorine (Y/N)
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					
15																					

SAMPLE

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS

SAMPLER NAME AND SIGNATURE		TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:					
SIGNATURE of SAMPLER:	DATE Signed:				

Appendix E

Landfill Gas Monitoring Well Network Summary
Landfill Gas Management System - Extraction Well and Probe Locations
Landfill Gas Monitoring Probe Construction Details

Landfill Gas Monitoring Probe Network Summary

Probe ID	Shallow Riser (ftbgs)	Shallow Screen (ftbgs)	Mid Riser (ftbgs)	Mid Screen (ftbgs)	Deep Riser (ftbgs)	Deep Screen (ftbgs)
J-1	0-3	3-8	---	---	---	---
J-3	0-3	3-10	---	---	---	---
J-4	0-3	3-7.5	---	---	0-20	20-46
J-5	0-3	3-7	0-22	22-28	0-34	34-40
J-6	0-4	4-10	---	---	0-15	15-45
J-7	0-24	24-30	---	---	---	---
J-8	0-48	48-53	---	---	---	---
J-11	0-3	3-8	---	---	---	---
J-12	0-20	20-50	---	---	---	---
J-13	0-9	9-13.5	0-36	36-42	0-47	47-62
J-14	0-5	5-10	---	---	0-12	12-18
J-15	0-3.5	3.5-6	0-9.5	9.5-19.5	0-21.5	21.5-34.5
J-16	0-4	4-21	---	---	---	---
J-17	0-9	9-19	---	---	---	---
J-18	0-4	4-11	---	---	---	---
J-19	0-4	4-19	---	---	0-35	35-40
J-20	0-5	5-15	---	---	0-24	24-48
J-21	0-2	2-9	0-13	13-29	0-33	33-65
J-22	0-2	2-9	0-13	13-29	0-33	33-70
J-23	0-2	2-9	0-13	13-29	0-33	33-75
J-24	0-2	2-9	0-13	13-29	0-33	33-60
J-25	0-2	2-9	0-13	13-29	0-33	33-75
J-26	0-2	2-9	0-13	13-29	0-33	33-90
J-27	0-2	2-9	0-13	13-29	0-33	33-90
J-28	0-2	2-9	0-13	13-29	0-33	33-85
J-29	0-2	2-9	0-13	13-29	0-33	33-75
J-30	0-2	2-9	0-13	13-29	0-33	33-55
J-31	0-2	2-9	0-13	13-29	0-33	33-75
J-32	0-2	2-9	0-13	13-29	0-33	33-65
J-33	0-2	2-9	0-13	13-29	0-33	33-44

ft = feet below ground surface

Notes:

1. Probe construction information for well J-1 - J-20 were obtained from the November 2009 Environmental Monitoring Plan.
2. Probe construction information for wells J-21 - J-33 were obtained from the driller logs.

MLFRRF GAS COLLECTION & CONVEYANCE SYSTEM EXTRACTION WELL LOCATIONS

EXTRACTION WELL/ HORIZONTAL COLLECTOR ID NUMBER	EXTRACTION WELL/ HORIZONTAL COLLECTOR WELLHEAD SURVEY LOCATION		GROUND SURFACE AT 6" WELL CASING	TOP OF 6" WELL CASING
	NORTHING	EASTING	ELEVATION	ELEVATION
CELL 1 EAST				
HC1-1	461,424.3	896,613.4	151.63	154.55
HC1-2	461,331.5	896,511.4	153.21	156.61
HC1-3	461,373.3	896,299.0	151.87	154.62
HC1-4	461,581.0	895,953.3	154.59	157.05
CELL 2				
EW2-1	460,804.5	894,664.0	182.19	186.34
EW2-2	460,762.6	894,726.4	186.44	189.86
EW2-3	460,639.1	894,681.3	182.25	185.29
EW2-4	460,674.9	894,811.8	188.49	191.24
EW2-5	460,521.7	894,646.6	182.43	185.06
EW2-6	460,546.0	894,781.2	185.61	188.71
EW2-7	460,580.7	894,842.1	187.99	189.89
EW2-8	460,560.9	894,913.1	188.37	191.31
EW2-9	460,440.3	894,746.3	182.70	185.43
EW2-10	460,414.6	894,866.7	181.95	185.55
EW2-11	460,454.5	894,980.1	183.26	186.26
EW2-12	460,537.0	894,807.4	185.55	188.95
EW2-13	460,907.0	894,731.9	187.48	190.92
EW2-14	460,869.9	894,683.4	185.33	189.29
EW2-15	460,834.3	894,794.8	190.26	193.06
CELL 4				
EW4-1	459,097.0	892,937.6	164.63	168.67
EW4-2	459,152.9	893,020.5	167.55	172.09
EW4-3	459,215.9	893,096.6	168.36	171.61
EW4-4	459,299.8	893,180.5	168.15	170.94
EW4-5	459,376.4	893,262.0	166.34	169.67
EW4-6	459,417.4	893,376.8	161.35	164.77
EW4-7	459,491.7	893,459.2	157.16	160.66
HC4-1	459,311.4	893,461.8	152.76	154.68
HC4-2	459,538.8	893,356.5	158.87	162.57
CELL 567				
EW5-1	459,859.0	895,559.9	179.53	183.90
EW5-2	459,732.8	895,429.4	190.55	196.34
EW5-3	459,646.9	895,577.1	215.34	221.50
EW5-4	459,666.1	895,268.9	187.61	191.82
EW5-5	459,588.4	895,409.1	208.38	213.11
EW5-6	459,593.9	895,132.7	181.55	185.61
EW5-7	459,421.6	895,057.6	190.06	194.31
EW5-8R	459,413.0	895,378.0	230.30	232.93
EW5-9	459,434.1	895,524.1	228.38	233.13
EW5-10	459,294.7	894,974.8	172.69	176.61
EW5-11	459,233.1	895,116.4	187.11	191.87
EW5-12	459,259.4	895,360.7	216.28	221.36
EW5-13R	459,214.5	895,610.3	225.81	230.66
EW5-16	459,016.6	895,411.9	181.23	185.98
EW5-17	459,063.0	895,604.0	205.18	211.01
EW5-18	458,922.5	895,310.7	160.65	163.69
EW5-19	458,863.7	895,527.9	165.45	171.03
EW5-20	459,347.1	895,650.0	231.53	237.26
EW5-21	459,531.9	895,582.3	224.01	227.17
EW6-1	460,293.3	896,352.5	169.50	174.00
EW6-2	460,263.2	896,464.2	166.71	171.71
EW6-3	460,186.2	896,231.0	177.28	181.40
EW6-4	460,157.0	896,373.1	181.59	185.51
EW6-5	460,101.5	896,092.4	181.77	185.62
EW6-6	460,051.7	896,218.1	188.47	193.70
EW6-7	460,022.7	896,372.1	184.95	189.28
EW6-8	460,044.5	896,494.7	157.60	162.64
EW6-9	460,002.3	895,975.4	186.18	190.68
EW6-10	459,934.1	896,116.7	196.54	200.39
EW6-11	459,907.6	896,272.7	195.32	199.78
EW6-12	459,914.6	896,471.0	167.20	172.86
EW6-13	459,949.7	895,661.5	175.74	178.45
EW6-14	459,912.2	895,826.4	188.26	192.59
EW6-15	459,840.3	895,998.7	202.60	206.76
EW6-16	459,782.4	895,693.4	196.96	201.62
EW7-1	459,761.2	895,847.9	202.41	207.91
EW7-2	459,768.9	896,163.8	209.67	213.86
EW7-3	459,766.5	896,328.0	198.94	203.10
EW7-5R	459,623.6	895,781.5	219.52	223.41
EW7-6	459,642.3	895,992.4	215.42	219.96
EW7-7	459,545.1	896,214.0	214.97	218.22
EW7-9	459,646.7	896,527.2	176.35	180.43
EW7-10	459,370.6	895,774.3	225.04	229.91
EW7-11	459,444.2	895,981.9	221.84	226.09
EW7-12	459,313.8	896,176.3	212.98	217.21
EW7-13	459,408.6	896,383.4	209.61	213.69
EW7-14	459,489.1	896,593.3	181.96	185.04
EW7-15	459,472.4	896,764.3	157.70	163.62
EW7-16	459,390.8	896,892.2	159.37	165.32
EW7-17	459,153.4	895,754.2	216.64	219.97
EW7-18	459,195.4	895,966.4	217.60	221.10
EW7-19	459,136.3	896,152.4	208.69	213.56
EW7-20	459,224.1	896,369.1	208.33	212.54
EW7-21	459,281.2	896,540.6	197.94	200.25
EW7-22	459,312.6	896,733.0	185.15	189.07
EW7-23	459,180.5	896,856.6	163.40	167.73
EW7-24	459,272.5	896,975.5	155.40	161.52
EW7-25	458,915.2	895,718.3	183.99	187.57
EW7-26	458,962.1	895,872.9	199.53	202.19
EW7-27	458,999.0	896,056.9	201.01	205.49
EW7-28	458,966.4	896,303.0	176.18	180.28
EW7-29	459,055.3	896,535.2	179.70	185.86
EW7-30	459,063.7	896,718.1	177.75	181.68
EW7-31	459,011.3	896,855.7	157.38	160.35
EW7-32	458,742.6	895,722.1	156.88	161.42
EW7-33	458,716.6	895,839.7	156.68	160.39
EW7-34	458,846.2	895,931.6	181.47	186.80
EW7-35	458,754.3	896,056.8	164.86	167.73
EW7-36	458,857.0	896,185.2	181.55	185.92
EW7-37	458,719.5	896,233.8	150.85	154.82
EW7-38	458,790.4	896,334.4	158.01	159.63
EW7-39	458,892.4	896,444.3	149.47	152.55
EW7-40	458,885.2	896,575.3	148.53	152.53
EW7-41R	458,953.8	896,651.9	167.46	171.56
EW7-42	458,885.7	896,819.0	153.88	156.25
EW7-43	459,577.3	895,881.7	218.40	224.71
EW7-44	459,238.0	895,945.5	219.58	225.24
EW7-45	459,355.5	896,190.9	214.23	220.48
EW7-46	459,583.6	896,350.1	207.59	213.80
EW7-47	459,632.9	896,124.0	217.00	221.33
EW7-48	459,419.1	896,057.3	220.00	223.83
CELL 8				
EW8-1	458,795.6	894,259.7	186.20	190.52
EW8-2	458,445.8	894,271.1	195.42	198.58
EW8-3	458,613.0	893,963.5	234.95	240.05
EW8-4	458,325.1	894,050.2	233.31	238.18
EW8-5	458,395.2	893,623.1	235.17	239.83
EW8-6R	458,194.1	893,454.7	228.05	232.80
EW8-7	458,691.5	893,681.0	198.31	203.64
EW8-8	458,404.7	893,167.1	203.93	208.30
EW8-9	458,004.2	893,926.2	209.02	209.60
EW8-10	457,953.8	893,679.5	215.74	222.90
EW8-11	457,804.6	893,577.5	192.96	198.08
EW8-12	458,334.7	892,984.6	197.11	201.03
EW8-13	458,562.9	893,742.8	233.89	236.97
EW8-14	458,213.2	893,776.7	239.20	242.53
EW8-15	458,587.8	894,162.7	231.04	232.98
EW8-16	458104	893597	235	N/A
EW8-17	457978	893385	233	N/A
EW8-18	457875	893220	234	N/A
EW8-19	457694	893082	234	N/A
EW8-20	458181	893234	236	N/A
EW8-21	458068	893081	237	N/A
EW8-22	458125	892857	221	N/A
EW8-23	457876	892971	239	N/A
EW8-24	457715	892839	233	N/A
EW8-25	457547	892916	220	N/A
EW8-26	457477	893150	208	N/A
EW8-27	457660	893326	197	N/A
EW8-28	457810	893810	177	N/A
EW8-29	457431.85	896496.57	190.93	N/A
EW8-30	457458.14	896498.25	190.41	N/A
EW8-31	457478.7	896499.31	190.15	N/A
EW8-32	457511.13	896501.98	189.09	N/A
EW8-33	457558.8	896504.63	187.23	N/A
EW8-34	457585.19	896506.14	185.98	N/A
EW8-35	457600.03	896506.98	185.23	N/A
EW8-36	457603.72	896304.23	179.07	N/A
EW8-37	458585	893472	195	N/A
EW8-38	458390	893376	231	N/A
EW8-39	458399	893863	241	N/A

PERIMETER LANDFILL GAS PROBE LOCATIONS

GAS PROBE ID NUMBER	GAS PROBE LOCATION		GROUND SURFACE AT CASING	TOP OF INSIDE PVC CASING
	NORTHING	EASTING	ELEVATION	ELEVATION
J-1	458,470.76	897,235.85	100.58	101.23
J-3	459,256.26	897,312.87	122.27	123.72
J-4	459,878.34	897,384.16	114.45	117.07
J-5	460,484.96	897,413.33	105.45	107.58
J-6	461,023.72	897,408.35	110.96	111.90
J-7	461,705.41	897,408.99	116.10	117.72
J-8	462,192.10	896,620.06	119.30	121.60
J-11	461,805.30	895,494.40	132.80	134.34
J-12	461,289.34	895,006.69	135.56	137.12
J-13	460,934.33	894,658.30	187.61	190.19
J-14	460,635.64	894,408.82	138.80	140.86
J-15	460,421.20	894,117.70	136.20	138.45
J-16	460,146.73	893,754.45	130.88	133.48
J-17	459,872.08	893,409.74	128.62	130.73
J-18	459,645.33	893,101.23	131.50	133.56
J-19	459,364.56	892,959.25	146.54	148.84
J-20	459,085.97	892,845.48	157.74	159.89
J-21	456419.99	893077.08	217.37	220.62
J-22	455579.09	892552.78	191.08	194.66
J-23	455587.51	893018.30	180.17	183.77
J-24	455633.48	893635.51	171.84	175.31
J-25	455905.87	894304.27	184.86	188.44
J-26	455910.58	894974.33	199.11	202.72
J-27	456218.45	895521.12	184.76	188.39
J-28	456505.22	896047.93	186.56	190.24
J-29	456582.24	896769.18	175.90	179.52
J-30	456881.02	896805.08	155.52	159.04
J-31	457179.31	896858.21	182.23	185.78
J-32	457557.76	896917.41	144.51	148.26
J-33	457873.73	896982.96	124.42	128.06

NOTES

1. EXISTING TOPOGRAPHY DATED DECEMBER 29, 2022 WAS PREPARED BY PHOTOGRAMETRIC SURVEY PERFORMED BY COOPER AERIAL SURVEYS, CO., KYLERTOWN, PENNSYLVANIA. ADDITIONAL TOPOGRAPHY SOUTH OF THE 12/29/2022 MAPPING LIMIT ADDED FROM TOPOGRAPHY DATED JANUARY 11, 2019 PREPARED BY PHOTOGRAMMETRIC SURVEY PERFORMED BY LAND AND MAPPING, CLEARFIELD, PA.
2. SURVEY BASED ON MARYLAND NAD 1927 (HORIZONTAL DATUM) AND NAVD 1929 (VERTICAL DATUM).
3. VISIBLE SURFACE LFG SYSTEM FEATURES SURVEYED BY TRANSITION ENGINEERING SURVEYING, MIDDLETOWN, DELAWARE. CELL 8 LFG WELLS ORIGINALLY SURVEYED ON NOVEMBER 18, 2015 AND OTHER SITE FEATURES AS WELL AS MISCELLANEOUS CELL 8 FEATURES SURVEYED ON VARIOUS DATES INCLUDING NOVEMBER 2015 – JANUARY 2016, AND JULY 2017.
4. NEW LFG FEATURES INSTALLED IN CELLS 5,6&7 IN 2015 INCLUDING CONDENSATE SUMPS, NEW EXTRACTION WELLS AND ASSOCIATED PIPING FOR BOTH WAS SURVEYED IN SEPTEMBER 2015 BY MTPLS LAND SURVEYORS, LLC, TIMONIUM, MD. WHERE NEW SURVEY WAS NOT AVAILABLE AS DESCRIBED IN NOTE 3, SEPTEMBER 2015 SURVEY WAS USED AS TAKEN FROM AS–BUILT DRAWING SET BY CB&I ENVIRONMENTAL & INFRASTRUCTURE, INC.
5. AS–BUILT FOR OTHER ELEMENTS OF THE LFG SYSTEM NOT ADJUSTED FOR SURFACE FEATURE SURVEY DESCRIBED IN NOTE 2 OR INCLUDED IN NEW ELEMENTS DESCRIBED IN NOTE 4 ARE TAKEN FROM VARIOUS SOURCES:
   - SCS ENGINEERS, RESTON VA DATED 9/28/04
   - NAVARRO & WRIGHT, NEW CUMBERLAND, PA DATED 2/7/07
   - GOLDER & ASSOCIATES, MT. LAUREL, NJ DATED 10/09
   - GEOSYNTEC CONSULTANTS AS PREPARED FOR CELL 8 FINAL CLOSURE EXISTING CONDITIONS DRAWING NOS. G–3 AND G–4 DATED 2/2016
   - CELL 9.1 LFG SURVEY PROVIDED BY FREDERICK WARD ASSOCIATES, SURVEYED 1/11/21.
6. GAS WELL TOP OF 6" WELL CASING DERIVED FROM GROUND SURFACE AT WELL CASING SURVEY PLUS DISTANCE TO TOP OF WELL CASING AS MEASURED BY APTIM IN JULY 2017.
7. CELL 9 PERIMETER LANDFILL GAS PROBES (J–21 TO J–33) SURVEYED IN SEPTEMBER 2016 FOR AS–BUILT BY ALLAN MYERS.
8. LFG FEATURES IN CLOSE PROXIMITY MAY NOT BE SHOWN IN EXACT LOCATION FOR CLARITY.
9. ABANDONED WELLS HAVE BEEN GROUTED AND ARE NO LONGER SERVICABLE BUT HAVE BEEN LEFT IN PLACE. DECOMMISSIONED WELLS AND PIPING ARE EXISTING BUT ARE NOT CURRENTLY IN SERVICE.
10. NEW HORIZONTAL LFG EXTRACTION WELLHEADS AND COLLECTOR PIPING AND LATERALS IN SUBCELL 9.1 OBTAINED FROM VARIOUS SOURCES INCLUDING PHASE 1: SURVEY BY MTPLS, 9/2019 AND PHASE 2: SURVEY BY ALAN MYERS ON 1/5, 4/29, 6/10 AND 6/16, 2021. NEW LFG EXTRACTION WELLHEADS AND COLLECTOR PIPING AND LATERALS IN SUBCELL 9.2 OBTAINED FROM SURVEY PROVIDED 4/12/23.

LEGEND

- PROPERTY BOUNDARY
- 50 — EXISTING CONTOURS (C.I. = 2'/10') (SEE NOTE 1)
- EW8–4 — VERTICAL LFG EXTRACTION WELL
- HC8–9 — HORIZONTAL LFG EXTRACTION WELLHEAD AND COLLECTOR PIPING
- LFG LATERAL PIPING
- LFG HEADER PIPING
- g — GAS LINE
- c — LFG CONDENSATE PIPE
- CD–5 — CONDENSATE DRAIN
- CS–5 — CONDENSATE PUMP STATION
- CT–12 — CONDENSATE TRAP
- V–8 — ISOLATION VALVE
- LFG WELL/PIPING ABANDONED OR DECOMMISSIONED
- J–33 — PERIMETER LANDFILL GAS PROBE

NORTH

CELL 1 EAST (CLOSED)
CELL 2 (CLOSED)
CELL 4 (CLOSED)
CELL 8 (CLOSED)
COMBINED CELLS 5,6 & 7 (CLOSED)
CELL 9 (FUTURE)
SUBCELL 8.1
SUBCELL 8.2
SUBCELL 8.3
SUBCELL 8.4
SUBCELL 8.5
SUBCELL 8.6
SUBCELL 8.7
SUBCELL 8.8
SUBCELL 9.1 (ACTIVE)
SUBCELL 9.2 (ACTIVE)
SWM POND #1
SWM POND #2
SWM POND #3
SWM POND #4
SWM POND #5
SWM POND #6
SWM POND #8–1
SWM POND #9–2
TRAP
HW
GAS–TO–ELECTRICITY PLANT
BLOWER/FLARE STATION
ENCLOSED FLARE
UTILITY FLARE
LFG HEADER TRENCHES ALSO CONTAIN AIR AND CONDENSATE PIPING
LFG CONDENSATE PIPE TO CELL 8 LEACHATE GRAVITY PIPE
EXISTING CELL 8 LFG HEADER TO REMAIN
CELL 8 LFG HEADER
LFG TIE–IN TO LEACHATE MANHOLE
LEACHATE GRAVITY MANHOLE GMB–3
LEACHATE RISER MANHOLE RMB–2
LFG SUMP RMB–1
LEACHATE COLLECTION SYSTEM WETWELL
EXISTING LFG HEADER AND LEACHATE FORCEMAIN FROM CELL 9
CULVERT/RISER HOUSE–MANHOLE ACCESS (TYP.)
2" VALVE ON CONDENSATE FORCEMAIN
3" CONDENSATE FORCEMAIN
4" CONDENSATE FORCEMAIN
6" CONDENSATE FORCEMAIN
CONNECTION TO LEACHATE SYSTEM
REDUCED TO 8" HDPE BLIND FLANGE ABOVE GROUND
12" LFG HEADER
10" LFG HEADER
HORIZONTAL COLLECTORS FOR FUTURE USE
10" HDPE SDR 17 SOLID HEADER PIPE EXTENSION
10" BLIND FLANGE WITH CAP
CONSTANT AVE
BURNS CROSSING ROAD
DICUS MILL ROAD
ARABIAN COURT
LEACHATE STORAGE TANK
LEACHATE PRETREATMENT PLANT
MAINTENANCE BUILDING
PAPER RECOVERY FACILITY
CENTRAL RECYCLING CENTER
SCALE HOUSE
WAREHOUSE
ADMINISTRATION BUILDING

GRAPHIC SCALE
200 0 100 200 400 800
(IN FEET)
1 inch = 200 ft.

REVISIONS

BA GROUP

ANNE ARUNDEL COUNTY MARYLAND
MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY
SEVERN ANNE ARUNDEL COUNTY MARYLAND
LANDFILL GAS MANAGEMENT SYSTEM (UPDATED MAY 2023)

State College Office (814) 238-2060 • Delaware Valley Office (610) 495-5585

DATE: 5/12/23
DRAWN BY: SWH
CHECKED: KEF
BAI DRAWING NO: AACTY-020F002B
SHEET NO. 1 OF 1

Log + SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: [illegible] Enterprises
Tools: 4¼" ID HSA, SPT, CME75
Driller: Jeff DeCarlo Hole Diameter: 8½" ID

Site: Millersville Project No.: GE3073-23 Logger: J. Rayner

Boring: J1 Page 1 of 1 GL Elev.: 94 ft (mapest) Date: 27 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	TOPSOIL: (SM) SILTY FINE SAND, Dk yelbrn						0850, 27 Mar 92: Boring begun; ground saturated.
1.0	(SW) FINE to MEDIUM SAND (fg-cg, ms, sr qtz), little silt, grayish orange (10YR 7/4); coarsening downward into...			4-4-4-4	1	1.5	@3ft: Sand wet.
	@3.0ft: thickbed of (GW) GRAVELLY SAND (fg-fp, ps, sr qtz);						@4ft: Sands running.
	@4.0ft: becoming (SP) FINE SAND (fg, ws, sa qtz); grading into...		5	2-5-8-8	2	1.2	
5.0	(SM) SILTY SAND (vfg-fg, ws, sa qtz), yel. gray (5Y 7/2); grading downward into...			10-8-6-12	3	1.7	@8ft: Clay dry.
	@6.0ft: thickbed of (GM) CLAYEY GRAVELLY SAND (vps; fg-mg sa qtz; cg-mp sr-sa qtz);		10				0920, 27 Mar: Boring terminated @8ft; set one well -- • screen 8-3ft
	@6.5ft: fining downward into...						8-3ft sand
7.0	(ML) SILT and FINE SAND (silt-vfg), yel. gray (5Y 8/1);						3-2ft hole plug
	@7.2ft: thinbed of (CH) CLAY, mod. red. brn (10R 4/6).						2-0ft concrete.
	Total depth: 8ft.						

Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A.C. Schulbo
Tools: 9¼" ID HSA, SPT; CME 75
Driller: Jeff DeCarlo Hole Diameter: 8½"

Site: Millersville Project No.: GE 3073-23 Logger: J. Rayner

Boring: J3 Page 1 of 2 GL Elev.: 121 ft (msl est) Date: 24-26 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
1.0	(SM) FINE SANDY SILT, dk. yel. brn (10YR4/2)						1200, 24Mar92: Boring begun; ground moist due to rain.
	(SW) FINE SAND with silt (ms, vfg-mg, sr qtz), mod. or. brn (10R6/6); cyclically coarsens downward with some thin to medium beds of (SP) FINE SAND (fg-mg, ws, sr qtz), grayish orange (10YR 7/4); @7.5ft: becoming gravelly, some silt (mg-fp, ps, sr qtz); @8.0ft: begins to fine downward into...		5	2-2-2-3	1	1.6	@3ft: Sand wet
				1-1-3-3	2	1.5	
				5-7-7-7	3	1.4	
9.0				3-4-3-3	4	1.6	
	(ML) SILT, moderate yellowish brown (10YR 5/4) and light brown (5YR 5/6); grading into...		10	1-1-1-3	5	1.5	
12.0	(CH) Moderately fat CLAY, trace lignite, trace sand; @12.0ft: becoming dk. yel. brn. (10YR4/2); @13.0ft: becoming olive gray (5Y4/1); @15.0ft: medium bed of (SC) FINE SANDY CLAY; @16.0ft: thin bed of (SC) FINE SANDY CLAY; @16.3ft: becoming dusky yel. brn. (5Y6/4) with some laminations of yel. gray (5Y8/1); @17.0ft: thin bed of (GC) GRAVELLY CLAY (fp-mp, rounded, irregular-shaped quartz); @19.0ft: becoming light olive gray (5Y6/1) with some lignite; @20.0ft: begins to coarsen downward into...			0-0-0-0	6	2.2	
			15	0-0-0-3	7	2.0	@15ft: Sandy clay wet.
				1-3-3-4	8	2	@16ft: Clay at liquid limit.
				0-2-2-3	9	2	
	@21.0ft: medium bed of (SC) FINE SANDY CLAY; @21.3ft: becoming intermottled & laminated mod. red. brn. (10R4/6), dusky yel. (5Y6/4), rare grayish brown (5YR3/2); @21.5ft: very thin bed of (GC) GRAVELLY CLAY (as @17ft); @27ft: becoming predominately v. lt. gray (N8); @31.5ft: becoming predominately gray. brn. (5YR3/2); grading downward into...		20	0-3-3-4	10	2	@21ft: Sand moist.
				2-4-7-9	11	2	
			25	4-8-13-15	12	2.2	
				6-9-15-21	13	2.3	@27ft: Clay dry and hard.
				7-15-19-25	14	2.3	
32.0	Cyclically coarsening downward sequence; each cycle has a sharp top and gradually fines downward: (SM) FINE SANDY SILT, grayish pink (5R8/2) with laminations of v. dk red (5R2/6); (CL) SILTY CLAY, v. lt. gray (N8) with nodules (vfp) of v. dk. red (5R2/6) ironstone; (SP) FINE SAND (vfg, vws, sa qtz); u. pale or. (10YR8/2) @32ft: thin bed of FINE SAND; @33ft: very thin bed of FINE SAND @38.5ft: thin bed of FINE SAND @41.0ft: medium bed of FINE SAND;		30	7-12-14-15	15	2.4	@32ft: Sand bed wet; clay beds dry.
				5-9-11-21	16	2.2	
			35	8-12-16-18	17	2.4	
				9-17-32-50/4"	18	2.4	
				21-27-54	19	1.5	@38.5: Sand bed wet.
			40	24-38-50/4"	20	1.5	1540, 24 Mar 92: Boring suspended @42ft; borehol dry.
				24-50/3"	21	0.8	0730, 25 Mar: Water measure @36ft, boring resumed.
44.1				28-49-46	22	1.1	

Field Log -- SPT

GEOSYNTEC CONSULTANTS
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: _____
Tools: _____
Driller: _____ Hole Diameter: _____
Site: Millersville Project No.: _____ Logger: _____
Boring: J3 Page 2 of 2 GL Elev.: _____ Date: _____

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	(SP) FINE SAND (fg, uws, sa qtz), pale yellowish orange (10YR8/6);			14-25-27	23	1.5	0850, 25Mar: Boring suspended @ 47.5ft (augers @46ft); hydropunch to 50ft; attempt failed; augered to 50ft, SPT to 52ft,
	@45ft: becoming very pale orange (10YR8/2);		50	15-26-32-47	24	2.2	1000, 25Mar: hydropunch to 53ft.
	Boring Terminated @52ft.						1100, 25Mar: set well @50 ft; sand to 45ft; attempted to set hole plug from 45-10ft; hole plug bridged in augers; pulled augers; borehole collapsed @5ft.
							1530, 25Mar: reamed hole to 50ft; pressure grouted (17sx cement) from 50-5ft; topped with holeplug;
							0900, 26Mar92: offset 10ft to south; auger to 10ft; bailer sample @9ft; set one well --
							1. screen 10-3ft
							10-3ft sand (1.5sx)
							3-2ft holeplug (0.5sx)
							2-0ft concrete

Log -- SPT

GeoSyntec Consultants

5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A.C. Schulles
Tools: 4½" IDHSA,
Driller: JEFF DECARLO Hole Diameter: 8½"
Site: Millersville Project No.: GE3073-23 Logger: J. RAYMER
Boring: J4 Page 1 of 2 GL Elev.: 116' map est Date: 23-24 MAR 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
1.0	TOPSOIL: (SM) SILTY FINE SAND, dk yel. brn (10YR4/2)						1015, 23 Mar 92: Began boring.
	(SP) FINE SAND (fg, ws, sa qtz), grayish orange (10YR 7/4);			1-1-2-2	1	2.0	@2ft: Sand dry.
	@4ft: becoming with some silt, lt. brn. (5YR5/6); silt content increases downward		5	2-2-4-6	2	2.0	@4.3ft: Sand wet.
	@6.5ft: grading into...						
7.0	(CL) SILTY CLAY, mod. red. brn. (10R4/6), some laminations of grayish or. pink (10R8/2);			4-4-5-6	3	1.5	@7.5ft: Clay dry.
	@12.0ft: becoming very light gray (N8) with mottles of mod. brn. (5YR3/4) and a few nodules (vfo) of v. dk. red (5R2/6);			3-3-6-6	4	1.7	
	@13.2ft: med. bed of (CH) CLAY;		10	3-3-4-6	5	1.5	1045: Boring suspended @12ft.
14.0	(ML) SILT with fine sand, mod. red. brn. (10R4/6);			3-4-6-6	6	1.5	1215: Boring resumed; borehole dry.
	@15.3ft: med. bed of (CH) CLAY, some nodules of v. dk. red (5R2/6);		15	2-2-3-5	7	1.7	@ 14.3-14.6 ft: moist.
	@16ft: becoming (SM) FINE SAND and SILT (silt-vfg, ms), pale red. brn (10R5/4);			4-5-6-6	8	2.0	
	@17ft: becoming ripple laminated with dark reddish brown (10R3/4);			4-4-4-6	9	2.0	
	@19ft: becoming (ML) SILT (as @14ft), with a few laminations of very dark red (5R2/6);		20	4-5-8-10	10	2.0	
	@19.3ft: fining downward into...						
20.0	(CL) SILTY CLAY, yel. gray (5Y8/1);			14-23 50/3"	11	1.8	@22ft: Sand dry.
	@21.0ft: med. bed of (SP) FINE SAND with silt (silt-vfg, ms), pale red dish brown (10R5/4) with laminations of v. dk. red (5R2/6); sharp top; fining downward;		25	19-28-49-48	12	2.1	
	@23.4ft: fining downward cycle, as @ 21.0ft;			16-28-30-54	13	2.2	
25.1	sharp base with lams. of v. dk. red (5R2/6).			12-31-41-49	14	2.0	
	(SP) FINE SAND (vfg-fg, ws, sa qtz), v. pale or. (10YR8/2) with a few mottles (vfo) of mod yel. brn. (10YR5/4); contains internal cycles that begin with a sharp top and fine downward into (CL) SILTY CLAY, yel. gray (5Y8/1) with ripple laminations; laminations of v. dk. red (5R2/6) present in some intervals;		30	21-35-38-36	15	2.0	
	@28.3ft: thick bed of (CL) SILTY CLAY			20-40-50/3"	16	1.5	
31.0	(SP) FINE SAND (vfg-fg, ws-vws, sa-sr qtz), very pale orange (10YR8/2) with rare lams of pale yel. or. (10YR8/6) and gray. or. (10YR 7/4).		35	14-32-47-49	17	2.0	
				19-40-50/5"	18	1.5	
				17-51-50/3"	19	1.4	
			40	17-31-45-50/5"	20	1.8	@41.5ft: Sand wet.
				21-31-28-25	21	2	1515, 23 Mar 92: Boring suspended @42ft.
					22	1.9	0730, 24 Mar 92: Backfilled

Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: _____
Tools: _____
Driller: _____ Hole Diameter: _____

Site: Millersville Project No.: GE3073-23 Logger: _____
Boring: J4 Page 2 of 2 GL Elev.: _____ Date: 24MAR92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	SPT Run	SPT Rec.	Comments
	Boring Terminated @46ft.		50	7-11-16-21	22		0800, 24Mar92: Boring Terminated @46ft; drove hydropunch to 48 ft; attempt failed (fine sand clogged check valve); collected bailer sample @46ft; set two wells -- 1. screen 46-20 ft, 2. screen 7.5-3 ft; Annular material -- 46-38ft sand 38-20ft gravel 20-8 ft holeplug 8-3ft gravel 3-2ft holeplug 2-0ft concrete

Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A.E. Schultes
Tools: HSA - 4¼" ID ; SPT , CME75
Driller: Jeff DeCarlo Hole Diameter: 8½"

Site: Millersville Project No.: GE 3073-23 Logger: J. RAYMER

Boring: J5 Page 1 of 1 GL Elev.: 104 Date: 17 MAR 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	(SC) FINE SANDY CLAY, grayish orange (10 YR 7/4); fining downward into...						0900, 17 Mar 92: Boring begun, ground saturated.
2.0	(CH) CLAY, light brown (5YR 5/6) with some veins and laminations of very pale orange 10 YR 8/2;			4-8-11-16	1	2	
4.5	@4ft: becoming silty; grading into...		5	7-9-11-11	2	1.8	@4.6ft: sand moist.
	Coarsening downward sequence, light brown (5YR 5/6): @4.5 (SM) SILTY FINE SAND, some clay, (fg, ms; sa qtz); grading into...			5-7-7-7	3	2	
	@4.8 (GM) SILTY SANDY GRAVEL, some clay (vps; silt|fg, sa qtz to mp, wr qtz);			6-8-12-16	4	2	
5.0	(SM) SILTY FINE SAND (silt-vfg, ws) light brown (5YR 6/4); cyclically interbedded (medium to thick beds) with (ML) SILT and (CL) SILTY CLAY, moderate brown (5YR 4/4); all contacts gradational; entire sequence gradually coarsens downward;		10	6-11-12-15	5	2.4	
	@9ft: becoming very pale orange (10YR 8/2), some laminations of pale yellowish orange (10YR 8/6); silt and clay beds becoming light brown (5YR 6/4);			6-12-13-29	6	2.2	
	@15ft: thin bed of (SP) FINE SAND, some silt (csilt-vfg, ms, sa qtz)		15	11-27-38-50/4"	7	2	@15ft: sand bed wet.
	@16.6ft: medium bed of (SP) FINE SAND (fg, ws, sa qtz); upper contact sharp, gradually fining downward;			19-52-60/5"	8	1.4	@16.5ft: sand dry.
	@18.2ft: thick bed of (SP) FINE SAND, as at 16.6ft;			16-36-50/3"	9	1.3	
	@20ft: ripple laminations;		20	18-29-30-50/3"	10	2.4	
22.0	(SP) FINE SAND (vfg-mg, ws, sa qtz), very pale orange (10YR 8/2); coarsens downward, vfg @22ft, fg @23ft, mg @24ft;			14-31-44-50/3"	11	2.4	@22ft: sand dry.
	@24-25ft: dark yellowish orange (10YR 6/6);		25	15-43-52	12	1.5	
	@26ft: medium bed with some silt, little clay, dark brownish orange (10YR 8/6)			19-31-30-37	13	2	
	@27.3 thin bed of (CL) CLAY, very light gray (N8)			4-20-33-42	14	2.4	@28ft: sand dry at top of clay.
	@27.6 grading into...		30	12-18-25-31	15	2.4	@30ft: clay hard and dry.
28.0	(MH) SILT, yellowish gray (5Y 8/1);			14-26-34-50/4"	16	2.1	
	@32.4ft: very thin bed of (SP) FINE SAND, some silt (vfg, ws, sa qtz);		35	7-16-18-22	17	2.1	@34ft: sand wet.
34	@33.1ft: thin bed of (SP) FINE SAND (fg, ws, sa qtz)			10-20-27-27	18	2	1345: Boring suspended @38ft hydropunch to 40.5ft, 1445: Borehole deepened to 40ft. Set three wells 1. screen 40-34ft 2. screen 28-22ft 3. screen 7-3 ft. sand 40-34 ft hole plug 34-28 ft gravel 28-21 ft hole plug 21-7 ft gravel 7-3 ft hole plug 3-2 ft
	(SP) FINE SAND (little silt (fg, ws, sa-sr qtz), dark yellowish orange 10YR 6/6 at top; @35ft: becoming very pale orange (10YR 8/2).		40				
	Boring terminated @ 40ft.						

Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A.C. Schultes
Tools: HSA 4¼" ID SPT
Driller: Jeff DeCarlo Hole Diameter: 8½in

Site: Millersville Project No.: GE 3073-23 Logger: J. RAYMER

Boring: J6 Page 1 of 2 GL Elev.: 110 ft (Precise) Date: 14-16 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	(CL) SILTY CLAY, pale brown (5YR5/2); coarsening downward into...						1145, 14Mar92: Boring begun, ground saturated.
1.0	SAND with fines, fines decrease downward to 3.5ft, then increase downward to base: @1.0ft (SC-SM) CLAYEY SILTY SAND (fg, ws, srqtz), moderate reddish brown (10R4/6); @2.2ft: becoming (SP) FINE SAND, some silt and clay (fg, ws, srqtz), light brown (5YR5/6); @3.ft: becoming (SP) FINESAND, little clay, grayish orange (10YR7/4) @3.8ft: as at 2.2ft; @4.6ft: as at 1.0ft;			5-7-8-11	1	2'	@3ft: Sand wet.
			5	5-9-9-10	2	2'	
				7-9-10-11	3	2'	
				5-8-8-8	4	2'	
			10	5-6-8-8	5	2'	@12ft: Sand dry.
5.0	Very thin bed of IRONSTONE CONGLOMERATE (vcg-fp, ms; wrqtz, little fsp).			6-6-7-10	6	2'	@14ft: silt dry.
5.1	(SP) FINESAND with silt (vfg-fg, ws, srqtz), moderate reddish brown (10R4/6) with a few laminations of very pale orange (10YR8/2); @10.3ft: grading into...		15	8-13-13-18	7	2'	@15ft: Sand dry.
				9-13-15-18	8	2'	
				8-13-12-18	9	2'	
			20	8-19-23-20	10	2'	
10.5	(SM) SANDY SILT (vfg, ws, saqtz) very pale orange (10YR8/2); cyclically layered with (MH) SILT, pinkish gray (5YR8/1); ripple laminations throughout; @11.8ft: nodules and streaks of very dark red (2.5R2/6) @12ft: thick bed of (SP) FINESAND (fg, ws, saqtz); fining downward; @13ft: thin bed of (CL) clay, very light gray (N8)			8-13-18-21	11	2'	@29ft: Sand dry.
			25	12-19-18-24	12	2'	
				15-22-27-34	13		
				13-31 43-50/4"	14		
14.5	(SP) FINESAND with silt (Csilt-vfg-fg, ms, saqtz), pale yellowish orange 10YR8/6; faint planar and ripple laminations; entire sequence gradually coarsens downward; @18.6ft: becoming very pale orange consisting of smaller fining downward cycles with sharp tops @24ft: (fg-mg, ws saqtz) fining downward @30ft (mg, ws, saqtz)		30	19-40 54-50/4"	15		1440, 14 Mar92: Boring suspended @ 32ft; borehole dry.
				22-31-39-52	16		0945, 16Mar92: Boring resumed; borehole dry, 1030, boring suspended @41 1230, boring resumed, borehole dry. @41 ft: Sand wet.
			35	20-32-40-50/3"	17		
				12-20-26-28	18		
				21-27-32-34	19		
			40	15-25-23-22	20		
				14-15-15-14	21		

Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: _____
Tools: _____
Driller: _____ Hole Diameter: _____

Site: Millersville Project No.: _____ Logger: _____

Boring: J6 Page 2 of 2 GL Elev.: _____ Date: _____

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	SPT Run	SPT Rec.	Comments
	Boring Terminated @46ft		50	0-3-4-12	22		1300, 16Mar92: Boring terminated @46ft; borehole wet; hydropunch to 49ft; set two wells 1. screen 45-15 ft 2. screen 10'-4 ft annular material-- 46-35 ft sand 35-15 ft gravel 15-10 ft hole plug 10-4 ft gravel 4-2 ft hole plug 2-0 ft concrete

Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30092

Drilling Co.:
Tools: HSA 4 1/4" ID
Driller: Jeff DeCarlo Hole Diameter: 8 1/2 in

Site: Millersville Project No.: GE3073-23 Logger: J. Rayner

Boring: J7 Page 1 of 1 GL Elev.: 115ft (mapped) Date: 13 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	(CH) CLAY, tough, moderate dry strength, mod. red. brn (10R4/6) with some veins and mottles of v. lt. gray (N9), rare dusky yellow (5Y6/4);						1215, 13 Mar 92: Began boring.
	@8ft: some nodules (vcg) of very dark red (5R2/6);			3-6-10-10	1		@2ft: Clays compacting when hammered.
			5	6-11-16-18	2		
				5-11-13-16	3		
				5-7-10-14	4		
			10	5-8-11-15	5		
	@12ft: grading into mod. brn (5YR4/4) with some mod. to mod. red. brn (10R4/6)			5-7-13-19	6		
	12.5ft. fracture filled with ochre silt, mod. yel. brn. (10YR5/4) and dusky brown (5YR2/2) ironstone;		15	7-9-14-7	7		
	@13.0ft: mod. brn (5YR4/4) with some med. gray (N5);			6-10-16-25	8		
	@13.5ft: fractures, as @ 12.5ft;			6-10-16-22	9		
	@18.2-18.5ft: some ochre nodules, dark yel. orange (10YR6/6);		20	5-12-13-16	10		
	@19.3ft: trace lignite;			9-8-11-14	11		@22.5ft: Clayey sand moist.
	@21.5ft: becoming with some sand (vfg, sr q, t2)			4-10-15-16	12		@24ft: Sand beds moist
	@22ft: becoming light brownish gray (5YR6/1)		25	12-20-25-21	13		
	@22.3ft: very thin bed of (SC) CLAYEY FINE SAND (fg, ws, sr q t2); dark yel. or. (10YR6/6);			2-5-9-13	14		1445, @ 26.5ft: Borehole wet, Collected water sample with bailer -- pH 6.6, cond 210 umhos, temp 13°C
	@22.7ft: thin bed of (SC) CLAYEY FINE SAND (same), dark yel. or. (10YR6/6) with some mod. red (5R4/6) and a little v. dk red (5R2/6);			4-9-12-17	15		1520: Water measured @ 25.7
	@22.8-24.5ft: no sand;		30				1550, 13 Mar 92: Boring termin
	@24.5ft: increasing sand and lignite;						@ 32ft; set well
26.0	(SC) CLAYEY FINE SAND with some lignite (fg, ws, sr q t2), dark gray (N3); lignite consists of large (1/4-1") wood;						screen 30-24 ft
	@28.5ft: Lining downward is to...						sand 32-23ft
29.0	(CH) CLAY, olive gray (5Y4/1);		35				holeplug 23-2ft
	@29.5ft: med. bed with a little silt and sand; becoming brownish gray (5YR4/1);						concrete 2'-0"ft
	@30.6ft: med bed as @ 29.5ft						
	Total depth: 32 ft.						

Old Log -- SPT

GEOSYNTEC CONSULTANTS
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A. J. Scudder of Delaware
Tools: 4¼" ID HSA SPT, CME 75
Driller: Jeff DeCarlo Hole Diameter: 8½"

Site: Millersville Project No.: GE3073-23 Logger: J. Raymer
Boring: J8 Page 1 of 2 GL Elev.: 119ft msl est Date: 18 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	(CH) CLAY, tough, moderate dry strength, mod. yel. brn (10YR5/4) with veins and mottles of yel. gray (5Y8/1), rare dark yel. or. (10YR6/6), few scattered nodules of mod. red. brn. (10R4/6);						0900, 18Mar92: Boring begun.
				4-7-8-9	1	1.2	@2ft: Clays compacting during SPT.
			5	3-6-11-15	2	1.4	
				6-9-15-18	3	1.3	
				6-9-14-18	4	1.6	
	@13ft: becoming pale brown (5YR5/2) with medium gray (N5);		10	5-7-11-15	5	1.6	
	@14-15ft: some dark yel. or. (10YR6/6);			4-7-11-16	6	1.6	
	@15.5ft: thick bed of (MH) SILT, grayish olive fork (5YR7/2), coarsening into...			5-9-11-17	7	1.6	
	@16.0ft: med. bed of (SM) SANDY SILT, dark yel. orange (10YR6/6), sharp base.		15	4-7-9-11	8	2.4	
	@16.5ft: becoming silt with a trace of lignite and rare, scattered laminated soil ochre silt dark yel. or. (10YR6/6);			1-3-5-7	9	2	@18ft: Silty zones wet.
	@18.2ft: medium bed of (ML) SILT, dark yellowish or. (10YR6/6) and med. red. (5R5/4); sharp base;		20	3-6-5-7	10	2	
	@18.4ft: (CH) CLAY; med. dark gray (N4) with rounded lignite (wood fragments up to ½ inch long)			4-8-12-17	11	2.1	@22ft: Clays expanding during SPT
	@18.9ft: becoming (CH) CLAY, olive gray (5R4/1) finely interbedded with dusky yellow (5Y6/4), rare lignite;		25	9-12-16-20	12	2.2	
	@20ft: becoming pale brown (5YR5/2);			5-9-14-19	13	2.2	
	@30ft: gradually grading into brownish gray (5YR4/1);			5-8-13-19	14	2	
			30	5-9-14-19	15	2	
				5-9-13-18	16	2.2	
	@43ft: gradually becoming silt with rare silt; silt content gradually increasing downward;		35	4-7-12-16	17	2.2	
	@46ft: silt and clay becoming distinctly interbedded;			4-8-13-18	18	2.2	
				4-8-11-14	19	2.2	
			40	3-8-10-14	20	2.2	
				7-14-21-28	21	2.2	
				11-22		2.3	

Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: _____
Tools: _____
Driller: _____ Hole Diameter: _____

Site: Millersville Project No.: GE3073-23 Logger: _____

Boring: J8 Page 2 of 2 GL Elev.: _____ Date: _____

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
				33-44	22		
47	Interbedded Clay and Silt; coarse grained, (CH) Clay, dark gray, (N3); (ML) SILT, light gray, (N7); weak abundant [illegible]			13-23-36-50/4"	23	2.4	@47ft: Sand wet
69' MSL			50	8-85-25-50/5"	24	2.4	
	@47.2ft: [illegible]			0-0-11-15	25	2.4	
	@45.6ft: [illegible]		55				1400, 18 Mar: Boring suspended @ 52ft; hydropunch sample, augered to 53ft; boring terminated @ 53ft Set one well -- screen 53-48ft, annular material: 53-47ft sand (2.5x) 47-2 ft hole plug (20sx) 2-0 ft [illegible]
48.6	(ML) SILT, pale yel. [illegible] (10YR 8/6); [illegible] (SP) Sand (fine, [illegible]); [illegible] (10YR 8/3); [illegible] (5Y 4/6) and [illegible] (5Y 2.5/2); [illegible]						
50	(SP) Fine SAND (mg, [illegible], sr qtz), pale yel. (10YR 8/6); [illegible] (10R 6/6) [illegible] (10YR 8/3).						
	Total Depth: 53ft						

Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: _____
Tools: _____
Driller: _____ Hole Diameter: _____

Site: Millersville Project No.: GE3073 Logger: _____
Boring: J10 Page 1 of ____ GL Elev.: 126 Date: 31 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
1	TOPSOIL (CL) SILTY CLAY, dark brn						1215, 31 Mar92: Boring begun.
	(CL) CLAY, mod. red brn (10R4/6) with mottles and veins of yel gray (5Y8/1) and a little dark red. brn. (10YR6/6), becoming gradually softer downward;			2-4-5-7	1	1.3	@2ft: clay compacting; dry to liquid limit.
			5	5-8-10-12	2	1.7	
				8-12-13-15	3	1.7	
				9-9-12-13	4	.4	
			10	9-9-12-15	5	1.6	
				6-10-14-18	6	1.7	
	@16ft: beginning to crumble into...		15	5-9-12-15	7	1.7	
				5-7-11-15	8	1.5	
				2-5-8-11	9	1.4	
			20	4-6-10-13	10	1.8	
	@24ft: becoming (CH) CLAY, tough, moderate dry strength; moist color: 5YR4/4, toughness increases downward			6-10-13-17	11	2.1	
			25	2-6-12-16	12	1.6	
	@29ft: becoming med. gray (N5) with some diffuse brownish gray (5YR4/1); becoming very mottled brownish gray downward;			6-11-13-17	13	1.6	
				2-5-8-13	14	1.8	
	@32ft: [illegible] brownish gray (5YR4/1)		30	3-6-11-16	15	2	
				6-11-17-21	16	=	1530, 31Mar: Boring suspended @32ft; borehole dry.
			35	13-18-19-24	17	=	0830, 1Apr92: Boring resumed borehole dry.
				7-11-17-17	18	2.1	
	@40ft [illegible] quartz			4-9-14-19	19	1.9	
			40	7-11-15-20	20	2.1	
				7-11-14-18	21	2.3	

Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: _____
Tools: _____
Driller: _____ Hole Diameter: _____
Site: _____ Project No.: _____ Logger: _____
Boring: SB10 Page 2 of 2 GL Elev.: _____ Date: _____

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
				11-61-15		2.2	Boring
	@47ft: becoming with [illegible] silt; silty [illegible]			8-14-23-27	23	23	
			50	3-12-23-31	24	2.1	
				6-16-25-31	25		
	@52ft: Total Depth		55				1100, 1 Apr: Boring terminated @52ft; bore hole dry; boring plugged with 25 sx hole plug (hydrated).
			60				
			65				
			70				

Boring Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: G. J. Services
Tools: 4¼" ID HSA SPT CME 75
Driller: Jeff DeCarlo Hole Diameter: 8½"
Site: Millersville Project No.: GC 3073-23 Logger: T. Rayner
Boring: J11 Page 1 of 1 GL Elev.: 132 ft (mapped) Date: 31 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	SPT Run	SPT Rec.	Comments
1.0	TOPSOIL: (SM) SILTY FINE SAND, [illegible]						0915, 31 Mar 92: Boring began.
	(SW) FINE to MED. SAND (fg-vcg, ms-ps, sa-sr qtz); grayish orange (10YR 7/4); [illegible]; sharp base.			1-2-2-3	1	1.6	@ 2ft: Sand wet
3.0	(SM) SILTY-CLAYEY FINE SAND (fg-mg, ws, sr qtz), [illegible] orange (5YR 5/6); @ 4ft: becoming dark [illegible] (10YR 6/6) with [illegible] (10YR 5/2),		5	4-8-12-12	2	1.8	@ 5ft: sandy clayey!
5.5	(SW) [illegible] SAND (mg-vfg, ms, sa qtz), grayish orange (10YR 7/4); sharp base			4-3-7-11	3	1	@ 8ft: Clay, dry
7.0	(CL) SILTY CLAY, moderate reddish brown (10R 4/6) with [illegible] of yel gray (5Y 8/1).		10				0945, 31 Mar: Boring [illegible] @ 8ft; bailer sample; set [illegible] @ 8-3ft
	Total depth: 8ft.						Annular material -- 8-3ft Sand (2 sx) 3-2ft hole plug (½ sx) 2-0ft Cuttings

d Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A.e. Schmidt's
Tools: HSA, 4¼" ID, w/SPT; CME75
Driller: Jeff Decarlo Hole Diameter: 8½ in
Site: Millersville Project No.: GE3073-23 Logger: T. Rayner
Boring: J12 Page 1 of 2 GL Elev.: 136' (map est.) Date: 4-5 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6	Run	Rec.	Comments
	(SP) FINE SAND (mg, ws, sr qtz, tr fsp) grayish orange (10YR 7/4); gradually becoming lighter downward, possibly bioturbated, grading into...			1-1-3-5	1	2'	1445, 4 Mar 92: Began Bor: @2ft: sand moist. @4ft: clay dry.
3.5	(CH) FAT CLAY, some silt and sand in upper 2.5ft; @3.5-6ft: interbedded very light gray (N8) and pale yellowish brown 10YR 6/2 @6-12ft: moderate yellowish brown (10YR5/4) with disturbed interbeds and mottles of very light gray (N8), brown becoming less dominant; @12-14: moderate reddish brown (10R 4/6) and moderate yellowish brown red becoming more dominant downward 14-19: mostly mod red (10R 4/6) with laminations of mod. yel. brn and dark yellowish orange (10YR 6/6); grading into ...		5	3-5-6-9	2	1'	@5-16ft: clay compacting / spoon;
				5-6-10-11	3	2'	
				3-5-9-9	4	1.6	
			10	7-9-10-13	5	1'	
				5-8-11-14	6	1.6	
			15	4-6-12-12	7	1.6	
				4-8-14-18	8	2	
19	(SC) FINE SANDY CLAY, very light gray (N8) with some laminations of very dark red (5R 2/6); grading into...			6-12-21-27	9	2	
21	Interbedded: (SP) FINE SAND (vfg-fg; ws, sr, qtz), very light gray with some laminations of very dark red (5R 2/6) that become rarer downward to 28ft; w/ (MH) ELASTIC SILT (qtz), very light gray (N8); all contacts very gradational, passing through intervals of (SM) FINE SANDY SILT; beds generally thin to thick; salient features are noted below		20	15-26-26-26	10	2	@22-46ft erratic silts & sanding in spoon;
				25-32-45-55	11	2.2	1630, 4 Mar 92: Suspend boring @ 24 ft.
			25	27-38-4760/4"	12	24	0730, 5 Mar 92: Resume boring; sand dry.
				12-36-6015"	13	24'	
				23-37-42-60/5"	14	24'	@21-41ft: Sand dry.
	@23ft: thin bed of bright reddish orange (10R 5/8) sand.		30	34-60-60-60	15	2.1	
	@27.5ft: very dark red lamination - and			22-51-53-60/3"	16	2.4'	
	@28ft: medium bed of sand (mg), dark yellowish orange (10YR 6/6)			24-42-51-60/2"	17	2.4	
	@27ft: thick bed of Elastic Silt		35	24-42-51-60/3"	18	2.4	
	@31ft: medium bed of pale yellowish orange (10YR 8/6) Sand (mg)			30-26-62-60/4"	19	24'	
	@34ft: possible bioturbations in Sandy Silt						
	@34.5ft: thin bed of moderate red sand		40	14-24-29-38	20	2.1	@41ft: Sand moist
	@35.5ft: thick bed of silt						
	@37ft: thick bed of sand			18-26-30-59	21	2.3'	
	@39ft: Silt becomes predominate						
	@41ft: Sand becomes predominate			19-44			

d Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: _____
Tools: _____
Driller: _____ Hole Diameter: _____

Site: Millersville Project No.: GE 3073-23 Logger: _____

Boring: J-12 Page 2 of 2 GL Elev.: _____ Date: _____

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
				41-60/5"	2'	2.4	@40ft: Sand wet; bore dry.
				25-35-33-40	2'	2.1	
				13-14-16-29	2'	2'	
50	Boring Terminated @ 50ft		50				1030, 5 Mar 92: Termin ated boring @ 50ft; se / well: screen 50-20 ft gravel 50-20 ft (10 s hole plug 20-2 ft (8 sx concrete 2-0 ft
			55				

Soil Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: [illegible] & Schnabel
Tools: 4¼" ID HSA, SPT CME 75
Driller: Jeff DeCarlo Hole Diameter: 9½"

Site: Millersville Project No.: GE 2073-23 Logger: J. Rauner

Boring: J13 Page 1 of 2 GL Elev.: 187ft (mayest) Date: 10-12 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
							1215, 10 Mar 92: Boring begun.
1.0	TOPSOIL: (SM) SILTY FINE SAND, dk brn. orn.						
	(SP-SW) MEDIUM SAND (fg-cg, little vfg-vfp, ms, sr qtz, tr hm), grayish orange (10YR 7/4); coarsening downward;			3-3-3-6	1	1.5	
	@4.5ft: medium bed with some gravel (to fp, wr qtz); little hematite cement;		5	5-10-10-7	2	1.7	
	@5.0ft: fining downward into...						
6.5	(CL) CLAY, yel. gray (5Y8/1); some nodules (vfp) of U. dk. red [illegible] (5R2/6); few lams. of fine sand;			4-4-6-8	3	1.5	@7.5ft: Sand wet.
	@7.0ft: coarsening downward into...			4-5-6-7	4	1.7	@8.5ft: Sand dry.
7.0	(SC) CLAYEY MEDIUM SAND (fg-vfp, ms, sr qtz), gray. or. (10YR7/4); coarsening downward;		10	3-5-5-6	5	1.6	
8.5	sharp base.			4-5-5-6	6	1.9	@14ft: Sand wet.
	(SP) FINE SAND (vfg-fg, ws, sa qtz), gray. or. (10YR 7/4); coarsening downward to 12.5ft;						
	@8.5-9.5ft: a few lams. and thin beds of (SM) SILTY FINE SAND, mod. yel. brn. (10YR 7/4);		15	2-3-3-4	7	2.0	@16ft: Clay dry.
	@12.0ft: becoming with some gravel (vfp-fp, sr qtz);			2-3-4-5	8	2	
	@13.0ft: fining downward, becoming clayey;			2-3-4-5	9	2	@19ft: [illegible] dry.
14.6	grading into...		20	3-7-9-9	10	2	@21ft: Sand dry.
	(MH) SILT, yel. gray (5Y8/1); rare lams. of (SP) FINE SAND (vfg), gray. or. (10YR 7/4); fining downward to 17ft, then coarsening downward;						1345, 10 Mar: Boring [illegible] @ 22ft.
	rare lams and mottles of dusky red (5R3/4);			4-4-9-9	11	1.6	0745, 11 Mar: Boring [illegible]; borehole dry
	@15.5-22.0ft: with [illegible] to medium interbeds of (SP) FINE SAND (fg, ws, sr qtz), v. pale or. (10YR 8/2) and pale yel or. (10YR 8/6);			1-3-5-8	12	2	
	@23.6ft: thick bed of (SP) FINE SAND (same);		25	4-5-6-8	13	2.2	
	@24.5ft: thick bed of pale red. brn. (10R 5/4);			3-3-4-7	14	2.3	
	@28.2ft: med. bed of FINE SAND (same)			9-8-12-16	15	2.3	
	@34.5ft: sand (same) filled burrow (thin bed size);		30	8-11-12-14	16	2.3	
	@35.8ft: med bed of Sand (same);			7-11-11-30	17	2.3	
	@36.4ft becoming interbedded with (SP) FINE SAND (vfg, ws); v. pale or. (10YR 8/2); grading into...		35	7-11-33-42	18	2.3	@38ft: Sand dry.
37.3	(SP) FINE SAND (vfg-fg, ws, sa qtz), little clay, v. pale or. (10YR 8/2);			17-18-26-32	19	2	
	@37.7ft: thin bed, fines into (MH) SILT, yell. gray (5Y8/1) with [illegible] of dusky red (5R 2/6);		40	14-22-16-22	20	2.2	@40.5ft: Sand wet.
41.5	eroded base.						
	(MH-CL) SILT and SILTY CLAY, light gray (5Y 7/1);			11-16-23-26	21	2.3	@43ft: Clay dry
				8-13-		2.3	

Log - SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross Georgia 30093

Drilling Co.: _____
Tools: _____
Driller: _____ Hole Diameter: _____

Site: Millersville Project No.: _____ Logger: _____

Boring: J13 Page 2 of 2 GL Elev.: _____ Date: _____

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
45.6	(SP) FINE SAND (f-vfg, ws, sg qtz), little clay, very pale orange (10YR8/2) with some to thin beds of pale yel. or. (10YR8/6) and grayish orange (10YR7/6); @45.9ft: med. bed of laminated sand. (MH) SILT, yel. gray (5Y8/1); @57-59ft: some clasts of cobble red (5YR6/2);		50	18-27	24	2	@46ft: Sand dry.
				62-33-45-50/5"	23	2	
				15-36-48-54/5"	24	2	
				28-43-46-51	25	2	
				16-27-33-42	26	2	
			55	18-26-39-50/4"	27	2	
				17-28-35-42	28	2	
				28-39-42-52	29	2	
			60	28-33-38-39	30	2	@62ft: Sand dry at [illegible] with clay.
	@62.3ft: thick bed of (C) CLAY yel. gray (5Y8/1); eroded (op) shark base;			0-23-31-36	31	2	@62ft: Rods fell 40ft, [illegible] spoon 6in [illegible].
	@64.2ft: thick bed of (C) CLAY (same)						@64ft: Sand dry.
			65	18-32-31-52	32	-	
	Total Depth: 66ft.						1450, 11 Mar: Boring terminated @42ft; borehole dry
							0900, 12 Mar: Borehole dry
							Set [illegible] wells --
							• screen: 62-47 ft
							• screen: 42-36 ft
							• screen: 13.5-9 ft
							Annular materials --
							66-62 ft: hole plug (1 sx)
							62-47 ft: gravel (5 sx)
							47-42 ft: hole plug (2 sx)
							42-36 ft: gravel (2 sx)
							36-13.5 ft: hole plug (10 s
							13.5-9 ft: gravel (2 sx
							9-2 ft: hole plug (3 s
							2-0 ft: cement

Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: S.C. Schultes
Tools: HSA 4¼" ID, SPT, CME75
Driller: Jeff Decarlo Hole Diameter: 8½"
Site: Millersville Project No.: GE 3073-23 Logger: J. Raymer
Boring: J 14 Page 1 of 1 GL Elev.: 136 (map est) Date: 4 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	Topsoil: (SM-SC) Sandy Clayey Silt, dark yellowish brown (10 YR 4/2)						0840, 4 Mar 92: Began Boring @0-3ft: Moist.
2	(SP) SAND (fg, WS, SR, qtz,) trace silt moderate yellowish brown (10 YR 5/4); @3.5: ironstone concretions (cp); @4-4.4: little gravel (fp-mp); @4.4: laminations of organic material (black); @4.4-5.4: some very thin beds of (SM) SILTY SAND with some organic matter, moderate brown; (5 YR 4/4) with streaks of black (NR); @5.5 becoming gray orange (10YR 7/4); @9.3 becoming bioturbated with fines and a trace of disseminated organic carbon, moderate yellowish brown (10YR 5/4); fines become more abundant downward		5	3-3-3-3	1	2'	@5ft: Sand dry.
				1-2-2-3	2	1.5'	
				3-3-4-5	3	2	
			10	1-3-4-4	4	1.8'	@8.9ft: Sand wet @9.5ft: mild odor.
				1-3-6-7	5	2'	@11ft: clay dry. @15ft: Sand dry.
10.5	Thinly interbedded CLAYEY SAND and CLAY: (CL) CLAY, very light gray (N8) (SC) CLAYEY SAND, very light gray (N8) and dark yellowish orange (10YR 6/6)			2-2-2-3	6	1.8'	@12.8ft: Sand wet
			15	2-2-3-3	7	1'	@15ft: Sand running.
11.0	(SP) SAND (fg, WS, SR, qtz), very pale orange (10YR 8/1) @14.5 becoming bioturbated, with fines, moderate yellowish brown (10YR 5/4); fines becoming more abundant downward.			1-2-3-3	8	2'	
				1-1-2-3	9	2'	
13.5	(CL) CLAY, lean, trace silt, very light gray (N8)		20				1050, 4 Mar 92: Terminated Boring @ 20ft; Set 2 wells: 1. Screen 18-12ft 2. Screen 10-5ft 20-18ft holeplug (1½ sx) 18-12ft gravel (1½ sx) 12-10ft holeplug (1 sx) 10-5ft gravel (1½ sx) 5-2ft holeplug (1½ sx) 2-0ft concrete
	Bottom of Boring at 20ft						1330, 4 Mar 92: Well Comp

Log -- SPT

GeoSyntec Consultants

5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A.S. Schuldes
Tools: HSA 4¼" ID; SPT; CME 75
Driller: Jeff DeCarlo Hole Diameter: 8½"

Site: Millersville Project No.: GE 3073-23 Logger: J. Rayner

Boring: J15 Page 1 of 2 GL Elev.: 134' (mapped) Date: 3 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
							0900, 3 Mar 92: Boring begun.
1.0	TOPSOIL: (SM) SILTY FINE SAND, dk. yel. brn. (10YR4/6)						
	(SP) FINE SAND (fg, ws-vws, sr-sph), grayish orange (10YR 7/4); a few very thin to medium and rare possible burrows of (SM) SILTY FINE SAND (same), moderate yellowish brown (10YR 5/4).			2-2-3-3	1	2'	
			5	2-3-3-5	2	1.8'	
6.0	(SC) FINE SANDY CLAY, yel. gray (5Y8/1) and grayish orange (10YR7/4); @6.6 ft: med. bed (CL) CLAY, yel. gray (5Y8/1); @7.3 ft: bed of brn. (MH) SILT, yel. gray (5Y8/1); gradational to...			5-6-10-11	3	2'	@5.8ft: Sand dry; sand moist 0.1ft above contact.
				7-12-27-40	4	2'	
9.3	(SP) FINE SAND (vfg-fg, ws, sr-sph), very pale orange (10YR8/2); cyclically fining clean, wood; interbedded with (SM) SILTY FINE SAND (same), dk. brown (7.5YR 3/2) and grayish or. (10YR 7/4); @12.0ft: medium bed of (SM) @14.0ft: becoming (SM) interbedded with @15.0ft: thickened of (SP), @16.0ft: thin bed of (SP), @17.6ft: thin bed of (CL) CLAY, yel. gray (5Y8/1)		10	18-33-38-41	5	2'	@10ft: Sand dry.
				15-22-34-37	6	2'	
			15	12-25-23-24	7	2'	
				12-25-22-24	8	2'	
	@19.0ft: gradational to...			12-20-16-16	9	2'	@19ft: Sand dry.
19.3	(CL) CLAY, some sand, some silt, yellowish gray (5Y 8/1); rare irregular red bed, v. dk. red (5R 2/6)		20	9-26-24-49	10	2'	@19.2ft: Sand moist. @20 ft: Sand dry.
	@20.5ft: medium bed of (SP) FINE SAND (fg, ws, sr-sph), interlaminated due to red (5R 2/6) and dusky yellowish orange (10YR 6/6)			14-22-30-46	11	2'	
21.5	(SP) FINE SAND (fg-vfg, ws, sr-sph), very pale orange; @25.5 ft: med. bed of (SM) SILTY FINE SAND (same), grayish orange (10YR 7/4); @26.2 ft: gradational to...		25	13-31-29-29	12	1.8'	@24ft: Sand dry.
				15-23-25-26	13	2'	
26.5	(SP-SM-SC) FINE SAND with fines (vfg-mg, vws-ms, sr-sph) grayish orange (10YR 7/4); becoming increasingly homogenized downward; @26.5ft: thin bed of (CL) CLAY, yel. gray (5Y8/1); burrowed; sharp base @26.6 ft: thick bed of (SP) SAND (as @ 21.5ft); @29.5-29.5ft: very thin beds of burrowed clay @30 ft: becoming very homogenized; bioturbated; sharp base with burrows.		30	11-13-17-18	14	2'	@30ft: Sand moist (?)
				5-18-32-36	15	2'	
				12-27-28-30	16	1.8'	
			35	6-10-13-20	17	2'	
34.3	(ML) SILT, some sand (vfg), little clay, moderate gray (5Y8/1); @37.5ft: med. bed of (SM) SILTY SAND, dk. yel. or. (10YR6/6) with a few laminae of v. dk. red (5R 2/6);			6-11-18-32	18	2'	@36ft: Sand dry.
38.2	(SP) FINE SAND (vfg-fg, ws, sr-sph) pale yel. or. (10YR 8/6) and grayish or. (10YR 7/4); @38.7ft: med bed of (ML) SILT (as @ 34.3ft); @40.5 ft: lamination of pale red. purple (5RP 6/2), @42ft: [illegible] (mg, ws) @44.1 ft: med bed of (CL) CLAY, yel. gray (5Y8/1) @44.3 ft: becoming (vfg, ws, sr-sph).		40	16-28-32-54	19	2'	@39ft: Sand dry.
				12-29-35-52	20	2'	@41ft: Sand wet.
				7-30-56-57	21	1.6	@44ft: Sand running.
						1.5	

Field Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: _____
Tools: _____
Driller: _____ Hole Diameter: _____
Site: _____ Project No.: _____ Logger: _____
Boring: J-15 Page 2 of 2 GL Elev.: _____ Date: _____

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	SPT Run	SPT Rec.	Comments
	Total Depth: 46ft.			19-26	22		1600, 3Mar92: Boring terminated @ 46ft; set 4 wells: 1. screen- 46-39 ft, 2. screen 34.5-21.5 ft, 3. screen 19.5-9.5 ft, 4. screen [illegible]-3.5 ft; annular materials: 46-39 ft grout (2.5 sx) 39-34.5 ft holeplug (2 sx) 34.5-21.5 ft grout (4 sx) 21.5-19.5 ft holeplug (1.5 sx) 19.5-9.5 ft grout (3 sx) 9.5-6 ft holeplug (1.5 sx) 6.0-3.5 ft grout (2 sx) 3.5-2 ft holeplug (1.5 sx) 2-0 ft Concrete 1830, 3Mar92: Wells Completed.

d Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A. J. Schaefes
Tools: 4¼" ID HSA, SPT ; CME 75
Driller: Jeff DeCarlo Hole Diameter: 8½"
Site: Millersville Project No.: GE 3573-23 Logger: J. RAYMER
Boring: J 116 Page 1 of 1 GL Elev.: 130 (mayeot) Date: 2-3 Mar 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	TOPSOIL: (SM) SILTY FINE SAND, some plant material, dark yellowish brown (10YR 4/2).						1430, 2 Mar: Boring begun.
1.0	(SP) FINE SAND with some silt, (sd: fg-mg, ws-ms, sa qtz), moderate brown (5YR 4/4).			2-2-3-4	1	1.8'	@ 3ft: Sand dry.
3.0	(SP) FINE SAND (fg-mg, a few vcg, ws-ms, sa qtz, no fines), grayish orange (10YR 7/4);		5	2-4-5-8	2	1.8'	
				4-4-5-6	3	1.8'	
	@9ft: medium bed of dark yellowish orange (10YR 6/6);			4-4-7-8	4	1.5'	
	@11.4ft: thin bed containing some iron-stone nodules (mp);		10	6-10-13-13	5	1.8	@10ft: Sand dry.
	@11.5ft: thin bed of (SM) SILTY FINE SAND, moderate brown (5YR 4/4),			10-12-16-22	6	1.8	
	@11.6ft: trace gravel (vfg-fg, sr qtz)		15	11-14-20-(34)	7	2	
	@12.6ft: very thin bed of (GW) GRAVELLY SAND (fg-mg, sa qtz; vfg-fg, sr-sa qtz);			13-16-(17-20)	8	2	@17ft: Sand dry. @18ft: Sand wet.
13.0	(SW) SAND with silt (mg-cs, fg-vcg sa qtz), moderate brown (5YR 4/4), moderately cohesive;			11-15-8-9	9	2	
	@16.3: thin bed of (GW) SANDY GRAVEL (ps, mg-mp, sa-sr qtz)		20	6-6	10	1	@21ft: Clay dry.
	@16.8: medium bed of (SP) FINE SAND (fg, ws, sa qtz, tr mat.), no fines, loose, Grayish orange (10YR 7/4),						1630, 2 Mar 92: Boring dry to @ 21ft; stop for evening. 0730, 3 Mar 92: Pull augers and set well, Screen 21-4 ft, gravel 21-11ft (45x), hole [illegible] 2ft (15x), cover to 2-0ft
	@18.4: thick bed of (GW) GRAVELLY SAND (fg-cp, ps sa-sr qtz); sharp base.						
19.2	(MH) CLAYEY SILT, trace sand (vfg) yellowish gray (10Y 8/1)						
22	Boring terminated @ 22ft						

Note: the sand is brown from 1-19.8ft appears to be a sequence of [illegible] deposits

d Log -- SPT

GeoSyntec Consultants

5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A.I. Schwabs
Tools: 4¼" ID HSA w/SPT; CME 75
Driller: Jeff DeCarlo Hole Diameter: 8½"

Site: Millersville Project No.: GE 3073-23 Logger: J. Rayner

Boring: J-17 Page 1 of 1 GL Elev.: 127 (mean sol) Date: 2 MAR 91

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	(SP) FINE SAND (ms, vfg-mg, sa qtz), moderate reddish brown (10YR 5/4);						0900, 2 Mar 91: Boring begun
	@ 2.1 ft: very thin bed of (GP) GRAVEL (fp-mp, ws, wr qtz)			4-6-7-10	1		@3ft: Sand wet.
	@2.3 ft: grading downward into ...						@4ft: Clay moist.
2.6	(SM-SW) SILTY SAND (ps, silt-mg sa qtz, cg-fp sr qtz), cohesive, light brown (5YR 5/6); grading into...		5	5-5-6-8	2		@6ft: Clay dry.
	@4.0ft: (SM-SP) SILTY FINE SAND (ms, silt-fg); grading into...			5-7-5-6	3		@6.8ft: Sand dry.
4.5	(MH) CLAYEY SILT, some sand (vfg), very pale orange (10YR 8/1);			3-4-5-9	4		@9ft: Sand wet.
	@4.7ft: very thin bed of (SP) SAND (vfg, vws);		10	1-3-6-9	5		
	@5.0ft: medium bed of (CL) CLAY, light gray;			2-4-13-14	6		@13ft: Borehole wet
	@6.0 ft: becoming dark grayish brown (5YR 5/6);						
	@7.2ft: very thin bed of (GW) GRAVELLY SAND (ps, mg-fp); sharp,		15	4-8-14-12	7		
7.5	Coarsening upward sequence, light brown 5YR 5/6;			4-16-17-24	8		
	@7.5ft: (CL) SILTY CLAY, some sand (vfg); grading into...			6-9-7-14	9		@19ft: Sands running.
	@ 8.5ft: (SM) SILTY FINE SAND (fg, vws) with rare very thin beds of clay and silt;		20	6-8-14-19	10		
	@ 9ft: (SP) FINE SAND (fg, vws) with silt; some layers of (SM) SANDY SILT; trace gravel (fp, wr qtz);						1030, 2 Mar 91: Boring terminated @ 22ft; Set well, screen 19-9ft, native sand 22-19ft, gravel 19-9ft (4 sx), hole dia 9-2ft (3 sx) Concrete 2-0ft.
	@10.7: very thin bed of dusky brown (5YR 2/2); followed by (GM-GW) SILTY SANDY GRAVEL (silt-mg, vfg-cg)						
	@11.3ft: thin bed of iron stained sand; sharp base.		25				
11.4	(SP) SAND (fg, vws, wr qtz), little clay, grayish orange (10YR 7/4); sand coarsens downward; rare disturbed laminations of (CL) CLAY, very light gray (N8); bioturbated;						
	@ 11.4 ft: thick bed of (ML) Clayey silt						
	@14ft: becoming (mg, vws, wr)						
	@16ft: becoming (cg, vws, wr)						
	@16.6ft: thin bed of (CL) CLAY, very light gray (N8)						
	@18.8ft: thin bed of CLAY						
	@19ft: becoming vcg, vws, wr						
19.1	(SC) SANDY CLAY (sd: fg-fp, ps), very light gray (N8);						
	@ 20.2ft: (SP) (ms, mg, sa qtz), grayish orange (10YR 7/4); sharp, burrowed base.						
20.5	(CL) CLAY, yellowish gray (5Y 8/1), rare burrow marks, very dark red (5R 2/6).						
22	Boring Terminated @ 22ft						

d Log + SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A. Schuttes of Delaware
Tools: HSA 4½" ID, SPT; CME 75
Driller: Ken DeRoche Hole Diameter: 8½"
Site: Millersville SLF Project No.: GE 3073-23 Logger: J. Raymer
Boring: J 18 Page 1 of 1 GL Elev.: 130' (map est) Date: 27-28 Feb 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
0.5	Topsoil: (SC) Sandy Clay, dark yel. brn, very soft						1245, 27 Feb 92: Began boring.
	(SM) SILTY FINE SAND (vfg, ms, qtz), stiff, yellowish gray (5Y 8/1); gradually coarsening downward into...			6-6-7-10	1		
3.5	(SP) SAND (mg, WS, sr, qtz, tr maf) medium dense, dark yellowish orange 10YR 6/6);		5	5-13-14-12	2		
	@3.5-4.5: fg, very pale orange (10YR 8/1)			5-10-10-14	3		
	@4.8-5.3: (GW) Gravelly SAND (mg-mp, ps)			6-5-3-3	4		@8.5ft: Sand wet.
	@5.3-5.4: ironstone cement, blackish red (5R 2/2)		10	2-2-3-5	5		@10.5ft: Clay dry, borehole dry
	@5.8: Thin bed of (ML) CLAYEY SILT						
	@9.0: (GW) Gravelly Sand (mg-mp, ps) Sharp base			6-10-10-11	6	1.8	@13ft: Borehole wet.
9.2'	(CL) CLAY, medium gray (N5), some silt, little sand (vfg); top 0.1 ft weathered to dark yellowish orange (10YR 6/6), dry.						@14ft: gravel heaving.
12.5	(SW) Sand (mg-vcg, some fg, ms, sr-sa qtz, tr maf), medium dense, grayish orange (10YR 7/4);		15	4-2-1-2	7	1.5	
	@14ft: thin bed of SILTY SAND sharp base			1-1-5-2	8	2	@17ft: gravel heaving.
15	(OL) LIGNITIC SILTY CLAY, dusky yellowish brown (10YR 2/2); coarsens downward, wet			2-4-6-8	9	1	1530, 27 Feb 92: Suspended boring (rig problems)
16.5	(SP) SAND (vfg-fg, WS, qtz), much organic matter, some silt, dusky yellowish brown (10YR 2/2); grading downward into		20	3-4-6-7	10	1	0800, 28 Feb 92: Cleaned hole, heaving gravel; attemp to plug back to 17.5 ft, gra heaved when augers pulled 'o caved to 18.5ft; hole plu
17	(GW) GRAVELLY ORGANIC SAND (fg-cg, PS, sr-sa qtz) dusky yel brn; sharp base loose						18.5-17.5 ft (½ bag); set well @18.5ft (screen 18.5-13. ft), 2 sx gravel; attempted seal 13-9 ft, pulled auger to 10 ft, gravel heaved up in augers to 9 ft.
17.5	(CH) CLAY, tough, plastic, moderately cut moderate reddish brown (10R 4/6) with streaks of pale red (10R 6/2) and grayish orange pink (10R 8/2).		25				1200, 28 Feb 92: Abando borehole; pulled casing reamed out to 22ft, plug to surface with bentonit slurry (65 gals); slur settled to 10ft after 24 hrs; topped with Hole Plug.
	BT @ 22 ft		30				1315, 28 Feb 92: Offset 3 to SW, auger to 11ft (no sa set well @ 11ft (screen 11'-4 gravel to 4ft, hole plug 4-21
	Set protective casing @ 2.56 ft above ground.		35				3 sx gravel, 1 sx hole plug.
	1430, 1 Mar 92: Measured water @ 8.8ft.		40				

Log -- SPT

GEOSYNTEC CONSULTANTS
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A.L. Schultes of Delaware
Tools: HSA, 4¼" ID, Cont. SPT ; CME-75
Driller: KEN DEROCHE Hole Diameter: 8½"

Site: Millersville SLF Project No.: GE3073-23 Logger: J. RAYMER

Boring: J19 Page 1 of GL Elev.: 144' (map est.) Date: 26-27 Feb 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	(SP) SAND (mg; ws, sr, qtz, trmafics) trace fines, trace gravel (vfp, wr, qtz), loose, grayish orange (10 YR 7/4); some medium to thin beds of (SP-SM) SAND (same) with fines, light brown (5 YR 5/6); @ 0-2.5ft: subsoil zone, dark yellowish orange (10 YR 6/6) with streaks of dark yellowish brown (10 YR 4/2);			7-2-2-2	1	1.6	1430, 26 Feb 92: Began boring
			5	6-3-4-5	2	2	
				WOR/12" 4-5	3	1	
				2-2-4-4	4	2	
			10	6-4-4-4	5	1.5	
				WOR-7-9	6	1	
			15	4-5-6-8	7	1	
				WOR/12" 6-7	8	2	
18.5	Sharp base.			3-4-6-8	9	2	@ 18ft: Sand dry; slightly moist at contact
	(CH) CLAY, tough, moderately fat moderate reddish brown (10 R 4/6) with rare laminations of moderate yellowish brown 10 YR 5/4); gradually coarsens downward @ 20: small (½ in diameter burrow filled with (SP) SAND (mg, ws); rare laminations of sand (same)		20	3-5-7-9	10	2	
				4-5-9-12	11	2	
	25ft - ft becoming less uniform; some intervals containing some sand (vfg) and with some swirls of grayish orange pink (10 R 8/2) and very light gray (N8).		25	5-7-9-12	12	2	@ 24.5 ft: Harder.
				10-11-17-17	13	2	1630, 26 Feb 92: Suspended boring @ 26ft; borehole d
				5-7-7-9	14	2	0720, 27 Feb 92: Resumed boring; borehole dry.
	@ 31ft some swirls of dark yellowish orange (10 YR 6/6); grading downward into		30	4-10-16-25	15	2	
				12-14-17-25	16	1.5	@ 32ft: Sand wet.
33	Silt with cyclically interbedded sand and clay, gradually coarsening downward; all contacts gradational: (ML) SILT, little sand (vfg), very light gray; (CL) CLAY, some silt, moderate red (5 R 4/6) with laminations of grayish orange pink (10 R 8/2), becoming diminutively light gray by 38ft; (SP) SAND (vfg-fg; uws, wr-sr qtz, occurs as very thin beds @ 34.2', 36.5', 37.5, and 38ft.		35	19-12-15-17	17	2	
				12-15-17-17	18	1.8	
			40	9-10-10-14	19	1.8	0930, 27 Feb 92: Termina boring @ 40ft; set two w (screens 40-35 ft and 19-4ft; gravel 40-32 ft an 19-4ft, hole plug 32-19ft a 4-2ft, concrete above 2ft
	BT @ 40'						

d Log -- SPT

GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: A. Schuckles
Tools: 4 1/4" ID HSA, SPT, CME 75
Driller: Ken DeRoche Hole Diameter: 8 1/2"
Site: Millersville Project No.: GE 3073-23 Logger: J. Raymer
Boring: J20 Page 1 of 2 GL Elev.: 156 msl est Date: 25 Feb 92

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	Run	Rec.	Comments
	Topsoil: (SM) SILTY MEDIUM SAND (fg-mg, vps) brown (10 YR 4/2)						1120, 25 Feb 92: Begin drilling, light rain.
1.5	Marshy Fm: (SW) Gravelly SAND (fg-mg, vps) some clay, hematite concr ±, light brown (5 YR 5/6); shard semi-loose.			5-10-11-11	1		
4	Pataspsco Fm: (ML) SILT, some sand; cyclically interbedded with some very thin to medium beds of (SP) FINE SAND (vfg, vws, sr qtz); @4-5ft: pale reddish brown (10 R 5/4); @5ft: becoming very pale orange (10 R 8/2) grading into ...		5	5-8-11-13	2		
				7-9-10-12	3		
				5-8-10-10	4		
			10	8-11-11-10	5		
12	(SP) Fine SAND (vfg-fg, vws-vws, sr-r qtz), very pale orange (10 YR 8/2); [illegible] interbedded with some very thin to thick beds of ... (CL) SILTY LEAN CLAY, very light gray, (N8); @19ft: thick bed of dark yellowish orange [illegible] Sand. @ 15-22: thick bed of (CL) clay with sand [illegible]			4-6-7-11	6		@ 12ft: Sand ced msic @ 16ft: borehole dry
			15	4-7-7-10	7		
				4-5-6-7	8		
				5-7-7-9	9		
			20	4-5-5-5	10		@ 21 ft: clay, dry
				6-12-18-18	11		@ 23 ft: Sand dry
23	(SP) FINE SAND (fg, vws, sr qtz), very pale orange (10 YR 8/2) to grayish orange/pink (10 R 8/2); [illegible] for... @23-24: very dark red (5 R 2/2) grading into dark yellowish orange (10 YR 6/6) @24-24.3: medium bed of Sand (vfg, with Cmes @24.5: very dark red [illegible] @ 26: medium bed of (mg, few fg, ms), in dark yellowish orange (10 YR 6/6) @29.5: thin bed of Sandstone, with [illegible], in pinkish gray (5 YR 8/1); Massive, possibly [illegible].		25	6-13-18-22	12		
				5-13-24-27	13		
			30	[illegible]-10-35	14		
				16-24-32-40	15		
				18-32-60/5"	16		
			35	[illegible]-22-27	17		
				[illegible]-26-25	18		
				15-17-19-29	19		1550, 25 Feb 92: Boring suspended @ 40 ft.
			40	13-22-30-40	20		0750, 26 Feb 92: Boring Resumed; borehole dry
				10-14-18-20	21		@ 43.5 ft: Sand wet.
				9-10	22		

Field Log -- SPT

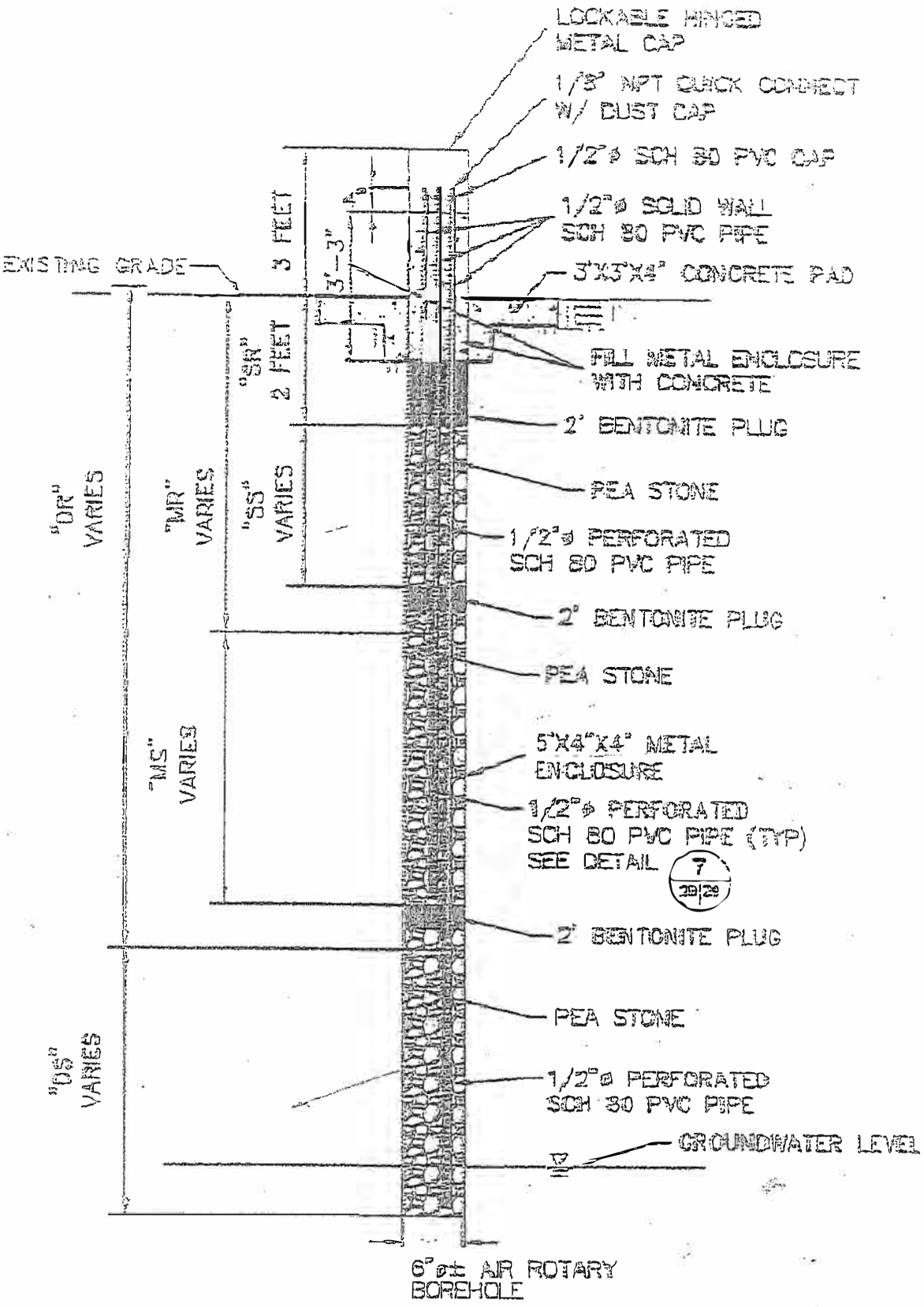
GeoSyntec Consultants
5950 Live Oak Parkway, Suite 330
Norcross, Georgia 30093

Drilling Co.: ____
Tools: ____
Driller: ____ Hole Diameter: ____

Site: Millersville Project No.: GE3073-23 Logger: ____

Boring: J-20 Page 2 of 2 GL Elev.: ____ Date: ____

Stratum Top	Description	Graphic Log	Depth Scale	SPT Blows/6"	SPT Run	SPT Rec.	Comments
	@45.5: High angle cross laminations; rare fine pebbles			15-20	24		
				8-12-20-26	24		
	Boring Terminated @ 48ft.						0910, 26 Feb 92: Boring terminated @ 48ft; Set 2 wells:
	Augers sank to 50 ft when rods pulled, indicating running sand.		50				1. Screen 48-24 ft 2. screen 15-5 ft 48-24 ft gravel (8 sx) 24-15 ft hole plug (4 sx) 15-5 ft gravel (5 sx) 5-2 ft hole plug (1 sx) 2-0 ft concrete



NESTED LFG PROBES DETAIL

5 | 29

NOT TO SCALE

4.8.8

NOTES:

1. METAL ENCLOSURE TO BE PAINTED WITH

C 1 | 28431 | SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY
8 13

DATE WELL COMPLETED MM DD YY: 07 13 16 (15 20)

Depth of Well 22 [illegible] 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" 28 29 30 31 32 33 34 35 36 37

OWNER Anne Arundel County (last name / first name)

WELL SITE ADDRESS 389 Burns Crossing Road TOWN Severn

SUBDIVISION SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED yes Y / no N

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO. M D 517 [illegible]

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO. D

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y / no N (44 44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT CM (45 46) · BENTONITE CLAY BC (45 46)

NO. OF BAGS [illegible] NO. OF POUNDS 175

GALLONS OF WATER [illegible]

DEPTH OF GROUT SEAL (to nearest foot)

from 0 (48) TOP (52) ft. to [illegible] (54) BOTTOM (58) ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL · CO CONCRETE · PL PLASTIC · OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	1/2 (63 64)	33 (66 70)

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to
PL	0	13
PL	0	3

SCREEN RECORD
screen type or open hole — insert appropriate code below

ST STEEL · BR BRASS BRONZE · HO OPEN HOLE · PL PLASTIC · OT OTHER

DEPTH (nearest ft.)

EACH SCREEN

1	PL (8 9)	33 (11 15)	65 (17 21)			
2	PL (23 24)	13 (26 30)	29 (32 36)			
3	PL (38 39)	3 (41 45)	5 (47 51)			

SLOT SIZE 1 1/8 2 [illegible] holes 3

DIAMETER OF SCREEN 1 1/2 (56 60) (NEAREST INCH)

from to

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: 2-10, 12-30, 32-65 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING · LOG INDICATOR · OTHER DATA

C 3 — PUMPING TEST
HOURS PUMPED (nearest hour) [illegible] (8 9)

PUMPING RATE (gal. per min.) [illegible] (11 15)

METHOD USED TO MEASURE PUMPING RATE N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING N/A (17 20) ft.

WHEN PUMPING N/A (22 25) ft.

TYPE OF PUMP USED (for test)

- A air (27)
- P piston (27)
- T turbine (27)
- C centrifugal (27)
- R rotary (27)
- O other (describe below) (27)
- J jet (27)
- S submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES / NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31 35)

PUMP HORSE POWER (37 41)

PUMP COLUMN LENGTH (nearest ft.) (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)

+ (49) above · − (49) below — LAND SURFACE (nearest foot) (50 51)

LATITUDE 3[illegible]

LONGITUDE 7[illegible]

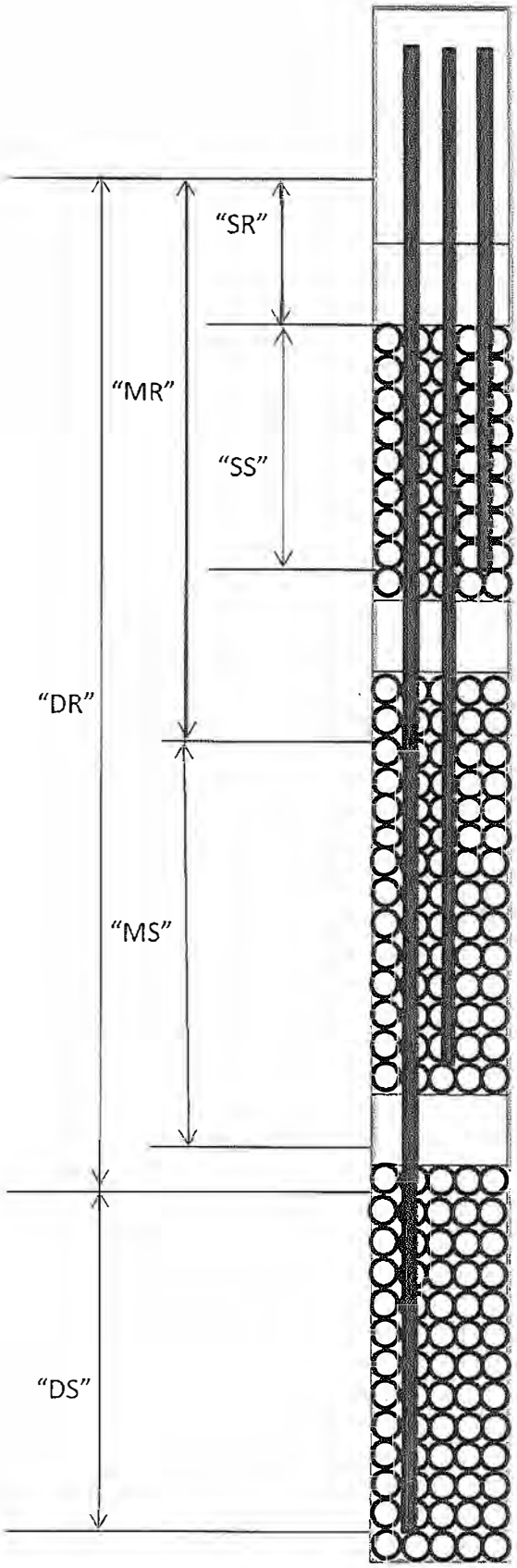
(DEFAULT COORD. WGS 84)

NOTES:

Well is (3) 1/2" nested LFG probes

Well tag: J21

OWNER



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J21

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 32'

Drawing Not To Scale

C 1 | 28436 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY (6–13)

DATE WELL COMPLETED MM DD YY (15–20): 07 12 16

Depth of Well (22–26): 70 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" (28–37): AA - 14 - 0680

OWNER Anne Arundel County (last name, first name)

WELL SITE ADDRESS 369 Burns Crossing Road TOWN Severn

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED (yes / no): N

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04 04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO. M D 347

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO. _ _ D _ _ _

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y (44) / no N (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT CM (45 46) BENTONITE CLAY BC (45 46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 87

DEPTH OF GROUT SEAL (to nearest foot)

from 0-2 (48) TOP 10-12 (52) ft. to 30-32 (54) BOTTOM (58) ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL; CO CONCRETE; PL PLASTIC; OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	1/2 (63 64)	33 (66 70)

EACH CASING — OTHER CASING (if used)

	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole — insert appropriate code below

ST STEEL; BR BRASS BRONZE; PL PLASTIC; HO OPEN HOLE; OT OTHER

C 2 (1 2)

DEPTH (nearest ft.)

EACH SCREEN		from	to
1 (8 9)	PL	33 (11 15)	70 (17 21)
2 (23 24)	PL	13 (26 30)	29 (32 36)
3 (38 39)	PL	2 (41 45)	9 (47 51)

SLOT SIZE 1 1/8 2 round holes 3

DIAMETER OF SCREEN 1/2 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: 2-10, 12-30, 32-70 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q

TELESCOPE CASING (70) LOG INDICATOR (72) OTHER DATA (74 75 76)

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) N/A (8 9)

PUMPING RATE (gal. per min.) N/A (11 15)

METHOD USED TO MEASURE PUMPING RATE N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING N/A (17 20) ft.

WHEN PUMPING N/A (22 25) ft.

TYPE OF PUMP USED (for test)

A (27) air; P (27) piston; T (27) turbine; C (27) centrifugal; R (27) rotary; O (27) other (describe below); J (27) jet; S (27) submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES / NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31 35)

PUMP HORSE POWER (37 41)

PUMP COLUMN LENGTH (nearest ft.) (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)

+ (49) above; – (49) below LAND SURFACE (nearest foot) (50 51): 2

LATITUDE 3 _ . _____

LONGITUDE 7 _ . _____

(DEFAULT COORD. WGS 84)

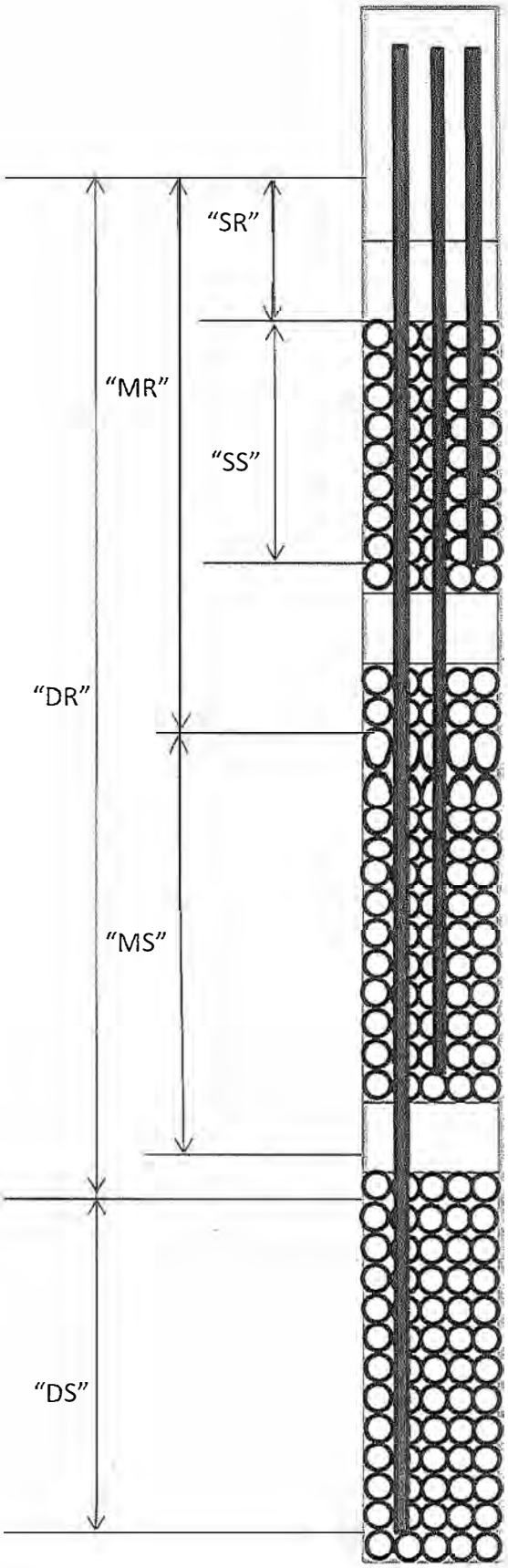
NOTES:

Well is (3) 1/2" nested LPG probes

Well tag: J22

OWNER

MDE/WMA/PER.071



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J22

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 37'

Drawing Not To Scale

C 1 28437 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY (8–13)

DATE WELL COMPLETED MM DD YY: 07 15 16 (15–20)

Depth of Well: 75 (TO NEAREST FOOT) (22–26)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 14 - 0680 (28–37)

OWNER Anne Arundel County (last name / first name)

WELL SITE ADDRESS 389 Burns Crossing Road TOWN Severn

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M __ D 547

DRILLERS SIGNATURE _____
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __ __ D __ __ __

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT [C M] (45 46) BENTONITE CLAY [B C] (45 46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 87

DEPTH OF GROUT SEAL (to nearest foot)

from 0-2, 10-12 (48–52) ft. to 30-32 (54–58) ft.
TOP / BOTTOM
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[S T] STEEL [C O] CONCRETE [P L] PLASTIC [O T] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60–61)	1/2 (63–64)	33 (66–70)

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole — insert appropriate code below

[S T] STEEL [B R] BRASS [H O] OPEN HOLE [P L] PLASTIC BRONZE [O T] OTHER

C 2 (1–2)

DEPTH (nearest ft.)

EACH SCREEN				
1	PL (8–9)	23 (11–15)	75 (17–21)	
2	PL (23–24)	13 (26–30)	28 (32–36)	
3	PL (38–39)	2 (41–45)	8 (47–51)	

SLOT SIZE 1 1/8 2 coated poles 3 _____

DIAMETER OF SCREEN 1/2 (56–60) (NEAREST INCH)

from to

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: 2-10, 12-30, 32-75 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W Q

70 ____ TELESCOPE CASING
72 ____ LOG INDICATOR
74 75 76 ____ OTHER DATA

C 3 (1–2)

PUMPING TEST
HOURS PUMPED (nearest hour) N/A (8–9)

PUMPING RATE (gal. per min.) N/A (11–15)

METHOD USED TO MEASURE PUMPING RATE N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING N/A (17–20) ft.

WHEN PUMPING N/A (22–25) ft.

TYPE OF PUMP USED (for test)

[A] air (27) [P] piston (27) [T] turbine (27)
[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)
[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES / NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31–35)

PUMP HORSE POWER (37–41)

PUMP COLUMN LENGTH (nearest ft.) (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)

[+] (49) above / [–] (49) below LAND SURFACE

(nearest foot) (50–51)

LATITUDE 39 . 084009

LONGITUDE 76 . 672007

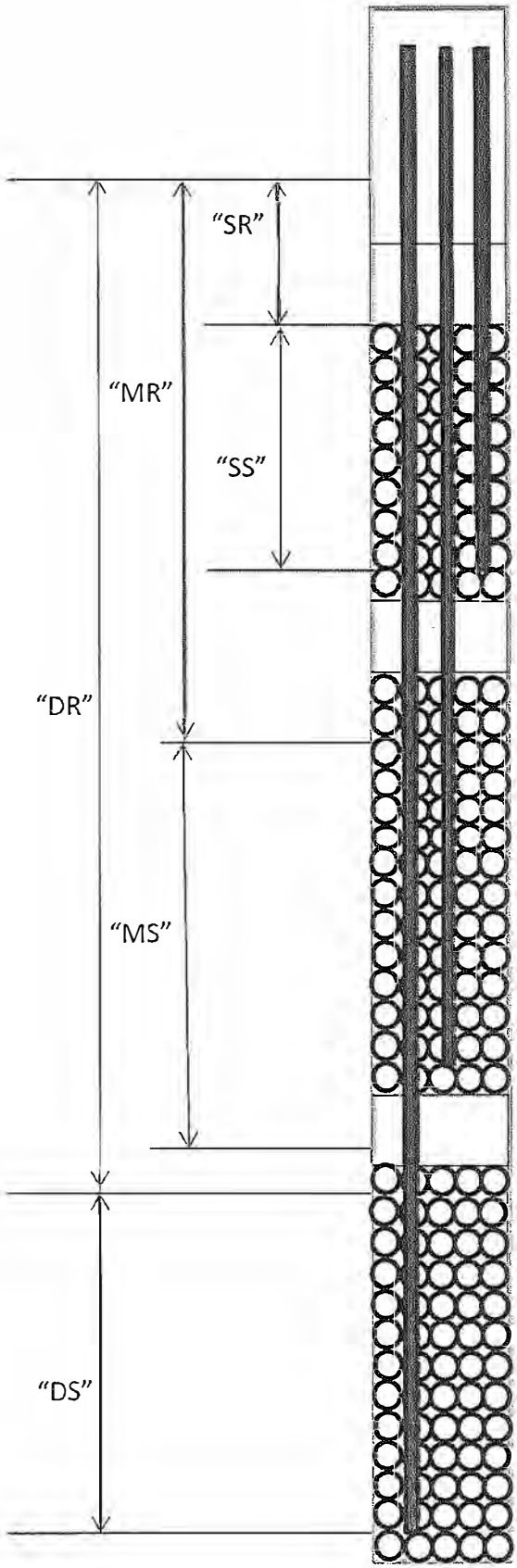
(DEFAULT COORD. WGS 84)

NOTES:

Well is (3) 1/2" nested LFG probes

Well tag: J23

OWNER



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J23

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 42'

Drawing Not To Scale

C 1 28438 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY DATE Received MM DD YY (8–13)

DATE WELL COMPLETED MM DD YY: 07 08 16 (15–20)

Depth of Well: 50 (TO NEAREST FOOT) (22–26)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 14 - 0680 (28–37)

OWNER Anne Arundel County (last name first name)

WELL SITE ADDRESS 389 Burns Crossing Road TOWN Severn

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M D 517

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: D

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT [C M] (45 46) BENTONITE CLAY [B C] (45 46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 87

DEPTH OF GROUT SEAL (to nearest foot)

from 0-2, 10-12 ft. (TOP 48 52) to 30-32 ft. (BOTTOM 54 58)

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[S T] STEEL [C O] CONCRETE [P L] PLASTIC [O T] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	1/2 (63 64)	33 (66 70)

EACH CASING — OTHER CASING (if used)

	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole — insert appropriate code below

[S T] STEEL [B R] BRASS [H O] OPEN HOLE [P L] PLASTIC [O T] OTHER

C 2 (1 2)

DEPTH (nearest ft.)

EACH SCREEN

1	PL (8 9)	33 (11 15)	50 (17 21)
2	PL (23 24)	13 (26 30)	29 (32 36)
3	PL (38 39)	2 (41 45)	9 (47 51)

SLOT SIZE 1 1/8" 2 round 3 holes

DIAMETER OF SCREEN 1/2 (56 60) (NEAREST INCH)

from to

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: 2-10, 12-30, 32-60 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) N/A (8 9)

PUMPING RATE (gal. per min.) N/A (11 15)

METHOD USED TO MEASURE PUMPING RATE N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING N/A ft. (17 20)

WHEN PUMPING N/A ft. (22 25)

TYPE OF PUMP USED (for test)

[A] air (27) [P] piston (27) [T] turbine (27)

[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)

[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES [NO]

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31 35)

PUMP HORSE POWER (37 41)

PUMP COLUMN LENGTH (nearest ft.) (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)

[+] above [–] below (49) LAND SURFACE

(nearest) foot: 3 (50 51)

LATITUDE 39.004068

LONGITUDE 76.669811

(DEFAULT COORD. WGS 84)

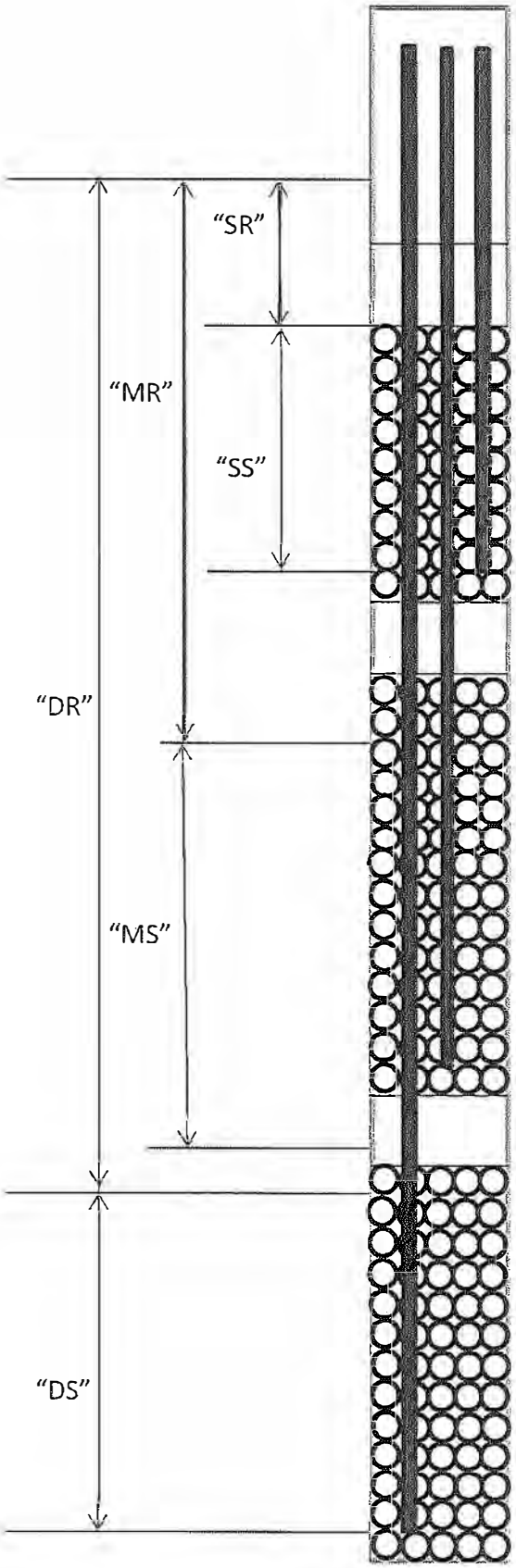
NOTES:

Well is (3) 1/2" nested LFG probes

Well tag: J24

MDE/WMA/PER.071

OWNER



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J24

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 27'

Drawing Not To Scale

C 1 | 28439 | SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY
8 13

DATE WELL COMPLETED MM DD YY: 07 06 16 (15 20)

Depth of Well: 75 (TO NEAREST FOOT) (22 26)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 14 - 0680 (28 29 30 31 32 33 34 35 36 37)

OWNER Anne Arundel County (last name, first name)

WELL SITE ADDRESS 389 Burns Crossing Road TOWN Severn

SUBDIVISION ____ SECTION ____ LOT ____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes [Y] no (N)

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT. AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M D 517

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __ __ D __ __ __

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes (Y) (44) no N (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT [CM] (45 46) BENTONITE CLAY [BC] (45 46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 87

DEPTH OF GROUT SEAL (to nearest foot)

from 0-2,10-12 ft. (48 TOP 52) to 30-32 ft. (54 BOTTOM 58)

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	1/2 (63 64)	33 (66 70)

EACH CASING

OTHER CASING (if used)

	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole insert appropriate code below

[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (1 2)

DEPTH (nearest ft.)

EACH SCREEN

1	PL	33 (8 9 11 15)	75 (17 21)		
2	PL	13 (23 24 26 30)	29 (32 36)		
3	PL	2 (38 39 41 45)	9 (47 51)		

SLOT SIZE 1 1/8" 2 round holes 3

DIAMETER OF SCREEN 1/2 (56 60) (NEAREST INCH)

from	to
2-10,12-	30,32-75

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING | LOG INDICATOR | OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour): N/A (8 9)

PUMPING RATE (gal. per min.): N/A (11 15)

METHOD USED TO MEASURE PUMPING RATE: N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING: N/A (17 20) ft.

WHEN PUMPING: N/A (22 25) ft.

TYPE OF PUMP USED (for test)

[A] air (27) [P] piston (27) [T] turbine (27)

[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)

[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES (NO)

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31 35)

PUMP HORSE POWER (37 41)

PUMP COLUMN LENGTH (nearest ft.) (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)

(+) (49) above LAND SURFACE

(–) (49) below 3 (50 51) (nearest foot)

LATITUDE 39.084852

LONGITUDE 76.667414

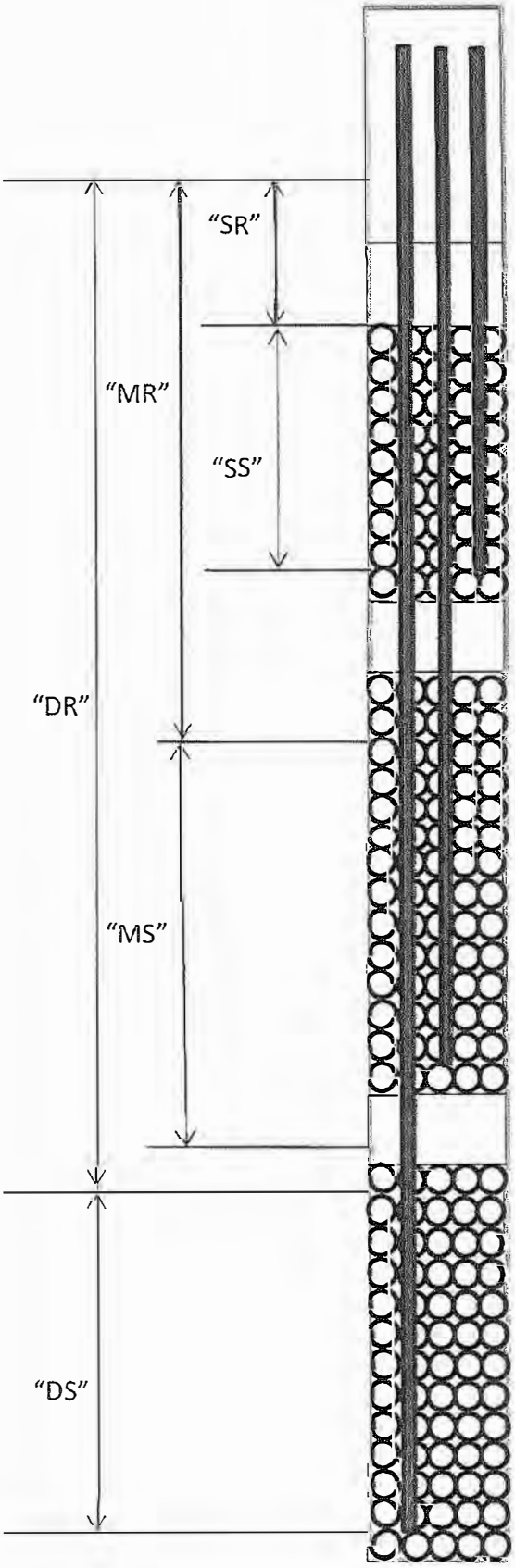
(DEFAULT COORD. WGS 84)

NOTES:

Well is (3) 1/2" nested LFG probes

Well tag: J25

OWNER



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J25

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 42'

Drawing Not To Scale

C 1 28440 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY (8–13)

DATE WELL COMPLETED: MM 07 DD 01 YY 16 (15–20)

Depth of Well: 22 90 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 14 - 0680 (28–37)

OWNER Anne Arundel County (last name / first name)

WELL SITE ADDRESS 389 Burns Crossing Road TOWN Severn

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes (Y) / no (N) — no

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26. 0404 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M D 517

DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __ __ D __ __ __

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes (Y) / no (N) — yes (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT (CM) BENTONITE CLAY (BC) (45 46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 87

DEPTH OF GROUT SEAL (to nearest foot)

from 0-2, 10-12 (48–52 TOP) ft. to 30-32 (54–58 BOTTOM) ft.

(enter 0 if from surface)

CASING RECORD
casing type insert appropriate code below

ST STEEL; CO CONCRETE; PL PLASTIC; OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60–61)	1/2 (63–64)	33 (66–70)

EACH CASING — OTHER CASING (if used)

	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole — insert appropriate code below

ST STEEL; BR BRASS BRONZE; HO OPEN HOLE; PL PLASTIC; OT OTHER

EACH SCREEN

		DEPTH (nearest ft.)	
1	PL	33	90
2	PL	13	29
3	PL	2	9

SLOT SIZE 1 1/8" 2 round 3 holes

DIAMETER OF SCREEN 1/2 (56–60) (NEAREST INCH)

from to

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: 2-10, 12-30, 32-90 — 68

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

PUMPING TEST
HOURS PUMPED (nearest hour): N/A (8–9)

PUMPING RATE (gal. per min.): N/A (11–15)

METHOD USED TO MEASURE PUMPING RATE: N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING: N/A (17–20) ft.

WHEN PUMPING: N/A (22–25) ft.

TYPE OF PUMP USED (for test)

A air (27); P piston (27); T turbine (27); C centrifugal (27); R rotary (27); O other (describe below) (27); J jet (27); S submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES / NO — NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31–35)

PUMP HORSE POWER (37–41)

PUMP COLUMN LENGTH (nearest ft.) (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)

(+) above (49) / (–) below (49) LAND SURFACE

(nearest) foot: 2 (50–51)

LATITUDE 39.084841

LONGITUDE 76.545171

(DEFAULT COORD. WGS 84)

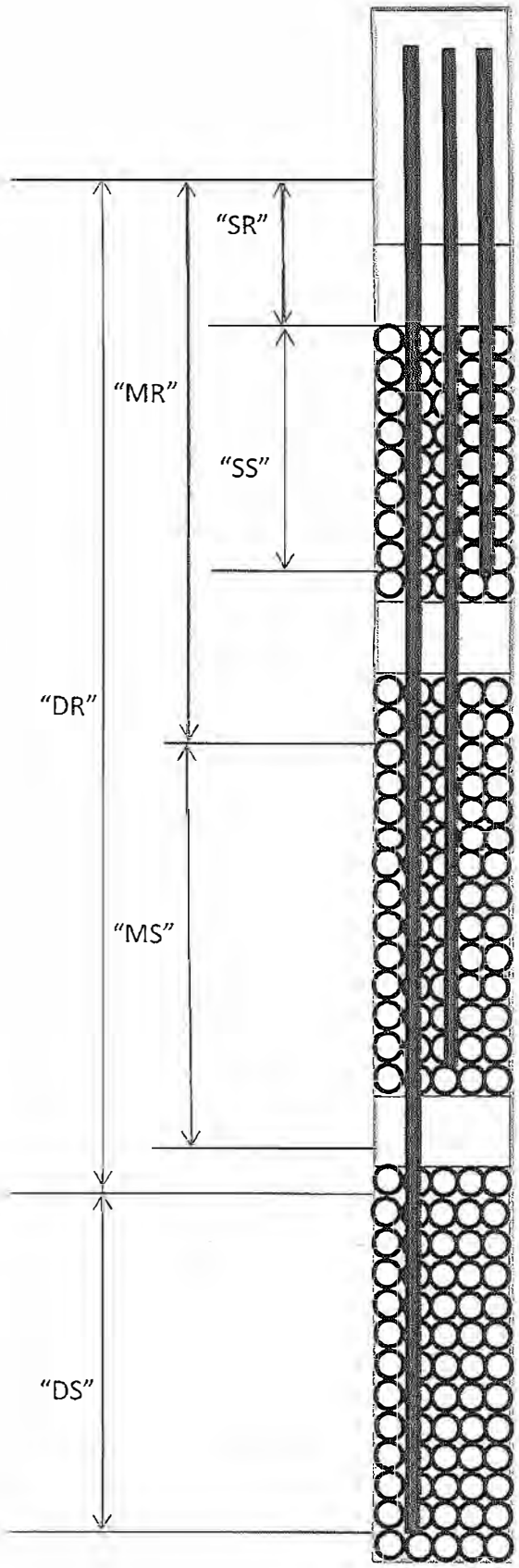
NOTES:

Well is (3) 1/2" nested LFG probes

Well tag: [redacted] J26

OWNER

MDE/WMA/PER.071



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J26

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 57'

Drawing Not To Scale

C 1 28453 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY (8–13)

DATE WELL COMPLETED MM DD YY (15–20): 06 29 16

Depth of Well (22–26) 90 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" (28–37): BA - 14 - 0680

OWNER Anne Arundel County (last name / first name)

WELL SITE ADDRESS 389 Burns Crossing Road TOWN Severn

SUBDIVISION ____ SECTION ____ LOT ____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED (yes / no): no

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M D 517

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: ___ D ___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) (44): yes (Y) / no (N)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT (CM) BENTONITE CLAY (BC) (45–46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 87

DEPTH OF GROUT SEAL (to nearest foot)

from 0 (48–51) TOP 12 (52–53) ft. to 30 (54–57) BOTTOM 58 ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL; CO CONCRETE; PL PLASTIC; OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60–61)	1/2 (63–64)	33 (66–70)

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole — insert appropriate code below

ST STEEL; BR BRASS BRONZE; HO OPEN HOLE; PL PLASTIC; OT OTHER

C 2 (1–2)

DEPTH (nearest ft.)

EACH SCREEN						
1	PL (8–9)	33 (11–15)		90 (17–21)		
2	PL (23–24)	13 (26–30)		23 (32–36)		
3	PL (38–39)	2 (41–45)		9 (47–51)		

SLOT SIZE 1/8" 2 rows 3 holes

DIAMETER OF SCREEN 1/2 (56–60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: from 2–10, 12–30, 32–90 to (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3 (1–2)

PUMPING TEST
HOURS PUMPED (nearest hour) N/A (8–9)

PUMPING RATE (gal. per min.) N/A (11–15)

METHOD USED TO MEASURE PUMPING RATE N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING N/A (17–20) ft.

WHEN PUMPING N/A (22–25) ft.

TYPE OF PUMP USED (for test)

A air (27); P piston (27); T turbine (27); C centrifugal (27); R rotary (27); O other (describe below) (27); J jet (27); S submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES / NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31–35)

PUMP HORSE POWER (37–41)

PUMP COLUMN LENGTH (nearest ft.) (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)

(+) above LAND SURFACE; (–) below (49) — (nearest) foot (50–51): 3

LATITUDE 3_ . _____

LONGITUDE 7_ . _____

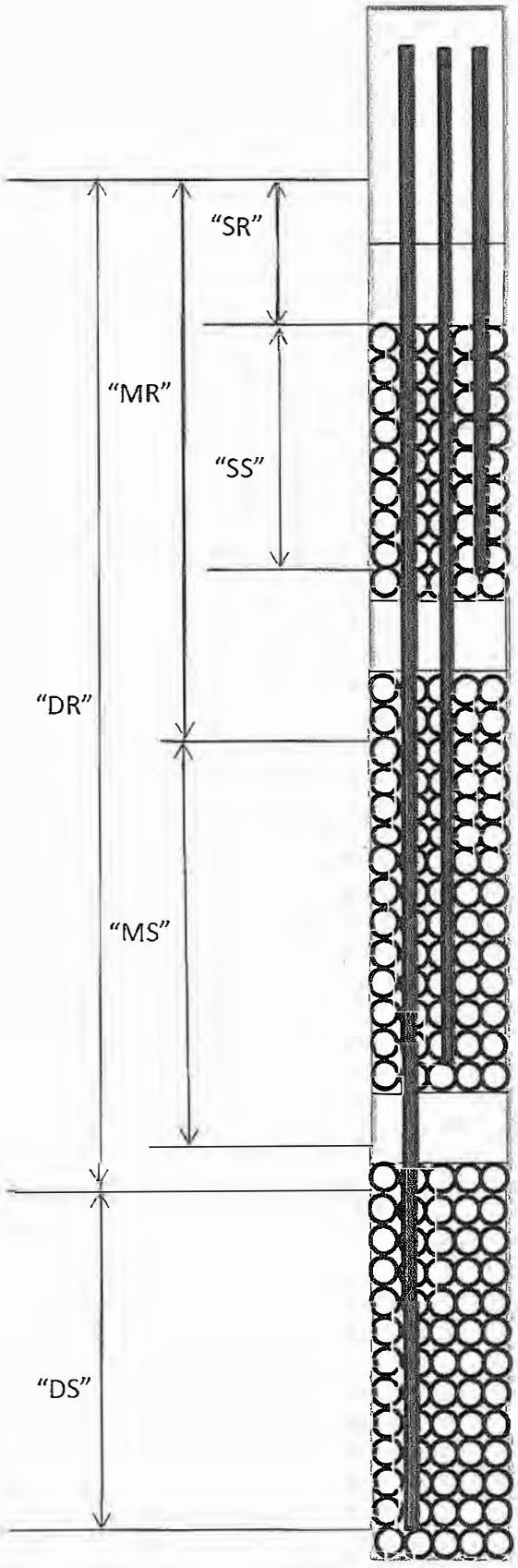
(DEFAULT COORD. WGS 84)

NOTES:

Well is (3) 1/2" nested LFG probes

Well tag: J27

OWNER



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J27

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 57'

Drawing Not To Scale

C 1 | 28454 | SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY DATE Received MM DD YY (8 13)

DATE WELL COMPLETED MM 06 DD 28 YY 16 (15 20)

Depth of Well (22 26) (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA - 14 - 0680 (28 29 30 31 32 33 34 35 36 37)

OWNER Anne Arundel County (last name) (first name)

WELL SITE ADDRESS 329 Burns Crossing Road TOWN Severn

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M D 617

DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: D

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] (44) no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT [CM] (45 46) BENTONITE CLAY [BC] (45 46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 87

DEPTH OF GROUT SEAL (to nearest foot)

from 0-2, 10-12 ft. (48 TOP 52) to 30-32 ft. (54 BOTTOM 58)

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	1 1/2 (63 64)	33 (66 70)

EACH CASING — OTHER CASING (if used)

	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole — insert appropriate code below

[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (1 2)

DEPTH (nearest ft.)

EACH SCREEN

1	PL (8 9)	33 (11 15)	35 (17 21)	
2	PL (23 24)	13 (26 30)	29 (32 36)	
3	PL (38 39)	2 (41 45)	9 (47 51)	

SLOT SIZE 1 1/8" 2 [illegible] holes

DIAMETER OF SCREEN 1 1/2 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

from	to
2-10, 12-30, 32	35

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) N/A (8 9)

PUMPING RATE (gal. per min.) N/A (11 15)

METHOD USED TO MEASURE PUMPING RATE N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING N/A (17 20) ft.

WHEN PUMPING N/A (22 25) ft.

TYPE OF PUMP USED (for test)

[A] air (27) [P] piston (27) [T] turbine (27)

[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)

[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31 35)

PUMP HORSE POWER (37 41)

PUMP COLUMN LENGTH (nearest ft.) (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)

[+] (49) above LAND SURFACE

[–] (49) below

3 (50 51) (nearest foot)

LATITUDE 39.036465

LONGITUDE 76.[illegible]

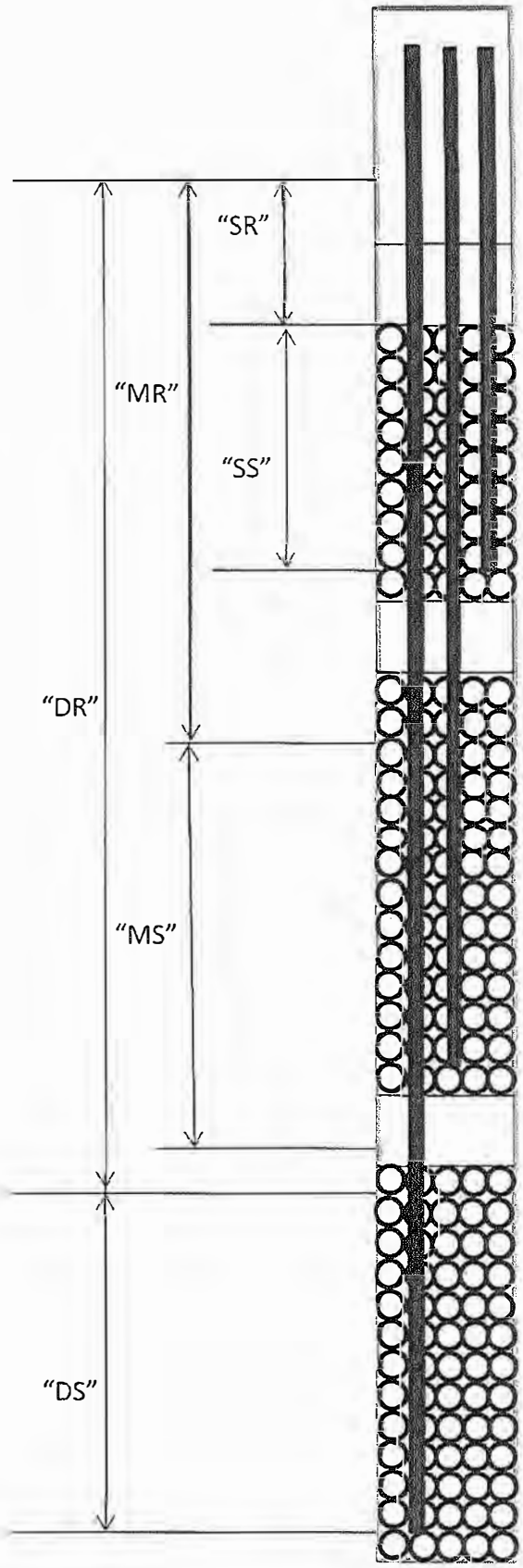
(DEFAULT COORD. WGS 84)

NOTES:

Well is (3) 1/2" nested LFG probes

Well tag: J28

OWNER



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J28

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 52'

Drawing Not To Scale

C 1 | 28455 | SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT

FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY (8–13)

DATE WELL COMPLETED MM DD YY: 06 27 16 (15–20)

Depth of Well: (22–26) (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 14 - 0680 (28–37)

OWNER Anne Arundel County (last name / first name)

WELL SITE ADDRESS 389 Burns Crossing Road TOWN Severn

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED (yes / no): no (N)

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO. M D 547

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO. _____ D _____

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes (Y) / no (N) (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT (CM) (45 46) BENTONITE CLAY (BC) (45 46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 87

DEPTH OF GROUT SEAL (to nearest foot)

from 2, 10, 12 (48–52) TOP ft. to 30, 32 (54–58) BOTTOM ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

STEEL (ST) CONCRETE (CO) PLASTIC (PL) OTHER (OT)

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60–61)	1/2 (63–64)	33 (66–70)

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole — insert appropriate code below

STEEL (ST) BRASS/BRONZE (BR) PLASTIC (PL) OPEN HOLE (HO) OTHER (OT)

C 2 (1–2)

DEPTH (nearest ft.)

EACH SCREEN		from	to
1	PL (8–9)	23 (11–15)	25 (17–21)
2	PL (23–24)	13 (26–30)	23 (32–36)
3	PL (38–39)	2 (41–45)	3 (47–51)

SLOT SIZE 1 1/8 2 round holes 3 _____

DIAMETER OF SCREEN 1/2 (56–60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: from 2-10,12 to 30,32-25 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING | LOG INDICATOR | OTHER DATA

C 3 (1–2)

PUMPING TEST
HOURS PUMPED (nearest hour) N/A (8–9)

PUMPING RATE (gal. per min.) N/A (11–15)

METHOD USED TO MEASURE PUMPING RATE N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING N/A (17–20) ft.

WHEN PUMPING N/A (22–25) ft.

TYPE OF PUMP USED (for test)

A (27) air; P (27) piston; T (27) turbine; C (27) centrifugal; R (27) rotary; O (27) other (describe below); J (27) jet; S (27) submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES / NO (NO)

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31–35)

PUMP HORSE POWER (37–41)

PUMP COLUMN LENGTH (nearest ft.) (43–47)

CASING HEIGHT (circle appropriate box and enter casing height) above (+) (49) / below (–) (49) LAND SURFACE (nearest foot) (50–51)

LATITUDE 39.066743

LONGITUDE 76.659769

(DEFAULT COORD. WGS 84)

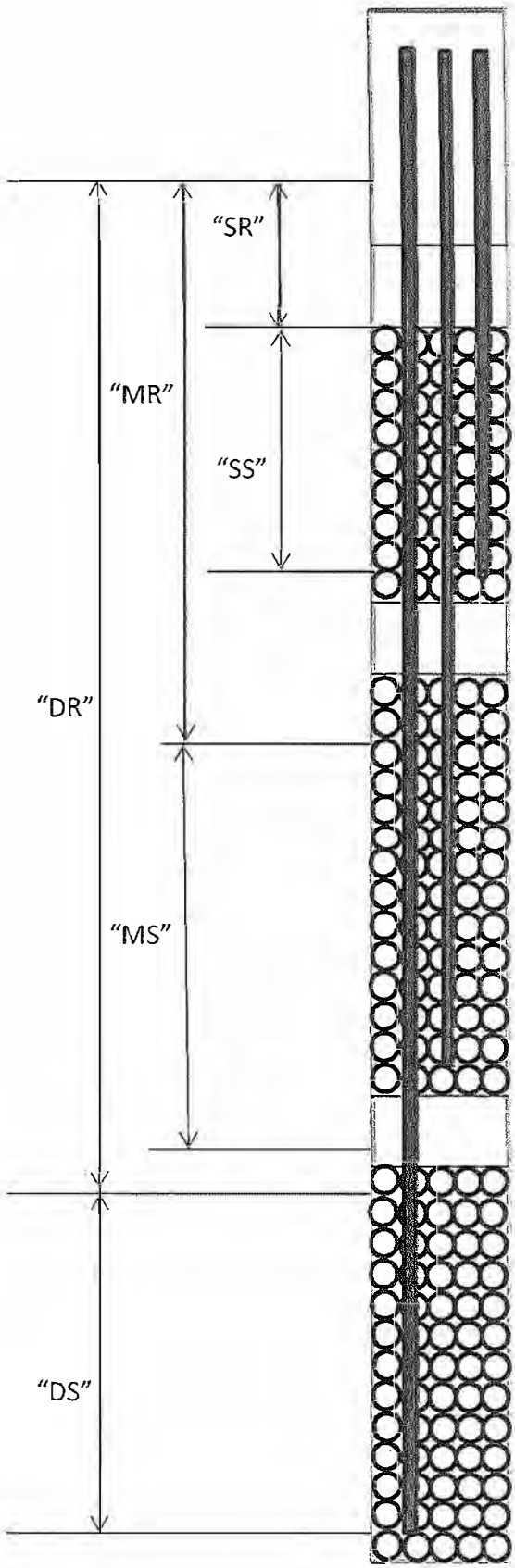
NOTES:

Well is (3) 1/2" nested LFG probes

Well tag: J29

OWNER

MDE/WMA/PER.071



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J29

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 42'

Drawing Not To Scale

C 1 28456 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY DATE Received MM DD YY (8–13)

DATE WELL COMPLETED MM DD YY (15–20): 06 21 16

Depth of Well (22–26): 55 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" (28–37): AA - 14 - 0680

OWNER Anne Arundel County

WELL SITE ADDRESS 389 Burns Crossing Road (last name / first name) TOWN Severn

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED (yes / no): no

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO. M W D 517 [illegible]

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO. _ _ D _ _ _

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) (yes / no): yes (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT (CM) BENTONITE CLAY (BC) (45–46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 27

DEPTH OF GROUT SEAL (to nearest foot)

from 0-2, 10-12, ft. (48–52) TOP to 30-32 ft. (54–58) BOTTOM

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below:
- ST STEEL
- CO CONCRETE
- PL PLASTIC
- OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60–61)	1/2 (63–64)	33 (66–70)

OTHER CASING (if used)

	diameter inch	depth (feet) from	to
EACH CASING	PL 1/2	0	13
	PL 1/2	0	2

SCREEN RECORD
screen type or open hole insert appropriate code below:
- ST STEEL
- BR BRASS BRONZE
- HO OPEN HOLE
- PL PLASTIC
- OT OTHER

DEPTH (nearest ft.)

EACH SCREEN 1	PL (8–9)	33 (11–15)	55 (17–21)
2	PL (23–24)	13 (26–30)	29 (32–36)
3	PL (38–39)	2 (41–45)	9 (47–51)

SLOT SIZE 1 1/8" 2 round holes 3

DIAMETER OF SCREEN 1/2 (56–60) (NEAREST INCH)

GRAVEL PACK from 2-10, 12-30, 32-55 to

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3 — PUMPING TEST
HOURS PUMPED (nearest hour) N/A (8–9)

PUMPING RATE (gal. per min.) N/A (11–15)

METHOD USED TO MEASURE PUMPING RATE N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING N/A ft. (17–20)

WHEN PUMPING N/A ft. (22–25)

TYPE OF PUMP USED (for test) (27)
- A air
- P piston
- T turbine
- C centrifugal
- R rotary
- O other (describe below)
- J jet
- S submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31–35)

PUMP HORSE POWER (37–41)

PUMP COLUMN LENGTH (nearest ft.) (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)
- (+) above LAND SURFACE
- (–) below

3 (nearest foot) (50–51)

LATITUDE 39.087445

LONGITUDE 76.650567

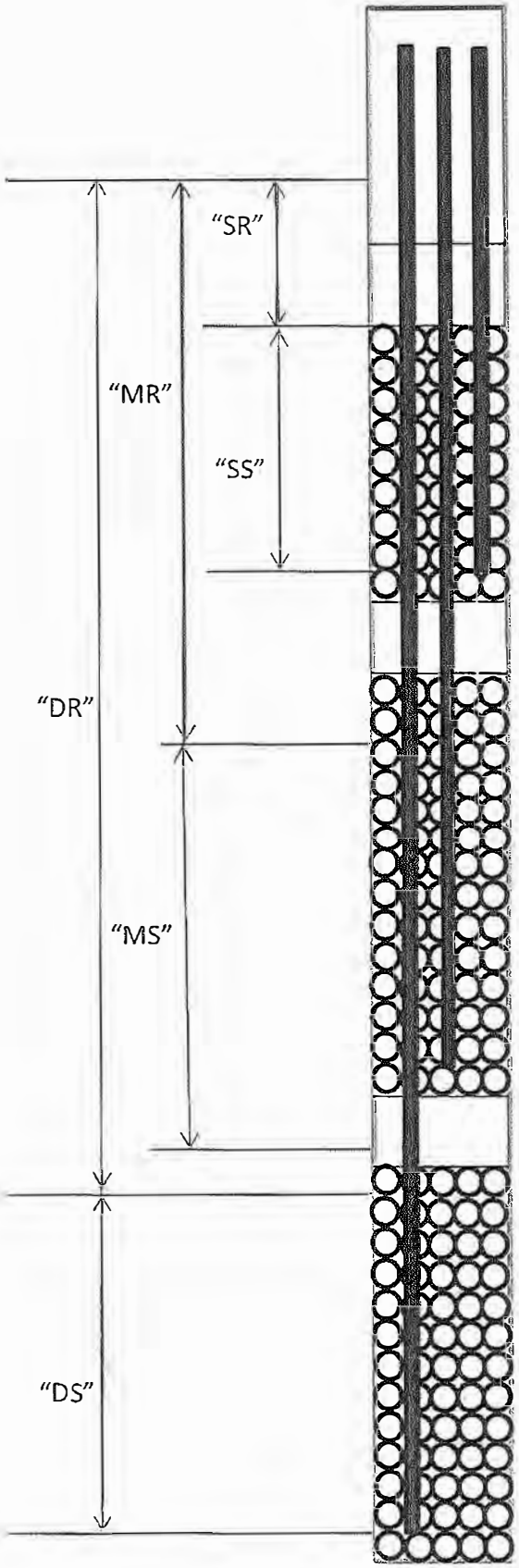
(DEFAULT COORD. WGS 84)

NOTES:

Well is (3) 1/2" nested LFG probes

Well tag: J30

OWNER



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J30

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 22'

Drawing Not To Scale

C 1 28457 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY (8–13)

DATE WELL COMPLETED MM 06 DD 23 YY 16 (15–20)

Depth of Well 22 75 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA - 14 - 0680 (28–37)

OWNER Anne Arundel County (last name, first name)

WELL SITE ADDRESS 389 Burns Crossing Road TOWN Severn

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M D 517

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: D

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] (44) no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT [CM] (45 46) BENTONITE CLAY [BC] (45 46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 27

DEPTH OF GROUT SEAL (to nearest foot)

from 0 (48) TOP 12 (52) ft. to 30-33 (54) BOTTOM (58) ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	1/2 (63 64)	33 (66 70)

EACH CASING — OTHER CASING (if used)

	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole — insert appropriate code below

[ST] STEEL [BR] BRASS [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (1 2)

DEPTH (nearest ft.)

EACH SCREEN

1	PL (8 9)	33 (11 15)	75 (17 21)
2	PL (23 24)	13 (26 30)	28 (32 36)
3	PL (38 39)	2 (41 45)	9 (47 51)

SLOT SIZE 1 1/8" 2 round holes 3 _____

DIAMETER OF SCREEN 1/2 (56 60) (NEAREST INCH)

GRAVEL PACK from to: 2-10, 12-30, 32-75

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) N/A (8 9)

PUMPING RATE (gal. per min.) N/A (11 15)

METHOD USED TO MEASURE PUMPING RATE N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING N/A (17 20) ft.

WHEN PUMPING N/A (22 25) ft.

TYPE OF PUMP USED (for test)

[A] air (27) [P] piston (27) [T] turbine (27)
[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)
[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31 35)

PUMP HORSE POWER (37 41)

PUMP COLUMN LENGTH (nearest ft.) (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)

[+] above (49) [–] below (49) LAND SURFACE

3 (50 51) (nearest foot)

LATITUDE 3 _____

LONGITUDE 7 _____

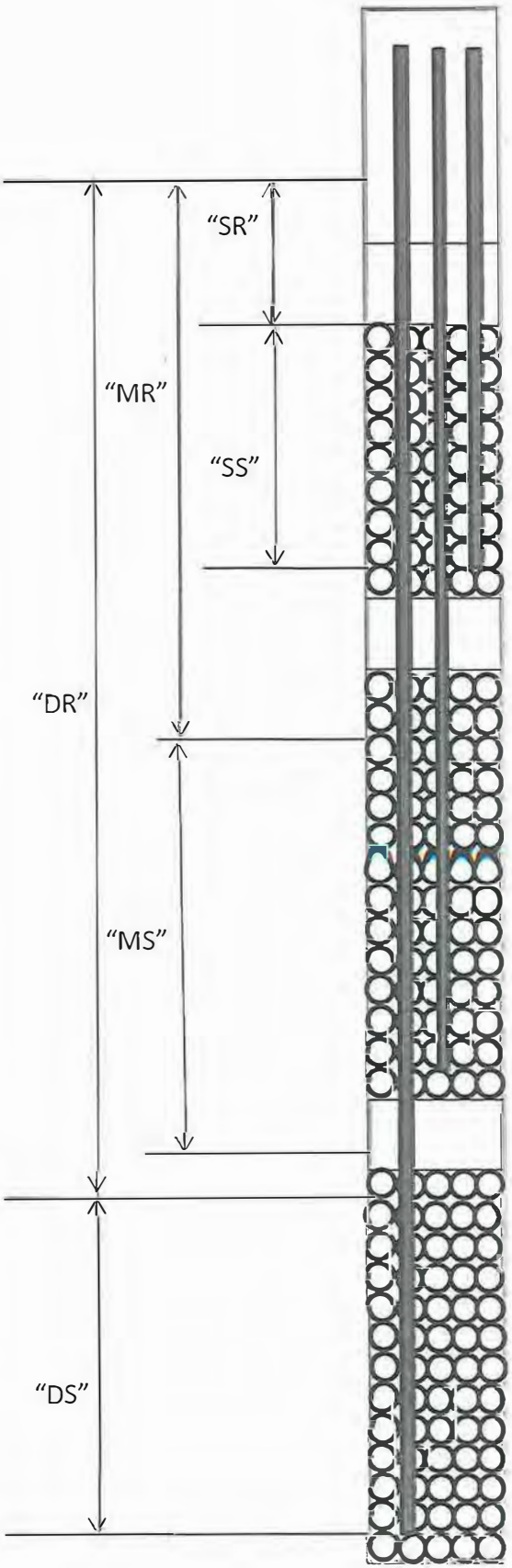
(DEFAULT COORD. WGS 84)

NOTES:

Well is (3) 1/2" nested LFG probes

Well tag: J31

OWNER



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J31

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 42'

Drawing Not To Scale

C 1 28458 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY (8–13)

DATE WELL COMPLETED MM 05 DD 21 YY 16 (15–20)

Depth of Well 65 (TO NEAREST FOOT) (22–26)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA - 14 - 0680 (28–37)

OWNER Anne Arundel County (last name first name)

WELL SITE ADDRESS 389 Burns Crossing Road TOWN Severn

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO. M D 517

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO. _____ D _____

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] (44) no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT [CM] (45 46) BENTONITE CLAY [BC] (45 46)

NO. OF BAGS 3.5 NO. OF POUNDS 175

GALLONS OF WATER 87

DEPTH OF GROUT SEAL (to nearest foot)

from 0-2, 10-12, ft. (48 TOP 52) to 30-32 ft. (54 BOTTOM 58)

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	1/2 (63 64)	33 (66–70)

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole — insert appropriate code below

[ST] STEEL [BR] BRASS [HO] OPEN HOLE [BZ] BRONZE [PL] PLASTIC [OT] OTHER

C 2 (1 2)

DEPTH (nearest ft.)

EACH SCREEN			
1	PL (8 9)	33 (11–15)	65 (17–21)
2	PL (23 24)	13 (26–30)	29 (32–36)
3	PL (38 39)	2 (41–45)	9 (47–51)

SLOT SIZE 1 1/8" 2 round holes

DIAMETER OF SCREEN 1/2 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 — from 2-10, 12-30, 32-65 — to — (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) N/A (8 9)

PUMPING RATE (gal. per min.) N/A (11–15)

METHOD USED TO MEASURE PUMPING RATE N/A

WATER LEVEL (distance from land surface)

BEFORE PUMPING N/A ft. (17–20)

WHEN PUMPING N/A ft. (22–25)

TYPE OF PUMP USED (for test)

[A] air (27) [P] piston (27) [T] turbine (27)
[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)
[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES [NO]

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31–35)

PUMP HORSE POWER (37–41)

PUMP COLUMN LENGTH (nearest ft.) (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)

[+] above [–] below (49) LAND SURFACE 3 (nearest foot) (50 51)

LATITUDE 39 . 089386

LONGITUDE 76 . 658087

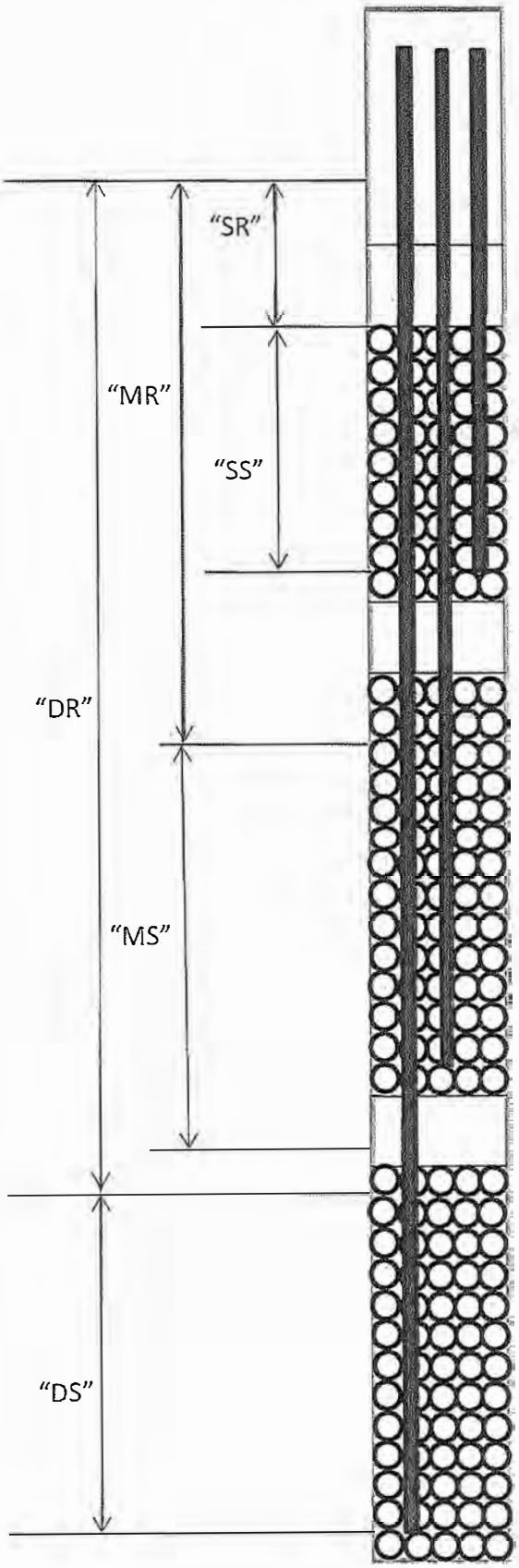
(DEFAULT COORD. WGS 84)

NOTES:

Well is (3) 1/2" nested LPG probes

Well tag: J32

OWNER



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J32

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 32'

Drawing Not To Scale

STATE OF MARYLAND
WELL COMPLETION REPORT

FILL IN THIS FORM COMPLETELY
PLEASE TYPE

C 1 | 28460 | SEQUENCE NO. (MDE USE ONLY)
1 2 3 6
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY
8 13

DATE WELL COMPLETED MM 06 DD 24 YY 16
15 20

Depth of Well 22 44 26
(TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA - 14 - 0680
28 29 30 31 32 33 34 35 36 37

OWNER Anne Arundel County (last name) (first name)
WELL SITE ADDRESS 389 Burns Crossing Road TOWN Severn
SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
See attached driller's log			

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED yes Y no N

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M D 517
DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)
LIC. NO.: D

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y no N (44)
TYPE OF GROUTING MATERIAL (Circle one)
CEMENT CM (45 46) BENTONITE CLAY BC (45 46)
NO. OF BAGS 3.5 NO. OF POUNDS 175
GALLONS OF WATER 87
DEPTH OF GROUT SEAL (to nearest foot)
from 0-2 , 10-12 ft. (48 TOP 52) to 30-32 ft. (54 BOTTOM 58)
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
ST STEEL | CO CONCRETE | PL PLASTIC | OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	1/2 (63 64)	33 (66 70)

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to
PL	1/2	0	13
PL	1/2	0	2

SCREEN RECORD
screen type or open hole — insert appropriate code below
ST STEEL | BR BRASS BRONZE | HO OPEN HOLE | PL PLASTIC | OT OTHER

C 2 (1 2)

DEPTH (nearest ft.)

EACH SCREEN			
1	PL (8 9)	33 (11 15)	44 (17 21)
2	PL (23 24)	13 (26 30)	29 (32 36)
3	PL (38 39)	2 (41 45)	9 (47 51)

SLOT SIZE 1 1/8" 2 round 3 holes
DIAMETER OF SCREEN 1/2 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

from	to
2-10,12-30,32-44	

(68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (70) (E.R.O.S.) (72) W Q (74 75 76)
TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) N/A (8 9)
PUMPING RATE (gal. per min.) N/A (11 15)
METHOD USED TO MEASURE PUMPING RATE N/A
WATER LEVEL (distance from land surface)
BEFORE PUMPING N/A (17 20) ft.
WHEN PUMPING N/A (22 25) ft.

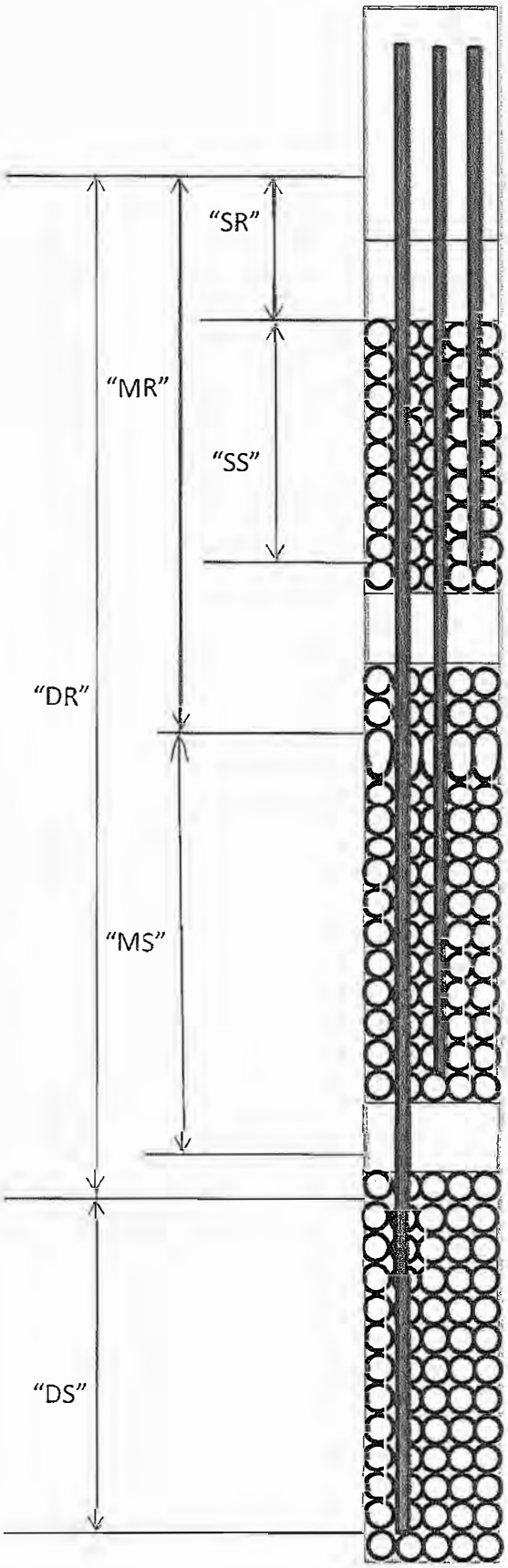
TYPE OF PUMP USED (for test)
A air (27) | P piston (27) | T turbine (27)
C centrifugal (27) | R rotary (27) | O other (describe below) (27)
J jet (27) | S submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES (NO)
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)
CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31 35)
PUMP HORSE POWER (37 41)
PUMP COLUMN LENGTH (nearest ft.) (43 47)
CASING HEIGHT (circle appropriate box and enter casing height)
(49) + above / − below LAND SURFACE
3 (nearest foot) (50 51)

LATITUDE 39.090160
LONGITUDE 76.657813
(DEFAULT COORD. WGS 84)

NOTES:
Well is (3) 1/2" nested LFG probes
Well tag: J33

OWNER



Anne Arundel County

Millersville Landfill

Nested LFG Probe Detail

Well : J33

SR: 2'

SS: 7'

MR: 13'

MS: 16'

DR: 33'

DS: 11'

Drawing Not To Scale

Appendix F

Landfill Gas Monitoring Probe Sample Log

Landfill Gas Monitoring Probe Sample Log

Project Name: _____ **Barometric Pressure:** _____

Date: _____ **Temperature:** _____

Personnel: _____ **Weather:** _____

Probe Number	Time	% Methane	% Carbon Dioxide	% Oxygen	% Balance Gas	Pressure (specify units)	Comments

SAMPLE

Appendix G

Leachate Analytical Parameters

PRETREATMENT STANDARDS FOR DISCHARGERS

Pollutant	Daily Maximum (mg/l)
Arsenic (T)	1.29
Cadmium (T)	0.11
Chromium (T)	1.07
Copper (T)	1.92
Lead (T)	0.35
Mercury (T)	0.002
Nickel (T)	3.98
Silver (T)	0.43
Zinc (T)	2.55
Cyanide (T)	1.20
Total Toxic Organics (TTO)	2.13
BOD_5	See Footnote 1
COD	See Footnote 1
Suspended Solids	See Footnote 1
Phosphorus (T)	See Footnote 1
Animal/Vegetable Oil and Grease	See Footnote 2
Petroleum Based Oil and Grease	100
Lower Explosive Limit	10%
pH	Not less than 6.0 and not greater than 10.0
Temperature	Not greater than 140^0 F (60^0 C)
Closed Cup Flashpoint	Not less than 140^0 F (60^0 C)

T = Total
All limits apply at end of pipe.

Footnote 1: Wastewater discharge concentrations greater than 250 mg/l for BOD and TSS and concentrations greater than 8 mg/l for Phosphorus are subject to a surcharge, as per County Code Section 5-509.

Footnote 2: No numerical discharge standard exists; however, the following narrative standard applies:

> Discharge prohibition of solids or viscous substances in quantities capable of obstructing the flow in sanitary sewers or otherwise interfering with the proper operation of the County system, discharge prohibition of free or emulsified materials that are not readily biodegradable. Discharge prohibition of grease or oil wastes that could solidify at normal wastewater temperatures and contribute to sewer line clogging, skimming and/or grease handling equipment overload, or treatment process interference.

wastewater has occurred since filing the last discharge report. I further certify that this facility is implementing the toxic organic management plan submitted to Anne Arundel County."

TABLE 1
Methods & Frequencies for Sampling Required in Part 3, Section I

Pollutant	Sampling Method	Sampling Frequency during each Quarter
Cadmium	Composite	each day for 3 consecutive days
Chromium	Composite	each day for 3 consecutive days
Copper	Composite	each day for 3 consecutive days
Lead	Composite	each day for 3 consecutive days
Nickel	Composite	each day for 3 consecutive days
Zinc	Composite	each day for 3 consecutive days
Cyanide	Grab	once/day for 3 consecutive days
Total Toxic Organics	Grab/Composite	once/day for 1 day
BOD5	Composite	each day for 3 consecutive days
COD	Composite	each day for 3 consecutive days
Suspended Solids	Composite	each day for 3 consecutive days
Petroleum-based grease and oil	Grab	once/day for 3 consecutive days
Lower Explosive limit	Tested onsite	once/day for 3 consecutive days
pH	Tested onsite	once/day for 3 consecutive days

Appendix H

Stormwater Quarterly Visual Monitoring Form
Inspection Checklists
Annual Reporting Form

Appendix B: **Quarterly Visual Monitoring Form**

Fill out a separate form for each outfall sampled.

Sample Location					
Quarter / Year:		**Date / Time Collected:**		**Date / Time Examined:**	
Qualifying Storm Event?	Yes No	**Runoff Source:**	Rainfall Snowmelt		
Collector's Name & Title					
Examiner's Name & Title					

Parameter	Parameter Description	Parameter Characteristics
1. Color	Does the stormwater appear to have any color? **Yes** **No (Clear)**	If Yes, describe: *Yellow Brown Red Gray Other*:
2. Clarity	Is the stormwater <u>not</u> clear? **Yes** **No**	If not clear, which of the following best describes the clarity of the stormwater? *Suspended Solids Milky/Cloudy Opaque Other:*
3. Oil Sheen	Can you see a rainbow effect or sheen on the water surface? **Yes** **No**	Which best describes the sheen? *Rainbow sheet Floating oil globules Other:*
4. Odor	Does the sample have an odor? **Yes** **No**	If Yes, describe: *Chemical Musty Rotten Eggs Sewage Sour Milk Oil/Petroleum Other:*
5. Floating Solids	Is there anything on the surface of the sample? **Yes** **No**	If Yes, describe: *Suds Oily Film Garbage Sewage Water Fowl Excrement Other:*
6. Suspended Solids	Is there anything suspended in the sample? **Yes** **No**	Describe:
******Leave sample undisturbed for 30 minutes.******		
7. Settled Solids	Is there anything settled on the bottom of the sample? **Yes** **No**	Describe: (*note type, size and material after sample is not disturbed for 30 minutes)*
8. Foam	Does foam or material form on the top of the sample surface if you shake it? **Yes** **No**	Describe:

9. If there are any visible indicators of pollution identify (1) where the pollution may come from and (2) any corrective actions taken.

Stormwater Collector's Signature and Date:

Stormwater Examiner's Signature and Date:

Note – Sample should be collected and analyzed in a colorless glass or plastic bottle.

Instructions for Completing the Visual Monitoring Form

Per PART V. INSPECTIONS, MONITORING, AND REPORTING, you must collect a stormwater sample from each outfall once each quarter for the entire permit term and conduct a visual assessment of each sample. You must follow the monitoring procedures outlined in Part V.C. These samples should be collected in such a manner that they are representative of the stormwater discharge from that outfall. Each assessment must be kept onsite with your SWPPP and available for inspection and review by the Department at anytime.

First, fill out all information on the top of the visual monitoring form. A qualifying storm event is any storm where there is a measurable discharge. Then, take a grab sample in a clear container. Evaluate the sample in a well-lit area for the following parameters:

1. **Color:** Record the best description of the sample color in the appropriate space on the form.
2. **Clarity**: This parameter refers to how cloudy the sample is. It is *usually* an indication of fewer pollutants in the water if the sample is clear or transparent. If the clarity has changed since the last sample, try to identify what might have caused this to happen.
   - **Clear** – Sample doesn't block any light; can be seen through regardless of color.
   - **Cloudy** – Sample blocks some light; objects not clear but can be identified looking through the sample.
   - **Very Cloudy** – Sample blocks most light; objects cannot be identified looking through the sample.
   - **Opaque** – Sample blocks all light; objects cannot be seen when looking through the sample.
3. **Oil Sheen:** Record whether or not an oil sheen is present. If a film of iridescent color is noted on the surface of the sample or a rainbow effect appears to be floating on the surface of the water, this usually indicates oil is present.
4. **Odor:** If sample has no odor other than natural rainwater or snowmelt, write "NO" on the visual monitoring form. Note the presence of any of the following odors if detected, such as gasoline, diesel, oil, solvents (WD-40, other petroleum products, etc.), garbage, fishy, sweet/sugary, any other unusual odors not normally present in clean runoff from the area sampled.
5. **Floating Solids:** A contaminated flow may contain solids or liquids floating on the surface. Identifying floatables can aid in finding the source of the contamination. Examples of floatables are spoiled food products, oils, plant parts, solvents, sawdust, foams and fuel. Give a general description of the type of floating solids present (wood chips, leaf debris, algae, etc) in the general comments section for each sample. Identify amount of floating solids as described below.
   - **High** – More than 20% of the surface of the sample is covered with floating solids.
   - **Moderate** – Less than 20% of the surface of the sample is covered with floating solids.
   - **Slight** – Only a few floating particles observed on the surface of the sample.
   - **None** – No floating solids present on the surface of the sample.
6. **Suspended solids:** Record whether or not suspended solids are present in the sample. Suspended solids are particles floating inside the column of water, not on top, and may contribute to changes in water color or clarity. Cracked or deteriorated concrete or peeling surface paint at an outfall usually indicates the presence of severely contaminated discharges. Contaminants causing this type of damage are usually very acidic or basic.

---------- WAIT 30 MINUTES ----------

Leave the sample undisturbed for 30 minutes to allow the water and anything in it to settle.

7. **Settled Solids:** After 30 minutes has passed, give a general description of the type of settled solids present (sand, decayed plant matter, rust particles, etc.) in the general comments section.
8. **Foam:** After completing #7, shake the bottle gently. Record foam results on the form as they most closely match one of the descriptions listed below.
   - **None** – Most bubbles break down within ten (10) seconds of shaking; only a few large bubbles persist longer than ten (10) seconds.
   - **Moderate** – Many small bubbles are present but these bubbles persist for less than two (minutes) after shaking.
   - **High** – Many small bubbles are present and they persist longer than two (2) minutes after shaking.
9. Detail any concerns, corrective actions taken and any other indicators of pollution present in the sample. This should include the identified source if there are visible indicators present in the sample. The person performing test must sign and date each form**.**

MLFRRF Quarterly Routine Inspection Certification

Location	In Compliance (Circle) *
Recycling Center	
Entrances, Administration Building, Main Road, Leachate Area and Paved Surfaces	Y N
Recycling Center Area	Y N
Oil, Batteries and AntiFreeze Recycling Area	Y N
Maintenance and Warehouse	
Maintenance Building	Y N
Warehouse Building	Y N
Compost Area and Cell 9 Area	
Compost Area	Y N
Cell 9	Y N
Post-Closure Inspection	Y N
Leachate Storage Area	Y N
Stormwater Management Ponds	Y N

* For each item not in compliance, complete a Corrective Action Form

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print Name and Title: _____

Signature: _____ Date: _____

Quarterly Routine Inspection Corrective Action Form

Complete a separate copy of this page for each specific condition identified during the inspection as not in compliance.

Date problem identified: _____

Identify the condition(s) triggering the need for this action (Check box):

☐ Unauthorized release or discharge

☐ Control measures inadequate

☐ Control measures not properly operated or maintained

☐ Change in facility operations necessitated change in control measures

☐ Other (describe): _____

Briefly describe the nature of the problem identified:

_____
_____
_____
_____
_____
_____
_____

Description of corrective action(s) taken or to be taken to eliminate or further investigate the problem (e.g., describe modifications or repairs to control measures, analyses to be conducted, etc.) or if no modifications are needed, basis for that determination:

_____
_____
_____
_____
_____
_____
_____

Date corrective action to be completed: _____

Name of person responsible: _____

MLFRRF Inspection Checklist

	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Date of Inspection:								
Entrances, Administration Building, Main Haul Road, and Paved Surfaces	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT
Recycling Center (Upper Area) Clean								
Bulk Material Drop Off (Lower Area) - Upper and Lower Area Clean								
Entrance/Exit Roads and Paved Area Clean								
Administration Building Area Clean								
Cardboard Building Area Clean								
Recycling Center Area	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT
Attendant on Duty								
Attendant Booth Clean								
Stormdrain Inlet Openings/Grates Clean								
Signs in Place								
Spills/Leaks or Containers Leaking								
Trash Cans Empty								
Oil, Batteries and AntiFreeze Recycling Area	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT
Check Fluid Levels								
Full Tanks Locked								
Screens Cleaned								
Tanks Cleaned								
Containment Basins Clean								
Sorbent Mats and Material Maintained or Disposed of Properly								
No Leaks/Spills								
Drain Valves Shut								
Batteries Stored in Metal Locker								
Pavement Clean (Powerwash Needed?)								
Trash Cans Emptied								

Comments: If UNSAT (Unsatisfactory) is checked, list what needs to be done, by whom, and the expected completion date.

MLFRRF Maintenance and Warehouse Inspection Checklist

	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Date of Inspection:								
Maintenance Building/Area	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT
Shop Floor Clean and Free of Debris								
Sorbent Material in Place and Clean, Used Sorbent Disposed of Properly								
Drip Pans Under Equipment Empty								
No Leaks/Spills in Maintenance Building or Adjacent Parking Areas								
Materials/Equipment Stored and All Drums have Lids								
Adjacent Parking Areas Clean								
Materials Stored Properly								
Floor Drain Sumps Dry/Pumped								
Strainer Clean under Sink								
Warehouse Building/Area	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT
Fueling Station Area Clean								
No Leaks from Fuel Dispensers/Hoses								
No Evidence of Spills								
Hazardouse Waste Lockers Maintained								
Inlets and Sediment Trap Maintained								
Materials/Equipment Properly Stored								
Yard Area Stable/Drainage Adequate								
Sediment Deposition in Perimeter Swales								

Comments: If UNSAT (Unsatisfactory) is checked, list what needs to be done, by whom, and the expected completion date.

MLFRRF Leachate Storage, Compost Area, and Cell 9 Area Checklist								
	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Date of Inspection:								
Leachate Storage	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT
Valve Manhole								
Gravel Sump/Containment Area								
Tanks								
Truck Load Station								
Perimeter Area								
SWM Pond #6 Outfall Clear								
Compost Area	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT
Materials/Equipment Properly Stored								
Entrance/Exit Roads and Paved Area Clean								
Access Roads (potholes, grading, vegetation)								
Blown Trash								
Litter Fence								
Super Silt Fence								
Cell 9	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT
Blown Trash								
Metal/Tire/Leaf Areas								
Brush Grinding Area								
Litter Fence								
Alternate Daily Cover								
Erosion and Sediment Controls								
SWM Pond #9-2 Outfall Clear								
Dewatering Devices								
Dust Control								
Access Roads (potholes, grading, vegetation)								
Riprap Ditches or Swales								

Comments: If UNSAT (Unsatisfactory) is checked, list what needs to be done, by whom, and the expected completion date.

MLFRRF Post-Closure Inspection Checklist

Date: _____
Time: _____
Weather: _____

Inspector's Name(s): _____
_____
Inspector's Title(s) _____
_____
Inspector's Contact Info _____

	Maintenance Required		Date Scheduled	Date Completed
	Yes	No		
Required Quarterly Inspections				
A. Final Cover Systems				
1. Erosion				
2. Vegetative Cover (other than erosion)				
3. Subsidence Areas				
4. Leachate Seeps				
5. Woody Vegetation				
6. Access Roads				
7. Sediment Deposition				
B. Drainage Control Systems				
1. Cover Terrace				
2. Riprap Downchutes				
3. Grassed and Riprap Swales				
4. Drainage Layer Toe Drains				
5. Riprap Slope Protection				
6. Culverts/Pipes under Access Roads				
7. Sediment Deposition				
C. Other Inspections				
1. Security (Perimeter Fence and Locking Gates)				
2. Groundwater Monitoring Wells				
3. Gas Monitoring Wells				

Comments (If Maintenance Required is Checked "YES" for any Items, a Comment is Required):

_____
_____
_____
_____

MLFRRF Stormwater Management Inspection Checklist

Date: _____ **Inspector's Name(s):** _____
Time: _____ _____
Weather: _____ **Inspector's Title(s)** _____

_____
Inspector's Contact Info
_____

		Operating Effectively Y / N	Maintenance Required Y / N	Date Scheduled	Date Completed
Structural Stormwater Management Controls					
SWM Pond #1	Retention Pond				
SWM Pond #2	Infiltration Pond				
SWM Pond #3	Retention Pond				
SWM Pond #4	Retention Pond				
SWM Pond #5	Retention Pond				
SWM Pond #6	Retention Pond				
SWM Pond #8-1	Retention Pond				
SWM Pond #9-2	Retention Pond				
SWM Pond #10	Bioretention Pond				
SWM Pond #11	Pocket Pond				
Infiltration Trench	Infiltration Trench				

Describe Corrective Actions

SWM Facility	Action Item

Inspection Items	**Check When Feature Is Inspected**				
Stormwater Management Ponds	**Pond #1**	**Pond #2**	**Pond #3**	**Pond #4**	**Pond #5**
1. Erosion					
2. Vegetative Cover (other than erosion)					
3. Seepage Through Pond Embankment					
4. Woody Vegetation					
5. Holes in Embankment (burrowing animals)					
6. Trash Racks					
7. Inside Riser and Barrel Structures					
8. Riprap Inlet and Outfall Aprons					
9. Structure (SWM) Culvert Inlet Structures					
10. Dewatering Devices					
11. Sediment Deposition					
12. Pre-Treatment Devices					
13. Pond/Discharge Clarity					

Stormwater Management Ponds	**Check When Feature Is Inspected**				
1. Erosion	**Pond #6**	**Pond #8-1**	**Pond #9-2**	**Pond #10**	**Pond #11**
2. Vegetative Cover (other than erosion)					
3. Seepage Through Pond Embankment					
4. Woody Vegetation					
5. Holes in Embankment (burrowing animals)					
6. Trash Racks					
7. Inside Riser and Barrel Structures					
8. Riprap Inlet and Outfall Aprons					
9. Structure (SWM) Culvert Inlet Structures					
10. Dewatering Devices					
11. Sediment Deposition					
12. Pre-Treatment Devices					
13. Pond/Discharge Clarity					

Inspection Items	**Check When Feature Is Inspected**
Stormwater Management Trench	**Inf. Trench**
1. Erosion	
2. Vegetative Cover (other than erosion)	
4. Woody Vegetation	
11. Sediment Deposition	

NPDES Permit Tracking No.:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

Annual Reporting Form

A. GENERAL INFORMATION

1. Facility Name: MILLERSVILLE LANDFILL & RESOURCE RECOVERY FACILITY AND CENTRAL RECYCILNG CENTER

2. NPDES Permit Tracking No.: REGISTRATION # 20SW1304
NPDES # MDR001304

3. Facility Physical Address: 389 Burns Crossing Road, Severn, MD 21144

a. Street: Burns Crossing Road

b. City: Severn c. State: MD d. Zip Code: 21144

4. Lead Inspectors Name: Title: Environmental Monitoring Manager

Additional Inspectors Name(s):

5. Contact Person: Title: Environmental Monitoring Manager

Phone: Ext. E-mail:

6. Inspection Date:

B. GENERAL INSPECTION FINDINGS

1. As part of this comprehensive site inspection, did you inspect all potential pollutant sources, including areas where industrial activity may be exposed to stormwater?
☐ YES ☐ NO

If NO, describe why not:

NOTE: *Complete Section C of this form for each industrial activity area inspected and included in your SWPPP or as newly identified in B.2 or B.3 below where pollutants may be exposed to stormwater.*

2. Did this inspection identify any stormwater or non-stormwater outfalls not previously identified in your SWPPP? ☐ YES ☐ NO

If YES, for each location, describe the sources of those stormwater and non-stormwater discharges and any associated control measures in place:

NPDES Permit Tracking No.:

3. Did this inspection identify any sources of stormwater or non-stormwater discharges not previously identified in your SWPPP? ☐ YES ☐ NO

If YES, describe these sources of stormwater or non-stormwater pollutants expected to be present in these discharges, and any control measures in place:

4. Did you review stormwater monitoring data as part of this inspection to identify potential pollutant hot spots? ☐ YES ☐ NO ☐ NA, no monitoring performed

If YES, summarize the findings of that review and describe any additional inspection activities resulting from this review:

5. Describe any evidence of pollutants entering the drainage system or discharging to surface waters, and the condition of and around outfalls, including flow dissipation measures to prevent scouring:

6. Have you taken or do you plan to take any corrective actions, as specified in Part 3 of the permit, since your last annual report submission (or since you received authorization to discharge under this permit if this is your first annual report), including any corrective actions identified as a result of this annual comprehensive site inspection?
☐ YES ☐ NO

If YES, how many conditions requiring review for correction action as specified in Parts 3.1 and 3.2 were addressed by these corrective actions? ☐☐

NOTE: *Complete the attached Corrective Action Form (Section D) for each condition identified, including any conditions identified as a result of this comprehensive stormwater inspection.*

NPDES Permit Tracking No.:

C. INDUSTRIAL ACTIVITY AREA SPECIFIC FINDINGS

Complete one block for each industrial activity area where pollutants may be exposed to stormwater. Copy this page for additional industrial activity areas.

In reviewing each area, you should consider:

- Industrial materials, residue, or trash that may have or could come into contact with stormwater;
- Leaks or spills from industrial equipment, drums, tanks, and other containers;
- Offsite tracking of industrial or waste materials from areas of no exposure to exposed areas; and
- Tracking or blowing of raw, final, or waste materials from areas of no exposure to exposed areas.

INDUSTRIAL ACTIVITY AREA _____:

1. Brief Description**:**

2. Are any control measures in need of maintenance or repair? ☐ YES ☐ NO

3. Have any control measures failed and require replacement? ☐ YES ☐ NO

4. Are any additional/revised control measures necessary in this area? ☐ YES ☐ NO

If YES to any of these three questions, provide a description of the problem: (Any necessary corrective actions should be described on the attached Corrective Action Form)

INDUSTRIAL ACTIVITY AREA _____:

1. Brief Description:

2. Are any control measures in need of maintenance or repair? ☐ YES ☐ NO

3. Have any control measures failed and require replacement? ☐ YES ☐ NO

4. Are any additional/revised c necessary in this area? ☐ YES ☐ NO

If YES to any of these three questions, provide a description of the problem: (Any necessary corrective actions should be described on the attached Corrective Action Form)

INDUSTRIAL ACTIVITY AREA _____:

Brief Description:

2. Are any control measures in need of maintenance or repair? ☐ YES ☐ NO

3. Have any control measures failed and require replacement? ☐ YES ☐ NO

4. Are any additional/revised BMPs necessary in this area? ☐ YES ☐ NO

If YES to any of these three questions, provide a description of the problem: (Any necessary corrective actions should be described on the attached Corrective Action Form)

NPDES Permit Tracking No.:

NOTE: *Copy this page and attach additional pages as necessary*

INDUSTRIAL ACTIVITY AREA _____:

1. Brief Description:

2. Are any control measures in need of maintenance or repair? ☐ YES ☐ NO

3. Have any control measures failed and require replacement? ☐ YES ☐ NO

4. Are any additional/revised BMPs necessary in this area? ☐ YES ☐ NO

If YES to any of these three questions, provide a description of the problem: (Any necessary corrective actions should be described on the attached Corrective Action Form)

INDUSTRIAL ACTIVITY AREA _____:

1. Brief Description:

2. Are any control measures in need of maintenance or repair? ☐ YES ☐ NO

3. Have any control measures failed and require replacement? ☐ YES ☐ NO

4. Are any additional/revised BMPs necessary in this area? ☐ YES ☐ NO

If YES to any of these three questions, provide a description of the problem: (Any necessary corrective actions should be described on the attached Corrective Action Form)

INDUSTRIAL ACTIVITY AREA _____:

1. Brief Description:

2. Are any control measures in need of maintenance or repair? ☐ YES ☐ NO

3. Have any control measures failed and require replacement? ☐ YES ☐ NO

4. Are any additional/revised BMPs necessary in this area? ☐ YES ☐ NO

If YES to any of these three questions, provide a description of the problem: (Any necessary corrective actions should be described on the attached Corrective Action Form)

NPDES Permit Tracking No.:

D. CORRECTIVE ACTIONS

Complete this page for each specific condition requiring a corrective action or a review determining that no corrective action is needed. Copy this page for additional corrective actions or reviews.

Include both corrective actions that have been initiated or completed since the last annual report, and future corrective actions needed to address problems identified in this comprehensive stormwater inspection. Include an update on any outstanding corrective actions that had not been completed at the time of your previous annual report.

1. Corrective Action # ☐☐ of ☐☐ for this reporting period.

2. Is this corrective action:

- ☐ An update on a corrective action from a previous annual report; or
- ☐ A new corrective action?

3. Identify the condition(s) triggering the need for this review:

- ☐ Unauthorized release or discharge
- ☐ Numeric effluent limitation exceedance
- ☐ Control measures inadequate to meet applicable water quality standards
- ☐ Control measures inadequate to meet non-numeric effluent limitations
- ☐ Control measures not properly operated or maintained
- ☐ Change in facility operations necessitated change in control measures
- ☐ Average benchmark value exceedance
- ☐ Other (describe): _____

4. Briefly describe the nature of the problem identified:

5. Date problem identified: ☐☐/☐☐/☐☐☐☐

6. How problem was identified:

- ☐ Comprehensive site inspection
- ☐ Quarterly visual assessment
- ☐ Routine facility inspection
- ☐ Benchmark monitoring
- ☐ Notification by EPA or State or local authorities
- ☐ Other (describe): _____

7. Description of corrective action(s) taken or to be taken to eliminate or further investigate the problem (e.g., describe modifications or repairs to control measures, analyses to be conducted, etc.) or if no modifications are needed, basis for that determination:

8. Did/will this corrective action require modification of your SWPPP? ☐ YES ☐ NO

9. Date corrective action initiated: ☐☐/☐☐/☐☐☐☐

10. Date correction action completed: ☐☐/☐☐/☐☐☐☐ or expected to be completed: ☐☐/☐☐/☐☐☐☐

11. If corrective action not yet completed, provide the status of corrective action at the time of the comprehensive site inspection and describe any remaining steps (including timeframes associated with each step) necessary to complete corrective action:

NPDES Permit Tracking No.:

E. ANNUAL REPORT CERTIFICATION

1. Compliance Certification

Do you certify that your annual inspection has met the requirements of Part 4.2 of the permit, and that, based upon the results of this inspection, to the best of your knowledge, you are in compliance with the permit? ☐ YES ☐ NO

If NO, summarize why you are not in compliance with the permit:

2. Annual Report Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Authorized Representative Printed Name: Title:

Signature: Date Signed:

Geosyntec
consultants

APPENDIX L
Landfill Gas Management System

Geosyntec
consultants

APPENDIX L.1
Landfill Gas Generation Estimate

CALCULATION COVER SHEET

Client: **Anne Arundel County** Project: **Millersville Cell 9 Vertical Expansion** Project No. **ME1418A** Phase/ Task No. **03/04**

Title of Calculations **Landfill Gas Generation**

Calculations Prepared by:	Signature		05/19/2025
	Printed Name Title	Daniel Espinoza Senior Staff Professional	Date
Assumptions and Procedures Checked by: (Assumptions and Procedures Checker, APC)	Signature		05/21/2025
	Printed Name Title	Helena Harris Professional	Date
Computations Checked by: (Computation Checker, CC)	Signature		05/21/2025
	Printed Name Title	Helena Harris Professional	Date
Computations backchecked by: (Calculation Preparer, CP)	Signature		05/22/2025
	Printed Name Title	Daniel Espinoza Senior Staff Professional	Date
Approved by: (Calculation Approver, CA)	Signature		05/23/2025
	Printed Name Title	Meena Viswanath Senior Engineer	Date

Approval notes:

Submittal History (Number and initial all submittals)

No.	Description	Date	CP	APC	CC	CA

LANDFILL GAS GENERATION

INTRODUCTION AND PURPOSE

This calculation package calculates the anticipated landfill gas (LFG) generation potential in support of the design for the vertical expansion of Cell 9 of the Millersville Landfill and Resource Recovery Facility (MLFRRF) located in Severn, Maryland. Cell 9 is an 84-acre cell subdivided into 5 subcells (Subcells 9.1 through 9.5) and is currently the only permitted cell available for waste disposal at MLFRRF. The proposed vertical expansion of MLFRRF will increase the maximum permitted elevation from 244 ft (National Geodetic Vertical Datum of 1929 [NGVD29]) to 285 ft NGVD29 as well as modify the geometry of the liner sideslopes and the final cover slopes. The LFG system to be installed in Cell 9 to extract LFG consists of vertical LFG collection wells, which are connected by lateral pipes to a header pipe around the perimeter of Cell 9 (perimeter header). The perimeter header then connects to the flare via a main header pipe section (flare header).

The objective of this calculation package is to estimate the LFG generation potential of the municipal solid waste (MSW) within Cell 9. The LFG generation potential will then be used in future calculations to design the LFG collection system. The LFG generation potential of the MSW within Cell 9 was previously evaluated by SCS Engineers in 2024 as part of the design of the LFG Management System for Cell 9 (Attachment L.1-1). Assumptions from the SCS analysis are considered in the selection of input parameters in this analysis.

DATA AND INFORMATION SOURCES

The LFG generation potential for Cell 9 was estimated using data from the following information sources:

1. *Cell 9 Landfill Gas Header and Collection System, Schematic Design Report* (SCS 2014)
2. United State Environmental Protection Agency (USEPA), Fifth Edition, *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources* (USEPA 1995)
3. Communications with Anne Arundel County

METHOD AND PARAMETERS

The inputs described below are used in the Landfill Gas Emissions Model (LandGEM) to estimate the peak LFG generation rate expected at Cell 9 with the proposed vertical expansion. The peak

LFG generation rate is used for sizing of LFG collection system components, which are designed in other calculation packages.

EVALUATION/ANALYSIS TOOLS

To properly design and size the landfill gas (LFG) extraction system components, the total quantity of LFG being produced in all areas of the landfill through its expected operational and post-closure periods must be estimated. LFG generation is estimated using LandGEM, which was developed by USEPA. This model is coded into a Microsoft Excel® spreadsheet published by the USEPA (2005). LandGEM is defined by the following first-order decomposition rate equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} kL_o \left(\frac{M_i}{10}\right) e^{-kt_{ij}} \quad (1)$$

where

Q_{CH_4} = annual methane generation in the year of the calculation (m^3/year)

i = one-year time increment

n = year of the calculation minus initial year of waste acceptance

j = 0.1-year time increment

k = methane generation rate ($year^{-1}$)

L_o = potential methane generation capacity (cubic meters per Megagram; m^3/Mg)

M_i = mass of waste accepted in the i^{th} year (Megagram; Mg)

t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (years)

INPUT PARAMETERS AND ASSUMPTIONS

In calculating the gas generation curves, the following assumptions were made:

1. The methane generation rate (k) is a function of moisture, pH, temperature, and landfill operating conditions. The LandGEM default value for MSW landfills in non-arid climates is 0.04 $year^{-1}$ (USEPA 1995). However, to be consistent with previous calculations performed by SCS (2014), these calculations use a value of 0.073 $year^{-1}$, which is the default value used by SCS for sites in the region that experience at least 41 inches of

precipitation annually. This value will result in a conservatively high estimate of methane generation compared to the LandGEM default value.

2. Potential methane generation capacity (L_o) has been observed to vary from 6 to 270 m^3/Mg, depending on the organic content of the waste material (USEPA 1995). For MSW landfills, an L_o value of 100 m^3/Mg is recommended by LandGEM. This is approximately consistent with previous calculations performed by SCS (2014) where an L_o value of 3,000 cubic feet per ton (ft^3/ton) (93.6 m^3/Mg) is used. An L_o value of 100 m^3/Mg is therefore used for this calculation.
3. The total volume of LFG generated in a given year is estimated assuming LFG is 50% methane by volume. This value is consistent with previous calculations performed by SCS (2014).
4. The in-place waste density is assumed to be 1,200 pounds per cubic yard (lb/cy). This value is consistent with previous calculations performed by SCS (2014).
5. Waste disposal rates from 2017 (when Cell 9 first accepted waste) to 2023 have been provided by Anne Arundel County. Per discussions with Anne Arundel County, the waste disposal rate is assumed to increase 1% annually starting in 2024. Assumed waste disposal rates are presented in Attachment L.1-2.

ANALYSIS AND EVALUATION APPROACH

Waste filling in Cell 9 commenced in 2017. As presented in Appendix C of this report, The gross disposal capacity (volume between top of subbase and top of final cover) available in Cell 9 following the vertical expansion (conservatively assuming the use of the alternative final cover [ClosureTurf®]) will be 13,492,174 cy (Attachment L.1-2). Subtracting the 2 ft of protective cover soil over the liner (276,232 cy) and 0.75 inches of ClosureTurf sand ballast (8,684 cy) leaves a net disposal capacity of approximately13,207,000 cy (7,924,200 tons). This capacity provides projected waste disposal through 2063 (Attachment L.1-3).

LandGEM is used to estimate peak LFG generation rates for the projected waste disposal rates.

SUMMARY OF RESULTS

The LandGEM output for the capacity in Cell 9 is provided in Attachment L.1-4. The peak LFG generation is expected to occur one year after cessation of landfill operation. The peak LFG generation rate expressed in cubic feet per minute at standard temperature and pressure (scfm) is 2,192 scfm, occurring in 2064.

CONCLUSIONS

The peak LFG generation rate will be 2,192 scfm. All components of the LFG system, including vertical wells and the perimeter header, shall be designed to accommodate this peak LFG generation rate.

REFERENCES

SCS. 2014. C*ell 9 Landfill Gas Header and Collection System, Schematic Design Report*. SCS Engineers. Prepared for Anne Arundel County. June 20.

USEPA. 1995. *AP-42, Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources*. United States Environmental Protection Agency. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. January. Supplement E (November 1998), update in review (October 2008).

USEPA 2005. *Landfill Gas Emissions Model (LandGEM)*. Version 3.02. United States Environmental Protection Agency. EPA-600/R-05/047.

ATTACHMENT L.1-1

LandGEM Output - Permitted

Summary Report

Landfill Name or Identifier: MLFRRF - Cell 9 - Option 1

Date: Friday, May 23, 2025

Description/Comments:
The purpose of this calculation is to determine the landfill gas generation potential of the proposed MLFRRF Cell 9, an MSW landfill located in Severn, Anne Arundel County, Maryland.

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} kL_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,
Q_{CH4} = annual methane generation in the year of the calculation ($m^3/year$)
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate ($year^{-1}$)
L_o = potential methane generation capacity (m^3/Mg)
M_i = mass of waste accepted in the i^{th} year (Mg)
t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**2017**	
Landfill Closure Year (with 80-year limit)	**2048**	
Actual Closure Year (without limit)	***2048***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity		*short tons*

MODEL PARAMETERS

Methane Generation Rate, k	**0.073**	$year^{-1}$
Potential Methane Generation Capacity, L_o	**100**	m^3/Mg
NMOC Concentration	**4,000**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Hydrogen sulfide**
Gas / Pollutant #4:	**NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2017	61,051	67,156	0	0
2018	119,053	130,958	61,051	67,156
2019	153,906	169,297	180,104	198,114
2020	109,926	120,919	334,010	367,411
2021	157,889	173,678	443,936	488,330
2022	126,562	139,218	601,825	662,008
2023	111,594	122,753	728,387	801,226
2024	127,273	140,000	839,981	923,979
2025	128,545	141,400	967,254	1,063,979
2026	129,831	142,814	1,095,799	1,205,379
2027	131,129	144,242	1,225,630	1,348,193
2028	132,441	145,685	1,356,759	1,492,435
2029	133,765	147,141	1,489,200	1,638,120
2030	135,103	148,613	1,622,965	1,785,261
2031	136,454	150,099	1,758,067	1,933,874
2032	137,818	151,600	1,894,521	2,083,973
2033	139,196	153,116	2,032,339	2,235,573
2034	140,588	154,647	2,171,535	2,388,689
2035	141,994	156,194	2,312,124	2,543,336
2036	143,414	157,756	2,454,118	2,699,529
2037	144,848	159,333	2,597,532	2,857,285
2038	146,297	160,926	2,742,380	3,016,618
2039	147,760	162,536	2,888,677	3,177,544
2040	149,237	164,161	3,036,436	3,340,080
2041	150,730	165,803	3,185,674	3,504,241
2042	152,237	167,461	3,336,403	3,670,044
2043	153,759	169,135	3,488,640	3,837,504
2044	155,297	170,827	3,642,400	4,006,640
2045	156,850	172,535	3,797,697	4,177,466
2046	158,418	174,260	3,954,546	4,350,001
2047	160,003	176,003	4,112,965	4,524,261
2048	161,603	177,763	4,272,967	4,700,264
2049	0	0	4,434,570	4,878,027
2050	0	0	4,434,570	4,878,027
2051	0	0	4,434,570	4,878,027
2052	0	0	4,434,570	4,878,027
2053	0	0	4,434,570	4,878,027
2054	0	0	4,434,570	4,878,027
2055	0	0	4,434,570	4,878,027
2056	0	0	4,434,570	4,878,027

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2057	0	0	4,434,570	4,878,027
2058	0	0	4,434,570	4,878,027
2059	0	0	4,434,570	4,878,027
2060	0	0	4,434,570	4,878,027
2061	0	0	4,434,570	4,878,027
2062	0	0	4,434,570	4,878,027
2063	0	0	4,434,570	4,878,027
2064	0	0	4,434,570	4,878,027
2065	0	0	4,434,570	4,878,027
2066	0	0	4,434,570	4,878,027
2067	0	0	4,434,570	4,878,027
2068	0	0	4,434,570	4,878,027
2069	0	0	4,434,570	4,878,027
2070	0	0	4,434,570	4,878,027
2071	0	0	4,434,570	4,878,027
2072	0	0	4,434,570	4,878,027
2073	0	0	4,434,570	4,878,027
2074	0	0	4,434,570	4,878,027
2075	0	0	4,434,570	4,878,027
2076	0	0	4,434,570	4,878,027
2077	0	0	4,434,570	4,878,027
2078	0	0	4,434,570	4,878,027
2079	0	0	4,434,570	4,878,027
2080	0	0	4,434,570	4,878,027
2081	0	0	4,434,570	4,878,027
2082	0	0	4,434,570	4,878,027
2083	0	0	4,434,570	4,878,027
2084	0	0	4,434,570	4,878,027
2085	0	0	4,434,570	4,878,027
2086	0	0	4,434,570	4,878,027
2087	0	0	4,434,570	4,878,027
2088	0	0	4,434,570	4,878,027
2089	0	0	4,434,570	4,878,027
2090	0	0	4,434,570	4,878,027
2091	0	0	4,434,570	4,878,027
2092	0	0	4,434,570	4,878,027
2093	0	0	4,434,570	4,878,027
2094	0	0	4,434,570	4,878,027
2095	0	0	4,434,570	4,878,027
2096	0	0	4,434,570	4,878,027

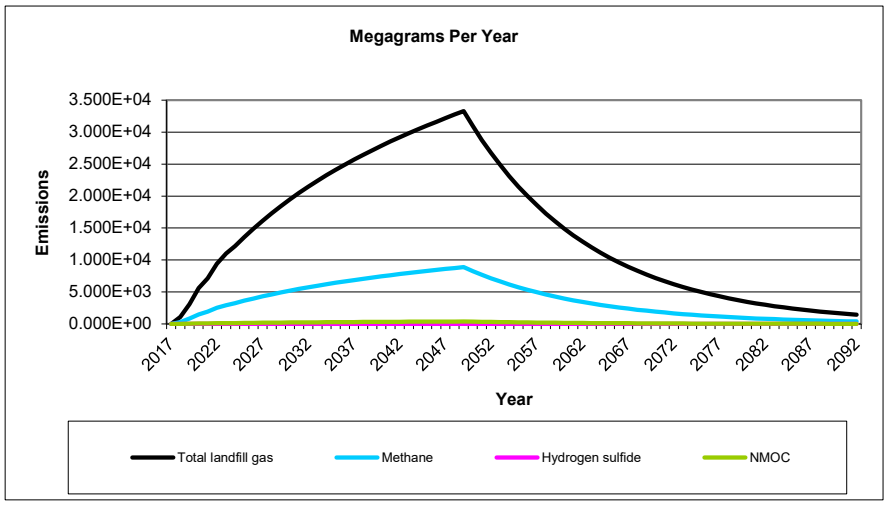
Pollutant Parameters

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs


Megagrams Per Year
Emissions
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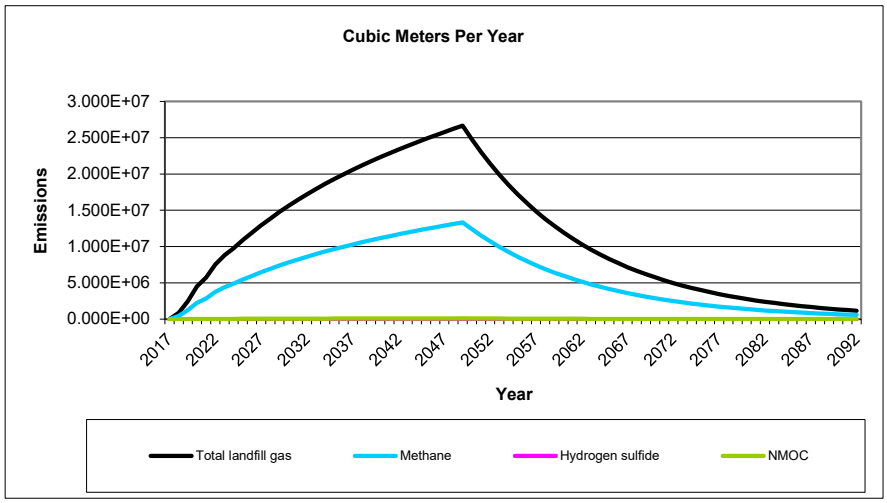
3.000E+04
2.500E+04
2.000E+04
1.500E+04
1.000E+04
5.000E+03
0.000E+00
2017
2022
2027
2032
2037
2042
2047
2052
2057
2062
2067
2072
2077
2082
2087
2092
Year
Total landfill gas
Methane
Hydrogen sulfide
NMOC


Cubic Meters Per Year
Emissions
3.000E+07
2.500E+07
2.000E+07
1.500E+07
1.000E+07
5.000E+06
0.000E+00
2017
2022
2027
2032
2037
2042
2047
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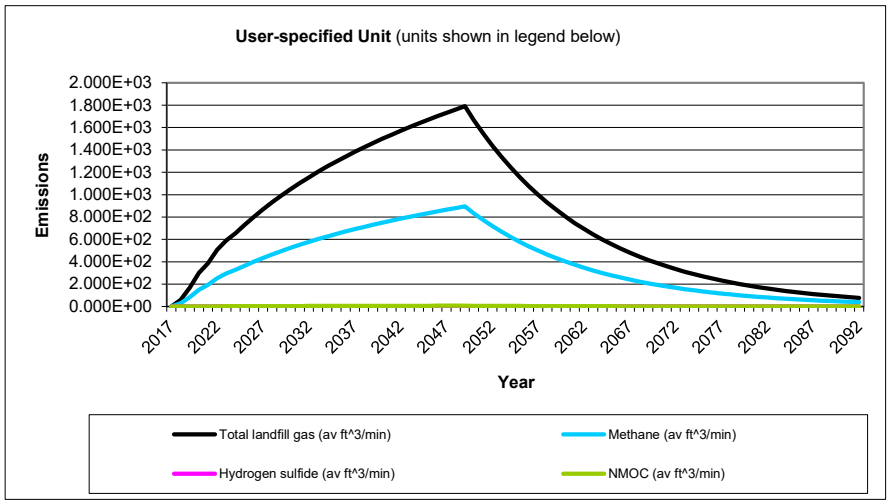
2057
2062
2067
2072
2077
2082
2087
2092
Year
Total landfill gas
Methane
Hydrogen sulfide
NMOC


User-specified Unit (units shown in legend below)
Emissions
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1.800E+03
1.600E+03
1.400E+03
1.200E+03
1.000E+03
8.000E+02
6.000E+02
4.000E+02
2.000E+02
0.000E+00
2017
2022
2027
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2037
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2057
2062
2067
2072
2077
2082
2087
2092
Year
Total landfill gas (av ft^3/min)
Methane (av ft^3/min)
Hydrogen sulfide (av ft^3/min)
NMOC (av ft^3/min)

Results

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2017	0	0	0	0	0	0
2018	1.077E+03	8.627E+05	5.797E+01	2.878E+02	4.314E+05	2.898E+01
2019	3.103E+03	2.484E+06	1.669E+02	8.287E+02	1.242E+06	8.346E+01
2020	5.600E+03	4.484E+06	3.013E+02	1.496E+03	2.242E+06	1.507E+02
2021	7.146E+03	5.722E+06	3.845E+02	1.909E+03	2.861E+06	1.922E+02
2022	9.429E+03	7.550E+06	5.073E+02	2.519E+03	3.775E+06	2.537E+02
2023	1.100E+04	8.807E+06	5.918E+02	2.938E+03	4.404E+06	2.959E+02
2024	1.219E+04	9.764E+06	6.561E+02	3.257E+03	4.882E+06	3.280E+02
2025	1.358E+04	1.088E+07	7.307E+02	3.628E+03	5.438E+06	3.654E+02
2026	1.489E+04	1.193E+07	8.013E+02	3.978E+03	5.963E+06	4.007E+02
2027	1.614E+04	1.292E+07	8.682E+02	4.310E+03	6.461E+06	4.341E+02
2028	1.731E+04	1.386E+07	9.316E+02	4.625E+03	6.932E+06	4.658E+02
2029	1.843E+04	1.476E+07	9.917E+02	4.924E+03	7.380E+06	4.959E+02
2030	1.950E+04	1.561E+07	1.049E+03	5.208E+03	7.806E+06	5.245E+02
2031	2.051E+04	1.642E+07	1.103E+03	5.478E+03	8.211E+06	5.517E+02
2032	2.147E+04	1.719E+07	1.155E+03	5.735E+03	8.597E+06	5.776E+02
2033	2.239E+04	1.793E+07	1.205E+03	5.981E+03	8.965E+06	6.024E+02
2034	2.327E+04	1.864E+07	1.252E+03	6.216E+03	9.318E+06	6.261E+02
2035	2.412E+04	1.931E+07	1.297E+03	6.441E+03	9.655E+06	6.487E+02
2036	2.492E+04	1.996E+07	1.341E+03	6.657E+03	9.979E+06	6.705E+02
2037	2.570E+04	2.058E+07	1.383E+03	6.865E+03	1.029E+07	6.914E+02
2038	2.645E+04	2.118E+07	1.423E+03	7.064E+03	1.059E+07	7.114E+02
2039	2.717E+04	2.175E+07	1.462E+03	7.256E+03	1.088E+07	7.308E+02
2040	2.786E+04	2.231E+07	1.499E+03	7.442E+03	1.116E+07	7.495E+02
2041	2.853E+04	2.285E+07	1.535E+03	7.622E+03	1.142E+07	7.676E+02
2042	2.919E+04	2.337E+07	1.570E+03	7.796E+03	1.169E+07	7.851E+02
2043	2.982E+04	2.388E+07	1.604E+03	7.964E+03	1.194E+07	8.021E+02
2044	3.043E+04	2.437E+07	1.637E+03	8.129E+03	1.218E+07	8.186E+02
2045	3.103E+04	2.485E+07	1.669E+03	8.288E+03	1.242E+07	8.347E+02
2046	3.161E+04	2.531E+07	1.701E+03	8.444E+03	1.266E+07	8.504E+02
2047	3.218E+04	2.577E+07	1.732E+03	8.597E+03	1.289E+07	8.658E+02
2048	3.274E+04	2.622E+07	1.762E+03	8.746E+03	1.311E+07	8.808E+02
2049	3.329E+04	2.666E+07	1.791E+03	8.892E+03	1.333E+07	8.955E+02
2050	3.094E+04	2.478E+07	1.665E+03	8.266E+03	1.239E+07	8.325E+02
2051	2.877E+04	2.303E+07	1.548E+03	7.684E+03	1.152E+07	7.739E+02
2052	2.674E+04	2.141E+07	1.439E+03	7.143E+03	1.071E+07	7.194E+02
2053	2.486E+04	1.991E+07	1.337E+03	6.640E+03	9.953E+06	6.687E+02
2054	2.311E+04	1.850E+07	1.243E+03	6.173E+03	9.252E+06	6.217E+02
2055	2.148E+04	1.720E+07	1.156E+03	5.738E+03	8.601E+06	5.779E+02
2056	1.997E+04	1.599E+07	1.074E+03	5.334E+03	7.995E+06	5.372E+02
2057	1.856E+04	1.486E+07	9.988E+02	4.959E+03	7.432E+06	4.994E+02
2058	1.726E+04	1.382E+07	9.285E+02	4.609E+03	6.909E+06	4.642E+02
2059	1.604E+04	1.285E+07	8.631E+02	4.285E+03	6.423E+06	4.315E+02
2060	1.491E+04	1.194E+07	8.023E+02	3.983E+03	5.971E+06	4.012E+02
2061	1.386E+04	1.110E+07	7.459E+02	3.703E+03	5.550E+06	3.729E+02
2062	1.289E+04	1.032E+07	6.933E+02	3.442E+03	5.160E+06	3.467E+02
2063	1.198E+04	9.593E+06	6.445E+02	3.200E+03	4.796E+06	3.223E+02
2064	1.114E+04	8.917E+06	5.992E+02	2.975E+03	4.459E+06	2.996E+02
2065	1.035E+04	8.290E+06	5.570E+02	2.765E+03	4.145E+06	2.785E+02
2066	9.623E+03	7.706E+06	5.178E+02	2.571E+03	3.853E+06	2.589E+02

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2067	8.946E+03	7.164E+06	4.813E+02	2.390E+03	3.582E+06	2.407E+02
2068	8.316E+03	6.659E+06	4.474E+02	2.221E+03	3.330E+06	2.237E+02
2069	7.731E+03	6.190E+06	4.159E+02	2.065E+03	3.095E+06	2.080E+02
2070	7.187E+03	5.755E+06	3.867E+02	1.920E+03	2.877E+06	1.933E+02
2071	6.681E+03	5.350E+06	3.594E+02	1.784E+03	2.675E+06	1.797E+02
2072	6.210E+03	4.973E+06	3.341E+02	1.659E+03	2.486E+06	1.671E+02
2073	5.773E+03	4.623E+06	3.106E+02	1.542E+03	2.311E+06	1.553E+02
2074	5.367E+03	4.297E+06	2.887E+02	1.433E+03	2.149E+06	1.444E+02
2075	4.989E+03	3.995E+06	2.684E+02	1.333E+03	1.997E+06	1.342E+02
2076	4.638E+03	3.714E+06	2.495E+02	1.239E+03	1.857E+06	1.248E+02
2077	4.311E+03	3.452E+06	2.320E+02	1.152E+03	1.726E+06	1.160E+02
2078	4.008E+03	3.209E+06	2.156E+02	1.070E+03	1.605E+06	1.078E+02
2079	3.726E+03	2.983E+06	2.004E+02	9.951E+02	1.492E+06	1.002E+02
2080	3.463E+03	2.773E+06	1.863E+02	9.251E+02	1.387E+06	9.317E+01
2081	3.219E+03	2.578E+06	1.732E+02	8.599E+02	1.289E+06	8.661E+01
2082	2.993E+03	2.396E+06	1.610E+02	7.994E+02	1.198E+06	8.051E+01
2083	2.782E+03	2.228E+06	1.497E+02	7.431E+02	1.114E+06	7.484E+01
2084	2.586E+03	2.071E+06	1.391E+02	6.908E+02	1.035E+06	6.957E+01
2085	2.404E+03	1.925E+06	1.294E+02	6.422E+02	9.626E+05	6.468E+01
2086	2.235E+03	1.790E+06	1.202E+02	5.970E+02	8.948E+05	6.012E+01
2087	2.078E+03	1.664E+06	1.118E+02	5.549E+02	8.318E+05	5.589E+01
2088	1.931E+03	1.547E+06	1.039E+02	5.159E+02	7.733E+05	5.196E+01
2089	1.795E+03	1.438E+06	9.659E+01	4.796E+02	7.188E+05	4.830E+01
2090	1.669E+03	1.336E+06	8.979E+01	4.458E+02	6.682E+05	4.490E+01
2091	1.551E+03	1.242E+06	8.347E+01	4.144E+02	6.212E+05	4.174E+01
2092	1.442E+03	1.155E+06	7.760E+01	3.852E+02	5.774E+05	3.880E+01
2093	1.341E+03	1.074E+06	7.213E+01	3.581E+02	5.368E+05	3.607E+01
2094	1.246E+03	9.980E+05	6.706E+01	3.329E+02	4.990E+05	3.353E+01
2095	1.159E+03	9.277E+05	6.234E+01	3.095E+02	4.639E+05	3.117E+01
2096	1.077E+03	8.624E+05	5.795E+01	2.877E+02	4.312E+05	2.897E+01
2097	1.001E+03	8.017E+05	5.387E+01	2.674E+02	4.009E+05	2.693E+01
2098	9.307E+02	7.453E+05	5.008E+01	2.486E+02	3.726E+05	2.504E+01
2099	8.652E+02	6.928E+05	4.655E+01	2.311E+02	3.464E+05	2.327E+01
2100	8.043E+02	6.440E+05	4.327E+01	2.148E+02	3.220E+05	2.164E+01
2101	7.477E+02	5.987E+05	4.023E+01	1.997E+02	2.993E+05	2.011E+01
2102	6.950E+02	5.566E+05	3.739E+01	1.857E+02	2.783E+05	1.870E+01
2103	6.461E+02	5.174E+05	3.476E+01	1.726E+02	2.587E+05	1.738E+01
2104	6.006E+02	4.809E+05	3.231E+01	1.604E+02	2.405E+05	1.616E+01
2105	5.583E+02	4.471E+05	3.004E+01	1.491E+02	2.235E+05	1.502E+01
2106	5.190E+02	4.156E+05	2.793E+01	1.386E+02	2.078E+05	1.396E+01
2107	4.825E+02	3.864E+05	2.596E+01	1.289E+02	1.932E+05	1.298E+01
2108	4.485E+02	3.592E+05	2.413E+01	1.198E+02	1.796E+05	1.207E+01
2109	4.169E+02	3.339E+05	2.243E+01	1.114E+02	1.669E+05	1.122E+01
2110	3.876E+02	3.104E+05	2.085E+01	1.035E+02	1.552E+05	1.043E+01
2111	3.603E+02	2.885E+05	1.939E+01	9.624E+01	1.443E+05	9.693E+00
2112	3.349E+02	2.682E+05	1.802E+01	8.947E+01	1.341E+05	9.010E+00
2113	3.114E+02	2.493E+05	1.675E+01	8.317E+01	1.247E+05	8.376E+00
2114	2.894E+02	2.318E+05	1.557E+01	7.731E+01	1.159E+05	7.786E+00
2115	2.691E+02	2.155E+05	1.448E+01	7.187E+01	1.077E+05	7.238E+00
2116	2.501E+02	2.003E+05	1.346E+01	6.681E+01	1.001E+05	6.729E+00
2117	2.325E+02	1.862E+05	1.251E+01	6.211E+01	9.309E+04	6.255E+00

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2118	2.161E+02	1.731E+05	1.163E+01	5.774E+01	8.654E+04	5.815E+00
2119	2.009E+02	1.609E+05	1.081E+01	5.367E+01	8.045E+04	5.405E+00
2120	1.868E+02	1.496E+05	1.005E+01	4.989E+01	7.478E+04	5.025E+00
2121	1.736E+02	1.390E+05	9.342E+00	4.638E+01	6.952E+04	4.671E+00
2122	1.614E+02	1.293E+05	8.684E+00	4.311E+01	6.463E+04	4.342E+00
2123	1.500E+02	1.202E+05	8.073E+00	4.008E+01	6.008E+04	4.037E+00
2124	1.395E+02	1.117E+05	7.505E+00	3.726E+01	5.585E+04	3.752E+00
2125	1.297E+02	1.038E+05	6.976E+00	3.464E+01	5.192E+04	3.488E+00
2126	1.205E+02	9.652E+04	6.485E+00	3.220E+01	4.826E+04	3.243E+00
2127	1.121E+02	8.973E+04	6.029E+00	2.993E+01	4.486E+04	3.014E+00
2128	1.042E+02	8.341E+04	5.604E+00	2.782E+01	4.170E+04	2.802E+00
2129	9.683E+01	7.754E+04	5.210E+00	2.586E+01	3.877E+04	2.605E+00
2130	9.001E+01	7.208E+04	4.843E+00	2.404E+01	3.604E+04	2.421E+00
2131	8.368E+01	6.700E+04	4.502E+00	2.235E+01	3.350E+04	2.251E+00
2132	7.779E+01	6.229E+04	4.185E+00	2.078E+01	3.114E+04	2.093E+00
2133	7.231E+01	5.790E+04	3.890E+00	1.931E+01	2.895E+04	1.945E+00
2134	6.722E+01	5.383E+04	3.617E+00	1.796E+01	2.691E+04	1.808E+00
2135	6.249E+01	5.004E+04	3.362E+00	1.669E+01	2.502E+04	1.681E+00
2136	5.809E+01	4.651E+04	3.125E+00	1.552E+01	2.326E+04	1.563E+00
2137	5.400E+01	4.324E+04	2.905E+00	1.442E+01	2.162E+04	1.453E+00
2138	5.020E+01	4.020E+04	2.701E+00	1.341E+01	2.010E+04	1.350E+00
2139	4.666E+01	3.737E+04	2.511E+00	1.246E+01	1.868E+04	1.255E+00
2140	4.338E+01	3.474E+04	2.334E+00	1.159E+01	1.737E+04	1.167E+00
2141	4.032E+01	3.229E+04	2.170E+00	1.077E+01	1.615E+04	1.085E+00
2142	3.749E+01	3.002E+04	2.017E+00	1.001E+01	1.501E+04	1.008E+00
2143	3.485E+01	2.790E+04	1.875E+00	9.308E+00	1.395E+04	9.374E-01
2144	3.239E+01	2.594E+04	1.743E+00	8.653E+00	1.297E+04	8.714E-01
2145	3.011E+01	2.411E+04	1.620E+00	8.044E+00	1.206E+04	8.101E-01
2146	2.799E+01	2.242E+04	1.506E+00	7.477E+00	1.121E+04	7.531E-01
2147	2.602E+01	2.084E+04	1.400E+00	6.951E+00	1.042E+04	7.000E-01
2148	2.419E+01	1.937E+04	1.302E+00	6.462E+00	9.685E+03	6.508E-01
2149	2.249E+01	1.801E+04	1.210E+00	6.007E+00	9.003E+03	6.049E-01
2150	2.090E+01	1.674E+04	1.125E+00	5.584E+00	8.370E+03	5.624E-01
2151	1.943E+01	1.556E+04	1.046E+00	5.191E+00	7.780E+03	5.228E-01
2152	1.806E+01	1.447E+04	9.719E-01	4.825E+00	7.233E+03	4.860E-01
2153	1.679E+01	1.345E+04	9.035E-01	4.486E+00	6.724E+03	4.518E-01
2154	1.561E+01	1.250E+04	8.399E-01	4.170E+00	6.250E+03	4.199E-01
2155	1.451E+01	1.162E+04	7.808E-01	3.876E+00	5.810E+03	3.904E-01
2156	1.349E+01	1.080E+04	7.258E-01	3.603E+00	5.401E+03	3.629E-01
2157	1.254E+01	1.004E+04	6.747E-01	3.350E+00	5.021E+03	3.374E-01

Results (Continued)

Year	Hydrogen sulfide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2017	0	0	0	0	0	0
2018	4.402E-02	3.106E+01	2.087E-03	1.237E+01	3.451E+03	2.319E-01
2019	1.268E-01	8.944E+01	6.009E-03	3.562E+01	9.937E+03	6.677E-01
2020	2.288E-01	1.614E+02	1.085E-02	6.430E+01	1.794E+04	1.205E+00
2021	2.920E-01	2.060E+02	1.384E-02	8.204E+01	2.289E+04	1.538E+00
2022	3.853E-01	2.718E+02	1.826E-02	1.083E+02	3.020E+04	2.029E+00
2023	4.494E-01	3.171E+02	2.130E-02	1.263E+02	3.523E+04	2.367E+00
2024	4.983E-01	3.515E+02	2.362E-02	1.400E+02	3.906E+04	2.624E+00
2025	5.550E-01	3.915E+02	2.631E-02	1.559E+02	4.350E+04	2.923E+00
2026	6.086E-01	4.293E+02	2.885E-02	1.710E+02	4.771E+04	3.205E+00
2027	6.594E-01	4.652E+02	3.125E-02	1.853E+02	5.169E+04	3.473E+00
2028	7.075E-01	4.991E+02	3.354E-02	1.988E+02	5.546E+04	3.726E+00
2029	7.532E-01	5.314E+02	3.570E-02	2.116E+02	5.904E+04	3.967E+00
2030	7.966E-01	5.620E+02	3.776E-02	2.238E+02	6.245E+04	4.196E+00
2031	8.380E-01	5.912E+02	3.972E-02	2.354E+02	6.569E+04	4.413E+00
2032	8.774E-01	6.190E+02	4.159E-02	2.465E+02	6.877E+04	4.621E+00
2033	9.150E-01	6.455E+02	4.337E-02	2.571E+02	7.172E+04	4.819E+00
2034	9.510E-01	6.709E+02	4.508E-02	2.672E+02	7.454E+04	5.008E+00
2035	9.854E-01	6.952E+02	4.671E-02	2.769E+02	7.724E+04	5.190E+00
2036	1.018E+00	7.185E+02	4.827E-02	2.861E+02	7.983E+04	5.364E+00
2037	1.050E+00	7.408E+02	4.978E-02	2.951E+02	8.232E+04	5.531E+00
2038	1.081E+00	7.624E+02	5.122E-02	3.036E+02	8.471E+04	5.692E+00
2039	1.110E+00	7.831E+02	5.262E-02	3.119E+02	8.701E+04	5.847E+00
2040	1.138E+00	8.032E+02	5.397E-02	3.199E+02	8.924E+04	5.996E+00
2041	1.166E+00	8.226E+02	5.527E-02	3.276E+02	9.139E+04	6.141E+00
2042	1.193E+00	8.413E+02	5.653E-02	3.351E+02	9.348E+04	6.281E+00
2043	1.218E+00	8.595E+02	5.775E-02	3.423E+02	9.550E+04	6.417E+00
2044	1.243E+00	8.773E+02	5.894E-02	3.494E+02	9.747E+04	6.549E+00
2045	1.268E+00	8.945E+02	6.010E-02	3.563E+02	9.939E+04	6.678E+00
2046	1.292E+00	9.113E+02	6.123E-02	3.630E+02	1.013E+05	6.803E+00
2047	1.315E+00	9.278E+02	6.234E-02	3.695E+02	1.031E+05	6.926E+00
2048	1.338E+00	9.438E+02	6.342E-02	3.759E+02	1.049E+05	7.046E+00
2049	1.360E+00	9.596E+02	6.448E-02	3.822E+02	1.066E+05	7.164E+00
2050	1.264E+00	8.921E+02	5.994E-02	3.553E+02	9.912E+04	6.660E+00
2051	1.175E+00	8.293E+02	5.572E-02	3.303E+02	9.214E+04	6.191E+00
2052	1.093E+00	7.709E+02	5.179E-02	3.070E+02	8.565E+04	5.755E+00
2053	1.016E+00	7.166E+02	4.815E-02	2.854E+02	7.962E+04	5.350E+00
2054	9.443E-01	6.662E+02	4.476E-02	2.653E+02	7.402E+04	4.973E+00
2055	8.778E-01	6.193E+02	4.161E-02	2.466E+02	6.881E+04	4.623E+00
2056	8.160E-01	5.757E+02	3.868E-02	2.293E+02	6.396E+04	4.298E+00
2057	7.585E-01	5.351E+02	3.596E-02	2.131E+02	5.946E+04	3.995E+00
2058	7.051E-01	4.975E+02	3.342E-02	1.981E+02	5.527E+04	3.714E+00
2059	6.555E-01	4.624E+02	3.107E-02	1.842E+02	5.138E+04	3.452E+00
2060	6.094E-01	4.299E+02	2.888E-02	1.712E+02	4.777E+04	3.209E+00
2061	5.665E-01	3.996E+02	2.685E-02	1.592E+02	4.440E+04	2.983E+00
2062	5.266E-01	3.715E+02	2.496E-02	1.480E+02	4.128E+04	2.773E+00
2063	4.895E-01	3.453E+02	2.320E-02	1.375E+02	3.837E+04	2.578E+00
2064	4.550E-01	3.210E+02	2.157E-02	1.279E+02	3.567E+04	2.397E+00
2065	4.230E-01	2.984E+02	2.005E-02	1.189E+02	3.316E+04	2.228E+00
2066	3.932E-01	2.774E+02	1.864E-02	1.105E+02	3.082E+04	2.071E+00

Results (Continued)

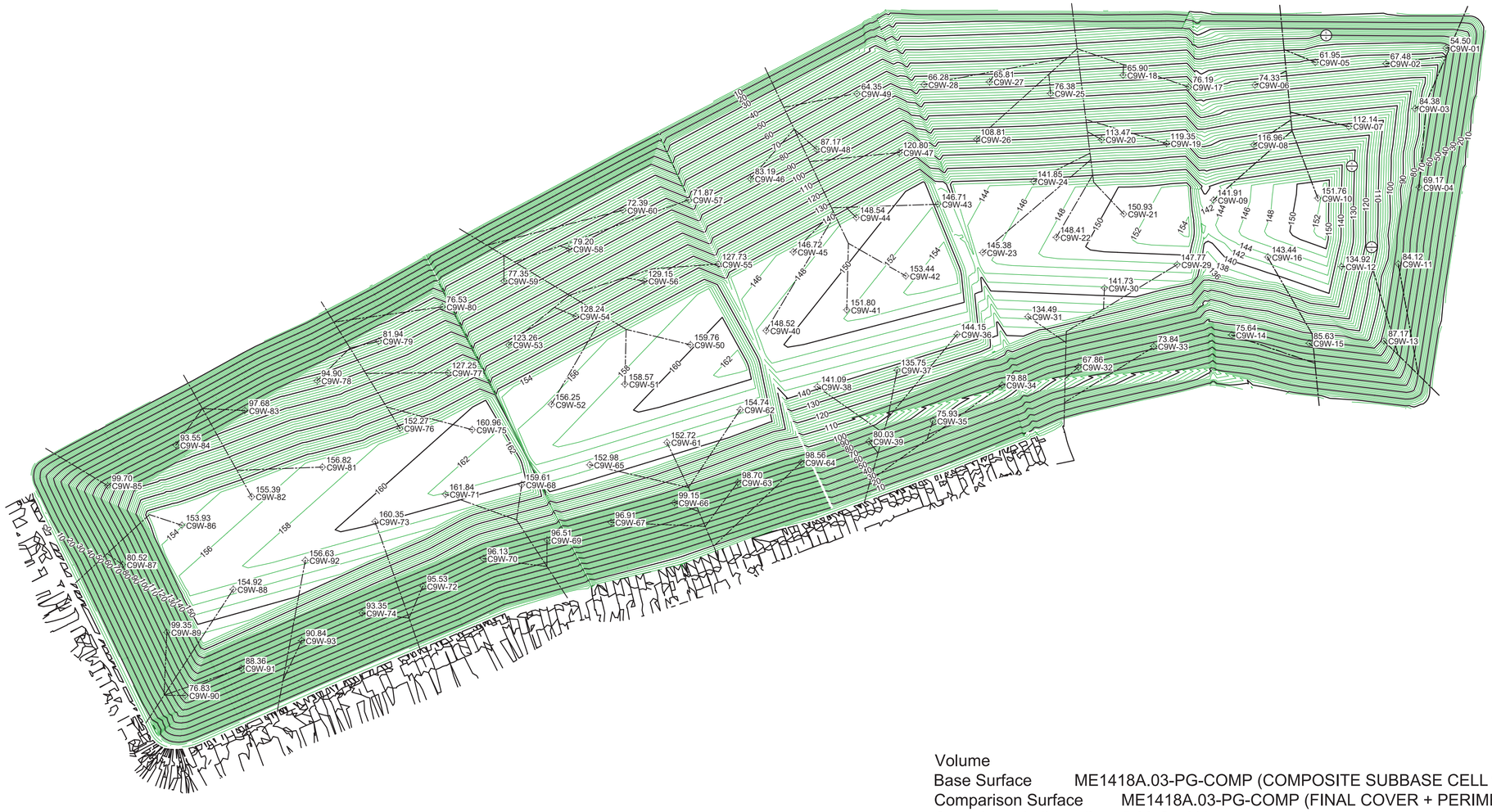
Year	Hydrogen sulfide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2067	3.656E-01	2.579E+02	1.733E-02	1.027E+02	2.865E+04	1.925E+00
2068	3.398E-01	2.397E+02	1.611E-02	9.548E+01	2.664E+04	1.790E+00
2069	3.159E-01	2.229E+02	1.497E-02	8.876E+01	2.476E+04	1.664E+00
2070	2.937E-01	2.072E+02	1.392E-02	8.251E+01	2.302E+04	1.547E+00
2071	2.730E-01	1.926E+02	1.294E-02	7.670E+01	2.140E+04	1.438E+00
2072	2.538E-01	1.790E+02	1.203E-02	7.130E+01	1.989E+04	1.337E+00
2073	2.359E-01	1.664E+02	1.118E-02	6.628E+01	1.849E+04	1.242E+00
2074	2.193E-01	1.547E+02	1.039E-02	6.162E+01	1.719E+04	1.155E+00
2075	2.039E-01	1.438E+02	9.663E-03	5.728E+01	1.598E+04	1.074E+00
2076	1.895E-01	1.337E+02	8.983E-03	5.325E+01	1.485E+04	9.981E-01
2077	1.762E-01	1.243E+02	8.350E-03	4.950E+01	1.381E+04	9.278E-01
2078	1.638E-01	1.155E+02	7.762E-03	4.601E+01	1.284E+04	8.625E-01
2079	1.522E-01	1.074E+02	7.216E-03	4.277E+01	1.193E+04	8.018E-01
2080	1.415E-01	9.984E+01	6.708E-03	3.976E+01	1.109E+04	7.453E-01
2081	1.316E-01	9.281E+01	6.236E-03	3.696E+01	1.031E+04	6.929E-01
2082	1.223E-01	8.627E+01	5.797E-03	3.436E+01	9.586E+03	6.441E-01
2083	1.137E-01	8.020E+01	5.389E-03	3.194E+01	8.911E+03	5.987E-01
2084	1.057E-01	7.455E+01	5.009E-03	2.969E+01	8.284E+03	5.566E-01
2085	9.824E-02	6.931E+01	4.657E-03	2.760E+01	7.701E+03	5.174E-01
2086	9.132E-02	6.443E+01	4.329E-03	2.566E+01	7.158E+03	4.810E-01
2087	8.489E-02	5.989E+01	4.024E-03	2.385E+01	6.655E+03	4.471E-01
2088	7.892E-02	5.567E+01	3.741E-03	2.217E+01	6.186E+03	4.156E-01
2089	7.336E-02	5.176E+01	3.477E-03	2.061E+01	5.751E+03	3.864E-01
2090	6.820E-02	4.811E+01	3.233E-03	1.916E+01	5.346E+03	3.592E-01
2091	6.340E-02	4.472E+01	3.005E-03	1.781E+01	4.969E+03	3.339E-01
2092	5.893E-02	4.158E+01	2.793E-03	1.656E+01	4.620E+03	3.104E-01
2093	5.478E-02	3.865E+01	2.597E-03	1.539E+01	4.294E+03	2.885E-01
2094	5.093E-02	3.593E+01	2.414E-03	1.431E+01	3.992E+03	2.682E-01
2095	4.734E-02	3.340E+01	2.244E-03	1.330E+01	3.711E+03	2.493E-01
2096	4.401E-02	3.105E+01	2.086E-03	1.237E+01	3.450E+03	2.318E-01
2097	4.091E-02	2.886E+01	1.939E-03	1.149E+01	3.207E+03	2.155E-01
2098	3.803E-02	2.683E+01	1.803E-03	1.069E+01	2.981E+03	2.003E-01
2099	3.535E-02	2.494E+01	1.676E-03	9.933E+00	2.771E+03	1.862E-01
2100	3.286E-02	2.319E+01	1.558E-03	9.234E+00	2.576E+03	1.731E-01
2101	3.055E-02	2.155E+01	1.448E-03	8.584E+00	2.395E+03	1.609E-01
2102	2.840E-02	2.004E+01	1.346E-03	7.980E+00	2.226E+03	1.496E-01
2103	2.640E-02	1.863E+01	1.251E-03	7.418E+00	2.069E+03	1.390E-01
2104	2.454E-02	1.731E+01	1.163E-03	6.896E+00	1.924E+03	1.293E-01
2105	2.281E-02	1.610E+01	1.081E-03	6.410E+00	1.788E+03	1.202E-01
2106	2.121E-02	1.496E+01	1.005E-03	5.959E+00	1.662E+03	1.117E-01
2107	1.972E-02	1.391E+01	9.345E-04	5.540E+00	1.545E+03	1.038E-01
2108	1.833E-02	1.293E+01	8.687E-04	5.150E+00	1.437E+03	9.653E-02
2109	1.704E-02	1.202E+01	8.076E-04	4.787E+00	1.335E+03	8.973E-02
2110	1.584E-02	1.117E+01	7.507E-04	4.450E+00	1.241E+03	8.341E-02
2111	1.472E-02	1.039E+01	6.979E-04	4.137E+00	1.154E+03	7.754E-02
2112	1.369E-02	9.655E+00	6.487E-04	3.846E+00	1.073E+03	7.208E-02
2113	1.272E-02	8.976E+00	6.031E-04	3.575E+00	9.973E+02	6.701E-02
2114	1.183E-02	8.344E+00	5.606E-04	3.323E+00	9.271E+02	6.229E-02
2115	1.099E-02	7.756E+00	5.212E-04	3.089E+00	8.618E+02	5.791E-02
2116	1.022E-02	7.210E+00	4.845E-04	2.872E+00	8.012E+02	5.383E-02
2117	9.501E-03	6.703E+00	4.504E-04	2.670E+00	7.448E+02	5.004E-02

Results (Continued)

Year	Hydrogen sulfide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2118	8.832E-03	6.231E+00	4.187E-04	2.482E+00	6.923E+02	4.652E-02
2119	8.210E-03	5.792E+00	3.892E-04	2.307E+00	6.436E+02	4.324E-02
2120	7.632E-03	5.384E+00	3.618E-04	2.145E+00	5.983E+02	4.020E-02
2121	7.095E-03	5.005E+00	3.363E-04	1.994E+00	5.562E+02	3.737E-02
2122	6.596E-03	4.653E+00	3.126E-04	1.853E+00	5.170E+02	3.474E-02
2123	6.131E-03	4.325E+00	2.906E-04	1.723E+00	4.806E+02	3.229E-02
2124	5.700E-03	4.021E+00	2.702E-04	1.601E+00	4.468E+02	3.002E-02
2125	5.298E-03	3.738E+00	2.511E-04	1.489E+00	4.153E+02	2.791E-02
2126	4.925E-03	3.475E+00	2.335E-04	1.384E+00	3.861E+02	2.594E-02
2127	4.579E-03	3.230E+00	2.170E-04	1.286E+00	3.589E+02	2.411E-02
2128	4.256E-03	3.003E+00	2.018E-04	1.196E+00	3.336E+02	2.242E-02
2129	3.957E-03	2.791E+00	1.875E-04	1.112E+00	3.101E+02	2.084E-02
2130	3.678E-03	2.595E+00	1.743E-04	1.033E+00	2.883E+02	1.937E-02
2131	3.419E-03	2.412E+00	1.621E-04	9.607E-01	2.680E+02	1.801E-02
2132	3.178E-03	2.242E+00	1.507E-04	8.931E-01	2.491E+02	1.674E-02
2133	2.955E-03	2.084E+00	1.401E-04	8.302E-01	2.316E+02	1.556E-02
2134	2.747E-03	1.938E+00	1.302E-04	7.718E-01	2.153E+02	1.447E-02
2135	2.553E-03	1.801E+00	1.210E-04	7.174E-01	2.001E+02	1.345E-02
2136	2.374E-03	1.675E+00	1.125E-04	6.669E-01	1.861E+02	1.250E-02
2137	2.206E-03	1.557E+00	1.046E-04	6.200E-01	1.730E+02	1.162E-02
2138	2.051E-03	1.447E+00	9.723E-05	5.763E-01	1.608E+02	1.080E-02
2139	1.907E-03	1.345E+00	9.038E-05	5.357E-01	1.495E+02	1.004E-02
2140	1.773E-03	1.250E+00	8.402E-05	4.980E-01	1.389E+02	9.335E-03
2141	1.648E-03	1.162E+00	7.810E-05	4.630E-01	1.292E+02	8.678E-03
2142	1.532E-03	1.081E+00	7.261E-05	4.304E-01	1.201E+02	8.067E-03
2143	1.424E-03	1.005E+00	6.749E-05	4.001E-01	1.116E+02	7.499E-03
2144	1.324E-03	9.338E-01	6.274E-05	3.719E-01	1.038E+02	6.971E-03
2145	1.230E-03	8.681E-01	5.833E-05	3.457E-01	9.645E+01	6.481E-03
2146	1.144E-03	8.070E-01	5.422E-05	3.214E-01	8.966E+01	6.024E-03
2147	1.063E-03	7.502E-01	5.040E-05	2.988E-01	8.335E+01	5.600E-03
2148	9.885E-04	6.973E-01	4.685E-05	2.777E-01	7.748E+01	5.206E-03
2149	9.189E-04	6.483E-01	4.356E-05	2.582E-01	7.203E+01	4.840E-03
2150	8.542E-04	6.026E-01	4.049E-05	2.400E-01	6.696E+01	4.499E-03
2151	7.941E-04	5.602E-01	3.764E-05	2.231E-01	6.224E+01	4.182E-03
2152	7.382E-04	5.208E-01	3.499E-05	2.074E-01	5.786E+01	3.888E-03
2153	6.862E-04	4.841E-01	3.253E-05	1.928E-01	5.379E+01	3.614E-03
2154	6.379E-04	4.500E-01	3.024E-05	1.792E-01	5.000E+01	3.360E-03
2155	5.930E-04	4.183E-01	2.811E-05	1.666E-01	4.648E+01	3.123E-03
2156	5.512E-04	3.889E-01	2.613E-05	1.549E-01	4.321E+01	2.903E-03
2157	5.124E-04	3.615E-01	2.429E-05	1.440E-01	4.017E+01	2.699E-03

ATTACHMENT L.1-2

Waste Capacity



Volume

Base Surface	ME1418A.03-PG-COMP (COMPOSITE SUBBASE CELL 9)
Comparison Surface	ME1418A.03-PG-COMP (FINAL COVER + PERIMETER BERM)
Cut volume (adjusted)	5.00 Cu. Yd.
Fill volume (adjusted)	13,492,174.09 Cu. Yd.
Net volume (adjusted)	13,492,169.09 Cu. Yd.<Fill>

0 150'
SCALE IN FEET

ISOPACH

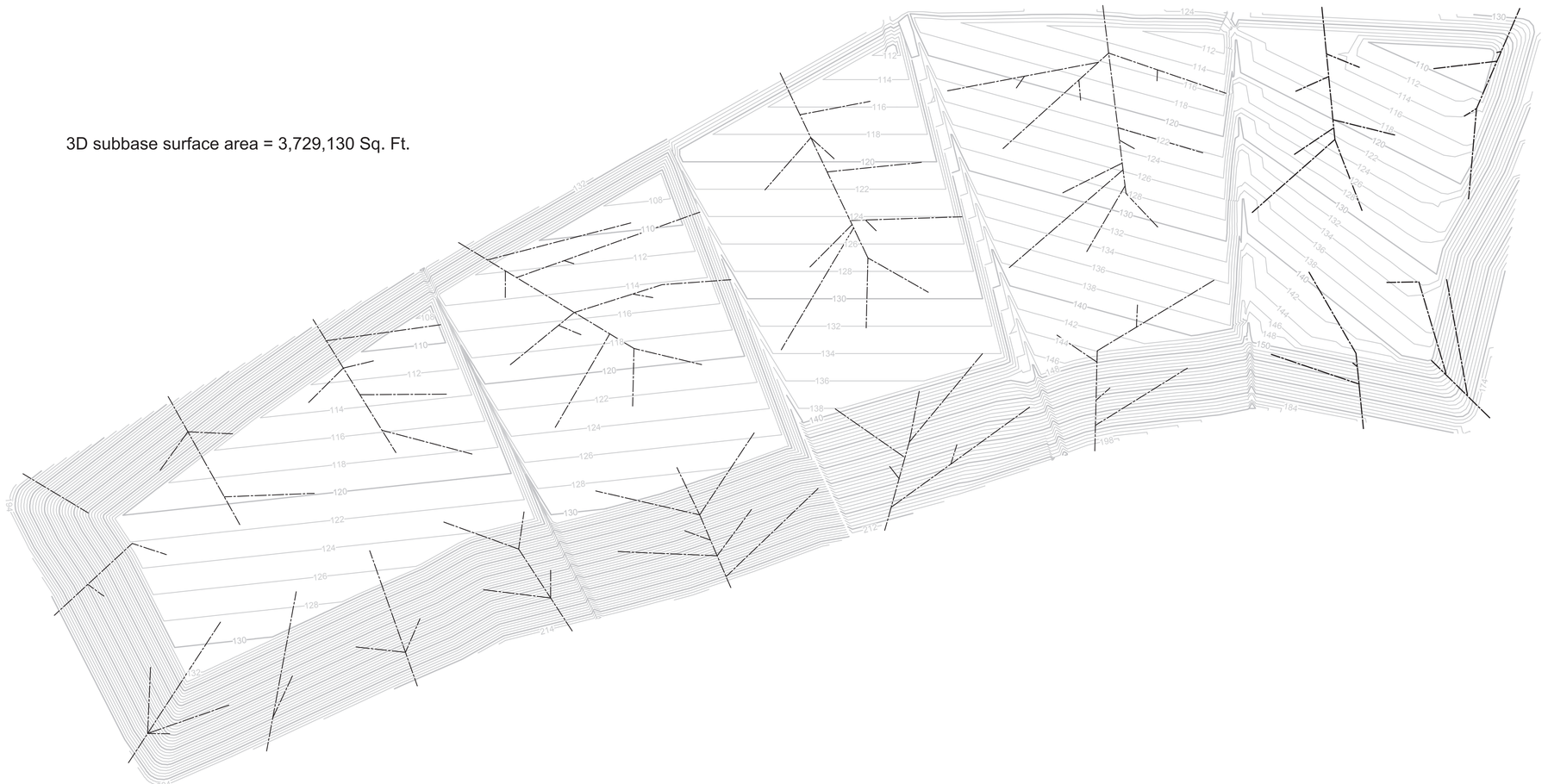
Geosyntec consultants

PROJECT NO: PRJ-NO | MAY 2024

FIGURE 3

C:\GEOPW\350\1DM\32629\P01

3D subbase surface area = 3,729,130 Sq. Ft.



N

0 150'
SCALE IN FEET

SUBBASE GRADES

Geosyntec consultants

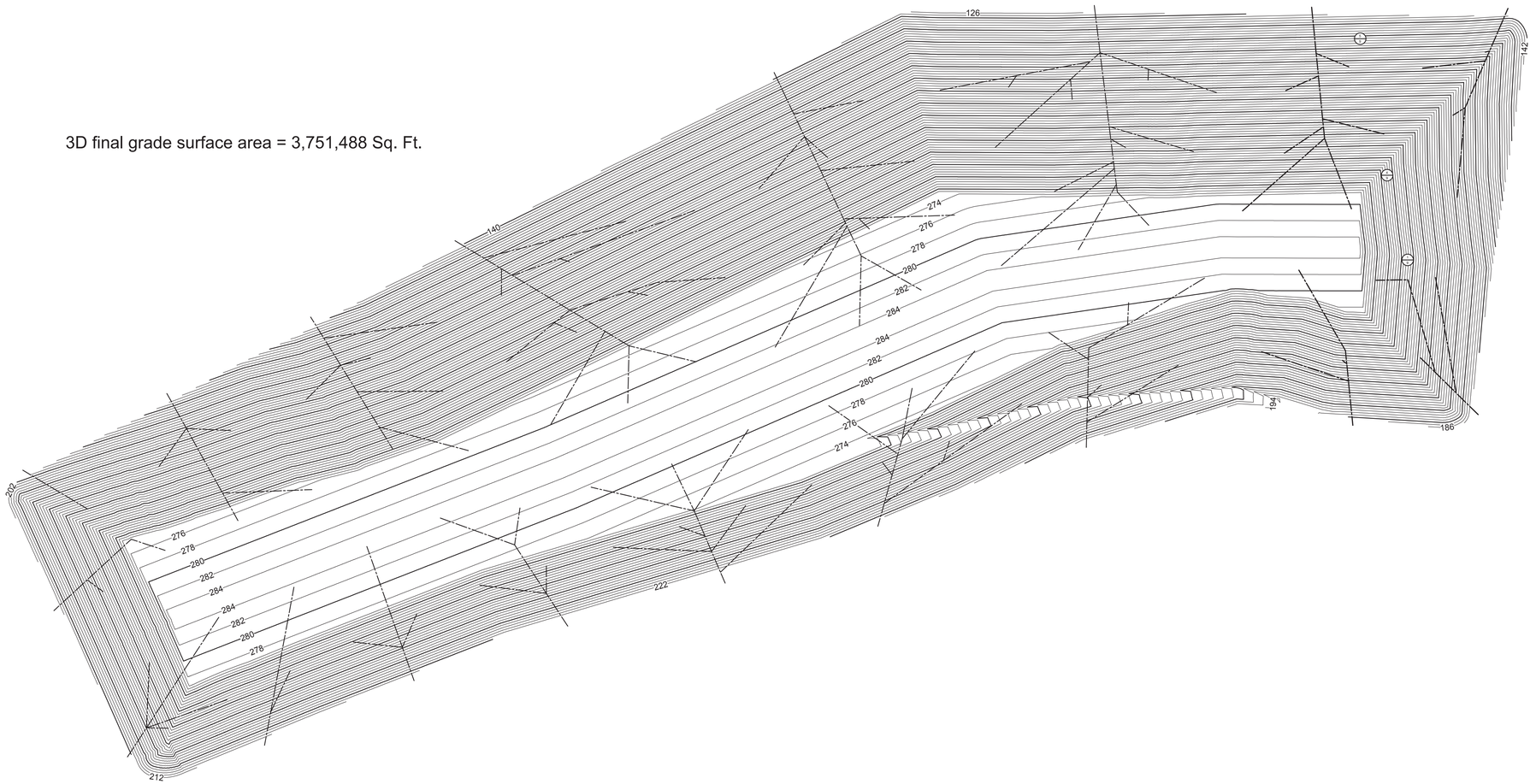
PROJECT NO: PRJ-NO | MAY 2024

FIGURE 1

C:_GEOPW\2501\DMS\2428P01

N

3D final grade surface area = 3,751,488 Sq. Ft.



0 150'
SCALE IN FEET

FINAL GRADES

Geosyntec consultants

FIGURE 2

PROJECT NO: PRJ-NO | MAY 2024

G:_GEOPWY\09310\MS\24268\FI

ATTACHMENT L.1-3

Waste Disposal Lifespan

Current Permit

Waste Density (lb/CY)	1,200
Permitted Capacity (CY)	8,523,100
Permitted Capacity (ton)	5,113,860

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	Refuse In-Place (CY)
2017	67,156	177,399	177,399
2018	130,958	289,887	467,286
2019	169,297	336,174	803,460
2020	120,919	227,584	1,031,044
2021	173,678	383,535	1,414,579
2022	139,218	283,966	1,698,545
2023	122,753	271,207	1,969,752
2024	140,000	233,333	2,203,085
2025	141,400	235,667	2,438,752
2026	142,814	238,023	2,676,775
2027	144,242	240,404	2,917,179
2028	145,685	242,808	3,159,987
2029	147,141	245,236	3,405,222
2030	148,613	247,688	3,652,910
2031	150,099	250,165	3,903,075
2032	151,600	252,667	4,155,742
2033	153,116	255,193	4,410,935
2034	154,647	257,745	4,668,680
2035	156,194	260,323	4,929,003
2036	157,756	262,926	5,191,929
2037	159,333	265,555	5,457,484
2038	160,926	268,211	5,725,694
2039	162,536	270,893	5,996,587
2040	164,161	273,602	6,270,189
2041	165,803	276,338	6,546,526
2042	167,461	279,101	6,825,628
2043	169,135	281,892	7,107,520
2044	170,827	284,711	7,392,231
2045	172,535	287,558	7,679,789
2046	174,260	290,434	7,970,222
2047	176,003	293,338	8,263,560
2048	177,763	296,271	8,559,832

Note
Disposal rate before 2024 is based off of data provided by the county. From 2024 on, a 1% growth is assumed.

Proposed Expansion

Waste Density (lb/CY)	1,200
Permitted Capacity (CY)	8,523,100
Permitted Capacity (ton)	5,113,860
Expanded Capacity (CY)	13,207,000
Expanded Capacity (ton)	7,924,200

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	Refuse In-Place (CY)
2017	67,156	67,156	177,399
2018	130,958	198,114	289,887
2019	169,297	367,411	336,174
2020	120,919	488,330	227,584
2021	173,678	662,008	383,535
2022	139,218	801,226	283,966
2023	122,753	923,979	271,207
2024	140,000	1,063,979	233,333
2025	141,400	1,205,379	235,667
2026	142,814	1,348,193	238,023
2027	144,242	1,492,435	240,404
2028	145,685	1,638,120	242,808
2029	147,141	1,785,261	245,236
2030	148,613	1,933,874	247,688
2031	150,099	2,083,973	250,165
2032	151,600	2,235,573	252,667
2033	153,116	2,388,689	255,193
2034	154,647	2,543,336	257,745
2035	156,194	2,699,529	260,323
2036	157,756	2,857,285	262,926
2037	159,333	3,016,618	265,555
2038	160,926	3,177,544	268,211
2039	162,536	3,340,080	270,893
2040	164,161	3,504,241	273,602
2041	165,803	3,670,044	276,338
2042	167,461	3,837,504	279,101
2043	169,135	4,006,640	281,892
2044	170,827	4,177,466	284,711
2045	172,535	4,350,001	287,558
2046	174,260	4,524,261	290,434
2047	176,003	4,700,264	293,338
2048	177,763	4,878,027	296,271
2049	179,540	5,057,567	299,234
2050	181,336	5,238,903	302,226
2051	183,149	5,422,053	305,249
2052	184,981	5,607,033	308,301
2053	186,831	5,793,864	311,384
2054	188,699	5,982,563	314,498
2055	190,586	6,173,148	317,643
2056	192,492	6,365,640	320,819
2057	194,417	6,560,057	324,028
2058	196,361	6,756,418	327,268
2059	198,324	6,954,742	330,541
2060	200,308	7,155,050	333,846
2061	202,311	7,357,360	337,185
2062	204,334	7,561,694	340,556
2063	206,377	7,768,071	343,962

ATTACHMENT L.1-4

LandGEM Output - Expansion

Summary Report

Landfill Name or Identifier: MLFRRF - Cell 9 - Option 2

Date: Tuesday, June 17, 2025

Description/Comments:
The purpose of this calculation is to determine the landfill gas generation potential of the proposed MLFRRF Cell 9, an MSW landfill located in Severn, Anne Arundel County, Maryland.

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} kL_o \left(\frac{M_i}{10}\right) e^{-kt_{ij}}$$

Where,
Q_{CH4} = annual methane generation in the year of the calculation ($m^3/year$)
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate ($year^{-1}$)
L_o = potential methane generation capacity (m^3/Mg)
M_i = mass of waste accepted in the i^{th} year (Mg)
t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**2017**	
Landfill Closure Year (with 80-year limit)	**2063**	
Actual Closure Year (without limit)	***2063***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity		*short tons*

MODEL PARAMETERS

Methane Generation Rate, k	**0.073**	$year^{-1}$
Potential Methane Generation Capacity, L_o	**100**	m^3/Mg
NMOC Concentration	**4,000**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Hydrogen sulfide**
Gas / Pollutant #4:	**NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2017	61,051	67,156	0	0
2018	119,053	130,958	61,051	67,156
2019	153,906	169,297	180,104	198,114
2020	109,926	120,919	334,010	367,411
2021	157,889	173,678	443,936	488,330
2022	126,562	139,218	601,825	662,008
2023	111,594	122,753	728,387	801,226
2024	127,273	140,000	839,981	923,979
2025	128,545	141,400	967,254	1,063,979
2026	129,831	142,814	1,095,799	1,205,379
2027	131,129	144,242	1,225,630	1,348,193
2028	132,441	145,685	1,356,759	1,492,435
2029	133,765	147,141	1,489,200	1,638,120
2030	135,103	148,613	1,622,965	1,785,261
2031	136,454	150,099	1,758,067	1,933,874
2032	137,818	151,600	1,894,521	2,083,973
2033	139,196	153,116	2,032,339	2,235,573
2034	140,588	154,647	2,171,535	2,388,689
2035	141,994	156,194	2,312,124	2,543,336
2036	143,414	157,756	2,454,118	2,699,529
2037	144,848	159,333	2,597,532	2,857,285
2038	146,297	160,926	2,742,380	3,016,618
2039	147,760	162,536	2,888,677	3,177,544
2040	149,237	164,161	3,036,436	3,340,080
2041	150,730	165,803	3,185,674	3,504,241
2042	152,237	167,461	3,336,403	3,670,044
2043	153,759	169,135	3,488,640	3,837,504
2044	155,297	170,827	3,642,400	4,006,640
2045	156,850	172,535	3,797,697	4,177,466
2046	158,418	174,260	3,954,546	4,350,001
2047	160,003	176,003	4,112,965	4,524,261
2048	161,603	177,763	4,272,967	4,700,264
2049	163,219	179,540	4,434,570	4,878,027
2050	164,851	181,336	4,597,789	5,057,567
2051	166,499	183,149	4,762,639	5,238,903
2052	168,164	184,981	4,929,139	5,422,053
2053	169,846	186,831	5,097,303	5,607,033
2054	171,544	188,699	5,267,149	5,793,864
2055	173,260	190,586	5,438,693	5,982,563
2056	174,992	192,492	5,611,953	6,173,148

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2057	176,742	194,417	5,786,946	6,365,640
2058	178,510	196,361	5,963,688	6,560,057
2059	180,295	198,324	6,142,198	6,756,418
2060	182,098	200,308	6,322,493	6,954,742
2061	183,919	202,311	6,504,591	7,155,050
2062	185,758	204,334	6,688,509	7,357,360
2063	187,616	206,377	6,874,267	7,561,694
2064	0	0	7,061,883	7,768,071
2065	0	0	7,061,883	7,768,071
2066	0	0	7,061,883	7,768,071
2067	0	0	7,061,883	7,768,071
2068	0	0	7,061,883	7,768,071
2069	0	0	7,061,883	7,768,071
2070	0	0	7,061,883	7,768,071
2071	0	0	7,061,883	7,768,071
2072	0	0	7,061,883	7,768,071
2073	0	0	7,061,883	7,768,071
2074	0	0	7,061,883	7,768,071
2075	0	0	7,061,883	7,768,071
2076	0	0	7,061,883	7,768,071
2077	0	0	7,061,883	7,768,071
2078	0	0	7,061,883	7,768,071
2079	0	0	7,061,883	7,768,071
2080	0	0	7,061,883	7,768,071
2081	0	0	7,061,883	7,768,071
2082	0	0	7,061,883	7,768,071
2083	0	0	7,061,883	7,768,071
2084	0	0	7,061,883	7,768,071
2085	0	0	7,061,883	7,768,071
2086	0	0	7,061,883	7,768,071
2087	0	0	7,061,883	7,768,071
2088	0	0	7,061,883	7,768,071
2089	0	0	7,061,883	7,768,071
2090	0	0	7,061,883	7,768,071
2091	0	0	7,061,883	7,768,071
2092	0	0	7,061,883	7,768,071
2093	0	0	7,061,883	7,768,071
2094	0	0	7,061,883	7,768,071
2095	0	0	7,061,883	7,768,071
2096	0	0	7,061,883	7,768,071

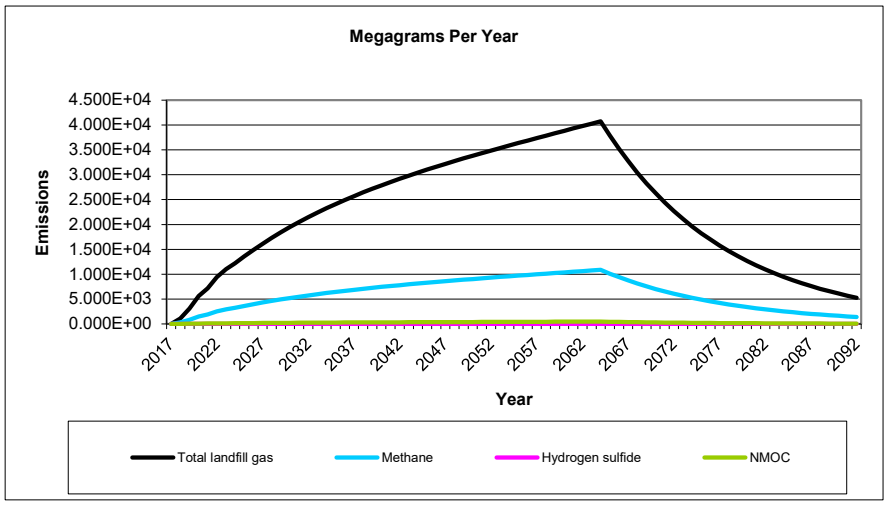
Pollutant Parameters

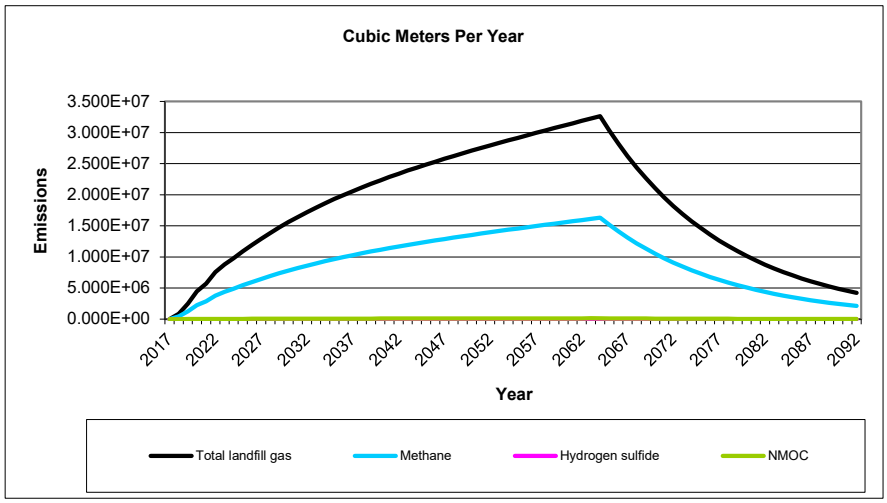
		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

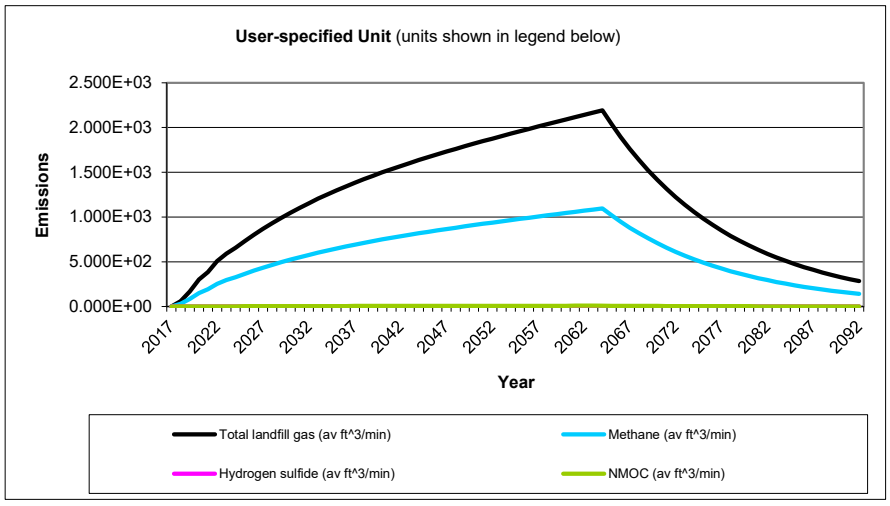
Pollutant Parameters (Continued)

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs


Megagrams Per Year
Emissions
4.500E+04
4.000E+04
3.500E+04
3.000E+04
2.500E+04
2.000E+04
1.500E+04
1.000E+04
5.000E+03
0.000E+00
2017 2022 2027 2032 2037 2042 2047 2052 2057 2062 2067 2072 2077 2082 2087 2092
Year
Total landfill gas
Methane
Hydrogen sulfide
NMOC


Cubic Meters Per Year
Emissions
3.500E+07
3.000E+07
2.500E+07
2.000E+07
1.500E+07
1.000E+07
5.000E+06
0.000E+00
2017 2022 2027 2032 2037 2042 2047 2052 2057 2062 2067 2072 2077 2082 2087 2092
Year
Total landfill gas
Methane
Hydrogen sulfide
NMOC


User-specified Unit (units shown in legend below)
Emissions
2.500E+03
2.000E+03
1.500E+03
1.000E+03
5.000E+02
0.000E+00
2017 2022 2027 2032 2037 2042 2047 2052 2057 2062 2067 2072 2077 2082 2087 2092
Year
Total landfill gas (av ft^3/min)
Methane (av ft^3/min)
Hydrogen sulfide (av ft^3/min)
NMOC (av ft^3/min)

Results

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2017	0	0	0	0	0	0
2018	1.077E+03	8.627E+05	5.797E+01	2.878E+02	4.314E+05	2.898E+01
2019	3.103E+03	2.484E+06	1.669E+02	8.287E+02	1.242E+06	8.346E+01
2020	5.600E+03	4.484E+06	3.013E+02	1.496E+03	2.242E+06	1.507E+02
2021	7.146E+03	5.722E+06	3.845E+02	1.909E+03	2.861E+06	1.922E+02
2022	9.429E+03	7.550E+06	5.073E+02	2.519E+03	3.775E+06	2.537E+02
2023	1.100E+04	8.807E+06	5.918E+02	2.938E+03	4.404E+06	2.959E+02
2024	1.219E+04	9.764E+06	6.561E+02	3.257E+03	4.882E+06	3.280E+02
2025	1.358E+04	1.088E+07	7.307E+02	3.628E+03	5.438E+06	3.654E+02
2026	1.489E+04	1.193E+07	8.013E+02	3.978E+03	5.963E+06	4.007E+02
2027	1.614E+04	1.292E+07	8.682E+02	4.310E+03	6.461E+06	4.341E+02
2028	1.731E+04	1.386E+07	9.316E+02	4.625E+03	6.932E+06	4.658E+02
2029	1.843E+04	1.476E+07	9.917E+02	4.924E+03	7.380E+06	4.959E+02
2030	1.950E+04	1.561E+07	1.049E+03	5.208E+03	7.806E+06	5.245E+02
2031	2.051E+04	1.642E+07	1.103E+03	5.478E+03	8.211E+06	5.517E+02
2032	2.147E+04	1.719E+07	1.155E+03	5.735E+03	8.597E+06	5.776E+02
2033	2.239E+04	1.793E+07	1.205E+03	5.981E+03	8.965E+06	6.024E+02
2034	2.327E+04	1.864E+07	1.252E+03	6.216E+03	9.318E+06	6.261E+02
2035	2.412E+04	1.931E+07	1.297E+03	6.441E+03	9.655E+06	6.487E+02
2036	2.492E+04	1.996E+07	1.341E+03	6.657E+03	9.979E+06	6.705E+02
2037	2.570E+04	2.058E+07	1.383E+03	6.865E+03	1.029E+07	6.914E+02
2038	2.645E+04	2.118E+07	1.423E+03	7.064E+03	1.059E+07	7.114E+02
2039	2.717E+04	2.175E+07	1.462E+03	7.256E+03	1.088E+07	7.308E+02
2040	2.786E+04	2.231E+07	1.499E+03	7.442E+03	1.116E+07	7.495E+02
2041	2.853E+04	2.285E+07	1.535E+03	7.622E+03	1.142E+07	7.676E+02
2042	2.919E+04	2.337E+07	1.570E+03	7.796E+03	1.169E+07	7.851E+02
2043	2.982E+04	2.388E+07	1.604E+03	7.964E+03	1.194E+07	8.021E+02
2044	3.043E+04	2.437E+07	1.637E+03	8.129E+03	1.218E+07	8.186E+02
2045	3.103E+04	2.485E+07	1.669E+03	8.288E+03	1.242E+07	8.347E+02
2046	3.161E+04	2.531E+07	1.701E+03	8.444E+03	1.266E+07	8.504E+02
2047	3.218E+04	2.577E+07	1.732E+03	8.597E+03	1.289E+07	8.658E+02
2048	3.274E+04	2.622E+07	1.762E+03	8.746E+03	1.311E+07	8.808E+02
2049	3.329E+04	2.666E+07	1.791E+03	8.892E+03	1.333E+07	8.955E+02
2050	3.383E+04	2.709E+07	1.820E+03	9.035E+03	1.354E+07	9.099E+02
2051	3.435E+04	2.751E+07	1.848E+03	9.176E+03	1.375E+07	9.241E+02
2052	3.487E+04	2.792E+07	1.876E+03	9.315E+03	1.396E+07	9.381E+02
2053	3.539E+04	2.834E+07	1.904E+03	9.452E+03	1.417E+07	9.519E+02
2054	3.589E+04	2.874E+07	1.931E+03	9.587E+03	1.437E+07	9.655E+02
2055	3.639E+04	2.914E+07	1.958E+03	9.721E+03	1.457E+07	9.790E+02
2056	3.689E+04	2.954E+07	1.985E+03	9.853E+03	1.477E+07	9.923E+02
2057	3.738E+04	2.993E+07	2.011E+03	9.984E+03	1.497E+07	1.006E+03
2058	3.787E+04	3.032E+07	2.037E+03	1.011E+04	1.516E+07	1.019E+03
2059	3.835E+04	3.071E+07	2.063E+03	1.024E+04	1.536E+07	1.032E+03
2060	3.883E+04	3.110E+07	2.089E+03	1.037E+04	1.555E+07	1.045E+03
2061	3.931E+04	3.148E+07	2.115E+03	1.050E+04	1.574E+07	1.058E+03
2062	3.979E+04	3.186E+07	2.141E+03	1.063E+04	1.593E+07	1.070E+03
2063	4.027E+04	3.224E+07	2.167E+03	1.076E+04	1.612E+07	1.083E+03
2064	4.074E+04	3.263E+07	2.192E+03	1.088E+04	1.631E+07	1.096E+03
2065	3.788E+04	3.033E+07	2.038E+03	1.012E+04	1.516E+07	1.019E+03
2066	3.521E+04	2.819E+07	1.894E+03	9.405E+03	1.410E+07	9.472E+02

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2067	3.273E+04	2.621E+07	1.761E+03	8.743E+03	1.310E+07	8.805E+02
2068	3.043E+04	2.436E+07	1.637E+03	8.127E+03	1.218E+07	8.185E+02
2069	2.828E+04	2.265E+07	1.522E+03	7.555E+03	1.132E+07	7.609E+02
2070	2.629E+04	2.105E+07	1.415E+03	7.023E+03	1.053E+07	7.073E+02
2071	2.444E+04	1.957E+07	1.315E+03	6.529E+03	9.786E+06	6.575E+02
2072	2.272E+04	1.819E+07	1.222E+03	6.069E+03	9.097E+06	6.112E+02
2073	2.112E+04	1.691E+07	1.136E+03	5.642E+03	8.457E+06	5.682E+02
2074	1.963E+04	1.572E+07	1.056E+03	5.245E+03	7.861E+06	5.282E+02
2075	1.825E+04	1.462E+07	9.820E+02	4.875E+03	7.308E+06	4.910E+02
2076	1.697E+04	1.359E+07	9.129E+02	4.532E+03	6.793E+06	4.565E+02
2077	1.577E+04	1.263E+07	8.486E+02	4.213E+03	6.315E+06	4.243E+02
2078	1.466E+04	1.174E+07	7.889E+02	3.917E+03	5.871E+06	3.944E+02
2079	1.363E+04	1.091E+07	7.334E+02	3.641E+03	5.457E+06	3.667E+02
2080	1.267E+04	1.015E+07	6.817E+02	3.385E+03	5.073E+06	3.409E+02
2081	1.178E+04	9.432E+06	6.337E+02	3.146E+03	4.716E+06	3.169E+02
2082	1.095E+04	8.768E+06	5.891E+02	2.925E+03	4.384E+06	2.946E+02
2083	1.018E+04	8.151E+06	5.476E+02	2.719E+03	4.075E+06	2.738E+02
2084	9.462E+03	7.577E+06	5.091E+02	2.527E+03	3.788E+06	2.545E+02
2085	8.796E+03	7.044E+06	4.733E+02	2.350E+03	3.522E+06	2.366E+02
2086	8.177E+03	6.548E+06	4.399E+02	2.184E+03	3.274E+06	2.200E+02
2087	7.601E+03	6.087E+06	4.090E+02	2.030E+03	3.043E+06	2.045E+02
2088	7.066E+03	5.658E+06	3.802E+02	1.887E+03	2.829E+06	1.901E+02
2089	6.569E+03	5.260E+06	3.534E+02	1.755E+03	2.630E+06	1.767E+02
2090	6.106E+03	4.890E+06	3.285E+02	1.631E+03	2.445E+06	1.643E+02
2091	5.676E+03	4.545E+06	3.054E+02	1.516E+03	2.273E+06	1.527E+02
2092	5.277E+03	4.225E+06	2.839E+02	1.409E+03	2.113E+06	1.420E+02
2093	4.905E+03	3.928E+06	2.639E+02	1.310E+03	1.964E+06	1.320E+02
2094	4.560E+03	3.651E+06	2.453E+02	1.218E+03	1.826E+06	1.227E+02
2095	4.239E+03	3.394E+06	2.281E+02	1.132E+03	1.697E+06	1.140E+02
2096	3.941E+03	3.155E+06	2.120E+02	1.053E+03	1.578E+06	1.060E+02
2097	3.663E+03	2.933E+06	1.971E+02	9.785E+02	1.467E+06	9.854E+01
2098	3.405E+03	2.727E+06	1.832E+02	9.096E+02	1.363E+06	9.160E+01
2099	3.165E+03	2.535E+06	1.703E+02	8.455E+02	1.267E+06	8.516E+01
2100	2.943E+03	2.356E+06	1.583E+02	7.860E+02	1.178E+06	7.916E+01
2101	2.735E+03	2.190E+06	1.472E+02	7.307E+02	1.095E+06	7.359E+01
2102	2.543E+03	2.036E+06	1.368E+02	6.792E+02	1.018E+06	6.841E+01
2103	2.364E+03	1.893E+06	1.272E+02	6.314E+02	9.464E+05	6.359E+01
2104	2.197E+03	1.760E+06	1.182E+02	5.870E+02	8.798E+05	5.911E+01
2105	2.043E+03	1.636E+06	1.099E+02	5.456E+02	8.179E+05	5.495E+01
2106	1.899E+03	1.521E+06	1.022E+02	5.072E+02	7.603E+05	5.108E+01
2107	1.765E+03	1.414E+06	9.498E+01	4.715E+02	7.068E+05	4.749E+01
2108	1.641E+03	1.314E+06	8.829E+01	4.383E+02	6.570E+05	4.415E+01
2109	1.525E+03	1.222E+06	8.207E+01	4.075E+02	6.108E+05	4.104E+01
2110	1.418E+03	1.136E+06	7.630E+01	3.788E+02	5.678E+05	3.815E+01
2111	1.318E+03	1.056E+06	7.093E+01	3.521E+02	5.278E+05	3.546E+01
2112	1.225E+03	9.813E+05	6.593E+01	3.273E+02	4.906E+05	3.297E+01
2113	1.139E+03	9.122E+05	6.129E+01	3.043E+02	4.561E+05	3.065E+01
2114	1.059E+03	8.480E+05	5.698E+01	2.829E+02	4.240E+05	2.849E+01
2115	9.844E+02	7.883E+05	5.297E+01	2.630E+02	3.941E+05	2.648E+01
2116	9.151E+02	7.328E+05	4.924E+01	2.444E+02	3.664E+05	2.462E+01
2117	8.507E+02	6.812E+05	4.577E+01	2.272E+02	3.406E+05	2.289E+01

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2118	7.908E+02	6.332E+05	4.255E+01	2.112E+02	3.166E+05	2.127E+01
2119	7.351E+02	5.887E+05	3.955E+01	1.964E+02	2.943E+05	1.978E+01
2120	6.834E+02	5.472E+05	3.677E+01	1.825E+02	2.736E+05	1.838E+01
2121	6.353E+02	5.087E+05	3.418E+01	1.697E+02	2.544E+05	1.709E+01
2122	5.906E+02	4.729E+05	3.177E+01	1.577E+02	2.364E+05	1.589E+01
2123	5.490E+02	4.396E+05	2.954E+01	1.466E+02	2.198E+05	1.477E+01
2124	5.103E+02	4.087E+05	2.746E+01	1.363E+02	2.043E+05	1.373E+01
2125	4.744E+02	3.799E+05	2.552E+01	1.267E+02	1.899E+05	1.276E+01
2126	4.410E+02	3.531E+05	2.373E+01	1.178E+02	1.766E+05	1.186E+01
2127	4.100E+02	3.283E+05	2.206E+01	1.095E+02	1.641E+05	1.103E+01
2128	3.811E+02	3.052E+05	2.050E+01	1.018E+02	1.526E+05	1.025E+01
2129	3.543E+02	2.837E+05	1.906E+01	9.463E+01	1.418E+05	9.530E+00
2130	3.293E+02	2.637E+05	1.772E+01	8.797E+01	1.319E+05	8.859E+00
2131	3.061E+02	2.451E+05	1.647E+01	8.178E+01	1.226E+05	8.236E+00
2132	2.846E+02	2.279E+05	1.531E+01	7.602E+01	1.139E+05	7.656E+00
2133	2.646E+02	2.118E+05	1.423E+01	7.067E+01	1.059E+05	7.117E+00
2134	2.459E+02	1.969E+05	1.323E+01	6.569E+01	9.847E+04	6.616E+00
2135	2.286E+02	1.831E+05	1.230E+01	6.107E+01	9.153E+04	6.150E+00
2136	2.125E+02	1.702E+05	1.143E+01	5.677E+01	8.509E+04	5.717E+00
2137	1.976E+02	1.582E+05	1.063E+01	5.277E+01	7.910E+04	5.315E+00
2138	1.837E+02	1.471E+05	9.881E+00	4.906E+01	7.353E+04	4.941E+00
2139	1.707E+02	1.367E+05	9.186E+00	4.560E+01	6.836E+04	4.593E+00
2140	1.587E+02	1.271E+05	8.539E+00	4.239E+01	6.354E+04	4.269E+00
2141	1.475E+02	1.181E+05	7.938E+00	3.941E+01	5.907E+04	3.969E+00
2142	1.371E+02	1.098E+05	7.379E+00	3.663E+01	5.491E+04	3.689E+00
2143	1.275E+02	1.021E+05	6.859E+00	3.405E+01	5.105E+04	3.430E+00
2144	1.185E+02	9.490E+04	6.377E+00	3.166E+01	4.745E+04	3.188E+00
2145	1.102E+02	8.822E+04	5.928E+00	2.943E+01	4.411E+04	2.964E+00
2146	1.024E+02	8.201E+04	5.510E+00	2.736E+01	4.101E+04	2.755E+00
2147	9.521E+01	7.624E+04	5.122E+00	2.543E+01	3.812E+04	2.561E+00
2148	8.851E+01	7.087E+04	4.762E+00	2.364E+01	3.544E+04	2.381E+00
2149	8.227E+01	6.588E+04	4.427E+00	2.198E+01	3.294E+04	2.213E+00
2150	7.648E+01	6.124E+04	4.115E+00	2.043E+01	3.062E+04	2.057E+00
2151	7.110E+01	5.693E+04	3.825E+00	1.899E+01	2.847E+04	1.913E+00
2152	6.609E+01	5.292E+04	3.556E+00	1.765E+01	2.646E+04	1.778E+00
2153	6.144E+01	4.920E+04	3.306E+00	1.641E+01	2.460E+04	1.653E+00
2154	5.711E+01	4.574E+04	3.073E+00	1.526E+01	2.287E+04	1.536E+00
2155	5.309E+01	4.252E+04	2.857E+00	1.418E+01	2.126E+04	1.428E+00
2156	4.936E+01	3.952E+04	2.655E+00	1.318E+01	1.976E+04	1.328E+00
2157	4.588E+01	3.674E+04	2.469E+00	1.226E+01	1.837E+04	1.234E+00

Results (Continued)

Year	Hydrogen sulfide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2017	0	0	0	0	0	0
2018	4.402E-02	3.106E+01	2.087E-03	1.237E+01	3.451E+03	2.319E-01
2019	1.268E-01	8.944E+01	6.009E-03	3.562E+01	9.937E+03	6.677E-01
2020	2.288E-01	1.614E+02	1.085E-02	6.430E+01	1.794E+04	1.205E+00
2021	2.920E-01	2.060E+02	1.384E-02	8.204E+01	2.289E+04	1.538E+00
2022	3.853E-01	2.718E+02	1.826E-02	1.083E+02	3.020E+04	2.029E+00
2023	4.494E-01	3.171E+02	2.130E-02	1.263E+02	3.523E+04	2.367E+00
2024	4.983E-01	3.515E+02	2.362E-02	1.400E+02	3.906E+04	2.624E+00
2025	5.550E-01	3.915E+02	2.631E-02	1.559E+02	4.350E+04	2.923E+00
2026	6.086E-01	4.293E+02	2.885E-02	1.710E+02	4.771E+04	3.205E+00
2027	6.594E-01	4.652E+02	3.125E-02	1.853E+02	5.169E+04	3.473E+00
2028	7.075E-01	4.991E+02	3.354E-02	1.988E+02	5.546E+04	3.726E+00
2029	7.532E-01	5.314E+02	3.570E-02	2.116E+02	5.904E+04	3.967E+00
2030	7.966E-01	5.620E+02	3.776E-02	2.238E+02	6.245E+04	4.196E+00
2031	8.380E-01	5.912E+02	3.972E-02	2.354E+02	6.569E+04	4.413E+00
2032	8.774E-01	6.190E+02	4.159E-02	2.465E+02	6.877E+04	4.621E+00
2033	9.150E-01	6.455E+02	4.337E-02	2.571E+02	7.172E+04	4.819E+00
2034	9.510E-01	6.709E+02	4.508E-02	2.672E+02	7.454E+04	5.008E+00
2035	9.854E-01	6.952E+02	4.671E-02	2.769E+02	7.724E+04	5.190E+00
2036	1.018E+00	7.185E+02	4.827E-02	2.861E+02	7.983E+04	5.364E+00
2037	1.050E+00	7.408E+02	4.978E-02	2.951E+02	8.232E+04	5.531E+00
2038	1.081E+00	7.624E+02	5.122E-02	3.036E+02	8.471E+04	5.692E+00
2039	1.110E+00	7.831E+02	5.262E-02	3.119E+02	8.701E+04	5.847E+00
2040	1.138E+00	8.032E+02	5.397E-02	3.199E+02	8.924E+04	5.996E+00
2041	1.166E+00	8.226E+02	5.527E-02	3.276E+02	9.139E+04	6.141E+00
2042	1.193E+00	8.413E+02	5.653E-02	3.351E+02	9.348E+04	6.281E+00
2043	1.218E+00	8.595E+02	5.775E-02	3.423E+02	9.550E+04	6.417E+00
2044	1.243E+00	8.773E+02	5.894E-02	3.494E+02	9.747E+04	6.549E+00
2045	1.268E+00	8.945E+02	6.010E-02	3.563E+02	9.939E+04	6.678E+00
2046	1.292E+00	9.113E+02	6.123E-02	3.630E+02	1.013E+05	6.803E+00
2047	1.315E+00	9.278E+02	6.234E-02	3.695E+02	1.031E+05	6.926E+00
2048	1.338E+00	9.438E+02	6.342E-02	3.759E+02	1.049E+05	7.046E+00
2049	1.360E+00	9.596E+02	6.448E-02	3.822E+02	1.066E+05	7.164E+00
2050	1.382E+00	9.751E+02	6.552E-02	3.884E+02	1.083E+05	7.280E+00
2051	1.404E+00	9.903E+02	6.654E-02	3.944E+02	1.100E+05	7.393E+00
2052	1.425E+00	1.005E+03	6.755E-02	4.004E+02	1.117E+05	7.505E+00
2053	1.446E+00	1.020E+03	6.854E-02	4.063E+02	1.133E+05	7.615E+00
2054	1.467E+00	1.035E+03	6.952E-02	4.121E+02	1.150E+05	7.724E+00
2055	1.487E+00	1.049E+03	7.049E-02	4.178E+02	1.166E+05	7.832E+00
2056	1.507E+00	1.063E+03	7.145E-02	4.235E+02	1.182E+05	7.939E+00
2057	1.527E+00	1.078E+03	7.240E-02	4.292E+02	1.197E+05	8.044E+00
2058	1.547E+00	1.092E+03	7.334E-02	4.348E+02	1.213E+05	8.149E+00
2059	1.567E+00	1.106E+03	7.428E-02	4.403E+02	1.228E+05	8.254E+00
2060	1.587E+00	1.119E+03	7.522E-02	4.458E+02	1.244E+05	8.357E+00
2061	1.606E+00	1.133E+03	7.614E-02	4.514E+02	1.259E+05	8.461E+00
2062	1.626E+00	1.147E+03	7.707E-02	4.568E+02	1.275E+05	8.563E+00
2063	1.645E+00	1.161E+03	7.799E-02	4.623E+02	1.290E+05	8.666E+00
2064	1.665E+00	1.175E+03	7.892E-02	4.678E+02	1.305E+05	8.769E+00
2065	1.548E+00	1.092E+03	7.336E-02	4.349E+02	1.213E+05	8.151E+00
2066	1.439E+00	1.015E+03	6.820E-02	4.042E+02	1.128E+05	7.577E+00

Results (Continued)

Year	Hydrogen sulfide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2067	1.337E+00	9.435E+02	6.340E-02	3.758E+02	1.048E+05	7.044E+00
2068	1.243E+00	8.771E+02	5.893E-02	3.493E+02	9.746E+04	6.548E+00
2069	1.156E+00	8.154E+02	5.478E-02	3.247E+02	9.060E+04	6.087E+00
2070	1.074E+00	7.580E+02	5.093E-02	3.019E+02	8.422E+04	5.659E+00
2071	9.988E-01	7.046E+02	4.734E-02	2.806E+02	7.829E+04	5.260E+00
2072	9.284E-01	6.550E+02	4.401E-02	2.609E+02	7.278E+04	4.890E+00
2073	8.631E-01	6.089E+02	4.091E-02	2.425E+02	6.765E+04	4.546E+00
2074	8.023E-01	5.660E+02	3.803E-02	2.254E+02	6.289E+04	4.226E+00
2075	7.458E-01	5.262E+02	3.535E-02	2.096E+02	5.846E+04	3.928E+00
2076	6.933E-01	4.891E+02	3.286E-02	1.948E+02	5.435E+04	3.652E+00
2077	6.445E-01	4.547E+02	3.055E-02	1.811E+02	5.052E+04	3.395E+00
2078	5.991E-01	4.227E+02	2.840E-02	1.683E+02	4.697E+04	3.156E+00
2079	5.570E-01	3.929E+02	2.640E-02	1.565E+02	4.366E+04	2.933E+00
2080	5.178E-01	3.653E+02	2.454E-02	1.455E+02	4.059E+04	2.727E+00
2081	4.813E-01	3.396E+02	2.281E-02	1.352E+02	3.773E+04	2.535E+00
2082	4.474E-01	3.156E+02	2.121E-02	1.257E+02	3.507E+04	2.356E+00
2083	4.159E-01	2.934E+02	1.972E-02	1.169E+02	3.260E+04	2.191E+00
2084	3.866E-01	2.728E+02	1.833E-02	1.086E+02	3.031E+04	2.036E+00
2085	3.594E-01	2.536E+02	1.704E-02	1.010E+02	2.817E+04	1.893E+00
2086	3.341E-01	2.357E+02	1.584E-02	9.388E+01	2.619E+04	1.760E+00
2087	3.106E-01	2.191E+02	1.472E-02	8.727E+01	2.435E+04	1.636E+00
2088	2.887E-01	2.037E+02	1.369E-02	8.113E+01	2.263E+04	1.521E+00
2089	2.684E-01	1.894E+02	1.272E-02	7.542E+01	2.104E+04	1.414E+00
2090	2.495E-01	1.760E+02	1.183E-02	7.011E+01	1.956E+04	1.314E+00
2091	2.319E-01	1.636E+02	1.099E-02	6.517E+01	1.818E+04	1.222E+00
2092	2.156E-01	1.521E+02	1.022E-02	6.058E+01	1.690E+04	1.136E+00
2093	2.004E-01	1.414E+02	9.501E-03	5.632E+01	1.571E+04	1.056E+00
2094	1.863E-01	1.315E+02	8.832E-03	5.235E+01	1.461E+04	9.813E-01
2095	1.732E-01	1.222E+02	8.210E-03	4.867E+01	1.358E+04	9.123E-01
2096	1.610E-01	1.136E+02	7.632E-03	4.524E+01	1.262E+04	8.480E-01
2097	1.497E-01	1.056E+02	7.095E-03	4.206E+01	1.173E+04	7.883E-01
2098	1.391E-01	9.816E+01	6.596E-03	3.910E+01	1.091E+04	7.328E-01
2099	1.293E-01	9.125E+01	6.131E-03	3.634E+01	1.014E+04	6.812E-01
2100	1.202E-01	8.483E+01	5.700E-03	3.378E+01	9.425E+03	6.333E-01
2101	1.118E-01	7.886E+01	5.298E-03	3.141E+01	8.762E+03	5.887E-01
2102	1.039E-01	7.330E+01	4.925E-03	2.920E+01	8.145E+03	5.473E-01
2103	9.659E-02	6.814E+01	4.579E-03	2.714E+01	7.572E+03	5.087E-01
2104	8.979E-02	6.335E+01	4.256E-03	2.523E+01	7.039E+03	4.729E-01
2105	8.347E-02	5.889E+01	3.957E-03	2.345E+01	6.543E+03	4.396E-01
2106	7.760E-02	5.474E+01	3.678E-03	2.180E+01	6.082E+03	4.087E-01
2107	7.213E-02	5.089E+01	3.419E-03	2.027E+01	5.654E+03	3.799E-01
2108	6.705E-02	4.731E+01	3.178E-03	1.884E+01	5.256E+03	3.532E-01
2109	6.233E-02	4.398E+01	2.955E-03	1.751E+01	4.886E+03	3.283E-01
2110	5.795E-02	4.088E+01	2.747E-03	1.628E+01	4.542E+03	3.052E-01
2111	5.387E-02	3.800E+01	2.553E-03	1.514E+01	4.222E+03	2.837E-01
2112	5.007E-02	3.533E+01	2.374E-03	1.407E+01	3.925E+03	2.637E-01
2113	4.655E-02	3.284E+01	2.206E-03	1.308E+01	3.649E+03	2.452E-01
2114	4.327E-02	3.053E+01	2.051E-03	1.216E+01	3.392E+03	2.279E-01
2115	4.023E-02	2.838E+01	1.907E-03	1.130E+01	3.153E+03	2.119E-01
2116	3.739E-02	2.638E+01	1.773E-03	1.051E+01	2.931E+03	1.969E-01
2117	3.476E-02	2.452E+01	1.648E-03	9.767E+00	2.725E+03	1.831E-01

Results (Continued)

Year	Hydrogen sulfide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2118	3.231E-02	2.280E+01	1.532E-03	9.079E+00	2.533E+03	1.702E-01
2119	3.004E-02	2.119E+01	1.424E-03	8.440E+00	2.355E+03	1.582E-01
2120	2.792E-02	1.970E+01	1.324E-03	7.846E+00	2.189E+03	1.471E-01
2121	2.596E-02	1.831E+01	1.230E-03	7.294E+00	2.035E+03	1.367E-01
2122	2.413E-02	1.702E+01	1.144E-03	6.780E+00	1.892E+03	1.271E-01
2123	2.243E-02	1.583E+01	1.063E-03	6.303E+00	1.758E+03	1.181E-01
2124	2.085E-02	1.471E+01	9.885E-04	5.859E+00	1.635E+03	1.098E-01
2125	1.939E-02	1.368E+01	9.189E-04	5.447E+00	1.520E+03	1.021E-01
2126	1.802E-02	1.271E+01	8.542E-04	5.063E+00	1.413E+03	9.491E-02
2127	1.675E-02	1.182E+01	7.941E-04	4.707E+00	1.313E+03	8.823E-02
2128	1.557E-02	1.099E+01	7.382E-04	4.375E+00	1.221E+03	8.202E-02
2129	1.448E-02	1.021E+01	6.862E-04	4.067E+00	1.135E+03	7.624E-02
2130	1.346E-02	9.494E+00	6.379E-04	3.781E+00	1.055E+03	7.088E-02
2131	1.251E-02	8.825E+00	5.930E-04	3.515E+00	9.806E+02	6.589E-02
2132	1.163E-02	8.204E+00	5.512E-04	3.267E+00	9.116E+02	6.125E-02
2133	1.081E-02	7.626E+00	5.124E-04	3.037E+00	8.474E+02	5.694E-02
2134	1.005E-02	7.090E+00	4.763E-04	2.824E+00	7.877E+02	5.293E-02
2135	9.342E-03	6.590E+00	4.428E-04	2.625E+00	7.323E+02	4.920E-02
2136	8.684E-03	6.127E+00	4.116E-04	2.440E+00	6.807E+02	4.574E-02
2137	8.073E-03	5.695E+00	3.827E-04	2.268E+00	6.328E+02	4.252E-02
2138	7.505E-03	5.294E+00	3.557E-04	2.109E+00	5.883E+02	3.952E-02
2139	6.976E-03	4.922E+00	3.307E-04	1.960E+00	5.468E+02	3.674E-02
2140	6.485E-03	4.575E+00	3.074E-04	1.822E+00	5.083E+02	3.416E-02
2141	6.029E-03	4.253E+00	2.858E-04	1.694E+00	4.726E+02	3.175E-02
2142	5.604E-03	3.954E+00	2.656E-04	1.575E+00	4.393E+02	2.952E-02
2143	5.210E-03	3.675E+00	2.469E-04	1.464E+00	4.084E+02	2.744E-02
2144	4.843E-03	3.417E+00	2.296E-04	1.361E+00	3.796E+02	2.551E-02
2145	4.502E-03	3.176E+00	2.134E-04	1.265E+00	3.529E+02	2.371E-02
2146	4.185E-03	2.952E+00	1.984E-04	1.176E+00	3.280E+02	2.204E-02
2147	3.890E-03	2.745E+00	1.844E-04	1.093E+00	3.050E+02	2.049E-02
2148	3.617E-03	2.551E+00	1.714E-04	1.016E+00	2.835E+02	1.905E-02
2149	3.362E-03	2.372E+00	1.594E-04	9.446E-01	2.635E+02	1.771E-02
2150	3.125E-03	2.205E+00	1.481E-04	8.781E-01	2.450E+02	1.646E-02
2151	2.905E-03	2.050E+00	1.377E-04	8.163E-01	2.277E+02	1.530E-02
2152	2.701E-03	1.905E+00	1.280E-04	7.588E-01	2.117E+02	1.422E-02
2153	2.511E-03	1.771E+00	1.190E-04	7.054E-01	1.968E+02	1.322E-02
2154	2.334E-03	1.646E+00	1.106E-04	6.557E-01	1.829E+02	1.229E-02
2155	2.170E-03	1.531E+00	1.028E-04	6.096E-01	1.701E+02	1.143E-02
2156	2.017E-03	1.423E+00	9.560E-05	5.667E-01	1.581E+02	1.062E-02
2157	1.875E-03	1.323E+00	8.887E-05	5.268E-01	1.470E+02	9.874E-03

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APPENDIX L.2

Landfill Gas Well Radius of Influence

CALCULATION COVER SHEET

Client: **Anne Arundel County** Project: **Millersville Cell 9 Vertical Expansion** Project No.: **ME1418A** Phase/ Task No. **03/04**

Title of Calculations **Landfill Gas Radius of Influence**

Calculations Prepared by:	Signature		05/19/2025
	Printed Name Title	Daniel Espinoza Senior Staff Professional	Date
Assumptions and Procedures Checked by: (Assumptions and Procedures Checker, APC)	Signature		05/21/2025
	Printed Name Title	Helena Harris Professional	Date
Computations Checked by: (Computation Checker, CC)	Signature		05/21/2025
	Printed Name Title	Helena Harris Professional	Date
Computations backchecked by: (Calculation Preparer, CP)	Signature		05/22/2025
	Printed Name Title	Daniel Espinoza Senior Staff Professional	Date
Approved by: (Calculation Approver, CA)	Signature		05/23/2025
	Printed Name Title	Meena Viswanath Senior Engineer	Date

Approval notes:

Submittal History (Number and initial all submittals)

No.	Description	Date	CP	APC	CC	CA

LANDFILL GAS RADIUS OF INFLUENCE

INTRODUCTION AND PURPOSE

This calculation package calculates the radius of influence (ROI) of a vertical landfill gas (LFG) collection well in support of the design for the vertical expansion of Cell 9 of the Millersville Landfill and Resource Recovery Facility (MLFRRF) located in Severn, Maryland. Cell 9 is an 84-acre cell subdivided into 5 subcells (Subcells 9.1 through 9.5) and is currently the only permitted cell available for waste disposal at MLFRRF. The proposed vertical expansion of MLFRRF will increase the maximum permitted elevation from 244 ft (National Geodetic Vertical Datum of 1929 [NGVD29]) to 285 ft NGVD29 as well as modify the geometry of the liner sideslopes and the final cover slopes. The LFG system to be installed in Cell 9 to extract LFG consists of vertical LFG collection wells, which are connected by lateral pipes to a header pipe around the perimeter of Cell 9 (perimeter header). The perimeter header then connects to the flare via a main header pipe section (flare header).

The objective of this calculation package is to calculate the ROI of each vertical LFG collection well within Cell 9. This ROI will then be used to design the landfill gas collection system to provide adequate LFG extraction coverage by locating the vertical LFG collection wells in close enough proximity to each other such that “dead spots” do not exist between the wells.

DATA AND INFORMATION SOURCES

Calculation of the ROI of the vertical LFG collection wells is performed using the peak LFG generation calculated in the Landfill Gas Generation calculation package (Appendix L.1 of the Phase III Report).

METHOD AND PARAMETERS

The ROI can be defined as the distance from the center of the well outward to the extent at which a vacuum is applied within the waste mass. A method based on Darcy’s equation is used to estimate the ROI of each pipe within the network (Kulasingam and Othman 2006).

INPUT PARAMETERS AND ASSUMPTIONS

The input parameters used to compute the ROI, including the rationale used in choosing parameters, are presented in Table 1.

PERFORMANCE CRITERIA

Vertical gas wells must be placed in close enough proximity such that "dead spots" do not exist between the wells. The ROI is limited to a maximum radius of 150 feet, which provides for a nominal wellfield density of one well per acre, consistent with industry norms.

ANALYSIS AND EVALUATION APPROACH

The ROI is calculated using the equation below:

$$ROI = \sqrt{\frac{2g \cdot K \cdot T_s \cdot \left(\frac{H_s}{H_T}\right)}{P_s \cdot GGR \cdot \gamma_w \cdot \mu \cdot T} \cdot (P_1^2 - P_O^2)} \quad (1)$$

where:

ROI	=	radius of influence
g	=	gravitational acceleration (32.2 ft/sec^2)
K	=	intrinsic permeability of waste (ft^2)
T_s	=	standard temperature (Rankine)
H_s	=	length of perforated pipe (ft)
H_T	=	total waste thickness(ft)
P_1	=	pressure (vacuum) at ROI boundary (lb/ft^2 or psf)
P_O	=	pressure (vacuum) at wellhead (lb/ft^2 or psf)
P_s	=	standard pressure (lb/ft^2 or psf)
GGR	=	gas generation rate (ft^3/lb/sec)
γ_w	=	unit weight of waste (lb/ft^3 or pcf)
μ	=	dynamic viscosity of the landfill gas (lb/ft/sec)
T	=	average landfill gas temperature (Rankine)

CALCULATIONS

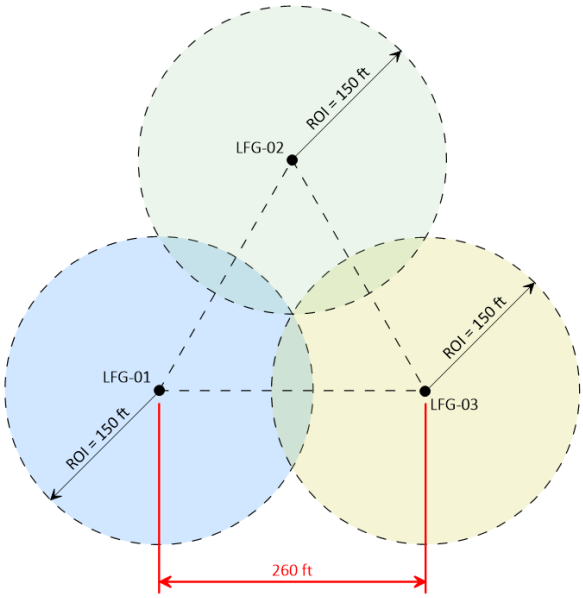
The GGR is calculated based on the peak LFG generation rate of 2,192 cubic feet per minute at standard temperature and pressure (scfm) as estimated by LandGEM (USEPA 2005) in the Landfill Gas Generation calculation package (Appendix L.1). To calculate the ROI, the generation rate is normalized by the landfill capacity, calculated as 7.9×10^6 tons in the Landfill Gas Generation calculation package (Appendix L.1). The shortest well, which will be 15 ft shorter than the waste thickness at that well location to ensure that it does not inadvertently penetrate the liner system, is conservatively analyzed (Attachment L.2-1).

SUMMARY OF RESULTS

ROI calculations for vertical LFG wells are included in Table 2. The calculated horizontal ROI for the modeled well is 150 feet.

CONCLUSIONS

To provide a reasonable amount of overlap in coverage and mitigate "dead spots" between wells, wells should be placed in a triangular pattern with a spacing of no more than 260 feet, as illustrated below.



The proposed well layout incorporating these geometric constraints is presented in Attachment L.2-2, with circles to represent the ROI to illustrate the lack of dead zones. As shown, the proposed wellfield comprises 93 vertical wells.

REFERENCES

Kulasingam, R., and M.A. Othman. 2006. *Gas Collection and Control System Phasing Plan*. WASTCON, Charlotte, North Carolina.

USEPA. 2005. *Landfill Gas Emissions Model (LandGEM)*. Version 3.02. United States Environmental Protection Agency. EPA-600/R-05/047.

TABLES

Table 1 - Input Parameters for ROI Calculations

Millersville Landfill and Resource Recovery Facility - Cell 9

Parameter	Value	Unit	Comment
g	32.2	ft/sec^2	Gravitational acceleration
K	2.68E-11	ft^2	Typical intrinsic permeability of waste
T_s	520	R	Corresponds to a temperature of 60° F
T	570	R	Average temperature of landfill gas assumed to be 110° F
H_s	20	ft	Length of slotted portion of pipe (shortest well is conservatively assumed)
H_T	51	ft	Total waste thickness (shortest well is conservatively assumed)
P_1	2,116.8	psf	Corresponds to a gage pressure of zero (i.e., no vacuum present at the extent of the ROI)
P_o	2,101.2	psf	Selected based on allowable vacuum of 3 in. w.c.
P_s	2,116.8	psf	Standard atmospheric pressure
GGR	2.31×10^{-9}	$ft^3/lb/sec$	Gas generation rate
γ_w	44	pcf	Typical unit weight of municipal solid waste
μ	8.31E-06	lb/ft/sec	Based on a mixture of methane and carbon dioxide at average temperature and pressure anticipated within the landfill

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Table 2 - Radius of Influence Calculation

Millersville Landfill and Resource Recovery Facility - Cell 9

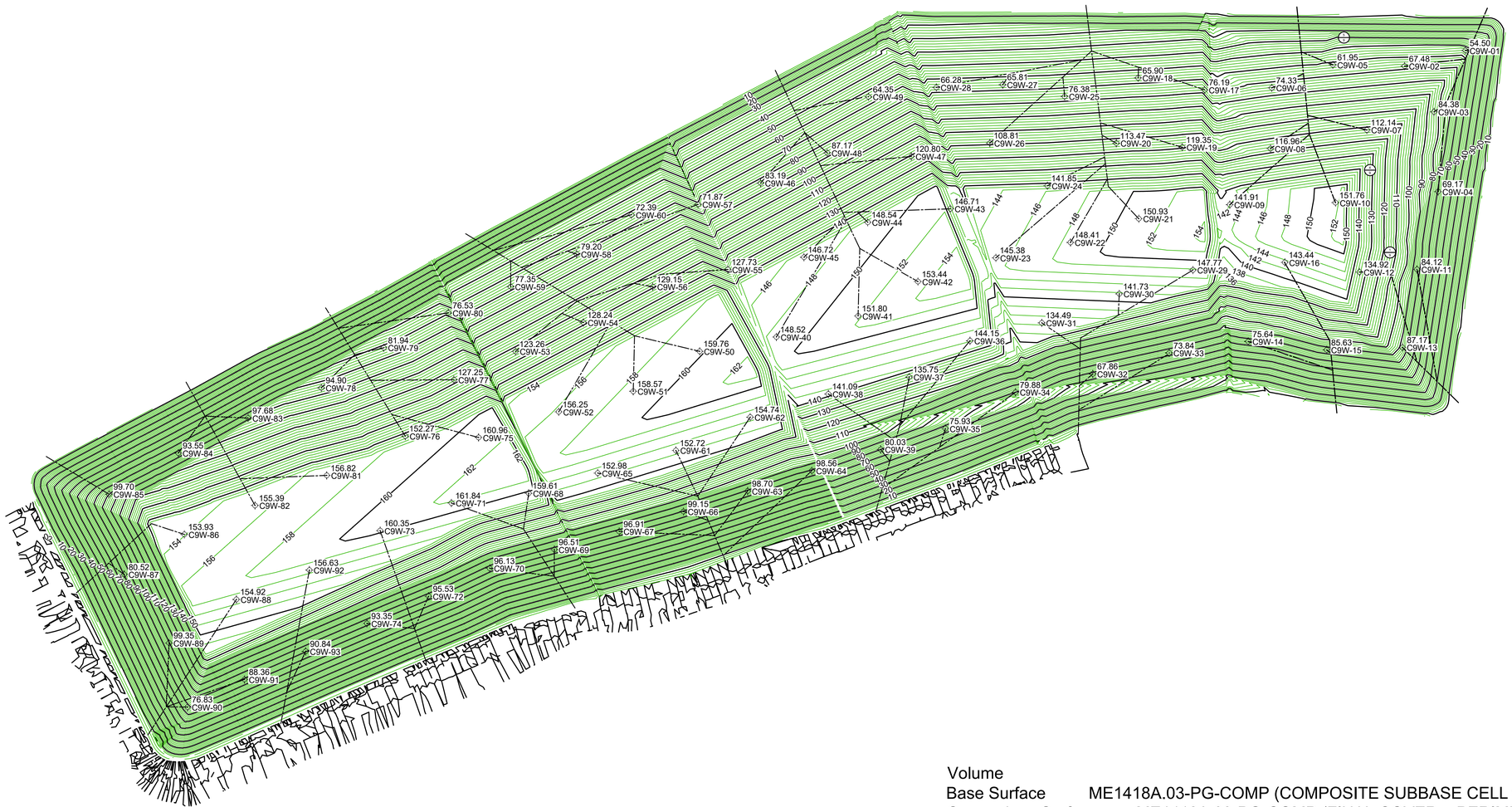
Location	Peak LFG Generation Rate	Waste Design Capacity		Gas Generation Rate, *GGR*		Slotted Length of Pipe, H_s	Total Waste Thickness[1], H_T	Calculated Radius of Influence, *ROI*	Assumed Radius of Influence[2], *ROI*
	(scfm)	(ton)	(lb)	(ft^3/lb/yr)	(ft^3/lb/sec)	(ft)	(ft)	(ft)	(ft)
Cell 9	2,192	7,901,774	1.58E+10	0.073	2.31E-09	20	51	151	150

1- The shortest pipe is at C9W-01

2 - A maximum ROI of 150 ft is assumed.

ATTACHMENT L.2-1

Waste Thickness



Volume

Base Surface	ME1418A.03-PG-COMP (COMPOSITE SUBBASE CELL 9)
Comparison Surface	ME1418A.03-PG-COMP (FINAL COVER + PERIMETER BERM)
Cut volume (adjusted)	5.00 Cu. Yd.
Fill volume (adjusted)	13,492,174.09 Cu. Yd.
Net volume (adjusted)	13,492,169.09 Cu. Yd.<Fill>

0 150'
SCALE IN FEET

ISOPACH

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PROJECT NO: ME1418A | MAY 2024

FIGURE L.2-1

C:_GEO\PW2501\10452426\F01

ATTACHMENT L.2-2

Proposed Well Layout

CELL 3
(MINED)

SEDIMENT TRAP 5A

LANDFILL GAS TO ELECTRICITY PLANT

BLOWER/FLARE STATION

CELL 4
(CLOSED)

CELLS 5,6,7
(CLOSED)

POND 4

POND 5

CELL 8
(CLOSED)

POND 8-1

POND 9-2

WELLS

BRANCH

CONNECTION TO
PERIMETER HEADER (TYP)
5
28

BLIND FLANGE ON
LANDFILL GAS HEADER

2
28
ISOLATION VALVE

JOEL SALINE WAY

6" LANDFILL GAS LATERAL
PIPING (TYP.)
4
28

LITTER FENCE

PERIMETER
DRAINAGE DITCH

PERIMETER
ACCESS ROAD

10" SDR-11
HDPE LFG HEADER

SUBCELL 9.2
(ACTIVE)

SUBCELL 9.1
(ACTIVE)

SUBCELL 9.3
(UNDER CONSTRUCTION)

SUBCELL 9.4
(FUTURE)

SUBCELL 9.5
(FUTURE)

10" Ø LFG HEADER

10" REDUCER

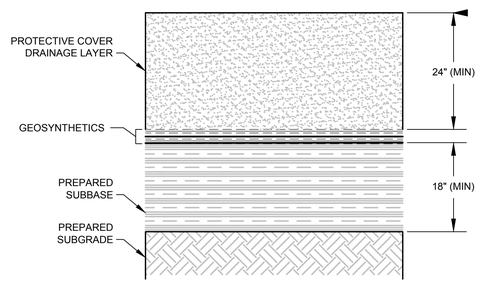
VERTICAL LANDFILL
GAS WELL (TYP.)
1
28

DICUS MILL ROAD

N

LEGEND

- PROPERTY BOUNDARY
- EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- PROPOSED FINAL GRADE CONTOUR (FEET-MSL)
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- STORMWATER CULVERT
- RIPRAP
- EXISTING CONCRETE MOMENT SLAB
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARY
- LITTER FENCE
- GUARDRAIL
- LFG — LANDFILL GAS HEADER
- VERTICAL LANDFILL GAS LATERAL PIPE
- ISOLATION VALVE
- BLIND FLANGE ON LANDFILL GAS HEADER
- C9W-19 — VERTICAL LANDFILL GAS WELL
- GAS WELL 150' RADIUS OF INFLUENCE



1 / - DETAIL
LINER SYSTEM (TYP.)
SCALE: NTS

NOTES:

1. SEE DRAWING NO. 2 FOR GENERAL NOTES.
2. PROVIDE A MINIMUM PIPE SLOPE OF 3 PERCENT.

0 200 400
SCALE IN FEET

SIGNATURE

DATE

DATE: APRIL 2024
FILE NO.: ME1418A.03-C31

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ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED		APPROVED: DATE	APPROVED: DATE
DATE	BY		
		CHIEF ENGINEER	PROJECT MANAGER
		APPROVED: DATE	APPROVED: DATE
		ASSISTANT CHIEF ENGINEER	CHIEF RIGHT-OF-WAY

SCALE: NOTED
DRAWN BY: BW/MJ
CHECKED BY: MV
DRAWING NO.: 27 OF 31
PROJECT NO.: ME1418A

PROJECT: CELL 9 VERTICAL EXPANSION
MILLERSVILLE LANDFILL AND
RESOURCE RECOVERY FACILITY

TITLE: LANDFILL GAS MANAGEMENT SYSTEM PLAN

3-May-24 - 9:29 AM
C:_GEOPW\350710\M\20224229\ME1418A.03-C31

pw:\\geosyntec-pw.bentley.com:geosyntec-pw-01\Documents\Clients\AI\ANNE ARUNDEL COUNTY\ME1418A - MILLERSVILLE CELL 9 VERTICAL EXPANSION\CADD\01 - MDE PERMITTING DOCUMENTS\DRAWINGS\SHEETS\ME1418A.03-C31.DWG

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APPENDIX L.3

Sizing of Landfill Gas Collection and Control System

CALCULATION COVER SHEET

Client: **Anne Arundel County** Project: **Millersville Cell 9 Vertical Expansion** Project No.: **ME1418A** Phase/ Task No. **03/04**

Title of Calculations **Landfill Gas Transmission System Components**

Calculations Prepared by:	Signature		05/19/2025
	Printed Name Title	Daniel Espinoza Senior Staff Professional	Date
Assumptions and Procedures Checked by: (Assumptions and Procedures Checker, APC)	Signature		05/21/2025
	Printed Name Title	Helena Harris Professional	Date
Computations Checked by: (Computation Checker, CC)	Signature		05/21/2025
	Printed Name Title	Helena Harris Professional	Date
Computations backchecked by: (Calculation Preparer, CP)	Signature		05/22/2025
	Printed Name Title	Daniel Espinoza Senior Staff Professional	Date
Approved by: (Calculation Approver, CA)	Signature		05/23/2025
	Printed Name Title	Meena Viswanath Senior Engineer	Date

Approval notes:

Submittal History (Number and initial all submittals)

No.	Description	Date	CP	APC	CC	CA

LANDFILL GAS TRANSMISSION SYSTEM COMPONENTS

INTRODUCTION AND PURPOSE

This calculation package presents the calculations for sizing the landfill gas (LFG) transmission system components in support of the design for the vertical expansion of Cell 9 of the Millersville Landfill and Resource Recovery Facility (MLFRRF) located in Severn, Maryland. Cell 9 is an 84-acre cell subdivided into 5 subcells (Subcells 9.1 through 9.5) and is currently the only permitted cell available for waste disposal at MLFRRF. The proposed vertical expansion of MLFRRF will increase the maximum permitted elevation from 244 feet (National Geodetic Vertical Datum of 1929 [NGVD29]) to 285 feet NGVD29 as well as modify the geometry of the liner sideslopes and the final cover slopes. The LFG system to be installed in Cell 9 to extract LFG consists of vertical LFG collection wells, which are connected by lateral pipes to a header pipe around the perimeter of Cell 9 (perimeter header). The perimeter header then connects to the flare via a main header pipe section (flare header). The objective of this calculation is to size the LFG transmission system, including the lateral pipes, the perimeter header, and the flare header.

DATA AND INFORMATION SOURCES

Calculation of the sizing of the components of the LFG collection system is performed using the peak LFG generation calculated in the Landfill Gas Generation calculation package (Appendix L.1 of the Phase III Report).

METHOD AND PARAMETERS

Lateral and header pipes are sized based on the expected peak LFG generation rate over the operational and post-closure life of the landfill.

Lateral Pipes

The peak LFG generation rate is assumed to be collected evenly by the 93 proposed vertical gas wells and distributed proportionally between laterals based on the number of wells attached to each lateral. The number of wells attributed to each lateral is determined based on the proposed LFG collection system design (Attachment L.3-1).

Perimeter Header

Gas flow from the wellfield enters the perimeter header via the laterals. The header pipe is a complete loop around the landfill perimeter and is designed in two sections (east header and west header), each beginning at a single point on the south side of Cell 9 and tying into the flare header.

The gas flows northward around the perimeter header to the flare header and ultimately to the flare station to the north of Cell 9. Gas flow is conveyed by vacuum pressure through the gas pipes. However, this vacuum pressure is not strong enough to move liquid condensate. It is assumed that the flow splits approximately halfway along the length of the perimeter header, near the C9W-29/C9W-33 lateral branch, as it is the midpoint of the loop starting from the 18-inch flare header pipe. Thus, it is assumed that the west side of the perimeter header will flow clockwise around Cell 9, while the east side will flow counterclockwise.

The liquid condensate is conveyed by gravity, flowing in the direction of the pipe's slope from higher elevations to lower elevations. In sections where the slope is positive relative to the direction of the gas flow, condensate drainage in the header flows concurrently with the gas. In sections where the slope is negative relative to the direction of the gas flow, the condensate flows countercurrent, or opposite to the gas flow.

The number of wells attributed to each perimeter header section is determined based on the LFG collection system design (Attachment L.3-1). Increasingly larger pipe diameters are needed to convey the increasing total LFG flow in downstream portions of each header section, as LFG collected from more and more wells is fed into the header section from contributing laterals.

The entire perimeter header has either already been constructed or is under construction. The vertical LFG collection wells and laterals in Subcell 9.1 are also under construction. These sections are analyzed based on the existing pipe sizes. The laterals in Subcells 9.2 through 9.5 are assumed to be the same size as those in Subcell 9.1.

Flare Header

The flare header is a third header pipe section leading from the perimeter header to the blower/flare station. It is evaluated separately because this section will need to convey the full peak LFG flow from both the east and west headers. The flare header has already been constructed and is therefore analyzed based on the existing pipe sizes.

The existing system (perimeter header and flare header) incorporates condensate sumps at low points along the header to avoid potential blockage of transmission pipes due to buildup of condensate. These condensate sumps are evaluated in the *Estimate of Landfill Gas Condensate Volume* calculation package (Appendix L.4).

INPUT PARAMETERS AND ASSUMPTIONS

Although LFG collection systems at landfills typically operate at less than 100 percent efficiency, this calculation conservatively assumes that all LFG generated in Cell 9 will be collected and thus conveyed in the LFG transmission pipes.

The lateral pipes are 6-inch diameter high-density polyethylene (HDPE) pipes with a standard dimension ratio (SDR) of 26 based on the iron pipe size (IPS) system. All lateral pipes are installed with a downward slope towards the perimeter header.

All lateral pipes are assumed to correspond with nominal pipe sizes based on the IPS system with an SDR of 26, except for the 10-inch portion of the existing East Header which is assumed to have a SDR of 17. Attachment L.3-1 has a color-coded figure that details each nominal pipe size. Pipe dimensions are taken from manufacturer data as presented in Attachment L.3-2. These dimensions, particularly the inner diameters, are used to calculate the cross-sectional flow area of the lateral pipes.

Evaluation of the sizing of the LFG collection system is performed assuming the flow through the system is at its expected maximum. Peak LFG generation in Cell 9 is estimated using LandGEM (USEPA 2005), as described previously in the *Landfill Gas Generation* calculation package (Appendix L.1). The calculated LFG generation rate of 2,192 cubic feet per minute at standard temperature and pressure (scfm) was used to evaluate the pipe sizing for the landfill gas transmission system.

PERFORMANCE CRITERIA

LFG is typically saturated with water vapor, which may condense on the side walls of transmission pipes due to temperature variations between the wells and the blower/flare station. To minimize entrainment of water vapor in LFG delivered to the flare, transmission piping components are evaluated in accordance with recommendations by the United States Army Corps of Engineers (USACE 2008) such that:

- gas velocity is less than 2,400 feet per minute (fpm) for downslope pipes where LFG and condensate are flowing concurrently;
- gas velocity is less than 1,200 fpm for upslope pipes where LFG flow is counter to condensate flow; and
- head losses amount to less than 1 inch-water per 100 feet of pipe to minimize the required blower horsepower at the flare station.

ANALYSIS AND EVALUATION APPROACH

Gas velocity in a pipe is calculated using the following standard formula:

$$V = \frac{Q}{A} \quad (1)$$

where

V = velocity (feet per second [ft/sec])

Q = flow rate (cubic feet per second [ft3/sec])

A = cross-sectional area of the pipe (square feet [ft2])

Head loss is calculated using a form of the Spitzglass formula (valid for gases at pressure less than 1 pound per square inch gauge [psig]):

$$\Delta h_w = \frac{q_h^2 \cdot L \cdot S_g}{C_s^2 \cdot d^5} \quad (2)$$

where:

Δh_w = head loss (inches of water per foot of pipe length)

q_h = flow rate (cubic feet per hour [ft^3/hr])

L = pipe length (ft) [assumed 1 ft]

S_g = specific gravity of gas relative to air = 1.04 (USACE 2008)

d = pipe inner diameter (inches)

C_s = $3550/(1 + 3.6/d + 0.03d)^{1/2}$

SUMMARY OF RESULTS

Results from calculations for the laterals are summarized in Table 1. Results from calculations for the perimeter header and the flare header are summarized in Table 2.

CONCLUSIONS

The proposed size of the laterals (6-inch nominal diameter pipes) is adequate to transmit the peak LFG flow generated in Cell 9. Although smaller diameter pipes could be used to accommodate the predicted flow, it is not recommended to use a smaller diameter pipe as this could cause potential clogging issues if pipe slopes change over time due to differential settlement.

The slope and size of the perimeter header pipes vary along their length, with both concurrent and countercurrent flow present. Along both the east and west headers, the flow velocities meet the performance criteria, and the head losses are less than 1 inch-water per 100 feet of pipe.

The slope and size of the flare header pipes vary along their length, with both concurrent and countercurrent flow present. The velocity in the flare header pipe, including in portions that have countercurrent flow, exceeds 1,200 fpm, which means that LFG conveyed in these sections will have a slightly higher-than-typical condensate load. However, since the flare header pipes switches from countercurrent to concurrent flow several times, and the last long run of pipe is concurrent flow, most of the LFG that does become entrained is expected to condense out again prior to condensate sump CS9-4. As such, condensate management is not expected to be an issue.

All header pipe sections meet the performance criterion of limiting pressure drop to less than 1 in.-w.c. per 100 feet, as this limits the total blower horsepower needed to convey LFG to the flare. In conclusion, the proposed and existing sections of the header appear to be adequate to transmit LFG from the wellfield to the flare.

REFERENCES

USACE. 2008. *Landfill Off-Gas Collection and Treatment Systems*. United States Army Corps of Engineers. EM 1110-1-4016.

USEPA. 2005. *Landfill Gas Emissions Model (LandGEM)*. Version 3.02. United States Environmental Protection Agency. EPA-600/R-05/047.

TABLES

Table 1 - Head Loss and Pipe Sizing Calculation: Laterals
Millersville Landfill and Resource Recovery Facility - Cell 9 Expansion

Peak LFG Generation Rate: 2192 scfm

Total # wells 93

Well IDs	Number of Wells	Peak LFG Generation (scfm)	Pipe LFG Flow (scfm)	Pipe Inner Diameter (in.)	Velocity [1,2] (ft/min)	C_s^2	Pressure Drop per Foot of Pipe (in.-w.c.)	Pressure Drop per 100 ft [3] (in.-w.c.)	Pipe Size [4] (in.)
Branches									
C9W-1, C9W-2, C9W-3, C9W-4	4	2,192	94	6.084	467	7,103,057	0.00056	0.06	6
C9W-5, C9W-6, C9W-7, C9W-8, C9W-9, C9W-10	6	2,192	141	6.084	700	7,103,057	0.00126	0.13	6
C9W-11, C9W-12, C9W-13	3	2,192	71	6.084	350	7,103,057	0.00032	0.03	6
C9W-14, C9W-15, C9W-16	3	2,192	71	6.084	350	7,103,057	0.00032	0.03	6
C9W-17, C9W-18, C9W-19, C9W-20, C9W-21, C9W-22, C9W-23, C9W-24, C9W-25, C9W-26, C9W-27, C9W-28	12	2,192	283	6.084	1,401	7,103,057	0.00506	0.51	6
C9W-29, C9W-30, C9W-31, C9W-32, C9W-33	5	2,192	118	6.084	584	7,103,057	0.00088	0.09	6
C9W-34, C9W-35, C9W-36, C9W-37, C9W-38, C9W-39	6	2,192	141	6.084	700	7,103,057	0.00126	0.13	6
C9W-40, C9W-41, C9W-42, C9W-43, C9W-44, C9W-45, C9W-46, C9W-47, C9W-48, C9W-49	10	2,192	236	6.084	1,167	7,103,057	0.00351	0.35	6
C9W-50, C9W-51, C9W-52, C9W-53, C9W-54, C9W-55, C9W-56, C9W-57, C9W-58, C9W-59, C9W-60	11	2,192	259	6.084	1,284	7,103,057	0.00425	0.43	6
C9W-61, C9W-62, C9W-63, C9W-64, C9W-65, C9W-66, C9W-67	7	2,192	165	6.084	817	7,103,057	0.00172	0.17	6
C9W-68, C9W-69, C9W-70, C9W-71	4	2,192	94	6.084	467	7,103,057	0.00056	0.06	6
C9W-72, C9W-73, C9W-74	3	2,192	71	6.084	350	7,103,057	0.00032	0.03	6
C9W-75, C9W-76, C9W-77, C9W-78, C9W-79, C9W-80	6	2,192	141	6.084	700	7,103,057	0.00126	0.13	6
C9W-81, C9W-82, C9W-83, C9W-84	4	2,192	94	6.084	467	7,103,057	0.00056	0.06	6
C9W-85	1	2,192	24	6.084	117	7,103,057	0.00004	0.00	6
C9W-86, C9W-87	2	2,192	47	6.084	233	7,103,057	0.00014	0.01	6
C9W-88, C9W-89, C9W-90, C9W-91	4	2,192	94	6.084	467	7,103,057	0.00056	0.06	6
C9W-92, C9W-93	2	2,192	47	6.084	233	7,103,057	0.00014	0.01	6

Notes:

1. Gas velocity should be less than 2,400 fpm for downslope pipe when LFG and condensate are flowing concurrently.
2. Gas velocity should be less than 1,200 fpm for upslope pipe when LFG flow direction is opposite that of the condensate.
3. Head loss should be less than 1 in.-w.c. per 100 feet of pipe to minimize the required blower horsepower.
4. All lateral pipes are 6 inch diameter SDR 26.

Geosyntec consultants

Table 2 - Head Loss and Pipe Sizing Calculation: Header

Millersville Landfill and Resource Recovery Facility - Cell 9 Expansion

Header ID[1]	Pipe SDR	Cumulative Number of Wells Feeding into Header Pipe	Peak LFG Generation (scfm)	Pipe LFG Flow (scfm)	Pipe Inner Diameter (in.)	LFG and Condensate Flow (Concurrent or Countercurrent)	Velocity [2,3] (ft/min)	C_s^2	Pressure Drop per Foot of Pipe (in.-w.c.)	Pressure Drop per 100 ft [4] (in.-w.c.)
Existing East Header (10")	17	21	2,192	495	9.410	Concurrent	1,025	7,569,652	0.002	0.16
Existing East Header (12")	26	33	2,192	778	11.711	Concurrent	1,040	7,597,665	0.001	0.14
Existing East Header (14")	26	43	2,192	1,014	12.895	Countercurrent	1,118	7,564,399	0.001	0.14
Existing West Header (14")	26	50	2,192	1,178	12.895	Concurrent	1,299	7,564,399	0.002	0.19
Existing Flare Header (18")	26	93	2,192	2,192	16.533	Countercurrent	1,470	7,353,815	0.002	0.20
Existing Flare Header (14")	26	93	2,192	2,192	12.895	Both	2,417	7,564,399	0.007	0.67

Notes:

1. West Header is proposed. All diameters of East Header and Flare Header are existing.
2. Gas velocity should be less than 2,400 fpm for downslope pipe when LFG and condensate are flowing concurrently.
3. Gas velocity should be less than 1,200 fpm for upslope pipe when LFG flow direction is opposite that of the condensate.
4. Head loss should be less than 1 in.-w.c. per 100 feet of pipe to minimize the required blower horsepower.

Geosyntec consultants

ATTACHMENT L.3-1

Conceptual LFG Collection System Design

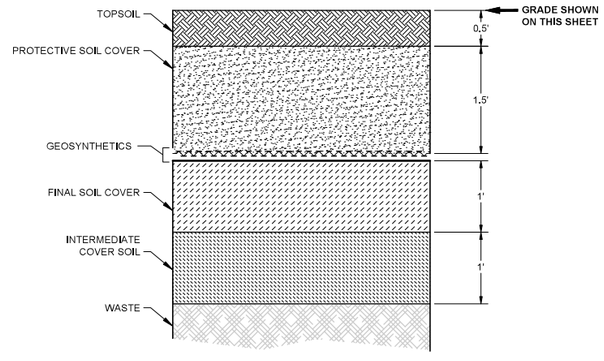
10" Header
12" Header
14" Header
18" Header

N

CELL 3 (MINED)
SEDIMENT TRAP 5A
LANDFILL GAS TO ELECTRICITY PLANT
CS9-4 Condensate Sump (Low Point)
BLOWER/FLARE STATION
CELL 4 (CLOSED)
Concurrent
High Point
CELLS 5,6,7 (CLOSED)
Countercurrent
POND 4
POND 5
CELL 8 (CLOSED)
CS9-3 Condensate Sump (low point)
POND 8-1
WELLS
BRANCH
CS9-1 Condensate Sump (low point)
POND 9-2
CONNECTION TO PERIMETER HEADER (TYP)
5 29
CS9-2 Condensate Sump (low point)
Concurrent
BLIND FLANGE ON LANDFILL GAS HEADER
Countercurrent
High Point
2
ISOLATION VALVE
High Point
JOEL SALINE WAY
Countercurrent
BRA
WELLS
SUBCELL 9.2 (ACTIVE)
SUBCELL 9.1 (ACTIVE)
SUBCELL 9.3 (UNDER CONSTRUCTION)
SUBCELL 9.4 (FUTURE)
SUBCELL 9.5 (FUTURE)
6" LANDFILL GAS LATERAL PIPING (TYP.)
4 29
LITTER FENCE
PERIMETER DRAINAGE DITCH
Concurrent
PERIMETER ACCESS ROAD
10" SDR-11 HDPE LFG HEADER
Concurrent
Concurrent
Countercurrent
Estimated location where LFG flow splits between east and west
10" Ø LFG HEADER
10" REDUCER
VERTICAL LANDFILL GAS WELL (TYP.)
1 29
High Point
Concurrent
Concurrent
DICUS MILL ROAD

LEGEND

- PROPERTY BOUNDARY
- EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- PROPOSED FINAL GRADE CONTOUR (FEET-MSL)
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- STORMWATER CULVERT
- RIPRAP
- EXISTING CONCRETE MOMENT SLAB
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARY
- LITTER FENCE
- GUARDRAIL
- LFG — LANDFILL GAS HEADER
- VERTICAL LANDFILL GAS LATERAL PIPE
- ISOLATION VALVE
- BLIND FLANGE ON LANDFILL GAS HEADER
- C9W-19 — VERTICAL LANDFILL GAS WELL



1 / - DETAIL
COVER SYSTEM (TYP.)
SCALE: NTS

NOTES:

1. SEE DRAWING NO. 2 FOR GENERAL NOTES.
2. PROVIDE A MINIMUM PIPE SLOPE OF 3 PERCENT.

0 200 400
SCALE IN FEET

DATE: JULY 2024
FILE NO.: ME1418A,03-C31

Geosyntec consultants
engineers | scientists | innovators
10211 WINCOPIN CIRCLE
4TH FLOOR
COLUMBIA, MD 21044
410.381.4333

SIGNATURE
DATE

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED DATE	BY	APPROVED: CHIEF ENGINEER DATE	APPROVED: PROJECT MANAGER DATE
		APPROVED: ASSISTANT CHIEF ENGINEER DATE	APPROVED: CHIEF, RIGHT-OF-WAY DATE

SCALE: NOTED
DRAWN BY: BW/MJ
CHECKED BY: MV
DRAWING NO.: 28 OF 30
PROJECT NO.: ME1418A

PROJECT: CELL 9 VERTICAL EXPANSION MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

TITLE: LANDFILL GAS MANAGEMENT SYSTEM PLAN

21-Aug-24 - 12:10 PM
C:\USERS\MCDOONG\DESKTOP\ANNE ARUNDEL CO_MILLERSVILLE\PROJECT FILES\CADD\01_LAYOUT\ME1418A_03-C31.DWG

ATTACHMENT L.3-2

Pipe Dimensions

HDPE Water/Sewer | IPS

PRESSURE-RATED HDPE PIPE

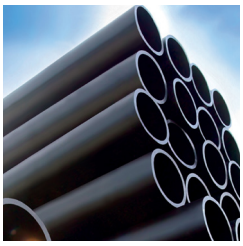
ANSI/AWWA C906, ASTM F714, ASTM D3035
ASTM D3350 Cell Class 445574C/E, PPI (TR-4) PE 4710
ANSI/NSF 61/14

JM Eagle™
DELIVERING GOOD WATER TO YOU

MARKETS

Potable | Reclaim | Sewer | Drainage | Irrigation | Rehabilitation

DESCRIPTION



Standard HDPE

Coiled HDPE

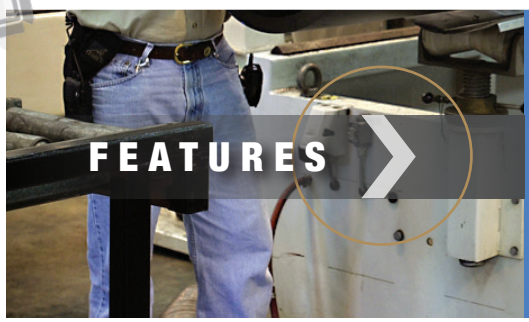
IPS	PIPE SIZES:	ADDITIONAL OPTIONS:
Nominal Laying Length: 40/50 feet *(Laying length tolerances are in accordance with AWWA and ASTM standards)*	4", 5", 6", 7", 8", 10", 12", 14", 16", 18" 20", 22", 24", 26" 28", 30", 32", 34", 36" 42", 48", 54", 63"	**Perforated*:** 4", 5", 6, 7", 8" **Coil*:** 4", 5", 6"
PIPE COLORS:	**BLACK W/COLOR STRIPES:**	**ADDITIONAL COLOR OPTIONS:**
Black	Blue Green Purple	Grey*

AWWA C906	
DR 7	335 psi
DR 9	250 psi
DR 11	200 psi
DR 13.5	160 psi
DR 17	125 psi
DR 19	112 psi
DR 21	100 psi
DR 26	80 psi
DR 32.5	63 psi

BENEFITS

Lightweight, with long laying length, great for easy transportation and installation.

Pipe applicable for open-trench and slip-lining installation.



Extremely durable, corrosive, gouging and abrasion resistant.

Features 100 years design life per Florida DOT.

Great flexibility, and highly suitable for earth-quake-prone areas.

Highest PE pressure rating, resistance to slow crack growth and rapid crack propagation.

Made in America

JM Eagle 50 YEAR WARRANTY* ON PLASTIC PIPE

*Please call regarding availability.

HDPE Water/Sewer | IPS

PRESSURE-RATED HDPE PIPE

DELIVERING GOOD WATER TO YOU

SUBMITTAL AND DATA SHEET

HDPE IRON PIPE SIZE (IPS) PRESSURE PIPE

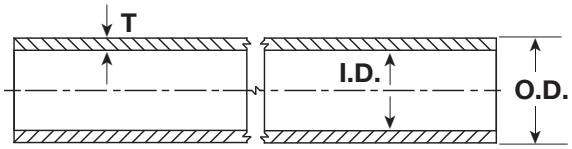
PIPE SIZE (IN)	AVG.O.D. (IN)	MIN. T. (IN)	AVG I.D. (IN)	WGT (LBS/FT)	MIN. T. (IN)	AVG I.D. (IN)	WGT (LBS/FT)	MIN. T. (IN)	AVG I.D. (IN)	WGT (LBS/FT)
		DR 7 (335 psi)			DR 9 (250 psi)			DR 11 (200 psi)		
4	4.500	0.643	3.137	3.40	0.500	3.440	2.75	0.409	3.633	2.30
5	5.375	0.795	3.747	4.85	0.618	4.109	3.92	0.506	4.338	3.29
6	6.625	0.946	4.619	7.36	0.736	5.065	5.96	0.602	5.349	4.99
7	7.125	1.018	5.056	8.52	0.792	5.446	6.89	0.648	5.751	5.78
8	8.625	1.232	6.013	12.48	0.958	6.594	10.09	0.784	6.963	8.46
10	10.750	1.536	7.494	19.40	1.194	8.219	15.68	0.977	8.679	13.14
12	12.750	1.821	8.889	27.28	1.417	9.746	22.07	1.159	10.293	18.49
14	14.000	2.000	9.760	32.90	1.556	10.107	26.61	1.273	11.301	22.30
16	16.000	2.286	11.154	42.97	1.778	12.231	34.75	1.455	12.915	29.12
18	18.000	2.571	12.549	54.37	2.000	13.760	43.97	1.636	14.532	36.84
20	20.000	2.857	13.943	67.13	2.222	15.289	54.28	1.818	16.146	45.49
22	22.000	3.143	15.337	81.23	2.444	16.819	65.68	2.000	17.760	55.05
24	24.000	3.429	16.732	96.67	2.667	18.346	78.18	2.182	19.374	65.52
26	26.000	N/A	N/A	N/A	2.889	19.875	91.75	2.364	20.988	76.90
28	28.000	N/A	N/A	N/A	3.111	21.405	106.40	2.545	22.605	89.15
30	30.000	N/A	N/A	N/A	3.333	22.934	122.13	2.727	24.219	102.35
32	32.000	N/A	N/A	N/A	N/A	N/A	N/A	2.909	25.833	116.46
34	34.000	N/A	N/A	N/A	N/A	N/A	N/A	3.091	27.447	131.48
36	36.000	N/A	N/A	N/A	N/A	N/A	N/A	3.273	29.061	147.41

Product Standard:
ANSI/AWWA C906
ASTM F714
ASTM D3035
Pipe Compound:
PPI TR-4 PE 4710, ASTM D3350
Cell Class 445574 C/E
Certification: ANSI/NSF 61, ANSI/NSF 14*
Additional Option:
Perforated (4" - 8")*

Nominal Laying Length: 40/50 feet (Laying length tolerances are in accordance with AWWA and ASTM standards)
Coil option available upon request for size 6" and below.
Installation: JM Eagle™ HDPE Water/Sewer Installation Guide

Manning Coefficient (n) = 0.009
Hazen-Williams Coefficient (c) = 150

*Supply may vary based on plant location. Please call regarding availability.



T: (Wall Thickness) **I.D.:** (Inside Diameter) **O.D.:** (Outside Diameter)

PIPE SIZE (IN)	AVG.O.D. (IN)	MIN. T. (IN)	AVG I.D. (IN)	WGT (LBS/FT)	MIN. T. (IN)	AVG I.D. (IN)	WGT (LBS/FT)	MIN. T. (IN)	AVG I.D. (IN)	WGT (LBS/FT)
		DR 13.5 (160 psi)			DR 17 (125 psi)			DR 19 (111 psi)		
4	4.500	0.333	3.794	1.91	0.265	3.938	1.55	0.237	3.998	1.39
5	5.375	0.412	4.531	2.73	0.327	4.705	2.21	0.283	4.775	1.99
6	6.625	0.491	5.584	4.15	0.390	5.798	3.35	0.349	5.885	3.02
7	7.125	0.528	6.006	4.80	0.420	6.237	3.88	0.375	6.330	3.49
8	8.625	0.639	7.270	7.03	0.507	7.550	5.68	0.454	7.663	5.12
10	10.750	0.796	9.062	10.92	0.632	9.410	8.82	0.566	9.550	7.95
12	12.750	0.944	10.749	15.36	0.750	11.160	12.41	0.671	11.327	11.19
14	14.000	1.037	11.802	18.52	0.824	12.253	14.98	0.737	12.438	13.49
16	16.000	1.185	13.488	24.19	0.941	14.005	19.55	0.842	14.215	17.61
18	18.000	1.333	15.174	30.61	1.059	15.755	24.75	0.947	15.992	22.29
20	20.000	1.481	16.860	37.79	1.176	17.507	30.53	1.053	17.768	27.52
22	22.000	1.630	18.544	45.75	1.294	19.257	36.86	1.158	19.545	33.30
24	24.000	1.778	20.231	54.44	1.412	21.007	43.99	1.263	21.322	39.63
26	26.000	1.926	21.917	63.89	1.529	22.759	51.61	1.368	23.100	46.51
28	28.000	2.074	23.603	74.09	1.647	24.508	59.87	1.474	24.875	53.94
30	30.000	2.222	25.289	85.04	1.765	26.258	68.74	1.579	26.653	61.92
32	32.000	2.370	26.967	96.76	1.882	28.010	78.18	1.684	28.430	70.45
34	34.000	2.519	28.660	109.26	2.000	29.760	88.28	1.790	30.205	79.54
36	36.000	2.667	30.346	122.49	2.118	31.510	98.98	1.895	31.983	89.17
42	42.000	3.111	35.404	166.70	2.471	36.761	134.72	2.211	37.314	121.37
48	48.000	3.556	40.462	217.76	2.824	42.013	175.97	2.526	42.644	158.52
54	54.000	N/A	N/A	N/A	3.177	47.265	222.67	2.842	47.975	200.63

PIPE SIZE (IN)	AVG.O.D. (IN)	MIN. T. (IN)	AVG I.D. (IN)	WGT (LBS/FT)	MIN. T. (IN)	AVG I.D. (IN)	WGT (LBS/FT)	MIN. T. (IN)	AVG I.D. (IN)	WGT (LBS/FT)
		DR 21 (100 psi)			DR 26 (80 psi)			DR 32.5 (63 psi)		
4	4.500	0.214	4.046	1.27	0.173	4.133	1.03	0.138	4.207	0.83
5	5.375	0.265	4.832	1.81	0.214	4.936	1.48	0.171	5.025	1.19
6	6.625	0.315	5.957	2.74	0.255	6.084	2.24	0.204	6.193	1.81
7	7.125	0.340	6.406	3.18	0.274	6.544	2.59	0.219	6.661	2.09
8	8.625	0.411	7.754	4.66	0.332	7.921	3.80	0.265	8.063	3.06
10	10.750	0.512	9.665	7.24	0.413	9.874	5.90	0.331	10.048	4.77
12	12.750	0.607	11.463	10.17	0.490	11.711	8.30	0.392	11.919	6.69
14	14.000	0.667	12.586	12.28	0.538	12.895	10.00	0.431	13.086	8.08
16	16.000	0.762	14.385	16.03	0.615	14.696	13.07	0.492	14.957	10.54
18	18.000	0.857	16.183	20.28	0.692	16.533	16.54	0.554	16.826	13.36
20	20.000	0.952	17.982	25.03	0.769	18.370	20.43	0.615	18.696	16.48
22	22.000	1.048	19.778	30.31	0.846	20.206	24.72	0.677	20.565	19.95
24	24.000	1.143	21.577	36.06	0.923	22.043	29.42	0.738	22.435	23.72
26	26.000	1.238	23.375	42.32	1.000	23.880	34.53	0.800	24.304	27.86
28	28.000	1.333	25.174	49.07	1.077	25.717	40.05	0.862	26.173	32.33
30	30.000	1.429	26.971	56.36	1.154	27.554	45.98	0.923	28.043	37.09
32	32.000	1.542	28.730	64.11	1.231	29.390	52.31	0.985	29.912	42.22
34	34.000	1.619	30.568	72.36	1.308	31.227	59.06	1.046	31.782	47.63
36	36.000	1.714	32.366	81.12	1.385	33.064	66.22	1.108	33.651	53.42
42	42.000	2.000	37.760	110.43	1.615	38.576	90.08	1.292	39.261	72.68
48	48.000	2.286	43.154	144.25	1.846	44.086	117.68	1.477	44.869	94.95
54	54.000	2.571	48.549	182.51	2.077	49.597	148.95	1.662	50.477	120.20
63	63.000	3.000	56.640	248.46	2.423	57.863	202.73	1.938	58.891	163.53

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Geosyntec
consultants

APPENDIX L.4
Estimate of Condensate Volume

CALCULATION COVER SHEET

Client: **Anne Arundel County** Project: **Millersville Cell 9 Vertical Expansion** Project No.: **ME1418A** Phase/ Task No. **03/04**

Title of Calculations **Estimate of Landfill Gas Condensate Volume**

Calculations Prepared by:	Signature		05/19/2025
	Printed Name Title	Daniel Espinoza Senior Staff Professional	Date
Assumptions and Procedures Checked by: (Assumptions and Procedures Checker, APC)	Signature		05/21/2025
	Printed Name Title	Helena Harris Professional	Date
Computations Checked by: (Computation Checker, CC)	Signature		05/21/2025
	Printed Name Title	Helena Harris Professional	Date
Computations backchecked by: (Calculation Preparer, CP)	Signature		05/22/2025
	Printed Name Title	Daniel Espinoza Senior Staff Professional	Date
Approved by: (Calculation Approver, CA)	Signature	Meena Viswanath	05/23/2025
	Printed Name Title	Meena Viswanath Senior Engineer	Date

Approval notes:

Submittal History (Number and initial all submittals)

No.	Description	Date	CP	APC	CC	CA

ESTIMATE OF LANDFILL GAS CONDENSATE VOLUME

INTRODUCTION AND PURPOSE

The objective of this calculation package is to estimate the volume of condensate that may form in the landfill gas (LFG) transmission pipes installed as components of the LFG collection system from the proposed vertical expansion of Cell 9 of the Millersville Landfill and Resource Recovery Facility (MLFRRF), a municipal solid waste (MSW) landfill located in Severn, Anne Arundel County, Maryland. Cell 9 is divided into five subcells (Cell 9.1 through 9.5), which will be constructed sequentially. To date, Subcells 9.1 and 9.2 have been constructed along with some components of the LFG collection system and Subcell 9.3 is currently under construction. There is one existing condensate sump on the existing East Header section of the Cell 9 perimeter header, which is installed near the northwest corner of Subcell 9.2 as part of the Subcell 9.1 construction contract. Three more condensate sumps are installed on the Flare Header, which transmits LFG from the perimeter headers of Cells 8 and 9 to the blower/flare station north of Cell 8. These three sumps are installed to the east of existing Cell 8, which is north of Cell 9. These analyses evaluate the design of the existing sumps to verify that they have adequate capacity to handle the expected additional condensate generation due to LFG recovery from the proposed vertical expansion of Cell 9.

DATA AND INFORMATION SOURCES

Estimation of the volume of condensate generated by the vertical expansion of Cell 9 and evaluation of the capacity of the existing condensate sumps is performed using data from the following sources:

1. LFG Generation Values are taken from the Cell 9 Vertical Expansion Landfill Gas Generation Estimate calculation package (Appendix L.1 of the Phase III Report)
2. Design details of the sump along the Cell 9 perimeter header are taken from the MLFRRF Cell 9 Landfill Gas Header Design – Construction Drawings produced by SCS in 2015.
3. Design details of the sumps along the Flare Header are taken from the MLFRRF Cell 8 Final Closure Construction Drawings produced by Geosyntec Consultants in 2016.
4. Information on the water content of gases is taken from the Engineering Data Book published by Gas Processors Suppliers Association (GPSA) in 2004.

METHOD AND PARAMETERS

Two elements are examined in these analyses: the volume of condensate produced and the capacity of the existing sumps.

Condensate is generated in the LFG system as the gas cools and moisture drops out as it moves through the LFG system. The volume of condensate produced is estimated by estimating the change in temperature as the landfill gas moves through the LFG collection system, and calculating the difference in the amount of moisture that would constitute the gas at those temperatures.

The volume of condensate generated can then be used to evaluate the capacity of the existing sumps through the physical size of the sump and the specifications of the pump installed within the sump.

INPUT PARAMETERS AND ASSUMPTIONS

Volume of Condensate

To estimate the volume of condensate that may form in the LFG transmission piping, it is first necessary to estimate the temperature of the gas at different points in the system. Based on Geosyntec's previous experience, the following temperatures are expected for normal operation of an LFG collection system:

- 110°F at gas wells, which reflects in-situ waste temperature; and
- 40°F at knockout tanks/condensate sumps, which are more reflective of average ambient temperatures.

The volume of condensate is also based on the volume of gas flowing through the LFG system. Peak LFG generation in Cell 9 is estimated using LandGEM (USEPA 2005) for the proposed expansion, as described previously in the *Landfill Gas Generation Estimate* calculation package (Appendix L.1). The peak LFG generation rate of 2,192 cubic feet per minute at standard temperature and pressure (scfm) is used to calculate expected condensate volumes. This peak LFG flow rate is also used to size pipes for the LFG transmission system (see *Sizing Landfill Gas Transmission System Components* calculation package in Appendix L.3). Although LFG collection efficiency at landfills is typically less than 100%, it is conservatively assumed that all LFG generated in Cell 9 will be collected and thus conveyed in the LFG transmission pipes.

Condensate Sump Capacity

There are four condensate sumps considered in these analyses. The existing condensate sump on the existing East Header section of the Cell 9 perimeter header, referred to as condensate sump

CS9-1, is installed near the northwest corner of Subcell 9.2. Figure 1 shows the design detail of CS9-1. The three condensate sumps installed on the Flare Header, are referred to as CS9-2, CS9-3, and CS9-4. Figure 2 shows the design details of CS9-2, CS9-3, and CS9-4.

CS9-1

Sump CS9-1 is a stacked tee sump on the East Cell 9 LFG header and is also the reducer between 14-in. and 12-in. header sections. As shown in the CS9-1 design detail, the sump is formed by a 14-in. nominal diameter SDR-17 HDPE pipe. The distance from the bottom of the sump to the invert of the 12-in. header is 6.25 ft (i.e., 14 ft. total length of CS9-1 pipe in ground minus 6 ft 8 in. measured from the ground surface to the top of 12-in. header minus 13-in. outer diameter [OD] of the 12-in. header, as shown in Figure 1).

A 14-in. nominal diameter SDR-17 HDPE pipe has an inner diameter [ID] of 12.25 in. The hose used for pumping is an 8-in. nominal diameter Schedule 80 PVC pipe (ID=7.565 in., OD=8.625 in.). The condensate sump is designed with a pump-on elevation of 6.25 ft and pump-off elevation of 1.5 ft above the bottom of the sump.

The existing pump at CS9-1 is Anchor Electric Piston Pump® Model 101 (1/2 HP, 208 Volt, 1 Phase) supplied by Black Hawk Technology Company. This pump has a constant pump rate of 1.2 gpm at a water head up to 385 ft.

CS9-2, CS9-3, and CS9-4

Condensate sumps CS9-2, CS9-3, and CS9-4 are of similar size and design, as shown in Figure 2. The sumps are 4-ft diameter HDPE manholes. All manholes are fitted with pumps to discharge condensate. These three sumps are intended to manage condensate in LFG from Cell 8 and/or Cell 9 as follows (Geosyntec 2016):

- CS9-2 is connected to the 14-in. diameter Flare Header for Cell 9 via a 3-in. gravity drain. The height difference between the drain inlet and the bottom of the sump is 7 ft 4 in. (i.e., 13.5 ft minus 5.5 ft minus 8 in.). Condensate from CS9-2 will be pumped to an 8-in. leachate gravity line.
- CS9-3 is connected to two condensate knockout tanks, one for the 12-in. Cell 8 Flare header and one for the 14-in. Cell 9 Flare Header. The knockout tank connections to the sump are via 3-in. gravity drains. The height difference between the drain inlet and the bottom of the sump is 7 ft 4 in. (i.e., 12 ft minus 4 ft minus 8 in.). Condensate from CS9-3 will be pumped to an 8-in. leachate gravity line.
- CS9-4 is connected to a condensate knockout tank for the 14-in. Cell 9 Flare Header. The knockout tank connection is via a 3-in. gravity drain. The height difference between the drain inlet and the bottom of the sump is 7 ft 4 in. (i.e., 12 ft minus 4 ft minus 8 in.).

Condensate from CS9-4 will be pumped via a 2-in. forcemain to an existing 2-in. condensate forcemain for Cell 8.

As all three sumps have the same height difference between inlet drains and the base, the available storage volume in each sump is the same. The critical sump is thus CS9-3, which handles condensate from both Cells 8 and 9. All three sumps are designed with pump-off and pump-on elevations of 1.0 ft and 5.5 ft from the bottom of the sump, respectively. The pumps installed are Series 5 SurePump^{TM} Model 5-2 from EPG Companies, Inc.

The worst-case scenario would occur if all condensate from both Cells 8 and 9 must all be managed at CS9-3 (i.e., all other sumps are inoperable). From Geosyntec (2016), the maximum expected condensate generation in LFG from Cell 8 is 390 gal/day. The total maximum daily inflow to CS9-3, therefore, can be assumed as 1,669 gal/day (1.2 gpm), comprising 1,279 gal/day (0.89 gpm) from the Cell 9 header and 390 gal/day (0.27 gpm) from the Cell 8 header.

The design analysis prepared by Geosyntec (2016) specified the design pumping rate for these sumps should range from 15 gpm to 30 gpm. For this evaluation, it is conservatively assumed that the pumping rate is 15 gpm.

PERFORMANCE CRITERIA

The design pumping rate of the pumps installed in the condensate should exceed the estimated flow of condensate into the sump, otherwise the sump may overflow. The sumps are also evaluated to verify that the pumping rate will result in an expected cycle rate of less than 300 cycles per day. If the pump exceeds 300 cycles per day, the pump will be overworked and may prematurely burn out.

ANALYSIS AND EVALUATION APPROACH

Volume of Condensate

The change in temperature over the LFG system is estimated and the water content of the LFG is estimated at the given temperatures. The condensate mass generated is estimated as the difference in water content of the LFG from the maximum expected temperature to the minimum expected temperature. Then the condensate mass generated per minute is estimated based on the maximum expected flow of LFG through the system and is converted to condensate volume generated per day.

Condensate Sump Capacity

To evaluate the performance of existing sumps and pumps, the following steps are followed in the selection of sump size and pump capacity:

1. Calculate design maximum liquid inflow rate (q_{in}) in gal./minute (gpm).
2. Calculate sump volume capacity (V) in gallons.
3. Verify that the design pumping rate (q_p) exceeds q_{in} (gpm).
4. Calculate the pump time off (t_{off}) in minutes as:

$$t_{off} = \frac{V}{q_{in}}$$

5. Calculate the pump time on (t_{on}) in minutes as:

$$t_{on} = \frac{V}{\left(q_p - q_{in}\right)}$$

6. Calculate the resulting pump off/on ratio:

$$r = \frac{t_{off}}{t_{on}}$$

7. Calculate the pumping cycles in a day:

$$cycle/day = \frac{24 \times 60}{\left(t_{on} + t_{off}\right)}$$

SUMMARY OF RESULTS

Volume of Condensate

Based on Figure 3, the water content of a hydrocarbon gas (LFG is typically 50% methane, a simple hydrocarbon) can be estimated at a given temperature (GPSA, 2004). From the figure, the water content of LFG is estimated at each of the two temperatures above. The estimates are as follows:

$$110°F \xrightarrow{yields} 4{,}000 \frac{lb\ H_2O}{10^6\ ft^3\ gas}$$

$$40°F \xrightarrow{yields} 400 \frac{lb\ H_2O}{10^6\ ft^3\ gas}$$

Assuming that the maximum change in temperature as gas flows from wells to condensate sumps will be from 110°F to 40°F, the maximum expected change in water content is:

$$4{,}000\frac{lb\ H_2O}{10^6\ ft^3\ gas} - 400\frac{lb\ H_2O}{10^6\ ft^3\ gas} = 3{,}600\frac{lb\ H_2O}{10^6\ ft^3\ gas}$$

The maximum daily total volume of condensate expected to be generated in the LFG transmission system of Cell 9 is calculated as follows:

$$3{,}600\frac{lb\ H_2O}{10^6\ ft^3\ gas} \times 2{,}192\frac{ft^3}{min} = 7.89\frac{lb}{min}$$

$$7.89\frac{lb}{min} \times 1{,}440\frac{min}{day} \div 62.4\frac{lb}{ft^3} \times 7.48\frac{gal}{ft^3} = 1{,}362\frac{gal}{day}$$

Existing Condensate Sump Capacity

CS9-1

Based on the properties of the sump discussed in the Input Parameters and Assumptions section above, the sump volume in CS9-1 can be calculated as:

V = π × (12.25 in. / 12 in./ft) ^ 2 / 4 × (6.25 ft – 1.5 ft) = 3.89 ft^3 = 29.1 gallons

Based on the total maximum daily inflow to CS9-1 of 1,362 gal/day (0.946 gpm), the pump time off (t_{off}) for CS9-1 is:

$$t_{off} = \frac{V}{q_{in}} = 29.1 \text{ gal. / } 0.946 \text{ gpm} = 30.74 \text{ min}$$

The pump time on (t_{on}) is:

$$t_{on} = \frac{V}{\left(q_p - q_{in}\right)} = 29.1 \text{ gal. / (1.2 gpm -0.946 gpm)} = 114.46 \text{ min}$$

The resulting pump off/on ratio is:

$$r = \frac{t_{off}}{t_{on}} = 30.74 \text{ / } 114.46 = 0.27$$

The expected maximum pumping cycles in a day is:

$$cycle/day = \frac{24 \times 60}{\left(t_{on} + t_{off}\right)} = 24 \times 60 \text{ / } (30.74+114.46) = 9.92 < 300 \rightarrow \text{Okay!}$$

CS9-2, CS9-3, and CS9-4

As all three sumps are designed with pump-off and pump-on elevations of 1.0 ft and 5.5 ft from the bottom of the sump, respectively, the volume of the sump is determined as:

$$V = \pi \times (4\text{ ft}) \text{ ^ } 2 / 4 \times (5.5\text{ ft} - 1.0\text{ ft}) = 56.55\text{ ft}^3 = 423.0\text{ gal.}$$

Assuming the worst-case scenario, where 1,752 gal/day (1.2 gpm) of condensate from both Cells 8 and 9 must be managed at CS9-3, as discussed in the Input Parameters and Assumptions section above, the calculated pump time off (t_{off}) is:

$$t_{off} = \frac{V}{q_{in}} = 423.0\text{ gal.} / 1.2\text{ gpm} = 352.5\text{ min}$$

The pump time on (t_{on}) is:

$$t_{on} = \frac{V}{\left(q_p - q_{in}\right)} = 423.0\text{ gal.} / (15\text{ gpm} - 1.2\text{ gpm}) = 30.65\text{ min}$$

The resulting pump off/on ratio is:

$$r = \frac{t_{off}}{t_{on}} = 352.5 / 30.65 = 11.5$$

The (maximum) pumping cycles in a day is:

$$cycle/day = \frac{24 \times 60}{\left(t_{on} + t_{off}\right)} = 24 \times 60 / (30.65 + 352.5) = 3.8 < 300 \rightarrow \text{Okay!}$$

CONCLUSIONS

Based on the analyses above, existing condensate sumps CS9-1, CS9-2, CS9-3, and CS9-4 and their associated pumping systems appear to have adequate capacity to handle the condensate generation expected from the proposed expansion of Cell 9.

REFERENCES

Geosyntec Consultants. 2016. *Cell 8 Final Closure, Millersville Landfill and Resource Recovery Facility*. Construction Drawings. Columbia, Maryland.

GPSA. 2004. *Engineering Data Book, FPS Version*, 12th Edition. Gas Processors Suppliers Association. Tulsa, Oklahoma.

SCS. 2015. *Cell 9 Landfill Gas Header Design* – Construction Drawings. Reston, Virginia.

USEPA. 2005. *Landfill Gas Emissions Model (LandGEM)*. Version 3.02. United States Environmental Protection Agency. EPA-600/R-05/047.

FIGURES

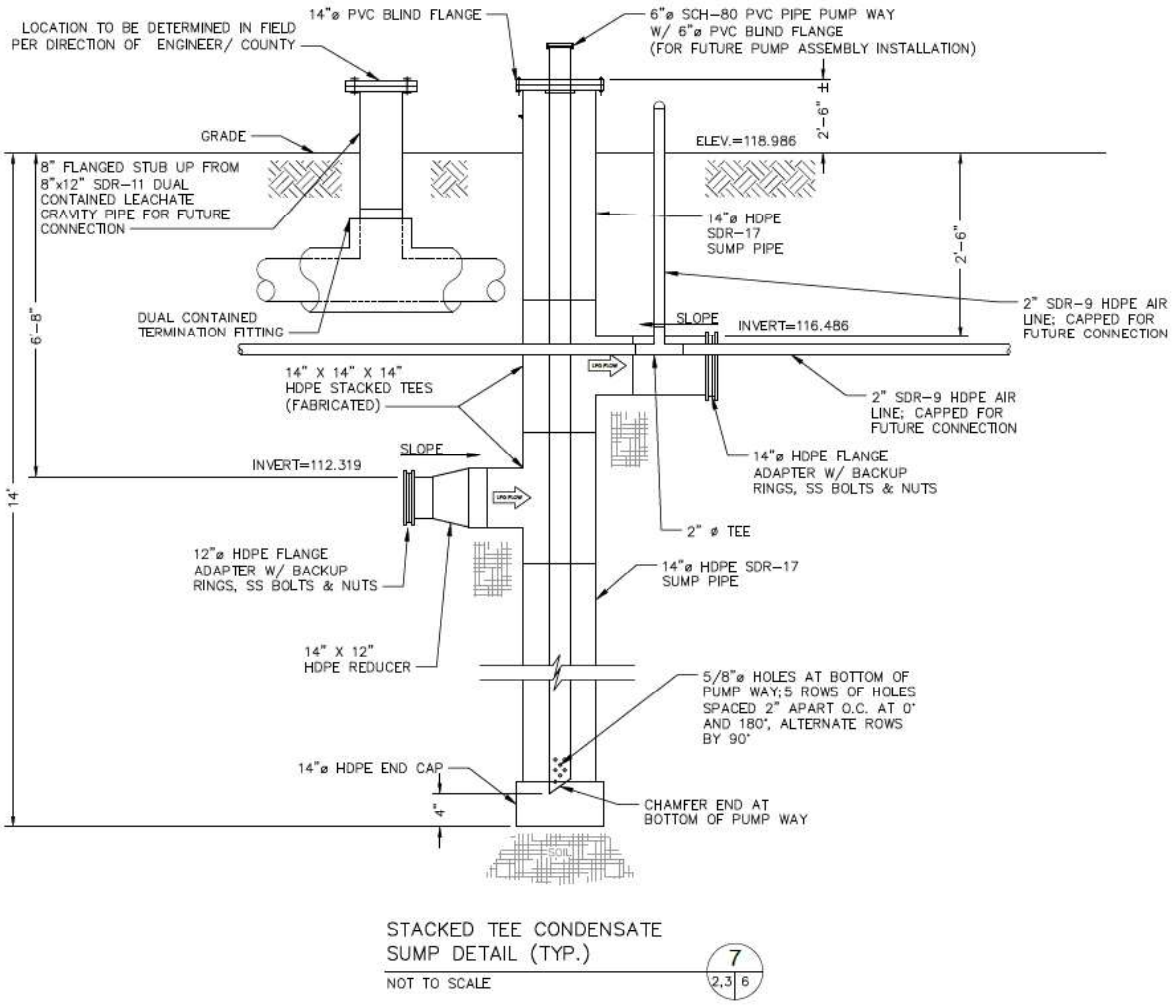

Figure 1. Design Detail of CS9-1 (SCS, 2015)

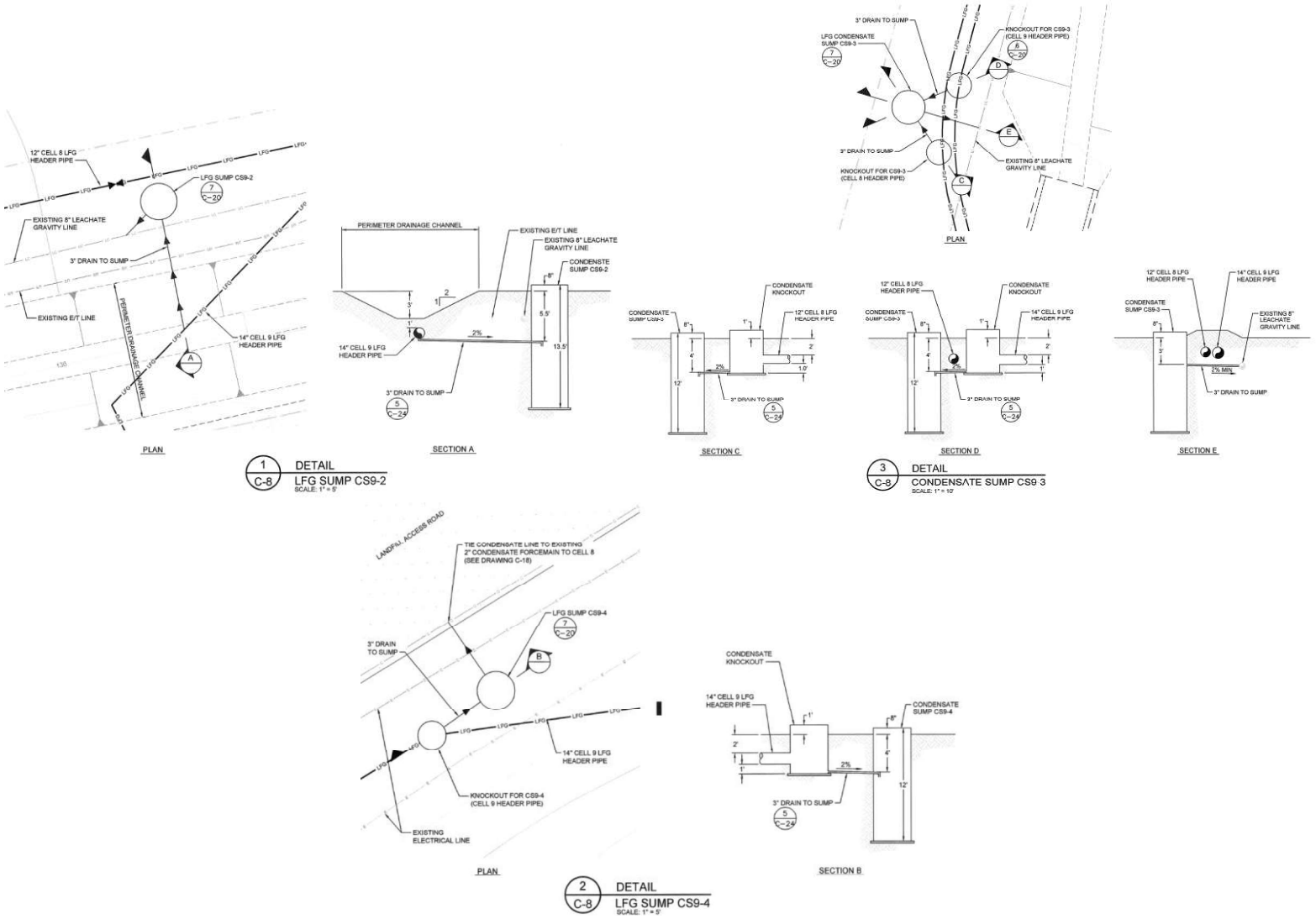

Figure 2. Design Details of CS9-2, CS9-3, and CS9-4 (Geosyntec, 2016)

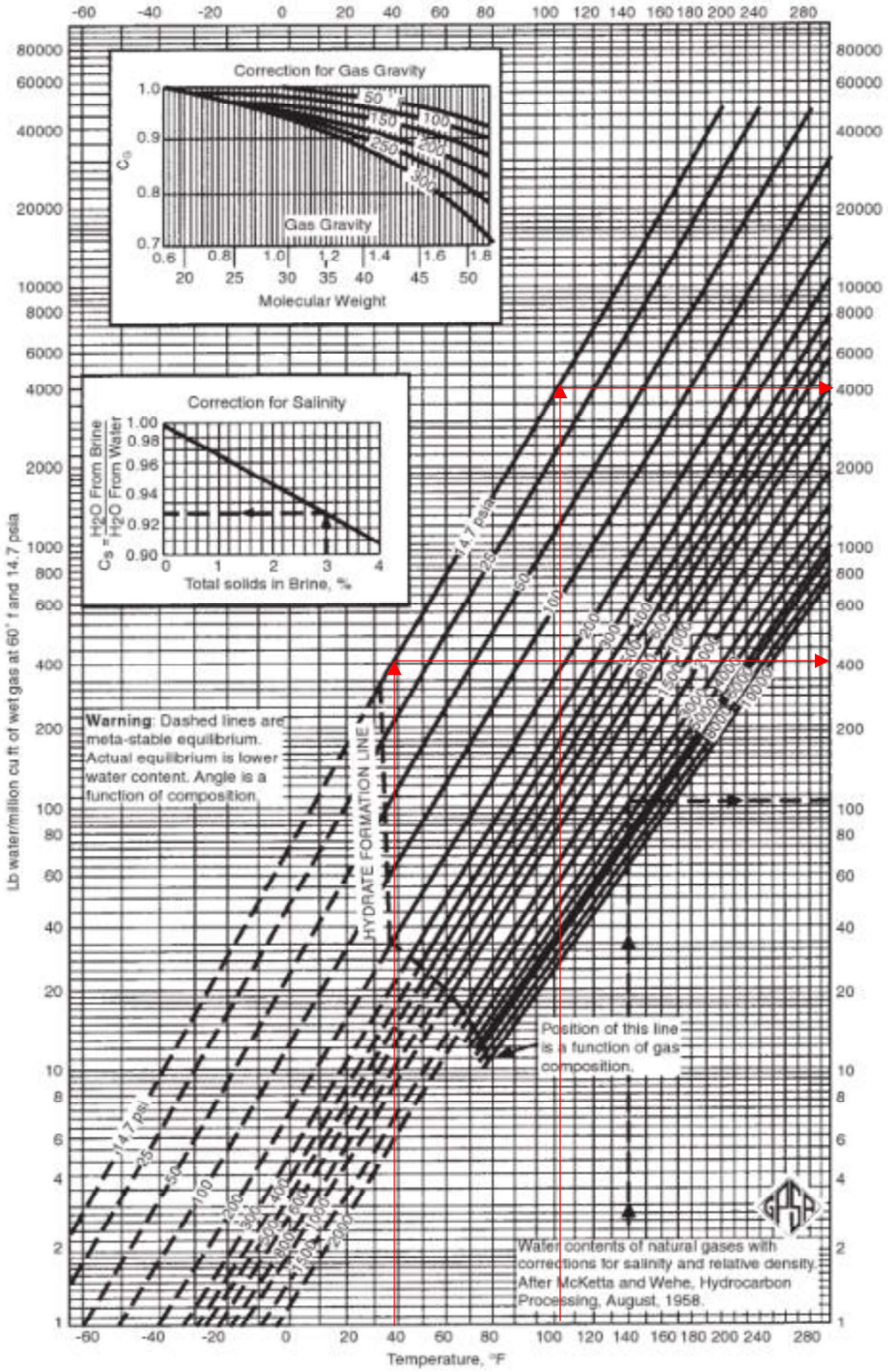

Figure 3. Water Content of Natural Gas Pressure-Temperature Correlation (GPSA, 2004)

Geosyntec
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APPENDIX M

Closure and Post-Closure Care Plan

Prepared for

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CLOSURE AND POST-CLOSURE CARE PLAN

CELL 9 CLOSURE

Millersville Landfill and Resource Recovery Facility
Severn, Maryland

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Geosyntec Project No: ME1418A

October 2025

TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 Terms of Reference 1
1.2 Regulatory Requirements and Post-Closure Plan Organization 1
1.3 Definitions 1
1.4 Overview of Closure and Post-Closure Care Activities 3
1.4.1 Required Submittals and Notification 3
1.4.2 Closure Construction Activities 4
1.4.3 Post-Closure Care, Maintenance, and Monitoring 5

2. METHODS, PROCEDURES, AND PROCESSES FOR LANDFILL CLOSURE 6

2.1 Introduction 6
2.2 Containment of Solid Waste 6
2.3 Containment of Leachate 7
2.4 Containment of Landfill Gas 8

3. DESCRIPTION OF FINAL CLOSURE SYSTEM COMPONENTS 9

3.1 Introduction 9
3.2 Grading Layer 9
3.3 Final Cover 10
3.3.1 Prescriptive Final Cover 10
3.3.2 Alternative Final Cover 10
3.4 Landfill Gas Control System 10
3.5 Stormwater Management System 11

4. POST-CLOSURE CARE 12

4.1 Overview 12
4.2 Post-Closure Operation 12
4.3 Post-Closure Maintenance and Inspection 13
4.3.1 Access Control and Road System 13
4.3.2 Vegetation 13
4.3.3 Stormwater Management System 14
4.3.4 Leachate Collection and Transmission System 14
4.3.5 Landfill Gas Management System 15
4.3.6 Environmental Monitoring System 15
4.3.7 Miscellaneous Site Activities 16

4.4 Post-Closure Monitoring....16
4.4.1 Introduction....16
4.4.2 Groundwater and Surface Water Monitoring....16
4.4.3 Stormwater Monitoring....17
4.4.4 Landfill Gas Monitoring....17
4.4.5 Leachate Monitoring....18
4.5 Post-Closure Use....18
4.6 Duration of Post-Closure Care....18
4.7 Facility Contact....19

5. COST ESTIMATES....21

5.1 Introduction....21
5.2 Closure Construction Cost Estimate....21
5.3 Post-Closure Care Cost Estimate....21
5.4 County Solid Waste Financial Assurance Fund....22

6. REFERENCES....23

TABLES

Table 1: Post-Closure Maintenance Inspection Schedule

Table 2: Approach for Evaluating Need for Continued Post-Closure Care

Table 3: Closure Plan Cost Estimate

Table 4: Post-Closure Care Cost Estimate

1. INTRODUCTION

1.1 Terms of Reference

The purpose of this Closure and Post-Closure Care (C/PCC) Plan is to address the requirements for landfill closure and post-closure care for Cell 9 at the Millersville Landfill and Resource Recovery Facility (MLFRRF), per the Code of Maryland Regulations (COMAR), Title 26, Subtitle 04, Section 07 (Solid Waste Management), subsections 21 and 22 (i.e., Closure and Post-Closure Care Monitoring and Maintenance) and the Code of Federal Regulations (CFR) Title 40, Part 258, Sections 60 and 61 (i.e. Closure Criteria and Post-Closure Care Requirements). This plan was prepared by Geosyntec Consultants (Geosyntec) on behalf of the Anne Arundel County Department of Public Works (the County) by Mr. Daniel Espinoza and reviewed by Ms. Meena Viswanath, P.E., in accordance with the internal peer review policy of the firm. Ms. Viswanath is a registered Professional Engineer in the state of Maryland.

1.2 Regulatory Requirements and Post-Closure Plan Organization

This C/PCC Plan has been prepared to meet Maryland Department of the Environment (MDE) and Federal requirements regarding post-closure care for sanitary landfills, as defined in COMAR Sections 26.04.07.21 and .22 and in 40 CFR Parts 258.60 and .61. The C/PCC Plan contents and the location where the requirements are addressed in this plan are as follows.

- Definitions and an overview of closure and post-closure care activities for Cell 9 are presented in the remainder of Section 1
- The methods, procedures, and processes that will be used to close Cell 9 are described in Section 2
- A description of the final closure system components is presented in Section 3
- A post-closure care plan is presented in Section 4
- Closure and post-closure cost estimates are presented in Section 5

1.3 Definitions

After development and filling of all landfill disposal subcells, Cell 9 will be closed. It is estimated that Cell 9 closure will begin about 2062 or 2063. After final closure is completed, the post-closure care period will begin. The following definitions are used throughout this C/PCC Plan in relation to closure and post-closure care. These definitions are consistent with the definitions presented in COMAR 26.04.07.21 and .22, but they have been clarified to describe activities that will be performed for closure and post-closure care of Cell 9.

- "*Closure*" is defined as cessation of waste disposal operations in Cell 9.

- "*Final Closure*" is defined as placement of the closure cap over the entire Cell 9 landfill disposal area, completion of the stormwater management system and site access roads, revegetation of all disturbed areas, construction of any post-closure landfill gas (LFG) removal system features, and development of post-closure use features (if any).

- "*Final Cover Material*" is defined as the 2-ft thick final cover soil layer placed over the final waste lift no later than 90 days following completion of that final lift as required under COMAR 26.04.07.10(F). Construction of this layer before construction of the Closure Cap (described below) constitutes "Partial Closure".

- "*Closure Cap*" system refers to the cap that will be constructed over the final cover material (which is described above in this section). The closure cap may be a traditional soil-geosynthetics cap or an alternative closure cover. The traditional soil-geosynthetics closure cap includes the following components over the final cover material (in ascending order):

    - Low-permeability cap (which is described in the following paragraph);
    - Drainage layer;
    - Final earthen cover;
    - Vegetative stabilization; and
    - Gas management system.

    The alternative closure cap includes the following components over the final cover material (in ascending order):

    - Low-permeability cap (which is described in the following paragraph);
    - Artificial turf layer;
    - Sand ballast layer; and
    - Gas management system.

- "*Low-Permeability Cap*" consists of the geosynthetic component of the closure cap system. The low-permeability cap will be a minimum 40-mil high-density polyethylene (HDPE) or linear low-density polyethylene (LLDPE) geomembrane with a maximum permeability of 1×10^{-10} centimeters/second (cm/sec), as required by COMAR 26.04.07.21(E)(1).

- "*Post-Closure Care*" is defined as the maintenance and monitoring activities that will be performed during the post-closure care period (which is not less than five years, as required by COMAR 26.04.07.22, and not less than 30 years, as required by 40 CFR 258.61). Post-closure care includes all activities that will be performed following closure, such as operation of the leachate, LFG, landfill cap and stormwater management systems; long-term maintenance; and environmental monitoring.

In this plan, the term "Drawings" refers to the drawing package entitled, *"Application for Municipal Landfill Permit: Phase III Report, Cell 9 Vertical Expansion Project, Millersville Landfill and Resource Recovery Facility,"* dated October 2025 and prepared by Geosyntec Consultants, which is included as Appendix A of the Phase III Report.

1.4 Overview of Closure and Post-Closure Care Activities

Cell 9 will be closed according to the closure requirements of COMAR 16.04.07.21. In this section, an overview is presented of the activities that will be performed for closure and post-closure care of Cell 9; more detail on each of these activities is provided in later sections.

1.4.1 Required Submittals and Notification

The County will make several submittals and notifications to describe its intentions for closure and post-closure care to the Maryland Department of the Environment (MDE) and the public. These submittals and notifications are identified below.

- This C/PCC Plan has been prepared in accordance with COMAR 26.04.07.21 and 40 CFR Part 258.60 and is being submitted as part of the application for a permit to vertically expand Cell 9.
- Written notification of the County's intent to close Cell 9 will be provided to MDE at least 180 days before the date of final receipt of waste. The County may elect to construct the closure cap in phases as portions of the landfill are filled to final grades. The County will set a preliminary date for notification of intent to close the landfill according to the operating conditions and regulatory requirements.
- The County will not commence closure of Cell 9 until the closure design is approved by MDE. When the County submits its notification of intent to close Cell 9, a closure schedule and revised C/PCC Plan will also be submitted to MDE. Once the C/PCC Plan has been approved, the plan will be executed as described in the terms of the approval documentation.
- A copy of this C/PCC Plan will be maintained at MLFRRF at all times during facility operation and throughout the post-closure care period.

- After closure construction activities are completed, a certification of closure will be provided to MDE with the final report of construction quality assurance for the closure construction event. The certification will state that the closure was completed in conformance with the requirements of the closure plan.
- A notification in the deed to the MLFRRF property will be made at the time of Cell 9 closure, if no further solid waste disposal activities are anticipated at the MLFRRF site. The notification will indicate that the land has been used as a solid waste disposal site and that the use of the land is restricted.
- The contact for final closure activities will be the Landfill Manager for MLFRRF, whose responsibilities and duties are described in the Operations Guide (Appendix B of the Phase III Report).

1.4.2 Closure Construction Activities

To close Cell 9, the County will perform several activities that are intended to minimize the need for further maintenance of the landfill and minimize the potential for escape of solid waste, leachate, and LFG constituents. These closure activities will include construction of the following features: (i) the final cover system; (ii) the LFG management system; and (iii) the stormwater management system. Construction activities associated with each of these features are briefly described in the following paragraphs.

Final Cover System. The County will construct a final cover system over all waste disposal areas after the landfill has been filled to the final permitted grades or capacity is exhausted. The final cover system, shown in Details 1 and 2 on Drawing 13 in Appendix A of the Phase III Report, will comply with the requirements of COMAR 26.04.07.21E. The 2-ft grading layer will be installed after the disposal areas reach final grades and may include 1 ft of intermediate cover soil and 1 ft of final cover soil. Construction of the closure cap will commence no later than 24 months after completion of the final lift of waste for the entire landfill, during which time the LFG management system and the stormwater management system will also be constructed.

Landfill Gas Management System. The LFG management system will be constructed upon closure of the landfill. The design of the LFG management system is described in Appendix L of the Phase III Report and is illustrated on Drawings 28 through 29 in Appendix A of the Phase III Report. As shown on the drawings, the gas system will consist of vertical gas extraction wells placed evenly throughout the landfill footprint to obtain good coverage for gas extraction.

Stormwater Management System. During construction of the landfill final cover system, additional stormwater management features will be constructed. The design of the system is presented in detail in Appendix H of the Phase III Report, as well as Drawings 21 through 27 in Appendix A of the Phase III Report. During construction and filling of Cell 9, the stormwater management

features that are already in place will be used for both sediment control and stormwater management; after closure (i.e., after all surfaces have been seeded and stabilized), the system will be used only for stormwater management. The stormwater management system described in the Phase III Report is designed to manage runoff from the entire final cover system.

1.4.3 Post-Closure Care, Maintenance, and Monitoring

After closure of Cell 9 has been completed, the County will provide post-closure care, maintenance, and monitoring in accordance with the requirements of COMAR 26.04.07.22 and 40 CFR Part 258.61. In general, this will include: (i) operating the landfill to manage leachate, LFG, and stormwater; (ii) monitoring ground water, surface water, and air at the site to detect releases of leachate, LFG, or waste that exceed regulatory requirements; (iii) maintaining the leachate management, LFG management, and stormwater management systems; and (iv) in the event of a problem, notifying the proper authorities of the problem and addressing the problem. The County's plan for providing post-closure operation, maintenance, and monitoring is presented in Section 4 of this plan.

The need for long-term maintenance of the landfill is described in Section 2.5. As described in Section 2.5 and as described in Section 4.6, after the first five years of post-closure care, the need for continued post-closure care will be reevaluated for each component of post-closure care (i.e., leachate management, LFG, groundwater monitoring, and final cover system). The purpose of the reevaluation will be to support a request to MDE that if post-closure care is no longer needed as described in this plan, then it will be terminated or the length of post-closure care may be reduced.

2. METHODS, PROCEDURES, AND PROCESSES FOR LANDFILL CLOSURE

2.1 Introduction

In this section, the methods, procedures, and processes that will be employed by the County to close Cell 9 are presented. The methods, procedures, and processes described in this section have been selected to meet the performance requirements of COMAR 26.04.07.21, which are:

- minimize the need for further maintenance of the landfill; and
- minimize the post-closure escape of solid waste, leachate, and LFG to surface water, ground water, or the atmosphere.

In the following sections, descriptions are provided of the methods, procedures, and processes that will be used to minimize the post-closure escape of solid waste (Section 2.2), leachate (Section 2.3), and LFG (Section 2.4) to surface water, ground water, and the atmosphere. The need for long-term maintenance of the landfill is also addressed (Section 2.5).

2.2 Containment of Solid Waste

The design of Cell 9 provides for containment of solid waste throughout the entire period of landfill operation, closure, and post-closure care and minimizes the possibility for release of solid waste to the environment. Design features that will provide for containment of solid waste through the closure and post-closure period include the liner system, the perimeter berm, the grading layer, and the closure cap. These features are described below.

- *Landfill Liner System.* The landfill liner system is designed to contain and to prevent a release of solid waste (including any liquid wastes that may exist in the landfill) to the environment. As shown on Drawings 4 through 9 in Appendix A of the Phase III Report, the liner system extends beneath all areas that will receive solid waste. The design and the Operations Guide (provided in Appendix B of the Phase III Report) include techniques that are intended to minimize the possibility of damage to the liner system during the life of the landfill, including: (i) thorough construction quality assurance measures to identify and remediate problems with the liner system during construction; (ii) specific operation measures for waste placement and final cover construction that minimize the possibility of damage to the liner system; and (iii) monitoring of the landfill during operation and after closure to identify problems with the liner system. Using these techniques, the landfill will be effective in containing solid waste throughout the post-closure period.

- *Perimeter Berm.* The landfill is designed with a perimeter berm to provide containment of solid waste. The berm provides stability to the landfill and contains waste within the landfill cells. The landfill liner completely covers all the areas within the perimeter berm.

- *Grading Layer.* The County will install the final grading layer in areas where solid waste operations have permanently ceased. In these areas, the grading layer provides containment of waste and limits the release of LFG and the potential for excessive soil erosion, which could cause exposure and possibly a release of solid waste.

- *Closure Cap.* A closure cap, as shown on Drawings 10 and 10A in Appendix A of the Phase III Report, will be installed on top of the grading layer for waste enclosure.

2.3 Containment of Leachate

The design of MLFRRF provides for containment of leachate throughout the landfill operation, closure, and post-closure care period and minimizes the possibility for release of leachate from the landfill to the environment. Design features that will provide for containment of leachate throughout the closure and post-closure period include: (i) the landfill liner and leachate collection system; (ii) the leachate removal, transmission, and treatment system; and (iii) the final cover system. These features are described below.

- *Liner and Leachate Collection System.* The liner system and leachate collection system will provide containment of leachate throughout the post-closure care period. The proposed liner system cross sections are illustrated on Drawing 11 in Appendix A of the Phase III Report. In addition to the liner system, all landfill subcells have a leachate collection system above the liner. The liner system is designed to minimize leakage of leachate into the environment; as described in Appendix F of the Phase III Report, the leachate collection system is designed to pump leachate from within the disposal areas to leachate collection riser vaults on the perimeter of the landfill and then drain the leachate by gravity from the riser vaults to a wet well on the north side of Cell 9 while maintaining a hydraulic head less than 12 inches on top of the liner.

- *Leachate Removal, Transmission, and Treatment System.* As described above, leachate is pumped from Cell 9 to leachate collection riser vaults located at the perimeter of the landfill and then drained by gravity from the riser vaults to a wet well on the north side of Cell 9. From the wet well, the leachate is pumped to the leachate storage tanks, where the leachate can be routed to a pre-treatment facility (if needed), and then pumped via a forcemain to the municipal sewer system. The leachate removal system, which relies on a series of gravity drains and pumps, will be operated throughout the post-closure period to remove leachate from Cell 9, pre-treat it if needed, and then discharge it to the municipal sewer system.

- *Final Cover System.* A final cover system will be constructed over all areas of the landfill that receive solid waste. The final cover system will be maintained throughout the post-closure period. The final cover system will reduce the amount of infiltration that enters the landfill, thereby minimizing the amount of leachate that is generated during the post-closure period. The final cover system will also prevent the release of leachate from the landfill sideslopes in leachate 'break-outs'.

2.4 Containment of Landfill Gas

The design of Cell 9 provides for containment of LFG throughout the landfill operation, closure, and post-closure care period and minimizes the possibility for release of LFG from the landfill to the environment. Design features that will provide for containment of LFG through the closure and post-closure periods include the landfill liner system, the final cover system, and the active gas management system. These features are described below.

- *Landfill Liner System.* The landfill liner system will prevent the escape of LFG by eliminating the possibility of downward or lateral migration of LFG into the ground beneath the landfill and subsequent lateral migration of gas.

- *Final Cover System.* The final cover system will cover all waste throughout the post-closure care period and will be designed to prevent the discharge of LFG to the atmosphere at concentrations exceeding applicable state and federal emissions guidelines. The final cover system will be anchored beyond, but near, the liner system at the perimeter berm to provide complete containment of the LFG.

- *Landfill Gas Management System.* As described in Section 1.4.3, an active LFG management system will be constructed for Cell 9 at the time of closure and will be operated as needed during the post-closure period. The system will consist of a network of vertical wells to remove LFG, transmission pipes to convey the gas from the landfill, and an enclosed flare, a utility flare, and an LFG-to-electricity plant to burn LFG. The gas management system will be fully automated and will operate continuously at all times throughout the post-closure period.

3. DESCRIPTION OF FINAL CLOSURE SYSTEM COMPONENTS

3.1 Introduction

The closure system will consist of several components, including a final cover system, an LFG management system, and a stormwater management system. The leachate management system, which will be operated during the post-closure period, is not considered a closure system component because it will be constructed and operated before final closure occurs. In this section, the final cover, gas management, and stormwater management components of the closure system are described.

3.2 Grading Layer

After the final receipt of waste in an area and before construction of the closure cap, the surface of the landfill will be graded such that the computed post-settlement elevation of the final grading layer is the required depth below the contours shown on Drawings 10 and 10A in Appendix A. In preparation for construction of the closure cap, the final grading layer (2 ft thick, including intermediate and final cover soil) will provide smooth grades for construction of the closure cap, locally repair any damage caused by erosion of intermediate cover, and provide proper stormwater drainage for the closure cap. This grading layer will also provide temporary control of LFG, minimize the amount of infiltration into the landfill, reduce odors, and minimize the amount of maintenance required. Soils that will be used for the final grading soil layer will be obtained from the on-site soil stockpiles and will conform to the requirements for soils identified in the specifications provided in Appendix D of the Phase III Report. All construction of final closure system components will be performed in accordance with the construction quality assurance procedures described in the Construction Quality Assurance Plan (Appendix J of the Phase III Report). The County will attempt to minimize the amount of final grading that is needed by filling the landfill as closely as possible to the required grades.

During final grading of the landfill final cover, some areas may require grading of waste or filling with additional waste in order to achieve the design final cover grades. Such grading will likely be needed, for example, to refill areas that experience settlement after waste placement ends but before closure construction begins. Regrading may also be needed to provide smooth slopes, to allow construction of cover access roads, or to provide proper drainage of cover benches. If such grading is required, the County will excavate the waste, or place new waste following the procedures described in Appendix B to the Phase III Report (i.e., Operations Guide), and will identify areas of the disposal area to receive the waste. As described in the Operations Guide, all relocated or newly placed waste will be covered with 0.5 ft of daily cover soil before the end of the day that it is relocated and then covered with the required intermediate and final cover soil layers.

3.3 Final Cover

Two different cover systems are proposed for Cell 9 – a prescriptive final cover and an alternative final cover. The prescriptive final cover is shown in Detail 1 on Drawing 13 in Appendix A of the Phase III Report, while the alternative final cover is shown in Detail 2 on Drawing 13 in Appendix A of the Phase III Report.

3.3.1 Prescriptive Final Cover

The prescriptive final cover will be constructed in accordance with the requirements of COMAR 26.04.07.21 and 40 CFR 258.60 to include a low-permeability layer overlain by a drainage layer, a 1.5-ft-thick final cover soil layer, and a 6-inch-thick topsoil layer. The closure cap will consist of a geomembrane placed over the soil grading layer, which will be overlain by (in ascending order): (i) a geocomposite drainage layer; (ii) a protective cover soil layer; and (iii) a vegetated topsoil layer. The closure cap may be constructed in phases as portions of the landfill are filled to final grades. At the time of final closure, final cover bench drainage features will be constructed of protective cover soil above the final cover geomembrane and drainage layer.

3.3.2 Alternative Final Cover

The proposed alternative final cover will consist of three layers (in ascending order): (i) 50-mil LLDPE AGRU MicroDrain® geomembrane; (ii) engineered synthetic turf with geotextile backing; and (iii) minimum 0.75-inch-thick sand infill. This final cover system is sold commercially as ClosureTurf®, manufactured by WatershedGeo, LLC. ClosureTurf is an alternative to traditional vegetated soil or geosynthetic-soil cover systems. The alternative closure cap may be constructed in phases as portions of the landfill are filled to final grades. Prior to installation of the alternative closure cap, final cover bench drainage features will be constructed of protective cover soil below the final cover geomembrane and drainage layer.

As required by COMAR 26.04.07.26, an engineering analysis of ClosureTurf has been prepared to supply the economic, technological, and environmental justification, as well an evaluation of the alternative final cover to conserve and protect the public health the natural resources, and environment of the State, and to control air, water, and land pollution to at least the same extent as would be obtained by compliance with the regulation. This analysis is presented in Appendix N.4 of the Phase III Report.

3.4 Landfill Gas Control System

LFG will be controlled by routing the gas from the landfill to a flare or to the LFG-to-electricity plant, as described in Appendix L of the Phase III Report. The LFG management system will be constructed in phases through the life of Cell 9 and will be completed at the time of closure. The

active gas collection system will be operated until active emission control is no longer necessary. Gases will be prevented from escaping the landfill by the final cover system. Regardless, a gas monitoring program (which is described in Section 4.4.4 of this C/PCC Plan) will be implemented to test for the presence of LFG outside of the landfill.

3.5 Stormwater Management System

At closure, the stormwater management system will be modified to meet the goals of post-closure care. During operation of the landfill, the system will have the dual purposes of managing stormwater and minimizing erosion and off-site sedimentation. After closure, the primary purpose of the system will shift from erosion and sediment control (because all surfaces will be stabilized with vegetation) to stormwater management (i.e., conveyance of stormwater in a non-erosive manner to the adjacent tributaries and creeks). To modify the stormwater management system for long-term post-closure use, any sediment dewatering devices will be removed from the stormwater management pond (Pond 9-2), the sediment will be cleaned from Pond 9-2, Pond 9-2 will be deepened and the riser structure modified, and all disturbed areas of the landfill will be stabilized with vegetation.

4. POST-CLOSURE CARE

4.1 Overview

In general, post-closure care of Cell 9 will include: (i) operating the landfill to manage leachate, LFG, and surface water; (ii) monitoring groundwater, surface water, and air at the site to ensure regulatory compliance; (iii) maintaining the leachate management, LFG management, and stormwater management systems; and (iv) in the event of a problem, notifying MDE of the problem and enacting a solution. The County's plan for providing post-closure operation, maintenance, and monitoring is presented in this section of this C/PCC Plan. The Cell 9 closure system has been designed to minimize maintenance throughout the post-closure period. Features of the design that minimize maintenance include:

- drainage benches to limit the length of stormwater sheet flow from the final cap slopes and thus limit erosion of the final cap soils;
- erosion-resistant material in the downchutes to route drainage off the cover efficiently while limiting erosion of the final cover soils;
- if the traditional final cover is selected, durable, hearty grasses for the cover that limit stormwater runoff and thus minimize erosion of the topsoil and vegetative support soil layers;
- if the alternative final cover is selected, artificial turf material and sand ballast that are more resistant to erosion than natural materials; and
- an all-weather road to allow access to the top of the landfill for operation, maintenance and monitoring during the post closure period.

As described in Section 4.6, after the first five years of post-closure care, the level of post-closure care will be re-evaluated. If conditions indicate that a specific portion of post-closure care is no longer needed as described in this C/PCC Plan, then the County will submit a plan to MDE to modify post-closure care requirements.

A description of the post closure operation, maintenance, inspection and monitoring procedures is presented below.

4.2 Post-Closure Operation

During the post-closure care period, leachate and LFG will continue to be generated within the landfill. Operation of the leachate and LFG management systems will continue to be performed according to existing standard operations and maintenance procedures until such time that leachate and LFG are either not produced or are produced in limited quantities or with limited

concentrations such that they are not harmful to human health or the environment. At that time, the County will demonstrate to MDE (using the approach described in Section 4.6 of this C/PCC Plan) that management of leachate and/or LFG is no longer necessary and, upon MDE's approval, will cease operation of the leachate and/or LFG management systems.

4.3 Post-Closure Maintenance and Inspection

4.3.1 Access Control and Road System

Access to Cell 9 will be controlled throughout the post-closure period by monitoring the site perimeter security features (i.e., fences and lockable gates) and access roads. On-site access roads will be maintained in a passable condition during the post-closure period. Access roads will consist of either asphalt or gravel surfaces. Access roads will be inspected quarterly for conditions that would prevent passage of vehicles (such as ruts, ponded water, washouts, gullies, or obstructions). As needed, repairs will be made to keep the roads passable. A post-closure maintenance inspection schedule is presented in Table 1.

4.3.2 Vegetation

Vegetation, where present, will be maintained in a condition that will minimize erosion of on-site soils (including the cap cover soils) in accordance with the 2011 Maryland Standards and Specifications for Soil and Erosion and Sediment Control, Section B-4 – Vegetative Stabilization, or subsequent revisions. During the post-closure period, maintenance will consist of inspections on a quarterly basis and after major storm events (i.e., 24-hour, 10-year or greater storm return frequency). Mowing of vegetated areas will be completed a minimum of once a year. Woody vegetation (i.e., trees or shrubs) will also be removed. Inspections will identify locations of excessive erosion, washout, poor vegetation density, and damaged vegetation. If required, the identified areas will be regraded to repair damage to the cap cover soils, including areas of surface settlement or erosion of the cover soils, and/or revegetated as discussed below:

- *Surface Settlement*. If excess differential settlement is observed during routine inspections of the cover, then the need for maintenance or repairs of the settled areas will be evaluated. Repairs will be needed if water is ponding, resulting in distress to the vegetation or erosion problems. Repairs will consist of either filling the depressions or, if the depressions are significant, placing soils over the depression and covering with a new geomembrane that would tie to the old geomembrane cap. Cover system soils would then be reconstructed over the area.

- *Cover Soil Erosion*. If erosion of the cover soils in the prescriptive final cover is observed, the eroded areas will be repaired by regrading with topsoil and placing fertilizer, seed and mulch to re-establish permanent vegetative cover. If erosion of the sand infill in the

alternative final cover is observed, the eroded areas will be repaired by replacing the sand infill in the eroded areas.

During inspections, on-site slopes will be inspected for stability. The inspector will attempt to identify signs of sloughing of the slope surface, bulging at the toes of slopes, tension cracks at the top of slopes, and other conditions that may indicate slope instability. If areas of instability are identified, MDE will be notified and appropriate remedial measures will be implemented.

4.3.3 Stormwater Management System

The stormwater management system will be maintained to control run-on and runoff at the landfill. Run-on control will be provided by the perimeter access road and perimeter channels, and runoff will be managed by the series of drainage benches and channels on the closure cover and around the perimeter of the landfill. The system consists of stormwater drainage channels, benches, culverts, and Pond 9-2. These structures will be maintained in a condition that allows continuous control of surface water at the site. During the post-closure period, channels, culverts, and Pond 9-2 will be inspected quarterly and after major storm events (i.e., 24-hour, 10-year or greater storm return frequency) for conditions that would restrict flow, such as

- washouts and areas of excessive erosion;
- settlement resulting in ponded water within the drainage benches;
- dislodged riprap or other channel lining materials;
- growth of woody vegetation;
- excessive sediment in channels or culverts; or
- accumulation of sediment to the cleanout elevation in Pond 9-2.

Washouts and excessive erosion will be repaired by regrading the areas to the proper elevations (as shown on the engineering plans), revegetating, or applying riprap. Channels having excessive deposits of sediment (i.e., 8 inches in depth or greater) or woody vegetation will be cleaned. In cases where settlement has resulted in ponding water within the drainage bench, the bench will be repaired to re-establish proper drainage by filling the low area with soil, placing drainage pipes, or other appropriate methods. Dislodged riprap or other channel lining materials will be replaced as necessary.

4.3.4 Leachate Collection and Transmission System

Routine inspection and maintenance will be performed on the leachate collection and transmission system to ensure it is operating properly. Quarterly inspections of the leachate collection and transmission system will be performed to check the following:

- mechanical equipment (pumps, meters, and valves)

- pipes, leachate riser stations, valve vaults, and the Cell 9 wet well
- electrical equipment and instrumentation (pump control panels, radios, data loggers, and related infrastructure)

At approximately 10-year intervals, the County will perform a camera inspection of the leachate collection piping system within Cell 9 for potential clogging and clean the leachate piping system utilizing the leachate collection cleanouts as necessary. System maintenance and inspection will continue until the leachate collection and leachate transmission, removal, and storage systems are taken out of service (as described in Section 4.6 of this C/PCC Plan).

4.3.5 Landfill Gas Management System

The LFG management system will be routinely inspected and maintained to provide continuous collection and management of LFG at the site for as long as LFG is generated in quantities requiring active collection and treatment. LFG recovery and transmission system components (including vertical gas extraction wells, header pipes, condensate sumps, air lines, pneumatic pumps, LFG-to-electricity plan, and blower/flare station) will be inspected, monitored, and maintained at a minimum on a quarterly basis (and likely more frequently) during the post-closure period for signs of damage to the components and for evidence of leaks in the LFG transmission lines.

Based on experience with similar gas management systems, routine maintenance involves:

- tuning the wellfield to apply proper levels of vacuum
- checking the integrity of wellfield components such as wellheads, valves, gas collection wells and monitoring probes
- maintaining the condensate management system, including inspecting sump pumps, sealing of traps and condensate knockouts
- maintaining air lines and pneumatic pumps
- maintaining the blower/flare station, including inspecting pipe fittings and valves, cleaning condensate knockouts, cleaning control panels, and inspecting flare stations and flame sensor

4.3.6 Environmental Monitoring System

The components of the environmental monitoring system (including groundwater, leachate, and LFG migration monitoring locations) will be inspected during each sampling event. The components will be inspected for damage and will be repaired or replaced, if necessary.

Environmental monitoring is addressed in the most recent version of the MLFRRF's Environmental Monitoring Plan (EMP).

4.3.7 Miscellaneous Site Activities

Maintenance of other site features will be performed during the post-closure period on a routine basis, as described below.

- The site perimeter fence will be inspected a minimum of semi-annually for breaks in the fence and to ensure that the gates are working properly. The fence and gates will be repaired as needed to provide continuous access control around the entire site.
- Buildings (including the office building and maintenance building) will be inspected a minimum of semi-annually and will be maintained to provide continuous support for landfill maintenance and monitoring activities.
- Open burning will not be performed on the landfill.
- Access to the landfill will be limited to only those persons who are engaged in approved post-closure activities.

4.4 Post-Closure Monitoring

4.4.1 Introduction

In this section, the activities that the County will perform to monitor Cell 9 throughout the post-closure care period are described. These activities include groundwater, stormwater, LFG migration, and leachate monitoring. The sampling and analysis for environmental monitoring services will be performed either by the County or by its contractor. In the following sections, brief descriptions are provided of the specific monitoring procedures that are required by state regulations and/or relevant permit conditions. Individuals that are responsible for post-closure monitoring will be trained in accordance with the safety procedures described in the most recent version of the EMP.

4.4.2 Groundwater and Surface Water Monitoring

Groundwater and surface water will be monitored throughout the Cell 9 post-closure care period, as specified in the permit and in the most recent version of the EMP. It should be noted that groundwater and surface water are monitored on a site-wide basis; therefore, even after Cell 9 is closed, groundwater monitoring may continue semi-annually at the site if active waste disposal continues at a different location on site. The site-specific groundwater and surface water monitoring requirements related to Cell 9 may be reviewed periodically during the post-closure period.

During the post-closure period monitoring wells will be maintained and protected, and should any require abandonment or replacement, construction will be performed in accordance with the requirements of COMAR 26.04.04.11.

4.4.3 Stormwater Monitoring

Stormwater will be monitored to evaluate compliance with the requirements of the General NPDES Stormwater Discharge Permit for the site and with specific permit conditions.

4.4.4 Landfill Gas Monitoring

LFG will be monitored as required by the air emission permit issued by MDE. The control and management of LFG will be performed in conformance with: (i) Part 70 Permit Program required by Title V of the 1990 Clean Air Act Amendments; (ii) New Source Performance Standards (NSPS) 40 CFR 60.755(c) and (d); (iii) National Emission Standards for Hazardous Air Pollutants (NESHAP); (iv) state regulations, specifically COMAR 26.04.07.08(B)(15); and (v) the most recent version of the EMP.

The post-closure gas monitoring procedures are described below.

- Perimeter LFG monitoring will be performed outside of the waste footprint with gas monitoring probes.
- Surface emission monitoring will be performed for a portion of the post-closure care period in accordance with the applicable regulatory requirements.
- Gas monitoring will be performed in accordance with the approved monitoring plan.
- Results of gas monitoring will be submitted to MDE as part of the annual report for the facility.

If LFG is detected in facility structures or at the property boundary in excess of 25 percent of the lower explosive limit (LEL), then the following response activities will be performed.

- MLFRRF will take immediate steps to protect human health and the environment.
- MLFRRF will immediately notify MDE.
- Within 7 days of detection, MLFRRF will place a note in the operating record that states the levels detected and the steps taken to protect human health and the environment.
- Within 60 days of detection, MLFRRF will implement a plan to remediate the release, place a copy of the plan in the operating record, and notify MDE that the plan has been implemented.

The remediation plan described above will contain a description of the following:

- the nature of the problem
- the extent of the problem, including work performed by the County to evaluate the extent of the problem
- a proposed remediation plan, including the engineering analyses performed to estimate the effectiveness of the proposed solution

4.4.5 Leachate Monitoring

Leachate will be monitored as required by the facility's refuse disposal permit and the County wastewater discharge permit.

4.5 Post-Closure Use

Landfilled areas of Cell 9 will be used throughout post-closure as open space and passive meadow. Additional passive uses, such as educational tours or wildlife and bird watching may also be pursued. Potential active uses include generation of alternative energy (wind or solar panels). Should any proposed use require modification or alteration of the Cell 9 closure cap, engineering plans and specifications will be prepared and submitted to MDE for approval. Other areas of the facility will continue to be used for waste management activities including active MSW disposal, recycling, composting, wood chipping operations, and renewable energy production.

4.6 Duration of Post-Closure Care

The duration of post-closure care will be 30 years after the completion of closure. MDE may remove required elements of the post-closure care plan if it determines that they are no longer needed to protect human health and the environment. At any time during the post-closure period, MDE may reduce the length of post-closure care if it determines that such care is not needed to protect human health and the environment. Prior to the end of post-closure care, MDE may extend the post-closure care period if it determines that an extended period is necessary to protect human health and the environment.

Based on these requirements, a performance-based approach will be applied to the duration of post-closure care at the facility. In general, this will consist of implementing the following approach.

- First, the post-closure requirements of the C/PCC Plan (i.e., as described in Sections 4.1 through 4.5) will be implemented beginning at the completion of closure.
- At any time after the first five years of post-closure care, an evaluation will be made of the need to continue post-closure care for each of the four components of post-closure care (i.e., leachate management, LFG management, groundwater and surface water monitoring, and cap system maintenance). The approach for evaluating the need for

continued post-closure care is outlined in Table 2. Depending on the outcome of the evaluation, the post-closure care plan may be revised to reflect the actual impact of the landfill to human health and the environment.

- If changes are made to the C/PCC Plan because of the evaluation of the need for continued post-closure care, then a demonstration will be made to MDE that the changes are reasonable based on the available information and the evaluations. No changes in post-closure care will be made before MDE formally approves such changes to the C/PCC Plan and the permit for Cell 9. If the outcome of the evaluation is inconclusive (e.g., no change to the post-closure care plan is indicated by the data and evaluations), then post-closure care will continue as required in the C/PCC Plan.
- Additional evaluations of the need for continued post-closure care may be performed when additional data exist that could result in a different outcome of the evaluation. This includes evaluation outcomes that could indicate the need for a longer post-closure period or additional elements of the C/PCC Plan.

4.7 Facility Contact

The MLFRRF facility contacts during the post-closure period are provided below:

Solid Waste Operations Administrator
Anne Arundel County Department of Public Works
Bureau of Waste Management Services
389 Burns Crossing Road
Severn, MD 21144
Office: 410.222.6108

Disposal and Maintenance Manager
Anne Arundel County Department of Public Works
Bureau of Waste Management Services
389 Burns Crossing Road
Severn, MD 21144
Office: 410.222.6108

Landfill Manager
Anne Arundel County Department of Public Works
Bureau of Waste Management Services
389 Burns Crossing Road
Severn, MD 21144
Office: 410.222.6108

Environmental Monitoring Manager
Anne Arundel County Department of Public Works
Bureau of Waste Management Services
389 Burns Crossing Road
Severn, MD 21144
Office: 410.222.6108

5. COST ESTIMATES

5.1 Introduction

In this section, cost estimates are presented for Cell 9 closure and post-closure care. It is noted that the MLFRRF includes multiple disposal units: Cell 1-East, Cell 2, Cell 4, Cell 567, Cell 8, and Cell 9. Certain post-closure care operation and maintenance costs are shared between the active and closed disposal units, since the facility will continue to be an active landfill. Examples of these shared costs include the leachate collection, conveyance, and treatment systems, the LFG management system (blower/flare and LFG-to-electricity facility), and groundwater and surface water monitoring. The following section describes what is included in the Cell 9 closure and post-closure cost estimate.

5.2 Closure Construction Cost Estimate

Estimates of capital closure costs for the landfill final cover system (i.e., grading layer and low permeability cap) are included in Table 3. The closure cost estimates include those costs that will be incurred during: (i) construction of the final cover system for the landfill; (ii) removal of construction equipment from MLFRRF; and (iii) establishment of the permanent landfill gas management system enhancements. As shown on Table 3, the estimated cost in 2024 dollars is $23.0 million for closure using the prescriptive final cover system and $26.2 million for closure using the alternative final cover system.

5.3 Post-Closure Care Cost Estimate

An estimate of the post-closure cost for Cell 9 is presented in Table 4. The post-closure cost estimate includes the cost of operation, maintenance and inspections of the following.

- Stormwater and final cap maintenance
- Leachate collection and transmission system within Cell 9
- LFG collection system wells and piping within Cell 9
- Access roads particular to Cell 9;
- MSE walls around the perimeter of Cell 9
- General labor and inspections

Because of the site-wide nature of a number of environmental monitoring and management systems, the following costs are shared, based on the total acreage of the closed and future active disposal areas:

- MLFRRF groundwater monitoring and reporting activities

- MLFRRF LFG migration monitoring and reporting
- Leachate monitoring, storage, and disposal
- Operation and maintenance of the blower/flare station and LFG-to-electricity facility
- Perimeter security and fencing and other facility repairs

As shown on Table 4, the post-closure cost is approximately $17.6 million if using the prescriptive final cover system or approximately $13.7 million if using the alternative final cover system. The estimate is based on a post-closure care period of 30 years as required by 40 CFR 258.61.

Owners of municipal solid waste landfills are required to provide a form of financial assurance to fund the costs of closure and post-closure care. The financial assurance requirement is included in state (MDE Environmental Article 9-211.1) and federal (US EPA Subtitle D, 40 CFR, Subpart G, Section 258.270 - 258.275) regulations. Financial assurance can be demonstrated by several surety (guaranty) mechanisms. The financial assurance must be in effect throughout a facility's existence, when active, and following closure, until the post-closure period expires. For the MLFRRF, the required financial assurance obligation is met through the backing and taxing authority of the County (local government financial test, per 40 CFR, Subpart G). The financial assurance obligation is updated annually and posted in the facility's operating record.

5.4 County Solid Waste Financial Assurance Fund

The County maintains a Solid Waste Financial Assurance Fund reserved to finance landfill closure and post closure care costs as required under §13-04-109 of the Anne Arundel County Code. Fund contributions are made annually based on estimated remaining landfill life and the estimated closure and post closure cost liability recorded in the County's audited annual financial statements.

6. REFERENCES

Scheutz, C. and Kjeldsen, P., (2002) *"Methane Oxidation of Organic Compounds in Landfill Cover Soils"* Proceedings of the 25th Annual Landfill Symposium, SWANA, Monterey, CA, March 25-28, pp.115-123.

Landfill Management and Operations Guide for the Millersville Sanitary Landfill and Resource Recovery Facility, prepared by Barton & Loguidice for, Department of Public Works, Bureau of Waste Management Services, June 2018.

Environmental Monitoring Plan Update, Millersville Landfill and Resource Recovery Facility, prepared by SCS Engineers, January 2025.

Surface Emission Monitoring Plan, Millersville Landfill and Resource Recovery Facility, prepared by Barton & Loguidice, P.C., September 2011.

TABLES

TABLE 1

POST-CLOSURE MAINTENANCE INSPECTION SCHEDULE

Cell 9 at Millersville Landfill Resource Recovery Facility
Anne Arundel County, Maryland

Item	Inspection Frequency
Access Roads	Quarterly
Landscaping	Quarterly and after major storm events[1]
Surface Water Management System	Quarterly and after major storm events[1]
Equipment	Quarterly
Leachate Collection System	Quarterly
Leachate Removal and Transmission System	Quarterly
Gas Management System	Quarterly
Environmental Monitoring Systems	Semi-annually (during monitoring events)
Security Fence and Signs	Semi-annually
Leachate Storage Area	Daily (during use)
Buildings	Semi-Annually
MSE Walls	Annually

Notes:

1. A "major storm event" is defined as a 24-hour, 10-year return frequency storm (greater than 4.9 inches)

TABLE 2

APPROACH FOR EVALUATING NEED FOR CONTINUED POST-CLOSURE CARE

Cell 9 at Millersville Landfill Resource Recovery Facility
Anne Arundel County, Maryland

Component of Post-Closure Care (PCC)	Purpose of PCC Component	Criteria for Demonstrating that PCC of Component is no Longer Necessary	Demonstration Approach
Leachate Management System (LMS)	Contain and treat leachate to prevent adverse impacts of leachate to surface water and groundwater.	No risk of impacts from uncontrolled releases of leachate. In addition, operation of LMS must not be necessary to maintain geotechnical stability.	Show that uncontrolled releases of leachate of current quality and quantity will not violate water quality standards in receiving surface-water or groundwater. Also, show that geotechnical stability is not affected.
Landfill Gas Management System	Control of potential impacts of landfill gas with regard to: • Compliance with Clean Air Act • Lateral migration (explosive potential) • Groundwater / vadose zone • Odor	No potential for future lateral gas migration problems and no potential for future exceedance of Clean Air Act standards.	Show that annual volume and quality of gas generated at site is such that elimination of gas management will not result in violation of COMAR 26.04.07.21(E)(5) or any other applicable Federal or State regulation or permit requirement.
Groundwater Monitoring System	Verify that there are no unacceptable impacts to groundwater from leachate release or gas migration from site.	Status of leachate and gas evaluations is such that potential impacts to groundwater are acceptable (i.e., time required for impacts to have been detected has passed).	Confirm that groundwater monitoring has been performed at least as long as the time required for impacts for hypothetical leachate and gas release to have been detected at compliance location.
Cover System	Control of one or more of the following: • Infiltration (i.e., generation of leachate) • Gas emission / migration • Direct exposure to waste • Geotechnical stability	Loss of, or changes to, cover integrity must not adversely affect any of the purposes listed. Long-term condition of cover must be compatible with end-use obligations for the site.	Evaluate effect of cover integrity on all other aspects of PCC and end-use. Ensure compatibility between cover maintenance program and requirements for cover from other PCC components.

Table 3. Cell 9 Closure
Engineer's Estimate of Probable Construction Cost
Millersville Landfill and Resource Recovery Facility - Anne Arundel County

Item No.	Bid Item	Units	Estimated Quantity	Unit Price	Total Price
GENERAL SITE DEVELOPMENT					
1	Mobilization/Demobilization	LS	1	$ 800,000	$ 800,000
2	Project Surveying	AC	88	$ 5,900	$ 519,200
3	Performance and Payment Bond	LS	1	$ 690,000	$ 690,000
				Subtotal	**$ 2,009,200**
EROSION AND SEDIMENT CONTROL					
4	Erosion and Sediment Controls	LS	1	$ 500,000	$ 500,000
5	Pond 9-2 Maintenance and Stormwater Conversion	LS	1	$ 290,000	$ 290,000
6	Stockpile Area Management	LS	1	$ 300,000	$ 300,000
				Subtotal	**$ 1,090,000**
Cell 9 CLOSURE					
7	Strip and Stockpile Topsoil (2" on 75% of Cell 9)	AC	66	$ 10,000	$ 660,000
8	Subgrade Soil (12" of cover over 25% of Cell 9 + Grading fill)	CY	100,000	$ 9.41	$ 940,950
9	Subgrade Preparation	SY	430,000	$ 1.05	$ 449,565
10	40-mil Textured HDPE Geomembrane (Prescriptive Final Cover)	SF	3,850,000	$ 0.75	$ 2,887,500
10A	ClosureTurf with Sand Infill (Alternative Final Cover)	SF	3,850,000	$ 4.00	$ 15,400,000
11	Geocomposite Drainage Layer (Prescriptive Final Cover)	SF	3,850,000	$ 1.00	$ 3,850,000
12	18" Protective Cover Soils (Prescriptive Final Cover)	CY	220,000	$ 10.76	$ 2,367,750
13	2" Topsoil (place on-site topsoil over 75% of Cell 9) (Prescriptive Final Cover)	CY	18,000	$ 13.04	$ 234,720
14	Topsoil Furnish and Place (4" in 75% of Cell 9 + 6" in 25% of Cell 9) (Prescriptive Final Cover)	TON	72,000	$ 32.45	$ 2,336,594
15	Vegetative Stabilization (Prescriptive Final Cover)	AC	88	$ 4,900	$ 431,200
16	Landfill Access Road	SY	12,600	$ 22.14	$ 278,964
17	Landfill Access Road Drainage Channel	LF	4,100	$ 98.25	$ 402,825
18	RCP Box Culverts (x7)	LF	280	$ 1,572	$ 440,160
19	Clean and Reinstall Perimeter Channel	LF	9,600	$ 58.95	$ 565,920
20	Grout 35% of Perimeter Channel	LF	3,360	$ 131.00	$ 440,160
				Subtotal (Prescriptive Final Cover)	**$ 16,286,308**
				Subtotal (Alternative Final Cover)	**$ 19,578,544**
Cell 9 CLOSURE LANDFILL GAS SYSTEM					
21	LFG Well Heads (Materials including boot)	EA	93	$ 1,353	$ 125,829
22	Bore and Install HDPE LFG wells	LF	6,000	$ 92	$ 552,540
23	LFG Well 8" Laterals to Header	LF	7,000	$ 38.66	$ 270,620
24	LFG Well 4" and 6" Laterals to Header	LF	16,500	$ 22.61	$ 373,065
25	Extend/Modify Existing Wells	EA	28	$ 3,075	$ 86,100
26	8-in Valves	EA	14	$ 4,694	$ 65,716
Subtotal					**$ 1,473,870**
CELL 9 CLOSURE ENGINEERING AND CQA					
27	Engineering Design and Construction Support	LS	1	$ 986,000	$ 986,000
28	CQA	LS	1	$1,110,800	$ 1,110,800
Subtotal					**$ 2,096,800**
				CELL 9 TOTAL ESTIMATE (PRESCRIPTIVE FINAL COVER): $	**22,956,178**
				CELL 9 TOTAL ESTIMATE (ALTERNATIVE FINAL COVER): $	**26,248,414**

TABLE 4

POST-CLOSURE CARE COST ESTIMATE

Cell 9 at Millersville Landfill Resource Recovery Facility
Anne Arundel County, Maryland

Post-Closure Care Period (years): 30

Item	Units	Unit Cost	Average Annual Quantity	Annual Cost
General Labor and Inspections	acre	$ 1,069	84	$ 89,830
Mowing (Prescriptive Final Cover only)	acre	$ 405	84	$ 33,979
Facility Repair	acre	$ 105	84	$ 8,781
Road Maintenance	annual	$ 519	1	$ 519
Miscellaneous Staff and Repairs (Prescriptive Final Cover)	annual	$ 129,192	1	$ 129,192
Miscellaneous Staff and Repairs (Alternative Final Cover)	annual	$ 50,000	1	$ 50,000
Other Supplies and Materials (Prescriptive Final Cover only)	acre	$ 7	84	$ 624
Stormwater and Final Cover Maintenance (Prescriptive Final Cover)	acre	$ 240	84	$ 20,174
Stormwater and Final Cover Maintenance (Alternative Final Cover)	acre	$ 72	84	$ 6,052
Includes, final cover repair, seeding, and stormwater channel and pond maint.				
Environmental Monitoring	acre	$ 1,458	84	$ 122,480
Includes groundwater, surface water, and air sampling, analytical, statistics, and reporting				
Leachate Treatment Disposal & System O&M	acre	$ 66.71	84	$ 5,604
Landfill Gas Management O&M	acre	$ 1,958	84	$ 164,435
Operation and Equipment Services	acre	$ 78	84	$ 6,569
LFG Well Replacement	acre	$ 41	84	$ 3,422

Gross Annual Cost (Prescriptive Final Cover): $ 585,609
Gross Annual Cost (Alternative Final Cover): $ 457,692

Total Gross Post-Closure Care Cost (Prescriptive Final Cover): $17,568,269
Total Gross Post-Closure Care Cost (Alternative Final Cover): $13,730,760

Note: Unit costs are based on weighted costs between Cells 1-9 based on average actual costs for post-closure care of Cells 1-9 over the last 5 years.

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APPENDIX N
Final Cover System Design

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APPENDIX N.1

Final Cover System Settlement Analysis

CALCULATION COVER SHEET

Client: **Anne Arundel County** Project: **Millersville Cell 9 Vertical Expansion** Project/ Proposal No.: **ME1418A** Phase/ Task No. **03/02**

Title of Calculation **Settlement of Cover System**

Calculations by:	Signature	Muaath Alsayyed	10/07/2024
	Printed Name Title	Muaath Alsayyedahmad Senior Staff Professional	Date
Assumptions and Procedures Checked by: (peer reviewer)	Signature		10/07/2024
	Printed Name Title	Jonas Bauer, PE Project Engineer	Date
Computations Checked by:	Signature		10/07/2024
	Printed Name Title	Jonas Bauer Project Engineer, PE	Date
Computations backchecked by: (originator)	Signature	Muaath Alsayyed	10/07/2024
	Printed Name Title	Muaath Alsayyedahmad Senior Staff Professional	Date
Approved by: (pm or designate)	Signature	Meena Viswanath	12/10/2024
	Printed Name Title	Meena Viswanath, PE Senior Engineer	Date

Approval notes:

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA

SETTLEMENT OF COVER SYSTEM

INTRODUCTION AND PURPOSE

The purpose of this calculation is to evaluate settlement of the final cover system in support of the design for the vertical expansion of Cell 9 of the Millersville Landfill and Resource Recovery Facility (MLFRRF) located in Severn, Maryland. Cell 9 is an 84-acre cell subdivided into 5 subcells (Subcells 9.1 through 9.5) and is currently the only permitted cell available for waste disposal at MLFRRF. The proposed vertical expansion of MLFRRF will increase the maximum permitted elevation from 244 ft (National Geodetic Vertical Datum of 1929 [NGVD29]) to 285 ft-NGVD29 as well as modify the geometry of the liner sideslopes and the final cover slopes.

This analysis estimates how much the final cover system will settle due to the secondary settlement of the foundation soils in response to placement of the municipal solid waste (MSW) as well as the primary and secondary settlement of the MSW in response to placement of the final cover system. Cell 9 consists of five subcells: Subcells 9.1 and 9.2 which have been constructed and are currently accepting waste; Subcell 9.3, which is under construction; and Subcells 9.4 through 9.5, which have yet to be constructed. Calculated settlement values are used to evaluate whether regulatory minimum post-settlement final cover drainage slopes are met. Additionally, strains in the HDPE geomembrane due to differential settlement of the final cover system are calculated and checked against accepted tolerable strains.

DATA AND INFORMATION SOURCES

The background data used in this analysis were as follows.

1. Subsurface and laboratory data from historical geotechnical investigations conducted within and around the footprint of Cell 9. These investigations are summarized in the Phase II report (Geosyntec 2024).
2. Material properties are as presented in the Subcell 9.3 Liner System Stability calculation package, Appendix E.2 to the Subcell 9.3 Design Report (Geosyntec 2023).
3. Permit-level drawings of Cell 9 (Appendix A of the Phase III report). See Figures 1 and 2 for the base grades and final grades of the landfill.

METHOD AND PARAMETERS

Final cover settlement can be attributed to two mechanisms: settlement of the foundation soil and settlement of the waste mass. This calculation package evaluates both mechanisms by considering

primary and secondary settlement in both the foundation soil and the waste. Therefore, the total settlement of the final cover can be calculated as follows:

$$S_t = S_{fp} + S_{fs} + S_{wp} + S_{ws} \quad (1)$$

where

S_{fp} = primary settlement of foundation soil;

S_{fs} = secondary settlement of foundation soil;

S_{wp} = primary settlement of waste;

S_{ws} = secondary settlement of waste.

Primary Settlement

For cohesive soils (silts and clays) and MSW, primary consolidation is responsible for most of the total settlement. According to one-dimensional (1-D) consolidation theory, the subsurface material is expected to exhibit increased pore water pressure upon loading and compress over an extended period while porewater pressures dissipate. Primary consolidation settlement can be calculated as follows (Terzaghi et al. 1967):

$$S_p = \begin{cases} H_o \frac{C_c}{1+e_o} \log\left(\frac{\sigma'_{vo}+\Delta\sigma'_v}{\sigma'_{vo}}\right), if\ \sigma'_{vo} = \sigma'_p\ and\ \sigma'_{vo} + \Delta\sigma'_v \geq \sigma'_p \\ H_o \frac{1}{1+e_o}\left[C_r \log\left(\frac{\sigma'_p}{\sigma'_{vo}}\right) + C_c \log\left(\frac{\sigma'_{vo}+\Delta\sigma'_v}{\sigma'_p}\right)\right], if\ \sigma'_{vo} < \sigma'_p < \sigma'_{vo} + \Delta\sigma'_v \\ H_o \frac{C_r}{1+e_o} \log\left(\frac{\sigma'_{vo}+\Delta\sigma'_v}{\sigma'_{vo}}\right), if\ \sigma'_{vo} \leq \sigma'_p\ and\ \sigma'_{vo} + \Delta\sigma'_v \leq \sigma'_p \end{cases} \quad (6)$$

where

S_p = primary consolidation settlement

C_c = compression index

C_r = recompression index

e_o = initial void ratio

σ'_p = preconsolidation stress

σ'_{vo} = initial vertical effective stress

$\Delta\sigma'_v$ = change in vertical effective stress

Secondary Settlement

Secondary settlement in saturated cohesive soils occurs due to particle rearrangement and creep (Terzaghi et al. 1967), while in waste it can be a result of several components such as mechanical compression, physicochemical reactions, and bio-chemical decay (Sowers 1973). The secondary settlement magnitude for foundation clays and MSW is calculated as a function of time as follows (Sowers 1973):

$$S_s = H_o \frac{C_\alpha}{1+e_o} \log\left(\frac{t_2}{t_1}\right) \quad (4)$$

where

S_s = secondary settlement

c_α = secondary compression index

t_1 = starting time of secondary settlement

t_2 = ending time of interest of secondary settlement

H_o = initial layer thickness

e_o = initial void ratio

The secondary compression index is defined as the reduction in void ratio during one logarithmic cycle of the ratio: the time of interest for secondary settlement divided by the starting time for secondary settlement.

Differential Settlement and Tensile Strain

Differential settlement refers to the settlement of a point relative to the settlement of adjacent points and is calculated to evaluate the change in slope of the cover system due to settlement. Differential settlement is calculated as follows:

$$\Delta S = S_1 - S_2 \quad (5)$$

where

ΔS = differential settlement

S_1 = total settlement at first point

S_2 = total settlement at second point

The change in grade resulting from differential settlement is calculated as follows (Terzaghi et al. 1967):

$$\Delta Grade\ (\%) = \left(\frac{\Delta S}{L}\right) \times 100\% \quad (6)$$

where

$\Delta Grade$ = change in grade

L = horizontal distance between points of concern

ΔS = differential settlement

The resulting tensile strain in a geomembrane is calculated using the following equation proposed by Giroud (1977):

$$\varepsilon\ (\%) = \frac{8}{3}\left(\frac{\Delta S}{L}\right)^2 \times 100\% \quad (7)$$

where

ε = tensile strain in a geomembrane (%)

L = horizontal distance between points of concern

ΔS = differential settlement

Depth of Influence

The depth of influence is considered to extend to a depth where the change in effective vertical stress at depth is less than 10% of the initial effective vertical stress at that depth (Coduto 2001). Materials below this depth are expected to experience negligible settlement induced by the change in vertical effective stress as presented in the equation below:

$$I_f \times \Delta\sigma_v' = 0.1\sigma_{vo}' \quad (8)$$

where

I_f = stress reduction influence factor

$\Delta\sigma_v'$ = change in vertical effective stress (psf)

σ_{vo}' = initial vertical effective stress

Stress reduction influence factors are calculated using the procedure outlined in the following section.

Stress Calculations and Stress Reduction Influence Factors

A stress reduction influence factor accounts for the fact that the impact of a load at the ground surface dissipates with depth. In addition, under the sideslope of a landfill where the load is not uniform, the use of a stress reduction factor can incorporate two-dimensional effects. The stress reduction influence factor is calculated using an idealized embankment (Figure 3). According to the procedure presented by Perloff and Baron (1976), the influence of the landfill load on the foundation soils varies both vertically and horizontally beneath the landfill as follows.

$$I_f = \frac{1}{\pi}\left[\beta + \frac{\alpha x}{a} - \left(\frac{z}{R_2^2}\right) * (x - b)\right] \quad (9)$$

where

I_f = stress reduction influence factor

R_0 = distance from point of interest to the ground surface below the embankment toe

R_1 = distance from point of interest to the ground surface below the embankment crest

R_2 = distance from point of interest to the ground surface below the embankment center line

z = thickness of waste

α = angle between R_0 and R_1

β = angle between R_1 and R_2

a = horizontal distance between embankment toe and embankment crest

b = horizontal distance between embankment toe and embankment center line

EVALUATION/ANALYSIS TOOLS

Microsoft Excel was used for all calculations.

INPUT PARAMETERS AND ASSUMPTIONS

The subsurface stratigraphy beneath Cell 9 is described in the Liner Settlement Analysis package (Appendix E.1 to the Phase III report). Relevant material properties for the subsurface layers are repeated here.

Material Properties

Foundation Soil

For this calculation package, the stratigraphy layers of concern are those prone to secondary settlement (i.e.: Clay I, Clay II, and Clay III). To calculate the secondary settlement, a ratio of secondary compression index to the compression index (c_α/c_c) was selected. Terzaghi et al (1996) recommends a c_α/c_c value of 0.04 for inorganic clays and silts. The compression index (c_c) was calculated based on the clays' plasticity index (PI) using the following correlation (Kulhawy and Mayne 1990):

$$c_c = \frac{PI}{74} \tag{10}$$

Using a PI value of 13, the resulted compression index (c_c) is 0.18. Using the recommended value for (c_α/c_c) of 0.04, the resulted secondary compression index (c_α) is 0.007.

Other material properties for Clay I, Clay II, and Clay III were developed in the Subcell 9.3 Liner System Stability calculation package, Appendix E.2 to the Subcell 9.3 Design Report (Geosyntec 2023). Foundation soil parameters used in the secondary settlement calculations are shown in Table 1.

Soil Cover Properties

The final cover system has a thickness of approximately 2 ft, and the soil used to construct the cover is assumed to have a unit weight of 120 pcf. Therefore, the change in vertical effective stress ($\Delta\sigma_v'$) will be 240 psf.

Waste Properties

The MSW was assumed to have a unit weight of 76 pounds per cubic foot (pcf), which assumes that the waste comprises 10% structural fill with unit weight of 130 pcf and 90% MSW with unit weight of 70 pcf.

Waste properties related to the settlement calculations were assumed based on previous experience and data reported in the literature. Sowers (1973) correlated the compression index (c_c) of MSW to initial void ratio (e_o) and organic content and indicated that c_c falls within the range of $0.15e_o$ (for MSW with low organic content) and $0.55e_o$ (for MSW with high organic content). For this settlement calculation, a compression coefficient index (c_c) equal to $0.55e_o$ is assumed. A porosity value (n) of 0.35 is assumed, from which a void ratio of 0.54 was calculated. The resulting C_c value was calculated to be 0.30, which corresponds to a modified compression index ($C_{c\varepsilon}$) of 0.19.

Basha et.al. (2015) collected a group of modified secondary compression index ($C_{\alpha\varepsilon}$) values for MSW from different literature resources. $C_{\alpha\varepsilon}$ was in range of 0.01 to 0.08. A modified secondary compression index ($C_{\alpha\varepsilon}$) of 0.08 is assumed for this analysis. The parameters used in the analysis are summarized in Table 2.

Depth of Influence and Stress Reduction

Using Equation 8, a cutoff depth was calculated where materials below this depth are expected to experience negligible settlement induced by the change in vertical effective stress.

The landfill was modeled as an idealized embankment for each of the analyzed cross sections, with a flat top and consistent sideslope to calculate the stress reduction influence factor (I_f). The x-values (Tables 3 and 4) were determined for each of the analysis points for cross sections A, B, and C by measuring the horizontal distance from the embankment toe to each analysis point. Using a and b values from the idealized embankment geometry for each cross section and Equation 9, influence factors were calculated at each analysis point. Influence factors were then applied above the cutoff depth to calculate settlement.

Settlement Model

Construction Sequence

Subcells 9.1 and 9.2 have already been constructed and are nearing an interim top deck elevation of 244 ft-NGVD29 (Figure 4). It is anticipated that Subcells 9.3, 9.4, and 9.5 will each be constructed and filled to 244 ft-NGVD29 before the top deck of the entire Cell 9 is filled to the full permitted elevation of 285 ft-NGVD29. Based on the current disposal rate, it is estimated the each subcell will take an average of 7 years to reach the interim top deck elevation of 244 ft-NGVD29. Similarly, it is expected that Cell 9 will reach the full permitted elevation of 285 ft-NGVD29 15 years after the interim elevation is achieved.

Foundation Soil

Due to the construction sequence discussed in the previous section, it is assumed that the primary consolidation settlement of the foundation soils due to placement of MSW will be complete prior to final cover construction. Primary settlement is therefore not evaluated in this calculation package.

Secondary settlement of the foundation soil will likely begin following the end of the primary consolidation, which would be sometime during waste filling, but for this analysis, the starting time of secondary settlement is conservatively assumed to be 1 year following the end of final cover system construction (i.e., t_1 =1 year), with a targeted time of interest (t_2) of 31 years.

Primary Settlement of Waste

It is assumed that the primary settlement of the MSW due to its self-weight is complete prior to the construction of the final cover system, and would therefore not affect the final cover performance. However, the MSW will undergo a small amount of primary settlement due to the construction of the final cover system. The evaluation of this primary settlement is carried out assuming the MSW can be treated as a normally consolidated cohesive soil.

Secondary Settlement - Waste Below Interim Top Deck Elevation

Secondary settlement in MSW is generally assumed to occur concurrently with primary settlement, beginning at the initial placement of the MSW (Quin et al 2001). Given the sequential construction of the subcells, the starting time of secondary settlement (t1) will differ from subcell to another and within multiple layers of waste. For simplicity, each subcell is treated separately, and the waste below and above the interim top deck elevation is treated separately. Based on the filling history and the anticipated filling sequence (Appendix C of the Phase III report), the average age of waste below the interim top deck elevation for Subcells 9.1 through 9.5 one year after final closure (t1) will be 49 years, 45 years, 40 years, 31 years, and 22 years, respectively. The time of interest is 30 years after the end of the final cover construction, which results in ending time of secondary settlement (t2) values of 79 years, 75 years, 70 years, 61 years, and 52 years for Subcells 9.1 through 9.5, respectively.

Secondary Settlement - Waste Above Interim Top Deck Elevation

As previously stated, it is assumed that it will take 15 years to fill Cell 9 from the interim top deck elevation to the permitted top deck elevation. The average age of waste above the interim top deck elevation for Subcells 9.1 through 9.5 one year after final closure (t_1) can therefore be assumed to be 8.5 years, while the ending time of secondary settlement (t_2) value would be 38.5 years.

Selected Cross Sections

Three cross sections (A-A', B-B', and C-C') were selected to represent Subcells 9.3 through 9.5. Cross section A-A' represents the greatest thickness of waste in the cell with a relatively young age (since Subcell 9.4 is filled later than Subcells 9.1 through 9.3), which could lead to greater secondary settlement in the MSW. Cross section C-C' represents the thickest clay layer in the foundation and the greatest variability in clay thickness beneath the liner, which could lead to more differential settlement. The cross sections are shown in plan view on the base grades and final cover grades in Figures 1 and 2, respectively, while the cross sections are shown in profile view in Figure 5.

PERFORMANCE CRITERIA

To reduce the potential of grade reversal and to maintain positive drainage during the life of the landfill, the post-settlement slopes must be greater than 4% (COMAR, 2023). Geomembrane post-settlement strains should be less than 4% to 5%, which is the long-term allowable strain of HDPE geomembrane reported by Berg and Bonaparte (1993).

SUMMARY OF RESULTS

The main results of this settlement analysis package are as follow:

- *Cross section A-A'*: The maximum total settlement of 6.99 feet occurs at point 3, where the waste thickness is the greatest. The maximum slope change between the selected points of interest is calculated to be 3.3% along the side slopes and 0.9% along the top deck. Additionally, the maximum tensile strain on the final cover geomembrane is calculated to be 0.22%. The calculation results of the selected points of interest along cross section A-A' are shown in Table 3.
- *Cross section B-B'*: The maximum total settlement of 7.92 feet occurs at point 4, where the waste thickness is the greatest. The maximum slope change between the selected points of interest is calculated to be 3.9% along the side slopes and 0.9% along the top deck. Additionally, the maximum tensile strain on the final cover geomembrane is calculated to be 0.24%. The calculation results of the selected points of interest along cross section B-B' are shown in Table 4.

CONCLUSIONS

As all the calculated post-settlement final cover slopes in the selected cross sections are greater than 4% in the direction of drainage, positive drainage is maintained in the final cover system and the minimum regulatory requirements are met. Geomembrane strains are also calculated to be within the long-term allowable strain range of HDPE geomembrane (4% to 5%).

REFERENCES

Basha, B.M., N. Parakalla, and K.R. Reddy. 2016. "Experimental and Statistical Evaluation of Compressibility of Fresh and Landfilled Municipal Solid Waste under Elevated Moisture Contents." *International Journal of Geotechnical Engineering* 10(1):86–98.

Berg, R.R., and R. Bonaparte. 1993. "Long-Term Allowable Tensile Stresses for Polyethylene Geomembranes." *Geotextiles and Geomembranes* 12(4)287–306.

Coduto, D. P. 2001. *Foundation Design: Principles and Practices*. Upper Saddle River: Prentice-Hall.

COMAR. 2023. *Code of Maryland Regulations*. COMAR Sec. 26.04.07.21.

Geosyntec Consultants, Inc. 2017. S*chematic Design Report, Subcell 9.2, Millersville Landfill and Resource Recovery Facility, Severn, Anne Arundel County, Maryland*. Prepared for Anne Arundel County, contract number N561401.

Giroud, J.P. 1977. "Conception de L'etancheite des Ouvrages Hydrauliques par Geomembranes." *Proceedings of 1st International Symposium on Plastic and Rubber Waterproofing in Civil Engineering*, Vol. 1, Session 3, Paper 13. Liege, Belgium. June (French).

Kulhawy, F.H., and P.W. Mayne. 1990. *Manual on Estimating Soil Properties for Foundation Design*. Research Project 1493-6. Cornell University Geotechnical Engineering Group. Prepared for Electric Power Research Institute. August.

Qian, X., R.M. Koerner, and D.H. Gary. 2001. Geotechnical Aspects of Landfill Design and Construction. Prentice Hall, Upper Saddle, New Jersey. p 451.

Sowers, G.F. 1973. "Settlement of Waste Disposal Fills." *8th Conference sur la Mecanique des Sols et I'Ingenierie des Foundations, Moscou*, pp 207–210.

Terzaghi, K. and R. Peck. 1967. *Soil Mechanics in Engineering Practice*. John Wiley and Sons: New York, New York.

Table 1 - Foundation Soil Settlement Calculations Parameters

Term	Definition	Value
c_c	Compression index	0.18
e_o	Void ratio	0.53
$c_{\varepsilon c}$	Modified compression index	0.12
c_α/c_c	Secondary compression index to compression index ratio	0.04
c_α	Secondary compression index	0.007
$c_{\varepsilon\alpha}$	Modified secondary compression index	0.005
t_1	Beginning time of secondary compression (years)	1
t_2	Secondary compression time of interest (years)	31

Table 2 - Waste Settlement Calculations Parameters

Term	Definition	Value
c_c	Waste compression index	0.30
e_o	Void ratio	0.54
$c_{\varepsilon c}$	Modified compression index	0.19
$c_{\varepsilon\alpha}$	Modified secondary compression index	0.08
t_1	Average age for the waste below the proposed interim top deck elevation (years)	31[(1)], 22[(2)]
	Average age for the waste above the proposed interim top deck elevation (years)	8.5[(1)(2)]
t_2	Secondary compression time of interest for the waste below the proposed interim top deck elevation (years)	61[(1)], 52[(2)]
	Secondary compression time of interest for the waste above the proposed interim top deck elevation (years)	38.5[(1)(2)]
$\gamma_{t\text{-waste}}$	Waste unit weight (pcf[(4)])	76
$\gamma_{t\text{-final cover}}$	Final cover unit weight (pcf)	120
$H_{final\ cover}$	Final cover thickness (feet)	2
$\Delta\sigma$	Final cover load (psf[(5)])	240

(1) Assumed time value in years for Subcell 9.4

(2) Assumed time value in years for Subcell 9.5

(3) pcf: Pound per cubic feet

(4) psf: Pound per square feet

Table 3- Summary of Settlement, Differential Settlement, Grade Change, and Geomembrane Strain - Section A-A'

	Point ID				
	1	2	3	4	5
x[1] (ft)[2]	10.00	441.14	660.38	923.04	1086.61
Horizontal distance between Point ID's (ft)		431.14	219.24	262.66	163.57
Final cover elevation (ft-NGVD29)[3]	130.48	274.34	285.00	272.17	217.70
Interim top deck elevation (ft-NGVD29)	128.48	244.00	244.00	244.00	215.70
Base grade elevation (ft-NGVD29)	127.18	127.23	130.23	160.47	214.36
MSW thickness below Interim Top Deck Elevation (in)[4]	1.30	116.77	113.77	83.53	1.34
MSW thickness Above Interim Top Deck Elevation (in)	0.00	28.34	39.00	26.17	0.00
Total MSW thickness (ft)	1.30	145.11	152.77	109.70	1.34
Clay layers total thickness[6] (ft)	106.85	268.54	255.00	271.51	121.61
Foundation soil secondary compression (in)	9	22	21	22	10
Total MSW primary settlement (in)	2	6	6	6	2
Secondary settlement in MSW below interim top deck elevation (in)	0	33	32	24	0
Secondary settlement in MSW above interim top deck elevation (in)	0	18	25	16	0
Total settlement (in)	11	79	84	69	13
Total settlement (ft)	0.95	6.59	6.99	5.71	1.06
Differential settlement between point ID's (ft)		5.63	0.40	-1.28	-4.65
Post-settlement final cover grade (ft-NGVD29)	129.53	267.75	278.01	266.46	216.64
Pre-settlement final cover slope between point ID's (%)		33.4	4.9	-4.9	-33.3
Post-settlement final cover slope between point ID's (%)		32.0	4.0	-4.4	-30.0
Slope change between point ID's (%)		1.4	0.9	-0.5	-3.3
Tensile strain (%)		0.05	0.00	0.01	0.22

(1) x: distance of the point ID from the landfill toe (feet).

(2) ft: Feet

(3) NGVD29: National Geodetic Vertical Datum of 1929

(4) in: Inch

(5) psf: Pound per square foot

(6) Represents the total thickness of Clay I, Clay II, and Clay III layers that are within the depth of influence.

Table 4- Summary of Settlement, Differential Settlement, Grade Change, and Geomembrane Strain - Section B-B'

	Point ID					
	1	2	3	4	5	6
x[1] (ft)[2]	10.00	199.87	287.00	504.53	666.00	865.38
Horizontal distance between Point ID's (ft)		189.87	87.13	217.53	161.47	199.38
Final cover elevation (ft-NGVD29)[3]	181.02	245.30	274.44	285.00	277.21	211.56
Interim top deck elevation (ft-NGVD29)	179.02	243.30	244.00	244.00	244.00	209.56
Base grade elevation (ft-NGVD29)	177.69	119.23	121.81	128.05	141.03	208.23
MSW thickness below Interim Top Deck Elevation (in)[4]	1.33	124.07	122.19	115.95	102.97	1.33
MSW thickness Above Interim Top Deck Elevation (in)	0.00	0.00	28.44	39.00	31.21	0.00
Total MSW thickness (ft)	1.33	124.07	150.63	154.95	134.18	1.33
Clay layers total thickness[6] (ft)	91.98	255.00	255.00	272.91	301.06	167.81
Foundation soil secondary compression (in)	8	21	21	23	25	14
Total MSW primary settlement (in)	2	6	6	6	6	2
Secondary settlement in MSW below interim top deck elevation (in	0	44	44	42	37	0
Secondary settlement in MSW above interim top deck elevation (in	0	0	18	25	20	0
Total settlement (in)	10	72	89	95	88	17
Total settlement (ft)	0.87	5.99	7.43	7.92	7.32	1.40
Differential settlement between point ID's (ft)		5.12	1.44	0.49	-0.60	-5.92
Post-settlement final cover grade (ft-NGVD29)	180.15	239.31	267.01	277.08	269.89	210.16
Pre-settlement final cover slope between point ID's (%)		33.9	33.4	4.9	-4.8	-32.9
Post-settlement final cover slope between point ID's (%)		31.0	31.0	4.0	-4.5	-29.0
Slope change between point ID's (%)		2.9	2.4	0.9	-0.3	-3.9
Tensile strain (%)		0.19	0.07	0.00	0.00	0.24

(1) x: distance of the point ID from the landfill toe (feet).

(2) ft: Feet

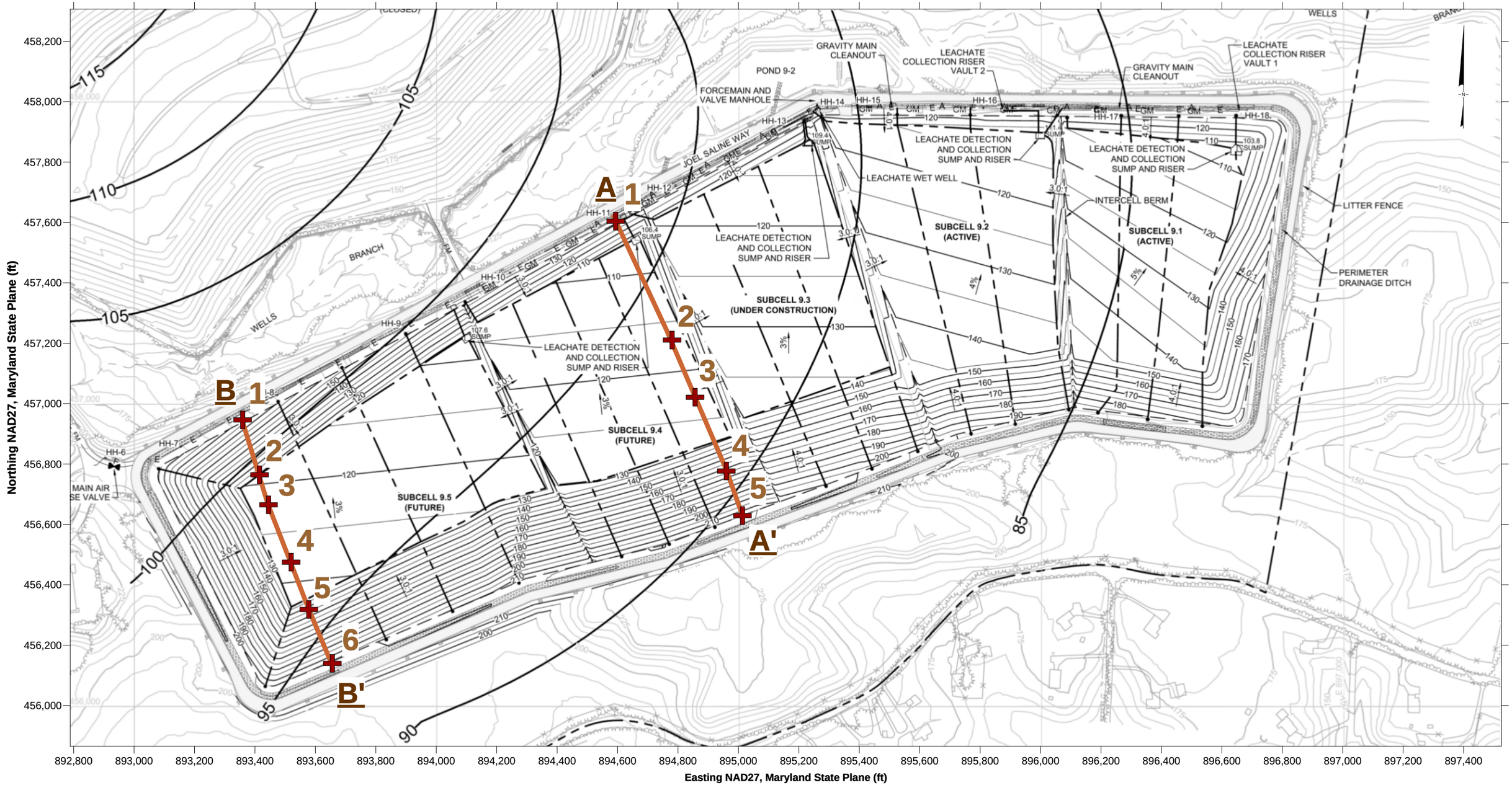
(3) NGVD29: National Geodetic Vertical Datum of 1929

(4) in: Inch

(5) psf: Pound per square foot

(6) Represents the total thickness of Clay I, Clay II, and Clay III layers that are within the depth of influence.

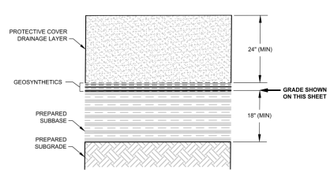
FIGURES



Notes:

1- Groundwater elevations used to produce the contours shown on this sheet are the highest recorded level for each individual well or piezometer measured on a monthly basis from January 2022 through December 2023.
2- Groundwater data was received from Anne Arundel County Department of Public Works, Bureau of Waste Management Services.
3- Liner grades and leachate collection pipes layout shown for Subcells 9.1 and 9.2 are as-built grades. Liner grades shown for Subcells 9.3 through 9.5 are proposed.

Liner System Detail



Legend

Final cover settlement cross section

Settlement points of interest

Scale

0 200 400

SCALE IN FEET

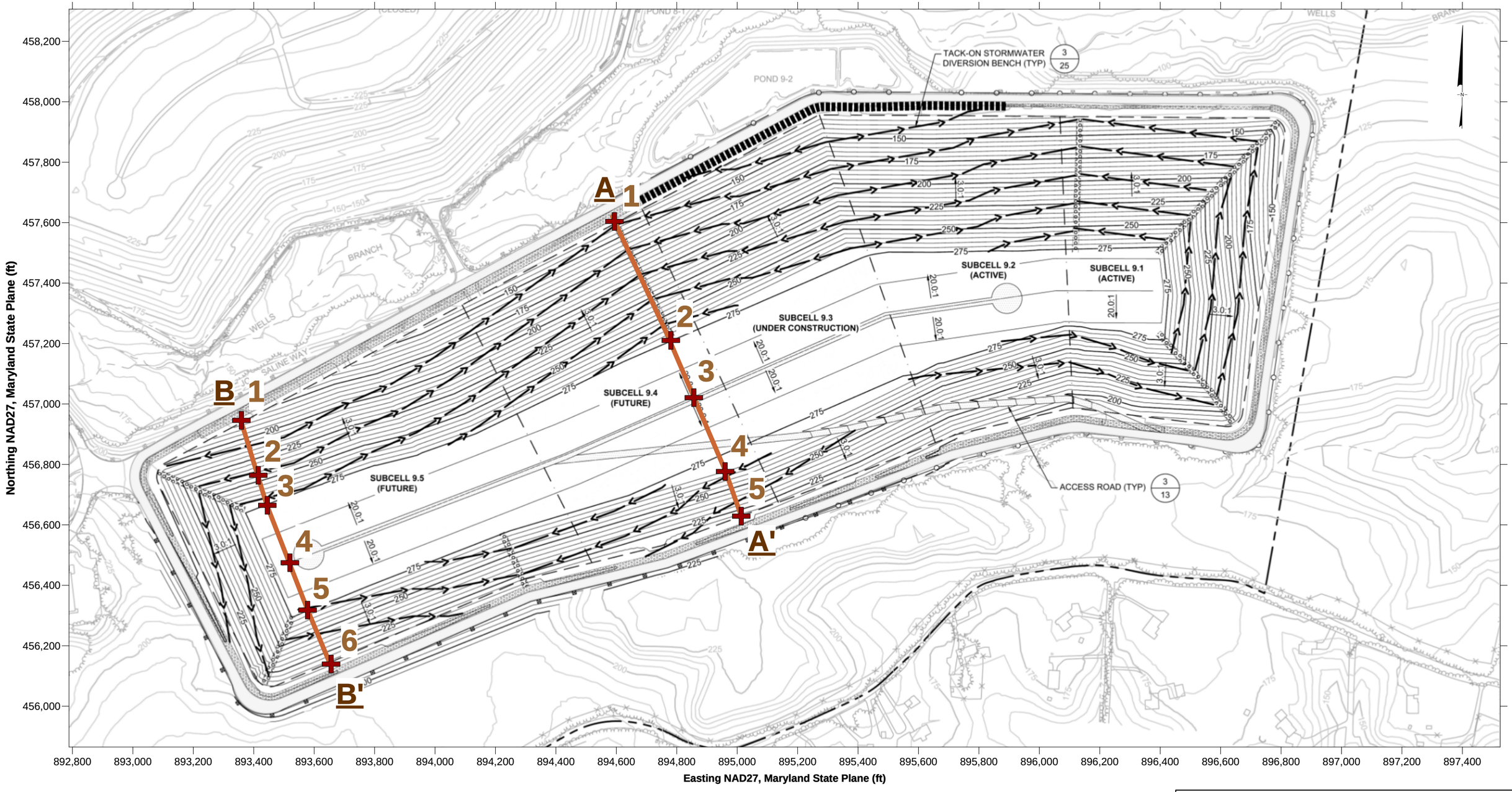
Proposed Settlement Cross Sections (Base Grades Layout)

Millersville Landfill and Resource Recovery Facility
Severn, Anne Arundel County, Maryland

Geosyntec consultants

Project No. ME1418A | October 2024

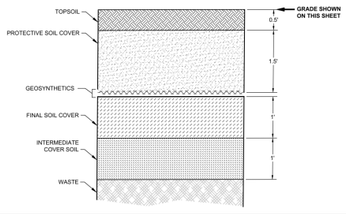
Figure 1



Notes:

1- Groundwater elevations used to produce the contours shown on this sheet are the highest recorded level for each individual well or piezometer measured on a monthly basis from January 2022 through December 2023.
2- Groundwater data was received from Anne Arundel County Department of Public Works, Bureau of Waste Management Services.
3- Liner grades and leachate collection pipes layout shown for Subcells 9.1 and 9.2 are as-built grades. Liner grades shown for Subcells 9.3 through 9.5 are proposed.

Final Cover System Detail



Legend

Final cover settlement cross section

Settlement points of interest

Scale

0 200 400

SCALE IN FEET

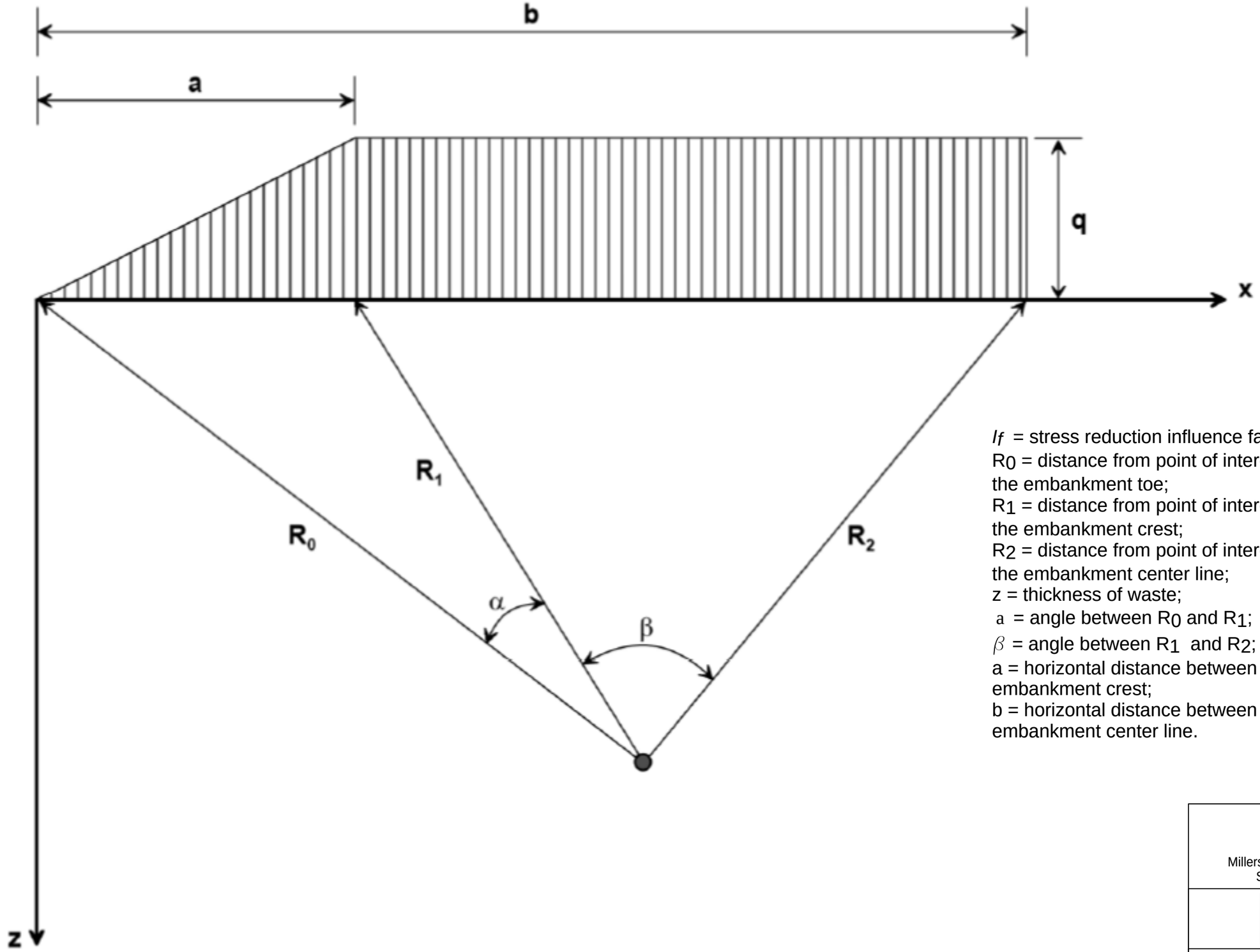
Proposed Settlement Cross Sections (Final Cover Layout)

Millersville Landfill and Resource Recovery Facility
Severn, Anne Arundel County, Maryland

Geosyntec consultants

Project No. ME1418A | October 2024

Figure 2



I_f = stress reduction influence factor;
R_0 = distance from point of interest to the ground surface below the embankment toe;
R_1 = distance from point of interest to the ground surface below the embankment crest;
R_2 = distance from point of interest to the ground surface below the embankment center line;
z = thickness of waste;
a = angle between R_0 and R_1;
β = angle between R_1 and R_2;
a = horizontal distance between embankment toe and embankment crest;
b = horizontal distance between embankment toe and embankment center line.

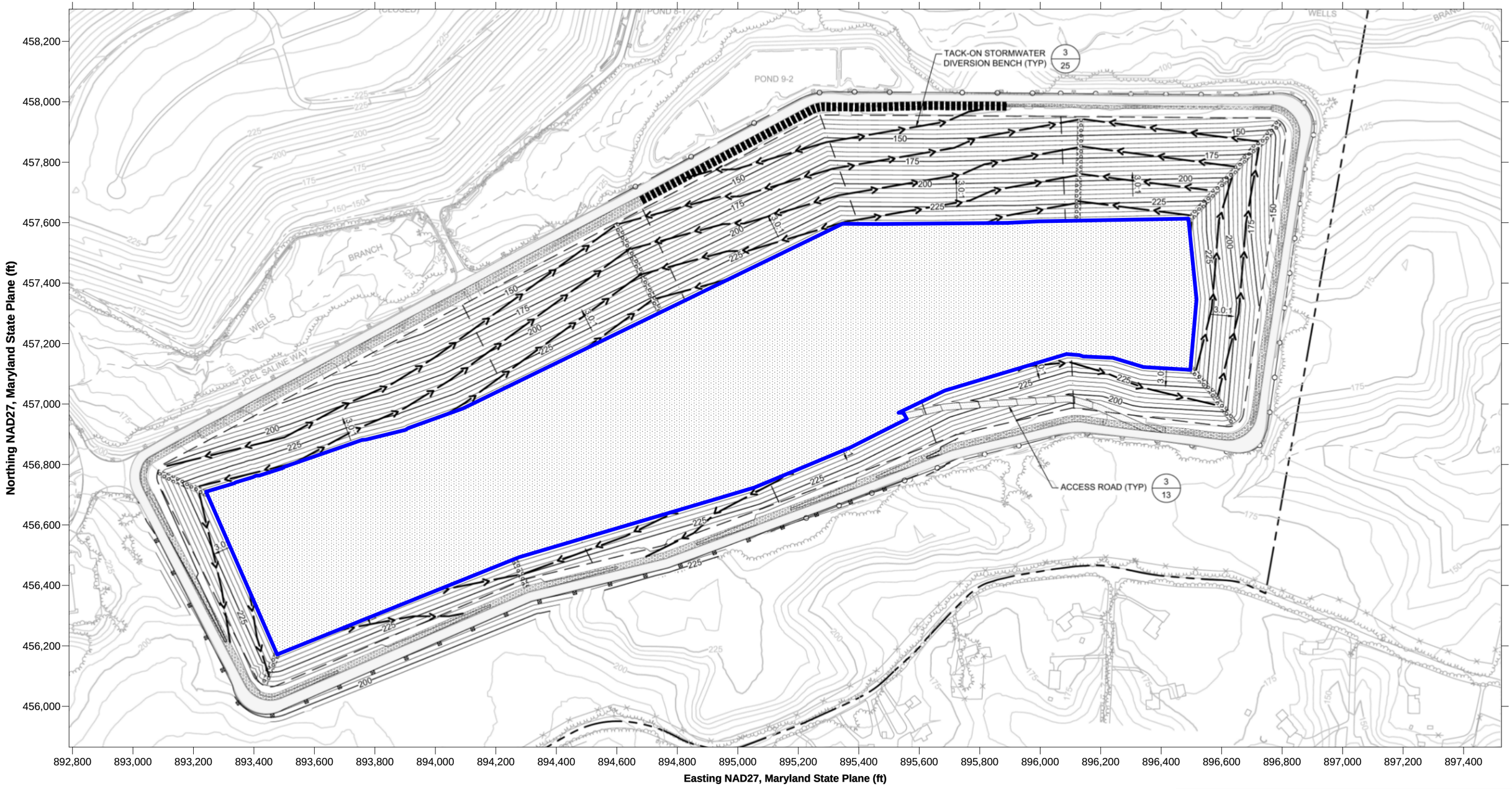
Idealized Embankment

Millersville Landfill and Resource Recovery Facility
Severn, Anne Arundel County, Maryland

Geosyntec consultants

Figure 3

Project No. ME1418A | October 2024



Notes:

1- It is assumed that each subcell will be filled to an interim top deck elevation of 244 ft-NGVD29, as shown, before the full permitted elevation of 285 ft-NGVD29 is achieved across Cell 9.

Legend

Scale

0 200 400

SCALE IN FEET

Assumed Interim Top Deck Elevation

Millersville Landfill and Resource Recovery Facility
Severn, Anne Arundel County, Maryland

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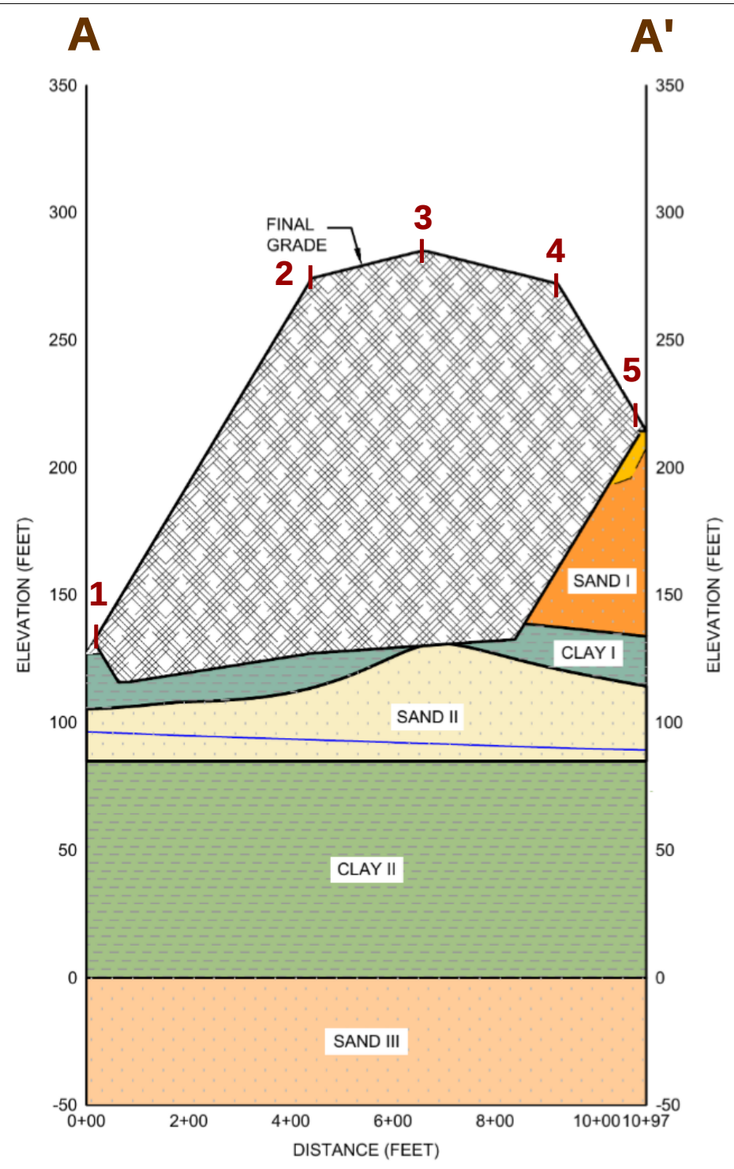
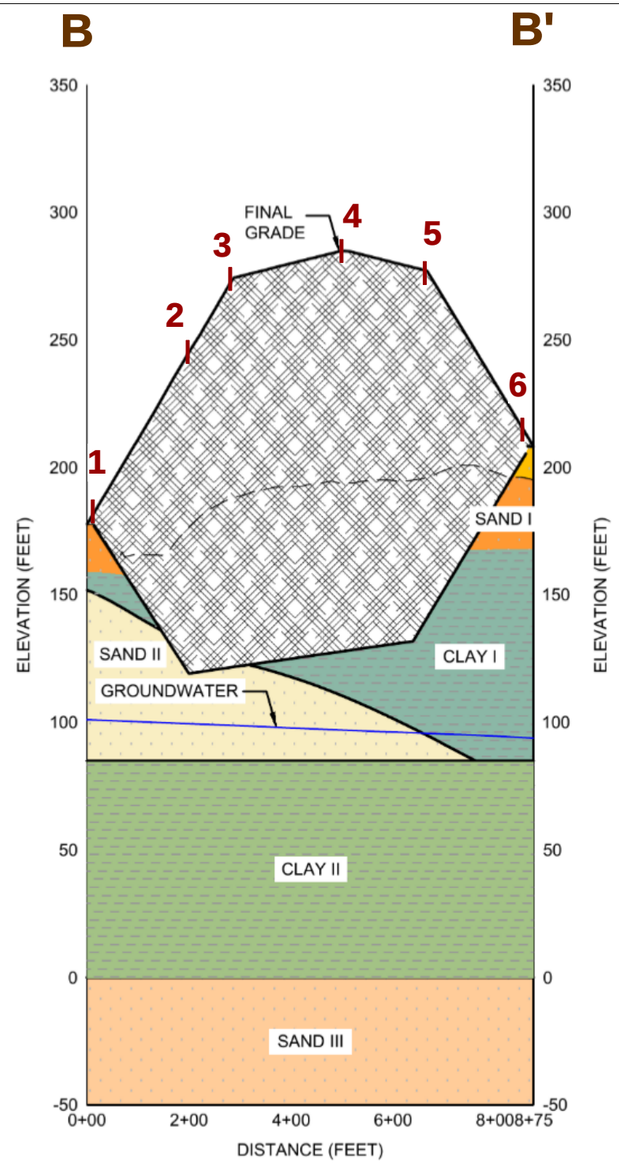
Project No. ME1418A | October 2024

Figure 4





Notes:

1- Soil profiles shown are generalizations based on available drawings, boring logs, and available information.

2- Soil profiles shown between boreholes involve interpolation and extrapolation. Variations from the profiles depicted should be expected.

3- Groundwater elevations used to produce the groundwater table shown on the profiles are the highest recorded level for each individual well or piezometer measured on a monthly basis from January 2022 through December 2023.

4- Groundwater data was received from Anne Arundel County Department of Public Works, Bureau of Waste Management Services.

Legend:

- WASTE
- SAND I (SP-SM): LOOSE TO VERY DENSE ORANGE BROWN POORLY GRADED SAND WITH SILT, GRAVEL, AND CLAY LENSES. MAGOTHY FORMATION
- CLAY I (CL): STIFF TO HARD GRAY WITH RED AND BROWN LEAN CLAY WITH SAND. UPPER PATAPSCO FORMATION
- STRUCTURAL FILL
- SAND II (SM): MEDIUM TO VERY DENSE LIGHT TAN WITH BROWN SILTY SAND. UPPER PATAPSCO FORMATION
- CLAY II (CL): LEAN CLAY, HARD, VARIEGATED COLOR. LOWER PATAPSCO FORMATION
- SAND III (SP-SM): SAND, FINE TO MEDIUM, BROWN. LOWER PATAPSCO FORMATION

Settlement calculation point of interest

Scale

0 300 600

HORIZONTAL SCALE: 1" = 300'
VERTICAL SCALE: 1" = 60'

Proposed Settlement Cross Sections (Profile View)

Millersville Landfill and Resource Recovery Facility
Severn, Anne Arundel County, Maryland

Geosyntec consultants

Project No. ME1418A | October 2024

Figure 5

Geosyntec
consultants

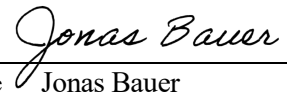
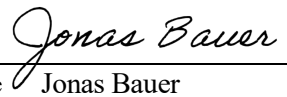
APPENDIX N.2

Geomembrane Puncture Resistance Analysis

CALCULATION COVER SHEET

Client: **Anne Arundel County** Project: **Millersville Cell 9 Vertical Expansion** Project/ Proposal No.: **1418A** Phase/ Task No. **03/02**

Title of Calculation **Geomembrane Final Cover Puncture Resistance Analysis**

Calculations by:	Signature		05/19/2025
	Printed Name	Daniel Espinoza	Date
	Title	Senior Staff Professional	
Assumptions and Procedures Checked by: (peer reviewer)	Signature		05/21/2025
	Printed Name	Jonas Bauer	Date
	Title	Project Engineer	
Computations Checked by:	Signature		05/21/2025
	Printed Name	Jonas Bauer	Date
	Title	Project Engineer	
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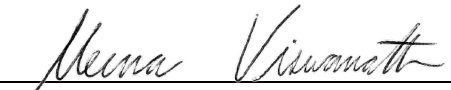
	Printed Name	Daniel Espinoza	Date
	Title	Senior Staff Professional	
Approved by: (pm or designate)	Signature		07/24/2025
	Printed Name	Meena Viswanath	Date
	Title	Senior Engineer	

Approval notes:

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA

GEOMEMBRANE FINAL COVER PUNCTURE RESISTANCE ANALYSIS

INTRODUCTION AND PURPOSE

This calculation package develops puncture-resistance criteria for the geosynthetic component of the cover system in support of the design for the vertical expansion of Cell 9 of the Millerville Landfill and Resource Recovery Facility (MLFRRF) located in Severn, Maryland. Cell 9 is an 84-acre cell subdivided into 5 subcells (Subcells 9.1 through 9.5) and is currently the only permitted cell available for waste disposal at MLFRRF. The proposed vertical expansion of MLFRRF will increase the maximum permitted elevation from 244 ft (National Geodetic Vertical Datum of 1929 [NGVD29]) to 285 ft NGVD29 as well as modify the geometry of the liner sideslopes and the final cover slopes.

The objective of this calculation package is to demonstrate that the integrity and function of the geosynthetic components of the composite cover system will not be compromised by the materials placed either above or below the geomembrane. Two types of loadings are analyzed for this puncture resistance calculation: the load from the dozers during soil placement, and the load from haul trucks on the final cover access road.

METHOD AND PARAMETERS

The method presented by Koerner (2012) was used to calculate the field load on a geosynthetic. The factor of safety against puncture was then calculated by comparing the calculated field load to the allowable load that can be applied on a geosynthetic based on the laboratory tests using the method derived by Koerner (2008).

The proposed final cover system (Figure 1) consists of the following components, from top to bottom:

- 6-inch-thick topsoil layer
- 18-inch-thick protective cover soil)
- 250-mil geocomposite drainage layer
- 40-mil textured high-density polyethylene (HPDE) geomembrane
- 12-inch-thick final cover soil grading layer
- 12-inch-thick intermediate cover soil grading layer

The proposed final cover access (Figure 2) consists of the following components, from top to bottom:

- Minimum 18-inch-thick recycled asphalt millings
- Geotextile separator
- 18-inch-thick protective cover soil with a hydraulic conductivity greater than 5×10^{-3} centimeters per second (cm/sec)
- 250-mil geocomposite drainage layer
- 40-mil textured high-density polyethylene (HPDE) geomembrane
- 12-inch-thick final cover soil grading layer
- 12-inch-thick intermediate cover soil grading layer

In this calculation package, puncture resistance will be evaluated for the above products considering active construction equipment above the geomembrane barrier layer, and landfill personnel driving over the cover system once the landfill is closed.

EVALUATION/ANALYSIS TOOLS

For this calculation, Microsoft Excel was used to calculate the field load on the geomembrane, the allowable load that can be applied on a geomembrane, and the factor of safety against puncture.

INPUT PARAMETERS AND ASSUMPTIONS

The input parameters and the assumptions used for calculating the factor of safety of the geosynthetic against puncture are discussed in detail in this section.

Allowable Force

The allowable force on the geomembrane is selected based on the minimum required puncture resistance of a 40-mil HDPE textured geomembrane using the testing procedure outlined by ASTM D4833 (ASTM 2013), per the Geosynthetics Research Institute's (GRI) geomembrane standard 13 (GM13) (GRI 2021), which is 60 pounds (lb). Tables detailing the modification and reduction factors required for these formulas taken from Koerner (2008) and Koerner (2012) have been compiled into Attachment N.2-1.

Cover System Soils

Cell 9 is proposed to be filled entirely with municipal solid waste (MSW). After filling the landfill, the solid waste will be covered with two layers of soil serving as intermediate and final cover, which will then be covered by a layer of geomembrane and geocomposite. Protective cover soil will then be placed above the geosynthetics. Intermediate cover, final cover, and protective cover soils will comprise native soils excavated during construction of the landfill.

Cover soils, both above and below the geosynthetics, are anticipated to be clayey-silty soil with a maximum particle diameter of 1 inch. The final cover soil grading layer will be proof-rolled with a smooth roller prior to placement of the geomembrane. Therefore, protrusions below the geomembrane are not expected to be greater than 0.5 inches. The unit weight of cover system soils was assumed to be 120 pounds per cubic foot (pcf). The material properties are given in Table 1 and 2.

Final Cover Access Road System

The Final Access Road System replaces the top 6 inches of topsoil from the cover system, with a minimum of 18 inches of recycled asphaltic concrete, and a geotextile separator. It is assumed that the thickness of recycled asphalt millings will not exceed 18 inches to provide the most critical factor of safety. The geotextile separator is put in place to prevent the protective cover soil from mixing with the millings. Since the geotextile separator is not providing any strength properties, and has a negligible weight, it is excluded the separator from the analysis. The unit weight of the recycled asphalt millings was assumed to be 145 pcf.

Geomembrane Factors

The particles in the native soil at the site are angular and relatively small; therefore, according to Koerner (2012), protrusion factor, scale factor and shape factor values of 0.6, 0.6, and 0.7, respectively. The related portions of Koerner (2012) that were used to obtain these factors are provided in Attachment N.2-1.

It is assumed that during protective cover soil placement, the dozer rides over the soil that is just pushed out by the blades. At that point, the thickness of soil is assumed to be 1 foot. The modification factor (MF_A) is applied in Equation 2 to consider the soil arching effect. Based on the soil thickness, considered a shallow geostatic condition, a value of 0.75 is assigned for the modification factor for construction conditions. A value of 0.5 is assigned for the modification factor for long term conditions on the final cover access road.

The protrusion height for the cover soils is assumed to be 0.5 inches (i.e., half of the puncturing particle diameter). Traditional puncture analyses of liner system geomembranes also include reduction factors due to long-term creep of the geomembrane under load, as presented in

Koerner (2008) for geomembranes under equivalent hydrostatic loads of 700 to 9,000 psf (equivalent to approximately 930 to 36,000 psf of soil loads); however, since in this case as the cover geomembrane will be covered by 2 to 3 foot of soil, which corresponds to a long-term load of approximately 360 psf, a reduction factor for creep was assumed to be unnecessary.

This calculation also assumes that adequate construction quality monitoring will be present during the construction of the cover system, thus preventing any isolated protrusions into the geomembrane.

Leachate Factors

Since the geomembrane will be used in a cover system where there is not expected to be direct contact with leachate, the reduction factor for chemical and biological degradation was selected to be as 1.1, the minimum value recommended by Koerner (2012).

Equipment Type and Operation

A low ground pressure (LGP) dozer with a maximum ground pressure of approximately 5 pounds per square inch (psi) (such as a Caterpillar D6R LGP or equivalent) will be used for the installation of the protective cover soils, with at least 1 ft of protective cover soils required between the dozer and the geosynthetics. The properties of the D6R LGP dozer provided by the manufacturer (Caterpillar 2023) is shown in Attachment N.2-2. The weight of the dozer is 47,874 pounds (lb), which is distributed equally over its two tracks. The length and width of each track are 10.7 and 3 feet, respectively (Attachment N.2-2). This equipment type is shown in Table 1.

A Caterpillar (CAT) 730C2 articulated dump vehicle will be used to haul in the recycled asphalt millings. The weight distribution of a CAT 730C2 is approximately 40,000 lb per axle when loaded, which corresponds to 20,000 lb per tire as shown in Attachment E.2-2. The tires are expected to be 23.5R25 tires with a minimum tire inflation pressure of 75 psi (Attachment E.2-2. Based on the minimum inflation pressure and a tire width of 23.5 in. (1.96 ft), the length of the tire contact is calculated to be 11.36 in (0.94 ft). A dynamic load factor of 2 was applied to account for breaking, accelerating, and turning.. This equipment type is shown in Table 2.

PERFORMANCE CRITERIA

A target factor of safety against puncture of 2.0 is recommended by Koerner (2012).

ANALYSIS AND EVALUATION APPROACH

Koerner (2012) presents a method that relates the vertical puncturing force acting on a geosynthetic material (in pounds), as measured by the ASTM International (ASTM) D4833 test method (ASTM 2013), to the diameter and shape of the puncturing particle. Although this method is presented in Koerner (2012) in the context of geotextiles, the equation inputs and factors are specific to the loads and puncturing particles. Therefore, the equation can be applied to any geosynthetic material that is tested using the ASTM D4833 test method.

Koerner (2012) defines the factor of safety against puncture as the ratio of the allowable force that can be applied on a geosynthetic, measured as per ASTM D4833, to the vertical puncturing force to be resisted by the geosynthetic in the field, as follows:

$$FS_{puncture} = \frac{F_{allow}}{F_{reqd}} \quad (1)$$

where

$FS_{puncture}$ = factor of safety against puncture

$Fallow$ = allowable force that can be applied on a geosynthetic

F_{reqd} = vertical puncturing force to be resisted by a geosynthetic

In this calculation, the vertical puncturing force to be resisted by the geosynthetic is the force that is applied on the geosynthetic by the construction equipment, the protective cover soil, and the topsoil.

Calculation of Vertical Puncture Force

Koerner (2012) recommends computing the vertical puncture force in pounds on a geosynthetic material, as would be measured by ASTM D4833 (ASTM 2013), using the following empirical equation, which relates the pressure exerted on the geosynthetic material (pounds per square inch [psi]) to the diameter of the puncturing particle in inches:

$$F_{reqd} = p' d_a^2 \, S_1 \, S_2 \, S_3 \quad (2)$$

where

F_{reqd} = required vertical puncturing force to be resisted (lb)

p' = pressure applied on the geosynthetic in pounds per square inch (psi)

d_a = average diameter of puncturing particle in inches

S_1 = protrusion factor of the puncturing object

S_2 = scale factor of the puncturing object

S_3 = shape factor of the puncturing object

Pressure exerted on the geosynthetic (p') was calculated as follows:

$$p' = \frac{W_{equip}}{B \times L} + \gamma_{pc} \times h_{pc} + \gamma_{msw} \times h_{msw} + \gamma_{fc} \times h_{fc} \quad (3)$$

where

W_{equip} = operating weight of the earthwork or hauling equipment (pounds per square foot [psf])

B = width of stress distribution from equipment on geosynthetic (ft)

L = length of stress distribution from equipment on geosynthetic (ft)

γ_{pc} = unit weight of protective cover (pounds per cubic foot [pcf])

h_{pc} = thickness of protective cover (ft)

γ_{msw} = unit weight of waste (pcf)

h_{msw} = thickness of impounded waste (ft)

γ_{fc} = unit weight of final cover (pcf)

h_{fc} = thickness of final cover (ft)

Calculation of Allowable Load

The allowable load is calculated by applying modification and reduction factors to the allowable force for a geomembrane (GRI). The modification factors are taken from Koerner (2008). The following formula calculates the allowable force that can be exerted on a geosynthetic material:

$$F_{allow} = F_{lab}\left(\frac{1}{RF_{CR} \times RF_{CBD} \times MF_A}\right) \quad (4)$$

where

F_{allow} = allowable force on geosynthetic (kilonewton [kN])

F_{lab} = minimum required puncture resistance (kN)

RF_{CR} = reduction factor for long-term creep

RF_{CBD} = reduction factor for long-term chemical/biological degradation

MF_A = modification factor for the arching of solids

SUMMARY OF RESULTS

Based on the calculation for the critical loading condition during construction and during closure, the minimum factor of safety against geomembrane puncture is 264.2 and 153.3 respectively, which is higher than the recommended target factor of safety of 2.0. Detailed calculations based on the assumptions stated in the previous sections are presented in Table 1 and 2.

CONCLUSIONS AND RECOMMENDATIONS

Based on the design considerations and the results of this analysis, the following recommendations are made with respect to selecting, testing, and using the geomembrane and geotextile cushion of the cover system:

- The minimum puncture resistance of the geomembrane shall be specified as 60 lb when tested in accordance with the active version of ASTM D4833, as recommended by GRI (2021) for textured 40-mil HDPE geomembranes.
- The puncture resistance of the material to be used in the cover system shall be verified through manufacturer quality control and construction quality assurance testing.
- The cover soils should be screened to limit the maximum particle size to 1 inch.
- If larger equipment than assumed in this calculation will be used during construction, additional evaluation may be necessary.
- Based on past experience, equipment traveling on less than 3 ft of cover (but greater than 1 ft of cover) should be limited to tracked vehicles with a ground pressure of 5 psi. No equipment should travel directly on the geosynthetics.

If field conditions vary from those assumed herein, then the engineer shall be notified and this analysis shall be reevaluated based on observed field conditions.

REFERENCES

ASTM. 2013. *Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products*. ASTM International, West Conshohocken, Pennsylvania.

Caterpillar. 2023. *Caterpillar Performance Handbook*. Edition 47, Caterpillar, Peoria, Illinois, January.

GRI. 2021. *Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes*. GRI – GM13 Standard Specification. Revision 16. Geosynthetic Research Institute. Folsom, Pennsylvania. March 17.

Koerner, R.M. 2008. *Modification to the "GRI-Method" for the RFCR-Factor Used in the Design of Geotextiles for Puncture Protection of Geomembranes*. GRI White Paper #14. Geosynthetic Research Institute. Folsom, Pennsylvania. November 24.

Koerner, R.M. 2012. *Designing with Geosynthetics*. Sixth Edition, Xlibris Corporation, United States of America.

TABLES

Table 1: Material Properties, Geosynthetic Puncture Resistance - Construction Condition

Millersville Landfill and Resource Recovery Facility, Severn, Maryland

Parameter		Value	Unit
Material Properties - Protective Cover Soil			
Thickness of Protective Cover	h_{pc}	1.0	ft
Unit Weight of Protective Cover	γ_{pc}	120.0	pcf
Material Properties - Earthmoving Equipment			
Dozer Load (on each track)	W_{equip}	23937.0	lb
Dozer Track Width (from specs)	B'	3.0	ft
Dozer Track Length (from specs)	L'	10.7	ft
Dozer Track Width (on Geosynthetic)	B	4.0	ft
Dozer Track Length(on Geosynthetic)	L	11.7	ft
Required Vertical Puncuring Force			
Protrusion Height	d_a	0.5	in
Protrusion Factor	S_1	0.6	-
Shape Factor	S_2	0.6	-
Scale Factor	S_3	0.7	-
Overburden and Vehicle Pressure Applied	p'	4.4	psi
Geosynthetic Vertical Puncturing Force	F_{reqd}	0.3	lb
Estimated Allowable Force on Geosynthetic			
Geosynthetic Puncture Resistance	F_{lab}	60.0	lbs
Geosynthetic Puncture Resistance	F_{lab}	0.3	kN
Long-Term Creep	RF_{CR}	1.0	-
Chemical/Biological Degradation	RF_{CBD}	1.1	-
Modification Factor (arching of solids)	MF_A	0.8	-
Ultimate Capacity of Geosynthetic	F_{allow}	0.3	kN
Ultimate Capacity of Geosynthetic	F_{allow}	73.2	lb
Estimated Allowable Pressure on Geosynthetic			
Factor of Safety	FS	264.2	-

Notes:

ft: feet

g/m^2 : grams per square meter

in: inches

lb: pounds

kN: kilo newton

pcf: pounds per cubic foot

psi: pounds per square inch

Table 2: Material Properties, Geosynthetic Puncture Resistance - Closure Condition

Millersville Landfill and Resource Recovery Facility, Severn, Maryland

Parameter		Value	Unit
Material Properties - Protective Cover Soil			
Thickness of Protective Cover	h_{pc}	1.5	ft
Unit Weight of Protective Cover	γ_{pc}	120.0	pcf
Thickness of Asphaltic Concrete	h_{ac}	1.5	ft
Unit Weight of Asphaltic Concrete	γ_{ac}	145.0	pcf
Material Properties - Earthmoving Equipment			
Dozer Load (on each track)	W_{equip}	20000	lb
Truck Tire Width (from specs)	B'	1.96	ft
Truck Tire Length (from specs)	L'	0.94	ft
Dozer Track Width (on Geosynthetic)	B	4.96	ft
Dozer Track Length (on Geosynthetic)	L	3.94	ft
Required Vertical Puncuring Force			
Protrusion Height	d_a	0.5	in
Protrusion Factor	S_1	0.6	-
Shape Factor	S_2	0.6	-
Scale Factor	S_3	0.7	-
Overburden and Vehicle Pressure Applied	p'	11.4	psi
Geosynthetic Vertical Puncturing Force	F_{reqd}	0.7	lb
Estimated Allowable Force on Geosynthetic			
Geosynthetic Puncture Resistance	F_{lab}	60.0	lbs
Geosynthetic Puncture Resistance	F_{lab}	0.3	kN
Long-Term Creep	RF_{CR}	1.0	-
Chemical/Biological Degradation	RF_{CBD}	1.1	-
Modification Factor (arching of solids)	MF_A	0.50	-
Ultimate Capacity of Geosynthetic	F_{allow}	0.5	kN
Ultimate Capacity of Geosynthetic	F_{allow}	109.9	lb
Factor of Safety			
Factor of Safety	FS	153.3	-

Notes:

ft: feet

g/m^2 : grams per square meter

in: inches

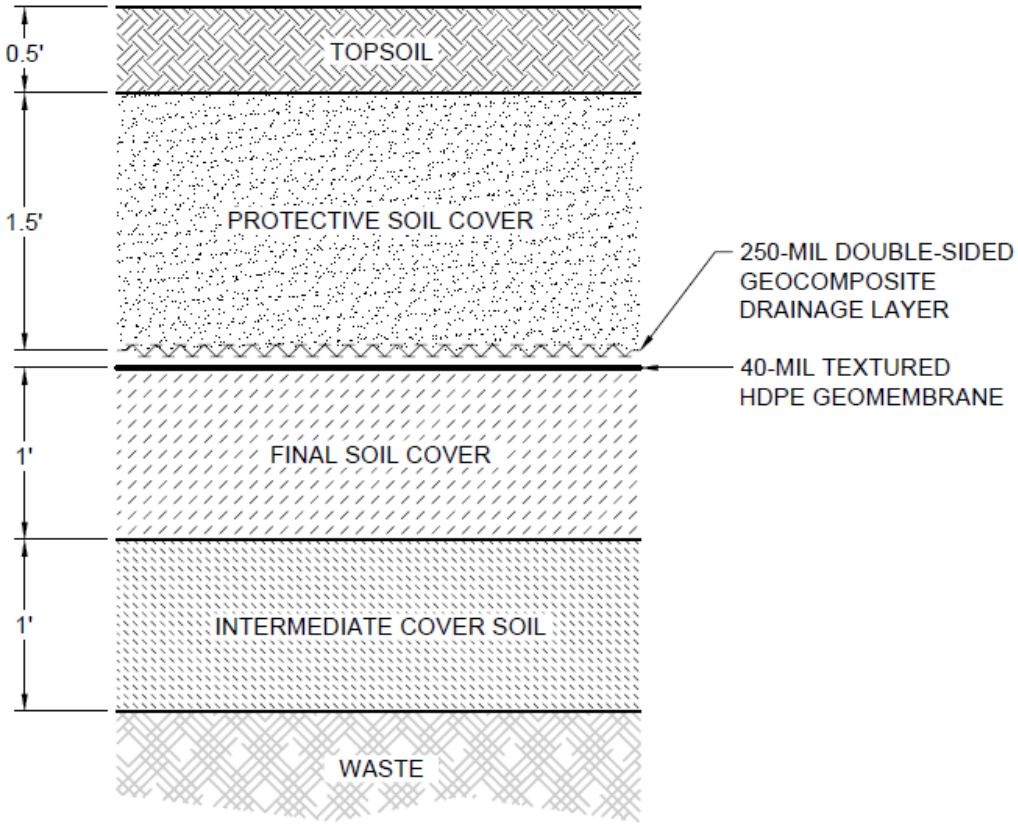
lb: pounds

kN: kilo newton

pcf: pounds per cubic foot

psi: pounds per square inch

FIGURES



TYPE I

1 / - DETAIL

FINAL COVER

SCALE: NTS

Cover System Details

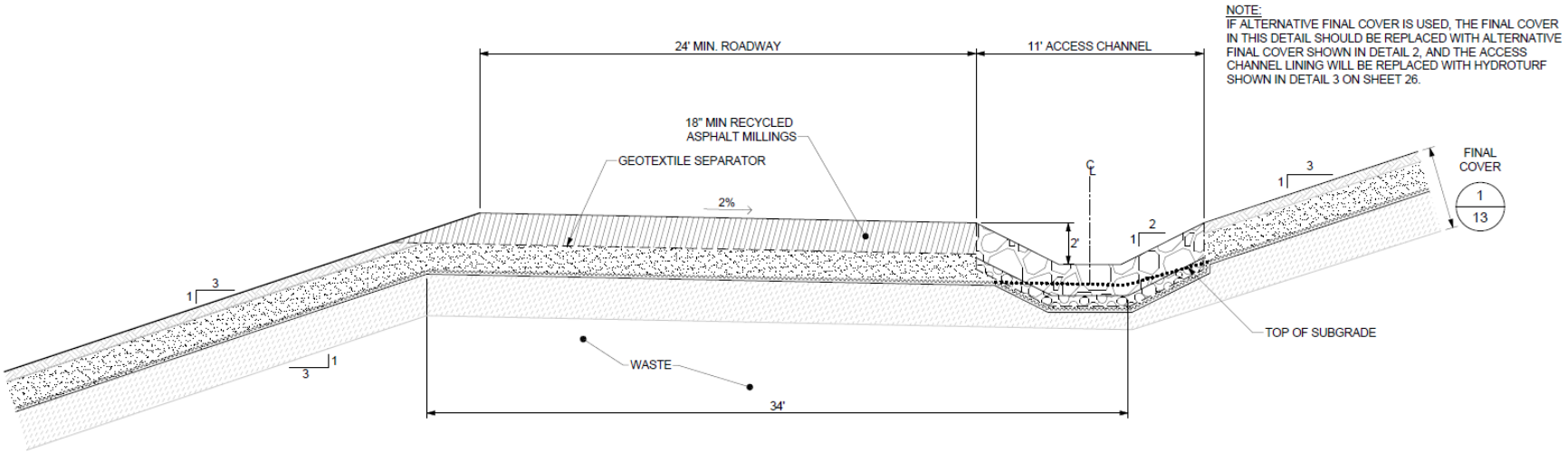
Millersville Landfill and Resource Recovery Facility
Cell 9 Vertical Expansion
Severn, Maryland

Geosyntec consultants

Project No. ME1418A | July 2025

Figure

1



3/10 DETAIL

FINAL COVER ACCESS ROAD AND DRAINAGE DITCH

SCALE: NTS

Final Cover Access Road Detail		
Millersville Landfill and Resource Recovery Facility Cell 9 Vertical Expansion Severn, Maryland		
Geosyntec consultants		Figure 2
Project No. ME1418A	July 2025	

ATTACHMENT N.2-1

Excerpts from *Designing with Geosynthetics*
(Koerner 2012)

Table 2.9 Recommended values for independent factors used in puncture analysis (dimensionless) (Koerner, 2012)

Puncturing Object	S_1	S_2	S_3
angular & relatively large	0.9	0.8	0.9
angular & relatively small	0.6	0.6	0.7
subrounded & relatively large	0.7	0.6	0.6
subrounded & relatively small	0.4	0.4	0.5
rounded & relatively large	0.5	0.4	0.4
rounded & relatively small	0.2	0.2	0.3

Table 5.16 Modification factors and reduction factors for geomembrane protection design using nonwoven needle-punched geotextiles (Koerner, 2012)

Modification Factors (all ≤ 1.0)

MF_S		MF_{PD}		MF_A	
Angular	1.0	Isolated	1.0	Hydrostatic	1.0
Subrounded	0.5	Dense, 38 mm	0.83	Geostatic, shallow	0.75
Rounded	0.25	Dense, 25 mm	0.67	Geostatic, mod.	0.50
		Dense, 12 mm	0.50	Geostatic, deep	0.25

Reduction Factors (all ≥ 1.0)

RF_{CBD}		RF_{CR}			
		Mass per unit area (gm/m^2)	Protrusion Height (mm)		
			38	25	12
Mild leachate	1.1	Geomembrane alone	N/R	N/R	N/R
Moderate leachate	1.3	270	N/R	N/R	N/R
Harsh leachate	1.5	550	N/R	N/R	1.5
		825	N/R	1.5	1.3
		≥ 1100	1.3	1.2	1.1

N/R = Not recommended

MF_S = modification factor for protrusion shape,
MF_{PD} = modification factor for packing density,
MF_A = modification factor for arching in solids,
RF_{CR} = reduction factor for long-term creep (note that these creep reduction factors have been increased since the previous editions of this book, see Koerner et al. [83]), and
RF_{CBD} = reduction factor for long-term chemical/biological degradation.

ATTACHMENT N.2-2

Excerpt from *Caterpillar Performance Handbook*
(Caterpillar 2023)

D6R Track-Type Tractor Specifications

Engine – XL/LGP

Engine Model	Cat® C9 ACERT™	
Rated Power at 1,850 rpm		
Gross Power – ISO 14396	163 kW	219 hp
Net Power – ISO 9249	149 kW	200 hp
Bore	112 mm	4.4 in
Stroke	149 mm	5.9 in
Displacement	8.8 L	537 in^3

- Net power advertised is the power available at the flywheel when engine is equipped with a fan, air cleaner, muffler and alternator.
- No deratings required up to 2286 m (7,500 ft) altitude, beyond 2286 m (7,500 ft) automatic derating occurs.
- Engine is capable to meet equivalent EPA Tier 3/EU Stage IIIA emission levels.

Transmission

1.0 Forward	3.7 km/h	2.3 mph
2.0 Forward	6.5 km/h	4.0 mph
3.0 Forward	11.3 km/h	7.0 mph
1.0 Reverse	4.8 km/h	3.0 mph
2.0 Reverse	8.3 km/h	5.1 mph
3.0 Reverse	14.4 km/h	8.9 mph

Service Refill Capacities

Fuel Tank	424 L	112 gal
Cooling System	76.8 L	20.3 gal
Engine Crankcase	28 L	7.4 gal
Power Train	145.7 L	38.5 gal
Final Drives (each)	13.6 L	3.6 gal
Roller Frames (each)	24.6 L	6.5 gal
Pivot Shaft Compartment	5 L	1.3 gal
Hydraulic Tank	51.5 L	13.6 gal

Weights

Operating Weight – XL SU	20 080 kg	44,270 lb
Operating Weight – XL A	20 257 kg	44,660 lb
Operating Weight – LGP S	21 715 kg	47,874 lb
Shipping Weight – XL	17 012 kg	37,505 lb
Shipping Weight – LGP	19 153 kg	42,225 lb

- Operating weight includes lubricants, coolant, full fuel tank, standard track, cab, hydraulic controls, drawbar and operator.
- Shipping weight includes lubricants, coolant, cab, hydraulic controls, standard track and 10 percent fuel.

Undercarriage

Width of Shoe – XL	560 mm	22 in
Width of Shoe – LGP	915 mm	36.02 in
Shoes/Side – XL	41	
Shoes/Side – LGP	45	
Grouser Height	65 mm	2.56 in
Pitch	203 mm	7.99 in
Track Gauge – XL	1880 mm	74 in
Track Gauge – LGP	2286 mm	90 in
Track on Ground – XL	2814 mm	110.8 in
Track on Ground – LGP	3245 mm	127.8 in
Ground Contact Area (STD Track) – XL	3.15 m^2	4,883 in^2
Ground Contact Area (STD Track) – LGP	5.94 m^2	9,207 in^2
Ground Pressure – XL	0.645 kg/cm^2	9.1 psi
Ground Pressure – LGP	0.366 kg/cm^2	5.2 psi

- XL with SU blade, with no rear attachments unless otherwise specified.

Hydraulic Controls – Pump

Pump Capacity at	6900 kPa	1,001 psi
RPM at Rated Engine Speed	2,125 rpm	
Pump Output	214 L/min	56.5 gal/min
Lift Cylinder Flow	190 L/min	50.2 gal/min
Tilt Cylinder Flow	80 L/min	21.1 gal/min
Ripper Cylinder Flow	160 L/min	42.3 gal/min

Hydraulic Controls – Main Relief Valve

Pressure Setting	42 000 kPa	6,092 psi

Hydraulic Controls – Maximum Operating Pressure

Bulldozer	19 300 kPa	2,799 psi
Bulldozer Tilt	19 300 kPa	2,799 psi
Tilt Cylinder	19 300 kPa	2,799 psi
Ripper (Lift)	19 300 kPa	2,799 psi
Ripper (Pitch)	19 300 kPa	2,799 psi
Steering	40 000 kPa	5,802 psi

Blades

SU-Blade Capacity	5.61 m^3	7.34 yd^3
SU-Blade Width	3260 mm	10 ft 8 in
A-Blade Capacity	3.93 m^3	5.14 yd^3
A-Blade Width	4166 mm	13 ft 8 in
LGP S-Blade Capacity	3.70 m^3	4.84 yd^3
LGP S-Blade Width	4063 mm	13 ft 4 in

Ripper

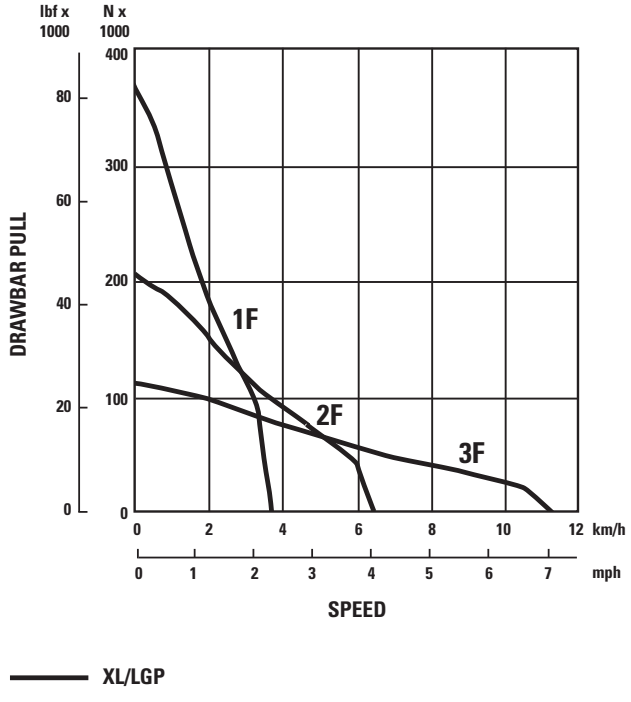
Type	Fixed Parallelogram	
Number of Pockets	3	
Overall Beam Width	2202 mm	87 in
Beam Cross Section	216 × 254 mm	8.5 × 10 in
Maximum Clearance Raised (under tip, pinned in bottom hole)	511 mm	20.1 in
Maximum Penetration	500 mm	19.7 in
Maximum Penetration Force	6603 kg	14,557 lb
Pryout Force	9134 kg	20,137 lb
Weight – with Three Shanks	1782 kg	3,932 lb

Standards

ROPS/FOPS	ROPS meets criteria SAE J395, SAE 1040 MAY94, ISO 3471-1994/ FOPS meets ISO 3449-1992 Level II
Brakes	Brakes meet criterion SAE J/ISO 10265 MAY98
Cab	Meets appropriate standards as listed below.

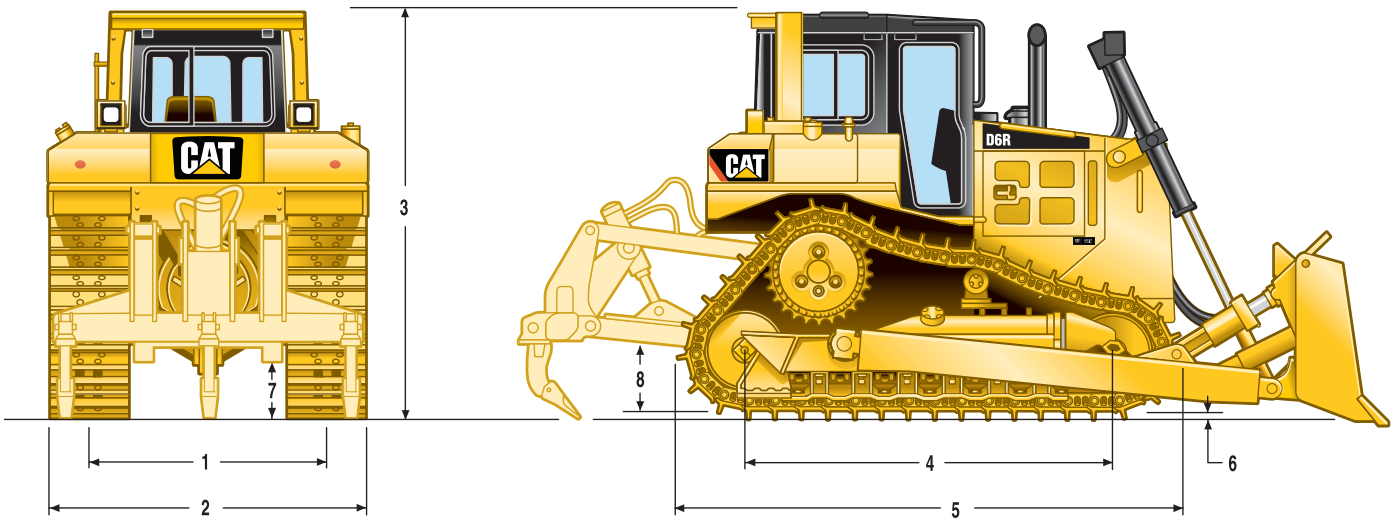
- The operator sound exposure Leq (equivalent sound pressure) measured according to the dynamic conditions in ISO 6396 is 79 dB(A) for a cab offered by Caterpillar when properly installed and maintained and with doors and windows closed when tested.
- Hearing protection may be needed when operating with an open operator station and cab (when not properly maintained or doors/windows open) for extended periods or in noisy environment.
- The exterior sound pressure level for a standard machine was measured according to the dynamic conditions in ISO 6395. On a machine equipped with a carrier roller, the sound level is 115 dB(A). On a machine without a carrier roller, the level is 114 dB(A).

D6R XL/LGP Track-Type Tractor
(EU Stage IIIA/U.S. EPA Tier 3 Equivalent)



D6R Track-Type Tractor Specifications

Dimensions



		XL	LGP
1	Track gauge	1880 mm (74 in)	2286 mm (90 in)
2	Width of tractor		
	Over trunnions	2640 mm (103.9 in)	3491 mm (137.4 in)
	Without trunnions (standard track)	2440 mm (96 in)	3201 mm (126 in)
3	Machine height from tip of grouser:		
	Stack	3143 mm (123.7 in)	3193 mm (125.7 in)
	ROPS	3195 mm (125.8 in)	3245 mm (127.8 in)
4	Length of track on ground[1]	2814 mm (110.8 in)	3245 mm (127.8 in)
5	Length of basic tractor	3860 mm (152 in)	4247 mm (167.2 in)
	With following attachments add:		
	Drawbar	217 mm (8.5 in)	251 mm (9.9 in)
	Ripper Multi-Shank (tip at ground line)	1403 mm (55.2 in)	—
	Winch	517 mm (20.4 in)	397 mm (15.6 in)
	S Blade	—	1218 mm (48 in)
	SU Blade	1472 mm (58 in)	—
	A Blade	1349 mm (53.1 in)	—
6	Height of grouser	65 mm (2.6 in)	65 mm (2.6 in)
7	Ground clearance	383 mm (15.1 in)	433 mm (17 in)
	Track pitch	203 mm (8 in)	203 mm (8 in)
	Number of shoes per side	41	45
	Number of rollers per side	7	8
	Standard shoe	560 mm (22 in)	915 mm (36 in)
	Ground contact area (standard track)	3.15 m^2 (4,883 in^2)	5.94 m^2 (9,207 in^2)
	Ground pressure[2]	0.645 kg/cm^2 (9.1 psi)	0.366 kg/cm^2 (5.2 psi)
8	Drawbar height (center of clevis from ground face of shoes)	576 mm (22.68 in)	576 mm (22.68 in)

[1] HD sealed and lubricated track. Add 48 mm (1.9 in) for XL and 22 mm (0.9 in) for LGP when fitted with SystemOne™ track.
[2] XL with SU blade, with no rear attachments unless otherwise specified.

Bulldozer Specifications

Bulldozer Specifications	S	SU	A
	LGP	XL	XL
Blade capacity (SAE J1265)	3.70 m^3 (4.84 yd^3)	5.61 m^3 (7.34 yd^3)	3.93 m^3 (5.14 yd^3)
Width (over end bits)	4063 mm (160 in)	3260 mm (128.3 in)	4166 mm (164 in)
Height	1101 mm (44 in)	1412 mm (56 in)	1155 mm (45 in)
Digging depth	655 mm (26 in)	459 mm (18 in)	524 mm (21 in)
Ground clearance	1083 mm (43 in)	1195 mm (47 in)	1205 mm (47 in)
Maximum tilt	701 mm (28 in)	743 mm (29 in)	408 mm (16 in)
Weight*	2836 kg (6,252 lb)	2973 kg (6,554 lb)	3150 kg (6,945 lb)

*Includes push arms, blade, blade tilt cylinder(s), cutting edges and miscellaneous hardware components.

D6R

Track-Type Tractor

Engine – XL/LGP		
Engine Model	Cat® C9 ACERT™	
Net Power – ISO 9249	149 kW	200 hp

Weights		
Operating Weight – XL	20 080 kg	44,270 lb
Operating Weight – LGP	21 715 kg	47,874 lb

Features

Cab and Controls
Comfort features, excellent visibility and low-effort controls help improve operator efficiency so they can stay focused and more productive on the job.

Engine and Power Train
The Cat® C9 engine with ACERT™ Technology provides optimal engine performance and reliability, is capable of meeting EPA Tier 3 and EU Stage IIIA emission levels.

Undercarriage
The Cat elevated sprocket design offers outstanding traction and balance. A variety of undercarriage configurations and components allow the machine to be matched to application needs.

Integrated Electronic Solutions
Grade control systems help improve operator efficiency and accuracy to help get more work done – on time and on budget. Flexibility is improved as well, allowing easy adjustments to specification changes on the job site. The Cat AccuGrade system and controls can be integrated from the factory for even greater system reliability.

Serviceability and Support
The D6R is designed with ease of serviceability in mind to help reduce your operating costs and keep the machine at work on the job site. And the D6R comes standard with the renowned service of the Cat dealer network. From preventive maintenance to outstanding parts and service support, Cat dealers excel at keeping you up and running.

Contents

Cab and Controls....3
Engine....4
Power Train....5
Structures....6
Undercarriage....7
Work Tools....8
Integrated Electronic Solutions....9
Serviceability....10
Total Customer Support....11
D6R Track-Type Tractor Specifications....12
D6R Standard Equipment....16
D6R Attachments....17
Notes....19

Caterpillar has been the world leader in Track-Type Tractors for more than a century. The D6R combines legendary Cat durability and reliability with proven technology designed to reduce emissions while improving your productivity and your bottom line. From rugged structures to fully integrated engine and power train systems, the D6R is a world-class tractor built to help you produce the highest quality work in a variety of applications.

Cab and Controls

Productivity, safety, comfort

Operator Environment

The D6R features a choice of an isolation-mounted, pressurized cab that reduces noise and vibration. Large, single pane windows offer good views all around the machine for maximum productivity and enhanced job site safety. The Comfort Series seat is offset by 15 degrees for better visibility. It features fully adjustable positioning and armrests to provide a comfortable platform when working on steep grades or slopes.

Gauges and warning lights on the in-dash instrument cluster are easy to read, even in direct sunlight. The Cat Monitoring System Display gives operators and service technicians easy access to operating and maintenance information. The system provides three levels of warning and system monitoring so the operator can stay informed and still concentrate on the job.

Heating and Air Conditioning vents evenly distribute airflow within the cab. The cab can also feature optional dual pane glass for extreme cold weather environments for further operator comfort.

Dozer and Ripper Controls

All D6R controls are ergonomically designed for low-effort and ease of operation. The dozer and ripper control levers feature pilot-operated hydraulics for added operator comfort and precise control. When the AccuGrade system is activated, the dozer is electro-hydraulically controlled. When the operator returns to manual control, the dozer is operated through the pilot hydraulic system.

Throttle Rocker Switch

With the touch of a finger, the rocker switch activates high or low idle. A decelerator pedal gives the operator full control of engine speed when the rocker switch is in the high idle position. Engine speed can also be easily set in any range between high and low idle by simultaneously using the decelerator pedal to set the desired speed and pressing the throttle switch in for three seconds.

Steering and Transmission Control

The operator uses a single handle control to perform all direction and gear selection. The tiller bar control allows the operator to work more precisely in close areas around structures, grade stakes and other machines. Differential Steering provides the finest modulation in the industry.

Work Tool Lock-Out Switch

The work tool lock-out valve prevents inadvertent operation of the hydraulic work tool attachments for added safety.

Engine

Power and reliability

Caterpillar is one of the world's leading engine manufacturers. Every component of a Cat® engine is carefully designed to maximize durability and reliability. Precise controls optimize power and fuel efficiency while reducing emissions. Modular design and advanced electronic diagnostics enhance the engine's serviceability.

ACERT Technology

The D6R features a Cat C9 engine with ACERT™ Technology. A series of Caterpillar innovations provide advanced electronic control, precision fuel delivery and refined air management, resulting in outstanding performance and lower emissions. To help customers work within expanding global regulatory requirements, the C9 engine with ACERT Technology can meet equivalent EPA Tier 3 and Stage IIIA emission levels.

ATAAC

The air-to-air aftercooler (ATAAC) – part of the advanced air management system – brings cool air to the engine. This increases life, reduces emissions, and helps maximize fuel efficiency.

Fuel Delivery

Multiple injection fuel delivery very precisely controls the combustion cycle. This lowers combustion chamber temperatures to reduce emissions and translates into more work output per unit of fuel. The Hydraulic Electronic Unit Injector (HEUI™) fuel system controls injection pressure over the entire engine operating speed range for complete control over injection timing, duration, and pressure.

Fractured Split Connecting Rods

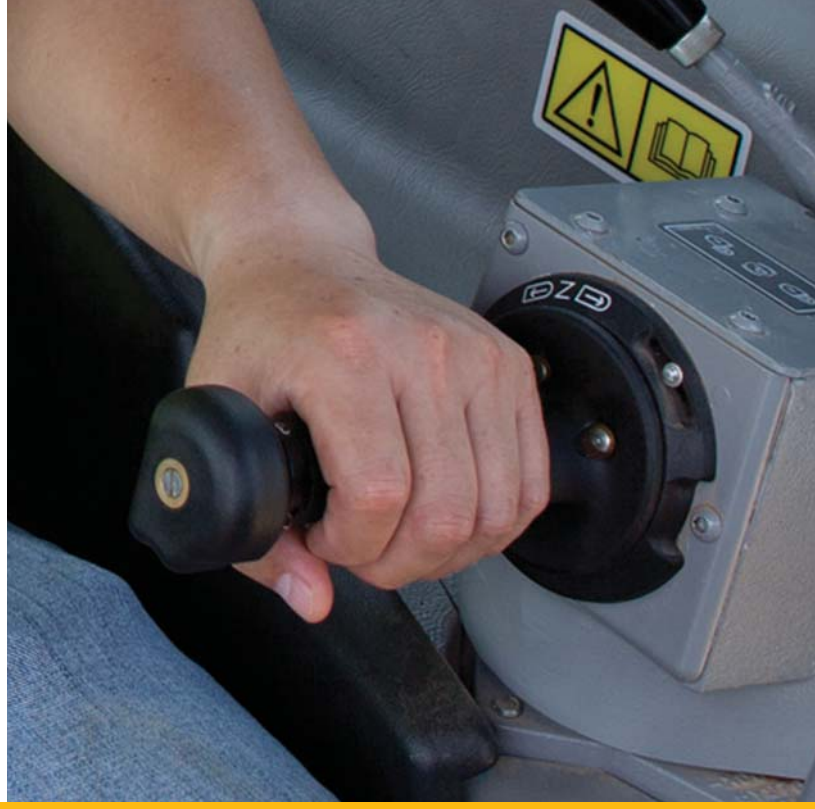
Design creates near-perfect joint alignment, maximizing rod bearing life. This, in combination with a high efficiency oil filter, ensures long engine life.

Cat Advanced High Efficiency Oil Filter

Advanced oil filters provide outstanding contamination control for a much cleaner running engine. The advanced filtration is accomplished without the shorter change intervals often required with other brands.

Cooling System

The all new cooling system includes engine radiator, Air-to-Air After Cooler (ATAAC), and hydraulic oil cooler. Engine radiator consists of two units of bar plate cooler, which are connected at the top with hose. The aluminum bar plate construction provides improved durability to debris plugging, abrasion and corrosion resistance.



Power Train

Powerful efficiency

The power shift transmission, unique Cat torque divider and differential steering are matched with the C9 engine to deliver outstanding power and reliability. The integrated system efficiently puts more power to the ground, utilizing more of the available horsepower, so you get more done with less.

Differential Steering System

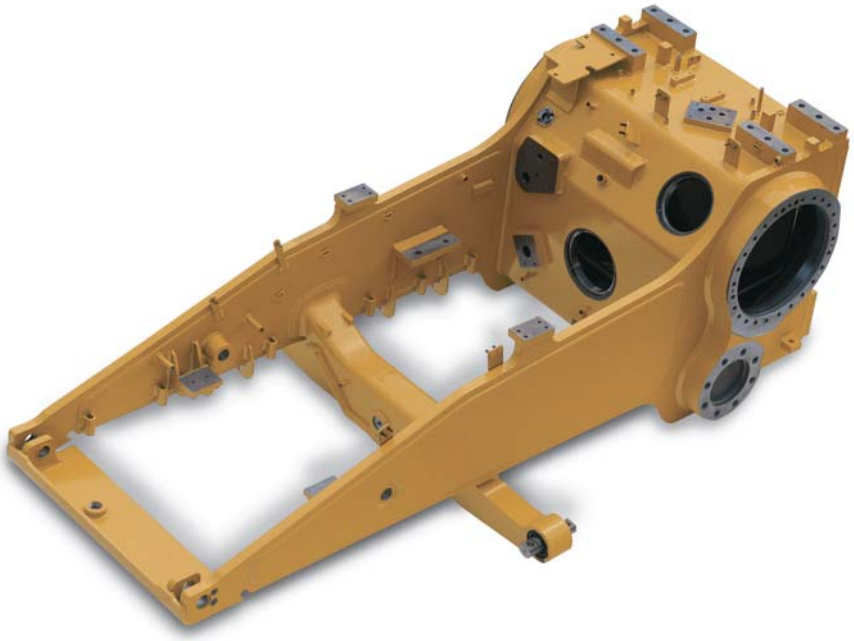
Differential steering puts you on the leading edge of productivity by maintaining power to both tracks while turning. When one track speeds up, the other slows down an equal amount. Maneuverability – especially with large blade loads – is improved, as well as cycle times in some applications. Greater load capacity, power and speed control are possible in soft underfoot conditions on steep slopes because both tracks are powered during turns. A single tiller bar controls all directional and speed functions for ease of operation.

Torque Divider

A unique Cat torque divider sends 70 percent of engine torque through a converter and 30 percent through a direct drive shaft for greater driveline efficiency and higher torque multiplication. The D6R torque divider provides high reliability and low dynamic torque. Components are designed to absorb full engine power, and deliver an optimum combination of operator efficiency and driveline reliability.

Planetary Power Shift Transmission

The transmission includes three speeds forward and three speeds reverse, featuring thick, large diameter, high capacity, oil-cooled clutches. These clutches provide higher torque capacity and increase service life. The planetary power shift transmission has a proven, robust mechanical control system. Modular transmission and differential slide into rear case for servicing ease, even when a ripper is installed. An oil-to-water cooler provides maximum cooling capacity, and forced oil flow lubricates and cools clutch packs for maximum clutch life.



Structures

Rugged design for maximum service

The foundation of every Cat dozer is a rugged frame built to absorb high impact shock loads and twisting forces. A reinforced saddle, welded front cross-member and steel castings on the main case add to the overall strength.

The pivot shaft is bolted to the mainframe and connects to the rear roller frames to allow independent oscillation. The pivot shaft distributes impact loads through the case. This design eliminates alignment problems and the need for diagonal braces on the roller frames.

The pinned equalizer bar gives the roller frames the ability to oscillate up and down to better match ground contours for maximum traction and operator comfort. Bolted end pins offer longer life and reduce downtime with improved serviceability and reliability. A remote lubrication point in the engine compartment provides easy access to lubricate the center pin of the equalizer bar as part of scheduled maintenance practices.

Ground and implement shock loads are transferred to the mainframe to protect final drives, axles and steering components from harsh impacts for longer component life.

Modular power train components make it quick to remove and repair the transmission, final drives, steering differential or brakes.

Modular undercarriage components simplify service. Lifetime lubricated idlers and track/carrier rollers provide the ability to re-use internal components and rebuild or reshell components. This reduces owning and operating costs, and saves raw materials and natural resources.

Undercarriage

Proven productivity

Since its ground-breaking introduction in 1978, more than 100,000 Cat Track-Type Tractors have been sold with the elevated sprocket "high drive" undercarriage. This is a field-proven design that offers outstanding machine performance and longer component life.

The elevated sprocket design gives the operator excellent sight lines to the blade, sides and back of the machine. However, machine center of gravity remains low, offering excellent stability, balance and traction.

Heavy Duty Undercarriage

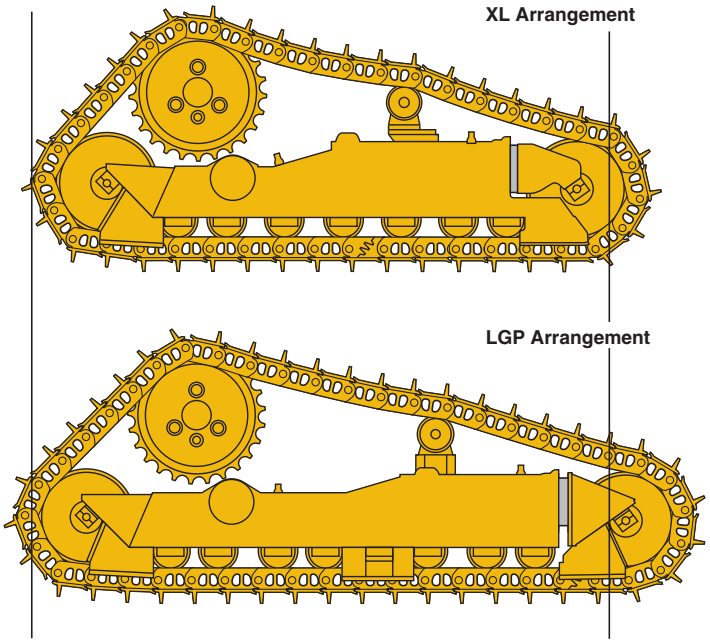
Standard Heavy Duty undercarriage components are designed for extended wear life in abrasive conditions and high impact applications like forestry, side-slopes, or working in rocky or uneven terrain. Heavy duty track is designed for enhanced penetration. The leading and trailing edges of each track shoe overlap the adjacent shoe to increase durability and component life.

SystemOne™ Undercarriage

Optional SystemOne undercarriage can help reduce total undercarriage owning and operating costs in many applications. SystemOne features lifetime sealed and lubricated cartridges to eliminate bushing turns, and sprockets require no replacement during the life of the chain designed to work and wear as a system.

Two (2) Undercarriage Arrangements are available:

- XL arrangement – More track to the front positions the tractors weight rearward, which increases traction and performance in grading applications.
- LGP arrangement – Specifically designed to work in soft or wet conditions. Wide track shoes, long track frames, and a wider machine gauge increases ground contact area and reduces ground pressure for improved stability requiring flotation in swampy conditions.



Track Shoes

Moderate Service and Extreme Service track shoes are available for both Heavy Duty and SystemOne Undercarriage to help optimize the machine based on its most frequent applications.

Work Tools

Equipped for the job

L-Shaped Push Arms

L-shaped push arms bring the blade closer to the machine, providing excellent maneuverability, balance and blade penetration. The design provides solid lateral stability and better cylinder positions for constant pry-out independent of blade height.

Load Sensing Hydraulics

Field-proven, load-sensing, pilot controlled hydraulics respond to operating requirements by automatically and continually adjusting hydraulic power to maximize work tool efficiency.

Cat Blades

Blade designs feature a strong box-section design, made from steel with high tensile strength to stand up to the most severe applications. Heavy moldboard construction and hardened bolt-on cutting edges and end bits add strength and durability.

- Semi-Universal Blade – designed for superior load retention and penetration in tightly packed materials.
- Straight Blade – versatile blade, ideal for heavier materials.
- Angle Blade – secured by outside-mounted push arms using a pinned connection that allows blade angling and tilting, left or right. Blade angle is changed manually and blade tilt is changed hydraulically.

Multi-Shank Ripper

The three-shank parallelogram style ripper is available with curved or straight ripper shanks. This ripper is an excellent tool for preparing hard-packed material before dozing operations.

Rear Counterweight

Optimize balance for backing up steep slopes or increasing performance in heavy dozing applications and if another rear attachment is not specified.

Winch

See your Cat dealer for available Winch options best suited to your applications.

Integrated Electronic Solutions

Technology to reduce costs and improve productivity

AccuGrade System for Track-Type Tractors

The AccuGrade system automates blade control for improved grading accuracy and more cost effective operation. Sensors calculate precise blade slope and elevation, then automatically adjust the blade to maintain grade. Automated blade control improves efficiency by reaching grade faster and in fewer passes, reducing the need for traditional survey stakes or grade checkers.

AccuGrade™ Ready Option

AccuGrade systems and controls can be integrated from the factory, making system installation and setup quick and easy. Integration also provides greater system protection and reliability.

AccuGrade Systems

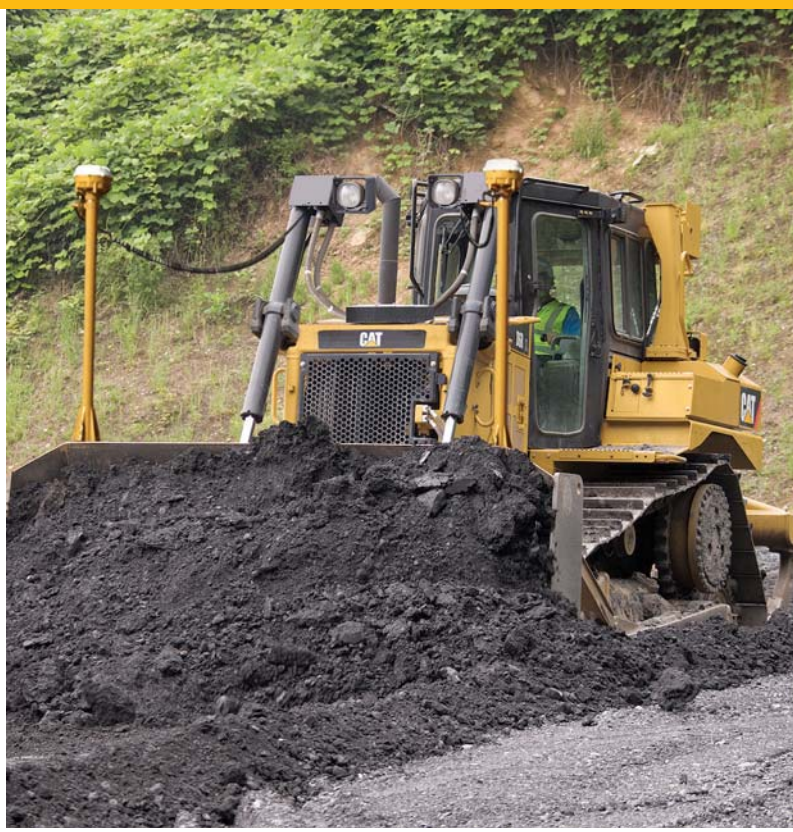
Three (3) systems are available to match the AccuGrade Ready Option integrated ex-factory selection. All calculate necessary blade adjustments to achieve grade, make automatic blade adjustments and calculate cut/fill requirements.

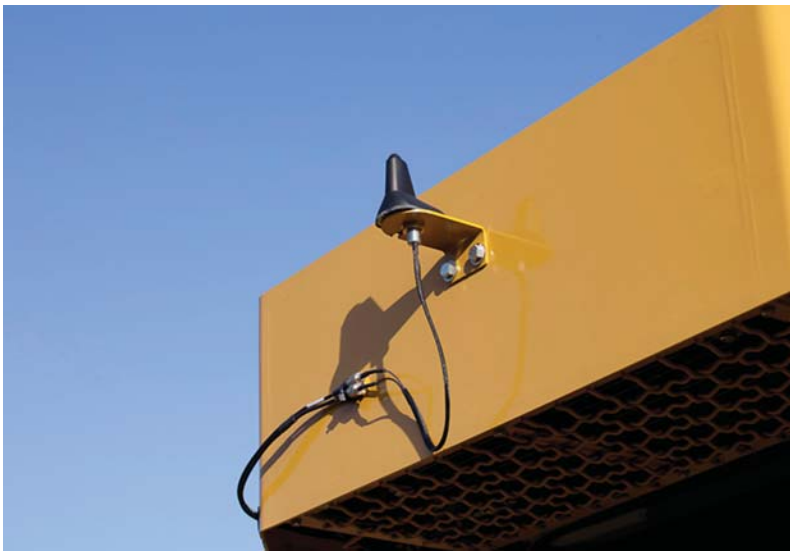
- **LASER** enables automatic blade control to execute 2D profiles and requires direct line of sight to a LASER transmitter. Field-proven and versatile, the dual laser system is ideal for fine grading of sites with flat, single or dual slope surfaces, such as industrial, commercial and residential building sites.
- **Universal Total Station (UTS)** is a high accuracy dynamic system to track a machine and monitor blade positioning. The UTS instrument continuously measures the target's position and transmits real-time positioning data to the operator via the in-cab display showing the exact position of the blade in relation to desired design.
- **Global Satellite Navigation Control Systems** are the best solution when a site involves contours, rather than single or dual slope planes. This technology uses Satellite Navigation to compare a blades position to a 3D computerized site plan and signals the operator, or automatically through the hydraulic system, to maneuver the blade to achieve the design.

Product Link

The optional Product Link* system is a factory installed or easily retrofitted wireless system that simplifies equipment fleet tracking. Using satellite or cellular technology, it automatically reports key machine parameters such as location, machine hours, active and logged service codes and security alarms.

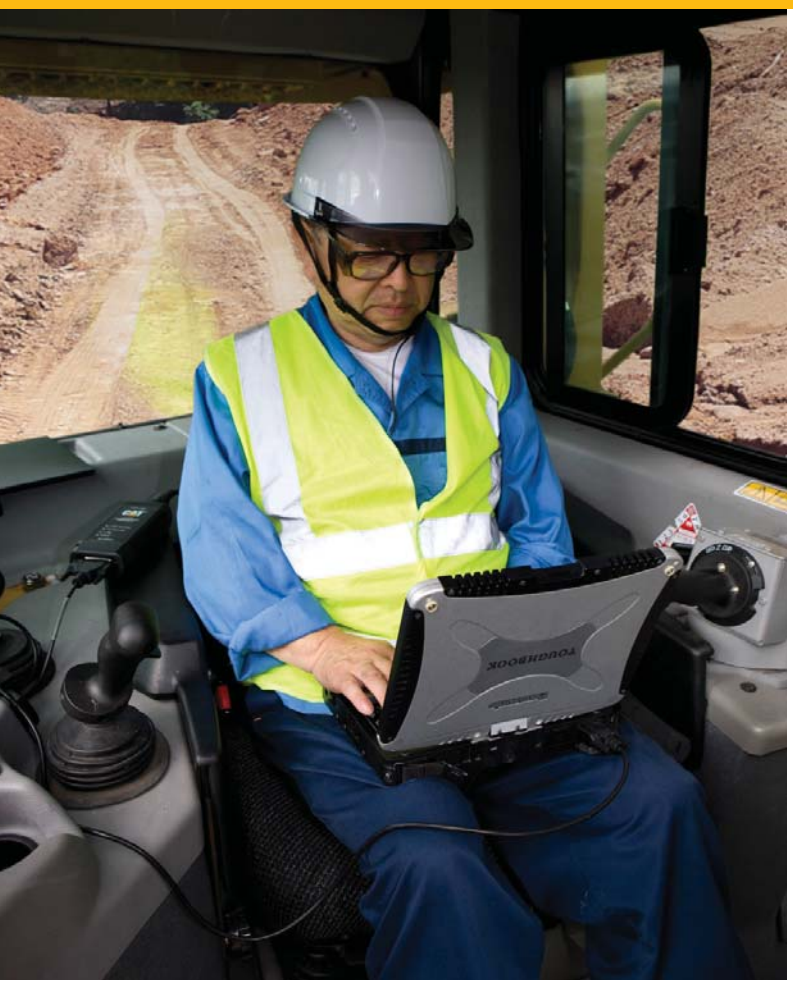
* Product Link licensing not available in all areas.





Serviceability

Stay up and running



Cat machines are designed with serviceability in mind. Modular components, easy access to regular service points and features that enable quicker diagnostics all add up to less maintenance time and more time on the job.

Cat Monitoring System

The D6R features a monitoring system that provides feedback to operators with easy-to-read gauges and warning lamps that allows the operator to concentrate on the job at hand.

With the use of a Cat Electronic Technician (ET), your Cat dealer can determine historical performance parameters of the machine.

The Cat Monitoring System is designed to:

- Reduce downtime
- Match software to unique application needs
- Provide feedback on machine performance events

Scheduled Oil Sampling (S•O•S℠) Analysis

Monitor machine health and identify key maintenance needs before they lead to downtime through Cat Scheduled Oil Sampling. Cat machines feature live sampling ports for the engine oil, power train hydraulics and coolant. Cat oil sampling offers accurate analysis using tests designed by Caterpillar for Cat products, as well as knowledgeable interpretation of the results.

Built to be Rebuilt

Major components on the D6R are built to be rebuilt, extending the useful life of the machine. Machine and component rebuilds save money, and offer a sustainability element by saving raw materials and natural resources. See your Cat dealer to learn more about rebuild options.

Total Customer Support

Renowned dealer support

Only Cat machines come with the industry's best sales and service support – the Cat Dealer network. From helping you choose the right machine to ongoing support, your Cat dealer provides the best in sales and service. Manage your costs with preventive maintenance programs like Custom Track Service, Scheduled Oil Sampling (S•O•S^{SM}) analysis, and guaranteed maintenance contracts. Stay productive with best-in-class parts availability. Your Cat dealer can even help with operator training to help you boost your profits.

And when it's time for replacement, your Cat dealer can help you save even more with Genuine Cat Remanufactured parts. Remanufactured power train and hydraulic components cost less, but come with the same warranty and reliability as new products. Talk with your Cat dealer to learn more about reducing waste and saving money through Cat Remanufacturing.

D6R Track-Type Tractor Specifications

Engine – XL/LGP

Engine Model	Cat® C9 ACERT™	
Rated Power at 1,850 rpm		
Gross Power – ISO 14396	163 kW	219 hp
Net Power – ISO 9249	149 kW	200 hp
Bore	112 mm	4.4 in
Stroke	149 mm	5.9 in
Displacement	8.8 L	537 in^3

- Net power advertised is the power available at the flywheel when engine is equipped with a fan, air cleaner, muffler and alternator.
- No deratings required up to 2286 m (7,500 ft) altitude, beyond 2286 m (7,500 ft) automatic derating occurs.
- Engine is capable to meet equivalent EPA Tier 3/EU Stage IIIA emission levels.

Transmission

1.0 Forward	3.7 km/h	2.3 mph
2.0 Forward	6.5 km/h	4.0 mph
3.0 Forward	11.3 km/h	7.0 mph
1.0 Reverse	4.8 km/h	3.0 mph
2.0 Reverse	8.3 km/h	5.1 mph
3.0 Reverse	14.4 km/h	8.9 mph

Service Refill Capacities

Fuel Tank	424 L	112 gal
Cooling System	76.8 L	20.3 gal
Engine Crankcase	28 L	7.4 gal
Power Train	145.7 L	38.5 gal
Final Drives (each)	13.6 L	3.6 gal
Roller Frames (each)	24.6 L	6.5 gal
Pivot Shaft Compartment	5 L	1.3 gal
Hydraulic Tank	51.5 L	13.6 gal

Weights

Operating Weight – XL SU	20 080 kg	44,270 lb
Operating Weight – XL A	20 257 kg	44,660 lb
Operating Weight – LGP S	21 715 kg	47,874 lb
Shipping Weight – XL	17 012 kg	37,505 lb
Shipping Weight – LGP	19 153 kg	42,225 lb

- Operating weight includes lubricants, coolant, full fuel tank, standard track, cab, hydraulic controls, drawbar and operator.
- Shipping weight includes lubricants, coolant, cab, hydraulic controls, standard track and 10 percent fuel.

Undercarriage

Width of Shoe – XL	560 mm	22 in
Width of Shoe – LGP	915 mm	36.02 in
Shoes/Side – XL	41	
Shoes/Side – LGP	45	
Grouser Height	65 mm	2.56 in
Pitch	203 mm	7.99 in
Track Gauge – XL	1880 mm	74 in
Track Gauge – LGP	2286 mm	90 in
Track on Ground – XL	2814 mm	110.8 in
Track on Ground – LGP	3245 mm	127.8 in
Ground Contact Area (STD Track) – XL	3.15 m^2	4,883 in^2
Ground Contact Area (STD Track) – LGP	5.94 m^2	9,207 in^2
Ground Pressure – XL	0.645 kg/cm^2	9.1 psi
Ground Pressure – LGP	0.366 kg/cm^2	5.2 psi

- XL with SU blade, with no rear attachments unless otherwise specified.

Hydraulic Controls – Pump

Pump Capacity at	6900 kPa	1,001 psi
RPM at Rated Engine Speed	2,125 rpm	
Pump Output	214 L/min	56.5 gal/min
Lift Cylinder Flow	190 L/min	50.2 gal/min
Tilt Cylinder Flow	80 L/min	21.1 gal/min
Ripper Cylinder Flow	160 L/min	42.3 gal/min

Hydraulic Controls – Main Relief Valve

Pressure Setting	42 000 kPa	6,092 psi

Hydraulic Controls – Maximum Operating Pressure

Bulldozer	19 300 kPa	2,799 psi
Bulldozer Tilt	19 300 kPa	2,799 psi
Tilt Cylinder	19 300 kPa	2,799 psi
Ripper (Lift)	19 300 kPa	2,799 psi
Ripper (Pitch)	19 300 kPa	2,799 psi
Steering	40 000 kPa	5,802 psi

Blades

SU-Blade Capacity	5.61 m^3	7.34 yd^3
SU-Blade Width	3260 mm	10 ft 8 in
A-Blade Capacity	3.93 m^3	5.14 yd^3
A-Blade Width	4166 mm	13 ft 8 in
LGP S-Blade Capacity	3.70 m^3	4.84 yd^3
LGP S-Blade Width	4063 mm	13 ft 4 in

Ripper

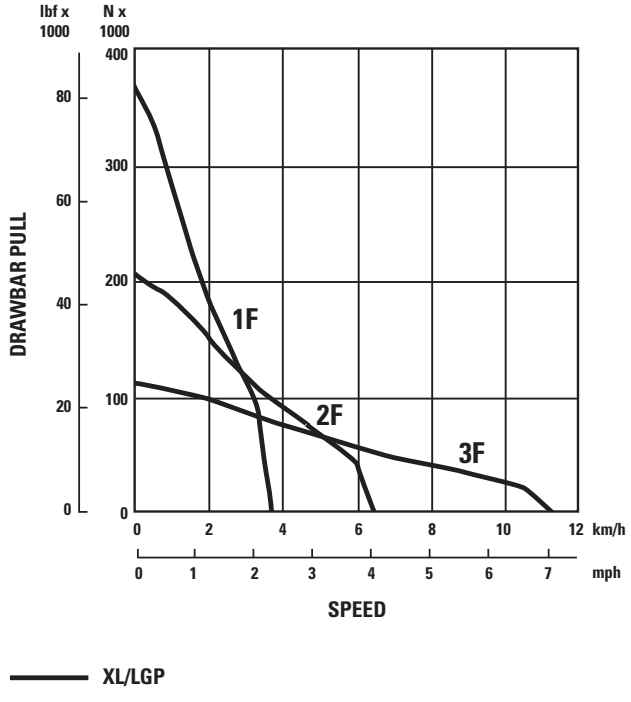
Type	Fixed Parallelogram	
Number of Pockets	3	
Overall Beam Width	2202 mm	87 in
Beam Cross Section	216 × 254 mm	8.5 × 10 in
Maximum Clearance Raised (under tip, pinned in bottom hole)	511 mm	20.1 in
Maximum Penetration	500 mm	19.7 in
Maximum Penetration Force	6603 kg	14,557 lb
Pryout Force	9134 kg	20,137 lb
Weight – with Three Shanks	1782 kg	3,932 lb

Standards

ROPS/FOPS	ROPS meets criteria SAE J395, SAE 1040 MAY94, ISO 3471-1994/ FOPS meets ISO 3449-1992 Level II
Brakes	Brakes meet criterion SAE J/ISO 10265 MAY98
Cab	Meets appropriate standards as listed below.

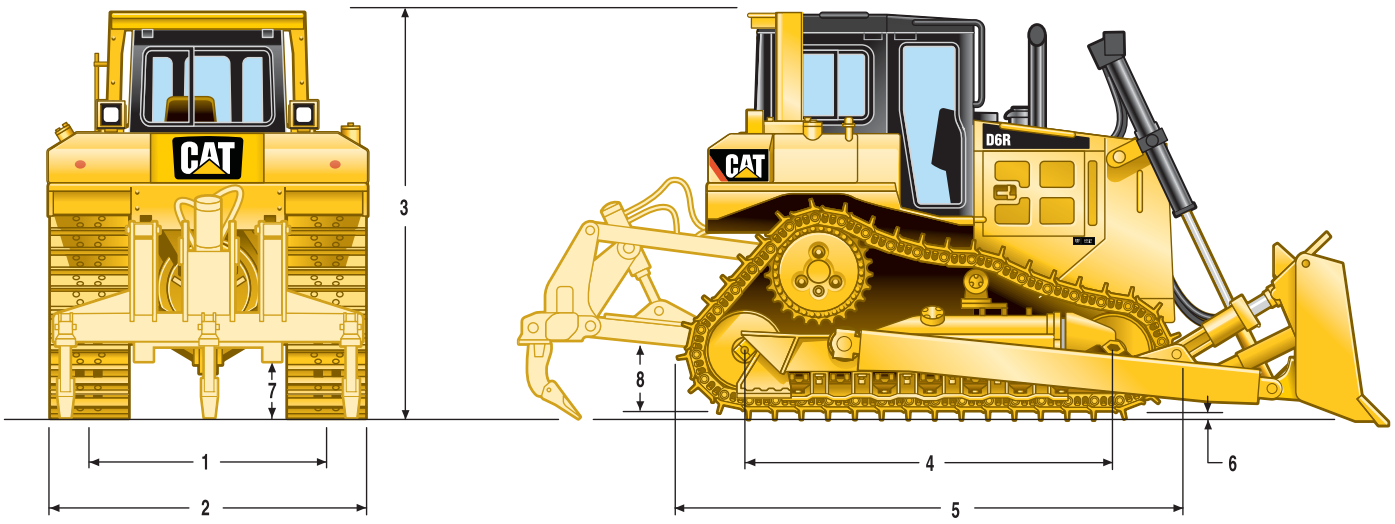
- The operator sound exposure Leq (equivalent sound pressure) measured according to the dynamic conditions in ISO 6396 is 79 dB(A) for a cab offered by Caterpillar when properly installed and maintained and with doors and windows closed when tested.
- Hearing protection may be needed when operating with an open operator station and cab (when not properly maintained or doors/windows open) for extended periods or in noisy environment.
- The exterior sound pressure level for a standard machine was measured according to the dynamic conditions in ISO 6395. On a machine equipped with a carrier roller, the sound level is 115 dB(A). On a machine without a carrier roller, the level is 114 dB(A).

D6R XL/LGP Track-Type Tractor
(EU Stage IIIA/U.S. EPA Tier 3 Equivalent)



D6R Track-Type Tractor Specifications

Dimensions



		XL	LGP
1	Track gauge	1880 mm (74 in)	2286 mm (90 in)
2	Width of tractor		
	Over trunnions	2640 mm (103.9 in)	3491 mm (137.4 in)
	Without trunnions (standard track)	2440 mm (96 in)	3201 mm (126 in)
3	Machine height from tip of grouser:		
	Stack	3143 mm (123.7 in)	3193 mm (125.7 in)
	ROPS	3195 mm (125.8 in)	3245 mm (127.8 in)
4	Length of track on ground[1]	2814 mm (110.8 in)	3245 mm (127.8 in)
5	Length of basic tractor	3860 mm (152 in)	4247 mm (167.2 in)
	With following attachments add:		
	Drawbar	217 mm (8.5 in)	251 mm (9.9 in)
	Ripper Multi-Shank (tip at ground line)	1403 mm (55.2 in)	—
	Winch	517 mm (20.4 in)	397 mm (15.6 in)
	S Blade	—	1218 mm (48 in)
	SU Blade	1472 mm (58 in)	—
	A Blade	1349 mm (53.1 in)	—
6	Height of grouser	65 mm (2.6 in)	65 mm (2.6 in)
7	Ground clearance	383 mm (15.1 in)	433 mm (17 in)
	Track pitch	203 mm (8 in)	203 mm (8 in)
	Number of shoes per side	41	45
	Number of rollers per side	7	8
	Standard shoe	560 mm (22 in)	915 mm (36 in)
	Ground contact area (standard track)	3.15 m^2 (4,883 in^2)	5.94 m^2 (9,207 in^2)
	Ground pressure[2]	0.645 kg/cm^2 (9.1 psi)	0.366 kg/cm^2 (5.2 psi)
8	Drawbar height (center of clevis from ground face of shoes)	576 mm (22.68 in)	576 mm (22.68 in)

[1] HD sealed and lubricated track. Add 48 mm (1.9 in) for XL and 22 mm (0.9 in) for LGP when fitted with SystemOne™ track.
[2] XL with SU blade, with no rear attachments unless otherwise specified.

Bulldozer Specifications

Bulldozer Specifications	S	SU	A
	LGP	XL	XL
Blade capacity (SAE J1265)	3.70 m^3 (4.84 yd^3)	5.61 m^3 (7.34 yd^3)	3.93 m^3 (5.14 yd^3)
Width (over end bits)	4063 mm (160 in)	3260 mm (128.3 in)	4166 mm (164 in)
Height	1101 mm (44 in)	1412 mm (56 in)	1155 mm (45 in)
Digging depth	655 mm (26 in)	459 mm (18 in)	524 mm (21 in)
Ground clearance	1083 mm (43 in)	1195 mm (47 in)	1205 mm (47 in)
Maximum tilt	701 mm (28 in)	743 mm (29 in)	408 mm (16 in)
Weight*	2836 kg (6,252 lb)	2973 kg (6,554 lb)	3150 kg (6,945 lb)

*Includes push arms, blade, blade tilt cylinder(s), cutting edges and miscellaneous hardware components.

D6R Standard Equipment

Standard equipment may vary. Consult your Cat dealer for details.

ELECTRICAL
- Alarm, backup
- Alternator, 70-Amp, brushless
- Batteries, 2 maintenance free 12V (24V system)
- Converter, 12V, 10-Amp w/2 outlets
- Connector, diagnostic
- Lights, 4 (2 mounted on the lift cylinder facing forward, 2 mounted on the fuel tank facing rearward)
- Electric start, 24V
- Horn, forward warning

OPERATOR ENVIRONMENT
- Air conditioner, under-hood
- Armrest, adjustable
- Cab, ROPS/FOPS
- Decelerator pedal
- Differential steering control
- Electronic Monitoring System (EMS) with coolant temperature, power train oil, hydraulic oil and fuel gauge, tachometer, and diagnostic functions
- Foot pads, dash
- Heater
- Hydraulic controls, pilot operated with electronic deactivation switch
- Mirror, rearview
- Radio ready
- Seat, adjustable contour suspension
- Seatbelt, retractable, 76 mm (3 in)
- Throttle switch, electronic
- Wipers, two (2) speed

POWER TRAIN
- Cat C9 (8.8 L) diesel
- Aluminum bar plate radiator cooling system
- Air cleaner, precleaner with strata tube dust ejector
- Air filter with electronic service indicator
- After-cooler, air to air (ATAAC)
- Coolant, extended life
- Fan, blower, direct drive
- Final drives, 3-planet single reduction planetary
- Fuel priming pump, electric
- Muffler with mitered stack
- Parking brake
- Prescreener
- Torque divider
- Planetary transmission, mechanical power shift 3F/3R speeds
- Turbocharger, waste-gate
- Water separator

UNDERCARRIAGE
- Carrier rollers, lifetime lubricated (XL and LGP)
- Equalizer bar
- Guards, end track guiding
- Guards, center track guiding (LGP)
- Idlers, lifetime lubricated
- Rollers, lifetime lubricated track
- Track roller frames, tubular
- Track adjusters, hydraulic
- Sprocket rim segments, replaceable
- Track, HD S & L, moderate service
  - XL arrangement: 560 mm (22 in), 41-section
  - LGP arrangement: 915 mm (36 in), 45-section

OTHER STANDARD EQUIPMENT
- Parts book – CD ROM
- Operation and Maintenance Manual – Paper
- Engine enclosures, perforated
- Front pull device
- Guards, hinged bottom
- Mounting, lift cylinder
- Lift cylinder with lines, LH
- Lift cylinder with lines, RH
- Hood, perforated
- Hydraulics, load sensing, dozer lift and tilt
- Oil cooler, hydraulic
- Product Link ready
- Radiator doors, louvered, hinged, fan blast deflector
- Sampling ports
  - Engine oil
  - Power train oil
  - Hydraulic oil
  - Engine coolant
- Tool box
- Vandalism protection
- Padlocks for battery compartment and fuel drain valve
- Padlock capable compartments

Weights are approximate.

	Additional Weight	
	kg	lb
ELECTRICAL		
Alternator, 150-Amp	–1	–2
Converter, 24V to 12V	2	4
Lights, additional 2 fwd, ROPS mounted	17	36
Lights, additional 2 fwd, lift cylinder mounted	6	12
ELECTRONICS		
Cat Product Link PL321 – Satellite	9	19
Cat Product Link PL522 – Cellular	9	19
GUARDS		
Guard, heavy-duty crankcase	164	362
Guard, heavy-duty radiator grill	44	96
Guard, fuel tank, without rear attachment	151	333
Guard, fuel tank, with rear attachment	158	348
Screen, rear	65	143
Striker bars, front, XL	399	879
Striker bars, front, LGP	460	1,014
OPERATOR ENVIRONMENT		
ROPS/FOPS canopy with vinyl seat	–358	–789
Air conditioner, ROPS cab mounted	114	251
Seat, cloth, air suspension	4	9
POWER TRAIN		
Drains, ecology, power train	3	6
Grid, radiator core protector	27	60
Prescreener, raised	–2	–4
Precleaner, turbine with screen	13	28
Heavy-duty batteries and starter	61	134
Fan, increased speed	10	21

	Additional Weight	
	kg	lb
UNDERCARRIAGE		
Heavy-duty, sealed and lubricated track		
41-section XL track roller frame		
560 mm (22 in) ES	150	331
610 mm (24 in) MS	72	159
610 mm (24 in) MS, TRAP-hole	20	44
45-section LGP track roller frame		
914 mm (36 in) ES, TRAP-hole, LGP	268	591
991 mm (39 in) self-cleaning, LGP	24	53
SystemOne™ track		
41-section XL track roller frame		
560 mm (22 in) ES, XL	–1315	–2,899
610 mm (24 in) ES, XL	–1232	–2,716
45-section LGP track roller frame		
914 mm (36 in) ES, LGP	278	613
Guards, track guiding, HD S & L		
Guide, track, moderate service, XL	197	434
Guide, track, moderate service, LGP	196	432
Guide, track, full length, XL	284	626
Guide, track, full length, LGP	242	534
Guards, track guiding, SystemOne™		
Guide, track, full length, XL	243	536
Guide, track, full length, LGP	275	606

	Additional Weight	
	kg	lb
OTHER ATTACHMENTS		
Rigid drawbar, long	117	258
Rear counterweight	781	1,722
Additional rear counterweight slab	342	753
Multi-shank ripper with 3 curved shanks	1848	4,074
Straight ripper shanks, set of 3	192	423
TECHNOLOGY PRODUCTS		
Installation, AccuGrade® ready, cab	29	63
HYDRAULICS		
Hydraulics, AccuGrade®, with rear attachments	11	23
Hydraulics, AccuGrade®, without rear attachments	11	24
Hydraulics, rear ripper	31	67
FEATURE PACKAGES		
Cold Weather Package	82	181
Includes: HD batteries, HD starter, 220V heater – engine coolant, heater – diesel fuel, solid engine hood, reversible fan, anti-freeze (–50° C/–58° F), ether starting aid, automatic.		
Cold Weather Package, Extreme	72	159
Includes: cab with dual pane glass, higher degree thermostat, arctic fluids (engine, pivot shaft, implement hydraulics and final drives).		
Waste Handling Packages, XL and LGP	934	2,059
Includes: 95-Amp ducted and sealed alternator, ES crankcase guard, HD radiator louvered guard, final drive and idler seal guard, turbine precleaner with screen, thermal shield, dozer line guards, chassis guards and seal.		
Sweep Package	381	840
Includes: sweep, lights (8) and guards.		

D6R Attachments

Weights are approximate.

	Additional Weight	
	kg	lb
FIELD INSTALLED ATTACHMENTS		
Guard, clamshell, final drive, XL	128	281
Guard, clamshell, final drive, LGP	209	460
Carrier roller kit	114	251

	Individual Component Weight	
	kg	lb
BULLDOZER		
Includes: tilt cylinder and hydraulic lines, brace, push-arms and trunnions		
Bulldozer Package, XL, A	1646	3,629
Bulldozer Package, XL, SU	1168	2,575
Bulldozer Package, LGP	1117	2,463
BULLDOZER ATTACHMENTS		
6SLGP blade	1323	2,917
6SUXL blade	1291	2,846
6AXL blade	1177	2,595
6SUXL landfill blade with trash rack	1654	3,646
6SLGP landfill blade with trash rack	1442	3,179
6SUXL blade with AccuGrade® mounting	1502	3,311
6SLGP blade with AccuGrade® mounting	1530	3,373

Notes

D6R Track-Type Tractor

For more complete information on Cat products, dealer services, and industry solutions, visit us on the web at **www.cat.com**

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AEHQ6786 (09-2012)

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Geosyntec
consultants

APPENDIX N.3

Final Cover System Veneer Stability Analysis

CALCULATION COVER SHEET

Client: **Anne Arundel County** Project: **Millersville Cell 9 Vertical Expansion** Project/ Proposal No.: **ME1418A** Phase/ Task No. **03/02**

Title of Calculation **Cover System Veneer Stability Analysis**

Calculations Prepared by:	Signature		05/19/2025
	Printed Name	Daniel Espinoza	Date
	Title	Senior Staff Professional	
Assumptions and Procedures Checked by: (Assumption and Procedure Checker, APC)	Signature	Jonas Bauer	05/21/2025
	Printed Name	Jonas Bauer	Date
	Title	Project Engineer	
Computations Checked by: (Computation Checker, CC)	Signature	Jonas Bauer	05/21/2025
	Printed Name	Jonas Bauer	Date
	Title	Project Engineer	
Computations backchecked by: (Computation Preparer, CP)	Signature		05/22/2025
	Printed Name	Daniel Espinoza	Date
	Title	Senior Staff Professional	
Approved by: (Calculation Approver, CA)	Signature	Meena Viswanath	07/24/2025
	Printed Name	Meena Viswanath	Date
	Title	Senior Engineer	

Approval notes:

Submittal History (Number and initial all submittals)

No.	Description	Date	CP	APC	CC	CA

COVER SYSTEM VENEER STABILITY ANALYSIS

INTRODUCTION AND PURPOSE

This cover system veneer stability analysis has been prepared in support of the vertical expansion of Cell 9 at Millersville Landfill and Resource Recovery Facility (MLFRRF) located in Severn, Maryland. The expansion of Cell 9 includes increasing the external side slopes from 4H:1V to 3H:1V and raising the final permitted elevation from 244 feet (National Geodetic Vertical Datum of 1929 [NGVD29]) to 285 ft NGVD29. Cell 9 comprises 5 subcells (9.1 through 9.5), of which Subcells 9.1 and 9.2 have already been constructed and Subcell 9.3 is currently under construction. This analysis will focus on the most critical condition of the final cover slope.

DATA AND INFORMATION SOURCES

Since the calculation presented here utilizes the proposed landfill geometry to back-calculate the minimum required interface friction properties, no interface friction information specific to Cell 9 was used. However, historical interface friction laboratory data from other landfills in Maryland designed by Geosyntec Consultants, Inc. (Geosyntec) were reviewed to evaluate whether the measured properties at those landfills would have met the interface friction parameters being specified for Cell 9, in order to demonstrate that such parameters are achievable using readily available products. The data from these landfills (Millersville Landfill Subcell 9.2, Midshore II Landfill Cell 3, and Newland Park Landfill Cell 9) are presented in Attachment N.3-1 and summarized in Table 1.

METHOD AND PARAMETERS

This analysis was performed to calculate the minimum required interface friction angle against shear failure for the components of the proposed cover system.

The proposed cover system (Figure 1) consists of the following layers (from top to bottom):

- 6-inch-thick topsoil layer
- 18-inch-thick protective cover soil with a hydraulic conductivity greater than 5×10^{-3} centimeters per second (cm/sec)
- 250-mil leachate collection geocomposite drainage layer
- 40-mil textured high-density polyethylene (HPDE) geomembrane
- 12-inch-thick final cover soil base grading layer
- 12-inch-thick intermediate cover soil base grading layer

A plan view with the proposed final cover grades for MLFRRF is presented in Figure 2. Tack-on diversion benches will be installed on the sideslopes of the final cover grades, as shown on Figure 2. The maximum vertical height between these diversion berms is 30 feet. Along the 3H:1V slope, the slope length is 95 ft.

The peak and large displacement values are given for both friction angle and adhesion for the historical interface friction laboratory data. Peak friction angles are calculated using the maximum shear strength that a sample can undergo. Residual/large displacement measurements are calculated using the strength of a sample after the sample has undergone a large strain (usually around 3 inches). For this analysis, peak friction angles were considered most relevant to the veneer stability failure mechanism.

EVALUATION/ANALYSIS TOOLS

For this calculation, Excel was used to calculate the factor of safety for veneer stability, and Hydrologic Evaluation of Landfill Performance (HELP) model 4.0.1 (United States Environmental Protection Agency [USEPA] 2020) was used to calculate the average and maximum head along the slope.

INPUT PARAMETERS AND ASSUMPTIONS

The input parameters and the assumptions used for calculating the factor of safety of the geomembrane against puncture are discussed in detail in this section.

Material Properties

In a veneer slope stability analysis, the unit weight and strength of the material that buttresses the veneer at the toe of the slope (e.g., protective drainage layer) and the strength of the weakest interface are required to calculate the factor of safety, as this presents the most critical case for veneer failure. Figure 3 presents typical values for compacted dry unit weight, and friction angle for different soil types (Unified Facilities Criteria [UFC] 2025). These values, along with site specific data, were used to choose representative soil properties for the final cover soils (poorly graded sand at 50% relative density) in Cell 9. The values chosen for this analysis are shown in Table 2.

The interfaces in the cover system used for comparison with back-calculated shear strength values are as follows:

- Interface 1: Between the protective cover soil and the geocomposite
- Interface 2: Between the geocomposite and the HDPE geomembrane

- Interface 3: Between the HDPE geomembrane and the final cover soil base grading layer

Water Flow Conditions

When analyzing veneer stability, water flow must be considered. The depth of water above the geomembrane was calculated using the HELP model Version 4.0.1 (USEPA 2022). The model analyzed by HELP was a 3H:1V slope with a drainage distance of 95 feet (ft; based on a maximum 30-foot-high slope between diversion berms). Because this analysis is for final cover conditions, the simulation was conducted for 30 years. A hydraulic conductivity of 4.05 cm/sec was selected for the geocomposite layer. This hydraulic conductivity is consistent with that used for the final cell condition in the leachate generation calculations (Appendix F.1 of this report). Based on the results of the HELP model (Attachment N.3-2), the peak daily values for hydraulic head (water pressure normalized by the unit weight of water) above the geomembrane on the slope are 0.0029 inches and 0.2131 inches for the average and maximum head along the slope, respectively.

Average head along slope (inches)	Maximum head along slope (inches)
0.0094	0.0124

For this analysis, it is conservatively assumed that the head of the water along the slope is equal to the thickness of the geocomposite (i.e., 0.25 inches).

PERFORMANCE CRITERIA

According to the USEPA technical manual *Solid Waste Disposal Facility Criteria* (USEPA 1993), when there is no imminent danger to human life or threat of major environmental impact, the minimum recommended slope stability factor of safety is 1.25. A veneer stability failure of the liner system is unlikely to pose an imminent threat to human life or the environment, and a failure could be repaired relatively easily. Therefore, the stability of the liner systems will be considered acceptable if the factor of safety is greater than or equal to 1.25.

ANALYSIS AND EVALUATION APPROACH

Veneer stability of the cover system immediately after the protective soil cover is placed and before any buttressing waste is placed was evaluated using the sliding wedge failure analysis method outlined by Giroud et al. (1995) for geosynthetic-soil layered systems along a critical interface of a finite slope length. Wedge failure refers to failures that occur on an inclined plane. This failure usually occurs when there is a weakness in the slope that can occur from weak layers or different materials interacting. The minimum interface friction angle (internal friction angle along slip

surface) required to achieve a target factor of safety was calculated using the following equation (Giroud et al. 1995):

$$FS = \lambda \frac{\tan\delta}{\tan\beta} + \frac{\gamma_{t,t}(t - t_w^*) + \gamma_{b,t} t_w^*}{\gamma_{t,s}(t - t_w) + \gamma_{sat,s} t_w} \frac{t}{h} \frac{\sin\phi}{2\sin\beta\cos\beta\cos(\beta + \phi)}$$
$$+ \frac{{}^{a}/_{\sin\beta}}{\gamma_{t,s}(t - t_w) + \gamma_{sat,s} t_w} + \frac{{}^{ct}/_{h}}{\gamma_{t,s}(t - t_w) + \gamma_{sat,s} t_w} \frac{\cos\phi}{\sin\beta\cos(\beta + \phi)}$$
$$+ \frac{{}^{T}/_{h}}{\gamma_{t,s}(t - t_w) + \gamma_{sat,s} t_w} \quad (1)$$

where

FS = factor of safety

λ = $\frac{\gamma_{t,s}(t - t_w) + \gamma_{b,s} t_w}{\gamma_{t,s}(t - t_w) + \gamma_{sat,s} t_w}$ for failure surface above the geomembrane

λ = 1 for failure surface below the geomembrane

$\gamma_{t,t}$ = total unit weight of soil at toe of slope (pounds per cubic foot [pcf])

$\gamma_{b,t}$ = buoyant unit weight of soil at toe of slope (pcf)

$\gamma_{t,s}$ = total unit weight of soil on slope (pcf)

$\gamma_{b,s}$ = buoyant unit weight of soil on slope (pcf)

$\gamma_{sat,s}$ = saturated unit weight of soil on slope (pcf)

δ = interface friction angle along slip surface (degrees)

β = slope angle (degrees)

a = interface adhesion (pounds per square foot [psf])

t = thickness of soil layer (ft)

t_w = thickness of water flow along slope (ft)

t_w^* = thickness of water flow in toe of slope (ft)

h = height of slope (ft)

ϕ = internal friction angle of soil above critical surface (degrees)

c = cohesion of soil above critical surface (psf)

T = tension in geosynthetics (pounds per foot [lb/ft])

Equation 1 was developed by using the two-wedge approach: Wedge 1 is located at the slope toe and Wedge 2 is located along the slope. The latter produces the driving forces. The first term of Equation 1 accounts for the contribution of the interface friction angle related to Wedge 1. The second term of Equation 1 accounts for the contribution of the interface friction angle related to Wedge 2. The third term quantifies the contribution of the interface adhesion. The fourth term considers the contribution of the toe buttressing effects. The fifth term quantifies the contribution of any tension in the geosynthetics. For this analysis, the tension in the geosynthetic was conservatively assumed as zero (T = 0 psf). The proposed protective cover consists of gravel and sandy materials, which typically have no cohesion; therefore, cohesion of soil above the critical surface was assumed as zero (c = 0 psf).

The combinations of interface friction angle (δ) and interface adhesion (a) required to achieve a target factor of safety equal to 1.25 were calculated using Equation 1. Results were plotted and can be found in Figure 3.

SUMMARY OF RESULTS

To achieve a factor of safety against veneer instability of 1.25 or greater, the interface shear strength of each interface must be characterized by a peak friction angle (δ) and an adhesion (a) that plot outside of the gray-shaded regions shown in Figure 3. Assuming an adhesion of 0, a friction angle of 21.1 degrees would therefore be required to obtain the required minimum factor of safety. Comparing Figure 3 to the regional historical data (Table 1 and Attachment N.3-1), the entirety of the historical data was easily able to achieve this specified interface friction strength.

CONCLUSIONS AND RECOMMENDATIONS

A stable configuration was calculated assuming an interface friction angle between cover system components that is well within typical interface friction values. It is recommended that the interface shear strength envelope of the proposed materials be characterized and confirmed by laboratory testing. The results of the project-specific laboratory testing will be evaluated by the Engineer prior to cover system construction to confirm the measured interface friction angle meets the interface friction angle specified in this analysis.

Based on the design considerations described in this calculation package and the results of these analyses, the following recommendations are made with respect to the selection, testing, and use of materials for the cover system:

- Interface friction testing shall be performed in accordance with the active version of ASTM International (ASTM) D5321 (ASTM 2021) as multilayer test (i.e., a single test with all components of the cover system simultaneously).

- Tests shall be performed at normal pressures that are representative of the expected loads above the cover system.
- Geomembrane shall be a double-sided textured geomembrane.
- Testing shall be performed using geosynthetics and protective cover materials proposed to be used for construction of the liner system.

If subsurface geometry and material properties are different than those assumed herein or if material qualification tests indicate that the material properties discussed herein cannot be achieved, then the engineer shall be notified, and the calculations will be reevaluated.

REFERENCES

ASTM. 2021. *Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear*. ASTM D5321. February.

Eid, H.T. and T.D. Stark. 1997. "Shear Behavior of an Unreinforced Geosynthetic Clay Liner." *Geosynthetics International*. 4(6):645–659.

Giroud, J.P., R.C. Bachus, and R. Bonaparte. 1995. "Influence of Water Flow on the Stability of Geosynthetic-Soil Layered Systems on Slopes." *Industrial Fabrics Association International, Geosynthetics International* 2(6):1149–1180.

Koerner, R.M., J.P. Martin, and G.R. Koerner. 1986. "Shear Strength Parameters Between Geomembranes and Cohesive Soils." *Geotextiles and Geomembranes* 4(1):21–30.

Martin, J.P., R.M. Koerner, and J.E. Whitty. 1984. "Experimental Friction Evaluation of Slippage Between Geomembranes, Geotextiles, and Soils." Proceedings: *International Conference on Geomembranes*. Denver, Colorado. pp. 191–196.

Sabatini, P.J., G.R. Schmertmann, and R.H. Swan. 1998. "Issues in Clay/Textured Geomembrane Testing." *Sixth International Conference on Geosynthetics.* pp. 423–426.

Stark, T.D., D. Arellano, W.D. Evans, V.L. Wilson, and J.M. Gonda. 1998. "Unreinforced Geosynthetic Clay Liner Case History." *Geosynthetics International*. 5(5):521–544.

USEPA 1993. *Solid Waste Disposal Facility Criteria*, Document No. EPA 530-R-93-017, United States Environmental Protection Agency, November.

Unified Facilities Criteria (UFC). 2025. *UFC 3-220-10N, Soil Mechanics (DM 7.1)*.

USEPA. 2022. *Hydrologic Evaluation of Landfill Performance*. Version 4.0.1. United States Environmental Protection Agency. November 1.

Williams N.D. and M.F. Houlihan. 1986. "Evaluation of Friction Coefficients Between Geomembranes, Geotextiles, and Related Products." *Third International Conference on Geotextiles*. Vienna, Austria. pp. 891–896.

Williams N.D. and M.F. Houlihan. 1987. "Evaluation of Interface Friction Properties between Geosynthetics and Soils." *Geosynthetics '87 Conference*. New Orleans, Louisiana. pp. 616–627.

Williams, N.D. and J. Luna. 1987. "Selection of Geotextiles for Use with Synthetic Drainage Products." *Geotextiles and Geomembranes* 5:45–61.

TABLES

Table 1: Historical Data

Millersville Landfill and Resource Recovery Facility - Cell 9, Severn, Maryland

Adhesion (psf)	Friction Angle (deg)	Interface	Location	Symbol[1]
26	30	Reynolds Subgrade vs Clay Liner	Newland Park	□
138	25.3	Clay Liner vs Geocomposite	Newland Park	○
115	31.2	Geocomposite vs Vulcan Cover Soil	Newland Park	◇
51	13.1	Clay Subgrade vs Clay Liner	Newland Park	△
116	17.1	Select Clay vs. Argu 60 mil HDPE MSGM - Shiny Side Up	Midshore	○
515	27	Skaps DSGC TN 450-2-8 vs. Argu 60 mil HDPE MSGM - Dull Side Up	Midshore	×
53	32.6	Protective Drainage Soil vs. Skaps DSGC TN-450-2-8	Midshore	◇
77	26.7	Strctural Fill vs. Select Clay	Midshore	□
72	18.9	Clay vs. Agru mil HDPE Microspike Geomembrane	Millersville 9.2	○
232	18	GSE 300E-06-06 Double-sided Geocomposite vs. Agru 60 mil HDPE Microspike Geomembrane	Millersville 9.2	+
0	25.6	GSE 300E-06-06 Double-sided Geocomposite vs. Agru 60 mil HDPE Microspike Geomembrane - Adjusted	Millersville 9.2	×

Note:

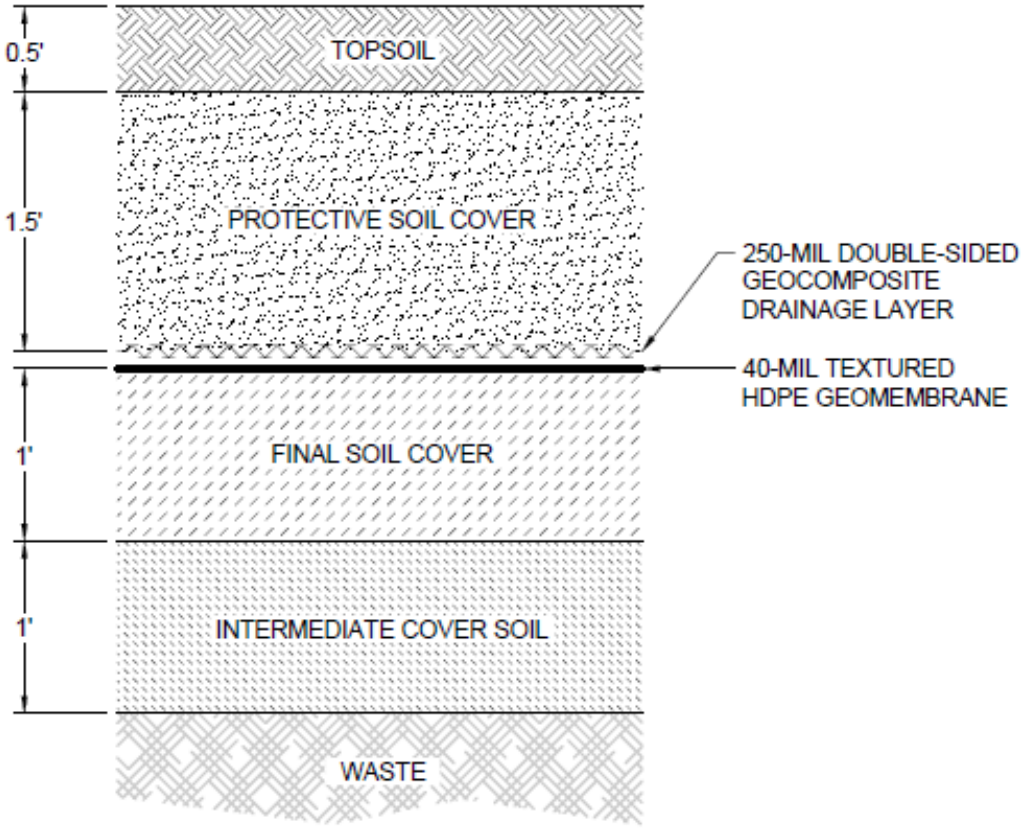
1) Symbols are presented in Figure 4

Table 2: Design Properties of Protective Cover Soil

Millersville Landfill and Resource Recovery Facility - Cell 9, Severn,Maryland

Material/Interface	Unit Weight (pcf)	Friction Angle (deg)	Cohesion/Adhesion (psf)	Reference
Protective Cover (Sand)	105 (dry) 110 (moist) 115 (saturated)	32.5	0	Based on UFC 2025 and Site-Specific Data

FIGURES



TYPE I

/ # DETAIL

FINAL COVER

SCALE: 1" = 1'

Cover System Details

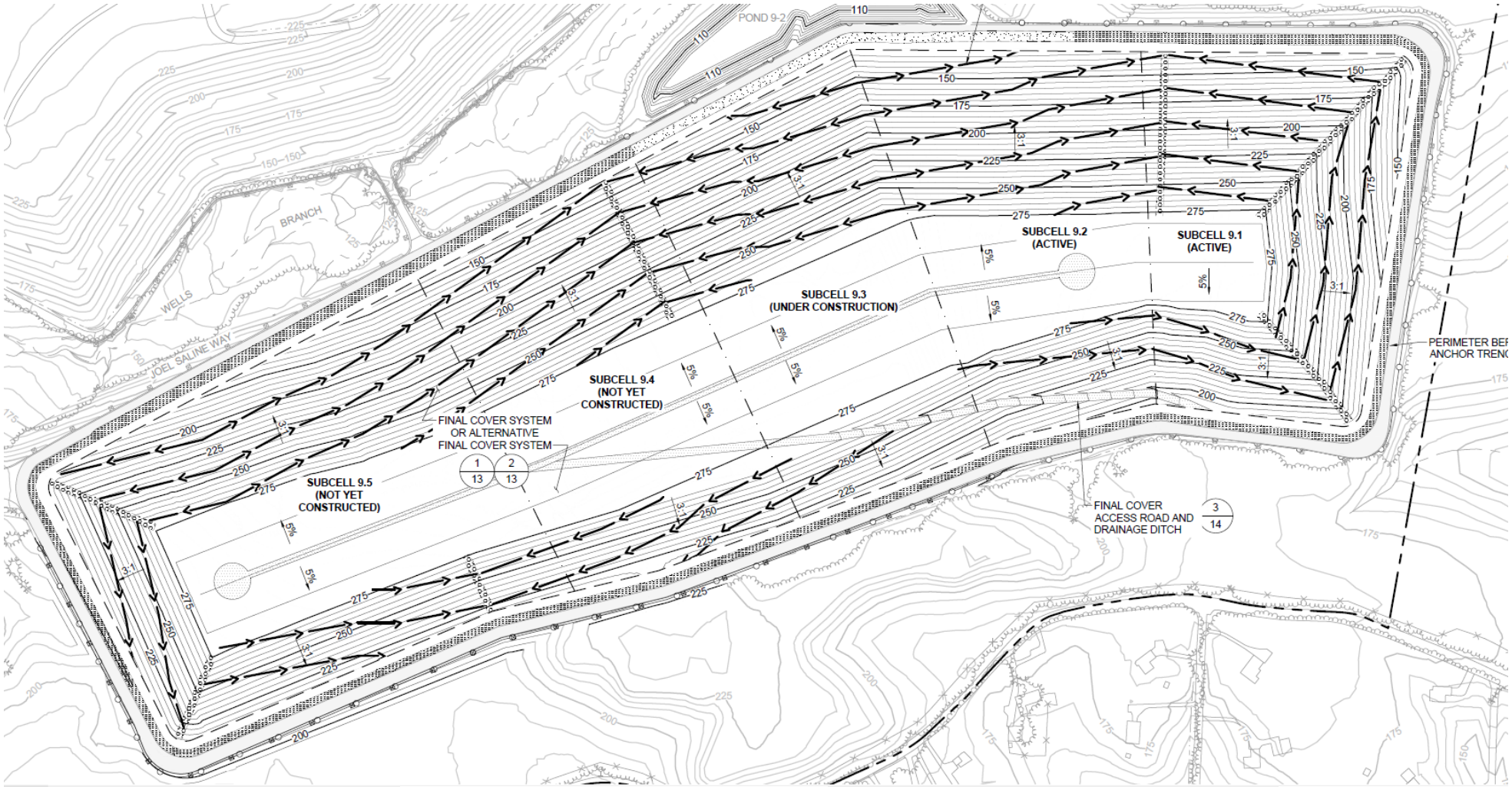
Millersville Landfill and Resource Recovery Facility
Cell 9 Vertical Expansion
Severn, Maryland

Geosyntec consultants

Project No. ME1418A | June 2025

Figure

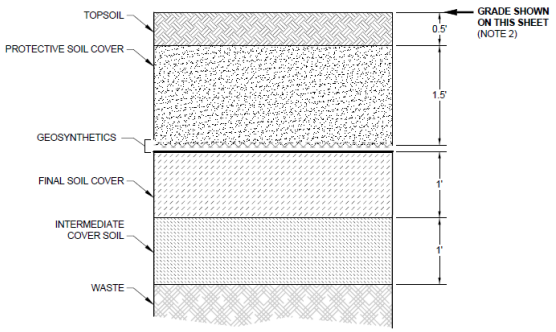
1



LEGEND

- PROPERTY BOUNDARY
- EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- PROPOSED FINAL GRADE CONTOUR (FEET-MSL)
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARY
- LITTER FENCE
- GUARDRAIL
- RIPRAP
- CONCRETE FOREBAY
- DOWNCHUTE
- TACK-ON STORMWATER DIVERSION BENCH
- ACCESS ROAD
- PERIMETER ROAD

N



1 / - DETAIL
COVER SYSTEM (TYP.)
SCALE: NTS

0 200 400
SCALE IN FEET

Top of Waste

Millersville Landfill and Resource Recovery Facility
Cell 9 Vertical Expansion
Severn, Maryland

Geosyntec consultants

Project No. ME1418A | June 2025

Figure 2

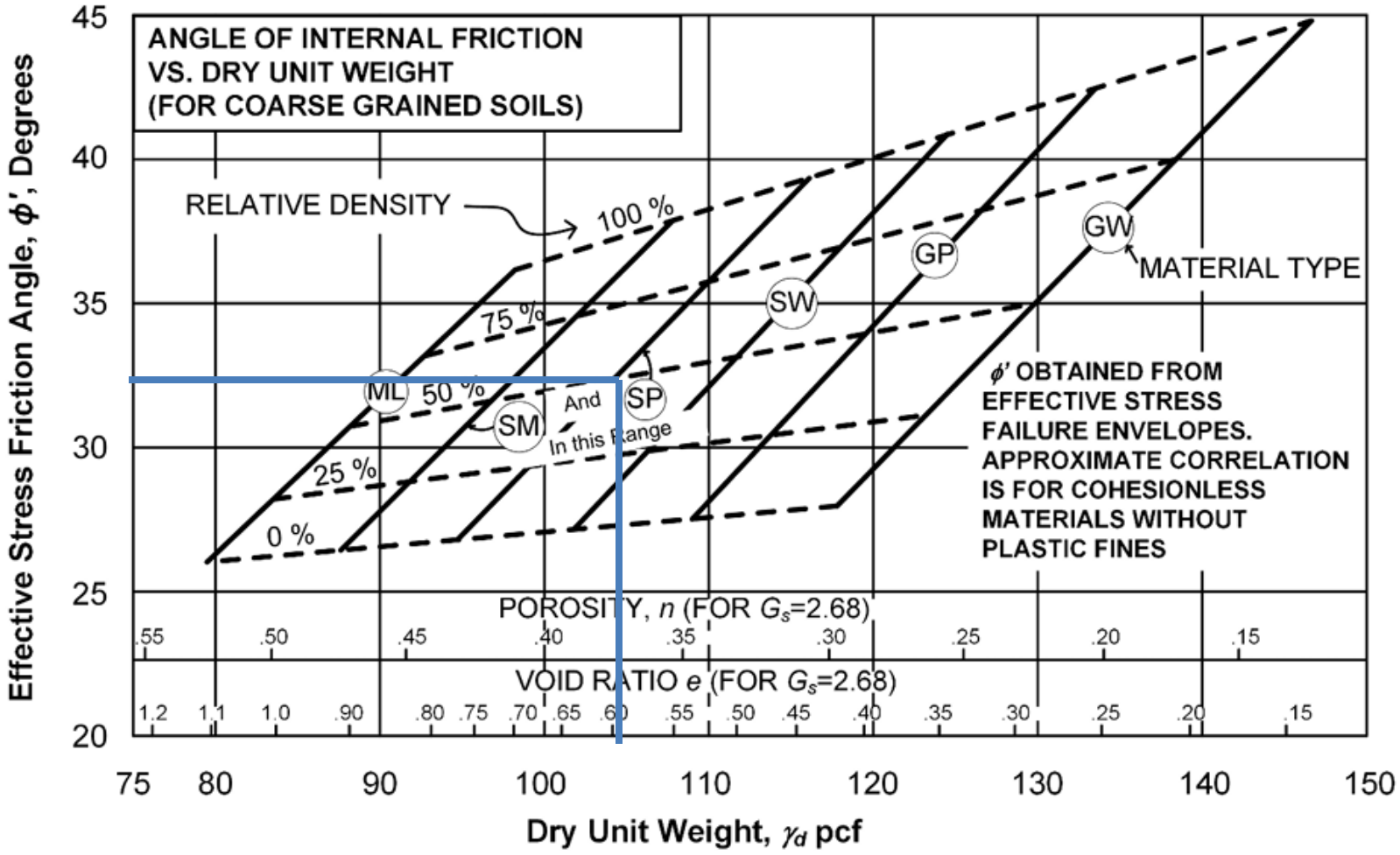
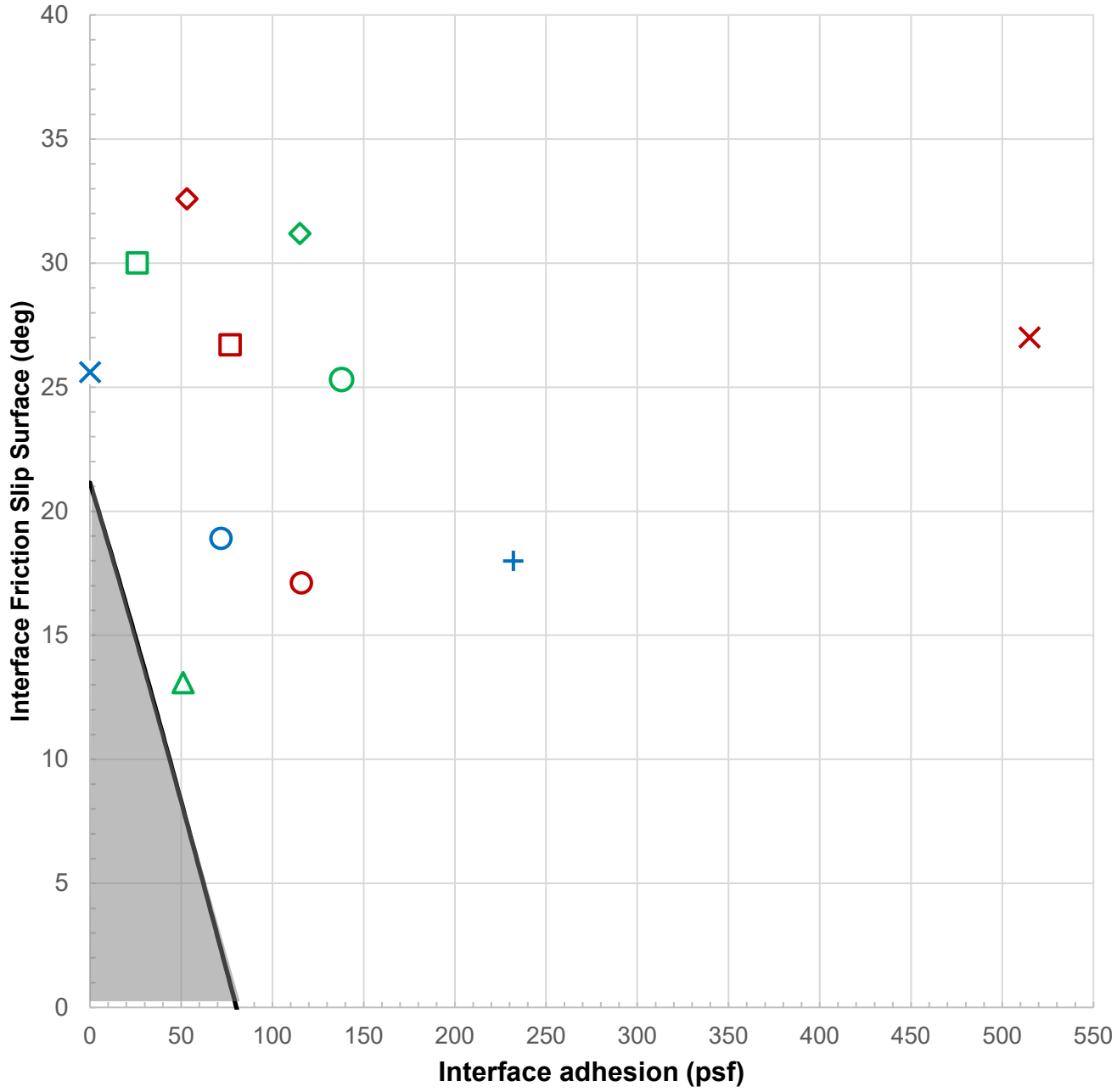


Figure 8-1 Approximate Relationship between the Effective Stress Friction Angle and Dry Unit Weight for Various Relative Densities and Types of Soil

Friction Angle vs Dry Unit Weight		
Millersville Landfill and Resource Recovery Facility Cell 9 Vertical Expansion Severn, Maryland		
Geosyntec consultants		Figure
Project No. ME1418A	June 2025	3

Source: Unified Facilities Critteria (UFC), UFC 3-220-10N Soil Mechanics (DM 7.1)



Notes:

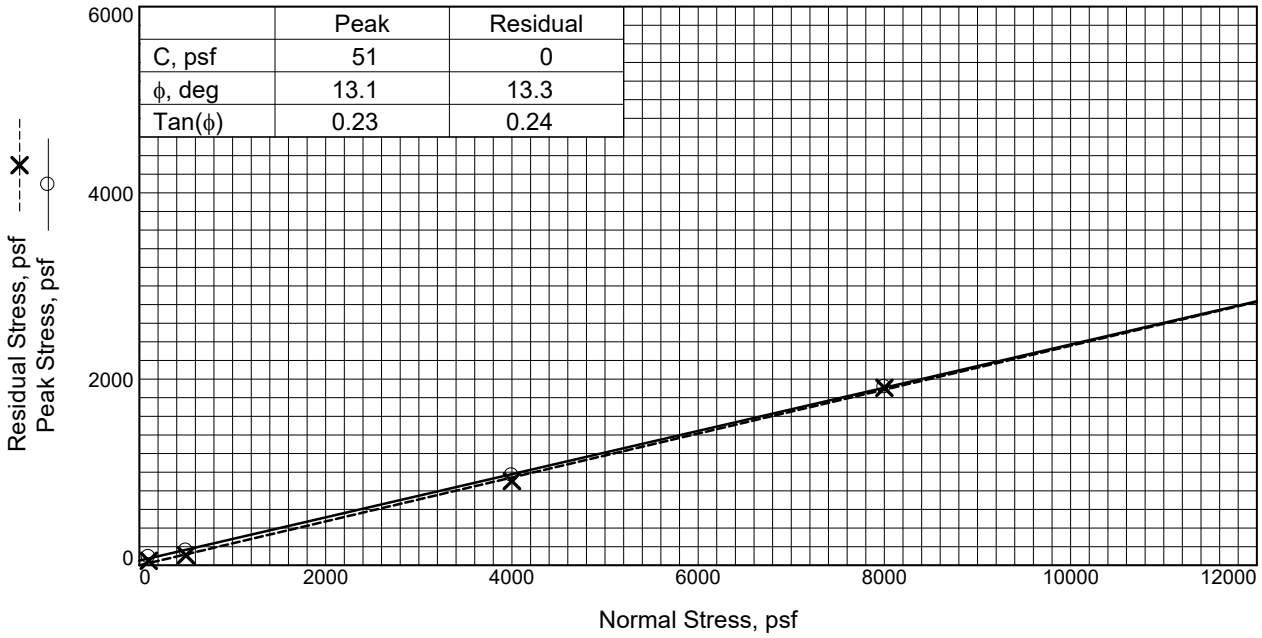
1. Full legend of symbols in Table 1

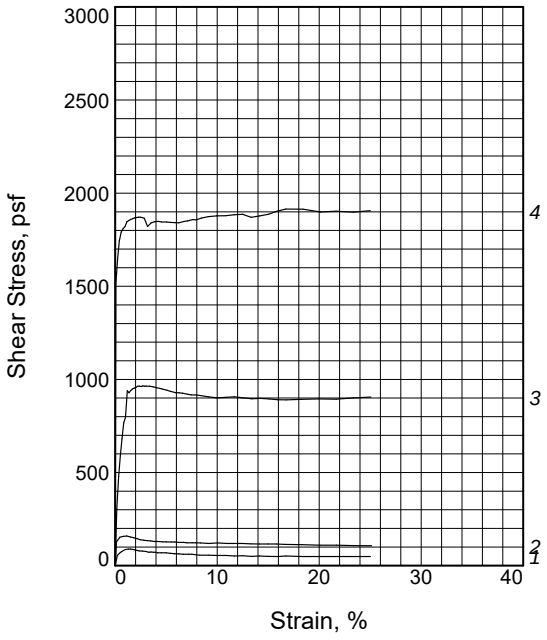
2. The shaded area under the solid black line represent values that yield a factor of safety less than 1.25

Interface Friction Angles vs Interface Adhesion		
Millersville Landfill and Resource Recovery Facility Cell 9 Vertical Expansion Severn, Maryland		
Geosyntec consultants		Figure 4
Project No. ME1418A	June 2025	

ATTACHMENT N.3-1

Historical Data





Sample No.		1	2	3	4
Initial	Water Content, %	24.0	23.7	23.5	23.9
	Dry Density, pcf	95.0	95.2	95.4	95.0
	Saturation, %	82.7	82.1	81.7	82.6
	Void Ratio	0.7881	0.7837	0.7808	0.7874
	Side Length, in.	12.00	12.00	12.00	12.00
	Height, in.	2.00	2.00	2.00	2.00
At Test	Water Content, %	27.7	27.8	22.3	24.0
	Dry Density, pcf	95.3	95.7	106.9	109.6
	Saturation, %	96.1	97.7	102.9	118.5
	Void Ratio	0.7823	0.7736	0.5892	0.5498
	Side Length, in.	12.00	12.00	12.00	12.00
	Height, in.	1.99	1.99	1.78	1.73
Normal Stress, psf		100	500	4000	8000
Peak Stress, psf		89	159	965	1915
Strain, %		1.3	1.1	2.7	16.7
Residual Stress, psf		49	107	905	1906
Strain, %		25.0	25.1	25.1	25.0
Strain rate, in./min.		0.040	0.040	0.040	0.040

Sample Type: ASTM D5321

Description: Liner: AGRU 60 ml HDPE Microspike R#GTF0014710002, Clay: Gray Clay from Onsite

Assumed Specific Gravity= 2.72

Remarks: Liner (shiny side tested) clamped bottom box, Subgrade clay recompacted (95% of ASTM D698, +/- 2% OMC) top box. Tested with water in box. Consolidate/Saturate 24 hrs.

Figure _____

Client: Atlantic Lining Company, Inc.

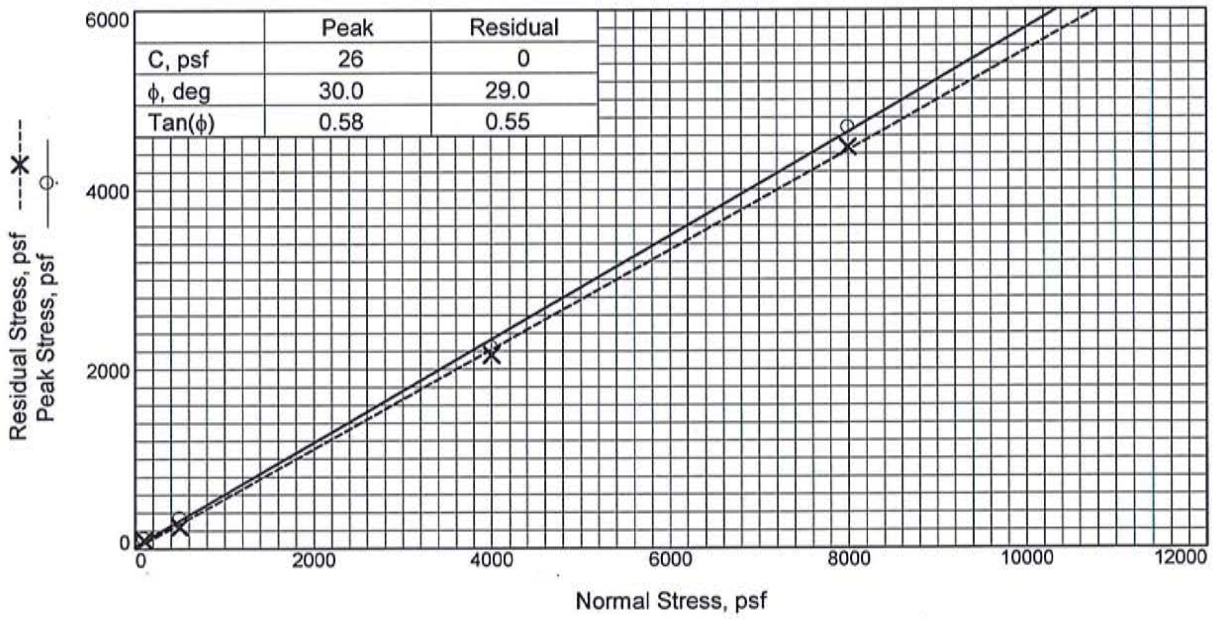
Project: Newland Park Landfill

Location: Clay Subgrade vs Liner

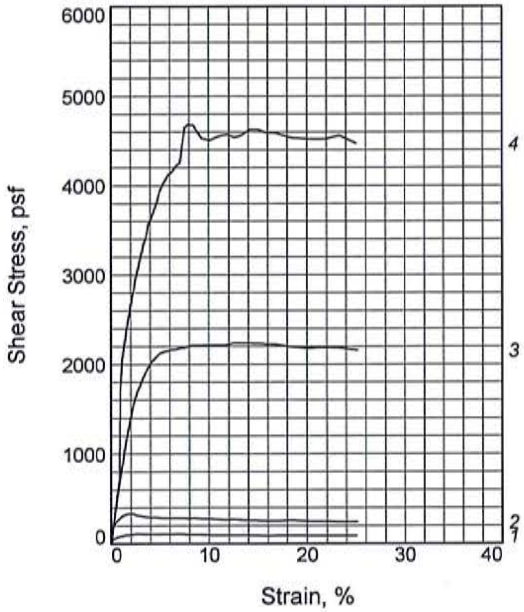
Proj. No.: 887 **Date Sampled:** 9-25-18

DIRECT SHEAR TEST REPORT
RSA Geolab
Union, New Jersey

Tested By: EE/RP **Checked By:** KP



	Peak	Residual
C, psf	26	0
ϕ, deg	30.0	29.0
Tan(ϕ)	0.58	0.55



Sample No.		1	2	3	4
Initial	Water Content, %	12.8	13.1	12.9	13.0
	Dry Density, pcf	111.7	111.4	111.5	111.4
	Saturation, %	66.8	67.8	67.2	67.7
	Void Ratio	0.5206	0.5246	0.5223	0.5241
	Side Length, in.	12.00	12.00	12.00	12.00
	Height, in.	2.00	2.00	2.00	2.00
At Test	Water Content, %	17.4	15.7	16.4	15.6
	Dry Density, pcf	113.5	114.7	119.2	128.6
	Saturation, %	95.5	89.0	105.0	132.7
	Void Ratio	0.4958	0.4810	0.4245	0.3202
	Side Length, in.	12.00	12.00	12.00	12.00
	Height, in.	1.97	1.94	1.87	1.73
Normal Stress, psf		100	500	4000	8000
Peak Stress, psf		110	336	2240	4685
Strain, %		2.7	1.9	12.6	7.9
Residual Stress, psf		90	241	2157	4470
Strain, %		25.0	25.1	25.1	25.0
Strain rate, in./min.		0.040	0.040	0.040	0.040

Sample Type: ASTM D5321
Description: Liner: AGRU 60 ml HDPE Microspike R#GTF0014710002

Assumed Specific Gravity= 2.72
Remarks: Liner (shiny side tested) clamped bottom box, Subgrade soil recompacted (95% of ASTM D698, +/- 2% OMC) top box. Tested with water in box. Consolidate/Saturate 24 hrs.
Figure _____

Client: Atlantic Lining Company, Inc.

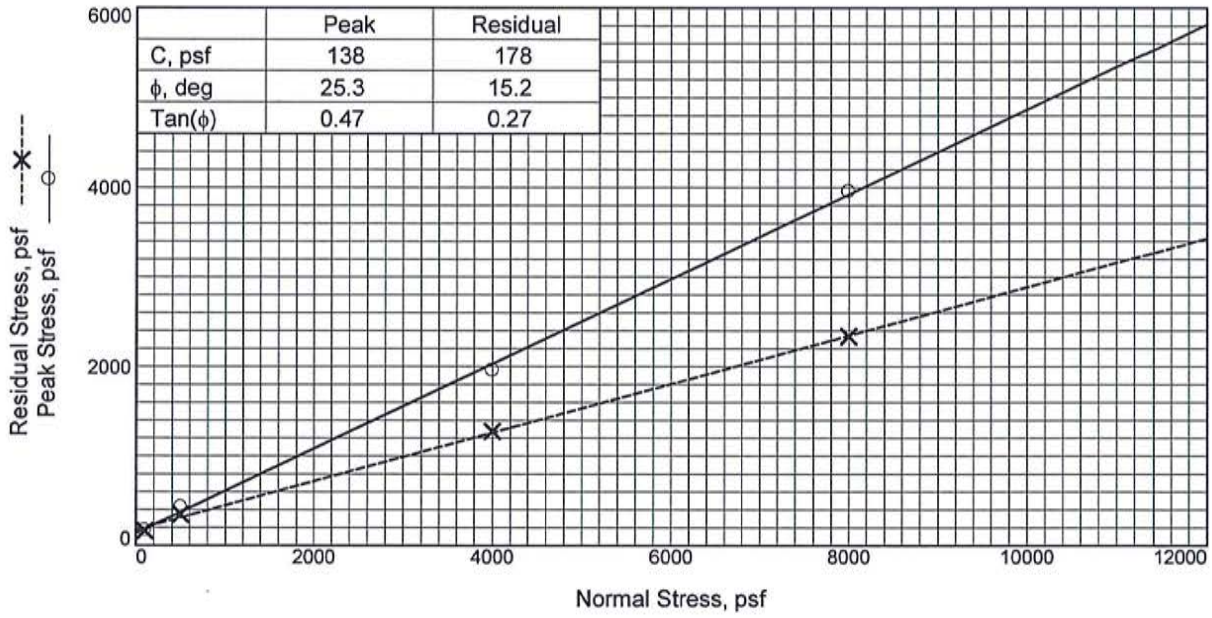
Project: Newland Park Landfill

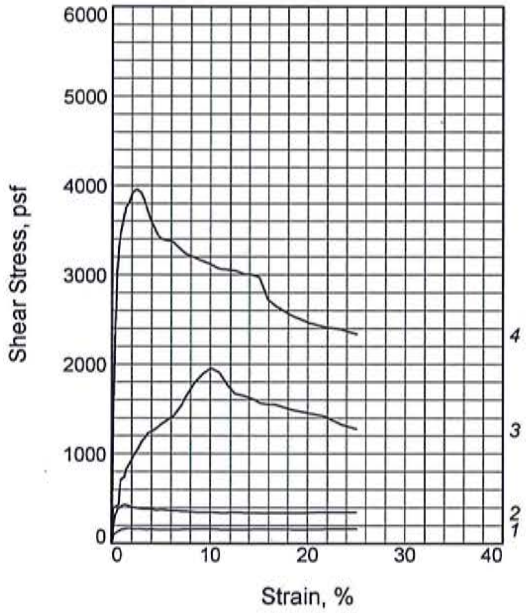
Location: Reynolds Subgrade vs Liner

Proj. No.: 887 **Date Sampled:** 9-14-18

DIRECT SHEAR TEST REPORT
RSA Geolab
Union, New Jersey

Tested By: EE/RP **Checked By:** KP





Sample No.		1	2	3	4
Initial	Water Content, %				
	Dry Density, pcf	NO SOIL INVOLVED IN THIS TEST			
	Saturation, %				
	Void Ratio				
	Side Length, in.	12.00	12.00	12.00	12.00
	Height, in.				
At Test	Water Content, %				
	Dry Density, pcf				
	Saturation, %				
	Void Ratio				
	Side Length, in.				
	Height, in.				
Normal Stress, psf		100	500	4000	8000
Peak Stress, psf		169	431	1957	3954
Strain, %		1.7	1.3	10.0	2.5
Residual Stress, psf		164	348	1276	2336
Strain, %		25.0	25.0	25.0	25.1
Strain rate, in./min.		0.200	0.200	0.200	0.200

Sample Type: ASTM D5321
Description: Liner: AGRU 60 ml HDPE Micropspike R#GTF0014710002, Geocomp: AGRU 8-330-8

Assumed Specific Gravity=
Remarks: Geocomp. R#GTE0014720185 clamp bottom box, Liner (dull side tested) clamped top box. Tested with water in box. Consolidate/Saturate 24 hrs.

Figure _____

Client: Atlantic Lining Company, Inc.

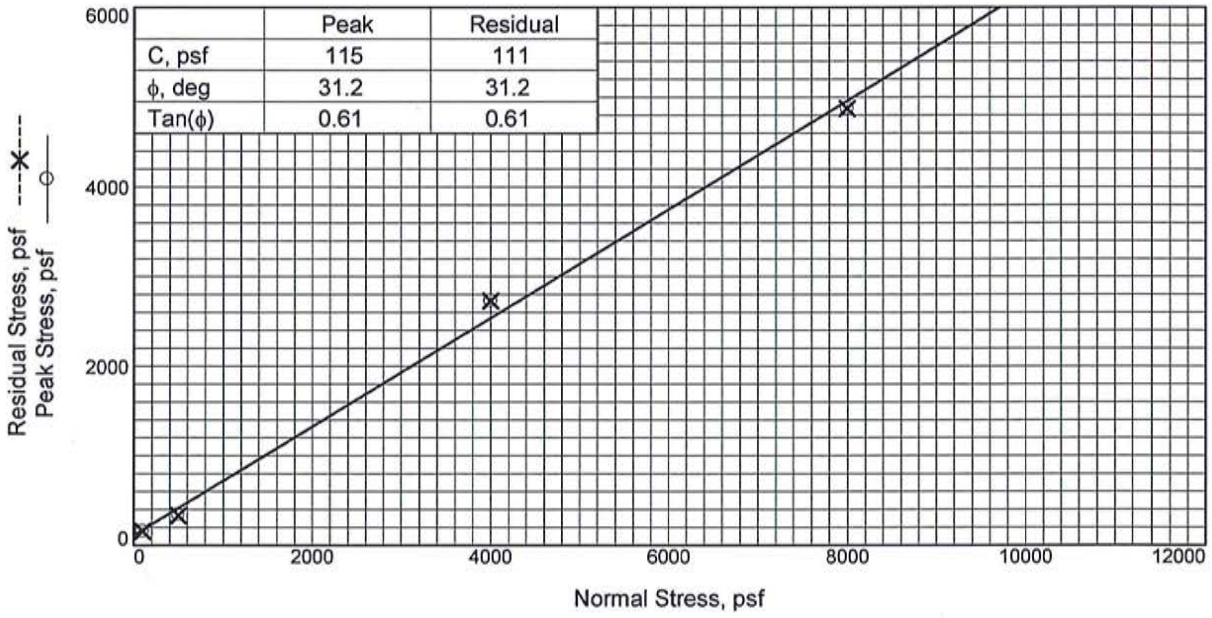
Project: Newland Park Landfill

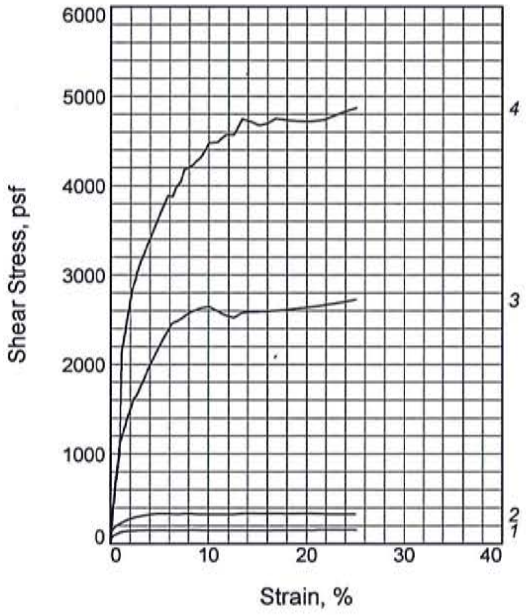
Location: Liner vs Geocomposite

Proj. No.: 887 **Date Sampled:** 9-14-18

DIRECT SHEAR TEST REPORT
RSA Geolab
Union, New Jersey

Tested By: EE/RP **Checked By:** KP





Sample No.		1	2	3	4
Initial	Water Content, %	11.5	11.3	11.4	11.6
	Dry Density, pcf	115.4	115.7	115.5	115.3
	Saturation, %	66.5	65.5	66.0	67.0
	Void Ratio	0.4714	0.4682	0.4698	0.4731
	Side Length, in.	12.00	12.00	12.00	12.00
	Height, in.	2.00	2.00	2.00	2.00
At Test	Water Content, %	23.9	24.3	23.0	22.7
	Dry Density, pcf	115.6	116.0	118.6	121.8
	Saturation, %	138.3	142.6	144.8	156.6
	Void Ratio	0.4691	0.4636	0.4316	0.3937
	Side Length, in.	12.00	12.00	12.00	12.00
	Height, in.	2.00	1.99	1.95	1.89
Normal Stress, psf		100	500	4000	8000
Peak Stress, psf		155	340	2726	4872
Strain, %		21.8	16.7	25.0	25.1
Residual Stress, psf		154	331	2726	4872
Strain, %		25.1	25.0	25.0	25.1
Strain rate, in./min.		0.040	0.040	0.040	0.040

Sample Type: ASTM D5321
Description: Geocomp: AGRU 8-300-8
R#GTE0014720185

Assumed Specific Gravity= 2.72
Remarks: Soil recompacted top box, Geocomposite clamped bottom box. Tested with water in box. Consolidate/Saturate 24 hrs.

Figure _____

Client: Atlantic Lining Company, Inc.

Project: Newland Park Landfill

Location: Geocomposite vs. Vulcan Cover Soil

Proj. No.: 887 **Date Sampled:** 9-14-18

DIRECT SHEAR TEST REPORT
RSA Geolab
Union, New Jersey

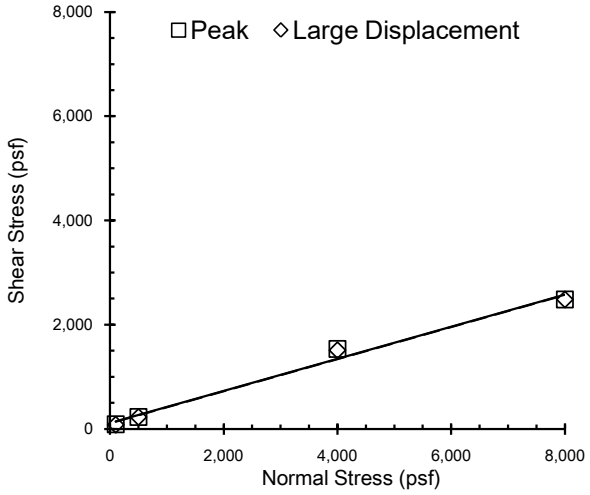
Tested By: EE/RP **Checked By:** KP

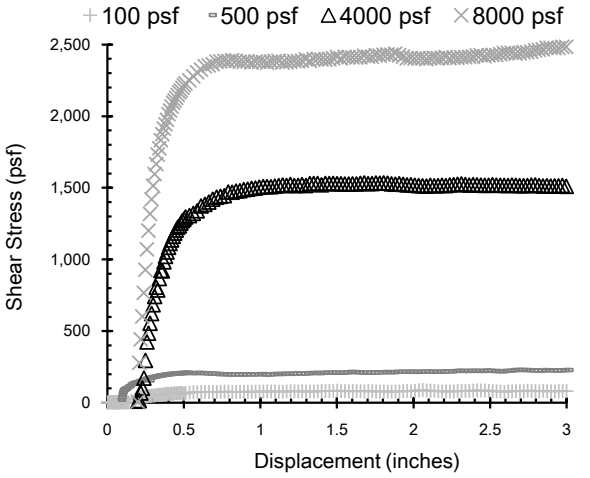
Shear Strength of Soil-Geosynthetic Interface by Direct Shear (ASTM D5321)

Client: Geosyntec Consultants
Project: Midshore 2 Landfill

TRI Log #: 39571-1
Richard S. Lacey, P.E. 1/10/2019
Analysis & Quality Review/Date

Select Clay vs.
Agru 60 mil HDPE MSGM (G18D002463) - shiny side up





Test Results, Linear Regression			
Mohr-Coulomb Parameters		Peak	Large Displacement
Friction Angle	Degrees	17.1	17.1
Y-intercept or Adhesion	psf	116	107
Minimum Secant Angle	Degrees	17.2	17.2

Note - Large Displacement Values Reported for 3.0 inches of Displacement

Test Conditions		
Upper Box	Select Clay ω = 17.4 % γ_d = 102.9 pcf	
Lower Box	Agru 60 mil HDPE MSGM (G18D002463) - shiny side up	
Conditioning	Wet - Loading applied and Interface flooded for a minimum of 24 hours prior to shear.	
Shearing Rate	inches/minute	0.04

Test Notes

Shearing occurred at the interface at all stresses.

Specimen No.		-	1	2	3	4
Normal Stress		psf	100	500	4,000	8,000
Box Edge Dimension		in	12	12	12	12
Equivalent Bearing Slide Resist. Correction		psf	9	13	46	84
Peak	Shear Stress	psf	89	230	1,535	2,484
	Secant Angle	deg.	41.8	24.7	21.0	17.2
Large Displacement	Shear Stress	psf	81	229	1,511	2,484
	Secant Angle	deg.	39.0	24.6	20.7	17.2
Asperity Height, Avg. of 5 Meas.		mils	34	34	34	32

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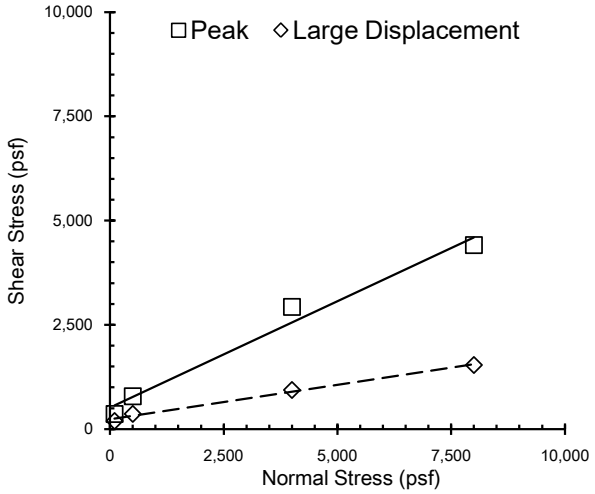
TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

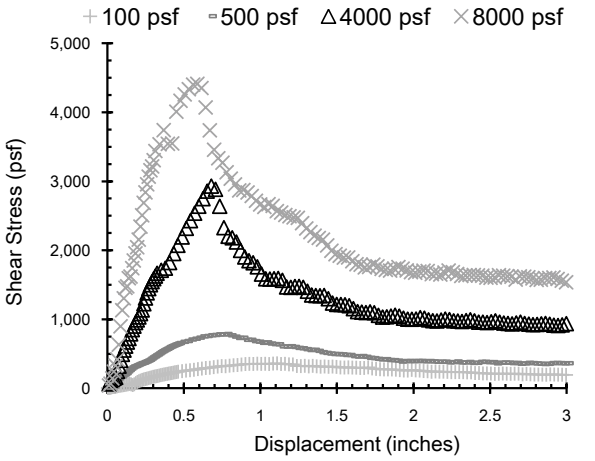
Shear Strength of Geosynthetic-Geosynthetic Interface by Direct Shear (ASTM D5321)

Client: Geosyntec Consultants
Project: Midshore 2 Landfill

TRI Log #: 39571-2
Jeffrey A. Kuhn, Ph.D., P.E., 3/4/2019
Analysis & Quality Review/Date

Skaps DSGC TN 450-2-8(85301010106) vs. Agru 60 mil HDPE MSGM (G18D002463) - Dull side up





Test Results, Linear Regression			
Mohr-Coulomb Parameters		Peak	Large Displacement
Friction Angle	Degrees	27.0	9.4
Y-intercept or Adhesion	psf	515	237
Minimum Secant Angle	Degrees	28.9	10.9

Note - Large Displacement Values Reported for 3.0 inches of Displacement

Test Conditions		
Upper Box	Skaps DSGC TN 450-2-8(85301010106)	
Lower Box	Agru 60 mil HDPE MSGM (G18D002463) - Dull side up	
Conditioning	Wet - Loading applied and Interface flooded for a minimum of 1 hour prior to shear.	
Shearing Rate	inches/minute	0.04

Test Notes

Shearing occurred at the interface at all stresses.

Specimen No.		-	1	2	3	4
Normal Stress		psf	100	500	4,000	8,000
Box Edge Dimension		in	12	12	12	12
Equivalent Bearing Slide Resist. Correction		psf	9	13	46	84
Peak	Shear Stress	psf	361	786	2,930	4,412
	Secant Angle	deg.	74.5	57.6	36.2	28.9
Large Displacement	Shear Stress	psf	193	363	937	1,536
	Secant Angle	deg.	62.6	36.0	13.2	10.9
Asperity Height, Avg. of 5 Meas.		mils	34	35	42	40

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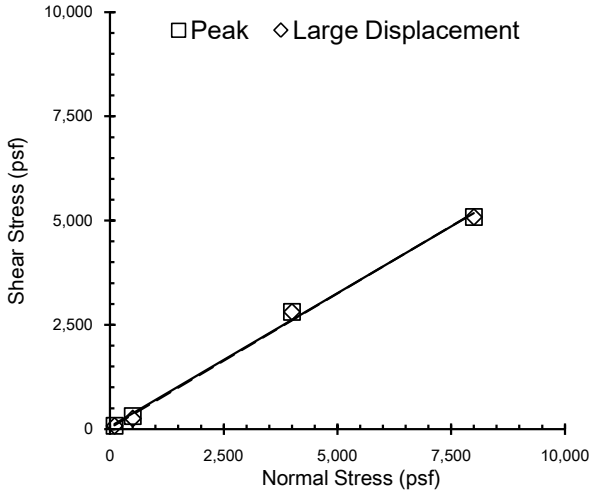
TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

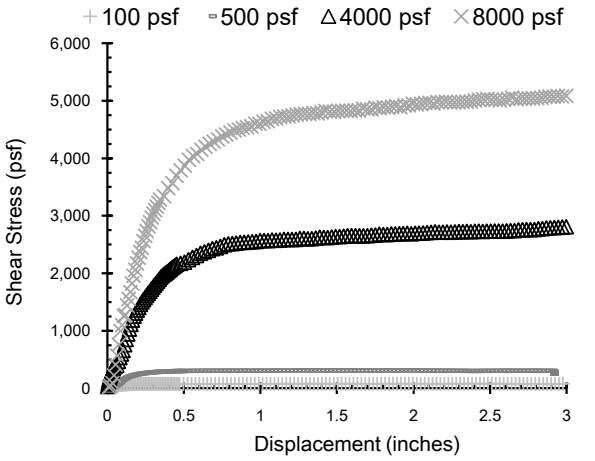
Shear Strength of Soil-Geosynthetic Interface by Direct Shear (ASTM D5321)

Client: Geosyntec Consultants
Project: Midshore 2 Landfill

TRI Log #: 39571-3
Jeffrey A. Kuhn, Ph.D., P.E., 3/4/2019
Analysis & Quality Review/Date

Protective Drainage Soil vs. Skaps DSGC TN 450-2-8(85301010106)





Test Results, Linear Regression			
Mohr-Coulomb Parameters		Peak	Large Displacement
Friction Angle	Degrees	32.6	32.8
Y-intercept or Adhesion	psf	53	26
Minimum Secant Angle	Degrees	31.9	26.9

Note - Large Displacement Values Reported for 3.0 inches of Displacement

Test Conditions		
Upper Box	Protective Drainage Soil (Tamp in Place)	
Lower Box	Skaps DSGC TN 450-2-8(85301010106)	
Conditioning	Wet - Loading applied and Interface flooded for a minimum of 24 hours prior to shear.	
Shearing Rate	inches/minute	0.04

Test Notes

Shearing occurred at the interface at all stresses.

Specimen No.		-	1	2	3	4
Normal Stress		psf	100	500	4,000	8,000
Box Edge Dimension		in	12	12	12	12
Equivalent Bearing Slide Resist. Correction		psf	9	13	46	84
Peak	Shear Stress	psf	79	311	2,810	5,085
	Secant Angle	deg.	38.2	31.9	35.1	32.4
Large Displacement	Shear Stress	psf	77	253	2,810	5,085
	Secant Angle	deg.	37.5	26.9	35.1	32.4

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TRI ENVIRONMENTAL, INC.
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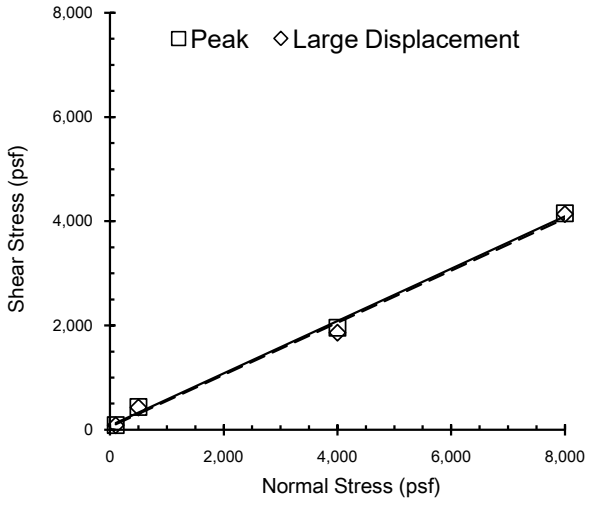
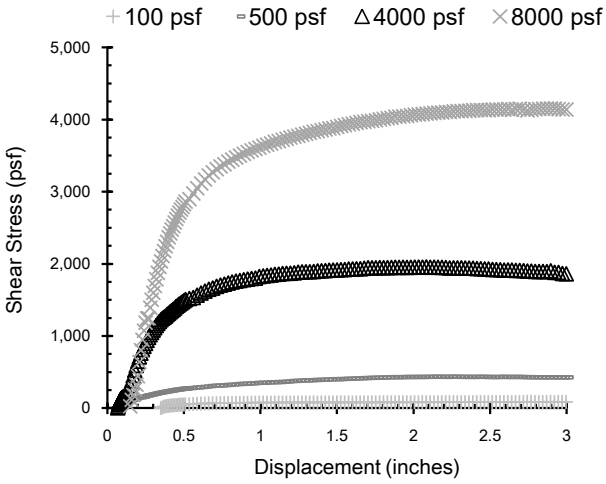
Large Scale Direct Shear Test (ASTM D3080 Modified)

Client: Geosyntec Consultants
Project: Midshore 2 Landfill

TRI Log #: 39571-4
Richard S. Lacey, P.E. 1/10/2019
Analysis & Quality Review/Date

Structural Fill vs. Select Clay





Test Results, Linear Regression			
Mohr-Coulomb Parameters		Peak	Large Displacement
Friction Angle	Degrees	26.7	26.5
Y-intercept or Adhesion	psf	77	55
Minimum Secant Angle	Degrees	26.1	25.0

Note - Large Displacement Values Reported for 3.0 inches of Displacement

Test Conditions		
Upper Box	Structural Fill ω = 11.5 % γ_d = 114.0 pcf	
Lower Box	Select Clay ω = 11.5 % γ_d = 114.0 pcf	
Conditioning	Wet - Loading applied and Interface flooded for a minimum of 1 hour prior to shear.	
Shearing Rate	inches/minute	0.04

Test Notes

Shearing occurred at the interface at all stresses.

Specimen No.		-	1	2	3	4
Normal Stress		psf	100	500	4,000	8,000
Box Edge Dimension		in	12	12	12	12
Equivalent Bearing Slide Resist. Correction		psf	9	13	46	84
Peak	Shear Stress	psf	89	437	1,957	4,152
	Secant Angle	deg.	41.6	41.2	26.1	27.4
Large Displacement	Shear Stress	psf	86	427	1,862	4,138
	Secant Angle	deg.	40.7	40.5	25.0	27.3

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TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

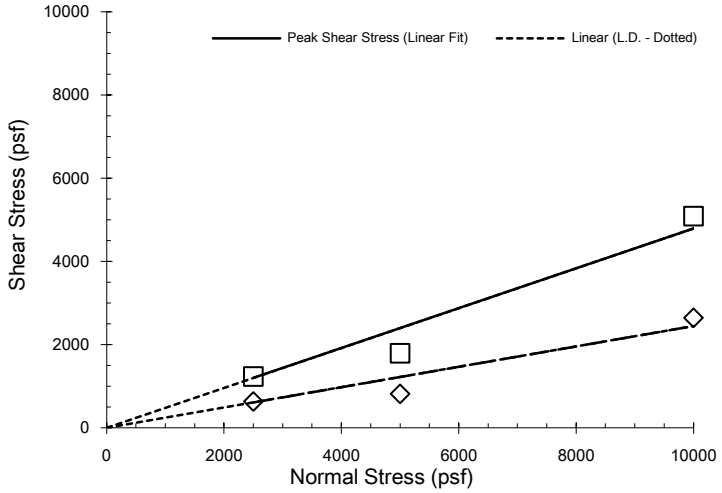
Interface Friction Test Report

Client: **Hallaton**
Project: **Millerville**
Date: 09-28-2015 to 09-29-2015

TRI Log#: E2388-69-01
Test Method: ASTM D5321

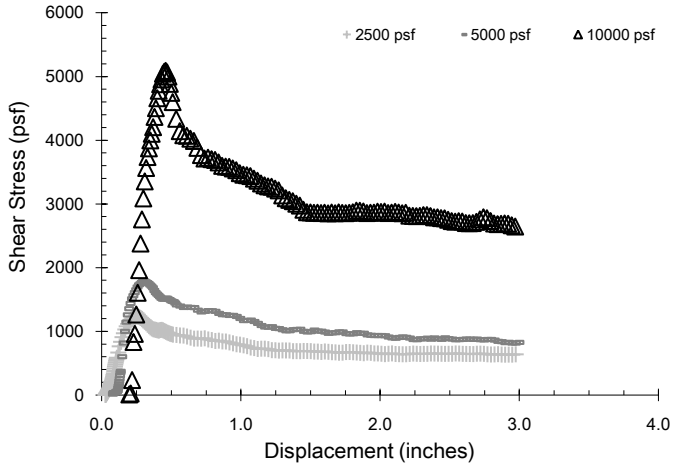
John M. Allen, P.E., 10/01/2015
Quality Review/Date

Tested Interface: GSE 300E-06-06 Double-sided Geocomposite (131467710) vs. Agru 60 mil HDPE Microspike Geomembrane (G15F286082)



Test Results		
	Peak	Large Displacement (@ 3.0 in.)
Friction Angle (degrees):	25.6	13.7
Y-intercept or Adhesion (psf):	0	0

Shearing occurred at the interface. Peak & large displacement friction angle regression analyses were adjusted to fit a zero y-intercept.



Test Conditions

Upper Box &	GSE 300E-06-06 double-sided geocomposite
Lower Box	Agru 60 mil HDPE Microspike geomembrane (dull side)
Box Dimensions: 12"x12"x4"	
Interface Conditioning:	Interface sprayed with water during mounting then soaked and loading applied for a minimum of 24 hours prior to shear.
Test Condition: Wet	
Shearing Rate: 0.04 inches/minute	

Test Data

Specimen No.	1	2	3
Bearing Slide Resistance (lbs)	32	56	103
Normal Stress (psf)	2500	5000	10000
Corrected Peak Shear Stress (psf)	1234	1793	5089
Corrected Large Displacement Shear Stress (psf)	633	816	2645
Peak Secant Angle (degrees)	26.3	19.7	27.0
Large Displacement Secant Angle (degrees)	14.2	9.3	14.8
Asperity (mils)	27.0	28.0	27.0

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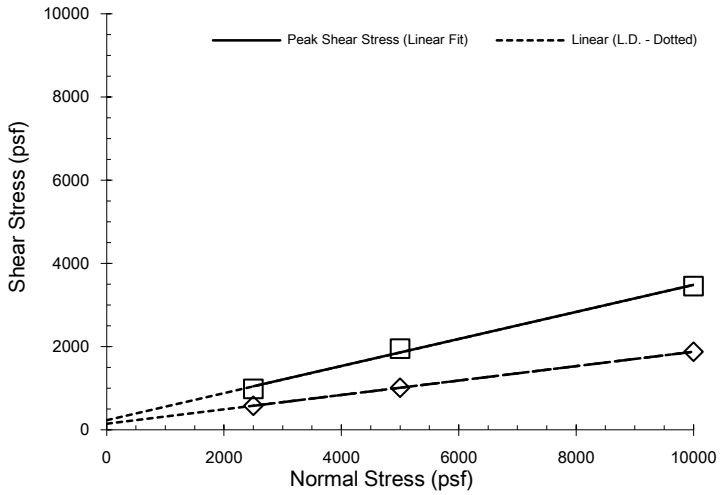
Interface Friction Test Report

Client: **Hallaton**
Project: **Millerville**
Date: 09-28-2015 to 09-29-2015

TRI Log#: E2388-69-01
Test Method: ASTM D5321

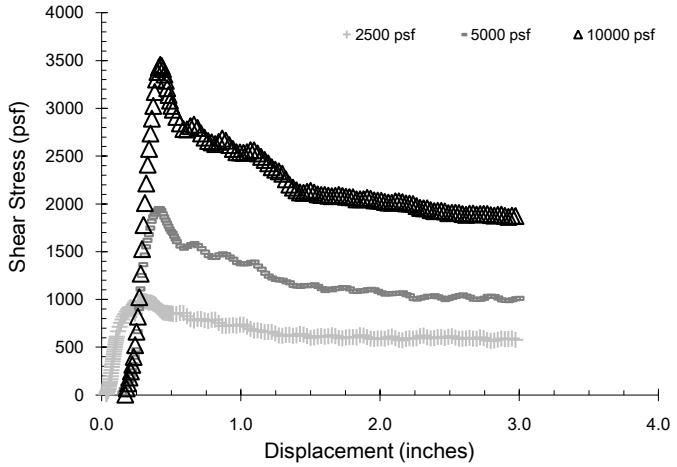
John M. Allen, P.E., 10/01/2015
Quality Review/Date

Tested Interface: GSE 300E-06-06 Double-sided Geocomposite (131467710) vs. Agru 60 mil HDPE Microspike Geomembrane (G15F286082)



Test Results		
	Peak	Large Displacement (@ 3.0 in.)
Friction Angle (degrees):	18.0	9.8
Y-intercept or Adhesion (psf):	232	146

Shearing occurred at the interface.



Test Conditions	
Upper Box &	GSE 300E-06-06 double-sided geocomposite
Lower Box	Agru 60 mil HDPE Microspike geomembrane (dull side)
Box Dimensions: 12"x12"x4"	
Interface Conditioning:	Interface sprayed with water during mounting then soaked and loading applied for a minimum of 24 hours prior to shear.
Test Condition: Wet	
Shearing Rate: 0.04 inches/minute	

Test Data			
Specimen No.	1	2	3
Bearing Slide Resistance (lbs)	32	56	103
Normal Stress (psf)	2500	5000	10000
Corrected Peak Shear Stress (psf)	984	1952	3455
Corrected Large Displacement Shear Stress (psf)	578	1012	1877
Peak Secant Angle (degrees)	21.5	21.3	19.1
Large Displacement Secant Angle (degrees)	13.0	11.4	10.6
Asperity (mils)	26.4	29.0	28.6

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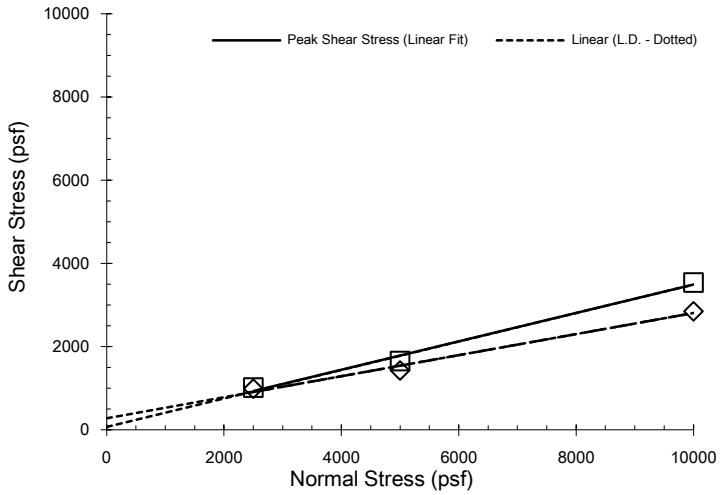
Interface Friction Test Report

Client: **Hallaton**
Project: **Millerville**
Date: 10-20-2015 to 10-21-2015

TRI Log#: E2388-69-01
Test Method: ASTM D5321

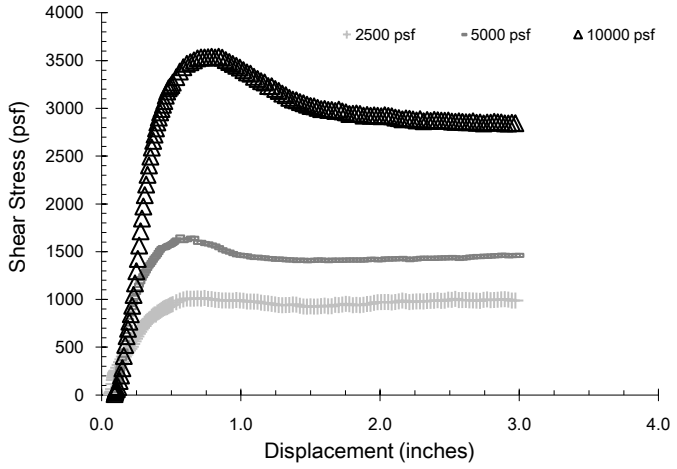
John M. Allen, P.E., 10/21/2015
Quality Review/Date

Tested Interface: Clay vs. Agru 60 mil HDPE Microspike Geomembrane (G15F286082)



Test Results		
	Peak	Large Displacement (@ 3.0 in.)
Friction Angle (degrees):	18.9	14.2
Y-intercept or Adhesion (psf):	72	277

Shearing occurred at the interface.



Test Conditions

Upper Box & Lower Box	Clay remolded to 95% of the maximum dry density at the optimum moisture content +2% or 106.2 pcf at 17.0% Agru 60 mil HDPE Microspike geomembrane (shiny side)
Box Dimensions: 12"x12"x4"	
Interface Conditioning:	Interface sprayed with water during mounting then soaked and loading applied for a minimum of 24 hours prior to shear.
Test Condition: Wet	
Shearing Rate: 0.04 inches/minute	

Test Data

Specimen No.	1	2	3
Bearing Slide Resistance (lbs)	32	56	103
Normal Stress (psf)	2500	5000	10000
Corrected Peak Shear Stress (psf)	1016	1653	3541
Corrected Large Displacement Shear Stress (psf)	989	1425	2849
Peak Secant Angle (degrees)	22.1	18.3	19.5
Large Displacement Secant Angle (degrees)	21.6	15.9	15.9
Asperity (mils)	27.6	27.4	28.0

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ATTACHMENT N.3-2

Hydrologic Evaluation of Landfill Performance (HELP) Analysis

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HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: Millersville Cell 9 - Final Co... **Simulated On:** 12/6/2024 15:29

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)
SC - Sandy Clay
Material Texture Number 13

Thickness	=	24	inches
Porosity	=	0.43	vol/vol
Field Capacity	=	0.321	vol/vol
Wilting Point	=	0.221	vol/vol
Initial Soil Water Content	=	0.3283	vol/vol
Effective Sat. Hyd. Conductivity	=	3.30E-05	cm/sec

Layer 2

Type 2 - Lateral Drainage Layer
Geocomposite Drainage Layer
Material Texture Number 123

Thickness	=	0.2	inches
Porosity	=	0.85	vol/vol
Field Capacity	=	0.01	vol/vol
Wilting Point	=	0.005	vol/vol
Initial Soil Water Content	=	0.013	vol/vol
Effective Sat. Hyd. Conductivity	=	4.05E+00	cm/sec
Slope	=	33	%
Drainage Length	=	95	ft

Layer 3

Type 4 - Flexible Membrane Liner
HDPE Membrane
Material Texture Number 35

Thickness	=	0.04	inches
Effective Sat. Hyd. Conductivity	=	2.00E-13	cm/sec
FML Pinhole Density	=	2	Holes/Acre
FML Installation Defects	=	2	Holes/Acre
FML Placement Quality	=	3	Good

Layer 4

Type 1 - Vertical Percolation Layer

SC - Sandy Clay

Material Texture Number 13

Thickness	=	24	inches
Porosity	=	0.43	vol/vol
Field Capacity	=	0.321	vol/vol
Wilting Point	=	0.221	vol/vol
Initial Soil Water Content	=	0.321	vol/vol
Effective Sat. Hyd. Conductivity	=	3.30E-05	cm/sec

Layer 5

Type 1 - Vertical Percolation Layer (Waste)

Municipal Solid Waste (MSW) (900 pcy)

Material Texture Number 18

Thickness	=	780	inches
Porosity	=	0.671	vol/vol
Field Capacity	=	0.292	vol/vol
Wilting Point	=	0.077	vol/vol
Initial Soil Water Content	=	0.292	vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-03	cm/sec

Layer 6

Type 1 - Vertical Percolation Layer

Protective Cover/ Drainage Layer

Material Texture Number 44

Thickness	=	24	inches
Porosity	=	0.437	vol/vol
Field Capacity	=	0.062	vol/vol
Wilting Point	=	0.024	vol/vol
Initial Soil Water Content	=	0.062	vol/vol
Effective Sat. Hyd. Conductivity	=	5.00E-03	cm/sec

Layer 7

Type 2 - Lateral Drainage Layer

Geocomposite Drainage Layer

Material Texture Number 123

Thickness	=	0.25	inches
Porosity	=	0.85	vol/vol
Field Capacity	=	0.01	vol/vol
Wilting Point	=	0.005	vol/vol
Initial Soil Water Content	=	0.01	vol/vol

Effective Sat. Hyd. Conductivity	=	4.05E+00	cm/sec
Slope	=	2	%
Drainage Length	=	550	ft

Layer 8

Type 4 - Flexible Membrane Liner

HDPE Membrane

Material Texture Number 35

Thickness	=	0.06	inches
Effective Sat. Hyd. Conductivity	=	2.00E-13	cm/sec
FML Pinhole Density	=	0	Holes/Acre
FML Installation Defects	=	0	Holes/Acre
FML Placement Quality	=	6	On geotextile

Layer 9

Type 2 - Lateral Drainage Layer

Geocomposite Drainage Layer

Material Texture Number 123

Thickness	=	0.25	inches
Porosity	=	0.85	vol/vol
Field Capacity	=	0.01	vol/vol
Wilting Point	=	0.005	vol/vol
Initial Soil Water Content	=	0.01	vol/vol
Effective Sat. Hyd. Conductivity	=	4.05E+00	cm/sec
Slope	=	2	%
Drainage Length	=	550	ft

Layer 10

Type 4 - Flexible Membrane Liner

HDPE Membrane

Material Texture Number 35

Thickness	=	0.06	inches
Effective Sat. Hyd. Conductivity	=	2.00E-13	cm/sec
FML Pinhole Density	=	2	Holes/Acre
FML Installation Defects	=	2	Holes/Acre
FML Placement Quality	=	3	Good

Layer 11

Type 3 - Barrier Soil Liner

Prepared Subbase

Material Texture Number 43

Thickness	=	18	inches

Porosity	=	0.437	vol/vol
Field Capacity	=	0.373	vol/vol
Wilting Point	=	0.266	vol/vol
Initial Soil Water Content	=	0.437	vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05	cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	89.6	
Fraction of Area Allowing Runoff	=	100	%
Area projected on a horizontal plane	=	1	acres
Evaporative Zone Depth	=	21	inches
Initial Water in Evaporative Zone	=	6.812	inches
Upper Limit of Evaporative Storage	=	9.03	inches
Lower Limit of Evaporative Storage	=	4.641	inches
Initial Snow Water	=	0	inches
Initial Water in Layer Materials	=	252.704	inches
Total Initial Water	=	252.704	inches
Total Subsurface Inflow	=	0	inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	39.12	Degrees
Maximum Leaf Area Index	=	0	
Start of Growing Season (Julian Date)	=	113	days
End of Growing Season (Julian Date)	=	298	days
Average Wind Speed	=	9	mph
Average 1st Quarter Relative Humidity	=	59	%
Average 2nd Quarter Relative Humidity	=	64	%
Average 3rd Quarter Relative Humidity	=	72	%
Average 4th Quarter Relative Humidity	=	64	%

Note: Evapotranspiration data was obtained for Severn, Maryland

Normal Mean Monthly Precipitation (inches)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec

2.895912	2.822198	4.084533	3.299112	3.041607	3.470176
4.499548	3.798158	4.168186	3.918788	3.471796	3.461437

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.12/-76.68

Normal Mean Monthly Temperature (Degrees Fahrenheit)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
36.7	37.8	47.5	59.4	71.5	78.1
82	78.5	67.8	59.7	48.5	41.5

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.12/-76.68
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.12/-76.68

Daily Output for Year 1

Title: Millersville Cell 9 - Final Cover

Simulated On: 12/6/2024 15:30

Column key: Head #1: drainage from Layer 3; Drain #1: drainage from Layer 2; Leak #1: leakage thru Layer 3; Head #2: drainage from Layer 8; Drain #2: drainage from Layer 7; Leak #2: leakage thru Layer 8; Head #3: drainage from Layer 10; Drain #3: drainage from Layer 9; Leak #3: leakage thru Layer 11

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.103	0.3189	0.0004	0.0204	7.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.00	0.000	0.142	0.3115	0.0003	0.0157	6.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.140	0.3043	0.0003	0.0158	6.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.00	0.000	0.149	0.2968	0.0003	0.0144	5.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.00	0.000	0.062	0.2936	0.0003	0.0147	5.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6			0.23	0.000	0.048	0.3023	0.0003	0.0153	6.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7			0.00	0.000	0.040	0.3003	0.0002	0.0114	4.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8			0.00	0.000	0.035	0.2986	0.0002	0.0087	3.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9			0.00	0.000	0.032	0.2971	0.0002	0.0081	3.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10			0.00	0.000	0.029	0.2957	0.0001	0.0068	3.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11			0.00	0.000	0.027	0.2944	0.0001	0.0059	2.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*		0.15	0.000	0.036	0.2954	0.0001	0.0052	2.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*		0.00	0.000	0.015	0.2963	0.0001	0.0046	2.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*		0.00	0.000	0.016	0.2972	0.0001	0.0042	2.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15			0.06	0.000	0.049	0.2990	0.0001	0.0038	1.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*		0.10	0.000	0.026	0.3000	0.0001	0.0024	1.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17	*		0.05	0.000	0.037	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.74E-09	0.0000	0.0000	4.07E-09
18			0.00	0.000	0.058	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	3.54E-10
19	*		0.00	0.000	0.024	0.2995	0.0000	0.0001	6.78E-10	0.0000	0.0000	6.61E-10	0.0000	0.0000	6.46E-10
20			0.00	0.000	0.023	0.2984	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.84E-14	0.0000	0.0000	2.84E-14
21	*		0.00	0.000	0.000	0.2984	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
22	*		0.00	0.000	0.022	0.2973	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
23	*		0.00	0.000	0.021	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
24	*		0.00	0.000	0.000	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
25	*		0.00	0.000	0.000	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
26	*		0.00	0.000	0.000	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
27	*		0.00	0.000	0.000	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
28	*		0.00	0.000	0.000	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
29	*		0.00	0.000	0.000	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
30	*		0.15	0.000	0.046	0.2972	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
31	*		0.00	0.000	0.021	0.2982	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
32			0.00	0.000	0.061	0.2972	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
33			0.00	0.000	0.020	0.2962	0.0000	0.0008	6.21E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
34			0.00	0.000	0.019	0.2953	0.0000	0.0012	6.50E-09	0.0000	0.0000	5.06E-09	0.0000	0.0000	5.06E-09
35	*		0.00	0.000	0.018	0.2944	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.31E-09	0.0000	0.0000	1.41E-09

36		0.00	0.000	0.018	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.13E-10
37	*	0.00	0.000	0.000	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
38	*	0.00	0.000	0.000	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
39		0.20	0.000	0.018	0.3020	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
40		0.38	0.000	0.017	0.3194	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
41		0.00	0.000	0.115	0.3139	0.0000	0.0004	2.13E-09	0.0000	0.0000	1.98E-09	0.0000	0.0000	1.85E-09
42		0.00	0.000	0.134	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
43		0.00	0.000	0.092	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
44		0.00	0.000	0.084	0.2992	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
45		0.00	0.000	0.062	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
46		0.08	0.000	0.048	0.2977	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
47		0.03	0.000	0.040	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
48	*	0.00	0.000	0.002	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
49	*	0.03	0.000	0.064	0.2954	0.0000	0.0008	5.47E-09	0.0000	0.0000	4.91E-09	0.0000	0.0000	3.28E-09
50		0.00	0.000	0.032	0.2939	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.04E-09
51		0.00	0.000	0.029	0.2925	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
52		0.00	0.000	0.027	0.2912	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
53		0.02	0.000	0.026	0.2910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
54		0.00	0.000	0.024	0.2898	0.0000	0.0007	5.36E-09	0.0000	0.0000	4.84E-09	0.0000	0.0000	3.24E-09
55		0.00	0.000	0.023	0.2887	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.03E-09
56		0.00	0.000	0.022	0.2876	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
57		0.00	0.000	0.021	0.2866	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
58	*	0.00	0.000	0.020	0.2857	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
59		0.00	0.000	0.020	0.2847	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
60		0.00	0.000	0.019	0.2838	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
61		0.00	0.000	0.018	0.2830	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
62		0.00	0.000	0.018	0.2821	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
63		0.00	0.000	0.017	0.2813	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
64		0.00	0.000	0.017	0.2805	0.0000	0.0001	4.19E-10	0.0000	0.0000	4.12E-10	0.0000	0.0000	4.06E-10
65		0.00	0.000	0.016	0.2797	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
66		0.00	0.000	0.016	0.2789	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
67	*	0.00	0.000	0.016	0.2782	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
68		0.00	0.000	0.015	0.2775	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
69		0.00	0.000	0.015	0.2767	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
70		0.00	0.000	0.015	0.2760	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
71		0.10	0.000	0.015	0.2802	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
72		0.00	0.000	0.014	0.2795	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
73		0.00	0.000	0.014	0.2788	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
74		0.00	0.000	0.014	0.2782	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
75		0.00	0.000	0.013	0.2775	0.0000	0.0011	6.99E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
76		0.00	0.000	0.013	0.2768	0.0000	0.0009	6.97E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77		0.00	0.000	0.013	0.2761	0.0000	0.0004	3.17E-09	0.0000	0.0000	3.33E-09	0.0000	0.0000	2.66E-09
78		0.00	0.000	0.013	0.2755	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	7.42E-10

79		0.00	0.000	0.013	0.2749	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
80		0.00	0.000	0.012	0.2743	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
81		0.22	0.000	0.013	0.2841	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
82		0.43	0.000	0.013	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
83		0.01	0.000	0.012	0.3040	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
84	*	0.00	0.000	0.012	0.3034	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
85		0.36	0.000	0.012	0.3202	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
86		0.00	0.000	0.082	0.3163	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
87		0.00	0.000	0.221	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
88		0.00	0.000	0.149	0.2987	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
89		0.00	0.000	0.062	0.2957	0.0000	0.0006	4.05E-09	0.0000	0.0000	3.79E-09	0.0000	0.0000	3.33E-09
90		0.00	0.000	0.047	0.2934	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
91		0.00	0.000	0.040	0.2915	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
92		0.00	0.000	0.035	0.2899	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
93		0.64	0.005	0.032	0.3184	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
94		0.00	0.000	0.300	0.3041	0.0000	0.0001	6.91E-10	0.0000	0.0000	6.74E-10	0.0000	0.0000	6.58E-10
95		0.00	0.000	0.029	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
96		0.33	0.000	0.028	0.3171	0.0000	0.0000	2.83E-10	0.0000	0.0000	2.80E-10	0.0000	0.0000	2.77E-10
97		0.00	0.000	0.290	0.3033	0.0000	0.0004	2.28E-09	0.0000	0.0000	2.10E-09	0.0000	0.0000	1.95E-09
98		0.00	0.000	0.026	0.3021	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
99		0.00	0.000	0.024	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
100		0.01	0.000	0.023	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
101		0.03	0.000	0.022	0.3007	0.0000	0.0001	1.00E-09	0.0000	0.0000	9.69E-10	0.0000	0.0000	9.36E-10
102	*	0.00	0.000	0.021	0.2997	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
103		0.00	0.000	0.020	0.2987	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
104	*	0.00	0.000	0.020	0.2978	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
105	*	0.00	0.000	0.019	0.2969	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
106		0.00	0.000	0.018	0.2960	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
107	*	0.02	0.000	0.039	0.2951	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
108		0.00	0.000	0.017	0.2943	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
109		0.00	0.000	0.017	0.2935	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
110		0.00	0.000	0.016	0.2927	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
111		0.24	0.000	0.016	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
112		0.10	0.000	0.016	0.3073	0.0000	0.0000	1.73E-10	0.0000	0.0000	1.72E-10	0.0000	0.0000	1.70E-10
113		0.00	0.000	0.015	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
114		0.00	0.000	0.015	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
115		0.00	0.000	0.015	0.3051	0.0000	0.0000	4.63E-10	0.0000	0.0000	4.55E-10	0.0000	0.0000	4.48E-10
116		0.00	0.000	0.014	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
117		0.00	0.000	0.014	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
118		0.00	0.000	0.014	0.3031	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
119		0.00	0.000	0.014	0.3024	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.00	0.000	0.013	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
121		0.00	0.000	0.013	0.3012	0.0000	0.0001	6.82E-10	0.0000	0.0000	6.66E-10	0.0000	0.0000	6.50E-10

122	0.00	0.000	0.013	0.3005	0.0000	0.0000	1.50E-10	0.0000	0.0000	1.49E-10	0.0000	0.0000	1.48E-10
123	0.00	0.000	0.013	0.2999	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
124	0.00	0.000	0.013	0.2993	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125	0.00	0.000	0.012	0.2987	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
126	0.00	0.000	0.012	0.2981	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
127	0.00	0.000	0.013	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
128	0.00	0.000	0.012	0.2970	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
129	0.00	0.000	0.012	0.2965	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
130	0.00	0.000	0.012	0.2959	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
131	0.00	0.000	0.012	0.2954	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
132	0.07	0.000	0.012	0.2981	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
133	0.19	0.000	0.012	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134	0.02	0.000	0.012	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
135	0.08	0.000	0.012	0.3097	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
136	0.04	0.000	0.238	0.3003	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137	0.02	0.000	0.011	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138	0.02	0.000	0.011	0.3013	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.00	0.000	0.011	0.3008	0.0000	0.0000	1.19E-10	0.0000	0.0000	1.18E-10	0.0000	0.0000	1.18E-10
140	0.01	0.000	0.011	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
141	0.00	0.000	0.010	0.3000	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142	0.00	0.000	0.010	0.2995	0.0000	0.0000	9.62E-10	0.0000	0.0000	9.29E-10	0.0000	0.0000	8.99E-10
143	0.00	0.000	0.010	0.2990	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
144	0.00	0.000	0.010	0.2986	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145	0.00	0.000	0.010	0.2981	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146	0.00	0.000	0.010	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
147	0.16	0.000	0.011	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
148	0.00	0.000	0.010	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
149	0.00	0.000	0.010	0.3037	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150	0.00	0.000	0.010	0.3032	0.0000	0.0000	4.20E-10	0.0000	0.0000	4.13E-10	0.0000	0.0000	4.07E-10
151	0.00	0.000	0.010	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
152	0.00	0.000	0.009	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.00	0.000	0.009	0.3019	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154	0.00	0.000	0.009	0.3014	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
155	0.00	0.000	0.009	0.3010	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156	0.00	0.000	0.009	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157	0.07	0.000	0.010	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158	0.00	0.000	0.009	0.3028	0.0000	0.0000	1.48E-10	0.0000	0.0000	1.47E-10	0.0000	0.0000	1.46E-10
159	0.00	0.000	0.009	0.3024	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
160	0.00	0.000	0.009	0.3019	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161	0.24	0.000	0.010	0.3131	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162	0.01	0.000	0.219	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163	0.00	0.000	0.009	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164	0.00	0.000	0.009	0.3024	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.00	0.000	0.009	0.3020	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.00	0.000	0.010	0.3017	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.01	0.000	0.010	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.33	0.000	0.010	0.3172	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.00	0.000	0.264	0.3046	0.0000	0.0004	2.23E-09	0.0000	0.0000	2.06E-09	0.0000	0.0000	1.91E-09
170	0.12	0.000	0.010	0.3097	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
171	0.00	0.000	0.259	0.2974	0.0000	0.0001	8.90E-10	0.0000	0.0000	8.62E-10	0.0000	0.0000	8.35E-10
172	0.07	0.000	0.010	0.3002	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
173	0.28	0.000	0.010	0.3131	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.34	0.002	0.139	0.3227	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.00	0.000	0.184	0.3140	0.0000	0.0001	6.10E-10	0.0000	0.0000	5.97E-10	0.0000	0.0000	5.84E-10
176	0.28	0.000	0.392	0.3085	0.0000	0.0003	1.53E-09	0.0000	0.0000	1.45E-09	0.0000	0.0000	1.38E-09
177	0.00	0.000	0.229	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
178	0.08	0.000	0.150	0.2942	0.0000	0.0000	1.70E-10	0.0000	0.0000	1.68E-10	0.0000	0.0000	1.67E-10
179	0.00	0.000	0.062	0.2913	0.0000	0.0001	5.26E-10	0.0000	0.0000	5.16E-10	0.0000	0.0000	5.07E-10
180	0.19	0.000	0.049	0.2980	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
181	0.01	0.000	0.041	0.2964	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.09	0.000	0.036	0.2989	0.0000	0.0000	2.07E-10	0.0000	0.0000	2.06E-10	0.0000	0.0000	1.54E-10
183	0.12	0.000	0.033	0.3031	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	5.11E-11
184	0.35	0.000	0.031	0.3185	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
185	1.08	0.342	0.336	0.3375	0.0000	0.0000	2.86E-10	0.0000	0.0000	2.83E-10	0.0000	0.0000	2.80E-10
186	0.00	0.000	0.198	0.3280	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
187	0.00	0.000	0.199	0.3185	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.20	0.000	0.267	0.3153	0.0000	0.0002	1.22E-09	0.0000	0.0000	1.17E-09	0.0000	0.0000	1.12E-09
189	0.12	0.000	0.214	0.3109	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
190	0.00	0.000	0.301	0.2965	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.00	0.000	0.149	0.2894	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.16	0.000	0.063	0.2938	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
193	0.00	0.000	0.047	0.2916	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	1.17	0.132	0.041	0.3391	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.75	0.229	0.116	0.3585	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
196	0.00	0.000	0.255	0.3463	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.00	0.000	0.174	0.3380	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.00	0.000	0.242	0.3265	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.00	0.000	0.187	0.3176	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.00	0.000	0.149	0.3105	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.00	0.000	0.063	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.00	0.000	0.047	0.3055	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.65	0.007	0.042	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.06	0.000	0.393	0.3182	0.0000	0.0016	9.40E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
205	0.67	0.022	0.037	0.3471	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.88E-09	0.0000	0.0000	2.35E-09
206	0.17	0.000	0.356	0.3381	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.39E-10
207	0.00	0.000	0.380	0.3197	0.0000	0.0008	4.26E-09	0.0000	0.0000	2.90E-09	0.0000	0.0000	2.63E-09

208	0.16	0.000	0.135	0.3199	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.23E-10	0.0000	0.0000	8.92E-10
209	0.00	0.000	0.352	0.3023	0.0000	0.0001	5.48E-10	0.0000	0.0000	5.37E-10	0.0000	0.0000	5.27E-10
210	0.00	0.000	0.149	0.2948	0.0000	0.0004	3.50E-09	0.0000	0.0000	3.11E-09	0.0000	0.0000	2.79E-09
211	0.00	0.000	0.062	0.2916	0.0001	0.0051	2.47E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
212	0.00	0.000	0.047	0.2893	0.0002	0.0090	3.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
213	0.00	0.000	0.040	0.2874	0.0002	0.0081	3.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
214	0.00	0.000	0.036	0.2858	0.0001	0.0068	3.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
215	0.00	0.000	0.032	0.2843	0.0001	0.0059	2.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
216	0.05	0.000	0.031	0.2853	0.0001	0.0052	2.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
217	0.23	0.000	0.029	0.2947	0.0001	0.0046	2.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
218	0.00	0.000	0.026	0.2935	0.0001	0.0042	2.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
219	0.00	0.000	0.024	0.2923	0.0001	0.0025	1.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
220	0.00	0.000	0.023	0.2911	0.0000	0.0023	1.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
221	0.59	0.001	0.024	0.3182	0.0001	0.0037	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
222	0.00	0.000	0.199	0.3088	0.0000	0.0010	5.08E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
223	0.69	0.034	0.023	0.3390	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.64E-09	0.0000	0.0000	1.59E-09
224	0.04	0.000	0.279	0.3278	0.0000	0.0002	1.37E-09	0.0000	0.0000	1.31E-09	0.0000	0.0000	1.25E-09
225	0.00	0.000	0.287	0.3141	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
226	0.01	0.000	0.151	0.3073	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
227	0.05	0.000	0.064	0.3067	0.0000	0.0002	1.43E-09	0.0000	0.0000	1.36E-09	0.0000	0.0000	9.89E-10
228	0.00	0.000	0.047	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	3.24E-10
229	0.00	0.000	0.040	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
230	0.00	0.000	0.035	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.00	0.000	0.031	0.2994	0.0000	0.0001	4.98E-10	0.0000	0.0000	4.89E-10	0.0000	0.0000	4.81E-10
232	0.00	0.000	0.029	0.2980	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
233	0.00	0.000	0.027	0.2967	0.0000	0.0001	6.84E-10	0.0000	0.0000	6.68E-10	0.0000	0.0000	6.52E-10
234	0.00	0.000	0.026	0.2955	0.0000	0.0001	6.20E-10	0.0000	0.0000	6.06E-10	0.0000	0.0000	5.93E-10
235	0.00	0.000	0.024	0.2943	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
236	0.75	0.021	0.025	0.3279	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.02	0.000	0.246	0.3170	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	1.04	0.176	0.128	0.3521	0.0000	0.0001	8.63E-10	0.0000	0.0000	8.37E-10	0.0000	0.0000	8.12E-10
239	0.08	0.000	0.293	0.3420	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
240	0.02	0.000	0.229	0.3322	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
241	0.02	0.000	0.196	0.3236	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
242	0.14	0.000	0.230	0.3192	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.03	0.000	0.222	0.3101	0.0000	0.0001	1.36E-09	0.0000	0.0000	1.30E-09	0.0000	0.0000	1.24E-09
244	0.51	0.001	0.151	0.3272	0.0000	0.0000	1.81E-10	0.0000	0.0000	1.80E-10	0.0000	0.0000	1.79E-10
245	0.00	0.000	0.172	0.3190	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
246	0.00	0.000	0.198	0.3095	0.0000	0.0002	9.09E-10	0.0000	0.0000	8.80E-10	0.0000	0.0000	8.53E-10
247	0.00	0.000	0.149	0.3024	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
248	0.00	0.000	0.062	0.2995	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.64	0.006	0.050	0.3275	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.00	0.000	0.187	0.3187	0.0000	0.0003	1.53E-09	0.0000	0.0000	1.45E-09	0.0000	0.0000	1.38E-09

251		0.00	0.000	0.154	0.3113	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
252		0.00	0.000	0.149	0.3042	0.0000	0.0000	1.09E-10	0.0000	0.0000	1.08E-10	0.0000	0.0000	1.08E-10
253		0.00	0.000	0.062	0.3013	0.0000	0.0000	5.94E-10	0.0000	0.0000	5.82E-10	0.0000	0.0000	5.70E-10
254		0.31	0.000	0.050	0.3139	0.0000	0.0001	5.52E-10	0.0000	0.0000	5.41E-10	0.0000	0.0000	5.30E-10
255		1.30	0.315	0.042	0.3588	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
256		0.59	0.198	0.229	0.3668	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
257		0.00	0.000	0.271	0.3539	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
258		0.00	0.000	0.315	0.3389	0.0000	0.0002	8.43E-10	0.0000	0.0000	8.18E-10	0.0000	0.0000	7.94E-10
259		0.00	0.000	0.156	0.3315	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
260		0.00	0.000	0.277	0.3182	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261		0.00	0.000	0.125	0.3123	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262		0.00	0.000	0.062	0.3094	0.0000	0.0001	5.76E-10	0.0000	0.0000	5.64E-10	0.0000	0.0000	5.53E-10
263		0.00	0.000	0.047	0.3064	0.0000	0.0000	9.22E-11	0.0000	0.0000	9.19E-11	0.0000	0.0000	9.16E-11
264		0.00	0.000	0.040	0.3033	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
265		0.00	0.000	0.035	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
266		0.00	0.000	0.032	0.2979	0.0000	0.0003	2.41E-09	0.0000	0.0000	2.22E-09	0.0000	0.0000	2.05E-09
267		0.00	0.000	0.029	0.2956	0.0002	0.0078	3.82E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
268		0.00	0.000	0.027	0.2936	0.0003	0.0152	6.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.026	0.2916	0.0003	0.0145	5.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.00	0.000	0.024	0.2897	0.0003	0.0159	6.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.31	0.000	0.026	0.3026	0.0004	0.0165	6.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.08	0.000	0.025	0.3049	0.0003	0.0162	6.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.00	0.000	0.021	0.3033	0.0003	0.0154	6.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		1.11	0.142	0.023	0.3480	0.0003	0.0144	5.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.06	0.000	0.103	0.3454	0.0002	0.0113	4.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.128	0.3387	0.0002	0.0115	4.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.222	0.3275	0.0003	0.0125	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.00	0.000	0.116	0.3215	0.0003	0.0147	6.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.00	0.000	0.081	0.3173	0.0003	0.0139	5.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280	*	0.00	0.000	0.081	0.3133	0.0003	0.0135	5.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281	*	0.36	0.000	0.026	0.3142	0.0003	0.0136	5.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282	*	0.08	0.000	0.035	0.3151	0.0002	0.0104	4.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.22	0.002	0.000	0.3419	0.0002	0.0084	3.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.00	0.000	0.069	0.3386	0.0001	0.0061	2.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285	*	0.00	0.000	0.000	0.3386	0.0001	0.0063	2.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.00	0.000	0.083	0.3346	0.0001	0.0049	2.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287	*	0.56	0.000	0.034	0.3355	0.0001	0.0050	2.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288	*	0.87	0.000	0.024	0.3365	0.0001	0.0046	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.02	0.000	0.000	0.3467	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.31	0.214	0.000	0.3794	0.0001	0.0037	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.30	0.435	0.012	0.3984	0.0000	0.0022	1.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.01	0.000	0.194	0.3811	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.68E-09	0.0000	0.0000	4.32E-09
293		0.17	0.000	0.110	0.3738	0.0035	0.1673	5.10E-07	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09

294		0.30	0.003	0.113	0.3770	0.0030	0.1400	4.39E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.35	0.027	0.127	0.3827	0.0019	0.0906	2.98E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.00	0.000	0.111	0.3732	0.0017	0.0793	2.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.00	0.000	0.099	0.3673	0.0017	0.0799	2.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		0.80	0.126	0.150	0.3875	0.0012	0.0399	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.00	0.000	0.150	0.3768	0.0022	0.0992	3.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		1.34	0.522	0.092	0.4068	0.0010	0.0475	1.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.11	0.006	0.065	0.3913	0.0064	0.3109	8.94E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.06	0.000	0.056	0.3806	0.0059	0.2721	7.98E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303	*	1.00	0.000	0.023	0.3755	0.0033	0.1533	4.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304	*	0.00	0.000	0.026	0.3716	0.0023	0.1101	3.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305	*	0.00	0.000	0.026	0.3690	0.0019	0.0887	2.94E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306	*	0.00	0.000	0.029	0.3669	0.0015	0.0712	2.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.00	0.165	0.000	0.3954	0.0014	0.0688	2.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308	*	0.00	0.000	0.039	0.3872	0.0011	0.0524	1.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309	*	0.31	0.000	0.017	0.3769	0.0054	0.2531	7.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310	*	0.00	0.000	0.022	0.3713	0.0034	0.1600	4.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.00	0.000	0.046	0.3752	0.0024	0.1107	3.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.00	0.000	0.079	0.3682	0.0020	0.0937	3.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.00	0.000	0.125	0.3584	0.0014	0.0677	2.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314	*	0.00	0.000	0.056	0.3534	0.0016	0.0749	2.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315	*	0.01	0.000	0.009	0.3521	0.0010	0.0486	1.74E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316	*	0.74	0.000	0.036	0.3522	0.0007	0.0320	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.10	0.015	0.000	0.3753	0.0005	0.0182	7.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318		0.00	0.006	0.068	0.3820	0.0007	0.0314	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.00	0.000	0.176	0.3711	0.0009	0.0438	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.00	0.000	0.086	0.3657	0.0008	0.0356	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.00	0.000	0.098	0.3562	0.0011	0.0525	1.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.20	0.000	0.086	0.3582	0.0019	0.0890	2.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323	*	0.00	0.000	0.000	0.3554	0.0015	0.0682	2.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324	*	0.00	0.000	0.000	0.3532	0.0012	0.0575	2.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325	*	0.00	0.000	0.000	0.3511	0.0010	0.0472	1.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326	*	0.00	0.000	0.000	0.3491	0.0009	0.0443	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	0.19	0.000	0.029	0.3483	0.0009	0.0415	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.037	0.3517	0.0008	0.0382	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.00	0.000	0.071	0.3470	0.0006	0.0299	1.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.00	0.000	0.063	0.3423	0.0007	0.0311	1.15E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	0.00	0.000	0.000	0.3413	0.0008	0.0360	1.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.00	0.000	0.049	0.3382	0.0006	0.0266	1.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333	*	0.00	0.000	0.046	0.3353	0.0005	0.0218	8.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.00	0.000	0.067	0.3315	0.0004	0.0186	7.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	0.00	0.000	0.000	0.3310	0.0003	0.0162	6.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.086	0.3262	0.0003	0.0122	5.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337	*	1.99	0.000	0.000	0.3263	0.0003	0.0119	5.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338	*	0.00	0.000	0.032	0.3265	0.0004	0.0166	6.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339	*	0.00	0.000	0.029	0.3269	0.0004	0.0170	6.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.062	0.000	0.3628	0.0003	0.0155	6.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.00	0.149	0.000	0.3839	0.0004	0.0157	6.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342	*	0.00	0.000	0.023	0.3845	0.0003	0.0146	5.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.00	0.031	0.017	0.3953	0.0001	0.0058	2.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.00	0.000	0.059	0.3854	0.0032	0.1521	4.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345		0.83	0.225	0.064	0.4014	0.0038	0.1729	5.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346		0.06	0.000	0.099	0.3877	0.0042	0.2094	6.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347		0.00	0.000	0.125	0.3712	0.0057	0.2623	7.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.00	0.000	0.102	0.3605	0.0033	0.1528	4.75E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		0.00	0.000	0.067	0.3533	0.0021	0.0993	3.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.00	0.000	0.102	0.3458	0.0016	0.0758	2.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.00	0.000	0.071	0.3402	0.0011	0.0524	1.83E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352	*	0.00	0.000	0.000	0.3387	0.0011	0.0492	1.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.065	0.3340	0.0007	0.0328	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354	*	0.00	0.000	0.000	0.3325	0.0007	0.0347	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.00	0.000	0.047	0.3288	0.0007	0.0317	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		0.23	0.000	0.060	0.3354	0.0006	0.0303	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.04	0.000	0.077	0.3328	0.0007	0.0339	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		0.24	0.000	0.127	0.3372	0.0006	0.0264	9.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359		0.00	0.000	0.109	0.3311	0.0005	0.0226	8.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		0.00	0.000	0.082	0.3266	0.0005	0.0211	8.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.00	0.000	0.086	0.3215	0.0003	0.0158	6.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.00	0.000	0.064	0.3176	0.0004	0.0183	7.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.00	0.000	0.096	0.3123	0.0004	0.0198	7.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.53	0.001	0.096	0.3322	0.0004	0.0188	7.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.00	0.000	0.145	0.3244	0.0003	0.0143	6.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 1			
	inches	cubic feet	percent
Precipitation	33.39	121,188.7	100.00
Runoff	3.623	13,151.0	10.85
Evapotranspiration	24.153	87,676.7	72.35
Drainage Collected from Layer 2	5.6087	20,359.7	16.80
Percolation/Leakage through Layer 3	0.000019	0.0685	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0651	0.00
Percolation/Leakage through Layer 8	0.000001	0.0034	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0000	0.00
Percolation/Leakage through Layer 11	0.000001	0.0034	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.0003	1.2055	0.00
Soil Water at Start of Year	256.5589	931,309.0	768.48
Soil Water at End of Year	256.5593	931,310.2	768.48
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 2

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.092	0.3195	0.0004	0.0203	7.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.00	0.000	0.120	0.3131	0.0003	0.0161	6.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.064	0.3097	0.0003	0.0164	6.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.14	0.000	0.056	0.3132	0.0003	0.0143	5.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.00	0.000	0.097	0.3082	0.0003	0.0122	5.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6	*		0.24	0.000	0.039	0.3090	0.0003	0.0122	5.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7			0.05	0.000	0.059	0.3172	0.0002	0.0102	4.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8			0.00	0.000	0.140	0.3105	0.0002	0.0103	4.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9			0.14	0.000	0.122	0.3115	0.0002	0.0096	4.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10			0.00	0.000	0.133	0.3052	0.0002	0.0078	3.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11			0.00	0.000	0.127	0.2991	0.0001	0.0067	3.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.00	0.000	0.062	0.2962	0.0001	0.0058	2.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13			0.00	0.000	0.047	0.2940	0.0001	0.0051	2.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14			0.56	0.000	0.041	0.3186	0.0001	0.0046	2.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15			0.00	0.000	0.055	0.3160	0.0001	0.0041	2.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16			0.00	0.000	0.062	0.3130	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.00	0.000	0.059	0.3102	0.0000	0.0022	1.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18	*		0.00	0.000	0.000	0.3102	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.40E-09	0.0000	0.0000	4.08E-09
19			0.20	0.000	0.065	0.3168	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
20			0.00	0.000	0.074	0.3132	0.0000	0.0001	3.80E-10	0.0000	0.0000	3.75E-10	0.0000	0.0000	3.70E-10
21			0.00	0.000	0.087	0.3091	0.0000	0.0002	1.96E-09	0.0000	0.0000	1.83E-09	0.0000	0.0000	1.71E-09
22			0.00	0.000	0.106	0.3040	0.0000	0.0005	3.10E-09	0.0000	0.0000	2.79E-09	0.0000	0.0000	2.53E-09
23			0.00	0.000	0.149	0.2969	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
24			0.00	0.000	0.062	0.2940	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
25			0.00	0.000	0.047	0.2917	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
26			0.00	0.000	0.040	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
27			0.00	0.000	0.036	0.2883	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
28			0.01	0.000	0.032	0.2872	0.0000	0.0000	3.12E-10	0.0000	0.0000	3.09E-10	0.0000	0.0000	3.05E-10
29			0.19	0.000	0.030	0.2949	0.0000	0.0000	1.42E-10	0.0000	0.0000	1.41E-10	0.0000	0.0000	1.40E-10
30			0.00	0.000	0.027	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
31			0.10	0.000	0.026	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
32			0.02	0.000	0.025	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
33			0.00	0.000	0.023	0.2960	0.0000	0.0000	4.07E-10	0.0000	0.0000	4.01E-10	0.0000	0.0000	3.95E-10
34			0.00	0.000	0.022	0.2950	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
35			0.03	0.000	0.022	0.2956	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

36			0.32	0.000	0.021	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
37			0.01	0.000	0.113	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
38			0.00	0.000	0.020	0.3037	0.0000	0.0001	5.39E-10	0.0000	0.0000	5.29E-10	0.0000	0.0000	5.19E-10
39	*		0.00	0.000	0.000	0.3037	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
40	*		0.51	0.000	0.026	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
41	*		0.00	0.000	0.011	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
42	*		0.00	0.000	0.007	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
43	*		0.00	0.000	0.018	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
44	*		0.00	0.000	0.034	0.3084	0.0000	0.0003	2.43E-09	0.0000	0.0000	2.24E-09	0.0000	0.0000	2.07E-09
45			0.00	0.000	0.087	0.3192	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
46			0.00	0.000	0.110	0.3139	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
47			0.00	0.000	0.109	0.3088	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
48	*		0.00	0.000	0.053	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
49	*		0.00	0.000	0.000	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
50	*		0.27	0.000	0.018	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
51	*		0.10	0.000	0.030	0.3081	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
52			0.52	0.060	0.000	0.3435	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
53	*		0.84	0.000	0.039	0.3445	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
54	*		0.03	0.000	0.037	0.3454	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
55			0.00	0.000	0.045	0.3464	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
56	*		0.00	0.000	0.025	0.3473	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
57	*		0.00	0.000	0.026	0.3482	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
58	*		0.00	0.000	0.013	0.3492	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
59	*		0.00	0.000	0.018	0.3501	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
60	*	*	0.00	0.000	0.030	0.3501	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
61	*	*	0.11	0.000	0.015	0.3501	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
62	*	*	0.77	0.000	0.019	0.3501	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
63	*	*	0.61	0.000	0.000	0.3501	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
64	*	*	0.02	0.000	0.000	0.3501	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
65	*	*	0.00	0.000	0.029	0.3501	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
66		*	0.00	0.761	0.000	0.3611	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
67		*	0.00	0.228	0.004	0.3671	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
68		*	0.00	0.479	0.007	0.3722	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
69	*	*	0.12	0.000	0.039	0.3722	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
70		*	0.00	0.015	0.066	0.3722	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
71		*	0.00	0.000	0.000	0.3722	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
72		*	0.00	0.000	0.000	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
73		*	0.00	0.000	0.000	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
74			0.41	0.119	0.126	0.3805	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
75			0.84	0.359	0.136	0.3966	0.0000	0.0010	5.33E-09	0.0000	0.0000	4.82E-09	0.0000	0.0000	3.23E-09
76	*		0.00	0.000	0.000	0.3884	0.0000	0.0018	9.05E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	5.04E-09
77			0.00	0.000	0.099	0.3725	0.0038	0.1891	5.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.00	0.000	0.129	0.3602	0.0033	0.1546	4.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.00	0.000	0.180	0.3474	0.0024	0.1104	3.59E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.52	0.007	0.191	0.3599	0.0016	0.0772	2.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.05	0.000	0.174	0.3524	0.0011	0.0530	1.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.00	0.000	0.225	0.3400	0.0009	0.0405	1.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.00	0.000	0.350	0.3219	0.0008	0.0375	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.00	0.000	0.256	0.3087	0.0006	0.0300	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.22	0.000	0.149	0.3102	0.0005	0.0247	9.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.062	0.3059	0.0007	0.0317	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.047	0.3027	0.0007	0.0315	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.040	0.3001	0.0005	0.0252	9.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.00	0.000	0.035	0.2977	0.0004	0.0210	8.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.032	0.2956	0.0004	0.0182	7.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.01	0.000	0.030	0.2942	0.0003	0.0160	6.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.00	0.000	0.027	0.2925	0.0003	0.0145	5.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.00	0.000	0.026	0.2908	0.0003	0.0132	5.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.024	0.2893	0.0003	0.0121	5.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.23	0.000	0.023	0.2987	0.0002	0.0095	4.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.00	0.000	0.022	0.2972	0.0002	0.0107	4.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.00	0.000	0.021	0.2959	0.0002	0.0108	4.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.00	0.000	0.020	0.2947	0.0002	0.0110	4.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.00	0.000	0.020	0.2936	0.0002	0.0100	4.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100	*	0.00	0.000	0.019	0.2925	0.0002	0.0088	3.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101	*	0.00	0.000	0.000	0.2923	0.0001	0.0064	2.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102	*	0.00	0.000	0.003	0.2921	0.0001	0.0064	2.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103	*	0.00	0.000	0.018	0.2911	0.0002	0.0076	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104	*	0.00	0.000	0.018	0.2901	0.0001	0.0066	3.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105	*	0.00	0.000	0.000	0.2899	0.0001	0.0045	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106	*	0.01	0.000	0.009	0.2897	0.0001	0.0047	2.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107	*	1.01	0.000	0.023	0.2906	0.0001	0.0062	2.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.07	0.000	0.000	0.2915	0.0001	0.0069	3.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.10	0.000	0.000	0.3009	0.0001	0.0060	2.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.11	0.110	0.073	0.3415	0.0001	0.0052	2.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.10	0.000	0.243	0.3345	0.0001	0.0047	2.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.00	0.000	0.238	0.3231	0.0001	0.0036	1.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113		0.00	0.000	0.239	0.3117	0.0001	0.0039	1.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114		0.01	0.000	0.109	0.3069	0.0001	0.0036	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		0.07	0.000	0.149	0.3030	0.0000	0.0004	2.07E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116		0.00	0.000	0.062	0.3001	0.0000	0.0005	3.60E-09	0.0000	0.0000	3.02E-09	0.0000	0.0000	2.11E-09
117		0.00	0.000	0.047	0.2978	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.96E-10	0.0000	0.0000	1.25E-09
118		0.00	0.000	0.040	0.2959	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.93E-10
119		0.00	0.000	0.035	0.2943	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.00	0.000	0.032	0.2927	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
121		0.00	0.000	0.029	0.2914	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

122	0.00	0.000	0.027	0.2901	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
123	0.00	0.000	0.026	0.2889	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
124	0.18	0.000	0.025	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125	0.00	0.000	0.023	0.2952	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
126	0.00	0.000	0.022	0.2942	0.0000	0.0003	2.08E-09	0.0000	0.0000	1.93E-09	0.0000	0.0000	1.81E-09
127	0.00	0.000	0.021	0.2931	0.0000	0.0011	7.88E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
128	0.00	0.000	0.020	0.2921	0.0000	0.0002	1.80E-09	0.0000	0.0000	2.87E-09	0.0000	0.0000	2.98E-09
129	0.00	0.000	0.020	0.2912	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	6.50E-10
130	0.00	0.000	0.019	0.2903	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
131	0.00	0.000	0.018	0.2894	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
132	0.41	0.000	0.018	0.3080	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
133	0.00	0.000	0.017	0.3072	0.0000	0.0000	2.91E-10	0.0000	0.0000	2.88E-10	0.0000	0.0000	2.85E-10
134	0.11	0.000	0.017	0.3118	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
135	0.20	0.000	0.186	0.3123	0.0000	0.0001	6.51E-10	0.0000	0.0000	6.36E-10	0.0000	0.0000	6.22E-10
136	0.08	0.000	0.186	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
137	0.00	0.000	0.133	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138	0.00	0.000	0.062	0.2979	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.07	0.000	0.048	0.2991	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140	0.41	0.000	0.041	0.3165	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141	0.00	0.000	0.157	0.3090	0.0000	0.0001	7.31E-10	0.0000	0.0000	7.12E-10	0.0000	0.0000	6.94E-10
142	0.00	0.000	0.116	0.3034	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
143	0.00	0.000	0.149	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144	0.07	0.000	0.062	0.2967	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145	0.04	0.000	0.048	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146	0.00	0.000	0.040	0.2944	0.0000	0.0001	7.06E-10	0.0000	0.0000	6.88E-10	0.0000	0.0000	6.71E-10
147	0.00	0.000	0.035	0.2927	0.0000	0.0003	2.32E-09	0.0000	0.0000	2.14E-09	0.0000	0.0000	1.99E-09
148	0.00	0.000	0.032	0.2912	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
149	0.00	0.000	0.029	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150	1.01	0.083	0.028	0.3328	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151	0.18	0.000	0.404	0.3221	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
152	0.13	0.000	0.236	0.3169	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.02	0.000	0.157	0.3105	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154	0.54	0.013	0.358	0.3183	0.0000	0.0001	4.06E-10	0.0000	0.0000	4.00E-10	0.0000	0.0000	3.94E-10
155	0.00	0.000	0.405	0.2990	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
156	0.00	0.000	0.149	0.2919	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157	0.00	0.000	0.062	0.2890	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158	0.00	0.000	0.047	0.2867	0.0000	0.0000	2.18E-10	0.0000	0.0000	2.17E-10	0.0000	0.0000	2.15E-10
159	0.00	0.000	0.040	0.2848	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
160	0.28	0.000	0.036	0.2965	0.0000	0.0000	1.21E-10	0.0000	0.0000	1.21E-10	0.0000	0.0000	1.20E-10
161	0.00	0.000	0.032	0.2950	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
162	0.18	0.000	0.030	0.3021	0.0000	0.0000	1.50E-10	0.0000	0.0000	1.49E-10	0.0000	0.0000	1.48E-10
163	0.00	0.000	0.027	0.3008	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
164	0.00	0.000	0.026	0.2996	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.00	0.000	0.024	0.2985	0.0000	0.0000	4.84E-10	0.0000	0.0000	4.76E-10	0.0000	0.0000	4.67E-10
166	0.00	0.000	0.023	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
167	0.29	0.000	0.023	0.3102	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.10	0.000	0.409	0.2953	0.0000	0.0012	6.42E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
169	0.00	0.000	0.021	0.2943	0.0000	0.0000	1.91E-10	0.0000	0.0000	5.68E-10	0.0000	0.0000	1.47E-09
170	0.00	0.000	0.020	0.2934	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.75E-11	0.0000	0.0000	1.74E-10
171	0.00	0.000	0.020	0.2924	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.18E-11
172	0.04	0.000	0.020	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.08	0.000	0.019	0.2966	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.54	0.010	0.019	0.3207	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.01	0.000	0.183	0.3123	0.0000	0.0001	5.75E-10	0.0000	0.0000	5.63E-10	0.0000	0.0000	5.52E-10
176	0.00	0.000	0.299	0.2981	0.0000	0.0002	8.55E-10	0.0000	0.0000	8.29E-10	0.0000	0.0000	8.05E-10
177	0.00	0.000	0.149	0.2910	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
178	0.00	0.000	0.062	0.2880	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.06	0.000	0.048	0.2885	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.00	0.000	0.040	0.2866	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.00	0.000	0.035	0.2849	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.21	0.000	0.033	0.2935	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.00	0.000	0.029	0.2921	0.0000	0.0001	4.95E-10	0.0000	0.0000	4.86E-10	0.0000	0.0000	4.78E-10
184	0.00	0.000	0.027	0.2908	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
185	0.00	0.000	0.026	0.2896	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
186	0.00	0.000	0.024	0.2885	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
187	0.70	0.018	0.024	0.3197	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.04	0.000	0.229	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.00	0.000	0.342	0.2945	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.00	0.000	0.149	0.2874	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.36	0.000	0.063	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.01	0.000	0.048	0.2998	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
193	0.06	0.000	0.041	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	0.00	0.000	0.035	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.00	0.000	0.032	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
196	0.00	0.000	0.029	0.2960	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.00	0.000	0.027	0.2947	0.0000	0.0000	2.98E-10	0.0000	0.0000	2.95E-10	0.0000	0.0000	2.92E-10
198	0.00	0.000	0.026	0.2935	0.0000	0.0001	8.44E-10	0.0000	0.0000	8.19E-10	0.0000	0.0000	7.95E-10
199	1.38	0.291	0.025	0.3442	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
200	0.22	0.013	0.139	0.3477	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.00	0.000	0.263	0.3352	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.00	0.000	0.342	0.3189	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.00	0.000	0.189	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.00	0.000	0.304	0.2955	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.00	0.000	0.149	0.2883	0.0000	0.0004	2.71E-09	0.0000	0.0000	2.47E-09	0.0000	0.0000	2.27E-09
206	0.16	0.000	0.063	0.2929	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
207	0.00	0.000	0.048	0.2907	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.01	0.000	0.041	0.2892	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
209	0.00	0.000	0.035	0.2875	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.00	0.000	0.032	0.2860	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.16	0.000	0.031	0.2923	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
212	0.17	0.000	0.029	0.2990	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
213	2.14	0.972	0.027	0.3536	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.00	0.000	0.273	0.3406	0.0000	0.0000	2.02E-10	0.0000	0.0000	2.00E-10	0.0000	0.0000	1.99E-10
215	0.90	0.163	0.269	0.3630	0.0000	0.0003	1.50E-09	0.0000	0.0000	1.42E-09	0.0000	0.0000	1.35E-09
216	0.00	0.000	0.257	0.3508	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
217	0.16	0.000	0.302	0.3441	0.0000	0.0004	2.13E-09	0.0000	0.0000	1.97E-09	0.0000	0.0000	1.84E-09
218	0.02	0.000	0.332	0.3292	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
219	1.20	0.199	0.283	0.3634	0.0000	0.0001	8.82E-10	0.0000	0.0000	8.54E-10	0.0000	0.0000	8.28E-10
220	0.79	0.281	0.154	0.3805	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
221	0.00	0.000	0.173	0.3721	0.0000	0.0015	7.89E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
222	0.00	0.000	0.310	0.3562	0.0000	0.0012	6.10E-09	0.0000	0.0000	6.79E-09	0.0000	0.0000	6.80E-09
223	0.00	0.000	0.299	0.3378	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	3.74E-10
224	0.05	0.000	0.128	0.3318	0.0003	0.0148	5.99E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09
225	0.01	0.000	0.113	0.3240	0.0009	0.0442	1.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
226	0.64	0.011	0.063	0.3489	0.0012	0.0570	1.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
227	0.01	0.000	0.141	0.3408	0.0010	0.0450	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
228	0.06	0.000	0.277	0.3292	0.0009	0.0416	1.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
229	0.00	0.000	0.135	0.3215	0.0007	0.0346	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
230	0.24	0.000	0.124	0.3258	0.0007	0.0308	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
231	0.00	0.000	0.136	0.3184	0.0006	0.0268	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
232	0.00	0.000	0.062	0.3145	0.0005	0.0241	9.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
233	0.08	0.000	0.049	0.3153	0.0005	0.0223	8.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
234	0.00	0.000	0.040	0.3127	0.0004	0.0192	7.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
235	1.18	0.170	0.037	0.3585	0.0004	0.0179	7.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
236	0.09	0.000	0.155	0.3547	0.0003	0.0135	5.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
237	0.02	0.000	0.326	0.3393	0.0003	0.0157	6.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
238	0.00	0.000	0.268	0.3259	0.0003	0.0158	6.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
239	0.00	0.000	0.211	0.3156	0.0004	0.0208	8.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
240	0.50	0.001	0.151	0.3322	0.0004	0.0164	6.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
241	0.09	0.000	0.137	0.3299	0.0003	0.0120	5.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
242	0.00	0.000	0.143	0.3229	0.0002	0.0081	3.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
243	0.00	0.000	0.294	0.3090	0.0002	0.0083	3.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
244	0.08	0.000	0.151	0.3055	0.0001	0.0068	3.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
245	0.00	0.000	0.063	0.3026	0.0001	0.0054	2.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
246	0.13	0.000	0.049	0.3065	0.0001	0.0055	2.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
247	1.26	0.190	0.042	0.3553	0.0001	0.0049	2.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
248	0.13	0.000	0.188	0.3526	0.0001	0.0044	2.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
249	0.00	0.000	0.149	0.3455	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
250	0.00	0.000	0.084	0.3415	0.0001	0.0037	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

251		0.00	0.000	0.185	0.3327	0.0000	0.0012	6.37E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
252		0.00	0.000	0.195	0.3233	0.0000	0.0003	1.77E-09	0.0000	0.0000	4.12E-09	0.0000	0.0000	3.85E-09
253		0.00	0.000	0.096	0.3187	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
254		0.25	0.000	0.151	0.3232	0.0000	0.0009	6.19E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
255		1.04	0.135	0.155	0.3589	0.0000	0.0012	8.16E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
256		0.82	0.289	0.142	0.3775	0.0000	0.0001	6.22E-10	0.0000	0.0000	1.33E-09	0.0000	0.0000	1.36E-09
257		0.34	0.063	0.051	0.3885	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.52E-10	0.0000	0.0000	4.29E-10
258		0.17	0.003	0.114	0.3901	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.78E-11
259	*	0.00	0.000	0.062	0.3782	0.0001	0.0072	2.71E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
260	*	0.00	0.000	0.081	0.3690	0.0025	0.1157	3.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261	*	0.03	0.000	0.047	0.3631	0.0023	0.1078	3.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.00	0.000	0.096	0.3548	0.0020	0.0918	3.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.10	0.000	0.070	0.3529	0.0016	0.0758	2.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.00	0.000	0.101	0.3458	0.0013	0.0604	2.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.00	0.000	0.249	0.3319	0.0011	0.0502	1.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.00	0.000	0.224	0.3198	0.0010	0.0493	1.74E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.00	0.000	0.149	0.3119	0.0007	0.0313	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.00	0.000	0.062	0.3078	0.0004	0.0203	7.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.047	0.3043	0.0005	0.0230	8.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.00	0.000	0.040	0.3013	0.0006	0.0265	1.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.035	0.2987	0.0005	0.0244	9.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.00	0.000	0.032	0.2963	0.0005	0.0218	8.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273	*	0.00	0.000	0.000	0.2954	0.0005	0.0215	8.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		0.00	0.000	0.029	0.2933	0.0004	0.0207	8.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.00	0.000	0.027	0.2913	0.0004	0.0186	7.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.19	0.000	0.028	0.2986	0.0004	0.0170	6.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.024	0.2969	0.0003	0.0155	6.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.00	0.000	0.023	0.2953	0.0003	0.0131	5.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.00	0.000	0.022	0.2938	0.0003	0.0138	5.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280	*	0.00	0.000	0.021	0.2924	0.0003	0.0133	5.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281		0.00	0.000	0.020	0.2911	0.0003	0.0119	5.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.00	0.000	0.020	0.2899	0.0002	0.0107	4.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.00	0.000	0.019	0.2887	0.0002	0.0096	4.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.08	0.000	0.021	0.2913	0.0002	0.0071	3.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.13	0.000	0.020	0.2963	0.0002	0.0081	3.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.00	0.000	0.017	0.2952	0.0002	0.0084	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.00	0.000	0.017	0.2941	0.0002	0.0083	3.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.00	0.000	0.016	0.2931	0.0002	0.0079	3.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289	*	0.20	0.000	0.035	0.2938	0.0002	0.0078	3.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290	*	0.00	0.000	0.038	0.2946	0.0002	0.0072	3.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291	*	0.00	0.000	0.020	0.2955	0.0002	0.0084	3.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.00	0.000	0.067	0.2947	0.0002	0.0081	3.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.00	0.000	0.016	0.2940	0.0001	0.0068	3.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.00	0.000	0.015	0.2932	0.0001	0.0059	2.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.00	0.000	0.015	0.2925	0.0001	0.0052	2.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.00	0.000	0.015	0.2918	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.00	0.000	0.014	0.2911	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		0.00	0.000	0.014	0.2905	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.00	0.000	0.014	0.2898	0.0001	0.0023	1.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.000	0.014	0.2891	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.61E-09	0.0000	0.0000	4.26E-09
301		0.00	0.000	0.013	0.2885	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
302		0.00	0.000	0.013	0.2879	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
303		0.00	0.000	0.013	0.2872	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
304		0.00	0.000	0.013	0.2866	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
305		0.00	0.000	0.013	0.2860	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
306		0.00	0.000	0.012	0.2854	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
307		0.00	0.000	0.012	0.2848	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
308		0.00	0.000	0.012	0.2843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
309		0.00	0.000	0.012	0.2837	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
310		0.00	0.000	0.012	0.2831	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
311		0.00	0.000	0.012	0.2826	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
312		0.29	0.000	0.013	0.2960	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
313		0.00	0.000	0.011	0.2954	0.0000	0.0001	5.07E-10	0.0000	0.0000	4.98E-10	0.0000	0.0000	4.89E-10
314		0.00	0.000	0.011	0.2949	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
315		0.14	0.000	0.012	0.3012	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
316		0.29	0.000	0.012	0.3145	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
317	*	0.00	0.000	0.056	0.3119	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
318		0.03	0.000	0.088	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
319		0.00	0.000	0.117	0.3033	0.0000	0.0004	2.67E-09	0.0000	0.0000	2.43E-09	0.0000	0.0000	2.23E-09
320		0.00	0.000	0.137	0.2968	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
321		0.00	0.000	0.062	0.2939	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
322		0.02	0.000	0.048	0.2924	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
323		0.25	0.000	0.041	0.3024	0.0000	0.0001	6.55E-10	0.0000	0.0000	6.40E-10	0.0000	0.0000	6.25E-10
324		0.86	0.073	0.036	0.3384	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
325		0.22	0.000	0.101	0.3438	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
326		0.09	0.000	0.084	0.3439	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
327	*	0.04	0.000	0.033	0.3443	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
328		0.02	0.000	0.052	0.3427	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
329		0.05	0.000	0.105	0.3399	0.0000	0.0001	6.42E-10	0.0000	0.0000	6.28E-10	0.0000	0.0000	6.14E-10
330		0.44	0.010	0.118	0.3546	0.0000	0.0001	8.89E-10	0.0000	0.0000	8.61E-10	0.0000	0.0000	8.35E-10
331		0.10	0.000	0.072	0.3559	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
332		0.86	0.243	0.087	0.3810	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
333		0.00	0.000	0.064	0.3779	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
334		0.00	0.000	0.075	0.3715	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
335		0.00	0.000	0.065	0.3624	0.0001	0.0060	2.36E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
336	*	0.02	0.000	0.024	0.3581	0.0018	0.0870	2.91E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337	*	0.29	0.000	0.035	0.3559	0.0017	0.0801	2.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.01	0.000	0.061	0.3621	0.0013	0.0627	2.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		0.05	0.000	0.096	0.3574	0.0012	0.0538	1.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.102	0.3508	0.0011	0.0519	1.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.00	0.000	0.051	0.3469	0.0009	0.0416	1.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		1.36	0.376	0.056	0.3898	0.0007	0.0319	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.30	0.076	0.055	0.3967	0.0008	0.0371	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.55	0.167	0.064	0.4015	0.0027	0.1239	3.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345		0.09	0.000	0.057	0.3902	0.0048	0.2302	6.85E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346		0.00	0.000	0.048	0.3773	0.0054	0.2539	7.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347	*	0.00	0.000	0.043	0.3693	0.0033	0.1519	4.73E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.02	0.000	0.051	0.3633	0.0022	0.1018	3.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349	*	0.08	0.000	0.041	0.3607	0.0018	0.0840	2.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.04	0.000	0.086	0.3561	0.0016	0.0729	2.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.00	0.000	0.110	0.3484	0.0012	0.0579	2.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.00	0.000	0.127	0.3404	0.0012	0.0548	1.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.114	0.3336	0.0009	0.0424	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.59	0.009	0.092	0.3559	0.0007	0.0342	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.18	0.000	0.090	0.3584	0.0005	0.0223	8.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		0.05	0.000	0.073	0.3563	0.0008	0.0357	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.00	0.000	0.072	0.3521	0.0006	0.0304	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*	0.06	0.000	0.032	0.3522	0.0005	0.0213	8.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359		0.32	0.001	0.053	0.3642	0.0004	0.0193	7.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		0.16	0.000	0.087	0.3666	0.0005	0.0229	8.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.18	0.000	0.073	0.3710	0.0004	0.0202	8.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.00	0.000	0.073	0.3666	0.0004	0.0188	7.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.04	0.000	0.116	0.3627	0.0005	0.0255	9.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.00	0.000	0.124	0.3568	0.0004	0.0206	8.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.00	0.000	0.068	0.3517	0.0001	0.0022	8.87E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 2			
	inches	cubic feet	percent
Precipitation	39.44	143,159.8	100.00
Runoff	5.994	21,758.5	15.20
Evapotranspiration	28.254	102,561.5	71.64
Drainage Collected from Layer 2	4.6143	16,750.0	11.70
Percolation/Leakage through Layer 3	0.000016	0.0595	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0554	0.00
Percolation/Leakage through Layer 8	0.000001	0.0042	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0041	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.5757	2,089.7	1.46
Soil Water at Start of Year	256.5593	931,310.2	650.54
Soil Water at End of Year	257.1350	933,399.9	652.00
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 3

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.04	0.000	0.122	0.3451	0.0002	0.0105	4.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.00	0.000	0.087	0.3388	0.0011	0.0503	1.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.088	0.3329	0.0009	0.0423	1.51E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4	*		0.37	0.000	0.036	0.3323	0.0008	0.0391	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5	*		0.00	0.000	0.033	0.3319	0.0007	0.0329	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6			0.00	0.000	0.048	0.3405	0.0006	0.0298	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7			0.05	0.000	0.074	0.3378	0.0006	0.0262	9.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8	*		0.00	0.000	0.005	0.3369	0.0007	0.0314	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9	*		0.00	0.000	0.000	0.3359	0.0005	0.0245	9.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10	*		0.00	0.000	0.000	0.3351	0.0005	0.0232	8.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*		0.00	0.000	0.000	0.3343	0.0004	0.0210	8.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*		0.00	0.000	0.000	0.3336	0.0004	0.0185	7.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*		0.00	0.000	0.049	0.3305	0.0004	0.0165	6.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14			0.00	0.000	0.096	0.3252	0.0003	0.0164	6.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15			0.23	0.000	0.097	0.3311	0.0004	0.0188	7.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16			0.00	0.000	0.076	0.3269	0.0002	0.0114	4.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.00	0.000	0.129	0.3201	0.0003	0.0120	5.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.00	0.000	0.063	0.3164	0.0003	0.0121	5.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19			0.00	0.000	0.106	0.3106	0.0002	0.0111	4.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.00	0.000	0.133	0.3036	0.0003	0.0141	5.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.06	0.000	0.099	0.3014	0.0004	0.0169	6.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22			0.12	0.000	0.062	0.3037	0.0003	0.0161	6.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23			0.03	0.000	0.048	0.3026	0.0003	0.0140	5.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.58	0.004	0.040	0.3280	0.0003	0.0122	5.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*		0.09	0.000	0.047	0.3287	0.0002	0.0114	4.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26			0.86	0.146	0.120	0.3578	0.0002	0.0094	4.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*		0.00	0.000	0.060	0.3549	0.0002	0.0114	4.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*		0.00	0.000	0.000	0.3549	0.0002	0.0090	3.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*		0.00	0.000	0.000	0.3549	0.0002	0.0075	3.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*		0.00	0.000	0.000	0.3549	0.0001	0.0063	2.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31	*		0.00	0.000	0.057	0.3522	0.0001	0.0056	2.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32			0.00	0.000	0.098	0.3476	0.0001	0.0049	2.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33			0.02	0.000	0.113	0.3429	0.0000	0.0012	6.12E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34	*		1.15	0.000	0.037	0.3422	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.48E-09	0.0000	0.0000	2.41E-09
35			0.13	0.244	0.000	0.3877	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.72E-10

36	*	0.14	0.000	0.053	0.3880	0.0003	0.0146	5.68E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
37		0.66	0.184	0.000	0.4044	0.0023	0.0567	1.69E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38		0.00	0.000	0.061	0.3864	0.0062	0.2878	8.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39		0.27	0.003	0.140	0.3817	0.0057	0.2672	7.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40	*	0.01	0.000	0.073	0.3725	0.0030	0.1379	4.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41		0.52	0.052	0.097	0.3850	0.0034	0.1289	4.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42		0.00	0.000	0.109	0.3773	0.0018	0.0807	2.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43	*	0.00	0.000	0.057	0.3708	0.0008	0.0374	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44	*	0.02	0.000	0.070	0.3624	0.0027	0.1258	4.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45		0.00	0.000	0.097	0.3535	0.0022	0.1027	3.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46		0.04	0.000	0.083	0.3485	0.0018	0.0821	2.74E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47		0.22	0.000	0.080	0.3527	0.0013	0.0593	2.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48	*	0.93	0.000	0.026	0.3520	0.0011	0.0512	1.80E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*	0.00	0.000	0.026	0.3513	0.0008	0.0354	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50	*	0.66	0.000	0.027	0.3506	0.0007	0.0349	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51	*	0.00	0.000	0.024	0.3499	0.0008	0.0356	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52	*	0.00	0.000	0.038	0.3495	0.0007	0.0338	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		0.00	0.000	0.028	0.3572	0.0007	0.0323	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		0.00	0.291	0.000	0.3897	0.0006	0.0281	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55		0.00	0.002	0.089	0.3905	0.0005	0.0249	9.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56		0.38	0.037	0.083	0.3922	0.0025	0.1211	3.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57		0.28	0.030	0.109	0.3920	0.0042	0.1986	6.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58		0.00	0.000	0.094	0.3815	0.0016	0.0798	2.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59		0.00	0.000	0.133	0.3672	0.0034	0.1581	4.91E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60		0.00	0.000	0.251	0.3496	0.0030	0.1404	4.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61		0.00	0.000	0.116	0.3407	0.0021	0.0997	3.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62		0.00	0.000	0.132	0.3324	0.0013	0.0592	2.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63		0.03	0.000	0.195	0.3222	0.0010	0.0453	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64		0.00	0.000	0.102	0.3156	0.0010	0.0451	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65	*	0.00	0.000	0.000	0.3140	0.0009	0.0424	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66	*	0.00	0.000	0.000	0.3127	0.0008	0.0353	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67	*	0.19	0.000	0.065	0.3123	0.0007	0.0313	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68	*	0.15	0.000	0.000	0.3121	0.0006	0.0287	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69		0.38	0.003	0.033	0.3385	0.0006	0.0263	9.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70	*	0.00	0.000	0.000	0.3376	0.0005	0.0240	9.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71		0.25	0.000	0.102	0.3436	0.0005	0.0215	8.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72		0.44	0.019	0.145	0.3564	0.0005	0.0245	9.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73		0.35	0.021	0.176	0.3628	0.0003	0.0146	5.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74		0.52	0.097	0.381	0.3638	0.0002	0.0109	4.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75		0.19	0.000	0.122	0.3661	0.0004	0.0179	7.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76		0.18	0.000	0.163	0.3661	0.0004	0.0200	8.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77		0.00	0.000	0.261	0.3530	0.0004	0.0177	7.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78		0.00	0.000	0.138	0.3463	0.0005	0.0235	9.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.00	0.000	0.127	0.3403	0.0004	0.0166	6.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80	*	0.02	0.000	0.105	0.3363	0.0003	0.0121	5.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.00	0.000	0.127	0.3302	0.0002	0.0095	4.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.02	0.000	0.155	0.3234	0.0001	0.0027	1.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.63	0.008	0.149	0.3452	0.0000	0.0002	9.15E-10	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.25	0.000	0.388	0.3377	0.0001	0.0055	2.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.17	0.000	0.349	0.3276	0.0001	0.0040	1.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.38	0.000	0.200	0.3352	0.0004	0.0200	7.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.07	0.000	0.275	0.3241	0.0004	0.0178	7.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.08	0.000	0.169	0.3189	0.0006	0.0261	9.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.00	0.000	0.149	0.3108	0.0004	0.0202	7.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.062	0.3072	0.0005	0.0239	9.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91	*	0.00	0.000	0.000	0.3067	0.0004	0.0208	8.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92	*	0.24	0.000	0.019	0.3073	0.0004	0.0165	6.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.00	0.000	0.053	0.3141	0.0003	0.0139	5.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.16	0.000	0.048	0.3189	0.0002	0.0111	4.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.29	0.000	0.127	0.3261	0.0002	0.0090	3.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.18	0.000	0.170	0.3264	0.0002	0.0113	4.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.00	0.000	0.212	0.3163	0.0003	0.0135	5.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.00	0.000	0.226	0.3055	0.0002	0.0105	4.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.08	0.000	0.149	0.3024	0.0002	0.0083	3.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.06	0.000	0.062	0.3023	0.0001	0.0070	3.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.00	0.000	0.047	0.3000	0.0001	0.0056	2.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.00	0.000	0.040	0.2981	0.0001	0.0052	2.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.00	0.000	0.035	0.2964	0.0001	0.0050	2.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.41	0.000	0.032	0.3145	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.06	0.000	0.029	0.3159	0.0001	0.0040	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.00	0.000	0.078	0.3122	0.0001	0.0037	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107	*	0.00	0.000	0.000	0.3122	0.0000	0.0011	5.54E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.18	0.000	0.027	0.3195	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.34E-09	0.0000	0.0000	2.25E-09
109		0.00	0.000	0.223	0.3089	0.0000	0.0003	1.80E-09	0.0000	0.0000	1.69E-09	0.0000	0.0000	1.59E-09
110		0.00	0.000	0.026	0.3077	0.0000	0.0005	2.76E-09	0.0000	0.0000	2.51E-09	0.0000	0.0000	2.30E-09
111	*	0.00	0.000	0.000	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
112	*	0.00	0.000	0.000	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
113	*	0.00	0.000	0.024	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
114		0.00	0.000	0.023	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
115		0.03	0.000	0.022	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
116		0.00	0.000	0.021	0.3048	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
117		0.00	0.000	0.020	0.3038	0.0000	0.0009	5.63E-09	0.0000	0.0000	5.02E-09	0.0000	0.0000	3.34E-09
118		0.00	0.000	0.020	0.3029	0.0000	0.0002	1.28E-09	0.0000	0.0000	1.22E-09	0.0000	0.0000	1.90E-09
119		0.00	0.000	0.019	0.3020	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.92E-10
120		0.00	0.000	0.018	0.3011	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
121		0.00	0.000	0.018	0.3003	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

122		0.12	0.000	0.018	0.3051	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
123	*	0.02	0.000	0.033	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
124		0.19	0.000	0.017	0.3127	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
125		0.00	0.000	0.016	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
126		0.00	0.000	0.016	0.3112	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
127		0.01	0.000	0.016	0.3111	0.0000	0.0001	9.13E-10	0.0000	0.0000	8.83E-10	0.0000	8.56E-10
128		0.01	0.000	0.015	0.3109	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	4.44E-16
129		0.00	0.000	0.015	0.3102	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
130		0.48	0.003	0.015	0.3320	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
131		0.18	0.000	0.365	0.3231	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
132		0.00	0.000	0.280	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
133		0.00	0.000	0.149	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
134		0.00	0.000	0.062	0.2997	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
135		0.00	0.000	0.047	0.2975	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
136		0.06	0.000	0.040	0.2986	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
137		0.00	0.000	0.035	0.2969	0.0000	0.0001	6.28E-10	0.0000	0.0000	6.14E-10	0.0000	6.01E-10
138		0.00	0.000	0.032	0.2954	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	4.44E-16
139		0.00	0.000	0.029	0.2940	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
140		0.00	0.000	0.027	0.2927	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
141		0.00	0.000	0.026	0.2915	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
142		0.00	0.000	0.024	0.2903	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
143		0.06	0.000	0.023	0.2920	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
144		0.00	0.000	0.022	0.2910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
145		0.00	0.000	0.021	0.2900	0.0000	0.0003	2.14E-09	0.0000	0.0000	1.98E-09	0.0000	1.85E-09
146		0.00	0.000	0.020	0.2890	0.0000	0.0000	7.79E-10	0.0000	0.0000	7.57E-10	0.0000	7.37E-10
147		0.06	0.000	0.020	0.2907	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	4.44E-16
148		0.00	0.000	0.019	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
149		0.00	0.000	0.018	0.2889	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
150		1.07	0.093	0.018	0.3345	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
151		0.62	0.129	0.192	0.3486	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
152		0.21	0.002	0.354	0.3417	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
153		0.40	0.020	0.286	0.3462	0.0000	0.0005	2.56E-09	0.0000	0.0000	2.34E-09	0.0000	2.16E-09
154		0.20	0.000	0.350	0.3392	0.0000	0.0004	2.43E-09	0.0000	0.0000	2.23E-09	0.0000	2.07E-09
155		0.00	0.000	0.281	0.3258	0.0000	0.0007	4.18E-09	0.0000	0.0000	2.85E-09	0.0000	2.58E-09
156		0.00	0.000	0.152	0.3185	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.06E-10	0.0000	8.77E-10
157		0.00	0.000	0.125	0.3125	0.0000	0.0004	3.65E-09	0.0000	0.0000	3.22E-09	0.0000	2.88E-09
158		0.02	0.000	0.150	0.3065	0.0000	0.0004	2.29E-09	0.0000	0.0000	2.11E-09	0.0000	1.96E-09
159		0.00	0.000	0.062	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	4.44E-16
160		0.00	0.000	0.047	0.3013	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
161		0.33	0.000	0.041	0.3151	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
162		0.42	0.000	0.036	0.3331	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.00E+00
163		0.15	0.000	0.321	0.3251	0.0000	0.0002	1.36E-09	0.0000	0.0000	1.30E-09	0.0000	1.24E-09
164		0.05	0.000	0.233	0.3165	0.0000	0.0009	5.02E-09	0.0000	0.0000	3.33E-09	0.0000	2.97E-09

165	0.00	0.000	0.168	0.3085	0.0000	0.0007	4.78E-09	0.0000	0.0000	4.93E-09	0.0000	0.0000	3.29E-09
166	0.01	0.000	0.130	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.70E-10	0.0000	0.0000	1.31E-09
167	0.00	0.000	0.062	0.2997	0.0000	0.0004	2.84E-09	0.0000	0.0000	2.57E-09	0.0000	0.0000	1.90E-09
168	0.00	0.000	0.047	0.2975	0.0000	0.0002	1.01E-09	0.0000	0.0000	9.77E-10	0.0000	0.0000	1.30E-09
169	0.00	0.000	0.040	0.2956	0.0000	0.0005	5.31E-09	0.0000	0.0000	4.80E-09	0.0000	0.0000	4.61E-09
170	1.24	0.166	0.036	0.3450	0.0000	0.0001	4.26E-10	0.0000	0.0000	4.19E-10	0.0000	0.0000	4.16E-10
171	0.84	0.301	0.296	0.3565	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
172	0.70	0.231	0.143	0.3722	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.00	0.000	0.302	0.3578	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.15	0.000	0.353	0.3481	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.01	0.000	0.363	0.3315	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.54	0.004	0.150	0.3501	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.03	0.000	0.352	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.52	0.006	0.360	0.3400	0.0000	0.0008	3.75E-09	0.0000	0.0000	3.30E-09	0.0000	0.0000	2.94E-09
179	0.02	0.000	0.337	0.3233	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
180	0.36	0.000	0.150	0.3316	0.0000	0.0007	4.14E-09	0.0000	0.0000	2.83E-09	0.0000	0.0000	2.56E-09
181	0.00	0.000	0.311	0.3157	0.0003	0.0147	5.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
182	0.09	0.000	0.063	0.3158	0.0005	0.0219	8.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
183	0.00	0.000	0.048	0.3128	0.0006	0.0268	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
184	0.27	0.000	0.041	0.3230	0.0005	0.0213	8.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
185	0.11	0.000	0.036	0.3261	0.0004	0.0185	7.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
186	0.01	0.000	0.133	0.3199	0.0003	0.0147	5.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
187	0.00	0.000	0.032	0.3180	0.0003	0.0153	6.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
188	0.39	0.000	0.031	0.3350	0.0003	0.0128	5.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
189	0.00	0.000	0.320	0.3194	0.0002	0.0093	4.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
190	0.00	0.000	0.027	0.3181	0.0003	0.0145	5.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
191	0.21	0.000	0.027	0.3269	0.0002	0.0110	4.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
192	0.03	0.000	0.388	0.3097	0.0002	0.0088	3.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
193	0.70	0.029	0.026	0.3406	0.0002	0.0073	3.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
194	0.11	0.000	0.342	0.3294	0.0001	0.0061	2.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
195	0.00	0.000	0.346	0.3129	0.0001	0.0047	2.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
196	0.00	0.000	0.149	0.3058	0.0001	0.0051	2.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
197	0.00	0.000	0.062	0.3028	0.0001	0.0046	2.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
198	0.00	0.000	0.047	0.3006	0.0001	0.0041	2.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
199	0.72	0.016	0.041	0.3320	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
200	0.00	0.000	0.294	0.3180	0.0001	0.0023	1.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
201	0.00	0.000	0.035	0.3163	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.50E-09	0.0000	0.0000	4.17E-09
202	0.15	0.000	0.033	0.3216	0.0000	0.0001	4.82E-10	0.0000	0.0000	4.74E-10	0.0000	0.0000	4.66E-10
203	0.13	0.000	0.031	0.3266	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
204	0.28	0.000	0.130	0.3335	0.0000	0.0001	4.22E-10	0.0000	0.0000	4.16E-10	0.0000	0.0000	4.10E-10
205	0.00	0.000	0.236	0.3222	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
206	0.55	0.021	0.151	0.3404	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
207	0.16	0.000	0.362	0.3309	0.0000	0.0002	9.70E-10	0.0000	0.0000	9.37E-10	0.0000	0.0000	9.06E-10

208	0.00	0.000	0.355	0.3140	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
209	0.01	0.000	0.151	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.00	0.000	0.062	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.28	0.000	0.049	0.3155	0.0000	0.0001	7.65E-10	0.0000	0.0000	7.44E-10	0.0000	0.0000	7.24E-10
212	0.01	0.000	0.042	0.3139	0.0000	0.0000	1.44E-10	0.0000	0.0000	1.43E-10	0.0000	0.0000	1.43E-10
213	0.00	0.000	0.035	0.3122	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
214	0.00	0.000	0.032	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.00	0.000	0.029	0.3093	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.027	0.3080	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	0.00	0.000	0.026	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.00	0.000	0.026	0.3057	0.0000	0.0001	1.64E-09	0.0000	0.0000	1.54E-09	0.0000	0.0000	1.46E-09
219	0.00	0.000	0.023	0.3046	0.0000	0.0000	1.65E-10	0.0000	0.0000	1.64E-10	0.0000	0.0000	1.63E-10
220	0.00	0.000	0.022	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
221	0.00	0.000	0.021	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.00	0.000	0.020	0.3016	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.02	0.000	0.021	0.3014	0.0000	0.0000	2.36E-10	0.0000	0.0000	2.34E-10	0.0000	0.0000	2.32E-10
224	1.02	0.102	0.021	0.3440	0.0000	0.0001	4.52E-10	0.0000	0.0000	4.45E-10	0.0000	0.0000	4.37E-10
225	0.02	0.000	0.275	0.3320	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
226	0.00	0.000	0.154	0.3247	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
227	0.00	0.000	0.113	0.3193	0.0000	0.0001	7.93E-10	0.0000	0.0000	7.71E-10	0.0000	0.0000	7.49E-10
228	0.00	0.000	0.149	0.3122	0.0000	0.0001	3.77E-10	0.0000	0.0000	3.72E-10	0.0000	0.0000	3.67E-10
229	0.58	0.005	0.064	0.3365	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
230	0.19	0.000	0.327	0.3301	0.0000	0.0009	4.82E-09	0.0000	0.0000	4.43E-09	0.0000	0.0000	3.00E-09
231	0.00	0.000	0.147	0.3233	0.0000	0.0001	8.07E-10	0.0000	0.0000	7.84E-10	0.0000	0.0000	1.50E-09
232	0.18	0.000	0.178	0.3233	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.90E-10
233	0.02	0.000	0.278	0.3111	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
234	0.00	0.000	0.149	0.3040	0.0000	0.0001	4.82E-10	0.0000	0.0000	4.74E-10	0.0000	0.0000	4.66E-10
235	0.00	0.000	0.062	0.3011	0.0000	0.0000	2.93E-10	0.0000	0.0000	2.90E-10	0.0000	0.0000	2.87E-10
236	0.00	0.000	0.047	0.2988	0.0000	0.0009	6.61E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
237	0.00	0.000	0.040	0.2969	0.0000	0.0008	5.55E-09	0.0000	0.0000	4.89E-09	0.0000	0.0000	4.51E-09
238	0.00	0.000	0.035	0.2952	0.0000	0.0006	4.11E-09	0.0000	0.0000	4.40E-09	0.0000	0.0000	4.76E-09
239	0.00	0.000	0.032	0.2936	0.0000	0.0000	2.24E-10	0.0000	0.0000	1.67E-10	0.0000	0.0000	3.42E-10
240	0.14	0.000	0.031	0.2990	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.55E-11	0.0000	0.0000	8.29E-11
241	0.17	0.000	0.029	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.38E-11
242	0.00	0.000	0.026	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.53	0.004	0.026	0.3284	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
244	0.07	0.000	0.124	0.3256	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
245	0.00	0.000	0.213	0.3155	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
246	0.00	0.000	0.150	0.3084	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	0.48	0.001	0.064	0.3281	0.0000	0.0003	1.53E-09	0.0000	0.0000	1.45E-09	0.0000	0.0000	1.38E-09
248	0.19	0.000	0.083	0.3333	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
249	0.12	0.000	0.227	0.3280	0.0000	0.0002	1.20E-09	0.0000	0.0000	1.15E-09	0.0000	0.0000	1.10E-09
250	0.00	0.000	0.100	0.3232	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16

251	0.00	0.000	0.094	0.3187	0.0000	0.0000	2.73E-10	0.0000	0.0000	2.70E-10	0.0000	0.0000	2.67E-10
252	0.14	0.000	0.151	0.3184	0.0000	0.0001	8.59E-10	0.0000	0.0000	8.33E-10	0.0000	0.0000	8.08E-10
253	0.34	0.000	0.064	0.3317	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
254	0.37	0.012	0.161	0.3411	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
255	0.43	0.046	0.083	0.3555	0.0000	0.0001	3.50E-10	0.0000	0.0000	3.46E-10	0.0000	0.0000	3.41E-10
256	0.04	0.000	0.108	0.3524	0.0000	0.0000	1.50E-10	0.0000	0.0000	1.49E-10	0.0000	0.0000	1.48E-10
257	0.21	0.000	0.165	0.3546	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
258	0.00	0.000	0.129	0.3485	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
259	0.00	0.000	0.160	0.3409	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
260	0.00	0.000	0.141	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261	0.00	0.000	0.141	0.3275	0.0000	0.0001	9.94E-10	0.0000	0.0000	9.60E-10	0.0000	0.0000	9.27E-10
262	0.00	0.000	0.121	0.3216	0.0000	0.0015	9.04E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
263	0.00	0.000	0.149	0.3145	0.0000	0.0004	1.85E-09	0.0000	0.0000	3.43E-09	0.0000	0.0000	4.18E-09
264	0.00	0.000	0.062	0.3116	0.0000	0.0002	1.12E-09	0.0000	0.0000	1.07E-09	0.0000	0.0000	1.03E-09
265	0.00	0.000	0.047	0.3093	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
266	0.00	0.000	0.040	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
267	0.61	0.003	0.037	0.3345	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
268	0.00	0.000	0.128	0.3283	0.0000	0.0012	8.25E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
269	0.00	0.000	0.205	0.3185	0.0000	0.0008	5.31E-09	0.0000	0.0000	4.97E-09	0.0000	0.0000	5.03E-09
270	0.00	0.000	0.099	0.3134	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-09	0.0000	0.0000	1.24E-09
271	0.00	0.000	0.061	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.67E-10
272	0.00	0.000	0.047	0.3071	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
273	0.04	0.000	0.042	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
274	0.00	0.000	0.035	0.3043	0.0000	0.0005	4.75E-09	0.0000	0.0000	3.19E-09	0.0000	0.0000	2.86E-09
275	0.00	0.000	0.032	0.3023	0.0001	0.0031	1.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
276	0.00	0.000	0.029	0.3006	0.0001	0.0053	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277	0.00	0.000	0.027	0.2989	0.0001	0.0065	3.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278	0.00	0.000	0.026	0.2973	0.0002	0.0071	3.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279	0.00	0.000	0.024	0.2959	0.0002	0.0075	3.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280	0.00	0.000	0.023	0.2945	0.0002	0.0076	3.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281	0.00	0.000	0.022	0.2932	0.0002	0.0075	3.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282	0.00	0.000	0.021	0.2919	0.0002	0.0074	3.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283	0.00	0.000	0.020	0.2907	0.0002	0.0071	3.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284	0.00	0.000	0.020	0.2894	0.0001	0.0057	2.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285	0.00	0.000	0.020	0.2883	0.0001	0.0064	3.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286	0.00	0.000	0.018	0.2872	0.0002	0.0072	3.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287	0.00	0.000	0.015	0.2863	0.0001	0.0063	2.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288	0.00	0.000	0.017	0.2853	0.0001	0.0063	2.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289	0.00	0.000	0.017	0.2844	0.0002	0.0080	3.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290	0.03	0.000	0.019	0.2848	0.0002	0.0082	3.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291	0.23	0.000	0.019	0.2949	0.0001	0.0069	3.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292	0.00	0.000	0.016	0.2942	0.0001	0.0060	2.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293	0.00	0.000	0.015	0.2935	0.0001	0.0052	2.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.00	0.000	0.015	0.2927	0.0001	0.0035	1.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.00	0.000	0.015	0.2919	0.0000	0.0019	1.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296	*	0.00	0.000	0.000	0.2919	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297	*	0.00	0.000	0.000	0.2919	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298	*	0.00	0.000	0.000	0.2919	0.0001	0.0037	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299	*	0.01	0.000	0.010	0.2919	0.0000	0.0016	8.32E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300	*	2.07	0.000	0.000	0.2928	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.31E-09	0.0000	0.0000	2.31E-09
301	*	0.00	0.000	0.013	0.2937	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.39E-10
302	*	0.00	0.000	0.027	0.2947	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
303	*	0.01	0.000	0.017	0.2956	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
304	*	0.00	0.000	0.000	0.2965	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
305		0.01	0.014	0.000	0.3300	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
306		0.00	0.387	0.000	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
307		0.00	0.000	0.117	0.3640	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
308		0.33	0.005	0.078	0.3757	0.0000	0.0001	4.45E-10	0.0000	0.0000	4.38E-10	0.0000	0.0000	4.31E-10
309		0.00	0.000	0.155	0.3684	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
310		0.00	0.000	0.135	0.3605	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
311		0.04	0.000	0.252	0.3490	0.0000	0.0011	6.23E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
312		1.02	0.155	0.153	0.3798	0.0000	0.0006	3.13E-09	0.0000	0.0000	2.46E-09	0.0000	0.0000	2.72E-09
313		1.11	0.586	0.186	0.3941	0.0011	0.0285	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.00	0.000	0.275	0.3772	0.0007	0.0317	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.00	0.000	0.101	0.3633	0.0035	0.1648	5.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.064	0.3552	0.0027	0.1267	4.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.00	0.000	0.078	0.3475	0.0020	0.0944	3.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318		0.00	0.000	0.094	0.3398	0.0017	0.0778	2.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.06	0.000	0.169	0.3326	0.0013	0.0624	2.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		1.13	0.158	0.154	0.3700	0.0010	0.0495	1.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.04	0.000	0.145	0.3641	0.0008	0.0388	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.00	0.000	0.186	0.3532	0.0004	0.0202	7.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.00	0.000	0.085	0.3476	0.0009	0.0436	1.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324	*	0.02	0.000	0.051	0.3452	0.0008	0.0368	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325	*	0.82	0.000	0.033	0.3461	0.0006	0.0301	1.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.065	0.000	0.3793	0.0003	0.0131	5.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	0.00	0.000	0.000	0.3778	0.0001	0.0061	2.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328	*	0.00	0.000	0.001	0.3766	0.0004	0.0194	7.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329	*	0.48	0.000	0.019	0.3714	0.0008	0.0392	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330	*	0.00	0.000	0.011	0.3674	0.0024	0.1137	3.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	0.00	0.000	0.014	0.3648	0.0019	0.0897	2.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.00	0.000	0.024	0.3717	0.0015	0.0696	2.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.000	0.046	0.3739	0.0015	0.0692	2.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.00	0.000	0.063	0.3683	0.0010	0.0455	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	0.01	0.000	0.006	0.3657	0.0014	0.0649	2.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.072	0.3621	0.0011	0.0512	1.80E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337		0.00	0.000	0.119	0.3540	0.0002	0.0083	3.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.11	0.000	0.059	0.3535	0.0010	0.0484	1.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339	*	0.08	0.000	0.028	0.3524	0.0012	0.0583	2.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.068	0.3489	0.0010	0.0447	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.00	0.000	0.102	0.3423	0.0008	0.0393	1.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		0.00	0.000	0.124	0.3349	0.0007	0.0339	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.00	0.000	0.191	0.3241	0.0008	0.0361	1.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.00	0.000	0.147	0.3163	0.0008	0.0367	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345		0.00	0.000	0.129	0.3093	0.0005	0.0235	8.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346		1.84	0.642	0.061	0.3625	0.0004	0.0206	8.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347	*	0.47	0.000	0.024	0.3625	0.0004	0.0187	7.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348	*	0.09	0.000	0.023	0.3625	0.0004	0.0188	7.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349	*	0.05	0.000	0.023	0.3622	0.0004	0.0195	7.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350	*	0.14	0.000	0.000	0.3627	0.0006	0.0291	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351	*	0.00	0.000	0.028	0.3636	0.0005	0.0236	9.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.00	0.051	0.000	0.3870	0.0004	0.0100	4.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.077	0.3816	0.0003	0.0143	5.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354	*	0.00	0.000	0.039	0.3730	0.0006	0.0307	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.00	0.000	0.079	0.3629	0.0031	0.1472	4.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356	*	0.13	0.000	0.037	0.3595	0.0023	0.1072	3.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357	*	0.00	0.000	0.020	0.3573	0.0018	0.0840	2.80E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*	0.00	0.000	0.037	0.3544	0.0013	0.0631	2.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	0.00	0.000	0.000	0.3522	0.0011	0.0528	1.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*	0.01	0.000	0.013	0.3502	0.0010	0.0475	1.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361	*	0.00	0.000	0.000	0.3485	0.0009	0.0432	1.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362	*	0.00	0.000	0.000	0.3469	0.0008	0.0376	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363	*	0.16	0.000	0.010	0.3463	0.0007	0.0342	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364	*	0.33	0.000	0.000	0.3459	0.0007	0.0333	1.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365	*	1.03	0.000	0.025	0.3456	0.0006	0.0294	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 3			
	inches	cubic feet	percent
Precipitation	44.95	163,171.7	100.00
Runoff	4.400	15,970.8	9.79
Evapotranspiration	32.424	117,699.0	72.13
Drainage Collected from Layer 2	6.8150	24,738.4	15.16
Percolation/Leakage through Layer 3	0.000024	0.0866	0.00
Average Head on Top of Layer 3	0.0004	---	---
Drainage Collected from Layer 7	0.0000	0.0809	0.00
Percolation/Leakage through Layer 8	0.000002	0.0055	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0054	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	1.3122	4,763.5	2.92
Soil Water at Start of Year	257.1350	933,399.9	572.04
Soil Water at End of Year	257.0256	933,002.8	571.79
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	1.4216	5,160.5	3.16
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 4

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*		0.00	0.000	0.026	0.3454	0.0006	0.0279	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2	*		0.00	0.000	0.024	0.3452	0.0006	0.0269	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3	*	*	0.41	0.000	0.023	0.3452	0.0007	0.0323	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4	*	*	0.00	0.000	0.023	0.3452	0.0004	0.0191	7.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5	*	*	0.00	0.000	0.024	0.3452	0.0003	0.0134	5.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6	*	*	0.00	0.000	0.036	0.3452	0.0002	0.0103	4.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7		*	0.00	0.579	0.000	0.3574	0.0002	0.0084	3.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8		*	0.44	1.046	0.000	0.3665	0.0001	0.0070	3.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9	*	*	0.09	0.000	0.048	0.3665	0.0001	0.0060	2.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10	*	*	0.10	0.000	0.035	0.3665	0.0001	0.0053	2.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*	*	0.00	0.000	0.013	0.3665	0.0001	0.0047	2.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*	*	0.00	0.000	0.029	0.3665	0.0001	0.0042	2.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13		*	0.00	0.000	0.063	0.3665	0.0001	0.0039	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*	*	0.00	0.000	0.000	0.3665	0.0001	0.0030	1.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15		*	0.20	0.102	0.000	0.3713	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.47E-09	0.0000	0.0000	4.77E-09
16	*	*	0.32	0.000	0.030	0.3713	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.81E-10
17		*	0.40	0.236	0.000	0.3761	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
18	*	*	0.37	0.000	0.041	0.3761	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
19		*	0.00	0.237	0.007	0.3798	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
20	*	*	0.00	0.000	0.028	0.3798	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
21		*	0.99	1.241	0.000	0.3839	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
22	*	*	0.10	0.000	0.041	0.3839	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
23		*	0.05	0.057	0.000	0.3863	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
24	*	*	0.02	0.000	0.024	0.3863	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
25	*	*	0.11	0.000	0.033	0.3863	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
26	*	*	0.26	0.000	0.022	0.3863	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
27		*	0.30	0.554	0.000	0.3893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
28		*	0.00	0.000	0.000	0.3893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
29	*	*	0.00	0.000	0.000	0.3893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
30	*	*	0.00	0.000	0.000	0.3893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
31	*	*	0.00	0.000	0.000	0.3893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
32		*	0.00	0.000	0.000	0.3893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
33	*	*	0.00	0.000	0.000	0.3893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
34		*	0.59	0.533	0.000	0.3918	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
35		*	0.10	0.062	0.000	0.3936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

36		*	0.00	0.000	0.000	0.3936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
37		*	0.00	0.000	0.000	0.3936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
38		*	0.00	0.000	0.000	0.3936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
39		*	0.47	0.425	0.000	0.3957	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
40			0.00	0.000	0.155	0.3833	0.0000	0.0013	6.29E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
41			0.02	0.000	0.130	0.3676	0.0023	0.1131	3.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42			0.00	0.000	0.147	0.3547	0.0032	0.1467	4.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43			0.00	0.000	0.072	0.3476	0.0019	0.0908	3.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44			0.00	0.000	0.085	0.3404	0.0016	0.0754	2.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45	*		0.00	0.000	0.000	0.3382	0.0013	0.0620	2.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46	*		0.00	0.000	0.000	0.3363	0.0010	0.0466	1.68E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47	*		0.00	0.000	0.000	0.3345	0.0009	0.0423	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48			0.00	0.000	0.077	0.3294	0.0008	0.0363	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*		0.46	0.000	0.044	0.3291	0.0008	0.0364	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50			0.00	0.000	0.014	0.3465	0.0006	0.0294	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51			0.00	0.000	0.065	0.3429	0.0005	0.0217	8.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52			0.00	0.000	0.111	0.3365	0.0003	0.0149	6.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53			0.00	0.000	0.126	0.3297	0.0006	0.0260	9.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54			0.12	0.000	0.126	0.3287	0.0004	0.0172	6.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55	*		0.00	0.000	0.000	0.3283	0.0005	0.0228	8.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56	*		0.00	0.000	0.000	0.3279	0.0003	0.0155	6.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57	*		0.00	0.000	0.000	0.3275	0.0003	0.0122	5.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58	*		0.00	0.000	0.078	0.3232	0.0002	0.0095	4.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59	*		0.00	0.000	0.000	0.3228	0.0003	0.0140	5.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60	*		0.00	0.000	0.000	0.3224	0.0002	0.0100	4.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61	*		0.00	0.000	0.062	0.3191	0.0002	0.0103	4.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62			2.03	0.814	0.109	0.3712	0.0002	0.0081	3.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63			0.15	0.003	0.115	0.3723	0.0001	0.0066	2.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64			0.00	0.000	0.099	0.3670	0.0003	0.0122	5.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65			0.00	0.000	0.114	0.3616	0.0004	0.0182	7.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66			0.00	0.000	0.126	0.3545	0.0001	0.0062	2.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67			0.00	0.000	0.223	0.3410	0.0000	0.0015	5.68E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.00	0.000	0.212	0.3287	0.0009	0.0414	1.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.00	0.000	0.209	0.3171	0.0009	0.0431	1.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70			0.00	0.000	0.120	0.3100	0.0007	0.0325	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71			0.08	0.000	0.062	0.3095	0.0006	0.0296	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72			0.00	0.000	0.047	0.3057	0.0007	0.0346	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73			0.00	0.000	0.040	0.3025	0.0007	0.0334	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.00	0.000	0.035	0.2996	0.0006	0.0294	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.00	0.000	0.032	0.2972	0.0006	0.0282	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76	*		0.00	0.000	0.000	0.2965	0.0005	0.0245	9.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77	*		0.40	0.000	0.016	0.2967	0.0004	0.0188	7.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.00	0.000	0.072	0.3099	0.0004	0.0174	6.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.03	0.000	0.030	0.3091	0.0004	0.0167	6.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.22	0.000	0.028	0.3176	0.0003	0.0155	6.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.12	0.000	0.146	0.3157	0.0003	0.0154	6.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.00	0.000	0.083	0.3110	0.0002	0.0096	4.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.00	0.000	0.136	0.3038	0.0003	0.0136	5.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.62	0.007	0.062	0.3297	0.0004	0.0166	6.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.172	0.3210	0.0003	0.0132	5.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.26	0.000	0.170	0.3249	0.0003	0.0128	5.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.70	0.078	0.280	0.3412	0.0004	0.0168	6.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.37	0.021	0.172	0.3495	0.0003	0.0137	5.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.00	0.000	0.254	0.3374	0.0002	0.0105	4.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.154	0.3301	0.0002	0.0085	3.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.00	0.000	0.235	0.3189	0.0002	0.0071	3.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.00	0.000	0.213	0.3088	0.0001	0.0059	2.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.03	0.000	0.149	0.3029	0.0001	0.0054	2.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.05	0.000	0.062	0.3025	0.0001	0.0048	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.01	0.000	0.048	0.3006	0.0001	0.0043	2.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.01	0.000	0.040	0.2993	0.0001	0.0039	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.01	0.000	0.035	0.2982	0.0001	0.0035	1.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.00	0.000	0.032	0.2967	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.07E-09	0.0000	0.0000	4.92E-09
99		0.00	0.000	0.029	0.2953	0.0000	0.0001	7.40E-10	0.0000	0.0000	7.20E-10	0.0000	0.0000	1.01E-09
100		0.21	0.000	0.027	0.3039	0.0000	0.0007	4.31E-09	0.0000	0.0000	2.93E-09	0.0000	0.0000	2.22E-09
101		0.28	0.000	0.026	0.3161	0.0000	0.0009	6.32E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.13	0.000	0.244	0.3104	0.0000	0.0003	2.76E-09	0.0000	0.0000	1.95E-09	0.0000	0.0000	1.61E-09
103		0.03	0.000	0.249	0.2998	0.0001	0.0023	1.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.03	0.000	0.149	0.2941	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.69E-09	0.0000	0.0000	2.03E-09
105		0.00	0.000	0.062	0.2911	0.0000	0.0009	5.26E-09	0.0000	0.0000	4.77E-09	0.0000	0.0000	4.89E-09
106		0.04	0.000	0.048	0.2908	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	3.33E-16
107		1.23	0.151	0.040	0.3405	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
108		0.02	0.000	0.181	0.3328	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
109		0.06	0.000	0.125	0.3296	0.0000	0.0001	8.62E-10	0.0000	0.0000	8.35E-10	0.0000	0.0000	8.11E-10
110		0.22	0.000	0.169	0.3322	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
111	*	0.00	0.000	0.084	0.3282	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
112		0.24	0.000	0.220	0.3293	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
113		0.00	0.000	0.103	0.3244	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
114		0.02	0.000	0.125	0.3195	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
115		0.00	0.000	0.113	0.3141	0.0000	0.0001	8.78E-10	0.0000	0.0000	8.51E-10	0.0000	0.0000	6.26E-10
116		0.00	0.000	0.159	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.06E-10
117		0.00	0.000	0.149	0.2994	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
118		0.00	0.000	0.062	0.2965	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
119		0.00	0.000	0.041	0.2946	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.00	0.000	0.040	0.2927	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
121		0.00	0.000	0.035	0.2910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

122		0.06	0.000	0.032	0.2922	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
123	*	0.00	0.000	0.029	0.2908	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
124	*	0.00	0.000	0.000	0.2908	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125	*	0.01	0.000	0.008	0.2908	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
126		0.00	0.000	0.027	0.2895	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
127		0.00	0.000	0.026	0.2883	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
128		0.00	0.000	0.024	0.2871	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
129		0.00	0.000	0.023	0.2862	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
130		1.58	0.445	0.022	0.3391	0.0000	0.0001	7.64E-10	0.0000	0.0000	7.44E-10	0.0000	0.0000	7.24E-10
131		0.33	0.015	0.108	0.3487	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
132		0.13	0.000	0.287	0.3412	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
133		0.00	0.000	0.161	0.3336	0.0000	0.0003	1.68E-09	0.0000	0.0000	1.59E-09	0.0000	0.0000	1.50E-09
134		0.04	0.000	0.175	0.3274	0.0000	0.0000	2.95E-10	0.0000	0.0000	2.91E-10	0.0000	0.0000	2.88E-10
135		0.43	0.002	0.174	0.3396	0.0000	0.0002	9.94E-10	0.0000	0.0000	9.59E-10	0.0000	0.0000	9.27E-10
136		0.00	0.000	0.226	0.3288	0.0000	0.0008	4.69E-09	0.0000	0.0000	3.15E-09	0.0000	0.0000	2.83E-09
137		0.00	0.000	0.121	0.3231	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.00E-09	0.0000	0.0000	9.67E-10
138		0.00	0.000	0.199	0.3136	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139		0.00	0.000	0.206	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140		0.00	0.000	0.127	0.2978	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141		0.00	0.000	0.062	0.2948	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142		0.00	0.000	0.047	0.2926	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143		0.00	0.000	0.040	0.2907	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144		0.00	0.000	0.035	0.2890	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145		0.00	0.000	0.032	0.2875	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146		0.00	0.000	0.029	0.2861	0.0000	0.0000	1.89E-10	0.0000	0.0000	1.88E-10	0.0000	0.0000	1.87E-10
147		0.00	0.000	0.027	0.2848	0.0000	0.0000	2.40E-10	0.0000	0.0000	2.38E-10	0.0000	0.0000	2.36E-10
148		0.00	0.000	0.026	0.2836	0.0000	0.0000	3.08E-10	0.0000	0.0000	3.05E-10	0.0000	0.0000	3.01E-10
149		0.00	0.000	0.025	0.2825	0.0000	0.0000	2.49E-10	0.0000	0.0000	2.47E-10	0.0000	0.0000	2.45E-10
150		0.05	0.000	0.024	0.2836	0.0000	0.0000	3.53E-10	0.0000	0.0000	3.48E-10	0.0000	0.0000	3.44E-10
151		0.24	0.000	0.023	0.2938	0.0000	0.0000	1.17E-10	0.0000	0.0000	1.17E-10	0.0000	0.0000	1.16E-10
152		0.08	0.000	0.022	0.2966	0.0000	0.0000	1.14E-10	0.0000	0.0000	1.13E-10	0.0000	0.0000	1.13E-10
153		0.02	0.000	0.021	0.2968	0.0000	0.0000	2.29E-10	0.0000	0.0000	2.27E-10	0.0000	0.0000	2.26E-10
154		0.00	0.000	0.020	0.2959	0.0000	0.0000	5.19E-10	0.0000	0.0000	5.10E-10	0.0000	0.0000	5.01E-10
155		0.25	0.000	0.020	0.3069	0.0000	0.0000	4.88E-10	0.0000	0.0000	4.79E-10	0.0000	0.0000	4.71E-10
156		0.00	0.000	0.018	0.3061	0.0000	0.0000	4.42E-10	0.0000	0.0000	4.35E-10	0.0000	0.0000	4.28E-10
157		0.37	0.000	0.019	0.3227	0.0000	0.0000	4.66E-10	0.0000	0.0000	4.59E-10	0.0000	0.0000	4.51E-10
158		0.14	0.000	0.138	0.3226	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
159		0.44	0.011	0.158	0.3354	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160		0.20	0.000	0.176	0.3367	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161		0.05	0.000	0.147	0.3322	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162		0.19	0.000	0.126	0.3355	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163		0.00	0.000	0.243	0.3239	0.0000	0.0005	2.72E-09	0.0000	0.0000	2.48E-09	0.0000	0.0000	2.27E-09
164		0.01	0.000	0.226	0.3134	0.0000	0.0009	5.50E-09	0.0000	0.0000	4.94E-09	0.0000	0.0000	3.29E-09

165	0.07	0.000	0.114	0.3115	0.0000	0.0003	2.14E-09	0.0000	0.0000	1.99E-09	0.0000	0.0000	2.39E-09
166	0.02	0.000	0.106	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.63E-10
167	0.22	0.000	0.150	0.3109	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
168	0.00	0.000	0.237	0.2997	0.0000	0.0000	3.04E-10	0.0000	0.0000	3.01E-10	0.0000	0.0000	2.98E-10
169	0.16	0.000	0.063	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
170	0.10	0.000	0.048	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.00	0.000	0.040	0.3049	0.0000	0.0000	2.97E-10	0.0000	0.0000	2.94E-10	0.0000	0.0000	2.91E-10
172	0.00	0.000	0.035	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
173	0.01	0.000	0.033	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.09	0.000	0.030	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.00	0.000	0.027	0.3040	0.0000	0.0000	1.51E-10	0.0000	0.0000	1.50E-10	0.0000	0.0000	1.49E-10
176	0.00	0.000	0.026	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
177	0.00	0.000	0.024	0.3016	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.00	0.000	0.023	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.022	0.2995	0.0000	0.0001	6.62E-10	0.0000	0.0000	6.46E-10	0.0000	0.0000	6.31E-10
180	0.00	0.000	0.021	0.2985	0.0000	0.0001	6.05E-10	0.0000	0.0000	5.92E-10	0.0000	0.0000	5.80E-10
181	0.00	0.000	0.020	0.2975	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
182	0.62	0.008	0.021	0.3256	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.10	0.000	0.338	0.3141	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.08	0.000	0.131	0.3118	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.00	0.000	0.328	0.2963	0.0000	0.0003	1.73E-09	0.0000	0.0000	1.63E-09	0.0000	0.0000	1.54E-09
186	0.41	0.000	0.129	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
187	0.24	0.000	0.063	0.3179	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.00	0.000	0.290	0.3041	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.00	0.000	0.047	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.00	0.000	0.040	0.2999	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.00	0.000	0.035	0.2983	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.00	0.000	0.032	0.2967	0.0000	0.0001	1.22E-09	0.0000	0.0000	1.17E-09	0.0000	0.0000	1.12E-09
193	0.10	0.000	0.031	0.2999	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
194	0.63	0.018	0.029	0.3277	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.39	0.024	0.305	0.3308	0.0000	0.0001	3.58E-10	0.0000	0.0000	3.53E-10	0.0000	0.0000	3.48E-10
196	0.00	0.000	0.298	0.3166	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
197	0.08	0.000	0.123	0.3144	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.12	0.000	0.328	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.29	0.000	0.145	0.3114	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	1.56	0.508	0.184	0.3527	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.00	0.000	0.289	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.00	0.000	0.193	0.3297	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.23	0.000	0.114	0.3354	0.0000	0.0000	1.97E-10	0.0000	0.0000	1.96E-10	0.0000	0.0000	1.94E-10
204	0.04	0.000	0.131	0.3309	0.0000	0.0001	1.00E-09	0.0000	0.0000	9.69E-10	0.0000	0.0000	9.36E-10
205	0.00	0.000	0.335	0.3149	0.0000	0.0002	1.27E-09	0.0000	0.0000	1.22E-09	0.0000	0.0000	1.17E-09
206	0.16	0.000	0.133	0.3161	0.0000	0.0001	5.76E-10	0.0000	0.0000	5.64E-10	0.0000	0.0000	5.53E-10
207	0.08	0.000	0.326	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16

208	0.00	0.000	0.149	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
209	0.00	0.000	0.062	0.2945	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.00	0.000	0.047	0.2922	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.07	0.000	0.041	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
212	0.03	0.000	0.037	0.2931	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
213	0.21	0.000	0.033	0.3014	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.00	0.000	0.029	0.3000	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.23	0.000	0.029	0.3097	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.20	0.000	0.027	0.3178	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	0.00	0.000	0.350	0.3012	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.00	0.000	0.024	0.3000	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.14	0.000	0.024	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.34	0.000	0.023	0.3204	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.03	0.000	0.340	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.04	0.000	0.023	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.06	0.000	0.022	0.3082	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.28	0.000	0.021	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
225	0.00	0.000	0.237	0.3092	0.0000	0.0004	1.89E-09	0.0000	0.0000	1.77E-09	0.0000	0.0000	1.66E-09
226	0.00	0.000	0.019	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
227	0.33	0.000	0.020	0.3230	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
228	0.01	0.000	0.240	0.3122	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
229	0.00	0.000	0.018	0.3113	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
230	0.00	0.000	0.017	0.3105	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.00	0.000	0.017	0.3097	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
232	0.89	0.089	0.018	0.3470	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
233	0.90	0.344	0.368	0.3558	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.00	0.000	0.315	0.3408	0.0000	0.0004	1.88E-09	0.0000	0.0000	1.76E-09	0.0000	0.0000	1.65E-09
235	0.00	0.000	0.253	0.3288	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
236	0.00	0.000	0.109	0.3236	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.00	0.000	0.288	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	0.00	0.000	0.149	0.3028	0.0000	0.0000	2.92E-10	0.0000	0.0000	2.89E-10	0.0000	0.0000	2.86E-10
239	0.00	0.000	0.062	0.2999	0.0000	0.0002	1.19E-09	0.0000	0.0000	1.14E-09	0.0000	0.0000	1.09E-09
240	0.00	0.000	0.047	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
241	0.04	0.000	0.042	0.2975	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
242	0.00	0.000	0.035	0.2958	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.06	0.000	0.034	0.2972	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
244	0.14	0.000	0.031	0.3025	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
245	0.16	0.000	0.029	0.3090	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
246	0.00	0.000	0.026	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	0.00	0.000	0.024	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
248	0.00	0.000	0.023	0.3055	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.03	0.000	0.024	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.00	0.000	0.021	0.3047	0.0000	0.0006	6.01E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09

251		0.00	0.000	0.020	0.3036	0.0000	0.0003	3.82E-09	0.0000	0.0000	2.78E-09	0.0000	0.0000	2.93E-09
252		0.06	0.000	0.022	0.3053	0.0000	0.0017	1.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
253		0.00	0.000	0.019	0.3042	0.0000	0.0010	7.19E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
254		0.00	0.000	0.018	0.3031	0.0000	0.0003	3.46E-09	0.0000	0.0000	4.37E-09	0.0000	0.0000	4.12E-09
255		0.00	0.000	0.018	0.3020	0.0000	0.0005	3.50E-09	0.0000	0.0000	3.10E-09	0.0000	0.0000	2.79E-09
256		0.00	0.000	0.017	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
257		1.60	0.453	0.019	0.3545	0.0000	0.0004	4.41E-09	0.0000	0.0000	2.99E-09	0.0000	0.0000	2.70E-09
258		0.35	0.040	0.080	0.3652	0.0000	0.0003	3.72E-09	0.0000	0.0000	4.32E-09	0.0000	0.0000	2.94E-09
259		0.64	0.187	0.076	0.3829	0.0001	0.0033	1.62E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.98E-09
260		0.03	0.000	0.114	0.3787	0.0001	0.0046	2.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261		0.00	0.000	0.132	0.3685	0.0001	0.0026	1.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.00	0.000	0.161	0.3550	0.0008	0.0418	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.00	0.000	0.148	0.3441	0.0023	0.1056	3.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.00	0.000	0.171	0.3340	0.0013	0.0626	2.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.00	0.000	0.153	0.3242	0.0010	0.0493	1.73E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.00	0.000	0.149	0.3154	0.0011	0.0511	1.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.00	0.000	0.062	0.3116	0.0008	0.0374	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.00	0.000	0.047	0.3082	0.0005	0.0238	9.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.040	0.3051	0.0005	0.0238	9.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.01	0.000	0.037	0.3026	0.0005	0.0248	9.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.031	0.3001	0.0005	0.0242	9.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.00	0.000	0.029	0.2979	0.0005	0.0236	9.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.00	0.000	0.027	0.2959	0.0004	0.0197	7.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		0.01	0.000	0.028	0.2945	0.0004	0.0173	6.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.00	0.000	0.024	0.2926	0.0004	0.0172	6.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.024	0.2909	0.0004	0.0169	6.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.04	0.000	0.024	0.2908	0.0003	0.0161	6.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.02	0.000	0.024	0.2902	0.0003	0.0151	6.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.20	0.000	0.023	0.2983	0.0003	0.0140	5.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		0.00	0.000	0.020	0.2969	0.0003	0.0127	5.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281	*	0.00	0.000	0.019	0.2954	0.0002	0.0104	4.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.00	0.000	0.018	0.2941	0.0003	0.0121	5.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.00	0.000	0.018	0.2929	0.0003	0.0121	5.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.00	0.000	0.017	0.2917	0.0002	0.0114	4.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.017	0.2906	0.0002	0.0105	4.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.00	0.000	0.016	0.2896	0.0002	0.0099	4.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.00	0.000	0.016	0.2887	0.0002	0.0098	4.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		2.68	1.496	0.018	0.3442	0.0002	0.0074	3.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.00	0.000	0.173	0.3359	0.0001	0.0059	2.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.00	0.000	0.172	0.3277	0.0002	0.0098	4.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		1.51	0.423	0.241	0.3681	0.0002	0.0084	3.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.00	0.000	0.194	0.3589	0.0001	0.0069	3.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.00	0.000	0.184	0.3501	0.0001	0.0059	2.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.00	0.000	0.206	0.3403	0.0001	0.0054	2.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.49	0.003	0.156	0.3562	0.0001	0.0048	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.00	0.000	0.126	0.3501	0.0001	0.0032	1.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.00	0.000	0.076	0.3452	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.09E-09	0.0000	0.0000	4.93E-09
298	*	0.00	0.000	0.064	0.3405	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.34E-19	0.0000	0.0000	5.08E-10
299	*	0.00	0.000	0.000	0.3391	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
300	*	0.00	0.000	0.000	0.3376	0.0002	0.0111	4.73E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
301	*	0.00	0.000	0.000	0.3362	0.0005	0.0250	9.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302	*	0.00	0.000	0.000	0.3351	0.0006	0.0278	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.00	0.000	0.075	0.3305	0.0006	0.0280	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.00	0.000	0.152	0.3222	0.0004	0.0186	7.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.00	0.000	0.076	0.3177	0.0006	0.0263	9.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.000	0.098	0.3125	0.0006	0.0265	1.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.00	0.000	0.062	0.3091	0.0004	0.0168	6.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		1.86	0.663	0.049	0.3631	0.0003	0.0126	5.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.00	0.000	0.101	0.3578	0.0003	0.0134	5.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.00	0.000	0.108	0.3519	0.0002	0.0082	3.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.00	0.000	0.158	0.3436	0.0003	0.0126	5.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.00	0.000	0.217	0.3328	0.0004	0.0165	6.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.00	0.000	0.095	0.3281	0.0004	0.0192	7.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.00	0.000	0.104	0.3232	0.0003	0.0150	6.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.00	0.000	0.077	0.3194	0.0002	0.0099	4.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.068	0.3160	0.0001	0.0049	2.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		1.70	0.536	0.063	0.3673	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318		0.00	0.000	0.124	0.3604	0.0001	0.0030	1.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.19	0.000	0.086	0.3640	0.0001	0.0029	1.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.00	0.000	0.095	0.3580	0.0004	0.0175	6.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.00	0.000	0.099	0.3529	0.0007	0.0351	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.00	0.000	0.058	0.3500	0.0005	0.0212	8.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.00	0.000	0.055	0.3462	0.0000	0.0016	8.14E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.00	0.000	0.054	0.3424	0.0003	0.0142	5.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325	*	0.00	0.000	0.047	0.3393	0.0005	0.0236	9.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326	*	0.00	0.000	0.000	0.3384	0.0004	0.0196	7.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	0.00	0.000	0.000	0.3377	0.0004	0.0199	7.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328	*	0.00	0.000	0.046	0.3345	0.0003	0.0149	6.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329	*	0.41	0.000	0.035	0.3344	0.0004	0.0178	7.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330	*	1.21	0.000	0.019	0.3343	0.0004	0.0205	7.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.00	0.000	0.000	0.3472	0.0004	0.0211	8.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.78	0.914	0.000	0.3985	0.0005	0.0239	9.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.02	0.000	0.154	0.3837	0.0007	0.0387	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.00	0.000	0.063	0.3703	0.0053	0.2489	7.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.00	0.000	0.097	0.3598	0.0031	0.1458	4.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.082	0.3515	0.0023	0.1066	3.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337		0.00	0.000	0.081	0.3450	0.0017	0.0777	2.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.00	0.000	0.086	0.3385	0.0012	0.0557	1.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		0.00	0.000	0.070	0.3336	0.0010	0.0474	1.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.28	0.000	0.108	0.3404	0.0007	0.0351	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.33	0.000	0.100	0.3500	0.0008	0.0362	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		0.00	0.000	0.051	0.3465	0.0006	0.0299	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.00	0.000	0.060	0.3424	0.0005	0.0250	9.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.00	0.000	0.055	0.3386	0.0006	0.0272	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345		0.21	0.000	0.071	0.3444	0.0006	0.0261	9.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*	0.05	0.000	0.034	0.3442	0.0005	0.0246	9.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347		0.00	0.000	0.074	0.3396	0.0004	0.0177	7.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.00	0.000	0.108	0.3338	0.0005	0.0239	9.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		0.00	0.000	0.117	0.3275	0.0004	0.0176	7.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.04	0.000	0.128	0.3228	0.0003	0.0164	6.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.00	0.000	0.211	0.3118	0.0003	0.0119	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.00	0.000	0.125	0.3051	0.0004	0.0195	7.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.075	0.3011	0.0004	0.0193	7.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.00	0.000	0.062	0.2978	0.0003	0.0157	6.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.00	0.000	0.047	0.2952	0.0003	0.0139	5.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		0.00	0.000	0.040	0.2930	0.0003	0.0123	5.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.24	0.000	0.036	0.3023	0.0002	0.0108	4.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*	0.00	0.000	0.000	0.3021	0.0002	0.0104	4.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359		1.55	0.408	0.033	0.3548	0.0002	0.0098	4.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		0.33	0.035	0.051	0.3664	0.0002	0.0100	4.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361	*	0.02	0.000	0.042	0.3654	0.0002	0.0082	3.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362	*	0.00	0.000	0.000	0.3654	0.0001	0.0069	3.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363	*	0.00	0.000	0.000	0.3654	0.0001	0.0059	2.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364	*	0.00	0.000	0.000	0.3644	0.0001	0.0023	1.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.00	0.000	0.066	0.3582	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.51E-09	0.0000	0.0000	4.78E-09

* = Frozen (air or soil)

Annual Totals for Year 4			
	inches	cubic feet	percent
Precipitation	45.04	163,485.1	100.00
Runoff	12.766	46,341.7	28.35
Evapotranspiration	29.377	106,637.5	65.23
Drainage Collected from Layer 2	4.0837	14,823.8	9.07
Percolation/Leakage through Layer 3	0.000015	0.0549	0.00
Average Head on Top of Layer 3	0.0002	---	---
Drainage Collected from Layer 7	0.0000	0.0504	0.00
Percolation/Leakage through Layer 8	0.000001	0.0048	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0047	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-1.1895	-4,317.9	-2.64
Soil Water at Start of Year	257.0256	933,002.8	570.70
Soil Water at End of Year	257.2577	933,845.4	571.21
Snow Water at Start of Year	1.4216	5,160.5	3.16
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 5

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Column key: Head #1: drainage from Layer 3; Drain #1: drainage from Layer 2; Leak #1: leakage thru Layer 3; Head #2: drainage from Layer 8; Drain #2: drainage from Layer 7; Leak #2: leakage thru Layer 8; Head #3: drainage from Layer 10; Drain #3: drainage from Layer 9; Leak #3: leakage thru Layer 11

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*		0.00	0.000	0.000	0.3528	0.0010	0.0484	1.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
2			0.00	0.000	0.077	0.3472	0.0011	0.0518	1.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.064	0.3424	0.0009	0.0437	1.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.00	0.000	0.055	0.3381	0.0008	0.0366	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5	*		0.00	0.000	0.000	0.3370	0.0008	0.0388	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6	*		0.00	0.000	0.000	0.3361	0.0006	0.0278	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7			0.00	0.000	0.081	0.3311	0.0004	0.0201	7.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8			0.00	0.000	0.125	0.3238	0.0004	0.0206	8.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9			0.00	0.000	0.060	0.3203	0.0006	0.0300	1.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10	*		0.00	0.000	0.000	0.3195	0.0004	0.0209	8.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*		0.00	0.000	0.000	0.3186	0.0004	0.0167	6.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.00	0.000	0.072	0.3143	0.0004	0.0177	7.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13			0.00	0.000	0.064	0.3104	0.0004	0.0203	7.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*		0.00	0.000	0.000	0.3099	0.0004	0.0200	7.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*		0.00	0.000	0.000	0.3092	0.0003	0.0156	6.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16			0.00	0.000	0.072	0.3051	0.0003	0.0145	5.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.00	0.000	0.115	0.2990	0.0003	0.0145	5.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.00	0.000	0.131	0.2921	0.0003	0.0148	6.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19			0.07	0.000	0.062	0.2917	0.0003	0.0125	5.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.00	0.000	0.048	0.2890	0.0003	0.0163	6.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.06	0.000	0.041	0.2892	0.0004	0.0170	6.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22	*		0.00	0.000	0.035	0.2871	0.0003	0.0156	6.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23	*		0.28	0.000	0.034	0.2877	0.0003	0.0144	5.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24	*	*	0.49	0.000	0.029	0.2877	0.0003	0.0162	6.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*	*	0.00	0.000	0.034	0.2877	0.0003	0.0120	5.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26	*	*	0.00	0.000	0.018	0.2877	0.0002	0.0094	4.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*	*	0.00	0.000	0.010	0.2877	0.0002	0.0078	3.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*	*	0.00	0.000	0.006	0.2877	0.0001	0.0066	3.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*	*	0.00	0.000	0.011	0.2877	0.0001	0.0057	2.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*	*	0.00	0.000	0.000	0.2877	0.0001	0.0050	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31		*	0.00	0.004	0.032	0.2922	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32	*	*	0.00	0.000	0.023	0.2922	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33	*	*	0.72	0.000	0.000	0.2923	0.0001	0.0037	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34		*	0.00	0.781	0.000	0.3108	0.0000	0.0016	8.11E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35		*	0.00	0.000	0.000	0.3108	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.30E-09	0.0000	0.0000	2.30E-09

36		*	0.03	0.000	0.001	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.36E-10
37		*	0.00	0.000	0.000	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
38		*	0.20	0.047	0.001	0.3194	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
39	*	*	0.46	0.000	0.029	0.3194	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
40	*	*	0.00	0.000	0.015	0.3194	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
41	*	*	0.05	0.000	0.028	0.3194	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
42		*	0.08	0.000	0.000	0.3199	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
43		*	0.00	0.293	0.039	0.3283	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
44		*	0.00	0.000	0.000	0.3283	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
45		*	0.00	0.000	0.000	0.3283	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
46			0.19	0.000	0.131	0.3307	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
47			0.03	0.000	0.107	0.3267	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
48	*		0.00	0.000	0.000	0.3265	0.0000	0.0016	1.02E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
49	*		0.00	0.000	0.003	0.3264	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50	*	*	0.15	0.000	0.023	0.3264	0.0001	0.0049	2.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		*	0.69	0.553	0.000	0.3392	0.0001	0.0044	2.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52	*	*	0.20	0.000	0.026	0.3392	0.0001	0.0039	1.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53	*	*	0.44	0.000	0.014	0.3392	0.0001	0.0036	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		*	0.10	0.421	0.000	0.3477	0.0000	0.0004	2.08E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55	*	*	0.16	0.000	0.022	0.3477	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.41E-10	0.0000	0.0000	4.75E-10
56		*	1.28	1.350	0.000	0.3553	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.57E-10
57		*	0.00	0.000	0.000	0.3553	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
58		*	0.42	0.309	0.000	0.3605	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
59		*	0.00	0.000	0.000	0.3605	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
60		*	1.17	1.061	0.000	0.3657	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
61	*	*	0.87	0.000	0.025	0.3657	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
62	*	*	0.03	0.000	0.013	0.3657	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
63	*	*	0.03	0.000	0.009	0.3657	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
64	*	*	0.06	0.000	0.000	0.3657	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
65	*	*	0.28	0.000	0.024	0.3657	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
66		*	0.02	0.872	0.000	0.3702	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
67		*	0.07	0.187	0.151	0.3702	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
68		*	0.00	0.000	0.000	0.3702	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
69		*	0.00	0.000	0.000	0.3702	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
70	*	*	0.00	0.000	0.000	0.3702	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
71	*	*	1.00	0.000	0.042	0.3702	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
72	*	*	0.00	0.000	0.041	0.3702	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
73	*	*	0.00	0.000	0.021	0.3702	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
74	*	*	0.00	0.000	0.025	0.3702	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
75		*	0.00	0.778	0.000	0.3739	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
76		*	0.95	0.889	0.000	0.3773	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
77		*	0.07	0.028	0.000	0.3792	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
78		*	0.00	0.000	0.000	0.3792	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

79		*	0.00	0.000	0.000	0.3792	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
80		*	0.00	0.000	0.000	0.3792	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
81	*	*	0.01	0.000	0.014	0.3792	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
82		*	0.06	0.027	0.000	0.3810	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
83			0.00	0.000	0.232	0.3700	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
84			0.00	0.000	0.296	0.3552	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
85			0.00	0.000	0.220	0.3408	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
86			0.12	0.000	0.190	0.3345	0.0001	0.0056	2.24E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
87			1.13	0.167	0.149	0.3705	0.0011	0.0498	1.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88			0.00	0.000	0.132	0.3623	0.0012	0.0568	1.99E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89			0.00	0.000	0.136	0.3535	0.0008	0.0391	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90			0.00	0.000	0.142	0.3447	0.0010	0.0484	1.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91			0.00	0.000	0.187	0.3345	0.0010	0.0456	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92	*		0.00	0.000	0.090	0.3296	0.0008	0.0371	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93			0.10	0.000	0.112	0.3290	0.0006	0.0272	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94			0.14	0.000	0.148	0.3281	0.0002	0.0105	4.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95			0.03	0.000	0.359	0.3115	0.0001	0.0060	2.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96			0.10	0.000	0.149	0.3085	0.0003	0.0150	6.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97			0.00	0.000	0.062	0.3046	0.0002	0.0081	3.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98			0.00	0.000	0.047	0.3012	0.0003	0.0153	6.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99			0.00	0.000	0.040	0.2984	0.0004	0.0202	7.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100			0.00	0.000	0.035	0.2958	0.0005	0.0212	8.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101			0.06	0.000	0.032	0.2964	0.0004	0.0205	7.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102			0.28	0.000	0.030	0.3077	0.0004	0.0184	7.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103			0.11	0.000	0.027	0.3109	0.0004	0.0168	6.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104			0.01	0.000	0.026	0.3096	0.0003	0.0154	6.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105			0.69	0.027	0.024	0.3397	0.0003	0.0142	5.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106			0.00	0.000	0.094	0.3345	0.0002	0.0101	4.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107			0.00	0.000	0.138	0.3273	0.0003	0.0124	5.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108			0.00	0.000	0.145	0.3199	0.0003	0.0137	5.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109			0.00	0.000	0.121	0.3138	0.0003	0.0138	5.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110			0.08	0.000	0.082	0.3134	0.0003	0.0134	5.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111			0.03	0.000	0.082	0.3109	0.0003	0.0151	6.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112	*		0.36	0.000	0.047	0.3118	0.0002	0.0113	4.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113			0.00	0.000	0.071	0.3223	0.0002	0.0090	3.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114			0.00	0.000	0.131	0.3162	0.0001	0.0071	3.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115			0.75	0.050	0.123	0.3438	0.0001	0.0063	2.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116			0.00	0.000	0.160	0.3362	0.0001	0.0055	2.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117			0.12	0.000	0.387	0.3235	0.0001	0.0050	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118			0.75	0.058	0.127	0.3503	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119			0.00	0.000	0.203	0.3407	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120			0.03	0.000	0.256	0.3300	0.0001	0.0037	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121			0.26	0.000	0.354	0.3254	0.0001	0.0022	1.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122		0.00	0.000	0.346	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.36E-09	0.0000	0.0000	4.05E-09
123		0.00	0.000	0.149	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
124		0.00	0.000	0.062	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125		0.00	0.000	0.047	0.2966	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
126		0.00	0.000	0.040	0.2947	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
127		0.00	0.000	0.035	0.2931	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
128	*	0.00	0.000	0.032	0.2915	0.0000	0.0005	3.25E-09	0.0000	0.0000	2.90E-09	0.0000	0.0000	2.63E-09
129		0.00	0.000	0.029	0.2901	0.0000	0.0004	4.01E-09	0.0000	0.0000	2.75E-09	0.0000	0.0000	2.50E-09
130		0.00	0.000	0.027	0.2888	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.74E-10	0.0000	0.0000	6.42E-10
131		0.00	0.000	0.026	0.2876	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.12E-10
132		1.40	0.265	0.025	0.3406	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
133		0.53	0.075	0.283	0.3489	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134		0.01	0.000	0.269	0.3365	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
135		0.00	0.000	0.241	0.3251	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
136		0.09	0.000	0.375	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137		0.01	0.000	0.154	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138		0.00	0.000	0.143	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139		0.00	0.000	0.062	0.2946	0.0000	0.0000	8.24E-11	0.0000	0.0000	8.21E-11	0.0000	0.0000	8.19E-11
140		0.00	0.000	0.047	0.2924	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
141		0.69	0.009	0.040	0.3229	0.0000	0.0005	4.13E-09	0.0000	0.0000	2.82E-09	0.0000	0.0000	2.56E-09
142		0.00	0.000	0.276	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.96E-10	0.0000	0.0000	8.68E-10
143		0.07	0.000	0.036	0.3113	0.0000	0.0000	1.41E-10	0.0000	0.0000	1.40E-10	0.0000	0.0000	1.39E-10
144		0.00	0.000	0.195	0.3021	0.0000	0.0002	9.09E-10	0.0000	0.0000	8.80E-10	0.0000	0.0000	8.52E-10
145		0.00	0.000	0.032	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
146		0.00	0.000	0.029	0.2992	0.0000	0.0000	3.47E-10	0.0000	0.0000	3.43E-10	0.0000	0.0000	3.39E-10
147		0.00	0.000	0.027	0.2979	0.0000	0.0001	7.48E-10	0.0000	0.0000	7.28E-10	0.0000	0.0000	7.09E-10
148		0.00	0.000	0.026	0.2967	0.0000	0.0000	4.46E-10	0.0000	0.0000	4.39E-10	0.0000	0.0000	4.32E-10
149		0.00	0.000	0.024	0.2956	0.0000	0.0000	6.09E-10	0.0000	0.0000	5.96E-10	0.0000	0.0000	5.83E-10
150		0.20	0.000	0.024	0.3039	0.0000	0.0001	7.83E-10	0.0000	0.0000	7.62E-10	0.0000	0.0000	7.41E-10
151		0.00	0.000	0.022	0.3028	0.0000	0.0001	1.11E-09	0.0000	0.0000	1.07E-09	0.0000	0.0000	1.03E-09
152		0.00	0.000	0.021	0.3018	0.0000	0.0002	1.31E-09	0.0000	0.0000	1.25E-09	0.0000	0.0000	1.20E-09
153		0.20	0.000	0.021	0.3104	0.0000	0.0001	9.47E-10	0.0000	0.0000	9.15E-10	0.0000	0.0000	8.86E-10
154		0.17	0.000	0.126	0.3126	0.0000	0.0000	3.75E-10	0.0000	0.0000	3.70E-10	0.0000	0.0000	3.65E-10
155		0.16	0.000	0.332	0.3044	0.0000	0.0003	1.69E-09	0.0000	0.0000	1.59E-09	0.0000	0.0000	1.50E-09
156		0.35	0.000	0.150	0.3139	0.0000	0.0012	6.31E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
157		0.00	0.000	0.398	0.2950	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.66E-10	0.0000	0.0000	1.33E-09
158		0.00	0.000	0.062	0.2920	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.04E-11
159		0.00	0.000	0.047	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160		0.00	0.000	0.040	0.2879	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161		0.04	0.000	0.036	0.2882	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162		0.08	0.000	0.033	0.2903	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163		0.15	0.000	0.030	0.2961	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164		0.00	0.000	0.027	0.2948	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.00	0.000	0.026	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.00	0.000	0.024	0.2925	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.00	0.000	0.023	0.2914	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.00	0.000	0.022	0.2903	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.26	0.000	0.022	0.3015	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
170	0.00	0.000	0.020	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.01	0.000	0.020	0.3002	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.13	0.000	0.020	0.3055	0.0000	0.0000	2.29E-10	0.0000	0.0000	2.27E-10	0.0000	0.0000	2.25E-10
173	0.00	0.000	0.018	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
174	0.02	0.000	0.019	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.00	0.000	0.017	0.3041	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.13	0.000	0.018	0.3093	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.00	0.000	0.016	0.3085	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.50	0.010	0.017	0.3309	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.221	0.3204	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.23	0.000	0.205	0.3213	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.00	0.000	0.177	0.3129	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.33	0.000	0.201	0.3190	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.00	0.000	0.325	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.35	0.000	0.150	0.3132	0.0000	0.0000	3.01E-10	0.0000	0.0000	2.98E-10	0.0000	0.0000	2.94E-10
185	0.68	0.068	0.330	0.3267	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
186	0.00	0.000	0.363	0.3095	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
187	0.00	0.000	0.149	0.3024	0.0000	0.0001	8.55E-10	0.0000	0.0000	8.29E-10	0.0000	0.0000	8.05E-10
188	0.00	0.000	0.062	0.2994	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
189	0.00	0.000	0.047	0.2972	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.00	0.000	0.040	0.2953	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.00	0.000	0.035	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.19	0.000	0.033	0.3013	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
193	0.30	0.000	0.030	0.3141	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	0.48	0.017	0.131	0.3299	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.09	0.000	0.119	0.3287	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
196	0.25	0.000	0.112	0.3355	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.00	0.000	0.228	0.3246	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.00	0.000	0.331	0.3088	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.12	0.000	0.132	0.3083	0.0000	0.0001	8.31E-10	0.0000	0.0000	8.07E-10	0.0000	0.0000	7.84E-10
200	0.05	0.000	0.063	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
201	1.38	0.293	0.049	0.3569	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.00	0.000	0.205	0.3471	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.76	0.125	0.357	0.3604	0.0000	0.0005	2.86E-09	0.0000	0.0000	2.59E-09	0.0000	0.0000	2.36E-09
204	0.19	0.001	0.328	0.3536	0.0000	0.0004	1.89E-09	0.0000	0.0000	1.77E-09	0.0000	0.0000	1.66E-09
205	0.12	0.000	0.136	0.3527	0.0000	0.0001	7.28E-10	0.0000	0.0000	7.09E-10	0.0000	0.0000	6.91E-10
206	0.18	0.000	0.114	0.3559	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
207	0.02	0.000	0.116	0.3514	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.00	0.000	0.246	0.3396	0.0000	0.0004	2.15E-09	0.0000	0.0000	1.99E-09	0.0000	0.0000	1.86E-09
209	0.18	0.000	0.124	0.3421	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
210	0.61	0.042	0.266	0.3564	0.0000	0.0004	1.91E-09	0.0000	0.0000	1.78E-09	0.0000	0.0000	1.67E-09
211	0.00	0.000	0.309	0.3416	0.0000	0.0004	1.91E-09	0.0000	0.0000	1.78E-09	0.0000	0.0000	1.68E-09
212	0.00	0.000	0.337	0.3254	0.0000	0.0023	1.21E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
213	0.00	0.000	0.219	0.3149	0.0000	0.0016	8.07E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
214	0.00	0.000	0.149	0.3078	0.0000	0.0003	2.92E-09	0.0000	0.0000	4.34E-09	0.0000	0.0000	4.36E-09
215	0.07	0.000	0.063	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
216	0.00	0.000	0.046	0.3053	0.0000	0.0009	6.02E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
217	0.15	0.000	0.041	0.3101	0.0000	0.0003	2.96E-09	0.0000	0.0000	2.98E-09	0.0000	0.0000	3.79E-09
218	0.00	0.000	0.035	0.3084	0.0001	0.0035	1.81E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
219	0.17	0.000	0.033	0.3149	0.0001	0.0042	2.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
220	0.13	0.000	0.031	0.3195	0.0001	0.0039	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
221	0.13	0.000	0.029	0.3243	0.0001	0.0030	1.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
222	0.00	0.000	0.245	0.3126	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.46E-09	0.0000	0.0000	4.80E-09
223	0.06	0.000	0.027	0.3143	0.0000	0.0013	8.76E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.80E-09
224	0.12	0.000	0.026	0.3186	0.0000	0.0007	6.03E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
225	0.00	0.000	0.023	0.3173	0.0000	0.0002	3.20E-09	0.0000	0.0000	2.34E-09	0.0000	0.0000	2.26E-09
226	0.40	0.000	0.024	0.3348	0.0000	0.0000	1.66E-09	0.0000	0.0000	1.87E-09	0.0000	0.0000	1.84E-09
227	0.31	0.001	0.268	0.3360	0.0000	0.0000	3.25E-10	0.0000	0.0000	6.28E-10	0.0000	0.0000	8.91E-10
228	0.01	0.000	0.320	0.3208	0.0001	0.0032	1.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
229	0.00	0.000	0.140	0.3142	0.0001	0.0067	3.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
230	0.00	0.000	0.149	0.3071	0.0001	0.0058	2.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
231	0.00	0.000	0.062	0.3041	0.0001	0.0051	2.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
232	0.00	0.000	0.047	0.3019	0.0001	0.0045	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
233	0.10	0.000	0.042	0.3047	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
234	0.00	0.000	0.035	0.3030	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
235	0.00	0.000	0.032	0.3014	0.0000	0.0021	1.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
236	0.00	0.000	0.029	0.3000	0.0000	0.0013	7.11E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
237	0.64	0.006	0.029	0.3286	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.05E-09	0.0000	0.0000	1.47E-09
238	0.18	0.000	0.151	0.3302	0.0000	0.0001	6.19E-10	0.0000	0.0000	6.05E-10	0.0000	0.0000	9.14E-10
239	0.00	0.000	0.138	0.3236	0.0000	0.0003	1.83E-09	0.0000	0.0000	1.71E-09	0.0000	0.0000	1.37E-09
240	0.00	0.000	0.217	0.3133	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.03E-10
241	0.00	0.000	0.149	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
242	0.00	0.000	0.062	0.3033	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.09	0.000	0.049	0.3052	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
244	0.00	0.000	0.040	0.3033	0.0000	0.0003	1.71E-09	0.0000	0.0000	1.61E-09	0.0000	0.0000	1.52E-09
245	0.26	0.000	0.037	0.3140	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
246	0.55	0.016	0.034	0.3378	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	0.49	0.059	0.199	0.3490	0.0000	0.0001	6.63E-10	0.0000	0.0000	6.48E-10	0.0000	0.0000	6.33E-10
248	0.08	0.000	0.110	0.3475	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
249	0.02	0.000	0.114	0.3432	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.00	0.000	0.300	0.3289	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

251		0.00	0.000	0.118	0.3233	0.0000	0.0001	7.13E-10	0.0000	0.0000	6.95E-10	0.0000	0.0000	6.78E-10
252		0.00	0.000	0.191	0.3142	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
253		0.38	0.000	0.151	0.3249	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
254		0.00	0.000	0.197	0.3156	0.0000	0.0002	8.57E-10	0.0000	0.0000	8.31E-10	0.0000	0.0000	8.06E-10
255		0.00	0.000	0.062	0.3126	0.0000	0.0004	2.95E-09	0.0000	0.0000	2.66E-09	0.0000	0.0000	2.43E-09
256		0.00	0.000	0.047	0.3104	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
257		0.00	0.000	0.040	0.3085	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
258		0.00	0.000	0.035	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
259		0.00	0.000	0.032	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
260		0.00	0.000	0.029	0.3039	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261		0.00	0.000	0.027	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262		0.00	0.000	0.026	0.3014	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
263		0.00	0.000	0.024	0.3003	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
264		0.00	0.000	0.023	0.2992	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
265		0.00	0.000	0.022	0.2981	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
266		0.00	0.000	0.021	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
267		0.00	0.000	0.020	0.2961	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
268		0.00	0.000	0.020	0.2952	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
269		0.00	0.000	0.019	0.2943	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
270		0.00	0.000	0.018	0.2934	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
271		0.00	0.000	0.018	0.2926	0.0000	0.0005	4.64E-09	0.0000	0.0000	3.12E-09	0.0000	0.0000	2.80E-09
272		0.00	0.000	0.017	0.2918	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.92E-10	0.0000	0.0000	9.58E-10
273		0.00	0.000	0.017	0.2910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
274		0.00	0.000	0.016	0.2902	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
275	*	0.00	0.000	0.016	0.2894	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
276		0.00	0.000	0.016	0.2887	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
277		0.00	0.000	0.015	0.2879	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
278		0.00	0.000	0.015	0.2872	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
279		0.00	0.000	0.015	0.2865	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
280		0.00	0.000	0.014	0.2858	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
281		0.00	0.000	0.014	0.2851	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
282		0.00	0.000	0.014	0.2845	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
283		0.53	0.000	0.016	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
284		0.01	0.000	0.016	0.3087	0.0000	0.0000	2.69E-10	0.0000	0.0000	2.67E-10	0.0000	0.0000	2.64E-10
285		0.00	0.000	0.013	0.3081	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
286		0.00	0.000	0.013	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
287		0.00	0.000	0.013	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
288		0.00	0.000	0.013	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
289		0.00	0.000	0.012	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
290		1.05	0.122	0.015	0.3493	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
291		0.02	0.000	0.125	0.3445	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
292		0.03	0.000	0.124	0.3402	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
293		0.08	0.000	0.149	0.3366	0.0000	0.0013	7.61E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09

294		0.24	0.000	0.067	0.3449	0.0000	0.0003	1.48E-09	0.0000	0.0000	2.09E-09	0.0000	0.0000	2.49E-09
295		0.00	0.000	0.063	0.3419	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.51E-10	0.0000	0.0000	7.40E-10
296		0.00	0.000	0.108	0.3368	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.67E-11
297		0.00	0.000	0.073	0.3333	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
298		0.00	0.000	0.111	0.3279	0.0000	0.0004	2.99E-09	0.0000	0.0000	2.70E-09	0.0000	0.0000	2.46E-09
299		0.00	0.000	0.092	0.3236	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
300		0.07	0.000	0.086	0.3226	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
301		0.00	0.000	0.057	0.3199	0.0000	0.0001	2.08E-09	0.0000	0.0000	1.93E-09	0.0000	0.0000	1.80E-09
302		0.05	0.000	0.104	0.3173	0.0000	0.0007	4.70E-09	0.0000	0.0000	3.16E-09	0.0000	0.0000	2.83E-09
303		0.00	0.000	0.110	0.3121	0.0000	0.0007	4.71E-09	0.0000	0.0000	4.86E-09	0.0000	0.0000	3.25E-09
304		0.00	0.000	0.062	0.3091	0.0000	0.0013	8.82E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.32	0.000	0.049	0.3221	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.23E-09	0.0000	0.0000	1.24E-09
306		0.00	0.000	0.079	0.3182	0.0000	0.0012	6.62E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.89E-09
307		0.07	0.000	0.041	0.3196	0.0000	0.0010	5.36E-09	0.0000	0.0000	4.81E-09	0.0000	0.0000	3.22E-09
308		0.02	0.000	0.073	0.3173	0.0000	0.0002	1.55E-09	0.0000	0.0000	1.68E-09	0.0000	0.0000	2.17E-09
309		0.00	0.000	0.035	0.3156	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.68E-10	0.0000	0.0000	6.64E-10
310		0.00	0.000	0.032	0.3141	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.07E-11
311		0.00	0.000	0.029	0.3127	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
312		0.00	0.000	0.027	0.3114	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
313		0.00	0.000	0.026	0.3102	0.0000	0.0000	5.22E-10	0.0000	0.0000	5.13E-10	0.0000	0.0000	5.03E-10
314		0.00	0.000	0.024	0.3090	0.0000	0.0008	6.30E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
315		0.00	0.000	0.023	0.3078	0.0000	0.0015	9.59E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.022	0.3065	0.0000	0.0006	4.13E-09	0.0000	0.0000	5.08E-09	0.0000	0.0000	4.95E-09
317		0.00	0.000	0.021	0.3054	0.0000	0.0005	4.96E-09	0.0000	0.0000	4.63E-09	0.0000	0.0000	3.12E-09
318		0.00	0.000	0.021	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	9.90E-10
319		0.00	0.000	0.020	0.3032	0.0000	0.0018	1.09E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09
320		0.00	0.000	0.019	0.3021	0.0000	0.0005	3.24E-09	0.0000	0.0000	4.57E-09	0.0000	0.0000	3.08E-09
321		0.00	0.000	0.018	0.3010	0.0000	0.0007	6.16E-09	0.0000	0.0000	5.07E-09	0.0000	0.0000	5.00E-09
322		0.00	0.000	0.018	0.2999	0.0000	0.0016	1.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.00	0.000	0.017	0.2989	0.0000	0.0024	1.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.00	0.000	0.017	0.2981	0.0001	0.0061	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.24	0.000	0.018	0.3085	0.0001	0.0054	2.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.000	0.016	0.3077	0.0001	0.0047	2.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	0.00	0.000	0.000	0.3077	0.0001	0.0043	2.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.016	0.3069	0.0001	0.0038	2.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.00	0.000	0.015	0.3062	0.0001	0.0036	2.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.00	0.000	0.015	0.3055	0.0000	0.0003	2.00E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.09	0.000	0.016	0.3090	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.29E-09	0.0000	0.0000	9.39E-10
332		0.00	0.000	0.014	0.3083	0.0000	0.0003	2.14E-09	0.0000	0.0000	1.99E-09	0.0000	0.0000	1.77E-09
333		0.00	0.000	0.014	0.3076	0.0000	0.0001	5.99E-10	0.0000	0.0000	5.87E-10	0.0000	0.0000	8.87E-10
334		0.00	0.000	0.014	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.44E-10
335	*	0.00	0.000	0.000	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
336		0.00	0.000	0.014	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

337		0.00	0.000	0.013	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
338		0.00	0.000	0.013	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
339		0.11	0.000	0.014	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
340		0.00	0.000	0.013	0.3090	0.0000	0.0001	9.98E-10	0.0000	0.0000	9.63E-10	0.0000	0.0000	9.30E-10
341		0.00	0.000	0.014	0.3086	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
342		0.03	0.000	0.013	0.3096	0.0000	0.0001	3.83E-10	0.0000	0.0000	3.77E-10	0.0000	0.0000	3.72E-10
343		0.96	0.107	0.013	0.3497	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
344		0.31	0.018	0.098	0.3589	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
345		0.00	0.000	0.053	0.3564	0.0000	0.0001	4.52E-10	0.0000	0.0000	4.45E-10	0.0000	0.0000	4.38E-10
346		0.00	0.000	0.089	0.3521	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
347		0.22	0.000	0.137	0.3561	0.0000	0.0003	2.00E-09	0.0000	0.0000	1.87E-09	0.0000	0.0000	1.75E-09
348		0.71	0.122	0.064	0.3812	0.0000	0.0003	1.55E-09	0.0000	0.0000	1.47E-09	0.0000	0.0000	1.39E-09
349		0.00	0.000	0.052	0.3786	0.0001	0.0023	1.16E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
350	*	0.00	0.000	0.000	0.3754	0.0000	0.0006	3.35E-09	0.0000	0.0000	4.84E-09	0.0000	0.0000	4.97E-09
351	*	0.00	0.000	0.041	0.3670	0.0003	0.0146	5.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352	*	0.00	0.000	0.003	0.3624	0.0021	0.1010	3.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353	*	0.00	0.000	0.000	0.3590	0.0018	0.0849	2.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354	*	0.00	0.000	0.000	0.3562	0.0014	0.0667	2.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355	*	0.00	0.000	0.000	0.3538	0.0012	0.0568	1.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356	*	0.00	0.000	0.000	0.3517	0.0011	0.0502	1.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.00	0.000	0.055	0.3473	0.0010	0.0465	1.64E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		0.22	0.000	0.049	0.3536	0.0008	0.0376	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359		0.61	0.061	0.060	0.3753	0.0010	0.0352	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		0.00	0.000	0.098	0.3693	0.0007	0.0325	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.07	0.000	0.049	0.3692	0.0009	0.0406	1.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362	*	0.01	0.000	0.043	0.3667	0.0004	0.0176	6.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.43	0.015	0.048	0.3800	0.0005	0.0192	6.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.25	0.012	0.059	0.3854	0.0017	0.0773	2.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.27	0.020	0.069	0.3915	0.0019	0.0886	2.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 5			
	inches	cubic feet	percent
Precipitation	38.98	141,498.0	100.00
Runoff	9.367	34,001.6	24.03
Evapotranspiration	26.708	96,951.6	68.52
Drainage Collected from Layer 2	2.1626	7,850.2	5.55
Percolation/Leakage through Layer 3	0.000008	0.0300	0.00
Average Head on Top of Layer 3	0.0001	---	---
Drainage Collected from Layer 7	0.0000	0.0256	0.00
Percolation/Leakage through Layer 8	0.000001	0.0035	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0034	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.7423	2,694.5	1.90
Soil Water at Start of Year	257.2577	933,845.4	659.97
Soil Water at End of Year	258.0000	936,539.9	661.88
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 6

Title: Millersville Cell 9 - Final Cover

Simulated On: 12/6/2024 15:30

Column key: Head #1: drainage from Layer 3; Drain #1: drainage from Layer 2; Leak #1: leakage thru Layer 3; Head #2: drainage from Layer 8; Drain #2: drainage from Layer 7; Leak #2: leakage thru Layer 8; Head #3: drainage from Layer 10; Drain #3: drainage from Layer 9; Leak #3: leakage thru Layer 11

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*		0.00	0.000	0.000	0.3867	0.0005	0.0247	9.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.59	0.105	0.057	0.3969	0.0049	0.1949	5.94E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3	*		0.10	0.000	0.026	0.3894	0.0032	0.1465	4.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.40	0.052	0.004	0.3974	0.0065	0.2614	7.59E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5	*		0.00	0.000	0.005	0.3885	0.0036	0.1715	5.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6	*		0.02	0.000	0.016	0.3772	0.0055	0.2621	7.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7	*		0.91	0.000	0.028	0.3713	0.0035	0.1631	5.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8	*		0.00	0.000	0.037	0.3674	0.0025	0.1167	3.75E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9			0.00	0.001	0.012	0.3787	0.0019	0.0873	2.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10	*	*	0.00	0.000	0.026	0.3787	0.0015	0.0698	2.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*	*	0.06	0.000	0.014	0.3787	0.0006	0.0273	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*	*	0.00	0.000	0.027	0.3787	0.0004	0.0170	6.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*	*	0.20	0.000	0.013	0.3787	0.0003	0.0123	5.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*	*	0.00	0.000	0.015	0.3787	0.0002	0.0097	4.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*	*	0.00	0.000	0.025	0.3787	0.0002	0.0079	3.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*	*	0.00	0.000	0.027	0.3787	0.0001	0.0067	3.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17		*	0.00	0.455	0.000	0.3851	0.0001	0.0058	2.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18		*	0.52	0.430	0.001	0.3895	0.0001	0.0051	2.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19		*	0.05	0.011	0.001	0.3912	0.0001	0.0046	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20		*	0.53	0.463	0.001	0.3944	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21		*	0.00	0.000	0.000	0.3944	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22		*	0.24	0.188	0.001	0.3970	0.0000	0.0019	9.94E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23			0.00	0.000	0.096	0.3855	0.0000	0.0015	7.40E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.56	0.079	0.123	0.3916	0.0043	0.1537	4.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25			0.22	0.015	0.146	0.3890	0.0038	0.1702	5.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26			0.34	0.038	0.122	0.3912	0.0017	0.0852	2.88E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27			0.39	0.075	0.097	0.3969	0.0031	0.1425	4.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28			0.00	0.000	0.066	0.3850	0.0023	0.1129	3.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29			0.00	0.000	0.122	0.3691	0.0049	0.2305	6.90E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*		0.00	0.000	0.063	0.3602	0.0032	0.1479	4.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31			0.21	0.000	0.106	0.3611	0.0022	0.1037	3.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32			0.00	0.000	0.103	0.3532	0.0016	0.0732	2.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33			0.00	0.000	0.104	0.3461	0.0013	0.0597	2.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34			0.00	0.000	0.128	0.3383	0.0009	0.0428	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35			0.00	0.000	0.081	0.3322	0.0009	0.0431	1.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36		0.00	0.000	0.080	0.3267	0.0010	0.0456	1.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37		0.00	0.000	0.069	0.3227	0.0008	0.0374	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38		0.06	0.000	0.099	0.3199	0.0006	0.0260	9.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39		0.00	0.000	0.105	0.3141	0.0005	0.0238	9.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40		0.00	0.000	0.108	0.3079	0.0004	0.0177	7.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41		0.00	0.000	0.060	0.3038	0.0004	0.0203	7.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42		0.00	0.000	0.047	0.3008	0.0006	0.0264	9.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43	*	0.00	0.000	0.001	0.3004	0.0005	0.0233	8.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44	*	0.15	0.000	0.037	0.3009	0.0004	0.0168	6.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45	*	0.29	0.000	0.014	0.3014	0.0003	0.0130	5.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46	*	0.00	0.000	0.018	0.3018	0.0003	0.0118	4.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47		0.00	0.000	0.054	0.3138	0.0002	0.0114	4.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48		0.00	0.000	0.083	0.3094	0.0002	0.0106	4.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49		0.16	0.000	0.040	0.3147	0.0002	0.0116	4.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50	*	0.00	0.000	0.000	0.3143	0.0002	0.0102	4.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		0.00	0.000	0.093	0.3093	0.0002	0.0073	3.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		0.00	0.000	0.107	0.3037	0.0002	0.0097	4.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		0.00	0.000	0.110	0.2980	0.0002	0.0114	4.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		0.52	0.000	0.062	0.3193	0.0003	0.0124	5.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55		0.27	0.000	0.138	0.3252	0.0002	0.0096	4.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56		0.00	0.000	0.219	0.3148	0.0003	0.0145	5.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57		0.21	0.000	0.191	0.3156	0.0002	0.0114	4.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58		0.11	0.000	0.077	0.3170	0.0002	0.0089	3.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59		0.56	0.023	0.096	0.3379	0.0002	0.0076	3.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60		1.43	0.636	0.134	0.3691	0.0001	0.0064	2.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61		0.00	0.000	0.107	0.3642	0.0001	0.0056	2.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62		0.26	0.000	0.103	0.3717	0.0001	0.0050	2.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63		0.01	0.000	0.099	0.3674	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64	*	0.00	0.000	0.084	0.3617	0.0000	0.0010	5.19E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65	*	0.00	0.000	0.001	0.3600	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.87E-09	0.0000	0.0000	2.02E-09
66	*	0.51	0.000	0.012	0.3593	0.0000	0.0006	4.39E-09	0.0000	0.0000	2.98E-09	0.0000	0.0000	2.67E-09
67	*	0.01	0.000	0.000	0.3581	0.0003	0.0160	6.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68		0.06	0.023	0.026	0.3785	0.0010	0.0394	1.39E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69		0.00	0.000	0.112	0.3710	0.0010	0.0443	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70		0.00	0.000	0.117	0.3638	0.0013	0.0642	2.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71		0.00	0.000	0.222	0.3512	0.0004	0.0171	6.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72		0.00	0.000	0.182	0.3393	0.0011	0.0545	1.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73		0.00	0.000	0.136	0.3309	0.0013	0.0594	2.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74		0.00	0.000	0.126	0.3227	0.0009	0.0413	1.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75	*	0.11	0.000	0.031	0.3219	0.0010	0.0459	1.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76	*	0.39	0.000	0.031	0.3211	0.0008	0.0376	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77	*	0.00	0.000	0.020	0.3204	0.0008	0.0375	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78	*	0.00	0.000	0.023	0.3200	0.0008	0.0353	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79	*	0.00	0.000	0.014	0.3197	0.0007	0.0318	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80	*	0.00	0.000	0.033	0.3196	0.0006	0.0283	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.03	0.000	0.000	0.3279	0.0005	0.0252	9.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82	*	0.06	0.000	0.045	0.3280	0.0005	0.0227	8.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.22	0.000	0.079	0.3366	0.0004	0.0205	8.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.00	0.000	0.068	0.3326	0.0004	0.0181	7.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.099	0.3275	0.0004	0.0204	8.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.08	0.000	0.183	0.3219	0.0003	0.0128	5.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.151	0.3140	0.0003	0.0129	5.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.03	0.000	0.174	0.3062	0.0002	0.0095	4.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.75	0.021	0.149	0.3333	0.0003	0.0165	6.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.77	0.134	0.211	0.3529	0.0004	0.0167	6.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.00	0.000	0.209	0.3425	0.0004	0.0165	6.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.06	0.000	0.160	0.3372	0.0004	0.0184	7.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.00	0.000	0.219	0.3268	0.0004	0.0163	6.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.68	0.028	0.134	0.3514	0.0003	0.0125	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.09	0.000	0.117	0.3502	0.0002	0.0094	4.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.61	0.088	0.310	0.3601	0.0002	0.0081	3.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.29	0.016	0.370	0.3555	0.0001	0.0065	3.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.43	0.041	0.410	0.3547	0.0001	0.0058	2.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.00	0.000	0.160	0.3471	0.0001	0.0052	2.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.03	0.000	0.246	0.3367	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		1.37	0.357	0.249	0.3729	0.0001	0.0035	1.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.00	0.000	0.218	0.3625	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.00	0.000	0.176	0.3541	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.00	0.000	0.227	0.3433	0.0000	0.0017	8.83E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.00	0.000	0.317	0.3269	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.48E-09	0.0000	0.0000	2.41E-09
106		0.00	0.000	0.149	0.3184	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.72E-10
107		0.00	0.000	0.062	0.3137	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
108		0.04	0.000	0.048	0.3111	0.0001	0.0069	2.96E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
109		0.00	0.000	0.040	0.3075	0.0007	0.0318	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.00	0.000	0.035	0.3044	0.0008	0.0356	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.00	0.000	0.032	0.3017	0.0007	0.0320	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.00	0.000	0.029	0.2993	0.0006	0.0280	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113		0.00	0.000	0.027	0.2972	0.0005	0.0256	9.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114		0.00	0.000	0.026	0.2952	0.0004	0.0205	7.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		1.15	0.118	0.024	0.3423	0.0004	0.0179	7.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116		0.00	0.000	0.299	0.3275	0.0004	0.0184	7.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117		0.00	0.000	0.254	0.3143	0.0002	0.0102	4.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118		0.17	0.000	0.149	0.3147	0.0005	0.0218	8.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119		0.00	0.000	0.062	0.3113	0.0005	0.0225	8.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120		0.00	0.000	0.047	0.3087	0.0004	0.0164	6.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121		0.00	0.000	0.040	0.3064	0.0003	0.0136	5.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	0.00	0.000	0.035	0.3045	0.0003	0.0121	5.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123	0.03	0.000	0.032	0.3041	0.0002	0.0108	4.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124	0.29	0.000	0.030	0.3162	0.0002	0.0097	4.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125	0.00	0.000	0.132	0.3098	0.0002	0.0102	4.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126	0.00	0.000	0.027	0.3085	0.0002	0.0106	4.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127	0.00	0.000	0.026	0.3073	0.0002	0.0085	3.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128	0.07	0.000	0.025	0.3093	0.0001	0.0071	3.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129	0.10	0.000	0.023	0.3129	0.0001	0.0061	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130	0.00	0.000	0.022	0.3118	0.0001	0.0053	2.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
131	0.00	0.000	0.021	0.3108	0.0001	0.0048	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132	0.00	0.000	0.020	0.3099	0.0001	0.0043	2.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133	0.00	0.000	0.020	0.3089	0.0001	0.0039	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134	0.00	0.000	0.019	0.3080	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
135	0.03	0.000	0.019	0.3088	0.0000	0.0000	1.16E-10	0.0000	0.0000	6.26E-09	0.0000	0.0000	4.97E-09
136	0.00	0.000	0.018	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	5.91E-10
137	0.27	0.000	0.018	0.3200	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
138	0.00	0.000	0.261	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.00	0.000	0.017	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140	0.00	0.000	0.016	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141	0.00	0.000	0.016	0.3052	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142	0.00	0.000	0.016	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143	0.69	0.022	0.016	0.3353	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144	0.48	0.051	0.402	0.3367	0.0000	0.0007	3.58E-09	0.0000	0.0000	3.17E-09	0.0000	0.0000	2.84E-09
145	0.00	0.000	0.222	0.3261	0.0000	0.0007	4.03E-09	0.0000	0.0000	2.76E-09	0.0000	0.0000	2.51E-09
146	0.00	0.000	0.263	0.3136	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.78E-10	0.0000	0.0000	8.51E-10
147	0.00	0.000	0.149	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
148	0.00	0.000	0.062	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
149	0.32	0.000	0.048	0.3165	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150	0.02	0.000	0.340	0.3011	0.0000	0.0002	7.99E-10	0.0000	0.0000	7.76E-10	0.0000	0.0000	7.55E-10
151	0.24	0.000	0.041	0.3104	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
152	0.00	0.000	0.036	0.3088	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.00	0.000	0.032	0.3073	0.0000	0.0004	2.34E-09	0.0000	0.0000	2.16E-09	0.0000	0.0000	2.00E-09
154	0.00	0.000	0.029	0.3059	0.0000	0.0001	3.46E-10	0.0000	0.0000	3.42E-10	0.0000	0.0000	3.38E-10
155	0.00	0.000	0.027	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
156	0.00	0.000	0.026	0.3034	0.0000	0.0001	6.45E-10	0.0000	0.0000	6.30E-10	0.0000	0.0000	6.16E-10
157	0.00	0.000	0.024	0.3022	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
158	0.25	0.000	0.024	0.3131	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159	0.00	0.000	0.022	0.3121	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160	0.02	0.000	0.022	0.3118	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161	0.05	0.000	0.021	0.3133	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162	0.00	0.000	0.020	0.3123	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163	0.00	0.000	0.019	0.3114	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164	0.00	0.000	0.018	0.3106	0.0000	0.0000	5.42E-10	0.0000	0.0000	5.31E-10	0.0000	0.0000	5.21E-10

165	0.00	0.000	0.019	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
166	0.27	0.000	0.019	0.3217	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.09	0.000	0.329	0.3101	0.0000	0.0008	4.15E-09	0.0000	0.0000	2.84E-09	0.0000	0.0000	2.57E-09
168	0.25	0.000	0.018	0.3211	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.01E-10	0.0000	0.0000	8.72E-10
169	0.00	0.000	0.394	0.3023	0.0000	0.0009	4.93E-09	0.0000	0.0000	3.28E-09	0.0000	0.0000	2.93E-09
170	0.15	0.000	0.018	0.3086	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.04E-09	0.0000	0.0000	1.01E-09
171	0.06	0.000	0.017	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.04	0.000	0.017	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.04	0.000	0.017	0.3125	0.0000	0.0000	4.91E-10	0.0000	0.0000	4.83E-10	0.0000	0.0000	4.74E-10
174	0.17	0.000	0.016	0.3198	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
175	0.00	0.000	0.337	0.3038	0.0000	0.0001	4.11E-10	0.0000	0.0000	4.05E-10	0.0000	0.0000	3.99E-10
176	0.67	0.028	0.016	0.3336	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
177	0.00	0.000	0.302	0.3192	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.24	0.000	0.203	0.3212	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.239	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.13	0.000	0.150	0.3088	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.00	0.000	0.062	0.3058	0.0000	0.0000	2.64E-10	0.0000	0.0000	2.62E-10	0.0000	0.0000	2.59E-10
182	0.00	0.000	0.049	0.3037	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
183	0.03	0.000	0.041	0.3030	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.08	0.000	0.037	0.3052	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.00	0.000	0.032	0.3037	0.0000	0.0000	4.67E-10	0.0000	0.0000	4.59E-10	0.0000	0.0000	4.51E-10
186	0.00	0.000	0.029	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
187	0.00	0.000	0.027	0.3010	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.04	0.000	0.027	0.3017	0.0000	0.0000	2.13E-10	0.0000	0.0000	2.11E-10	0.0000	0.0000	2.09E-10
189	0.22	0.000	0.026	0.3109	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
190	0.32	0.000	0.025	0.3249	0.0000	0.0000	8.47E-11	0.0000	0.0000	8.45E-11	0.0000	0.0000	8.42E-11
191	0.24	0.000	0.241	0.3250	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
192	0.05	0.000	0.248	0.3158	0.0000	0.0001	5.39E-10	0.0000	0.0000	5.29E-10	0.0000	0.0000	5.19E-10
193	0.11	0.000	0.231	0.3099	0.0000	0.0004	2.64E-09	0.0000	0.0000	2.41E-09	0.0000	0.0000	2.21E-09
194	0.00	0.000	0.149	0.3028	0.0000	0.0007	3.83E-09	0.0000	0.0000	3.36E-09	0.0000	0.0000	2.99E-09
195	0.00	0.000	0.062	0.2999	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
196	0.00	0.000	0.047	0.2977	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.10	0.000	0.042	0.3003	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	1.12	0.171	0.037	0.3436	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.00	0.000	0.309	0.3288	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.00	0.000	0.279	0.3155	0.0000	0.0010	5.16E-09	0.0000	0.0000	4.70E-09	0.0000	0.0000	3.16E-09
201	0.00	0.000	0.301	0.3012	0.0000	0.0001	4.58E-10	0.0000	0.0000	4.50E-10	0.0000	0.0000	1.32E-09
202	0.16	0.000	0.151	0.3015	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.11E-10
203	0.24	0.000	0.064	0.3097	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
204	1.15	0.189	0.049	0.3529	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.01	0.000	0.194	0.3441	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
206	0.64	0.074	0.148	0.3639	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
207	0.00	0.000	0.354	0.3470	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.00	0.000	0.222	0.3364	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
209	0.00	0.000	0.249	0.3246	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.17	0.000	0.151	0.3255	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.42	0.000	0.336	0.3293	0.0000	0.0001	8.90E-10	0.0000	0.0000	8.62E-10	0.0000	0.0000	8.35E-10
212	1.40	0.358	0.311	0.3638	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
213	0.35	0.042	0.340	0.3624	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.20	0.000	0.362	0.3545	0.0000	0.0002	2.31E-09	0.0000	0.0000	2.13E-09	0.0000	0.0000	1.98E-09
215	0.24	0.000	0.353	0.3487	0.0000	0.0000	2.74E-10	0.0000	0.0000	2.71E-10	0.0000	0.0000	2.68E-10
216	0.00	0.000	0.350	0.3310	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
217	0.00	0.000	0.287	0.3168	0.0001	0.0028	1.23E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
218	0.66	0.013	0.151	0.3398	0.0000	0.0001	7.42E-10	0.0000	0.0000	3.50E-09	0.0000	0.0000	3.56E-09
219	0.00	0.000	0.195	0.3301	0.0001	0.0031	1.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
220	0.00	0.000	0.163	0.3222	0.0002	0.0095	4.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
221	0.00	0.000	0.304	0.3073	0.0001	0.0036	1.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
222	0.51	0.000	0.151	0.3243	0.0002	0.0100	4.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
223	0.00	0.000	0.278	0.3110	0.0002	0.0094	4.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
224	0.00	0.000	0.062	0.3081	0.0002	0.0077	3.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
225	0.00	0.000	0.047	0.3058	0.0001	0.0066	3.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
226	0.01	0.000	0.042	0.3044	0.0001	0.0057	2.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
227	0.07	0.000	0.037	0.3059	0.0001	0.0050	2.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
228	0.09	0.000	0.034	0.3087	0.0001	0.0045	2.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
229	0.03	0.000	0.032	0.3087	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
230	0.00	0.000	0.027	0.3074	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
231	0.00	0.000	0.026	0.3062	0.0000	0.0018	9.34E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
232	0.00	0.000	0.024	0.3051	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.66E-09	0.0000	0.0000	3.45E-09
233	0.00	0.000	0.023	0.3040	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
234	0.12	0.000	0.024	0.3086	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
235	0.11	0.000	0.023	0.3127	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
236	0.28	0.000	0.023	0.3247	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
237	0.65	0.070	0.188	0.3433	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
238	0.17	0.000	0.245	0.3397	0.0000	0.0001	7.21E-10	0.0000	0.0000	5.31E-10	0.0000	0.0000	5.21E-10
239	0.11	0.000	0.226	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.76E-10	0.0000	0.0000	1.74E-10
240	0.00	0.000	0.266	0.3215	0.0000	0.0003	1.50E-09	0.0000	0.0000	1.09E-09	0.0000	0.0000	1.05E-09
241	0.01	0.000	0.276	0.3088	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.57E-10	0.0000	0.0000	3.52E-10
242	0.10	0.000	0.151	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.05	0.000	0.064	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
244	0.00	0.000	0.047	0.3036	0.0000	0.0002	1.41E-09	0.0000	0.0000	1.34E-09	0.0000	0.0000	1.28E-09
245	0.00	0.000	0.040	0.3017	0.0000	0.0002	1.74E-09	0.0000	0.0000	1.63E-09	0.0000	0.0000	1.54E-09
246	0.02	0.000	0.038	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
247	0.43	0.000	0.034	0.3198	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
248	0.00	0.000	0.029	0.3184	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.00	0.000	0.027	0.3171	0.0000	0.0002	9.84E-10	0.0000	0.0000	9.50E-10	0.0000	0.0000	9.18E-10
250	0.00	0.000	0.026	0.3159	0.0000	0.0001	1.64E-09	0.0000	0.0000	1.55E-09	0.0000	0.0000	1.46E-09

251		0.02	0.000	0.027	0.3156	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
252		0.00	0.000	0.023	0.3145	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
253		0.00	0.000	0.022	0.3134	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
254		0.00	0.000	0.021	0.3124	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
255		0.00	0.000	0.020	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
256		0.09	0.000	0.022	0.3145	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
257		0.00	0.000	0.019	0.3136	0.0000	0.0000	2.39E-10	0.0000	0.0000	2.37E-10	0.0000	0.0000	2.35E-10
258		0.00	0.000	0.018	0.3127	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
259		0.00	0.000	0.018	0.3119	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
260		0.00	0.000	0.017	0.3111	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261		0.00	0.000	0.017	0.3103	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262		0.50	0.002	0.019	0.3328	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
263		0.00	0.000	0.179	0.3243	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
264		0.00	0.000	0.088	0.3201	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
265		0.00	0.000	0.119	0.3144	0.0000	0.0001	8.38E-10	0.0000	0.0000	8.13E-10	0.0000	0.0000	7.89E-10
266		0.00	0.000	0.062	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
267		0.36	0.000	0.050	0.3262	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
268		0.02	0.000	0.197	0.3176	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
269		0.96	0.143	0.043	0.3545	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
270		0.00	0.000	0.224	0.3438	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
271		0.00	0.000	0.179	0.3353	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
272		0.03	0.000	0.147	0.3298	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
273		0.27	0.000	0.162	0.3348	0.0000	0.0001	7.51E-10	0.0000	0.0000	7.31E-10	0.0000	0.0000	7.12E-10
274		0.02	0.000	0.164	0.3278	0.0000	0.0002	9.12E-10	0.0000	0.0000	8.82E-10	0.0000	0.0000	8.55E-10
275		0.00	0.000	0.248	0.3160	0.0000	0.0005	2.57E-09	0.0000	0.0000	2.35E-09	0.0000	0.0000	2.16E-09
276		0.00	0.000	0.149	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
277		0.00	0.000	0.062	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
278		1.74	0.570	0.050	0.3591	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
279		0.03	0.000	0.109	0.3552	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
280		0.00	0.000	0.235	0.3440	0.0000	0.0005	2.49E-09	0.0000	0.0000	2.28E-09	0.0000	0.0000	2.10E-09
281		0.00	0.000	0.221	0.3335	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
282		0.69	0.031	0.217	0.3545	0.0000	0.0006	3.08E-09	0.0000	0.0000	2.77E-09	0.0000	0.0000	2.51E-09
283		0.02	0.000	0.180	0.3467	0.0000	0.0007	4.98E-09	0.0000	0.0000	3.31E-09	0.0000	0.0000	2.95E-09
284		0.16	0.000	0.183	0.3457	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.05E-09	0.0000	0.0000	1.01E-09
285		0.00	0.000	0.150	0.3385	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
286		0.00	0.000	0.143	0.3313	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
287		0.00	0.000	0.100	0.3265	0.0001	0.0031	1.64E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
288	*	0.00	0.000	0.067	0.3233	0.0001	0.0024	1.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.03	0.000	0.133	0.3175	0.0000	0.0003	1.30E-09	0.0000	0.0000	4.66E-09	0.0000	0.0000	4.62E-09
290		0.00	0.000	0.136	0.3110	0.0001	0.0044	2.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
291		0.00	0.000	0.062	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.41E-09	0.0000	0.0000	4.91E-09
292		0.00	0.000	0.047	0.3049	0.0000	0.0005	3.96E-09	0.0000	0.0000	2.72E-09	0.0000	0.0000	2.47E-09
293		0.22	0.000	0.043	0.3132	0.0001	0.0043	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.25	0.000	0.038	0.3234	0.0001	0.0054	2.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.24	0.000	0.107	0.3294	0.0001	0.0033	1.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.38	0.002	0.136	0.3407	0.0000	0.0017	1.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.00	0.000	0.270	0.3270	0.0000	0.0000	2.89E-10	0.0000	0.0000	4.20E-09	0.0000	0.0000	3.92E-09
298		0.00	0.000	0.107	0.3214	0.0001	0.0026	1.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
299		0.00	0.000	0.083	0.3171	0.0001	0.0062	2.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.000	0.052	0.3143	0.0002	0.0080	3.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.00	0.000	0.069	0.3108	0.0002	0.0076	3.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302	*	1.38	0.000	0.020	0.3116	0.0002	0.0110	4.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.06	0.029	0.000	0.3465	0.0002	0.0096	4.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304	*	0.00	0.000	0.028	0.3475	0.0002	0.0079	3.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305	*	0.00	0.000	0.031	0.3484	0.0001	0.0067	3.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.000	0.039	0.3496	0.0001	0.0057	2.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.00	0.024	0.013	0.3702	0.0001	0.0049	2.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		0.00	0.000	0.144	0.3633	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.00	0.000	0.148	0.3562	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.06	0.000	0.179	0.3505	0.0001	0.0039	1.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.00	0.000	0.080	0.3463	0.0000	0.0016	8.39E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.00	0.000	0.142	0.3376	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.46E-09	0.0000	0.0000	2.40E-09
313		0.00	0.000	0.131	0.3293	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.69E-10
314		0.00	0.000	0.096	0.3227	0.0001	0.0074	3.17E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
315		0.00	0.000	0.066	0.3183	0.0007	0.0318	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.062	0.3137	0.0005	0.0262	9.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.10	0.000	0.049	0.3147	0.0007	0.0339	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318		0.00	0.000	0.041	0.3118	0.0006	0.0289	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.00	0.000	0.035	0.3092	0.0005	0.0257	9.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.00	0.000	0.032	0.3068	0.0005	0.0218	8.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.00	0.000	0.029	0.3044	0.0004	0.0208	8.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322	*	0.00	0.000	0.027	0.3024	0.0005	0.0222	8.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.00	0.000	0.026	0.3006	0.0004	0.0210	8.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.13	0.000	0.026	0.3052	0.0003	0.0155	6.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.00	0.000	0.023	0.3036	0.0003	0.0132	5.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.000	0.022	0.3019	0.0002	0.0117	5.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	0.00	0.000	0.021	0.3004	0.0003	0.0140	5.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.020	0.2990	0.0003	0.0135	5.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.00	0.000	0.020	0.2977	0.0003	0.0123	5.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.15	0.000	0.020	0.3034	0.0002	0.0117	5.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.35	0.000	0.020	0.3187	0.0002	0.0103	4.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.00	0.000	0.156	0.3107	0.0001	0.0052	2.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.16	0.000	0.019	0.3169	0.0002	0.0110	4.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.00	0.000	0.045	0.3144	0.0002	0.0104	4.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	0.00	0.000	0.000	0.3141	0.0002	0.0110	4.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336	*	0.00	0.000	0.000	0.3139	0.0002	0.0098	4.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337	*	0.44	0.000	0.018	0.3146	0.0002	0.0088	3.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338	*	0.00	0.000	0.031	0.3153	0.0002	0.0080	3.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		0.00	0.000	0.033	0.3305	0.0002	0.0074	3.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340	*	0.00	0.000	0.042	0.3284	0.0002	0.0079	3.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.00	0.000	0.084	0.3244	0.0002	0.0086	3.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342	*	0.00	0.000	0.043	0.3223	0.0002	0.0072	3.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343	*	0.12	0.000	0.019	0.3233	0.0001	0.0062	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344	*	0.00	0.000	0.022	0.3242	0.0001	0.0054	2.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345	*	0.00	0.000	0.036	0.3242	0.0001	0.0048	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*	0.00	0.000	0.000	0.3241	0.0001	0.0039	1.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347	*	0.15	0.000	0.010	0.3251	0.0001	0.0039	1.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348	*	0.86	0.000	0.013	0.3260	0.0001	0.0032	1.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349	*	0.33	0.000	0.000	0.3269	0.0000	0.0017	8.65E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350	*	0.00	0.000	0.000	0.3279	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.18E-09	0.0000	0.0000	3.02E-09
351	*	0.06	0.000	0.000	0.3288	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
352		0.06	0.209	0.000	0.3697	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
353		0.04	0.042	0.043	0.3802	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
354		0.00	0.000	0.118	0.3746	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
355		0.00	0.000	0.123	0.3668	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
356		0.54	0.030	0.056	0.3829	0.0001	0.0019	7.09E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
357		0.00	0.000	0.091	0.3744	0.0011	0.0481	1.69E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		0.00	0.000	0.089	0.3684	0.0019	0.0883	2.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	0.25	0.000	0.034	0.3649	0.0009	0.0456	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*	0.02	0.000	0.026	0.3618	0.0020	0.0928	3.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.01	0.000	0.045	0.3649	0.0017	0.0787	2.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.16	0.000	0.111	0.3645	0.0014	0.0651	2.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.01	0.000	0.161	0.3550	0.0013	0.0623	2.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.00	0.000	0.125	0.3476	0.0009	0.0428	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.02	0.000	0.065	0.3437	0.0007	0.0347	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 6			
	inches	cubic feet	percent
Precipitation	44.41	161,214.1	100.00
Runoff	5.498	19,958.3	12.38
Evapotranspiration	34.056	123,621.9	76.68
Drainage Collected from Layer 2	5.8593	21,269.4	13.19
Percolation/Leakage through Layer 3	0.000021	0.0748	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0697	0.00
Percolation/Leakage through Layer 8	0.000002	0.0055	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000002	0.0055	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-1.0015	-3,635.5	-2.26
Soil Water at Start of Year	258.0000	936,539.9	580.93
Soil Water at End of Year	256.9985	932,904.4	578.67
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 7

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.28	0.000	0.083	0.3511	0.0008	0.0362	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2	*		0.55	0.000	0.036	0.3505	0.0008	0.0377	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.40	0.173	0.000	0.3835	0.0008	0.0349	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.30	0.059	0.085	0.3902	0.0007	0.0336	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.29	0.031	0.070	0.3954	0.0003	0.0136	4.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6	*		0.00	0.000	0.000	0.3871	0.0025	0.1215	3.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7	*		0.00	0.000	0.047	0.3747	0.0046	0.2190	6.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8			0.00	0.000	0.056	0.3656	0.0034	0.1579	4.91E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9	*		0.00	0.000	0.051	0.3588	0.0024	0.1116	3.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10	*		0.29	0.000	0.033	0.3563	0.0018	0.0827	2.75E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11			0.01	0.000	0.043	0.3634	0.0015	0.0679	2.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.00	0.000	0.065	0.3580	0.0011	0.0528	1.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*		0.00	0.000	0.056	0.3536	0.0011	0.0511	1.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*		0.00	0.000	0.000	0.3520	0.0008	0.0361	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*		0.00	0.000	0.000	0.3501	0.0007	0.0345	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16			0.00	0.000	0.083	0.3442	0.0008	0.0392	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.23	0.000	0.125	0.3482	0.0009	0.0434	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.00	0.000	0.081	0.3434	0.0006	0.0275	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19			0.00	0.000	0.066	0.3390	0.0005	0.0229	8.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.00	0.000	0.115	0.3326	0.0006	0.0265	1.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21	*		0.03	0.000	0.051	0.3312	0.0006	0.0274	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22	*		0.11	0.000	0.038	0.3317	0.0004	0.0170	6.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23			0.09	0.000	0.049	0.3356	0.0003	0.0144	5.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.01	0.000	0.066	0.3328	0.0002	0.0120	5.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*		0.01	0.000	0.010	0.3323	0.0002	0.0093	4.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26	*		0.02	0.000	0.013	0.3322	0.0002	0.0106	4.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*		0.00	0.000	0.000	0.3319	0.0002	0.0110	4.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*		0.00	0.000	0.000	0.3314	0.0002	0.0082	3.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*	*	0.59	0.000	0.025	0.3314	0.0003	0.0146	6.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*	*	0.02	0.000	0.027	0.3314	0.0002	0.0112	4.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31		*	0.34	0.596	0.000	0.3456	0.0002	0.0089	4.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32		*	0.08	0.005	0.001	0.3490	0.0002	0.0074	3.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33		*	0.05	0.001	0.001	0.3514	0.0001	0.0063	3.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34		*	0.00	0.000	0.000	0.3514	0.0001	0.0055	2.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35	*	*	0.00	0.000	0.000	0.3514	0.0001	0.0049	2.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36	*	*	0.00	0.000	0.000	0.3514	0.0001	0.0044	2.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*	*	0.00	0.000	0.000	0.3514	0.0001	0.0040	2.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38	*	*	0.00	0.000	0.000	0.3514	0.0001	0.0036	2.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39	*	*	0.29	0.000	0.041	0.3514	0.0000	0.0006	3.29E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40		*	0.10	0.209	0.008	0.3581	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.64E-09	0.0000	0.0000	1.18E-09
41		*	1.10	0.946	0.001	0.3655	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.86E-10
42		*	0.11	0.037	0.001	0.3688	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
43		*	0.04	0.003	0.001	0.3705	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
44		*	0.00	0.000	0.000	0.3705	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
45		*	0.00	0.000	0.000	0.3705	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
46			0.00	0.000	0.120	0.3643	0.0000	0.0010	5.33E-09	0.0000	0.0000	4.82E-09	0.0000	0.0000	3.22E-09
47			0.26	0.000	0.111	0.3708	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.02E-09
48	*		0.01	0.000	0.081	0.3674	0.0001	0.0056	2.62E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09
49	*		0.04	0.000	0.072	0.3645	0.0000	0.0016	7.71E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
50	*	*	0.02	0.000	0.020	0.3645	0.0002	0.0104	4.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51	*	*	0.00	0.000	0.000	0.3645	0.0002	0.0084	3.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		*	0.00	0.000	0.000	0.3645	0.0002	0.0070	3.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53	*	*	0.00	0.000	0.000	0.3645	0.0001	0.0061	2.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		*	0.00	0.000	0.000	0.3645	0.0001	0.0053	2.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55	*	*	0.00	0.000	0.000	0.3645	0.0001	0.0047	2.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56		*	0.00	0.000	0.000	0.3645	0.0001	0.0042	2.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57	*	*	0.00	0.000	0.000	0.3645	0.0001	0.0039	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58	*	*	0.00	0.000	0.000	0.3645	0.0001	0.0031	1.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59		*	0.00	0.000	0.000	0.3645	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.63E-09	0.0000	0.0000	4.81E-09
60		*	0.00	0.000	0.000	0.3645	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.72E-10
61		*	0.00	0.000	0.000	0.3645	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
62		*	0.00	0.000	0.000	0.3645	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
63		*	0.00	0.000	0.000	0.3645	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
64		*	0.00	0.000	0.000	0.3645	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
65			0.00	0.000	0.103	0.3576	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
66			0.00	0.000	0.152	0.3488	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
67			0.00	0.000	0.084	0.3426	0.0000	0.0004	1.76E-09	0.0000	0.0000	1.65E-09	0.0000	0.0000	1.56E-09
68			0.00	0.000	0.146	0.3339	0.0005	0.0253	9.61E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
69			0.00	0.000	0.150	0.3255	0.0007	0.0319	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70			0.24	0.000	0.233	0.3244	0.0007	0.0317	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71			0.56	0.003	0.115	0.3443	0.0005	0.0242	9.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72			0.00	0.000	0.253	0.3311	0.0006	0.0283	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73			0.00	0.000	0.205	0.3200	0.0005	0.0225	8.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.00	0.000	0.186	0.3099	0.0006	0.0267	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.00	0.000	0.149	0.3017	0.0006	0.0279	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.00	0.000	0.062	0.2979	0.0005	0.0249	9.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.00	0.000	0.047	0.2947	0.0005	0.0223	8.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.00	0.000	0.040	0.2921	0.0005	0.0221	8.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.00	0.000	0.035	0.2900	0.0004	0.0191	7.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.00	0.000	0.032	0.2880	0.0003	0.0164	6.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.00	0.000	0.029	0.2863	0.0003	0.0141	5.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.00	0.000	0.027	0.2847	0.0003	0.0124	5.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.20	0.000	0.026	0.2925	0.0002	0.0110	4.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84	*	0.00	0.000	0.000	0.2923	0.0002	0.0103	4.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.024	0.2909	0.0002	0.0089	3.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86	*	0.00	0.000	0.000	0.2907	0.0002	0.0082	3.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87	*	0.00	0.000	0.000	0.2907	0.0002	0.0091	3.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.023	0.2895	0.0002	0.0079	3.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.00	0.000	0.022	0.2884	0.0001	0.0059	2.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.021	0.2874	0.0001	0.0068	3.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.00	0.000	0.020	0.2864	0.0001	0.0059	2.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.00	0.000	0.020	0.2855	0.0001	0.0052	2.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.00	0.000	0.019	0.2846	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.018	0.2837	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.00	0.000	0.018	0.2829	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96	*	0.04	0.000	0.057	0.2821	0.0000	0.0023	1.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.00	0.000	0.017	0.2812	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.48E-09	0.0000	0.0000	4.15E-09
98	*	0.38	0.000	0.047	0.2822	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.34E-19
99		0.00	0.000	0.159	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
100		0.00	0.000	0.016	0.2890	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
101		0.00	0.000	0.016	0.2882	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
102		0.24	0.000	0.016	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
103		0.00	0.000	0.015	0.2981	0.0000	0.0001	8.57E-10	0.0000	0.0000	8.31E-10	0.0000	0.0000	6.11E-10
104		0.38	0.000	0.015	0.3154	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.02E-10
105		0.00	0.000	0.197	0.3061	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
106		0.05	0.000	0.015	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
107		0.00	0.000	0.014	0.3070	0.0000	0.0003	1.84E-09	0.0000	0.0000	1.73E-09	0.0000	0.0000	1.62E-09
108		0.26	0.000	0.015	0.3188	0.0000	0.0001	6.41E-10	0.0000	0.0000	6.27E-10	0.0000	0.0000	6.13E-10
109		0.01	0.000	0.197	0.3100	0.0000	0.0003	1.65E-09	0.0000	0.0000	1.56E-09	0.0000	0.0000	1.47E-09
110		0.83	0.086	0.192	0.3364	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
111		0.16	0.000	0.205	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
112		0.00	0.000	0.137	0.3276	0.0000	0.0009	5.96E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
113		0.00	0.000	0.084	0.3236	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.42E-10	0.0000	0.0000	1.18E-09
114		0.00	0.000	0.144	0.3167	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.52E-11
115	*	0.00	0.000	0.000	0.3167	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
116	*	0.00	0.000	0.000	0.3167	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
117	*	0.00	0.000	0.117	0.3112	0.0000	0.0003	1.70E-09	0.0000	0.0000	1.60E-09	0.0000	0.0000	1.51E-09
118	*	0.00	0.000	0.000	0.3112	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
119		0.24	0.000	0.111	0.3171	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.72	0.048	0.139	0.3422	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
121		1.07	0.402	0.225	0.3632	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

122		0.00	0.000	0.115	0.3577	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
123	*	0.00	0.000	0.133	0.3514	0.0000	0.0001	8.59E-10	0.0000	0.0000	8.33E-10	0.0000	0.0000	8.08E-10
124		0.00	0.000	0.165	0.3436	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
125		0.14	0.000	0.152	0.3432	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
126		0.07	0.000	0.156	0.3393	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
127		0.01	0.000	0.182	0.3309	0.0000	0.0003	1.79E-09	0.0000	0.0000	1.68E-09	0.0000	0.0000	1.58E-09
128		0.32	0.000	0.420	0.3257	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
129		0.00	0.000	0.339	0.3086	0.0000	0.0014	7.28E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
130		0.00	0.000	0.133	0.3013	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.07E-10	0.0000	0.0000	1.71E-09
131		0.04	0.000	0.062	0.2992	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.20E-10
132		0.16	0.000	0.048	0.3036	0.0001	0.0043	2.10E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
133		0.00	0.000	0.040	0.3009	0.0003	0.0135	5.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134		0.00	0.000	0.035	0.2984	0.0003	0.0167	6.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
135		0.00	0.000	0.032	0.2963	0.0004	0.0186	7.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
136		0.50	0.000	0.030	0.3181	0.0004	0.0168	6.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
137		0.00	0.000	0.420	0.2972	0.0002	0.0083	3.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
138		0.00	0.000	0.028	0.2955	0.0004	0.0192	7.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
139		0.07	0.000	0.026	0.2974	0.0003	0.0159	6.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
140		0.26	0.000	0.025	0.3083	0.0003	0.0135	5.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
141		0.00	0.000	0.023	0.3069	0.0002	0.0117	4.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
142		0.99	0.126	0.022	0.3466	0.0002	0.0104	4.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
143		0.00	0.000	0.138	0.3399	0.0002	0.0078	3.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
144		0.01	0.000	0.130	0.3341	0.0003	0.0126	5.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
145		0.06	0.000	0.102	0.3322	0.0002	0.0098	4.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
146		0.00	0.000	0.182	0.3236	0.0002	0.0080	3.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
147		0.00	0.000	0.320	0.3084	0.0001	0.0067	3.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
148		0.00	0.000	0.142	0.3016	0.0001	0.0056	2.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
149		0.01	0.000	0.062	0.2989	0.0001	0.0052	2.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
150		2.43	1.219	0.048	0.3543	0.0001	0.0047	2.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
151		0.00	0.000	0.343	0.3379	0.0001	0.0042	2.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
152		0.00	0.000	0.169	0.3299	0.0001	0.0039	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
153		0.00	0.000	0.249	0.3180	0.0001	0.0033	1.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
154		0.00	0.000	0.253	0.3060	0.0000	0.0001	6.66E-10	0.0000	0.0000	6.48E-09	0.0000	0.0000	5.02E-09
155		0.00	0.000	0.149	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	6.96E-10
156		0.00	0.000	0.062	0.2960	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
157		0.00	0.000	0.047	0.2937	0.0000	0.0002	1.32E-09	0.0000	0.0000	1.26E-09	0.0000	0.0000	1.20E-09
158		0.36	0.000	0.041	0.3090	0.0000	0.0003	1.84E-09	0.0000	0.0000	1.73E-09	0.0000	0.0000	1.63E-09
159		0.12	0.000	0.036	0.3131	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
160		0.00	0.000	0.032	0.3116	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161		0.02	0.000	0.030	0.3110	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162		0.00	0.000	0.027	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163		0.00	0.000	0.026	0.3085	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164		0.00	0.000	0.024	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.00	0.000	0.023	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.05	0.000	0.023	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.46	0.000	0.022	0.3285	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.00	0.000	0.302	0.3140	0.0000	0.0011	5.92E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
169	0.12	0.000	0.021	0.3185	0.0000	0.0002	8.10E-10	0.0000	0.0000	7.05E-10	0.0000	0.0000	1.57E-09
170	0.00	0.000	0.249	0.3066	0.0000	0.0004	2.50E-09	0.0000	0.0000	1.95E-09	0.0000	0.0000	1.56E-09
171	0.00	0.000	0.020	0.3057	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.72E-10	0.0000	0.0000	8.68E-10
172	0.00	0.000	0.019	0.3048	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.40E-10
173	0.00	0.000	0.018	0.3039	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.09	0.000	0.019	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.00	0.000	0.017	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.76	0.037	0.018	0.3401	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.00	0.000	0.413	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.00	0.000	0.434	0.2998	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.149	0.2927	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.00	0.000	0.062	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.00	0.000	0.047	0.2875	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.04	0.000	0.041	0.2875	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.49	0.000	0.036	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.03	0.000	0.033	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.02	0.000	0.030	0.3086	0.0000	0.0002	1.25E-09	0.0000	0.0000	1.19E-09	0.0000	0.0000	1.14E-09
186	0.10	0.000	0.028	0.3119	0.0000	0.0002	1.06E-09	0.0000	0.0000	1.02E-09	0.0000	0.0000	9.84E-10
187	0.03	0.000	0.027	0.3122	0.0000	0.0001	7.65E-10	0.0000	0.0000	7.44E-10	0.0000	0.0000	7.24E-10
188	0.32	0.000	0.025	0.3260	0.0000	0.0002	1.03E-09	0.0000	0.0000	9.97E-10	0.0000	0.0000	9.62E-10
189	0.36	0.005	0.322	0.3274	0.0000	0.0001	6.72E-10	0.0000	0.0000	6.56E-10	0.0000	0.0000	6.40E-10
190	0.03	0.000	0.317	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
191	0.00	0.000	0.149	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
192	0.02	0.000	0.063	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
193	0.00	0.000	0.047	0.3022	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
194	0.05	0.000	0.041	0.3025	0.0000	0.0002	1.67E-09	0.0000	0.0000	1.57E-09	0.0000	0.0000	1.49E-09
195	0.00	0.000	0.035	0.3008	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
196	0.71	0.022	0.033	0.3320	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.00	0.000	0.264	0.3194	0.0000	0.0002	1.10E-09	0.0000	0.0000	1.05E-09	0.0000	0.0000	1.01E-09
198	0.00	0.000	0.136	0.3129	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
199	0.00	0.000	0.149	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.00	0.000	0.062	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.00	0.000	0.047	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.00	0.000	0.040	0.2987	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	1.26	0.177	0.036	0.3483	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.64	0.192	0.129	0.3634	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.03	0.000	0.141	0.3581	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
206	0.57	0.069	0.232	0.3709	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
207	0.00	0.000	0.352	0.3541	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.01	0.000	0.153	0.3473	0.0000	0.0000	9.90E-11	0.0000	0.0000	9.86E-11	0.0000	0.0000	9.82E-11
209	0.27	0.000	0.403	0.3409	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
210	0.01	0.000	0.329	0.3254	0.0000	0.0017	8.76E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
211	0.02	0.000	0.131	0.3197	0.0000	0.0020	1.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
212	0.02	0.000	0.063	0.3173	0.0000	0.0019	9.47E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
213	0.00	0.000	0.047	0.3141	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.11E-09	0.0000	0.0000	1.63E-09
214	0.00	0.000	0.040	0.3110	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.91E-10
215	0.00	0.000	0.036	0.3081	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.032	0.3056	0.0001	0.0062	2.92E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
217	0.17	0.000	0.031	0.3111	0.0003	0.0148	6.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
218	0.00	0.000	0.029	0.3092	0.0004	0.0187	7.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
219	0.00	0.000	0.026	0.3072	0.0003	0.0155	6.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
220	0.00	0.000	0.024	0.3053	0.0004	0.0182	7.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
221	0.06	0.000	0.024	0.3062	0.0004	0.0173	6.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
222	0.00	0.000	0.023	0.3047	0.0003	0.0154	6.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
223	0.09	0.000	0.023	0.3075	0.0003	0.0144	6.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
224	0.36	0.000	0.022	0.3233	0.0003	0.0137	5.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
225	0.01	0.000	0.131	0.3171	0.0002	0.0111	4.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
226	0.21	0.000	0.021	0.3253	0.0002	0.0116	4.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
227	0.27	0.000	0.132	0.3314	0.0002	0.0114	4.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
228	0.02	0.000	0.311	0.3169	0.0002	0.0109	4.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
229	0.00	0.000	0.147	0.3095	0.0003	0.0158	6.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
230	0.22	0.000	0.063	0.3172	0.0004	0.0184	7.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
231	0.24	0.000	0.049	0.3261	0.0003	0.0131	5.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
232	0.18	0.000	0.251	0.3226	0.0002	0.0098	4.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
233	0.91	0.163	0.217	0.3479	0.0002	0.0083	3.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
234	0.08	0.000	0.099	0.3471	0.0001	0.0070	3.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
235	2.18	1.207	0.267	0.3807	0.0001	0.0060	2.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
236	0.87	0.507	0.308	0.3834	0.0001	0.0053	2.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
237	0.23	0.010	0.229	0.3829	0.0001	0.0047	2.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
238	0.00	0.000	0.209	0.3691	0.0000	0.0003	1.43E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
239	0.37	0.006	0.146	0.3751	0.0002	0.0099	3.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
240	0.00	0.000	0.260	0.3604	0.0016	0.0762	2.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
241	0.00	0.000	0.228	0.3467	0.0008	0.0373	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
242	0.00	0.000	0.262	0.3313	0.0013	0.0618	2.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
243	0.01	0.000	0.190	0.3206	0.0013	0.0625	2.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
244	0.00	0.000	0.149	0.3125	0.0010	0.0457	1.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
245	0.09	0.000	0.063	0.3137	0.0007	0.0345	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
246	0.23	0.000	0.049	0.3219	0.0003	0.0156	6.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
247	0.15	0.000	0.042	0.3261	0.0002	0.0088	3.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
248	0.38	0.000	0.251	0.3314	0.0003	0.0132	5.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
249	0.00	0.000	0.292	0.3168	0.0003	0.0128	5.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
250	0.11	0.000	0.151	0.3137	0.0002	0.0114	4.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

251		0.00	0.000	0.062	0.3099	0.0004	0.0169	6.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
252		0.08	0.000	0.049	0.3105	0.0004	0.0204	7.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
253		0.00	0.000	0.041	0.3079	0.0004	0.0177	7.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
254		0.00	0.000	0.035	0.3056	0.0004	0.0169	6.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
255		0.00	0.000	0.032	0.3036	0.0003	0.0159	6.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
256		0.00	0.000	0.029	0.3018	0.0003	0.0147	5.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257		0.00	0.000	0.027	0.3002	0.0003	0.0132	5.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258		0.00	0.000	0.026	0.2987	0.0003	0.0118	4.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259		0.00	0.000	0.024	0.2972	0.0002	0.0106	4.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260		0.00	0.000	0.023	0.2959	0.0002	0.0096	4.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261		0.00	0.000	0.022	0.2946	0.0002	0.0087	3.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.00	0.000	0.021	0.2935	0.0002	0.0094	4.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.10	0.000	0.022	0.2972	0.0002	0.0097	4.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.02	0.000	0.022	0.2970	0.0002	0.0080	3.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.60	0.003	0.021	0.3247	0.0001	0.0067	3.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.00	0.000	0.071	0.3213	0.0001	0.0058	2.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.20	0.000	0.072	0.3275	0.0001	0.0051	2.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.10	0.000	0.070	0.3289	0.0001	0.0046	2.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.068	0.3257	0.0001	0.0041	2.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.00	0.000	0.102	0.3208	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.109	0.3156	0.0000	0.0021	1.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.00	0.000	0.093	0.3112	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.21E-09	0.0000	0.0000	3.93E-09
273		0.00	0.000	0.062	0.3082	0.0000	0.0011	7.63E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
274		0.00	0.000	0.047	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.08E-09	0.0000	0.0000	1.83E-09
275		0.01	0.000	0.042	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.61E-10
276		0.37	0.000	0.037	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
277		0.00	0.000	0.161	0.3128	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
278		0.00	0.000	0.032	0.3113	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
279	*	0.00	0.000	0.029	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
280	*	0.32	0.000	0.022	0.3109	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
281		0.42	0.029	0.000	0.3426	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
282		0.00	0.000	0.064	0.3396	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
283		0.00	0.000	0.098	0.3349	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
284		0.00	0.000	0.078	0.3312	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
285		0.10	0.000	0.104	0.3309	0.0000	0.0004	2.36E-09	0.0000	0.0000	2.18E-09	0.0000	0.0000	2.02E-09
286		0.00	0.000	0.128	0.3248	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
287		0.00	0.000	0.117	0.3192	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
288		2.59	1.326	0.116	0.3740	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
289		0.01	0.000	0.126	0.3687	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
290		0.05	0.000	0.193	0.3617	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
291		0.00	0.000	0.181	0.3522	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
292		0.00	0.000	0.248	0.3375	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
293		0.00	0.000	0.297	0.3214	0.0001	0.0056	2.24E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09

294		0.12	0.000	0.151	0.3170	0.0004	0.0191	7.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.48	0.000	0.064	0.3353	0.0011	0.0506	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.57	0.025	0.215	0.3500	0.0007	0.0345	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.15	0.000	0.161	0.3490	0.0006	0.0283	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		2.86	1.745	0.090	0.3969	0.0004	0.0177	7.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.00	0.000	0.105	0.3848	0.0004	0.0191	7.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.000	0.074	0.3705	0.0051	0.2456	7.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301	*	0.71	0.000	0.034	0.3653	0.0032	0.1495	4.69E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.04	0.080	0.000	0.3907	0.0019	0.1007	3.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		1.72	1.225	0.098	0.4057	0.0032	0.0806	2.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.00	0.000	0.113	0.3841	0.0058	0.2759	8.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305	*	0.00	0.000	0.054	0.3711	0.0055	0.2545	7.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.000	0.066	0.3619	0.0032	0.1488	4.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.00	0.000	0.077	0.3539	0.0022	0.1035	3.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308	*	0.00	0.000	0.000	0.3509	0.0017	0.0813	2.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.00	0.000	0.074	0.3451	0.0012	0.0583	2.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.15	0.000	0.093	0.3455	0.0010	0.0468	1.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311	*	0.00	0.000	0.058	0.3410	0.0011	0.0525	1.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.15	0.000	0.076	0.3431	0.0008	0.0357	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.00	0.000	0.059	0.3389	0.0007	0.0324	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.03	0.000	0.087	0.3349	0.0007	0.0323	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.01	0.000	0.092	0.3299	0.0006	0.0257	9.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.05	0.000	0.074	0.3275	0.0004	0.0206	8.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.00	0.000	0.064	0.3236	0.0006	0.0259	9.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318	*	0.39	0.000	0.024	0.3238	0.0004	0.0198	7.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.18	0.002	0.000	0.3479	0.0004	0.0185	7.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.00	0.000	0.113	0.3419	0.0004	0.0195	7.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.56	0.034	0.060	0.3635	0.0004	0.0167	6.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.00	0.000	0.074	0.3593	0.0003	0.0136	5.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323	*	0.00	0.000	0.039	0.3566	0.0002	0.0109	4.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324	*	0.00	0.000	0.047	0.3536	0.0003	0.0158	6.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325	*	0.00	0.000	0.000	0.3534	0.0005	0.0226	8.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.000	0.074	0.3499	0.0004	0.0168	6.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.00	0.000	0.062	0.3464	0.0001	0.0054	2.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328	*	0.00	0.000	0.045	0.3430	0.0000	0.0005	2.70E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.00	0.000	0.058	0.3385	0.0001	0.0071	3.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.00	0.000	0.056	0.3346	0.0006	0.0261	9.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	0.00	0.000	0.000	0.3334	0.0006	0.0273	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332	*	0.00	0.000	0.000	0.3323	0.0005	0.0242	9.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.000	0.074	0.3275	0.0005	0.0236	9.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.00	0.000	0.085	0.3221	0.0006	0.0287	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.00	0.000	0.130	0.3150	0.0006	0.0289	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.179	0.3058	0.0005	0.0254	9.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337		0.07	0.000	0.078	0.3049	0.0004	0.0175	6.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.02	0.000	0.063	0.3021	0.0003	0.0145	5.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339	*	0.00	0.000	0.000	0.3012	0.0004	0.0177	7.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340	*	0.00	0.000	0.047	0.2982	0.0004	0.0197	7.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.84	0.032	0.041	0.3340	0.0004	0.0191	7.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		0.19	0.000	0.135	0.3363	0.0004	0.0170	6.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.00	0.000	0.173	0.3272	0.0002	0.0096	4.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.05	0.000	0.124	0.3228	0.0003	0.0161	6.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345		0.04	0.000	0.065	0.3214	0.0004	0.0175	7.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*	0.18	0.000	0.028	0.3220	0.0003	0.0161	6.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347	*	0.52	0.000	0.025	0.3227	0.0003	0.0131	5.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.00	0.022	0.000	0.3503	0.0002	0.0112	5.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349	*	0.17	0.000	0.028	0.3510	0.0002	0.0098	4.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.30	0.018	0.008	0.3692	0.0002	0.0087	4.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.00	0.000	0.075	0.3654	0.0001	0.0063	2.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.00	0.000	0.112	0.3601	0.0002	0.0107	4.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.052	0.3576	0.0002	0.0088	4.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354	*	0.00	0.000	0.000	0.3565	0.0000	0.0021	9.91E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355	*	0.29	0.000	0.018	0.3549	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.42E-09	0.0000	0.0000	5.01E-09
356	*	0.23	0.000	0.010	0.3532	0.0003	0.0139	5.42E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.78E-09
357	*	0.00	0.000	0.005	0.3518	0.0010	0.0468	1.66E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*	0.00	0.000	0.017	0.3507	0.0010	0.0484	1.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	0.00	0.000	0.009	0.3499	0.0009	0.0435	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*	0.00	0.000	0.021	0.3493	0.0008	0.0387	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361	*	0.43	0.000	0.000	0.3488	0.0007	0.0344	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.00	0.001	0.000	0.3652	0.0007	0.0318	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.00	0.000	0.026	0.3719	0.0006	0.0305	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.00	0.000	0.036	0.3775	0.0005	0.0219	8.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.00	0.000	0.067	0.3729	0.0005	0.0243	9.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 7			
	inches	cubic feet	percent
Precipitation	47.04	170,749.3	100.00
Runoff	10.883	39,504.6	23.14
Evapotranspiration	29.646	107,614.4	63.02
Drainage Collected from Layer 2	5.9119	21,460.2	12.57
Percolation/Leakage through Layer 3	0.000021	0.0775	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0717	0.00
Percolation/Leakage through Layer 8	0.000002	0.0060	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000002	0.0059	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.5978	2,170.1	1.27
Soil Water at Start of Year	256.9985	932,904.4	546.36
Soil Water at End of Year	257.5963	935,074.5	547.63
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 8

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.062	0.3696	0.0007	0.0317	1.15E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2	*		0.21	0.000	0.046	0.3660	0.0002	0.0135	5.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.047	0.3665	0.0018	0.0853	2.83E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.00	0.000	0.073	0.3596	0.0017	0.0802	2.68E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.12	0.000	0.082	0.3590	0.0014	0.0660	2.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6			0.00	0.000	0.065	0.3531	0.0010	0.0457	1.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7			0.00	0.000	0.060	0.3481	0.0013	0.0604	2.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8			0.00	0.000	0.096	0.3421	0.0010	0.0458	1.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9			0.04	0.000	0.123	0.3373	0.0008	0.0358	1.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10			0.00	0.000	0.144	0.3294	0.0004	0.0211	8.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11			0.00	0.000	0.109	0.3227	0.0005	0.0226	8.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.00	0.000	0.084	0.3174	0.0006	0.0278	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*		1.20	0.000	0.029	0.3176	0.0007	0.0316	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*		0.12	0.000	0.000	0.3180	0.0005	0.0238	9.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15			0.00	0.184	0.000	0.3680	0.0004	0.0183	7.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16			0.00	0.000	0.104	0.3632	0.0004	0.0165	6.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.18	0.000	0.082	0.3669	0.0001	0.0052	2.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18	*		0.19	0.000	0.031	0.3676	0.0004	0.0186	7.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19	*		0.29	0.000	0.000	0.3682	0.0003	0.0125	5.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.49	0.222	0.000	0.3984	0.0002	0.0078	2.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.02	0.000	0.103	0.3859	0.0008	0.0416	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22			0.01	0.000	0.143	0.3692	0.0054	0.2528	7.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23			1.56	0.599	0.123	0.4035	0.0032	0.1524	4.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.00	0.000	0.059	0.3867	0.0047	0.2231	6.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25			0.00	0.000	0.114	0.3702	0.0058	0.2671	7.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26			0.00	0.000	0.109	0.3589	0.0032	0.1504	4.69E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27			0.00	0.000	0.078	0.3512	0.0023	0.1060	3.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*		0.00	0.000	0.000	0.3485	0.0015	0.0711	2.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*		0.00	0.000	0.000	0.3461	0.0012	0.0565	1.96E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*		0.07	0.000	0.031	0.3448	0.0011	0.0502	1.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31			0.00	0.000	0.075	0.3401	0.0010	0.0472	1.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32			0.00	0.000	0.094	0.3338	0.0009	0.0434	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33	*		0.00	0.000	0.000	0.3324	0.0009	0.0418	1.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34			0.18	0.000	0.066	0.3370	0.0007	0.0312	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35	*		0.01	0.000	0.070	0.3327	0.0005	0.0247	9.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36		0.13	0.000	0.130	0.3314	0.0006	0.0277	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37		0.00	0.000	0.104	0.3259	0.0006	0.0292	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38		0.00	0.000	0.100	0.3201	0.0003	0.0153	6.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39		0.00	0.000	0.073	0.3160	0.0005	0.0225	8.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40		0.00	0.000	0.075	0.3119	0.0004	0.0177	7.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41		0.01	0.000	0.088	0.3075	0.0003	0.0134	5.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42	*	0.00	0.000	0.000	0.3068	0.0003	0.0135	5.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43		0.18	0.000	0.100	0.3102	0.0003	0.0159	6.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44		0.00	0.000	0.109	0.3044	0.0003	0.0141	5.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45		0.69	0.010	0.062	0.3331	0.0003	0.0118	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46		0.34	0.002	0.160	0.3406	0.0003	0.0140	5.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47		0.00	0.000	0.093	0.3357	0.0004	0.0167	6.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48		0.00	0.000	0.124	0.3294	0.0003	0.0142	5.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49		0.00	0.000	0.151	0.3218	0.0003	0.0130	5.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50		0.00	0.000	0.088	0.3175	0.0003	0.0154	6.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		0.00	0.000	0.173	0.3092	0.0003	0.0132	5.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		0.60	0.005	0.235	0.3263	0.0002	0.0102	4.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		0.00	0.000	0.184	0.3176	0.0002	0.0076	3.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		0.05	0.000	0.112	0.3148	0.0001	0.0069	3.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55		0.33	0.000	0.092	0.3260	0.0001	0.0062	2.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56		0.00	0.000	0.090	0.3218	0.0001	0.0052	2.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57		0.00	0.000	0.082	0.3179	0.0001	0.0048	2.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58		0.00	0.000	0.063	0.3149	0.0001	0.0043	2.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59	*	0.00	0.000	0.000	0.3149	0.0001	0.0039	1.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60		0.00	0.000	0.110	0.3097	0.0001	0.0036	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61		0.00	0.000	0.124	0.3038	0.0000	0.0003	1.67E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62		0.00	0.000	0.125	0.2978	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.25E-10	0.0000	0.0000	4.21E-10
63		1.83	0.651	0.062	0.3509	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
64		0.00	0.000	0.164	0.3431	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
65		0.00	0.000	0.167	0.3351	0.0000	0.0002	1.10E-09	0.0000	0.0000	1.05E-09	0.0000	0.0000	1.01E-09
66		0.00	0.000	0.189	0.3261	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
67		0.00	0.000	0.236	0.3148	0.0000	0.0002	8.50E-10	0.0000	0.0000	8.24E-10	0.0000	0.0000	8.00E-10
68		0.11	0.000	0.186	0.3113	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
69		0.00	0.000	0.149	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
70		0.00	0.000	0.059	0.3014	0.0000	0.0011	6.03E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
71		0.00	0.000	0.047	0.2991	0.0000	0.0002	1.10E-09	0.0000	0.0000	9.84E-10	0.0000	0.0000	1.76E-09
72		0.00	0.000	0.040	0.2972	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.64E-10	0.0000	0.0000	4.32E-10
73		0.00	0.000	0.035	0.2955	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.54E-11
74		0.00	0.000	0.032	0.2940	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
75		0.00	0.000	0.029	0.2926	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
76		0.00	0.000	0.027	0.2913	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
77	*	0.00	0.000	0.000	0.2913	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
78	*	0.00	0.000	0.000	0.2913	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

79	*	0.00	0.000	0.000	0.2913	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
80	*	0.00	0.000	0.000	0.2913	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
81		0.00	0.000	0.025	0.2901	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
82		0.00	0.000	0.024	0.2890	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
83		0.00	0.000	0.023	0.2879	0.0000	0.0001	2.27E-09	0.0000	0.0000	2.09E-09	0.0000	0.0000	1.95E-09
84		0.00	0.000	0.022	0.2868	0.0000	0.0010	7.46E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
85		0.00	0.000	0.021	0.2857	0.0000	0.0012	7.79E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.020	0.2844	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.08E-10	0.0000	0.0000	1.04E-09
87		0.07	0.000	0.020	0.2864	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.20E-10
88		0.00	0.000	0.019	0.2853	0.0000	0.0002	2.67E-09	0.0000	0.0000	2.43E-09	0.0000	0.0000	2.24E-09
89		0.16	0.000	0.019	0.2917	0.0000	0.0010	7.44E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
90		0.00	0.000	0.018	0.2907	0.0001	0.0031	1.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91	*	0.00	0.000	0.000	0.2907	0.0001	0.0052	2.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.00	0.000	0.017	0.2899	0.0001	0.0047	2.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.12	0.000	0.017	0.2947	0.0001	0.0042	2.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.13	0.000	0.017	0.3002	0.0001	0.0038	1.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95	*	0.00	0.000	0.000	0.3002	0.0001	0.0027	1.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96	*	0.00	0.000	0.002	0.3002	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.03E-09	0.0000	0.0000	4.22E-09
97	*	0.02	0.000	0.017	0.3003	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.67E-10
98		0.17	0.000	0.016	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
99		0.10	0.000	0.016	0.3118	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
100		0.52	0.010	0.108	0.3310	0.0000	0.0002	9.21E-10	0.0000	0.0000	8.91E-10	0.0000	0.0000	8.63E-10
101		0.06	0.000	0.199	0.3245	0.0000	0.0001	7.03E-10	0.0000	0.0000	6.86E-10	0.0000	0.0000	6.69E-10
102		0.44	0.006	0.221	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
103		0.00	0.000	0.140	0.3280	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
104	*	0.13	0.000	0.056	0.3289	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
105	*	0.09	0.000	0.050	0.3299	0.0000	0.0000	2.98E-10	0.0000	0.0000	2.95E-10	0.0000	0.0000	2.91E-10
106	*	0.69	0.000	0.033	0.3308	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
107		0.00	0.069	0.069	0.3580	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
108		0.00	0.000	0.218	0.3476	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
109		0.00	0.000	0.252	0.3356	0.0000	0.0002	1.36E-09	0.0000	0.0000	1.30E-09	0.0000	0.0000	1.24E-09
110		0.00	0.000	0.133	0.3293	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
111		0.20	0.000	0.107	0.3339	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
112		0.00	0.000	0.256	0.3217	0.0000	0.0008	4.81E-09	0.0000	0.0000	4.42E-09	0.0000	0.0000	2.99E-09
113		0.23	0.000	0.098	0.3281	0.0000	0.0002	1.78E-09	0.0000	0.0000	1.67E-09	0.0000	0.0000	2.10E-09
114		1.23	0.250	0.087	0.3706	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	3.93E-10
115		0.50	0.142	0.132	0.3815	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
116		1.78	1.201	0.348	0.3920	0.0001	0.0016	8.02E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
117		0.10	0.000	0.146	0.3873	0.0001	0.0030	1.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118		0.28	0.008	0.369	0.3731	0.0011	0.0533	1.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119		0.01	0.000	0.233	0.3577	0.0026	0.1200	3.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120		0.00	0.000	0.227	0.3434	0.0019	0.0886	2.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121		0.00	0.000	0.226	0.3299	0.0014	0.0657	2.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	0.10	0.000	0.149	0.3247	0.0013	0.0604	2.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123	0.00	0.000	0.062	0.3205	0.0012	0.0562	1.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124	0.27	0.000	0.048	0.3303	0.0007	0.0338	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125	0.06	0.000	0.113	0.3269	0.0005	0.0249	9.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126	0.05	0.000	0.151	0.3215	0.0005	0.0219	8.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127	0.26	0.000	0.149	0.3264	0.0004	0.0166	6.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128	0.00	0.000	0.145	0.3188	0.0003	0.0125	5.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129	0.00	0.000	0.062	0.3151	0.0003	0.0132	5.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130	0.31	0.000	0.048	0.3269	0.0003	0.0154	6.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
131	0.00	0.000	0.403	0.3065	0.0002	0.0098	4.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132	0.00	0.000	0.040	0.3042	0.0005	0.0233	8.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133	0.03	0.000	0.036	0.3034	0.0004	0.0179	7.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134	0.00	0.000	0.032	0.3017	0.0003	0.0163	6.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
135	0.00	0.000	0.029	0.3000	0.0002	0.0110	4.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
136	0.00	0.000	0.027	0.2985	0.0002	0.0095	4.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
137	0.00	0.000	0.026	0.2970	0.0002	0.0089	3.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
138	0.00	0.000	0.024	0.2956	0.0002	0.0083	3.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
139	0.00	0.000	0.023	0.2944	0.0002	0.0089	3.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
140	0.00	0.000	0.022	0.2933	0.0002	0.0098	4.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
141	0.00	0.000	0.021	0.2923	0.0002	0.0080	3.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
142	0.00	0.000	0.020	0.2914	0.0001	0.0068	3.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
143	0.00	0.000	0.020	0.2904	0.0001	0.0058	2.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
144	0.00	0.000	0.019	0.2895	0.0001	0.0051	2.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
145	0.00	0.000	0.019	0.2887	0.0001	0.0046	2.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
146	0.01	0.000	0.018	0.2885	0.0001	0.0041	2.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
147	0.32	0.000	0.018	0.3029	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
148	0.00	0.000	0.017	0.3021	0.0001	0.0025	1.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
149	0.05	0.000	0.017	0.3037	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.93E-09	0.0000	0.0000	4.51E-09
150	0.10	0.000	0.017	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151	0.00	0.000	0.016	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
152	0.09	0.000	0.016	0.3104	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.00	0.000	0.016	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154	0.00	0.000	0.015	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
155	0.00	0.000	0.014	0.3084	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156	0.00	0.000	0.014	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157	0.17	0.000	0.015	0.3149	0.0000	0.0001	7.05E-10	0.0000	0.0000	6.87E-10	0.0000	0.0000	6.70E-10
158	0.02	0.000	0.015	0.3152	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
159	0.31	0.000	0.014	0.3290	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160	0.00	0.000	0.182	0.3204	0.0000	0.0001	6.70E-10	0.0000	0.0000	6.54E-10	0.0000	0.0000	6.39E-10
161	0.51	0.012	0.247	0.3324	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
162	0.00	0.000	0.328	0.3168	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163	0.01	0.000	0.150	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164	0.00	0.000	0.062	0.3070	0.0000	0.0006	3.73E-09	0.0000	0.0000	3.28E-09	0.0000	0.0000	2.93E-09

165	0.00	0.000	0.048	0.3048	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
166	0.04	0.000	0.041	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.85	0.054	0.036	0.3413	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.41	0.043	0.328	0.3433	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.00	0.000	0.244	0.3317	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
170	0.00	0.000	0.301	0.3174	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.03	0.000	0.139	0.3123	0.0000	0.0002	1.84E-09	0.0000	0.0000	1.72E-09	0.0000	0.0000	1.62E-09
172	0.13	0.000	0.063	0.3156	0.0000	0.0001	1.12E-09	0.0000	0.0000	1.07E-09	0.0000	0.0000	1.03E-09
173	0.00	0.000	0.047	0.3134	0.0000	0.0000	3.25E-10	0.0000	0.0000	3.21E-10	0.0000	0.0000	3.17E-10
174	0.00	0.000	0.040	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
175	0.01	0.000	0.036	0.3100	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.05	0.000	0.033	0.3109	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.00	0.000	0.029	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.00	0.000	0.027	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.32	0.000	0.027	0.3222	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.00	0.000	0.199	0.3127	0.0000	0.0002	1.08E-09	0.0000	0.0000	1.04E-09	0.0000	0.0000	1.00E-09
181	0.00	0.000	0.024	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
182	0.42	0.000	0.024	0.3303	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.00	0.000	0.222	0.3198	0.0000	0.0003	1.92E-09	0.0000	0.0000	1.80E-09	0.0000	0.0000	1.69E-09
184	0.00	0.000	0.250	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
185	0.07	0.000	0.131	0.3047	0.0000	0.0001	9.42E-10	0.0000	0.0000	9.11E-10	0.0000	0.0000	8.82E-10
186	0.27	0.000	0.063	0.3147	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
187	0.08	0.000	0.049	0.3159	0.0000	0.0002	9.92E-10	0.0000	0.0000	9.58E-10	0.0000	0.0000	9.25E-10
188	0.00	0.000	0.041	0.3140	0.0000	0.0002	1.25E-09	0.0000	0.0000	1.20E-09	0.0000	0.0000	1.15E-09
189	0.53	0.012	0.037	0.3370	0.0000	0.0000	3.23E-10	0.0000	0.0000	3.19E-10	0.0000	0.0000	3.16E-10
190	0.00	0.000	0.319	0.3217	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
191	0.79	0.082	0.358	0.3385	0.0000	0.0005	2.74E-09	0.0000	0.0000	2.49E-09	0.0000	0.0000	2.28E-09
192	0.46	0.051	0.278	0.3448	0.0000	0.0002	1.35E-09	0.0000	0.0000	1.28E-09	0.0000	0.0000	1.23E-09
193	0.13	0.000	0.364	0.3336	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
194	0.00	0.000	0.335	0.3178	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	1.07	0.162	0.150	0.3539	0.0000	0.0000	2.19E-10	0.0000	0.0000	2.18E-10	0.0000	0.0000	2.16E-10
196	0.04	0.000	0.314	0.3410	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
197	0.29	0.000	0.156	0.3476	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.00	0.000	0.282	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.00	0.000	0.301	0.3198	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.13	0.000	0.317	0.3109	0.0000	0.0001	5.34E-10	0.0000	0.0000	5.24E-10	0.0000	0.0000	3.88E-10
201	0.00	0.000	0.149	0.3038	0.0000	0.0001	9.15E-10	0.0000	0.0000	8.86E-10	0.0000	0.0000	7.75E-10
202	0.00	0.000	0.062	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.14E-10
203	0.00	0.000	0.047	0.2986	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
204	0.00	0.000	0.038	0.2968	0.0000	0.0000	2.44E-10	0.0000	0.0000	2.42E-10	0.0000	0.0000	2.40E-10
205	0.04	0.000	0.037	0.2967	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
206	0.00	0.000	0.032	0.2952	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
207	0.00	0.000	0.029	0.2938	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.14	0.000	0.029	0.2993	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
209	0.00	0.000	0.026	0.2981	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.00	0.000	0.024	0.2969	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	1.01	0.073	0.025	0.3402	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
212	0.03	0.000	0.107	0.3367	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
213	0.00	0.000	0.231	0.3257	0.0000	0.0006	3.06E-09	0.0000	0.0000	2.76E-09	0.0000	0.0000	2.50E-09
214	0.13	0.000	0.237	0.3205	0.0000	0.0002	1.28E-09	0.0000	0.0000	1.22E-09	0.0000	0.0000	1.17E-09
215	0.04	0.000	0.120	0.3166	0.0000	0.0003	1.72E-09	0.0000	0.0000	1.62E-09	0.0000	0.0000	1.53E-09
216	0.00	0.000	0.149	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
217	0.00	0.000	0.062	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.00	0.000	0.047	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.00	0.000	0.040	0.3025	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.00	0.000	0.035	0.3008	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.00	0.000	0.032	0.2993	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.00	0.000	0.029	0.2979	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.00	0.000	0.027	0.2966	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.00	0.000	0.026	0.2954	0.0000	0.0002	1.43E-09	0.0000	0.0000	1.36E-09	0.0000	0.0000	1.29E-09
225	0.00	0.000	0.024	0.2942	0.0000	0.0005	3.35E-09	0.0000	0.0000	2.99E-09	0.0000	0.0000	2.69E-09
226	0.07	0.000	0.025	0.2961	0.0000	0.0002	1.68E-09	0.0000	0.0000	1.59E-09	0.0000	0.0000	1.50E-09
227	0.39	0.000	0.024	0.3134	0.0000	0.0002	2.35E-09	0.0000	0.0000	2.16E-09	0.0000	0.0000	2.00E-09
228	0.00	0.000	0.021	0.3123	0.0000	0.0003	2.46E-09	0.0000	0.0000	2.25E-09	0.0000	0.0000	2.08E-09
229	0.02	0.000	0.022	0.3122	0.0000	0.0001	8.69E-10	0.0000	0.0000	8.42E-10	0.0000	0.0000	8.17E-10
230	0.00	0.000	0.020	0.3113	0.0000	0.0000	2.18E-10	0.0000	0.0000	2.16E-10	0.0000	0.0000	2.14E-10
231	0.00	0.000	0.019	0.3104	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
232	0.00	0.000	0.018	0.3095	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
233	0.00	0.000	0.018	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.00	0.000	0.017	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
235	0.59	0.009	0.019	0.3345	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
236	0.00	0.000	0.315	0.3195	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.03	0.000	0.202	0.3112	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	0.00	0.000	0.149	0.3041	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
239	0.03	0.000	0.064	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
240	1.11	0.129	0.049	0.3468	0.0000	0.0000	3.11E-10	0.0000	0.0000	3.08E-10	0.0000	0.0000	3.04E-10
241	0.00	0.000	0.139	0.3401	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
242	0.00	0.000	0.209	0.3302	0.0000	0.0000	2.50E-10	0.0000	0.0000	2.48E-10	0.0000	0.0000	2.46E-10
243	0.00	0.000	0.225	0.3195	0.0000	0.0006	3.24E-09	0.0000	0.0000	2.90E-09	0.0000	0.0000	2.62E-09
244	0.00	0.000	0.222	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
245	0.00	0.000	0.149	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
246	0.00	0.000	0.062	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	0.00	0.000	0.047	0.2966	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
248	0.00	0.000	0.040	0.2947	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.00	0.000	0.035	0.2930	0.0000	0.0002	1.56E-09	0.0000	0.0000	1.47E-09	0.0000	0.0000	1.40E-09
250	0.22	0.000	0.034	0.3020	0.0000	0.0000	4.52E-10	0.0000	0.0000	4.44E-10	0.0000	0.0000	4.37E-10

251		0.03	0.000	0.032	0.3021	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
252		0.00	0.000	0.027	0.3008	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
253		0.02	0.000	0.028	0.3002	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
254		0.05	0.000	0.026	0.3012	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
255		0.17	0.000	0.025	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
256		0.11	0.000	0.024	0.3121	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
257		0.00	0.000	0.021	0.3111	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
258		0.00	0.000	0.020	0.3102	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
259		0.00	0.000	0.020	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
260	*	0.00	0.000	0.019	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261	*	0.00	0.000	0.018	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262		0.18	0.000	0.020	0.3151	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
263		0.00	0.000	0.018	0.3143	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
264		0.06	0.000	0.019	0.3163	0.0000	0.0002	1.44E-09	0.0000	0.0000	1.37E-09	0.0000	0.0000	1.30E-09
265		0.00	0.000	0.016	0.3156	0.0000	0.0001	1.13E-09	0.0000	0.0000	1.09E-09	0.0000	0.0000	1.05E-09
266		0.08	0.000	0.018	0.3187	0.0000	0.0003	2.94E-09	0.0000	0.0000	2.65E-09	0.0000	0.0000	2.42E-09
267		0.61	0.030	0.133	0.3399	0.0000	0.0001	7.29E-10	0.0000	0.0000	7.10E-10	0.0000	0.0000	6.92E-10
268		0.00	0.000	0.119	0.3342	0.0000	0.0000	1.16E-10	0.0000	0.0000	1.16E-10	0.0000	0.0000	1.15E-10
269		0.02	0.000	0.106	0.3302	0.0000	0.0001	6.72E-10	0.0000	0.0000	6.56E-10	0.0000	0.0000	6.40E-10
270		0.00	0.000	0.169	0.3221	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
271		0.00	0.000	0.271	0.3092	0.0000	0.0008	4.94E-09	0.0000	0.0000	4.53E-09	0.0000	0.0000	3.06E-09
272		0.00	0.000	0.149	0.3021	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	9.71E-10
273		0.00	0.000	0.062	0.2991	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
274		0.00	0.000	0.047	0.2969	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
275		0.00	0.000	0.040	0.2950	0.0000	0.0005	4.44E-09	0.0000	0.0000	3.01E-09	0.0000	0.0000	2.71E-09
276		0.00	0.000	0.035	0.2933	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.54E-10	0.0000	0.0000	9.22E-10
277		0.00	0.000	0.032	0.2918	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
278		0.00	0.000	0.029	0.2904	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
279		0.37	0.000	0.030	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
280		0.00	0.000	0.026	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
281		0.00	0.000	0.024	0.3044	0.0000	0.0002	1.71E-09	0.0000	0.0000	1.61E-09	0.0000	0.0000	1.52E-09
282		0.89	0.063	0.026	0.3425	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
283		2.31	1.438	0.092	0.3796	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
284		0.00	0.000	0.119	0.3739	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
285		0.00	0.000	0.147	0.3661	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
286		0.00	0.000	0.125	0.3549	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
287		0.00	0.000	0.251	0.3392	0.0006	0.0298	1.10E-07	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
288		0.00	0.000	0.303	0.3221	0.0015	0.0691	2.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.92	0.063	0.152	0.3542	0.0011	0.0539	1.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.01	0.000	0.171	0.3447	0.0007	0.0319	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.06	0.000	0.226	0.3348	0.0008	0.0368	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.00	0.000	0.174	0.3254	0.0009	0.0420	1.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.91	0.080	0.154	0.3566	0.0006	0.0285	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.00	0.000	0.212	0.3454	0.0005	0.0244	9.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.00	0.000	0.125	0.3384	0.0005	0.0256	9.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.00	0.000	0.132	0.3312	0.0005	0.0215	8.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.00	0.000	0.113	0.3249	0.0005	0.0227	9.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298	*	0.00	0.000	0.069	0.3211	0.0005	0.0233	8.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.00	0.000	0.093	0.3161	0.0004	0.0176	6.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300	*	0.00	0.000	0.051	0.3133	0.0003	0.0164	6.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301	*	0.06	0.000	0.058	0.3130	0.0003	0.0148	6.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302	*	1.06	0.000	0.020	0.3137	0.0003	0.0121	5.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.14	0.000	0.000	0.3157	0.0002	0.0104	4.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304	*	0.00	0.000	0.027	0.3164	0.0002	0.0092	4.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.00	0.117	0.000	0.3619	0.0002	0.0100	4.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.000	0.094	0.3574	0.0002	0.0083	3.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		1.48	0.604	0.151	0.3917	0.0001	0.0048	2.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		1.01	0.670	0.061	0.4028	0.0001	0.0051	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.00	0.000	0.082	0.3848	0.0024	0.1217	3.72E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.00	0.000	0.066	0.3714	0.0054	0.2504	7.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311	*	0.00	0.000	0.000	0.3652	0.0033	0.1517	4.72E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.00	0.000	0.079	0.3574	0.0023	0.1075	3.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.00	0.000	0.110	0.3486	0.0016	0.0774	2.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.00	0.000	0.131	0.3396	0.0014	0.0681	2.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.00	0.000	0.088	0.3336	0.0013	0.0608	2.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.072	0.3289	0.0009	0.0399	1.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317	*	0.03	0.000	0.029	0.3277	0.0007	0.0304	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318	*	0.99	0.000	0.034	0.3273	0.0006	0.0267	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.00	0.010	0.000	0.3568	0.0006	0.0269	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320	*	0.00	0.000	0.029	0.3564	0.0006	0.0280	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.02	0.000	0.046	0.3652	0.0006	0.0278	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322	*	0.62	0.000	0.033	0.3651	0.0005	0.0261	9.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323	*	0.00	0.000	0.030	0.3649	0.0004	0.0180	7.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.00	0.000	0.038	0.3648	0.0005	0.0258	9.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.00	0.027	0.000	0.3852	0.0007	0.0273	1.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326	*	0.00	0.000	0.000	0.3842	0.0004	0.0186	7.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.04	0.000	0.089	0.3747	0.0004	0.0253	9.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.111	0.3633	0.0032	0.1487	4.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.00	0.000	0.128	0.3529	0.0022	0.1023	3.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.02	0.000	0.090	0.3458	0.0019	0.0901	2.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	0.04	0.000	0.044	0.3433	0.0014	0.0672	2.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.44	0.001	0.086	0.3586	0.0011	0.0491	1.72E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.000	0.067	0.3540	0.0008	0.0378	1.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.00	0.000	0.111	0.3475	0.0007	0.0346	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.15	0.000	0.052	0.3511	0.0006	0.0263	9.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336	*	0.18	0.000	0.022	0.3508	0.0005	0.0253	9.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337	*		0.00	0.000	0.039	0.3502	0.0005	0.0259	9.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338	*		0.02	0.000	0.020	0.3500	0.0007	0.0333	1.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339	*		0.02	0.000	0.000	0.3502	0.0006	0.0286	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340			0.53	0.048	0.000	0.3752	0.0005	0.0207	7.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341			0.68	0.251	0.058	0.3920	0.0006	0.0199	7.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342			0.57	0.221	0.064	0.4027	0.0004	0.0181	6.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343			0.10	0.000	0.056	0.3907	0.0038	0.1887	5.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344	*		0.00	0.000	0.000	0.3801	0.0053	0.2499	7.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345	*		0.08	0.000	0.036	0.3750	0.0032	0.1504	4.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*		0.71	0.000	0.032	0.3710	0.0024	0.1118	3.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347			0.00	0.000	0.039	0.3676	0.0021	0.0973	3.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348	*		0.00	0.000	0.017	0.3649	0.0018	0.0848	2.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349	*		0.00	0.000	0.009	0.3629	0.0015	0.0713	2.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350	*		0.00	0.000	0.013	0.3614	0.0013	0.0599	2.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351	*		0.29	0.000	0.015	0.3603	0.0011	0.0511	1.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352	*		0.00	0.000	0.006	0.3595	0.0009	0.0443	1.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353	*	*	0.00	0.000	0.003	0.3595	0.0010	0.0459	1.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354	*	*	0.00	0.000	0.011	0.3595	0.0005	0.0228	8.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355	*	*	0.00	0.000	0.000	0.3595	0.0003	0.0152	6.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356	*	*	0.00	0.000	0.014	0.3595	0.0002	0.0113	4.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357	*	*	0.00	0.000	0.018	0.3595	0.0002	0.0090	3.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*	*	0.45	0.000	0.000	0.3595	0.0002	0.0075	3.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	*	0.52	0.000	0.000	0.3595	0.0001	0.0064	2.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*	*	0.00	0.000	0.013	0.3595	0.0001	0.0056	2.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361	*	*	0.00	0.000	0.014	0.3595	0.0001	0.0049	2.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		*	0.43	1.839	0.000	0.3713	0.0001	0.0044	2.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363	*	*	0.14	0.000	0.038	0.3713	0.0001	0.0040	2.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		*	0.00	0.026	0.063	0.3718	0.0001	0.0036	1.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		*	0.30	0.188	0.001	0.3772	0.0000	0.0008	4.08E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 8			
	inches	cubic feet	percent
Precipitation	46.58	169,069.4	100.00
Runoff	9.662	35,073.5	20.75
Evapotranspiration	29.949	108,715.9	64.30
Drainage Collected from Layer 2	6.9964	25,396.9	15.02
Percolation/Leakage through Layer 3	0.000024	0.0871	0.00
Average Head on Top of Layer 3	0.0004	---	---
Drainage Collected from Layer 7	0.0000	0.0826	0.00
Percolation/Leakage through Layer 8	0.000001	0.0048	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0000	0.00
Percolation/Leakage through Layer 11	0.000001	0.0048	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-0.0323	-117.1	-0.07
Soil Water at Start of Year	257.5963	935,074.5	553.07
Soil Water at End of Year	257.5640	934,957.4	553.00
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 9

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*	*	0.00	0.000	0.000	0.3772	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.89E-10
2		*	0.14	0.067	0.001	0.3809	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
3		*	0.18	0.104	0.001	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
4	*	*	0.03	0.000	0.028	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
5	*	*	0.28	0.000	0.030	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
6	*	*	0.00	0.000	0.037	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
7	*	*	0.00	0.000	0.019	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
8	*	*	0.01	0.000	0.011	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
9	*	*	0.00	0.000	0.010	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
10	*	*	0.00	0.000	0.012	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
11	*	*	0.00	0.000	0.007	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
12	*	*	0.00	0.000	0.032	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
13		*	0.00	0.066	0.068	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
14		*	0.00	0.000	0.000	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
15	*	*	0.00	0.000	0.000	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
16		*	0.00	0.000	0.000	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
17		*	0.79	0.707	0.001	0.3881	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
18		*	0.21	0.153	0.001	0.3908	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
19		*	0.50	0.443	0.001	0.3936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
20		*	0.00	0.000	0.000	0.3936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
21			0.00	0.000	0.077	0.3861	0.0000	0.0017	8.03E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
22			0.13	0.000	0.069	0.3777	0.0019	0.0951	2.96E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23			0.00	0.000	0.075	0.3682	0.0032	0.1484	4.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24	*		0.00	0.000	0.000	0.3632	0.0023	0.1102	3.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*		0.02	0.000	0.022	0.3595	0.0020	0.0936	3.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26	*	*	0.00	0.000	0.000	0.3595	0.0015	0.0668	2.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*	*	0.00	0.000	0.000	0.3595	0.0006	0.0268	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*	*	0.00	0.000	0.000	0.3595	0.0004	0.0169	6.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29		*	0.49	0.280	0.001	0.3694	0.0003	0.0123	5.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*	*	0.00	0.000	0.000	0.3694	0.0002	0.0096	4.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31		*	0.00	0.000	0.001	0.3696	0.0002	0.0079	3.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32	*	*	0.00	0.000	0.000	0.3696	0.0001	0.0067	3.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33	*	*	0.00	0.000	0.000	0.3696	0.0001	0.0058	2.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34		*	0.00	0.000	0.000	0.3696	0.0001	0.0051	2.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35	*	*	0.13	0.000	0.042	0.3696	0.0001	0.0045	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36	*	*	0.00	0.000	0.039	0.3696	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*	*	0.00	0.000	0.048	0.3696	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38	*	*	0.00	0.000	0.001	0.3696	0.0000	0.0018	9.49E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39	*	*	0.00	0.000	0.000	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.79E-09	0.0000	0.0000	3.56E-09
40	*	*	0.01	0.000	0.009	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
41	*	*	0.09	0.000	0.013	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
42	*	*	0.29	0.000	0.006	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
43	*	*	0.10	0.000	0.004	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
44	*	*	0.00	0.000	0.009	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
45	*	*	0.14	0.000	0.000	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
46	*	*	0.00	0.000	0.024	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
47	*	*	0.00	0.000	0.024	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
48	*	*	0.32	0.000	0.011	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
49	*	*	0.00	0.000	0.007	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
50	*	*	0.17	0.000	0.018	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
51	*	*	0.00	0.000	0.023	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
52	*	*	0.19	0.000	0.012	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
53		*	0.00	0.000	0.000	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
54		*	0.00	0.435	0.000	0.3773	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
55	*	*	0.19	0.000	0.029	0.3773	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
56	*	*	0.00	0.000	0.042	0.3773	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
57	*	*	0.00	0.000	0.025	0.3773	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
58	*	*	0.00	0.000	0.040	0.3773	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
59		*	0.33	0.806	0.027	0.3820	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
60		*	0.00	0.000	0.000	0.3820	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
61	*	*	0.00	0.000	0.000	0.3820	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
62		*	0.00	0.000	0.000	0.3820	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
63		*	0.06	0.010	0.001	0.3841	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
64		*	0.16	0.093	0.001	0.3874	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
65		*	0.77	0.692	0.001	0.3910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
66	*	*	1.29	0.000	0.042	0.3910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
67	*	*	0.00	0.000	0.034	0.3910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
68		*	0.02	1.168	0.000	0.3941	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
69		*	0.00	0.000	0.000	0.3941	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
70		*	0.60	0.549	0.000	0.3967	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
71			0.01	0.000	0.159	0.3838	0.0000	0.0016	7.40E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
72	*		0.65	0.000	0.036	0.3739	0.0028	0.1332	4.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73	*		0.65	0.000	0.039	0.3686	0.0033	0.1526	4.75E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.04	0.040	0.000	0.3877	0.0019	0.1047	3.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.20	0.416	0.014	0.4057	0.0031	0.0853	2.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.19	0.022	0.075	0.3937	0.0057	0.2598	7.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77	*		0.29	0.000	0.045	0.3839	0.0058	0.2670	7.83E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78	*		0.12	0.000	0.039	0.3779	0.0032	0.1520	4.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79	*	0.33	0.000	0.039	0.3727	0.0030	0.1425	4.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.15	0.124	0.000	0.3965	0.0025	0.1183	3.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.00	0.000	0.145	0.3830	0.0016	0.0734	2.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.00	0.000	0.156	0.3654	0.0049	0.2337	6.98E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.00	0.000	0.156	0.3523	0.0031	0.1462	4.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.00	0.000	0.177	0.3403	0.0020	0.0909	2.98E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.153	0.3308	0.0015	0.0695	2.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.083	0.3247	0.0011	0.0496	1.74E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.06	0.000	0.109	0.3205	0.0010	0.0464	1.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.060	0.3160	0.0008	0.0362	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89	*	1.38	0.000	0.038	0.3153	0.0008	0.0394	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90	*	0.00	0.000	0.022	0.3150	0.0008	0.0352	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91	*	0.00	0.000	0.033	0.3148	0.0006	0.0299	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92	*	0.00	0.000	0.033	0.3148	0.0006	0.0261	9.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93	*	0.00	0.000	0.016	0.3148	0.0005	0.0234	8.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94	*	0.64	0.000	0.028	0.3150	0.0005	0.0212	8.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.45	1.051	0.000	0.3682	0.0004	0.0193	7.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96	*	0.98	0.000	0.041	0.3686	0.0004	0.0184	7.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.17	0.236	0.000	0.3977	0.0003	0.0148	6.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.10	0.089	0.025	0.3994	0.0004	0.0235	8.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.15	0.002	0.233	0.3838	0.0057	0.2693	7.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.03	0.000	0.198	0.3680	0.0039	0.1820	5.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.00	0.000	0.293	0.3491	0.0028	0.1308	4.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.00	0.000	0.129	0.3393	0.0018	0.0855	2.85E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.00	0.000	0.159	0.3298	0.0016	0.0732	2.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.00	0.000	0.149	0.3215	0.0009	0.0407	1.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.00	0.000	0.062	0.3179	0.0007	0.0329	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.00	0.000	0.047	0.3145	0.0004	0.0187	7.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107		0.19	0.000	0.040	0.3202	0.0004	0.0210	8.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.00	0.000	0.035	0.3173	0.0005	0.0259	9.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.00	0.000	0.032	0.3147	0.0006	0.0269	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.00	0.000	0.029	0.3123	0.0005	0.0243	9.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.00	0.000	0.027	0.3101	0.0005	0.0231	8.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.00	0.000	0.026	0.3081	0.0005	0.0218	8.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113		0.37	0.000	0.025	0.3238	0.0004	0.0197	7.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114	*	0.00	0.000	0.121	0.3175	0.0005	0.0221	8.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		0.00	0.000	0.023	0.3159	0.0003	0.0160	6.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116		0.64	0.015	0.022	0.3441	0.0003	0.0132	5.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117		0.00	0.000	0.089	0.3394	0.0003	0.0126	5.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118		0.00	0.000	0.088	0.3347	0.0002	0.0102	4.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119	*	0.00	0.000	0.066	0.3309	0.0002	0.0087	3.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120	*	0.00	0.000	0.120	0.3246	0.0003	0.0122	5.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121	*	0.00	0.000	0.000	0.3243	0.0003	0.0143	5.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	0.22	0.000	0.103	0.3295	0.0002	0.0111	4.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123	0.00	0.000	0.097	0.3245	0.0002	0.0104	4.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124	0.00	0.000	0.160	0.3165	0.0002	0.0091	3.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125	0.00	0.000	0.267	0.3038	0.0003	0.0145	5.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126	0.00	0.000	0.144	0.2969	0.0002	0.0114	4.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127	0.00	0.000	0.062	0.2939	0.0002	0.0091	3.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128	0.00	0.000	0.047	0.2917	0.0002	0.0075	3.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129	0.00	0.000	0.040	0.2898	0.0001	0.0064	2.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130	0.00	0.000	0.035	0.2881	0.0001	0.0056	2.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
131	0.00	0.000	0.032	0.2866	0.0001	0.0049	2.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132	0.34	0.000	0.030	0.3013	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133	0.08	0.000	0.028	0.3040	0.0001	0.0040	2.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134	0.17	0.000	0.026	0.3107	0.0001	0.0036	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
135	0.70	0.046	0.025	0.3405	0.0000	0.0010	5.32E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
136	0.00	0.000	0.282	0.3271	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.21E-09	0.0000	0.0000	1.58E-09
137	0.00	0.000	0.372	0.3093	0.0000	0.0006	3.61E-09	0.0000	0.0000	3.19E-09	0.0000	0.0000	2.84E-09
138	0.00	0.000	0.149	0.3022	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	7.14E-10
139	0.02	0.000	0.062	0.3001	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
140	0.10	0.000	0.048	0.3024	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141	0.00	0.000	0.040	0.3005	0.0000	0.0002	1.44E-09	0.0000	0.0000	1.36E-09	0.0000	0.0000	1.30E-09
142	0.00	0.000	0.035	0.2988	0.0000	0.0001	1.01E-09	0.0000	0.0000	9.77E-10	0.0000	0.0000	9.44E-10
143	1.12	0.119	0.032	0.3449	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
144	0.00	0.000	0.206	0.3350	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145	0.00	0.000	0.182	0.3264	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146	0.00	0.000	0.225	0.3157	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
147	0.00	0.000	0.156	0.3082	0.0000	0.0003	1.44E-09	0.0000	0.0000	1.36E-09	0.0000	0.0000	1.30E-09
148	0.00	0.000	0.145	0.3013	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
149	0.13	0.000	0.062	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150	0.32	0.000	0.048	0.3174	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151	0.02	0.000	0.194	0.3090	0.0000	0.0001	3.72E-10	0.0000	0.0000	3.67E-10	0.0000	0.0000	3.62E-10
152	0.37	0.000	0.041	0.3247	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
153	0.02	0.000	0.147	0.3185	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154	0.03	0.000	0.123	0.3141	0.0000	0.0005	3.42E-09	0.0000	0.0000	3.04E-09	0.0000	0.0000	2.74E-09
155	0.11	0.000	0.123	0.3132	0.0000	0.0003	1.79E-09	0.0000	0.0000	1.68E-09	0.0000	0.0000	1.58E-09
156	0.00	0.000	0.062	0.3103	0.0000	0.0001	5.79E-10	0.0000	0.0000	5.67E-10	0.0000	0.0000	5.56E-10
157	0.00	0.000	0.047	0.3081	0.0000	0.0000	2.54E-10	0.0000	0.0000	2.52E-10	0.0000	0.0000	1.88E-10
158	0.06	0.000	0.041	0.3092	0.0000	0.0000	5.13E-10	0.0000	0.0000	5.04E-10	0.0000	0.0000	4.35E-10
159	0.00	0.000	0.035	0.3075	0.0000	0.0001	1.22E-09	0.0000	0.0000	1.16E-09	0.0000	0.0000	9.67E-10
160	0.00	0.000	0.032	0.3060	0.0000	0.0000	2.40E-10	0.0000	0.0000	2.38E-10	0.0000	0.0000	4.54E-10
161	0.13	0.000	0.030	0.3107	0.0000	0.0001	9.84E-10	0.0000	0.0000	9.50E-10	0.0000	0.0000	7.54E-10
162	0.00	0.000	0.027	0.3094	0.0000	0.0000	6.83E-10	0.0000	0.0000	6.66E-10	0.0000	0.0000	7.24E-10
163	0.08	0.000	0.026	0.3118	0.0000	0.0001	1.01E-09	0.0000	0.0000	9.73E-10	0.0000	0.0000	8.70E-10
164	0.18	0.000	0.025	0.3192	0.0000	0.0000	6.33E-10	0.0000	0.0000	6.19E-10	0.0000	0.0000	6.87E-10

165	0.00	0.000	0.256	0.3070	0.0000	0.0002	1.21E-09	0.0000	0.0000	1.16E-09	0.0000	0.0000	9.93E-10
166	0.00	0.000	0.023	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.79E-10
167	0.00	0.000	0.022	0.3048	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
168	0.00	0.000	0.021	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.06	0.000	0.021	0.3056	0.0000	0.0000	1.13E-10	0.0000	0.0000	1.12E-10	0.0000	0.0000	1.12E-10
170	0.10	0.000	0.021	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
171	0.09	0.000	0.020	0.3125	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.06	0.000	0.019	0.3145	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.04	0.000	0.019	0.3155	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.00	0.000	0.250	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.00	0.000	0.017	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.00	0.000	0.017	0.3020	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.32	0.000	0.017	0.3163	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.09	0.000	0.172	0.3121	0.0000	0.0002	1.37E-09	0.0000	0.0000	1.30E-09	0.0000	0.0000	1.24E-09
179	0.00	0.000	0.016	0.3114	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
180	0.00	0.000	0.016	0.3106	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.00	0.000	0.015	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.00	0.000	0.015	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.00	0.000	0.015	0.3085	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.00	0.000	0.014	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.00	0.000	0.014	0.3071	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
186	0.00	0.000	0.014	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
187	0.00	0.000	0.014	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.20	0.000	0.015	0.3144	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.00	0.000	0.013	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.00	0.000	0.013	0.3132	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.00	0.000	0.013	0.3126	0.0000	0.0000	4.83E-10	0.0000	0.0000	4.74E-10	0.0000	0.0000	4.66E-10
192	0.00	0.000	0.013	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
193	0.00	0.000	0.012	0.3114	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	0.07	0.000	0.014	0.3139	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.00	0.000	0.012	0.3133	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
196	0.62	0.029	0.013	0.3409	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.08	0.000	0.141	0.3381	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.10	0.000	0.156	0.3354	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.00	0.000	0.371	0.3177	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.01	0.000	0.383	0.2998	0.0000	0.0001	6.24E-10	0.0000	0.0000	6.10E-10	0.0000	0.0000	5.97E-10
201	0.00	0.000	0.150	0.2927	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
202	0.16	0.000	0.063	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.00	0.000	0.047	0.2951	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.00	0.000	0.040	0.2932	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.00	0.000	0.035	0.2915	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
206	0.00	0.000	0.032	0.2900	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
207	0.00	0.000	0.029	0.2886	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.00	0.000	0.027	0.2874	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
209	0.00	0.000	0.026	0.2861	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.00	0.000	0.024	0.2850	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.00	0.000	0.023	0.2839	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
212	0.00	0.000	0.022	0.2829	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
213	0.24	0.000	0.022	0.2930	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.00	0.000	0.020	0.2921	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.00	0.000	0.020	0.2911	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.019	0.2902	0.0000	0.0002	2.36E-09	0.0000	0.0000	2.17E-09	0.0000	0.0000	2.01E-09
217	0.00	0.000	0.018	0.2894	0.0000	0.0000	4.52E-10	0.0000	0.0000	4.44E-10	0.0000	0.0000	4.37E-10
218	0.00	0.000	0.018	0.2885	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
219	0.00	0.000	0.017	0.2877	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.15	0.000	0.018	0.2940	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.67	0.013	0.018	0.3246	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.60	0.064	0.119	0.3442	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.05	0.000	0.117	0.3412	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.00	0.000	0.236	0.3300	0.0000	0.0003	1.76E-09	0.0000	0.0000	1.65E-09	0.0000	0.0000	1.56E-09
225	0.48	0.010	0.104	0.3476	0.0000	0.0001	6.37E-10	0.0000	0.0000	6.22E-10	0.0000	0.0000	6.08E-10
226	0.00	0.000	0.269	0.3349	0.0000	0.0005	3.51E-09	0.0000	0.0000	3.11E-09	0.0000	0.0000	2.80E-09
227	0.03	0.000	0.240	0.3248	0.0000	0.0003	2.22E-09	0.0000	0.0000	2.05E-09	0.0000	0.0000	1.91E-09
228	1.20	0.235	0.253	0.3587	0.0000	0.0009	4.58E-09	0.0000	0.0000	3.09E-09	0.0000	0.0000	2.78E-09
229	0.29	0.029	0.255	0.3591	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.81E-10	0.0000	0.0000	9.47E-10
230	0.15	0.000	0.272	0.3532	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.91	0.247	0.271	0.3717	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
232	0.03	0.000	0.227	0.3625	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
233	0.00	0.000	0.342	0.3462	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.00	0.000	0.334	0.3303	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
235	0.01	0.000	0.127	0.3245	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
236	0.04	0.000	0.063	0.3221	0.0000	0.0000	1.54E-10	0.0000	0.0000	1.53E-10	0.0000	0.0000	1.52E-10
237	0.12	0.000	0.049	0.3238	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
238	0.00	0.000	0.040	0.3201	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
239	0.00	0.000	0.035	0.3168	0.0002	0.0100	4.41E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
240	0.00	0.000	0.032	0.3139	0.0006	0.0263	9.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
241	0.00	0.000	0.029	0.3113	0.0006	0.0297	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
242	0.00	0.000	0.027	0.3090	0.0006	0.0276	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
243	0.16	0.000	0.027	0.3145	0.0005	0.0245	9.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
244	0.12	0.000	0.026	0.3184	0.0005	0.0231	8.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
245	0.00	0.000	0.023	0.3167	0.0004	0.0194	7.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
246	0.00	0.000	0.022	0.3152	0.0004	0.0169	6.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
247	0.00	0.000	0.021	0.3137	0.0003	0.0141	5.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
248	0.00	0.000	0.020	0.3123	0.0003	0.0119	5.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
249	0.00	0.000	0.020	0.3108	0.0002	0.0105	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
250	0.01	0.000	0.021	0.3101	0.0003	0.0124	5.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

251		0.17	0.000	0.020	0.3167	0.0002	0.0108	4.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
252		0.00	0.000	0.018	0.3154	0.0002	0.0098	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
253		0.02	0.000	0.019	0.3148	0.0002	0.0101	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
254		0.03	0.000	0.019	0.3152	0.0002	0.0099	4.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
255		0.00	0.000	0.016	0.3140	0.0002	0.0096	4.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
256		0.00	0.000	0.016	0.3128	0.0002	0.0078	3.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257		0.21	0.000	0.018	0.3214	0.0002	0.0086	3.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258		0.57	0.021	0.172	0.3386	0.0001	0.0071	3.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259		0.00	0.000	0.196	0.3287	0.0002	0.0095	4.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260		0.00	0.000	0.207	0.3186	0.0003	0.0149	6.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261		0.00	0.000	0.259	0.3063	0.0003	0.0141	5.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.00	0.000	0.149	0.2992	0.0002	0.0107	4.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.00	0.000	0.062	0.2962	0.0002	0.0086	3.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.00	0.000	0.047	0.2939	0.0001	0.0067	3.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.00	0.000	0.040	0.2920	0.0001	0.0061	2.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.00	0.000	0.035	0.2904	0.0001	0.0056	2.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.28	0.000	0.034	0.3020	0.0001	0.0049	2.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		1.76	0.588	0.031	0.3564	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.134	0.3500	0.0001	0.0039	1.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.01	0.000	0.069	0.3470	0.0001	0.0037	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		2.16	1.018	0.101	0.3967	0.0000	0.0012	6.22E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.00	0.000	0.120	0.3842	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.59E-09	0.0000	0.0000	2.48E-09
273		0.24	0.000	0.312	0.3699	0.0030	0.1445	4.42E-07	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
274		0.01	0.000	0.270	0.3527	0.0030	0.1377	4.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.00	0.000	0.222	0.3387	0.0016	0.0728	2.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.183	0.3270	0.0017	0.0810	2.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.118	0.3197	0.0012	0.0547	1.90E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.11	0.000	0.064	0.3204	0.0008	0.0390	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.00	0.000	0.047	0.3167	0.0008	0.0372	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		0.00	0.000	0.040	0.3135	0.0007	0.0336	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281		0.00	0.000	0.035	0.3107	0.0006	0.0294	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.00	0.000	0.032	0.3081	0.0006	0.0269	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.00	0.000	0.029	0.3059	0.0005	0.0244	9.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.00	0.000	0.027	0.3038	0.0005	0.0218	8.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.026	0.3020	0.0004	0.0194	7.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.00	0.000	0.024	0.3003	0.0004	0.0174	6.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.36	0.000	0.025	0.3155	0.0003	0.0148	6.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.06	0.000	0.024	0.3169	0.0003	0.0163	6.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.00	0.000	0.021	0.3157	0.0003	0.0149	6.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.00	0.000	0.020	0.3144	0.0002	0.0111	4.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.00	0.000	0.020	0.3132	0.0002	0.0091	3.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292	*	0.00	0.000	0.019	0.3119	0.0002	0.0084	3.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.00	0.000	0.018	0.3107	0.0002	0.0081	3.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.00	0.000	0.018	0.3094	0.0001	0.0066	3.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295	*	0.00	0.000	0.000	0.3090	0.0002	0.0071	3.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296	*	0.00	0.000	0.000	0.3087	0.0002	0.0086	3.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297	*	0.00	0.000	0.017	0.3075	0.0002	0.0087	3.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298	*	0.00	0.000	0.017	0.3064	0.0002	0.0089	3.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299	*	0.00	0.000	0.016	0.3053	0.0002	0.0086	3.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300	*	0.00	0.000	0.016	0.3043	0.0002	0.0082	3.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301	*	0.04	0.000	0.027	0.3049	0.0002	0.0081	3.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302	*	0.02	0.000	0.017	0.3047	0.0002	0.0074	3.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303	*	0.27	0.000	0.016	0.3055	0.0002	0.0076	3.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.00	0.000	0.056	0.3138	0.0002	0.0087	4.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.00	0.000	0.140	0.3071	0.0002	0.0072	3.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.000	0.016	0.3064	0.0001	0.0062	3.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.00	0.000	0.015	0.3056	0.0001	0.0055	2.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		0.00	0.000	0.015	0.3049	0.0001	0.0048	2.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.32	0.000	0.016	0.3194	0.0001	0.0043	2.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.09	0.000	0.113	0.3183	0.0001	0.0039	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.10	0.000	0.080	0.3194	0.0001	0.0036	2.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.00	0.000	0.073	0.3159	0.0000	0.0004	2.26E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313	*	0.62	0.000	0.024	0.3169	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.52E-09	0.0000	0.0000	1.48E-09
314		0.28	0.000	0.000	0.3258	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
315		0.40	0.247	0.000	0.3646	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
316		0.00	0.000	0.120	0.3588	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
317		0.30	0.002	0.111	0.3676	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
318		0.00	0.000	0.110	0.3624	0.0000	0.0001	5.44E-10	0.0000	0.0000	5.33E-10	0.0000	0.0000	5.23E-10
319		0.00	0.000	0.086	0.3583	0.0000	0.0001	9.40E-10	0.0000	0.0000	9.09E-10	0.0000	0.0000	8.79E-10
320		0.03	0.000	0.069	0.3564	0.0000	0.0006	3.50E-09	0.0000	0.0000	3.11E-09	0.0000	0.0000	2.79E-09
321		1.38	0.422	0.097	0.3966	0.0000	0.0008	4.08E-09	0.0000	0.0000	2.79E-09	0.0000	0.0000	2.54E-09
322		0.00	0.000	0.078	0.3858	0.0001	0.0024	1.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
323		0.00	0.000	0.065	0.3718	0.0035	0.1739	5.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324	*	0.00	0.000	0.000	0.3656	0.0033	0.1527	4.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325	*	0.00	0.000	0.046	0.3591	0.0023	0.1054	3.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.000	0.065	0.3526	0.0017	0.0795	2.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	0.00	0.000	0.000	0.3497	0.0015	0.0713	2.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328	*	0.00	0.000	0.000	0.3477	0.0012	0.0570	1.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329	*	0.00	0.000	0.000	0.3460	0.0009	0.0429	1.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330	*	0.37	0.000	0.012	0.3452	0.0008	0.0381	1.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	0.00	0.000	0.024	0.3446	0.0008	0.0360	1.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332	*	0.00	0.000	0.027	0.3441	0.0007	0.0339	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333	*	0.00	0.000	0.014	0.3438	0.0007	0.0313	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.00	0.000	0.008	0.3435	0.0006	0.0289	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	1.67	0.000	0.000	0.3434	0.0006	0.0266	1.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.040	0.3434	0.0005	0.0247	9.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337			0.00	0.342	0.000	0.3881	0.0005	0.0226	8.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338	*		0.36	0.000	0.031	0.3884	0.0006	0.0250	9.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339	*		0.09	0.000	0.017	0.3792	0.0017	0.0833	2.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340			0.00	0.038	0.000	0.3928	0.0044	0.1643	4.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341			0.00	0.073	0.018	0.4016	0.0030	0.1234	3.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342			0.78	0.376	0.063	0.4052	0.0055	0.2069	6.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343			0.29	0.058	0.052	0.3975	0.0071	0.3288	9.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344	*		0.20	0.000	0.021	0.3875	0.0054	0.2544	7.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345	*		0.00	0.000	0.033	0.3787	0.0045	0.2104	6.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346			0.00	0.000	0.068	0.3739	0.0034	0.1575	4.88E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347			0.18	0.000	0.125	0.3717	0.0024	0.1110	3.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348			0.00	0.000	0.109	0.3636	0.0020	0.0931	3.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349			0.00	0.000	0.052	0.3581	0.0012	0.0555	1.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350			0.00	0.000	0.050	0.3526	0.0014	0.0665	2.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351			0.00	0.000	0.057	0.3481	0.0013	0.0610	2.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352			0.00	0.000	0.062	0.3438	0.0009	0.0413	1.51E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353			0.00	0.000	0.058	0.3403	0.0007	0.0348	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354			0.00	0.000	0.097	0.3348	0.0004	0.0201	7.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355	*		0.00	0.000	0.047	0.3318	0.0005	0.0228	8.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356	*		0.03	0.000	0.024	0.3313	0.0004	0.0182	7.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357	*	*	0.01	0.000	0.013	0.3313	0.0005	0.0233	8.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*	*	0.00	0.000	0.000	0.3313	0.0003	0.0154	6.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359		*	0.00	0.000	0.000	0.3313	0.0002	0.0114	4.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		*	0.71	0.400	0.001	0.3462	0.0002	0.0091	3.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		*	0.24	0.079	0.001	0.3539	0.0002	0.0075	3.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		*	0.00	0.000	0.000	0.3539	0.0001	0.0064	2.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363	*	*	0.00	0.000	0.000	0.3539	0.0001	0.0056	2.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364	*	*	0.00	0.000	0.000	0.3539	0.0001	0.0049	2.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365	*	*	0.00	0.000	0.000	0.3539	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 9			
	inches	cubic feet	percent
Precipitation	41.63	151,112.7	100.00
Runoff	12.022	43,640.9	28.88
Evapotranspiration	21.402	77,689.6	51.41
Drainage Collected from Layer 2	8.6849	31,526.4	20.86
Percolation/Leakage through Layer 3	0.000029	0.1056	0.00
Average Head on Top of Layer 3	0.0005	---	---
Drainage Collected from Layer 7	0.0000	0.1004	0.00
Percolation/Leakage through Layer 8	0.000001	0.0051	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0000	0.00
Percolation/Leakage through Layer 11	0.000001	0.0051	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-0.4805	-1,744.2	-1.15
Soil Water at Start of Year	257.5640	934,957.4	618.72
Soil Water at End of Year	257.0835	933,213.2	617.56
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 10

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Column key: Head #1: drainage from Layer 3; Drain #1: drainage from Layer 2; Leak #1: leakage thru Layer 3; Head #2: drainage from Layer 8; Drain #2: drainage from Layer 7; Leak #2: leakage thru Layer 8; Head #3: drainage from Layer 10; Drain #3: drainage from Layer 9; Leak #3: leakage thru Layer 11

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*	*	0.00	0.000	0.000	0.3539	0.0001	0.0040	2.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2	*	*	0.48	0.000	0.025	0.3539	0.0001	0.0037	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3		*	0.67	0.913	0.000	0.3640	0.0000	0.0009	4.72E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4	*	*	0.00	0.000	0.000	0.3640	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.96E-09	0.0000	0.0000	1.41E-09
5		*	0.00	0.000	0.000	0.3640	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	4.58E-10
6		*	0.30	0.177	0.001	0.3699	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
7		*	0.00	0.000	0.000	0.3699	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
8		*	0.00	0.000	0.000	0.3699	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
9		*	0.00	0.000	0.000	0.3699	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
10		*	0.01	0.000	0.001	0.3703	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
11			0.00	0.000	0.129	0.3634	0.0000	0.0007	3.42E-09	0.0000	0.0000	3.04E-09	0.0000	0.0000	2.13E-09
12			0.01	0.000	0.151	0.3552	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	6.83E-10
13			0.17	0.000	0.115	0.3569	0.0000	0.0019	1.01E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09
14			0.40	0.008	0.167	0.3674	0.0002	0.0104	4.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
15			0.08	0.000	0.080	0.3667	0.0002	0.0089	3.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16			0.00	0.000	0.082	0.3617	0.0001	0.0036	1.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.00	0.000	0.067	0.3562	0.0000	0.0025	1.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.00	0.000	0.071	0.3511	0.0007	0.0353	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19			0.05	0.000	0.061	0.3500	0.0008	0.0350	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.31	0.000	0.110	0.3591	0.0006	0.0274	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.14	0.000	0.129	0.3585	0.0002	0.0110	4.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22			0.00	0.000	0.080	0.3538	0.0004	0.0188	7.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23	*		0.00	0.000	0.000	0.3532	0.0005	0.0223	8.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24	*		0.05	0.000	0.019	0.3529	0.0003	0.0118	4.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*		0.02	0.000	0.012	0.3521	0.0004	0.0188	7.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26	*		0.07	0.000	0.012	0.3515	0.0005	0.0238	9.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*		0.50	0.000	0.013	0.3511	0.0006	0.0304	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*		0.40	0.000	0.015	0.3508	0.0007	0.0307	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*		0.00	0.000	0.007	0.3511	0.0006	0.0297	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*		0.00	0.000	0.005	0.3517	0.0005	0.0251	9.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31	*		0.00	0.000	0.007	0.3524	0.0004	0.0180	7.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32	*		0.36	0.000	0.004	0.3530	0.0002	0.0107	4.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33	*		0.35	0.000	0.000	0.3533	0.0001	0.0063	2.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34			0.17	0.223	0.000	0.3886	0.0002	0.0085	3.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35			0.00	0.076	0.008	0.3996	0.0003	0.0151	5.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36			0.00	0.041	0.081	0.3966	0.0019	0.0928	2.85E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37			0.00	0.000	0.168	0.3785	0.0051	0.2382	7.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38			0.00	0.000	0.088	0.3665	0.0037	0.1718	5.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39			0.00	0.000	0.093	0.3568	0.0028	0.1316	4.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40			0.35	0.000	0.109	0.3648	0.0020	0.0953	3.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41	*		0.00	0.000	0.060	0.3590	0.0015	0.0707	2.39E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42			0.00	0.000	0.114	0.3515	0.0012	0.0584	2.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43			0.18	0.000	0.167	0.3501	0.0010	0.0451	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44			0.25	0.000	0.126	0.3543	0.0008	0.0380	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45	*		0.00	0.000	0.000	0.3523	0.0007	0.0353	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46	*		0.00	0.000	0.075	0.3471	0.0009	0.0423	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47			0.00	0.000	0.099	0.3415	0.0008	0.0367	1.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48			0.00	0.000	0.066	0.3378	0.0006	0.0284	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*		0.00	0.000	0.000	0.3371	0.0004	0.0164	6.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50	*		0.21	0.000	0.020	0.3372	0.0003	0.0157	6.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51	*	*	0.16	0.000	0.015	0.3372	0.0005	0.0249	9.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		*	0.00	0.031	0.037	0.3426	0.0003	0.0163	6.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		*	0.00	0.000	0.072	0.3426	0.0003	0.0120	5.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54	*	*	0.00	0.000	0.065	0.3426	0.0002	0.0094	4.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55	*	*	0.00	0.000	0.000	0.3426	0.0002	0.0077	3.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56		*	0.00	0.000	0.000	0.3426	0.0001	0.0066	3.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57		*	0.00	0.000	0.000	0.3426	0.0001	0.0057	2.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58	*	*	0.00	0.000	0.000	0.3426	0.0001	0.0050	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59		*	0.00	0.000	0.000	0.3426	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60		*	0.15	0.023	0.000	0.3484	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61	*	*	0.00	0.000	0.000	0.3484	0.0001	0.0037	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62	*	*	0.00	0.000	0.000	0.3484	0.0000	0.0015	7.85E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63	*	*	0.83	0.000	0.009	0.3484	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.21E-09	0.0000	0.0000	2.24E-09
64	*	*	0.54	0.000	0.022	0.3484	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.19E-10
65	*	*	1.24	0.000	0.026	0.3484	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
66	*	*	0.00	0.000	0.000	0.3484	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
67	*	*	0.48	0.000	0.017	0.3484	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
68	*	*	0.00	0.000	0.031	0.3484	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
69	*	*	0.00	0.000	0.034	0.3484	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
70	*	*	0.00	0.000	0.034	0.3484	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
71	*	*	0.00	0.000	0.035	0.3484	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
72		*	0.00	0.908	0.000	0.3595	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
73		*	0.00	0.634	0.000	0.3670	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
74	*	*	0.05	0.000	0.030	0.3670	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
75		*	0.44	0.319	0.000	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
76	*	*	0.01	0.000	0.045	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
77	*	*	0.00	0.000	0.027	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
78	*	*	0.00	0.000	0.016	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

79	*	*	0.00	0.000	0.020	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
80	*	*	0.00	0.000	0.010	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
81	*	*	0.01	0.000	0.010	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
82	*	*	0.32	0.000	0.000	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
83		*	0.14	1.235	0.000	0.3773	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
84		*	0.00	0.000	0.000	0.3773	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
85		*	0.00	0.000	0.000	0.3773	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
86		*	0.00	0.000	0.000	0.3773	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
87		*	0.70	0.613	0.000	0.3812	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
88		*	0.00	0.000	0.000	0.3812	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
89			0.00	0.000	0.277	0.3669	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
90			0.08	0.000	0.156	0.3633	0.0001	0.0053	2.51E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
91			0.68	0.071	0.154	0.3813	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.45E-09	0.0000	0.0000	6.80E-09
92			0.00	0.000	0.087	0.3733	0.0001	0.0025	1.06E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.79E-09
93	*		0.00	0.000	0.100	0.3664	0.0018	0.0834	2.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
94	*		0.00	0.000	0.055	0.3607	0.0005	0.0243	9.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95			0.00	0.000	0.199	0.3475	0.0017	0.0776	2.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96			0.00	0.000	0.162	0.3367	0.0016	0.0755	2.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97	*		0.09	0.000	0.082	0.3354	0.0012	0.0565	1.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98	*		0.23	0.000	0.024	0.3344	0.0007	0.0343	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99			0.00	0.000	0.147	0.3345	0.0009	0.0402	1.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100			0.00	0.000	0.096	0.3282	0.0009	0.0420	1.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101	*		0.00	0.000	0.000	0.3267	0.0008	0.0369	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102	*		0.00	0.000	0.000	0.3255	0.0007	0.0334	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103	*		0.09	0.000	0.042	0.3254	0.0006	0.0285	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104			0.03	0.000	0.072	0.3240	0.0005	0.0250	9.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105			0.04	0.000	0.191	0.3159	0.0005	0.0245	9.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106			0.17	0.000	0.083	0.3194	0.0005	0.0222	8.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107			0.09	0.000	0.117	0.3175	0.0005	0.0213	8.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108			0.00	0.000	0.094	0.3125	0.0003	0.0127	5.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109			0.00	0.000	0.282	0.2985	0.0003	0.0134	5.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110			0.00	0.000	0.130	0.2913	0.0002	0.0083	3.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111			0.00	0.000	0.062	0.2876	0.0003	0.0160	6.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112			0.00	0.000	0.047	0.2847	0.0004	0.0187	7.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113			0.00	0.000	0.040	0.2823	0.0004	0.0172	6.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114			0.00	0.000	0.035	0.2803	0.0003	0.0152	6.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115			0.01	0.000	0.032	0.2786	0.0003	0.0133	5.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116			0.00	0.000	0.028	0.2770	0.0003	0.0118	4.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117			0.00	0.000	0.027	0.2755	0.0002	0.0105	4.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118			0.00	0.000	0.026	0.2740	0.0002	0.0095	4.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119			0.00	0.000	0.024	0.2727	0.0002	0.0086	3.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120			0.00	0.000	0.023	0.2716	0.0002	0.0109	4.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121			0.00	0.000	0.022	0.2706	0.0002	0.0088	3.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	*	0.00	0.000	0.021	0.2696	0.0002	0.0073	3.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123	*	0.00	0.000	0.000	0.2696	0.0001	0.0062	2.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124		0.00	0.000	0.020	0.2686	0.0001	0.0055	2.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125		0.12	0.000	0.020	0.2736	0.0001	0.0048	2.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126		0.03	0.000	0.019	0.2739	0.0001	0.0043	2.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127		0.00	0.000	0.018	0.2730	0.0001	0.0039	1.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128		0.00	0.000	0.018	0.2721	0.0001	0.0036	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129		0.74	0.011	0.018	0.3059	0.0000	0.0003	1.63E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130		0.00	0.000	0.017	0.3052	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.02E-10	0.0000	0.0000	2.98E-10
131	*	0.11	0.000	0.117	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.90E-11
132		0.01	0.000	0.016	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
133		0.00	0.000	0.016	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134		0.00	0.000	0.015	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
135		0.00	0.000	0.015	0.3022	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
136		0.26	0.000	0.015	0.3137	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137		1.11	0.262	0.155	0.3466	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138		0.22	0.002	0.142	0.3502	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139		0.45	0.048	0.325	0.3537	0.0000	0.0004	1.85E-09	0.0000	0.0000	1.74E-09	0.0000	0.0000	1.63E-09
140		0.00	0.000	0.294	0.3397	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
141		0.00	0.000	0.268	0.3271	0.0000	0.0003	1.50E-09	0.0000	0.0000	1.43E-09	0.0000	0.0000	1.36E-09
142		0.48	0.002	0.279	0.3366	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
143		0.19	0.000	0.264	0.3332	0.0000	0.0005	2.57E-09	0.0000	0.0000	2.35E-09	0.0000	0.0000	2.16E-09
144		0.01	0.000	0.122	0.3279	0.0000	0.0005	2.39E-09	0.0000	0.0000	2.20E-09	0.0000	0.0000	2.04E-09
145		0.09	0.000	0.154	0.3249	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
146		0.17	0.000	0.142	0.3264	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
147		0.41	0.004	0.134	0.3396	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
148		0.32	0.005	0.310	0.3397	0.0000	0.0003	1.81E-09	0.0000	0.0000	1.70E-09	0.0000	0.0000	1.60E-09
149		0.07	0.000	0.333	0.3270	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
150		0.14	0.000	0.182	0.3251	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151		0.00	0.000	0.233	0.3141	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
152		0.00	0.000	0.143	0.3073	0.0000	0.0000	1.34E-10	0.0000	0.0000	1.33E-10	0.0000	0.0000	1.33E-10
153		0.03	0.000	0.063	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
154		0.03	0.000	0.048	0.3050	0.0000	0.0000	1.48E-10	0.0000	0.0000	1.47E-10	0.0000	0.0000	1.47E-10
155		0.00	0.000	0.040	0.3031	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
156		0.00	0.000	0.035	0.3014	0.0000	0.0005	3.79E-09	0.0000	0.0000	3.33E-09	0.0000	0.0000	2.97E-09
157		0.00	0.000	0.032	0.2999	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
158		0.45	0.000	0.030	0.3200	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159		0.00	0.000	0.205	0.3103	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160		0.00	0.000	0.027	0.3090	0.0000	0.0000	4.24E-10	0.0000	0.0000	4.17E-10	0.0000	0.0000	4.11E-10
161		0.00	0.000	0.026	0.3077	0.0000	0.0004	4.60E-09	0.0000	0.0000	3.10E-09	0.0000	0.0000	2.79E-09
162		0.02	0.000	0.025	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.85E-10	0.0000	0.0000	9.51E-10
163		0.00	0.000	0.023	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164		0.00	0.000	0.022	0.3052	0.0000	0.0007	6.08E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09

165	0.00	0.000	0.021	0.3042	0.0000	0.0000	2.63E-10	0.0000	0.0000	4.14E-10	0.0000	0.0000	1.37E-09
166	0.03	0.000	0.021	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.51E-11	0.0000	0.0000	1.50E-10
167	0.08	0.000	0.021	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.62E-11
168	0.21	0.000	0.020	0.3166	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.00	0.000	0.293	0.3027	0.0000	0.0000	1.25E-10	0.0000	0.0000	1.25E-10	0.0000	0.0000	1.24E-10
170	0.12	0.000	0.019	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
171	0.00	0.000	0.018	0.3066	0.0000	0.0000	2.43E-10	0.0000	0.0000	2.41E-10	0.0000	0.0000	2.39E-10
172	0.22	0.000	0.018	0.3160	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
173	0.00	0.000	0.136	0.3095	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.00	0.000	0.017	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.00	0.000	0.017	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.05	0.000	0.017	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.32	0.000	0.017	0.3242	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.00	0.000	0.376	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.015	0.3055	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.08	0.000	0.016	0.3084	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.07	0.000	0.016	0.3111	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.37	0.000	0.016	0.3280	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.04	0.000	0.299	0.3157	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.74	0.069	0.123	0.3416	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.05	0.000	0.314	0.3292	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
186	0.23	0.000	0.158	0.3327	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
187	0.01	0.000	0.110	0.3281	0.0000	0.0001	8.90E-10	0.0000	0.0000	8.62E-10	0.0000	0.0000	8.35E-10
188	0.64	0.054	0.290	0.3421	0.0000	0.0006	2.94E-09	0.0000	0.0000	2.65E-09	0.0000	0.0000	2.42E-09
189	0.38	0.028	0.332	0.3432	0.0000	0.0002	1.25E-09	0.0000	0.0000	1.20E-09	0.0000	0.0000	1.15E-09
190	0.88	0.277	0.298	0.3579	0.0000	0.0003	1.69E-09	0.0000	0.0000	1.59E-09	0.0000	0.0000	1.50E-09
191	0.72	0.266	0.122	0.3739	0.0000	0.0001	6.65E-10	0.0000	0.0000	6.49E-10	0.0000	0.0000	6.34E-10
192	0.00	0.000	0.130	0.3677	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
193	0.00	0.000	0.138	0.3611	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	0.29	0.000	0.292	0.3600	0.0000	0.0000	2.68E-10	0.0000	0.0000	2.65E-10	0.0000	0.0000	2.62E-10
195	0.28	0.000	0.288	0.3568	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
196	0.00	0.000	0.277	0.3415	0.0000	0.0029	1.31E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
197	0.00	0.000	0.284	0.3264	0.0004	0.0201	8.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
198	0.00	0.000	0.149	0.3176	0.0006	0.0284	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
199	0.00	0.000	0.062	0.3132	0.0008	0.0363	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
200	0.00	0.000	0.047	0.3094	0.0007	0.0324	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
201	0.01	0.000	0.042	0.3066	0.0007	0.0325	1.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
202	0.03	0.000	0.037	0.3053	0.0006	0.0295	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
203	0.02	0.000	0.033	0.3036	0.0005	0.0257	9.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
204	0.22	0.000	0.031	0.3118	0.0005	0.0223	8.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
205	0.03	0.000	0.029	0.3114	0.0004	0.0195	7.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
206	0.05	0.000	0.027	0.3117	0.0004	0.0173	6.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
207	0.00	0.000	0.024	0.3101	0.0003	0.0149	6.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

208	0.00	0.000	0.023	0.3085	0.0003	0.0134	5.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
209	0.00	0.000	0.022	0.3069	0.0003	0.0125	5.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
210	0.00	0.000	0.021	0.3055	0.0003	0.0130	5.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
211	0.00	0.000	0.020	0.3041	0.0003	0.0124	5.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
212	0.71	0.017	0.021	0.3360	0.0002	0.0114	4.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
213	0.10	0.000	0.128	0.3345	0.0002	0.0084	3.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
214	0.00	0.000	0.163	0.3263	0.0002	0.0100	4.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
215	0.00	0.000	0.155	0.3190	0.0003	0.0140	5.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
216	0.00	0.000	0.171	0.3108	0.0002	0.0106	4.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
217	0.05	0.000	0.151	0.3059	0.0002	0.0086	3.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
218	0.20	0.000	0.063	0.3126	0.0002	0.0072	3.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
219	0.37	0.000	0.049	0.3279	0.0001	0.0061	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
220	0.00	0.000	0.273	0.3149	0.0001	0.0054	2.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
221	0.00	0.000	0.120	0.3092	0.0001	0.0048	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
222	0.44	0.000	0.151	0.3231	0.0001	0.0043	2.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
223	0.01	0.000	0.266	0.3110	0.0001	0.0039	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
224	0.16	0.000	0.064	0.3158	0.0001	0.0035	1.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
225	0.00	0.000	0.149	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.07E-09	0.0000	0.0000	4.92E-09
226	0.00	0.000	0.047	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.34E-19	0.0000	0.0000	4.95E-10
227	0.00	0.000	0.040	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
228	0.00	0.000	0.035	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
229	0.16	0.000	0.034	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
230	0.00	0.000	0.029	0.3073	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.76	0.053	0.029	0.3395	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
232	0.00	0.000	0.250	0.3276	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
233	0.00	0.000	0.237	0.3163	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.00	0.000	0.203	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
235	0.00	0.000	0.105	0.3017	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
236	0.98	0.080	0.064	0.3417	0.0000	0.0002	2.62E-09	0.0000	0.0000	2.39E-09	0.0000	0.0000	2.20E-09
237	0.04	0.000	0.198	0.3340	0.0000	0.0001	8.63E-10	0.0000	0.0000	8.37E-10	0.0000	0.0000	8.12E-10
238	0.60	0.053	0.286	0.3463	0.0000	0.0002	9.78E-10	0.0000	0.0000	9.44E-10	0.0000	0.0000	9.13E-10
239	0.00	0.000	0.150	0.3391	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
240	0.00	0.000	0.187	0.3302	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
241	0.00	0.000	0.266	0.3176	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
242	0.00	0.000	0.216	0.3073	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	1.02	0.096	0.151	0.3443	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
244	0.00	0.000	0.253	0.3322	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
245	0.00	0.000	0.141	0.3255	0.0000	0.0001	1.05E-09	0.0000	0.0000	1.01E-09	0.0000	0.0000	9.73E-10
246	0.08	0.000	0.236	0.3179	0.0000	0.0003	2.20E-09	0.0000	0.0000	2.04E-09	0.0000	0.0000	1.90E-09
247	0.00	0.000	0.179	0.3094	0.0000	0.0002	8.50E-10	0.0000	0.0000	8.24E-10	0.0000	0.0000	8.00E-10
248	0.15	0.000	0.151	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
249	0.01	0.000	0.064	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.06	0.000	0.050	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

251		0.00	0.000	0.040	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
252		0.00	0.000	0.035	0.3033	0.0000	0.0003	2.50E-09	0.0000	0.0000	2.29E-09	0.0000	0.0000	2.11E-09
253		0.80	0.032	0.034	0.3385	0.0000	0.0000	1.30E-10	0.0000	0.0000	1.30E-10	0.0000	0.0000	1.29E-10
254		0.00	0.000	0.090	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
255	*	0.97	0.000	0.033	0.3351	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
256		0.10	0.222	0.013	0.3725	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
257		0.15	0.004	0.138	0.3727	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
258		0.00	0.000	0.089	0.3684	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
259		0.00	0.000	0.122	0.3625	0.0000	0.0000	1.04E-10	0.0000	0.0000	1.04E-10	0.0000	0.0000	1.04E-10
260		0.18	0.000	0.079	0.3647	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
261		0.00	0.000	0.130	0.3554	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262		0.27	0.000	0.117	0.3611	0.0005	0.0234	9.00E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
263		0.05	0.000	0.306	0.3458	0.0006	0.0295	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.00	0.000	0.144	0.3371	0.0013	0.0633	2.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.08	0.000	0.218	0.3294	0.0009	0.0391	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.00	0.000	0.224	0.3181	0.0006	0.0293	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.00	0.000	0.149	0.3097	0.0004	0.0172	6.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.00	0.000	0.059	0.3056	0.0005	0.0240	9.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.046	0.3026	0.0006	0.0291	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.00	0.000	0.040	0.3002	0.0005	0.0231	8.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.035	0.2982	0.0004	0.0195	7.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.00	0.000	0.032	0.2964	0.0003	0.0145	5.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.00	0.000	0.029	0.2946	0.0002	0.0101	4.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		0.48	0.000	0.030	0.3154	0.0002	0.0092	4.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.07	0.000	0.342	0.3019	0.0002	0.0084	3.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.04	0.000	0.028	0.3016	0.0002	0.0094	4.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.024	0.3000	0.0003	0.0120	5.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.00	0.000	0.023	0.2986	0.0003	0.0130	5.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.09	0.000	0.025	0.3011	0.0002	0.0109	4.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		1.35	0.247	0.024	0.3524	0.0002	0.0104	4.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281		0.00	0.000	0.203	0.3422	0.0001	0.0062	2.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.00	0.000	0.199	0.3326	0.0003	0.0137	5.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.15	0.000	0.104	0.3347	0.0003	0.0120	5.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.02	0.000	0.166	0.3277	0.0002	0.0090	3.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.153	0.3204	0.0002	0.0083	3.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.10	0.000	0.182	0.3166	0.0001	0.0069	3.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.65	0.015	0.144	0.3400	0.0001	0.0060	2.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.00	0.000	0.117	0.3344	0.0001	0.0052	2.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.72	0.078	0.236	0.3537	0.0001	0.0047	2.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.06	0.000	0.280	0.3430	0.0001	0.0042	2.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.00	0.000	0.187	0.3342	0.0001	0.0038	1.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.00	0.000	0.083	0.3302	0.0001	0.0029	1.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.00	0.000	0.170	0.3222	0.0000	0.0004	2.42E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.00	0.000	0.092	0.3178	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.77E-10	0.0000	0.0000	2.76E-10
295		1.31	0.228	0.141	0.3626	0.0000	0.0011	5.83E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
296		0.01	0.000	0.116	0.3574	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.16E-11	0.0000	0.0000	1.11E-09
297		0.00	0.000	0.122	0.3516	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.29E-11
298		0.86	0.139	0.134	0.3794	0.0000	0.0002	1.17E-09	0.0000	0.0000	1.13E-09	0.0000	0.0000	1.08E-09
299		0.01	0.000	0.133	0.3733	0.0000	0.0010	5.77E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
300		0.02	0.000	0.141	0.3667	0.0000	0.0017	9.32E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		1.38	0.446	0.128	0.4001	0.0001	0.0021	7.47E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.02	0.000	0.125	0.3848	0.0015	0.0769	2.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.00	0.000	0.138	0.3678	0.0055	0.2553	7.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.00	0.000	0.189	0.3528	0.0031	0.1459	4.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.02	0.000	0.165	0.3422	0.0021	0.1005	3.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.72	0.037	0.157	0.3654	0.0015	0.0699	2.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.00	0.000	0.096	0.3591	0.0009	0.0449	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		0.00	0.000	0.104	0.3524	0.0008	0.0367	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.02	0.000	0.093	0.3471	0.0008	0.0367	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.00	0.000	0.120	0.3396	0.0008	0.0382	1.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.00	0.000	0.080	0.3341	0.0008	0.0395	1.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.00	0.000	0.111	0.3278	0.0008	0.0367	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.00	0.000	0.203	0.3175	0.0007	0.0322	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.00	0.000	0.149	0.3099	0.0004	0.0174	6.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.53	0.000	0.063	0.3316	0.0003	0.0162	6.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316	*	0.02	0.000	0.041	0.3304	0.0004	0.0186	7.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317	*	0.00	0.000	0.000	0.3302	0.0003	0.0145	5.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318	*	0.00	0.000	0.000	0.3300	0.0002	0.0103	4.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319	*	0.46	0.000	0.007	0.3306	0.0002	0.0080	3.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320	*	0.00	0.000	0.035	0.3311	0.0001	0.0070	3.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321	*	0.32	0.000	0.019	0.3317	0.0001	0.0068	3.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322	*	0.00	0.000	0.032	0.3322	0.0001	0.0069	3.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323	*	0.00	0.000	0.018	0.3327	0.0002	0.0075	3.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324	*	0.00	0.000	0.010	0.3332	0.0002	0.0080	3.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325	*	0.00	0.000	0.007	0.3339	0.0002	0.0096	4.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326	*	0.00	0.000	0.017	0.3344	0.0002	0.0077	3.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	0.00	0.000	0.022	0.3349	0.0002	0.0074	3.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.004	0.005	0.3547	0.0002	0.0076	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.00	0.000	0.134	0.3480	0.0002	0.0093	4.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.00	0.000	0.064	0.3443	0.0001	0.0050	2.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	0.00	0.000	0.000	0.3438	0.0002	0.0084	3.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332	*	0.00	0.000	0.000	0.3434	0.0002	0.0104	4.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.000	0.050	0.3406	0.0002	0.0099	4.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.00	0.000	0.045	0.3381	0.0002	0.0105	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	0.00	0.000	0.043	0.3357	0.0002	0.0104	4.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.051	0.3332	0.0003	0.0132	5.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337	*	*	0.00	0.000	0.002	0.3332	0.0002	0.0108	4.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338	*	*	0.36	0.000	0.021	0.3332	0.0002	0.0087	3.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		*	0.00	0.120	0.014	0.3432	0.0002	0.0073	3.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		*	0.23	0.073	0.001	0.3508	0.0001	0.0062	2.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		*	0.04	0.000	0.001	0.3526	0.0001	0.0054	2.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342	*	*	0.39	0.000	0.026	0.3526	0.0001	0.0048	2.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343	*	*	0.05	0.000	0.000	0.3526	0.0001	0.0043	2.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344	*	*	0.00	0.000	0.019	0.3526	0.0001	0.0039	1.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345	*	*	0.00	0.000	0.031	0.3526	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346		*	0.00	0.206	0.026	0.3590	0.0000	0.0002	8.41E-10	0.0000	0.0000	6.70E-09	0.0000	0.0000	5.05E-09
347	*	*	0.26	0.000	0.030	0.3590	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.04E-09
348		*	0.00	0.112	0.043	0.3626	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
349		*	0.00	0.000	0.000	0.3626	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
350		*	0.00	0.000	0.000	0.3626	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
351		*	0.00	0.000	0.000	0.3626	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
352		*	0.00	0.000	0.000	0.3626	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
353	*	*	0.03	0.000	0.028	0.3626	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
354	*	*	0.00	0.000	0.005	0.3626	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
355	*	*	0.02	0.000	0.022	0.3626	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
356		*	0.24	0.129	0.001	0.3678	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
357		*	0.25	0.149	0.001	0.3724	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
358		*	0.08	0.027	0.001	0.3751	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
359		*	0.00	0.000	0.000	0.3751	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
360			0.00	0.000	0.049	0.3725	0.0000	0.0010	5.14E-09	0.0000	0.0000	4.69E-09	0.0000	0.0000	3.15E-09
361			0.31	0.006	0.100	0.3820	0.0001	0.0036	1.86E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	5.03E-09
362			0.43	0.069	0.085	0.3918	0.0000	0.0007	3.84E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363			0.01	0.000	0.058	0.3857	0.0004	0.0208	7.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364			0.47	0.052	0.062	0.3931	0.0028	0.1207	3.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365			0.78	0.349	0.103	0.4014	0.0055	0.1549	4.59E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 10			
	inches	cubic feet	percent
Precipitation	45.63	165,626.4	100.00
Runoff	9.344	33,917.0	20.48
Evapotranspiration	30.185	109,569.8	66.15
Drainage Collected from Layer 2	4.9025	17,795.9	10.74
Percolation/Leakage through Layer 3	0.000018	0.0643	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0576	0.00
Percolation/Leakage through Layer 8	0.000001	0.0053	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0052	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	1.1966	4,343.6	2.62
Soil Water at Start of Year	257.0835	933,213.2	563.44
Soil Water at End of Year	258.2801	937,556.8	566.07
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 11

Title: Millersville Cell 9 - Final Cover

Simulated On: 12/6/2024 15:30

Column key: Head #1: drainage from Layer 3; Drain #1: drainage from Layer 2; Leak #1: leakage thru Layer 3; Head #2: drainage from Layer 8; Drain #2: drainage from Layer 7; Leak #2: leakage thru Layer 8; Head #3: drainage from Layer 10; Drain #3: drainage from Layer 9; Leak #3: leakage thru Layer 11

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.103	0.3842	0.0047	0.2173	6.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.00	0.000	0.103	0.3690	0.0054	0.2511	7.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.32	0.000	0.103	0.3735	0.0031	0.1453	4.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.33	0.014	0.105	0.3798	0.0023	0.1067	3.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			1.02	0.458	0.057	0.4010	0.0017	0.0569	1.91E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6			0.00	0.000	0.068	0.3862	0.0034	0.1594	4.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7	*		0.05	0.000	0.033	0.3760	0.0057	0.2644	7.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8			0.19	0.000	0.080	0.3747	0.0034	0.1563	4.85E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9			0.46	0.050	0.127	0.3841	0.0026	0.1123	3.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10			0.00	0.000	0.093	0.3755	0.0016	0.0734	2.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11			0.00	0.000	0.128	0.3675	0.0015	0.0673	2.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.00	0.000	0.062	0.3592	0.0016	0.0770	2.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13			0.00	0.000	0.108	0.3504	0.0021	0.0972	3.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14			0.00	0.000	0.103	0.3425	0.0016	0.0733	2.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*		0.02	0.000	0.051	0.3389	0.0013	0.0593	2.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16			0.00	0.000	0.092	0.3322	0.0009	0.0428	1.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.00	0.000	0.080	0.3266	0.0010	0.0487	1.72E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.00	0.000	0.086	0.3210	0.0008	0.0399	1.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19	*		0.00	0.000	0.044	0.3179	0.0007	0.0349	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20	*		0.00	0.000	0.000	0.3169	0.0005	0.0248	9.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.00	0.000	0.071	0.3123	0.0005	0.0233	8.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22			0.01	0.000	0.062	0.3086	0.0005	0.0251	9.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23			0.23	0.000	0.048	0.3166	0.0005	0.0232	8.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.01	0.000	0.110	0.3109	0.0005	0.0221	8.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25			0.25	0.000	0.041	0.3202	0.0004	0.0171	6.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26			0.00	0.000	0.076	0.3158	0.0004	0.0178	7.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*		0.00	0.000	0.000	0.3151	0.0004	0.0177	7.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*		0.00	0.000	0.000	0.3144	0.0004	0.0175	6.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29			0.00	0.000	0.072	0.3105	0.0004	0.0167	6.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30			0.73	0.023	0.102	0.3387	0.0003	0.0123	5.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31			0.00	0.000	0.131	0.3319	0.0002	0.0117	4.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32			0.00	0.000	0.134	0.3249	0.0003	0.0149	6.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33			0.18	0.000	0.204	0.3230	0.0003	0.0138	5.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34			0.00	0.000	0.158	0.3151	0.0003	0.0149	6.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35			0.00	0.000	0.126	0.3090	0.0004	0.0176	7.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36			1.07	0.127	0.087	0.3499	0.0003	0.0134	5.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*		0.58	0.000	0.025	0.3509	0.0002	0.0104	4.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38	*		0.00	0.000	0.027	0.3518	0.0002	0.0084	3.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39	*		0.00	0.000	0.025	0.3528	0.0001	0.0070	3.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40	*		0.19	0.000	0.025	0.3537	0.0001	0.0060	2.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41	*		0.05	0.000	0.011	0.3546	0.0001	0.0053	2.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42	*		0.04	0.000	0.006	0.3556	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43	*		0.31	0.000	0.009	0.3565	0.0001	0.0043	2.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44	*		0.29	0.000	0.012	0.3574	0.0001	0.0039	1.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45	*		0.00	0.000	0.022	0.3584	0.0001	0.0032	1.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46			0.00	0.183	0.000	0.3912	0.0000	0.0015	7.75E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47			0.02	0.041	0.083	0.3953	0.0001	0.0027	1.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48	*		0.21	0.000	0.059	0.3851	0.0014	0.0703	2.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*		0.00	0.000	0.034	0.3781	0.0037	0.1719	5.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50	*		0.00	0.000	0.014	0.3727	0.0032	0.1483	4.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51	*	*	0.15	0.000	0.018	0.3727	0.0019	0.0906	2.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		*	0.00	0.039	0.040	0.3761	0.0006	0.0300	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53	*	*	0.00	0.000	0.027	0.3761	0.0004	0.0181	7.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54	*	*	0.07	0.000	0.030	0.3761	0.0003	0.0129	5.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55	*	*	0.65	0.000	0.010	0.3761	0.0002	0.0100	4.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56	*	*	0.06	0.000	0.000	0.3761	0.0002	0.0081	3.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57	*	*	0.04	0.000	0.014	0.3761	0.0001	0.0069	3.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58	*	*	0.03	0.000	0.000	0.3761	0.0001	0.0059	2.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59	*	*	0.00	0.000	0.039	0.3761	0.0001	0.0052	2.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60		*	0.00	0.435	0.017	0.3833	0.0001	0.0046	2.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61	*	*	0.16	0.000	0.031	0.3833	0.0001	0.0042	2.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62	*	*	0.00	0.000	0.032	0.3833	0.0001	0.0038	1.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63	*	*	0.00	0.000	0.016	0.3833	0.0001	0.0025	1.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64		*	0.00	0.131	0.076	0.3844	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.79E-09	0.0000	0.0000	4.40E-09
65		*	0.00	0.000	0.000	0.3844	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
66	*	*	0.00	0.000	0.000	0.3844	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
67		*	0.00	0.000	0.000	0.3844	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
68		*	0.00	0.000	0.000	0.3844	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
69		*	0.18	0.096	0.000	0.3885	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
70		*	0.08	0.024	0.000	0.3910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
71		*	0.94	0.854	0.000	0.3952	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
72			0.00	0.000	0.198	0.3811	0.0001	0.0034	1.39E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
73			0.00	0.000	0.220	0.3607	0.0017	0.0809	2.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.00	0.000	0.215	0.3453	0.0030	0.1365	4.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.00	0.000	0.220	0.3317	0.0020	0.0919	3.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.00	0.000	0.149	0.3220	0.0013	0.0596	2.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.00	0.000	0.062	0.3170	0.0012	0.0544	1.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.00	0.000	0.047	0.3127	0.0010	0.0451	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.22	0.000	0.040	0.3196	0.0009	0.0437	1.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.11	0.000	0.036	0.3215	0.0008	0.0388	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.54	0.003	0.032	0.3443	0.0007	0.0336	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.00	0.000	0.172	0.3352	0.0007	0.0321	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.00	0.000	0.191	0.3253	0.0005	0.0226	8.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.00	0.000	0.389	0.3058	0.0004	0.0196	7.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.09	0.000	0.149	0.3017	0.0004	0.0186	7.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.062	0.2981	0.0006	0.0271	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.08	0.000	0.048	0.2991	0.0004	0.0200	7.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.040	0.2967	0.0004	0.0176	7.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.00	0.000	0.035	0.2947	0.0004	0.0168	6.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.032	0.2929	0.0003	0.0117	4.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.00	0.000	0.029	0.2912	0.0002	0.0104	4.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92	*	0.00	0.000	0.000	0.2909	0.0002	0.0104	4.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93	*	0.00	0.000	0.027	0.2894	0.0002	0.0087	3.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.026	0.2879	0.0002	0.0083	3.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95	*	0.00	0.000	0.024	0.2866	0.0002	0.0078	3.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.21	0.000	0.023	0.2955	0.0002	0.0104	4.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.09	0.000	0.022	0.2986	0.0002	0.0084	3.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.00	0.000	0.021	0.2976	0.0002	0.0070	3.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.00	0.000	0.020	0.2966	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.00	0.000	0.020	0.2956	0.0001	0.0053	2.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101	*	0.03	0.000	0.026	0.2956	0.0001	0.0051	2.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.04	0.000	0.019	0.2968	0.0001	0.0046	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.01	0.000	0.019	0.2963	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.02	0.000	0.018	0.2963	0.0001	0.0035	1.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.02	0.000	0.018	0.2965	0.0001	0.0024	1.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.00	0.000	0.017	0.2957	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.50E-09	0.0000	0.0000	4.17E-09
107		0.00	0.000	0.016	0.2948	0.0000	0.0011	7.14E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
108		0.00	0.000	0.016	0.2941	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.39E-10	0.0000	0.0000	1.66E-09
109		0.18	0.000	0.016	0.3019	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.03E-10
110		0.00	0.000	0.015	0.3012	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
111		0.00	0.000	0.015	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
112		0.09	0.000	0.015	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
113		0.31	0.000	0.015	0.3181	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
114		0.00	0.000	0.180	0.3095	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
115		0.00	0.000	0.014	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
116		0.00	0.000	0.014	0.3082	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
117		0.00	0.000	0.014	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
118		0.00	0.000	0.013	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
119		0.53	0.004	0.014	0.3311	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.05	0.000	0.237	0.3220	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
121		0.00	0.000	0.265	0.3094	0.0000	0.0001	4.75E-10	0.0000	0.0000	4.67E-10	0.0000	0.0000	4.59E-10

122	0.00	0.000	0.149	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
123	1.15	0.146	0.062	0.3472	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
124	0.00	0.000	0.146	0.3403	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125	0.00	0.000	0.182	0.3316	0.0000	0.0002	9.86E-10	0.0000	0.0000	9.51E-10	0.0000	0.0000	9.20E-10
126	0.00	0.000	0.291	0.3176	0.0000	0.0013	7.00E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
127	0.00	0.000	0.132	0.3113	0.0000	0.0001	6.22E-10	0.0000	0.0000	1.20E-09	0.0000	0.0000	1.90E-09
128	0.55	0.002	0.149	0.3304	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.52E-10	0.0000	0.0000	4.00E-10
129	0.00	0.000	0.258	0.3181	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.78E-11
130	0.00	0.000	0.137	0.3116	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
131	0.00	0.000	0.149	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
132	0.41	0.000	0.062	0.3213	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
133	0.15	0.000	0.089	0.3241	0.0000	0.0000	2.93E-10	0.0000	0.0000	2.90E-10	0.0000	0.0000	2.87E-10
134	0.16	0.000	0.114	0.3265	0.0000	0.0000	1.35E-10	0.0000	0.0000	1.35E-10	0.0000	0.0000	1.34E-10
135	0.00	0.000	0.231	0.3155	0.0000	0.0004	1.95E-09	0.0000	0.0000	1.82E-09	0.0000	0.0000	1.71E-09
136	0.00	0.000	0.211	0.3055	0.0000	0.0000	3.15E-10	0.0000	0.0000	3.11E-10	0.0000	0.0000	3.08E-10
137	0.00	0.000	0.132	0.2992	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
138	0.00	0.000	0.062	0.2962	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.00	0.000	0.048	0.2940	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140	0.00	0.000	0.040	0.2921	0.0000	0.0000	1.38E-10	0.0000	0.0000	1.37E-10	0.0000	0.0000	1.36E-10
141	0.51	0.000	0.036	0.3148	0.0000	0.0002	1.15E-09	0.0000	0.0000	1.11E-09	0.0000	0.0000	1.06E-09
142	0.01	0.000	0.202	0.3055	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
143	0.07	0.000	0.032	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144	0.25	0.000	0.030	0.3176	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145	0.41	0.007	0.342	0.3208	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146	0.40	0.012	0.177	0.3311	0.0000	0.0001	8.32E-10	0.0000	0.0000	8.07E-10	0.0000	0.0000	7.84E-10
147	0.00	0.000	0.443	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
148	0.00	0.000	0.149	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
149	0.00	0.000	0.062	0.2999	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150	0.00	0.000	0.047	0.2977	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151	0.01	0.000	0.041	0.2962	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
152	0.16	0.000	0.036	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.00	0.000	0.032	0.3008	0.0000	0.0001	6.20E-10	0.0000	0.0000	6.06E-10	0.0000	0.0000	5.93E-10
154	0.37	0.000	0.030	0.3169	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
155	0.00	0.000	0.334	0.3010	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156	0.04	0.000	0.028	0.3017	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157	0.05	0.000	0.026	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158	0.00	0.000	0.024	0.3018	0.0000	0.0001	5.37E-10	0.0000	0.0000	5.27E-10	0.0000	0.0000	5.17E-10
159	0.10	0.000	0.024	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
160	0.25	0.000	0.023	0.3160	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161	0.38	0.004	0.103	0.3289	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162	0.27	0.002	0.302	0.3273	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163	0.20	0.000	0.256	0.3244	0.0000	0.0007	3.92E-09	0.0000	0.0000	2.69E-09	0.0000	0.0000	2.45E-09
164	0.01	0.000	0.155	0.3177	0.0000	0.0007	4.81E-09	0.0000	0.0000	4.80E-09	0.0000	0.0000	4.41E-09

165	0.03	0.000	0.182	0.3106	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.85E-10	0.0000	0.0000	2.86E-10
166	0.32	0.000	0.150	0.3188	0.0000	0.0000	2.66E-10	0.0000	0.0000	2.64E-10	0.0000	0.0000	2.91E-10
167	0.05	0.000	0.149	0.3141	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	6.53E-11
168	0.14	0.000	0.063	0.3177	0.0000	0.0000	2.64E-10	0.0000	0.0000	2.62E-10	0.0000	0.0000	1.95E-10
169	0.00	0.000	0.315	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	6.48E-11
170	0.64	0.023	0.048	0.3299	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
171	0.67	0.145	0.219	0.3445	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.00	0.000	0.298	0.3303	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.00	0.000	0.326	0.3147	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.01	0.000	0.305	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.00	0.000	0.149	0.2934	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.19	0.000	0.063	0.2996	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.52	0.001	0.049	0.3221	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.00	0.000	0.324	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.040	0.3048	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.00	0.000	0.035	0.3031	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.24	0.000	0.033	0.3130	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.00	0.000	0.029	0.3116	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.97	0.140	0.028	0.3499	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.08	0.000	0.296	0.3395	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.00	0.000	0.351	0.3227	0.0000	0.0006	3.06E-09	0.0000	0.0000	2.75E-09	0.0000	0.0000	2.50E-09
186	0.00	0.000	0.172	0.3146	0.0000	0.0001	7.25E-10	0.0000	0.0000	7.06E-10	0.0000	0.0000	6.89E-10
187	1.19	0.177	0.150	0.3556	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
188	0.02	0.000	0.271	0.3435	0.0000	0.0000	9.65E-11	0.0000	0.0000	9.62E-11	0.0000	0.0000	9.59E-11
189	0.49	0.023	0.305	0.3510	0.0000	0.0004	2.14E-09	0.0000	0.0000	1.98E-09	0.0000	0.0000	1.85E-09
190	0.00	0.000	0.171	0.3428	0.0000	0.0006	3.40E-09	0.0000	0.0000	3.03E-09	0.0000	0.0000	2.72E-09
191	0.00	0.000	0.171	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
192	0.31	0.000	0.178	0.3408	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
193	0.00	0.000	0.180	0.3322	0.0000	0.0006	3.42E-09	0.0000	0.0000	3.04E-09	0.0000	0.0000	2.74E-09
194	0.00	0.000	0.300	0.3179	0.0000	0.0000	1.19E-10	0.0000	0.0000	1.18E-10	0.0000	0.0000	1.18E-10
195	0.00	0.000	0.302	0.3035	0.0000	0.0011	7.37E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
196	0.14	0.000	0.150	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.55E-10	0.0000	0.0000	1.74E-09
197	0.35	0.000	0.063	0.3168	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.31E-10
198	0.04	0.000	0.291	0.3051	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.41	0.000	0.049	0.3220	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.11	0.000	0.114	0.3218	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.01	0.000	0.290	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.00	0.000	0.149	0.3012	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.56	0.002	0.063	0.3246	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.57	0.046	0.104	0.3445	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.00	0.000	0.232	0.3334	0.0000	0.0000	3.22E-10	0.0000	0.0000	3.18E-10	0.0000	0.0000	3.15E-10
206	0.29	0.000	0.246	0.3357	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
207	0.00	0.000	0.295	0.3217	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.00	0.000	0.269	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
209	0.00	0.000	0.149	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.17	0.000	0.063	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.00	0.000	0.047	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
212	0.28	0.000	0.042	0.3159	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
213	0.00	0.000	0.035	0.3142	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.13	0.000	0.034	0.3189	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.00	0.000	0.182	0.3102	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.029	0.3088	0.0000	0.0000	8.30E-11	0.0000	0.0000	8.27E-11	0.0000	0.0000	8.25E-11
217	0.00	0.000	0.027	0.3075	0.0000	0.0000	3.29E-10	0.0000	0.0000	3.25E-10	0.0000	0.0000	3.21E-10
218	0.00	0.000	0.026	0.3063	0.0000	0.0000	6.05E-10	0.0000	0.0000	5.92E-10	0.0000	0.0000	5.79E-10
219	0.19	0.000	0.026	0.3143	0.0000	0.0000	5.58E-10	0.0000	0.0000	5.47E-10	0.0000	0.0000	5.36E-10
220	0.04	0.000	0.025	0.3151	0.0000	0.0001	9.68E-10	0.0000	0.0000	9.35E-10	0.0000	0.0000	9.04E-10
221	0.00	0.000	0.022	0.3141	0.0000	0.0000	6.47E-10	0.0000	0.0000	6.32E-10	0.0000	0.0000	6.18E-10
222	0.00	0.000	0.021	0.3131	0.0000	0.0001	9.18E-10	0.0000	0.0000	8.88E-10	0.0000	0.0000	8.60E-10
223	0.17	0.000	0.022	0.3200	0.0000	0.0001	9.88E-10	0.0000	0.0000	9.53E-10	0.0000	0.0000	9.21E-10
224	0.00	0.000	0.302	0.3057	0.0000	0.0001	9.99E-10	0.0000	0.0000	9.64E-10	0.0000	0.0000	9.31E-10
225	0.00	0.000	0.020	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
226	0.02	0.000	0.021	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
227	0.02	0.000	0.020	0.3045	0.0000	0.0000	2.00E-10	0.0000	0.0000	1.99E-10	0.0000	0.0000	1.98E-10
228	0.14	0.000	0.020	0.3104	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
229	0.19	0.000	0.019	0.3188	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
230	0.13	0.000	0.098	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.37	0.003	0.191	0.3289	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
232	0.00	0.000	0.228	0.3181	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
233	0.00	0.000	0.284	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.00	0.000	0.149	0.2974	0.0000	0.0006	3.02E-09	0.0000	0.0000	2.72E-09	0.0000	0.0000	2.47E-09
235	0.11	0.000	0.064	0.2996	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
236	0.14	0.000	0.049	0.3040	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.06	0.000	0.042	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	0.12	0.000	0.037	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
239	0.19	0.000	0.034	0.3161	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
240	0.06	0.000	0.031	0.3174	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
241	0.00	0.000	0.239	0.3060	0.0000	0.0004	2.14E-09	0.0000	0.0000	1.99E-09	0.0000	0.0000	1.85E-09
242	0.00	0.000	0.027	0.3047	0.0000	0.0007	3.96E-09	0.0000	0.0000	2.72E-09	0.0000	0.0000	2.47E-09
243	0.00	0.000	0.026	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.64E-10	0.0000	0.0000	8.38E-10
244	0.17	0.000	0.026	0.3104	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
245	0.94	0.140	0.025	0.3472	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
246	0.00	0.000	0.094	0.3427	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	0.00	0.000	0.092	0.3383	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
248	0.91	0.161	0.091	0.3697	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.00	0.000	0.144	0.3628	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.00	0.000	0.193	0.3536	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

251		0.00	0.000	0.158	0.3461	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
252		0.00	0.000	0.125	0.3400	0.0000	0.0001	1.13E-09	0.0000	0.0000	1.09E-09	0.0000	0.0000	1.05E-09
253		0.00	0.000	0.079	0.3348	0.0000	0.0001	4.03E-10	0.0000	0.0000	3.97E-10	0.0000	0.0000	3.92E-10
254		0.00	0.000	0.147	0.3255	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
255		0.00	0.000	0.088	0.3195	0.0001	0.0044	1.91E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
256		0.00	0.000	0.062	0.3152	0.0004	0.0197	7.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257		0.00	0.000	0.047	0.3115	0.0005	0.0258	9.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258		0.00	0.000	0.040	0.3082	0.0006	0.0299	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259		0.00	0.000	0.035	0.3054	0.0006	0.0296	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260		0.40	0.000	0.034	0.3216	0.0006	0.0272	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261		0.98	0.109	0.164	0.3545	0.0006	0.0263	9.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.10	0.000	0.251	0.3465	0.0004	0.0190	7.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.83	0.161	0.197	0.3682	0.0004	0.0181	7.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.00	0.000	0.197	0.3577	0.0004	0.0168	6.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.00	0.000	0.172	0.3487	0.0005	0.0239	9.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.00	0.000	0.128	0.3422	0.0005	0.0238	9.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.00	0.000	0.068	0.3389	0.0005	0.0219	8.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.00	0.000	0.113	0.3336	0.0003	0.0147	6.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.136	0.3267	0.0001	0.0054	2.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.59	0.005	0.119	0.3476	0.0000	0.0002	2.28E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271	*	1.34	0.000	0.032	0.3473	0.0001	0.0042	2.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272	*	0.73	0.000	0.025	0.3467	0.0003	0.0155	6.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.00	0.557	0.000	0.3935	0.0006	0.0283	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		0.00	0.142	0.068	0.3983	0.0005	0.0245	8.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.00	0.000	0.147	0.3798	0.0043	0.2054	6.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.094	0.3671	0.0039	0.1839	5.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.211	0.3516	0.0029	0.1343	4.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.00	0.000	0.107	0.3429	0.0021	0.0979	3.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.18	0.000	0.227	0.3383	0.0014	0.0666	2.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		0.00	0.000	0.283	0.3229	0.0010	0.0470	1.66E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281		0.00	0.000	0.149	0.3140	0.0009	0.0439	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.00	0.000	0.061	0.3097	0.0009	0.0414	1.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.00	0.000	0.047	0.3065	0.0007	0.0306	1.15E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.00	0.000	0.040	0.3035	0.0005	0.0240	9.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.035	0.3007	0.0005	0.0238	9.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.14	0.000	0.034	0.3049	0.0005	0.0239	9.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.00	0.000	0.029	0.3025	0.0005	0.0231	8.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.77	0.021	0.030	0.3361	0.0005	0.0223	8.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		1.55	0.574	0.082	0.3779	0.0004	0.0195	7.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.00	0.000	0.138	0.3702	0.0003	0.0123	5.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.00	0.000	0.084	0.3661	0.0006	0.0282	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.89	0.169	0.097	0.3925	0.0001	0.0039	1.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.00	0.000	0.125	0.3831	0.0012	0.0549	1.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.11	0.000	0.071	0.3751	0.0033	0.1587	4.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.00	0.000	0.126	0.3634	0.0031	0.1438	4.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.00	0.000	0.067	0.3558	0.0021	0.0985	3.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297	*	0.00	0.000	0.000	0.3524	0.0018	0.0853	2.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298	*	0.00	0.000	0.000	0.3497	0.0015	0.0686	2.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299	*	0.00	0.000	0.000	0.3477	0.0012	0.0553	1.92E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300	*	0.00	0.000	0.000	0.3463	0.0009	0.0432	1.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301	*	0.00	0.000	0.000	0.3451	0.0007	0.0343	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302	*	0.00	0.000	0.000	0.3440	0.0006	0.0283	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303	*	0.00	0.000	0.000	0.3430	0.0005	0.0247	9.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304	*	0.00	0.000	0.000	0.3420	0.0005	0.0228	8.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305	*	0.00	0.000	0.000	0.3410	0.0005	0.0218	8.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306	*	0.00	0.000	0.000	0.3401	0.0005	0.0213	8.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307	*	0.00	0.000	0.000	0.3392	0.0004	0.0207	8.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308	*	0.00	0.000	0.000	0.3383	0.0004	0.0201	7.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309	*	0.00	0.000	0.000	0.3375	0.0004	0.0196	7.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310	*	0.00	0.000	0.000	0.3367	0.0004	0.0183	7.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311	*	0.04	0.000	0.039	0.3360	0.0004	0.0175	6.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.12	0.000	0.061	0.3380	0.0004	0.0178	7.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.05	0.000	0.082	0.3356	0.0003	0.0136	5.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.21	0.000	0.155	0.3375	0.0005	0.0199	7.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.00	0.000	0.147	0.3301	0.0004	0.0198	8.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.138	0.3234	0.0004	0.0196	7.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.00	0.000	0.145	0.3161	0.0002	0.0093	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318		0.00	0.000	0.110	0.3103	0.0001	0.0060	2.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.00	0.000	0.089	0.3054	0.0002	0.0080	3.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.00	0.000	0.089	0.3005	0.0002	0.0077	3.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.00	0.000	0.062	0.2968	0.0003	0.0123	5.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.01	0.000	0.049	0.2945	0.0003	0.0148	6.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.26	0.000	0.041	0.3044	0.0003	0.0142	5.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.33	0.000	0.055	0.3172	0.0003	0.0127	5.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.03	0.000	0.057	0.3153	0.0002	0.0116	4.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.000	0.100	0.3102	0.0002	0.0098	4.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.00	0.000	0.117	0.3045	0.0003	0.0123	5.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.094	0.3000	0.0003	0.0119	5.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329	*	0.11	0.000	0.036	0.3010	0.0002	0.0094	4.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.32	0.000	0.030	0.3172	0.0002	0.0077	3.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.00	0.000	0.133	0.3109	0.0001	0.0066	3.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.96	0.120	0.090	0.3464	0.0001	0.0057	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.48	0.077	0.070	0.3625	0.0001	0.0050	2.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.06	0.000	0.098	0.3605	0.0001	0.0044	2.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.00	0.000	0.105	0.3555	0.0001	0.0041	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.085	0.3514	0.0001	0.0035	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337	*		0.00	0.000	0.043	0.3494	0.0000	0.0021	1.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338	*		0.00	0.000	0.000	0.3494	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.23E-09	0.0000	0.0000	3.94E-09
339	*		0.00	0.000	0.000	0.3493	0.0000	0.0001	1.01E-09	0.0000	0.0000	9.74E-10	0.0000	0.0000	9.40E-10
340	*		0.00	0.000	0.000	0.3484	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
341			0.00	0.000	0.079	0.3431	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
342			0.04	0.000	0.119	0.3376	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
343	*		0.23	0.000	0.037	0.3370	0.0002	0.0104	4.33E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
344	*		0.03	0.000	0.040	0.3370	0.0005	0.0230	8.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345			0.00	0.000	0.039	0.3409	0.0004	0.0209	8.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346			0.12	0.000	0.113	0.3399	0.0003	0.0164	6.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347			0.74	0.076	0.106	0.3653	0.0006	0.0271	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348			0.00	0.000	0.051	0.3624	0.0005	0.0264	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349			0.00	0.000	0.048	0.3590	0.0002	0.0111	4.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350			0.54	0.041	0.056	0.3793	0.0004	0.0221	8.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351			0.19	0.004	0.101	0.3824	0.0004	0.0181	7.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352			0.00	0.000	0.076	0.3783	0.0005	0.0220	8.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353			0.00	0.000	0.061	0.3704	0.0001	0.0081	2.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354			0.00	0.000	0.063	0.3620	0.0023	0.1102	3.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355	*		0.93	0.000	0.025	0.3589	0.0021	0.0981	3.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356			0.00	0.074	0.000	0.3867	0.0019	0.0785	2.59E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357	*		0.00	0.000	0.031	0.3854	0.0014	0.0690	2.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358			0.00	0.000	0.062	0.3804	0.0015	0.0728	2.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359			0.00	0.000	0.060	0.3707	0.0035	0.1618	5.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*		0.00	0.000	0.000	0.3658	0.0026	0.1205	3.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361	*		0.00	0.000	0.000	0.3625	0.0019	0.0885	2.94E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362	*		0.70	0.000	0.010	0.3608	0.0014	0.0643	2.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363	*		0.03	0.000	0.005	0.3594	0.0011	0.0535	1.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364	*		0.70	0.000	0.003	0.3582	0.0011	0.0506	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365	*	*	0.96	0.000	0.000	0.3582	0.0011	0.0521	1.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 11			
	inches	cubic feet	percent
Precipitation	47.14	171,131.7	100.00
Runoff	5.643	20,483.5	11.97
Evapotranspiration	32.416	117,669.6	68.76
Drainage Collected from Layer 2	7.7876	28,268.9	16.52
Percolation/Leakage through Layer 3	0.000027	0.0971	0.00
Average Head on Top of Layer 3	0.0005	---	---
Drainage Collected from Layer 7	0.0000	0.0926	0.00
Percolation/Leakage through Layer 8	0.000001	0.0053	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0000	0.00
Percolation/Leakage through Layer 11	0.000001	0.0052	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	1.2974	4,709.7	2.75
Soil Water at Start of Year	258.2801	937,556.8	547.86
Soil Water at End of Year	257.2640	933,868.2	545.70
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	2.3136	8,398.2	4.91
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 12

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Column key: Head #1: drainage from Layer 3; Drain #1: drainage from Layer 2; Leak #1: leakage thru Layer 3; Head #2: drainage from Layer 8; Drain #2: drainage from Layer 7; Leak #2: leakage thru Layer 8; Head #3: drainage from Layer 10; Drain #3: drainage from Layer 9; Leak #3: leakage thru Layer 11

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1		*	0.00	0.000	0.000	0.3582	0.0005	0.0246	9.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2	*	*	0.01	0.000	0.000	0.3582	0.0003	0.0159	6.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3	*	*	0.00	0.000	0.034	0.3582	0.0003	0.0117	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4		*	0.00	0.479	0.000	0.3690	0.0002	0.0093	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5	*	*	0.00	0.000	0.030	0.3690	0.0002	0.0077	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6		*	0.00	0.004	0.044	0.3695	0.0001	0.0065	2.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7	*	*	0.00	0.000	0.022	0.3695	0.0001	0.0057	2.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8		*	0.00	0.446	0.000	0.3767	0.0001	0.0050	2.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9		*	0.00	0.162	0.015	0.3808	0.0001	0.0045	2.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10	*	*	0.04	0.000	0.038	0.3808	0.0001	0.0040	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*	*	0.00	0.000	0.017	0.3808	0.0001	0.0037	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*	*	0.00	0.000	0.016	0.3808	0.0000	0.0013	6.64E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13		*	0.00	0.042	0.039	0.3821	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.79E-09	0.0000	0.0000	2.66E-09
14	*	*	0.00	0.000	0.041	0.3821	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
15		*	0.00	0.344	0.022	0.3854	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
16		*	0.00	0.000	0.000	0.3854	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
17		*	0.00	0.000	0.000	0.3854	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
18		*	0.00	0.000	0.000	0.3854	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
19		*	0.81	0.727	0.001	0.3893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
20		*	0.00	0.000	0.000	0.3893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
21			0.00	0.000	0.141	0.3810	0.0001	0.0028	1.25E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
22			0.00	0.000	0.081	0.3692	0.0000	0.0025	1.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23			0.00	0.000	0.066	0.3599	0.0025	0.1211	3.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.00	0.000	0.078	0.3521	0.0023	0.1070	3.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25			0.00	0.000	0.088	0.3451	0.0016	0.0757	2.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26	*		0.04	0.000	0.040	0.3426	0.0013	0.0613	2.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27			0.00	0.000	0.097	0.3360	0.0010	0.0488	1.72E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28			0.00	0.000	0.077	0.3307	0.0009	0.0434	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*		0.00	0.000	0.000	0.3292	0.0008	0.0381	1.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*		0.00	0.000	0.000	0.3278	0.0007	0.0318	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31			0.00	0.000	0.072	0.3230	0.0006	0.0290	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32	*		0.00	0.000	0.064	0.3188	0.0007	0.0321	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33	*		0.00	0.000	0.000	0.3178	0.0006	0.0265	9.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34	*		0.01	0.000	0.011	0.3168	0.0005	0.0228	8.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35	*		0.00	0.000	0.000	0.3159	0.0005	0.0225	8.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36	*	0.00	0.000	0.062	0.3120	0.0005	0.0214	8.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*	0.00	0.000	0.065	0.3083	0.0005	0.0234	8.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38	*	0.54	0.000	0.018	0.3086	0.0004	0.0169	7.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39		0.00	0.000	0.000	0.3196	0.0003	0.0149	6.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40		0.00	0.000	0.098	0.3269	0.0003	0.0148	6.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41		0.02	0.000	0.104	0.3223	0.0003	0.0152	6.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42		0.75	0.051	0.119	0.3493	0.0003	0.0136	5.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43		0.36	0.020	0.061	0.3617	0.0002	0.0103	4.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44		0.02	0.000	0.076	0.3583	0.0003	0.0139	5.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45		0.06	0.000	0.091	0.3563	0.0003	0.0152	6.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46		1.01	0.273	0.092	0.3866	0.0003	0.0156	6.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47		0.00	0.000	0.144	0.3796	0.0003	0.0162	6.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48		0.00	0.000	0.143	0.3660	0.0003	0.0139	5.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49		0.00	0.000	0.154	0.3529	0.0027	0.1290	4.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50		0.22	0.000	0.132	0.3534	0.0019	0.0901	2.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		0.00	0.000	0.141	0.3443	0.0015	0.0697	2.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		0.00	0.000	0.071	0.3387	0.0011	0.0514	1.80E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		0.00	0.000	0.112	0.3313	0.0010	0.0454	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		0.00	0.000	0.099	0.3251	0.0010	0.0454	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55	*	0.00	0.000	0.000	0.3238	0.0007	0.0325	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56		0.00	0.000	0.086	0.3182	0.0007	0.0312	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57	*	0.00	0.000	0.000	0.3172	0.0007	0.0308	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58		0.10	0.000	0.098	0.3160	0.0006	0.0263	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59		0.60	0.006	0.062	0.3408	0.0006	0.0270	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60	*	0.58	0.000	0.033	0.3408	0.0004	0.0190	7.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61		0.00	0.000	0.045	0.3410	0.0004	0.0195	7.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62		0.06	0.025	0.052	0.3616	0.0004	0.0189	7.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63		0.01	0.000	0.121	0.3556	0.0004	0.0182	7.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64		0.18	0.000	0.121	0.3578	0.0003	0.0135	5.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65		0.04	0.000	0.233	0.3478	0.0003	0.0122	5.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66		0.41	0.006	0.235	0.3552	0.0005	0.0223	8.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67		0.00	0.000	0.122	0.3489	0.0003	0.0155	6.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68		0.00	0.000	0.137	0.3422	0.0004	0.0175	6.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69	*	0.00	0.000	0.000	0.3422	0.0003	0.0148	6.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70		0.00	0.000	0.100	0.3375	0.0002	0.0109	4.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71		0.00	0.000	0.133	0.3308	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72		0.00	0.000	0.165	0.3221	0.0000	0.0004	2.29E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73		0.00	0.000	0.274	0.3082	0.0000	0.0013	9.26E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74		0.00	0.000	0.149	0.3006	0.0002	0.0103	4.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75		0.00	0.000	0.062	0.2976	0.0004	0.0174	7.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76		0.00	0.000	0.047	0.2953	0.0003	0.0135	5.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77		0.00	0.000	0.040	0.2934	0.0002	0.0100	4.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78		0.63	0.003	0.036	0.3215	0.0002	0.0084	3.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.00	0.000	0.169	0.3134	0.0001	0.0055	2.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80	*	0.00	0.000	0.032	0.3115	0.0000	0.0001	1.61E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81	*	0.00	0.000	0.000	0.3110	0.0000	0.0007	6.35E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82	*	0.00	0.000	0.000	0.3106	0.0001	0.0028	1.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83	*	0.00	0.000	0.000	0.3103	0.0001	0.0045	2.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84	*	0.00	0.000	0.000	0.3099	0.0001	0.0056	2.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.58	0.005	0.030	0.3355	0.0001	0.0043	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.02	0.000	0.179	0.3272	0.0001	0.0036	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.201	0.3171	0.0002	0.0074	3.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.281	0.3034	0.0003	0.0129	5.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.37	0.000	0.149	0.3140	0.0003	0.0146	5.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.092	0.3097	0.0002	0.0110	4.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.00	0.000	0.062	0.3067	0.0002	0.0088	3.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92	*	0.03	0.000	0.074	0.3045	0.0002	0.0073	3.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.00	0.000	0.040	0.3026	0.0001	0.0063	2.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.035	0.3009	0.0001	0.0055	2.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.00	0.000	0.032	0.2994	0.0001	0.0048	2.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.00	0.000	0.029	0.2980	0.0001	0.0043	2.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.00	0.000	0.027	0.2967	0.0001	0.0037	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.00	0.000	0.026	0.2955	0.0001	0.0036	1.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.13	0.000	0.025	0.3007	0.0000	0.0007	3.40E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.00	0.000	0.023	0.2996	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.31E-09	0.0000	0.0000	9.52E-10
101		0.00	0.000	0.022	0.2985	0.0000	0.0009	5.48E-09	0.0000	0.0000	4.92E-09	0.0000	0.0000	4.77E-09
102		0.98	0.085	0.021	0.3403	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.45E-16	0.0000	0.0000	3.34E-16
103		0.04	0.000	0.157	0.3345	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
104		0.00	0.000	0.118	0.3289	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
105		0.06	0.000	0.100	0.3272	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
106	*	0.00	0.000	0.062	0.3242	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
107		0.06	0.000	0.238	0.3156	0.0000	0.0010	4.94E-09	0.0000	0.0000	4.53E-09	0.0000	0.0000	3.06E-09
108		0.07	0.000	0.109	0.3139	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	9.71E-10
109		0.00	0.000	0.187	0.3050	0.0000	0.0003	2.25E-09	0.0000	0.0000	2.08E-09	0.0000	0.0000	1.48E-09
110		0.02	0.000	0.149	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.83E-10
111		0.00	0.000	0.062	0.2959	0.0000	0.0008	6.57E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09
112		0.00	0.000	0.047	0.2935	0.0000	0.0013	8.80E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
113		0.00	0.000	0.040	0.2916	0.0000	0.0008	4.28E-09	0.0000	0.0000	4.26E-09	0.0000	0.0000	4.51E-09
114		0.00	0.000	0.035	0.2899	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.25E-10	0.0000	0.0000	8.95E-10
115		0.00	0.000	0.030	0.2885	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
116		0.00	0.000	0.029	0.2871	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
117		0.00	0.000	0.027	0.2858	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
118		0.00	0.000	0.026	0.2846	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
119		0.00	0.000	0.024	0.2834	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.00	0.000	0.023	0.2824	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
121		0.00	0.000	0.022	0.2813	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

122	0.00	0.000	0.021	0.2803	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
123	0.27	0.000	0.021	0.2920	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
124	0.00	0.000	0.020	0.2911	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125	0.37	0.000	0.019	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
126	0.24	0.000	0.019	0.3184	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
127	0.04	0.000	0.163	0.3127	0.0000	0.0000	8.66E-11	0.0000	0.0000	8.63E-11	0.0000	0.0000	8.61E-11
128	0.05	0.000	0.018	0.3142	0.0000	0.0001	6.08E-10	0.0000	0.0000	5.94E-10	0.0000	0.0000	5.82E-10
129	0.70	0.055	0.300	0.3308	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
130	0.00	0.000	0.379	0.3127	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
131	0.01	0.000	0.149	0.3060	0.0000	0.0003	2.53E-09	0.0000	0.0000	2.32E-09	0.0000	0.0000	2.14E-09
132	0.00	0.000	0.062	0.3031	0.0000	0.0007	3.89E-09	0.0000	0.0000	3.65E-09	0.0000	0.0000	3.22E-09
133	0.00	0.000	0.047	0.3008	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
134	0.08	0.000	0.040	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
135	0.00	0.000	0.035	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
136	0.00	0.000	0.032	0.2994	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137	0.00	0.000	0.029	0.2980	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138	0.02	0.000	0.028	0.2978	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.00	0.000	0.026	0.2966	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140	0.00	0.000	0.024	0.2955	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141	0.00	0.000	0.023	0.2944	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142	0.00	0.000	0.022	0.2933	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143	0.78	0.027	0.022	0.3284	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144	0.00	0.000	0.235	0.3172	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145	0.00	0.000	0.307	0.3025	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146	0.00	0.000	0.149	0.2955	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
147	0.00	0.000	0.062	0.2925	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
148	0.49	0.000	0.048	0.3133	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
149	0.08	0.000	0.216	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150	0.00	0.000	0.041	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151	0.41	0.000	0.036	0.3230	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
152	0.51	0.043	0.257	0.3331	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.16	0.000	0.153	0.3333	0.0000	0.0001	7.60E-10	0.0000	0.0000	7.39E-10	0.0000	0.0000	7.20E-10
154	0.09	0.000	0.142	0.3310	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
155	0.00	0.000	0.247	0.3192	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156	0.00	0.000	0.235	0.3080	0.0000	0.0003	1.88E-09	0.0000	0.0000	1.76E-09	0.0000	0.0000	1.65E-09
157	0.00	0.000	0.149	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
158	0.35	0.000	0.062	0.3147	0.0000	0.0001	1.64E-09	0.0000	0.0000	1.55E-09	0.0000	0.0000	1.47E-09
159	0.23	0.000	0.355	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
160	0.00	0.000	0.047	0.3065	0.0000	0.0003	1.80E-09	0.0000	0.0000	1.69E-09	0.0000	0.0000	1.59E-09
161	0.00	0.000	0.040	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
162	0.00	0.000	0.035	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163	0.96	0.107	0.033	0.3420	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164	0.01	0.000	0.134	0.3359	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.14	0.000	0.153	0.3354	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.04	0.000	0.284	0.3240	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.13	0.000	0.156	0.3226	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.20	0.000	0.325	0.3164	0.0000	0.0004	2.62E-09	0.0000	0.0000	2.39E-09	0.0000	0.0000	2.20E-09
169	0.02	0.000	0.198	0.3078	0.0000	0.0005	2.71E-09	0.0000	0.0000	2.46E-09	0.0000	0.0000	2.26E-09
170	0.02	0.000	0.150	0.3016	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
171	0.03	0.000	0.063	0.2998	0.0000	0.0001	7.60E-10	0.0000	0.0000	7.40E-10	0.0000	0.0000	7.20E-10
172	0.00	0.000	0.047	0.2975	0.0000	0.0001	6.76E-10	0.0000	0.0000	6.59E-10	0.0000	0.0000	6.44E-10
173	0.00	0.000	0.040	0.2956	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
174	0.00	0.000	0.035	0.2940	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.00	0.000	0.032	0.2924	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.12	0.000	0.030	0.2968	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.00	0.000	0.027	0.2955	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.00	0.000	0.027	0.2944	0.0000	0.0001	7.35E-10	0.0000	0.0000	7.16E-10	0.0000	0.0000	6.98E-10
179	0.61	0.004	0.025	0.3221	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
180	0.01	0.000	0.293	0.3083	0.0000	0.0003	1.66E-09	0.0000	0.0000	1.57E-09	0.0000	0.0000	1.48E-09
181	0.02	0.000	0.024	0.3082	0.0000	0.0009	4.90E-09	0.0000	0.0000	3.27E-09	0.0000	0.0000	2.92E-09
182	0.02	0.000	0.023	0.3082	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.04E-09	0.0000	0.0000	1.00E-09
183	0.57	0.012	0.022	0.3336	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.00	0.000	0.254	0.3215	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.34	0.000	0.246	0.3258	0.0000	0.0002	1.02E-09	0.0000	0.0000	9.86E-10	0.0000	0.0000	9.51E-10
186	0.00	0.000	0.383	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
187	0.00	0.000	0.149	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.00	0.000	0.062	0.2975	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.00	0.000	0.047	0.2953	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.00	0.000	0.040	0.2934	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.00	0.000	0.035	0.2917	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.00	0.000	0.032	0.2902	0.0000	0.0000	1.66E-10	0.0000	0.0000	1.65E-10	0.0000	0.0000	1.64E-10
193	1.30	0.176	0.031	0.3423	0.0000	0.0001	5.14E-10	0.0000	0.0000	5.05E-10	0.0000	0.0000	4.95E-10
194	0.15	0.000	0.125	0.3433	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
195	0.38	0.022	0.273	0.3474	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
196	0.63	0.145	0.297	0.3566	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.00	0.000	0.174	0.3483	0.0000	0.0001	6.34E-10	0.0000	0.0000	6.20E-10	0.0000	0.0000	6.06E-10
198	0.00	0.000	0.297	0.3341	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
199	0.31	0.000	0.252	0.3367	0.0000	0.0011	6.24E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
200	0.00	0.000	0.328	0.3211	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.20E-10	0.0000	0.0000	1.30E-09
201	0.00	0.000	0.182	0.3124	0.0000	0.0001	8.73E-10	0.0000	0.0000	8.46E-10	0.0000	0.0000	6.98E-10
202	0.15	0.000	0.118	0.3139	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.05E-10
203	0.62	0.009	0.063	0.3399	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
204	0.00	0.000	0.246	0.3282	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.00	0.000	0.208	0.3183	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
206	0.00	0.000	0.173	0.3100	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
207	0.00	0.000	0.121	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.05	0.000	0.063	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
209	0.12	0.000	0.049	0.3069	0.0000	0.0001	1.15E-09	0.0000	0.0000	1.11E-09	0.0000	0.0000	1.06E-09
210	0.06	0.000	0.042	0.3073	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
211	0.14	0.000	0.037	0.3122	0.0000	0.0012	6.70E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
212	0.00	0.000	0.032	0.3107	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
213	0.00	0.000	0.029	0.3093	0.0001	0.0039	1.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
214	0.00	0.000	0.027	0.3080	0.0001	0.0033	1.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
215	0.00	0.000	0.026	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.73E-09	0.0000	0.0000	4.87E-09
216	0.00	0.000	0.024	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.22E-10
217	0.00	0.000	0.023	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.00	0.000	0.022	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.22	0.000	0.023	0.3127	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.72	0.045	0.022	0.3439	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.00	0.000	0.283	0.3304	0.0000	0.0002	1.28E-09	0.0000	0.0000	1.22E-09	0.0000	0.0000	1.17E-09
222	0.00	0.000	0.243	0.3188	0.0000	0.0005	2.98E-09	0.0000	0.0000	2.69E-09	0.0000	0.0000	2.45E-09
223	0.48	0.002	0.132	0.3353	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
224	0.13	0.000	0.300	0.3273	0.0000	0.0001	4.01E-10	0.0000	0.0000	3.96E-10	0.0000	0.0000	3.90E-10
225	0.19	0.000	0.278	0.3232	0.0000	0.0015	7.86E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
226	0.39	0.002	0.135	0.3352	0.0000	0.0001	8.59E-10	0.0000	0.0000	1.79E-09	0.0000	0.0000	2.29E-09
227	0.00	0.000	0.115	0.3299	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.08E-10	0.0000	0.0000	5.72E-10
228	0.00	0.000	0.197	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.17E-11
229	0.00	0.000	0.149	0.3134	0.0000	0.0001	8.60E-10	0.0000	0.0000	8.34E-10	0.0000	0.0000	8.09E-10
230	0.00	0.000	0.144	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
231	0.69	0.018	0.064	0.3358	0.0000	0.0000	1.24E-10	0.0000	0.0000	1.23E-10	0.0000	0.0000	1.23E-10
232	0.00	0.000	0.132	0.3295	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
233	0.00	0.000	0.305	0.3149	0.0000	0.0013	6.62E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
234	0.00	0.000	0.149	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.52E-10	0.0000	0.0000	1.46E-09
235	0.00	0.000	0.062	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.35E-10
236	0.03	0.000	0.049	0.3041	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.09	0.000	0.042	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	0.00	0.000	0.035	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
239	0.00	0.000	0.032	0.3031	0.0000	0.0004	3.52E-09	0.0000	0.0000	3.12E-09	0.0000	0.0000	2.80E-09
240	0.00	0.000	0.029	0.3017	0.0000	0.0002	3.80E-09	0.0000	0.0000	3.34E-09	0.0000	0.0000	2.97E-09
241	0.16	0.000	0.029	0.3079	0.0000	0.0000	1.34E-10	0.0000	0.0000	1.34E-10	0.0000	0.0000	1.33E-10
242	0.01	0.000	0.028	0.3070	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
243	0.00	0.000	0.024	0.3058	0.0000	0.0001	9.85E-10	0.0000	0.0000	9.51E-10	0.0000	0.0000	9.19E-10
244	0.00	0.000	0.023	0.3047	0.0000	0.0002	2.01E-09	0.0000	0.0000	1.88E-09	0.0000	0.0000	1.76E-09
245	0.64	0.014	0.024	0.3336	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
246	0.25	0.000	0.111	0.3402	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	0.39	0.024	0.108	0.3525	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
248	0.00	0.000	0.176	0.3443	0.0000	0.0001	1.02E-09	0.0000	0.0000	9.86E-10	0.0000	0.0000	9.52E-10
249	0.00	0.000	0.085	0.3402	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
250	0.36	0.001	0.139	0.3508	0.0000	0.0001	3.41E-10	0.0000	0.0000	3.37E-10	0.0000	0.0000	3.33E-10

251		0.00	0.000	0.083	0.3469	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
252		0.00	0.000	0.134	0.3405	0.0000	0.0002	9.91E-10	0.0000	0.0000	9.57E-10	0.0000	0.0000	9.24E-10
253		0.19	0.000	0.100	0.3446	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
254		0.85	0.157	0.265	0.3650	0.0000	0.0001	4.67E-10	0.0000	0.0000	4.59E-10	0.0000	0.0000	4.51E-10
255		0.00	0.000	0.227	0.3541	0.0000	0.0000	1.43E-10	0.0000	0.0000	1.42E-10	0.0000	0.0000	1.42E-10
256		0.00	0.000	0.278	0.3409	0.0000	0.0003	1.83E-09	0.0000	0.0000	1.71E-09	0.0000	0.0000	1.61E-09
257		0.00	0.000	0.237	0.3296	0.0000	0.0003	1.93E-09	0.0000	0.0000	1.80E-09	0.0000	0.0000	1.69E-09
258		0.00	0.000	0.160	0.3220	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
259		0.00	0.000	0.114	0.3165	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
260		0.32	0.000	0.064	0.3289	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261		0.15	0.000	0.197	0.3266	0.0000	0.0002	1.59E-09	0.0000	0.0000	1.50E-09	0.0000	0.0000	1.09E-09
262		0.02	0.000	0.078	0.3233	0.0000	0.0000	2.39E-10	0.0000	0.0000	2.37E-10	0.0000	0.0000	5.29E-10
263		0.00	0.000	0.149	0.3149	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	5.86E-11
264		0.00	0.000	0.062	0.3108	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
265		0.00	0.000	0.047	0.3078	0.0001	0.0039	1.80E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
266		0.00	0.000	0.040	0.3052	0.0001	0.0068	3.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.00	0.000	0.035	0.3028	0.0002	0.0102	4.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.74	0.013	0.034	0.3352	0.0003	0.0129	5.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.093	0.3301	0.0003	0.0140	5.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		1.86	0.714	0.089	0.3801	0.0003	0.0147	6.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.16	0.013	0.112	0.3813	0.0003	0.0123	5.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.17	0.000	0.124	0.3827	0.0004	0.0166	6.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		1.25	0.595	0.165	0.4009	0.0011	0.0256	8.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		0.00	0.000	0.126	0.3836	0.0032	0.1586	4.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.00	0.000	0.095	0.3686	0.0055	0.2551	7.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.061	0.3598	0.0031	0.1442	4.51E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.108	0.3507	0.0022	0.1026	3.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.00	0.000	0.199	0.3381	0.0016	0.0723	2.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.00	0.000	0.169	0.3281	0.0014	0.0644	2.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		0.00	0.000	0.160	0.3189	0.0009	0.0448	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281		0.00	0.000	0.149	0.3105	0.0007	0.0330	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.06	0.000	0.064	0.3089	0.0006	0.0290	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.05	0.000	0.050	0.3076	0.0007	0.0318	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.00	0.000	0.040	0.3044	0.0007	0.0317	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285	*	0.04	0.000	0.079	0.3017	0.0006	0.0286	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.42	0.000	0.034	0.3190	0.0005	0.0251	9.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.06	0.000	0.099	0.3161	0.0004	0.0195	7.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.37	0.000	0.118	0.3275	0.0005	0.0238	9.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289	*	0.00	0.000	0.073	0.3234	0.0004	0.0180	7.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290	*	0.44	0.000	0.040	0.3236	0.0003	0.0165	6.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.00	0.000	0.038	0.3240	0.0003	0.0163	6.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.00	0.000	0.048	0.3367	0.0003	0.0151	6.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.00	0.000	0.138	0.3295	0.0002	0.0106	4.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294			0.00	0.000	0.197	0.3194	0.0003	0.0120	5.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295			0.00	0.000	0.251	0.3069	0.0003	0.0138	5.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296			0.00	0.000	0.149	0.2994	0.0003	0.0162	6.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297			0.08	0.000	0.064	0.3001	0.0004	0.0180	7.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298			0.00	0.000	0.047	0.2978	0.0003	0.0119	4.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299	*		0.00	0.000	0.000	0.2978	0.0002	0.0104	4.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300	*		0.00	0.000	0.000	0.2978	0.0002	0.0084	3.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301	*		0.00	0.000	0.000	0.2978	0.0001	0.0070	3.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302	*		0.00	0.000	0.000	0.2978	0.0001	0.0061	2.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303			0.00	0.000	0.040	0.2959	0.0001	0.0053	2.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304			0.00	0.000	0.035	0.2943	0.0001	0.0047	2.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305	*		0.00	0.000	0.000	0.2943	0.0001	0.0042	2.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306	*		0.00	0.000	0.000	0.2943	0.0001	0.0039	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307	*		0.00	0.000	0.000	0.2942	0.0001	0.0031	1.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308	*		0.00	0.000	0.000	0.2942	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-09	0.0000	0.0000	4.82E-09
309	*		0.00	0.000	0.000	0.2942	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.34E-19	0.0000	0.0000	2.97E-10
310			0.00	0.000	0.032	0.2927	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
311	*		0.00	0.000	0.029	0.2913	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
312			0.06	0.000	0.029	0.2928	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
313			0.00	0.000	0.026	0.2916	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
314			0.00	0.000	0.024	0.2903	0.0000	0.0003	2.56E-09	0.0000	0.0000	2.34E-09	0.0000	0.0000	2.16E-09
315			0.00	0.000	0.023	0.2892	0.0000	0.0017	1.05E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
316	*		0.31	0.000	0.034	0.2901	0.0000	0.0012	6.32E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317	*		0.20	0.000	0.015	0.2910	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.36E-10	0.0000	0.0000	8.45E-10
318	*		0.00	0.000	0.010	0.2920	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.56E-10
319	*		0.00	0.000	0.016	0.2929	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
320	*		0.00	0.000	0.029	0.2938	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
321	*		0.00	0.000	0.016	0.2948	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
322			0.00	0.000	0.034	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
323	*		0.00	0.000	0.000	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
324	*	*	0.00	0.000	0.000	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
325	*	*	0.06	0.000	0.029	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
326		*	0.00	0.000	0.035	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
327		*	0.00	0.000	0.000	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
328		*	0.00	0.000	0.000	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
329		*	0.00	0.000	0.000	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
330		*	0.00	0.000	0.000	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
331		*	0.00	0.000	0.000	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
332			0.00	0.000	0.022	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
333			0.02	0.000	0.022	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
334	*		0.18	0.000	0.030	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
335			0.00	0.000	0.066	0.3094	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
336			0.41	0.000	0.021	0.3277	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

337		0.00	0.000	0.115	0.3222	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
338		0.42	0.004	0.134	0.3358	0.0000	0.0001	8.50E-10	0.0000	0.0000	8.24E-10	0.0000	0.0000	8.00E-10
339		0.58	0.079	0.107	0.3544	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
340		0.00	0.000	0.059	0.3515	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
341		0.00	0.000	0.102	0.3467	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
342	*	0.00	0.000	0.047	0.3445	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
343		0.00	0.000	0.093	0.3400	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
344	*	0.00	0.000	0.045	0.3379	0.0000	0.0004	2.54E-09	0.0000	0.0000	2.33E-09	0.0000	0.0000	2.14E-09
345		0.00	0.000	0.056	0.3352	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
346	*	0.00	0.000	0.000	0.3352	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
347	*	0.00	0.000	0.045	0.3330	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
348		0.00	0.000	0.087	0.3289	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
349		0.00	0.000	0.065	0.3256	0.0000	0.0003	3.44E-09	0.0000	0.0000	3.06E-09	0.0000	0.0000	2.75E-09
350		0.00	0.000	0.100	0.3204	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
351		0.40	0.000	0.090	0.3346	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
352		0.07	0.000	0.075	0.3335	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
353		0.21	0.000	0.111	0.3374	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
354	*	0.00	0.000	0.044	0.3347	0.0001	0.0027	1.46E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
355	*	0.00	0.000	0.038	0.3319	0.0001	0.0045	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		0.00	0.000	0.077	0.3274	0.0002	0.0099	4.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357	*	0.00	0.000	0.040	0.3248	0.0004	0.0169	6.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*	0.00	0.000	0.038	0.3223	0.0004	0.0165	6.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	0.00	0.000	0.043	0.3197	0.0003	0.0159	6.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*	0.00	0.000	0.041	0.3172	0.0003	0.0148	6.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.06	0.000	0.052	0.3169	0.0002	0.0116	4.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362	*	0.73	0.000	0.020	0.3173	0.0003	0.0142	5.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363	*	1.23	0.000	0.000	0.3178	0.0003	0.0138	5.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364	*	0.03	0.000	0.031	0.3184	0.0003	0.0127	5.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.00	0.000	0.010	0.3322	0.0002	0.0116	4.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 12			
	inches	cubic feet	percent
Precipitation	37.89	137,544.0	100.00
Runoff	4.958	17,996.3	13.08
Evapotranspiration	30.791	111,772.8	81.26
Drainage Collected from Layer 2	3.4871	12,658.2	9.20
Percolation/Leakage through Layer 3	0.000013	0.0463	0.00
Average Head on Top of Layer 3	0.0002	---	---
Drainage Collected from Layer 7	0.0000	0.0426	0.00
Percolation/Leakage through Layer 8	0.000001	0.0042	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0041	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-1.3453	-4,883.4	-3.55
Soil Water at Start of Year	257.2640	933,868.2	678.96
Soil Water at End of Year	256.7056	931,841.2	677.49
Snow Water at Start of Year	2.3136	8,398.2	6.11
Snow Water at End of Year	1.5267	5,541.8	4.03
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 13

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.530	0.000	0.3804	0.0002	0.0095	4.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.00	0.000	0.107	0.3751	0.0002	0.0089	3.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.108	0.3685	0.0002	0.0072	3.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.00	0.000	0.079	0.3591	0.0002	0.0113	4.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.00	0.000	0.079	0.3515	0.0019	0.0913	3.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6	*		0.00	0.000	0.000	0.3486	0.0015	0.0723	2.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7			0.00	0.000	0.060	0.3435	0.0013	0.0592	2.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8	*		0.00	0.000	0.000	0.3411	0.0011	0.0503	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9	*		0.00	0.000	0.000	0.3393	0.0010	0.0483	1.74E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10	*		0.00	0.000	0.000	0.3377	0.0008	0.0398	1.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*		0.17	0.000	0.023	0.3372	0.0007	0.0352	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.00	0.000	0.049	0.3398	0.0007	0.0323	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13			0.00	0.000	0.081	0.3347	0.0006	0.0303	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14			0.00	0.000	0.088	0.3293	0.0006	0.0261	9.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15			0.00	0.000	0.068	0.3250	0.0006	0.0279	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*		0.81	0.000	0.026	0.3253	0.0006	0.0261	9.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.03	0.026	0.000	0.3583	0.0004	0.0189	7.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.80	0.256	0.000	0.3860	0.0004	0.0164	6.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19	*		0.03	0.000	0.026	0.3855	0.0005	0.0203	7.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.01	0.000	0.065	0.3745	0.0009	0.0445	1.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21	*		0.00	0.000	0.050	0.3657	0.0033	0.1550	4.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22			0.00	0.000	0.068	0.3580	0.0024	0.1100	3.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23			0.00	0.000	0.058	0.3517	0.0018	0.0841	2.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.02	0.000	0.117	0.3445	0.0015	0.0685	2.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25			0.00	0.000	0.154	0.3349	0.0011	0.0521	1.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26			0.00	0.000	0.069	0.3302	0.0010	0.0479	1.69E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27			0.00	0.000	0.122	0.3230	0.0006	0.0302	1.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*		0.04	0.000	0.048	0.3218	0.0007	0.0317	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29			0.00	0.000	0.110	0.3154	0.0005	0.0240	9.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30			0.00	0.000	0.154	0.3070	0.0005	0.0256	9.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31			0.02	0.000	0.077	0.3036	0.0006	0.0270	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32			0.64	0.004	0.062	0.3299	0.0004	0.0196	7.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33			0.33	0.000	0.111	0.3393	0.0005	0.0213	8.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34			0.11	0.000	0.130	0.3373	0.0005	0.0214	8.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35			0.00	0.000	0.124	0.3306	0.0005	0.0235	8.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36		0.00	0.000	0.130	0.3236	0.0004	0.0174	6.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37		0.00	0.000	0.205	0.3129	0.0004	0.0189	7.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38		0.00	0.000	0.164	0.3044	0.0004	0.0210	8.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39		0.09	0.000	0.129	0.3020	0.0004	0.0188	7.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40		0.04	0.000	0.062	0.3005	0.0004	0.0167	6.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41		0.00	0.000	0.047	0.2980	0.0003	0.0140	5.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42		0.00	0.000	0.040	0.2959	0.0003	0.0124	5.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43		0.31	0.000	0.036	0.3087	0.0002	0.0110	4.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44		0.01	0.000	0.119	0.3033	0.0002	0.0103	4.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45		0.00	0.000	0.032	0.3018	0.0002	0.0084	4.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46	*	0.00	0.000	0.029	0.3004	0.0002	0.0071	3.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47	*	0.34	0.000	0.020	0.3013	0.0001	0.0061	3.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48	*	0.19	0.000	0.024	0.3023	0.0001	0.0053	2.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*	0.00	0.000	0.012	0.3032	0.0001	0.0047	2.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50		0.00	0.000	0.030	0.3095	0.0001	0.0043	2.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		0.00	0.000	0.059	0.3187	0.0001	0.0039	2.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		0.00	0.000	0.094	0.3142	0.0001	0.0031	1.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		0.17	0.000	0.152	0.3152	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.65E-09	0.0000	0.0000	5.03E-09
54		0.54	0.019	0.134	0.3339	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	1.03E-09
55		0.00	0.000	0.127	0.3278	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
56		0.59	0.040	0.137	0.3477	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
57		0.00	0.000	0.202	0.3381	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
58		0.00	0.000	0.187	0.3292	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
59		0.00	0.000	0.090	0.3249	0.0000	0.0002	8.72E-10	0.0000	0.0000	8.45E-10	0.0000	0.0000	6.21E-10
60		0.30	0.000	0.072	0.3356	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	2.05E-10
61		0.00	0.000	0.174	0.3273	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
62		0.00	0.000	0.095	0.3228	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
63		0.00	0.000	0.108	0.3176	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
64		1.12	0.157	0.136	0.3568	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
65		0.00	0.000	0.154	0.3495	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
66		0.00	0.000	0.158	0.3419	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
67		0.16	0.000	0.283	0.3363	0.0000	0.0002	9.87E-10	0.0000	0.0000	9.53E-10	0.0000	0.0000	6.99E-10
68		0.04	0.000	0.101	0.3333	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	2.30E-10
69		0.00	0.000	0.140	0.3266	0.0000	0.0001	6.79E-10	0.0000	0.0000	6.63E-10	0.0000	0.0000	4.89E-10
70		0.00	0.000	0.128	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.62E-10
71	*	0.00	0.000	0.000	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
72	*	0.00	0.000	0.000	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
73	*	0.00	0.000	0.000	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
74	*	0.00	0.000	0.000	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
75		0.33	0.000	0.072	0.3330	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
76	*	0.00	0.000	0.000	0.3329	0.0000	0.0001	1.21E-09	0.0000	0.0000	1.16E-09	0.0000	0.0000	1.11E-09
77		0.03	0.000	0.154	0.3265	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
78		0.00	0.000	0.134	0.3201	0.0001	0.0024	1.24E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09

79	*	0.00	0.000	0.000	0.3194	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.09E-09	0.0000	0.0000	3.89E-09
80	*	0.25	0.000	0.034	0.3198	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
81	*	0.00	0.000	0.044	0.3202	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
82	*	0.00	0.000	0.065	0.3206	0.0000	0.0002	2.56E-09	0.0000	0.0000	2.34E-09	0.0000	0.0000	2.15E-09
83	*	0.12	0.000	0.000	0.3210	0.0001	0.0026	1.44E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
84	*	0.34	0.000	0.024	0.3215	0.0001	0.0054	2.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85	*	0.00	0.000	0.014	0.3219	0.0002	0.0074	3.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.070	0.3373	0.0002	0.0086	3.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.01	0.000	0.132	0.3313	0.0002	0.0091	3.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88	*	0.03	0.000	0.063	0.3293	0.0001	0.0066	3.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.21	0.000	0.129	0.3323	0.0002	0.0084	3.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.166	0.3239	0.0002	0.0106	4.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.07	0.000	0.159	0.3194	0.0003	0.0122	5.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92	*	0.20	0.000	0.039	0.3201	0.0003	0.0145	5.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93	*	0.00	0.000	0.081	0.3209	0.0003	0.0118	4.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.120	0.3172	0.0002	0.0114	4.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95	*	0.00	0.000	0.002	0.3172	0.0002	0.0095	4.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.15	0.000	0.097	0.3198	0.0002	0.0077	3.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97	*	0.05	0.000	0.045	0.3202	0.0001	0.0067	3.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.04	0.000	0.200	0.3124	0.0001	0.0058	2.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.18	0.000	0.145	0.3140	0.0001	0.0050	2.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.00	0.000	0.280	0.3007	0.0001	0.0046	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.00	0.000	0.149	0.2936	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.00	0.000	0.062	0.2907	0.0001	0.0037	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.64	0.003	0.048	0.3187	0.0000	0.0019	9.86E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104	*	0.00	0.000	0.062	0.3158	0.0000	0.0001	4.71E-10	0.0000	0.0000	4.20E-09	0.0000	0.0000	3.92E-09
105		0.17	0.000	0.113	0.3185	0.0000	0.0001	8.89E-10	0.0000	0.0000	7.65E-10	0.0000	0.0000	7.44E-10
106	*	0.00	0.000	0.126	0.3125	0.0000	0.0004	1.99E-09	0.0000	0.0000	1.62E-09	0.0000	0.0000	1.53E-09
107		0.00	0.000	0.162	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.63E-10	0.0000	0.0000	4.55E-10
108		0.00	0.000	0.149	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
109		0.00	0.000	0.062	0.2947	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
110		0.60	0.004	0.048	0.3210	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
111		0.00	0.000	0.078	0.3173	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
112		0.00	0.000	0.139	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
113		0.10	0.000	0.341	0.2991	0.0000	0.0005	2.72E-09	0.0000	0.0000	2.47E-09	0.0000	0.0000	2.27E-09
114		0.15	0.000	0.149	0.2991	0.0000	0.0006	3.33E-09	0.0000	0.0000	2.97E-09	0.0000	0.0000	2.68E-09
115		0.24	0.000	0.062	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
116	*	0.26	0.000	0.054	0.3088	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
117		0.04	0.000	0.090	0.3155	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
118		0.00	0.000	0.170	0.3074	0.0000	0.0003	1.53E-09	0.0000	0.0000	1.45E-09	0.0000	0.0000	1.37E-09
119		0.00	0.000	0.047	0.3052	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
120		0.00	0.000	0.040	0.3033	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
121		0.00	0.000	0.035	0.3016	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

122		1.21	0.206	0.032	0.3479	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
123		0.00	0.000	0.151	0.3407	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
124		0.02	0.000	0.215	0.3313	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125		0.03	0.000	0.209	0.3226	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
126		0.00	0.000	0.211	0.3125	0.0000	0.0001	8.80E-10	0.0000	0.0000	8.53E-10	0.0000	0.0000	8.27E-10
127		0.08	0.000	0.264	0.3037	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
128		0.00	0.000	0.149	0.2966	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
129		0.00	0.000	0.058	0.2939	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
130		0.00	0.000	0.047	0.2916	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
131		0.02	0.000	0.040	0.2907	0.0000	0.0003	2.20E-09	0.0000	0.0000	2.03E-09	0.0000	0.0000	1.89E-09
132		0.00	0.000	0.035	0.2890	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
133	*	0.00	0.000	0.036	0.2875	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134		0.01	0.000	0.030	0.2867	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
135		0.40	0.000	0.028	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
136	*	0.00	0.000	0.026	0.3030	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137		0.06	0.000	0.025	0.3048	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138		0.09	0.000	0.024	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139		0.06	0.000	0.023	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140		0.20	0.000	0.022	0.3181	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141		0.00	0.000	0.282	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142		0.00	0.000	0.020	0.3037	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143		0.00	0.000	0.020	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144		0.07	0.000	0.020	0.3052	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145		0.02	0.000	0.019	0.3051	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146		0.30	0.000	0.018	0.3186	0.0000	0.0001	9.79E-10	0.0000	0.0000	9.46E-10	0.0000	0.0000	9.14E-10
147		0.00	0.000	0.241	0.3071	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
148		0.00	0.000	0.017	0.3063	0.0000	0.0003	3.86E-09	0.0000	0.0000	3.38E-09	0.0000	0.0000	3.01E-09
149		0.40	0.000	0.017	0.3244	0.0000	0.0000	3.21E-10	0.0000	0.0000	3.17E-10	0.0000	0.0000	3.14E-10
150		0.10	0.000	0.440	0.3081	0.0000	0.0000	1.25E-10	0.0000	0.0000	1.25E-10	0.0000	0.0000	1.24E-10
151		0.00	0.000	0.016	0.3073	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
152		0.26	0.000	0.017	0.3190	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153		0.13	0.000	0.181	0.3164	0.0000	0.0001	4.87E-10	0.0000	0.0000	4.78E-10	0.0000	0.0000	4.70E-10
154		0.00	0.000	0.151	0.3094	0.0000	0.0001	3.48E-10	0.0000	0.0000	3.43E-10	0.0000	0.0000	3.39E-10
155		0.00	0.000	0.149	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
156		0.00	0.000	0.062	0.2993	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157		0.00	0.000	0.047	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158		0.00	0.000	0.040	0.2952	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159		0.00	0.000	0.035	0.2935	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160		0.00	0.000	0.032	0.2920	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161		0.00	0.000	0.029	0.2906	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162		0.00	0.000	0.027	0.2893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163		0.00	0.000	0.026	0.2881	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164		0.00	0.000	0.024	0.2869	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.00	0.000	0.023	0.2858	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.00	0.000	0.022	0.2848	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.00	0.000	0.021	0.2838	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.01	0.000	0.021	0.2832	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.27	0.000	0.020	0.2950	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
170	0.44	0.000	0.020	0.3149	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.00	0.000	0.154	0.3076	0.0000	0.0001	4.42E-10	0.0000	0.0000	4.35E-10	0.0000	0.0000	4.28E-10
172	0.00	0.000	0.018	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
173	0.00	0.000	0.018	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.19	0.000	0.018	0.3142	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.30	0.000	0.212	0.3182	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.09	0.000	0.152	0.3152	0.0000	0.0000	2.10E-10	0.0000	0.0000	2.08E-10	0.0000	0.0000	2.07E-10
177	0.03	0.000	0.149	0.3095	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
178	0.20	0.000	0.150	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.155	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.00	0.000	0.062	0.3016	0.0000	0.0002	1.67E-09	0.0000	0.0000	1.58E-09	0.0000	0.0000	1.49E-09
181	0.00	0.000	0.047	0.2994	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
182	0.00	0.000	0.040	0.2975	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.00	0.000	0.035	0.2958	0.0000	0.0002	1.68E-09	0.0000	0.0000	1.58E-09	0.0000	0.0000	1.49E-09
184	0.00	0.000	0.032	0.2943	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
185	0.34	0.000	0.030	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
186	0.03	0.000	0.028	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
187	0.45	0.006	0.027	0.3288	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.00	0.000	0.289	0.3150	0.0000	0.0003	1.62E-09	0.0000	0.0000	1.53E-09	0.0000	0.0000	1.45E-09
189	0.51	0.012	0.284	0.3250	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
190	0.75	0.146	0.135	0.3475	0.0000	0.0003	1.48E-09	0.0000	0.0000	1.40E-09	0.0000	0.0000	1.33E-09
191	0.12	0.000	0.336	0.3371	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
192	0.04	0.000	0.131	0.3327	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
193	0.00	0.000	0.336	0.3167	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	0.00	0.000	0.367	0.2992	0.0000	0.0012	6.66E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
195	0.32	0.000	0.150	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.69E-10	0.0000	0.0000	1.47E-09
196	0.00	0.000	0.062	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.39E-10
197	0.23	0.000	0.048	0.3131	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.03	0.000	0.125	0.3085	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.00	0.000	0.040	0.3066	0.0000	0.0004	2.58E-09	0.0000	0.0000	2.36E-09	0.0000	0.0000	2.17E-09
200	0.50	0.002	0.036	0.3286	0.0000	0.0001	1.02E-09	0.0000	0.0000	9.85E-10	0.0000	0.0000	9.51E-10
201	0.04	0.000	0.302	0.3163	0.0000	0.0001	3.58E-10	0.0000	0.0000	3.54E-10	0.0000	0.0000	3.49E-10
202	0.56	0.019	0.307	0.3274	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
203	0.02	0.000	0.140	0.3216	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.00	0.000	0.288	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.02	0.000	0.150	0.3018	0.0000	0.0002	8.38E-10	0.0000	0.0000	8.13E-10	0.0000	0.0000	7.90E-10
206	0.15	0.000	0.063	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
207	0.00	0.000	0.048	0.3037	0.0000	0.0000	2.20E-10	0.0000	0.0000	2.19E-10	0.0000	0.0000	2.17E-10

208	0.64	0.018	0.041	0.3314	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
209	0.00	0.000	0.195	0.3221	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.00	0.000	0.241	0.3106	0.0000	0.0002	7.88E-10	0.0000	0.0000	7.66E-10	0.0000	0.0000	7.45E-10
211	0.00	0.000	0.252	0.2986	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
212	0.00	0.000	0.149	0.2915	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
213	0.00	0.000	0.062	0.2885	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.00	0.000	0.047	0.2863	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.00	0.000	0.041	0.2845	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.035	0.2828	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	0.00	0.000	0.032	0.2813	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.00	0.000	0.029	0.2799	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.00	0.000	0.027	0.2786	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.00	0.000	0.026	0.2774	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.04	0.000	0.026	0.2779	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.00	0.000	0.023	0.2768	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.00	0.000	0.024	0.2759	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.20	0.000	0.023	0.2844	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
225	0.14	0.000	0.022	0.2899	0.0000	0.0001	6.22E-10	0.0000	0.0000	6.08E-10	0.0000	0.0000	5.95E-10
226	0.02	0.000	0.021	0.2897	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
227	0.00	0.000	0.019	0.2888	0.0000	0.0001	7.11E-10	0.0000	0.0000	6.93E-10	0.0000	0.0000	6.76E-10
228	0.00	0.000	0.018	0.2879	0.0000	0.0000	1.49E-10	0.0000	0.0000	1.49E-10	0.0000	0.0000	1.48E-10
229	0.00	0.000	0.018	0.2871	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
230	0.36	0.000	0.019	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.20	0.000	0.019	0.3120	0.0000	0.0000	3.70E-10	0.0000	0.0000	3.65E-10	0.0000	0.0000	3.60E-10
232	0.00	0.000	0.231	0.3010	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
233	0.00	0.000	0.016	0.3002	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.00	0.000	0.016	0.2995	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
235	0.09	0.000	0.018	0.3030	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
236	0.22	0.000	0.017	0.3125	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.00	0.000	0.186	0.3036	0.0000	0.0003	1.64E-09	0.0000	0.0000	1.55E-09	0.0000	0.0000	1.46E-09
238	0.00	0.000	0.015	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
239	0.00	0.000	0.015	0.3022	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
240	0.00	0.000	0.014	0.3015	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
241	0.00	0.000	0.014	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
242	0.72	0.036	0.016	0.3325	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.84	0.256	0.086	0.3561	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
244	1.72	1.115	0.088	0.3807	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
245	0.00	0.000	0.109	0.3756	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
246	0.00	0.000	0.254	0.3614	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	0.00	0.000	0.193	0.3473	0.0000	0.0012	4.43E-09	0.0000	0.0000	3.00E-09	0.0000	0.0000	2.71E-09
248	0.00	0.000	0.247	0.3324	0.0011	0.0516	1.80E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
249	0.00	0.000	0.153	0.3228	0.0011	0.0530	1.85E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
250	0.00	0.000	0.149	0.3138	0.0011	0.0505	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

251		0.00	0.000	0.062	0.3089	0.0009	0.0415	1.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
252		0.00	0.000	0.047	0.3048	0.0009	0.0428	1.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
253		0.06	0.000	0.042	0.3044	0.0008	0.0390	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
254		0.06	0.000	0.037	0.3042	0.0007	0.0336	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
255		0.54	0.001	0.034	0.3273	0.0006	0.0289	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
256		0.00	0.000	0.098	0.3218	0.0005	0.0256	9.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257		0.00	0.000	0.214	0.3108	0.0004	0.0198	7.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258		0.36	0.000	0.125	0.3209	0.0004	0.0185	7.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259		0.00	0.000	0.146	0.3130	0.0004	0.0167	6.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260		0.00	0.000	0.062	0.3093	0.0005	0.0218	8.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261		0.00	0.000	0.047	0.3065	0.0004	0.0203	7.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.90	0.065	0.042	0.3440	0.0004	0.0175	7.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.36	0.021	0.092	0.3553	0.0003	0.0142	6.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.00	0.000	0.141	0.3481	0.0003	0.0122	5.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.00	0.000	0.219	0.3373	0.0003	0.0132	5.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.00	0.000	0.195	0.3280	0.0003	0.0152	6.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.00	0.000	0.160	0.3204	0.0003	0.0118	4.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.00	0.000	0.088	0.3162	0.0002	0.0093	4.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.206	0.3064	0.0002	0.0077	3.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.00	0.000	0.104	0.3014	0.0001	0.0058	2.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.062	0.2985	0.0001	0.0059	2.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.00	0.000	0.047	0.2962	0.0001	0.0052	2.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.00	0.000	0.040	0.2943	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		0.00	0.000	0.035	0.2927	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.00	0.000	0.032	0.2911	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.029	0.2898	0.0000	0.0023	1.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277	*	0.00	0.000	0.027	0.2884	0.0000	0.0009	6.89E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278	*	0.00	0.000	0.000	0.2882	0.0000	0.0000	1.72E-10	0.0000	0.0000	2.05E-09	0.0000	0.0000	1.47E-09
279		0.62	0.002	0.028	0.3159	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.77E-10
280	*	0.00	0.000	0.071	0.3122	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
281		0.00	0.000	0.024	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
282		0.00	0.000	0.023	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
283		0.00	0.000	0.022	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
284	*	0.45	0.000	0.037	0.3082	0.0000	0.0021	1.26E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
285		0.00	0.000	0.051	0.3242	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.00	0.000	0.133	0.3174	0.0000	0.0024	1.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287	*	0.00	0.000	0.078	0.3133	0.0001	0.0063	2.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.22	0.000	0.086	0.3193	0.0002	0.0082	3.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.11	0.000	0.085	0.3205	0.0002	0.0107	4.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.00	0.000	0.102	0.3156	0.0002	0.0087	3.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.10	0.000	0.194	0.3113	0.0001	0.0068	3.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		1.17	0.211	0.150	0.3498	0.0001	0.0063	2.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.39	0.045	0.180	0.3574	0.0001	0.0055	2.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.42	0.055	0.142	0.3679	0.0001	0.0049	2.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.07	0.000	0.094	0.3670	0.0001	0.0044	2.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.38	0.025	0.063	0.3809	0.0001	0.0039	1.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.02	0.000	0.081	0.3778	0.0001	0.0029	1.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		4.02	2.968	0.098	0.4208	0.0001	0.0037	1.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.00	0.000	0.086	0.3856	0.0093	0.4447	1.21E-06	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.000	0.102	0.3699	0.0058	0.2711	7.96E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.00	0.000	0.069	0.3606	0.0032	0.1509	4.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.02	0.000	0.108	0.3522	0.0023	0.1059	3.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.13	0.000	0.162	0.3477	0.0016	0.0727	2.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.03	0.000	0.095	0.3428	0.0014	0.0673	2.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.06	0.000	0.083	0.3400	0.0008	0.0376	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.000	0.084	0.3342	0.0009	0.0436	1.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307	*	0.00	0.000	0.000	0.3328	0.0008	0.0379	1.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308	*	0.03	0.000	0.031	0.3315	0.0007	0.0323	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309	*	0.00	0.000	0.003	0.3304	0.0006	0.0284	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310	*	0.00	0.000	0.051	0.3268	0.0005	0.0252	9.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311	*	0.00	0.000	0.044	0.3238	0.0006	0.0270	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312	*	1.55	0.000	0.000	0.3240	0.0005	0.0227	8.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313	*	0.00	0.000	0.000	0.3242	0.0004	0.0186	7.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.00	0.317	0.000	0.3771	0.0004	0.0177	7.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.08	0.001	0.141	0.3763	0.0003	0.0145	6.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.89	0.265	0.096	0.4003	0.0006	0.0223	8.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.32	0.087	0.060	0.3978	0.0014	0.0678	2.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318	*	0.00	0.000	0.043	0.3847	0.0058	0.2672	7.85E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.04	0.000	0.082	0.3732	0.0043	0.2009	6.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.34	0.004	0.129	0.3767	0.0031	0.1480	4.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.06	0.000	0.123	0.3702	0.0022	0.1027	3.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.25	0.000	0.063	0.3749	0.0015	0.0718	2.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.00	0.000	0.126	0.3670	0.0019	0.0880	2.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		1.95	0.966	0.121	0.4058	0.0008	0.0398	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.20	0.052	0.181	0.3891	0.0043	0.2039	5.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.31	0.019	0.224	0.3828	0.0054	0.2545	7.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.06	0.000	0.155	0.3722	0.0030	0.1393	4.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.272	0.3552	0.0026	0.1201	3.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.00	0.000	0.097	0.3495	0.0012	0.0544	1.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.05	0.000	0.077	0.3462	0.0007	0.0348	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	0.00	0.000	0.043	0.3424	0.0009	0.0396	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332	*	0.00	0.000	0.000	0.3408	0.0008	0.0372	1.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333	*	0.00	0.000	0.000	0.3393	0.0007	0.0333	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.00	0.000	0.000	0.3378	0.0007	0.0329	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	0.00	0.000	0.000	0.3363	0.0007	0.0327	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336	*	0.00	0.000	0.039	0.3331	0.0007	0.0315	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337			0.00	0.000	0.080	0.3281	0.0006	0.0296	1.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338			0.00	0.000	0.068	0.3235	0.0006	0.0280	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339			0.29	0.000	0.057	0.3337	0.0006	0.0295	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340			0.00	0.000	0.059	0.3303	0.0005	0.0233	8.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341	*		0.40	0.000	0.024	0.3304	0.0003	0.0155	6.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342	*		0.14	0.000	0.010	0.3305	0.0004	0.0169	6.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343	*		0.56	0.000	0.006	0.3308	0.0004	0.0172	6.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344	*		0.15	0.000	0.000	0.3310	0.0004	0.0168	6.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345	*		0.00	0.000	0.010	0.3313	0.0003	0.0160	6.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*		0.00	0.000	0.025	0.3317	0.0003	0.0151	6.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347			0.00	0.000	0.041	0.3321	0.0003	0.0143	5.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348			0.00	0.000	0.008	0.3449	0.0003	0.0144	5.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349			0.00	0.112	0.000	0.3728	0.0003	0.0121	5.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350			0.10	0.000	0.077	0.3735	0.0002	0.0078	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351			0.00	0.000	0.100	0.3683	0.0003	0.0154	6.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352			0.00	0.000	0.079	0.3644	0.0003	0.0139	5.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353			0.01	0.000	0.079	0.3580	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354			0.00	0.000	0.109	0.3497	0.0006	0.0286	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355			0.00	0.000	0.156	0.3395	0.0013	0.0606	2.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356			0.00	0.000	0.057	0.3347	0.0013	0.0607	2.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357	*		0.00	0.000	0.000	0.3335	0.0009	0.0435	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*		0.55	0.000	0.010	0.3331	0.0006	0.0282	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	*	0.00	0.000	0.036	0.3331	0.0008	0.0376	1.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		*	0.00	0.213	0.001	0.3461	0.0004	0.0209	8.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361	*	*	0.00	0.000	0.000	0.3461	0.0003	0.0143	5.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		*	0.04	0.000	0.001	0.3478	0.0002	0.0108	4.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		*	0.00	0.000	0.000	0.3478	0.0002	0.0087	3.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		*	0.00	0.000	0.000	0.3478	0.0002	0.0072	3.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		*	1.06	0.802	0.001	0.3602	0.0001	0.0062	2.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 13			
	inches	cubic feet	percent
Precipitation	45.31	164,485.9	100.00
Runoff	9.086	32,983.5	20.05
Evapotranspiration	30.728	111,543.9	67.81
Drainage Collected from Layer 2	6.5019	23,601.9	14.35
Percolation/Leakage through Layer 3	0.000022	0.0814	0.00
Average Head on Top of Layer 3	0.0004	---	---
Drainage Collected from Layer 7	0.0000	0.0766	0.00
Percolation/Leakage through Layer 8	0.000001	0.0048	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0000	0.00
Percolation/Leakage through Layer 11	0.000001	0.0048	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-1.0037	-3,643.4	-2.22
Soil Water at Start of Year	256.7056	931,841.2	566.52
Soil Water at End of Year	257.2285	933,739.6	567.67
Snow Water at Start of Year	1.5267	5,541.8	3.37
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 14

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Column key: Head #1: drainage from Layer 3; Drain #1: drainage from Layer 2; Leak #1: leakage thru Layer 3; Head #2: drainage from Layer 8; Drain #2: drainage from Layer 7; Leak #2: leakage thru Layer 8; Head #3: drainage from Layer 10; Drain #3: drainage from Layer 9; Leak #3: leakage thru Layer 11

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1		*	0.00	0.000	0.000	0.3602	0.0001	0.0054	2.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2		*	0.44	0.283	0.001	0.3676	0.0001	0.0048	2.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.03	0.000	0.149	0.3605	0.0000	0.0002	1.39E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.00	0.000	0.227	0.3483	0.0000	0.0003	1.48E-09	0.0000	0.0000	2.94E-09	0.0000	0.0000	2.06E-09
5			0.00	0.000	0.163	0.3392	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	6.64E-10
6			0.13	0.000	0.159	0.3362	0.0002	0.0103	4.29E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09
7			0.00	0.000	0.120	0.3294	0.0005	0.0261	9.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
8			0.00	0.000	0.112	0.3237	0.0006	0.0281	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9			0.00	0.000	0.087	0.3194	0.0005	0.0216	8.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10			0.00	0.000	0.087	0.3149	0.0003	0.0129	5.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11			0.00	0.000	0.062	0.3119	0.0003	0.0141	5.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.00	0.000	0.047	0.3094	0.0002	0.0079	3.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*		0.03	0.000	0.048	0.3079	0.0001	0.0039	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*		0.00	0.000	0.000	0.3073	0.0001	0.0035	1.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*		0.00	0.000	0.000	0.3066	0.0001	0.0058	2.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*		2.32	0.000	0.000	0.3068	0.0002	0.0094	4.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17	*		0.00	0.000	0.012	0.3071	0.0003	0.0122	5.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18	*		0.00	0.000	0.022	0.3074	0.0003	0.0135	5.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19	*		0.00	0.000	0.023	0.3078	0.0003	0.0143	5.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.00	0.000	0.005	0.3257	0.0003	0.0136	5.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.00	0.067	0.000	0.3601	0.0003	0.0118	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22			0.92	1.176	0.000	0.3947	0.0002	0.0106	4.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23	*		0.13	0.000	0.039	0.3898	0.0002	0.0101	4.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24	*		0.69	0.000	0.015	0.3791	0.0046	0.2186	6.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*		0.00	0.000	0.028	0.3733	0.0035	0.1640	5.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26			0.00	0.113	0.000	0.3958	0.0029	0.1108	3.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27			0.00	0.000	0.094	0.3850	0.0019	0.0859	2.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28			0.26	0.002	0.128	0.3808	0.0050	0.2454	7.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29			0.12	0.000	0.111	0.3756	0.0029	0.1363	4.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30			0.00	0.000	0.175	0.3623	0.0026	0.1218	3.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31			0.02	0.000	0.149	0.3533	0.0018	0.0834	2.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32			0.00	0.000	0.071	0.3478	0.0011	0.0525	1.83E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33			0.00	0.000	0.092	0.3425	0.0011	0.0494	1.73E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34			0.29	0.000	0.076	0.3520	0.0006	0.0286	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35	*		0.20	0.000	0.053	0.3514	0.0002	0.0094	4.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36			0.02	0.000	0.089	0.3527	0.0006	0.0278	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*		0.14	0.000	0.048	0.3523	0.0007	0.0320	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38	*		0.04	0.000	0.043	0.3521	0.0006	0.0294	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39			0.00	0.000	0.079	0.3496	0.0006	0.0270	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40			0.00	0.000	0.070	0.3454	0.0005	0.0240	9.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41			0.00	0.000	0.074	0.3411	0.0004	0.0206	8.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42	*		0.00	0.000	0.000	0.3403	0.0004	0.0196	7.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43	*		0.00	0.000	0.000	0.3393	0.0003	0.0155	6.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44	*		0.00	0.000	0.000	0.3383	0.0004	0.0191	7.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45	*	*	0.00	0.000	0.000	0.3383	0.0006	0.0291	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46	*	*	0.31	0.000	0.010	0.3383	0.0004	0.0177	7.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47	*	*	0.00	0.000	0.039	0.3383	0.0003	0.0127	5.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48	*	*	0.00	0.000	0.034	0.3383	0.0002	0.0099	4.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*	*	0.00	0.000	0.030	0.3383	0.0002	0.0081	3.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50		*	0.00	0.038	0.053	0.3432	0.0001	0.0068	3.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51	*	*	0.29	0.000	0.032	0.3432	0.0001	0.0059	2.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		*	0.08	0.009	0.000	0.3479	0.0001	0.0052	2.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		*	0.08	0.137	0.068	0.3529	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		*	0.12	0.021	0.000	0.3573	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55		*	0.06	0.004	0.000	0.3600	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56		*	0.00	0.000	0.000	0.3600	0.0001	0.0023	1.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57		*	0.03	0.000	0.000	0.3613	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.57E-09	0.0000	0.0000	3.99E-09
58			0.00	0.000	0.206	0.3504	0.0000	0.0003	1.83E-09	0.0000	0.0000	1.71E-09	0.0000	0.0000	1.50E-09
59			0.00	0.000	0.111	0.3446	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.03E-10
60	*		0.00	0.000	0.057	0.3412	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
61	*		0.00	0.000	0.000	0.3405	0.0000	0.0000	6.75E-10	0.0000	0.0000	6.59E-10	0.0000	0.0000	6.44E-10
62	*		0.00	0.000	0.000	0.3399	0.0001	0.0038	1.98E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
63	*		0.00	0.000	0.000	0.3395	0.0002	0.0088	3.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64	*		0.00	0.000	0.000	0.3395	0.0003	0.0145	5.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65	*		1.10	0.000	0.023	0.3404	0.0002	0.0111	4.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66			0.00	0.029	0.000	0.3700	0.0002	0.0081	3.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67			0.19	0.148	0.116	0.3857	0.0001	0.0040	1.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.07	0.000	0.281	0.3747	0.0001	0.0053	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.73	0.140	0.155	0.3915	0.0001	0.0041	1.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70	*		0.00	0.000	0.000	0.3872	0.0013	0.0598	1.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71			0.00	0.000	0.167	0.3693	0.0030	0.1458	4.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72	*		0.18	0.000	0.051	0.3641	0.0033	0.1553	4.85E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73			0.36	0.013	0.010	0.3814	0.0020	0.1040	3.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.00	0.000	0.207	0.3682	0.0014	0.0715	2.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.00	0.000	0.283	0.3524	0.0019	0.0915	3.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.00	0.000	0.232	0.3399	0.0007	0.0324	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.08	0.000	0.084	0.3367	0.0008	0.0383	1.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.00	0.000	0.170	0.3270	0.0012	0.0571	2.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79	*	0.08	0.000	0.047	0.3266	0.0008	0.0388	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80	*	2.02	0.000	0.000	0.3262	0.0006	0.0280	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.46	0.238	0.000	0.3759	0.0006	0.0278	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.20	0.253	0.000	0.3956	0.0008	0.0312	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83	*	0.42	0.000	0.032	0.3894	0.0007	0.0342	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84	*	0.08	0.000	0.028	0.3790	0.0054	0.2613	7.80E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85	*	0.00	0.000	0.049	0.3732	0.0035	0.1626	5.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86	*	0.00	0.000	0.045	0.3693	0.0025	0.1154	3.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.226	0.010	0.3987	0.0021	0.0939	3.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.13	0.006	0.086	0.3914	0.0021	0.1046	3.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.41	0.056	0.081	0.3936	0.0055	0.2484	7.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.124	0.3822	0.0037	0.1722	5.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91	*	0.04	0.000	0.108	0.3697	0.0029	0.1410	4.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.07	0.000	0.142	0.3603	0.0031	0.1439	4.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93	*	0.18	0.000	0.079	0.3573	0.0023	0.1059	3.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.112	0.3531	0.0015	0.0706	2.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.13	0.000	0.144	0.3503	0.0013	0.0615	2.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.44	0.007	0.075	0.3651	0.0010	0.0502	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.23	0.001	0.232	0.3631	0.0011	0.0507	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.57	0.092	0.075	0.3813	0.0007	0.0362	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.21	0.010	0.074	0.3856	0.0005	0.0227	8.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.43	0.079	0.072	0.3968	0.0007	0.0315	1.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.00	0.000	0.178	0.3808	0.0013	0.0648	2.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.00	0.000	0.269	0.3584	0.0048	0.2245	6.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.00	0.000	0.164	0.3458	0.0029	0.1316	4.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.00	0.000	0.201	0.3333	0.0018	0.0828	2.75E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.00	0.000	0.113	0.3254	0.0012	0.0586	2.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.25	0.000	0.149	0.3279	0.0012	0.0551	1.91E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107		0.05	0.000	0.062	0.3253	0.0009	0.0437	1.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.08	0.000	0.048	0.3250	0.0009	0.0411	1.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.20	0.000	0.170	0.3251	0.0008	0.0388	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		1.41	0.338	0.106	0.3704	0.0007	0.0348	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.00	0.000	0.171	0.3612	0.0005	0.0235	9.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.00	0.000	0.214	0.3495	0.0005	0.0231	8.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113		0.23	0.000	0.073	0.3560	0.0007	0.0332	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114	*	0.00	0.000	0.053	0.3536	0.0006	0.0286	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115	*	0.03	0.000	0.033	0.3535	0.0003	0.0156	6.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116	*	0.46	0.000	0.036	0.3529	0.0000	0.0000	1.91E-10	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117		0.15	0.026	0.081	0.3722	0.0002	0.0074	3.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118	*	0.00	0.000	0.077	0.3669	0.0007	0.0320	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119		0.00	0.000	0.239	0.3532	0.0007	0.0339	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120		0.00	0.000	0.223	0.3415	0.0011	0.0505	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121		0.00	0.000	0.387	0.3224	0.0007	0.0314	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122		0.08	0.000	0.149	0.3187	0.0006	0.0264	9.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123		1.40	0.254	0.062	0.3696	0.0002	0.0088	3.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124		0.00	0.000	0.225	0.3574	0.0002	0.0090	3.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125		0.00	0.000	0.162	0.3479	0.0004	0.0185	7.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126		0.00	0.000	0.269	0.3334	0.0007	0.0331	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127		0.00	0.000	0.330	0.3161	0.0008	0.0370	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128		0.00	0.000	0.149	0.3083	0.0008	0.0370	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129		0.10	0.000	0.062	0.3100	0.0006	0.0291	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130		0.00	0.000	0.047	0.3077	0.0004	0.0176	7.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
131		0.00	0.000	0.040	0.3057	0.0002	0.0096	4.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132	*	0.00	0.000	0.034	0.3034	0.0000	0.0014	8.99E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133		0.10	0.000	0.032	0.3059	0.0001	0.0041	2.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134		0.00	0.000	0.029	0.3038	0.0002	0.0089	3.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
135		0.64	0.006	0.028	0.3322	0.0002	0.0111	4.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
136		0.01	0.000	0.150	0.3251	0.0003	0.0137	5.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
137		0.00	0.000	0.156	0.3170	0.0002	0.0094	4.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
138		0.00	0.000	0.149	0.3093	0.0002	0.0104	4.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
139		0.00	0.000	0.062	0.3055	0.0002	0.0100	4.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
140		0.00	0.000	0.047	0.3026	0.0003	0.0161	6.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
141		0.00	0.000	0.040	0.3002	0.0003	0.0162	6.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
142		0.58	0.001	0.036	0.3256	0.0003	0.0148	6.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
143		0.12	0.000	0.254	0.3187	0.0002	0.0113	4.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
144		0.08	0.000	0.217	0.3117	0.0003	0.0129	5.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
145		0.00	0.000	0.125	0.3058	0.0003	0.0148	6.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
146		0.00	0.000	0.062	0.3029	0.0003	0.0131	5.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
147		0.00	0.000	0.047	0.3006	0.0002	0.0101	4.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
148		0.00	0.000	0.040	0.2987	0.0002	0.0081	3.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
149		0.09	0.000	0.036	0.3015	0.0001	0.0070	3.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
150		0.34	0.000	0.032	0.3162	0.0001	0.0060	2.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
151		0.01	0.000	0.030	0.3154	0.0001	0.0053	2.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
152		0.58	0.025	0.028	0.3404	0.0001	0.0047	2.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
153		0.00	0.000	0.322	0.3250	0.0001	0.0039	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
154		0.00	0.000	0.189	0.3160	0.0001	0.0038	2.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
155		0.00	0.000	0.134	0.3097	0.0001	0.0036	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
156		0.59	0.006	0.062	0.3346	0.0000	0.0004	2.36E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
157		0.04	0.000	0.231	0.3254	0.0000	0.0003	1.50E-09	0.0000	0.0000	2.12E-09	0.0000	0.0000	1.51E-09
158		0.00	0.000	0.302	0.3110	0.0000	0.0004	1.85E-09	0.0000	0.0000	1.66E-09	0.0000	0.0000	1.66E-09
159		0.04	0.000	0.136	0.3066	0.0000	0.0002	9.42E-10	0.0000	0.0000	1.11E-09	0.0000	0.0000	1.19E-09
160		0.00	0.000	0.062	0.3037	0.0000	0.0001	4.54E-10	0.0000	0.0000	5.61E-10	0.0000	0.0000	6.76E-10
161		0.00	0.000	0.047	0.3014	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.12E-10	0.0000	0.0000	2.20E-10
162		0.00	0.000	0.040	0.2995	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.78E-11
163		0.00	0.000	0.036	0.2980	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164		0.00	0.000	0.032	0.2965	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.12	0.000	0.030	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.08	0.000	0.028	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.00	0.000	0.026	0.3020	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.23	0.000	0.025	0.3116	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.00	0.000	0.023	0.3105	0.0000	0.0000	2.07E-10	0.0000	0.0000	2.05E-10	0.0000	0.0000	2.04E-10
170	0.56	0.013	0.023	0.3355	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
171	0.00	0.000	0.293	0.3216	0.0000	0.0000	2.52E-10	0.0000	0.0000	2.50E-10	0.0000	0.0000	2.47E-10
172	0.13	0.000	0.313	0.3128	0.0000	0.0006	3.48E-09	0.0000	0.0000	3.08E-09	0.0000	0.0000	2.77E-09
173	0.00	0.000	0.150	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
174	0.03	0.000	0.063	0.3041	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.03	0.000	0.048	0.3033	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	2.17	1.001	0.041	0.3573	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.00	0.000	0.214	0.3471	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.00	0.000	0.344	0.3307	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.206	0.3209	0.0000	0.0002	1.22E-09	0.0000	0.0000	1.16E-09	0.0000	0.0000	1.12E-09
180	0.00	0.000	0.209	0.3109	0.0000	0.0005	3.56E-09	0.0000	0.0000	3.15E-09	0.0000	0.0000	2.83E-09
181	0.01	0.000	0.149	0.3042	0.0000	0.0001	8.86E-10	0.0000	0.0000	8.59E-10	0.0000	0.0000	8.33E-10
182	0.00	0.000	0.062	0.3013	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
183	0.00	0.000	0.047	0.2990	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.00	0.000	0.040	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.00	0.000	0.035	0.2954	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
186	0.00	0.000	0.032	0.2939	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
187	0.00	0.000	0.029	0.2925	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.00	0.000	0.027	0.2912	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.00	0.000	0.026	0.2900	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.11	0.000	0.025	0.2938	0.0000	0.0008	6.91E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
191	0.00	0.000	0.023	0.2925	0.0000	0.0000	9.43E-11	0.0000	0.0000	7.83E-10	0.0000	0.0000	1.62E-09
192	0.10	0.000	0.023	0.2959	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.35E-11	0.0000	0.0000	2.08E-10
193	0.08	0.000	0.022	0.2984	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.88E-12
194	0.00	0.000	0.020	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.00	0.000	0.020	0.2958	0.0000	0.0000	1.07E-09	0.0000	0.0000	1.03E-09	0.0000	0.0000	9.93E-10
196	0.47	0.000	0.020	0.3168	0.0000	0.0003	3.10E-09	0.0000	0.0000	2.79E-09	0.0000	0.0000	2.53E-09
197	0.54	0.020	0.262	0.3284	0.0000	0.0006	3.11E-09	0.0000	0.0000	2.79E-09	0.0000	0.0000	2.53E-09
198	0.18	0.000	0.350	0.3194	0.0000	0.0014	7.02E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
199	0.00	0.000	0.326	0.3037	0.0002	0.0117	4.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
200	0.00	0.000	0.149	0.2966	0.0003	0.0121	5.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
201	0.95	0.068	0.063	0.3356	0.0002	0.0095	4.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
202	0.40	0.028	0.336	0.3373	0.0002	0.0078	3.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
203	0.45	0.036	0.266	0.3443	0.0001	0.0066	3.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
204	0.08	0.000	0.132	0.3419	0.0001	0.0057	2.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
205	0.00	0.000	0.174	0.3336	0.0001	0.0051	2.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
206	0.00	0.000	0.180	0.3250	0.0001	0.0042	2.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
207	0.12	0.000	0.240	0.3193	0.0001	0.0040	2.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

208	0.75	0.047	0.329	0.3369	0.0000	0.0017	8.79E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
209	0.19	0.000	0.130	0.3395	0.0001	0.0040	2.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
210	0.00	0.000	0.270	0.3267	0.0001	0.0037	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
211	0.30	0.000	0.131	0.3348	0.0000	0.0010	4.91E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
212	1.52	0.607	0.274	0.3651	0.0000	0.0002	1.63E-09	0.0000	0.0000	3.34E-09	0.0000	0.0000	2.33E-09
213	0.10	0.000	0.252	0.3581	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	7.45E-10
214	0.05	0.000	0.234	0.3492	0.0000	0.0000	2.93E-10	0.0000	0.0000	2.90E-10	0.0000	0.0000	2.16E-10
215	0.21	0.000	0.106	0.3542	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	7.18E-11
216	0.00	0.000	0.106	0.3492	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
217	0.26	0.000	0.270	0.3485	0.0000	0.0017	9.34E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
218	0.00	0.000	0.190	0.3394	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.85E-09	0.0000	0.0000	2.33E-09
219	0.37	0.000	0.101	0.3519	0.0000	0.0012	5.93E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	5.01E-09
220	0.04	0.000	0.259	0.3408	0.0000	0.0012	6.01E-09	0.0000	0.0000	4.80E-09	0.0000	0.0000	3.22E-09
221	0.01	0.000	0.232	0.3302	0.0000	0.0024	1.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
222	0.00	0.000	0.136	0.3234	0.0001	0.0025	1.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
223	0.00	0.000	0.130	0.3168	0.0000	0.0003	1.69E-09	0.0000	0.0000	4.16E-09	0.0000	0.0000	3.88E-09
224	0.00	0.000	0.062	0.3133	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.97E-10	0.0000	0.0000	5.10E-10
225	0.00	0.000	0.046	0.3106	0.0000	0.0000	9.13E-10	0.0000	0.0000	8.84E-10	0.0000	0.0000	8.56E-10
226	0.00	0.000	0.040	0.3081	0.0000	0.0021	1.39E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
227	0.44	0.000	0.037	0.3268	0.0001	0.0056	2.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
228	0.08	0.000	0.290	0.3162	0.0001	0.0061	2.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
229	0.17	0.000	0.034	0.3223	0.0002	0.0115	5.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
230	0.27	0.000	0.278	0.3211	0.0002	0.0086	3.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
231	0.00	0.000	0.313	0.3055	0.0003	0.0126	5.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
232	0.00	0.000	0.149	0.2982	0.0004	0.0201	7.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
233	0.00	0.000	0.062	0.2952	0.0004	0.0167	6.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
234	0.06	0.000	0.049	0.2959	0.0003	0.0121	5.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
235	0.02	0.000	0.042	0.2948	0.0002	0.0096	4.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
236	0.00	0.000	0.035	0.2931	0.0002	0.0073	3.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
237	0.00	0.000	0.032	0.2915	0.0001	0.0056	2.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
238	0.00	0.000	0.029	0.2901	0.0001	0.0063	2.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
239	0.27	0.000	0.029	0.3014	0.0001	0.0055	2.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
240	0.00	0.000	0.026	0.3002	0.0001	0.0048	2.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
241	0.00	0.000	0.024	0.2990	0.0001	0.0044	2.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
242	0.00	0.000	0.023	0.2979	0.0001	0.0040	1.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
243	0.01	0.000	0.024	0.2974	0.0001	0.0036	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
244	0.00	0.000	0.023	0.2965	0.0000	0.0008	4.96E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
245	0.11	0.000	0.022	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.03E-09	0.0000	0.0000	1.52E-09
246	0.26	0.000	0.022	0.3119	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	4.73E-10
247	0.00	0.000	0.019	0.3110	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
248	0.00	0.000	0.018	0.3102	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
249	0.33	0.000	0.020	0.3248	0.0000	0.0001	3.35E-10	0.0000	0.0000	3.31E-10	0.0000	0.0000	2.47E-10
250	0.02	0.000	0.115	0.3202	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	8.18E-11

251	0.00	0.000	0.225	0.3094	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
252	0.00	0.000	0.149	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
253	0.00	0.000	0.062	0.2994	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
254	0.31	0.000	0.050	0.3117	0.0000	0.0001	3.67E-10	0.0000	0.0000	3.62E-10	0.0000	0.0000	3.58E-10
255	0.00	0.000	0.040	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
256	0.75	0.056	0.038	0.3409	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
257	0.01	0.000	0.218	0.3312	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
258	0.04	0.000	0.177	0.3248	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
259	0.00	0.000	0.284	0.3114	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
260	0.00	0.000	0.149	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261	0.00	0.000	0.058	0.3015	0.0000	0.0001	8.56E-10	0.0000	0.0000	8.30E-10	0.0000	0.0000	8.05E-10
262	0.00	0.000	0.047	0.2993	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
263	0.42	0.000	0.042	0.3172	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
264	0.00	0.000	0.035	0.3155	0.0000	0.0002	1.55E-09	0.0000	0.0000	1.47E-09	0.0000	0.0000	1.39E-09
265	0.62	0.022	0.034	0.3423	0.0000	0.0006	4.91E-09	0.0000	0.0000	3.27E-09	0.0000	0.0000	2.92E-09
266	0.35	0.020	0.085	0.3541	0.0000	0.0001	5.81E-10	0.0000	0.0000	1.45E-09	0.0000	0.0000	1.38E-09
267	0.00	0.000	0.081	0.3503	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.42E-10	0.0000	0.0000	1.42E-10
268	0.25	0.000	0.079	0.3583	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
269	1.08	0.419	0.162	0.3822	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
270	0.24	0.032	0.113	0.3866	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
271	0.67	0.213	0.234	0.3939	0.0001	0.0025	1.16E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
272	0.01	0.000	0.155	0.3816	0.0002	0.0075	3.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273	0.00	0.000	0.143	0.3656	0.0030	0.1473	4.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274	0.00	0.000	0.097	0.3553	0.0030	0.1422	4.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275	0.00	0.000	0.133	0.3455	0.0019	0.0888	2.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276	0.00	0.000	0.131	0.3364	0.0016	0.0733	2.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277	0.00	0.000	0.201	0.3247	0.0011	0.0508	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278	0.00	0.000	0.149	0.3161	0.0011	0.0495	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279	0.41	0.000	0.064	0.3312	0.0007	0.0317	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280	0.00	0.000	0.214	0.3193	0.0006	0.0299	1.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281	0.00	0.000	0.047	0.3158	0.0008	0.0384	1.39E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282	0.00	0.000	0.040	0.3128	0.0007	0.0317	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283	0.00	0.000	0.035	0.3103	0.0006	0.0274	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284	0.00	0.000	0.032	0.3080	0.0005	0.0212	8.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285	0.00	0.000	0.029	0.3058	0.0004	0.0183	7.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286	0.00	0.000	0.027	0.3038	0.0004	0.0180	7.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287	0.00	0.000	0.026	0.3019	0.0004	0.0174	7.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288	0.00	0.000	0.024	0.3002	0.0004	0.0165	6.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289	0.16	0.000	0.026	0.3061	0.0003	0.0153	6.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290	0.00	0.000	0.022	0.3045	0.0003	0.0142	5.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291	0.00	0.000	0.021	0.3030	0.0003	0.0122	5.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292	0.00	0.000	0.020	0.3016	0.0003	0.0121	5.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293	0.04	0.000	0.022	0.3018	0.0002	0.0112	5.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.00	0.000	0.019	0.3005	0.0002	0.0115	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.00	0.000	0.018	0.2993	0.0002	0.0113	5.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.63	0.003	0.021	0.3280	0.0002	0.0104	4.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.13	0.000	0.097	0.3290	0.0002	0.0081	3.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		0.16	0.000	0.087	0.3320	0.0002	0.0091	3.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.01	0.000	0.093	0.3280	0.0002	0.0117	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.000	0.156	0.3206	0.0002	0.0106	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.00	0.000	0.068	0.3173	0.0002	0.0085	3.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.90	0.091	0.075	0.3523	0.0002	0.0071	3.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.00	0.000	0.133	0.3459	0.0001	0.0061	2.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.28	0.000	0.181	0.3508	0.0001	0.0054	2.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.00	0.000	0.152	0.3435	0.0001	0.0047	2.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.000	0.144	0.3367	0.0001	0.0043	2.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.00	0.000	0.094	0.3322	0.0001	0.0033	1.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		0.00	0.000	0.110	0.3269	0.0001	0.0036	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.00	0.000	0.183	0.3181	0.0000	0.0017	8.66E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.00	0.000	0.158	0.3106	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.35E-09	0.0000	0.0000	2.33E-09
311		0.00	0.000	0.097	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.47E-10
312		0.00	0.000	0.062	0.3030	0.0000	0.0003	1.90E-09	0.0000	0.0000	1.77E-09	0.0000	0.0000	1.67E-09
313		0.00	0.000	0.047	0.3008	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
314		0.00	0.000	0.040	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
315		0.00	0.000	0.035	0.2972	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
316		0.00	0.000	0.032	0.2957	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
317		0.00	0.000	0.029	0.2943	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
318		0.00	0.000	0.027	0.2930	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
319		0.00	0.000	0.026	0.2918	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
320		0.00	0.000	0.024	0.2906	0.0000	0.0007	6.61E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
321		0.00	0.000	0.023	0.2894	0.0000	0.0009	7.72E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.13	0.000	0.023	0.2944	0.0000	0.0000	8.80E-10	0.0000	0.0000	1.35E-09	0.0000	0.0000	1.35E-09
323	*	0.37	0.000	0.034	0.2951	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.13E-10	0.0000	0.0000	4.79E-10
324		0.00	0.000	0.019	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.29E-11
325	*	0.14	0.000	0.034	0.3099	0.0000	0.0001	2.65E-09	0.0000	0.0000	2.42E-09	0.0000	0.0000	2.22E-09
326	*	0.69	0.000	0.028	0.3105	0.0000	0.0001	1.24E-09	0.0000	0.0000	1.19E-09	0.0000	0.0000	1.14E-09
327	*	0.17	0.000	0.029	0.3111	0.0000	0.0003	2.75E-09	0.0000	0.0000	2.50E-09	0.0000	0.0000	2.29E-09
328	*	0.56	0.000	0.029	0.3117	0.0000	0.0019	1.13E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
329	*	0.00	0.000	0.037	0.3124	0.0001	0.0032	1.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330	*	0.37	0.000	0.032	0.3131	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.03	0.000	0.000	0.3234	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.00	0.000	0.037	0.3244	0.0001	0.0049	2.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.08	0.021	0.000	0.3505	0.0001	0.0050	2.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.01	0.000	0.025	0.3513	0.0001	0.0050	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.55	0.178	0.000	0.3817	0.0002	0.0077	3.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336	*	0.02	0.000	0.036	0.3826	0.0001	0.0055	2.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337	*		0.00	0.000	0.018	0.3791	0.0000	0.0022	1.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338	*		0.00	0.000	0.033	0.3733	0.0012	0.0607	1.99E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339	*		0.00	0.000	0.015	0.3694	0.0024	0.1144	3.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340	*		0.00	0.000	0.019	0.3666	0.0019	0.0895	2.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341	*		0.00	0.000	0.018	0.3646	0.0016	0.0727	2.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342	*		0.00	0.000	0.009	0.3630	0.0013	0.0611	2.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343	*		0.03	0.000	0.000	0.3617	0.0011	0.0527	1.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344			0.00	0.001	0.009	0.3748	0.0009	0.0430	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345			0.06	0.000	0.053	0.3736	0.0010	0.0477	1.69E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*		0.02	0.000	0.023	0.3717	0.0008	0.0385	1.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347	*	*	0.01	0.000	0.014	0.3717	0.0009	0.0411	1.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348	*	*	0.00	0.000	0.000	0.3717	0.0005	0.0216	8.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349	*	*	0.00	0.000	0.000	0.3717	0.0003	0.0146	5.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350	*	*	0.45	0.000	0.018	0.3717	0.0002	0.0110	4.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		*	0.04	0.301	0.000	0.3800	0.0002	0.0088	3.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		*	0.00	0.000	0.000	0.3800	0.0002	0.0073	3.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		*	0.00	0.000	0.000	0.3800	0.0001	0.0063	2.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		*	0.00	0.000	0.000	0.3800	0.0001	0.0055	2.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		*	0.00	0.000	0.000	0.3800	0.0001	0.0049	2.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		*	0.02	0.000	0.001	0.3809	0.0001	0.0044	2.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357			0.55	0.146	0.143	0.3923	0.0001	0.0023	1.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358			0.00	0.000	0.087	0.3845	0.0001	0.0050	2.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359			0.00	0.000	0.066	0.3713	0.0018	0.0900	2.80E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360			0.37	0.006	0.070	0.3792	0.0032	0.1488	4.64E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361			0.10	0.000	0.059	0.3774	0.0022	0.1042	3.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362	*		0.00	0.000	0.000	0.3733	0.0019	0.0898	2.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363	*		0.00	0.000	0.000	0.3719	0.0014	0.0646	2.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364	*	*	0.42	0.000	0.012	0.3719	0.0009	0.0427	1.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		*	0.00	0.036	0.025	0.3761	0.0005	0.0223	8.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 14			
	inches	cubic feet	percent
Precipitation	48.59	176,379.5	100.00
Runoff	7.168	26,020.8	14.75
Evapotranspiration	31.995	116,140.8	65.85
Drainage Collected from Layer 2	8.7800	31,871.3	18.07
Percolation/Leakage through Layer 3	0.000030	0.1101	0.00
Average Head on Top of Layer 3	0.0005	---	---
Drainage Collected from Layer 7	0.0000	0.1031	0.00
Percolation/Leakage through Layer 8	0.000002	0.0068	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000002	0.0067	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.6464	2,346.5	1.33
Soil Water at Start of Year	257.2285	933,739.6	529.39
Soil Water at End of Year	257.6116	935,130.0	530.18
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.2634	956.1	0.54
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 15

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*	*	0.02	0.000	0.040	0.3761	0.0003	0.0150	6.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2	*	*	0.18	0.000	0.020	0.3761	0.0002	0.0112	4.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3	*	*	0.00	0.000	0.034	0.3761	0.0002	0.0089	3.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4		*	0.00	0.218	0.034	0.3815	0.0002	0.0074	3.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5		*	0.03	0.000	0.001	0.3828	0.0001	0.0063	2.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6		*	0.32	0.207	0.001	0.3881	0.0001	0.0055	2.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7		*	0.29	0.202	0.001	0.3921	0.0001	0.0049	2.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8		*	0.00	0.000	0.000	0.3921	0.0001	0.0044	2.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9		*	0.00	0.000	0.000	0.3921	0.0001	0.0040	2.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10			0.00	0.000	0.094	0.3847	0.0001	0.0034	1.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11			0.00	0.000	0.146	0.3676	0.0012	0.0615	1.99E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.00	0.000	0.179	0.3530	0.0032	0.1476	4.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13			0.00	0.000	0.139	0.3428	0.0020	0.0946	3.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14			0.00	0.000	0.068	0.3373	0.0015	0.0688	2.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*		0.32	0.000	0.025	0.3360	0.0010	0.0488	1.72E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*		0.00	0.000	0.040	0.3347	0.0010	0.0483	1.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17	*		0.45	0.000	0.000	0.3337	0.0010	0.0472	1.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.08	0.028	0.000	0.3651	0.0009	0.0420	1.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19			0.35	0.025	0.120	0.3733	0.0008	0.0383	1.39E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.42	0.068	0.068	0.3858	0.0006	0.0283	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.00	0.000	0.109	0.3798	0.0007	0.0347	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22			0.00	0.000	0.113	0.3685	0.0006	0.0285	9.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23			0.00	0.000	0.108	0.3574	0.0029	0.1358	4.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.14	0.000	0.131	0.3539	0.0022	0.1019	3.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25			0.00	0.000	0.209	0.3412	0.0015	0.0689	2.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26			0.00	0.000	0.087	0.3351	0.0012	0.0576	1.99E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27			0.00	0.000	0.100	0.3287	0.0008	0.0387	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28			0.00	0.000	0.148	0.3201	0.0009	0.0404	1.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29			0.00	0.000	0.149	0.3118	0.0007	0.0315	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30			0.00	0.000	0.062	0.3076	0.0006	0.0284	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31			0.00	0.000	0.047	0.3041	0.0006	0.0276	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32			0.00	0.000	0.040	0.3012	0.0006	0.0275	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33	*		0.00	0.000	0.035	0.2985	0.0005	0.0232	8.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34			0.00	0.000	0.032	0.2960	0.0005	0.0231	8.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35	*		0.13	0.000	0.026	0.2962	0.0005	0.0219	8.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36		0.00	0.000	0.083	0.2953	0.0004	0.0204	7.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*	0.00	0.000	0.000	0.2947	0.0004	0.0183	7.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38	*	0.00	0.000	0.000	0.2942	0.0003	0.0164	6.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39	*	0.00	0.000	0.000	0.2937	0.0003	0.0148	6.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40		0.00	0.000	0.027	0.2920	0.0003	0.0137	5.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41		0.34	0.000	0.026	0.3067	0.0003	0.0121	5.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42		0.08	0.000	0.025	0.3086	0.0002	0.0089	3.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43		0.13	0.000	0.023	0.3133	0.0002	0.0111	4.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44		0.00	0.000	0.089	0.3086	0.0002	0.0103	4.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45	*	0.25	0.000	0.034	0.3093	0.0003	0.0126	5.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46		0.00	0.000	0.090	0.3143	0.0002	0.0109	4.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47		0.00	0.000	0.073	0.3106	0.0002	0.0081	3.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48	*	0.00	0.000	0.000	0.3104	0.0002	0.0098	4.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*	0.40	0.000	0.024	0.3112	0.0002	0.0086	3.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50		0.61	0.099	0.000	0.3521	0.0002	0.0094	4.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		0.56	0.125	0.121	0.3672	0.0002	0.0088	3.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		0.00	0.000	0.065	0.3641	0.0002	0.0073	3.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		0.00	0.000	0.112	0.3588	0.0001	0.0058	2.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		0.00	0.000	0.142	0.3520	0.0001	0.0055	2.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55		0.00	0.000	0.166	0.3440	0.0001	0.0038	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56		0.00	0.000	0.319	0.3269	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.79E-09	0.0000	0.0000	5.10E-09
57		0.00	0.000	0.121	0.3199	0.0000	0.0011	6.10E-09	0.0000	0.0000	4.93E-09	0.0000	0.0000	4.36E-09
58		0.11	0.000	0.135	0.3173	0.0000	0.0004	3.06E-09	0.0000	0.0000	2.60E-09	0.0000	0.0000	2.78E-09
59		0.00	0.000	0.062	0.3126	0.0003	0.0154	6.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60		0.42	0.000	0.048	0.3289	0.0007	0.0323	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61		0.00	0.000	0.139	0.3208	0.0007	0.0350	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62	*	0.00	0.000	0.080	0.3161	0.0007	0.0314	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63	*	0.00	0.000	0.000	0.3150	0.0005	0.0238	9.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64	*	0.74	0.000	0.011	0.3150	0.0005	0.0241	9.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65	*	0.00	0.000	0.027	0.3152	0.0005	0.0223	8.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66	*	0.52	0.000	0.000	0.3154	0.0004	0.0201	7.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67	*	0.23	0.000	0.020	0.3158	0.0004	0.0181	7.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68	*	0.03	0.000	0.024	0.3161	0.0003	0.0163	6.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69	*	0.00	0.000	0.012	0.3166	0.0003	0.0148	6.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70		0.12	0.000	0.000	0.3171	0.0003	0.0135	5.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71		0.00	0.000	0.047	0.3176	0.0003	0.0124	5.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72		0.89	1.086	0.000	0.3710	0.0002	0.0115	4.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73		0.00	0.000	0.220	0.3599	0.0001	0.0057	2.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74		0.25	0.000	0.111	0.3660	0.0003	0.0138	5.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75	*	0.00	0.000	0.059	0.3632	0.0004	0.0167	6.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76		0.00	0.000	0.112	0.3576	0.0002	0.0093	3.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77		0.18	0.000	0.121	0.3580	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78		0.11	0.000	0.276	0.3478	0.0002	0.0106	4.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.12	0.000	0.195	0.3426	0.0008	0.0395	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.12	0.000	0.342	0.3301	0.0009	0.0418	1.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.00	0.000	0.150	0.3226	0.0008	0.0375	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.26	0.000	0.111	0.3291	0.0005	0.0235	9.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83	*	0.00	0.000	0.102	0.3239	0.0004	0.0190	7.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84	*	0.00	0.000	0.000	0.3236	0.0003	0.0156	6.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.106	0.3182	0.0002	0.0107	4.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.139	0.3110	0.0001	0.0068	3.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.062	0.3074	0.0001	0.0070	3.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.08	0.000	0.048	0.3084	0.0002	0.0107	4.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89	*	0.00	0.000	0.040	0.3059	0.0003	0.0125	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.035	0.3037	0.0003	0.0131	5.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.00	0.000	0.032	0.3017	0.0003	0.0142	5.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.00	0.000	0.029	0.3000	0.0003	0.0127	5.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.13	0.000	0.027	0.3044	0.0002	0.0094	4.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.026	0.3027	0.0002	0.0109	4.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.00	0.000	0.024	0.3013	0.0002	0.0117	4.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.00	0.000	0.023	0.3000	0.0002	0.0116	4.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.00	0.000	0.022	0.2987	0.0002	0.0100	4.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.10	0.000	0.021	0.3021	0.0001	0.0065	2.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.40	0.000	0.021	0.3198	0.0001	0.0069	3.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.12	0.000	0.187	0.3162	0.0001	0.0041	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.09	0.000	0.089	0.3160	0.0003	0.0119	4.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.04	0.000	0.134	0.3113	0.0002	0.0094	4.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.00	0.000	0.149	0.3043	0.0002	0.0078	3.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		1.03	0.126	0.062	0.3444	0.0001	0.0066	3.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.00	0.000	0.276	0.3313	0.0001	0.0057	2.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.00	0.000	0.359	0.3142	0.0001	0.0047	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107		0.00	0.000	0.149	0.3071	0.0001	0.0046	2.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.00	0.000	0.062	0.3041	0.0001	0.0041	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.00	0.000	0.047	0.3019	0.0001	0.0038	2.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.02	0.000	0.040	0.3009	0.0001	0.0024	1.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.00	0.000	0.035	0.2992	0.0000	0.0009	5.00E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.00	0.000	0.032	0.2977	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.78E-09	0.0000	0.0000	1.28E-09
113		0.00	0.000	0.029	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.18E-10
114		0.11	0.000	0.027	0.3002	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
115		0.13	0.000	0.026	0.3051	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
116		0.43	0.000	0.024	0.3246	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
117		0.00	0.000	0.111	0.3193	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
118	*	0.01	0.000	0.062	0.3167	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
119		0.01	0.000	0.093	0.3127	0.0000	0.0001	1.52E-09	0.0000	0.0000	1.44E-09	0.0000	0.0000	1.37E-09
120		0.05	0.000	0.143	0.3084	0.0000	0.0001	6.78E-10	0.0000	0.0000	6.62E-10	0.0000	0.0000	6.46E-10
121		0.09	0.000	0.062	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16

122	0.02	0.000	0.048	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
123	0.25	0.000	0.040	0.3183	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
124	0.04	0.000	0.335	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125	0.00	0.000	0.035	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
126	0.00	0.000	0.032	0.3012	0.0000	0.0005	3.75E-09	0.0000	0.0000	3.30E-09	0.0000	0.0000	2.95E-09
127	0.00	0.000	0.029	0.2998	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
128	0.00	0.000	0.027	0.2986	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
129	0.24	0.000	0.026	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
130	0.04	0.000	0.025	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
131	0.00	0.000	0.023	0.3088	0.0000	0.0000	3.14E-10	0.0000	0.0000	3.10E-10	0.0000	0.0000	3.07E-10
132	0.06	0.000	0.022	0.3106	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
133	0.00	0.000	0.021	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134	0.00	0.000	0.020	0.3086	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
135	0.00	0.000	0.020	0.3077	0.0000	0.0000	5.95E-10	0.0000	0.0000	5.83E-10	0.0000	0.0000	5.70E-10
136	0.00	0.000	0.019	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
137	0.00	0.000	0.018	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138	0.00	0.000	0.018	0.3051	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.00	0.000	0.017	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140	0.00	0.000	0.017	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141	0.06	0.000	0.017	0.3055	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142	0.00	0.000	0.016	0.3048	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143	0.17	0.000	0.016	0.3123	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144	0.00	0.000	0.015	0.3116	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145	0.15	0.000	0.016	0.3180	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146	0.00	0.000	0.182	0.3093	0.0000	0.0001	5.09E-10	0.0000	0.0000	4.99E-10	0.0000	0.0000	4.91E-10
147	0.00	0.000	0.015	0.3086	0.0000	0.0002	1.05E-09	0.0000	0.0000	1.01E-09	0.0000	0.0000	9.72E-10
148	0.00	0.000	0.014	0.3080	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
149	0.00	0.000	0.015	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150	0.18	0.000	0.015	0.3151	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151	0.00	0.000	0.095	0.3105	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
152	0.36	0.000	0.014	0.3268	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.00	0.000	0.248	0.3149	0.0000	0.0002	8.69E-10	0.0000	0.0000	8.43E-10	0.0000	0.0000	8.18E-10
154	0.00	0.000	0.257	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
155	0.00	0.000	0.149	0.2956	0.0000	0.0008	4.60E-09	0.0000	0.0000	3.10E-09	0.0000	0.0000	2.79E-09
156	0.20	0.000	0.062	0.3020	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.85E-10	0.0000	0.0000	9.51E-10
157	0.16	0.000	0.048	0.3073	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158	0.00	0.000	0.040	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159	0.00	0.000	0.035	0.3037	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160	0.00	0.000	0.032	0.3022	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161	0.00	0.000	0.029	0.3008	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162	0.00	0.000	0.027	0.2995	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163	0.00	0.000	0.026	0.2983	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164	0.00	0.000	0.024	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.19	0.000	0.024	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.02	0.000	0.023	0.3049	0.0000	0.0000	2.31E-10	0.0000	0.0000	2.29E-10	0.0000	0.0000	2.27E-10
167	0.09	0.000	0.022	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
168	1.07	0.208	0.021	0.3485	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.00	0.000	0.278	0.3353	0.0000	0.0000	2.51E-10	0.0000	0.0000	2.49E-10	0.0000	0.0000	2.46E-10
170	0.00	0.000	0.315	0.3203	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
171	0.00	0.000	0.359	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.00	0.000	0.149	0.2961	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.00	0.000	0.062	0.2932	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.00	0.000	0.047	0.2909	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.00	0.000	0.040	0.2890	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.00	0.000	0.035	0.2873	0.0000	0.0002	1.46E-09	0.0000	0.0000	1.39E-09	0.0000	0.0000	1.32E-09
177	0.00	0.000	0.032	0.2858	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
178	0.00	0.000	0.029	0.2844	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.027	0.2831	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.07	0.000	0.027	0.2854	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.35	0.000	0.025	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.90	0.079	0.024	0.3385	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.00	0.000	0.323	0.3231	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.00	0.000	0.244	0.3114	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.10	0.000	0.129	0.3101	0.0000	0.0002	8.80E-10	0.0000	0.0000	8.53E-10	0.0000	0.0000	8.27E-10
186	0.29	0.000	0.063	0.3207	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
187	0.02	0.000	0.153	0.3142	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
188	0.54	0.010	0.142	0.3325	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
189	0.03	0.000	0.134	0.3273	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
190	0.01	0.000	0.227	0.3169	0.0000	0.0002	1.81E-09	0.0000	0.0000	1.70E-09	0.0000	0.0000	1.60E-09
191	0.56	0.014	0.326	0.3275	0.0000	0.0010	6.06E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
192	1.24	0.408	0.371	0.3495	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.05E-10	0.0000	0.0000	1.22E-09
193	0.00	0.000	0.250	0.3376	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.10E-11
194	0.00	0.000	0.193	0.3284	0.0000	0.0002	8.05E-10	0.0000	0.0000	7.82E-10	0.0000	0.0000	7.61E-10
195	0.30	0.000	0.152	0.3356	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
196	0.00	0.000	0.186	0.3267	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.03	0.000	0.297	0.3140	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.27	0.000	0.150	0.3199	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.09	0.000	0.315	0.3090	0.0000	0.0001	1.06E-09	0.0000	0.0000	1.02E-09	0.0000	0.0000	9.88E-10
200	0.00	0.000	0.062	0.3061	0.0000	0.0001	1.11E-09	0.0000	0.0000	1.07E-09	0.0000	0.0000	1.03E-09
201	0.00	0.000	0.047	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
202	0.00	0.000	0.040	0.3019	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.19	0.000	0.037	0.3094	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.00	0.000	0.032	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.47	0.001	0.031	0.3290	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
206	0.01	0.000	0.146	0.3225	0.0000	0.0000	8.74E-11	0.0000	0.0000	8.71E-11	0.0000	0.0000	8.68E-11
207	0.00	0.000	0.126	0.3166	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16

208	0.00	0.000	0.306	0.3019	0.0000	0.0016	9.39E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
209	0.28	0.000	0.150	0.3081	0.0000	0.0015	7.59E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
210	0.00	0.000	0.063	0.3053	0.0000	0.0001	6.94E-10	0.0000	0.0000	1.60E-09	0.0000	0.0000	1.52E-09
211	0.00	0.000	0.047	0.3030	0.0000	0.0001	9.87E-10	0.0000	0.0000	8.86E-10	0.0000	0.0000	1.02E-09
212	0.00	0.000	0.040	0.3011	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.38E-10	0.0000	0.0000	3.90E-10
213	0.03	0.000	0.037	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.90E-11
214	0.44	0.000	0.033	0.3200	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.03	0.000	0.378	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.01	0.000	0.031	0.3025	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	0.00	0.000	0.027	0.3012	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.00	0.000	0.026	0.3000	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.00	0.000	0.024	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.00	0.000	0.023	0.2978	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.17	0.000	0.023	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.15	0.000	0.023	0.3112	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.00	0.000	0.020	0.3103	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.00	0.000	0.020	0.3093	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
225	0.13	0.000	0.020	0.3146	0.0000	0.0000	1.77E-10	0.0000	0.0000	1.76E-10	0.0000	0.0000	1.75E-10
226	0.00	0.000	0.259	0.3023	0.0000	0.0001	8.82E-10	0.0000	0.0000	8.54E-10	0.0000	0.0000	8.28E-10
227	0.00	0.000	0.018	0.3015	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
228	0.00	0.000	0.018	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
229	0.24	0.000	0.019	0.3109	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
230	0.16	0.000	0.018	0.3178	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	1.42	0.478	0.169	0.3544	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
232	0.00	0.000	0.235	0.3432	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
233	0.00	0.000	0.227	0.3323	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	2.34	1.177	0.182	0.3790	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
235	0.01	0.000	0.268	0.3666	0.0000	0.0001	5.56E-10	0.0000	0.0000	5.45E-10	0.0000	0.0000	5.34E-10
236	0.00	0.000	0.177	0.3582	0.0000	0.0000	2.24E-10	0.0000	0.0000	2.22E-10	0.0000	0.0000	2.20E-10
237	0.98	0.163	0.123	0.3880	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
238	0.03	0.000	0.221	0.3756	0.0001	0.0074	2.92E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
239	0.00	0.000	0.217	0.3611	0.0004	0.0186	6.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
240	0.00	0.000	0.259	0.3435	0.0024	0.1130	3.66E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
241	0.00	0.000	0.151	0.3336	0.0019	0.0888	2.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
242	0.86	0.058	0.124	0.3636	0.0011	0.0529	1.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
243	0.02	0.000	0.138	0.3557	0.0011	0.0535	1.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
244	0.28	0.000	0.349	0.3507	0.0009	0.0443	1.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
245	2.28	1.184	0.371	0.3836	0.0007	0.0346	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
246	0.00	0.000	0.386	0.3637	0.0008	0.0370	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
247	0.00	0.000	0.306	0.3489	0.0009	0.0395	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
248	0.11	0.000	0.147	0.3442	0.0002	0.0088	3.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
249	0.04	0.000	0.314	0.3272	0.0012	0.0570	2.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
250	0.00	0.000	0.149	0.3180	0.0016	0.0742	2.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

251		0.00	0.000	0.059	0.3132	0.0009	0.0443	1.59E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
252		0.00	0.000	0.047	0.3091	0.0010	0.0454	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
253		0.01	0.000	0.042	0.3062	0.0008	0.0396	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
254		0.89	0.044	0.037	0.3434	0.0007	0.0336	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
255		0.23	0.000	0.124	0.3475	0.0007	0.0314	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
256		0.00	0.000	0.270	0.3340	0.0005	0.0231	8.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257		0.00	0.000	0.195	0.3237	0.0004	0.0191	7.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258		0.00	0.000	0.149	0.3156	0.0004	0.0181	7.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259		0.00	0.000	0.061	0.3118	0.0005	0.0233	9.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260		0.17	0.000	0.049	0.3170	0.0005	0.0222	8.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261		0.00	0.000	0.040	0.3146	0.0004	0.0191	7.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.14	0.000	0.037	0.3190	0.0003	0.0160	6.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.19	0.000	0.034	0.3261	0.0003	0.0139	5.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.03	0.000	0.187	0.3183	0.0002	0.0093	4.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.08	0.000	0.031	0.3205	0.0003	0.0136	5.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.25	0.000	0.029	0.3309	0.0003	0.0124	5.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.27	0.000	0.091	0.3396	0.0003	0.0119	4.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.00	0.000	0.148	0.3327	0.0002	0.0094	4.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.113	0.3273	0.0002	0.0075	3.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.00	0.000	0.135	0.3209	0.0001	0.0066	3.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.153	0.3136	0.0001	0.0058	2.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.00	0.000	0.143	0.3068	0.0001	0.0051	2.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.02	0.000	0.064	0.3046	0.0001	0.0045	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		0.30	0.000	0.050	0.3166	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.00	0.000	0.040	0.3147	0.0001	0.0033	1.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.035	0.3130	0.0001	0.0029	1.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.032	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.29E-09	0.0000	0.0000	4.73E-09
278		0.50	0.002	0.032	0.3339	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.48E-11
279		0.00	0.000	0.075	0.3303	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
280		0.00	0.000	0.103	0.3255	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
281	*	0.00	0.000	0.052	0.3230	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
282	*	0.00	0.000	0.052	0.3205	0.0000	0.0002	1.82E-09	0.0000	0.0000	1.71E-09	0.0000	0.0000	1.61E-09
283		0.00	0.000	0.143	0.3137	0.0000	0.0002	1.76E-09	0.0000	0.0000	1.66E-09	0.0000	0.0000	1.56E-09
284		0.00	0.000	0.149	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
285		0.00	0.000	0.062	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
286		0.00	0.000	0.047	0.3014	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
287		0.00	0.000	0.040	0.2995	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
288		0.00	0.000	0.035	0.2978	0.0000	0.0004	2.37E-09	0.0000	0.0000	2.18E-09	0.0000	0.0000	2.02E-09
289		0.00	0.000	0.032	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
290		0.00	0.000	0.029	0.2949	0.0000	0.0003	1.84E-09	0.0000	0.0000	1.73E-09	0.0000	0.0000	1.62E-09
291		0.00	0.000	0.027	0.2936	0.0000	0.0003	1.67E-09	0.0000	0.0000	1.57E-09	0.0000	0.0000	1.49E-09
292		0.00	0.000	0.027	0.2924	0.0000	0.0002	1.30E-09	0.0000	0.0000	1.25E-09	0.0000	0.0000	1.19E-09
293		0.03	0.000	0.027	0.2925	0.0000	0.0002	1.62E-09	0.0000	0.0000	1.53E-09	0.0000	0.0000	1.45E-09

294		0.03	0.000	0.025	0.2928	0.0000	0.0003	2.10E-09	0.0000	0.0000	1.95E-09	0.0000	0.0000	1.82E-09
295		0.00	0.000	0.022	0.2917	0.0000	0.0000	2.39E-10	0.0000	0.0000	2.37E-10	0.0000	0.0000	2.34E-10
296		0.00	0.000	0.021	0.2907	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
297		0.00	0.000	0.020	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
298		0.00	0.000	0.020	0.2888	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
299		0.00	0.000	0.019	0.2879	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
300		0.00	0.000	0.018	0.2871	0.0000	0.0000	1.18E-10	0.0000	0.0000	1.17E-10	0.0000	0.0000	1.17E-10
301		0.00	0.000	0.018	0.2862	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
302		0.00	0.000	0.017	0.2854	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
303		0.09	0.000	0.018	0.2889	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
304		0.00	0.000	0.016	0.2881	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
305		0.00	0.000	0.016	0.2873	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
306		0.00	0.000	0.016	0.2866	0.0000	0.0006	4.82E-09	0.0000	0.0000	3.22E-09	0.0000	0.0000	2.88E-09
307		0.00	0.000	0.015	0.2858	0.0000	0.0002	3.15E-09	0.0000	0.0000	3.11E-09	0.0000	0.0000	2.79E-09
308		0.03	0.000	0.016	0.2864	0.0000	0.0001	4.35E-10	0.0000	0.0000	1.02E-09	0.0000	0.0000	9.82E-10
309		0.00	0.000	0.015	0.2857	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.07E-10	0.0000	0.0000	1.07E-10
310		0.00	0.000	0.015	0.2850	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
311		0.00	0.000	0.014	0.2843	0.0000	0.0007	5.36E-09	0.0000	0.0000	4.84E-09	0.0000	0.0000	3.23E-09
312		0.00	0.000	0.014	0.2836	0.0000	0.0003	3.81E-09	0.0000	0.0000	3.34E-09	0.0000	0.0000	3.41E-09
313	*	0.00	0.000	0.000	0.2836	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	7.45E-10
314		0.00	0.000	0.014	0.2830	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
315		0.87	0.034	0.015	0.3223	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
316	*	0.00	0.000	0.051	0.3199	0.0000	0.0001	5.54E-10	0.0000	0.0000	5.43E-10	0.0000	0.0000	5.32E-10
317		0.09	0.000	0.014	0.3236	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
318		0.00	0.000	0.098	0.3189	0.0000	0.0001	8.86E-10	0.0000	0.0000	8.58E-10	0.0000	0.0000	8.32E-10
319	*	0.00	0.000	0.013	0.3183	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
320		0.00	0.000	0.013	0.3176	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
321		0.00	0.000	0.013	0.3170	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
322		0.64	0.031	0.014	0.3455	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
323		0.05	0.000	0.057	0.3450	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
324		0.18	0.000	0.075	0.3500	0.0000	0.0000	2.95E-10	0.0000	0.0000	2.92E-10	0.0000	0.0000	2.89E-10
325	*	0.46	0.000	0.026	0.3510	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
326	*	0.00	0.000	0.014	0.3519	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
327	*	0.44	0.000	0.016	0.3528	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
328	*	0.00	0.000	0.018	0.3538	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
329	*	0.09	0.000	0.000	0.3547	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
330		0.00	0.000	0.012	0.3674	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
331	*	0.00	0.000	0.025	0.3683	0.0000	0.0001	8.90E-10	0.0000	0.0000	8.62E-10	0.0000	0.0000	8.35E-10
332	*	0.00	0.000	0.015	0.3690	0.0000	0.0011	5.71E-09	0.0000	0.0000	5.08E-09	0.0000	0.0000	3.37E-09
333	*	0.03	0.000	0.009	0.3700	0.0001	0.0036	1.85E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	5.08E-09
334	*	0.20	0.000	0.000	0.3690	0.0000	0.0005	2.47E-09	0.0000	0.0000	6.65E-09	0.0000	0.0000	6.80E-09
335	*	0.00	0.000	0.000	0.3665	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.45E-16	0.0000	0.0000	6.55E-11
336		0.00	0.076	0.000	0.3898	0.0008	0.0180	6.33E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09

337		0.00	0.000	0.126	0.3817	0.0014	0.0637	2.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.00	0.000	0.071	0.3699	0.0020	0.0972	3.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339	*	0.00	0.000	0.000	0.3639	0.0031	0.1459	4.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.075	0.3562	0.0022	0.1037	3.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341	*	0.00	0.000	0.039	0.3509	0.0017	0.0796	2.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342	*	0.00	0.000	0.000	0.3484	0.0014	0.0661	2.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.00	0.000	0.073	0.3431	0.0011	0.0534	1.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.14	0.000	0.100	0.3429	0.0008	0.0396	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345		0.34	0.000	0.095	0.3529	0.0010	0.0457	1.64E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346		0.03	0.000	0.093	0.3487	0.0007	0.0342	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347		0.41	0.008	0.099	0.3624	0.0007	0.0319	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.00	0.000	0.119	0.3558	0.0005	0.0236	9.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		0.21	0.000	0.112	0.3596	0.0004	0.0203	7.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.00	0.000	0.057	0.3555	0.0003	0.0145	5.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.00	0.000	0.066	0.3514	0.0007	0.0307	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.00	0.000	0.113	0.3453	0.0005	0.0210	8.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.103	0.3397	0.0004	0.0201	7.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.04	0.000	0.099	0.3362	0.0004	0.0189	7.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.08	0.000	0.127	0.3333	0.0003	0.0155	6.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		1.29	0.270	0.202	0.3722	0.0004	0.0190	7.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.00	0.000	0.082	0.3680	0.0003	0.0137	5.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		0.00	0.000	0.063	0.3648	0.0003	0.0131	5.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359		0.00	0.000	0.104	0.3596	0.0002	0.0112	4.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		0.00	0.000	0.050	0.3539	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.00	0.000	0.059	0.3483	0.0006	0.0309	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.00	0.000	0.050	0.3436	0.0011	0.0522	1.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.00	0.000	0.058	0.3386	0.0011	0.0505	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.00	0.000	0.050	0.3346	0.0010	0.0451	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.07	0.000	0.088	0.3323	0.0008	0.0354	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 15			
	inches	cubic feet	percent
Precipitation	39.76	144,343.5	100.00
Runoff	6.429	23,338.3	16.17
Evapotranspiration	29.801	108,177.1	74.94
Drainage Collected from Layer 2	4.6553	16,898.7	11.71
Percolation/Leakage through Layer 3	0.000017	0.0618	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0569	0.00
Percolation/Leakage through Layer 8	0.000001	0.0048	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0000	0.00
Percolation/Leakage through Layer 11	0.000001	0.0047	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-1.1214	-4,070.6	-2.82
Soil Water at Start of Year	257.6116	935,130.0	647.85
Soil Water at End of Year	256.7536	932,015.5	645.69
Snow Water at Start of Year	0.2634	956.1	0.66
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 16

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.33	0.000	0.124	0.3406	0.0007	0.0345	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.00	0.000	0.170	0.3315	0.0007	0.0327	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.197	0.3211	0.0005	0.0248	9.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.05	0.000	0.164	0.3148	0.0005	0.0222	8.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.63	0.007	0.077	0.3395	0.0004	0.0190	7.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6	*		0.09	0.000	0.037	0.3395	0.0005	0.0235	9.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7	*		0.00	0.000	0.018	0.3394	0.0005	0.0236	9.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8	*		0.00	0.000	0.000	0.3388	0.0004	0.0211	8.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9	*		0.00	0.000	0.000	0.3382	0.0004	0.0186	7.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10	*		0.51	0.000	0.016	0.3386	0.0004	0.0165	6.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*		0.00	0.000	0.029	0.3390	0.0003	0.0147	5.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*		0.00	0.000	0.042	0.3395	0.0003	0.0135	5.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13			0.00	0.001	0.014	0.3556	0.0003	0.0122	5.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*		0.00	0.000	0.003	0.3552	0.0002	0.0109	4.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*		0.00	0.000	0.000	0.3549	0.0002	0.0110	4.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*		0.00	0.000	0.000	0.3544	0.0002	0.0085	3.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.40	0.009	0.066	0.3694	0.0002	0.0086	3.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18	*		0.00	0.000	0.003	0.3693	0.0003	0.0122	5.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19			0.00	0.000	0.082	0.3651	0.0002	0.0092	4.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20	*		0.00	0.000	0.000	0.3650	0.0002	0.0107	4.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21	*		0.00	0.000	0.000	0.3623	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22	*		0.00	0.000	0.000	0.3589	0.0003	0.0134	5.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23	*		1.30	0.000	0.026	0.3569	0.0013	0.0599	2.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.00	0.000	0.009	0.3710	0.0013	0.0592	2.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*	*	0.00	0.000	0.041	0.3710	0.0012	0.0557	1.94E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26		*	0.00	0.209	0.004	0.3772	0.0005	0.0253	9.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*	*	0.00	0.000	0.024	0.3772	0.0003	0.0163	6.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*	*	0.00	0.000	0.013	0.3772	0.0003	0.0119	4.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*	*	0.48	0.000	0.017	0.3772	0.0002	0.0094	4.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*	*	0.00	0.000	0.007	0.3772	0.0002	0.0077	3.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31	*	*	0.00	0.000	0.004	0.3772	0.0001	0.0066	3.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32	*	*	0.00	0.000	0.013	0.3772	0.0001	0.0057	2.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33		*	0.01	0.242	0.000	0.3822	0.0001	0.0050	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34	*	*	0.00	0.000	0.023	0.3822	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35	*	*	0.14	0.000	0.026	0.3822	0.0001	0.0041	2.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36	*	*	0.00	0.000	0.024	0.3822	0.0001	0.0037	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*	*	0.00	0.000	0.011	0.3822	0.0000	0.0015	7.62E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38	*	*	0.02	0.000	0.006	0.3822	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.14E-09	0.0000	0.0000	2.98E-09
39	*	*	0.00	0.000	0.015	0.3822	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
40		*	0.00	0.329	0.000	0.3865	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
41		*	0.00	0.102	0.108	0.3865	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
42		*	0.00	0.000	0.000	0.3865	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
43		*	0.53	0.454	0.000	0.3900	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
44	*	*	0.13	0.000	0.056	0.3900	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
45		*	0.02	0.024	0.070	0.3900	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
46		*	0.22	0.159	0.000	0.3928	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
47		*	0.22	0.173	0.000	0.3952	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
48			0.00	0.000	0.095	0.3855	0.0000	0.0016	7.36E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
49			0.00	0.000	0.117	0.3689	0.0023	0.1141	3.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50			0.06	0.000	0.143	0.3590	0.0032	0.1512	4.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51			0.41	0.004	0.141	0.3683	0.0022	0.1029	3.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52			0.57	0.088	0.090	0.3841	0.0020	0.0745	2.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53			0.23	0.014	0.086	0.3875	0.0010	0.0503	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54	*		0.10	0.000	0.068	0.3858	0.0009	0.0392	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55			0.51	0.078	0.144	0.3921	0.0039	0.1232	3.74E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56			0.00	0.000	0.112	0.3815	0.0038	0.1661	5.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57			0.00	0.000	0.121	0.3678	0.0023	0.1121	3.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58			0.00	0.000	0.168	0.3540	0.0031	0.1448	4.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59			0.50	0.009	0.224	0.3632	0.0022	0.0977	3.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60			0.00	0.000	0.117	0.3554	0.0016	0.0724	2.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61			1.79	0.735	0.111	0.3985	0.0010	0.0484	1.72E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62			0.01	0.000	0.078	0.3862	0.0012	0.0680	2.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63			0.00	0.000	0.067	0.3721	0.0056	0.2635	7.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64			0.00	0.000	0.109	0.3608	0.0033	0.1562	4.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65			0.00	0.000	0.091	0.3520	0.0023	0.1070	3.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66			0.00	0.000	0.073	0.3458	0.0017	0.0792	2.66E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67			0.00	0.000	0.124	0.3375	0.0012	0.0559	1.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.00	0.000	0.251	0.3236	0.0010	0.0462	1.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.10	0.000	0.173	0.3191	0.0010	0.0478	1.69E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70			0.00	0.000	0.149	0.3111	0.0006	0.0268	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71			0.71	0.015	0.062	0.3397	0.0005	0.0242	9.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72			1.90	0.816	0.112	0.3845	0.0006	0.0300	1.15E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73	*		0.41	0.000	0.035	0.3845	0.0007	0.0306	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.12	0.057	0.036	0.3967	0.0005	0.0229	8.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.00	0.000	0.154	0.3820	0.0035	0.1608	4.88E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.00	0.000	0.180	0.3637	0.0041	0.1987	6.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.00	0.000	0.371	0.3404	0.0030	0.1403	4.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.00	0.000	0.242	0.3263	0.0020	0.0921	3.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.35	0.000	0.149	0.3340	0.0011	0.0520	1.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.01	0.000	0.265	0.3196	0.0009	0.0410	1.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.00	0.000	0.062	0.3149	0.0010	0.0466	1.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.61	0.003	0.048	0.3400	0.0009	0.0418	1.51E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83	*	0.89	0.000	0.045	0.3397	0.0008	0.0365	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84	*	0.02	0.000	0.027	0.3396	0.0006	0.0289	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.15	0.168	0.006	0.3755	0.0005	0.0250	9.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.173	0.3663	0.0004	0.0180	7.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.101	0.3610	0.0006	0.0294	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.186	0.3517	0.0003	0.0151	5.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		1.10	0.197	0.089	0.3876	0.0000	0.0015	6.48E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90	*	0.78	0.000	0.036	0.3862	0.0013	0.0633	2.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.00	0.059	0.000	0.3982	0.0028	0.0785	2.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.00	0.025	0.089	0.3949	0.0039	0.1706	5.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93	*	0.11	0.000	0.035	0.3846	0.0059	0.2713	7.96E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94	*	0.41	0.000	0.039	0.3779	0.0036	0.1679	5.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.18	0.077	0.092	0.3915	0.0038	0.1454	4.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.00	0.000	0.085	0.3834	0.0029	0.1261	3.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.00	0.000	0.079	0.3708	0.0027	0.1278	3.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.00	0.000	0.123	0.3589	0.0031	0.1463	4.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99	*	0.21	0.000	0.054	0.3557	0.0023	0.1081	3.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.06	0.000	0.203	0.3530	0.0015	0.0703	2.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.05	0.000	0.181	0.3441	0.0012	0.0564	1.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.13	0.000	0.161	0.3399	0.0012	0.0585	2.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.00	0.000	0.242	0.3268	0.0011	0.0535	1.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.00	0.000	0.133	0.3190	0.0007	0.0344	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.24	0.000	0.099	0.3249	0.0008	0.0359	1.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.00	0.000	0.092	0.3200	0.0005	0.0243	9.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107	*	0.00	0.000	0.120	0.3135	0.0003	0.0139	5.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.00	0.000	0.149	0.3052	0.0003	0.0127	5.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.00	0.000	0.062	0.3011	0.0005	0.0225	8.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.00	0.000	0.042	0.2985	0.0006	0.0258	9.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.00	0.000	0.040	0.2961	0.0004	0.0210	8.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.09	0.000	0.035	0.2983	0.0004	0.0187	7.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113		0.18	0.000	0.032	0.3049	0.0003	0.0125	5.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114		0.00	0.000	0.029	0.3031	0.0002	0.0094	4.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		0.00	0.000	0.027	0.3012	0.0002	0.0076	3.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116		0.01	0.000	0.026	0.3003	0.0002	0.0113	4.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117		0.00	0.000	0.024	0.2987	0.0002	0.0093	4.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118		0.24	0.000	0.023	0.3087	0.0002	0.0104	4.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119		0.00	0.000	0.022	0.3073	0.0002	0.0095	4.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120		0.00	0.000	0.021	0.3058	0.0001	0.0071	3.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121		0.23	0.000	0.021	0.3154	0.0002	0.0090	3.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	*	0.00	0.000	0.130	0.3087	0.0002	0.0079	3.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123		0.00	0.000	0.020	0.3075	0.0003	0.0119	4.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124		0.00	0.000	0.019	0.3063	0.0002	0.0105	4.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125		0.00	0.000	0.018	0.3052	0.0002	0.0094	4.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126		0.07	0.000	0.018	0.3073	0.0002	0.0085	3.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127		0.29	0.000	0.018	0.3200	0.0002	0.0096	4.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128		0.02	0.000	0.377	0.3031	0.0002	0.0093	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129		0.02	0.000	0.017	0.3032	0.0002	0.0077	3.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130		0.00	0.000	0.016	0.3024	0.0001	0.0065	2.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
131		0.00	0.000	0.016	0.3017	0.0001	0.0057	2.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132		0.03	0.000	0.016	0.3024	0.0001	0.0050	2.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133		0.34	0.000	0.016	0.3178	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134		0.00	0.000	0.111	0.3125	0.0001	0.0039	2.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
135		0.00	0.000	0.108	0.3075	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
136		0.45	0.001	0.126	0.3229	0.0000	0.0017	8.90E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
137		0.00	0.000	0.256	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.55E-09	0.0000	0.0000	2.46E-09
138		0.01	0.000	0.159	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.86E-10
139		0.00	0.000	0.149	0.2964	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140		0.00	0.000	0.062	0.2935	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141		0.00	0.000	0.047	0.2912	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142		0.00	0.000	0.040	0.2893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143		0.00	0.000	0.035	0.2876	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144		0.26	0.000	0.032	0.2985	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145		0.24	0.000	0.030	0.3084	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146		0.15	0.000	0.412	0.2957	0.0000	0.0008	4.22E-09	0.0000	0.0000	3.94E-09	0.0000	0.0000	2.70E-09
147		0.00	0.000	0.027	0.2944	0.0000	0.0005	2.41E-09	0.0000	0.0000	2.21E-09	0.0000	0.0000	2.92E-09
148		0.00	0.000	0.026	0.2932	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
149		0.00	0.000	0.024	0.2921	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150		0.00	0.000	0.023	0.2910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151		0.00	0.000	0.022	0.2899	0.0000	0.0000	2.61E-10	0.0000	0.0000	2.58E-10	0.0000	0.0000	2.56E-10
152		0.00	0.000	0.021	0.2889	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
153		0.36	0.000	0.021	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154		0.00	0.000	0.020	0.3040	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
155		0.00	0.000	0.019	0.3031	0.0000	0.0000	2.92E-10	0.0000	0.0000	2.89E-10	0.0000	0.0000	2.86E-10
156		0.00	0.000	0.018	0.3022	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
157		0.87	0.086	0.018	0.3387	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158		0.00	0.000	0.267	0.3260	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159		0.00	0.000	0.262	0.3135	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160		0.00	0.000	0.272	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161		0.47	0.000	0.150	0.3159	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162		0.00	0.000	0.208	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163		0.00	0.000	0.062	0.3030	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164		0.00	0.000	0.047	0.3007	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.00	0.000	0.040	0.2988	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.00	0.000	0.035	0.2972	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.00	0.000	0.032	0.2956	0.0000	0.0005	4.96E-09	0.0000	0.0000	4.54E-09	0.0000	0.0000	4.20E-09
168	0.62	0.005	0.030	0.3234	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
169	0.00	0.000	0.398	0.3045	0.0000	0.0006	2.91E-09	0.0000	0.0000	2.63E-09	0.0000	0.0000	2.40E-09
170	0.00	0.000	0.027	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
171	0.02	0.000	0.026	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.04	0.000	0.025	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.22	0.000	0.024	0.3131	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.00	0.000	0.384	0.2948	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.01	0.000	0.023	0.2940	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.00	0.000	0.021	0.2930	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.00	0.000	0.020	0.2920	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.00	0.000	0.020	0.2911	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.019	0.2902	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.29	0.000	0.019	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.00	0.000	0.018	0.3020	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.00	0.000	0.017	0.3012	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.23	0.000	0.018	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.00	0.000	0.386	0.2931	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.46	0.000	0.017	0.3144	0.0000	0.0000	3.26E-10	0.0000	0.0000	3.22E-10	0.0000	0.0000	3.19E-10
186	0.09	0.000	0.403	0.2996	0.0000	0.0004	2.09E-09	0.0000	0.0000	1.94E-09	0.0000	0.0000	1.81E-09
187	0.00	0.000	0.016	0.2988	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
188	0.00	0.000	0.016	0.2981	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.00	0.000	0.015	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.17	0.000	0.016	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.00	0.000	0.015	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.00	0.000	0.014	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
193	0.00	0.000	0.014	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	0.00	0.000	0.015	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.22	0.000	0.015	0.3121	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
196	0.33	0.001	0.352	0.3112	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.00	0.000	0.326	0.2957	0.0000	0.0001	5.54E-10	0.0000	0.0000	5.43E-10	0.0000	0.0000	5.33E-10
198	0.00	0.000	0.149	0.2886	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
199	0.00	0.000	0.062	0.2857	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.00	0.000	0.047	0.2834	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.00	0.000	0.040	0.2815	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.00	0.000	0.036	0.2799	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.28	0.000	0.033	0.2917	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	1.06	0.156	0.030	0.3332	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.00	0.000	0.259	0.3208	0.0000	0.0002	1.06E-09	0.0000	0.0000	1.02E-09	0.0000	0.0000	9.88E-10
206	0.00	0.000	0.198	0.3114	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
207	0.00	0.000	0.286	0.2978	0.0000	0.0002	1.27E-09	0.0000	0.0000	1.22E-09	0.0000	0.0000	1.17E-09

208	0.00	0.000	0.149	0.2907	0.0000	0.0002	8.16E-10	0.0000	0.0000	7.92E-10	0.0000	0.0000	7.70E-10
209	0.66	0.009	0.063	0.3185	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
210	0.01	0.000	0.286	0.3053	0.0000	0.0009	4.57E-09	0.0000	0.0000	4.23E-09	0.0000	0.0000	2.88E-09
211	0.00	0.000	0.047	0.3031	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	9.15E-10
212	0.00	0.000	0.040	0.3012	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
213	0.00	0.000	0.035	0.2995	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.00	0.000	0.032	0.2980	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.00	0.000	0.029	0.2966	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.027	0.2953	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	0.00	0.000	0.026	0.2941	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.82	0.043	0.025	0.3300	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.15	0.000	0.143	0.3305	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.40	0.020	0.191	0.3396	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.19	0.000	0.121	0.3428	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.35	0.019	0.241	0.3469	0.0000	0.0000	2.31E-10	0.0000	0.0000	2.29E-10	0.0000	0.0000	2.27E-10
223	0.19	0.000	0.133	0.3495	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
224	0.00	0.000	0.221	0.3390	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
225	0.00	0.000	0.273	0.3260	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
226	0.00	0.000	0.119	0.3203	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
227	0.00	0.000	0.324	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
228	0.00	0.000	0.149	0.2978	0.0000	0.0000	1.57E-10	0.0000	0.0000	1.56E-10	0.0000	0.0000	1.55E-10
229	0.44	0.000	0.063	0.3156	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
230	0.15	0.000	0.231	0.3116	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.00	0.000	0.119	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
232	0.02	0.000	0.124	0.3007	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
233	0.43	0.000	0.063	0.3181	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.28	0.000	0.228	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
235	0.00	0.000	0.180	0.3119	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
236	0.00	0.000	0.231	0.3010	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.07	0.000	0.151	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	0.00	0.000	0.062	0.2944	0.0000	0.0003	2.34E-09	0.0000	0.0000	2.15E-09	0.0000	0.0000	2.00E-09
239	0.00	0.000	0.047	0.2921	0.0000	0.0001	9.60E-10	0.0000	0.0000	9.27E-10	0.0000	0.0000	8.97E-10
240	0.00	0.000	0.040	0.2902	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
241	0.08	0.000	0.037	0.2922	0.0000	0.0000	2.59E-10	0.0000	0.0000	2.57E-10	0.0000	0.0000	2.54E-10
242	0.38	0.000	0.033	0.3086	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
243	0.04	0.000	0.031	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
244	0.62	0.030	0.029	0.3359	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
245	0.01	0.000	0.143	0.3294	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
246	0.25	0.000	0.289	0.3277	0.0000	0.0001	3.72E-10	0.0000	0.0000	3.67E-10	0.0000	0.0000	3.62E-10
247	0.01	0.000	0.218	0.3177	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
248	0.00	0.000	0.207	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.00	0.000	0.119	0.3022	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.00	0.000	0.062	0.2992	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

251		0.10	0.000	0.049	0.3017	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
252		0.00	0.000	0.040	0.2998	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
253		0.00	0.000	0.035	0.2981	0.0000	0.0003	2.17E-09	0.0000	0.0000	2.01E-09	0.0000	0.0000	1.87E-09
254		0.00	0.000	0.032	0.2966	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
255		0.00	0.000	0.029	0.2952	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
256		0.00	0.000	0.027	0.2939	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
257		0.00	0.000	0.026	0.2927	0.0000	0.0000	2.45E-10	0.0000	0.0000	2.43E-10	0.0000	0.0000	1.81E-10
258		0.00	0.000	0.024	0.2915	0.0000	0.0002	3.79E-09	0.0000	0.0000	3.33E-09	0.0000	0.0000	2.37E-09
259		1.10	0.099	0.025	0.3380	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	7.42E-10
260		1.72	0.933	0.172	0.3672	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
261		0.00	0.000	0.231	0.3562	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262		0.00	0.000	0.098	0.3515	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
263		2.10	0.951	0.204	0.3963	0.0000	0.0004	1.92E-09	0.0000	0.0000	1.80E-09	0.0000	0.0000	1.69E-09
264		0.02	0.000	0.123	0.3849	0.0000	0.0013	6.51E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
265		0.81	0.203	0.305	0.3888	0.0039	0.1299	3.83E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.07	0.000	0.278	0.3729	0.0034	0.1474	4.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.08	0.000	0.188	0.3655	0.0016	0.0741	2.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.17	0.000	0.182	0.3607	0.0016	0.0782	2.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.16	0.000	0.125	0.3590	0.0019	0.0884	2.92E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.00	0.000	0.198	0.3471	0.0013	0.0600	2.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.171	0.3371	0.0012	0.0553	1.92E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.00	0.000	0.221	0.3249	0.0008	0.0369	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.00	0.000	0.097	0.3189	0.0008	0.0365	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		0.00	0.000	0.062	0.3147	0.0007	0.0330	1.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.00	0.000	0.047	0.3113	0.0006	0.0284	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.040	0.3083	0.0006	0.0264	9.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.035	0.3056	0.0005	0.0258	9.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		1.41	0.271	0.034	0.3573	0.0005	0.0236	9.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.00	0.000	0.148	0.3496	0.0005	0.0215	8.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		0.38	0.006	0.164	0.3588	0.0003	0.0145	5.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281		0.00	0.000	0.085	0.3541	0.0004	0.0207	8.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.00	0.000	0.114	0.3481	0.0004	0.0164	6.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.00	0.000	0.080	0.3438	0.0003	0.0154	6.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		1.61	0.524	0.192	0.3860	0.0003	0.0141	5.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.241	0.3743	0.0003	0.0165	6.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.00	0.000	0.138	0.3629	0.0001	0.0042	1.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.00	0.000	0.121	0.3521	0.0018	0.0889	2.96E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288	*	0.40	0.000	0.038	0.3493	0.0019	0.0910	3.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.01	0.000	0.090	0.3590	0.0015	0.0707	2.39E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.15	0.000	0.087	0.3592	0.0013	0.0603	2.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.00	0.000	0.101	0.3522	0.0012	0.0572	1.98E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.03	0.000	0.166	0.3442	0.0010	0.0477	1.69E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.23	0.000	0.091	0.3497	0.0008	0.0368	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.20	0.000	0.122	0.3522	0.0006	0.0279	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.02	0.000	0.079	0.3476	0.0005	0.0234	9.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.57	0.043	0.126	0.3655	0.0006	0.0352	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.14	0.000	0.073	0.3679	0.0006	0.0279	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298	*	0.00	0.000	0.000	0.3670	0.0004	0.0164	6.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.00	0.000	0.073	0.3627	0.0004	0.0209	8.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.000	0.097	0.3581	0.0006	0.0264	9.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.00	0.000	0.116	0.3515	0.0002	0.0074	2.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.00	0.000	0.136	0.3427	0.0001	0.0039	1.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.00	0.000	0.138	0.3340	0.0008	0.0389	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.26	0.000	0.194	0.3354	0.0008	0.0367	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.00	0.000	0.155	0.3270	0.0008	0.0394	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.000	0.166	0.3172	0.0005	0.0229	8.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.01	0.000	0.123	0.3109	0.0008	0.0399	1.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		0.42	0.000	0.063	0.3268	0.0006	0.0297	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.00	0.000	0.177	0.3175	0.0005	0.0235	9.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.00	0.000	0.078	0.3131	0.0004	0.0200	7.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311	*	0.00	0.000	0.053	0.3097	0.0003	0.0159	6.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		1.00	0.081	0.063	0.3496	0.0004	0.0181	7.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.00	0.000	0.110	0.3437	0.0004	0.0187	7.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.00	0.000	0.116	0.3374	0.0004	0.0173	6.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.00	0.000	0.121	0.3308	0.0003	0.0142	5.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.191	0.3209	0.0004	0.0174	6.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.00	0.000	0.163	0.3126	0.0004	0.0187	7.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318		0.31	0.000	0.074	0.3233	0.0004	0.0186	7.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.00	0.000	0.091	0.3188	0.0003	0.0149	6.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.00	0.000	0.058	0.3157	0.0002	0.0113	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321	*	0.00	0.000	0.000	0.3156	0.0002	0.0112	4.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.00	0.000	0.078	0.3118	0.0002	0.0116	4.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.00	0.000	0.061	0.3089	0.0002	0.0095	4.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.56	0.002	0.060	0.3326	0.0002	0.0079	3.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.05	0.000	0.096	0.3303	0.0001	0.0066	3.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.05	0.000	0.097	0.3281	0.0001	0.0059	2.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.00	0.000	0.124	0.3221	0.0001	0.0036	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.51	0.009	0.080	0.3421	0.0001	0.0049	2.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.03	0.000	0.066	0.3403	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.51	0.036	0.095	0.3585	0.0001	0.0040	2.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.00	0.000	0.077	0.3548	0.0001	0.0037	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.00	0.000	0.106	0.3498	0.0000	0.0010	5.05E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.000	0.115	0.3443	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.11E-09	0.0000	0.0000	1.51E-09
334		0.00	0.000	0.115	0.3388	0.0000	0.0004	2.37E-09	0.0000	0.0000	2.18E-09	0.0000	0.0000	2.01E-09
335		0.00	0.000	0.085	0.3348	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	5.05E-10
336		0.00	0.000	0.086	0.3307	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16

337		0.00	0.000	0.115	0.3252	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
338		0.41	0.000	0.170	0.3366	0.0000	0.0011	6.52E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
339		0.01	0.000	0.117	0.3311	0.0000	0.0008	4.01E-09	0.0000	0.0000	4.17E-09	0.0000	0.0000	4.03E-09
340		0.05	0.000	0.068	0.3295	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	9.04E-10
341		0.00	0.000	0.062	0.3256	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
342		0.32	0.000	0.099	0.3350	0.0000	0.0009	5.13E-09	0.0000	0.0000	3.39E-09	0.0000	0.0000	3.02E-09
343		0.10	0.000	0.070	0.3357	0.0001	0.0029	1.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
344	*	0.11	0.000	0.027	0.3357	0.0002	0.0077	3.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345	*	0.00	0.000	0.012	0.3359	0.0003	0.0145	5.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*	0.42	0.000	0.000	0.3361	0.0004	0.0168	6.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347		0.00	0.005	0.026	0.3545	0.0004	0.0168	6.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.00	0.000	0.089	0.3497	0.0003	0.0163	6.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		0.08	0.000	0.120	0.3473	0.0003	0.0129	5.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.00	0.000	0.090	0.3423	0.0002	0.0110	4.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.00	0.000	0.128	0.3356	0.0003	0.0144	5.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.05	0.000	0.127	0.3317	0.0003	0.0164	6.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.125	0.3254	0.0003	0.0147	6.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.00	0.000	0.180	0.3164	0.0002	0.0095	4.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.00	0.000	0.069	0.3128	0.0002	0.0116	4.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356	*	0.00	0.000	0.000	0.3127	0.0003	0.0125	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357	*	0.00	0.000	0.000	0.3127	0.0002	0.0112	4.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		0.00	0.000	0.075	0.3090	0.0002	0.0086	3.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	0.00	0.000	0.032	0.3075	0.0002	0.0084	3.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		0.00	0.000	0.062	0.3046	0.0002	0.0071	3.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.00	0.000	0.047	0.3023	0.0001	0.0061	2.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.00	0.000	0.040	0.3004	0.0001	0.0053	2.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.00	0.000	0.035	0.2987	0.0001	0.0047	2.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.00	0.000	0.032	0.2972	0.0001	0.0035	1.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365	*	0.00	0.000	0.000	0.2970	0.0000	0.0007	5.90E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 16			
	inches	cubic feet	percent
Precipitation	48.45	175,859.4	100.00
Runoff	7.585	27,533.5	15.66
Evapotranspiration	33.513	121,650.5	69.17
Drainage Collected from Layer 2	8.2111	29,806.1	16.95
Percolation/Leakage through Layer 3	0.000028	0.1024	0.00
Average Head on Top of Layer 3	0.0005	---	---
Drainage Collected from Layer 7	0.0000	0.0973	0.00
Percolation/Leakage through Layer 8	0.000002	0.0056	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0000	0.00
Percolation/Leakage through Layer 11	0.000002	0.0056	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-0.8625	-3,130.8	-1.78
Soil Water at Start of Year	256.7536	932,015.5	529.98
Soil Water at End of Year	255.8911	928,884.6	528.20
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 17

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*		0.00	0.000	0.000	0.2965	0.0000	0.0000	9.16E-10	0.0000	0.0000	9.53E-10	0.0000	0.0000	1.42E-09
2			0.00	0.000	0.029	0.2949	0.0000	0.0007	6.36E-09	0.0000	0.0000	4.93E-09	0.0000	0.0000	4.70E-09
3			0.00	0.000	0.027	0.2933	0.0000	0.0009	6.93E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
4			0.00	0.000	0.026	0.2917	0.0000	0.0005	3.36E-09	0.0000	0.0000	2.82E-09	0.0000	0.0000	2.57E-09
5			0.06	0.000	0.025	0.2927	0.0000	0.0007	5.36E-09	0.0000	0.0000	4.95E-09	0.0000	0.0000	5.47E-09
6			0.02	0.000	0.023	0.2923	0.0001	0.0032	1.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
7			0.00	0.000	0.022	0.2909	0.0001	0.0049	2.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8			0.00	0.000	0.021	0.2897	0.0001	0.0068	3.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9			0.00	0.000	0.020	0.2885	0.0001	0.0058	2.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10			0.23	0.000	0.020	0.2984	0.0001	0.0060	2.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11			0.18	0.000	0.019	0.3059	0.0001	0.0061	2.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.29	0.000	0.019	0.3188	0.0002	0.0079	3.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*		0.43	0.000	0.031	0.3197	0.0002	0.0082	3.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14			0.00	0.000	0.025	0.3366	0.0001	0.0069	3.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*		0.00	0.000	0.000	0.3366	0.0001	0.0059	2.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*		0.00	0.000	0.000	0.3366	0.0001	0.0052	2.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.00	0.000	0.064	0.3335	0.0001	0.0044	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.03	0.000	0.101	0.3301	0.0001	0.0039	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19			0.00	0.000	0.119	0.3245	0.0001	0.0039	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.00	0.000	0.141	0.3177	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.00	0.000	0.114	0.3123	0.0000	0.0000	3.12E-10	0.0000	0.0000	6.34E-09	0.0000	0.0000	4.99E-09
22			0.00	0.000	0.063	0.3091	0.0000	0.0002	3.45E-09	0.0000	0.0000	3.06E-09	0.0000	0.0000	2.70E-09
23			0.00	0.000	0.106	0.3041	0.0001	0.0029	1.48E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.80E-09
24	*		0.00	0.000	0.048	0.3019	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.88E-09	0.0000	0.0000	3.09E-09
25	*		0.23	0.000	0.017	0.3028	0.0000	0.0001	9.63E-10	0.0000	0.0000	9.31E-10	0.0000	0.0000	1.74E-09
26			0.00	0.000	0.050	0.3097	0.0000	0.0010	7.16E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
27			0.00	0.000	0.129	0.3035	0.0000	0.0005	2.94E-09	0.0000	0.0000	2.82E-09	0.0000	0.0000	2.95E-09
28			0.00	0.000	0.062	0.3006	0.0000	0.0007	5.97E-09	0.0000	0.0000	4.93E-09	0.0000	0.0000	4.69E-09
29			0.01	0.000	0.048	0.2986	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.23E-09	0.0000	0.0000	1.31E-09
30			0.01	0.000	0.040	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.93E-10
31			0.00	0.000	0.035	0.2954	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
32			0.00	0.000	0.032	0.2939	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
33			0.00	0.000	0.029	0.2925	0.0000	0.0001	7.54E-10	0.0000	0.0000	7.34E-10	0.0000	0.0000	7.15E-10
34			0.00	0.000	0.027	0.2912	0.0000	0.0004	2.78E-09	0.0000	0.0000	2.52E-09	0.0000	0.0000	2.31E-09
35			0.00	0.000	0.026	0.2900	0.0000	0.0004	3.39E-09	0.0000	0.0000	3.02E-09	0.0000	0.0000	2.72E-09

36		0.00	0.000	0.024	0.2888	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
37	*	0.00	0.000	0.023	0.2877	0.0000	0.0001	4.08E-10	0.0000	0.0000	4.02E-10	0.0000	0.0000	3.96E-10
38		0.00	0.000	0.022	0.2867	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
39	*	0.00	0.000	0.021	0.2857	0.0000	0.0000	2.81E-10	0.0000	0.0000	2.78E-10	0.0000	0.0000	2.76E-10
40	*	0.03	0.000	0.025	0.2860	0.0000	0.0005	3.68E-09	0.0000	0.0000	3.24E-09	0.0000	0.0000	2.90E-09
41		0.14	0.000	0.021	0.2918	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
42		0.00	0.000	0.020	0.2909	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
43	*	0.00	0.000	0.019	0.2900	0.0000	0.0006	3.79E-09	0.0000	0.0000	3.33E-09	0.0000	0.0000	2.97E-09
44	*	0.00	0.000	0.000	0.2900	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
45		0.00	0.000	0.018	0.2891	0.0000	0.0002	2.91E-09	0.0000	0.0000	2.63E-09	0.0000	0.0000	2.40E-09
46		0.34	0.000	0.018	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
47		0.13	0.000	0.018	0.3094	0.0000	0.0001	3.30E-10	0.0000	0.0000	3.26E-10	0.0000	0.0000	3.23E-10
48		0.00	0.000	0.070	0.3061	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
49		0.00	0.000	0.017	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
50	*	0.00	0.000	0.000	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
51	*	0.17	0.000	0.018	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
52	*	0.00	0.000	0.055	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
53		0.00	0.000	0.070	0.3064	0.0000	0.0001	4.07E-10	0.0000	0.0000	4.01E-10	0.0000	0.0000	3.95E-10
54		0.00	0.000	0.016	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
55		0.04	0.000	0.016	0.3067	0.0000	0.0000	1.37E-10	0.0000	0.0000	1.37E-10	0.0000	0.0000	1.36E-10
56		0.34	0.000	0.016	0.3222	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
57		0.01	0.000	0.086	0.3185	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
58		0.00	0.000	0.123	0.3126	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
59		0.03	0.000	0.117	0.3084	0.0000	0.0003	1.73E-09	0.0000	0.0000	1.62E-09	0.0000	0.0000	1.53E-09
60		0.00	0.000	0.233	0.2973	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
61		0.00	0.000	0.091	0.2929	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
62		0.00	0.000	0.062	0.2900	0.0000	0.0001	6.44E-10	0.0000	0.0000	6.29E-10	0.0000	0.0000	6.15E-10
63		0.59	0.002	0.048	0.3156	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
64		0.07	0.000	0.089	0.3149	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
65	*	0.00	0.000	0.000	0.3149	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
66		0.00	0.000	0.104	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
67		0.14	0.000	0.181	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
68		0.14	0.000	0.156	0.3071	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
69		0.00	0.000	0.149	0.3000	0.0000	0.0001	8.52E-10	0.0000	0.0000	8.26E-10	0.0000	0.0000	8.02E-10
70		0.01	0.000	0.062	0.2975	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
71		0.00	0.000	0.047	0.2952	0.0000	0.0000	1.86E-10	0.0000	0.0000	1.85E-10	0.0000	0.0000	1.84E-10
72		0.00	0.000	0.040	0.2933	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
73		0.00	0.000	0.035	0.2917	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
74		0.00	0.000	0.032	0.2902	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
75		0.00	0.000	0.029	0.2888	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
76		0.00	0.000	0.027	0.2875	0.0000	0.0000	1.19E-10	0.0000	0.0000	1.18E-10	0.0000	0.0000	1.18E-10
77	*	0.00	0.000	0.026	0.2862	0.0000	0.0002	3.36E-09	0.0000	0.0000	2.99E-09	0.0000	0.0000	2.70E-09
78	*	0.00	0.000	0.024	0.2851	0.0000	0.0004	4.26E-09	0.0000	0.0000	2.90E-09	0.0000	0.0000	2.62E-09

79		0.00	0.000	0.023	0.2840	0.0000	0.0005	4.86E-09	0.0000	0.0000	4.87E-09	0.0000	0.0000	3.25E-09
80	*	0.22	0.000	0.082	0.2849	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.04E-10	0.0000	0.0000	1.32E-09
81	*	0.00	0.000	0.043	0.2858	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.95E-11
82	*	0.00	0.000	0.029	0.2868	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
83	*	0.00	0.000	0.003	0.2868	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
84	*	0.00	0.000	0.000	0.2868	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
85	*	0.00	0.000	0.000	0.2868	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
86	*	0.00	0.000	0.022	0.2857	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
87	*	0.00	0.000	0.000	0.2857	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
88	*	0.00	0.000	0.000	0.2857	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
89		0.00	0.000	0.021	0.2847	0.0000	0.0006	4.30E-09	0.0000	0.0000	2.92E-09	0.0000	0.0000	2.64E-09
90		0.00	0.000	0.020	0.2837	0.0000	0.0008	6.41E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
91		0.00	0.000	0.020	0.2827	0.0000	0.0006	5.49E-09	0.0000	0.0000	4.83E-09	0.0000	0.0000	4.65E-09
92		0.09	0.000	0.019	0.2860	0.0000	0.0000	1.80E-10	0.0000	0.0000	3.29E-10	0.0000	0.0000	6.31E-10
93		0.00	0.000	0.018	0.2851	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.48E-11	0.0000	0.0000	1.15E-10
94		0.00	0.000	0.018	0.2842	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.12E-11
95		0.00	0.000	0.017	0.2834	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
96	*	0.20	0.000	0.064	0.2843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
97	*	0.15	0.000	0.024	0.2853	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
98		0.13	0.000	0.078	0.2985	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
99	*	0.00	0.000	0.000	0.2985	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
100	*	0.42	0.000	0.022	0.2995	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
101	*	0.00	0.000	0.043	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
102	*	0.00	0.000	0.052	0.3013	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
103		0.00	0.000	0.183	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
104		0.02	0.000	0.017	0.3044	0.0000	0.0000	2.59E-10	0.0000	0.0000	2.56E-10	0.0000	0.0000	2.54E-10
105		0.19	0.000	0.017	0.3125	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
106		0.00	0.000	0.112	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
107	*	0.00	0.000	0.016	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
108		0.01	0.000	0.016	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
109		0.17	0.000	0.016	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
110		0.53	0.023	0.122	0.3320	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
111		0.00	0.000	0.108	0.3269	0.0000	0.0000	9.12E-11	0.0000	0.0000	9.09E-11	0.0000	0.0000	9.06E-11
112		0.14	0.000	0.100	0.3290	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
113		0.06	0.000	0.137	0.3254	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
114	*	0.39	0.000	0.040	0.3263	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
115	*	0.01	0.000	0.042	0.3272	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
116	*	0.32	0.000	0.040	0.3282	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
117	*	0.37	0.000	0.031	0.3291	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
118	*	0.03	0.000	0.000	0.3300	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
119		0.00	0.140	0.109	0.3588	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.00	0.000	0.261	0.3464	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
121		0.10	0.000	0.289	0.3374	0.0000	0.0002	8.57E-10	0.0000	0.0000	8.31E-10	0.0000	0.0000	8.06E-10

122	0.35	0.000	0.363	0.3371	0.0000	0.0003	1.81E-09	0.0000	0.0000	1.70E-09	0.0000	0.0000	1.60E-09
123	0.05	0.000	0.251	0.3275	0.0000	0.0006	3.81E-09	0.0000	0.0000	3.34E-09	0.0000	0.0000	2.98E-09
124	1.09	0.191	0.164	0.3627	0.0000	0.0001	8.74E-10	0.0000	0.0000	8.47E-10	0.0000	0.0000	8.22E-10
125	0.00	0.000	0.145	0.3558	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
126	0.00	0.000	0.117	0.3502	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
127	0.12	0.000	0.139	0.3495	0.0000	0.0001	5.55E-10	0.0000	0.0000	5.44E-10	0.0000	0.0000	5.33E-10
128	0.07	0.000	0.331	0.3371	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
129	0.00	0.000	0.265	0.3245	0.0000	0.0002	1.21E-09	0.0000	0.0000	1.16E-09	0.0000	0.0000	1.11E-09
130	0.00	0.000	0.446	0.3027	0.0000	0.0015	8.27E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
131	0.01	0.000	0.149	0.2962	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132	0.01	0.000	0.062	0.2935	0.0001	0.0024	1.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133	0.01	0.000	0.048	0.2911	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.31E-09	0.0000	0.0000	4.11E-09
134	0.00	0.000	0.039	0.2886	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
135	0.09	0.000	0.035	0.2904	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
136	0.35	0.000	0.032	0.3048	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137	0.00	0.000	0.029	0.3027	0.0000	0.0010	6.76E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
138	0.00	0.000	0.027	0.3007	0.0001	0.0064	2.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
139	0.00	0.000	0.026	0.2989	0.0002	0.0103	4.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
140	0.00	0.000	0.024	0.2972	0.0003	0.0121	5.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
141	0.00	0.000	0.023	0.2956	0.0003	0.0125	5.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
142	0.00	0.000	0.022	0.2940	0.0002	0.0114	5.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
143	0.06	0.000	0.022	0.2951	0.0002	0.0107	4.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
144	0.00	0.000	0.020	0.2937	0.0003	0.0121	5.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
145	0.00	0.000	0.020	0.2924	0.0003	0.0129	5.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
146	0.00	0.000	0.019	0.2913	0.0003	0.0123	5.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
147	0.00	0.000	0.018	0.2901	0.0002	0.0084	3.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
148	0.41	0.000	0.019	0.3086	0.0002	0.0086	3.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
149	0.82	0.096	0.018	0.3419	0.0002	0.0083	3.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
150	0.40	0.032	0.413	0.3394	0.0002	0.0073	2.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
151	0.03	0.000	0.400	0.3218	0.0003	0.0117	4.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
152	0.00	0.000	0.222	0.3112	0.0002	0.0094	4.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
153	0.16	0.000	0.150	0.3116	0.0002	0.0077	3.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
154	1.02	0.123	0.062	0.3514	0.0001	0.0066	3.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
155	0.13	0.000	0.161	0.3498	0.0001	0.0057	2.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
156	0.01	0.000	0.366	0.3328	0.0001	0.0044	2.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
157	0.57	0.021	0.299	0.3447	0.0001	0.0046	2.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
158	0.00	0.000	0.250	0.3328	0.0001	0.0040	1.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
159	0.09	0.000	0.248	0.3255	0.0001	0.0039	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
160	0.00	0.000	0.222	0.3149	0.0001	0.0034	1.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
161	0.00	0.000	0.334	0.2990	0.0000	0.0000	2.48E-10	0.0000	0.0000	6.15E-09	0.0000	0.0000	4.94E-09
162	0.00	0.000	0.149	0.2919	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	5.35E-10
163	0.00	0.000	0.062	0.2890	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
164	0.17	0.000	0.048	0.2946	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.24	0.000	0.041	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.47	0.000	0.036	0.3250	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.00	0.000	0.260	0.3126	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.62	0.022	0.033	0.3396	0.0000	0.0000	1.48E-10	0.0000	0.0000	1.47E-10	0.0000	0.0000	1.46E-10
169	0.00	0.000	0.293	0.3256	0.0000	0.0002	1.25E-09	0.0000	0.0000	1.19E-09	0.0000	0.0000	1.14E-09
170	0.58	0.026	0.322	0.3365	0.0000	0.0004	2.57E-09	0.0000	0.0000	2.35E-09	0.0000	0.0000	2.16E-09
171	2.07	1.118	0.368	0.3641	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
172	0.71	0.296	0.303	0.3692	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.00	0.000	0.321	0.3539	0.0000	0.0001	8.74E-10	0.0000	0.0000	8.47E-10	0.0000	0.0000	8.21E-10
174	0.06	0.000	0.367	0.3395	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
175	0.02	0.000	0.301	0.3263	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.03	0.000	0.150	0.3207	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.00	0.000	0.062	0.3178	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.06	0.000	0.049	0.3179	0.0000	0.0001	7.77E-10	0.0000	0.0000	7.56E-10	0.0000	0.0000	7.36E-10
179	0.56	0.003	0.041	0.3411	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
180	0.00	0.000	0.296	0.3258	0.0001	0.0024	9.93E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
181	0.00	0.000	0.035	0.3231	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.13E-09	0.0000	0.0000	2.51E-09
182	0.17	0.000	0.033	0.3285	0.0001	0.0042	2.02E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	5.06E-09
183	0.00	0.000	0.284	0.3141	0.0003	0.0155	6.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
184	0.00	0.000	0.029	0.3117	0.0004	0.0170	6.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
185	1.05	0.108	0.029	0.3546	0.0005	0.0213	8.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
186	0.67	0.180	0.389	0.3583	0.0003	0.0155	6.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
187	0.00	0.000	0.159	0.3500	0.0005	0.0241	9.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
188	0.05	0.000	0.146	0.3448	0.0004	0.0205	7.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
189	0.10	0.000	0.286	0.3354	0.0003	0.0141	5.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
190	0.00	0.000	0.218	0.3248	0.0004	0.0205	7.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
191	0.00	0.000	0.290	0.3110	0.0003	0.0155	6.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
192	0.00	0.000	0.149	0.3039	0.0002	0.0115	4.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
193	0.00	0.000	0.062	0.3010	0.0002	0.0091	3.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
194	0.00	0.000	0.048	0.2988	0.0002	0.0076	3.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
195	0.05	0.000	0.041	0.2993	0.0001	0.0064	2.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
196	0.00	0.000	0.035	0.2976	0.0001	0.0056	2.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
197	0.00	0.000	0.032	0.2961	0.0001	0.0050	2.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
198	0.00	0.000	0.029	0.2947	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
199	0.00	0.000	0.027	0.2934	0.0001	0.0040	2.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
200	0.00	0.000	0.026	0.2921	0.0000	0.0019	1.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
201	0.24	0.000	0.026	0.3020	0.0000	0.0000	6.72E-10	0.0000	0.0000	4.81E-09	0.0000	0.0000	4.10E-09
202	0.40	0.000	0.024	0.3196	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.64E-10	0.0000	0.0000	5.02E-10
203	0.34	0.000	0.023	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	4.08E-11
204	0.00	0.000	0.156	0.3263	0.0000	0.0009	5.71E-09	0.0000	0.0000	4.83E-09	0.0000	0.0000	4.44E-09
205	0.00	0.000	0.145	0.3189	0.0000	0.0005	2.82E-09	0.0000	0.0000	2.27E-09	0.0000	0.0000	2.09E-09
206	0.00	0.000	0.149	0.3113	0.0000	0.0001	1.35E-09	0.0000	0.0000	1.59E-09	0.0000	0.0000	1.50E-09
207	0.12	0.000	0.063	0.3135	0.0001	0.0045	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09

208	0.04	0.000	0.049	0.3127	0.0001	0.0061	2.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
209	0.25	0.000	0.041	0.3226	0.0001	0.0067	3.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
210	0.48	0.011	0.280	0.3314	0.0002	0.0093	3.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
211	0.12	0.000	0.116	0.3314	0.0002	0.0087	3.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
212	0.00	0.000	0.287	0.3178	0.0002	0.0074	3.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
213	0.05	0.000	0.142	0.3132	0.0001	0.0063	2.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
214	0.04	0.000	0.151	0.3080	0.0000	0.0021	1.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
215	0.00	0.000	0.063	0.3052	0.0001	0.0055	2.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
216	0.01	0.000	0.049	0.3033	0.0001	0.0051	2.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
217	0.01	0.000	0.042	0.3016	0.0001	0.0046	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
218	0.02	0.000	0.037	0.3008	0.0001	0.0039	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
219	0.07	0.000	0.034	0.3023	0.0001	0.0038	1.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
220	0.00	0.000	0.029	0.3009	0.0001	0.0024	1.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
221	0.00	0.000	0.027	0.2995	0.0000	0.0008	5.33E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
222	0.00	0.000	0.026	0.2983	0.0000	0.0001	5.10E-10	0.0000	0.0000	1.65E-09	0.0000	0.0000	1.24E-09
223	0.00	0.000	0.024	0.2972	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.25E-10	0.0000	0.0000	4.81E-10
224	0.00	0.000	0.023	0.2961	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.12E-11
225	0.00	0.000	0.022	0.2950	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
226	0.00	0.000	0.021	0.2940	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
227	0.00	0.000	0.020	0.2931	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
228	0.06	0.000	0.021	0.2951	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
229	0.84	0.042	0.021	0.3323	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
230	0.07	0.000	0.187	0.3269	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.31	0.000	0.089	0.3372	0.0000	0.0000	1.01E-10	0.0000	0.0000	1.01E-10	0.0000	0.0000	1.00E-10
232	0.00	0.000	0.120	0.3316	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
233	0.34	0.001	0.165	0.3397	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.32	0.007	0.190	0.3455	0.0000	0.0002	7.82E-10	0.0000	0.0000	7.60E-10	0.0000	0.0000	7.40E-10
235	0.85	0.259	0.105	0.3686	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
236	0.25	0.024	0.162	0.3716	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.00	0.000	0.217	0.3613	0.0000	0.0005	2.65E-09	0.0000	0.0000	2.42E-09	0.0000	0.0000	2.22E-09
238	0.00	0.000	0.140	0.3546	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
239	0.00	0.000	0.120	0.3489	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
240	0.00	0.000	0.196	0.3381	0.0000	0.0004	2.17E-09	0.0000	0.0000	2.01E-09	0.0000	0.0000	1.88E-09
241	0.03	0.000	0.093	0.3334	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
242	0.15	0.000	0.163	0.3306	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.43	0.000	0.081	0.3458	0.0004	0.0206	8.09E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
244	0.00	0.000	0.115	0.3388	0.0006	0.0283	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
245	0.00	0.000	0.246	0.3256	0.0007	0.0351	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
246	0.61	0.011	0.259	0.3405	0.0006	0.0281	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
247	0.00	0.000	0.189	0.3302	0.0006	0.0260	9.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
248	0.00	0.000	0.124	0.3232	0.0006	0.0292	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
249	0.00	0.000	0.315	0.3070	0.0005	0.0217	8.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
250	0.00	0.000	0.149	0.2991	0.0006	0.0272	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

251		0.00	0.000	0.062	0.2956	0.0005	0.0244	9.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
252		0.00	0.000	0.047	0.2929	0.0004	0.0192	7.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
253		0.00	0.000	0.040	0.2906	0.0003	0.0157	6.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
254		0.00	0.000	0.035	0.2886	0.0003	0.0134	5.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
255		0.00	0.000	0.032	0.2869	0.0002	0.0116	4.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
256		0.00	0.000	0.029	0.2852	0.0002	0.0102	4.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257		0.04	0.000	0.029	0.2857	0.0002	0.0092	3.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258		0.25	0.000	0.028	0.2965	0.0002	0.0113	4.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259		0.00	0.000	0.024	0.2953	0.0002	0.0091	3.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260		0.01	0.000	0.025	0.2945	0.0002	0.0076	3.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261		0.00	0.000	0.022	0.2934	0.0001	0.0055	2.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.90	0.045	0.023	0.3328	0.0001	0.0058	2.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		1.22	0.438	0.185	0.3613	0.0001	0.0051	2.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.25	0.017	0.088	0.3681	0.0001	0.0046	2.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.40	0.055	0.160	0.3768	0.0001	0.0041	2.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.00	0.000	0.117	0.3713	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.00	0.000	0.138	0.3647	0.0000	0.0022	1.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.00	0.000	0.143	0.3541	0.0000	0.0001	3.50E-10	0.0000	0.0000	4.60E-09	0.0000	0.0000	4.25E-09
269		0.00	0.000	0.104	0.3458	0.0001	0.0031	1.29E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
270		0.00	0.000	0.101	0.3383	0.0010	0.0474	1.68E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.056	0.3336	0.0011	0.0497	1.75E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272	*	0.00	0.000	0.044	0.3297	0.0009	0.0445	1.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.00	0.000	0.105	0.3227	0.0009	0.0419	1.51E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274	*	0.00	0.000	0.066	0.3182	0.0009	0.0442	1.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.00	0.000	0.149	0.3098	0.0007	0.0324	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.062	0.3058	0.0006	0.0285	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.047	0.3025	0.0005	0.0248	9.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.00	0.000	0.040	0.2997	0.0005	0.0242	9.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.18	0.000	0.038	0.3055	0.0004	0.0209	8.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		1.25	0.173	0.034	0.3541	0.0005	0.0214	8.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281		0.10	0.000	0.147	0.3511	0.0004	0.0210	8.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.01	0.000	0.161	0.3431	0.0004	0.0173	6.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.00	0.000	0.199	0.3326	0.0003	0.0154	6.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.00	0.000	0.157	0.3244	0.0004	0.0208	8.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.166	0.3159	0.0004	0.0189	7.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.00	0.000	0.095	0.3111	0.0004	0.0183	7.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.00	0.000	0.119	0.3051	0.0003	0.0131	5.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.00	0.000	0.149	0.2977	0.0003	0.0143	5.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.00	0.000	0.062	0.2948	0.0003	0.0139	5.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.01	0.000	0.050	0.2930	0.0002	0.0106	4.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.39	0.000	0.042	0.3095	0.0002	0.0085	3.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.00	0.000	0.035	0.3078	0.0001	0.0065	2.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.00	0.000	0.032	0.3062	0.0001	0.0050	2.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.47	0.000	0.032	0.3272	0.0001	0.0059	2.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		1.25	0.353	0.180	0.3614	0.0001	0.0051	2.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.00	0.000	0.107	0.3563	0.0001	0.0046	2.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.21	0.000	0.071	0.3631	0.0001	0.0041	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		0.00	0.000	0.086	0.3590	0.0001	0.0038	2.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.06	0.000	0.080	0.3580	0.0000	0.0021	1.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.000	0.091	0.3536	0.0000	0.0006	2.91E-09	0.0000	0.0000	6.79E-09	0.0000	0.0000	5.10E-09
301		0.00	0.000	0.081	0.3497	0.0000	0.0018	9.68E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.90E-09
302		0.00	0.000	0.089	0.3452	0.0000	0.0000	3.03E-10	0.0000	0.0000	2.30E-09	0.0000	0.0000	2.09E-09
303		0.00	0.000	0.067	0.3405	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	5.31E-10
304	*	0.00	0.000	0.053	0.3362	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
305	*	0.00	0.000	0.043	0.3330	0.0001	0.0032	1.55E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
306	*	0.00	0.000	0.000	0.3321	0.0003	0.0135	5.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307	*	0.00	0.000	0.000	0.3313	0.0003	0.0153	6.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		0.00	0.000	0.073	0.3267	0.0003	0.0151	6.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.12	0.000	0.114	0.3259	0.0004	0.0198	7.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.00	0.000	0.096	0.3208	0.0006	0.0266	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.00	0.000	0.106	0.3149	0.0003	0.0159	6.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.00	0.000	0.196	0.3047	0.0003	0.0155	6.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.00	0.000	0.081	0.2996	0.0003	0.0158	6.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.00	0.000	0.062	0.2959	0.0005	0.0257	9.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315	*	0.00	0.000	0.000	0.2955	0.0005	0.0233	8.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.05	0.000	0.049	0.2951	0.0003	0.0161	6.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.00	0.000	0.040	0.2931	0.0004	0.0164	6.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318		0.00	0.000	0.035	0.2911	0.0002	0.0102	4.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.00	0.000	0.032	0.2892	0.0002	0.0081	3.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.42	0.000	0.031	0.3073	0.0002	0.0077	3.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.00	0.000	0.027	0.3056	0.0002	0.0077	3.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.00	0.000	0.026	0.3040	0.0002	0.0080	3.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.00	0.000	0.024	0.3024	0.0001	0.0061	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.00	0.000	0.023	0.3008	0.0002	0.0089	3.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325	*	0.00	0.000	0.022	0.2994	0.0002	0.0098	4.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.000	0.021	0.2981	0.0002	0.0098	4.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.00	0.000	0.020	0.2969	0.0002	0.0094	4.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.020	0.2957	0.0002	0.0089	3.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.77	0.023	0.020	0.3302	0.0002	0.0083	3.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.12	0.000	0.103	0.3309	0.0002	0.0082	3.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.36	0.004	0.115	0.3425	0.0002	0.0101	4.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.01	0.000	0.059	0.3400	0.0002	0.0082	3.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333	*	0.00	0.000	0.000	0.3400	0.0001	0.0069	3.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.00	0.000	0.072	0.3366	0.0001	0.0060	2.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	0.00	0.000	0.000	0.3366	0.0001	0.0052	2.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.088	0.3324	0.0001	0.0041	2.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337		0.00	0.000	0.131	0.3259	0.0000	0.0009	5.68E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.00	0.000	0.086	0.3218	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		0.00	0.000	0.084	0.3178	0.0001	0.0042	2.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.088	0.3137	0.0001	0.0039	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.00	0.000	0.095	0.3091	0.0001	0.0031	1.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342	*	0.17	0.000	0.041	0.3101	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.54E-09	0.0000	0.0000	4.79E-09
343	*	0.00	0.000	0.039	0.3110	0.0000	0.0002	1.33E-09	0.0000	0.0000	1.27E-09	0.0000	0.0000	1.14E-09
344	*	0.00	0.000	0.019	0.3119	0.0000	0.0002	1.56E-09	0.0000	0.0000	1.47E-09	0.0000	0.0000	1.35E-09
345	*	0.00	0.000	0.016	0.3119	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	3.49E-10
346	*	0.00	0.000	0.040	0.3100	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
347		0.00	0.000	0.052	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
348		0.00	0.000	0.089	0.3033	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
349		0.00	0.000	0.072	0.2998	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
350		0.00	0.000	0.062	0.2966	0.0000	0.0003	1.35E-09	0.0000	0.0000	1.29E-09	0.0000	0.0000	9.39E-10
351	*	0.00	0.000	0.037	0.2947	0.0000	0.0014	9.18E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.91E-09
352		0.00	0.000	0.040	0.2928	0.0001	0.0028	1.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
353		0.00	0.000	0.035	0.2911	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.00	0.000	0.032	0.2896	0.0000	0.0017	9.00E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.23	0.000	0.030	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.21E-09	0.0000	0.0000	2.47E-09
356		0.00	0.000	0.027	0.2976	0.0000	0.0004	4.66E-09	0.0000	0.0000	3.13E-09	0.0000	0.0000	2.83E-09
357		0.00	0.000	0.026	0.2962	0.0000	0.0005	3.51E-09	0.0000	0.0000	3.50E-09	0.0000	0.0000	3.04E-09
358		0.00	0.000	0.024	0.2949	0.0000	0.0005	4.85E-09	0.0000	0.0000	4.27E-09	0.0000	0.0000	4.49E-09
359		0.00	0.000	0.023	0.2937	0.0000	0.0013	8.67E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		1.82	0.641	0.023	0.3484	0.0000	0.0002	1.15E-09	0.0000	0.0000	2.12E-09	0.0000	0.0000	1.56E-09
361	*	0.05	0.000	0.037	0.3490	0.0000	0.0002	3.67E-09	0.0000	0.0000	2.78E-09	0.0000	0.0000	2.40E-09
362	*	0.00	0.000	0.037	0.3470	0.0000	0.0002	3.32E-09	0.0000	0.0000	3.02E-09	0.0000	0.0000	2.68E-09
363	*	0.00	0.000	0.047	0.3445	0.0000	0.0014	9.31E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.00	0.000	0.085	0.3405	0.0001	0.0057	2.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.00	0.000	0.130	0.3343	0.0001	0.0050	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 17			
	inches	cubic feet	percent
Precipitation	38.32	139,110.1	100.00
Runoff	4.485	16,279.4	11.70
Evapotranspiration	31.053	112,721.9	81.03
Drainage Collected from Layer 2	1.9993	7,257.6	5.22
Percolation/Leakage through Layer 3	0.000008	0.0302	0.00
Average Head on Top of Layer 3	0.0001	---	---
Drainage Collected from Layer 7	0.0000	0.0251	0.00
Percolation/Leakage through Layer 8	0.000001	0.0051	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0049	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.7854	2,851.1	2.05
Soil Water at Start of Year	255.8911	928,884.6	667.73
Soil Water at End of Year	256.6765	931,735.8	669.78
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 18

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.175	0.3259	0.0001	0.0043	2.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.00	0.000	0.079	0.3222	0.0001	0.0041	2.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.53	0.002	0.089	0.3433	0.0001	0.0034	1.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4	*		0.00	0.000	0.046	0.3411	0.0001	0.0029	1.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.01	0.000	0.084	0.3374	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.15E-09	0.0000	0.0000	4.69E-09
6			0.02	0.000	0.068	0.3350	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	6.12E-12
7			0.00	0.000	0.104	0.3300	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
8			0.00	0.000	0.127	0.3240	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
9			1.27	0.219	0.115	0.3682	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
10			0.05	0.000	0.113	0.3653	0.0001	0.0033	1.98E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09
11			0.00	0.000	0.067	0.3616	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.26E-09	0.0000	0.0000	4.77E-09
12			0.13	0.000	0.055	0.3650	0.0001	0.0047	2.30E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
13			0.00	0.000	0.066	0.3617	0.0001	0.0027	1.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*		0.00	0.000	0.000	0.3604	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.79E-09	0.0000	0.0000	4.73E-09
15			0.00	0.000	0.075	0.3541	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
16			0.00	0.000	0.117	0.3464	0.0003	0.0126	5.05E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
17			0.00	0.000	0.164	0.3369	0.0007	0.0311	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.00	0.000	0.105	0.3300	0.0007	0.0338	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19			0.00	0.000	0.109	0.3236	0.0009	0.0404	1.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20	*		0.00	0.000	0.054	0.3202	0.0007	0.0315	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21	*		0.07	0.000	0.026	0.3208	0.0006	0.0277	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22	*		0.02	0.000	0.011	0.3214	0.0004	0.0174	6.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23	*		0.69	0.000	0.006	0.3218	0.0002	0.0102	4.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24	*		0.03	0.000	0.016	0.3220	0.0002	0.0087	3.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25			0.00	0.000	0.000	0.3440	0.0002	0.0107	4.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26			0.00	0.000	0.065	0.3495	0.0003	0.0134	5.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27			0.00	0.000	0.126	0.3426	0.0003	0.0140	5.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28			0.07	0.000	0.093	0.3411	0.0005	0.0212	8.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29			0.35	0.001	0.108	0.3519	0.0003	0.0129	5.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30			0.00	0.000	0.109	0.3460	0.0003	0.0125	5.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31			0.00	0.000	0.156	0.3379	0.0003	0.0139	6.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32			0.55	0.020	0.200	0.3529	0.0003	0.0114	4.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33			0.65	0.133	0.170	0.3689	0.0004	0.0170	6.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34			0.00	0.000	0.154	0.3612	0.0004	0.0181	7.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35			0.14	0.000	0.113	0.3622	0.0004	0.0184	7.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36			0.20	0.000	0.060	0.3691	0.0004	0.0182	7.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*		0.10	0.000	0.054	0.3700	0.0003	0.0130	5.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38			0.08	0.000	0.091	0.3683	0.0000	0.0021	8.84E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39			0.05	0.000	0.132	0.3623	0.0003	0.0176	6.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40			0.14	0.000	0.166	0.3599	0.0006	0.0294	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41			0.00	0.000	0.079	0.3543	0.0004	0.0207	8.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42	*		0.01	0.000	0.011	0.3530	0.0008	0.0365	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43			1.01	0.205	0.103	0.3844	0.0006	0.0271	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44	*		0.30	0.000	0.031	0.3836	0.0009	0.0409	1.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45	*		0.00	0.000	0.032	0.3791	0.0007	0.0364	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46	*		0.00	0.000	0.056	0.3732	0.0033	0.1542	4.80E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47	*		0.04	0.000	0.039	0.3694	0.0025	0.1172	3.75E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48	*		0.00	0.000	0.028	0.3666	0.0019	0.0903	2.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*		0.00	0.000	0.016	0.3645	0.0016	0.0732	2.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50	*		0.00	0.000	0.017	0.3619	0.0013	0.0608	2.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51	*		0.00	0.000	0.000	0.3599	0.0012	0.0545	1.90E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52	*		0.00	0.000	0.000	0.3579	0.0009	0.0439	1.59E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53	*		0.10	0.000	0.013	0.3570	0.0009	0.0427	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54	*		0.07	0.000	0.020	0.3565	0.0008	0.0396	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55	*		0.00	0.000	0.026	0.3560	0.0007	0.0332	1.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56			0.00	0.000	0.063	0.3545	0.0007	0.0316	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57	*		0.00	0.000	0.052	0.3510	0.0006	0.0286	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58			0.00	0.000	0.098	0.3452	0.0005	0.0237	9.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59			0.00	0.000	0.146	0.3373	0.0006	0.0258	9.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60	*		0.00	0.000	0.067	0.3327	0.0004	0.0168	6.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61	*	*	0.00	0.000	0.000	0.3327	0.0007	0.0372	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62		*	0.00	0.000	0.000	0.3327	0.0004	0.0203	7.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63		*	0.00	0.000	0.000	0.3327	0.0003	0.0140	5.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64		*	0.00	0.000	0.000	0.3327	0.0002	0.0106	4.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65		*	0.00	0.000	0.000	0.3327	0.0002	0.0086	3.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66		*	0.00	0.000	0.000	0.3328	0.0002	0.0072	3.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67		*	0.00	0.000	0.000	0.3328	0.0001	0.0061	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.00	0.000	0.101	0.3263	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.19	0.000	0.106	0.3287	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.23E-09	0.0000	0.0000	1.59E-09
70			0.01	0.000	0.228	0.3173	0.0002	0.0093	3.99E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	5.08E-09
71			0.10	0.000	0.289	0.3076	0.0003	0.0149	6.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
72			0.26	0.000	0.208	0.3100	0.0005	0.0221	8.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73			0.01	0.000	0.154	0.3027	0.0002	0.0100	4.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.00	0.000	0.146	0.2953	0.0002	0.0088	3.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.26	0.000	0.062	0.3041	0.0001	0.0056	2.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.15	0.000	0.048	0.3084	0.0002	0.0118	4.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.00	0.000	0.136	0.3013	0.0003	0.0121	5.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.00	0.000	0.040	0.2990	0.0003	0.0150	6.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.00	0.000	0.035	0.2970	0.0003	0.0130	5.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80	*	0.13	0.000	0.070	0.2978	0.0003	0.0120	5.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.00	0.000	0.071	0.2961	0.0002	0.0109	4.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.01	0.000	0.030	0.2948	0.0002	0.0079	3.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.00	0.000	0.027	0.2934	0.0002	0.0091	3.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.00	0.000	0.026	0.2920	0.0002	0.0071	3.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.024	0.2908	0.0002	0.0076	3.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86	*	0.00	0.000	0.023	0.2897	0.0002	0.0078	3.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.022	0.2886	0.0001	0.0066	3.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.021	0.2876	0.0001	0.0057	2.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.00	0.000	0.020	0.2867	0.0001	0.0050	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.020	0.2857	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.08	0.000	0.019	0.2887	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92	*	0.00	0.000	0.000	0.2887	0.0001	0.0037	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.00	0.000	0.018	0.2878	0.0000	0.0016	8.09E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.04	0.000	0.018	0.2888	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.29E-09	0.0000	0.0000	2.29E-09
95		0.03	0.000	0.018	0.2893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.34E-10
96		0.11	0.000	0.017	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
97		0.03	0.000	0.017	0.2942	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
98		0.28	0.000	0.016	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
99		0.00	0.000	0.195	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
100	*	0.00	0.000	0.016	0.2967	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
101		0.18	0.000	0.016	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
102		0.26	0.000	0.151	0.3094	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
103		0.00	0.000	0.231	0.2984	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
104		0.17	0.000	0.149	0.2994	0.0000	0.0002	8.42E-10	0.0000	0.0000	8.17E-10	0.0000	0.0000	7.93E-10
105		0.12	0.000	0.062	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
106		0.25	0.000	0.072	0.3106	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
107	*	0.11	0.000	0.043	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
108		0.00	0.000	0.205	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
109		0.00	0.000	0.186	0.2949	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
110		0.00	0.000	0.149	0.2879	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
111		0.22	0.000	0.062	0.2952	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
112		0.25	0.000	0.048	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
113		0.00	0.000	0.235	0.2938	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
114		0.00	0.000	0.040	0.2919	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
115		0.00	0.000	0.035	0.2902	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
116		0.00	0.000	0.032	0.2887	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
117		0.00	0.000	0.029	0.2873	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
118		0.33	0.000	0.028	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
119		0.38	0.000	0.026	0.3187	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.01	0.000	0.109	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
121		0.04	0.000	0.255	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

122	0.04	0.000	0.115	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
123	0.39	0.000	0.109	0.3137	0.0000	0.0006	3.66E-09	0.0000	0.0000	3.23E-09	0.0000	0.0000	2.89E-09
124	0.41	0.007	0.103	0.3278	0.0000	0.0000	3.72E-10	0.0000	0.0000	3.67E-10	0.0000	0.0000	3.62E-10
125	0.05	0.000	0.097	0.3254	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
126	0.00	0.000	0.161	0.3177	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
127	0.06	0.000	0.179	0.3119	0.0000	0.0002	1.20E-09	0.0000	0.0000	1.15E-09	0.0000	0.0000	1.10E-09
128	0.20	0.000	0.356	0.3046	0.0000	0.0013	7.74E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
129	1.26	0.246	0.260	0.3403	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.14E-09	0.0000	0.0000	1.86E-09
130	0.00	0.000	0.127	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.73E-10
131	0.00	0.000	0.151	0.3271	0.0000	0.0002	8.22E-10	0.0000	0.0000	7.98E-10	0.0000	0.0000	7.76E-10
132	0.03	0.000	0.174	0.3203	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
133	0.00	0.000	0.146	0.3133	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134	0.00	0.000	0.248	0.3015	0.0000	0.0003	1.51E-09	0.0000	0.0000	1.44E-09	0.0000	0.0000	1.36E-09
135	0.00	0.000	0.149	0.2945	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
136	0.00	0.000	0.062	0.2915	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137	0.00	0.000	0.047	0.2893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138	0.00	0.000	0.040	0.2874	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.00	0.000	0.035	0.2857	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140	0.00	0.000	0.032	0.2842	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141	0.00	0.000	0.029	0.2828	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142	0.01	0.000	0.028	0.2821	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143	0.21	0.000	0.026	0.2911	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144	0.00	0.000	0.024	0.2899	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145	0.02	0.000	0.024	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146	0.00	0.000	0.022	0.2888	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
147	0.00	0.000	0.021	0.2878	0.0000	0.0001	1.01E-09	0.0000	0.0000	9.70E-10	0.0000	0.0000	9.37E-10
148	0.00	0.000	0.020	0.2868	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
149	0.00	0.000	0.020	0.2859	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150	0.00	0.000	0.019	0.2850	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151	0.29	0.000	0.019	0.2978	0.0000	0.0000	8.11E-11	0.0000	0.0000	8.08E-11	0.0000	0.0000	8.06E-11
152	0.01	0.000	0.019	0.2975	0.0000	0.0000	2.01E-10	0.0000	0.0000	2.00E-10	0.0000	0.0000	1.98E-10
153	0.00	0.000	0.017	0.2967	0.0000	0.0000	1.86E-10	0.0000	0.0000	1.85E-10	0.0000	0.0000	1.84E-10
154	0.03	0.000	0.018	0.2972	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
155	0.00	0.000	0.016	0.2964	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
156	0.72	0.029	0.017	0.3287	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
157	0.12	0.000	0.221	0.3238	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
158	0.01	0.000	0.117	0.3185	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
159	0.32	0.000	0.152	0.3265	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
160	0.32	0.002	0.170	0.3334	0.0000	0.0002	9.34E-10	0.0000	0.0000	9.03E-10	0.0000	0.0000	8.74E-10
161	0.00	0.000	0.157	0.3259	0.0000	0.0000	3.15E-10	0.0000	0.0000	3.12E-10	0.0000	0.0000	3.08E-10
162	0.00	0.000	0.258	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
163	0.31	0.000	0.167	0.3206	0.0000	0.0001	3.66E-10	0.0000	0.0000	3.62E-10	0.0000	0.0000	3.57E-10
164	0.00	0.000	0.142	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16

165	0.07	0.000	0.123	0.3112	0.0000	0.0001	8.66E-10	0.0000	0.0000	8.40E-10	0.0000	0.0000	8.15E-10
166	0.39	0.000	0.114	0.3241	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
167	0.00	0.000	0.118	0.3185	0.0000	0.0000	1.33E-10	0.0000	0.0000	1.32E-10	0.0000	0.0000	1.32E-10
168	0.81	0.100	0.149	0.3451	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
169	0.00	0.000	0.256	0.3329	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
170	1.20	0.321	0.299	0.3607	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.00	0.000	0.162	0.3530	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.00	0.000	0.205	0.3432	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.69	0.055	0.272	0.3606	0.0000	0.0003	2.36E-09	0.0000	0.0000	2.17E-09	0.0000	0.0000	2.01E-09
174	0.00	0.000	0.229	0.3497	0.0000	0.0000	8.13E-11	0.0000	0.0000	8.10E-11	0.0000	0.0000	8.08E-11
175	0.00	0.000	0.203	0.3400	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
176	0.00	0.000	0.160	0.3324	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.03	0.000	0.349	0.3165	0.0000	0.0001	3.44E-10	0.0000	0.0000	3.39E-10	0.0000	0.0000	3.35E-10
178	1.11	0.139	0.150	0.3553	0.0000	0.0008	4.90E-09	0.0000	0.0000	3.27E-09	0.0000	0.0000	2.92E-09
179	0.08	0.000	0.431	0.3386	0.0001	0.0038	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
180	0.02	0.000	0.203	0.3300	0.0001	0.0047	2.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
181	0.05	0.000	0.174	0.3240	0.0001	0.0040	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
182	1.51	0.363	0.416	0.3588	0.0001	0.0039	1.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
183	0.09	0.000	0.162	0.3550	0.0000	0.0000	3.46E-10	0.0000	0.0000	6.60E-09	0.0000	0.0000	5.07E-09
184	0.00	0.000	0.430	0.3335	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.45E-16	0.0000	0.0000	7.52E-10
185	0.01	0.000	0.296	0.3194	0.0000	0.0012	5.42E-09	0.0000	0.0000	4.88E-09	0.0000	0.0000	4.48E-09
186	0.00	0.000	0.149	0.3120	0.0001	0.0030	1.58E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
187	0.00	0.000	0.062	0.3090	0.0002	0.0075	3.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
188	0.02	0.000	0.049	0.3075	0.0002	0.0079	3.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
189	0.00	0.000	0.040	0.3056	0.0001	0.0067	3.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
190	0.00	0.000	0.035	0.3039	0.0001	0.0058	2.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
191	0.05	0.000	0.033	0.3045	0.0001	0.0050	2.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
192	0.52	0.000	0.030	0.3277	0.0001	0.0031	1.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
193	0.09	0.000	0.324	0.3167	0.0001	0.0045	2.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
194	0.00	0.000	0.027	0.3154	0.0001	0.0040	2.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
195	0.05	0.000	0.027	0.3163	0.0001	0.0037	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
196	0.17	0.000	0.026	0.3230	0.0000	0.0011	6.91E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
197	0.00	0.000	0.311	0.3081	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.35E-09	0.0000	0.0000	2.33E-09
198	0.00	0.000	0.023	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	7.46E-10
199	0.03	0.000	0.023	0.3070	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
200	0.02	0.000	0.022	0.3067	0.0000	0.0004	4.55E-09	0.0000	0.0000	3.07E-09	0.0000	0.0000	2.15E-09
201	0.15	0.000	0.022	0.3126	0.0000	0.0012	8.53E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
202	0.00	0.000	0.020	0.3116	0.0001	0.0036	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
203	0.00	0.000	0.019	0.3107	0.0001	0.0051	2.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
204	0.02	0.000	0.020	0.3109	0.0001	0.0046	2.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
205	0.00	0.000	0.018	0.3101	0.0001	0.0039	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
206	0.00	0.000	0.017	0.3092	0.0001	0.0038	1.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
207	0.10	0.000	0.018	0.3131	0.0001	0.0025	1.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

208	0.00	0.000	0.018	0.3125	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.82E-09	0.0000	0.0000	4.43E-09
209	0.00	0.000	0.016	0.3117	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.00	0.000	0.016	0.3109	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.01	0.000	0.017	0.3105	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
212	0.15	0.000	0.017	0.3170	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
213	0.14	0.000	0.016	0.3228	0.0000	0.0000	2.45E-10	0.0000	0.0000	2.42E-10	0.0000	0.0000	2.40E-10
214	0.46	0.011	0.109	0.3391	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
215	0.00	0.000	0.161	0.3314	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.118	0.3258	0.0000	0.0004	2.22E-09	0.0000	0.0000	2.05E-09	0.0000	0.0000	1.91E-09
217	0.00	0.000	0.229	0.3149	0.0000	0.0003	2.18E-09	0.0000	0.0000	2.02E-09	0.0000	0.0000	1.88E-09
218	0.00	0.000	0.149	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
219	0.00	0.000	0.062	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
220	0.94	0.066	0.049	0.3441	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
221	0.01	0.000	0.287	0.3308	0.0000	0.0001	4.79E-10	0.0000	0.0000	4.71E-10	0.0000	0.0000	4.63E-10
222	0.00	0.000	0.135	0.3244	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
223	0.00	0.000	0.288	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
224	0.02	0.000	0.120	0.3061	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
225	0.01	0.000	0.063	0.3034	0.0000	0.0000	6.09E-10	0.0000	0.0000	5.96E-10	0.0000	0.0000	5.83E-10
226	0.02	0.000	0.049	0.3020	0.0000	0.0004	3.75E-09	0.0000	0.0000	3.30E-09	0.0000	0.0000	2.95E-09
227	0.10	0.000	0.042	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
228	0.01	0.000	0.037	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
229	0.69	0.015	0.034	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
230	0.00	0.000	0.265	0.3215	0.0000	0.0003	1.92E-09	0.0000	0.0000	1.80E-09	0.0000	0.0000	1.69E-09
231	0.00	0.000	0.250	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
232	0.00	0.000	0.149	0.3025	0.0000	0.0002	8.28E-10	0.0000	0.0000	8.04E-10	0.0000	0.0000	7.81E-10
233	0.00	0.000	0.062	0.2996	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
234	0.00	0.000	0.048	0.2973	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
235	0.00	0.000	0.040	0.2954	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
236	0.00	0.000	0.035	0.2938	0.0000	0.0003	1.65E-09	0.0000	0.0000	1.56E-09	0.0000	0.0000	1.47E-09
237	0.00	0.000	0.032	0.2922	0.0000	0.0003	2.15E-09	0.0000	0.0000	2.00E-09	0.0000	0.0000	1.86E-09
238	0.00	0.000	0.029	0.2908	0.0000	0.0003	2.17E-09	0.0000	0.0000	2.01E-09	0.0000	0.0000	1.87E-09
239	0.00	0.000	0.027	0.2895	0.0000	0.0003	2.04E-09	0.0000	0.0000	1.90E-09	0.0000	0.0000	1.77E-09
240	0.07	0.000	0.028	0.2916	0.0000	0.0003	2.30E-09	0.0000	0.0000	2.12E-09	0.0000	0.0000	1.97E-09
241	0.26	0.000	0.026	0.3028	0.0000	0.0003	2.30E-09	0.0000	0.0000	2.12E-09	0.0000	0.0000	1.97E-09
242	0.17	0.000	0.025	0.3098	0.0000	0.0003	2.00E-09	0.0000	0.0000	1.87E-09	0.0000	0.0000	1.75E-09
243	0.06	0.000	0.024	0.3113	0.0000	0.0001	9.51E-10	0.0000	0.0000	9.19E-10	0.0000	0.0000	8.90E-10
244	0.00	0.000	0.021	0.3103	0.0000	0.0001	1.11E-09	0.0000	0.0000	1.07E-09	0.0000	0.0000	1.03E-09
245	0.00	0.000	0.020	0.3094	0.0000	0.0001	1.18E-09	0.0000	0.0000	1.13E-09	0.0000	0.0000	1.09E-09
246	0.00	0.000	0.020	0.3084	0.0000	0.0001	1.40E-09	0.0000	0.0000	1.33E-09	0.0000	0.0000	1.27E-09
247	0.00	0.000	0.019	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
248	0.21	0.000	0.020	0.3167	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.00	0.000	0.018	0.3159	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.00	0.000	0.017	0.3151	0.0000	0.0000	1.48E-10	0.0000	0.0000	1.47E-10	0.0000	0.0000	1.46E-10

251		0.06	0.000	0.019	0.3169	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
252		0.00	0.000	0.016	0.3161	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
253		0.01	0.000	0.018	0.3158	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
254		0.00	0.000	0.016	0.3150	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
255		0.12	0.000	0.018	0.3198	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
256		0.00	0.000	0.126	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
257		0.00	0.000	0.015	0.3131	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
258		0.00	0.000	0.015	0.3124	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
259		0.00	0.000	0.014	0.3117	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
260		0.00	0.000	0.014	0.3110	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261		0.00	0.000	0.014	0.3104	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262		0.00	0.000	0.014	0.3097	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
263		0.00	0.000	0.013	0.3091	0.0000	0.0001	1.23E-09	0.0000	0.0000	1.18E-09	0.0000	0.0000	1.13E-09
264		0.00	0.000	0.013	0.3084	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
265		0.00	0.000	0.013	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
266		0.00	0.000	0.013	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
267		0.00	0.000	0.013	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
268		0.00	0.000	0.012	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
269	*	0.01	0.000	0.021	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
270		0.00	0.000	0.012	0.3048	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
271		0.97	0.095	0.014	0.3459	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
272		0.00	0.000	0.098	0.3412	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
273		0.00	0.000	0.128	0.3351	0.0000	0.0001	3.69E-10	0.0000	0.0000	3.65E-10	0.0000	0.0000	3.60E-10
274		0.09	0.000	0.229	0.3283	0.0000	0.0003	1.43E-09	0.0000	0.0000	1.36E-09	0.0000	0.0000	1.30E-09
275		0.45	0.003	0.198	0.3400	0.0000	0.0001	5.29E-10	0.0000	0.0000	5.19E-10	0.0000	0.0000	5.09E-10
276		0.00	0.000	0.149	0.3329	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
277		0.00	0.000	0.158	0.3254	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
278		0.00	0.000	0.187	0.3165	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
279		0.00	0.000	0.116	0.3110	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
280		0.00	0.000	0.062	0.3081	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
281		0.22	0.000	0.050	0.3161	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
282		0.00	0.000	0.040	0.3142	0.0000	0.0003	1.97E-09	0.0000	0.0000	1.84E-09	0.0000	0.0000	1.72E-09
283		0.06	0.000	0.038	0.3154	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
284		0.00	0.000	0.032	0.3139	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
285		0.00	0.000	0.029	0.3125	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
286		0.00	0.000	0.027	0.3112	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
287		0.00	0.000	0.026	0.3100	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
288		0.00	0.000	0.024	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
289		0.00	0.000	0.023	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
290	*	0.00	0.000	0.000	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
291		0.00	0.000	0.022	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
292		0.00	0.000	0.021	0.3057	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
293	*	0.13	0.000	0.047	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

294		0.00	0.000	0.088	0.3057	0.0000	0.0003	2.50E-09	0.0000	0.0000	2.29E-09	0.0000	0.0000	2.11E-09
295		0.58	0.003	0.022	0.3319	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
296		0.00	0.000	0.137	0.3254	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
297		0.70	0.063	0.123	0.3500	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
298		0.00	0.000	0.228	0.3392	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
299		0.00	0.000	0.276	0.3260	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
300		0.00	0.000	0.215	0.3158	0.0000	0.0002	8.56E-10	0.0000	0.0000	8.30E-10	0.0000	0.0000	8.05E-10
301		0.00	0.000	0.126	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
302		0.00	0.000	0.062	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
303		0.00	0.000	0.047	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
304		0.00	0.000	0.040	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
305		0.04	0.000	0.037	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
306		0.00	0.000	0.032	0.3011	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
307		0.00	0.000	0.029	0.2998	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
308		0.00	0.000	0.027	0.2985	0.0000	0.0003	2.22E-09	0.0000	0.0000	2.05E-09	0.0000	0.0000	1.91E-09
309		0.07	0.000	0.027	0.3007	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
310		0.13	0.000	0.025	0.3057	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
311		0.00	0.000	0.023	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
312		0.00	0.000	0.022	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
313		0.00	0.000	0.021	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
314		0.00	0.000	0.020	0.3016	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
315		0.00	0.000	0.020	0.3007	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
316		0.00	0.000	0.019	0.2998	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
317	*	0.21	0.000	0.034	0.3007	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
318	*	0.00	0.000	0.019	0.3017	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
319	*	0.00	0.000	0.036	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
320	*	0.00	0.000	0.034	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
321	*	0.04	0.000	0.036	0.3041	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
322	*	0.00	0.000	0.001	0.3041	0.0000	0.0000	5.03E-10	0.0000	0.0000	4.94E-10	0.0000	0.0000	4.85E-10
323	*	0.38	0.000	0.009	0.3050	0.0000	0.0003	4.72E-09	0.0000	0.0000	3.17E-09	0.0000	0.0000	2.84E-09
324	*	0.14	0.000	0.013	0.3057	0.0000	0.0000	4.80E-10	0.0000	0.0000	1.34E-09	0.0000	0.0000	1.28E-09
325	*	0.00	0.000	0.016	0.3065	0.0000	0.0003	4.52E-09	0.0000	0.0000	4.28E-09	0.0000	0.0000	2.91E-09
326	*	0.00	0.000	0.019	0.3074	0.0001	0.0037	1.87E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.97E-09
327	*	0.00	0.000	0.031	0.3084	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.042	0.3224	0.0000	0.0000	1.16E-10	0.0000	0.0000	5.76E-09	0.0000	0.0000	4.97E-09
329		0.00	0.000	0.097	0.3177	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	3.37E-10
330		0.00	0.000	0.018	0.3169	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
331		0.00	0.000	0.018	0.3160	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
332		0.00	0.000	0.017	0.3152	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
333		0.16	0.000	0.018	0.3218	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
334		0.95	0.146	0.054	0.3574	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
335		0.00	0.000	0.090	0.3531	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
336	*	0.00	0.000	0.044	0.3511	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

337		0.22	0.000	0.085	0.3575	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
338		0.03	0.000	0.065	0.3557	0.0000	0.0003	1.42E-09	0.0000	0.0000	1.35E-09	0.0000	0.0000	1.29E-09
339		0.35	0.006	0.055	0.3695	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
340	*	0.00	0.000	0.040	0.3676	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
341		0.00	0.000	0.049	0.3648	0.0000	0.0012	6.06E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
342		0.00	0.000	0.090	0.3605	0.0001	0.0037	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.00	0.000	0.130	0.3521	0.0000	0.0002	9.31E-10	0.0000	0.0000	5.44E-09	0.0000	0.0000	5.07E-09
344		0.00	0.000	0.117	0.3437	0.0000	0.0000	1.79E-10	0.0000	0.0000	1.78E-10	0.0000	0.0000	3.00E-10
345		0.12	0.000	0.085	0.3430	0.0004	0.0189	7.23E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.69E-09
346	*	0.04	0.000	0.040	0.3414	0.0008	0.0356	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
347		0.00	0.000	0.053	0.3372	0.0007	0.0309	1.15E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348	*	0.00	0.000	0.000	0.3355	0.0008	0.0357	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349	*	0.00	0.000	0.044	0.3318	0.0008	0.0363	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.00	0.000	0.084	0.3263	0.0007	0.0317	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351	*	0.00	0.000	0.044	0.3232	0.0007	0.0352	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.00	0.000	0.081	0.3185	0.0006	0.0274	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.081	0.3139	0.0005	0.0223	8.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.00	0.000	0.090	0.3089	0.0004	0.0210	8.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.41	0.000	0.075	0.3241	0.0003	0.0160	6.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		0.02	0.000	0.061	0.3214	0.0003	0.0142	5.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.27	0.000	0.049	0.3313	0.0004	0.0167	6.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*	0.18	0.000	0.018	0.3316	0.0004	0.0169	6.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	0.01	0.000	0.027	0.3319	0.0004	0.0171	6.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*	0.00	0.000	0.027	0.3323	0.0003	0.0159	6.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361	*	0.00	0.000	0.012	0.3328	0.0003	0.0147	5.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.00	0.000	0.050	0.3310	0.0003	0.0136	5.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363	*	0.00	0.000	0.000	0.3306	0.0003	0.0117	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364	*	0.00	0.000	0.000	0.3301	0.0002	0.0097	4.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365	*	0.00	0.000	0.000	0.3297	0.0002	0.0104	4.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 18			
	inches	cubic feet	percent
Precipitation	33.29	120,833.9	100.00
Runoff	2.251	8,169.4	6.76
Evapotranspiration	28.701	104,185.5	86.22
Drainage Collected from Layer 2	2.3711	8,607.2	7.12
Percolation/Leakage through Layer 3	0.000009	0.0330	0.00
Average Head on Top of Layer 3	0.0001	---	---
Drainage Collected from Layer 7	0.0000	0.0293	0.00
Percolation/Leakage through Layer 8	0.000001	0.0037	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0036	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-0.0354	-128.4	-0.11
Soil Water at Start of Year	256.6765	931,735.8	771.09
Soil Water at End of Year	256.6412	931,607.4	770.98
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 19

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*		0.00	0.000	0.000	0.3293	0.0002	0.0108	4.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2	*	*	0.00	0.000	0.000	0.3293	0.0003	0.0149	6.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3	*	*	0.03	0.000	0.004	0.3293	0.0002	0.0113	4.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4	*	*	0.00	0.000	0.004	0.3293	0.0002	0.0090	3.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5	*	*	0.00	0.000	0.003	0.3293	0.0002	0.0075	3.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6	*	*	0.00	0.000	0.013	0.3293	0.0001	0.0064	2.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7	*	*	0.00	0.000	0.005	0.3293	0.0001	0.0056	2.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8		*	0.00	0.000	0.000	0.3293	0.0001	0.0049	2.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9		*	0.06	0.000	0.001	0.3323	0.0001	0.0044	2.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10		*	0.05	0.000	0.001	0.3347	0.0001	0.0040	2.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*	*	0.07	0.000	0.041	0.3347	0.0001	0.0036	1.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*	*	0.09	0.000	0.036	0.3347	0.0000	0.0008	4.20E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*	*	0.20	0.000	0.024	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.69E-09	0.0000	0.0000	1.64E-09
14	*	*	0.00	0.000	0.011	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
15	*	*	0.00	0.000	0.023	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
16	*	*	0.00	0.000	0.012	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
17	*	*	0.00	0.000	0.007	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
18	*	*	0.00	0.000	0.033	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
19	*	*	0.00	0.000	0.021	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
20	*	*	0.00	0.000	0.037	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
21	*	*	0.06	0.000	0.000	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
22		*	0.42	0.374	0.004	0.3453	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
23		*	0.06	0.003	0.001	0.3480	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
24		*	0.01	0.000	0.001	0.3483	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
25		*	0.04	0.000	0.001	0.3500	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
26	*	*	0.19	0.000	0.037	0.3500	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
27	*	*	0.08	0.000	0.013	0.3500	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
28	*	*	0.09	0.000	0.006	0.3500	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
29	*	*	0.00	0.000	0.032	0.3500	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
30		*	0.00	0.143	0.071	0.3525	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
31		*	0.93	0.778	0.001	0.3597	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
32		*	0.03	0.000	0.001	0.3609	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
33		*	0.08	0.019	0.001	0.3636	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
34	*	*	0.44	0.000	0.029	0.3636	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
35		*	0.07	0.373	0.027	0.3670	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

36		*	0.10	0.043	0.001	0.3699	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
37		*	0.07	0.025	0.001	0.3723	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
38			0.16	0.010	0.134	0.3725	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
39			0.01	0.000	0.134	0.3664	0.0001	0.0029	1.44E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
40			0.00	0.000	0.105	0.3614	0.0001	0.0042	2.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41			0.01	0.000	0.089	0.3564	0.0000	0.0011	5.28E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42	*		0.00	0.000	0.000	0.3535	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.98E-09	0.0000	0.0000	1.53E-09
43	*		0.00	0.000	0.000	0.3511	0.0002	0.0077	3.23E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	5.03E-09
44	*		0.00	0.000	0.050	0.3465	0.0008	0.0380	1.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
45	*		0.00	0.000	0.000	0.3442	0.0010	0.0465	1.64E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46			0.00	0.000	0.098	0.3377	0.0010	0.0461	1.64E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47			0.00	0.000	0.119	0.3304	0.0009	0.0413	1.51E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48			0.00	0.000	0.134	0.3227	0.0008	0.0368	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49			0.00	0.000	0.140	0.3153	0.0007	0.0333	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50	*		0.00	0.000	0.072	0.3112	0.0004	0.0209	8.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51			0.00	0.000	0.062	0.3073	0.0003	0.0165	6.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52			0.00	0.000	0.047	0.3042	0.0004	0.0192	7.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53			0.00	0.000	0.040	0.3015	0.0004	0.0181	7.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54			0.17	0.000	0.036	0.3071	0.0004	0.0176	6.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55			0.00	0.000	0.032	0.3048	0.0004	0.0190	7.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56			0.00	0.000	0.029	0.3026	0.0004	0.0184	7.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57			0.00	0.000	0.027	0.3007	0.0004	0.0195	7.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58			0.00	0.000	0.026	0.2989	0.0004	0.0172	6.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59			0.33	0.000	0.025	0.3130	0.0003	0.0154	6.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60			0.39	0.000	0.068	0.3279	0.0003	0.0135	5.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61			0.44	0.009	0.112	0.3426	0.0002	0.0079	3.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62			0.00	0.000	0.137	0.3355	0.0002	0.0112	4.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63			0.00	0.000	0.103	0.3301	0.0003	0.0137	5.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64			0.21	0.000	0.219	0.3291	0.0003	0.0136	5.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65			0.00	0.000	0.111	0.3235	0.0002	0.0115	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66			0.00	0.000	0.169	0.3154	0.0003	0.0150	6.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67			0.08	0.000	0.132	0.3131	0.0002	0.0116	4.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68	*		0.04	0.000	0.059	0.3120	0.0002	0.0092	4.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69	*		0.52	0.000	0.021	0.3130	0.0002	0.0071	3.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70	*		0.00	0.000	0.024	0.3139	0.0001	0.0062	2.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71			0.00	0.000	0.016	0.3336	0.0001	0.0053	2.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72			0.70	0.106	0.205	0.3523	0.0001	0.0054	2.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73			0.00	0.000	0.265	0.3397	0.0001	0.0048	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.08	0.000	0.087	0.3394	0.0001	0.0043	2.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.34	0.000	0.112	0.3501	0.0001	0.0035	1.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.34	0.011	0.142	0.3588	0.0001	0.0036	1.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.00	0.000	0.140	0.3522	0.0000	0.0007	3.94E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.07	0.000	0.322	0.3399	0.0000	0.0005	2.49E-09	0.0000	0.0000	3.76E-09	0.0000	0.0000	2.59E-09

79	0.00	0.000	0.175	0.3316	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	8.27E-10
80	1.24	0.230	0.090	0.3754	0.0000	0.0001	1.05E-09	0.0000	0.0000	1.01E-09	0.0000	0.0000	9.96E-10
81	0.09	0.000	0.134	0.3731	0.0000	0.0002	8.35E-10	0.0000	0.0000	8.10E-10	0.0000	0.0000	7.87E-10
82	0.03	0.000	0.230	0.3634	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
83	0.00	0.000	0.233	0.3507	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
84	0.00	0.000	0.228	0.3370	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
85	0.00	0.000	0.132	0.3286	0.0002	0.0081	3.40E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
86	0.00	0.000	0.149	0.3197	0.0005	0.0255	9.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87	0.00	0.000	0.062	0.3148	0.0008	0.0400	1.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88	0.22	0.000	0.048	0.3215	0.0009	0.0419	1.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89	0.09	0.000	0.040	0.3227	0.0007	0.0324	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90	1.11	0.142	0.035	0.3665	0.0006	0.0280	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91	0.00	0.000	0.309	0.3513	0.0005	0.0230	8.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92	0.42	0.007	0.213	0.3602	0.0003	0.0133	5.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93	0.62	0.113	0.092	0.3791	0.0003	0.0099	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94	0.00	0.000	0.262	0.3657	0.0003	0.0129	5.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95	0.38	0.007	0.089	0.3792	0.0006	0.0271	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96	0.00	0.000	0.140	0.3700	0.0001	0.0024	1.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97	0.00	0.000	0.121	0.3594	0.0011	0.0521	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98	0.00	0.000	0.295	0.3436	0.0016	0.0724	2.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99	0.00	0.000	0.224	0.3309	0.0010	0.0467	1.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100	0.00	0.000	0.143	0.3231	0.0009	0.0407	1.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101	0.03	0.000	0.130	0.3170	0.0005	0.0256	9.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102	0.00	0.000	0.062	0.3125	0.0005	0.0234	8.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103	0.00	0.000	0.047	0.3086	0.0006	0.0306	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104	0.07	0.000	0.040	0.3084	0.0007	0.0343	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105	0.09	0.000	0.035	0.3099	0.0007	0.0321	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106	0.08	0.000	0.032	0.3111	0.0006	0.0286	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107	0.00	0.000	0.029	0.3089	0.0006	0.0262	9.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108	0.12	0.000	0.027	0.3126	0.0004	0.0210	8.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109	0.02	0.000	0.026	0.3116	0.0004	0.0185	7.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110	1.10	0.136	0.024	0.3555	0.0004	0.0181	7.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111	0.21	0.001	0.150	0.3576	0.0004	0.0170	6.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112	0.00	0.000	0.366	0.3391	0.0002	0.0109	4.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113	0.00	0.000	0.242	0.3267	0.0004	0.0188	7.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114	0.00	0.000	0.162	0.3185	0.0005	0.0219	8.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115	0.03	0.000	0.253	0.3072	0.0003	0.0154	6.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116	0.05	0.000	0.149	0.3020	0.0004	0.0173	6.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117	0.00	0.000	0.062	0.2990	0.0004	0.0171	6.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118	0.00	0.000	0.047	0.2968	0.0003	0.0124	5.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119	0.00	0.000	0.040	0.2949	0.0002	0.0097	4.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120	0.00	0.000	0.035	0.2931	0.0001	0.0059	2.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121	0.35	0.000	0.032	0.3083	0.0001	0.0058	2.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	0.33	0.000	0.030	0.3225	0.0001	0.0066	3.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123	0.68	0.059	0.447	0.3305	0.0001	0.0052	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124	1.16	0.341	0.362	0.3524	0.0001	0.0056	2.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125	0.00	0.000	0.310	0.3376	0.0001	0.0048	2.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126	0.00	0.000	0.206	0.3278	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127	0.02	0.000	0.199	0.3191	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128	0.14	0.000	0.321	0.3105	0.0001	0.0037	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129	0.00	0.000	0.149	0.3034	0.0000	0.0014	7.40E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130	0.00	0.000	0.062	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.02E-09	0.0000	0.0000	2.11E-09
131	0.00	0.000	0.044	0.2984	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.79E-10
132	0.00	0.000	0.040	0.2965	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
133	0.00	0.000	0.035	0.2948	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134	0.01	0.000	0.032	0.2936	0.0000	0.0006	3.77E-09	0.0000	0.0000	3.31E-09	0.0000	0.0000	2.95E-09
135	0.00	0.000	0.029	0.2922	0.0000	0.0001	9.17E-10	0.0000	0.0000	8.87E-10	0.0000	0.0000	8.60E-10
136	0.15	0.000	0.028	0.2979	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
137	0.02	0.000	0.026	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138	0.75	0.019	0.025	0.3309	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.34	0.002	0.284	0.3334	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140	0.41	0.014	0.144	0.3454	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141	0.16	0.000	0.394	0.3345	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142	0.00	0.000	0.295	0.3204	0.0000	0.0011	6.07E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
143	0.82	0.074	0.127	0.3500	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.16E-10	0.0000	0.0000	1.23E-09
144	0.02	0.000	0.235	0.3398	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.35E-11
145	0.05	0.000	0.329	0.3264	0.0000	0.0001	6.65E-10	0.0000	0.0000	6.49E-10	0.0000	0.0000	6.34E-10
146	0.02	0.000	0.135	0.3207	0.0000	0.0000	2.55E-10	0.0000	0.0000	2.53E-10	0.0000	0.0000	2.51E-10
147	0.00	0.000	0.187	0.3118	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
148	0.06	0.000	0.150	0.3073	0.0000	0.0001	1.07E-09	0.0000	0.0000	1.03E-09	0.0000	0.0000	9.92E-10
149	0.03	0.000	0.062	0.3060	0.0000	0.0001	6.13E-10	0.0000	0.0000	5.99E-10	0.0000	0.0000	5.87E-10
150	0.00	0.000	0.047	0.3037	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
151	0.00	0.000	0.040	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
152	0.01	0.000	0.036	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.00	0.000	0.032	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154	0.00	0.000	0.029	0.2975	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
155	0.20	0.000	0.028	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156	0.26	0.000	0.026	0.3169	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157	0.28	0.000	0.357	0.3135	0.0000	0.0001	8.89E-10	0.0000	0.0000	8.61E-10	0.0000	0.0000	8.35E-10
158	1.10	0.219	0.025	0.3545	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
159	0.00	0.000	0.162	0.3468	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160	0.18	0.000	0.179	0.3470	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161	0.00	0.000	0.401	0.3279	0.0000	0.0007	3.92E-09	0.0000	0.0000	2.70E-09	0.0000	0.0000	2.45E-09
162	0.03	0.000	0.391	0.3107	0.0000	0.0016	8.23E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
163	0.03	0.000	0.150	0.3052	0.0000	0.0014	7.24E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
164	0.00	0.000	0.062	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.44E-10	0.0000	0.0000	6.93E-10

165	0.00	0.000	0.047	0.3000	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.57E-10
166	0.10	0.000	0.041	0.3030	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.00	0.000	0.035	0.3013	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.00	0.000	0.032	0.2998	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.09	0.000	0.030	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
170	0.00	0.000	0.027	0.3014	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.06	0.000	0.026	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.18	0.000	0.025	0.3103	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.03	0.000	0.024	0.3103	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.00	0.000	0.022	0.3093	0.0000	0.0002	1.65E-09	0.0000	0.0000	1.56E-09	0.0000	0.0000	1.47E-09
175	0.02	0.000	0.022	0.3091	0.0000	0.0001	1.35E-09	0.0000	0.0000	1.29E-09	0.0000	0.0000	1.23E-09
176	0.02	0.000	0.021	0.3091	0.0000	0.0006	4.02E-09	0.0000	0.0000	2.76E-09	0.0000	0.0000	2.51E-09
177	0.14	0.000	0.021	0.3147	0.0000	0.0006	5.62E-09	0.0000	0.0000	4.85E-09	0.0000	0.0000	3.24E-09
178	0.00	0.000	0.019	0.3136	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.17E-09	0.0000	0.0000	1.84E-09
179	0.06	0.000	0.019	0.3155	0.0000	0.0000	1.31E-10	0.0000	0.0000	1.30E-10	0.0000	0.0000	4.08E-10
180	0.00	0.000	0.018	0.3144	0.0000	0.0004	7.22E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
181	0.13	0.000	0.018	0.3197	0.0001	0.0036	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
182	0.07	0.000	0.134	0.3168	0.0001	0.0043	2.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
183	0.44	0.002	0.299	0.3234	0.0001	0.0039	1.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
184	0.00	0.000	0.268	0.3106	0.0001	0.0032	1.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
185	0.24	0.000	0.150	0.3151	0.0000	0.0000	1.09E-10	0.0000	0.0000	5.75E-09	0.0000	0.0000	4.85E-09
186	0.81	0.093	0.063	0.3465	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.45E-16	0.0000	0.0000	3.32E-10
187	0.25	0.005	0.114	0.3528	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.00	0.000	0.252	0.3408	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.00	0.000	0.255	0.3286	0.0000	0.0005	2.78E-09	0.0000	0.0000	2.52E-09	0.0000	0.0000	2.31E-09
190	1.12	0.187	0.279	0.3597	0.0000	0.0003	1.65E-09	0.0000	0.0000	1.55E-09	0.0000	0.0000	1.47E-09
191	0.08	0.000	0.278	0.3502	0.0000	0.0002	1.08E-09	0.0000	0.0000	1.04E-09	0.0000	0.0000	1.00E-09
192	0.07	0.000	0.273	0.3406	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
193	0.00	0.000	0.252	0.3288	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	0.18	0.000	0.240	0.3260	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.00	0.000	0.188	0.3170	0.0000	0.0002	1.42E-09	0.0000	0.0000	1.35E-09	0.0000	0.0000	1.29E-09
196	0.00	0.000	0.149	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
197	0.00	0.000	0.062	0.3070	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.00	0.000	0.044	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.22	0.000	0.041	0.3132	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.58	0.004	0.037	0.3387	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	1.81	0.815	0.300	0.3718	0.0000	0.0018	1.13E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
202	0.07	0.000	0.139	0.3682	0.0000	0.0001	8.87E-10	0.0000	0.0000	3.26E-09	0.0000	0.0000	3.39E-09
203	0.00	0.000	0.296	0.3541	0.0001	0.0034	1.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
204	0.24	0.000	0.137	0.3590	0.0000	0.0006	3.23E-09	0.0000	0.0000	6.77E-09	0.0000	0.0000	6.80E-09
205	0.14	0.000	0.132	0.3582	0.0000	0.0003	1.38E-09	0.0000	0.0000	1.31E-09	0.0000	0.0000	1.01E-09
206	0.00	0.000	0.218	0.3460	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	3.13E-10
207	0.06	0.000	0.130	0.3413	0.0000	0.0018	7.95E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09

208	0.00	0.000	0.275	0.3268	0.0001	0.0041	1.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
209	0.00	0.000	0.149	0.3178	0.0004	0.0200	7.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
210	0.83	0.043	0.063	0.3513	0.0007	0.0340	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
211	0.00	0.000	0.198	0.3409	0.0005	0.0236	9.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
212	0.00	0.000	0.178	0.3319	0.0005	0.0242	9.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
213	0.14	0.000	0.356	0.3207	0.0003	0.0153	6.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
214	0.00	0.000	0.151	0.3127	0.0004	0.0165	6.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
215	0.06	0.000	0.063	0.3115	0.0004	0.0191	7.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
216	0.23	0.000	0.049	0.3191	0.0005	0.0229	8.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
217	0.68	0.032	0.163	0.3417	0.0004	0.0190	7.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
218	0.01	0.000	0.262	0.3289	0.0004	0.0169	6.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
219	0.01	0.000	0.309	0.3142	0.0004	0.0173	6.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
220	0.00	0.000	0.149	0.3071	0.0005	0.0218	8.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
221	0.00	0.000	0.062	0.3041	0.0003	0.0136	5.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
222	0.00	0.000	0.047	0.3019	0.0002	0.0117	4.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
223	0.00	0.000	0.040	0.3000	0.0002	0.0092	4.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
224	0.00	0.000	0.035	0.2983	0.0002	0.0076	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
225	0.00	0.000	0.032	0.2968	0.0001	0.0065	2.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
226	0.00	0.000	0.029	0.2954	0.0001	0.0056	2.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
227	0.00	0.000	0.027	0.2941	0.0001	0.0050	2.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
228	0.00	0.000	0.026	0.2929	0.0001	0.0045	2.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
229	0.02	0.000	0.026	0.2925	0.0001	0.0040	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
230	0.00	0.000	0.023	0.2914	0.0001	0.0037	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
231	0.00	0.000	0.024	0.2905	0.0000	0.0013	6.82E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
232	0.02	0.000	0.023	0.2904	0.0000	0.0008	5.63E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
233	0.00	0.000	0.020	0.2894	0.0000	0.0008	6.58E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
234	0.00	0.000	0.020	0.2885	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.81E-12	0.0000	0.0000	5.81E-12
235	0.00	0.000	0.019	0.2876	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
236	0.00	0.000	0.020	0.2868	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.00	0.000	0.018	0.2859	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	0.00	0.000	0.017	0.2851	0.0000	0.0001	3.41E-10	0.0000	0.0000	3.37E-10	0.0000	0.0000	3.33E-10
239	0.00	0.000	0.017	0.2843	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
240	0.11	0.000	0.018	0.2888	0.0000	0.0008	5.32E-09	0.0000	0.0000	4.81E-09	0.0000	0.0000	3.22E-09
241	0.12	0.000	0.018	0.2937	0.0000	0.0002	1.20E-09	0.0000	0.0000	1.15E-09	0.0000	0.0000	1.82E-09
242	0.00	0.000	0.016	0.2929	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.75E-10
243	0.30	0.000	0.017	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
244	0.01	0.000	0.017	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
245	0.00	0.000	0.016	0.3052	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
246	0.20	0.000	0.017	0.3140	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	0.00	0.000	0.014	0.3133	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
248	0.00	0.000	0.014	0.3127	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.00	0.000	0.014	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.03	0.000	0.016	0.3128	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

251		0.42	0.000	0.015	0.3322	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
252		0.38	0.012	0.175	0.3412	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
253		0.02	0.000	0.234	0.3312	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
254		0.01	0.000	0.180	0.3231	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
255		0.54	0.012	0.086	0.3442	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
256		1.29	0.557	0.192	0.3701	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
257		0.00	0.000	0.143	0.3633	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
258		1.80	0.858	0.175	0.4000	0.0000	0.0001	4.53E-10	0.0000	0.0000	4.45E-10	0.0000	0.0000	4.38E-10
259		0.80	0.515	0.099	0.3987	0.0000	0.0013	6.52E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
260		0.00	0.000	0.078	0.3838	0.0045	0.2117	6.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261		0.01	0.000	0.094	0.3704	0.0044	0.2083	6.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.28	0.000	0.118	0.3721	0.0031	0.1459	4.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.00	0.000	0.092	0.3638	0.0023	0.1086	3.51E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.49	0.029	0.210	0.3729	0.0016	0.0637	2.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.09	0.000	0.143	0.3678	0.0015	0.0674	2.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.01	0.000	0.223	0.3552	0.0010	0.0452	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		1.19	0.321	0.092	0.3911	0.0012	0.0572	1.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.01	0.000	0.082	0.3855	0.0007	0.0311	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.71	0.152	0.169	0.3934	0.0040	0.1358	4.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.73	0.326	0.156	0.4003	0.0048	0.1532	4.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.125	0.3832	0.0035	0.1663	5.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.00	0.000	0.175	0.3650	0.0051	0.2387	7.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.01	0.000	0.076	0.3561	0.0031	0.1453	4.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		0.01	0.000	0.089	0.3488	0.0018	0.0851	2.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.25	0.000	0.202	0.3477	0.0015	0.0729	2.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.188	0.3365	0.0015	0.0695	2.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.325	0.3192	0.0010	0.0460	1.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.00	0.000	0.136	0.3121	0.0008	0.0389	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.00	0.000	0.062	0.3082	0.0005	0.0211	8.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		0.00	0.000	0.047	0.3049	0.0004	0.0203	7.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281		0.00	0.000	0.040	0.3020	0.0005	0.0239	9.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.00	0.000	0.035	0.2994	0.0005	0.0214	8.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283	*	0.02	0.000	0.048	0.2970	0.0004	0.0204	7.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.28	0.000	0.032	0.3082	0.0004	0.0207	8.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.027	0.3061	0.0004	0.0198	7.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.06	0.000	0.028	0.3068	0.0004	0.0183	7.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.00	0.000	0.026	0.3051	0.0004	0.0168	6.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.00	0.000	0.023	0.3034	0.0003	0.0143	5.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.00	0.000	0.022	0.3019	0.0003	0.0150	6.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.00	0.000	0.023	0.3006	0.0003	0.0143	5.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.00	0.000	0.020	0.2993	0.0002	0.0117	4.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.00	0.000	0.020	0.2980	0.0002	0.0108	4.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293	*	1.17	0.000	0.039	0.2985	0.0002	0.0086	3.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		2.43	2.401	0.000	0.3527	0.0002	0.0094	4.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.00	0.000	0.189	0.3432	0.0001	0.0059	2.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.00	0.000	0.106	0.3377	0.0002	0.0104	4.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.00	0.000	0.095	0.3330	0.0003	0.0126	5.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		0.00	0.000	0.131	0.3267	0.0003	0.0120	5.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.22	0.000	0.099	0.3327	0.0002	0.0100	4.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.01	0.000	0.130	0.3268	0.0002	0.0081	3.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.00	0.000	0.150	0.3196	0.0001	0.0069	3.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.75	0.032	0.100	0.3490	0.0001	0.0059	2.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.00	0.000	0.128	0.3428	0.0001	0.0032	1.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.18	0.000	0.083	0.3477	0.0001	0.0051	2.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305	*	0.04	0.000	0.044	0.3477	0.0001	0.0045	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306	*	0.01	0.000	0.010	0.3477	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307	*	0.02	0.000	0.048	0.3463	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308	*	0.00	0.000	0.000	0.3463	0.0000	0.0018	9.66E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309	*	0.00	0.000	0.000	0.3460	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.83E-09	0.0000	0.0000	2.64E-09
310		0.13	0.000	0.065	0.3487	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.41E-10
311	*	0.00	0.000	0.000	0.3486	0.0001	0.0026	1.42E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
312	*	0.00	0.000	0.000	0.3486	0.0001	0.0037	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313	*	0.00	0.000	0.000	0.3486	0.0001	0.0040	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314	*	0.00	0.000	0.000	0.3486	0.0001	0.0037	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315	*	0.00	0.000	0.000	0.3486	0.0000	0.0009	4.99E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316	*	0.00	0.000	0.000	0.3482	0.0000	0.0002	1.67E-09	0.0000	0.0000	3.77E-09	0.0000	0.0000	2.84E-09
317	*	0.00	0.000	0.043	0.3453	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	8.29E-10
318		0.00	0.000	0.064	0.3414	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
319		0.00	0.000	0.098	0.3362	0.0000	0.0009	4.27E-09	0.0000	0.0000	2.91E-09	0.0000	0.0000	2.63E-09
320		0.00	0.000	0.083	0.3314	0.0000	0.0007	4.09E-09	0.0000	0.0000	4.53E-09	0.0000	0.0000	4.19E-09
321		0.00	0.000	0.067	0.3272	0.0000	0.0021	1.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.00	0.000	0.073	0.3230	0.0003	0.0127	5.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.03	0.000	0.098	0.3191	0.0003	0.0138	5.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324	*	0.00	0.000	0.053	0.3165	0.0004	0.0205	7.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.00	0.000	0.092	0.3119	0.0002	0.0110	4.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.000	0.097	0.3067	0.0001	0.0045	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.00	0.000	0.049	0.3038	0.0002	0.0076	3.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.070	0.3001	0.0002	0.0116	4.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.30	0.000	0.063	0.3110	0.0002	0.0116	5.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.05	0.000	0.081	0.3092	0.0003	0.0127	5.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.11	0.000	0.130	0.3078	0.0002	0.0070	3.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.02	0.000	0.077	0.3044	0.0000	0.0024	1.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.07	0.000	0.079	0.3036	0.0002	0.0075	3.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.03	0.000	0.073	0.3013	0.0002	0.0077	3.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.04	0.000	0.061	0.2994	0.0001	0.0052	2.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.54	0.001	0.063	0.3214	0.0002	0.0101	4.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337		0.00	0.000	0.056	0.3183	0.0002	0.0116	5.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.00	0.000	0.069	0.3146	0.0002	0.0114	4.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339	*	0.07	0.000	0.035	0.3153	0.0003	0.0123	5.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340	*	0.00	0.000	0.042	0.3139	0.0002	0.0099	4.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.03	0.000	0.056	0.3127	0.0002	0.0091	3.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		0.00	0.000	0.064	0.3094	0.0002	0.0076	3.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.12	0.000	0.074	0.3114	0.0002	0.0110	4.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.00	0.000	0.120	0.3057	0.0002	0.0087	3.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345		0.00	0.000	0.175	0.2973	0.0002	0.0074	3.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346		0.03	0.000	0.150	0.2915	0.0001	0.0063	2.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347		0.00	0.000	0.062	0.2885	0.0001	0.0055	2.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.08	0.000	0.048	0.2902	0.0001	0.0049	2.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		0.02	0.000	0.041	0.2891	0.0001	0.0044	2.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.00	0.000	0.035	0.2874	0.0001	0.0037	1.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.00	0.000	0.032	0.2858	0.0001	0.0026	1.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.00	0.000	0.029	0.2845	0.0001	0.0035	1.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.027	0.2832	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.61E-09	0.0000	0.0000	4.80E-09
354		0.00	0.000	0.026	0.2819	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.60E-10
355		0.00	0.000	0.024	0.2808	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
356	*	0.00	0.000	0.000	0.2808	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
357	*	0.00	0.000	0.000	0.2808	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
358	*	0.02	0.000	0.042	0.2800	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
359	*	0.00	0.000	0.022	0.2789	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
360	*	0.00	0.000	0.000	0.2789	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
361	*	0.38	0.000	0.007	0.2798	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
362	*	0.00	0.000	0.020	0.2808	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
363		0.00	0.000	0.021	0.2946	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
364		0.00	0.000	0.021	0.2936	0.0000	0.0000	2.41E-10	0.0000	0.0000	2.39E-10	0.0000	0.0000	2.37E-10
365	*	0.30	0.000	0.019	0.2945	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14

* = Frozen (air or soil)

Annual Totals for Year 19			
	inches	cubic feet	percent
Precipitation	47.23	171,458.2	100.00
Runoff	9.654	35,043.9	20.44
Evapotranspiration	33.441	121,392.3	70.80
Drainage Collected from Layer 2	4.6947	17,041.7	9.94
Percolation/Leakage through Layer 3	0.000017	0.0620	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0565	0.00
Percolation/Leakage through Layer 8	0.000002	0.0057	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000002	0.0056	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-0.5564	-2,019.9	-1.18
Soil Water at Start of Year	256.6412	931,607.4	543.34
Soil Water at End of Year	255.8272	928,652.6	541.62
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.2575	934.9	0.55
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 20

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.032	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
2			0.00	0.000	0.109	0.3001	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
3	*		0.00	0.000	0.052	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
4	*		0.00	0.000	0.000	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
5	*		0.00	0.000	0.000	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
6	*		0.03	0.000	0.030	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
7	*		0.00	0.000	0.049	0.2953	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
8	*		0.06	0.000	0.026	0.2962	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
9			0.00	0.000	0.071	0.2935	0.0000	0.0006	4.00E-09	0.0000	0.0000	2.74E-09	0.0000	0.0000	2.49E-09
10	*		0.36	0.000	0.025	0.2945	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.72E-10	0.0000	0.0000	8.45E-10
11	*		0.03	0.000	0.024	0.2954	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
12	*		0.50	0.000	0.022	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
13			0.05	0.000	0.000	0.3081	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
14	*		0.00	0.000	0.023	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
15	*	*	0.00	0.000	0.034	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
16	*	*	0.37	0.000	0.018	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
17	*	*	0.00	0.000	0.031	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
18		*	0.80	0.530	0.000	0.3221	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
19		*	0.02	0.623	0.000	0.3318	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
20		*	0.00	0.000	0.000	0.3318	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
21		*	0.00	0.000	0.000	0.3318	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
22	*	*	0.00	0.000	0.000	0.3318	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
23	*	*	0.48	0.000	0.015	0.3318	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
24		*	1.37	1.657	0.000	0.3402	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
25		*	0.05	0.002	0.001	0.3424	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
26		*	0.19	0.086	0.001	0.3472	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
27		*	0.04	0.002	0.001	0.3491	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
28			0.00	0.000	0.126	0.3431	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
29			0.00	0.000	0.082	0.3392	0.0000	0.0001	5.96E-10	0.0000	0.0000	4.40E-10	0.0000	0.0000	4.33E-10
30			0.00	0.000	0.068	0.3359	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.46E-10	0.0000	0.0000	1.45E-10
31	*		0.04	0.000	0.057	0.3351	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
32	*		0.00	0.000	0.066	0.3320	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
33			0.00	0.000	0.120	0.3263	0.0000	0.0002	9.59E-10	0.0000	0.0000	9.27E-10	0.0000	0.0000	8.97E-10
34			0.00	0.000	0.128	0.3202	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
35			0.00	0.000	0.067	0.3170	0.0000	0.0002	1.48E-09	0.0000	0.0000	1.41E-09	0.0000	0.0000	1.34E-09

36				0.00	0.000	0.072	0.3136	0.0000	0.0002	1.53E-09	0.0000	0.0000	1.45E-09	0.0000	0.0000	1.38E-09
37	*			0.00	0.000	0.000	0.3136	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
38	*			0.53	0.000	0.011	0.3145	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
39				0.00	0.000	0.045	0.3155	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
40				0.00	0.000	0.010	0.3356	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
41				0.00	0.000	0.063	0.3327	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
42	*			0.00	0.000	0.067	0.3295	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
43				0.00	0.000	0.086	0.3254	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
44				0.00	0.000	0.094	0.3208	0.0000	0.0005	3.81E-09	0.0000	0.0000	3.34E-09	0.0000	0.0000	2.98E-09
45				0.00	0.000	0.103	0.3157	0.0000	0.0000	1.90E-10	0.0000	0.0000	1.89E-10	0.0000	0.0000	1.88E-10
46				0.00	0.000	0.117	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
47	*			0.00	0.000	0.065	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
48	*			0.23	0.000	0.015	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
49	*			0.06	0.000	0.032	0.3070	0.0000	0.0001	1.68E-09	0.0000	0.0000	1.58E-09	0.0000	0.0000	1.49E-09
50				0.33	0.000	0.011	0.3313	0.0000	0.0024	1.35E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
51	*			0.00	0.000	0.000	0.3310	0.0001	0.0047	2.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52	*			0.00	0.000	0.000	0.3307	0.0001	0.0059	2.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53	*			0.00	0.000	0.000	0.3304	0.0001	0.0066	3.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54	*			0.00	0.000	0.000	0.3302	0.0001	0.0068	3.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55	*	*		0.00	0.000	0.000	0.3302	0.0002	0.0103	4.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56	*	*		0.00	0.000	0.000	0.3302	0.0002	0.0083	3.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57	*	*		0.38	0.000	0.040	0.3302	0.0001	0.0070	3.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58		*		0.06	0.183	0.095	0.3359	0.0001	0.0060	2.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59		*		0.00	0.000	0.000	0.3359	0.0001	0.0053	2.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60		*		0.00	0.000	0.000	0.3359	0.0001	0.0047	2.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61		*		0.00	0.000	0.000	0.3359	0.0001	0.0042	2.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62		*		0.00	0.000	0.000	0.3359	0.0001	0.0038	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63		*		0.34	0.163	0.000	0.3445	0.0001	0.0030	1.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64				0.00	0.000	0.116	0.3385	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.44E-09	0.0000	0.0000	4.76E-09
65	*			0.00	0.000	0.058	0.3356	0.0000	0.0011	5.79E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.79E-09
66				0.05	0.000	0.072	0.3346	0.0001	0.0042	2.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
67				0.00	0.000	0.137	0.3281	0.0001	0.0038	1.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68				0.00	0.000	0.151	0.3209	0.0001	0.0027	1.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69				0.00	0.000	0.224	0.3103	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.86E-09	0.0000	0.0000	4.52E-09
70				0.00	0.000	0.201	0.3007	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
71				0.00	0.000	0.149	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
72				0.00	0.000	0.062	0.2907	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
73				0.00	0.000	0.047	0.2884	0.0000	0.0001	3.46E-10	0.0000	0.0000	3.42E-10	0.0000	0.0000	3.38E-10
74				0.00	0.000	0.040	0.2865	0.0000	0.0004	2.52E-09	0.0000	0.0000	2.31E-09	0.0000	0.0000	2.13E-09
75	*			0.14	0.000	0.067	0.2874	0.0000	0.0004	2.89E-09	0.0000	0.0000	2.62E-09	0.0000	0.0000	2.39E-09
76	*			0.34	0.000	0.020	0.2883	0.0000	0.0005	3.65E-09	0.0000	0.0000	3.22E-09	0.0000	0.0000	2.88E-09
77	*			0.00	0.000	0.014	0.2892	0.0000	0.0004	3.59E-09	0.0000	0.0000	3.18E-09	0.0000	0.0000	2.85E-09
78				0.11	0.000	0.009	0.3096	0.0000	0.0005	4.01E-09	0.0000	0.0000	2.75E-09	0.0000	0.0000	2.50E-09

79		0.04	0.000	0.209	0.3018	0.0000	0.0002	1.12E-09	0.0000	0.0000	1.65E-09	0.0000	0.0000	1.56E-09
80		0.38	0.000	0.036	0.3180	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.68E-10	0.0000	0.0000	2.65E-10
81		0.68	0.054	0.145	0.3408	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
82		0.03	0.000	0.169	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
83		0.00	0.000	0.160	0.3265	0.0000	0.0002	1.14E-09	0.0000	0.0000	1.09E-09	0.0000	0.0000	1.05E-09
84		0.03	0.000	0.146	0.3211	0.0000	0.0002	9.51E-10	0.0000	0.0000	9.20E-10	0.0000	0.0000	8.90E-10
85		0.00	0.000	0.193	0.3119	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
86		0.08	0.000	0.169	0.3075	0.0000	0.0003	1.86E-09	0.0000	0.0000	1.74E-09	0.0000	0.0000	1.63E-09
87		0.00	0.000	0.149	0.3004	0.0000	0.0002	1.43E-09	0.0000	0.0000	1.36E-09	0.0000	0.0000	1.29E-09
88	*	0.00	0.000	0.000	0.3004	0.0000	0.0004	3.94E-09	0.0000	0.0000	2.71E-09	0.0000	0.0000	2.46E-09
89		0.00	0.000	0.119	0.2947	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.61E-10	0.0000	0.0000	8.35E-10
90	*	0.00	0.000	0.000	0.2947	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
91		0.21	0.000	0.062	0.3019	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
92		0.89	0.058	0.048	0.3394	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
93		0.56	0.086	0.232	0.3508	0.0000	0.0001	8.55E-10	0.0000	0.0000	8.29E-10	0.0000	0.0000	8.05E-10
94		0.24	0.004	0.105	0.3568	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
95		0.01	0.000	0.142	0.3506	0.0000	0.0001	1.14E-09	0.0000	0.0000	1.10E-09	0.0000	0.0000	1.06E-09
96		0.00	0.000	0.114	0.3451	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
97		0.30	0.000	0.147	0.3524	0.0000	0.0003	2.32E-09	0.0000	0.0000	2.14E-09	0.0000	0.0000	1.98E-09
98		0.02	0.000	0.174	0.3449	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
99		0.01	0.000	0.323	0.3300	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
100		0.12	0.000	0.183	0.3271	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
101		0.07	0.000	0.199	0.3211	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
102		0.01	0.000	0.225	0.3109	0.0000	0.0005	3.86E-09	0.0000	0.0000	3.38E-09	0.0000	0.0000	3.01E-09
103		0.46	0.000	0.071	0.3292	0.0000	0.0003	1.80E-09	0.0000	0.0000	1.69E-09	0.0000	0.0000	1.59E-09
104		0.00	0.000	0.072	0.3258	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
105		0.43	0.001	0.123	0.3406	0.0000	0.0001	9.22E-10	0.0000	0.0000	8.92E-10	0.0000	0.0000	8.64E-10
106		0.03	0.000	0.082	0.3379	0.0000	0.0002	1.33E-09	0.0000	0.0000	1.27E-09	0.0000	0.0000	1.21E-09
107	*	0.00	0.000	0.065	0.3345	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
108	*	0.17	0.000	0.056	0.3350	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
109		0.01	0.000	0.106	0.3343	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
110		0.06	0.000	0.099	0.3322	0.0000	0.0005	3.92E-09	0.0000	0.0000	2.69E-09	0.0000	0.0000	2.45E-09
111		0.07	0.000	0.116	0.3294	0.0000	0.0000	2.73E-10	0.0000	0.0000	1.05E-09	0.0000	0.0000	1.01E-09
112		0.02	0.000	0.263	0.3173	0.0000	0.0005	3.72E-09	0.0000	0.0000	2.62E-09	0.0000	0.0000	2.39E-09
113		0.00	0.000	0.235	0.3056	0.0001	0.0047	2.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
114		0.00	0.000	0.149	0.2985	0.0003	0.0147	6.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		0.00	0.000	0.053	0.2959	0.0002	0.0111	4.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116		0.00	0.000	0.047	0.2937	0.0002	0.0091	3.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117		0.72	0.014	0.040	0.3255	0.0002	0.0075	3.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118	*	1.26	0.000	0.035	0.3264	0.0001	0.0064	2.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119	*	0.00	0.000	0.044	0.3274	0.0001	0.0056	2.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120		0.00	0.263	0.000	0.3691	0.0001	0.0049	2.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121		0.00	0.000	0.181	0.3604	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	0.00	0.000	0.284	0.3469	0.0001	0.0040	2.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123	0.00	0.000	0.228	0.3360	0.0001	0.0037	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124	0.00	0.000	0.147	0.3290	0.0000	0.0010	5.02E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125	0.00	0.000	0.149	0.3215	0.0000	0.0001	6.07E-10	0.0000	0.0000	2.53E-09	0.0000	0.0000	1.79E-09
126	0.00	0.000	0.062	0.3173	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.49E-10	0.0000	0.0000	6.87E-10
127	0.00	0.000	0.047	0.3134	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.69E-11
128	0.18	0.000	0.040	0.3183	0.0000	0.0001	1.53E-09	0.0000	0.0000	1.45E-09	0.0000	0.0000	1.38E-09
129	0.06	0.000	0.036	0.3179	0.0003	0.0139	5.67E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
130	0.01	0.000	0.032	0.3154	0.0005	0.0253	9.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
131	0.00	0.000	0.029	0.3130	0.0006	0.0268	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132	0.03	0.000	0.028	0.3121	0.0005	0.0239	9.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133	0.00	0.000	0.026	0.3101	0.0005	0.0236	9.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134	0.00	0.000	0.024	0.3082	0.0004	0.0187	7.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
135	0.00	0.000	0.023	0.3064	0.0004	0.0183	7.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
136	0.00	0.000	0.022	0.3048	0.0004	0.0166	6.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
137	0.10	0.000	0.022	0.3080	0.0003	0.0156	6.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
138	0.00	0.000	0.020	0.3065	0.0003	0.0141	5.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
139	0.00	0.000	0.020	0.3050	0.0003	0.0121	5.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
140	0.00	0.000	0.019	0.3036	0.0003	0.0132	5.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
141	0.00	0.000	0.018	0.3023	0.0003	0.0132	5.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
142	0.00	0.000	0.018	0.3011	0.0003	0.0120	5.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
143	0.00	0.000	0.017	0.2999	0.0002	0.0109	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
144	0.00	0.000	0.017	0.2988	0.0002	0.0099	4.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
145	0.00	0.000	0.016	0.2978	0.0002	0.0092	3.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
146	0.00	0.000	0.016	0.2967	0.0002	0.0086	4.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
147	0.00	0.000	0.016	0.2957	0.0002	0.0081	3.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
148	0.00	0.000	0.015	0.2947	0.0002	0.0077	3.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
149	0.00	0.000	0.015	0.2938	0.0002	0.0073	3.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
150	0.20	0.000	0.016	0.3024	0.0001	0.0055	2.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
151	0.04	0.000	0.015	0.3034	0.0001	0.0064	3.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
152	0.00	0.000	0.015	0.3026	0.0001	0.0067	3.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
153	0.09	0.000	0.015	0.3061	0.0001	0.0068	3.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
154	0.00	0.000	0.014	0.3052	0.0001	0.0067	3.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
155	0.00	0.000	0.013	0.3044	0.0001	0.0065	2.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
156	0.00	0.000	0.013	0.3038	0.0002	0.0091	3.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
157	0.00	0.000	0.013	0.3032	0.0002	0.0076	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
158	0.03	0.000	0.014	0.3038	0.0001	0.0065	2.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
159	0.04	0.000	0.014	0.3049	0.0001	0.0055	2.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
160	0.02	0.000	0.014	0.3051	0.0001	0.0050	2.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
161	0.61	0.011	0.013	0.3328	0.0001	0.0045	2.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
162	0.06	0.000	0.166	0.3278	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
163	0.01	0.000	0.128	0.3220	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
164	0.00	0.000	0.240	0.3105	0.0001	0.0026	1.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

165	0.00	0.000	0.149	0.3034	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.22E-09	0.0000	0.0000	4.31E-09
166	0.00	0.000	0.062	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.39E-10
167	0.00	0.000	0.047	0.2982	0.0000	0.0001	8.89E-10	0.0000	0.0000	8.61E-10	0.0000	0.0000	8.35E-10
168	1.07	0.093	0.041	0.3426	0.0000	0.0001	4.33E-10	0.0000	0.0000	4.27E-10	0.0000	0.0000	3.17E-10
169	0.04	0.000	0.169	0.3367	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.05E-10
170	0.00	0.000	0.155	0.3293	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
171	0.00	0.000	0.356	0.3123	0.0000	0.0005	2.86E-09	0.0000	0.0000	2.59E-09	0.0000	0.0000	2.37E-09
172	0.00	0.000	0.308	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
173	0.00	0.000	0.149	0.2905	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.00	0.000	0.062	0.2876	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.02	0.000	0.049	0.2862	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.05	0.000	0.041	0.2866	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.05	0.000	0.036	0.2873	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.00	0.000	0.032	0.2858	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	1.26	0.157	0.030	0.3369	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.08	0.000	0.354	0.3238	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.03	0.000	0.361	0.3080	0.0000	0.0004	2.41E-09	0.0000	0.0000	2.22E-09	0.0000	0.0000	2.05E-09
182	0.00	0.000	0.149	0.3009	0.0000	0.0000	7.37E-10	0.0000	0.0000	7.18E-10	0.0000	0.0000	7.00E-10
183	0.00	0.000	0.062	0.2979	0.0000	0.0011	6.34E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
184	0.00	0.000	0.047	0.2957	0.0000	0.0004	2.71E-09	0.0000	0.0000	2.94E-09	0.0000	0.0000	3.02E-09
185	0.00	0.000	0.040	0.2938	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	6.63E-10
186	0.00	0.000	0.035	0.2921	0.0000	0.0001	1.11E-09	0.0000	0.0000	1.07E-09	0.0000	0.0000	7.82E-10
187	0.00	0.000	0.032	0.2906	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	2.57E-10
188	0.18	0.000	0.031	0.2975	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
189	0.39	0.000	0.029	0.3145	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
190	0.41	0.002	0.317	0.3190	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
191	0.00	0.000	0.298	0.3048	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
192	0.00	0.000	0.149	0.2977	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
193	0.00	0.000	0.062	0.2948	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
194	0.03	0.000	0.049	0.2938	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
195	0.14	0.000	0.041	0.2984	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
196	0.11	0.000	0.037	0.3017	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
197	0.09	0.000	0.033	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
198	0.06	0.000	0.031	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
199	0.01	0.000	0.029	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
200	0.00	0.000	0.026	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
201	0.47	0.002	0.026	0.3244	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
202	0.01	0.000	0.249	0.3131	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
203	0.18	0.000	0.298	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
204	0.00	0.000	0.149	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
205	0.18	0.000	0.063	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
206	0.12	0.000	0.049	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
207	0.00	0.000	0.040	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14

208	0.00	0.000	0.035	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
209	0.00	0.000	0.032	0.3045	0.0000	0.0000	5.30E-10	0.0000	0.0000	5.20E-10	0.0000	0.0000	3.85E-10
210	0.00	0.000	0.029	0.3031	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	1.28E-10
211	0.00	0.000	0.027	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
212	0.89	0.085	0.027	0.3388	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
213	0.00	0.000	0.265	0.3261	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
214	0.00	0.000	0.213	0.3160	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
215	0.00	0.000	0.272	0.3030	0.0000	0.0013	6.88E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09
216	0.00	0.000	0.149	0.2959	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.98E-10	0.0000	0.0000	6.81E-10
217	0.00	0.000	0.062	0.2930	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.00	0.000	0.047	0.2907	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.00	0.000	0.040	0.2888	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.00	0.000	0.035	0.2871	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.53	0.000	0.034	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.00	0.000	0.029	0.3093	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.21	0.000	0.029	0.3178	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.00	0.000	0.263	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
225	0.00	0.000	0.027	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
226	0.00	0.000	0.024	0.3031	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
227	0.00	0.000	0.023	0.3020	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
228	0.00	0.000	0.022	0.3009	0.0000	0.0000	1.60E-10	0.0000	0.0000	1.59E-10	0.0000	0.0000	1.58E-10
229	0.00	0.000	0.021	0.2999	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
230	0.50	0.000	0.022	0.3225	0.0000	0.0000	1.83E-10	0.0000	0.0000	1.82E-10	0.0000	0.0000	1.81E-10
231	0.00	0.000	0.186	0.3136	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
232	0.00	0.000	0.238	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
233	0.03	0.000	0.151	0.2967	0.0000	0.0000	2.38E-10	0.0000	0.0000	2.36E-10	0.0000	0.0000	2.34E-10
234	0.00	0.000	0.063	0.2938	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
235	0.00	0.000	0.047	0.2916	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
236	0.00	0.000	0.040	0.2897	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.00	0.000	0.035	0.2880	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	0.00	0.000	0.032	0.2865	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
239	0.01	0.000	0.031	0.2855	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
240	0.26	0.000	0.030	0.2967	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
241	0.00	0.000	0.026	0.2954	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
242	0.00	0.000	0.024	0.2943	0.0000	0.0001	8.51E-10	0.0000	0.0000	8.25E-10	0.0000	0.0000	8.01E-10
243	0.00	0.000	0.023	0.2932	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
244	0.00	0.000	0.022	0.2921	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
245	0.00	0.000	0.021	0.2911	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
246	0.00	0.000	0.020	0.2902	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	0.04	0.000	0.022	0.2911	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
248	0.00	0.000	0.019	0.2902	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.00	0.000	0.018	0.2893	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.00	0.000	0.018	0.2884	0.0000	0.0001	1.90E-09	0.0000	0.0000	1.77E-09	0.0000	0.0000	1.66E-09

251	0.00	0.000	0.017	0.2876	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
252	0.00	0.000	0.017	0.2868	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
253	0.36	0.000	0.019	0.3030	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
254	0.52	0.011	0.018	0.3262	0.0000	0.0000	1.17E-10	0.0000	0.0000	1.17E-10	0.0000	0.0000	1.16E-10
255	0.00	0.000	0.132	0.3199	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
256	0.02	0.000	0.175	0.3127	0.0000	0.0003	1.47E-09	0.0000	0.0000	1.39E-09	0.0000	0.0000	1.33E-09
257	0.00	0.000	0.143	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
258	0.00	0.000	0.112	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
259	0.00	0.000	0.062	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
260	0.00	0.000	0.047	0.2953	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261	0.00	0.000	0.040	0.2934	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262	0.00	0.000	0.035	0.2918	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
263	1.14	0.127	0.034	0.3383	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
264	0.02	0.000	0.107	0.3340	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
265	1.05	0.285	0.064	0.3674	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
266	0.29	0.050	0.066	0.3756	0.0000	0.0000	2.99E-10	0.0000	0.0000	2.96E-10	0.0000	0.0000	2.93E-10
267	0.82	0.329	0.145	0.3920	0.0000	0.0002	1.28E-09	0.0000	0.0000	1.22E-09	0.0000	0.0000	1.17E-09
268	0.37	0.095	0.117	0.3970	0.0000	0.0010	5.29E-09	0.0000	0.0000	4.79E-09	0.0000	0.0000	3.21E-09
269	0.12	0.000	0.109	0.3875	0.0010	0.0478	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270	0.08	0.000	0.168	0.3747	0.0038	0.1799	5.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271	0.24	0.000	0.176	0.3723	0.0029	0.1338	4.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272	0.00	0.000	0.160	0.3619	0.0020	0.0942	3.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273	0.00	0.000	0.151	0.3516	0.0012	0.0556	1.94E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274	0.00	0.000	0.208	0.3390	0.0013	0.0632	2.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275	0.00	0.000	0.200	0.3271	0.0012	0.0564	1.96E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276	0.00	0.000	0.191	0.3163	0.0011	0.0506	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277	0.00	0.000	0.149	0.3083	0.0009	0.0403	1.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278	0.00	0.000	0.062	0.3052	0.0007	0.0317	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279	0.00	0.000	0.047	0.3027	0.0004	0.0178	7.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280	0.00	0.000	0.040	0.3004	0.0002	0.0109	4.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281	0.00	0.000	0.035	0.2981	0.0002	0.0086	4.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282	0.14	0.000	0.034	0.3026	0.0002	0.0100	4.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283	0.41	0.000	0.032	0.3200	0.0002	0.0097	4.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284	0.00	0.000	0.106	0.3143	0.0002	0.0094	4.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285	0.49	0.001	0.030	0.3352	0.0002	0.0101	4.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286	0.05	0.000	0.122	0.3312	0.0003	0.0136	5.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287	0.22	0.000	0.158	0.3336	0.0002	0.0097	4.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288	0.07	0.000	0.094	0.3317	0.0003	0.0150	6.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289	0.00	0.000	0.107	0.3260	0.0003	0.0160	6.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290	0.00	0.000	0.073	0.3221	0.0003	0.0159	6.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291	0.01	0.000	0.086	0.3181	0.0003	0.0138	5.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292	0.18	0.000	0.141	0.3198	0.0002	0.0112	4.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293	0.00	0.000	0.125	0.3139	0.0003	0.0146	5.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.25	0.000	0.109	0.3208	0.0003	0.0129	5.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.00	0.000	0.110	0.3156	0.0002	0.0100	4.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.00	0.000	0.070	0.3122	0.0002	0.0081	3.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297	*	0.54	0.000	0.035	0.3132	0.0001	0.0069	3.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298	*	0.12	0.000	0.030	0.3141	0.0001	0.0059	2.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299	*	0.00	0.000	0.027	0.3151	0.0001	0.0052	2.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300	*	0.16	0.000	0.031	0.3160	0.0001	0.0046	2.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.00	0.000	0.027	0.3219	0.0001	0.0042	2.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.00	0.008	0.026	0.3425	0.0001	0.0038	1.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.00	0.000	0.110	0.3373	0.0001	0.0025	1.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		1.07	0.267	0.101	0.3706	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.75E-09	0.0000	0.0000	4.08E-09
305		1.19	0.711	0.162	0.3855	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.59E-10
306		0.00	0.000	0.075	0.3819	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
307		0.00	0.000	0.058	0.3719	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
308	*	0.00	0.000	0.000	0.3658	0.0018	0.0854	2.79E-07	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
309	*	0.00	0.000	0.059	0.3587	0.0023	0.1054	3.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.67	0.060	0.085	0.3804	0.0020	0.0783	2.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.20	0.005	0.138	0.3802	0.0014	0.0645	2.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.80	0.276	0.109	0.3978	0.0021	0.0623	2.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.08	0.000	0.076	0.3892	0.0018	0.0840	2.64E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314	*	0.25	0.000	0.030	0.3794	0.0055	0.2560	7.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.00	0.000	0.054	0.3802	0.0034	0.1587	4.92E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.098	0.3713	0.0019	0.0915	3.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.00	0.000	0.105	0.3619	0.0024	0.1146	3.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318		0.00	0.000	0.062	0.3573	0.0013	0.0622	2.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.29	0.000	0.074	0.3653	0.0009	0.0412	1.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.00	0.000	0.086	0.3588	0.0010	0.0491	1.73E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.00	0.000	0.059	0.3541	0.0011	0.0505	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.01	0.000	0.082	0.3486	0.0008	0.0382	1.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323	*	1.73	0.000	0.000	0.3475	0.0009	0.0442	1.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.00	0.002	0.000	0.3660	0.0009	0.0410	1.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325	*	0.09	0.000	0.027	0.3654	0.0009	0.0418	1.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326	*	0.01	0.000	0.016	0.3650	0.0006	0.0287	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	0.00	0.000	0.021	0.3647	0.0007	0.0319	1.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328	*	0.56	0.000	0.000	0.3656	0.0008	0.0361	1.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329	*	0.00	0.000	0.020	0.3657	0.0002	0.0101	3.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.00	0.058	0.000	0.3883	0.0005	0.0114	4.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	0.00	0.000	0.029	0.3872	0.0009	0.0415	1.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332	*	0.00	0.000	0.014	0.3791	0.0018	0.0947	3.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.005	0.007	0.3871	0.0036	0.1694	5.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.00	0.000	0.024	0.3825	0.0025	0.1199	3.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	0.00	0.000	0.026	0.3789	0.0017	0.0792	2.59E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.126	0.000	0.3990	0.0043	0.1480	4.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337			0.00	0.000	0.101	0.3848	0.0031	0.1386	4.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338			0.00	0.000	0.160	0.3667	0.0057	0.2636	7.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339			0.46	0.014	0.073	0.3788	0.0034	0.1491	4.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340			0.04	0.000	0.060	0.3746	0.0020	0.0911	2.99E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341	*		0.00	0.000	0.000	0.3707	0.0018	0.0872	2.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342	*		1.11	0.000	0.035	0.3703	0.0012	0.0534	1.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343	*		0.40	0.000	0.016	0.3679	0.0009	0.0416	1.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344			0.00	0.000	0.020	0.3748	0.0014	0.0646	2.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345			0.28	0.040	0.000	0.3904	0.0015	0.0740	2.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*		0.10	0.000	0.017	0.3885	0.0014	0.0636	2.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347	*	*	0.51	0.000	0.010	0.3885	0.0011	0.0525	1.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348	*	*	0.00	0.000	0.006	0.3885	0.0005	0.0243	9.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349	*	*	0.18	0.000	0.000	0.3885	0.0003	0.0158	6.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		*	0.00	0.000	0.000	0.3885	0.0002	0.0117	4.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351	*	*	0.00	0.000	0.036	0.3885	0.0002	0.0092	4.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352	*	*	0.00	0.000	0.031	0.3885	0.0002	0.0076	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353	*	*	0.00	0.000	0.027	0.3885	0.0001	0.0065	2.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354	*	*	0.00	0.000	0.021	0.3885	0.0001	0.0056	2.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		*	0.00	0.136	0.012	0.3939	0.0001	0.0050	2.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356	*	*	0.33	0.000	0.035	0.3939	0.0001	0.0045	2.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		*	0.00	0.101	0.019	0.3974	0.0001	0.0040	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		*	0.04	1.377	0.000	0.4023	0.0001	0.0037	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359		*	1.11	1.104	0.000	0.4056	0.0000	0.0012	6.20E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		*	0.00	0.000	0.000	0.4056	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.62E-09	0.0000	0.0000	1.85E-09
361		*	0.00	0.000	0.000	0.4056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.98E-10
362	*	*	0.00	0.000	0.000	0.4056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
363		*	0.00	0.000	0.000	0.4056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
364	*	*	0.00	0.000	0.000	0.4056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
365	*	*	0.00	0.000	0.000	0.4056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

* = Frozen (air or soil)

Annual Totals for Year 20			
	inches	cubic feet	percent
Precipitation	41.98	152,377.1	100.00
Runoff	9.267	33,638.4	22.08
Evapotranspiration	25.634	93,051.6	61.07
Drainage Collected from Layer 2	5.0008	18,152.8	11.91
Percolation/Leakage through Layer 3	0.000017	0.0627	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0586	0.00
Percolation/Leakage through Layer 8	0.000001	0.0042	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0041	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	2.0756	7,534.3	4.94
Soil Water at Start of Year	255.8272	928,652.6	609.44
Soil Water at End of Year	258.1603	937,121.8	615.00
Snow Water at Start of Year	0.2575	934.9	0.61
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 21

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*	*	0.00	0.000	0.000	0.4056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
2		*	0.00	0.000	0.000	0.4056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
3		*	0.02	0.001	0.001	0.4063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
4		*	0.56	0.513	0.001	0.4085	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
5		*	0.23	0.191	0.001	0.4102	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
6	*	*	0.30	0.000	0.024	0.4102	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
7		*	0.00	0.248	0.031	0.4102	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
8		*	0.18	0.153	0.001	0.4117	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
9			0.08	0.015	0.076	0.3897	0.0041	0.1983	5.55E-07	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
10	*		0.03	0.000	0.034	0.3783	0.0059	0.2730	8.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*		0.00	0.000	0.000	0.3719	0.0034	0.1606	4.98E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*	*	0.00	0.000	0.000	0.3719	0.0019	0.0858	2.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*	*	0.00	0.000	0.000	0.3719	0.0006	0.0291	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*	*	0.00	0.000	0.000	0.3719	0.0004	0.0178	7.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*	*	0.55	0.000	0.010	0.3719	0.0003	0.0127	5.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*	*	0.00	0.000	0.006	0.3719	0.0002	0.0099	4.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17	*	*	0.00	0.000	0.004	0.3719	0.0002	0.0081	3.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18	*	*	0.08	0.000	0.002	0.3719	0.0001	0.0068	3.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19	*	*	0.00	0.000	0.000	0.3719	0.0001	0.0059	2.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20	*	*	0.00	0.000	0.023	0.3719	0.0001	0.0052	2.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21	*	*	0.03	0.000	0.026	0.3719	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22		*	0.00	0.395	0.000	0.3813	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23		*	0.77	0.622	0.000	0.3881	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24		*	0.24	0.163	0.051	0.3897	0.0001	0.0023	1.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*	*	0.00	0.000	0.000	0.3897	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.58E-09	0.0000	0.0000	4.24E-09
26	*	*	0.00	0.000	0.000	0.3897	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.34E-19
27	*	*	0.00	0.000	0.000	0.3897	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
28		*	0.13	0.066	0.000	0.3928	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
29		*	0.07	0.023	0.000	0.3949	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
30		*	0.12	0.071	0.000	0.3973	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
31	*	*	0.04	0.000	0.039	0.3973	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
32		*	0.61	0.555	0.000	0.4000	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
33		*	0.03	0.008	0.000	0.4011	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
34		*	0.00	0.000	0.000	0.4011	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
35		*	0.00	0.000	0.000	0.4011	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

36			0.00	0.000	0.087	0.3859	0.0000	0.0012	5.45E-09	0.0000	0.0000	4.90E-09	0.0000	0.0000	4.50E-09
37			0.00	0.000	0.097	0.3701	0.0050	0.2414	7.24E-07	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
38			0.01	0.000	0.091	0.3601	0.0033	0.1538	4.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39	*		0.00	0.000	0.000	0.3560	0.0022	0.1028	3.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40	*		0.03	0.000	0.016	0.3534	0.0017	0.0811	2.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41	*	*	0.24	0.000	0.015	0.3534	0.0014	0.0640	2.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42	*	*	0.25	0.000	0.007	0.3534	0.0006	0.0267	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43	*	*	0.07	0.000	0.000	0.3534	0.0004	0.0168	6.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44	*	*	0.09	0.000	0.000	0.3534	0.0003	0.0122	5.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45	*	*	0.51	0.000	0.014	0.3534	0.0002	0.0096	4.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46	*	*	0.00	0.000	0.015	0.3534	0.0002	0.0079	3.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47	*	*	0.00	0.000	0.008	0.3534	0.0001	0.0067	3.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48	*	*	0.00	0.000	0.010	0.3534	0.0001	0.0058	2.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*	*	0.00	0.000	0.000	0.3534	0.0001	0.0051	2.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50		*	0.00	0.363	0.000	0.3653	0.0001	0.0045	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		*	0.00	0.308	0.043	0.3717	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		*	0.00	0.000	0.000	0.3717	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		*	0.00	0.000	0.000	0.3717	0.0000	0.0018	9.40E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		*	0.00	0.000	0.000	0.3718	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.76E-09	0.0000	0.0000	2.60E-09
55		*	0.10	0.024	0.000	0.3756	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.27E-10
56			0.05	0.000	0.297	0.3618	0.0000	0.0001	6.02E-10	0.0000	0.0000	5.89E-10	0.0000	0.0000	5.77E-10
57			0.00	0.000	0.213	0.3490	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
58			1.59	0.493	0.127	0.3934	0.0004	0.0165	6.25E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
59			0.00	0.000	0.104	0.3847	0.0005	0.0214	7.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60			0.09	0.000	0.137	0.3716	0.0035	0.1790	5.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61			0.12	0.000	0.254	0.3596	0.0031	0.1445	4.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62			0.00	0.000	0.118	0.3503	0.0021	0.0967	3.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63			0.00	0.000	0.145	0.3409	0.0014	0.0663	2.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64			0.01	0.000	0.117	0.3335	0.0011	0.0504	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65			0.27	0.000	0.114	0.3389	0.0011	0.0497	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66			0.00	0.000	0.182	0.3285	0.0007	0.0342	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67			0.00	0.000	0.195	0.3177	0.0009	0.0419	1.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.07	0.000	0.149	0.3132	0.0007	0.0348	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.00	0.000	0.062	0.3090	0.0005	0.0224	8.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70	*		0.00	0.000	0.000	0.3080	0.0006	0.0261	9.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71	*		0.00	0.000	0.000	0.3072	0.0005	0.0236	9.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72	*		0.49	0.000	0.018	0.3074	0.0005	0.0212	8.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73	*		0.10	0.000	0.012	0.3077	0.0004	0.0190	7.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74	*		0.00	0.000	0.010	0.3080	0.0004	0.0172	6.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75	*		0.16	0.000	0.015	0.3084	0.0003	0.0155	6.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76	*		0.47	0.000	0.010	0.3089	0.0003	0.0142	5.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.00	0.000	0.049	0.3094	0.0003	0.0130	5.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78	*		0.04	0.000	0.024	0.3100	0.0003	0.0120	5.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79	*	0.19	0.000	0.000	0.3106	0.0002	0.0111	4.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.19	0.021	0.000	0.3437	0.0002	0.0096	4.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.92	0.686	0.000	0.3835	0.0002	0.0086	3.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.12	0.002	0.073	0.3853	0.0002	0.0119	5.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.00	0.000	0.150	0.3736	0.0001	0.0046	1.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.00	0.000	0.082	0.3641	0.0017	0.0795	2.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.18	0.000	0.108	0.3637	0.0020	0.0955	3.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.19	0.000	0.129	0.3634	0.0017	0.0797	2.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.169	0.3529	0.0014	0.0662	2.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88	*	0.00	0.000	0.104	0.3463	0.0010	0.0488	1.74E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89	*	0.26	0.000	0.030	0.3456	0.0008	0.0355	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90	*	0.78	0.000	0.019	0.3447	0.0008	0.0359	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.77	0.598	0.000	0.3967	0.0008	0.0383	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.39	0.177	0.131	0.3940	0.0007	0.0364	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.11	0.000	0.082	0.3846	0.0051	0.2431	7.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94	*	0.00	0.000	0.000	0.3782	0.0030	0.1399	4.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95	*	0.35	0.000	0.045	0.3739	0.0028	0.1295	4.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.47	0.148	0.087	0.3947	0.0025	0.0884	2.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97	*	0.52	0.000	0.037	0.3896	0.0020	0.0833	2.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.14	0.114	0.114	0.3961	0.0047	0.2387	7.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.78	0.367	0.170	0.4008	0.0039	0.1807	5.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		1.02	0.584	0.308	0.3961	0.0038	0.1832	5.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.03	0.000	0.177	0.3812	0.0039	0.1842	5.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.00	0.000	0.261	0.3604	0.0036	0.1745	5.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.00	0.000	0.218	0.3446	0.0029	0.1362	4.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.00	0.000	0.135	0.3355	0.0019	0.0893	2.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.09	0.000	0.125	0.3317	0.0011	0.0509	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.00	0.000	0.201	0.3200	0.0010	0.0487	1.73E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107		0.00	0.000	0.149	0.3111	0.0010	0.0481	1.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.00	0.000	0.062	0.3069	0.0008	0.0370	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.00	0.000	0.047	0.3034	0.0006	0.0278	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.32	0.000	0.040	0.3152	0.0006	0.0269	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.00	0.000	0.035	0.3124	0.0007	0.0331	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.00	0.000	0.032	0.3102	0.0006	0.0274	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113	*	0.80	0.000	0.055	0.3104	0.0004	0.0199	7.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114	*	0.00	0.000	0.043	0.3107	0.0004	0.0188	7.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		0.00	0.013	0.084	0.3372	0.0004	0.0167	6.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116		0.25	0.000	0.089	0.3441	0.0003	0.0158	6.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117	*	0.05	0.000	0.055	0.3435	0.0003	0.0148	6.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118		0.00	0.000	0.131	0.3369	0.0002	0.0116	4.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119		0.18	0.000	0.172	0.3368	0.0002	0.0093	4.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120	*	0.18	0.000	0.117	0.3371	0.0002	0.0073	3.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121		0.00	0.000	0.235	0.3271	0.0002	0.0076	3.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122		0.00	0.000	0.118	0.3209	0.0003	0.0151	6.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123		0.00	0.000	0.291	0.3063	0.0003	0.0124	5.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124		0.23	0.000	0.124	0.3108	0.0004	0.0168	6.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125		0.09	0.000	0.062	0.3121	0.0004	0.0182	7.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126		0.00	0.000	0.047	0.3099	0.0003	0.0127	5.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127	*	0.00	0.000	0.040	0.3080	0.0002	0.0102	4.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128	*	0.00	0.000	0.035	0.3063	0.0002	0.0083	3.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129		0.00	0.000	0.032	0.3048	0.0001	0.0070	3.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130		0.00	0.000	0.029	0.3034	0.0001	0.0060	2.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
131		0.00	0.000	0.027	0.3021	0.0001	0.0053	2.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132		0.00	0.000	0.026	0.3009	0.0001	0.0047	2.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133		0.00	0.000	0.024	0.2997	0.0001	0.0042	2.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134		0.01	0.000	0.023	0.2989	0.0001	0.0038	1.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
135		0.00	0.000	0.022	0.2978	0.0001	0.0029	1.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
136		0.00	0.000	0.021	0.2968	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.31E-09	0.0000	0.0000	4.73E-09
137		0.00	0.000	0.020	0.2959	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.20E-11
138		1.41	0.270	0.020	0.3491	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139		0.21	0.003	0.131	0.3529	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140		0.15	0.000	0.214	0.3497	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141		0.00	0.000	0.274	0.3366	0.0000	0.0004	2.32E-09	0.0000	0.0000	2.14E-09	0.0000	0.0000	1.99E-09
142		0.00	0.000	0.245	0.3248	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
143		0.00	0.000	0.225	0.3141	0.0001	0.0030	1.54E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
144		0.00	0.000	0.249	0.3022	0.0000	0.0006	3.27E-09	0.0000	0.0000	6.52E-09	0.0000	0.0000	6.80E-09
145		0.00	0.000	0.149	0.2951	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.03E-10
146		0.00	0.000	0.062	0.2922	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
147		0.00	0.000	0.047	0.2899	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
148		0.00	0.000	0.040	0.2880	0.0000	0.0007	4.32E-09	0.0000	0.0000	2.94E-09	0.0000	0.0000	2.65E-09
149		0.00	0.000	0.035	0.2863	0.0000	0.0002	1.93E-09	0.0000	0.0000	2.25E-09	0.0000	0.0000	2.08E-09
150		0.00	0.000	0.032	0.2848	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.51E-10	0.0000	0.0000	4.44E-10
151		0.00	0.000	0.029	0.2834	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
152		0.00	0.000	0.027	0.2821	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153		0.00	0.000	0.026	0.2809	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154		0.00	0.000	0.024	0.2797	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
155		0.00	0.000	0.023	0.2786	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156		0.00	0.000	0.022	0.2776	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157		0.00	0.000	0.021	0.2766	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158		0.00	0.000	0.020	0.2756	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159		1.12	0.093	0.020	0.3237	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160		0.26	0.000	0.168	0.3283	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161		0.00	0.000	0.215	0.3180	0.0000	0.0001	5.68E-10	0.0000	0.0000	5.56E-10	0.0000	0.0000	5.45E-10
162		0.01	0.000	0.435	0.2975	0.0000	0.0008	3.92E-09	0.0000	0.0000	2.69E-09	0.0000	0.0000	2.45E-09
163		0.40	0.000	0.150	0.3097	0.0000	0.0012	6.32E-09	0.0000	0.0000	6.78E-09	0.0000	0.0000	5.10E-09
164		0.31	0.000	0.063	0.3215	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	6.42E-10

165	0.44	0.012	0.197	0.3323	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
166	0.06	0.000	0.221	0.3246	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.06	0.000	0.436	0.3067	0.0000	0.0009	4.59E-09	0.0000	0.0000	3.09E-09	0.0000	0.0000	2.78E-09
168	0.10	0.000	0.150	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.83E-10	0.0000	0.0000	9.49E-10
169	0.06	0.000	0.063	0.3040	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
170	0.11	0.000	0.048	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.13	0.000	0.041	0.3112	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.09	0.000	0.036	0.3139	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.00	0.000	0.033	0.3125	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.00	0.000	0.029	0.3111	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.08	0.000	0.028	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.00	0.000	0.026	0.3126	0.0000	0.0000	8.77E-11	0.0000	0.0000	8.75E-11	0.0000	0.0000	8.72E-11
177	0.00	0.000	0.024	0.3114	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
178	0.00	0.000	0.023	0.3103	0.0000	0.0000	5.57E-10	0.0000	0.0000	5.46E-10	0.0000	0.0000	5.35E-10
179	0.00	0.000	0.022	0.3093	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
180	0.00	0.000	0.022	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.00	0.000	0.020	0.3073	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.00	0.000	0.020	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.01	0.000	0.020	0.3061	0.0000	0.0002	1.77E-09	0.0000	0.0000	1.66E-09	0.0000	0.0000	1.57E-09
184	0.00	0.000	0.018	0.3052	0.0000	0.0000	8.04E-11	0.0000	0.0000	8.02E-11	0.0000	0.0000	8.00E-11
185	0.00	0.000	0.018	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
186	0.00	0.000	0.017	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
187	0.00	0.000	0.017	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.02	0.000	0.018	0.3031	0.0000	0.0002	2.08E-09	0.0000	0.0000	1.93E-09	0.0000	0.0000	1.80E-09
189	0.00	0.000	0.016	0.3023	0.0000	0.0001	1.20E-09	0.0000	0.0000	1.15E-09	0.0000	0.0000	1.10E-09
190	0.00	0.000	0.016	0.3016	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
191	0.00	0.000	0.015	0.3008	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.00	0.000	0.015	0.3001	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
193	0.00	0.000	0.015	0.2994	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	0.40	0.000	0.016	0.3177	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.00	0.000	0.170	0.3097	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
196	0.00	0.000	0.014	0.3090	0.0000	0.0000	1.51E-10	0.0000	0.0000	1.51E-10	0.0000	0.0000	1.50E-10
197	0.00	0.000	0.014	0.3084	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
198	0.00	0.000	0.014	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.00	0.000	0.013	0.3071	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.08	0.000	0.015	0.3103	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.05	0.000	0.015	0.3118	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.02	0.000	0.014	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.15	0.000	0.014	0.3186	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.00	0.000	0.190	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.00	0.000	0.012	0.3090	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
206	0.02	0.000	0.014	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
207	0.00	0.000	0.012	0.3086	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.00	0.000	0.012	0.3081	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
209	0.00	0.000	0.012	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.00	0.000	0.012	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.00	0.000	0.013	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
212	0.00	0.000	0.011	0.3059	0.0000	0.0001	8.16E-10	0.0000	0.0000	7.92E-10	0.0000	0.0000	7.70E-10
213	0.00	0.000	0.011	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
214	0.81	0.058	0.013	0.3407	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.03	0.000	0.241	0.3308	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.24	0.000	0.232	0.3314	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	0.00	0.000	0.285	0.3178	0.0000	0.0007	3.82E-09	0.0000	0.0000	3.35E-09	0.0000	0.0000	2.99E-09
218	0.02	0.000	0.253	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
219	0.33	0.000	0.151	0.3155	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.00	0.000	0.210	0.3055	0.0000	0.0003	2.21E-09	0.0000	0.0000	2.04E-09	0.0000	0.0000	1.90E-09
221	0.24	0.000	0.064	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
222	0.00	0.000	0.048	0.3116	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.01	0.000	0.042	0.3101	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.21	0.000	0.037	0.3184	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
225	0.11	0.000	0.233	0.3127	0.0000	0.0001	4.96E-10	0.0000	0.0000	4.88E-10	0.0000	0.0000	4.79E-10
226	0.60	0.032	0.034	0.3383	0.0000	0.0002	1.06E-09	0.0000	0.0000	1.02E-09	0.0000	0.0000	9.86E-10
227	0.11	0.000	0.089	0.3393	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
228	0.49	0.047	0.186	0.3516	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
229	0.29	0.016	0.090	0.3602	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
230	0.00	0.000	0.180	0.3516	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.00	0.000	0.169	0.3436	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
232	0.00	0.000	0.177	0.3351	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
233	0.08	0.000	0.102	0.3339	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.19	0.000	0.171	0.3346	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
235	0.00	0.000	0.266	0.3219	0.0000	0.0001	6.40E-10	0.0000	0.0000	6.25E-10	0.0000	0.0000	6.11E-10
236	0.00	0.000	0.221	0.3114	0.0000	0.0015	9.14E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
237	0.14	0.000	0.101	0.3134	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.74E-09	0.0000	0.0000	2.26E-09
238	0.51	0.000	0.064	0.3346	0.0000	0.0002	2.15E-09	0.0000	0.0000	1.99E-09	0.0000	0.0000	1.81E-09
239	0.00	0.000	0.209	0.3243	0.0000	0.0015	7.60E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	5.03E-09
240	0.47	0.002	0.293	0.3323	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.07E-09	0.0000	0.0000	7.83E-10
241	0.11	0.000	0.261	0.3241	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.58E-10
242	0.00	0.000	0.135	0.3166	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.00	0.000	0.149	0.3087	0.0000	0.0008	5.25E-09	0.0000	0.0000	4.76E-09	0.0000	0.0000	3.19E-09
244	0.05	0.000	0.064	0.3073	0.0002	0.0089	3.92E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	5.04E-09
245	0.91	0.075	0.050	0.3445	0.0002	0.0114	4.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
246	0.00	0.000	0.079	0.3403	0.0002	0.0110	4.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
247	0.00	0.000	0.083	0.3360	0.0002	0.0105	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
248	0.00	0.000	0.196	0.3263	0.0002	0.0096	4.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
249	0.00	0.000	0.160	0.3187	0.0003	0.0146	5.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
250	0.00	0.000	0.143	0.3119	0.0002	0.0110	4.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

251		0.00	0.000	0.149	0.3047	0.0002	0.0077	3.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
252		2.18	0.948	0.064	0.3601	0.0002	0.0077	3.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
253		0.00	0.000	0.167	0.3522	0.0001	0.0065	3.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
254		0.08	0.000	0.138	0.3496	0.0001	0.0057	2.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
255		0.11	0.000	0.118	0.3494	0.0001	0.0050	2.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
256		0.45	0.014	0.118	0.3644	0.0001	0.0045	2.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257		0.58	0.118	0.094	0.3817	0.0001	0.0032	1.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258		0.02	0.000	0.205	0.3726	0.0001	0.0028	1.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259		0.00	0.000	0.258	0.3585	0.0000	0.0023	1.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260		0.15	0.000	0.303	0.3464	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.85E-09	0.0000	0.0000	2.65E-09
261		0.37	0.000	0.246	0.3497	0.0008	0.0420	1.53E-07	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.91E-09
262		0.00	0.000	0.198	0.3381	0.0011	0.0506	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.00	0.000	0.150	0.3289	0.0009	0.0412	1.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.00	0.000	0.149	0.3199	0.0010	0.0448	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.00	0.000	0.062	0.3154	0.0009	0.0407	1.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266		0.00	0.000	0.047	0.3119	0.0007	0.0341	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.00	0.000	0.040	0.3088	0.0006	0.0293	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.28	0.000	0.038	0.3194	0.0006	0.0279	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.01	0.000	0.034	0.3173	0.0005	0.0252	9.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.04	0.000	0.032	0.3172	0.0005	0.0225	8.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.027	0.3152	0.0004	0.0196	7.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.00	0.000	0.026	0.3135	0.0004	0.0175	6.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.00	0.000	0.024	0.3118	0.0003	0.0156	6.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274		0.00	0.000	0.023	0.3102	0.0003	0.0132	5.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275		0.00	0.000	0.022	0.3086	0.0003	0.0118	4.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.021	0.3071	0.0003	0.0130	5.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.00	0.000	0.020	0.3058	0.0003	0.0126	5.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.00	0.000	0.020	0.3045	0.0002	0.0117	4.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.00	0.000	0.019	0.3034	0.0002	0.0107	4.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		0.00	0.000	0.018	0.3022	0.0002	0.0098	4.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281	*	0.00	0.000	0.000	0.3020	0.0002	0.0094	4.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.28	0.000	0.020	0.3140	0.0002	0.0079	3.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.00	0.000	0.017	0.3130	0.0002	0.0076	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.00	0.000	0.017	0.3122	0.0002	0.0099	4.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.016	0.3114	0.0002	0.0081	3.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.01	0.000	0.019	0.3109	0.0001	0.0068	3.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.02	0.000	0.018	0.3111	0.0001	0.0057	2.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.00	0.000	0.015	0.3103	0.0001	0.0047	2.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289	*	0.00	0.000	0.000	0.3103	0.0001	0.0046	2.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290	*	0.00	0.000	0.000	0.3103	0.0001	0.0043	2.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.04	0.000	0.018	0.3114	0.0001	0.0038	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.04	0.000	0.017	0.3124	0.0001	0.0035	1.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.00	0.000	0.014	0.3117	0.0000	0.0002	1.49E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.00	0.000	0.014	0.3111	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.24E-10	0.0000	0.0000	1.67E-10
295	*	0.00	0.000	0.014	0.3104	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.57E-11
296		0.00	0.000	0.014	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
297	*	0.00	0.000	0.013	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
298	*	0.00	0.000	0.013	0.3085	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
299	*	0.00	0.000	0.000	0.3085	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
300	*	0.00	0.000	0.013	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
301	*	0.00	0.000	0.000	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
302	*	0.00	0.000	0.000	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
303		0.00	0.000	0.013	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
304		0.00	0.000	0.013	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
305		0.00	0.000	0.012	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
306		0.00	0.000	0.012	0.3055	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
307	*	0.00	0.000	0.017	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
308		0.03	0.000	0.014	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
309		0.04	0.000	0.013	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
310		0.37	0.000	0.013	0.3237	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
311		0.57	0.039	0.085	0.3451	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
312		0.00	0.000	0.080	0.3413	0.0000	0.0001	8.43E-10	0.0000	0.0000	8.18E-10	0.0000	0.0000	7.95E-10
313		0.00	0.000	0.072	0.3379	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
314		0.00	0.000	0.080	0.3341	0.0000	0.0002	9.54E-10	0.0000	0.0000	9.22E-10	0.0000	0.0000	8.92E-10
315		0.00	0.000	0.093	0.3297	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
316		0.51	0.007	0.095	0.3491	0.0000	0.0006	4.05E-09	0.0000	0.0000	2.77E-09	0.0000	0.0000	2.52E-09
317		0.35	0.014	0.061	0.3621	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.82E-10	0.0000	0.0000	8.54E-10
318		0.00	0.000	0.075	0.3585	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
319		0.00	0.000	0.088	0.3543	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
320		0.90	0.172	0.140	0.3823	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
321		0.00	0.000	0.142	0.3753	0.0000	0.0015	7.88E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
322		0.00	0.000	0.085	0.3686	0.0000	0.0011	5.76E-09	0.0000	0.0000	6.56E-09	0.0000	0.0000	6.80E-09
323		0.29	0.000	0.074	0.3729	0.0001	0.0042	1.63E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.84E-09
324		0.00	0.000	0.062	0.3661	0.0018	0.0855	2.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
325	*	1.25	0.000	0.037	0.3641	0.0013	0.0617	2.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.371	0.000	0.4003	0.0016	0.0731	2.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.00	0.000	0.095	0.3851	0.0027	0.1327	4.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.122	0.3685	0.0056	0.2617	7.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.80	0.125	0.074	0.3910	0.0036	0.1483	4.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.53	0.194	0.108	0.3990	0.0025	0.1118	3.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.00	0.000	0.109	0.3835	0.0026	0.1263	3.88E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.04	0.000	0.208	0.3656	0.0049	0.2275	6.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.03	0.000	0.237	0.3505	0.0031	0.1437	4.51E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.16	0.000	0.090	0.3506	0.0018	0.0839	2.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.18	0.000	0.067	0.3530	0.0015	0.0701	2.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.052	0.3482	0.0013	0.0592	2.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337		0.00	0.000	0.092	0.3422	0.0011	0.0498	1.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338	*	0.24	0.000	0.030	0.3421	0.0009	0.0402	1.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339	*	0.00	0.000	0.016	0.3423	0.0006	0.0272	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.038	0.3468	0.0004	0.0185	7.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.00	0.000	0.098	0.3411	0.0004	0.0172	6.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		0.00	0.000	0.115	0.3341	0.0004	0.0184	7.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.00	0.000	0.092	0.3290	0.0007	0.0324	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.00	0.000	0.087	0.3241	0.0005	0.0219	8.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345		0.00	0.000	0.064	0.3205	0.0004	0.0198	7.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346		0.00	0.000	0.103	0.3152	0.0004	0.0182	7.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347		0.00	0.000	0.146	0.3077	0.0002	0.0109	4.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.25	0.000	0.062	0.3157	0.0002	0.0099	4.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		0.43	0.000	0.053	0.3332	0.0003	0.0130	5.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350	*	0.00	0.000	0.003	0.3326	0.0003	0.0138	5.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351	*	0.00	0.000	0.037	0.3303	0.0003	0.0147	5.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352	*	0.00	0.000	0.000	0.3298	0.0003	0.0120	5.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353	*	0.00	0.000	0.000	0.3293	0.0003	0.0127	5.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354	*	0.00	0.000	0.000	0.3289	0.0003	0.0129	5.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355	*	0.00	0.000	0.000	0.3285	0.0003	0.0122	5.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356	*	0.00	0.000	0.000	0.3282	0.0002	0.0112	4.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.09	0.000	0.049	0.3301	0.0002	0.0099	4.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		0.00	0.000	0.087	0.3256	0.0002	0.0079	3.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359		0.00	0.000	0.122	0.3194	0.0002	0.0075	3.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		0.00	0.000	0.105	0.3144	0.0003	0.0127	5.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.00	0.000	0.124	0.3085	0.0002	0.0105	4.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.08	0.000	0.103	0.3075	0.0002	0.0084	3.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.41	0.000	0.062	0.3239	0.0002	0.0071	3.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.00	0.000	0.118	0.3183	0.0001	0.0061	2.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.00	0.000	0.059	0.3155	0.0001	0.0054	2.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 21			
	inches	cubic feet	percent
Precipitation	42.39	153,861.4	100.00
Runoff	9.533	34,604.9	22.49
Evapotranspiration	26.487	96,147.0	62.49
Drainage Collected from Layer 2	8.2417	29,917.3	19.44
Percolation/Leakage through Layer 3	0.000028	0.1011	0.00
Average Head on Top of Layer 3	0.0005	---	---
Drainage Collected from Layer 7	0.0000	0.0957	0.00
Percolation/Leakage through Layer 8	0.000001	0.0054	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0053	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-1.8754	-6,807.8	-4.42
Soil Water at Start of Year	258.1603	937,121.8	609.07
Soil Water at End of Year	256.2849	930,314.0	604.64
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 22

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.072	0.3121	0.0001	0.0048	2.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.00	0.000	0.082	0.3082	0.0001	0.0043	2.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.089	0.3039	0.0001	0.0038	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.00	0.000	0.062	0.3010	0.0001	0.0035	1.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.00	0.000	0.047	0.2987	0.0000	0.0000	1.70E-10	0.0000	0.0000	6.16E-09	0.0000	0.0000	4.78E-09
6			0.45	0.000	0.041	0.3183	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	8.70E-10
7			0.00	0.000	0.057	0.3156	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
8	*		0.00	0.000	0.000	0.3156	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
9			0.00	0.000	0.061	0.3126	0.0000	0.0005	3.54E-09	0.0000	0.0000	3.13E-09	0.0000	0.0000	2.97E-09
10			0.00	0.000	0.072	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
11			0.00	0.000	0.061	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
12	*		0.00	0.000	0.053	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
13	*		0.43	0.000	0.032	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
14			0.82	0.172	0.000	0.3534	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
15			0.00	0.000	0.123	0.3476	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
16	*		0.09	0.000	0.051	0.3485	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
17	*		0.00	0.000	0.052	0.3472	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
18			0.01	0.000	0.086	0.3436	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
19			0.00	0.000	0.116	0.3381	0.0000	0.0001	9.55E-10	0.0000	0.0000	9.23E-10	0.0000	0.0000	8.93E-10
20			0.00	0.000	0.113	0.3327	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
21			0.06	0.000	0.185	0.3267	0.0000	0.0000	2.47E-10	0.0000	0.0000	2.45E-10	0.0000	0.0000	2.43E-10
22			0.13	0.000	0.136	0.3266	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
23			0.24	0.000	0.069	0.3348	0.0000	0.0000	1.14E-09	0.0000	0.0000	1.09E-09	0.0000	0.0000	1.05E-09
24			0.00	0.000	0.084	0.3305	0.0000	0.0004	2.47E-09	0.0000	0.0000	2.26E-09	0.0000	0.0000	2.09E-09
25	*		0.00	0.000	0.000	0.3305	0.0001	0.0037	1.93E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
26	*		0.00	0.000	0.000	0.3305	0.0000	0.0017	8.53E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*		0.00	0.000	0.000	0.3304	0.0000	0.0007	6.33E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*		0.00	0.000	0.000	0.3301	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.74E-10	0.0000	0.0000	7.65E-10
29	*		0.00	0.000	0.000	0.3297	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.12E-10
30	*		0.14	0.000	0.042	0.3302	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
31			0.02	0.000	0.111	0.3288	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
32	*		1.00	0.000	0.041	0.3292	0.0000	0.0000	9.47E-11	0.0000	0.0000	9.44E-11	0.0000	0.0000	9.41E-11
33	*		0.71	0.000	0.036	0.3296	0.0000	0.0008	6.37E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
34	*		1.21	0.000	0.000	0.3301	0.0001	0.0035	1.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35	*		0.24	0.000	0.038	0.3306	0.0001	0.0064	2.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36	*		0.29	0.000	0.019	0.3311	0.0002	0.0078	3.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*		0.00	0.000	0.031	0.3316	0.0002	0.0073	3.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38	*		0.00	0.000	0.031	0.3321	0.0002	0.0077	3.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39			0.14	0.130	0.000	0.3688	0.0002	0.0084	3.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40			0.00	0.088	0.000	0.3849	0.0002	0.0078	3.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41			0.09	0.334	0.000	0.4052	0.0003	0.0124	5.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42			0.00	0.025	0.024	0.3970	0.0034	0.1643	4.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43			0.01	0.225	0.000	0.4063	0.0094	0.2641	7.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44			0.50	0.494	0.000	0.4065	0.0084	0.3450	9.74E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45			0.15	0.007	0.094	0.3916	0.0079	0.3733	1.06E-06	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46	*		0.00	0.000	0.056	0.3784	0.0053	0.2508	7.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47	*		0.00	0.000	0.000	0.3728	0.0030	0.1415	4.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48	*		0.00	0.000	0.000	0.3677	0.0024	0.1107	3.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*	*	0.00	0.000	0.000	0.3677	0.0018	0.0819	2.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50		*	0.00	0.000	0.000	0.3677	0.0006	0.0287	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		*	0.00	0.000	0.000	0.3677	0.0004	0.0176	7.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		*	0.00	0.000	0.000	0.3677	0.0003	0.0126	5.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		*	0.46	0.265	0.000	0.3770	0.0002	0.0098	4.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		*	0.26	0.136	0.000	0.3830	0.0002	0.0080	3.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55		*	0.00	0.000	0.000	0.3830	0.0001	0.0068	3.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56			0.00	0.000	0.127	0.3726	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57			0.04	0.000	0.153	0.3647	0.0008	0.0391	1.39E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58			0.03	0.000	0.291	0.3496	0.0006	0.0287	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59			0.04	0.000	0.153	0.3412	0.0013	0.0611	2.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60	*		0.02	0.000	0.058	0.3366	0.0013	0.0606	2.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61			0.00	0.000	0.091	0.3299	0.0012	0.0541	1.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62			0.00	0.000	0.104	0.3233	0.0011	0.0506	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63	*		0.00	0.000	0.056	0.3191	0.0008	0.0392	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64			0.11	0.000	0.062	0.3207	0.0007	0.0312	1.15E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65	*		1.30	0.000	0.031	0.3205	0.0005	0.0216	8.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66	*		0.41	0.000	0.016	0.3207	0.0005	0.0238	9.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67			0.00	0.000	0.048	0.3209	0.0004	0.0210	8.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.35	0.788	0.000	0.3741	0.0004	0.0175	6.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.00	0.000	0.104	0.3686	0.0003	0.0138	5.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70	*		0.09	0.000	0.051	0.3691	0.0004	0.0197	7.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71	*		0.03	0.000	0.019	0.3689	0.0003	0.0116	4.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72	*		0.11	0.000	0.025	0.3658	0.0002	0.0127	4.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73	*		0.00	0.000	0.027	0.3632	0.0015	0.0709	2.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74	*		0.00	0.000	0.084	0.3578	0.0015	0.0697	2.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75	*		0.00	0.000	0.061	0.3526	0.0013	0.0609	2.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.00	0.000	0.088	0.3464	0.0011	0.0507	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.16	0.000	0.078	0.3488	0.0009	0.0401	1.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78	*		0.00	0.000	0.000	0.3471	0.0008	0.0361	1.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.69	0.065	0.105	0.3701	0.0009	0.0371	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.13	0.000	0.188	0.3665	0.0008	0.0390	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.19	0.000	0.280	0.3607	0.0004	0.0183	7.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.00	0.000	0.230	0.3488	0.0006	0.0290	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.00	0.000	0.179	0.3402	0.0007	0.0313	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.00	0.000	0.157	0.3327	0.0004	0.0191	7.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.159	0.3242	0.0001	0.0026	1.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.01	0.000	0.128	0.3169	0.0001	0.0030	1.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.062	0.3133	0.0005	0.0233	8.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.047	0.3107	0.0004	0.0204	7.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.00	0.000	0.040	0.3083	0.0003	0.0146	5.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.17	0.000	0.035	0.3142	0.0002	0.0116	4.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.01	0.000	0.032	0.3126	0.0002	0.0109	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92	*	0.00	0.000	0.002	0.3121	0.0002	0.0118	5.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93	*	0.00	0.000	0.000	0.3115	0.0002	0.0116	5.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.74	0.020	0.030	0.3437	0.0002	0.0105	4.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.00	0.000	0.198	0.3338	0.0002	0.0115	4.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.18	0.000	0.094	0.3372	0.0002	0.0106	4.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.14	0.000	0.163	0.3351	0.0002	0.0092	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.00	0.000	0.158	0.3269	0.0003	0.0155	6.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.00	0.000	0.124	0.3205	0.0004	0.0169	6.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.01	0.000	0.221	0.3104	0.0004	0.0199	7.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.23	0.000	0.149	0.3136	0.0002	0.0083	3.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.80	0.055	0.062	0.3457	0.0002	0.0115	4.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.02	0.000	0.285	0.3326	0.0002	0.0104	4.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.02	0.000	0.351	0.3167	0.0003	0.0139	5.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.02	0.000	0.149	0.3104	0.0002	0.0104	4.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.00	0.000	0.062	0.3075	0.0002	0.0086	3.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107		0.00	0.000	0.047	0.3053	0.0002	0.0072	3.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.14	0.000	0.040	0.3100	0.0001	0.0061	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.15	0.000	0.035	0.3152	0.0001	0.0054	2.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.34	0.000	0.032	0.3297	0.0001	0.0048	2.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.01	0.000	0.193	0.3211	0.0001	0.0043	2.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112	*	1.74	0.000	0.000	0.3220	0.0001	0.0039	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113		0.00	0.590	0.000	0.3757	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114		0.00	0.000	0.159	0.3681	0.0000	0.0001	6.37E-10	0.0000	0.0000	6.58E-09	0.0000	0.0000	5.05E-09
115		0.00	0.000	0.259	0.3558	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.45E-16	0.0000	0.0000	7.42E-10
116		0.00	0.000	0.222	0.3437	0.0000	0.0001	4.20E-10	0.0000	0.0000	4.14E-10	0.0000	0.0000	4.08E-10
117		0.00	0.000	0.109	0.3361	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
118		0.00	0.000	0.148	0.3263	0.0000	0.0020	9.13E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
119		0.00	0.000	0.117	0.3184	0.0008	0.0400	1.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120		0.00	0.000	0.062	0.3138	0.0009	0.0415	1.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121		0.12	0.000	0.048	0.3157	0.0008	0.0382	1.39E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	0.75	0.026	0.040	0.3466	0.0008	0.0369	1.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123	0.00	0.000	0.217	0.3351	0.0008	0.0372	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124	0.48	0.007	0.254	0.3447	0.0006	0.0259	9.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125	0.10	0.000	0.111	0.3433	0.0005	0.0221	8.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126	0.00	0.000	0.101	0.3377	0.0005	0.0239	9.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127	0.29	0.000	0.074	0.3470	0.0005	0.0222	8.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128	0.00	0.000	0.157	0.3386	0.0004	0.0174	6.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129	0.00	0.000	0.302	0.3233	0.0004	0.0207	8.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130	0.00	0.000	0.274	0.3096	0.0004	0.0197	7.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
131	0.00	0.000	0.149	0.3021	0.0004	0.0198	7.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132	0.00	0.000	0.062	0.2990	0.0004	0.0190	7.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133	0.02	0.000	0.048	0.2977	0.0003	0.0154	6.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134	0.26	0.000	0.041	0.3082	0.0002	0.0108	4.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
135	0.02	0.000	0.036	0.3074	0.0002	0.0089	3.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
136	0.42	0.000	0.032	0.3259	0.0002	0.0075	3.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
137	0.00	0.000	0.149	0.3188	0.0001	0.0069	3.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
138	0.00	0.000	0.104	0.3139	0.0001	0.0060	2.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
139	1.31	0.266	0.125	0.3576	0.0001	0.0052	2.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
140	0.00	0.000	0.133	0.3512	0.0001	0.0046	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
141	0.00	0.000	0.206	0.3414	0.0001	0.0042	2.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
142	0.11	0.000	0.106	0.3415	0.0001	0.0038	1.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
143	0.03	0.000	0.089	0.3387	0.0001	0.0028	1.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
144	0.15	0.000	0.160	0.3381	0.0000	0.0002	1.14E-09	0.0000	0.0000	6.01E-09	0.0000	0.0000	4.90E-09
145	0.00	0.000	0.256	0.3258	0.0000	0.0001	5.33E-10	0.0000	0.0000	5.23E-10	0.0000	0.0000	8.46E-10
146	0.30	0.000	0.152	0.3328	0.0000	0.0009	4.54E-09	0.0000	0.0000	4.20E-09	0.0000	0.0000	4.02E-09
147	0.00	0.000	0.276	0.3196	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
148	0.00	0.000	0.358	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
149	0.00	0.000	0.138	0.2960	0.0000	0.0003	3.15E-09	0.0000	0.0000	2.82E-09	0.0000	0.0000	2.56E-09
150	0.05	0.000	0.063	0.2950	0.0000	0.0000	1.13E-10	0.0000	0.0000	1.12E-10	0.0000	0.0000	1.12E-10
151	0.00	0.000	0.047	0.2923	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
152	0.00	0.000	0.039	0.2900	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.00	0.000	0.035	0.2879	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154	1.65	0.500	0.033	0.3404	0.0000	0.0000	6.71E-10	0.0000	0.0000	6.55E-10	0.0000	0.0000	6.40E-10
155	0.07	0.000	0.235	0.3318	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
156	0.13	0.000	0.271	0.3244	0.0000	0.0022	1.32E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
157	0.18	0.000	0.270	0.3196	0.0002	0.0101	4.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
158	0.26	0.000	0.234	0.3210	0.0003	0.0155	6.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
159	0.03	0.000	0.163	0.3145	0.0002	0.0115	4.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
160	0.00	0.000	0.367	0.2970	0.0002	0.0091	3.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
161	0.00	0.000	0.149	0.2899	0.0002	0.0075	3.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
162	0.00	0.000	0.062	0.2870	0.0001	0.0064	2.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
163	0.08	0.000	0.048	0.2883	0.0001	0.0056	2.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
164	0.36	0.000	0.041	0.3033	0.0001	0.0049	2.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

165	0.10	0.000	0.036	0.3065	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
166	0.06	0.000	0.163	0.3017	0.0001	0.0040	2.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
167	0.40	0.000	0.033	0.3192	0.0001	0.0037	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
168	0.00	0.000	0.371	0.3015	0.0000	0.0010	5.03E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
169	0.00	0.000	0.029	0.3001	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.11E-09	0.0000	0.0000	1.51E-09
170	0.00	0.000	0.027	0.2988	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.90E-10
171	0.00	0.000	0.026	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.03	0.000	0.025	0.2977	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.00	0.000	0.023	0.2966	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.00	0.000	0.022	0.2956	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.45	0.000	0.022	0.3159	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.00	0.000	0.317	0.3008	0.0000	0.0003	1.90E-09	0.0000	0.0000	1.78E-09	0.0000	0.0000	1.67E-09
177	0.00	0.000	0.020	0.2998	0.0000	0.0003	1.41E-09	0.0000	0.0000	1.34E-09	0.0000	0.0000	1.28E-09
178	0.00	0.000	0.020	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
179	0.00	0.000	0.019	0.2980	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.00	0.000	0.018	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.00	0.000	0.018	0.2962	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.00	0.000	0.017	0.2954	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.66	0.014	0.018	0.3252	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.00	0.000	0.336	0.3092	0.0000	0.0001	5.86E-10	0.0000	0.0000	5.74E-10	0.0000	0.0000	5.62E-10
185	0.00	0.000	0.170	0.3011	0.0000	0.0002	1.80E-09	0.0000	0.0000	1.69E-09	0.0000	0.0000	1.59E-09
186	0.00	0.000	0.149	0.2940	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
187	0.00	0.000	0.062	0.2910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.62	0.005	0.049	0.3182	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.07	0.000	0.132	0.3151	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.01	0.000	0.145	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.00	0.000	0.186	0.2998	0.0000	0.0008	4.97E-09	0.0000	0.0000	3.31E-09	0.0000	0.0000	2.95E-09
192	0.03	0.000	0.151	0.2939	0.0000	0.0005	2.77E-09	0.0000	0.0000	2.89E-09	0.0000	0.0000	2.62E-09
193	0.34	0.000	0.063	0.3071	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.28E-10	0.0000	0.0000	6.14E-10
194	0.12	0.000	0.152	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.22	0.000	0.118	0.3109	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
196	0.17	0.000	0.112	0.3134	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.30	0.000	0.130	0.3215	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.53	0.057	0.323	0.3285	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.00	0.000	0.197	0.3192	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.03	0.000	0.305	0.3061	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.03	0.000	0.338	0.2916	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.00	0.000	0.132	0.2856	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.70	0.014	0.063	0.3152	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.42	0.011	0.273	0.3215	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.08	0.000	0.272	0.3124	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
206	0.03	0.000	0.131	0.3077	0.0000	0.0002	1.55E-09	0.0000	0.0000	1.47E-09	0.0000	0.0000	1.39E-09
207	0.03	0.000	0.281	0.2956	0.0000	0.0005	2.66E-09	0.0000	0.0000	2.42E-09	0.0000	0.0000	2.23E-09

208	0.00	0.000	0.149	0.2885	0.0000	0.0009	6.15E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
209	0.17	0.000	0.064	0.2935	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.65E-10	0.0000	0.0000	1.26E-09
210	0.04	0.000	0.049	0.2930	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.56E-11
211	0.00	0.000	0.040	0.2911	0.0000	0.0001	9.05E-10	0.0000	0.0000	8.76E-10	0.0000	0.0000	8.49E-10
212	1.07	0.128	0.037	0.3341	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
213	0.40	0.054	0.142	0.3439	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.00	0.000	0.131	0.3377	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.00	0.000	0.344	0.3213	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.295	0.3072	0.0000	0.0002	1.22E-09	0.0000	0.0000	1.17E-09	0.0000	0.0000	1.12E-09
217	0.00	0.000	0.217	0.2969	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
218	0.00	0.000	0.149	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.00	0.000	0.062	0.2869	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.00	0.000	0.047	0.2846	0.0000	0.0001	1.04E-09	0.0000	0.0000	9.97E-10	0.0000	0.0000	9.62E-10
221	0.00	0.000	0.040	0.2827	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
222	0.00	0.000	0.035	0.2810	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.07	0.000	0.034	0.2828	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.09	0.000	0.031	0.2855	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
225	0.81	0.032	0.029	0.3212	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
226	0.20	0.000	0.148	0.3235	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
227	0.42	0.008	0.137	0.3364	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
228	0.12	0.000	0.321	0.3268	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
229	0.00	0.000	0.164	0.3190	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
230	0.32	0.000	0.106	0.3293	0.0000	0.0002	1.44E-09	0.0000	0.0000	1.37E-09	0.0000	0.0000	1.30E-09
231	0.00	0.000	0.102	0.3244	0.0000	0.0001	4.15E-10	0.0000	0.0000	4.08E-10	0.0000	0.0000	4.02E-10
232	0.09	0.000	0.256	0.3167	0.0000	0.0006	3.49E-09	0.0000	0.0000	3.10E-09	0.0000	0.0000	2.78E-09
233	0.00	0.000	0.108	0.3116	0.0000	0.0002	1.50E-09	0.0000	0.0000	1.42E-09	0.0000	0.0000	1.35E-09
234	0.42	0.000	0.129	0.3254	0.0000	0.0005	3.29E-09	0.0000	0.0000	2.93E-09	0.0000	0.0000	2.65E-09
235	0.03	0.000	0.241	0.3155	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
236	0.00	0.000	0.113	0.3101	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.00	0.000	0.175	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	0.12	0.000	0.130	0.3011	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
239	0.01	0.000	0.064	0.2983	0.0000	0.0001	8.01E-10	0.0000	0.0000	7.78E-10	0.0000	0.0000	7.56E-10
240	0.17	0.000	0.050	0.3039	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
241	0.94	0.111	0.042	0.3413	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
242	0.00	0.000	0.249	0.3294	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.00	0.000	0.254	0.3173	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
244	0.00	0.000	0.199	0.3080	0.0000	0.0000	9.84E-11	0.0000	0.0000	9.81E-11	0.0000	0.0000	9.77E-11
245	0.00	0.000	0.252	0.2959	0.0000	0.0007	3.75E-09	0.0000	0.0000	3.30E-09	0.0000	0.0000	2.95E-09
246	0.11	0.000	0.151	0.2942	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
247	0.00	0.000	0.062	0.2912	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
248	0.00	0.000	0.047	0.2890	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.00	0.000	0.039	0.2871	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.37	0.000	0.038	0.3030	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

251		0.00	0.000	0.032	0.3015	0.0000	0.0000	3.90E-10	0.0000	0.0000	3.84E-10	0.0000	0.0000	3.79E-10
252		0.42	0.000	0.032	0.3199	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
253		0.12	0.000	0.104	0.3207	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
254		0.00	0.000	0.120	0.3151	0.0000	0.0001	8.91E-10	0.0000	0.0000	8.63E-10	0.0000	0.0000	8.37E-10
255		0.17	0.000	0.094	0.3187	0.0000	0.0001	5.25E-10	0.0000	0.0000	5.15E-10	0.0000	0.0000	5.06E-10
256		0.00	0.000	0.153	0.3114	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
257		0.00	0.000	0.214	0.3012	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
258		0.06	0.000	0.151	0.2970	0.0000	0.0000	3.19E-10	0.0000	0.0000	3.15E-10	0.0000	0.0000	3.11E-10
259		0.00	0.000	0.062	0.2941	0.0000	0.0002	1.24E-09	0.0000	0.0000	1.19E-09	0.0000	0.0000	1.14E-09
260		0.55	0.001	0.050	0.3180	0.0000	0.0000	1.05E-10	0.0000	0.0000	1.05E-10	0.0000	0.0000	1.04E-10
261		0.24	0.000	0.109	0.3243	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
262		0.00	0.000	0.096	0.3197	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
263		0.00	0.000	0.145	0.3128	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
264		0.00	0.000	0.185	0.3040	0.0000	0.0003	2.13E-09	0.0000	0.0000	1.97E-09	0.0000	0.0000	1.84E-09
265		0.00	0.000	0.149	0.2969	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
266		0.72	0.020	0.064	0.3272	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
267		0.00	0.000	0.168	0.3192	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
268		0.00	0.000	0.204	0.3095	0.0000	0.0005	2.89E-09	0.0000	0.0000	2.62E-09	0.0000	0.0000	2.39E-09
269		0.00	0.000	0.101	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
270		0.00	0.000	0.149	0.2976	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
271		0.00	0.000	0.062	0.2947	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
272		0.00	0.000	0.047	0.2924	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
273		0.02	0.000	0.043	0.2915	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
274		0.11	0.000	0.038	0.2950	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
275		0.00	0.000	0.032	0.2935	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
276	*	0.00	0.000	0.029	0.2921	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
277		0.00	0.000	0.027	0.2908	0.0000	0.0005	4.19E-09	0.0000	0.0000	2.86E-09	0.0000	0.0000	2.59E-09
278	*	0.00	0.000	0.026	0.2895	0.0000	0.0007	5.80E-09	0.0000	0.0000	4.97E-09	0.0000	0.0000	3.31E-09
279		0.00	0.000	0.024	0.2884	0.0000	0.0000	2.14E-10	0.0000	0.0000	1.35E-09	0.0000	0.0000	1.98E-09
280		0.00	0.000	0.023	0.2873	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.31E-11	0.0000	0.0000	3.60E-10
281		0.00	0.000	0.022	0.2862	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.32E-11
282		0.00	0.000	0.021	0.2852	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
283		0.00	0.000	0.020	0.2842	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
284		0.00	0.000	0.020	0.2833	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
285		0.00	0.000	0.019	0.2824	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
286		0.00	0.000	0.018	0.2815	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
287		0.00	0.000	0.018	0.2807	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
288		0.00	0.000	0.017	0.2799	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
289		0.00	0.000	0.017	0.2791	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
290		0.03	0.000	0.019	0.2795	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
291		0.06	0.000	0.019	0.2813	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
292	*	0.05	0.000	0.035	0.2820	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
293		1.57	0.441	0.018	0.3350	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

294	*	0.00	0.000	0.000	0.3350	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
295		0.00	0.000	0.118	0.3294	0.0000	0.0001	5.13E-10	0.0000	0.0000	5.03E-10	0.0000	0.0000	4.94E-10
296		0.00	0.000	0.121	0.3236	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
297		0.00	0.000	0.076	0.3200	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
298		0.00	0.000	0.116	0.3144	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
299		0.00	0.000	0.099	0.3097	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
300		0.00	0.000	0.113	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
301		0.02	0.000	0.107	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
302		0.01	0.000	0.089	0.2965	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
303		0.36	0.000	0.141	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
304		0.00	0.000	0.144	0.3003	0.0000	0.0008	4.65E-09	0.0000	0.0000	3.13E-09	0.0000	0.0000	2.81E-09
305		0.00	0.000	0.088	0.2961	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.93E-10	0.0000	0.0000	9.59E-10
306		0.63	0.004	0.079	0.3219	0.0000	0.0011	7.09E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
307	*	0.00	0.000	0.041	0.3199	0.0000	0.0000	2.20E-10	0.0000	0.0000	9.65E-10	0.0000	0.0000	1.74E-09
308		0.00	0.000	0.086	0.3158	0.0000	0.0001	5.24E-10	0.0000	0.0000	4.42E-10	0.0000	0.0000	5.57E-10
309		0.00	0.000	0.090	0.3116	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.29E-10	0.0000	0.0000	2.04E-10
310		0.09	0.000	0.086	0.3118	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.20E-11
311		0.00	0.000	0.099	0.3070	0.0000	0.0002	1.46E-09	0.0000	0.0000	1.38E-09	0.0000	0.0000	1.32E-09
312		0.00	0.000	0.104	0.3021	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
313		0.00	0.000	0.073	0.2986	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
314		0.00	0.000	0.065	0.2955	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
315	*	0.00	0.000	0.000	0.2955	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
316	*	0.18	0.000	0.029	0.2964	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
317	*	0.00	0.000	0.035	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
318	*	0.04	0.000	0.000	0.2983	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
319		0.00	0.000	0.079	0.2991	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
320		0.86	0.051	0.052	0.3352	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
321	*	0.13	0.000	0.023	0.3362	0.0000	0.0000	8.14E-11	0.0000	0.0000	8.12E-11	0.0000	0.0000	8.09E-11
322	*	0.14	0.000	0.012	0.3371	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
323	*	0.01	0.000	0.025	0.3380	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
324		0.01	0.000	0.040	0.3438	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
325		0.97	0.285	0.096	0.3719	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
326		0.00	0.000	0.123	0.3661	0.0000	0.0000	1.06E-10	0.0000	0.0000	1.06E-10	0.0000	0.0000	1.06E-10
327		0.00	0.000	0.108	0.3609	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
328		0.00	0.000	0.117	0.3552	0.0000	0.0001	3.56E-10	0.0000	0.0000	3.51E-10	0.0000	0.0000	3.47E-10
329		0.00	0.000	0.135	0.3465	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
330		0.00	0.000	0.187	0.3348	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
331		0.00	0.000	0.148	0.3259	0.0003	0.0161	6.42E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
332		0.00	0.000	0.094	0.3198	0.0007	0.0338	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.01	0.000	0.063	0.3155	0.0007	0.0315	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.02	0.000	0.045	0.3127	0.0007	0.0338	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	0.00	0.000	0.000	0.3113	0.0007	0.0347	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336	*	0.00	0.000	0.000	0.3100	0.0007	0.0324	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337	*	0.19	0.000	0.028	0.3099	0.0006	0.0291	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.02	0.000	0.057	0.3139	0.0005	0.0258	9.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		0.60	0.006	0.041	0.3395	0.0005	0.0227	8.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.094	0.3344	0.0005	0.0234	9.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.00	0.000	0.133	0.3275	0.0004	0.0166	6.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		0.03	0.000	0.061	0.3250	0.0003	0.0137	5.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.07	0.000	0.054	0.3250	0.0003	0.0150	6.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344	*	0.00	0.000	0.000	0.3244	0.0003	0.0150	6.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345	*	0.00	0.000	0.000	0.3238	0.0003	0.0148	6.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346		0.00	0.000	0.051	0.3209	0.0003	0.0132	5.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347		0.00	0.000	0.087	0.3161	0.0002	0.0113	4.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.00	0.000	0.092	0.3113	0.0003	0.0133	5.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		0.00	0.000	0.077	0.3072	0.0003	0.0134	5.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.00	0.000	0.074	0.3033	0.0003	0.0124	5.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.00	0.000	0.060	0.3002	0.0002	0.0115	4.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.00	0.000	0.048	0.2977	0.0002	0.0114	4.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.68	0.007	0.041	0.3277	0.0003	0.0122	5.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.00	0.000	0.058	0.3250	0.0002	0.0095	4.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355	*	0.00	0.000	0.000	0.3250	0.0002	0.0079	3.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356	*	0.00	0.000	0.000	0.3250	0.0001	0.0067	3.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357	*	0.00	0.000	0.044	0.3229	0.0001	0.0058	2.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		0.00	0.000	0.082	0.3190	0.0001	0.0051	2.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	0.00	0.000	0.043	0.3170	0.0001	0.0046	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		0.02	0.000	0.055	0.3151	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.10	0.000	0.073	0.3166	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.28	0.000	0.117	0.3244	0.0000	0.0019	9.66E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.00	0.000	0.122	0.3186	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.86E-09	0.0000	0.0000	2.65E-09
364		0.34	0.000	0.099	0.3302	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.45E-10
365		0.35	0.004	0.095	0.3420	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

* = Frozen (air or soil)

Annual Totals for Year 22			
	inches	cubic feet	percent
Precipitation	44.72	162,330.4	100.00
Runoff	5.448	19,776.5	12.18
Evapotranspiration	34.451	125,057.0	77.04
Drainage Collected from Layer 2	4.2805	15,538.2	9.57
Percolation/Leakage through Layer 3	0.000015	0.0545	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0503	0.00
Percolation/Leakage through Layer 8	0.000001	0.0043	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0042	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.5396	1,958.8	1.21
Soil Water at Start of Year	256.2849	930,314.0	573.10
Soil Water at End of Year	256.8245	932,272.8	574.31
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 23

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.146	0.3350	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
2			0.00	0.000	0.125	0.3291	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
3			0.00	0.000	0.091	0.3248	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
4			0.00	0.000	0.118	0.3192	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
5			0.00	0.000	0.136	0.3127	0.0000	0.0001	9.98E-10	0.0000	0.0000	9.63E-10	0.0000	0.0000	9.30E-10
6			0.00	0.000	0.104	0.3077	0.0000	0.0000	3.12E-10	0.0000	0.0000	3.09E-10	0.0000	0.0000	3.05E-10
7			0.00	0.000	0.092	0.3034	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
8			0.00	0.000	0.062	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
9			0.00	0.000	0.047	0.2982	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
10			0.00	0.000	0.040	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
11			0.00	0.000	0.035	0.2946	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
12			0.00	0.000	0.032	0.2931	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
13			0.00	0.000	0.029	0.2917	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
14			0.00	0.000	0.027	0.2904	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
15			0.00	0.000	0.026	0.2892	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
16			0.35	0.000	0.025	0.3045	0.0000	0.0001	7.03E-10	0.0000	0.0000	6.86E-10	0.0000	0.0000	6.69E-10
17			0.00	0.000	0.023	0.3034	0.0000	0.0001	1.05E-09	0.0000	0.0000	1.01E-09	0.0000	0.0000	9.72E-10
18			0.00	0.000	0.022	0.3023	0.0000	0.0004	2.83E-09	0.0000	0.0000	2.56E-09	0.0000	0.0000	2.34E-09
19	*		0.50	0.000	0.037	0.3033	0.0000	0.0000	2.73E-10	0.0000	0.0000	2.71E-10	0.0000	0.0000	2.68E-10
20	*		0.14	0.000	0.017	0.3042	0.0000	0.0002	2.08E-09	0.0000	0.0000	1.93E-09	0.0000	0.0000	1.81E-09
21	*		0.00	0.000	0.029	0.3051	0.0000	0.0002	1.65E-09	0.0000	0.0000	1.56E-09	0.0000	0.0000	1.47E-09
22	*		0.00	0.000	0.040	0.3060	0.0000	0.0003	2.24E-09	0.0000	0.0000	2.07E-09	0.0000	0.0000	1.92E-09
23			0.00	0.000	0.039	0.3253	0.0000	0.0002	2.03E-09	0.0000	0.0000	1.89E-09	0.0000	0.0000	1.77E-09
24			0.00	0.000	0.081	0.3214	0.0000	0.0002	1.55E-09	0.0000	0.0000	1.46E-09	0.0000	0.0000	1.39E-09
25			0.01	0.000	0.070	0.3185	0.0000	0.0004	3.05E-09	0.0000	0.0000	2.74E-09	0.0000	0.0000	2.49E-09
26			0.29	0.000	0.058	0.3294	0.0000	0.0002	1.64E-09	0.0000	0.0000	1.55E-09	0.0000	0.0000	1.47E-09
27	*		0.00	0.000	0.045	0.3272	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
28	*		0.01	0.000	0.006	0.3272	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
29	*		0.03	0.000	0.029	0.3272	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
30	*		0.26	0.000	0.010	0.3282	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
31	*		0.47	0.000	0.012	0.3291	0.0000	0.0000	2.26E-10	0.0000	0.0000	2.24E-10	0.0000	0.0000	2.22E-10
32	*		0.15	0.000	0.000	0.3300	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
33			0.00	0.100	0.000	0.3633	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
34			0.00	0.000	0.119	0.3577	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
35	*		0.67	0.000	0.038	0.3586	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

36	*		0.02	0.000	0.034	0.3595	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
37	*		0.00	0.000	0.032	0.3605	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
38			0.00	0.034	0.003	0.3836	0.0000	0.0009	4.52E-09	0.0000	0.0000	3.06E-09	0.0000	0.0000	2.75E-09
39	*		0.00	0.000	0.000	0.3817	0.0000	0.0013	6.29E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
40	*		0.00	0.000	0.000	0.3771	0.0001	0.0032	1.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41			0.00	0.000	0.075	0.3669	0.0015	0.0748	2.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42	*	*	0.00	0.000	0.000	0.3669	0.0020	0.0886	2.88E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43	*	*	0.00	0.000	0.000	0.3669	0.0006	0.0294	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44	*	*	0.00	0.000	0.000	0.3669	0.0004	0.0179	7.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45		*	1.23	0.979	0.001	0.3789	0.0003	0.0128	5.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46		*	0.00	0.000	0.001	0.3790	0.0002	0.0099	4.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47	*	*	0.00	0.000	0.000	0.3790	0.0002	0.0081	3.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48		*	0.00	0.000	0.000	0.3790	0.0001	0.0068	3.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*	*	0.00	0.000	0.000	0.3790	0.0001	0.0059	2.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50	*	*	0.00	0.000	0.000	0.3790	0.0001	0.0052	2.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51	*	*	0.00	0.000	0.000	0.3790	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52	*	*	0.00	0.000	0.000	0.3790	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53	*	*	0.00	0.000	0.000	0.3790	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		*	0.23	0.118	0.001	0.3844	0.0001	0.0024	1.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55		*	0.00	0.000	0.000	0.3844	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.64E-09	0.0000	0.0000	4.29E-09
56		*	0.00	0.000	0.000	0.3844	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
57		*	0.00	0.000	0.000	0.3844	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
58		*	0.23	0.138	0.001	0.3888	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
59	*	*	0.00	0.000	0.002	0.3888	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
60		*	0.03	0.001	0.001	0.3900	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
61	*	*	0.10	0.000	0.046	0.3900	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
62	*	*	0.44	0.000	0.041	0.3900	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
63		*	0.19	0.550	0.053	0.3917	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
64		*	0.00	0.000	0.000	0.3917	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
65		*	0.00	0.000	0.000	0.3917	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
66			0.00	0.000	0.129	0.3814	0.0001	0.0049	1.89E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
67			0.00	0.000	0.159	0.3660	0.0008	0.0378	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.21	0.000	0.219	0.3596	0.0030	0.1441	4.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.00	0.000	0.128	0.3500	0.0020	0.0920	3.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70			0.00	0.000	0.073	0.3442	0.0013	0.0616	2.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71			0.00	0.000	0.111	0.3365	0.0011	0.0508	1.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72			0.01	0.000	0.163	0.3272	0.0011	0.0529	1.85E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73			0.97	0.085	0.145	0.3609	0.0009	0.0418	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.85	0.265	0.177	0.3789	0.0009	0.0321	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.28	0.031	0.190	0.3801	0.0006	0.0272	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.04	0.000	0.164	0.3735	0.0010	0.0452	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.00	0.000	0.340	0.3557	0.0002	0.0107	4.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.04	0.000	0.245	0.3421	0.0007	0.0352	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.58	0.010	0.141	0.3587	0.0018	0.0833	2.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.00	0.000	0.143	0.3501	0.0014	0.0649	2.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.39	0.003	0.094	0.3628	0.0009	0.0444	1.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.03	0.000	0.080	0.3590	0.0005	0.0261	9.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.00	0.000	0.125	0.3521	0.0006	0.0276	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84	*	0.00	0.000	0.070	0.3473	0.0004	0.0192	7.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.205	0.3363	0.0006	0.0287	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.277	0.3219	0.0005	0.0228	8.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.149	0.3137	0.0006	0.0298	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.062	0.3102	0.0006	0.0270	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.00	0.000	0.047	0.3077	0.0005	0.0242	9.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.040	0.3058	0.0004	0.0188	7.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.00	0.000	0.035	0.3040	0.0003	0.0123	5.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.40	0.000	0.032	0.3211	0.0002	0.0076	3.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.40	0.000	0.328	0.3243	0.0002	0.0083	3.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.236	0.3127	0.0001	0.0037	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.14	0.000	0.149	0.3114	0.0000	0.0010	7.21E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.04	0.000	0.062	0.3097	0.0000	0.0024	1.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.04	0.000	0.048	0.3089	0.0002	0.0100	4.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.00	0.000	0.040	0.3065	0.0003	0.0125	5.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.00	0.000	0.035	0.3045	0.0003	0.0126	5.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.00	0.000	0.032	0.3026	0.0003	0.0118	4.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.00	0.000	0.029	0.3009	0.0002	0.0109	4.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.00	0.000	0.027	0.2994	0.0002	0.0100	4.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.00	0.000	0.026	0.2980	0.0002	0.0091	3.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104	*	0.00	0.000	0.024	0.2966	0.0002	0.0084	3.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.06	0.000	0.023	0.2984	0.0002	0.0108	4.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.11	0.000	0.022	0.3025	0.0002	0.0087	3.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107		0.00	0.000	0.021	0.3015	0.0002	0.0071	3.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.00	0.000	0.020	0.3005	0.0001	0.0062	2.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.00	0.000	0.020	0.2996	0.0001	0.0054	2.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.00	0.000	0.019	0.2987	0.0001	0.0048	2.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.00	0.000	0.018	0.2978	0.0001	0.0043	2.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112	*	0.00	0.000	0.018	0.2970	0.0001	0.0039	1.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113	*	0.00	0.000	0.000	0.2970	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114	*	0.07	0.000	0.032	0.2979	0.0000	0.0002	1.06E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		0.75	0.025	0.034	0.3316	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.12E-11	0.0000	0.0000	1.59E-11
116		0.19	0.000	0.126	0.3346	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.30E-12
117		0.19	0.000	0.182	0.3348	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
118		0.19	0.000	0.138	0.3373	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
119		0.00	0.000	0.099	0.3327	0.0000	0.0001	8.90E-10	0.0000	0.0000	8.62E-10	0.0000	0.0000	8.36E-10
120	*	0.00	0.000	0.082	0.3288	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
121	*	0.00	0.000	0.000	0.3288	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

122	*	0.00	0.000	0.132	0.3225	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
123		0.00	0.000	0.078	0.3188	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
124		0.19	0.000	0.117	0.3223	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125		0.00	0.000	0.185	0.3134	0.0000	0.0002	8.93E-10	0.0000	0.0000	8.65E-10	0.0000	0.0000	8.39E-10
126		0.00	0.000	0.101	0.3087	0.0000	0.0001	1.50E-09	0.0000	0.0000	1.42E-09	0.0000	0.0000	1.35E-09
127		0.08	0.000	0.062	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
128		0.00	0.000	0.047	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
129		0.00	0.000	0.040	0.3056	0.0000	0.0002	1.69E-09	0.0000	0.0000	1.59E-09	0.0000	0.0000	1.51E-09
130		0.08	0.000	0.036	0.3077	0.0000	0.0003	2.34E-09	0.0000	0.0000	2.15E-09	0.0000	0.0000	2.00E-09
131		0.09	0.000	0.032	0.3103	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
132		0.00	0.000	0.029	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
133		0.00	0.000	0.027	0.3076	0.0000	0.0004	3.16E-09	0.0000	0.0000	2.83E-09	0.0000	0.0000	2.57E-09
134		0.09	0.000	0.026	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
135		0.01	0.000	0.025	0.3100	0.0000	0.0001	7.43E-10	0.0000	0.0000	7.24E-10	0.0000	0.0000	7.05E-10
136		0.03	0.000	0.023	0.3103	0.0000	0.0000	9.97E-11	0.0000	0.0000	9.94E-11	0.0000	0.0000	9.90E-11
137		0.00	0.000	0.022	0.3093	0.0000	0.0000	2.24E-10	0.0000	0.0000	2.22E-10	0.0000	0.0000	2.20E-10
138		0.00	0.000	0.021	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
139		0.00	0.000	0.020	0.3073	0.0000	0.0001	5.71E-10	0.0000	0.0000	5.59E-10	0.0000	0.0000	5.48E-10
140		0.00	0.000	0.020	0.3064	0.0000	0.0003	2.24E-09	0.0000	0.0000	2.07E-09	0.0000	0.0000	1.93E-09
141		0.00	0.000	0.019	0.3054	0.0000	0.0002	2.20E-09	0.0000	0.0000	2.03E-09	0.0000	0.0000	1.89E-09
142		0.00	0.000	0.018	0.3046	0.0000	0.0003	2.27E-09	0.0000	0.0000	2.09E-09	0.0000	0.0000	1.94E-09
143		0.76	0.033	0.018	0.3384	0.0000	0.0001	7.18E-10	0.0000	0.0000	7.00E-10	0.0000	0.0000	6.82E-10
144		0.22	0.000	0.345	0.3326	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
145		0.08	0.000	0.144	0.3294	0.0000	0.0001	8.90E-10	0.0000	0.0000	8.62E-10	0.0000	0.0000	8.35E-10
146		0.00	0.000	0.250	0.3175	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
147		0.00	0.000	0.288	0.3038	0.0000	0.0002	1.02E-09	0.0000	0.0000	9.81E-10	0.0000	0.0000	9.47E-10
148		0.00	0.000	0.149	0.2967	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
149		0.00	0.000	0.062	0.2938	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150		0.00	0.000	0.047	0.2915	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151		0.00	0.000	0.040	0.2896	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
152		0.00	0.000	0.035	0.2879	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153		0.02	0.000	0.033	0.2874	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154		0.08	0.000	0.030	0.2900	0.0000	0.0001	6.25E-10	0.0000	0.0000	6.11E-10	0.0000	0.0000	5.98E-10
155		0.00	0.000	0.027	0.2887	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
156		0.20	0.000	0.026	0.2971	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157		0.02	0.000	0.025	0.2966	0.0000	0.0002	1.09E-09	0.0000	0.0000	1.05E-09	0.0000	0.0000	1.01E-09
158		0.00	0.000	0.023	0.2955	0.0000	0.0000	2.68E-10	0.0000	0.0000	2.66E-10	0.0000	0.0000	2.63E-10
159		0.00	0.000	0.022	0.2945	0.0000	0.0002	1.62E-09	0.0000	0.0000	1.53E-09	0.0000	0.0000	1.45E-09
160		0.54	0.001	0.022	0.3191	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
161		0.08	0.000	0.152	0.3159	0.0000	0.0000	2.09E-10	0.0000	0.0000	2.08E-10	0.0000	0.0000	2.06E-10
162		0.12	0.000	0.192	0.3126	0.0000	0.0001	8.18E-10	0.0000	0.0000	7.94E-10	0.0000	0.0000	7.72E-10
163		0.00	0.000	0.149	0.3055	0.0000	0.0001	3.30E-10	0.0000	0.0000	3.26E-10	0.0000	0.0000	3.22E-10
164		0.00	0.000	0.062	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16

165	0.05	0.000	0.048	0.3025	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.00	0.000	0.040	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.00	0.000	0.035	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.00	0.000	0.032	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.28	0.000	0.030	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
170	0.00	0.000	0.027	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.00	0.000	0.026	0.3067	0.0000	0.0000	1.51E-10	0.0000	0.0000	1.50E-10	0.0000	0.0000	1.49E-10
172	0.00	0.000	0.024	0.3056	0.0000	0.0000	1.80E-10	0.0000	0.0000	1.79E-10	0.0000	0.0000	1.78E-10
173	0.07	0.000	0.024	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
174	0.00	0.000	0.022	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.02	0.000	0.022	0.3065	0.0000	0.0000	4.76E-10	0.0000	0.0000	4.68E-10	0.0000	0.0000	4.60E-10
176	0.00	0.000	0.020	0.3055	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
177	0.00	0.000	0.020	0.3046	0.0000	0.0000	1.08E-09	0.0000	0.0000	1.04E-09	0.0000	0.0000	1.01E-09
178	0.02	0.000	0.020	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
179	0.00	0.000	0.018	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.00	0.000	0.018	0.3026	0.0000	0.0002	2.78E-09	0.0000	0.0000	2.53E-09	0.0000	0.0000	2.31E-09
181	0.00	0.000	0.017	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
182	0.00	0.000	0.017	0.3010	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.09	0.000	0.018	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.00	0.000	0.016	0.3035	0.0000	0.0001	5.46E-10	0.0000	0.0000	5.35E-10	0.0000	0.0000	5.25E-10
185	0.40	0.000	0.017	0.3218	0.0000	0.0000	2.02E-10	0.0000	0.0000	2.00E-10	0.0000	0.0000	1.99E-10
186	0.00	0.000	0.361	0.3046	0.0000	0.0002	9.45E-10	0.0000	0.0000	9.13E-10	0.0000	0.0000	8.84E-10
187	0.00	0.000	0.015	0.3039	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
188	0.00	0.000	0.015	0.3032	0.0000	0.0000	1.70E-10	0.0000	0.0000	1.69E-10	0.0000	0.0000	1.68E-10
189	0.00	0.000	0.015	0.3025	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
190	0.20	0.000	0.016	0.3110	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.04	0.000	0.016	0.3124	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.22	0.000	0.015	0.3221	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
193	0.00	0.000	0.125	0.3162	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	0.39	0.002	0.242	0.3230	0.0000	0.0002	7.80E-10	0.0000	0.0000	7.58E-10	0.0000	0.0000	7.38E-10
195	0.03	0.000	0.112	0.3190	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
196	0.00	0.000	0.159	0.3114	0.0000	0.0000	3.25E-10	0.0000	0.0000	3.21E-10	0.0000	0.0000	3.17E-10
197	0.00	0.000	0.149	0.3043	0.0000	0.0001	1.11E-09	0.0000	0.0000	1.07E-09	0.0000	0.0000	1.03E-09
198	0.00	0.000	0.062	0.3014	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
199	0.00	0.000	0.047	0.2991	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.00	0.000	0.040	0.2972	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.00	0.000	0.035	0.2955	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.00	0.000	0.032	0.2940	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.00	0.000	0.029	0.2926	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.00	0.000	0.027	0.2913	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.64	0.006	0.027	0.3203	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
206	0.26	0.000	0.151	0.3253	0.0000	0.0001	8.33E-10	0.0000	0.0000	8.08E-10	0.0000	0.0000	7.85E-10
207	0.00	0.000	0.167	0.3173	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16

208	0.00	0.000	0.162	0.3096	0.0000	0.0001	5.30E-10	0.0000	0.0000	5.20E-10	0.0000	0.0000	5.11E-10
209	0.53	0.009	0.151	0.3274	0.0000	0.0002	1.59E-09	0.0000	0.0000	1.51E-09	0.0000	0.0000	1.43E-09
210	0.09	0.000	0.359	0.3145	0.0000	0.0002	1.58E-09	0.0000	0.0000	1.49E-09	0.0000	0.0000	1.42E-09
211	0.25	0.000	0.063	0.3233	0.0000	0.0006	2.96E-09	0.0000	0.0000	2.67E-09	0.0000	0.0000	2.43E-09
212	0.00	0.000	0.371	0.3056	0.0000	0.0005	2.84E-09	0.0000	0.0000	2.57E-09	0.0000	0.0000	2.35E-09
213	0.00	0.000	0.047	0.3033	0.0000	0.0008	4.11E-09	0.0000	0.0000	2.81E-09	0.0000	0.0000	2.55E-09
214	0.00	0.000	0.040	0.3014	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.93E-10	0.0000	0.0000	8.64E-10
215	0.20	0.000	0.037	0.3090	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.032	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	2.90	1.726	0.031	0.3619	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.00	0.000	0.338	0.3458	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.00	0.000	0.204	0.3361	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.00	0.000	0.262	0.3236	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.70	0.022	0.216	0.3455	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.00	0.000	0.256	0.3333	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.00	0.000	0.243	0.3218	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.00	0.000	0.149	0.3147	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
225	0.02	0.000	0.064	0.3128	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
226	0.00	0.000	0.047	0.3105	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
227	0.00	0.000	0.040	0.3086	0.0000	0.0006	4.53E-09	0.0000	0.0000	4.19E-09	0.0000	0.0000	2.86E-09
228	0.00	0.000	0.035	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	9.09E-10
229	0.30	0.000	0.034	0.3189	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
230	0.34	0.000	0.031	0.3332	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.23	0.000	0.240	0.3321	0.0000	0.0006	4.40E-09	0.0000	0.0000	2.98E-09	0.0000	0.0000	2.69E-09
232	0.00	0.000	0.206	0.3215	0.0000	0.0005	2.27E-09	0.0000	0.0000	2.48E-09	0.0000	0.0000	2.28E-09
233	0.00	0.000	0.110	0.3158	0.0000	0.0009	6.74E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
234	0.00	0.000	0.149	0.3082	0.0001	0.0035	1.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
235	0.00	0.000	0.062	0.3050	0.0002	0.0080	3.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
236	0.07	0.000	0.049	0.3058	0.0002	0.0084	3.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
237	0.51	0.001	0.042	0.3280	0.0002	0.0113	4.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
238	0.80	0.135	0.113	0.3541	0.0002	0.0092	4.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
239	0.04	0.000	0.131	0.3497	0.0002	0.0077	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
240	0.32	0.003	0.131	0.3585	0.0001	0.0065	2.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
241	0.14	0.000	0.236	0.3541	0.0001	0.0056	2.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
242	0.00	0.000	0.141	0.3474	0.0001	0.0050	2.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
243	0.01	0.000	0.196	0.3386	0.0001	0.0045	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
244	1.05	0.183	0.227	0.3689	0.0001	0.0040	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
245	0.00	0.000	0.212	0.3588	0.0001	0.0038	2.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
246	0.00	0.000	0.264	0.3462	0.0001	0.0024	1.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
247	0.00	0.000	0.230	0.3353	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.02E-09	0.0000	0.0000	4.59E-09
248	0.00	0.000	0.316	0.3202	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	1.15	0.143	0.151	0.3611	0.0000	0.0011	6.02E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
250	0.01	0.000	0.372	0.3426	0.0000	0.0000	2.51E-10	0.0000	0.0000	3.63E-10	0.0000	0.0000	1.33E-09

251	0.00	0.000	0.126	0.3353	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.21E-11	0.0000	0.0000	1.36E-10
252	0.00	0.000	0.202	0.3240	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.55E-11
253	0.00	0.000	0.149	0.3154	0.0001	0.0039	1.81E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
254	0.00	0.000	0.062	0.3113	0.0005	0.0220	8.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
255	0.00	0.000	0.047	0.3082	0.0005	0.0242	9.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
256	0.04	0.000	0.042	0.3075	0.0004	0.0210	8.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257	0.08	0.000	0.038	0.3087	0.0004	0.0185	7.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258	0.49	0.000	0.034	0.3299	0.0003	0.0153	6.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259	0.61	0.042	0.077	0.3524	0.0003	0.0138	5.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260	0.00	0.000	0.106	0.3468	0.0003	0.0148	6.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261	0.00	0.000	0.260	0.3338	0.0003	0.0126	5.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262	0.00	0.000	0.108	0.3283	0.0003	0.0163	6.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263	0.81	0.063	0.145	0.3569	0.0003	0.0160	6.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264	0.99	0.384	0.073	0.3822	0.0003	0.0144	5.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265	0.04	0.000	0.073	0.3806	0.0002	0.0108	4.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266	0.00	0.000	0.070	0.3734	0.0001	0.0033	1.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267	0.00	0.000	0.099	0.3626	0.0011	0.0547	1.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268	0.74	0.091	0.120	0.3835	0.0022	0.1037	3.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269	0.00	0.000	0.105	0.3751	0.0017	0.0757	2.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270	0.00	0.000	0.070	0.3700	0.0012	0.0545	1.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271	0.00	0.000	0.109	0.3593	0.0017	0.0810	2.69E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272	0.00	0.000	0.108	0.3500	0.0022	0.1044	3.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273	0.00	0.000	0.231	0.3360	0.0015	0.0726	2.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
274	0.08	0.000	0.085	0.3338	0.0013	0.0632	2.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
275	0.60	0.010	0.093	0.3559	0.0008	0.0375	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276	0.00	0.000	0.084	0.3503	0.0008	0.0376	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277	0.00	0.000	0.151	0.3417	0.0007	0.0331	1.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278	0.00	0.000	0.164	0.3326	0.0007	0.0313	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279	0.00	0.000	0.094	0.3271	0.0006	0.0299	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280	0.00	0.000	0.132	0.3195	0.0004	0.0207	8.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281	0.00	0.000	0.106	0.3134	0.0006	0.0306	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282	0.00	0.000	0.128	0.3065	0.0005	0.0243	9.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283	0.09	0.000	0.064	0.3071	0.0004	0.0201	7.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284	0.02	0.000	0.050	0.3051	0.0004	0.0191	7.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285	0.00	0.000	0.040	0.3026	0.0004	0.0167	6.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286	0.00	0.000	0.035	0.3004	0.0004	0.0171	6.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287	0.00	0.000	0.032	0.2984	0.0003	0.0155	6.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288	0.00	0.000	0.029	0.2967	0.0003	0.0133	5.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289	0.00	0.000	0.027	0.2950	0.0002	0.0117	4.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290	0.00	0.000	0.026	0.2933	0.0002	0.0088	3.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291	0.00	0.000	0.024	0.2918	0.0002	0.0101	4.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292	0.32	0.000	0.026	0.3053	0.0002	0.0102	4.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293	0.56	0.003	0.025	0.3302	0.0002	0.0098	4.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.00	0.000	0.179	0.3213	0.0001	0.0067	3.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.00	0.000	0.100	0.3163	0.0002	0.0118	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.04	0.000	0.163	0.3105	0.0003	0.0118	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.75	0.038	0.097	0.3398	0.0002	0.0093	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		0.00	0.000	0.113	0.3344	0.0002	0.0077	3.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.00	0.000	0.215	0.3241	0.0001	0.0060	3.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.000	0.274	0.3111	0.0001	0.0058	2.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.00	0.000	0.181	0.3025	0.0001	0.0051	2.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.00	0.000	0.144	0.2956	0.0001	0.0046	2.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.01	0.000	0.063	0.2932	0.0001	0.0041	2.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.02	0.000	0.049	0.2918	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.00	0.000	0.037	0.2900	0.0000	0.0021	1.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.000	0.035	0.2883	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.20E-09	0.0000	0.0000	3.91E-09
307		0.00	0.000	0.032	0.2868	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
308		0.00	0.000	0.029	0.2854	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
309		0.00	0.000	0.027	0.2841	0.0000	0.0002	1.37E-09	0.0000	0.0000	1.30E-09	0.0000	0.0000	1.25E-09
310		0.00	0.000	0.026	0.2829	0.0000	0.0003	1.68E-09	0.0000	0.0000	1.58E-09	0.0000	0.0000	1.49E-09
311		0.00	0.000	0.024	0.2817	0.0000	0.0002	1.52E-09	0.0000	0.0000	1.44E-09	0.0000	0.0000	1.37E-09
312		0.00	0.000	0.023	0.2806	0.0000	0.0002	1.55E-09	0.0000	0.0000	1.46E-09	0.0000	0.0000	1.39E-09
313		0.41	0.000	0.023	0.2992	0.0000	0.0003	1.78E-09	0.0000	0.0000	1.67E-09	0.0000	0.0000	1.57E-09
314		0.00	0.000	0.021	0.2982	0.0000	0.0003	2.16E-09	0.0000	0.0000	2.00E-09	0.0000	0.0000	1.87E-09
315		0.65	0.015	0.021	0.3272	0.0000	0.0002	1.40E-09	0.0000	0.0000	1.33E-09	0.0000	0.0000	1.27E-09
316		0.21	0.000	0.109	0.3321	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
317		0.48	0.034	0.160	0.3456	0.0000	0.0004	2.32E-09	0.0000	0.0000	2.14E-09	0.0000	0.0000	1.98E-09
318		0.53	0.090	0.082	0.3626	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
319	*	0.00	0.000	0.046	0.3604	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
320	*	0.00	0.000	0.040	0.3585	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
321		0.62	0.069	0.086	0.3805	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
322		0.09	0.000	0.157	0.3771	0.0000	0.0013	6.41E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
323		0.60	0.110	0.121	0.3929	0.0001	0.0029	1.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.00	0.000	0.091	0.3842	0.0002	0.0068	2.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.36	0.016	0.052	0.3884	0.0023	0.1139	3.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326	*	0.30	0.000	0.036	0.3820	0.0034	0.1619	5.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	0.16	0.000	0.017	0.3788	0.0019	0.0884	2.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328	*	0.47	0.000	0.020	0.3732	0.0030	0.1424	4.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329	*	0.59	0.000	0.022	0.3693	0.0024	0.1146	3.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.00	0.055	0.000	0.3897	0.0021	0.0845	2.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.00	0.000	0.038	0.3881	0.0020	0.0863	2.83E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.00	0.184	0.000	0.4044	0.0044	0.1233	3.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.000	0.066	0.3862	0.0063	0.2894	8.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.00	0.000	0.113	0.3699	0.0057	0.2636	7.77E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.00	0.000	0.088	0.3597	0.0032	0.1489	4.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.064	0.3526	0.0023	0.1053	3.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337		0.00	0.000	0.054	0.3472	0.0015	0.0716	2.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.00	0.000	0.059	0.3419	0.0012	0.0573	1.99E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		0.00	0.000	0.073	0.3363	0.0012	0.0549	1.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.061	0.3318	0.0009	0.0437	1.59E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.00	0.000	0.051	0.3278	0.0008	0.0364	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342	*	0.74	0.000	0.033	0.3274	0.0007	0.0338	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.44	0.134	0.000	0.3737	0.0006	0.0297	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		1.47	0.892	0.102	0.3951	0.0005	0.0252	9.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345		0.09	0.000	0.058	0.3907	0.0005	0.0232	8.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346		0.00	0.000	0.062	0.3768	0.0048	0.2283	6.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347		0.00	0.000	0.108	0.3658	0.0033	0.1546	4.80E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.96	0.203	0.101	0.3925	0.0022	0.1026	3.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		1.84	1.378	0.057	0.4074	0.0028	0.0817	2.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350	*	0.46	0.000	0.024	0.3896	0.0071	0.3260	9.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351	*	0.00	0.000	0.011	0.3791	0.0060	0.2788	8.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352	*	0.00	0.000	0.014	0.3732	0.0035	0.1656	5.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353	*	0.00	0.000	0.008	0.3694	0.0025	0.1170	3.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354	*	0.03	0.000	0.000	0.3666	0.0019	0.0901	2.99E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.00	0.000	0.023	0.3723	0.0015	0.0704	2.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		0.00	0.000	0.080	0.3722	0.0015	0.0724	2.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.00	0.000	0.070	0.3659	0.0008	0.0380	1.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*	0.30	0.000	0.022	0.3652	0.0014	0.0663	2.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	0.00	0.000	0.011	0.3653	0.0007	0.0332	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*	0.00	0.000	0.015	0.3639	0.0004	0.0195	7.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361	*	0.00	0.000	0.016	0.3621	0.0010	0.0458	1.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362	*	0.00	0.000	0.028	0.3605	0.0012	0.0562	1.95E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363	*	0.00	0.000	0.028	0.3591	0.0012	0.0542	1.89E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364	*	0.00	0.000	0.025	0.3580	0.0010	0.0488	1.72E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.05	0.000	0.065	0.3564	0.0010	0.0456	1.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 23			
	inches	cubic feet	percent
Precipitation	44.47	161,442.3	100.00
Runoff	8.411	30,532.6	18.91
Evapotranspiration	28.523	103,537.3	64.13
Drainage Collected from Layer 2	7.1011	25,776.9	15.97
Percolation/Leakage through Layer 3	0.000024	0.0873	0.00
Average Head on Top of Layer 3	0.0004	---	---
Drainage Collected from Layer 7	0.0000	0.0820	0.00
Percolation/Leakage through Layer 8	0.000001	0.0047	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0047	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.4395	1,595.4	0.99
Soil Water at Start of Year	256.8245	932,272.8	577.47
Soil Water at End of Year	257.2640	933,868.2	578.45
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 24

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.09	0.000	0.079	0.3555	0.0008	0.0369	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.00	0.000	0.121	0.3480	0.0006	0.0293	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.155	0.3391	0.0008	0.0365	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.00	0.000	0.148	0.3315	0.0008	0.0388	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.00	0.000	0.128	0.3252	0.0005	0.0235	8.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6			0.18	0.000	0.128	0.3264	0.0001	0.0062	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7			0.00	0.000	0.124	0.3203	0.0005	0.0237	9.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8			0.04	0.000	0.099	0.3166	0.0003	0.0138	5.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9			0.00	0.000	0.126	0.3103	0.0004	0.0187	7.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10			0.00	0.000	0.071	0.3065	0.0003	0.0117	4.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11			0.00	0.000	0.113	0.3007	0.0002	0.0102	4.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.01	0.000	0.062	0.2973	0.0001	0.0057	2.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13			0.00	0.000	0.047	0.2945	0.0003	0.0139	5.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14			0.07	0.000	0.040	0.2958	0.0003	0.0155	6.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15			0.44	0.000	0.036	0.3147	0.0002	0.0110	4.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*		0.55	0.000	0.021	0.3154	0.0002	0.0086	3.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.04	0.002	0.000	0.3384	0.0002	0.0082	3.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18	*		0.50	0.000	0.027	0.3390	0.0001	0.0068	3.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19			0.00	0.025	0.005	0.3613	0.0001	0.0065	3.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.00	0.000	0.075	0.3573	0.0001	0.0063	2.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.02	0.000	0.056	0.3551	0.0002	0.0084	3.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22	*		0.00	0.000	0.052	0.3524	0.0002	0.0088	3.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23	*		0.04	0.000	0.040	0.3524	0.0003	0.0125	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24	*		0.00	0.000	0.003	0.3524	0.0002	0.0100	4.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*		0.00	0.000	0.000	0.3523	0.0002	0.0072	3.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26	*		0.05	0.000	0.009	0.3522	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*		0.00	0.000	0.053	0.3490	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.15E-09	0.0000	0.0000	2.20E-09
28			0.09	0.000	0.069	0.3482	0.0001	0.0069	3.06E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.81E-09
29	*		0.10	0.000	0.054	0.3476	0.0005	0.0213	8.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*		0.16	0.000	0.026	0.3472	0.0006	0.0303	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31	*		0.00	0.000	0.023	0.3470	0.0006	0.0299	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32	*		0.01	0.000	0.013	0.3469	0.0006	0.0268	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33	*		0.02	0.000	0.008	0.3470	0.0005	0.0237	9.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34	*	*	0.00	0.000	0.018	0.3470	0.0006	0.0289	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35	*	*	0.00	0.000	0.036	0.3470	0.0004	0.0176	7.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36		*	0.00	0.000	0.005	0.3470	0.0003	0.0127	5.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37		*	0.00	0.000	0.000	0.3470	0.0002	0.0099	4.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38	*	*	0.00	0.000	0.000	0.3470	0.0002	0.0080	3.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39	*	*	0.00	0.000	0.000	0.3470	0.0001	0.0068	3.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40	*	*	0.06	0.000	0.030	0.3470	0.0001	0.0059	2.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41	*	*	0.00	0.000	0.028	0.3470	0.0001	0.0052	2.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42	*	*	0.00	0.000	0.000	0.3470	0.0001	0.0046	2.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43	*	*	0.00	0.000	0.000	0.3470	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44		*	0.05	0.000	0.000	0.3492	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45		*	0.22	0.072	0.000	0.3563	0.0000	0.0023	1.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46		*	0.00	0.000	0.000	0.3563	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.48E-09	0.0000	0.0000	4.15E-09
47		*	0.00	0.000	0.000	0.3563	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
48		*	0.00	0.000	0.000	0.3563	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
49	*	*	0.00	0.000	0.000	0.3563	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
50		*	0.00	0.000	0.000	0.3563	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
51	*	*	0.00	0.000	0.000	0.3563	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
52	*	*	0.38	0.000	0.018	0.3563	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
53		*	0.04	0.242	0.036	0.3623	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
54		*	0.27	0.149	0.000	0.3682	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
55	*	*	0.82	0.000	0.029	0.3682	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
56	*	*	0.01	0.000	0.030	0.3682	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
57	*	*	0.10	0.000	0.014	0.3682	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
58		*	0.01	0.050	0.000	0.3721	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
59	*	*	0.00	0.000	0.040	0.3721	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
60		*	0.37	0.954	0.000	0.3776	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
61	*	*	0.03	0.000	0.028	0.3776	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
62		*	0.31	0.228	0.000	0.3815	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
63		*	0.14	0.079	0.000	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
64		*	0.00	0.000	0.000	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
65		*	0.00	0.000	0.000	0.3843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
66			0.12	0.005	0.228	0.3781	0.0000	0.0013	6.40E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
67			0.08	0.000	0.167	0.3718	0.0001	0.0027	1.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.25	0.000	0.147	0.3712	0.0001	0.0046	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.31	0.010	0.126	0.3764	0.0017	0.0796	2.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70			0.00	0.000	0.086	0.3698	0.0011	0.0505	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71	*		0.56	0.000	0.034	0.3678	0.0014	0.0678	2.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72	*		0.10	0.000	0.018	0.3682	0.0011	0.0493	1.70E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73	*		1.44	0.000	0.000	0.3660	0.0004	0.0186	7.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74	*		0.00	0.000	0.020	0.3635	0.0014	0.0662	2.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75	*		0.82	0.000	0.010	0.3615	0.0015	0.0687	2.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76	*		0.26	0.000	0.000	0.3600	0.0013	0.0599	2.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77	*		0.74	0.000	0.000	0.3588	0.0011	0.0517	1.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78	*	*	0.12	0.000	0.026	0.3588	0.0011	0.0505	1.76E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79	*	*	0.14	0.000	0.016	0.3588	0.0005	0.0239	9.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80	*	*	0.00	0.000	0.012	0.3588	0.0003	0.0156	6.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81	*	*	0.00	0.000	0.030	0.3588	0.0002	0.0116	4.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		*	0.00	0.000	0.000	0.3588	0.0002	0.0092	3.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		*	0.00	0.005	0.047	0.3603	0.0002	0.0076	3.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		*	0.00	0.004	0.048	0.3614	0.0001	0.0065	2.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85	*	*	0.02	0.000	0.029	0.3614	0.0001	0.0056	2.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86	*	*	0.02	0.000	0.000	0.3615	0.0001	0.0050	2.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87	*	*	0.00	0.000	0.044	0.3615	0.0001	0.0044	2.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		*	0.00	1.862	0.000	0.3723	0.0001	0.0040	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		*	0.10	1.547	0.000	0.3792	0.0001	0.0037	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		*	0.40	0.302	0.000	0.3837	0.0000	0.0011	5.65E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		*	0.00	0.000	0.000	0.3837	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.39E-09	0.0000	0.0000	1.70E-09
92		*	0.00	0.000	0.000	0.3837	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.50E-10
93		*	0.00	0.000	0.000	0.3837	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
94			0.05	0.000	0.183	0.3753	0.0000	0.0000	1.64E-10	0.0000	0.0000	1.63E-10	0.0000	0.0000	1.22E-10
95			0.00	0.000	0.183	0.3651	0.0001	0.0052	2.23E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.69E-09
96			0.00	0.000	0.092	0.3554	0.0001	0.0075	2.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
97			0.00	0.000	0.083	0.3478	0.0018	0.0831	2.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98	*		0.55	0.000	0.032	0.3463	0.0014	0.0655	2.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99			0.02	0.006	0.008	0.3684	0.0011	0.0514	1.83E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100			0.00	0.000	0.183	0.3578	0.0009	0.0428	1.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101			0.08	0.000	0.193	0.3510	0.0008	0.0369	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102			0.03	0.000	0.202	0.3408	0.0007	0.0313	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103			0.25	0.000	0.292	0.3373	0.0010	0.0450	1.59E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104			0.97	0.145	0.189	0.3661	0.0006	0.0289	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105			0.00	0.000	0.289	0.3516	0.0008	0.0353	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106			0.01	0.000	0.126	0.3454	0.0004	0.0184	7.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107			0.00	0.000	0.187	0.3356	0.0003	0.0164	6.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108			0.47	0.002	0.173	0.3492	0.0005	0.0228	8.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109			0.00	0.000	0.275	0.3359	0.0004	0.0181	7.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110			0.00	0.000	0.119	0.3300	0.0003	0.0141	5.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111			0.29	0.000	0.260	0.3310	0.0001	0.0057	2.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112			0.12	0.000	0.164	0.3288	0.0003	0.0159	6.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113			0.07	0.000	0.256	0.3200	0.0002	0.0113	4.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114			0.57	0.009	0.118	0.3408	0.0002	0.0075	3.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115			0.00	0.000	0.251	0.3287	0.0002	0.0071	3.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116			0.00	0.000	0.176	0.3199	0.0001	0.0023	1.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117	*		0.00	0.000	0.129	0.3131	0.0000	0.0004	3.40E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118			0.26	0.000	0.062	0.3221	0.0001	0.0029	1.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119	*		0.00	0.000	0.000	0.3216	0.0002	0.0092	3.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120			0.00	0.000	0.211	0.3109	0.0001	0.0064	3.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121			0.16	0.000	0.048	0.3159	0.0003	0.0130	5.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	0.29	0.000	0.040	0.3277	0.0003	0.0117	4.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123	0.00	0.000	0.261	0.3151	0.0002	0.0106	4.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124	0.00	0.000	0.035	0.3134	0.0003	0.0127	5.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125	0.00	0.000	0.032	0.3119	0.0002	0.0099	4.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126	0.10	0.000	0.030	0.3150	0.0002	0.0081	3.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127	0.09	0.000	0.028	0.3179	0.0001	0.0068	3.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128	0.09	0.000	0.026	0.3209	0.0001	0.0058	2.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129	0.25	0.000	0.283	0.3195	0.0001	0.0052	2.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130	0.00	0.000	0.292	0.3056	0.0001	0.0046	2.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
131	0.01	0.000	0.149	0.2988	0.0001	0.0042	2.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132	0.09	0.000	0.062	0.3002	0.0001	0.0038	1.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133	0.00	0.000	0.047	0.2979	0.0001	0.0026	1.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134	0.00	0.000	0.040	0.2960	0.0000	0.0001	6.81E-10	0.0000	0.0000	5.40E-09	0.0000	0.0000	4.75E-09
135	0.00	0.000	0.035	0.2942	0.0000	0.0013	9.12E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.77E-09
136	0.31	0.000	0.032	0.3074	0.0000	0.0013	6.93E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
137	0.00	0.000	0.029	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.36E-10	0.0000	0.0000	1.18E-09
138	0.00	0.000	0.027	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.79E-10
139	0.00	0.000	0.026	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140	0.01	0.000	0.025	0.3028	0.0000	0.0004	2.95E-09	0.0000	0.0000	2.66E-09	0.0000	0.0000	2.43E-09
141	0.00	0.000	0.023	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
142	0.21	0.000	0.023	0.3108	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143	0.00	0.000	0.021	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144	0.03	0.000	0.021	0.3104	0.0000	0.0001	3.58E-10	0.0000	0.0000	3.54E-10	0.0000	0.0000	3.49E-10
145	0.00	0.000	0.020	0.3095	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
146	0.00	0.000	0.019	0.3086	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
147	0.00	0.000	0.018	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
148	0.00	0.000	0.018	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
149	0.00	0.000	0.017	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150	0.12	0.000	0.018	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151	0.08	0.000	0.017	0.3135	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
152	0.00	0.000	0.016	0.3128	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.23	0.000	0.017	0.3230	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154	0.18	0.000	0.313	0.3168	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
155	0.16	0.000	0.016	0.3234	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156	0.56	0.051	0.279	0.3345	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157	0.68	0.143	0.359	0.3428	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158	0.16	0.000	0.147	0.3432	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159	0.41	0.027	0.125	0.3555	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160	0.00	0.000	0.196	0.3462	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161	0.00	0.000	0.196	0.3370	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162	0.26	0.000	0.315	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163	0.00	0.000	0.338	0.3181	0.0000	0.0003	1.57E-09	0.0000	0.0000	1.48E-09	0.0000	0.0000	1.40E-09
164	0.00	0.000	0.149	0.3110	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16

165	0.00	0.000	0.063	0.3081	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.00	0.000	0.047	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.00	0.000	0.040	0.3040	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
168	0.00	0.000	0.035	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
169	0.12	0.000	0.033	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
170	0.07	0.000	0.030	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.20	0.000	0.028	0.3159	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.06	0.000	0.027	0.3176	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.00	0.000	0.024	0.3164	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.14	0.000	0.024	0.3220	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.15	0.000	0.398	0.3099	0.0000	0.0016	8.25E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
176	0.00	0.000	0.022	0.3088	0.0001	0.0034	1.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
177	0.72	0.033	0.022	0.3405	0.0000	0.0022	1.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
178	0.00	0.000	0.282	0.3265	0.0000	0.0009	5.38E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
179	0.00	0.000	0.362	0.3088	0.0000	0.0020	9.50E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
180	0.43	0.000	0.150	0.3219	0.0001	0.0052	2.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
181	0.00	0.000	0.304	0.3074	0.0001	0.0046	2.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
182	0.61	0.011	0.063	0.3329	0.0001	0.0041	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
183	0.02	0.000	0.415	0.3139	0.0001	0.0038	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
184	0.95	0.113	0.049	0.3513	0.0001	0.0027	1.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
185	0.00	0.000	0.151	0.3442	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.96E-09	0.0000	0.0000	4.54E-09
186	0.07	0.000	0.132	0.3414	0.0000	0.0000	2.42E-10	0.0000	0.0000	2.39E-10	0.0000	0.0000	2.37E-10
187	0.00	0.000	0.332	0.3256	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
188	0.19	0.000	0.274	0.3217	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.04	0.000	0.151	0.3165	0.0000	0.0000	1.17E-10	0.0000	0.0000	1.16E-10	0.0000	0.0000	1.16E-10
190	0.00	0.000	0.149	0.3093	0.0000	0.0007	5.26E-09	0.0000	0.0000	4.77E-09	0.0000	0.0000	3.20E-09
191	0.48	0.000	0.063	0.3290	0.0000	0.0009	4.52E-09	0.0000	0.0000	3.05E-09	0.0000	0.0000	3.04E-09
192	0.48	0.013	0.320	0.3360	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.70E-10	0.0000	0.0000	1.37E-09
193	0.00	0.000	0.191	0.3269	0.0000	0.0001	4.19E-10	0.0000	0.0000	4.12E-10	0.0000	0.0000	5.37E-10
194	0.00	0.000	0.260	0.3145	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.02E-10
195	0.00	0.000	0.149	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
196	0.00	0.000	0.062	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.00	0.000	0.048	0.3022	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.58	0.002	0.041	0.3279	0.0000	0.0001	5.72E-10	0.0000	0.0000	5.60E-10	0.0000	0.0000	5.49E-10
199	0.05	0.000	0.167	0.3222	0.0000	0.0003	1.70E-09	0.0000	0.0000	1.60E-09	0.0000	0.0000	1.51E-09
200	0.00	0.000	0.194	0.3129	0.0000	0.0015	7.87E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
201	0.04	0.000	0.151	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.20E-09	0.0000	0.0000	1.90E-09
202	0.00	0.000	0.062	0.3048	0.0000	0.0004	2.80E-09	0.0000	0.0000	2.54E-09	0.0000	0.0000	2.06E-09
203	0.00	0.000	0.047	0.3025	0.0000	0.0004	3.50E-09	0.0000	0.0000	3.10E-09	0.0000	0.0000	2.69E-09
204	0.47	0.000	0.042	0.3228	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	6.97E-10
205	0.00	0.000	0.286	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
206	0.00	0.000	0.035	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
207	0.28	0.000	0.033	0.3195	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.39	0.004	0.237	0.3268	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
209	0.00	0.000	0.243	0.3152	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
210	0.06	0.000	0.109	0.3130	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.00	0.000	0.062	0.3101	0.0000	0.0001	1.30E-09	0.0000	0.0000	1.24E-09	0.0000	0.0000	1.18E-09
212	0.00	0.000	0.047	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
213	0.00	0.000	0.040	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.00	0.000	0.035	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.00	0.000	0.032	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.029	0.3013	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	0.32	0.000	0.029	0.3150	0.0000	0.0002	1.99E-09	0.0000	0.0000	1.85E-09	0.0000	0.0000	1.73E-09
218	0.00	0.000	0.026	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
219	0.00	0.000	0.024	0.3127	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.55	0.014	0.025	0.3368	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.15	0.000	0.321	0.3285	0.0000	0.0001	5.86E-10	0.0000	0.0000	5.73E-10	0.0000	0.0000	5.62E-10
222	1.62	0.648	0.127	0.3686	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
223	0.08	0.000	0.113	0.3669	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.34	0.016	0.201	0.3729	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
225	0.00	0.000	0.150	0.3658	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
226	0.13	0.000	0.145	0.3644	0.0000	0.0001	3.43E-10	0.0000	0.0000	3.38E-10	0.0000	0.0000	3.34E-10
227	0.07	0.000	0.279	0.3539	0.0000	0.0006	2.85E-09	0.0000	0.0000	2.58E-09	0.0000	0.0000	2.36E-09
228	0.00	0.000	0.237	0.3410	0.0000	0.0003	1.84E-09	0.0000	0.0000	1.73E-09	0.0000	0.0000	1.62E-09
229	0.00	0.000	0.257	0.3262	0.0000	0.0011	5.47E-09	0.0000	0.0000	4.92E-09	0.0000	0.0000	4.51E-09
230	0.00	0.000	0.134	0.3186	0.0005	0.0224	8.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
231	0.00	0.000	0.062	0.3142	0.0005	0.0233	9.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
232	0.00	0.000	0.047	0.3104	0.0006	0.0295	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
233	0.01	0.000	0.042	0.3074	0.0007	0.0314	1.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
234	0.05	0.000	0.037	0.3069	0.0006	0.0291	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
235	0.00	0.000	0.032	0.3045	0.0006	0.0266	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
236	0.10	0.000	0.031	0.3067	0.0004	0.0209	8.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
237	0.48	0.000	0.029	0.3272	0.0004	0.0200	8.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
238	0.01	0.000	0.086	0.3228	0.0004	0.0195	7.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
239	0.04	0.000	0.163	0.3161	0.0004	0.0180	7.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
240	0.28	0.000	0.104	0.3235	0.0003	0.0129	5.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
241	0.00	0.000	0.207	0.3128	0.0004	0.0168	6.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
242	0.00	0.000	0.062	0.3094	0.0004	0.0207	8.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
243	0.00	0.000	0.047	0.3068	0.0004	0.0169	6.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
244	0.00	0.000	0.040	0.3045	0.0003	0.0141	5.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
245	0.00	0.000	0.035	0.3026	0.0003	0.0121	5.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
246	0.00	0.000	0.032	0.3008	0.0002	0.0106	4.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
247	0.00	0.000	0.029	0.2992	0.0002	0.0095	4.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
248	0.00	0.000	0.027	0.2979	0.0002	0.0115	4.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
249	0.00	0.000	0.026	0.2967	0.0002	0.0093	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
250	0.00	0.000	0.024	0.2956	0.0002	0.0077	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

251	1.82	0.658	0.025	0.3498	0.0001	0.0065	2.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
252	0.00	0.000	0.091	0.3456	0.0001	0.0057	2.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
253	0.01	0.000	0.254	0.3340	0.0001	0.0050	2.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
254	0.00	0.000	0.197	0.3245	0.0001	0.0035	1.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
255	0.00	0.000	0.115	0.3190	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
256	0.00	0.000	0.151	0.3118	0.0001	0.0039	1.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257	0.00	0.000	0.116	0.3063	0.0001	0.0036	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258	0.00	0.000	0.087	0.3022	0.0000	0.0003	1.78E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259	0.00	0.000	0.062	0.2992	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.08E-10	0.0000	0.0000	3.03E-10
260	0.00	0.000	0.047	0.2970	0.0000	0.0000	3.79E-10	0.0000	0.0000	2.82E-10	0.0000	0.0000	3.09E-10
261	0.00	0.000	0.040	0.2950	0.0000	0.0009	5.98E-09	0.0000	0.0000	4.97E-09	0.0000	0.0000	4.61E-09
262	0.00	0.000	0.035	0.2934	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.52E-10	0.0000	0.0000	4.45E-10
263	0.00	0.000	0.032	0.2919	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
264	0.12	0.000	0.032	0.2961	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
265	0.15	0.000	0.030	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
266	0.98	0.079	0.028	0.3435	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
267	0.08	0.000	0.097	0.3428	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
268	0.00	0.000	0.157	0.3352	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
269	1.00	0.197	0.078	0.3697	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
270	0.00	0.000	0.072	0.3662	0.0001	0.0033	1.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
271	0.00	0.000	0.068	0.3630	0.0001	0.0038	1.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272	0.00	0.000	0.098	0.3583	0.0001	0.0026	1.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273	0.00	0.000	0.141	0.3497	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.58E-09	0.0000	0.0000	3.50E-09
274	0.00	0.000	0.139	0.3403	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	9.82E-10
275	0.00	0.000	0.253	0.3263	0.0002	0.0095	3.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276	0.00	0.000	0.203	0.3153	0.0007	0.0328	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277	0.00	0.000	0.132	0.3077	0.0005	0.0250	9.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278	0.00	0.000	0.062	0.3032	0.0006	0.0267	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279	0.00	0.000	0.047	0.2995	0.0007	0.0320	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280	0.00	0.000	0.040	0.2964	0.0007	0.0317	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281	0.39	0.000	0.038	0.3121	0.0006	0.0292	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282	0.00	0.000	0.032	0.3096	0.0005	0.0224	8.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283	0.00	0.000	0.029	0.3073	0.0005	0.0234	9.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284	0.00	0.000	0.027	0.3053	0.0004	0.0209	8.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285	0.00	0.000	0.026	0.3034	0.0004	0.0188	7.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286	0.54	0.001	0.027	0.3273	0.0004	0.0172	6.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287	0.00	0.000	0.166	0.3189	0.0003	0.0153	6.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288	0.00	0.000	0.161	0.3104	0.0002	0.0108	4.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289	0.00	0.000	0.149	0.3027	0.0003	0.0163	6.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290	0.00	0.000	0.062	0.2993	0.0004	0.0175	6.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291	0.00	0.000	0.047	0.2967	0.0003	0.0148	6.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292	0.31	0.000	0.043	0.3094	0.0003	0.0127	5.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293	1.52	0.381	0.038	0.3617	0.0002	0.0110	4.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.00	0.000	0.096	0.3570	0.0002	0.0110	4.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.00	0.000	0.073	0.3535	0.0002	0.0113	4.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.00	0.000	0.130	0.3473	0.0002	0.0089	3.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.00	0.000	0.200	0.3378	0.0002	0.0075	3.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		1.98	0.819	0.155	0.3854	0.0001	0.0061	2.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		1.59	1.171	0.112	0.3996	0.0001	0.0041	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.000	0.069	0.3856	0.0001	0.0096	3.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.00	0.000	0.061	0.3723	0.0051	0.2408	7.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302	*	0.20	0.000	0.044	0.3670	0.0033	0.1542	4.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303	*	0.98	0.000	0.000	0.3636	0.0023	0.1072	3.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304	*	0.36	0.000	0.000	0.3611	0.0018	0.0844	2.80E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305	*	0.04	0.000	0.018	0.3593	0.0014	0.0674	2.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.082	0.000	0.3860	0.0012	0.0559	1.96E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.87	1.083	0.000	0.4089	0.0017	0.0493	1.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		0.22	0.043	0.136	0.3919	0.0067	0.3107	8.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.44	0.075	0.192	0.3901	0.0054	0.2407	7.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.02	0.000	0.145	0.3782	0.0038	0.1766	5.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.26	0.000	0.142	0.3784	0.0014	0.0665	2.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.00	0.000	0.087	0.3692	0.0027	0.1238	3.96E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.00	0.000	0.092	0.3599	0.0023	0.1074	3.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.00	0.000	0.077	0.3532	0.0019	0.0899	2.96E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.00	0.000	0.098	0.3466	0.0012	0.0553	1.92E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.178	0.3368	0.0009	0.0408	1.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.00	0.000	0.145	0.3287	0.0008	0.0360	1.35E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318		0.27	0.000	0.182	0.3318	0.0005	0.0256	9.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.45	0.000	0.136	0.3461	0.0006	0.0262	9.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.00	0.000	0.201	0.3354	0.0003	0.0147	5.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		1.51	0.430	0.169	0.3777	0.0005	0.0214	8.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.07	0.000	0.215	0.3694	0.0003	0.0128	5.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.00	0.000	0.110	0.3635	0.0008	0.0382	1.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.00	0.000	0.063	0.3594	0.0004	0.0173	6.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.02	0.000	0.076	0.3532	0.0003	0.0152	5.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.000	0.130	0.3441	0.0013	0.0640	2.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.00	0.000	0.124	0.3368	0.0014	0.0622	2.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.00	0.000	0.132	0.3285	0.0006	0.0300	1.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.00	0.000	0.124	0.3209	0.0008	0.0394	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.00	0.000	0.124	0.3141	0.0009	0.0402	1.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.00	0.000	0.062	0.3105	0.0006	0.0261	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.00	0.000	0.047	0.3074	0.0004	0.0173	6.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.000	0.040	0.3046	0.0004	0.0174	6.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.00	0.000	0.035	0.3020	0.0004	0.0190	7.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.00	0.000	0.032	0.2998	0.0004	0.0208	8.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.11	0.000	0.030	0.3030	0.0004	0.0171	6.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337		0.00	0.000	0.027	0.3009	0.0004	0.0167	7.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.00	0.000	0.026	0.2989	0.0003	0.0163	6.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		0.00	0.000	0.024	0.2971	0.0004	0.0184	7.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.023	0.2955	0.0004	0.0168	6.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341	*	0.25	0.000	0.036	0.2960	0.0003	0.0151	6.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		0.58	0.018	0.000	0.3314	0.0003	0.0132	5.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.00	0.000	0.130	0.3248	0.0003	0.0121	5.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.00	0.000	0.163	0.3162	0.0001	0.0060	2.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345		0.00	0.000	0.068	0.3125	0.0003	0.0131	5.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*	0.00	0.000	0.000	0.3122	0.0003	0.0140	5.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347	*	0.00	0.000	0.000	0.3120	0.0003	0.0119	5.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348	*	0.00	0.000	0.000	0.3117	0.0002	0.0104	4.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349	*	0.07	0.000	0.031	0.3124	0.0002	0.0093	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.10	0.000	0.074	0.3143	0.0002	0.0072	3.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.03	0.000	0.114	0.3101	0.0002	0.0088	3.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.09	0.000	0.084	0.3102	0.0002	0.0097	4.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.062	0.3072	0.0002	0.0082	3.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.00	0.000	0.047	0.3050	0.0002	0.0072	3.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.01	0.000	0.041	0.3035	0.0001	0.0062	2.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		0.00	0.000	0.035	0.3018	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.40	0.000	0.032	0.3195	0.0001	0.0050	2.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		0.21	0.000	0.093	0.3249	0.0001	0.0045	2.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	0.53	0.000	0.033	0.3258	0.0001	0.0041	2.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*	0.00	0.000	0.030	0.3267	0.0001	0.0037	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361	*	0.00	0.000	0.014	0.3277	0.0000	0.0014	7.46E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362	*	0.00	0.000	0.007	0.3286	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.08E-09	0.0000	0.0000	2.92E-09
363	*	0.00	0.000	0.011	0.3295	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
364	*	0.00	0.000	0.012	0.3305	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
365	*	0.00	0.000	0.025	0.3314	0.0000	0.0001	8.85E-10	0.0000	0.0000	8.57E-10	0.0000	0.0000	8.31E-10

* = Frozen (air or soil)

Annual Totals for Year 24			
	inches	cubic feet	percent
Precipitation	48.29	175,285.5	100.00
Runoff	11.812	42,878.2	24.46
Evapotranspiration	31.216	113,312.6	64.64
Drainage Collected from Layer 2	5.6764	20,605.3	11.76
Percolation/Leakage through Layer 3	0.000021	0.0745	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0690	0.00
Percolation/Leakage through Layer 8	0.000002	0.0062	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000002	0.0061	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-0.4162	-1,510.6	-0.86
Soil Water at Start of Year	257.2640	933,868.2	532.77
Soil Water at End of Year	256.6218	931,537.1	531.44
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.2260	820.5	0.47
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 25

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*		0.00	0.000	0.030	0.3333	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
2	*		0.00	0.000	0.042	0.3342	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
3	*		0.00	0.000	0.023	0.3352	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
4	*		0.31	0.000	0.033	0.3361	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
5	*		0.61	0.000	0.031	0.3370	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
6			0.00	0.161	0.000	0.3719	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
7			0.00	0.000	0.087	0.3677	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
8			0.00	0.000	0.092	0.3634	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
9			0.00	0.000	0.100	0.3583	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
10	*		0.00	0.000	0.049	0.3529	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
11	*		0.00	0.000	0.043	0.3481	0.0000	0.0001	5.70E-10	0.0000	0.0000	5.59E-10	0.0000	0.0000	5.48E-10
12	*		0.00	0.000	0.000	0.3456	0.0006	0.0289	1.08E-07	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
13	*		0.12	0.000	0.009	0.3445	0.0010	0.0476	1.68E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*	*	0.07	0.000	0.008	0.3445	0.0011	0.0501	1.75E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*	*	0.00	0.000	0.006	0.3445	0.0005	0.0238	9.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*	*	0.00	0.000	0.017	0.3445	0.0003	0.0156	6.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17	*	*	0.00	0.000	0.033	0.3445	0.0002	0.0116	4.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18		*	0.00	0.003	0.068	0.3458	0.0002	0.0092	3.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19		*	0.00	0.000	0.000	0.3458	0.0002	0.0076	3.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20		*	0.00	0.000	0.000	0.3458	0.0001	0.0065	2.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21		*	0.00	0.000	0.000	0.3458	0.0001	0.0056	2.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22		*	0.20	0.040	0.000	0.3532	0.0001	0.0050	2.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23		*	0.33	0.146	0.000	0.3619	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.00	0.000	0.074	0.3563	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25			0.00	0.000	0.097	0.3503	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.85E-10	0.0000	0.0000	4.81E-10
26			0.52	0.020	0.095	0.3682	0.0002	0.0037	1.49E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
27			0.34	0.026	0.089	0.3774	0.0003	0.0160	6.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28			0.00	0.000	0.136	0.3692	0.0004	0.0190	7.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*		0.00	0.000	0.066	0.3656	0.0009	0.0425	1.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*		0.00	0.000	0.000	0.3633	0.0002	0.0099	3.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31	*		0.00	0.000	0.000	0.3594	0.0010	0.0477	1.67E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32	*		0.00	0.000	0.000	0.3561	0.0016	0.0749	2.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33	*	*	0.12	0.000	0.015	0.3561	0.0014	0.0645	2.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34	*	*	0.01	0.000	0.030	0.3561	0.0006	0.0265	9.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35	*	*	0.19	0.000	0.000	0.3561	0.0004	0.0167	6.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36	*	*	0.34	0.000	0.021	0.3561	0.0003	0.0122	5.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*	*	1.22	0.000	0.000	0.3561	0.0002	0.0096	4.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38		*	0.00	1.040	0.000	0.3697	0.0002	0.0078	3.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39	*	*	0.00	0.000	0.034	0.3697	0.0001	0.0066	3.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40		*	0.00	0.000	0.044	0.3697	0.0001	0.0058	2.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41	*	*	0.00	0.000	0.042	0.3697	0.0001	0.0051	2.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42		*	0.02	0.233	0.027	0.3754	0.0001	0.0045	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43		*	0.10	0.024	0.000	0.3788	0.0001	0.0041	2.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44		*	0.00	0.000	0.000	0.3788	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45		*	0.00	0.000	0.000	0.3788	0.0000	0.0017	9.02E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46		*	0.00	0.000	0.000	0.3788	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.62E-09	0.0000	0.0000	2.51E-09
47	*	*	0.00	0.000	0.000	0.3788	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.00E-10
48	*	*	0.00	0.000	0.000	0.3788	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
49	*	*	0.07	0.000	0.030	0.3788	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
50	*	*	0.10	0.000	0.011	0.3788	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
51	*	*	0.08	0.000	0.016	0.3788	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
52		*	0.22	0.305	0.033	0.3825	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
53	*	*	0.00	0.000	0.000	0.3825	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
54	*	*	0.00	0.000	0.000	0.3825	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
55		*	0.00	0.000	0.000	0.3825	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
56		*	0.00	0.000	0.000	0.3825	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
57		*	0.00	0.000	0.000	0.3825	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
58		*	0.00	0.000	0.000	0.3825	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
59		*	0.00	0.000	0.000	0.3825	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
60		*	0.03	0.001	0.000	0.3839	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
61			0.37	0.089	0.119	0.3885	0.0000	0.0001	5.71E-10	0.0000	0.0000	5.60E-10	0.0000	0.0000	5.49E-10
62			0.00	0.000	0.173	0.3788	0.0002	0.0084	3.36E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
63			0.00	0.000	0.178	0.3626	0.0008	0.0384	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64			0.00	0.000	0.127	0.3515	0.0028	0.1327	4.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65			0.00	0.000	0.186	0.3391	0.0018	0.0848	2.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66			0.00	0.000	0.172	0.3286	0.0015	0.0693	2.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67			0.00	0.000	0.149	0.3194	0.0011	0.0523	1.82E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.00	0.000	0.062	0.3148	0.0009	0.0410	1.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.00	0.000	0.047	0.3108	0.0008	0.0376	1.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70			0.56	0.001	0.040	0.3341	0.0008	0.0380	1.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71			0.00	0.000	0.142	0.3260	0.0008	0.0347	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72			0.00	0.000	0.161	0.3175	0.0007	0.0325	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73			0.24	0.000	0.149	0.3206	0.0005	0.0216	8.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.00	0.000	0.268	0.3070	0.0005	0.0229	8.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.02	0.000	0.062	0.3039	0.0004	0.0197	7.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.05	0.000	0.048	0.3030	0.0005	0.0222	8.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.43	0.000	0.040	0.3208	0.0005	0.0220	8.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.00	0.000	0.144	0.3133	0.0004	0.0178	7.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.00	0.000	0.035	0.3113	0.0004	0.0185	7.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.00	0.000	0.032	0.3094	0.0003	0.0150	6.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81	*	0.39	0.000	0.042	0.3101	0.0003	0.0132	5.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82	*	0.04	0.000	0.037	0.3108	0.0002	0.0110	4.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83	*	0.38	0.000	0.038	0.3116	0.0002	0.0095	4.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.94	0.453	0.000	0.3650	0.0002	0.0084	3.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85	*	0.28	0.000	0.026	0.3657	0.0002	0.0076	3.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.070	0.3735	0.0002	0.0090	3.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.12	0.000	0.118	0.3737	0.0002	0.0082	3.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.178	0.3649	0.0001	0.0057	2.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.00	0.000	0.115	0.3581	0.0000	0.0002	1.29E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.166	0.3475	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.48E-09	0.0000	0.0000	2.38E-09
91		0.00	0.000	0.319	0.3300	0.0004	0.0211	7.93E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
92		0.00	0.000	0.289	0.3148	0.0010	0.0468	1.66E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.47	0.000	0.149	0.3293	0.0007	0.0303	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.23	0.000	0.129	0.3327	0.0005	0.0210	8.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.12	0.000	0.155	0.3298	0.0007	0.0317	1.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.00	0.000	0.075	0.3250	0.0006	0.0285	1.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.00	0.000	0.069	0.3205	0.0006	0.0276	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.00	0.000	0.117	0.3139	0.0006	0.0276	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.04	0.000	0.149	0.3079	0.0005	0.0251	9.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100	*	0.89	0.000	0.043	0.3080	0.0005	0.0217	8.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.00	0.036	0.095	0.3407	0.0004	0.0210	8.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.31	0.004	0.140	0.3479	0.0003	0.0157	6.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.05	0.000	0.072	0.3462	0.0004	0.0182	7.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.05	0.000	0.099	0.3433	0.0003	0.0163	6.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.00	0.000	0.087	0.3388	0.0003	0.0151	6.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.03	0.000	0.083	0.3361	0.0003	0.0136	5.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107		0.11	0.000	0.109	0.3361	0.0003	0.0123	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.15	0.000	0.149	0.3358	0.0002	0.0113	4.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.15	0.000	0.158	0.3353	0.0002	0.0112	4.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.25	0.000	0.379	0.3290	0.0002	0.0083	3.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.03	0.000	0.353	0.3137	0.0002	0.0090	3.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.00	0.000	0.149	0.3066	0.0002	0.0072	3.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113		0.00	0.000	0.062	0.3036	0.0001	0.0054	2.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114		0.00	0.000	0.047	0.3013	0.0001	0.0047	2.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		0.00	0.000	0.040	0.2992	0.0001	0.0034	1.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116		0.00	0.000	0.035	0.2974	0.0001	0.0030	1.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117		0.00	0.000	0.032	0.2959	0.0001	0.0052	2.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118		0.00	0.000	0.029	0.2945	0.0001	0.0048	2.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119		0.00	0.000	0.027	0.2932	0.0001	0.0043	2.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120		0.00	0.000	0.026	0.2920	0.0001	0.0039	1.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121		0.00	0.000	0.022	0.2910	0.0001	0.0033	1.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	0.00	0.000	0.023	0.2899	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.86E-09	0.0000	0.0000	4.63E-09
123	0.00	0.000	0.022	0.2888	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.69E-10
124	0.00	0.000	0.021	0.2878	0.0000	0.0000	2.75E-10	0.0000	0.0000	2.72E-10	0.0000	0.0000	2.70E-10
125	0.00	0.000	0.020	0.2868	0.0000	0.0003	2.66E-09	0.0000	0.0000	2.42E-09	0.0000	0.0000	2.23E-09
126	0.00	0.000	0.020	0.2859	0.0000	0.0003	2.71E-09	0.0000	0.0000	2.47E-09	0.0000	0.0000	2.26E-09
127	0.00	0.000	0.019	0.2850	0.0000	0.0004	3.30E-09	0.0000	0.0000	2.94E-09	0.0000	0.0000	2.66E-09
128	0.03	0.000	0.019	0.2855	0.0000	0.0004	3.72E-09	0.0000	0.0000	3.28E-09	0.0000	0.0000	2.93E-09
129	0.28	0.000	0.018	0.2978	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
130	0.00	0.000	0.017	0.2970	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
131	0.05	0.000	0.017	0.2983	0.0000	0.0000	2.16E-10	0.0000	0.0000	2.14E-10	0.0000	0.0000	2.13E-10
132	0.02	0.000	0.017	0.2985	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
133	0.78	0.030	0.017	0.3333	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134	0.09	0.000	0.252	0.3257	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
135	0.35	0.001	0.152	0.3353	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
136	0.00	0.000	0.333	0.3195	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137	0.00	0.000	0.276	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138	0.00	0.000	0.149	0.2992	0.0000	0.0001	6.91E-10	0.0000	0.0000	6.74E-10	0.0000	0.0000	6.57E-10
139	0.00	0.000	0.062	0.2963	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
140	0.21	0.000	0.048	0.3042	0.0000	0.0001	3.69E-10	0.0000	0.0000	3.64E-10	0.0000	0.0000	3.59E-10
141	0.02	0.000	0.040	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
142	0.01	0.000	0.036	0.3018	0.0000	0.0002	1.58E-09	0.0000	0.0000	1.49E-09	0.0000	0.0000	1.41E-09
143	0.02	0.000	0.032	0.3014	0.0000	0.0000	1.58E-10	0.0000	0.0000	1.57E-10	0.0000	0.0000	1.56E-10
144	0.07	0.000	0.030	0.3035	0.0000	0.0001	3.50E-10	0.0000	0.0000	3.46E-10	0.0000	0.0000	3.41E-10
145	0.00	0.000	0.027	0.3022	0.0000	0.0001	7.79E-10	0.0000	0.0000	7.57E-10	0.0000	0.0000	7.37E-10
146	0.00	0.000	0.026	0.3010	0.0000	0.0000	1.11E-10	0.0000	0.0000	1.10E-10	0.0000	0.0000	1.10E-10
147	0.00	0.000	0.024	0.2998	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
148	0.00	0.000	0.023	0.2987	0.0000	0.0002	1.21E-09	0.0000	0.0000	1.16E-09	0.0000	0.0000	1.11E-09
149	0.00	0.000	0.022	0.2977	0.0000	0.0001	5.82E-10	0.0000	0.0000	5.70E-10	0.0000	0.0000	5.58E-10
150	0.00	0.000	0.021	0.2967	0.0000	0.0000	2.86E-10	0.0000	0.0000	2.83E-10	0.0000	0.0000	2.80E-10
151	0.46	0.000	0.021	0.3175	0.0000	0.0002	1.10E-09	0.0000	0.0000	1.06E-09	0.0000	0.0000	1.02E-09
152	0.00	0.000	0.206	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
153	0.00	0.000	0.020	0.3067	0.0000	0.0000	2.56E-10	0.0000	0.0000	2.54E-10	0.0000	0.0000	2.51E-10
154	0.00	0.000	0.019	0.3058	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
155	0.00	0.000	0.018	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156	0.00	0.000	0.018	0.3041	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157	0.00	0.000	0.017	0.3033	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158	0.09	0.000	0.018	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159	0.01	0.000	0.017	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160	0.26	0.000	0.017	0.3185	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161	0.01	0.000	0.202	0.3095	0.0000	0.0001	4.19E-10	0.0000	0.0000	4.12E-10	0.0000	0.0000	4.06E-10
162	0.00	0.000	0.016	0.3087	0.0000	0.0005	2.42E-09	0.0000	0.0000	2.23E-09	0.0000	0.0000	2.06E-09
163	0.00	0.000	0.016	0.3081	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
164	0.00	0.000	0.016	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.11	0.000	0.016	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.01	0.000	0.016	0.3116	0.0000	0.0000	8.97E-11	0.0000	0.0000	8.94E-11	0.0000	0.0000	8.91E-11
167	0.17	0.000	0.015	0.3190	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
168	0.02	0.000	0.170	0.3118	0.0000	0.0003	1.97E-09	0.0000	0.0000	1.84E-09	0.0000	0.0000	1.73E-09
169	0.00	0.000	0.014	0.3112	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
170	0.00	0.000	0.014	0.3105	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.33	0.000	0.015	0.3254	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.04	0.000	0.376	0.3094	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.19	0.000	0.014	0.3180	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.23	0.000	0.159	0.3213	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.71	0.101	0.302	0.3358	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	1.79	0.985	0.275	0.3610	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.04	0.000	0.255	0.3509	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.12	0.000	0.179	0.3483	0.0000	0.0002	9.07E-10	0.0000	0.0000	8.78E-10	0.0000	0.0000	8.51E-10
179	0.01	0.000	0.143	0.3422	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
180	0.10	0.000	0.158	0.3393	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.00	0.000	0.374	0.3217	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.15	0.000	0.150	0.3218	0.0000	0.0006	4.16E-09	0.0000	0.0000	2.84E-09	0.0000	0.0000	2.58E-09
183	0.32	0.000	0.063	0.3338	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.03E-10	0.0000	0.0000	8.74E-10
184	0.09	0.000	0.122	0.3322	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.00	0.000	0.263	0.3197	0.0000	0.0002	1.95E-09	0.0000	0.0000	1.82E-09	0.0000	0.0000	1.71E-09
186	0.00	0.000	0.149	0.3126	0.0000	0.0003	2.80E-09	0.0000	0.0000	2.54E-09	0.0000	0.0000	2.33E-09
187	0.00	0.000	0.062	0.3093	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
188	0.00	0.000	0.047	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.00	0.000	0.040	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.00	0.000	0.035	0.3021	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.00	0.000	0.032	0.3001	0.0000	0.0002	2.51E-09	0.0000	0.0000	2.30E-09	0.0000	0.0000	2.12E-09
192	0.00	0.000	0.029	0.2982	0.0000	0.0004	3.88E-09	0.0000	0.0000	3.40E-09	0.0000	0.0000	3.03E-09
193	0.00	0.000	0.027	0.2964	0.0001	0.0035	1.79E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
194	0.00	0.000	0.026	0.2947	0.0001	0.0067	3.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
195	0.00	0.000	0.025	0.2933	0.0002	0.0082	3.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
196	0.21	0.000	0.025	0.3019	0.0002	0.0087	3.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
197	0.00	0.000	0.022	0.3006	0.0002	0.0086	3.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
198	0.00	0.000	0.021	0.2994	0.0002	0.0090	3.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
199	0.00	0.000	0.020	0.2983	0.0002	0.0095	4.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
200	0.00	0.000	0.020	0.2973	0.0002	0.0082	3.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
201	0.00	0.000	0.019	0.2962	0.0001	0.0044	2.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
202	0.34	0.000	0.020	0.3111	0.0001	0.0047	2.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
203	0.00	0.000	0.018	0.3101	0.0001	0.0065	3.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
204	0.20	0.000	0.019	0.3189	0.0002	0.0076	3.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
205	0.00	0.000	0.229	0.3080	0.0001	0.0064	3.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
206	0.00	0.000	0.017	0.3071	0.0001	0.0053	2.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
207	0.08	0.000	0.018	0.3102	0.0001	0.0042	2.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

208	0.00	0.000	0.016	0.3094	0.0001	0.0044	2.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
209	0.00	0.000	0.016	0.3087	0.0001	0.0043	2.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
210	0.00	0.000	0.015	0.3079	0.0001	0.0039	2.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
211	0.00	0.000	0.015	0.3072	0.0001	0.0028	1.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
212	0.00	0.000	0.015	0.3065	0.0000	0.0017	9.47E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
213	0.03	0.000	0.016	0.3070	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.44E-09	0.0000	0.0000	2.39E-09
214	0.00	0.000	0.014	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.64E-10
215	0.00	0.000	0.014	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.014	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	0.00	0.000	0.013	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.00	0.000	0.013	0.3037	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.00	0.000	0.013	0.3031	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	1.42	0.279	0.015	0.3566	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.00	0.000	0.243	0.3450	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.00	0.000	0.177	0.3366	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.00	0.000	0.173	0.3285	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.85	0.071	0.129	0.3595	0.0000	0.0001	7.99E-10	0.0000	0.0000	7.76E-10	0.0000	0.0000	7.55E-10
225	0.01	0.000	0.306	0.3456	0.0000	0.0005	2.64E-09	0.0000	0.0000	2.41E-09	0.0000	0.0000	1.71E-09
226	0.01	0.000	0.341	0.3298	0.0000	0.0001	4.92E-10	0.0000	0.0000	4.84E-10	0.0000	0.0000	9.02E-10
227	0.00	0.000	0.359	0.3127	0.0000	0.0009	4.47E-09	0.0000	0.0000	3.02E-09	0.0000	0.0000	2.22E-09
228	0.00	0.000	0.149	0.3056	0.0000	0.0011	6.22E-09	0.0000	0.0000	6.76E-09	0.0000	0.0000	6.80E-09
229	0.00	0.000	0.062	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.07E-10
230	0.00	0.000	0.047	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
231	0.00	0.000	0.040	0.2985	0.0000	0.0004	2.65E-09	0.0000	0.0000	2.41E-09	0.0000	0.0000	2.22E-09
232	0.00	0.000	0.035	0.2968	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
233	0.00	0.000	0.032	0.2953	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.00	0.000	0.029	0.2939	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
235	0.00	0.000	0.027	0.2926	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
236	0.00	0.000	0.026	0.2914	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.00	0.000	0.024	0.2902	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	0.00	0.000	0.023	0.2891	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
239	0.00	0.000	0.022	0.2880	0.0000	0.0006	4.39E-09	0.0000	0.0000	4.08E-09	0.0000	0.0000	3.81E-09
240	0.00	0.000	0.021	0.2869	0.0000	0.0004	3.14E-09	0.0000	0.0000	2.81E-09	0.0000	0.0000	2.55E-09
241	0.04	0.000	0.022	0.2875	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
242	0.00	0.000	0.020	0.2863	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.00	0.000	0.019	0.2851	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
244	0.03	0.000	0.020	0.2854	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
245	2.33	1.166	0.020	0.3396	0.0000	0.0003	3.44E-09	0.0000	0.0000	3.06E-09	0.0000	0.0000	2.75E-09
246	0.00	0.000	0.241	0.3274	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
247	0.01	0.000	0.105	0.3223	0.0001	0.0027	1.48E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
248	0.12	0.000	0.232	0.3165	0.0001	0.0026	1.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
249	0.00	0.000	0.181	0.3078	0.0003	0.0121	5.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
250	0.00	0.000	0.104	0.3029	0.0002	0.0105	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

251		0.04	0.000	0.087	0.3005	0.0002	0.0085	3.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
252		0.07	0.000	0.207	0.2941	0.0001	0.0068	3.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
253		0.15	0.000	0.151	0.2939	0.0001	0.0062	2.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
254		0.00	0.000	0.062	0.2909	0.0001	0.0048	2.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
255		0.00	0.000	0.047	0.2887	0.0001	0.0047	2.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
256		0.51	0.000	0.042	0.3111	0.0001	0.0045	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257		2.08	0.910	0.326	0.3511	0.0001	0.0040	1.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258		0.18	0.001	0.168	0.3515	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259		0.00	0.000	0.292	0.3375	0.0001	0.0029	1.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260		0.00	0.000	0.206	0.3277	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.34E-09	0.0000	0.0000	4.37E-09
261		0.00	0.000	0.150	0.3206	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.84E-10
262		0.00	0.000	0.085	0.3166	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
263		0.01	0.000	0.102	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
264		0.53	0.001	0.112	0.3319	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
265		0.00	0.000	0.156	0.3245	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
266		0.00	0.000	0.093	0.3200	0.0000	0.0001	1.03E-09	0.0000	0.0000	9.89E-10	0.0000	0.0000	9.54E-10
267		0.00	0.000	0.131	0.3138	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
268		0.00	0.000	0.152	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
269		1.11	0.117	0.151	0.3464	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
270		0.00	0.000	0.086	0.3423	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
271		1.15	0.332	0.094	0.3767	0.0000	0.0002	8.40E-10	0.0000	0.0000	8.15E-10	0.0000	0.0000	7.91E-10
272		0.00	0.000	0.137	0.3702	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
273		0.00	0.000	0.074	0.3667	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
274		0.00	0.000	0.094	0.3589	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
275	*	0.07	0.000	0.069	0.3549	0.0001	0.0031	1.29E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
276	*	0.00	0.000	0.079	0.3483	0.0010	0.0470	1.66E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277		0.33	0.000	0.103	0.3566	0.0012	0.0574	2.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278	*	0.00	0.000	0.060	0.3516	0.0013	0.0597	2.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279	*	0.00	0.000	0.000	0.3502	0.0009	0.0436	1.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280	*	0.00	0.000	0.000	0.3488	0.0007	0.0318	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281		0.00	0.000	0.114	0.3418	0.0006	0.0288	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.64	0.034	0.138	0.3628	0.0009	0.0352	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.48	0.070	0.154	0.3738	0.0007	0.0287	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.00	0.000	0.093	0.3684	0.0005	0.0221	8.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.200	0.3579	0.0007	0.0306	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.00	0.000	0.250	0.3457	0.0005	0.0247	9.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.00	0.000	0.186	0.3349	0.0001	0.0074	3.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.00	0.000	0.232	0.3218	0.0004	0.0215	8.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.00	0.000	0.149	0.3130	0.0009	0.0420	1.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.00	0.000	0.062	0.3082	0.0008	0.0355	1.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.06	0.000	0.050	0.3068	0.0009	0.0405	1.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.00	0.000	0.040	0.3035	0.0008	0.0384	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.00	0.000	0.035	0.3006	0.0007	0.0335	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294		0.44	0.000	0.034	0.3187	0.0006	0.0289	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295		0.20	0.000	0.032	0.3259	0.0006	0.0260	9.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296		0.23	0.000	0.101	0.3314	0.0004	0.0201	7.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297		0.03	0.000	0.100	0.3274	0.0004	0.0186	7.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		0.00	0.000	0.075	0.3231	0.0004	0.0185	7.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299	*	0.00	0.000	0.040	0.3205	0.0004	0.0179	7.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.000	0.122	0.3139	0.0003	0.0143	5.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.00	0.000	0.149	0.3061	0.0004	0.0167	6.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.00	0.000	0.062	0.3027	0.0004	0.0186	7.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.00	0.000	0.047	0.3000	0.0003	0.0159	6.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.00	0.000	0.040	0.2978	0.0003	0.0136	5.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305	*	0.00	0.000	0.000	0.2976	0.0003	0.0125	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306	*	0.00	0.000	0.035	0.2957	0.0002	0.0097	4.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.00	0.000	0.032	0.2939	0.0002	0.0090	3.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		0.12	0.000	0.031	0.2982	0.0002	0.0109	4.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.00	0.000	0.027	0.2969	0.0002	0.0094	4.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.06	0.000	0.027	0.2983	0.0002	0.0078	3.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.62	0.005	0.026	0.3265	0.0001	0.0066	3.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.24	0.000	0.097	0.3333	0.0001	0.0057	2.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313	*	0.00	0.000	0.055	0.3307	0.0001	0.0050	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.00	0.000	0.088	0.3265	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315	*	0.00	0.000	0.055	0.3239	0.0001	0.0038	1.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316	*	0.03	0.000	0.022	0.3244	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317	*	0.42	0.000	0.036	0.3253	0.0000	0.0020	1.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318	*	0.00	0.000	0.035	0.3263	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.08E-09	0.0000	0.0000	3.74E-09
319	*	0.00	0.000	0.034	0.3272	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	8.33E-11
320		0.00	0.000	0.063	0.3366	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
321		0.00	0.000	0.103	0.3316	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
322		0.00	0.000	0.168	0.3236	0.0000	0.0006	3.42E-09	0.0000	0.0000	3.04E-09	0.0000	0.0000	2.74E-09
323		0.00	0.000	0.147	0.3166	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
324		0.00	0.000	0.154	0.3093	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
325		0.00	0.000	0.149	0.3022	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
326		0.00	0.000	0.062	0.2992	0.0000	0.0003	1.58E-09	0.0000	0.0000	1.49E-09	0.0000	0.0000	1.42E-09
327		0.00	0.000	0.047	0.2969	0.0000	0.0005	3.11E-09	0.0000	0.0000	2.80E-09	0.0000	0.0000	2.54E-09
328		0.00	0.000	0.040	0.2950	0.0000	0.0006	4.16E-09	0.0000	0.0000	3.88E-09	0.0000	0.0000	2.67E-09
329		0.00	0.000	0.035	0.2933	0.0000	0.0005	3.10E-09	0.0000	0.0000	2.78E-09	0.0000	0.0000	2.72E-09
330		0.00	0.000	0.032	0.2918	0.0000	0.0005	3.21E-09	0.0000	0.0000	2.87E-09	0.0000	0.0000	2.58E-09
331		0.56	0.000	0.030	0.3171	0.0000	0.0001	8.14E-10	0.0000	0.0000	7.90E-10	0.0000	0.0000	1.21E-09
332	*	0.03	0.000	0.032	0.3171	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.92E-10
333		0.04	0.000	0.077	0.3153	0.0000	0.0002	1.58E-09	0.0000	0.0000	1.50E-09	0.0000	0.0000	1.08E-09
334		0.00	0.000	0.127	0.3093	0.0000	0.0002	1.15E-09	0.0000	0.0000	1.11E-09	0.0000	0.0000	1.15E-09
335		0.00	0.000	0.127	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.66E-10
336		0.00	0.000	0.062	0.3003	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16

337		0.20	0.000	0.048	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
338		0.00	0.000	0.040	0.3057	0.0000	0.0000	2.46E-10	0.0000	0.0000	2.44E-10	0.0000	0.0000	2.42E-10
339	*	0.00	0.000	0.000	0.3057	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
340	*	0.00	0.000	0.003	0.3057	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
341	*	0.38	0.000	0.010	0.3066	0.0000	0.0000	2.09E-10	0.0000	0.0000	2.08E-10	0.0000	0.0000	2.06E-10
342	*	0.00	0.000	0.006	0.3075	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
343	*	0.06	0.000	0.011	0.3085	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
344	*	0.21	0.000	0.000	0.3094	0.0000	0.0000	3.02E-10	0.0000	0.0000	2.99E-10	0.0000	0.0000	2.95E-10
345	*	0.00	0.000	0.027	0.3104	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
346		0.00	0.004	0.000	0.3339	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
347		0.00	0.000	0.056	0.3313	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
348		0.00	0.000	0.089	0.3270	0.0000	0.0001	8.38E-10	0.0000	0.0000	8.13E-10	0.0000	0.0000	7.89E-10
349	*	0.00	0.000	0.000	0.3270	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
350		0.00	0.000	0.053	0.3245	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
351	*	0.10	0.000	0.024	0.3255	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
352	*	0.22	0.000	0.024	0.3264	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
353		0.00	0.000	0.032	0.3363	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
354		0.20	0.000	0.095	0.3415	0.0000	0.0002	1.58E-09	0.0000	0.0000	1.50E-09	0.0000	0.0000	1.42E-09
355		0.00	0.000	0.075	0.3379	0.0000	0.0003	1.57E-09	0.0000	0.0000	1.48E-09	0.0000	0.0000	1.41E-09
356		0.00	0.000	0.074	0.3344	0.0000	0.0001	6.90E-10	0.0000	0.0000	6.74E-10	0.0000	0.0000	6.57E-10
357		0.09	0.000	0.087	0.3346	0.0000	0.0001	4.39E-10	0.0000	0.0000	4.32E-10	0.0000	0.0000	4.25E-10
358		0.04	0.000	0.087	0.3321	0.0000	0.0002	9.45E-10	0.0000	0.0000	9.13E-10	0.0000	0.0000	8.84E-10
359	*	0.00	0.000	0.046	0.3300	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
360		0.00	0.000	0.056	0.3273	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
361	*	0.00	0.000	0.000	0.3273	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
362	*	0.01	0.000	0.043	0.3255	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
363	*	0.13	0.000	0.017	0.3265	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
364		0.00	0.000	0.046	0.3288	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
365		0.87	0.111	0.097	0.3605	0.0000	0.0006	4.66E-09	0.0000	0.0000	4.30E-09	0.0000	0.0000	2.92E-09

* = Frozen (air or soil)

Annual Totals for Year 25			
	inches	cubic feet	percent
Precipitation	37.59	136,441.1	100.00
Runoff	6.801	24,686.8	18.09
Evapotranspiration	27.403	99,474.1	72.91
Drainage Collected from Layer 2	3.0181	10,955.8	8.03
Percolation/Leakage through Layer 3	0.000012	0.0422	0.00
Average Head on Top of Layer 3	0.0002	---	---
Drainage Collected from Layer 7	0.0000	0.0376	0.00
Percolation/Leakage through Layer 8	0.000001	0.0046	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0045	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.3648	1,324.2	0.97
Soil Water at Start of Year	256.6218	931,537.1	682.74
Soil Water at End of Year	257.2126	933,681.8	684.31
Snow Water at Start of Year	0.2260	820.5	0.60
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 26

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.133	0.3541	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	9.28E-10
2			0.30	0.001	0.150	0.3610	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
3			0.03	0.000	0.089	0.3582	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
4			0.00	0.000	0.070	0.3549	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
5	*		0.00	0.000	0.003	0.3549	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
6			0.00	0.000	0.074	0.3514	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
7			0.00	0.000	0.112	0.3460	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
8			0.00	0.000	0.134	0.3392	0.0000	0.0006	3.20E-09	0.0000	0.0000	2.86E-09	0.0000	0.0000	2.01E-09
9			0.00	0.000	0.150	0.3306	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	6.48E-10
10			0.00	0.000	0.084	0.3257	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
11			0.01	0.000	0.066	0.3223	0.0000	0.0007	4.78E-09	0.0000	0.0000	4.40E-09	0.0000	0.0000	2.98E-09
12			0.00	0.000	0.057	0.3189	0.0001	0.0053	2.88E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.99E-09
13			0.00	0.000	0.087	0.3138	0.0001	0.0052	2.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14			1.57	0.415	0.070	0.3643	0.0003	0.0123	5.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*		0.00	0.000	0.000	0.3634	0.0004	0.0190	7.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16	*		0.05	0.000	0.032	0.3630	0.0003	0.0161	6.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.00	0.000	0.074	0.3583	0.0005	0.0232	8.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18	*		0.00	0.000	0.000	0.3581	0.0007	0.0339	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19	*		0.00	0.000	0.053	0.3553	0.0004	0.0164	6.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20	*		0.00	0.000	0.000	0.3538	0.0000	0.0000	2.72E-10	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21	*		0.13	0.000	0.016	0.3525	0.0003	0.0153	6.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22	*		0.00	0.000	0.050	0.3516	0.0008	0.0396	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23			0.09	0.000	0.056	0.3529	0.0008	0.0398	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24			0.03	0.000	0.079	0.3490	0.0007	0.0345	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*		0.00	0.000	0.000	0.3477	0.0007	0.0327	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26	*		0.00	0.000	0.004	0.3465	0.0006	0.0293	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*		0.06	0.000	0.017	0.3462	0.0006	0.0271	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28			0.73	0.079	0.000	0.3774	0.0005	0.0259	9.81E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*		0.01	0.000	0.012	0.3762	0.0004	0.0189	7.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*		0.00	0.000	0.000	0.3758	0.0007	0.0324	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31			0.00	0.000	0.068	0.3672	0.0003	0.0171	6.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32			0.06	0.000	0.103	0.3606	0.0022	0.1060	3.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33			0.16	0.000	0.172	0.3566	0.0018	0.0839	2.79E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34			0.02	0.000	0.149	0.3475	0.0015	0.0702	2.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35			0.20	0.000	0.105	0.3505	0.0012	0.0575	1.99E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36		0.07	0.000	0.094	0.3484	0.0007	0.0341	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
37	*	0.00	0.000	0.058	0.3443	0.0006	0.0296	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
38	*	0.00	0.000	0.000	0.3431	0.0006	0.0272	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
39		0.00	0.000	0.068	0.3386	0.0006	0.0274	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
40	*	0.10	0.000	0.030	0.3382	0.0006	0.0265	1.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
41		0.00	0.000	0.107	0.3343	0.0006	0.0293	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42		0.09	0.000	0.119	0.3320	0.0005	0.0265	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43		0.40	0.000	0.127	0.3443	0.0005	0.0255	9.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44		0.00	0.000	0.069	0.3402	0.0004	0.0171	6.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45		0.00	0.000	0.115	0.3340	0.0004	0.0170	6.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46		0.00	0.000	0.159	0.3257	0.0004	0.0170	7.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47		0.02	0.000	0.085	0.3217	0.0003	0.0136	5.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48		0.00	0.000	0.100	0.3161	0.0004	0.0178	7.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49		0.35	0.000	0.066	0.3292	0.0004	0.0190	7.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50		0.69	0.062	0.114	0.3532	0.0003	0.0160	6.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		0.09	0.000	0.143	0.3501	0.0003	0.0143	5.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		0.51	0.049	0.126	0.3656	0.0003	0.0137	5.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		0.01	0.000	0.085	0.3618	0.0003	0.0154	6.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		0.00	0.000	0.169	0.3537	0.0003	0.0132	5.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55		0.00	0.000	0.168	0.3458	0.0002	0.0103	4.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56		0.00	0.000	0.169	0.3377	0.0002	0.0083	3.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57		0.00	0.000	0.163	0.3299	0.0001	0.0066	2.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58		0.00	0.000	0.152	0.3216	0.0000	0.0000	2.56E-10	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59		0.00	0.000	0.149	0.3133	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.80E-09	0.0000	0.0000	1.97E-09
60		0.21	0.000	0.062	0.3191	0.0000	0.0001	1.00E-09	0.0000	0.0000	9.67E-10	0.0000	0.0000	1.32E-09
61		0.00	0.000	0.047	0.3153	0.0003	0.0147	5.96E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.84E-09
62		0.00	0.000	0.040	0.3120	0.0006	0.0272	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
63		0.00	0.000	0.035	0.3092	0.0006	0.0283	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64		0.00	0.000	0.032	0.3066	0.0006	0.0272	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65		0.00	0.000	0.029	0.3043	0.0005	0.0249	9.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66		0.00	0.000	0.027	0.3023	0.0005	0.0222	8.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67		0.00	0.000	0.026	0.3004	0.0004	0.0198	7.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68		0.14	0.000	0.025	0.3050	0.0004	0.0169	6.76E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69	*	1.84	0.000	0.000	0.3055	0.0004	0.0178	7.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70	*	0.00	0.000	0.042	0.3061	0.0003	0.0150	6.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71		0.00	0.634	0.000	0.3595	0.0003	0.0136	5.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72		0.16	0.000	0.093	0.3624	0.0003	0.0127	5.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73	*	0.00	0.000	0.000	0.3620	0.0002	0.0077	3.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74	*	0.59	0.000	0.018	0.3624	0.0001	0.0054	2.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75		0.00	0.037	0.021	0.3832	0.0003	0.0104	4.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76		0.00	0.000	0.062	0.3823	0.0002	0.0111	4.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77		0.00	0.000	0.100	0.3722	0.0001	0.0042	1.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78	*	0.00	0.000	0.060	0.3630	0.0022	0.1048	3.39E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79	*	0.00	0.000	0.000	0.3588	0.0023	0.1062	3.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.00	0.000	0.145	0.3487	0.0017	0.0804	2.68E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.00	0.000	0.080	0.3420	0.0014	0.0647	2.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82	*	0.00	0.000	0.000	0.3403	0.0013	0.0601	2.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		2.02	0.876	0.080	0.3892	0.0007	0.0351	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.00	0.000	0.137	0.3816	0.0009	0.0450	1.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.135	0.3666	0.0018	0.0881	2.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.151	0.3535	0.0031	0.1451	4.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.247	0.3380	0.0020	0.0934	3.07E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88		0.00	0.000	0.230	0.3248	0.0015	0.0713	2.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89		0.09	0.000	0.089	0.3231	0.0011	0.0495	1.74E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.06	0.000	0.062	0.3211	0.0008	0.0355	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.00	0.000	0.047	0.3170	0.0009	0.0403	1.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.06	0.000	0.040	0.3161	0.0008	0.0388	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.00	0.000	0.035	0.3132	0.0008	0.0353	1.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.032	0.3106	0.0006	0.0303	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.08	0.000	0.030	0.3118	0.0005	0.0255	9.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.01	0.000	0.028	0.3103	0.0005	0.0245	9.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.00	0.000	0.026	0.3084	0.0005	0.0215	8.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.00	0.000	0.024	0.3065	0.0004	0.0173	6.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.00	0.000	0.023	0.3048	0.0004	0.0173	6.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.00	0.000	0.022	0.3032	0.0003	0.0158	6.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.00	0.000	0.021	0.3017	0.0003	0.0145	5.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102	*	0.16	0.000	0.065	0.3022	0.0003	0.0138	5.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.07	0.000	0.076	0.3051	0.0003	0.0125	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.42	0.000	0.021	0.3238	0.0003	0.0117	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105	*	0.08	0.000	0.098	0.3223	0.0002	0.0108	4.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106	*	0.40	0.000	0.025	0.3228	0.0002	0.0099	4.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107		0.00	0.000	0.059	0.3363	0.0002	0.0087	3.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.00	0.000	0.227	0.3248	0.0001	0.0052	2.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.00	0.000	0.323	0.3087	0.0002	0.0082	3.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.00	0.000	0.149	0.3014	0.0004	0.0177	7.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.00	0.000	0.062	0.2985	0.0003	0.0159	6.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.00	0.000	0.047	0.2962	0.0003	0.0117	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113		0.08	0.000	0.040	0.2983	0.0002	0.0093	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114		0.04	0.000	0.035	0.2986	0.0002	0.0077	3.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		0.02	0.000	0.032	0.2979	0.0001	0.0065	2.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116		0.01	0.000	0.029	0.2971	0.0001	0.0057	2.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117		0.00	0.000	0.027	0.2958	0.0001	0.0050	2.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118		0.00	0.000	0.026	0.2945	0.0001	0.0027	1.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119		0.00	0.000	0.024	0.2933	0.0001	0.0037	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120		0.00	0.000	0.023	0.2922	0.0001	0.0041	2.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121		0.08	0.000	0.022	0.2948	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122	0.49	0.000	0.021	0.3169	0.0000	0.0020	1.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123	0.04	0.000	0.173	0.3103	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.07E-09	0.0000	0.0000	3.80E-09
124	0.00	0.000	0.426	0.2900	0.0000	0.0001	8.42E-10	0.0000	0.0000	8.17E-10	0.0000	0.0000	7.93E-10
125	0.20	0.000	0.149	0.2925	0.0000	0.0001	4.94E-10	0.0000	0.0000	4.85E-10	0.0000	0.0000	4.77E-10
126	0.01	0.000	0.062	0.2901	0.0000	0.0004	2.90E-09	0.0000	0.0000	2.62E-09	0.0000	0.0000	2.39E-09
127	0.00	0.000	0.047	0.2879	0.0000	0.0004	2.48E-09	0.0000	0.0000	2.27E-09	0.0000	0.0000	2.10E-09
128	0.03	0.000	0.040	0.2872	0.0000	0.0000	3.04E-10	0.0000	0.0000	3.01E-10	0.0000	0.0000	2.98E-10
129	0.00	0.000	0.035	0.2855	0.0000	0.0001	6.16E-10	0.0000	0.0000	6.02E-10	0.0000	0.0000	5.89E-10
130	0.02	0.000	0.032	0.2848	0.0000	0.0002	1.82E-09	0.0000	0.0000	1.71E-09	0.0000	0.0000	1.61E-09
131	0.36	0.000	0.030	0.3005	0.0000	0.0000	2.64E-10	0.0000	0.0000	2.62E-10	0.0000	0.0000	2.59E-10
132	0.38	0.000	0.027	0.3173	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
133	0.01	0.000	0.389	0.2992	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134	0.00	0.000	0.026	0.2980	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
135	0.02	0.000	0.024	0.2977	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
136	0.49	0.000	0.023	0.3198	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137	0.22	0.000	0.150	0.3231	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138	0.00	0.000	0.329	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.01	0.000	0.140	0.3014	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140	0.11	0.000	0.062	0.3038	0.0000	0.0002	8.83E-10	0.0000	0.0000	8.56E-10	0.0000	0.0000	8.30E-10
141	0.00	0.000	0.047	0.3016	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
142	0.00	0.000	0.040	0.2997	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143	1.58	0.438	0.036	0.3524	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144	0.00	0.000	0.254	0.3403	0.0000	0.0001	8.88E-10	0.0000	0.0000	8.61E-10	0.0000	0.0000	8.34E-10
145	0.00	0.000	0.245	0.3287	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
146	0.00	0.000	0.162	0.3210	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
147	0.20	0.000	0.114	0.3251	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
148	0.00	0.000	0.204	0.3154	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
149	0.01	0.000	0.184	0.3073	0.0000	0.0004	2.19E-09	0.0000	0.0000	2.03E-09	0.0000	0.0000	1.89E-09
150	0.31	0.000	0.149	0.3149	0.0000	0.0004	2.16E-09	0.0000	0.0000	2.00E-09	0.0000	0.0000	1.87E-09
151	0.07	0.000	0.266	0.3057	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
152	0.13	0.000	0.062	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153	0.00	0.000	0.047	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154	0.00	0.000	0.040	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
155	0.14	0.000	0.036	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156	0.66	0.022	0.032	0.3383	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157	0.00	0.000	0.303	0.3239	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158	0.14	0.000	0.327	0.3152	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159	0.66	0.027	0.208	0.3355	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160	0.10	0.000	0.389	0.3219	0.0000	0.0001	7.37E-10	0.0000	0.0000	7.18E-10	0.0000	0.0000	7.00E-10
161	0.00	0.000	0.378	0.3039	0.0000	0.0006	3.10E-09	0.0000	0.0000	2.79E-09	0.0000	0.0000	2.53E-09
162	0.00	0.000	0.149	0.2968	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
163	0.00	0.000	0.062	0.2939	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164	0.00	0.000	0.047	0.2916	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.01	0.000	0.041	0.2902	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.00	0.000	0.033	0.2886	0.0000	0.0007	4.89E-09	0.0000	0.0000	4.49E-09	0.0000	0.0000	3.04E-09
167	0.00	0.000	0.031	0.2871	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	9.64E-10
168	0.21	0.000	0.030	0.2957	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
169	0.00	0.000	0.027	0.2944	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
170	0.00	0.000	0.026	0.2931	0.0000	0.0004	2.95E-09	0.0000	0.0000	2.67E-09	0.0000	0.0000	2.43E-09
171	0.00	0.000	0.024	0.2920	0.0000	0.0000	6.43E-10	0.0000	0.0000	6.28E-10	0.0000	0.0000	6.14E-10
172	0.00	0.000	0.023	0.2909	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
173	0.00	0.000	0.022	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.00	0.000	0.021	0.2888	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.00	0.000	0.020	0.2879	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.04	0.000	0.021	0.2890	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.00	0.000	0.019	0.2881	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.00	0.000	0.018	0.2873	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.018	0.2864	0.0000	0.0005	4.59E-09	0.0000	0.0000	3.09E-09	0.0000	0.0000	2.78E-09
180	0.00	0.000	0.017	0.2856	0.0000	0.0001	1.19E-09	0.0000	0.0000	1.81E-09	0.0000	0.0000	1.69E-09
181	0.12	0.000	0.018	0.2906	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.84E-10	0.0000	0.0000	2.81E-10
182	0.35	0.000	0.018	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.00	0.000	0.017	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.00	0.000	0.016	0.3048	0.0000	0.0000	2.36E-10	0.0000	0.0000	2.34E-10	0.0000	0.0000	2.32E-10
185	1.02	0.139	0.017	0.3458	0.0000	0.0000	2.46E-10	0.0000	0.0000	2.44E-10	0.0000	0.0000	2.42E-10
186	0.22	0.004	0.339	0.3400	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
187	0.00	0.000	0.264	0.3273	0.0000	0.0001	7.75E-10	0.0000	0.0000	7.54E-10	0.0000	0.0000	7.33E-10
188	0.00	0.000	0.310	0.3125	0.0000	0.0015	8.39E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
189	0.18	0.000	0.150	0.3141	0.0000	0.0003	1.94E-09	0.0000	0.0000	2.80E-09	0.0000	0.0000	2.94E-09
190	0.00	0.000	0.335	0.2979	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.54E-10	0.0000	0.0000	9.62E-10
191	0.00	0.000	0.062	0.2950	0.0001	0.0037	1.90E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.75E-09
192	0.00	0.000	0.047	0.2927	0.0000	0.0017	8.64E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
193	0.33	0.000	0.041	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.88E-09	0.0000	0.0000	3.32E-09
194	0.27	0.000	0.037	0.3176	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.00	0.000	0.271	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
196	0.00	0.000	0.033	0.3033	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.19	0.000	0.031	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.03	0.000	0.029	0.3108	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.00	0.000	0.026	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.01	0.000	0.026	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.00	0.000	0.023	0.3078	0.0000	0.0003	2.71E-09	0.0000	0.0000	2.47E-09	0.0000	0.0000	2.26E-09
202	0.00	0.000	0.022	0.3067	0.0000	0.0001	1.59E-09	0.0000	0.0000	1.50E-09	0.0000	0.0000	1.42E-09
203	0.05	0.000	0.023	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
204	0.12	0.000	0.022	0.3128	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.00	0.000	0.020	0.3119	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
206	0.90	0.120	0.020	0.3481	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
207	0.05	0.000	0.249	0.3385	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.65	0.074	0.103	0.3610	0.0000	0.0000	1.23E-10	0.0000	0.0000	1.22E-10	0.0000	0.0000	1.22E-10
209	0.04	0.000	0.195	0.3536	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
210	0.22	0.000	0.131	0.3576	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.00	0.000	0.170	0.3495	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
212	0.00	0.000	0.121	0.3437	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
213	0.01	0.000	0.313	0.3295	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.00	0.000	0.251	0.3173	0.0000	0.0017	9.33E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
215	1.45	0.315	0.151	0.3643	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
216	0.29	0.021	0.134	0.3702	0.0000	0.0020	1.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
217	0.00	0.000	0.125	0.3639	0.0000	0.0022	1.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
218	0.02	0.000	0.331	0.3487	0.0000	0.0017	8.29E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
219	0.00	0.000	0.214	0.3386	0.0001	0.0054	2.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
220	0.00	0.000	0.274	0.3254	0.0001	0.0036	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
221	0.00	0.000	0.149	0.3166	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.39E-09	0.0000	0.0000	4.90E-09
222	0.00	0.000	0.062	0.3126	0.0000	0.0003	2.51E-09	0.0000	0.0000	2.30E-09	0.0000	0.0000	2.50E-09
223	0.66	0.009	0.049	0.3406	0.0001	0.0044	2.21E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.68E-09
224	0.31	0.000	0.129	0.3485	0.0002	0.0105	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
225	0.16	0.000	0.308	0.3404	0.0003	0.0143	5.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
226	0.00	0.000	0.250	0.3277	0.0004	0.0164	6.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
227	0.00	0.000	0.125	0.3207	0.0003	0.0138	5.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
228	0.10	0.000	0.151	0.3174	0.0004	0.0186	7.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
229	0.07	0.000	0.064	0.3166	0.0004	0.0203	7.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
230	0.06	0.000	0.049	0.3166	0.0004	0.0207	8.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
231	0.92	0.093	0.042	0.3532	0.0004	0.0175	6.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
232	0.00	0.000	0.248	0.3405	0.0003	0.0156	6.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
233	0.00	0.000	0.270	0.3269	0.0004	0.0185	7.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
234	0.00	0.000	0.320	0.3110	0.0004	0.0178	7.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
235	0.00	0.000	0.149	0.3039	0.0005	0.0228	8.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
236	0.00	0.000	0.062	0.3010	0.0003	0.0156	6.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
237	0.00	0.000	0.047	0.2987	0.0002	0.0117	4.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
238	0.00	0.000	0.040	0.2968	0.0002	0.0092	4.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
239	0.00	0.000	0.035	0.2951	0.0002	0.0076	3.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
240	0.00	0.000	0.033	0.2936	0.0001	0.0065	2.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
241	0.35	0.000	0.031	0.3087	0.0001	0.0056	2.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
242	0.13	0.000	0.029	0.3134	0.0001	0.0049	2.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
243	0.00	0.000	0.026	0.3121	0.0001	0.0040	1.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
244	0.00	0.000	0.024	0.3110	0.0001	0.0035	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
245	0.00	0.000	0.023	0.3099	0.0001	0.0037	1.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
246	0.27	0.000	0.024	0.3214	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
247	0.00	0.000	0.133	0.3153	0.0000	0.0002	1.11E-09	0.0000	0.0000	6.78E-09	0.0000	0.0000	5.10E-09
248	0.00	0.000	0.021	0.3143	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	8.31E-10
249	0.00	0.000	0.020	0.3133	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
250	0.00	0.000	0.020	0.3124	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

251		0.00	0.000	0.019	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
252		0.00	0.000	0.018	0.3106	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
253		0.00	0.000	0.018	0.3097	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
254		0.00	0.000	0.017	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
255		0.00	0.000	0.017	0.3081	0.0000	0.0001	8.69E-10	0.0000	0.0000	8.42E-10	0.0000	0.0000	8.17E-10
256		0.00	0.000	0.016	0.3073	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
257		0.00	0.000	0.016	0.3065	0.0000	0.0002	1.69E-09	0.0000	0.0000	1.59E-09	0.0000	0.0000	1.50E-09
258		0.00	0.000	0.016	0.3058	0.0000	0.0002	1.64E-09	0.0000	0.0000	1.55E-09	0.0000	0.0000	1.47E-09
259		0.00	0.000	0.015	0.3051	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
260		0.00	0.000	0.015	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261		0.10	0.000	0.017	0.3084	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262		0.00	0.000	0.014	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
263		0.00	0.000	0.014	0.3070	0.0000	0.0009	5.29E-09	0.0000	0.0000	4.79E-09	0.0000	0.0000	3.21E-09
264		0.00	0.000	0.014	0.3063	0.0000	0.0004	3.07E-09	0.0000	0.0000	2.76E-09	0.0000	0.0000	2.86E-09
265		0.00	0.000	0.014	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	6.28E-10
266		0.00	0.000	0.013	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
267		0.37	0.000	0.016	0.3217	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
268	*	0.00	0.000	0.073	0.3182	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
269	*	0.00	0.000	0.050	0.3158	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
270		0.00	0.000	0.087	0.3116	0.0000	0.0010	6.13E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
271		0.00	0.000	0.062	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.53E-10	0.0000	0.0000	1.25E-09
272		0.38	0.000	0.050	0.3245	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.26E-11
273		0.00	0.000	0.064	0.3215	0.0000	0.0001	6.91E-10	0.0000	0.0000	6.74E-10	0.0000	0.0000	6.58E-10
274	*	0.00	0.000	0.071	0.3181	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
275	*	0.00	0.000	0.000	0.3181	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
276		0.00	0.000	0.137	0.3115	0.0000	0.0007	3.75E-09	0.0000	0.0000	3.30E-09	0.0000	0.0000	2.95E-09
277		0.00	0.000	0.149	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
278		0.00	0.000	0.064	0.3016	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
279		0.00	0.000	0.047	0.2993	0.0000	0.0000	1.76E-10	0.0000	0.0000	1.75E-10	0.0000	0.0000	1.74E-10
280		0.00	0.000	0.040	0.2974	0.0000	0.0000	1.17E-10	0.0000	0.0000	1.17E-10	0.0000	0.0000	1.16E-10
281		0.00	0.000	0.035	0.2958	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
282		0.00	0.000	0.032	0.2942	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
283		0.00	0.000	0.029	0.2929	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
284		0.00	0.000	0.027	0.2916	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
285		0.16	0.000	0.028	0.2979	0.0000	0.0000	8.84E-11	0.0000	0.0000	8.81E-11	0.0000	0.0000	8.79E-11
286		0.00	0.000	0.024	0.2967	0.0000	0.0000	1.92E-10	0.0000	0.0000	1.91E-10	0.0000	0.0000	1.89E-10
287		0.00	0.000	0.023	0.2956	0.0000	0.0002	1.44E-09	0.0000	0.0000	1.36E-09	0.0000	0.0000	1.30E-09
288		0.00	0.000	0.022	0.2946	0.0000	0.0008	6.20E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
289		0.00	0.000	0.021	0.2936	0.0000	0.0001	1.56E-09	0.0000	0.0000	1.41E-09	0.0000	0.0000	2.04E-09
290		0.00	0.000	0.020	0.2926	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.70E-10	0.0000	0.0000	6.04E-10
291		0.00	0.000	0.020	0.2917	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	9.12E-11
292		0.00	0.000	0.019	0.2908	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
293		0.00	0.000	0.018	0.2899	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

294		0.73	0.012	0.020	0.3233	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
295		0.26	0.000	0.155	0.3285	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
296		0.00	0.000	0.080	0.3247	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
297		0.00	0.000	0.072	0.3213	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
298		0.00	0.000	0.113	0.3159	0.0000	0.0001	4.52E-10	0.0000	0.0000	4.45E-10	0.0000	0.0000	4.38E-10
299		0.00	0.000	0.149	0.3088	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
300		0.00	0.000	0.062	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
301		0.00	0.000	0.047	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
302		0.19	0.000	0.042	0.3106	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
303		0.00	0.000	0.035	0.3089	0.0000	0.0000	3.30E-10	0.0000	0.0000	3.26E-10	0.0000	0.0000	3.22E-10
304		0.00	0.000	0.032	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
305		0.00	0.000	0.029	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
306		0.00	0.000	0.027	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
307		0.24	0.000	0.027	0.3149	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
308		0.00	0.000	0.024	0.3137	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
309		0.48	0.006	0.024	0.3351	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
310		0.36	0.015	0.075	0.3478	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
311		0.00	0.000	0.137	0.3413	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
312		0.08	0.000	0.103	0.3401	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
313		0.00	0.000	0.149	0.3330	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
314		0.00	0.000	0.091	0.3287	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
315	*	0.50	0.000	0.031	0.3296	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
316		0.04	0.000	0.000	0.3460	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
317		0.00	0.000	0.041	0.3508	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
318		0.00	0.000	0.063	0.3478	0.0000	0.0000	3.21E-10	0.0000	0.0000	3.17E-10	0.0000	0.0000	3.13E-10
319		0.00	0.000	0.070	0.3445	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
320		0.00	0.000	0.119	0.3388	0.0000	0.0004	2.19E-09	0.0000	0.0000	2.02E-09	0.0000	0.0000	1.88E-09
321	*	0.00	0.000	0.050	0.3364	0.0000	0.0001	6.96E-10	0.0000	0.0000	6.79E-10	0.0000	0.0000	6.63E-10
322	*	1.07	0.000	0.018	0.3373	0.0000	0.0000	2.01E-10	0.0000	0.0000	2.00E-10	0.0000	0.0000	1.99E-10
323	*	0.05	0.000	0.031	0.3383	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
324	*	0.00	0.000	0.015	0.3392	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
325	*	0.00	0.000	0.021	0.3401	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
326		0.49	0.405	0.000	0.3900	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
327	*	0.00	0.000	0.045	0.3867	0.0000	0.0019	9.69E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
328	*	0.98	0.000	0.029	0.3768	0.0005	0.0328	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329	*	0.00	0.000	0.029	0.3712	0.0033	0.1554	4.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.00	0.000	0.041	0.3674	0.0024	0.1122	3.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.92	0.774	0.000	0.4095	0.0018	0.0829	2.73E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.00	0.000	0.122	0.3841	0.0071	0.3307	9.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.000	0.070	0.3702	0.0057	0.2662	7.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.17	0.000	0.032	0.3650	0.0032	0.1501	4.68E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	0.06	0.000	0.031	0.3618	0.0022	0.1051	3.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.28	0.004	0.016	0.3765	0.0017	0.0805	2.71E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337		0.08	0.000	0.076	0.3742	0.0015	0.0697	2.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.09	0.000	0.083	0.3712	0.0012	0.0580	2.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		0.00	0.000	0.065	0.3677	0.0014	0.0614	2.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.066	0.3617	0.0003	0.0130	5.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341	*	0.30	0.000	0.028	0.3600	0.0012	0.0549	1.91E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		0.00	0.000	0.041	0.3604	0.0011	0.0540	1.88E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343	*	0.00	0.000	0.024	0.3595	0.0009	0.0421	1.51E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344	*	0.00	0.000	0.027	0.3586	0.0008	0.0395	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345	*	0.00	0.000	0.026	0.3577	0.0008	0.0397	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346		0.00	0.000	0.069	0.3537	0.0008	0.0379	1.37E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347		0.00	0.000	0.076	0.3484	0.0009	0.0404	1.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.00	0.000	0.065	0.3439	0.0008	0.0386	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		0.00	0.000	0.098	0.3379	0.0007	0.0328	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.00	0.000	0.053	0.3342	0.0006	0.0268	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.00	0.000	0.095	0.3282	0.0006	0.0269	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		1.94	0.793	0.068	0.3781	0.0006	0.0290	1.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.01	0.000	0.102	0.3728	0.0006	0.0293	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.00	0.000	0.157	0.3652	0.0007	0.0322	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.00	0.000	0.092	0.3567	0.0001	0.0071	2.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		0.00	0.000	0.089	0.3491	0.0016	0.0744	2.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.19	0.000	0.089	0.3511	0.0013	0.0624	2.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		0.00	0.000	0.089	0.3441	0.0012	0.0573	1.98E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359		0.12	0.000	0.114	0.3422	0.0012	0.0577	2.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		0.00	0.000	0.176	0.3322	0.0010	0.0448	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.15	0.000	0.071	0.3350	0.0008	0.0394	1.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362	*	0.48	0.000	0.027	0.3352	0.0006	0.0263	9.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.00	0.000	0.040	0.3352	0.0004	0.0189	7.45E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.00	0.000	0.014	0.3512	0.0004	0.0196	7.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.00	0.000	0.061	0.3473	0.0004	0.0206	8.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 26			
	inches	cubic feet	percent
Precipitation	39.86	144,705.3	100.00
Runoff	5.425	19,692.5	13.61
Evapotranspiration	28.903	104,916.4	72.50
Drainage Collected from Layer 2	5.7025	20,700.0	14.30
Percolation/Leakage through Layer 3	0.000020	0.0733	0.00
Average Head on Top of Layer 3	0.0003	---	---
Drainage Collected from Layer 7	0.0000	0.0681	0.00
Percolation/Leakage through Layer 8	0.000001	0.0048	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0048	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-0.1663	-603.8	-0.42
Soil Water at Start of Year	257.2126	933,681.8	645.23
Soil Water at End of Year	257.0463	933,078.0	644.81
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 27

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.057	0.3438	0.0005	0.0218	8.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2	*		0.00	0.000	0.000	0.3431	0.0004	0.0204	7.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3	*		0.00	0.000	0.000	0.3425	0.0004	0.0174	7.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4	*		0.00	0.000	0.000	0.3418	0.0003	0.0148	6.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5	*		0.45	0.000	0.013	0.3420	0.0003	0.0151	6.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6	*		0.00	0.000	0.026	0.3423	0.0003	0.0154	6.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7	*		0.05	0.000	0.012	0.3426	0.0003	0.0148	6.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8	*		0.00	0.000	0.017	0.3429	0.0003	0.0129	5.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9	*		0.15	0.000	0.018	0.3432	0.0003	0.0152	6.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10	*		0.76	0.000	0.016	0.3437	0.0003	0.0151	6.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*		0.00	0.000	0.018	0.3442	0.0003	0.0139	5.70E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12			0.00	0.000	0.037	0.3493	0.0003	0.0145	5.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*		0.00	0.000	0.024	0.3501	0.0003	0.0129	5.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*		0.01	0.000	0.010	0.3510	0.0002	0.0109	4.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*		0.00	0.000	0.041	0.3520	0.0002	0.0095	4.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16			0.00	0.180	0.000	0.3854	0.0001	0.0059	2.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.49	0.182	0.121	0.3940	0.0001	0.0052	2.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.00	0.000	0.128	0.3822	0.0001	0.0021	9.16E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19			0.00	0.000	0.066	0.3698	0.0029	0.1413	4.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20			0.07	0.000	0.056	0.3646	0.0031	0.1424	4.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21	*		0.66	0.000	0.021	0.3613	0.0022	0.1029	3.36E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22	*		0.20	0.000	0.011	0.3593	0.0016	0.0748	2.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23	*	*	0.11	0.000	0.000	0.3593	0.0013	0.0616	2.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24	*	*	0.00	0.000	0.037	0.3593	0.0006	0.0260	9.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*	*	1.35	0.000	0.019	0.3593	0.0004	0.0165	6.62E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26		*	0.12	0.103	0.000	0.3672	0.0003	0.0121	5.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*	*	0.39	0.000	0.026	0.3673	0.0002	0.0095	4.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*	*	0.21	0.000	0.000	0.3675	0.0002	0.0078	3.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*	*	0.26	0.000	0.022	0.3675	0.0001	0.0066	3.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30	*	*	0.01	0.000	0.000	0.3675	0.0001	0.0057	2.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31		*	0.26	0.381	0.000	0.3756	0.0001	0.0051	2.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32		*	0.00	0.734	0.000	0.3821	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33		*	0.01	1.086	0.000	0.3873	0.0001	0.0041	2.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34	*	*	0.03	0.000	0.039	0.3873	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
35		*	0.00	0.346	0.015	0.3902	0.0000	0.0016	8.46E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

36		*	0.00	0.000	0.079	0.3902	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.41E-09	0.0000	0.0000	2.37E-09
37		*	0.79	0.722	0.000	0.3935	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.57E-10
38		*	1.07	1.007	0.000	0.3964	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
39	*	*	0.00	0.000	0.000	0.3964	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
40		*	0.00	0.000	0.000	0.3964	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
41			0.43	0.221	0.077	0.3965	0.0000	0.0014	6.38E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
42	*		0.00	0.000	0.076	0.3818	0.0029	0.1404	4.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43			0.00	0.000	0.134	0.3676	0.0035	0.1669	5.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44	*		0.00	0.000	0.071	0.3586	0.0030	0.1382	4.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45			0.00	0.000	0.123	0.3492	0.0021	0.0979	3.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46			0.00	0.000	0.124	0.3403	0.0015	0.0696	2.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47	*		0.00	0.000	0.068	0.3351	0.0013	0.0611	2.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48	*		0.00	0.000	0.000	0.3333	0.0009	0.0420	1.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49	*	*	0.00	0.000	0.000	0.3333	0.0010	0.0458	1.66E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50		*	0.00	0.000	0.000	0.3333	0.0005	0.0231	9.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		*	0.32	0.094	0.000	0.3441	0.0003	0.0153	6.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		*	0.00	0.000	0.000	0.3441	0.0002	0.0114	4.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		*	0.00	0.000	0.000	0.3441	0.0002	0.0091	3.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		*	0.00	0.000	0.000	0.3441	0.0002	0.0075	3.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55		*	0.00	0.000	0.000	0.3441	0.0001	0.0064	2.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56			0.14	0.000	0.239	0.3373	0.0000	0.0002	9.89E-10	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57			0.00	0.000	0.213	0.3257	0.0000	0.0020	1.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58			0.00	0.000	0.103	0.3198	0.0003	0.0119	5.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59	*		0.00	0.000	0.000	0.3188	0.0004	0.0175	6.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60			0.00	0.000	0.080	0.3139	0.0004	0.0189	7.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61			0.31	0.000	0.132	0.3218	0.0005	0.0238	9.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62			0.40	0.000	0.169	0.3320	0.0004	0.0180	7.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63			0.25	0.000	0.099	0.3386	0.0004	0.0188	7.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64			0.60	0.064	0.157	0.3556	0.0004	0.0189	7.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65	*		0.00	0.000	0.071	0.3513	0.0004	0.0183	7.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66			0.00	0.000	0.173	0.3423	0.0004	0.0196	7.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67			0.01	0.000	0.150	0.3350	0.0004	0.0194	7.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.03	0.000	0.136	0.3293	0.0004	0.0166	6.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.01	0.000	0.140	0.3229	0.0003	0.0158	6.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70	*		0.00	0.000	0.084	0.3186	0.0003	0.0125	5.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71	*		0.00	0.000	0.052	0.3161	0.0003	0.0145	5.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72	*		0.00	0.000	0.004	0.3161	0.0002	0.0115	4.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73	*		0.00	0.000	0.000	0.3161	0.0002	0.0093	4.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.00	0.000	0.094	0.3116	0.0002	0.0075	3.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			0.05	0.000	0.149	0.3064	0.0001	0.0027	1.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.00	0.000	0.062	0.3035	0.0001	0.0070	3.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.00	0.000	0.047	0.3012	0.0001	0.0060	3.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78			0.43	0.000	0.040	0.3200	0.0001	0.0053	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.00	0.000	0.114	0.3146	0.0001	0.0043	2.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80	*	0.00	0.000	0.000	0.3145	0.0001	0.0030	1.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.00	0.000	0.182	0.3057	0.0000	0.0019	1.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.00	0.000	0.149	0.2983	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.98E-09	0.0000	0.0000	3.73E-09
83		0.00	0.000	0.062	0.2947	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
84		0.00	0.000	0.047	0.2919	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
85		0.00	0.000	0.040	0.2895	0.0000	0.0011	7.72E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
86		0.00	0.000	0.030	0.2877	0.0001	0.0040	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.00	0.000	0.032	0.2859	0.0001	0.0057	3.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88	*	0.31	0.000	0.026	0.2866	0.0002	0.0072	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89	*	0.12	0.000	0.019	0.2873	0.0001	0.0070	3.36E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.00	0.000	0.066	0.3001	0.0001	0.0068	3.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91	*	0.00	0.000	0.000	0.3000	0.0001	0.0065	3.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.00	0.000	0.029	0.2984	0.0001	0.0067	3.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.00	0.000	0.027	0.2970	0.0001	0.0068	3.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.026	0.2958	0.0001	0.0069	3.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.00	0.000	0.024	0.2946	0.0001	0.0066	3.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.05	0.000	0.023	0.2960	0.0001	0.0057	2.68E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.46	0.000	0.022	0.3167	0.0001	0.0050	2.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.03	0.000	0.157	0.3105	0.0001	0.0045	2.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.10	0.000	0.252	0.3030	0.0001	0.0040	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100		0.11	0.000	0.116	0.3027	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.26	0.000	0.062	0.3120	0.0000	0.0020	1.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.00	0.000	0.126	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.13E-09	0.0000	0.0000	3.85E-09
103		0.33	0.000	0.048	0.3192	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
104		0.15	0.000	0.242	0.3148	0.0000	0.0004	2.08E-09	0.0000	0.0000	1.94E-09	0.0000	0.0000	1.81E-09
105		0.10	0.000	0.251	0.3074	0.0000	0.0005	2.71E-09	0.0000	0.0000	2.47E-09	0.0000	0.0000	2.26E-09
106		0.00	0.000	0.149	0.3003	0.0000	0.0002	8.88E-10	0.0000	0.0000	8.61E-10	0.0000	0.0000	8.34E-10
107		0.00	0.000	0.062	0.2973	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
108		0.00	0.000	0.047	0.2951	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
109		0.72	0.023	0.040	0.3262	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
110		0.60	0.084	0.349	0.3340	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
111		0.10	0.000	0.333	0.3228	0.0000	0.0002	8.68E-10	0.0000	0.0000	8.41E-10	0.0000	0.0000	8.16E-10
112		0.28	0.000	0.333	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
113		0.00	0.000	0.179	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
114		0.06	0.000	0.148	0.3078	0.0000	0.0000	2.97E-10	0.0000	0.0000	2.94E-10	0.0000	0.0000	2.91E-10
115		0.06	0.000	0.149	0.3037	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
116		0.07	0.000	0.062	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
117		0.10	0.000	0.048	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
118		0.16	0.000	0.040	0.3124	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
119		0.00	0.000	0.208	0.3025	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.00	0.000	0.035	0.3009	0.0000	0.0001	1.62E-09	0.0000	0.0000	1.53E-09	0.0000	0.0000	1.45E-09
121		0.38	0.000	0.032	0.3175	0.0000	0.0000	1.97E-10	0.0000	0.0000	1.96E-10	0.0000	0.0000	1.94E-10

122	0.00	0.000	0.173	0.3093	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
123	0.00	0.000	0.029	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
124	0.00	0.000	0.027	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125	0.00	0.000	0.026	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
126	0.00	0.000	0.024	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
127	0.00	0.000	0.023	0.3031	0.0000	0.0001	7.37E-10	0.0000	0.0000	7.18E-10	0.0000	0.0000	6.99E-10
128	0.00	0.000	0.022	0.3021	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
129	0.04	0.000	0.021	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
130	0.00	0.000	0.020	0.3019	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
131	0.00	0.000	0.020	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
132	0.30	0.000	0.019	0.3142	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
133	0.00	0.000	0.143	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134	0.00	0.000	0.018	0.3065	0.0000	0.0000	6.97E-10	0.0000	0.0000	6.80E-10	0.0000	0.0000	6.63E-10
135	0.69	0.038	0.018	0.3365	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
136	0.00	0.000	0.376	0.3186	0.0000	0.0001	5.20E-10	0.0000	0.0000	5.10E-10	0.0000	0.0000	5.01E-10
137	0.00	0.000	0.431	0.2981	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
138	0.26	0.000	0.149	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.00	0.000	0.062	0.3002	0.0000	0.0000	4.77E-10	0.0000	0.0000	4.69E-10	0.0000	0.0000	4.61E-10
140	0.05	0.000	0.048	0.3003	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
141	0.27	0.000	0.040	0.3111	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142	0.04	0.000	0.203	0.3033	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143	0.34	0.000	0.036	0.3178	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
144	0.01	0.000	0.368	0.3008	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
145	0.00	0.000	0.032	0.2993	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146	0.00	0.000	0.029	0.2979	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
147	0.20	0.000	0.028	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
148	0.03	0.000	0.026	0.3061	0.0000	0.0000	1.73E-10	0.0000	0.0000	1.72E-10	0.0000	0.0000	1.71E-10
149	0.09	0.000	0.025	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
150	0.00	0.000	0.023	0.3080	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
151	0.03	0.000	0.023	0.3082	0.0000	0.0000	2.00E-10	0.0000	0.0000	1.98E-10	0.0000	0.0000	1.97E-10
152	0.00	0.000	0.021	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
153	0.00	0.000	0.020	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154	0.00	0.000	0.020	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
155	0.00	0.000	0.019	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156	0.00	0.000	0.018	0.3035	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157	0.12	0.000	0.019	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158	0.03	0.000	0.018	0.3090	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159	0.00	0.000	0.017	0.3082	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160	0.00	0.000	0.017	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161	0.06	0.000	0.017	0.3097	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162	0.03	0.000	0.128	0.3052	0.0000	0.0000	3.11E-10	0.0000	0.0000	3.08E-10	0.0000	0.0000	3.04E-10
163	0.40	0.000	0.017	0.3232	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
164	0.33	0.006	0.352	0.3219	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.08	0.000	0.198	0.3163	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.00	0.000	0.261	0.3039	0.0000	0.0002	7.91E-10	0.0000	0.0000	7.69E-10	0.0000	0.0000	7.48E-10
167	0.00	0.000	0.149	0.2968	0.0000	0.0002	1.26E-09	0.0000	0.0000	1.20E-09	0.0000	0.0000	1.15E-09
168	0.00	0.000	0.062	0.2938	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
169	0.81	0.041	0.048	0.3280	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
170	0.13	0.000	0.380	0.3161	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
171	0.13	0.000	0.343	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.00	0.000	0.149	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
173	0.00	0.000	0.062	0.2959	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.24	0.000	0.048	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
175	0.57	0.024	0.041	0.3288	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.37	0.026	0.296	0.3313	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.10	0.000	0.297	0.3218	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.01	0.000	0.288	0.3085	0.0000	0.0005	2.80E-09	0.0000	0.0000	2.54E-09	0.0000	0.0000	2.32E-09
179	0.23	0.000	0.150	0.3121	0.0000	0.0000	1.70E-10	0.0000	0.0000	1.69E-10	0.0000	0.0000	1.68E-10
180	0.74	0.074	0.318	0.3284	0.0000	0.0001	9.70E-10	0.0000	0.0000	9.37E-10	0.0000	0.0000	9.06E-10
181	0.00	0.000	0.263	0.3159	0.0000	0.0004	2.58E-09	0.0000	0.0000	2.36E-09	0.0000	0.0000	2.17E-09
182	0.00	0.000	0.178	0.3075	0.0000	0.0003	1.42E-09	0.0000	0.0000	1.35E-09	0.0000	0.0000	1.28E-09
183	0.00	0.000	0.149	0.3003	0.0000	0.0003	2.21E-09	0.0000	0.0000	2.05E-09	0.0000	0.0000	1.90E-09
184	0.00	0.000	0.062	0.2974	0.0000	0.0000	2.05E-10	0.0000	0.0000	2.03E-10	0.0000	0.0000	2.02E-10
185	0.30	0.000	0.049	0.3093	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
186	0.07	0.000	0.041	0.3108	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
187	0.00	0.000	0.190	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.00	0.000	0.035	0.3001	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.00	0.000	0.032	0.2986	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.05	0.000	0.031	0.2997	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.46	0.001	0.029	0.3200	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.16	0.000	0.278	0.3144	0.0000	0.0001	8.25E-10	0.0000	0.0000	8.01E-10	0.0000	0.0000	7.78E-10
193	1.72	0.692	0.339	0.3473	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
194	0.27	0.024	0.132	0.3525	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
195	0.00	0.000	0.121	0.3469	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
196	0.05	0.000	0.208	0.3395	0.0000	0.0001	6.45E-10	0.0000	0.0000	6.31E-10	0.0000	0.0000	6.16E-10
197	0.20	0.000	0.328	0.3335	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
198	0.04	0.000	0.293	0.3215	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.23	0.000	0.332	0.3164	0.0000	0.0004	2.52E-09	0.0000	0.0000	2.31E-09	0.0000	0.0000	2.13E-09
200	0.15	0.000	0.293	0.3096	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
201	0.03	0.000	0.151	0.3041	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
202	0.00	0.000	0.062	0.3011	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
203	0.00	0.000	0.047	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
204	0.00	0.000	0.040	0.2970	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
205	0.00	0.000	0.035	0.2953	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
206	0.03	0.000	0.033	0.2953	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
207	0.03	0.000	0.031	0.2953	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14

208	0.29	0.000	0.029	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
209	0.07	0.000	0.027	0.3098	0.0000	0.0000	1.09E-10	0.0000	0.0000	1.09E-10	0.0000	0.0000	1.09E-10
210	0.06	0.000	0.026	0.3112	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
211	1.47	0.370	0.025	0.3624	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
212	0.00	0.000	0.283	0.3490	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
213	0.08	0.000	0.115	0.3475	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
214	0.23	0.000	0.175	0.3502	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
215	0.00	0.000	0.243	0.3386	0.0000	0.0006	3.84E-09	0.0000	0.0000	3.37E-09	0.0000	0.0000	3.00E-09
216	0.00	0.000	0.344	0.3222	0.0000	0.0004	2.29E-09	0.0000	0.0000	2.12E-09	0.0000	0.0000	1.96E-09
217	0.18	0.000	0.151	0.3235	0.0000	0.0010	5.28E-09	0.0000	0.0000	4.78E-09	0.0000	0.0000	3.20E-09
218	0.00	0.000	0.325	0.3080	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.02E-09
219	0.00	0.000	0.062	0.3050	0.0000	0.0013	8.86E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09
220	0.00	0.000	0.047	0.3025	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.63E-09	0.0000	0.0000	1.53E-09
221	0.00	0.000	0.040	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.00	0.000	0.033	0.2985	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.00	0.000	0.032	0.2967	0.0000	0.0002	2.85E-09	0.0000	0.0000	2.58E-09	0.0000	0.0000	2.36E-09
224	0.04	0.000	0.031	0.2966	0.0000	0.0008	6.59E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
225	0.00	0.000	0.027	0.2951	0.0000	0.0008	6.51E-09	0.0000	0.0000	6.79E-09	0.0000	0.0000	6.80E-09
226	0.02	0.000	0.028	0.2943	0.0000	0.0020	1.17E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.96E-09
227	0.36	0.000	0.026	0.3100	0.0001	0.0026	1.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
228	0.00	0.000	0.023	0.3084	0.0000	0.0004	4.11E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
229	0.11	0.000	0.024	0.3120	0.0000	0.0020	1.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
230	0.03	0.000	0.023	0.3117	0.0001	0.0033	1.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
231	0.01	0.000	0.022	0.3107	0.0001	0.0053	2.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
232	0.00	0.000	0.020	0.3093	0.0001	0.0068	3.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
233	0.00	0.000	0.019	0.3080	0.0002	0.0078	3.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
234	0.00	0.000	0.018	0.3067	0.0002	0.0072	3.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
235	0.00	0.000	0.018	0.3054	0.0002	0.0076	3.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
236	0.55	0.002	0.019	0.3301	0.0002	0.0096	4.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
237	0.00	0.000	0.211	0.3194	0.0001	0.0074	3.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
238	0.04	0.000	0.292	0.3068	0.0002	0.0098	4.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
239	0.16	0.000	0.151	0.3072	0.0004	0.0172	6.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
240	0.00	0.000	0.062	0.3043	0.0003	0.0119	4.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
241	0.00	0.000	0.047	0.3020	0.0002	0.0099	4.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
242	0.00	0.000	0.040	0.3001	0.0002	0.0081	3.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
243	0.00	0.000	0.035	0.2984	0.0001	0.0068	3.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
244	0.00	0.000	0.032	0.2969	0.0001	0.0059	2.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
245	0.00	0.000	0.029	0.2955	0.0001	0.0052	2.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
246	0.00	0.000	0.027	0.2942	0.0001	0.0046	2.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
247	0.00	0.000	0.026	0.2930	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
248	0.00	0.000	0.024	0.2919	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
249	0.00	0.000	0.023	0.2908	0.0001	0.0025	1.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
250	0.21	0.000	0.024	0.2996	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.88E-09	0.0000	0.0000	4.47E-09

251		0.00	0.000	0.021	0.2986	0.0000	0.0002	1.32E-09	0.0000	0.0000	1.26E-09	0.0000	0.0000	1.20E-09
252		0.00	0.000	0.020	0.2976	0.0000	0.0002	1.24E-09	0.0000	0.0000	1.18E-09	0.0000	0.0000	1.13E-09
253		0.13	0.000	0.022	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
254		0.07	0.000	0.021	0.3052	0.0000	0.0001	3.52E-10	0.0000	0.0000	3.48E-10	0.0000	0.0000	3.44E-10
255		0.06	0.000	0.021	0.3069	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
256		0.00	0.000	0.018	0.3060	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
257		0.00	0.000	0.017	0.3052	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
258		0.00	0.000	0.017	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
259		0.00	0.000	0.016	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
260		0.00	0.000	0.018	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261		0.07	0.000	0.018	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262		0.00	0.000	0.015	0.3046	0.0000	0.0002	1.15E-09	0.0000	0.0000	1.10E-09	0.0000	0.0000	1.06E-09
263		0.00	0.000	0.015	0.3039	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
264		0.00	0.000	0.015	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
265		0.00	0.000	0.014	0.3025	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
266		0.00	0.000	0.014	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
267		0.00	0.000	0.014	0.3012	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
268		0.00	0.000	0.014	0.3005	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
269		0.00	0.000	0.013	0.2999	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
270		0.00	0.000	0.013	0.2992	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
271		0.04	0.000	0.016	0.3006	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
272		0.01	0.000	0.015	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
273		0.00	0.000	0.013	0.2998	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
274		0.00	0.000	0.013	0.2992	0.0000	0.0009	6.08E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
275		0.00	0.000	0.012	0.2986	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.23E-10	0.0000	0.0000	1.23E-09
276		0.00	0.000	0.012	0.2980	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.52E-11
277		0.00	0.000	0.012	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
278		0.00	0.000	0.012	0.2969	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
279		0.00	0.000	0.012	0.2962	0.0000	0.0017	1.04E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
280		0.00	0.000	0.012	0.2957	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.31E-09	0.0000	0.0000	2.63E-09
281		0.00	0.000	0.011	0.2951	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.34E-10
282		0.02	0.000	0.014	0.2956	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
283		0.09	0.000	0.014	0.2992	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
284		0.49	0.001	0.014	0.3219	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
285		0.00	0.000	0.245	0.3103	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
286		0.00	0.000	0.011	0.3098	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
287		0.00	0.000	0.011	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
288		0.00	0.000	0.011	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
289		0.00	0.000	0.011	0.3082	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
290		0.00	0.000	0.010	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
291	*	0.03	0.000	0.040	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
292	*	0.00	0.000	0.000	0.3072	0.0000	0.0000	2.65E-10	0.0000	0.0000	2.62E-10	0.0000	0.0000	2.60E-10
293	*	0.00	0.000	0.000	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16

294	*	0.00	0.000	0.000	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
295		0.00	0.000	0.010	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
296		0.00	0.000	0.010	0.3063	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
297		0.02	0.000	0.013	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
298		0.00	0.000	0.010	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
299		0.00	0.000	0.010	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
300		0.30	0.000	0.012	0.3193	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
301		1.94	0.826	0.130	0.3663	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
302		0.00	0.000	0.127	0.3603	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
303		0.24	0.000	0.062	0.3688	0.0000	0.0000	3.24E-10	0.0000	0.0000	3.20E-10	0.0000	0.0000	3.17E-10
304		0.35	0.022	0.060	0.3813	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
305		0.00	0.000	0.077	0.3770	0.0000	0.0007	3.26E-09	0.0000	0.0000	2.91E-09	0.0000	0.0000	2.63E-09
306		0.00	0.000	0.068	0.3712	0.0000	0.0023	1.11E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
307		0.00	0.000	0.138	0.3588	0.0001	0.0047	1.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		0.00	0.000	0.107	0.3495	0.0019	0.0908	3.00E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309	*	0.00	0.000	0.051	0.3444	0.0016	0.0735	2.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310	*	0.00	0.000	0.059	0.3394	0.0012	0.0569	1.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.00	0.000	0.086	0.3335	0.0010	0.0449	1.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		0.00	0.000	0.101	0.3269	0.0009	0.0402	1.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.00	0.000	0.140	0.3187	0.0009	0.0410	1.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314		0.00	0.000	0.109	0.3124	0.0007	0.0322	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.00	0.000	0.062	0.3082	0.0006	0.0270	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.047	0.3048	0.0006	0.0268	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317		0.00	0.000	0.040	0.3019	0.0006	0.0271	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318	*	0.63	0.000	0.035	0.3019	0.0005	0.0235	9.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319		0.04	0.001	0.028	0.3288	0.0004	0.0210	8.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.00	0.000	0.056	0.3253	0.0004	0.0206	8.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321		0.00	0.000	0.056	0.3219	0.0004	0.0191	7.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		2.05	0.889	0.069	0.3733	0.0004	0.0179	7.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.14	0.002	0.080	0.3752	0.0003	0.0152	6.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.81	0.269	0.069	0.3972	0.0005	0.0179	7.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.66	0.324	0.123	0.4002	0.0003	0.0146	5.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.00	0.000	0.125	0.3826	0.0047	0.2317	6.99E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.00	0.000	0.114	0.3675	0.0048	0.2250	6.75E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.52	0.027	0.057	0.3825	0.0034	0.1441	4.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.20	0.004	0.090	0.3835	0.0020	0.0895	2.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		1.67	1.004	0.078	0.4087	0.0021	0.0980	3.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	0.00	0.000	0.001	0.3887	0.0064	0.3037	8.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.00	0.000	0.051	0.3748	0.0061	0.2823	8.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333	*	0.04	0.000	0.022	0.3688	0.0035	0.1628	5.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.00	0.000	0.000	0.3642	0.0024	0.1122	3.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335	*	0.62	0.000	0.011	0.3617	0.0019	0.0877	2.90E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336	*	0.08	0.000	0.005	0.3596	0.0015	0.0689	2.34E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337	*	0.09	0.000	0.000	0.3579	0.0014	0.0639	2.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.00	0.087	0.000	0.3855	0.0011	0.0530	1.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		0.00	0.000	0.115	0.3783	0.0010	0.0497	1.75E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.051	0.3711	0.0006	0.0309	1.08E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341	*	0.00	0.000	0.000	0.3651	0.0029	0.1345	4.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		0.40	0.006	0.072	0.3760	0.0022	0.1041	3.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343		0.37	0.036	0.086	0.3852	0.0019	0.0918	3.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.10	0.000	0.088	0.3824	0.0013	0.0601	2.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345	*	0.87	0.000	0.035	0.3798	0.0009	0.0439	1.49E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*	0.05	0.000	0.034	0.3749	0.0027	0.1255	3.99E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347	*	0.01	0.000	0.029	0.3714	0.0022	0.1013	3.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		0.00	0.149	0.000	0.3972	0.0021	0.0969	3.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		0.00	0.000	0.059	0.3864	0.0015	0.0793	2.64E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		0.00	0.000	0.105	0.3705	0.0054	0.2580	7.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		0.00	0.000	0.070	0.3611	0.0033	0.1535	4.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		0.43	0.006	0.103	0.3721	0.0023	0.1059	3.44E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.69	0.166	0.115	0.3888	0.0023	0.0772	2.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.01	0.000	0.117	0.3818	0.0016	0.0678	2.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.37	0.016	0.157	0.3834	0.0015	0.0787	2.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		0.00	0.000	0.127	0.3714	0.0028	0.1294	4.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357		0.49	0.039	0.108	0.3833	0.0024	0.1315	4.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358		0.00	0.000	0.102	0.3758	0.0014	0.0642	2.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359		0.03	0.000	0.057	0.3723	0.0009	0.0411	1.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*	0.00	0.000	0.000	0.3665	0.0020	0.1005	3.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361	*	0.00	0.000	0.000	0.3623	0.0022	0.1015	3.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.36	0.002	0.052	0.3733	0.0017	0.0793	2.66E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.02	0.000	0.062	0.3688	0.0017	0.0788	2.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.52	0.058	0.072	0.3848	0.0013	0.0453	1.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365	*	0.00	0.000	0.038	0.3812	0.0014	0.0590	2.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 27			
	inches	cubic feet	percent
Precipitation	45.50	165,168.6	100.00
Runoff	10.457	37,960.5	22.98
Evapotranspiration	27.012	98,054.0	59.37
Drainage Collected from Layer 2	7.2905	26,464.6	16.02
Percolation/Leakage through Layer 3	0.000025	0.0893	0.00
Average Head on Top of Layer 3	0.0004	---	---
Drainage Collected from Layer 7	0.0000	0.0842	0.00
Percolation/Leakage through Layer 8	0.000001	0.0047	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0046	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.7409	2,689.4	1.63
Soil Water at Start of Year	257.0463	933,078.0	564.92
Soil Water at End of Year	257.7872	935,767.4	566.55
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 28

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Column key: Head #1: drainage from Layer 3; Drain #1: drainage from Layer 2; Leak #1: leakage thru Layer 3; Head #2: drainage from Layer 8; Drain #2: drainage from Layer 7; Leak #2: leakage thru Layer 8; Head #3: drainage from Layer 10; Drain #3: drainage from Layer 9; Leak #3: leakage thru Layer 11

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*		0.00	0.000	0.000	0.3760	0.0007	0.0350	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2	*		0.00	0.000	0.000	0.3694	0.0032	0.1485	4.64E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3	*		0.00	0.000	0.045	0.3626	0.0025	0.1152	3.69E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4	*		0.00	0.000	0.000	0.3590	0.0018	0.0862	2.85E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5	*		0.00	0.000	0.000	0.3561	0.0015	0.0721	2.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6	*		0.06	0.000	0.016	0.3547	0.0012	0.0583	2.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7	*		0.00	0.000	0.021	0.3528	0.0010	0.0487	1.72E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8	*		0.10	0.000	0.033	0.3518	0.0009	0.0426	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9	*		0.00	0.000	0.000	0.3511	0.0009	0.0411	1.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10	*		0.04	0.000	0.000	0.3506	0.0007	0.0351	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*		0.00	0.000	0.044	0.3496	0.0007	0.0329	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*		0.00	0.000	0.000	0.3483	0.0007	0.0306	1.13E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*		0.00	0.000	0.000	0.3472	0.0006	0.0296	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14			0.00	0.000	0.081	0.3423	0.0005	0.0248	9.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15			0.00	0.000	0.083	0.3373	0.0006	0.0263	9.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16			0.00	0.000	0.095	0.3323	0.0006	0.0269	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.00	0.000	0.077	0.3276	0.0002	0.0116	4.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18			0.00	0.000	0.082	0.3224	0.0003	0.0159	6.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19	*		0.00	0.000	0.000	0.3217	0.0006	0.0274	1.03E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20	*		0.19	0.000	0.051	0.3221	0.0004	0.0209	8.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.00	0.000	0.060	0.3245	0.0004	0.0168	6.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
22	*		0.00	0.000	0.000	0.3240	0.0003	0.0144	5.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
23	*	*	0.35	0.000	0.014	0.3240	0.0004	0.0195	7.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
24	*	*	0.36	0.000	0.008	0.3240	0.0003	0.0138	5.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
25	*	*	0.00	0.000	0.013	0.3240	0.0002	0.0105	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
26		*	0.10	0.000	0.000	0.3265	0.0002	0.0085	3.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
27	*	*	0.00	0.000	0.020	0.3265	0.0002	0.0071	3.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
28	*	*	0.81	0.000	0.024	0.3265	0.0001	0.0061	2.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
29	*	*	0.00	0.000	0.033	0.3265	0.0001	0.0054	2.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
30		*	0.03	0.827	0.000	0.3423	0.0001	0.0048	2.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
31		*	0.39	0.491	0.000	0.3525	0.0001	0.0043	2.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
32	*	*	0.00	0.000	0.000	0.3525	0.0001	0.0039	1.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
33		*	0.35	0.208	0.001	0.3593	0.0001	0.0033	1.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
34		*	0.02	0.000	0.001	0.3601	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.92E-09	0.0000	0.0000	4.66E-09
35		*	0.00	0.000	0.000	0.3602	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.34E-19	0.0000	0.0000	7.87E-10

36		*	0.37	0.245	0.001	0.3659	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
37		*	0.12	0.051	0.001	0.3694	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
38			0.21	0.014	0.092	0.3740	0.0000	0.0001	7.88E-10	0.0000	0.0000	7.66E-10	0.0000	0.0000	7.45E-10
39	*		0.20	0.000	0.052	0.3741	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
40			0.38	0.058	0.016	0.3941	0.0001	0.0041	1.88E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
41			0.30	0.053	0.074	0.3974	0.0001	0.0041	1.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
42			0.00	0.000	0.080	0.3831	0.0024	0.1228	3.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
43	*		0.00	0.000	0.052	0.3717	0.0041	0.1913	5.83E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
44	*		0.00	0.000	0.000	0.3657	0.0032	0.1472	4.60E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
45	*		0.00	0.000	0.000	0.3614	0.0022	0.1049	3.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
46	*	*	0.06	0.000	0.059	0.3614	0.0016	0.0752	2.51E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
47		*	0.02	0.000	0.001	0.3624	0.0006	0.0284	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
48	*	*	0.00	0.000	0.000	0.3624	0.0004	0.0175	6.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
49		*	0.00	0.000	0.000	0.3624	0.0003	0.0126	5.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
50		*	0.00	0.000	0.000	0.3624	0.0002	0.0098	4.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
51		*	0.00	0.000	0.000	0.3624	0.0002	0.0080	3.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
52		*	0.01	0.000	0.001	0.3626	0.0001	0.0068	3.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
53		*	0.27	0.103	0.001	0.3705	0.0001	0.0058	2.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
54		*	0.00	0.000	0.000	0.3705	0.0001	0.0051	2.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
55			0.63	0.112	0.178	0.3833	0.0000	0.0002	8.36E-10	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
56			0.07	0.000	0.141	0.3766	0.0001	0.0042	1.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
57			0.20	0.000	0.100	0.3800	0.0008	0.0352	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58	*		0.00	0.000	0.000	0.3747	0.0011	0.0544	1.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59	*		0.00	0.000	0.082	0.3656	0.0026	0.1247	3.97E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60			0.00	0.000	0.109	0.3588	0.0016	0.0762	2.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61	*		0.00	0.000	0.087	0.3522	0.0007	0.0334	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62			0.00	0.000	0.160	0.3422	0.0011	0.0508	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63	*		0.01	0.000	0.085	0.3367	0.0012	0.0557	1.93E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64	*		0.00	0.000	0.050	0.3328	0.0009	0.0414	1.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65			0.00	0.000	0.109	0.3258	0.0007	0.0336	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66			0.00	0.000	0.172	0.3160	0.0009	0.0398	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67			0.27	0.000	0.066	0.3249	0.0007	0.0320	1.18E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68			0.04	0.000	0.115	0.3201	0.0006	0.0261	9.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69			0.45	0.000	0.119	0.3348	0.0006	0.0293	1.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70			0.00	0.000	0.156	0.3264	0.0005	0.0214	8.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71			0.00	0.000	0.181	0.3168	0.0005	0.0219	8.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72			0.00	0.000	0.078	0.3120	0.0005	0.0230	8.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73			0.00	0.000	0.121	0.3055	0.0005	0.0219	8.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74			0.06	0.000	0.149	0.3004	0.0004	0.0194	7.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75			3.02	1.812	0.062	0.3544	0.0005	0.0232	8.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76			0.95	0.398	0.226	0.3691	0.0003	0.0154	6.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77			0.50	0.126	0.113	0.3810	0.0004	0.0182	7.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78	*		0.01	0.000	0.107	0.3762	0.0004	0.0181	7.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.04	0.000	0.138	0.3694	0.0002	0.0084	3.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.00	0.000	0.169	0.3559	0.0009	0.0440	1.48E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.20	0.000	0.184	0.3533	0.0018	0.0863	2.86E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.00	0.000	0.162	0.3423	0.0016	0.0742	2.50E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.00	0.000	0.161	0.3327	0.0013	0.0627	2.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.33	0.000	0.080	0.3431	0.0009	0.0435	1.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.076	0.3387	0.0007	0.0323	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86	*	0.00	0.000	0.000	0.3376	0.0005	0.0214	8.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87	*	0.00	0.000	0.000	0.3363	0.0005	0.0222	8.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88	*	2.44	0.000	0.000	0.3361	0.0005	0.0258	9.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89	*	0.22	0.000	0.010	0.3359	0.0005	0.0258	9.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90		0.06	0.000	0.000	0.3372	0.0005	0.0243	9.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.69	2.174	0.000	0.3906	0.0005	0.0229	8.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.06	0.000	0.094	0.3876	0.0005	0.0205	7.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.18	0.000	0.193	0.3770	0.0024	0.1158	3.55E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.202	0.3617	0.0029	0.1368	4.33E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.00	0.000	0.253	0.3455	0.0022	0.1042	3.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.00	0.000	0.330	0.3268	0.0016	0.0733	2.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.00	0.000	0.149	0.3172	0.0014	0.0655	2.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.41	0.000	0.062	0.3325	0.0011	0.0528	1.85E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.05	0.000	0.064	0.3313	0.0008	0.0356	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100	*	0.00	0.000	0.000	0.3308	0.0005	0.0232	8.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.00	0.000	0.192	0.3207	0.0003	0.0141	5.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.00	0.000	0.149	0.3134	0.0004	0.0206	7.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.00	0.000	0.062	0.3097	0.0002	0.0098	4.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.00	0.000	0.048	0.3067	0.0003	0.0123	5.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.17	0.000	0.040	0.3122	0.0003	0.0145	5.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.11	0.000	0.035	0.3151	0.0003	0.0153	6.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107		0.00	0.000	0.032	0.3130	0.0003	0.0148	6.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108		0.00	0.000	0.029	0.3111	0.0003	0.0144	5.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.00	0.000	0.027	0.3092	0.0002	0.0113	4.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		1.41	0.267	0.026	0.3618	0.0003	0.0132	5.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.44	0.095	0.112	0.3722	0.0002	0.0118	4.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.04	0.000	0.107	0.3688	0.0003	0.0126	5.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113		0.00	0.000	0.071	0.3653	0.0004	0.0165	6.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114		0.08	0.000	0.077	0.3653	0.0002	0.0109	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		0.00	0.000	0.264	0.3495	0.0000	0.0014	7.00E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
116		0.12	0.000	0.267	0.3404	0.0004	0.0188	7.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
117		0.00	0.000	0.244	0.3265	0.0011	0.0509	1.78E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
118		0.00	0.000	0.253	0.3127	0.0009	0.0409	1.47E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
119		0.02	0.000	0.149	0.3057	0.0009	0.0440	1.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
120		0.01	0.000	0.062	0.3027	0.0006	0.0262	9.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
121		0.04	0.000	0.048	0.3017	0.0003	0.0164	6.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

122		0.00	0.000	0.040	0.2989	0.0003	0.0160	6.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
123		0.00	0.000	0.035	0.2965	0.0004	0.0186	7.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
124		1.66	0.520	0.032	0.3486	0.0004	0.0164	6.58E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
125	*	0.02	0.000	0.130	0.3427	0.0003	0.0161	6.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
126	*	0.00	0.000	0.000	0.3419	0.0003	0.0161	6.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
127		0.13	0.000	0.165	0.3396	0.0004	0.0170	6.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
128		0.00	0.000	0.197	0.3295	0.0003	0.0149	6.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
129		0.00	0.000	0.354	0.3116	0.0003	0.0140	5.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
130		0.00	0.000	0.300	0.2966	0.0004	0.0205	7.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
131		0.00	0.000	0.149	0.2891	0.0004	0.0210	8.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
132		0.00	0.000	0.062	0.2861	0.0004	0.0206	8.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
133		0.06	0.000	0.048	0.2867	0.0003	0.0148	6.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
134		0.06	0.000	0.041	0.2875	0.0002	0.0111	4.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
135		0.00	0.000	0.035	0.2859	0.0002	0.0089	3.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
136		0.00	0.000	0.032	0.2843	0.0001	0.0057	2.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
137		0.00	0.000	0.029	0.2828	0.0001	0.0062	2.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
138		0.00	0.000	0.027	0.2816	0.0001	0.0061	2.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
139		0.53	0.000	0.026	0.3054	0.0001	0.0053	2.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
140		0.56	0.013	0.166	0.3234	0.0001	0.0047	2.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
141		0.04	0.000	0.100	0.3207	0.0001	0.0042	2.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
142		0.00	0.000	0.182	0.3120	0.0001	0.0037	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
143		0.00	0.000	0.322	0.2965	0.0000	0.0017	1.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
144		0.00	0.000	0.149	0.2894	0.0001	0.0038	1.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
145		0.00	0.000	0.062	0.2865	0.0001	0.0025	1.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
146		0.25	0.000	0.048	0.2961	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-09	0.0000	0.0000	4.12E-09
147		0.00	0.000	0.040	0.2942	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
148		0.10	0.000	0.036	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
149		0.00	0.000	0.032	0.2959	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
150		0.50	0.000	0.030	0.3182	0.0000	0.0001	4.79E-10	0.0000	0.0000	4.71E-10	0.0000	0.0000	4.63E-10
151		0.00	0.000	0.141	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
152		0.43	0.002	0.115	0.3263	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
153		0.16	0.000	0.100	0.3289	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
154		0.00	0.000	0.140	0.3224	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
155		1.17	0.288	0.167	0.3567	0.0000	0.0001	8.81E-10	0.0000	0.0000	8.53E-10	0.0000	0.0000	8.28E-10
156		0.00	0.000	0.271	0.3437	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
157		0.00	0.000	0.323	0.3283	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
158		0.42	0.000	0.135	0.3417	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
159		0.00	0.000	0.169	0.3337	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160		0.00	0.000	0.233	0.3225	0.0000	0.0014	7.58E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
161		0.19	0.000	0.354	0.3148	0.0000	0.0010	5.38E-09	0.0000	0.0000	4.82E-09	0.0000	0.0000	4.96E-09
162		0.00	0.000	0.150	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.12E-09	0.0000	0.0000	1.19E-09
163		0.00	0.000	0.062	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.70E-10
164		0.08	0.000	0.048	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.00	0.000	0.040	0.3043	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	1.17	0.132	0.036	0.3519	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.00	0.000	0.204	0.3422	0.0000	0.0002	1.22E-09	0.0000	0.0000	1.17E-09	0.0000	0.0000	1.12E-09
168	0.00	0.000	0.263	0.3296	0.0000	0.0004	2.25E-09	0.0000	0.0000	2.08E-09	0.0000	0.0000	1.93E-09
169	0.54	0.009	0.285	0.3413	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
170	0.00	0.000	0.282	0.3279	0.0000	0.0002	1.60E-09	0.0000	0.0000	1.51E-09	0.0000	0.0000	1.43E-09
171	0.00	0.000	0.313	0.3130	0.0000	0.0006	3.05E-09	0.0000	0.0000	2.75E-09	0.0000	0.0000	2.50E-09
172	0.19	0.000	0.142	0.3154	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
173	0.38	0.000	0.063	0.3303	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
174	0.00	0.000	0.290	0.3165	0.0000	0.0000	2.35E-10	0.0000	0.0000	2.33E-10	0.0000	0.0000	2.31E-10
175	0.00	0.000	0.047	0.3142	0.0000	0.0010	5.94E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
176	0.00	0.000	0.040	0.3123	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.31E-10	0.0000	0.0000	1.17E-09
177	0.00	0.000	0.035	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.27E-11
178	0.00	0.000	0.032	0.3091	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
179	0.00	0.000	0.029	0.3078	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	1.21	0.174	0.029	0.3556	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.73	0.252	0.353	0.3614	0.0000	0.0003	1.40E-09	0.0000	0.0000	1.33E-09	0.0000	0.0000	1.27E-09
182	0.05	0.000	0.191	0.3547	0.0000	0.0001	8.62E-10	0.0000	0.0000	8.36E-10	0.0000	0.0000	8.11E-10
183	0.74	0.136	0.140	0.3767	0.0000	0.0001	8.43E-10	0.0000	0.0000	8.18E-10	0.0000	0.0000	6.02E-10
184	0.35	0.067	0.303	0.3758	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.99E-10
185	0.03	0.000	0.263	0.3649	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
186	0.00	0.000	0.144	0.3577	0.0000	0.0001	3.50E-10	0.0000	0.0000	3.45E-10	0.0000	0.0000	3.41E-10
187	0.16	0.000	0.303	0.3490	0.0000	0.0002	8.72E-10	0.0000	0.0000	8.45E-10	0.0000	0.0000	8.20E-10
188	0.00	0.000	0.337	0.3300	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
189	0.00	0.000	0.145	0.3214	0.0004	0.0190	7.35E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
190	0.00	0.000	0.056	0.3179	0.0006	0.0289	1.11E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
191	0.27	0.000	0.049	0.3272	0.0004	0.0192	7.89E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
192	0.02	0.000	0.042	0.3248	0.0005	0.0257	9.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
193	0.00	0.000	0.035	0.3219	0.0006	0.0297	1.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
194	1.06	0.116	0.034	0.3641	0.0006	0.0281	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
195	0.03	0.000	0.260	0.3521	0.0006	0.0295	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
196	0.65	0.071	0.133	0.3724	0.0004	0.0172	6.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
197	0.38	0.058	0.144	0.3797	0.0005	0.0210	8.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
198	0.00	0.000	0.195	0.3695	0.0005	0.0233	8.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
199	0.19	0.000	0.134	0.3720	0.0005	0.0235	8.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
200	0.09	0.000	0.130	0.3662	0.0001	0.0078	3.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
201	0.03	0.000	0.150	0.3564	0.0013	0.0642	2.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
202	0.63	0.055	0.145	0.3739	0.0019	0.0743	2.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
203	0.00	0.000	0.307	0.3572	0.0014	0.0627	2.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
204	0.06	0.000	0.236	0.3466	0.0009	0.0439	1.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
205	0.00	0.000	0.330	0.3288	0.0010	0.0456	1.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
206	0.00	0.000	0.189	0.3189	0.0011	0.0492	1.73E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
207	0.00	0.000	0.149	0.3111	0.0006	0.0276	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

208	0.69	0.014	0.064	0.3405	0.0006	0.0272	1.02E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
209	0.08	0.000	0.150	0.3369	0.0003	0.0135	5.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
210	0.03	0.000	0.389	0.3192	0.0002	0.0111	4.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
211	0.00	0.000	0.149	0.3114	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
212	0.00	0.000	0.062	0.3076	0.0001	0.0055	2.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
213	0.00	0.000	0.047	0.3046	0.0003	0.0126	5.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
214	0.00	0.000	0.040	0.3021	0.0003	0.0143	5.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
215	0.01	0.000	0.037	0.3004	0.0003	0.0155	6.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
216	0.33	0.000	0.034	0.3142	0.0003	0.0142	5.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
217	0.00	0.000	0.029	0.3122	0.0002	0.0112	4.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
218	0.00	0.000	0.027	0.3105	0.0003	0.0136	5.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
219	0.00	0.000	0.026	0.3088	0.0003	0.0122	5.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
220	0.00	0.000	0.024	0.3073	0.0003	0.0120	5.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
221	0.00	0.000	0.023	0.3059	0.0002	0.0113	4.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
222	0.00	0.000	0.022	0.3046	0.0002	0.0104	4.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
223	0.00	0.000	0.021	0.3033	0.0002	0.0095	4.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
224	0.09	0.000	0.022	0.3064	0.0002	0.0088	3.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
225	0.00	0.000	0.020	0.3052	0.0002	0.0080	3.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
226	0.03	0.000	0.021	0.3058	0.0002	0.0098	4.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
227	0.10	0.000	0.021	0.3095	0.0002	0.0088	3.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
228	0.01	0.000	0.020	0.3091	0.0002	0.0072	3.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
229	1.23	0.215	0.020	0.3563	0.0001	0.0063	2.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
230	0.17	0.000	0.234	0.3533	0.0001	0.0055	2.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
231	0.00	0.000	0.251	0.3413	0.0001	0.0044	2.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
232	0.00	0.000	0.260	0.3287	0.0000	0.0022	1.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
233	0.00	0.000	0.154	0.3213	0.0001	0.0043	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
234	0.26	0.000	0.105	0.3286	0.0001	0.0043	2.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
235	0.51	0.008	0.091	0.3482	0.0001	0.0039	2.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
236	0.00	0.000	0.184	0.3394	0.0001	0.0028	1.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
237	0.28	0.000	0.116	0.3470	0.0001	0.0027	1.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
238	0.35	0.009	0.202	0.3536	0.0000	0.0006	3.49E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
239	0.01	0.000	0.220	0.3437	0.0000	0.0010	5.25E-09	0.0000	0.0000	4.84E-09	0.0000	0.0000	4.12E-09
240	0.00	0.000	0.114	0.3382	0.0000	0.0013	6.75E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
241	0.56	0.022	0.100	0.3590	0.0000	0.0001	7.55E-10	0.0000	0.0000	7.05E-10	0.0000	0.0000	6.48E-10
242	0.00	0.000	0.171	0.3508	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.84E-10	0.0000	0.0000	3.08E-10
243	0.00	0.000	0.180	0.3422	0.0000	0.0002	1.23E-09	0.0000	0.0000	1.18E-09	0.0000	0.0000	9.01E-10
244	0.00	0.000	0.204	0.3325	0.0000	0.0002	9.08E-10	0.0000	0.0000	8.79E-10	0.0000	0.0000	9.19E-10
245	0.00	0.000	0.146	0.3255	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.13E-10
246	0.00	0.000	0.136	0.3190	0.0000	0.0005	3.21E-09	0.0000	0.0000	2.88E-09	0.0000	0.0000	2.02E-09
247	0.00	0.000	0.149	0.3119	0.0000	0.0001	9.36E-10	0.0000	0.0000	9.05E-10	0.0000	0.0000	1.29E-09
248	0.00	0.000	0.062	0.3090	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.19E-10
249	0.00	0.000	0.047	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
250	0.23	0.000	0.042	0.3158	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

251		0.91	0.063	0.038	0.3542	0.0000	0.0003	2.88E-09	0.0000	0.0000	2.60E-09	0.0000	0.0000	2.38E-09
252		0.00	0.000	0.147	0.3467	0.0000	0.0011	6.18E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
253		0.00	0.000	0.123	0.3404	0.0000	0.0000	5.80E-10	0.0000	0.0000	8.49E-10	0.0000	0.0000	1.67E-09
254		0.50	0.012	0.191	0.3540	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	2.06E-10
255		0.01	0.000	0.172	0.3456	0.0000	0.0006	3.17E-09	0.0000	0.0000	2.84E-09	0.0000	0.0000	2.00E-09
256		0.42	0.010	0.123	0.3587	0.0001	0.0031	1.65E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.76E-09
257		0.17	0.000	0.129	0.3600	0.0001	0.0053	2.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258		0.00	0.000	0.141	0.3525	0.0001	0.0045	2.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259		0.00	0.000	0.225	0.3411	0.0002	0.0095	4.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260		0.00	0.000	0.298	0.3263	0.0003	0.0126	5.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261		0.00	0.000	0.115	0.3205	0.0003	0.0155	6.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.00	0.000	0.236	0.3092	0.0003	0.0157	6.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.39	0.000	0.152	0.3205	0.0003	0.0134	5.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.00	0.000	0.122	0.3147	0.0002	0.0107	4.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
265		0.00	0.000	0.062	0.3118	0.0002	0.0086	3.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
266	*	0.00	0.000	0.047	0.3096	0.0002	0.0072	3.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
267		0.00	0.000	0.040	0.3075	0.0001	0.0025	1.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
268		0.00	0.000	0.035	0.3056	0.0001	0.0033	1.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
269		0.00	0.000	0.032	0.3039	0.0001	0.0034	1.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
270		0.00	0.000	0.029	0.3023	0.0001	0.0026	1.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
271		0.00	0.000	0.027	0.3009	0.0001	0.0040	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
272		0.05	0.000	0.028	0.3016	0.0000	0.0020	1.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
273		0.00	0.000	0.025	0.3000	0.0000	0.0000	1.07E-09	0.0000	0.0000	4.77E-09	0.0000	0.0000	4.39E-09
274		0.00	0.000	0.023	0.2985	0.0000	0.0015	9.70E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
275		0.00	0.000	0.022	0.2970	0.0001	0.0036	1.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
276		0.00	0.000	0.021	0.2956	0.0001	0.0050	2.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
277	*	0.00	0.000	0.020	0.2943	0.0001	0.0060	2.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
278		0.00	0.000	0.020	0.2930	0.0001	0.0067	3.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279		0.00	0.000	0.018	0.2918	0.0001	0.0069	3.14E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		0.01	0.000	0.021	0.2909	0.0002	0.0088	3.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281		0.66	0.004	0.021	0.3211	0.0002	0.0076	3.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282		0.00	0.000	0.146	0.3136	0.0001	0.0029	1.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		2.01	0.848	0.110	0.3636	0.0002	0.0082	3.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.00	0.000	0.173	0.3549	0.0001	0.0053	2.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.191	0.3453	0.0002	0.0077	3.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.00	0.000	0.242	0.3338	0.0003	0.0148	5.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.00	0.000	0.144	0.3269	0.0002	0.0114	4.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.00	0.000	0.146	0.3200	0.0002	0.0093	4.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.00	0.000	0.149	0.3129	0.0002	0.0077	3.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.21	0.000	0.065	0.3198	0.0001	0.0065	2.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291		0.00	0.000	0.047	0.3172	0.0000	0.0015	7.37E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292		0.00	0.000	0.040	0.3144	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.85E-09	0.0000	0.0000	4.45E-09
293		0.49	0.000	0.038	0.3347	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

294			0.54	0.024	0.190	0.3495	0.0001	0.0064	2.68E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
295			0.66	0.117	0.111	0.3695	0.0002	0.0103	4.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296			0.88	0.369	0.100	0.3879	0.0004	0.0108	4.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297			0.00	0.000	0.154	0.3801	0.0005	0.0215	8.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298			0.00	0.000	0.086	0.3681	0.0008	0.0385	1.27E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299	*		0.00	0.000	0.000	0.3622	0.0030	0.1399	4.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300			0.00	0.000	0.072	0.3547	0.0022	0.1021	3.32E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301	*		0.00	0.000	0.000	0.3516	0.0017	0.0798	2.66E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302	*		0.00	0.000	0.000	0.3492	0.0013	0.0610	2.09E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303			0.00	0.000	0.085	0.3431	0.0011	0.0529	1.84E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304			0.00	0.000	0.135	0.3343	0.0009	0.0437	1.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305			0.00	0.000	0.069	0.3294	0.0011	0.0508	1.81E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306			0.00	0.000	0.082	0.3243	0.0008	0.0352	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307	*		0.00	0.000	0.053	0.3209	0.0007	0.0317	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308	*		0.00	0.000	0.000	0.3200	0.0005	0.0218	8.43E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309			0.00	0.000	0.089	0.3147	0.0004	0.0194	7.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310			0.00	0.000	0.059	0.3109	0.0005	0.0227	8.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311	*		0.00	0.000	0.000	0.3101	0.0005	0.0215	8.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312	*		0.00	0.000	0.000	0.3092	0.0004	0.0193	7.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313			0.39	0.000	0.063	0.3243	0.0004	0.0207	8.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314	*		0.00	0.000	0.000	0.3235	0.0004	0.0174	6.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315	*		0.00	0.000	0.000	0.3228	0.0004	0.0168	6.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316			0.00	0.000	0.075	0.3186	0.0004	0.0167	6.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317			0.08	0.000	0.089	0.3178	0.0003	0.0152	6.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318	*		0.06	0.000	0.035	0.3181	0.0003	0.0140	5.72E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319	*		0.13	0.000	0.024	0.3185	0.0003	0.0146	5.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320	*		0.01	0.000	0.000	0.3190	0.0003	0.0140	5.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321	*		0.02	0.000	0.027	0.3195	0.0002	0.0117	4.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322	*		0.69	0.000	0.011	0.3199	0.0002	0.0117	4.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323	*	*	0.00	0.000	0.013	0.3199	0.0004	0.0171	6.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		*	0.19	0.086	0.000	0.3293	0.0003	0.0125	5.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325	*	*	0.04	0.000	0.035	0.3293	0.0002	0.0098	4.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		*	0.00	0.121	0.000	0.3377	0.0002	0.0080	3.55E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	*	0.00	0.000	0.021	0.3377	0.0001	0.0068	3.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328	*	*	0.00	0.000	0.035	0.3377	0.0001	0.0058	2.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329	*	*	0.21	0.000	0.020	0.3377	0.0001	0.0051	2.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330	*	*	0.76	0.000	0.024	0.3377	0.0001	0.0046	2.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	*	0.00	0.000	0.024	0.3377	0.0001	0.0041	2.06E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		*	0.00	0.391	0.000	0.3468	0.0001	0.0038	1.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		*	0.95	1.352	0.000	0.3554	0.0000	0.0021	1.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		*	0.14	0.058	0.001	0.3594	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.28E-09	0.0000	0.0000	3.84E-09
335		*	0.09	0.024	0.001	0.3623	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.71E-10
336		*	0.00	0.000	0.000	0.3623	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

337		*	0.00	0.000	0.000	0.3623	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
338			0.02	0.000	0.074	0.3594	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
339	*		0.35	0.000	0.027	0.3601	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
340			0.11	0.015	0.012	0.3783	0.0000	0.0004	3.31E-09	0.0000	0.0000	2.95E-09	0.0000	0.0000	2.07E-09
341			0.01	0.000	0.103	0.3735	0.0001	0.0036	1.68E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.78E-09
342			0.00	0.000	0.163	0.3654	0.0001	0.0047	2.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343			0.19	0.000	0.068	0.3667	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.40E-09	0.0000	0.0000	5.02E-09
344	*		0.12	0.000	0.029	0.3638	0.0007	0.0343	1.22E-07	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.99E-09
345			0.00	0.000	0.073	0.3610	0.0013	0.0627	2.17E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346			0.00	0.000	0.107	0.3532	0.0012	0.0582	2.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347			0.00	0.000	0.117	0.3455	0.0012	0.0558	1.94E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348			0.00	0.000	0.124	0.3377	0.0010	0.0456	1.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349			0.01	0.000	0.114	0.3311	0.0008	0.0396	1.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350			0.34	0.000	0.096	0.3413	0.0009	0.0402	1.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351			0.00	0.000	0.114	0.3347	0.0008	0.0354	1.30E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352			0.00	0.000	0.108	0.3287	0.0007	0.0329	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353			0.00	0.000	0.129	0.3221	0.0006	0.0257	9.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354			0.00	0.000	0.112	0.3166	0.0004	0.0201	7.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355			0.00	0.000	0.053	0.3139	0.0003	0.0137	5.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356			0.00	0.000	0.100	0.3087	0.0001	0.0070	3.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357			0.00	0.000	0.062	0.3051	0.0001	0.0061	2.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358			0.00	0.000	0.047	0.3023	0.0002	0.0087	3.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359			0.00	0.000	0.040	0.2998	0.0002	0.0107	4.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360			0.00	0.000	0.035	0.2977	0.0002	0.0117	4.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361			0.00	0.000	0.032	0.2955	0.0002	0.0097	4.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362			0.00	0.000	0.029	0.2936	0.0003	0.0126	5.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363			0.00	0.000	0.027	0.2919	0.0003	0.0130	5.39E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364	*		0.03	0.000	0.029	0.2919	0.0003	0.0127	5.27E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365	*		0.20	0.000	0.026	0.2925	0.0002	0.0113	4.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 28			
	inches	cubic feet	percent
Precipitation	51.46	186,783.6	100.00
Runoff	12.692	46,072.9	24.67
Evapotranspiration	33.392	121,211.5	64.89
Drainage Collected from Layer 2	7.1750	26,045.2	13.94
Percolation/Leakage through Layer 3	0.000026	0.0951	0.00
Average Head on Top of Layer 3	0.0004	---	---
Drainage Collected from Layer 7	0.0000	0.0882	0.00
Percolation/Leakage through Layer 8	0.000002	0.0074	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000002	0.0074	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	-1.8033	-6,546.1	-3.50
Soil Water at Start of Year	257.7872	935,767.4	500.99
Soil Water at End of Year	255.8628	928,781.9	497.25
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.1210	439.3	0.24
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 29

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.00	0.000	0.063	0.2957	0.0002	0.0091	3.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.00	0.000	0.026	0.2943	0.0002	0.0078	3.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.024	0.2929	0.0002	0.0083	3.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.00	0.000	0.023	0.2918	0.0002	0.0088	3.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.51	0.000	0.023	0.3149	0.0001	0.0053	2.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6			0.00	0.000	0.111	0.3096	0.0002	0.0086	3.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7			0.06	0.000	0.115	0.3068	0.0001	0.0068	3.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8			0.00	0.000	0.108	0.3017	0.0001	0.0060	2.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9	*		0.00	0.000	0.052	0.2992	0.0001	0.0055	2.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10			0.00	0.000	0.047	0.2970	0.0001	0.0049	2.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11	*		0.00	0.000	0.000	0.2970	0.0001	0.0044	2.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*		0.00	0.000	0.000	0.2970	0.0001	0.0040	2.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13	*		0.01	0.000	0.006	0.2970	0.0001	0.0036	2.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14	*		0.00	0.000	0.000	0.2970	0.0000	0.0006	3.26E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15	*		0.00	0.000	0.000	0.2970	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.62E-09	0.0000	0.0000	1.17E-09
16	*		0.00	0.000	0.000	0.2970	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.82E-10
17	*		0.00	0.000	0.040	0.2951	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
18	*		0.00	0.000	0.000	0.2951	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
19	*		0.05	0.000	0.019	0.2960	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
20	*		0.02	0.000	0.037	0.2960	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
21	*		1.28	0.000	0.031	0.2969	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
22	*		0.04	0.000	0.030	0.2979	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
23	*	*	0.00	0.000	0.039	0.2979	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
24		*	0.00	0.802	0.000	0.3163	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
25		*	0.00	0.000	0.000	0.3163	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
26		*	0.00	0.000	0.000	0.3163	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
27		*	0.00	0.000	0.000	0.3163	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
28		*	0.00	0.000	0.000	0.3163	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
29		*	0.19	0.043	0.001	0.3231	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
30			0.07	0.000	0.104	0.3213	0.0000	0.0000	1.57E-10	0.0000	0.0000	1.56E-10	0.0000	0.0000	1.55E-10
31	*		0.71	0.000	0.040	0.3222	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
32	*		0.39	0.000	0.020	0.3232	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
33			0.00	0.000	0.018	0.3358	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
34			0.00	0.000	0.044	0.3370	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
35	*		0.00	0.000	0.022	0.3379	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

36	*		0.79	0.000	0.011	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
37	*	*	0.00	0.000	0.015	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
38	*	*	0.00	0.000	0.008	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
39	*	*	0.31	0.000	0.013	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
40	*	*	0.00	0.000	0.007	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
41	*	*	0.00	0.000	0.017	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
42	*	*	0.00	0.000	0.011	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
43	*	*	0.08	0.000	0.000	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
44	*	*	0.00	0.000	0.008	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
45	*	*	0.02	0.000	0.000	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
46	*	*	0.73	0.000	0.000	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
47	*	*	0.23	0.000	0.000	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
48	*	*	0.00	0.000	0.034	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
49	*	*	0.00	0.000	0.017	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
50	*	*	0.00	0.000	0.019	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
51	*	*	0.00	0.000	0.009	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
52	*	*	0.02	0.000	0.006	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
53	*	*	0.00	0.000	0.016	0.3389	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
54		*	0.05	0.103	0.000	0.3466	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
55	*	*	0.00	0.000	0.023	0.3470	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
56	*	*	0.00	0.000	0.024	0.3470	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
57		*	0.41	2.478	0.000	0.3564	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
58		*	0.01	0.000	0.051	0.3564	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
59		*	0.00	0.000	0.000	0.3564	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
60		*	0.41	0.293	0.000	0.3618	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
61		*	0.00	0.000	0.000	0.3618	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
62		*	0.00	0.000	0.000	0.3618	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
63			0.00	0.000	0.212	0.3518	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
64			0.00	0.000	0.203	0.3421	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
65			0.00	0.000	0.099	0.3374	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
66	*		0.00	0.000	0.000	0.3374	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
67	*		0.00	0.000	0.000	0.3374	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
68			0.00	0.000	0.153	0.3301	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
69			0.00	0.000	0.128	0.3240	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
70			0.00	0.000	0.141	0.3170	0.0000	0.0006	3.69E-09	0.0000	0.0000	3.25E-09	0.0000	0.0000	2.90E-09
71			0.00	0.000	0.149	0.3096	0.0000	0.0001	9.55E-10	0.0000	0.0000	9.23E-10	0.0000	0.0000	8.93E-10
72			0.00	0.000	0.062	0.3059	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
73			0.00	0.000	0.047	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
74			0.06	0.000	0.040	0.3027	0.0000	0.0002	1.57E-09	0.0000	0.0000	1.48E-09	0.0000	0.0000	1.41E-09
75			0.35	0.000	0.036	0.3167	0.0001	0.0026	1.48E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
76			0.03	0.000	0.032	0.3155	0.0002	0.0084	3.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77	*		0.00	0.000	0.000	0.3147	0.0003	0.0143	6.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78	*		0.01	0.000	0.041	0.3126	0.0004	0.0173	6.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.00	0.000	0.027	0.3106	0.0004	0.0169	6.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80	*	0.01	0.000	0.037	0.3088	0.0003	0.0161	6.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.40	0.000	0.025	0.3263	0.0003	0.0150	6.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.25	0.000	0.133	0.3312	0.0002	0.0112	4.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.00	0.000	0.153	0.3232	0.0003	0.0122	5.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.08	0.000	0.129	0.3204	0.0003	0.0153	6.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.070	0.3167	0.0003	0.0152	6.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86		0.00	0.000	0.126	0.3103	0.0003	0.0117	4.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87		0.25	0.000	0.076	0.3185	0.0003	0.0123	5.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88	*	0.00	0.000	0.000	0.3185	0.0003	0.0145	5.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89	*	0.00	0.000	0.000	0.3185	0.0002	0.0109	4.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90	*	0.04	0.000	0.044	0.3185	0.0002	0.0088	3.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91	*	0.00	0.000	0.000	0.3185	0.0002	0.0072	3.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.00	0.000	0.133	0.3122	0.0001	0.0063	2.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.33	0.000	0.120	0.3224	0.0001	0.0055	2.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
94		0.00	0.000	0.141	0.3157	0.0001	0.0049	2.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
95		0.13	0.000	0.233	0.3107	0.0001	0.0044	2.15E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
96		0.52	0.006	0.149	0.3279	0.0001	0.0040	1.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.12	0.000	0.161	0.3261	0.0001	0.0036	1.85E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.73	0.101	0.161	0.3483	0.0000	0.0004	2.23E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99		0.28	0.012	0.305	0.3465	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.58E-10	0.0000	0.0000	5.59E-10
100		0.05	0.000	0.179	0.3404	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.84E-10
101		0.04	0.000	0.230	0.3315	0.0000	0.0005	2.83E-09	0.0000	0.0000	2.57E-09	0.0000	0.0000	2.35E-09
102		0.27	0.000	0.183	0.3356	0.0000	0.0001	5.52E-10	0.0000	0.0000	5.41E-10	0.0000	0.0000	5.31E-10
103		0.46	0.018	0.132	0.3504	0.0000	0.0002	1.33E-09	0.0000	0.0000	1.26E-09	0.0000	0.0000	1.21E-09
104		0.00	0.000	0.123	0.3446	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
105		0.00	0.000	0.260	0.3322	0.0000	0.0001	7.57E-10	0.0000	0.0000	7.37E-10	0.0000	0.0000	7.17E-10
106		0.00	0.000	0.163	0.3244	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
107		0.17	0.000	0.132	0.3263	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
108		0.39	0.000	0.149	0.3376	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
109		0.00	0.000	0.203	0.3279	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
110		0.00	0.000	0.199	0.3184	0.0000	0.0013	7.47E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
111		0.23	0.000	0.279	0.3159	0.0000	0.0001	8.49E-10	0.0000	0.0000	1.60E-09	0.0000	0.0000	2.17E-09
112		0.30	0.000	0.389	0.3119	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.06E-10	0.0000	0.0000	5.29E-10
113		0.07	0.000	0.304	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.11E-11
114		0.02	0.000	0.127	0.2958	0.0000	0.0001	8.60E-10	0.0000	0.0000	8.34E-10	0.0000	0.0000	8.09E-10
115		0.00	0.000	0.062	0.2929	0.0000	0.0002	1.29E-09	0.0000	0.0000	1.23E-09	0.0000	0.0000	1.18E-09
116		0.00	0.000	0.047	0.2906	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
117		0.44	0.000	0.040	0.3094	0.0000	0.0001	3.66E-10	0.0000	0.0000	3.61E-10	0.0000	0.0000	3.57E-10
118	*	0.00	0.000	0.035	0.3077	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
119		0.02	0.000	0.032	0.3072	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.00	0.000	0.029	0.3058	0.0000	0.0000	3.04E-10	0.0000	0.0000	3.00E-10	0.0000	0.0000	2.97E-10
121		0.00	0.000	0.027	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16

122		0.00	0.000	0.026	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
123	*	0.00	0.000	0.024	0.3021	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
124		0.00	0.000	0.023	0.3010	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
125	*	2.03	0.000	0.000	0.3019	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
126	*	0.00	0.000	0.044	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
127	*	0.00	0.000	0.037	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
128		0.00	0.000	0.016	0.3229	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
129		0.08	0.542	0.000	0.3676	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
130		0.00	0.000	0.166	0.3630	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
131		0.00	0.000	0.296	0.3489	0.0000	0.0002	1.07E-09	0.0000	0.0000	1.03E-09	0.0000	0.0000	9.90E-10
132		0.00	0.000	0.212	0.3388	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
133		0.00	0.000	0.149	0.3317	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
134		0.00	0.000	0.120	0.3257	0.0000	0.0001	6.25E-10	0.0000	0.0000	6.11E-10	0.0000	0.0000	5.98E-10
135		0.00	0.000	0.105	0.3192	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
136		0.00	0.000	0.062	0.3147	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137		0.00	0.000	0.047	0.3108	0.0000	0.0001	5.74E-10	0.0000	0.0000	5.62E-10	0.0000	0.0000	5.50E-10
138		0.00	0.000	0.040	0.3074	0.0003	0.0137	5.84E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
139		0.00	0.000	0.035	0.3045	0.0005	0.0258	9.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
140		0.00	0.000	0.032	0.3019	0.0006	0.0273	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
141		0.03	0.000	0.030	0.3008	0.0005	0.0253	9.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
142		0.00	0.000	0.027	0.2987	0.0005	0.0237	9.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
143		0.00	0.000	0.026	0.2967	0.0004	0.0185	7.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
144		0.16	0.000	0.025	0.3025	0.0004	0.0177	7.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
145		0.00	0.000	0.023	0.3008	0.0004	0.0174	7.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
146		0.00	0.000	0.022	0.2990	0.0003	0.0158	6.42E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
147		0.00	0.000	0.021	0.2975	0.0004	0.0170	6.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
148		0.02	0.000	0.021	0.2969	0.0003	0.0160	6.48E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
149		0.69	0.011	0.020	0.3279	0.0003	0.0133	5.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
150		0.51	0.020	0.310	0.3356	0.0001	0.0063	2.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
151		0.00	0.000	0.180	0.3264	0.0003	0.0132	5.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
152		0.00	0.000	0.144	0.3191	0.0003	0.0146	5.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
153		0.42	0.000	0.169	0.3306	0.0003	0.0136	5.59E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
154		0.01	0.000	0.109	0.3258	0.0004	0.0170	6.78E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
155		0.03	0.000	0.113	0.3219	0.0003	0.0125	5.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
156		0.05	0.000	0.100	0.3195	0.0002	0.0098	4.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
157		0.00	0.000	0.201	0.3099	0.0002	0.0078	3.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
158		0.00	0.000	0.149	0.3028	0.0001	0.0068	3.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
159		0.15	0.000	0.062	0.3067	0.0001	0.0059	2.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
160		0.40	0.000	0.048	0.3234	0.0001	0.0051	2.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
161		0.21	0.000	0.141	0.3265	0.0001	0.0046	2.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
162		0.03	0.000	0.361	0.3108	0.0001	0.0039	1.94E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
163		0.28	0.000	0.150	0.3169	0.0001	0.0038	1.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
164		0.01	0.000	0.391	0.2987	0.0001	0.0030	1.52E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

165	0.00	0.000	0.062	0.2958	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.38E-09	0.0000	0.0000	4.39E-09
166	0.00	0.000	0.047	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.34E-19	0.0000	0.0000	5.96E-10
167	0.13	0.000	0.041	0.2979	0.0000	0.0001	3.35E-10	0.0000	0.0000	3.31E-10	0.0000	0.0000	3.27E-10
168	0.00	0.000	0.035	0.2962	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
169	0.00	0.000	0.032	0.2947	0.0000	0.0005	4.06E-09	0.0000	0.0000	2.78E-09	0.0000	0.0000	2.53E-09
170	0.38	0.000	0.030	0.3115	0.0000	0.0000	1.03E-10	0.0000	0.0000	9.59E-10	0.0000	0.0000	9.26E-10
171	0.00	0.000	0.027	0.3102	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.58E-11	0.0000	0.0000	2.58E-11
172	0.14	0.000	0.026	0.3157	0.0000	0.0001	4.90E-10	0.0000	0.0000	4.81E-10	0.0000	0.0000	4.73E-10
173	0.00	0.000	0.210	0.3057	0.0000	0.0005	2.58E-09	0.0000	0.0000	2.35E-09	0.0000	0.0000	2.17E-09
174	0.00	0.000	0.024	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
175	0.00	0.000	0.024	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
176	0.00	0.000	0.022	0.3025	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
177	0.00	0.000	0.021	0.3015	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
178	0.04	0.000	0.021	0.3025	0.0000	0.0000	2.68E-10	0.0000	0.0000	2.66E-10	0.0000	0.0000	2.63E-10
179	0.52	0.003	0.020	0.3259	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
180	0.17	0.000	0.173	0.3257	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.02	0.000	0.172	0.3184	0.0000	0.0001	5.53E-10	0.0000	0.0000	5.42E-10	0.0000	0.0000	5.31E-10
182	0.00	0.000	0.206	0.3088	0.0000	0.0001	3.45E-10	0.0000	0.0000	3.41E-10	0.0000	0.0000	3.37E-10
183	0.32	0.000	0.150	0.3171	0.0000	0.0001	8.91E-10	0.0000	0.0000	8.63E-10	0.0000	0.0000	8.36E-10
184	0.00	0.000	0.412	0.2975	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
185	0.00	0.000	0.062	0.2946	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
186	0.00	0.000	0.047	0.2923	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
187	0.00	0.000	0.040	0.2904	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.00	0.000	0.035	0.2887	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.08	0.000	0.033	0.2910	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.00	0.000	0.029	0.2897	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.06	0.000	0.028	0.2912	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.94	0.076	0.027	0.3311	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
193	0.33	0.017	0.372	0.3285	0.0000	0.0001	7.46E-10	0.0000	0.0000	7.26E-10	0.0000	0.0000	7.08E-10
194	0.00	0.000	0.337	0.3123	0.0000	0.0008	4.20E-09	0.0000	0.0000	2.87E-09	0.0000	0.0000	2.59E-09
195	0.00	0.000	0.298	0.2981	0.0000	0.0002	1.27E-09	0.0000	0.0000	1.79E-09	0.0000	0.0000	1.68E-09
196	0.00	0.000	0.149	0.2910	0.0000	0.0000	0.00E+00	0.0000	0.0000	3.04E-10	0.0000	0.0000	3.01E-10
197	0.00	0.000	0.062	0.2881	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.17	0.000	0.048	0.2939	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.64	0.011	0.041	0.3219	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
200	0.01	0.000	0.313	0.3073	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
201	0.13	0.000	0.036	0.3116	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.00	0.000	0.032	0.3101	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
203	0.00	0.000	0.029	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
204	0.00	0.000	0.028	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.37	0.000	0.027	0.3240	0.0000	0.0000	1.65E-10	0.0000	0.0000	1.64E-10	0.0000	0.0000	1.63E-10
206	0.00	0.000	0.246	0.3123	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
207	0.00	0.000	0.329	0.2965	0.0000	0.0010	5.62E-09	0.0000	0.0000	5.02E-09	0.0000	0.0000	3.33E-09

208	0.00	0.000	0.149	0.2895	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.45E-16	0.0000	0.0000	1.06E-09
209	0.00	0.000	0.062	0.2865	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
210	0.00	0.000	0.047	0.2843	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
211	0.24	0.000	0.041	0.2935	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
212	0.00	0.000	0.035	0.2919	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
213	0.00	0.000	0.032	0.2903	0.0000	0.0001	1.10E-09	0.0000	0.0000	1.06E-09	0.0000	0.0000	1.02E-09
214	0.00	0.000	0.029	0.2890	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
215	0.00	0.000	0.027	0.2877	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.026	0.2864	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	0.17	0.000	0.026	0.2934	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.03	0.000	0.024	0.2936	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
219	0.39	0.000	0.023	0.3111	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
220	0.00	0.000	0.021	0.3101	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
221	0.00	0.000	0.020	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
222	0.00	0.000	0.020	0.3082	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
223	0.10	0.000	0.020	0.3122	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
224	0.00	0.000	0.279	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
225	0.36	0.000	0.020	0.3151	0.0000	0.0000	4.56E-10	0.0000	0.0000	4.48E-10	0.0000	0.0000	4.41E-10
226	0.07	0.000	0.139	0.3116	0.0000	0.0001	3.58E-10	0.0000	0.0000	3.53E-10	0.0000	0.0000	3.49E-10
227	0.00	0.000	0.018	0.3107	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
228	0.00	0.000	0.017	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
229	0.00	0.000	0.017	0.3091	0.0000	0.0000	1.39E-10	0.0000	0.0000	1.38E-10	0.0000	0.0000	1.37E-10
230	0.00	0.000	0.016	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
231	0.00	0.000	0.016	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
232	0.00	0.000	0.016	0.3068	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
233	0.00	0.000	0.015	0.3061	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.00	0.000	0.015	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
235	0.00	0.000	0.015	0.3047	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
236	0.02	0.000	0.016	0.3050	0.0000	0.0000	2.43E-10	0.0000	0.0000	2.41E-10	0.0000	0.0000	2.39E-10
237	0.00	0.000	0.014	0.3043	0.0000	0.0000	3.35E-10	0.0000	0.0000	3.31E-10	0.0000	0.0000	3.27E-10
238	1.62	0.475	0.016	0.3582	0.0000	0.0000	1.65E-10	0.0000	0.0000	1.64E-10	0.0000	0.0000	1.63E-10
239	0.00	0.000	0.185	0.3494	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
240	0.00	0.000	0.299	0.3352	0.0000	0.0001	8.90E-10	0.0000	0.0000	8.62E-10	0.0000	0.0000	8.36E-10
241	0.12	0.000	0.264	0.3285	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
242	0.20	0.000	0.351	0.3215	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.12	0.000	0.157	0.3198	0.0000	0.0003	2.12E-09	0.0000	0.0000	1.97E-09	0.0000	0.0000	1.84E-09
244	0.04	0.000	0.358	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
245	0.00	0.000	0.148	0.2974	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
246	0.00	0.000	0.062	0.2945	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	0.02	0.000	0.049	0.2932	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
248	0.49	0.000	0.042	0.3146	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.05	0.000	0.037	0.3151	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.15	0.000	0.033	0.3207	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

251		0.00	0.000	0.247	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
252		0.00	0.000	0.029	0.3072	0.0000	0.0003	1.76E-09	0.0000	0.0000	1.65E-09	0.0000	0.0000	1.56E-09
253		0.00	0.000	0.027	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
254		0.00	0.000	0.026	0.3041	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
255		0.00	0.000	0.024	0.3028	0.0000	0.0006	5.39E-09	0.0000	0.0000	4.86E-09	0.0000	0.0000	3.25E-09
256		0.00	0.000	0.023	0.3014	0.0000	0.0015	9.63E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257		0.07	0.000	0.024	0.3036	0.0001	0.0050	2.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
258		0.00	0.000	0.021	0.3026	0.0001	0.0052	2.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
259		0.01	0.000	0.022	0.3022	0.0001	0.0042	2.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
260		0.07	0.000	0.021	0.3045	0.0001	0.0042	2.09E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
261		0.04	0.000	0.021	0.3053	0.0001	0.0039	1.97E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
262		0.51	0.001	0.020	0.3284	0.0001	0.0036	1.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
263		0.00	0.000	0.091	0.3242	0.0000	0.0002	1.32E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
264		0.00	0.000	0.148	0.3171	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.13E-10	0.0000	0.0000	8.49E-11
265		0.00	0.000	0.149	0.3100	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.82E-11
266		0.00	0.000	0.062	0.3071	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
267	*	0.05	0.000	0.081	0.3056	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
268	*	0.17	0.000	0.031	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
269	*	0.21	0.000	0.020	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
270		0.01	0.000	0.000	0.3126	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
271	*	0.00	0.000	0.043	0.3135	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
272		0.00	0.000	0.033	0.3186	0.0000	0.0002	1.10E-09	0.0000	0.0000	1.05E-09	0.0000	0.0000	1.01E-09
273		0.06	0.000	0.056	0.3188	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
274		0.00	0.000	0.165	0.3110	0.0000	0.0002	8.36E-10	0.0000	0.0000	8.11E-10	0.0000	0.0000	7.88E-10
275		0.01	0.000	0.138	0.3049	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
276		1.17	0.169	0.064	0.3498	0.0000	0.0001	8.38E-10	0.0000	0.0000	8.14E-10	0.0000	0.0000	7.90E-10
277		0.00	0.000	0.128	0.3437	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
278		0.03	0.000	0.224	0.3345	0.0000	0.0002	9.25E-10	0.0000	0.0000	8.94E-10	0.0000	0.0000	8.66E-10
279		0.00	0.000	0.147	0.3275	0.0000	0.0001	6.86E-10	0.0000	0.0000	6.69E-10	0.0000	0.0000	6.53E-10
280		0.00	0.000	0.081	0.3237	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
281	*	0.00	0.000	0.052	0.3212	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
282	*	0.00	0.000	0.000	0.3212	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
283	*	0.00	0.000	0.000	0.3212	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
284		0.00	0.000	0.083	0.3172	0.0000	0.0003	2.25E-09	0.0000	0.0000	2.08E-09	0.0000	0.0000	1.93E-09
285	*	0.00	0.000	0.053	0.3147	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.68E-14	0.0000	0.0000	5.68E-14
286	*	0.00	0.000	0.000	0.3147	0.0000	0.0002	1.66E-09	0.0000	0.0000	1.56E-09	0.0000	0.0000	1.48E-09
287		0.00	0.000	0.062	0.3117	0.0000	0.0000	2.24E-10	0.0000	0.0000	2.22E-10	0.0000	0.0000	2.20E-10
288		0.00	0.000	0.047	0.3095	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
289		0.00	0.000	0.040	0.3076	0.0000	0.0005	3.09E-09	0.0000	0.0000	2.78E-09	0.0000	0.0000	2.52E-09
290		0.09	0.000	0.037	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
291		0.80	0.042	0.034	0.3445	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
292		0.00	0.000	0.130	0.3383	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
293		0.00	0.000	0.136	0.3318	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

294		0.00	0.000	0.147	0.3248	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
295		0.00	0.000	0.128	0.3187	0.0000	0.0012	8.15E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
296		0.00	0.000	0.127	0.3126	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.33E-09	0.0000	0.0000	1.99E-09
297		0.00	0.000	0.149	0.3052	0.0000	0.0001	7.84E-10	0.0000	0.0000	7.62E-10	0.0000	0.0000	8.69E-10
298		0.37	0.000	0.064	0.3194	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	1.85E-10
299		0.00	0.000	0.165	0.3114	0.0000	0.0017	8.04E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.65E-09
300		0.00	0.000	0.047	0.3091	0.0001	0.0049	2.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	5.10E-09
301		0.00	0.000	0.040	0.3072	0.0001	0.0044	2.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.09	0.000	0.036	0.3096	0.0001	0.0039	2.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303	*	0.35	0.000	0.030	0.3106	0.0001	0.0037	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304	*	0.00	0.000	0.031	0.3115	0.0000	0.0009	4.54E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.03	0.000	0.069	0.3216	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.83E-09	0.0000	0.0000	1.32E-09
306		0.00	0.000	0.115	0.3161	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.29E-10
307		0.00	0.000	0.032	0.3146	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
308		0.00	0.000	0.029	0.3132	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
309	*	0.35	0.000	0.035	0.3142	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
310	*	1.20	0.000	0.000	0.3151	0.0000	0.0001	3.94E-10	0.0000	0.0000	3.89E-10	0.0000	0.0000	3.83E-10
311	*	0.01	0.000	0.035	0.3160	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
312		0.35	0.659	0.000	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
313		0.06	0.000	0.158	0.3650	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
314		0.00	0.000	0.205	0.3553	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
315		0.00	0.000	0.271	0.3424	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
316		0.00	0.000	0.118	0.3361	0.0000	0.0000	1.55E-10	0.0000	0.0000	1.54E-10	0.0000	0.0000	1.54E-10
317		0.00	0.000	0.122	0.3296	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
318		0.00	0.000	0.158	0.3207	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
319		0.00	0.000	0.094	0.3151	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
320		0.38	0.000	0.057	0.3290	0.0000	0.0018	9.77E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
321		0.18	0.000	0.108	0.3311	0.0003	0.0160	6.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322	*	0.01	0.000	0.048	0.3283	0.0005	0.0256	9.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.00	0.000	0.067	0.3240	0.0006	0.0267	1.01E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.35	0.000	0.102	0.3348	0.0005	0.0231	8.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325		0.36	0.001	0.169	0.3427	0.0004	0.0209	8.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326		0.15	0.000	0.208	0.3391	0.0004	0.0210	8.17E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327		0.00	0.000	0.171	0.3299	0.0004	0.0173	7.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328		0.29	0.000	0.145	0.3362	0.0005	0.0240	9.19E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329		0.29	0.000	0.252	0.3371	0.0004	0.0206	8.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.00	0.000	0.118	0.3311	0.0004	0.0206	8.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331		0.00	0.000	0.123	0.3249	0.0003	0.0163	6.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.04	0.000	0.092	0.3221	0.0003	0.0157	6.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.000	0.084	0.3182	0.0003	0.0151	6.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334		0.00	0.000	0.068	0.3150	0.0002	0.0113	4.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.01	0.000	0.116	0.3101	0.0002	0.0090	3.93E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.17	0.000	0.062	0.3155	0.0002	0.0075	3.35E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337		0.00	0.000	0.047	0.3132	0.0001	0.0060	2.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338		0.06	0.000	0.040	0.3142	0.0001	0.0049	2.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339		0.45	0.001	0.036	0.3340	0.0001	0.0052	2.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340		0.00	0.000	0.099	0.3292	0.0001	0.0045	2.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341		0.81	0.115	0.135	0.3559	0.0001	0.0040	2.00E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342		0.86	0.344	0.094	0.3760	0.0001	0.0036	1.88E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343	*	0.00	0.000	0.042	0.3741	0.0001	0.0030	1.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344		0.07	0.000	0.050	0.3748	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.45E-09	0.0000	0.0000	4.76E-09
345	*	0.03	0.000	0.045	0.3698	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.73E-10
346		0.09	0.000	0.055	0.3664	0.0002	0.0119	4.60E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
347		0.00	0.000	0.049	0.3599	0.0019	0.0883	2.92E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348	*	0.00	0.000	0.042	0.3559	0.0015	0.0717	2.42E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349	*	0.00	0.000	0.000	0.3541	0.0009	0.0424	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350	*	0.00	0.000	0.042	0.3499	0.0009	0.0404	1.45E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351	*	0.00	0.000	0.040	0.3464	0.0010	0.0472	1.68E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352	*	0.00	0.000	0.000	0.3451	0.0007	0.0340	1.25E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353		0.00	0.000	0.070	0.3405	0.0007	0.0326	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		0.00	0.000	0.111	0.3344	0.0006	0.0281	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355		0.00	0.000	0.150	0.3261	0.0004	0.0200	7.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
356		0.00	0.000	0.066	0.3220	0.0005	0.0243	9.30E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357	*	0.48	0.000	0.023	0.3227	0.0006	0.0279	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*	0.27	0.000	0.023	0.3234	0.0004	0.0183	7.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*	0.00	0.000	0.011	0.3239	0.0002	0.0103	4.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360		0.01	0.000	0.000	0.3242	0.0002	0.0072	3.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361		0.00	0.000	0.000	0.3478	0.0002	0.0082	3.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362		0.00	0.000	0.056	0.3500	0.0002	0.0108	4.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363		0.00	0.000	0.079	0.3454	0.0003	0.0124	5.16E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364		0.00	0.000	0.125	0.3389	0.0004	0.0191	7.56E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365		0.00	0.000	0.086	0.3342	0.0003	0.0120	5.04E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 29			
	inches	cubic feet	percent
Precipitation	37.71	136,887.0	100.00
Runoff	6.343	23,024.9	16.82
Evapotranspiration	28.967	105,149.7	76.81
Drainage Collected from Layer 2	1.6325	5,925.9	4.33
Percolation/Leakage through Layer 3	0.000007	0.0240	0.00
Average Head on Top of Layer 3	0.0001	---	---
Drainage Collected from Layer 7	0.0000	0.0206	0.00
Percolation/Leakage through Layer 8	0.000001	0.0033	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0001	0.00
Percolation/Leakage through Layer 11	0.000001	0.0033	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	0.7676	2,786.5	2.04
Soil Water at Start of Year	255.8628	928,781.9	678.50
Soil Water at End of Year	256.7514	932,007.7	680.86
Snow Water at Start of Year	0.1210	439.3	0.32
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 30

Column key: Head #1: drainage from Layer 3 | Head #2: drainage from Layer 8 | Head #3: drainage from Layer 10
Drain #1: drainage from Layer 2 | Drain #2: drainage from Layer 7 | Drain #3: drainage from Layer 9
Leak #1: leakage thru Layer 3 | Leak #2: leakage thru Layer 8 | Leak #3: leakage thru Layer 11

Title: Millersville Cell 9 - Final Cover
Simulated On: 12/6/2024 15:30

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1			0.04	0.000	0.091	0.3310	0.0003	0.0129	5.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
2			0.10	0.000	0.135	0.3285	0.0003	0.0133	5.47E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
3			0.00	0.000	0.142	0.3209	0.0002	0.0108	4.60E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
4			0.12	0.000	0.156	0.3184	0.0003	0.0137	5.64E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
5			0.00	0.000	0.091	0.3137	0.0004	0.0199	7.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
6			0.00	0.000	0.091	0.3089	0.0003	0.0144	5.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
7			0.00	0.000	0.126	0.3024	0.0003	0.0123	5.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
8			0.00	0.000	0.102	0.2972	0.0003	0.0126	5.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
9			0.00	0.000	0.061	0.2940	0.0003	0.0124	5.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
10			0.00	0.000	0.047	0.2917	0.0003	0.0134	5.53E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
11			0.00	0.000	0.040	0.2898	0.0002	0.0115	4.82E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
12	*		0.00	0.000	0.035	0.2881	0.0002	0.0091	3.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
13			0.05	0.000	0.032	0.2891	0.0002	0.0075	3.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
14			0.00	0.000	0.029	0.2877	0.0001	0.0064	2.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
15			0.00	0.000	0.027	0.2864	0.0001	0.0056	2.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
16			0.04	0.000	0.026	0.2869	0.0001	0.0049	2.38E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
17			0.02	0.000	0.024	0.2869	0.0001	0.0044	2.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
18	*		0.24	0.000	0.034	0.2878	0.0001	0.0040	2.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
19	*		0.08	0.000	0.019	0.2887	0.0001	0.0037	1.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
20	*		0.15	0.000	0.032	0.2897	0.0000	0.0009	4.81E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
21			0.00	0.000	0.053	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.01E-09	0.0000	0.0000	1.44E-09
22			0.00	0.000	0.023	0.3015	0.0000	0.0002	1.95E-09	0.0000	0.0000	1.82E-09	0.0000	0.0000	1.75E-09
23			0.00	0.000	0.022	0.3004	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.27E-10
24			0.00	0.000	0.021	0.2994	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
25			0.00	0.000	0.020	0.2984	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
26			0.21	0.000	0.020	0.3074	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
27			0.00	0.000	0.096	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
28			0.00	0.000	0.019	0.3019	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
29	*		0.00	0.000	0.018	0.3011	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
30			0.00	0.000	0.018	0.3002	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
31			0.00	0.000	0.017	0.2994	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
32			0.00	0.000	0.017	0.2986	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
33			0.00	0.000	0.016	0.2978	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
34	*		0.00	0.000	0.002	0.2978	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
35			0.08	0.000	0.016	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

36		0.03	0.000	0.016	0.3015	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
37		0.08	0.000	0.016	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
38	*	0.42	0.000	0.027	0.3055	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
39	*	0.77	0.000	0.026	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
40	*	0.35	0.000	0.000	0.3073	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
41	*	0.00	0.000	0.032	0.3083	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
42	*	0.00	0.000	0.039	0.3092	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
43	*	0.00	0.000	0.018	0.3101	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
44	*	0.06	0.000	0.023	0.3111	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
45	*	0.23	0.000	0.023	0.3120	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
46	*	0.03	0.000	0.000	0.3130	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
47	*	0.00	0.000	0.031	0.3139	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
48	*	0.58	0.000	0.000	0.3148	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
49	*	0.64	0.000	0.017	0.3158	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
50	*	0.00	0.000	0.031	0.3167	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
51		0.00	0.000	0.046	0.3176	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
52		0.00	0.078	0.000	0.3520	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
53		0.00	0.963	0.000	0.3862	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
54		0.03	0.000	0.099	0.3831	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
55		0.01	0.000	0.106	0.3713	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
56		0.42	0.014	0.124	0.3783	0.0018	0.0840	2.74E-07	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
57		0.00	0.000	0.131	0.3689	0.0022	0.1011	3.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
58		0.00	0.000	0.092	0.3606	0.0016	0.0764	2.56E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
59		0.00	0.000	0.125	0.3534	0.0015	0.0675	2.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
60		0.00	0.000	0.140	0.3452	0.0006	0.0306	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
61		0.02	0.000	0.186	0.3353	0.0007	0.0344	1.26E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
62		0.00	0.000	0.171	0.3256	0.0009	0.0406	1.46E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
63		0.00	0.000	0.124	0.3183	0.0008	0.0380	1.38E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
64		0.00	0.000	0.062	0.3139	0.0006	0.0283	1.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
65	*	0.00	0.000	0.000	0.3123	0.0007	0.0311	1.15E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
66	*	0.00	0.000	0.000	0.3108	0.0007	0.0336	1.23E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
67	*	0.07	0.000	0.086	0.3090	0.0007	0.0320	1.21E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
68		0.30	0.000	0.040	0.3203	0.0006	0.0286	1.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
69		0.27	0.000	0.137	0.3257	0.0006	0.0280	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
70		0.23	0.000	0.173	0.3278	0.0004	0.0195	7.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
71		0.00	0.000	0.138	0.3204	0.0003	0.0165	6.61E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
72		0.00	0.000	0.163	0.3118	0.0004	0.0164	6.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
73		1.59	0.445	0.148	0.3583	0.0003	0.0159	6.41E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
74		0.00	0.000	0.127	0.3515	0.0004	0.0208	8.11E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
75		0.04	0.000	0.257	0.3407	0.0004	0.0193	7.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
76		0.41	0.002	0.089	0.3556	0.0004	0.0177	7.03E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
77		0.00	0.000	0.220	0.3446	0.0003	0.0123	5.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
78		0.00	0.000	0.111	0.3393	0.0004	0.0183	7.25E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

79		0.00	0.000	0.191	0.3302	0.0003	0.0133	5.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
80		0.00	0.000	0.189	0.3211	0.0002	0.0098	4.20E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
81		0.00	0.000	0.130	0.3145	0.0000	0.0015	1.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
82		0.00	0.000	0.149	0.3071	0.0001	0.0054	2.63E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
83		0.15	0.000	0.062	0.3112	0.0002	0.0094	4.07E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
84		0.04	0.000	0.048	0.3110	0.0002	0.0087	3.80E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
85		0.00	0.000	0.040	0.3091	0.0002	0.0072	3.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
86	*	0.00	0.000	0.035	0.3074	0.0001	0.0062	2.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
87	*	0.38	0.000	0.043	0.3084	0.0001	0.0054	2.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
88	*	0.12	0.000	0.022	0.3093	0.0001	0.0046	2.26E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
89	*	0.00	0.000	0.016	0.3102	0.0001	0.0027	1.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
90	*	0.00	0.000	0.036	0.3109	0.0000	0.0012	8.25E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
91		0.00	0.000	0.080	0.3216	0.0000	0.0008	6.24E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
92		0.04	0.000	0.225	0.3128	0.0001	0.0034	1.83E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
93		0.00	0.000	0.032	0.3107	0.0000	0.0000	2.71E-10	0.0000	0.0000	4.87E-09	0.0000	0.0000	4.14E-09
94		0.00	0.000	0.029	0.3090	0.0000	0.0004	3.90E-09	0.0000	0.0000	3.71E-09	0.0000	0.0000	2.92E-09
95		0.00	0.000	0.027	0.3076	0.0000	0.0022	1.56E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	4.89E-09
96		0.00	0.000	0.026	0.3060	0.0000	0.0018	1.10E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
97		0.00	0.000	0.024	0.3046	0.0001	0.0036	1.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
98		0.06	0.000	0.023	0.3061	0.0000	0.0015	9.86E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
99	*	0.06	0.000	0.081	0.3047	0.0001	0.0040	2.02E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
100	*	1.11	0.000	0.021	0.3053	0.0001	0.0064	2.95E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
101		0.00	0.107	0.000	0.3507	0.0001	0.0070	3.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
102		0.00	0.000	0.163	0.3425	0.0001	0.0037	1.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
103		0.18	0.000	0.120	0.3451	0.0002	0.0090	3.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
104		0.02	0.000	0.108	0.3407	0.0002	0.0113	4.75E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
105		0.00	0.000	0.137	0.3341	0.0002	0.0091	4.08E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
106		0.17	0.000	0.119	0.3367	0.0002	0.0079	3.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
107	*	0.00	0.000	0.079	0.3329	0.0001	0.0065	2.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
108	*	0.09	0.000	0.080	0.3334	0.0001	0.0058	2.73E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
109		0.00	0.000	0.147	0.3262	0.0001	0.0031	1.57E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
110		0.00	0.000	0.186	0.3174	0.0001	0.0049	2.37E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
111		0.08	0.000	0.196	0.3120	0.0001	0.0046	2.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
112		0.04	0.000	0.235	0.3028	0.0001	0.0040	1.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
113		0.41	0.000	0.149	0.3150	0.0001	0.0038	1.92E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
114		0.00	0.000	0.404	0.2958	0.0001	0.0024	1.21E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
115		0.30	0.000	0.062	0.3071	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.58E-09	0.0000	0.0000	3.99E-09
116		0.00	0.000	0.047	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	2.91E-10
117		0.19	0.000	0.040	0.3123	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
118		0.73	0.056	0.194	0.3352	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
119		0.01	0.000	0.138	0.3289	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
120		0.00	0.000	0.357	0.3119	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
121		0.00	0.000	0.415	0.2922	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

122	0.00	0.000	0.149	0.2851	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
123	0.00	0.000	0.062	0.2821	0.0000	0.0001	8.46E-10	0.0000	0.0000	8.21E-10	0.0000	0.0000	7.97E-10
124	0.32	0.000	0.048	0.2953	0.0000	0.0003	1.98E-09	0.0000	0.0000	1.85E-09	0.0000	0.0000	1.73E-09
125	0.41	0.000	0.040	0.3129	0.0000	0.0001	9.41E-10	0.0000	0.0000	9.09E-10	0.0000	0.0000	8.80E-10
126	0.01	0.000	0.181	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
127	0.05	0.000	0.035	0.3052	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
128	0.00	0.000	0.032	0.3037	0.0000	0.0000	1.76E-10	0.0000	0.0000	1.74E-10	0.0000	0.0000	1.73E-10
129	0.00	0.000	0.029	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
130	0.00	0.000	0.027	0.3010	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
131	0.33	0.000	0.026	0.3155	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
132	0.07	0.000	0.090	0.3147	0.0000	0.0001	7.75E-10	0.0000	0.0000	7.54E-10	0.0000	0.0000	7.34E-10
133	0.02	0.000	0.098	0.3111	0.0000	0.0002	1.20E-09	0.0000	0.0000	1.15E-09	0.0000	0.0000	1.11E-09
134	0.10	0.000	0.149	0.3087	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
135	0.22	0.000	0.062	0.3162	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
136	0.00	0.000	0.126	0.3102	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
137	0.00	0.000	0.047	0.3080	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
138	0.00	0.000	0.040	0.3061	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
139	0.00	0.000	0.035	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
140	0.00	0.000	0.032	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
141	0.00	0.000	0.029	0.3015	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
142	0.06	0.000	0.028	0.3031	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
143	0.10	0.000	0.026	0.3065	0.0000	0.0002	1.56E-09	0.0000	0.0000	1.47E-09	0.0000	0.0000	1.40E-09
144	0.00	0.000	0.024	0.3053	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
145	0.00	0.000	0.023	0.3042	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
146	0.00	0.000	0.022	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
147	0.38	0.000	0.022	0.3205	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
148	0.11	0.000	0.145	0.3187	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
149	0.07	0.000	0.374	0.3040	0.0000	0.0007	3.50E-09	0.0000	0.0000	3.10E-09	0.0000	0.0000	2.78E-09
150	0.27	0.000	0.149	0.3097	0.0000	0.0004	2.23E-09	0.0000	0.0000	2.06E-09	0.0000	0.0000	1.92E-09
151	0.00	0.000	0.062	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
152	0.00	0.000	0.047	0.3045	0.0000	0.0001	7.15E-10	0.0000	0.0000	6.97E-10	0.0000	0.0000	6.80E-10
153	0.00	0.000	0.040	0.3026	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
154	0.00	0.000	0.035	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
155	0.00	0.000	0.032	0.2994	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
156	0.00	0.000	0.030	0.2981	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
157	0.00	0.000	0.027	0.2968	0.0000	0.0001	1.07E-09	0.0000	0.0000	1.03E-09	0.0000	0.0000	9.96E-10
158	0.00	0.000	0.026	0.2955	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
159	0.28	0.000	0.025	0.3076	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
160	0.00	0.000	0.023	0.3065	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
161	0.00	0.000	0.022	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
162	0.33	0.000	0.022	0.3201	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
163	0.01	0.000	0.223	0.3099	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
164	0.00	0.000	0.020	0.3090	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

165	0.31	0.000	0.020	0.3230	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
166	0.00	0.000	0.240	0.3115	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
167	0.00	0.000	0.019	0.3106	0.0000	0.0003	2.37E-09	0.0000	0.0000	2.18E-09	0.0000	0.0000	2.02E-09
168	0.18	0.000	0.019	0.3182	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
169	0.79	0.117	0.307	0.3359	0.0000	0.0003	2.09E-09	0.0000	0.0000	1.95E-09	0.0000	0.0000	1.82E-09
170	0.23	0.002	0.265	0.3339	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
171	0.01	0.000	0.316	0.3195	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
172	0.04	0.000	0.339	0.3052	0.0000	0.0002	1.10E-09	0.0000	0.0000	1.06E-09	0.0000	0.0000	1.02E-09
173	0.49	0.001	0.150	0.3212	0.0000	0.0003	1.76E-09	0.0000	0.0000	1.65E-09	0.0000	0.0000	1.56E-09
174	0.10	0.000	0.284	0.3125	0.0000	0.0010	5.94E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
175	0.25	0.000	0.342	0.3079	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.27E-10	0.0000	0.0000	1.17E-09
176	0.70	0.059	0.148	0.3312	0.0000	0.0003	1.53E-09	0.0000	0.0000	1.45E-09	0.0000	0.0000	1.08E-09
177	0.00	0.000	0.143	0.3244	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	3.44E-10
178	0.14	0.000	0.356	0.3139	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
179	0.00	0.000	0.324	0.2985	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
180	0.00	0.000	0.149	0.2914	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
181	0.03	0.000	0.063	0.2898	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
182	0.01	0.000	0.049	0.2877	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
183	0.20	0.000	0.041	0.2955	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
184	0.01	0.000	0.036	0.2943	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
185	0.02	0.000	0.033	0.2935	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
186	0.02	0.000	0.031	0.2928	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
187	0.00	0.000	0.027	0.2915	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
188	0.25	0.000	0.027	0.3023	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
189	0.00	0.000	0.024	0.3011	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
190	0.06	0.000	0.024	0.3029	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
191	0.10	0.000	0.023	0.3067	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
192	0.46	0.007	0.023	0.3274	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
193	0.00	0.000	0.307	0.3128	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
194	0.35	0.000	0.345	0.3132	0.0000	0.0005	2.81E-09	0.0000	0.0000	2.54E-09	0.0000	0.0000	2.33E-09
195	0.01	0.000	0.303	0.2994	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
196	0.00	0.000	0.149	0.2924	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
197	0.00	0.000	0.062	0.2894	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
198	0.00	0.000	0.047	0.2872	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
199	0.00	0.000	0.040	0.2853	0.0000	0.0000	2.90E-10	0.0000	0.0000	2.87E-10	0.0000	0.0000	2.84E-10
200	0.40	0.000	0.037	0.3027	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
201	0.49	0.011	0.033	0.3241	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
202	0.07	0.000	0.117	0.3220	0.0000	0.0000	2.31E-10	0.0000	0.0000	2.30E-10	0.0000	0.0000	2.28E-10
203	0.00	0.000	0.224	0.3113	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
204	0.02	0.000	0.123	0.3066	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
205	0.00	0.000	0.062	0.3036	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
206	0.00	0.000	0.047	0.3014	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
207	0.11	0.000	0.042	0.3046	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00

208	0.03	0.000	0.037	0.3041	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
209	0.06	0.000	0.034	0.3056	0.0000	0.0001	9.19E-10	0.0000	0.0000	8.89E-10	0.0000	0.0000	8.61E-10
210	0.34	0.000	0.031	0.3204	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
211	0.04	0.000	0.307	0.3075	0.0000	0.0002	8.84E-10	0.0000	0.0000	8.56E-10	0.0000	0.0000	8.30E-10
212	0.00	0.000	0.027	0.3062	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
213	0.00	0.000	0.026	0.3050	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
214	0.00	0.000	0.024	0.3038	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
215	0.00	0.000	0.023	0.3028	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
216	0.00	0.000	0.022	0.3017	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
217	0.00	0.000	0.021	0.3007	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
218	0.02	0.000	0.022	0.3006	0.0000	0.0000	1.33E-10	0.0000	0.0000	1.32E-10	0.0000	0.0000	1.32E-10
219	0.00	0.000	0.020	0.2996	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
220	0.00	0.000	0.021	0.2988	0.0000	0.0001	1.38E-09	0.0000	0.0000	1.32E-09	0.0000	0.0000	1.26E-09
221	0.74	0.036	0.020	0.3315	0.0000	0.0001	1.73E-09	0.0000	0.0000	1.62E-09	0.0000	0.0000	1.53E-09
222	0.22	0.001	0.302	0.3277	0.0000	0.0003	1.51E-09	0.0000	0.0000	1.43E-09	0.0000	0.0000	1.36E-09
223	0.15	0.000	0.280	0.3213	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
224	0.09	0.000	0.290	0.3119	0.0000	0.0001	1.07E-09	0.0000	0.0000	1.03E-09	0.0000	0.0000	9.93E-10
225	0.09	0.000	0.141	0.3093	0.0000	0.0010	5.95E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
226	0.93	0.143	0.151	0.3394	0.0000	0.0004	1.95E-09	0.0000	0.0000	1.52E-09	0.0000	0.0000	2.12E-09
227	0.00	0.000	0.139	0.3328	0.0000	0.0000	3.06E-10	0.0000	0.0000	6.78E-10	0.0000	0.0000	8.60E-10
228	0.00	0.000	0.127	0.3267	0.0000	0.0000	0.00E+00	0.0000	0.0000	7.57E-11	0.0000	0.0000	2.22E-10
229	0.15	0.000	0.115	0.3286	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.89E-11
230	0.00	0.000	0.138	0.3220	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
231	0.00	0.000	0.198	0.3125	0.0000	0.0003	1.63E-09	0.0000	0.0000	1.54E-09	0.0000	0.0000	1.46E-09
232	0.00	0.000	0.129	0.3064	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
233	0.00	0.000	0.149	0.2993	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
234	0.00	0.000	0.062	0.2964	0.0000	0.0002	1.24E-09	0.0000	0.0000	1.18E-09	0.0000	0.0000	1.13E-09
235	0.00	0.000	0.047	0.2941	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
236	0.02	0.000	0.042	0.2931	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
237	0.06	0.000	0.037	0.2943	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
238	0.25	0.000	0.034	0.3045	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
239	0.00	0.000	0.029	0.3031	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
240	0.06	0.000	0.029	0.3044	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
241	0.00	0.000	0.026	0.3032	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
242	0.00	0.000	0.024	0.3020	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
243	0.00	0.000	0.023	0.3009	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
244	0.00	0.000	0.022	0.2999	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
245	0.00	0.000	0.021	0.2989	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
246	0.30	0.000	0.023	0.3122	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
247	1.04	0.188	0.219	0.3424	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
248	0.23	0.002	0.201	0.3435	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
249	0.19	0.000	0.157	0.3449	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
250	0.01	0.000	0.088	0.3410	0.0000	0.0001	6.01E-10	0.0000	0.0000	5.88E-10	0.0000	0.0000	5.76E-10

251		0.02	0.000	0.180	0.3332	0.0000	0.0001	6.92E-10	0.0000	0.0000	6.75E-10	0.0000	0.0000	6.59E-10
252		0.10	0.000	0.074	0.3344	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.44E-16
253		0.06	0.000	0.061	0.3343	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
254		0.06	0.000	0.162	0.3294	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
255		0.00	0.000	0.165	0.3215	0.0000	0.0008	5.99E-09	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
256		0.00	0.000	0.129	0.3153	0.0000	0.0010	7.49E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
257	*	0.00	0.000	0.073	0.3119	0.0000	0.0002	1.06E-09	0.0000	0.0000	1.51E-09	0.0000	0.0000	1.49E-09
258		0.00	0.000	0.135	0.3054	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	3.57E-10
259		0.77	0.028	0.114	0.3356	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	1.11E-16
260		0.01	0.000	0.096	0.3315	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
261		0.20	0.000	0.072	0.3375	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
262		0.00	0.000	0.160	0.3299	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
263		0.00	0.000	0.118	0.3243	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
264		0.00	0.000	0.126	0.3182	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
265		0.00	0.000	0.196	0.3089	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
266		0.00	0.000	0.149	0.3018	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
267		0.00	0.000	0.062	0.2989	0.0000	0.0002	1.71E-09	0.0000	0.0000	1.61E-09	0.0000	0.0000	1.52E-09
268		0.00	0.000	0.047	0.2966	0.0000	0.0006	3.92E-09	0.0000	0.0000	3.67E-09	0.0000	0.0000	3.24E-09
269		0.60	0.003	0.043	0.3232	0.0000	0.0006	3.81E-09	0.0000	0.0000	3.35E-09	0.0000	0.0000	2.98E-09
270		0.97	0.192	0.179	0.3518	0.0000	0.0000	3.20E-10	0.0000	0.0000	3.16E-10	0.0000	0.0000	3.12E-10
271		0.11	0.000	0.119	0.3515	0.0000	0.0000	2.73E-10	0.0000	0.0000	2.70E-10	0.0000	0.0000	2.68E-10
272		0.28	0.003	0.231	0.3537	0.0000	0.0002	9.29E-10	0.0000	0.0000	8.99E-10	0.0000	0.0000	8.70E-10
273		1.28	0.563	0.193	0.3787	0.0000	0.0000	0.00E+00	0.0000	0.0000	4.44E-16	0.0000	0.0000	4.43E-16
274		0.00	0.000	0.130	0.3725	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
275		0.00	0.000	0.102	0.3673	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
276		0.00	0.000	0.091	0.3581	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.00E+00
277		0.00	0.000	0.107	0.3492	0.0004	0.0216	7.90E-08	0.0000	0.0000	5.10E-09	0.0000	0.0000	3.38E-09
278		0.00	0.000	0.112	0.3409	0.0013	0.0631	2.16E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
279	*	0.00	0.000	0.061	0.3360	0.0013	0.0612	2.10E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
280		0.00	0.000	0.092	0.3297	0.0009	0.0429	1.53E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
281	*	0.00	0.000	0.000	0.3280	0.0009	0.0422	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
282	*	0.00	0.000	0.000	0.3265	0.0008	0.0360	1.31E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
283		0.00	0.000	0.084	0.3209	0.0007	0.0326	1.20E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
284		0.00	0.000	0.060	0.3169	0.0007	0.0351	1.28E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
285		0.00	0.000	0.060	0.3130	0.0006	0.0280	1.05E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
286		0.00	0.000	0.062	0.3090	0.0005	0.0248	9.44E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
287		0.00	0.000	0.047	0.3059	0.0005	0.0231	8.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
288		0.00	0.000	0.040	0.3033	0.0005	0.0216	8.40E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
289		0.00	0.000	0.035	0.3008	0.0004	0.0174	6.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
290		0.00	0.000	0.032	0.2985	0.0004	0.0180	7.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
291	*	0.00	0.000	0.029	0.2963	0.0004	0.0181	7.18E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
292	*	0.00	0.000	0.000	0.2957	0.0004	0.0173	6.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
293		0.01	0.000	0.030	0.2944	0.0004	0.0167	6.67E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

294	*	0.06	0.000	0.040	0.2948	0.0003	0.0148	6.01E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
295	*	2.00	0.000	0.000	0.2953	0.0003	0.0139	5.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
296	*	0.07	0.000	0.012	0.2958	0.0003	0.0128	5.32E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
297	*	0.00	0.000	0.000	0.2963	0.0002	0.0114	4.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
298		0.01	0.000	0.000	0.3045	0.0002	0.0096	4.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
299		0.01	0.142	0.000	0.3537	0.0002	0.0106	4.69E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
300		0.00	0.169	0.000	0.3770	0.0002	0.0112	4.91E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
301		0.27	0.035	0.109	0.3828	0.0002	0.0086	3.90E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
302		0.00	0.000	0.122	0.3771	0.0003	0.0138	5.65E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
303		0.03	0.000	0.105	0.3691	0.0001	0.0021	9.00E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
304		0.04	0.000	0.126	0.3598	0.0014	0.0673	2.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
305		0.40	0.004	0.111	0.3696	0.0021	0.0969	3.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
306		0.00	0.000	0.111	0.3615	0.0016	0.0774	2.59E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
307		0.24	0.000	0.075	0.3679	0.0010	0.0468	1.65E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
308		0.03	0.000	0.111	0.3614	0.0009	0.0454	1.61E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
309		0.05	0.000	0.107	0.3574	0.0010	0.0461	1.66E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
310		0.00	0.000	0.096	0.3509	0.0006	0.0304	1.14E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
311		0.00	0.000	0.113	0.3443	0.0009	0.0426	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
312		1.46	0.413	0.142	0.3871	0.0007	0.0329	1.22E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
313		0.00	0.000	0.070	0.3833	0.0005	0.0220	8.50E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
314	*	0.00	0.000	0.000	0.3751	0.0007	0.0410	1.41E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
315		0.00	0.000	0.088	0.3644	0.0033	0.1557	4.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
316		0.00	0.000	0.096	0.3554	0.0024	0.1098	3.54E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
317	*	0.13	0.000	0.047	0.3530	0.0019	0.0879	2.90E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
318	*	0.00	0.000	0.025	0.3518	0.0013	0.0619	2.12E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
319	*	0.00	0.000	0.017	0.3497	0.0010	0.0464	1.64E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
320		0.00	0.000	0.064	0.3446	0.0009	0.0445	1.58E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
321	*	0.00	0.000	0.000	0.3429	0.0009	0.0443	1.57E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
322		0.00	0.000	0.081	0.3377	0.0008	0.0393	1.43E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
323		0.59	0.015	0.130	0.3573	0.0006	0.0274	1.04E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
324		0.00	0.000	0.062	0.3530	0.0008	0.0385	1.40E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
325	*	0.00	0.000	0.000	0.3523	0.0007	0.0337	1.24E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
326	*	0.00	0.000	0.000	0.3517	0.0005	0.0231	8.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
327	*	0.10	0.000	0.015	0.3517	0.0003	0.0141	5.79E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
328	*	0.07	0.000	0.021	0.3516	0.0003	0.0154	6.23E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
329	*	0.05	0.000	0.023	0.3514	0.0004	0.0212	8.24E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
330		0.00	0.000	0.052	0.3537	0.0005	0.0248	9.46E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
331	*	0.06	0.000	0.029	0.3544	0.0005	0.0234	8.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
332		0.28	0.000	0.072	0.3648	0.0004	0.0172	6.86E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
333		0.00	0.000	0.079	0.3607	0.0002	0.0108	4.51E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
334	*	0.00	0.000	0.039	0.3585	0.0002	0.0080	3.34E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
335		0.00	0.000	0.056	0.3542	0.0000	0.0004	2.50E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
336		0.00	0.000	0.055	0.3511	0.0004	0.0211	8.29E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

337			0.00	0.000	0.088	0.3467	0.0004	0.0173	6.99E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
338			0.00	0.000	0.093	0.3414	0.0001	0.0046	2.28E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
339			0.48	0.002	0.077	0.3592	0.0001	0.0070	2.98E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
340			0.00	0.000	0.056	0.3554	0.0004	0.0202	7.87E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
341	*		0.82	0.000	0.037	0.3553	0.0005	0.0239	9.13E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
342	*		0.39	0.000	0.016	0.3549	0.0005	0.0215	8.33E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
343	*	*	0.00	0.000	0.008	0.3549	0.0008	0.0354	1.29E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
344	*	*	0.21	0.000	0.004	0.3549	0.0004	0.0199	7.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
345	*	*	0.00	0.000	0.013	0.3549	0.0003	0.0138	5.66E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
346	*	*	0.00	0.000	0.000	0.3549	0.0002	0.0105	4.49E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
347		*	0.00	0.000	0.000	0.3549	0.0002	0.0085	3.74E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
348		*	0.00	1.054	0.000	0.3667	0.0002	0.0071	3.22E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
349		*	0.00	0.000	0.000	0.3667	0.0001	0.0061	2.84E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
350		*	1.51	1.351	0.001	0.3743	0.0001	0.0054	2.54E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
351		*	0.00	0.000	0.000	0.3743	0.0001	0.0048	2.31E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
352		*	0.00	0.000	0.000	0.3743	0.0001	0.0043	2.12E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
353	*	*	0.00	0.000	0.000	0.3743	0.0001	0.0039	1.96E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
354		*	0.00	0.000	0.000	0.3743	0.0001	0.0033	1.71E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
355			0.00	0.000	0.068	0.3696	0.0000	0.0000	0.00E+00	0.0000	0.0000	5.92E-09	0.0000	0.0000	4.88E-09
356			0.00	0.000	0.054	0.3654	0.0000	0.0019	7.95E-09	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
357			0.00	0.000	0.060	0.3622	0.0002	0.0098	4.05E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
358	*		0.21	0.000	0.028	0.3599	0.0000	0.0000	0.00E+00	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
359	*		0.00	0.000	0.025	0.3576	0.0007	0.0329	1.19E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
360	*		0.15	0.000	0.019	0.3560	0.0013	0.0600	2.06E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
361			0.05	0.000	0.020	0.3659	0.0011	0.0537	1.87E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
362			0.55	0.079	0.065	0.3832	0.0014	0.0475	1.63E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
363	*		0.00	0.000	0.000	0.3814	0.0009	0.0425	1.52E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
364	*	*	0.00	0.000	0.000	0.3814	0.0010	0.0460	1.62E-07	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09
365	*	*	0.14	0.000	0.029	0.3814	0.0005	0.0228	8.77E-08	0.0000	0.0000	6.80E-09	0.0000	0.0000	6.80E-09

* = Frozen (air or soil)

Annual Totals for Year 30			
	inches	cubic feet	percent
Precipitation	40.92	148,531.2	100.00
Runoff	6.285	22,815.7	15.36
Evapotranspiration	29.763	108,038.3	72.74
Drainage Collected from Layer 2	3.7801	13,721.6	9.24
Percolation/Leakage through Layer 3	0.000014	0.0509	0.00
Average Head on Top of Layer 3	0.0002	---	---
Drainage Collected from Layer 7	0.0000	0.0463	0.00
Percolation/Leakage through Layer 8	0.000001	0.0044	0.00

Average Head on Top of Layer 8	0.0000	---	---
Drainage Collected from Layer 9	0.0000	0.0000	0.00
Percolation/Leakage through Layer 11	0.000001	0.0044	0.00
Average Head on Top of Layer 10	0.0000	---	---
Change in Water Storage	1.0897	3,955.5	2.66
Soil Water at Start of Year	256.7514	932,007.7	627.48
Soil Water at End of Year	257.7251	935,542.2	629.86
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.1160	421.0	0.28
Annual Water Budget Balance	0.0000	0.0000	0.00

Average Annual Totals Summary

Title: Millersville Cell 9 - Final Cover
Simulated on: 12/6/2024 15:31

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	42.93	[4.57]	155,841.2	100.00
Runoff	7.776	[2.81]	28,228.3	18.11
Evapotranspiration	29.678	[3.018]	107,731.4	69.13
Subprofile1				
Lateral drainage collected from Layer 2	5.4342	[2.0541]	19,726.2	12.66
Percolation/leakage through Layer 3	0.000019	[0.000007]	0.0696	0.00
Average Head on Top of Layer 3	0.0003	[0.0001]	---	---
Subprofile2				
Lateral drainage collected from Layer 7	0.0000	[0]	0.0647	0.00
Percolation/leakage through Layer 8	0.000001	[0]	0.0049	0.00
Average Head on Top of Layer 8	0.0000	[0]	---	---
Subprofile3				
Lateral drainage collected from Layer 9	0.0000	[0]	0.0001	0.00
Percolation/leakage through Layer 11	0.000001	[0]	0.0049	0.00
Average Head on Top of Layer 10	0.0000	[0]	---	---
Water storage				
Change in water storage	0.0427	[1.001]	155.1	0.10

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: Millersville Cell 9 - Final Cover
Simulated on: 12/6/2024 15:31

	Peak Values for Years 1 - 30*		
	(inches)		(cubic feet)
Precipitation	4.02		14,603.9
Runoff	2.968		10,772.1
Subprofile1			
Drainage collected from Layer 2	0.4447		1,614.4
Percolation/leakage through Layer 3	0.000001		0.0044
Average head on Layer 3	0.0094		---
Maximum head on Layer 3	0.0124		---
Location of maximum head in Layer 2	0.00	(feet from drain)	
Subprofile2			
Drainage collected from Layer 7	0.0000		0.0033
Percolation/leakage through Layer 8	0.000000		0.0000
Average head on Layer 8	0.0000		---
Maximum head on Layer 8	0.0000		---
Location of maximum head in Layer 7	31.46	(feet from drain)	
Subprofile3			
Drainage collected from Layer 9	0.0000		0.0000
Percolation/leakage through Layer 11	0.000000		0.0000
Average head on Layer 10	0.0000		---
Maximum head on Layer 10	0.0000		---
Location of maximum head in Layer 9	0.00	(feet from drain)	
Other Parameters			
Snow water	3.9431		14,313.3
Maximum vegetation soil water	0.4208	(vol/vol)	
Minimum vegetation soil water	0.2686	(vol/vol)	

Final Water Storage in Landfill Profile at End of Simulation Period

Title: Millersville Cell 9 - Final Cover
Simulated on: 12/6/2024 15:32
Simulation period: 30 years

	Final Water Storage	
Layer	(inches)	(vol/vol)
1	9.0450	0.3769
2	0.0026	0.0132
3	0.0000	0.0000
4	7.7040	0.3210
5	227.7600	0.2920
6	1.4880	0.0620
7	0.0025	0.0100
8	0.0000	0.0000
9	0.0025	0.0100
10	0.0000	0.0000
11	7.8660	0.4370
Snow water	0.1160	---

Geosyntec
consultants

APPENDIX N.4

Closure Turf Equivalency Memorandum

Geosyntec consultants

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Memorandum

Date:	October 3, 2025
To:	Andrew Grenzer, Maryland Department of the Environment (MDE)
Copies to:	David Moncrief, Anne Arundel County Department of Public Works (DPW)
	Stephen Krajcsik, Anne Arundel County Bureau of Waste Management Services (WMS)
	Michael Porath, WMS
From:	Meena Viswanath, P.E. (MD)
	Thomas Ramsey, P.E. (MD)
	Daniel Espinoza
Subject:	ClosureTurf Final Cover System Equivalency Millersville Landfill and Resource Recovery Facility Geosyntec Project Number: ME1418A

Geosyntec prepared this memorandum on behalf of the Millersville Landfill and Resource Recovery Facility (MLFRRF) to provide information for MDE's consideration and approval of an alternative final cover system for Cell 9. The proposed alternative final cover system, ClosureTurf®, is manufactured by WatershedGeo, Inc. This memorandum is included as an appendix to the Phase III report prepared in support of the vertical expansion of Cell 9.

MLFRRF, which began operating in 1975, is located on a 567.66-acre parcel of land at 389 Burns Crossing Road in Severn, Maryland. MLFRRF has 269 acres permitted for waste disposal. Cell 9 is an 84-acre disposal area at MLFRRF and is currently subdivided into five subcells (Subcells 9.1 through 9.5). Cell 9 is currently the only remaining permitted cell available for waste disposal at MLFRRF.

The remainder of this memorandum describes (i) the regulatory requirements for sanitary landfill final covers in Maryland, (ii) the components of the ClosureTurf system, (iii) the engineering basis for considering ClosureTurf as an alternative final cover for Cell 9, and (iv) examples of successful installations and approvals in other states.

1. REGULATORY REQUIREMENTS FOR FINAL COVER

Landfills in Maryland are governed by both the Code of Maryland Regulations (COMAR) and Federal Subtitle D.

1.1 Code of Maryland Regulations

Maryland Regulation of Water Supply, Sewage Disposal, and Solid Waste, COMAR 26.04.07.21, establishes the regulatory requirements for closure of a sanitary landfill (e.g., a municipal solid waste [MSW] landfill). COMAR 26.04.07.21.E lists the requirements for a final cover (closure cap) of a municipal landfill:

(1) A low permeability cap shall be emplaced over the final cover. The cap material may consist of synthetic material with a minimum thickness of 20 mil and a maximum permeability of 1×10^{-10th} centimeters/second, or a minimum of 1 foot of clay or other natural fine-grained material having an in-place permeability less than or equal to 1×10^{-5th} centimeters/second. The cap shall be installed with a minimum slope of 4 percent to facilitate drainage of percolate.

(2) A drainage layer with a minimum thickness of 6 inches shall be emplaced immediately above the low permeability cap. Acceptable drainage layer material shall include clean sand or other natural coarse grained material with an in-place permeability greater than 1×10^{-3rd} centimeters/second. The drainage layer shall be free of materials which may puncture or otherwise jeopardize the integrity of the low permeability cap. Commercially available filter fabrics, when used in conjunction with synthetic drainage blankets, may serve instead of the fine material, provided that the Department reviews and approves the selected materials and design configuration.

(3) Final earthen cover shall be placed over the drainage layer. Minimum cover thickness shall be 2 feet. Minimum cover slope shall be 4 percent to facilitate surface drainage from the site. The cover material shall contain sufficient organic material and nutrients to sustain a vegetative cover over time. Topsoil, or topsoil created using sewage sludge, and less select soils as authorized by COMAR 26.04.06, shall constitute acceptable final cover.

(4) Vegetative Stabilization. Within 30 days after the final earthen cover has been installed, the area shall be vegetatively stabilized using a perennial cover species as recommended by the county soil conservation district. Sufficient lime and commercial fertilizer, or sewage sludge as authorized by a permit issued under COMAR 26.04.06, shall be applied to the site to sustain vegetative growth. If the final cover is installed at a time which precludes seeding, the site shall be tacked and mulched in accordance with accepted sediment and erosion control specifications until the next available seeding window, at which time the site shall be vegetatively stabilized.

COMAR 26.04.07.21.D notes that "*The Department shall consider alternative proposals for landfill closure based upon an engineering analysis of the site.*" Additionally, COMAR 26.04.07.26 states the following:

(A) An owner, operator, or person proposing to construct or currently operating a solid waste acceptance facility may apply to the Approving Authority for a variance from one or more of the provisions of these regulations. Variance may be sought for design or operation and maintenance requirements, or both. The Approving Authority shall grant a

variance when the design or method of operation proposed in the variance application has been shown by the applicant to the satisfaction of the Approving Authority to conserve and protect the public health, the natural resources, and environment of the State, and to control air, water, and land pollution to at least the same extent as would be obtained by compliance with the regulation.

(B) Requests for variance shall supply information required by the Approving Authority, including:

(1) The nature and location of the solid waste facility;

(2) The reasons for which the variance is required, including the economic, technological, and environmental justification; and

(3) Other relevant information the Approving Authority may require in order to make a determination regarding the application.

For the final cover of a sanitary landfill, the requirement to "*conserve and protect the public health, the natural resources, and environment of the State, and to control air, water, and land pollution to at least the same extent as would be obtained by compliance with the regulation"* can be broken down into the following four engineering criteria:

1. Providing containment of waste and waste byproducts (i.e., leachate and landfill gas) and controlling infiltration into the waste to minimize leachate generation at the facility
2. Providing the ability to manage stormwater in a non-erosive manner and in compliance with Maryland regulations for stormwater management contained in COMAR 26.17.02, as implemented by local stormwater management ordinances
3. Having sufficient long-term mechanical and chemical properties to provide requisite durability, tensile strength due to localized settlement or snow loads, and resistance to ultraviolet (UV) degradation and puncture over the required post-closure period
4. Providing suitable access for installation and post-closure inspection as well as operation and maintenance (O&M)

1.2 Federal Subtitle D

MDE's prescriptive cover design for MSW landfills is generally consistent with the requirements for a final cover under 40 CFR 258.60(a):

Owners or operators of all MSWLF units must install a final cover system that is designed to minimize infiltration and erosion. The final cover system must be designed and constructed to:

(1) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1 × 10^{-5} cm/sec, whichever is less, and

(2) Minimize infiltration through the closed MSWLF by the use of an infiltration layer that contains a minimum 18-inches of earthen material, and

(3) Minimize erosion of the final cover by the use of an erosion layer that contains a minimum 6-inches of earthen material that is capable of sustaining native plant growth.

2. CLOSURETURF COVER SYSTEM

ClosureTurf is an alternative to traditional vegetated soil or geosynthetic-soil cover systems. The ClosureTurf system comprises a textured polyethylene geomembrane overlain by a geotextile-based engineered synthetic turf layer and a thin layer of sand infill (Figure 1). The geomembrane acts as a hydraulic barrier layer to reduce precipitation infiltration into the underlying waste, just as in a traditional cover system. The geomembrane can be made with either high-density polyethylene (HDPE) or linear low-density polyethylene (LLDPE). The engineered synthetic turf consists of synthetic grass blades made of HDPE tufted into a double-layer polypropylene woven geotextile backing. The engineered synthetic turf and the sand infill components protect the geomembrane from degradation caused by UV light, ballast the geomembrane against wind uplift, and protect the geomembrane from physical damage that may be caused by loads on the cover system. The engineered synthetic turf has the appearance and texture of natural grass while minimizing maintenance associated with natural grass. In locations where high stormwater flows are expected (e.g., drainage benches, downchutes, perimeter channels), a cementitious binder (Hydrobinder®) is used in lieu of the sand infill to provide greater resistance to erosion of the sand infill. This product is called HydroTurf®.

3. ENGINEERING BASIS FOR CONSIDERING CLOSURETURF

An engineering basis for an alternative final cover should consider how the alternative final cover will perform compared to the prescriptive final cover, how the alternative cover meets the regulatory requirements for final cover, and what the advantages are of the alternative final cover over the prescriptive final cover.

The prescriptive final cover currently permitted for the site (i.e., the approved final cover) consists of the following from top to bottom:

- 6-inch-thick topsoil layer to support vegetation
- 18-inch-thick protective cover soil
- 250-mil leachate collection geocomposite drainage layer
- 40-mil textured LLDPE geomembrane
- 12-inch-thick final cover soil base grading layer
- 12-inch-thick intermediate cover soil base grading layer

ClosureTurf is being proposed to replace the geomembrane, geocomposite, protective cover layer, and topsoil layer. The two soil base grading layers included in the approved final cover underneath the geomembrane would be incorporated underneath the ClosureTurf closure system. As a result, the proposed alternative final cover (ClosureTurf final cover) would consist of the following from top to bottom:

- 0.75-inch-thick sand infill layer
- Engineered synthetic turf layer
- 50-mil textured LLDPE geomembrane (Agru MicroDrain)
- 12-inch-thick final cover soil base grading layer
- 12-inch-thick intermediate cover soil base grading layer

As will be described, ClosureTurf is expected to perform better than the approved final cover in nearly all engineering analyses; as a result, the final cover calculations completed and presented in the Phase III report conservatively consider the approved soil-geosynthetic cover, except in the case of stormwater management where the calculations conservatively considered the ClosureTurf cover, and wind uplift, which has historically not been analyzed for the approved final cover.

3.1 ClosureTurf and Regulatory Compliance

As described in Section 1, the requirements for a final cover of a municipal landfill are detailed in COMAR 26.04.07.21.E and 40 CFR 258.60(a), and the requirements for requesting a variance from the prescriptive final cover are detailed in COMAR 26.04.07.26.

3.1.1 Requirements of COMAR 26.04.07.21.E and 40 CFR 258.60(a)

The regulations specify four cap components: a low-permeability cap, a drainage layer, an earthen cover, and vegetative stabilization. The components of ClosureTurf meet or exceed the intent of each of the four prescriptive cap components:

1. A low-permeability cap

   The geomembrane component of ClosureTurf, which is a 50-mil LLDPE geomembrane (typically considered to have a permeability of approximately 2 x 10^{-13} cm/sec) exceeds the minimum requirements for a low-permeability barrier layer. It also has a permeability essentially equivalent to the permeability of the bottom liner, which incorporates a 60-mil HDPE geomembrane.

2. A drainage layer

   A drainage layer above the geomembrane is not required in the ClosureTurf system because there is no overlying soil to retain water and generate a potential driving head on the low-permeability cap layer.

3. Final earthen cover

   The final earthen cover component of the prescriptive cover serves multiple purposes. It protects the geomembrane from puncture and UV exposure, retains stormwater, and supports the growth of vegetation. As described in Sections 3.2.1 and 3.2.3, ClosureTurf is adequately protected from puncture and UV exposure by the sand infill and the synthetic turf. As described in Section 3.2.2, use of ClosureTurf may necessitate the

design of expanded stormwater infrastructure, which has been incorporated into this design.

4. Vegetative stabilization

The vegetative stabilization component of the prescriptive cover serves to protect the final earthen cover from erosion and encourage evapotranspiration. As described in Section 3.2.2, with ClosureTurf there is no thick exposed soil layer that is at risk of erosion; therefore, no vegetative stabilization is needed.

3.1.2 Requirements of COMAR 26.04.07.26

The regulations require an alternative final cover to *"conserve and protect the public health, the natural resources, and environment of the State, and to control air, water, and land pollution to at least the same extent as would be obtained by compliance with the regulation."* ClosureTurf meets or exceeds each of the primary evaluation criteria presented in Section 1.

1. Providing containment of waste and waste byproducts (i.e., leachate and landfill gas) and controlling infiltration into the waste to minimize leachate generation at the facility.

   The primary component of the approved final cover that provides containment of waste and waste byproducts and controls infiltration into the waste is a 40-mil HDPE geomembrane. ClosureTurf incorporates a 50-mil LLDPE geomembrane to provide containment of waste and waste byproducts; therefore, the use of the ClosureTurf final cover would not result in any increase in leachate generation compared to the use of the approved final cover. This is described in more detail in Section 3.2.1.

2. Serving as a component of the facility stormwater management system.

   The ClosureTurf final cover system is designed to manage stormwater in a similar manner to the approved final cover – through tack-on benches, downchutes, a perimeter channel, and a stormwater pond. This is described in more detail in Section 3.2.2.

3. Have sufficient long-term mechanical and chemical properties to provide requisite durability, tensile strength due to localized settlement or snow loads, and resistance to UV degradation and puncture.

   The ClosureTurf final cover system components have a service life of over 100 years when installed and maintained properly and are resistant to UV radiation, temperature extremes, settlement-induced stresses, wind uplift stresses, and wildlife. This is described in more detail in Section 3.2.3.

4. Providing suitable access for installation and post-closure inspection and O&M.

   Access to the ClosureTurf final cover would be provided using low-ground pressure equipment or an access road on the final cover, as it would be with the approved final cover. Additionally, because the turf is synthetic and will not need to be mowed,

access for post-closure inspection and O&M will be easier than with the approved final cover. This is described in more detail in Section 3.2.4.

3.2 Engineering Performance of ClosureTurf

As part of the Phase III report, Geosyntec prepared design calculations for the vertical expansion of Cell 9. The calculations relating to the final cover design evaluate the ability of the final cover to meet the engineering criteria described in Section 1. These calculations will be reviewed here, with a discussion of how the use of ClosureTurf would affect the result of these calculations. Several additional calculations specific to the use of ClosureTurf are also discussed.

3.2.1 Waste Containment and Infiltration Minimization

The primary purpose of a final cover is to contain the underlying waste and control infiltration into the waste to minimize leachate generation. This is generally achieved by incorporating a low-permeability soil or geosynthetic layer into the final cover and construction, incorporating a drainage layer to effectively remove stormwater from the final cover, and maintaining the final cover to avoid damaging the cover through puncture or wear.

ClosureTurf equals or exceeds the capability of the approved final cover to control infiltration. The low-permeability component of the ClosureTurf, a 50-mil LLDPE geomembrane, is thicker than the 40-mil HDPE geomembrane component of the approved final cover and will therefore result in a marginal reduction in infiltration. Additionally, the use of the 0.75-inch sand infill in place of the protective cover soils will promote faster stormwater runoff, reducing the amount of time stormwater is present on the final cover and thereby also resulting in a more significant reduction in infiltration and a consequent reduction in leachate generation.

The thicker geomembrane component of ClosureTurf also increases its resistance to puncture compared to the approved final cover. The approved final cover limits puncture by limiting the maximum particle size of the final cover soils above and below the geosynthetics to 1 inch, specifying a 40-mil HDPE geomembrane with a puncture resistance of 60 pounds, and limiting equipment traveling on the cover to vehicles with a ground pressure less than 5 psi. The ClosureTurf final cover, which will be installed over soils meeting the specifications described above, provides increased puncture resistance by specifying a 50-mil LLDPE geomembrane with a puncture resistance of 55 pounds and engineered sand infill above the geomembrane with a maximum particle size of 3/8 inch, while maintaining the same ground pressure limitations.

3.2.2 Stormwater Management

Closure capping construction activities at MSW landfills must comply with the Maryland regulations for stormwater management contained in COMAR 26.17.02, as implemented by local stormwater management ordinances. The basic stormwater design requirements for any development project in Maryland require that environmental site design techniques be implemented to the maximum extent practicable, which is the first step in addressing management of five stormwater volumes (collectively referred to as the Unified Stormwater Sizing Criteria under the 2009 Maryland Stormwater Design Manual). The five criteria are water quality volume, groundwater recharge volume, channel protection storage volume, overbank flood protection volume, and extreme flood volume.

In addition to meeting the Maryland regulatory requirements, the design of a closed landfill, which often features long steep slopes, must include features to efficiently remove stormwater from the final cover to reduce infiltration while reducing the risk of erosion and controlling sediment transport. This is generally achieved by providing a drainage layer above the low-permeability layer to reduce erosion from the overlying protective cover soil, incorporating drainage benches or berms to reduce the length of steep drainage paths, adding gravel- or concrete-lined downchutes to quickly remove stormwater from the final cover, and avoiding shallow slopes that could flatten out with settlement.

ClosureTurf's performance exceeds that of a traditional cover with respect to erosion and sediment control, due to the use of an engineered sand infill in place of protective cover soils. Studies have found a significant reduction in sediment transport and runoff turbidity from closed landfills using ClosureTurf[1]. This will reduce the impact of sediment on benches, berms, downchutes, channels, and ponds, resulting in significantly less maintenance of those stormwater facilities.

As a result of this efficient removal of stormwater, the volume and intensity of stormwater runoff is increased, requiring larger stormwater infrastructure to meet the five stormwater criteria in the 2009 Maryland Stormwater Design Manual. The stormwater analysis presented as Appendix H.3 of the Phase III report designed the proposed stormwater channels and on-site stormwater management pond to accommodate the flow from the ClosureTurf final cover. Portions of the ClosureTurf final cover where stormwater flow is channelized (e.g., tack-on berms and downchutes) were designed with Hydroturf rather than the sand infill to provide the needed erosion resistance. The expanded stormwater channels and stormwater pond are presented in the permit drawings (Appendix A of the Phase III report).

3.2.3 Durability

A key concern when designing a final cover system is the durability of the geosynthetic components under environmental conditions. The geosynthetics could be exposed to UV radiation, temperature extremes, tensile stress due to localized settlement, wind uplift stress, and wildlife, and need to maintain their long-term mechanical and chemical properties over the required post-closure period.

3.2.3.1 UV Radiation

UV radiation is of minimal concern with ClosureTurf, because each of the geosynthetic components is covered – the geomembrane is covered by the geotextile-backed turf and the geotextile backing of the turf is covered by the 0.75-inch sand infill. WatershedGeo conducted a multiyear testing program to evaluate the service life of the engineered turf fibers, which remain exposed to the environment above the sand infill. The results of the study, which was independently reviewed by Geosyntec in 2015, showed that the half-life of the turf fibers would be over 100 years, resulting in a service life much longer than 100 years. The study and the independent review are included in Appendix H to the ClosureTurf Design Guidance Manual

[1] Orzech, T., Cooley, B., Zhu, M., and Scholl, B. 2024. "Performance of Engineered Turf Cover System Under Extreme Weather Conditions." *World of Coal Ash 2024*. https://uknowledge.uky.edu/woca/woca2024/day2/176/

(Attachment N.4-1). Finally, the specified sand infill will not degrade appreciably and will have a lower risk of erosion than the more heterogeneous soil material that is usually used as protective cover soil with the approved final cover.

3.2.3.2 Temperature Extremes

Although the geosynthetics in the ClosureTurf final cover system will be exposed to greater temperature extremes than they would be in the approved final cover system because of the thinner overlying material, LLDPE geomembrane is resilient to a wide range of temperatures ranging from -20°C to +30°C[2]. Temperature restrictions during installation should be implemented to limit the formation of wrinkles during installation when the geomembrane is exposed.

3.2.3.3 Settlement-Induced Stresses

Cell 9 is expected to settle up to 8 ft, with tensile stresses in the geomembrane of up to 0.24% (Appendix N.2 to the Phase III Report). Decomposition of the heterogeneous waste mass is likely to cause localized differential settlement as well. Differential settlement can cause increased tensile strain as well as localized ponding of rainwater.

The ClosureTurf final cover is designed to tolerate a large amount of settlement and strain. The LLDPE geomembrane component of the ClosureTurf final cover system has a strain capacity of up to 4 to 5%[3]. Additionally, because of the minimal weight of the infill sand on the final cover geomembrane, it is possible that the final cover geosynthetics will span any localized depressions rather than settlement with them, leading to a phenomenon called “trampolining”. If depressions occur, they can be repaired by cutting the geosynthetics (which are easily accessible because there is no thick overlying soil layer), filling the hole with flowable backfill, patching the final cover geosynthetics, and then replacing the sand infill.

3.2.3.4 Wind Uplift Stresses

Exposed geomembrane covers are at risk of being uplifted by wind, which can cause the geomembrane to tear.[4] Wind uplift of the geomembrane is the result of the same fluid dynamics that provide lift to aircraft wings. Essentially, as air passes at a faster rate over the top of the geomembrane, the top surface experiences a lower pressure than the underside, which creates lift. In traditional soil-geosynthetic covers, such as the approved final cover, the weight of as little as a few inches of soil is usually sufficient to prevent the wind from being able to uplift the geomembrane. The ClosureTurf final cover uses the combination of the weight of 0.75 inches of sand infill together with the tufted shape of the engineered turf material to provide resistance to the wind uplift forces. The integrity of the final cover geomembrane component of ClosureTurf under wind uplift loading is evaluated in Appendix N.5 of the Phase III report.

---

[2] Comer, A.I., Sculli, M.L., and Hsuan, Y.G. 1996. *Freeze-Thaw Cycling and Cold Temperature Effects on Geomembrane Sheets and Seams*. United States Environmental Protection Agency, National Risk Management Laboratory, Cincinnati, Ohio. EPA/600/S-96/004. https://semspub.epa.gov/work/05/70682.pdf

[3] Berg, R.R. and R. Bonaparte. 1993. *Long-Term Allowable Tensile Stresses for Polyethylene Geomembranes*. Geotextiles and Geomembranes, Vol. 12, No. 4, pp. 287–306.

[4] Giroud, J.P., T. Pelte, and R.J. Bathurst R.J. 1995. *Uplift of Geomembranes by Wind*. Geosynthetics International, Vol. 2, No. 6, pp. 897–952.

It should be noted that, in addition to the sand infill and the engineered turf mechanisms, additional resistance to wind uplift will be provided by the vacuum contributed by the landfill gas (LFG) collection system (although the stability design is conservative and does not depend on application of this vacuum to the underside of the geomembrane). Millersville currently operates an active LFG collection system at the facility that will be expanded as waste filling reaches final grade and cells are capped. A discussion of the LFG collection system is provided in Section 16 of the Phase III Report.

3.2.3.5 Wildlife

Many traditional final covers become habitats for burrowing animals and birds because of the thick overlying soil layer and the vegetation; these animals can impact the integrity of the final cover system. Because the ClosureTurf final cover system does not have a thick overlying soil layer and the turf is artificial, it does not provide a burrowing habitat or food source for animals. Any minor impact from animals can be addressed during regular maintenance.

3.2.4 Installation and Operation and Maintenance During Post-Closure

The initial steps of installation of ClosureTurf are similar to those of a traditional soil-geosynthetic cover. A summary of the installation procedure is provided here; the full installation guidelines are attached as Attachment N.4-2.

1. The contractor prepares the subgrade, creating a firm and nonyielding surface for geosynthetics placement. The subgrade should not have surface irregularities or protrusions.
2. The contractor deploys and welds the geomembrane component of ClosureTurf using typical geosynthetics installation equipment with traditional quality control (QC) and construction quality assurance (CQA) techniques.
3. The contractor deploys and welds or seams the engineered turf and geotextile backing component of ClosureTurf using typical geosynthetics installation equipment with traditional QC and CQA techniques.
4. Sand infill is spread over the final cover surface using an air-blown conveyance system and/or a high-speed conveyor belt system. Low-ground-pressure equipment is used to work the sand into the tufted fibers of the engineered turf such that the turf fibers are in an upright position. The thickness of the sand is measured at multiple locations to verify the minimum thickness is met.
5. Rip-rap or Hydrobinder is installed in drainage features per the design.

A ClosureTurf final cover requires significantly less maintenance than a traditional soil-geosynthetic cover. Since there is no vegetation, there is no need for mowing, fertilizing, and revegetation. Low-ground-pressure equipment can be used for maintenance and repairs, or access roads can be constructed over the final cover to allow heavier equipment to traverse the final cover.

Post-closure care generally consists of annual inspections of the ClosureTurf final cover, looking for the following issues:

- Differential settlement
- Exposed geotextile backing
- Exposed geomembrane
- Damage to engineered turf fibers in high traffic access areas
- Significant sand and drainage channel ballast migration
- Physical damage from equipment or animals

Suggested corrective actions for each of these observed issues are proposed are included in the attached ClosureTurf Post-Closure Care Manual (Attachment N.4-3) and generally consist of replacing the damaged section of geosynthetics and replenishment of sand and drainage channel ballast.

3.3 Impact on Other Cell 9 Design Calculations

As described above in Section 3.2, ClosureTurf is as effective or better than the approved final cover at containing the underlying waste, minimizing infiltration, and managing stormwater. Because ClosureTurf has a reduced cover thickness compared to the approved final cover, additional waste can be placed while still achieving the design final cover grades. Using ClosureTurf in place of the approved final cover does not significantly affect calculations relating to the liner system or global slope stability, because the weight of the waste mass and final cover is essentially unchanged. Finally, veneer stability of the ClosureTurf final cover system will be less critical than in the case of the approved final cover, because of the use of 0.75 inches of sand infill in place in place of 2 ft of cover soil results in almost negligible driving force.

4. EXAMPLE CLOSURETURF PROJECTS

Although ClosureTurf has not previously been approved as a final cover system in Maryland, it has been approved and used as final cover in neighboring states and across the United States (Figure 2). ClosureTurf has been installed at 123 sites (totaling 4,634 acres) in 34 states, of which 47 sites are MSW landfills (totaling 1,03 acres). Example ClosureTurf projects are described below, including two sites in Maryland that have used HydroTurf.

4.1 Lanchester Landfill Cover, Navron, Pennsylvania

The Lanchester Landfill, an MSW landfill in Chester County, Pennsylvania, owned and operated by the Chester County Solid Waste Authority, has used ClosureTurf in two phases of closure: Phase 1 in 2014 and Phase 2 in 2018.[5] To date, 11 acres have been capped with ClosureTurf. The

[5] https://watershedgeo.com/projects/lanchester-landfill/

benefits of ClosureTurf at the site include reduced project costs and truck traffic compared to a traditional vegetated cap (because of a lack of on-site soils) and improved runoff quality. After a 2-year demonstration, the Pennsylvania Department of Environmental Protection approved ClosureTurf as a permanent final cover system.. In 2016, the Solid Waste Association of North America (SWANA) awarded the project the silver excellence award for Landfill Management. In addition, the Wildlife Habitat Council certified the Lanchester Landfill for its habitat and conservation efforts.

4.2 Louisa County Landfill, Mineral, Virginia

The 14-acre Louisa County Landfill final closure was capped with ClosureTurf in 2015.[6] Due to the highly erodible, silty borrow soils of the area, ClosureTurf was selected as a non-erodible solution for the landfill cap. This was the first ClosureTurf landfill closure approved by the Virginia Department of Environmental Quality. ClosureTurf is now approved as a final cover system in Virginia.

4.3 Accomack County Northern Landfill, Accomack County, Virginia

The 10-acre Cell 2 of the Accomack County Northern Landfill was capped with ClosureTurf in 2017.[7] ClosureTurf was selected because of the lack of local non-erodible soils to use as cover soils. Accomack County eliminated the need to import 20,000 cubic feet of barrier soil, which prevented approximately 1,000 truck trips of soil import to the site. This improved closure construction safety and reduced the carbon footprint of the closure construction by 80 percent. The reduced cover thickness added 2 feet of airspace to the landfill for waste disposal. The post-closure maintenance costs were also significantly reduced compared to the landfill's previous traditional cell closures, which had significant erosion issues due to the erodible soils.

4.4 DB Wilson Station Landfill, Centertown, Kentucky

The 107-acre Phase 1 coal combustion residuals landfill at DB Wilson Generating Station was capped with ClosureTurf in 2022.[8] ClosureTurf was selected because of reduced environmental impact for closure construction and reduced post-closure maintenance. Big Rivers Electric Corporation saved approximately 14,000 to 15,000 truckloads of clay material from having to be imported to the site, which improved safety and reduced the carbon footprint of the closure construction. Cost savings for closure construction was estimated to be approximately 20 percent compared to a traditional closure system.

4.5 Berkeley County Landfill, Moncks Corner, South Carolina

Four cells covering 10 acres of the Berkeley County MSW Landfill were capped with ClosureTurf in 2014.[9] ClosureTurf was selected because of its reduced cover thickness compared to a traditional capping system and reduced post-closure maintenance costs and because the

[6] https://watershedgeo.com/projects/louisa-county-landfill/
[7] https://watershedgeo.com/projects/test/
[8] https://watershedgeo.com/projects/big-rivers-electric-corporation/
[9] https://watershedgeo.com/projects/berkeley-county-landfill/

landfill is located in an area susceptible to earthquakes, hurricanes, and high rainfall events. Using ClosureTurf significantly reduced the risk of slides and erosion at the landfill slopes compared to a traditional capping system exposed to these conditions..

The South Carolina Department of Health and Environmental Control allowed the use of ClosureTurf as an alternative long-term cover system and assured Berkeley County that they would grant final approval if it could meet inspection requirements for the first 2 years of use. In 2 years of use, only minimal turf repairs were necessary. The ClosureTurf cover also proved its capacity to withstand a significant rain event when the area received 26 inches of rain over a few days in 2015, with no significant erosion or damage to the cap and only a small amount of infill migration to the toe of the slopes. Many other landfills in the county experienced significant erosion from the rain event.

4.6 Gerwig Lane Spillway, Columbia, Maryland

The Gerwig Lane embankment dam auxiliary spillway in Maryland was lined with 36,000 square feet of HydroTurf in 2023.[10] The dam embankment is classified as high hazard and was predicted to overtop during the probable maximum flood. Howard County Department of Public Works selected HydroTurf to line the dam embankment to safely convey potential overtopping flows and protect the embankment soil from erosion.

4.7 HoneyGo Run, Perry Hall, Maryland

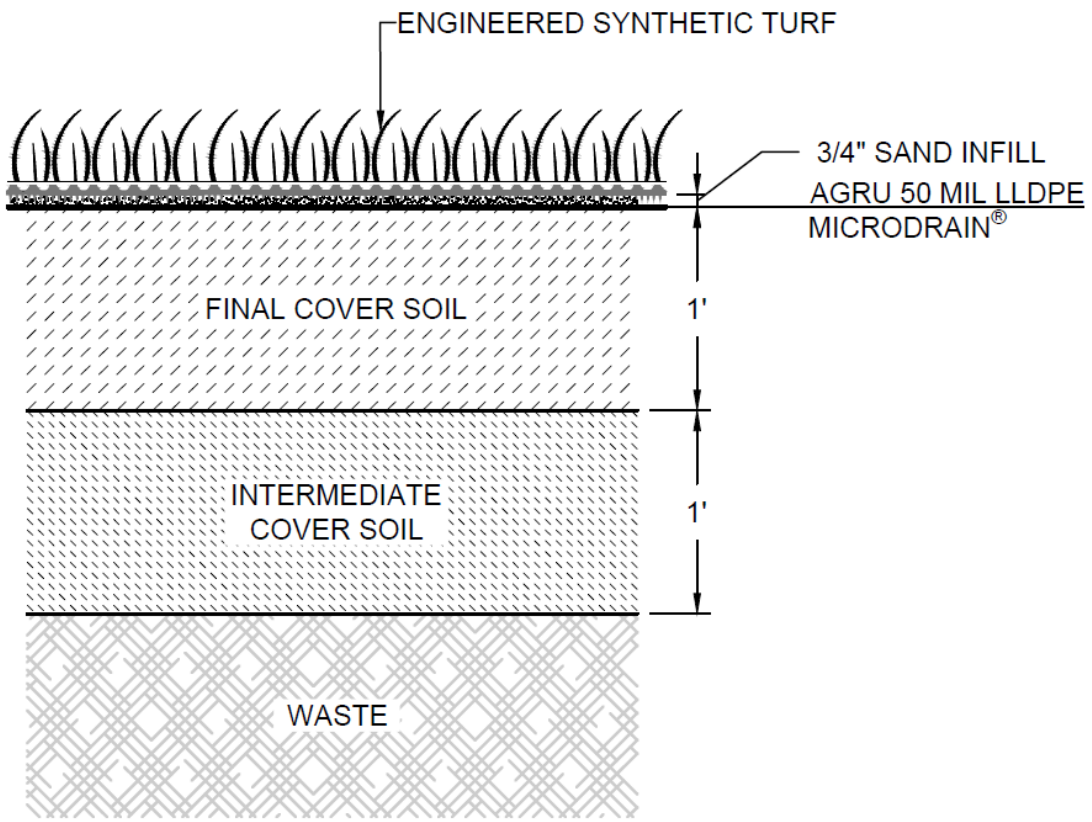
Approximately 15,000 square feet of HydroTurf was installed to line the HoneyGo Run MSW landfill downchute in 2019.[11] The HydroTurf allows for high-velocity flows without causing erosion to the downchute.

5. CONCLUSION

ClosureTurf is a well-established engineered alternative to traditional vegetated soil or geosynthetic-soil cover systems. Its physical and chemical properties lead to equivalent or better performance than the regulatory prescriptive final cover system. It has been used at multiple MSW sites across the United States, including in most states in the Eastern United States. At Cell 9, the use of ClosureTurf would minimize post-closure maintenance costs, increase the available airspace for waste disposal, reduce the risk of final cover erosion, and improve post-closure stormwater quality.

[10] https://watershedgeo.com/projects/gerwig-lane-spillway/
[11] https://watershedgeo.com/projects/honeygo-run/

FIGURES



ClosureTurf

Millersville Landfill and Resource Recovery Facility
Cell 9 Vertical Expansion
Severn, Maryland

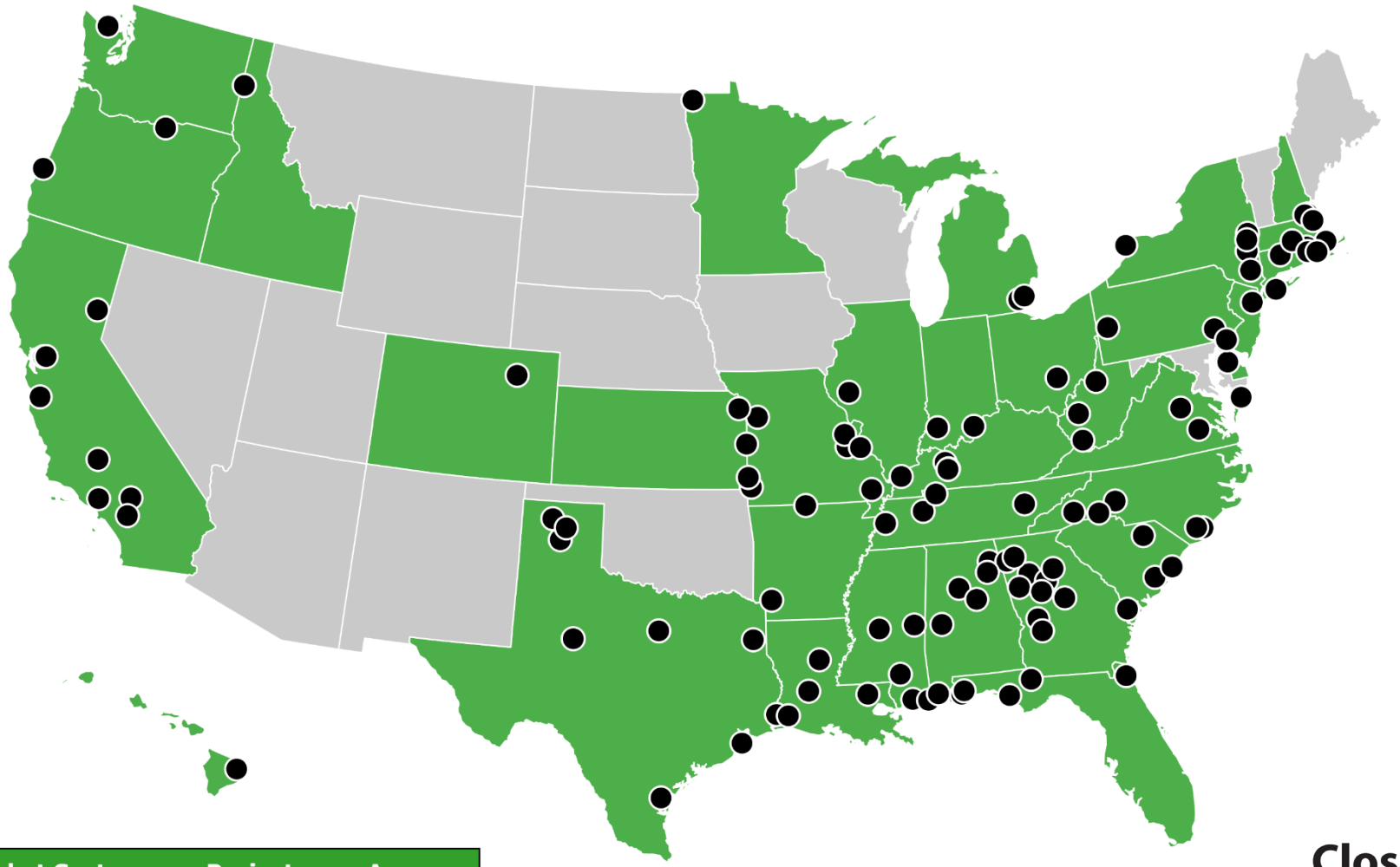
Geosyntec consultants

Figure

1

Project No. ME1418A

Aug 2025



Market Sector	Projects	Acres
Coal Ash (CCR)	35	2,469
Municipal Solid Waste (MSW)	47	1,035
Industrial	36	888
Superfund (CERCLA)	4	197
Hazardous Waste	1	45
TOTAL	**123**	**4,634**

ClosureTurf®

ClosureTurf Market Sector Map

Millersville Landfill and Resource Recovery Facility
Cell 9 Vertical Expansion
Severn, Maryland

Geosyntec consultants

Project No. ME1418A | Aug 2025

Figure 2

ATTACHMENT N.4-1
ClosureTurf Design Guidance Manual

DESIGN GUIDANCE MANUAL

ClosureTurf® Final Cover System

February 10th, 2023

Copyright 2023, Watershed Geosynthetics LLC.

ClosureTurf® is a US registered trademark which designates a product from Watershed Geosynthetics LLC. The ClosureTurf product is the subject of issued US and foreign patents and US and foreign patent-pending applications. PowerCap™ is a US trademark that designates a product from Watershed Solar LLC which is licensed to Watershed Geosynthetics LLC. The PowerCap product is the subject of issued US patents and US and foreign patent-pending applications.

All information provided herein by Watershed Geosynthetics LLC concerning these products are based upon data derived from independent third-party testing. This information, however, should not be used or relied upon for any specific use without first consulting with an independent professional engineer licensed in the geographic area in which a project is located. Since the actual site conditions, and the installation and use of these products are beyond our control, no guaranty or warranty of any kind, expressed or implied, is made by Watershed Geosynthetics LLC with respect to these products.

Version History

Version Number	Date	Description
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TABLE OF CONTENTS

1. Introduction 1
   - 1.1. Purpose and Scope of Design Guidance Manual 1
   - 1.2. Components of ClosureTurf 2
   - 1.3. Benefits of ClosureTurf 4
   - 1.4. ClosureTurf Applications 5

2. Final Cover Slope Stability 6
   - 2.1. Potential Failure Modes 6
   - 2.2. Veneer Stability Analysis Method 6
   - 2.3. ClosureTurf Interface Shear Strength 7
   - 2.4. General Guidance on Maximum Slope 8
   - 2.5. Example Calculation 9

3. Wind Uplift Resistance 10
   - 3.1. Analysis Method 10
   - 3.2. Wind Tunnel Test Results 11
   - 3.3. Wind Uplift Analysis Procedure 13
   - 3.4. Example Calculations 13

4. Puncture and Tearing Loads and Resistance 14
   - 4.1. Design Considerations 14
   - 4.2. Puncture Resistance Test Summary 15

5. Surface Water Management 16
   - 5.1. Hydrology, Channel Sizing, and Channel Infill Selection 16
   - 5.2. General Design Considerations 17
     - 5.2.1. Hydrology 17
     - 5.2.2. Typical ClosureTurf Stormwater Management Features 17
     - 5.2.3. Channel Infill Selection for ClosureTurf Stormwater Management Features 18
     - 5.2.4. Energy Dissipation 18
     - 5.2.5. Stormwater Pond Design 18

6. Hydraulic Stability of Granular Infill 20
6.1. Hydraulic Testing and Performance Specifications 20
6.2. Suggested Method for Calculating Hydraulic Shear Stress 21

7. Landfill Gas Management 22
7.1. ClosureTurf Gas Management 22
7.2. Integration with Gas Management System 23
7.3. Surficial Gas Collection System 24

8. ClosureTurf Performance Equivalency 26
8.1. Regulatory Requirements 26
8.2. Infiltration Reduction Equivalency 27
8.3. Erosion Resistance Equivalency 28

9. ClosureTurf Design Life 29
9.1. Longevity of System Components 29
9.2. Service Life Projection of Turf Fibers 29
9.3. Summary 31

10. Other Considerations 32
10.1. Settlement 32
10.2. Thermal Effects 33
10.3. Impact of Animals 34
10.4. Resistance to Fires 34
10.5. Resistance to Lightning 35
10.6. Measures to Prevent Vandalism 35
10.7. Post-Closure Care 35
10.8. Beneficial Use for Solar Development 36

11. References 37

LIST OF APPENDICES

Appendix A	ClosureTurf Interface Shear Strength Test Results
Appendix B	Example Calculation for ClosureTurf Veneer Slope Stability
Appendix C	Example Calculation for Wind Uplift of ClosureTurf
Appendix D	ClosureTurf Hydrostatic Puncture Test Report
Appendix E	Parametric Study Results for Pond Design
Appendix F	Evaluation of Sand Infill Criteria for ClosureTurf
Appendix G	Example Sand Infill Hydraulic Shear Calculations
Appendix H	ClosureTurf UV Longevity Evaluation Reports
Appendix I	Example Calculation for Pull-Out Resistance of ClosureTurf for Thermal Effects
Appendix J	ClosureTurf Deep Freeze Test Results
Appendix K	ClosureTurf Fire Resistance Test Report

1. Introduction

ClosureTurf®, illustrated below in Figure 1-1, is a three-component system patented by Watershed Geosynthetics, LLC (Watershed Geo®) that consists of, from bottom to top, a structured geomembrane, an engineered turf, and a specified infill. ClosureTurf is primarily used as a final cover system at landfills and other waste containment facilities undergoing closure. As described herein, ClosureTurf offers a variety of benefits over traditional soil cover systems.

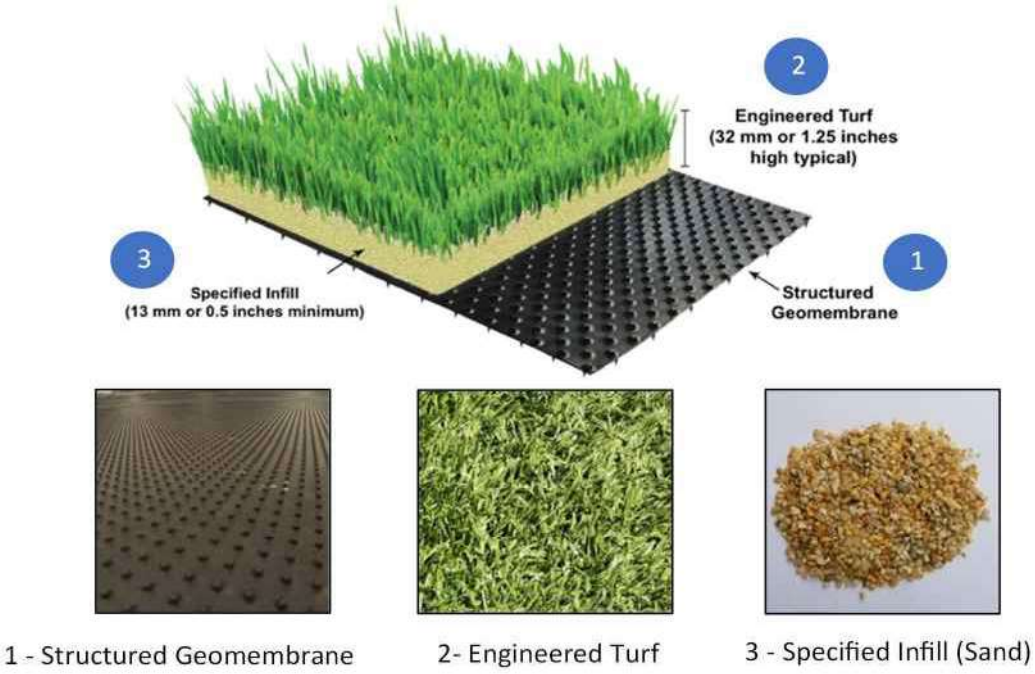

Figure 1-1. ClosureTurf Components

1.1. Purpose and Scope of Design Guidance Manual

This design guidance manual, referred to as the Design Guidance, was developed to guide the engineering design of landfill and waste containment facility closures using ClosureTurf. The Design Guidance is an update to the ClosureTurf Design Guidelines Manual dated May 2019.

The Design Guidance describes technical factors relevant to ClosureTurf that are frequently considered during landfill closure design and provides guidance on how to address these factors. Each project will require the design engineer to tailor the ClosureTurf system design to project

requirements as well as the site and facility conditions. Furthermore, it may be necessary to adjust the design to address field conditions encountered during installation. Watershed Geo cannot anticipate all the possible ways that this product may be designed; therefore, this Design Guidance should be considered as guidance only.

Watershed Geo maintains an online technical library to provide the latest product information and technical documents, including the ClosureTurf product data sheets, design guidance manual, installation guidance, technical specifications, construction details, etc. Instructions on how to access the technical library can be found on Watershed Geo's website through this link: https://watershedgeo.com/downloads/ct-technical/. The design engineer is encouraged to contact Watershed Geo if additional information or assistance on ClosureTurf design is needed. Contact information can be found at: https://watershedgeo.com/contact/.

1.2. Components of ClosureTurf

As illustrated in Figure 1-1, the bottom component of ClosureTurf is a structured geomembrane that serves as the hydraulic barrier to minimize rainfall infiltration. The structured geomembrane is made with either a high-density polyethylene (HDPE) or linear low-density polyethylene (LLDPE) formulation. The engineered turf overlying the structured geomembrane is made of HDPE synthetic grass blades tufted into a double-layer polypropylene (PP) woven geotextile backing. The engineered turf provides the appearance and texture of natural grass for the cover system, while also protecting the geomembrane from weathering. The infill component is usually a specified granular material placed between the blades of the engineered turf. It provides additional protection of ClosureTurf from wind uplift and weathering, while improving trafficability of the cover system by people, vehicles, and equipment. In areas with concentrated flows (e.g., drainage swales and perimeter channels), the HydroBinder® infill is recommended instead of the granular infill.

The components in the ClosureTurf system can be selected from available product options to address specific site conditions. Three types of structured geomembranes can be used in ClosureTurf: MicroSpike®, MicroDrain®, and Super GripNet® manufactured by Agru America. All three types are available in HDPE and LLDPE formulations. The structured geomembrane should be selected based on factors including slope angle, interface shear strength, drainage of stormwater, and construction costs. The three types of structured geomembranes shown on Figure 1-2 are described below:

- MicroSpike consists of both top and bottom surfaces having consistent texturing patterns.

- MicroDrain has studs on its top face to create a transmissive drainage layer, thereby eliminating the need for a separate geonet or geocomposite drainage layer. The bottom face of the geomembrane uses the same texturing pattern as MicroSpike.
- Super GripNet also has studs on the top face to create a transmissive drainage layer. The bottom of Super GripNet has a spiked surface to increase the interface shear strength between ClosureTurf and subgrade for cover stability on steep slopes.

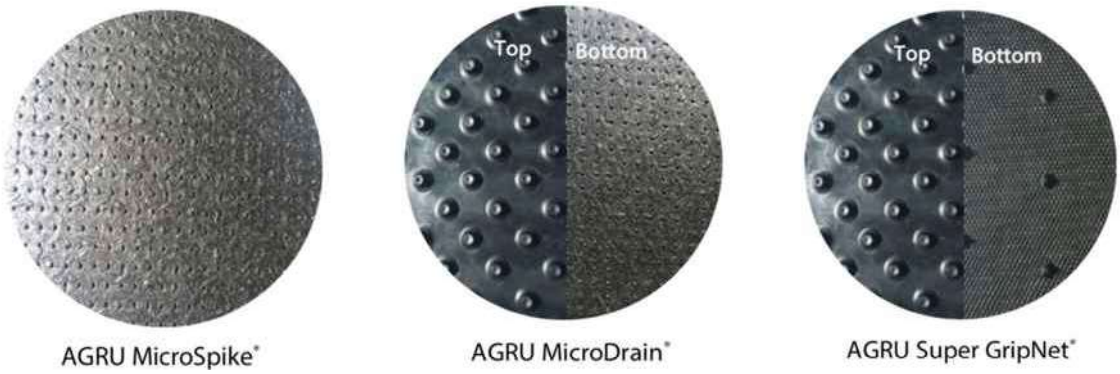

Figure 1-2. Structured Geomembranes Available for ClosureTurf

Three types of engineered turf are available for the ClosureTurf system: CT, CT-X, and CT-HD. The types differ by the tufting gauge (i.e., turf fiber density) and color. CT is the standard turf commonly used for typical closure applications. It is generally available in two colors: olive green and tan. CT-X is the blended turf that contains a mixture of both olive green and tan turf fibers. It can be customized for aesthetic purposes to better blend with surrounding landscapes. CT-HD is the high-density turf that has a higher turf fiber density than CT and CT-X. CT-HD provides higher seam strength, wind uplift resistance, and hydraulic shear resistance against potential granular infill movement, which results in less post-closure maintenance. CT-HD is also generally available in olive green and tan colors.

The specified granular infill is typically a coarse, angular sand. It is noted that “sand infill” is also used interchangeably with “granular infill” in this Design Guidance. Watershed Geo recommends that the granular infill should meet Watershed Geo’s technical specification to achieve adequate hydraulic shear resistance and minimize potential movement in the field. The specified infill is discussed in detail in Chapter 6. Watershed Geo evaluates potential sources of locally available granular infill and maintains a database of appropriate sources to assist customers and installers in identifying a material source. Contact Watershed Geo for potential granular infill sources near a project location, as needed.

1.3. Benefits of ClosureTurf

ClosureTurf has been developed to address long-standing challenges with traditional soil cover systems, including the following:

- Sites where suitable soil materials are unavailable or where it is expensive to import from an off-site source;
- Performance issues stemming from erosion of the soil cover and/or difficulty in sustaining healthy vegetation;
- Problems with slope instability caused by cracking and veneer-type sliding that adversely affect the integrity of the traditional soil cover system; and
- Need for frequent and sometimes extensive post-closure maintenance.

With the engineered turf and a specified infill layer, ClosureTurf overcomes the above challenges and provides the following advantages and benefits:

- ClosureTurf requires minimal soil (i.e., only the thin layer of sand infill). Sites with limited available soil can avoid purchasing and importing large quantities of soil required for a traditional soil cover system.
- For sites that would otherwise require large quantities of soil to be imported, the elimination of these materials benefits neighbors and local communities by lowering nuisance truck traffic, dust, mud tracked onto public roads, chances of vehicle accidents, and noise during construction.
- At landfills, depending on permits, it is possible that the elimination of the soil layers in a traditional soil cover system can provide additional capacity (airspace) for waste disposal, which represents an opportunity to increase site life as well as landfill revenue.
- In general, ClosureTurf can be constructed faster than traditional soil cover systems.
- Upon completion of installation, ClosureTurf is fully functional and able to perform as designed. Traditional soil cover systems take one or more growing seasons to establish vegetation. The soil cover is particularly vulnerable to erosion problems during this interim period.
- As a manufactured product in accordance with stringent industrial standards and procedures, ClosureTurf properties are consistent and verifiable. This results in a reliable

finished product that performs more predictably and consistently than traditional soil cover systems.

- Because the specified infill layer used in ClosureTurf is thin, the probability of a veneer-type soil cover failure above the geomembrane is negligible. With relatively high interface shear strength, the ClosureTurf system is inherently more stable than traditional soil covers from a geotechnical engineering perspective.
- Compared with traditional soil cover systems, ClosureTurf is more tolerant of differential settlement because of the flexible geosynthetic components.
- Stormwater runoff quality is significantly improved at sites using ClosureTurf compared to sites with traditional soil cover systems.
- Significantly lower post-closure maintenance costs are expected for ClosureTurf than for a traditional soil cover system because no mowing, fertilization, or revegetation is required.
- Site maintenance and system repairs are easier with ClosureTurf compared to traditional soil cover systems, as no soil excavation is required for ClosureTurf.
- Installation of ClosureTurf conserves water and natural soil and requires fewer truck trips and less heavy equipment; therefore, the environmental impact is much smaller. A study has shown that approximately 65% to 75% reduction in carbon emissions can be achieved when using ClosureTurf instead of a traditional soil cover system (Joshi 2023).
- ClosureTurf provides an improved base for solar arrays at closed landfills than traditional soil cover systems due to elimination of soil erosion and reduction in post-closure maintenance.

1.4. ClosureTurf Applications

Engineered specifically for waste containment facilities, ClosureTurf has been used at sites ranging from local municipalities to large industrial, utility, and United States Environmental Protection Agency (USEPA) Superfund sites. The waste types in those facilities include municipal solid waste (MSW), construction and demolition debris, industrial sludge and byproducts, coal combustion residuals (CCR), and contaminated materials. ClosureTurf has been installed successfully in different climatic regions that experience heavy rainfall, hurricane-force winds, and extreme temperatures, as well as areas with seismic activity. A map of ClosureTurf project sites can be found at: https://watershedgeo.com/.

2. Final Cover Slope Stability

This chapter addresses slope stability considerations associated with the use of ClosureTurf for landfill final closure.

2.1. Potential Failure Modes

Veneer-type slope instability is the propensity of the cover layer (or veneer) of a final cover system to slide. Veneer-type sliding failures have occurred with soil-geosynthetic cover systems placed over steep slopes of landfills, especially after major storm events (Koerner and Soong 1998), which include rupture, tearing, or cracking of the cover system components. In such cases, sliding of the cover system occurred along the weakest interface between the cover system components (e.g., soil-geosynthetic or geosynthetic-geosynthetic interface).

The stability of ClosureTurf on landfill side slopes should be evaluated by calculating the factor of safety (FS) against veneer slope instability. Experience shows that the critical slip surface for ClosureTurf is usually along either the interface between the engineered turf and geomembrane or the interface between the geomembrane and subgrade (i.e., foundation layer of the cover system). Hence, this chapter focuses on the method for evaluating the veneer stability of these interfaces.

In addition to veneer stability, the design engineer should evaluate other potential modes of slope instability (e.g., global waste slope stability) that do not necessarily pertain to ClosureTurf. Those potential modes are beyond the scope of this Design Guidance.

2.2. Veneer Stability Analysis Method

The static and pseudo-static (seismic) veneer stability of ClosureTurf on a slope can be evaluated using methods based on limit equilibrium, such as closed-form equations developed for both finite and infinite slope configurations. In practice, closed-form equations are widely used because they are simple, practical, technically-sound, and can be easily coded in a spreadsheet. Examples of these equations include Giroud et al. (1995a) and Matasovic (1991). The design engineer is responsible for selecting an appropriate method for analyzing the stability of a particular slope or set of slopes.

Inputs to a veneer slope stability analysis include the unit weight of ClosureTurf, interface shear strength between the engineered turf and geomembrane, interface shear strength between the

geomembrane and subgrade soil, and the hydraulic head acting on the geomembrane component of ClosureTurf. The hydraulic head on the geomembrane can be estimated using equations presented in the literature (e.g., Thiel and Stewart 1993) or using the Hydrologic Evaluation of Landfill Performance (HELP) software developed by the USEPA (Schroeder et al. 1994a and 1994b; Tolaymat and Krause 2020). Inputs for the hydraulic head calculation include weather data and characteristics of the ClosureTurf (i.e., transmissivity, slope, and length of the drainage layer). Additionally, external loading (e.g., vehicular loading) may need to be included in a veneer stability analysis to achieve an adequate target FS, if applicable.

The design engineer should review technical guidance and state and federal solid waste regulations to understand if there are any specific methods or target FSs required by the regulations for the veneer slope stability of a landfill final cover system.

2.3. ClosureTurf Interface Shear Strength

As stated above, inputs to a ClosureTurf veneer stability analysis require information on shear strengths along two interfaces (i.e., between the engineered turf and geomembrane and between the geomembrane and subgrade soil). Watershed Geo conducted interface shear testing in accordance with ASTM D5321 to evaluate the interface shear strength of the engineered turf layer against the underlying geomembrane. Appendix A provides the results of interface shear strength tests between the engineered turf layer and different structured geomembranes used in ClosureTurf. The test indicated peak interface friction angles range from 34 (for the CT-HD turf) to 36 degrees (for the CT turf) when using the Super GripNet geomembrane and from 19 (for the CT-HD turf) to 23 degrees (for the CT turf) when using the MicroSpike geomembrane. Measured large displacement shear strengths were lower than the peak interface strengths reported above (i.e., strain-softening).

The interface shear strength between the geomembrane and the subgrade soil depends on the subgrade soil used at the site. Therefore, when selecting the appropriate interface friction angle for the veneer stability analysis, it is recommended that project-specific interface shear testing be conducted using samples of subgrade soil collected from the site.

The design engineer should use the selected interface shear strength parameters to perform a veneer stability analysis of ClosureTurf to evaluate whether the calculated FS meets or exceeds the target FS. Alternatively, the design engineer may back-calculate the minimum required interface shear strength parameters to achieve the target FS. These values can then be incorporated into the technical specifications as minimum required parameters; and the project

specifications would require the contractor to perform interface shear testing to verify that the construction materials supplied to the project have adequate interface shear strengths to meet the target FS.

2.4. General Guidance on Maximum Slope

Table 2-1 provides the design engineer with general guidance on the maximum allowable slope at which each ClosureTurf system can be constructed. This table was developed by Watershed Geo assuming typical values of interface shear strength between the engineered turf and geomembrane and between the geomembrane and subgrade soil. Therefore, it is important to note that this table should be used for preliminary design purposes only. The design engineer is highly encouraged to conduct project-specific interface shear testing to evaluate the critical interface (i.e., the interface with the lowest interface shear strength) and perform detailed slope stability analyses for the site-specific design.

Table 2-1. Maximum Allowable Slope for ClosureTurf for Preliminary Design [(2) (3) (4) (5)]

Geomembrane	Engineered Turf	
	CT (Standard Turf)	CT-HD (High-Density Turf)
MicroSpike	4H:1V	5H:1V
MicroDrain	3H:1V	3H:1V
Super GripNet	2.5H:1V[(1)]	3H:1V[(1)]

Notes:

1. For slopes steeper than 2.5H:1V (for CT) or 3H:1V (for CT-HD), additional measures (e.g., additional anchor trench or ballast) may be implemented to improve veneer stability, as determined by the design engineer for site-specific conditions.
2. The interface shear strength between the engineered turf and geomembrane has been tested by SGI Testing Services, LLC and the test results are provided in Appendix A.
3. The interface shear strength between the geomembrane and subgrade is dependent on the site soils. For the purpose of developing Table 2-1, the peak interface friction angle between the geomembrane and subgrade was assumed to be 31 degrees for MicroSpike and MicroDrain and 37 degrees for Super GripNet. Site-specific interface shear testing should be conducted to obtain the interface friction angle for the detailed slope stability analyses.

4. Table 2-1 does not account for seismic conditions. If the site is in a seismic impact zone, additional slope stability analyses should be performed to evaluate the slope stability under the design earthquake event.
5. If PowerCap®, Watershed Geo's patented solar energy generation system, is considered for future beneficial site reuse, MicroSpike is recommended for use only on the landfill top deck where the slope is 10 percent (%) or less. It is recommended that Super GripNet be used on the side slopes for PowerCap installations.

2.5. Example Calculation

Appendix B provides an example calculation for final cover veneer slope stability of ClosureTurf.

3. Wind Uplift Resistance

Exposed geomembranes can be lifted by wind, causing the geomembrane to be torn or separated from the anchor trench. ClosureTurf is not an exposed geomembrane system. Unlike an exposed system, the engineered turf and granular infill above the structured geomembrane provide resistance against wind uplift.

This chapter presents the wind uplift calculation method for ClosureTurf. The pressure necessary to cause an exposed geomembrane to lift is typically calculated based on the negative pressure relative to atmospheric pressure (suction) induced by wind and the resulting strain on the geomembrane. The calculation method for exposed geomembranes developed by Giroud et al. (1995b) and Giroud and Zornberg (1997) is used in this Design Guidance. Because ClosureTurf is not an exposed geomembrane, additional steps are needed to analyze the system's resistance to wind uplift that involve the engineered turf and granular infill.

3.1. Analysis Method

When wind flows over obstacles, local air pressure increases or decreases depending on the geometry of the obstacles that the flow encounters. If the air pressure becomes negative (relative to atmospheric pressure), suction (or uplift pressure) occurs. If the suction is strong enough, geomembrane cover systems can be lifted by wind. For ClosureTurf, the weight of the geomembrane, engineered turf, and granular infill is intended to counteract this wind uplift pressure.

Wind uplift pressure acting on ClosureTurf can be calculated using Equation 3-1 (Dedrick 1973; Wayne and Koerner 1988; Giroud et al. 1995b):

$$P = \frac{1}{2} C_p \rho U(H)^2 \cdot K_d \cdot K_e \quad (3\text{-}1)$$

In this equation, P is the wind-generated uplift pressure normal to the surface in pounds per square foot, C_p is a wind pressure coefficient, ρ is the air density (= 0.0024 slug per cubic foot at 59 degrees Fahrenheit [°F] and sea level), U(H) is the mean upstream wind speed in feet per second at the height of the slope, K_d is the wind directionality factor (= 1.10), and K_e is the ground elevation factor.

The ground elevation factor can be calculated using Equation 3-2 (ASCE 2022):

$$K_e = e^{-0.000362 \cdot Z_e} \quad (3\text{-}2)$$

In the above equation, Z_e is the ground elevation above sea level in feet.

3.2. Wind Tunnel Test Results

Watershed Geo has conducted extensive wind tunnel testing of ClosureTurf at the Iowa State University Aerodynamic and Atmospheric Boundary Layer Wind and Gust Tunnel. The key observations made during the wind tunnel testing are as follows:

- The wind-induced uplift pressures varied along the side slopes and top deck. Uplift pressures were observed approximately from mid-windward (i.e., slopes facing the wind) slope extending along the top deck to the leeward side slopes.
- The maximum uplift pressure occurred near the crest of the windward slope.
- Windward slopes experienced higher wind uplift pressures than leeward slopes.
- The measured maximum wind uplift pressures were larger for a 3H:1V slope than those for a 4H:1V slope.
- For the given test conditions, the wind uplift pressure experienced by ClosureTurf is about 70% lower than the wind uplift pressure experienced by an exposed smooth geomembrane cover. This lower uplift pressure appears to be associated with turbulence created by the engineered turf.
- For the given test conditions, the maximum uplift pressure experienced by a high-density turf (CT-HD) is lower than that experienced by a standard density turf (CT). On a 4H:1V slope, the maximum wind uplift pressure of CT-HD is 17% lower than that of CT; and on a 3H:1V slope, the maximum wind uplift pressure of CT-HD is 24% lower than that of CT.

The wind tunnel test results are presented in the form of wind pressure coefficients, C_p. Figures 3-1 and 3-2 show the wind pressure coefficient distributions for 3H:1V and 4H:1V slopes, respectively, with two types of engineered turfs, CT and CT-HD.

It is noted that the positive wind pressure coefficients correspond to downward pressure (or compression) and the negative wind pressure coefficients correspond to upward pressure (or uplift). The horizontal locations of the measurement points, x, are normalized by the length of the model, L, in Figures 3-1 and 3-2.

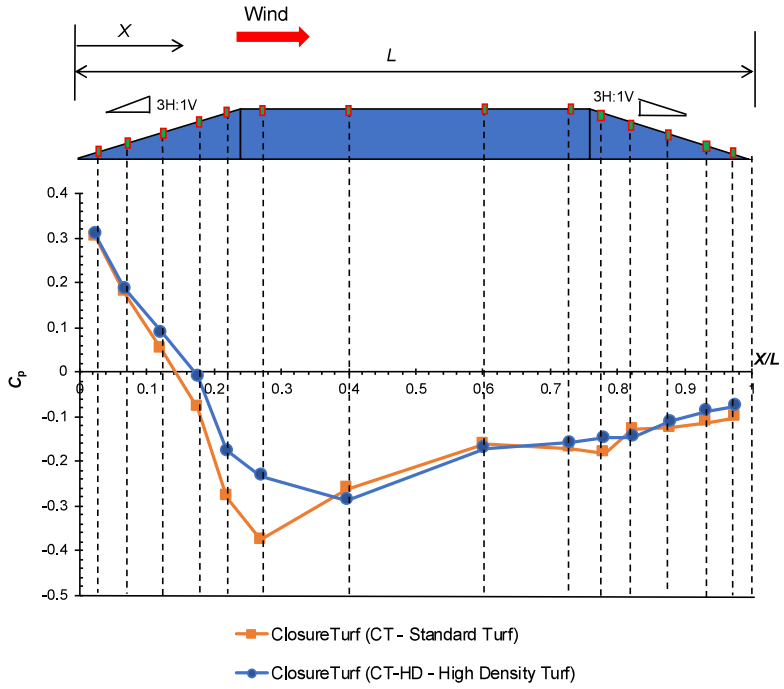

Figure 3-1. Wind Pressure Coefficients for ClosureTurf on a 3H:1V Slope

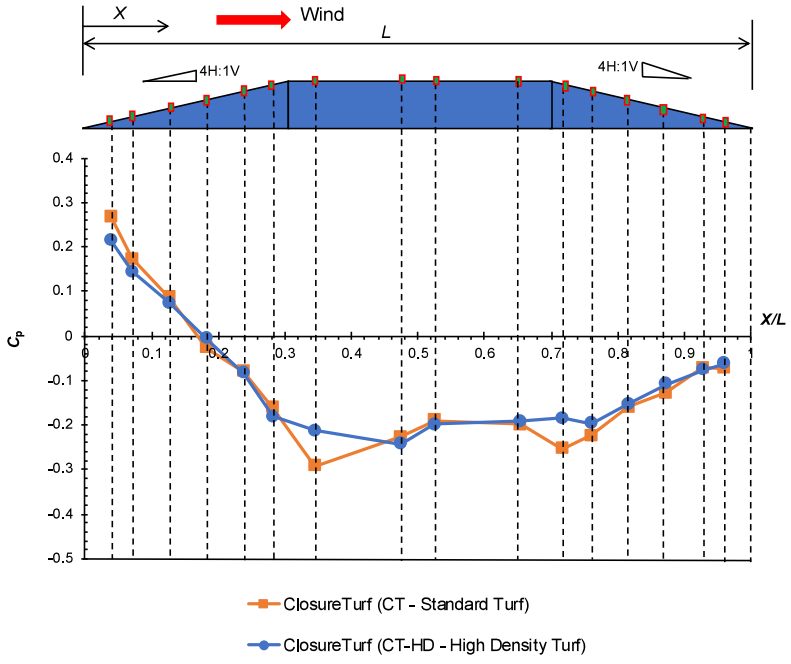

Figure 3-2. Wind Pressure Coefficients for ClosureTurf on a 4H:1V Slope

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3.3. Wind Uplift Analysis Procedure

The procedure for wind uplift analysis of ClosureTurf consists of the following steps (see Appendix C for more details):

1. Select the maximum absolute value of the negative wind pressure coefficient, C_p, based on the results of wind tunnel testing and the landfill slope configuration.
2. Select the appropriate design wind speed for the location of the project. The basic wind speed, corresponding to a 3-second gust at 32.8 feet above ground, at locations in the United States can be obtained from an online database (https://asce7hazardtool.online/) based on recommendations in ASCE 7-22 (ASCE 2022).
3. Calculate the mean hourly design wind speed at the top of the landfill from the basic wind speed.
4. Calculate the maximum wind uplift pressure using Equation 3-1. The critical location is usually at or near the windward crest.
5. Calculate the weight of ClosureTurf on a per square foot basis.
6. Calculate an FS against the maximum wind uplift pressure by dividing the weight of ClosureTurf by the wind uplift pressure. A minimum FS in the range of 1.1 to 1.2 is considered adequate for purposes of design against the maximum wind uplift pressure. The basis for these minimum FS values is given in Appendix C to this Design Guidance.
7. If the target FS is not met, a tension strain analysis is performed to evaluate whether the wind-induced tension in the ClosureTurf system is acceptable, as discussed in Appendix C.

3.4. Example Calculations

Appendix C presents example wind uplift calculations for ClosureTurf using the procedures presented above.

4. Puncture and Tearing Loads and Resistance

This chapter presents a summary of design considerations regarding the puncture and tearing loads induced on ClosureTurf and the resistance of the system to these loads.

4.1. Design Considerations

Potential sources for puncture and tearing stresses applied to ClosureTurf are similar to sources considered for traditional cover systems with geomembranes. The geomembrane component of ClosureTurf can potentially be punctured by large or sharp objects in the subgrade. Puncture can be induced by equipment loads on top of ClosureTurf or by punching through the system should voids exist in the subsurface beneath ClosureTurf. In addition, equipment traveling on slopes induce static and dynamic loads (e.g., equipment weight, acceleration, and braking), which may cause the cover system to slide or components of the system to tear.

To avoid puncturing the ClosureTurf geomembrane, the following steps should be taken:

- The subgrade should be prepared such that it:
    - has relatively uniform and smooth surface; and
    - is free of sharp objects, oversized particles, and other deleterious materials that could damage the geomembrane.
- Subgrade soil should conform to the requirements of the project technical specifications.
- Anchor trenches should be free of sharp objects and other deleterious materials.
- Construction stakes and hubs in the subgrade should be removed and resulting holes backfilled.
- Any potentially damaging particles, including stones, construction debris, and soil clods that accumulate on the exposed geomembrane during ClosureTurf installation should be removed before placing the engineered turf on the geomembrane.

The maximum particle size of the subgrade material should be determined by the design engineer based on the anticipated equipment loading and puncture resistance properties of the geomembrane.

With the subgrade meeting the requirements described above, the following steps should be taken regarding equipment loads to prevent ClosureTurf from tearing:

- Do not allow equipment with ground contact pressures exceeding 5 pounds per square inch (psi) on the partially constructed system until granular infill has been installed.
- Do not allow equipment with ground contact pressure greater than 35 psi on slopes steeper than 15% or ground contact pressure greater than 85 psi on slopes less than 15%, after ClosureTurf installation is complete.

The contractor should use rubber-tired or -tracked equipment and limit the speed of equipment traveling on ClosureTurf. The equipment is not allowed to make a sharp turn, sudden acceleration/deceleration, and repetitive passes on ClosureTurf. The design engineer should evaluate the maximum allowable equipment speed on ClosureTurf. See Appendix B for an example ClosureTurf veneer slope stability analysis considering equipment loading.

It should be noted that the above-mentioned limits on equipment loading are for the general guidance purposes only. The design or construction quality assurance (CQA) engineer should specify the maximum allowed equipment loading limits based on site conditions. A puncture resistance analysis of the geomembrane can be performed by the engineer, as needed, using commonly accepted approaches (e.g., Wilson-Fahmy et al. 1997, Narejo et al. 1997, and Koerner et al. 1997).

4.2. Puncture Resistance Test Summary

To examine puncture resistance, Watershed Geo and SGI Testing Services conducted tests on the engineered turf and structured geomembrane samples. The specific geomembrane used in the testing was 40-mil HDPE MicroSpike. Testing was conducted in accordance with the *Standard Test Method for Large-Scale Hydrostatic Puncture Testing of Geosynthetics* (ASTM D5514) using the Virginia Department of Transportation #57 aggregate. For a maximum loading of 85 psi, the geomembrane component was deformed but not punctured. Because no punctures were observed in the geomembrane component for the loading of 85 psi, the ultimate static puncture strength of the system is expected to be greater than 85 psi. Additional details on the hydrostatic puncture testing are provided in Appendix D.

5. Surface Water Management

This chapter provides guidance on the design of open channels with ClosureTurf to manage surface water. The chapter addresses landfill hydrology, final cover conveyance channels, infill materials, and downstream considerations related to energy dissipation systems and sediment storage volumes in ponds.

5.1. Hydrology, Channel Sizing, and Channel Infill Selection

Table 5-1 presents parameters for defining site hydrology when applying the Rational Method or the Soil Conservation Service Unit Hydrograph Method to evaluate hydrologic performance of ClosureTurf. These parameters are used for sizing conveyance channels using Manning's Equation and selecting infill materials as a function of permissible and computed flow velocities.

Table 5-1. Hydrology and Hydraulics Parameter Recommendations for ClosureTurf-lined Areas

Runoff Process	Parameter	Value
Rainfall to Runoff	Curve Number	92 - 95, or as selected by the design engineer
	Rational "C"	0.74 - 0.78, or as selected by the design engineer
Sheet Flow	Manning's Roughness	0.22 (when land slope $\leq$ 10%) 0.12 (when land slope > 10%)
	Maximum Flow Length	Selected such that flow depth is $\leq$ 0.1 foot, or as required
Shallow Concentrated Flow	Average Velocity [(1)] (feet/second)	TR-55 unpaved condition (calculated as 16.135 x $(S)^{0.5}$, where S is the surface slope in feet/foot), or as selected by the design engineer
Concentrated Flow [(2)]	Manning's Roughness	0.02 (when using HydroBinder)

Notes:

1. The suggested value is based on Part 630 Hydrology, National Engineering Handbook (NRCS 2010) for shallow concentrated flow over an unpaved surface or grassed waterway of a given slope. Check local requirements for suitability.
2. Hydraulically stable stone (gravel/riprap) or HydroBinder other than the granular infill should be used in concentrated flow locations.

The terminology in Table 5-1 is based on Hydraulic Engineering Circular Number 22 (HEC-22), *Urban Drainage Design Manual* (FHWA 2009). Only the parameters that are influenced by the selection of ClosureTurf over traditional cover systems are discussed herein. For example, many state or local agencies require that a design storm event be selected from Atlas 14 Point Precipitation Frequency Estimates published by the National Oceanic and Atmospheric Administration (NOAA 2022). However, because this design requirement is applicable for all cover systems, it is not addressed in this Design Guidance. It is also recommended that the design engineer consider applicable federal (e.g., *Urban Drainage Design Manual*, FHWA 2009) and state (e.g., *Georgia Stormwater Management Manual*, ARC 2016) design guidelines, as appropriate for the site location and standards of practice, during the design process.

5.2. General Design Considerations

5.2.1. Hydrology

Because longer drainage lengths are typically possible with ClosureTurf compared to traditional soil cover systems, the need for drainage benches to intercept and manage runoff may be eliminated or the spacing of benches, if still needed, can be increased. The ability to maintain sheet flow for extended distances is a significant advantage to ClosureTurf.

Due to the relative impermeability of the underlying geomembrane and small thickness of the granular infill layer, curve numbers for ClosureTurf tend to be higher than those of traditional soil cover systems. This may affect the runoff volumes and rates to be managed by stormwater ponds and other downstream features, which are discussed in Section 5.2.5.

5.2.2. Typical ClosureTurf Stormwater Management Features

Regulatory requirements generally specify that a network of final cover channels be designed to route runoff generated within a final cover area so that this runoff does not increase peak discharge rates and total runoff volumes associated with any predevelopment outfalls of a site. Typical landfill or other site development regulations for channel sizing will also require conveyance of specific design storms, such as the 25-year/24-hour storm event, or the 100-year/24-hour storm event with some degree of freeboard, or both. Note that, for reasons to be described in Chapter 6, storm events selected to size drainage benches and channels may differ from those selected for evaluating hydraulic stability of the ClosureTurf granular infill.

Typical final cover drainage features include benches, berms, swales, downchutes, perimeter channels, etc. Relevant standard details are provided in Watershed Geo's online technical library.

5.2.3. Channel Infill Selection for ClosureTurf Stormwater Management Features

Stone (gravel or riprap) or HydroBinder is recommended as a ClosureTurf infill option within channels rather than granular infill. The relative costs and advantages of HydroBinder versus stone depend on site-specific conditions.

When stone is used, the design engineer should assess whether a nonwoven geotextile cushion should be placed between the stone and ClosureTurf to reduce the potential for damage to the ClosureTurf system including puncture of the ClosureTurf geomembrane component.

When HydroBinder is used, water relief vents (e.g., a slit cut into the HydroBinder layer with a geocomposite insert) should be considered to relieve hydraulic pressure within the ClosureTurf drainage layer at locations where the hydraulic capacity of the drainage layer decreases (e.g., at riprap check dams, sharp decreases in slope, grade breaks at downchutes, or structure terminations).

Also, as is standard practice for the design of any channel lining system, the calculated flow velocity for the selected design storm should be compared to the permissible flow velocity of the ClosureTurf with the HydroBinder infill within channels, which is considered to be 29 ft/s.

5.2.4. Energy Dissipation

Similar to any surface water conveyance terminating and transitioning flow direction at the toe of a slope, proper energy dissipation is necessary at the base of downslope channels using ClosureTurf and around any relatively sharp changes in flow direction. Proper energy dissipation techniques can be found in HEC 14, *Hydraulic Design of Energy Dissipators for Culverts and Channels* (FHWA 2006).

Where concrete energy dissipators are required, HDPE embedment strips can be cured into the concrete dissipators and later welded to the geomembrane component of ClosureTurf to maintain a continuous closure system. Alternatively, batten strips with concrete anchors may be used. Where stone energy dissipators are used, placement of HydroBinder around the footprint of stone is suggested to minimize loss of granular infill placed in the vicinity of the energy dissipators.

5.2.5. Stormwater Pond Design

Because runoff from ClosureTurf may generate greater peak discharge rates and volumes compared to that from traditional soil cover systems, projects using stormwater ponds to

attenuate flows prior to discharge may need an increased stormwater pond size. However, this potential increase to pond size can be at least partially offset by a reduction or elimination of the required sediment storage volume that must be managed (i.e., the volume of ClosureTurf granular infill transported by runoff will typically be small and often negligible relative to the volume of sediment transported by runoff from a traditional soil cover system). As a reference, Appendix E presents a parametric study comparing pond design for traditional soil cover versus the ClosureTurf final cover system.

6. Hydraulic Stability of Granular Infill

The specified granular infill is one of the three components of ClosureTurf. The infill serves as a protective layer for the turf and geomembrane components. While the turf and geomembrane components are not directly sensitive to hydraulic forces, washout of the sand layer can increase exposure of the turf and geomembrane to puncture stresses, ultraviolet (UV) degradation, and wind uplift.

Washout of the granular infill can occur when raindrops dislodge individual sand particles (i.e., splash erosion), when planar flow concentrations during a storm impose hydraulic shear stresses high enough to mobilize the infill (i.e., sheet erosion), or when a combination of the two mechanisms occurs.

This chapter presents evaluation methods and performance requirements for the granular infill based on an extensive testing program to establish allowable shear stresses, material specification requirements, recommended design methods to compare calculated shear stresses with allowable ones, and the selection of an alternative infill in case calculated shear stresses exceed allowable ones.

This chapter is limited in scope to areas of a ClosureTurf installation that receive sheet flow or shallow concentrated flow. It is considered best practice to use supplemental/alternative infill materials in ClosureTurf concentrated flow channels, as discussed in Section 5.2.3.

6.1. Hydraulic Testing and Performance Specifications

Hydraulic stability of granular (sand) infill has been independently tested by TRI Environmental (TRI), a third-party laboratory, in general accordance with ASTM D 6460, *Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion*, and ASTM D 6459, *Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Hillslopes from Rainfall-Induced Erosion.* A summary of the sand infill testing program and results and the development of the sand infill specification based on the test results is provided as Appendix F.

The ClosureTurf Sand Infill Specification is available at Watershed Geo's online technical library. The sand infill must meet criteria for fine aggregate angularity, specific gravity, and particle size distribution. When the sand infill material specifications are met, the permissible hydraulic shear stress of the sand infill is suggested to be 0.8 psf.

6.2. Suggested Method for Calculating Hydraulic Shear Stress

For design, the calculated hydraulic shear stresses for a ClosureTurf installation should be less than the suggested permissible hydraulic stress of 0.8 psf for the sand infill. The example calculations included as Appendix G provide a suggested method to estimate the hydraulic shear stress on ClosureTurf using typical engineering methods such as those presented in HEC 22, Urban Drainage Design Manual (FHWA 2009). Two different hydraulic shear stress calculations are presented in the appendix, differentiated by location and the choice of geomembrane used in ClosureTurf. Typically, multiple drainage paths are evaluated to establish a maximum anticipated hydraulic shear stress for design. If the calculated maximum hydraulic shear stress exceeds the permissible value, mitigation options include flattening the slope, shortening drainage lengths (e.g., addition of a drainage bench), and using infill with a higher permissible shear stress (e.g., HydroBinder, as discussed in Chapter 5).

Based on Watershed Geo's experience, it is suggested that the maximum drainage length on a typical landfill slope (e.g., 3H:1V or 4H:1V) be limited to the drainage length calculated using the permissible sand infill hydraulic shear stress of 0.8 psf or 350 ft, whichever is smaller, or an alternative length as determined appropriate by the design engineer. Depending on the size of drainage area of the landfill top deck, a stormwater diversion berm is also suggested to separate top deck runoff and the runoff from the side slope in order to mitigate potential localized sand infill movement resulting from surface irregularities due to imperfections during construction and differential landfill settlement along the crest line.

7. Landfill Gas Management

For waste containment facilities (e.g., MSW landfills) that contain organic waste materials and generate gas, a landfill gas management system should be considered to control gas emissions from these facilities in accordance with regulatory requirements on landfill closure and gas emissions. This chapter provides general design considerations of the landfill gas management system associated with ClosureTurf.

7.1. ClosureTurf Gas Management

Due to the light weight of ClosureTurf compared to a soil cover, ClosureTurf is susceptible to uplift caused by landfill gas pressure buildup underneath the cover system. A gas-generating landfill closed with ClosureTurf should develop a landfill gas management plan to prevent gas uplift of ClosureTurf. The design engineer should evaluate the site conditions and regulatory requirements to determine whether a passive landfill gas venting system or an active landfill gas collection and control system (GCCS) is required. For landfills that allow free venting of gas, passive gas vents should be considered to relieve gas pressure under ClosureTurf. For landfills where the active gas collection system is required, pressure relief valves should be considered in combination with the active gas collection system to provide gas pressure relief in case of system malfunction, such as a flare shutdown. Details of the passive gas vent and pressure relief valve developed by Watershed Geo for the use with ClosureTurf can be found at Watershed Geo's online technical library. Figure 7-1 is a photo of ClosureTurf pressure relief valve installed in the field.

Figure 7-1. ClosureTurf Pressure Relief Valve Installed in Field

The ClosureTurf pressure relief valve is designed with an internal one-way check valve that closes under the vacuum applied to the GCCS and opens under the positive gas pressure accumulated underneath the geomembrane of ClosureTurf. Based on the laboratory flow test results, the suggested design maximum gas flow rate for each pressure relief valve is 50 standard cubic feet per minute (scfm) under a pressure differential equal to one inch of water column.

The pressure relief valves are typically installed at a minimum density of one per acre of installed ClosureTurf. However, the design engineer should evaluate whether additional pressure relief valves are necessary based on a site-specific landfill gas generation rate analysis, for example, using the Landfill Gas Emissions Model (LandGEM) developed by USEPA (USEPA 2005) and taking into account the field measurements of landfill gas flow rates, if available.

7.2. Integration with Gas Management System

A conventional active landfill GCCS consists of vertical gas extraction wells, gas collection wellheads, lateral and header gas collection pipes, condensate sumps, gas blowers, and flare stations. ClosureTurf has been installed at landfills with the conventional active GCCS, as shown in Figure 7-2.

Figure 7-2. ClosureTurf Integrated with Landfill Gas Collection System

Geomembrane boots are used to seal penetrations around gas collection wellheads and pipes. An example of the pipe penetration detail is available at Watershed Geo's online technical library. The gas collection pipes can be installed either above or below the ClosureTurf cover system. Table 7-1 summarizes the advantages and disadvantages of these two installation options for the design engineer to consider.

Table 7-1. Advantages and Disadvantages of GCCS Pipe Installation Options

Above ClosureTurf System		Below ClosureTurf System	
Advantages	Disadvantages	Advantages	Disadvantages
No or fewer pipe penetrations	Pipes exposed to weather, including freeze-thaw and thermal expansion/ contraction	Pipes protected from weather by the ClosureTurf system	Possible leak points created by pipe penetrations
Increased ability to inspect, repair, or upgrade piping	More visible; aesthetics may be a consideration	Pipes concealed beneath the ClosureTurf system	More difficult to inspect, repair, or upgrade pipes
Less expensive to install	Potential damage due to external loads (e.g., traffic)	Less susceptible to damage due to external loads (e.g., traffic)	More expensive to install

7.3. Surficial Gas Collection System

Watershed Geo has developed a surficial gas collection system to use with ClosureTurf installations (Figure 7-3). This system consists of surficial gas collection wellheads, gas collection strips, and pressure relief valves. The collection strips may consist of Super GripNet, single-sided geocomposite, or other materials that facilitate the lateral flow of gas. The system allows a vacuum to be applied to the wellhead to extract the gas from the surface below the geomembrane of ClosureTurf.

The locations of the surficial gas collection strips and wellheads should be established by the design engineer in the landfill gas management plan. It is also recommended that automatic isolation of the surficial gas collection system be incorporated in the design to prevent potential backflow of landfill gas during a flare shutdown event, if the surficial gas collection system is connected to a conventional GCCS with vertical gas extraction wells.

Details of the surficial gas collection system, including the surficial gas collection wellhead detail not shown on Figure 7-3, are available at Watershed Geo's online technical library.

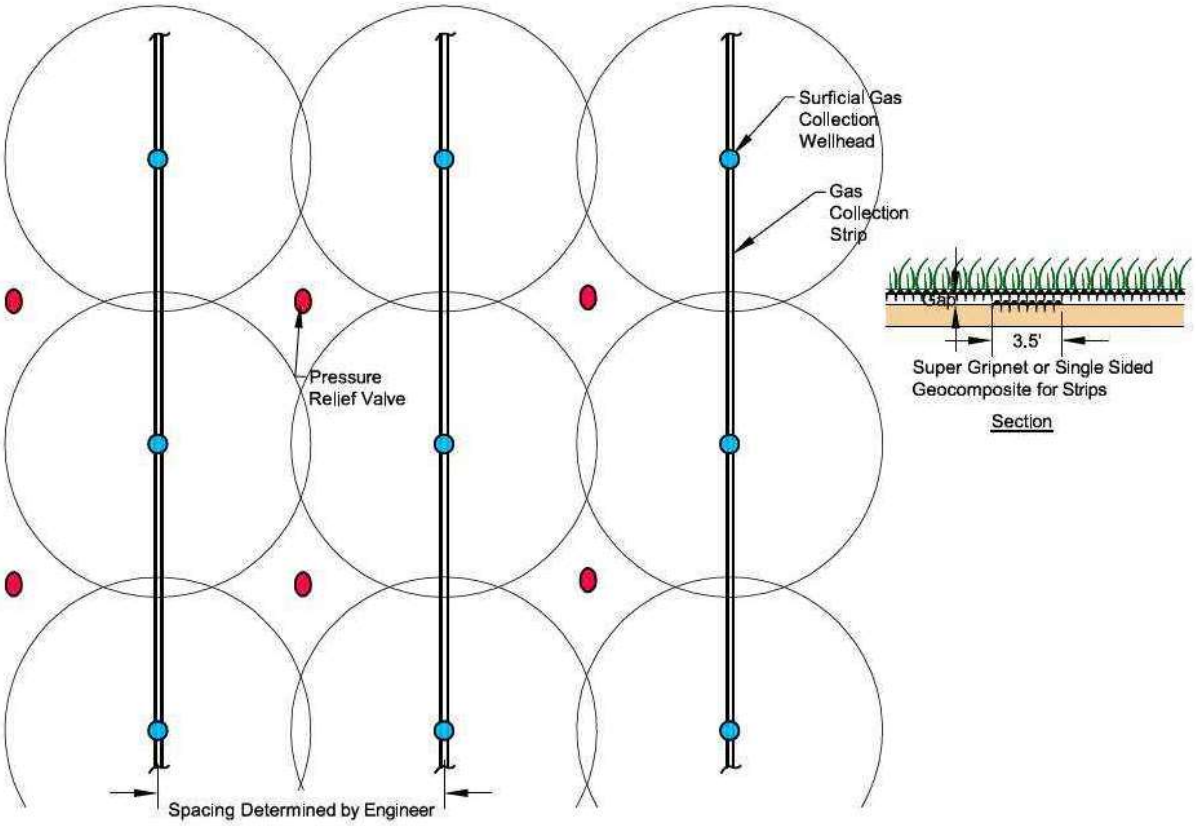


Figure 7-3. Illustration of ClosureTurf Surficial Gas Collection System

8. ClosureTurf Performance Equivalency

This chapter compares the performance of ClosureTurf with prescriptive final cover systems. This comparison is presented in terms of reduction in infiltration through the cover system and erosion resistance.

8.1. Regulatory Requirements

The USEPA has established minimum requirements for the management of MSW landfills through Title 40 Code of Federal Regulations (CFR) Part 258, commonly referred to as Resource Conservation and Recovery Act (RCRA) Subtitle D requirements. 40 CFR §258.60(a) requires that the final cover system be designed and constructed to meet the following criteria:

(1) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} centimeters per second (cm/sec), whichever is less, and

(2) Minimize infiltration through the closed MSW landfill unit by the use of an infiltration layer that contains a minimum of 18 inches of earthen material, and

(3) Minimize erosion of the final cover by the use of an erosion layer that contains a minimum of 6 inches of earthen material that is capable of sustaining native plant growth.

For the closure of coal combustion residuals (CCR) units (i.e., CCR landfills and surface impoundments), the USEPA prescribes similar minimum final cover system requirements to those for MSW landfills under 40 CFR §257.102(d)(3)(i).

Many state regulations adopt the federal requirements for final cover systems. Furthermore, the Federal and state regulations allow for the use of alternative final cover systems, provided it can be demonstrated that the performance of the alternative system is equivalent to or better than the prescriptive final cover system, for example, as stated under 40 CFR §258.60(b) and 40 CFR §257.102(d)(3)(ii). The following sections present methods to demonstrate that ClosureTurf is equivalent to the final cover systems prescribed by the regulations, both in terms of reduction of infiltration through the cover system and erosion resistance.

8.2. Infiltration Reduction Equivalency

The hydrologic performance of ClosureTurf has been evaluated to demonstrate its equivalency to the final cover systems prescribed in the federal regulations and similar state regulations using the HELP model. Table 8-1 provides typical parameters for modeling the components of ClosureTurf in the HELP model.

Table 8-1. Typical Material Properties Used in HELP Model for ClosureTurf

Component	Thickness	HELP Material Texture # (1)	Hydraulic Conductivity	HELP Layer Type
Engineered Turf (2)	0.5 in (2)	2	2.5×10^{-2} cm/sec (3)	Vertical Percolation Layer
Studded Drainage Layer for Geomembrane	130 mil (0.13 in)	20	Varies (4,5)	Lateral Drainage Layer
Geomembrane	40 to 50 mil (0.04 to 0.05 in)	35	2.0×10^{-13} cm/sec (6)	Flexible Membrane Liner

Notes:

1. The HELP material texture numbers are typically used in the HELP model for the default values of total porosity, field capacity, and wilting point.
2. The engineered turf component and thickness represent the combination of the synthetic turf and granular infill. A larger thickness of 0.6 in may also be used to consider the approximate thickness of the geotextile backing.
3. The hydraulic conductivity is based on a typical value for sand.
4. The hydraulic conductivity of the drainage layer is calculated using the transmissivity of the studded geomembrane divided by its thickness. Based on the laboratory test results, the transmissivity of the studded geomembrane (MicroDrain or Super Gripnet) is a function of hydraulic gradient: $\theta = 2.542 \times 10^{-3}/i^{0.376}$, where *i* is the hydraulic gradient in percentage (e.g., 33.3% or 25%).
5. The hydraulic conductivity of the drainage layer may be reduced to account for creep, intrusion, and/or clogging expected under long-term conditions.
6. The hydraulic conductivity of the geomembrane represents a typical value from manufacturers.

A commonly used approach to demonstrate a reduction in infiltration rates is to evaluate the ratio of the calculated annual infiltration rate through ClosureTurf to the rate through the

prescriptive final cover system. Multiple case studies examined by Carlson et al. (2019) have demonstrated the infiltration rate through ClosureTurf is much less than or equivalent to the calculated infiltration rates through the prescriptive final cover systems. A similar infiltration equivalency demonstration for ClosureTurf can be performed for a landfill site based on the site-specific conditions and the prescriptive soil cover requirements by the state where the landfill is located, as a part of the permit application package.

8.3. Erosion Resistance Equivalency

The prescribed final cover systems rely on establishing and maintaining vegetative cover to provide erosion resistance. When adequate vegetation is not established, either during the period soon after closure completion or on a seasonal/long-term basis (e.g., droughts, etc.), maintenance is necessary to repair and reseed the eroded area and could result in poor runoff water quality and dusty conditions until proper vegetation is established.

ClosureTurf is different from vegetated soil covers because its manufactured/specified properties have been developed to be inherently erosion-resistant, and the system is effective upon completion of installation, without a lengthy period to establish vegetation. The synthetic engineered turf and granular infill have been shown through laboratory testing (and verified by field performance) to provide excellent resistance to wind and water erosion. When ClosureTurf is designed in accordance with the recommendations provided in this Design Guidance (e.g., related to hydraulic and wind uplift considerations), it is expected to provide equivalent or superior water and wind erosion resistance to vegetated final cover systems, thus reducing the need for post-closure maintenance and repairs.

As another indicator of superior erosional performance in terms of runoff quality, the lack of fine-grained soil materials in the ClosureTurf infill makes the system less susceptible to erosion-induced suspension of solids and related migration of sediment particles. For example, a case study from De Abreu and Franklin (2014) measured a turbidity of 11 nephelometric turbidity units (NTU) for the runoff from ClosureTurf, whereas runoff generated from a clayey cover soil at the same site produced a turbidity of 371 NTU.

9. ClosureTurf Design Life

This chapter discusses the UV longevity and the projected design life of ClosureTurf.

9.1. Longevity of System Components

The ClosureTurf final cover system is comprised of three components: (1) a structured geomembrane performing as the hydraulic barrier for closure, (2) an engineered turf protecting the geomembrane from UV exposure, and (3) the specified granular (sand) infill providing an additional UV protection layer and ballast against wind uplift.

Longevity of ClosureTurf depends on the longevity of individual components. Because the geomembrane is covered by the engineered turf and specified infill, the unexposed geomembrane has an anticipated service life of at least 200 years under most climate conditions (Koerner et al. 2011; Scholl et al. 2023). The engineered turf geotextile backing has an expected service life greater than 100 years, provided it remains covered with the specified infill (Gobla 2014; Scholl et al. 2023). The specified infill will not degrade appreciably from weathering for centuries. The most critical ClosureTurf component with respect to longevity is the exposed engineered turf fibers forming the "grass" matrix that hold the specified infill in place.

9.2. Service Life Projection of Turf Fibers

A multi-year testing program was instituted to evaluate the service life of the engineered turf fibers. Outdoor weathering testing was initially conducted on samples of turf fibers placed at the test field of Atlas Material Testing Solutions located in New River, Arizona. Samples of the weathered turf fibers after approximately 1, 5, 7 and 10 years of exposure were sent to a geosynthetics laboratory and tested for remaining tensile strength. The results were independently reviewed by a third-party consulting firm (Geosyntec 2015) and the evaluation report is provided in Appendix H. Based on the evaluation results, the half-life of the turf fibers was projected to be more than 100 years (Figure 9-1). As noted in the report, the service life of the turf fibers was expected to be much longer than the projected half-life.

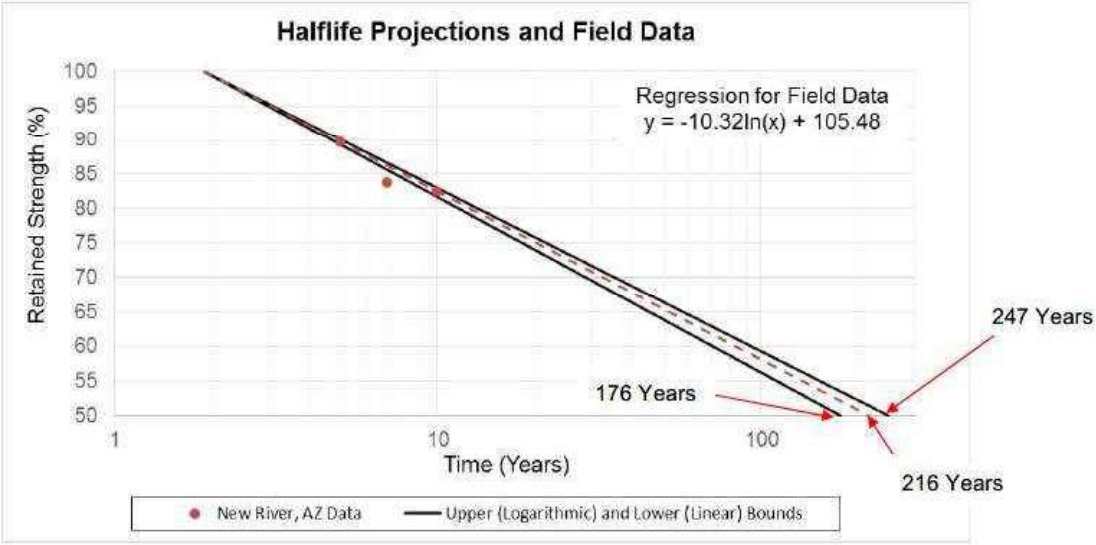


Figure 9-1. Half-Life Projection of Turf Fibers of ClosureTurf (Geosyntec 2015)

Subsequently, field samples of the turf fibers were collected from multiple sites to evaluate the real-world performance. In addition, an accelerated natural weathering program has been undertaken on samples of the turf fibers at the same Atlas facility in Arizona using Fresnel Solar Collectors. The accelerated results equivalent up to 21 years of UV exposure have been obtained to date. The 2015 UV longevity evaluation report has been updated to incorporate the new test results (Geosyntec 2022). The updated evaluation report is provided in Appendix H, too.

The new data from the real-world field and accelerated weathering test results are plotted in Figure 9-2, along with the data points from the initial 10-year weathering test and projected trend lines. The new data points clearly validate the projected half-life of more than 100 years for the turf fibers, as most of them are above the projected trend lines.

The accelerated weathering testing is still ongoing. The projection plot will be updated once additional data points beyond the equivalent 21-year become available.

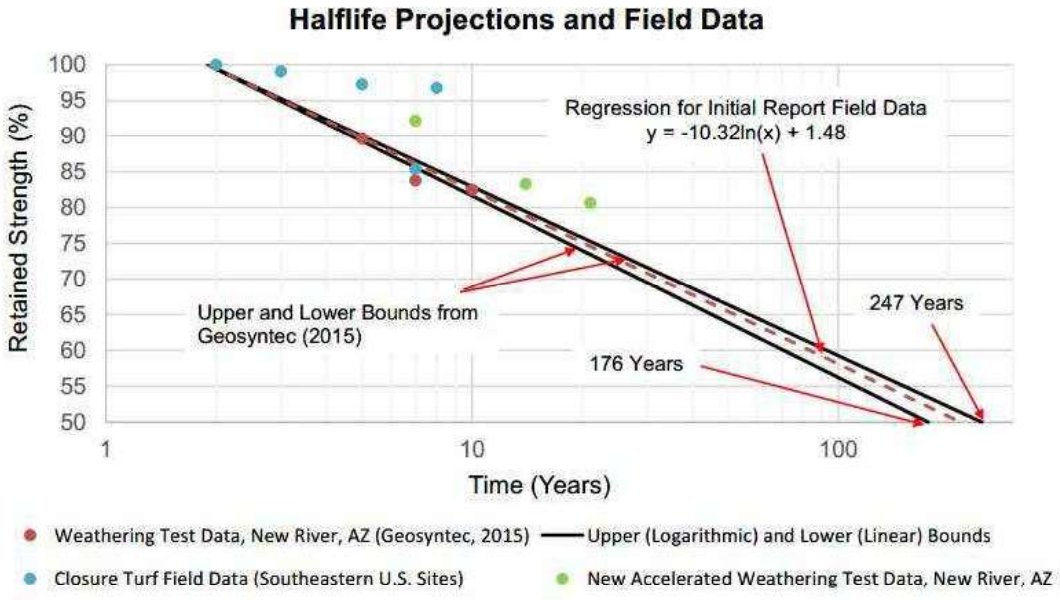


Figure 9-2. Half-Life Projection of Turf Fibers of ClosureTurf with Additional Field and Accelerated Weathering Data (Geosyntec 2022)

9.3. Summary

Based on the results of field samples and weathering test results, ClosureTurf is projected to have a design life, represented by the service life, of 100 years or longer, provided it is installed and maintained appropriately in accordance with engineering design drawings, technical specifications, and post-closure care procedures.

10. Other Considerations

This chapter addresses several considerations for design of ClosureTurf cover systems not discussed in previous chapters. These other considerations are:

- Settlement
- Thermal effects
- Impact of animals
- Resistance to fire and lightning
- Measures to prevent vandalism
- Post-closure care
- Beneficial use for solar development

10.1. Settlement

ClosureTurf is a light-weight cover system with an average weight on a unit area of approximately 5 psf, compared to minimum 240 psf for a typical soil cover system. As a result, installation of ClosureTurf induces significantly less additional settlement of the underlying waste mass than installation of the traditional soil cover system. Since the waste is usually inhomogeneous, differential settlement may occur over time after the landfill is closed. The differential settlement may result in tension in the final cover system, causing a soil cover to crack. Unlike the soil cover, ClosureTurf is made of flexible geosynthetic materials, which can tolerate relatively large differential settlements. The settlement can be estimated during the design using one-dimensional consolidation equations coded in a calculation spreadsheet or commercially available computer software.

The differential settlement may cause grade reversal and hence, localized ponding of rainwater, which needs to be repaired as part of post-closure maintenance. Repair of depressions is straightforward for ClosureTurf because there is no excavation of thick soil layers. One repair approach with ClosureTurf is to cut one or more holes at the location of the depression. Flowable backfill (usually a mix of fly ash, cement, and water) is then pumped into the depressed area to raise “subgrade” for the ClosureTurf to its original grade. After mitigating settlements, the holes in the geomembrane are patched and seamed with new pieces of geomembrane; the engineered

turf is repaired using a heat-bonded seam; and granular infill is replaced to cover the repaired area.

10.2. Thermal Effects

Stress cracks can result from relatively large temperature changes over a brief duration and from other causes. Stress cracking of the structured geomembrane component of ClosureTurf was evaluated using the *Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test* (ASTM D5397). For example, the product specification sheets for 50-mil HDPE Super GripNet and MicroDrain report stress crack resistance at more than 500 hours based on testing in accordance with ASTM D5397, which meets the minimum acceptable resistance for geomembranes per GRI-GM13 (GSI 2016).

Results of freeze-thaw tests ranging from -20 to +30 degrees Celsius (°C) (Comer et al. 1996) indicated "neither geomembrane sheets nor their associated seams were adversely affected." The performance of the geomembrane component of ClosureTurf with respect to freeze-thaw cycling is expected to be similar to the performance of geomembranes in the Comer et al. (1996) study.

Similar to other HDPE and LLDPE geomembranes, ClosureTurf should typically not be installed for ambient temperatures below 35°F or above 104°F. If ClosureTurf is planned for installation outside the above-mentioned temperature range, it should be demonstrated before installation that the integrity of the geomembrane is not affected by the weather conditions (USBR 2014). If ClosureTurf is installed during periods of temperatures approaching 104°F, wrinkles could form during installation, particularly for HDPE geomembranes, which have a higher coefficient of thermal expansion than LLDPE geomembranes (Scheirs 2009). Best practices should be implemented during installation to minimize wrinkles.

After installation, temperature changes may cause the ClosureTurf system to contract and develop tensile stresses. Calculations of factors of safety against pull-out can be performed, as determined by the design engineer, to evaluate whether these tensile stresses may cause the cover system to pull out of perimeter anchor trenches. Appendix I provides an example calculation for pull-out resistance for one potential design scenario.

Watershed Geo worked with GSI to test ClosureTurf under deep freeze conditions. No tears or punctures were observed in the structured geomembrane or engineered turf component of ClosureTurf for the deep freeze test. Appendix J presents the details of the deep freeze test.

Additionally, there have been no observations of damage to ClosureTurf installations exposed to freezing temperatures in field conditions.

10.3. Impact of Animals

Traditional vegetated soil cover systems can provide suitable habitats for burrowing animals and birds. Burrowing animals can pose problems to the integrity and performance of traditional cover systems (Lutton et al. 1979). ClosureTurf does not include soil layers that can provide a suitable habitat for burrowing animals. Watershed Geo has not observed evidence of burrowing animal activities to date. Nonetheless, should evidence of burrowing ever be discovered, the disturbed area of ClosureTurf can be easily repaired. ClosureTurf has little attraction for birds because it does not provide a suitable habitat. However, bird damages to ClosureTurf have been observed at landfill sites where there is a working phase with food sources. The damages often occurred in localized areas around landfill gas wellheads and drainage berms, where the bird could perch. Birds appear to target the black geotextile backing of the engineered turf, not the geomembrane. For sites with a bird nuisance, the damaged turf can be repaired and infilled with HydroBinder for additional protection. Bird droppings may cause some grasses or weeds to grow on ClosureTurf in limited areas, usually in drainage swales and perimeter channels where ponded water is present. Any observed grass or weeds growing at the site can be manually removed.

Hoofed animals (e.g., deer or elk) have been observed at ClosureTurf sites, but they do not inhabit these areas because no food source is present. Furthermore, there have been no reports of damage to ClosureTurf trampled by animal hoofs at these sites. The granular infill and engineered turf prevent direct contact of the hoofs with the underlying geomembrane and dissipate contact pressures. Estimates of maximum ground contact pressure for a typical adult hoofed animals are less than the allowable loading limits of ClosureTurf suggested by Watershed Geo. Should the geomembrane be damaged from hoofed animals, it can be repaired by replacing the geomembrane in patches and seaming.

10.4. Resistance to Fires

Grasses used on traditional cover systems are composed of organic matter that is combustible under certain climatic and seasonal conditions. Fires on vegetated covers can be ignited by natural or human-induced causes, and once started, can rapidly spread. Unlike natural grass, ClosureTurf is a synthetic product that is unlikely to propagate fires under field conditions.

To further evaluate the fire resistance of ClosureTurf, Watershed Geo conducted tests using the *Standard Test Methods for Fire Tests of Roof Coverings* (ASTM E108). When exposed to flame as prescribed by the test conditions, some damage to ClosureTurf was observed in the form of melting of the engineered turf. The underside of the Super GripNet also displayed some effects from the fire. Despite the observed damages, the geomembrane component of the cover system was not breached by fire. Furthermore, the damaged area observed during the fire resistance test was confined and the fire didn't spread. Additional details on the setup and results of the fire resistance tests are provided in Appendix K.

10.5. Resistance to Lightning

ClosureTurf is not a conductor of electricity and therefore, is unlikely to be hit by lightning strikes. However, if lightning does strike the system and causes a fire, the damage is expected to be localized based on the observations during the fire resistance tests. Damage from lightning strikes can be repaired by patching the damaged geomembrane and engineered turf and replacing the granular infill.

10.6. Measures to Prevent Vandalism

Geosynthetic materials are susceptible to damage from vandalism. Although vandalism has not been observed at any ClosureTurf installation, it could potentially be vandalized, thereby affecting the performance of the system during the post-closure care period. Measures should be taken to prevent or discourage vandalism during the post-closure care period, which may include the following, as necessary:

- Use of a chain-link fence or other suitable fence at the property boundary;
- Posting of appropriate signs (e.g., no trespassing) on the fence at the entrance and within the property boundary; and/or
- Use of cameras, video surveillance, and/or motion sensors at key locations at the facility.

10.7. Post-Closure Care

Landfill post-closure care (e.g., final cover system maintenance) is required by the federal and state regulations for a minimum period of 30 years. ClosureTurf does not require significant maintenance activities in comparison to traditional soil cover systems, i.e., no mowing, fertilizing, revegetation, etc. However, regular inspection of ClosureTurf is still required to identify any

damages or granular infill movement, followed by repairs, as necessary. The ClosureTurf Post-Closure Care Manual is available at Watershed Geo's online technical library.

10.8. Beneficial Use for Solar Development

Several landfills closed with ClosureTurf have been beneficially reused to develop solar farms for electricity generation. Compared with a traditional landfill soil cover system, the ClosureTurf system provides a stable foundation for a solar farm for the following reasons:

- Less maintenance is required with ClosureTurf, which lowers the risk of damage to the solar panels from personnel and equipment.
- No vegetation overgrowth is present that may block sunlight and negatively impact power generation efficiency of the solar panels.
- Dust, which can lower the efficiency of a solar array, is less likely to be generated.
- Rainwater from the drip edge of solar panels is less likely to erode the cover system.

Watershed Geo has developed a patented solar power generation system, PowerCap™, specifically for installation on ClosureTurf. No penetrations through or mechanical connections to the ClosureTurf final cover system are required for this system. The system can be installed on landfill side slopes and top deck, maximizing power generation at the site.

More information on solar development can be found at Watershed Geo's website: https://watershedgeo.com/products/powercap/.

It should be noted that if future solar development is planned during the landfill closure, potential impact of the solar arrays on the final cover system (e.g., access roads, stormwater management, slope stability, final cover settlement, etc.) should be evaluated and incorporated into the landfill closure design.

11. References

ARC 2016. “2016 Edition of the Georgia Stormwater Management Manual.” Volume 2. Atlanta Regional Commission. February.

ASCE 2022. “Minimum Design Loads and Associated Criteria for Buildings and Other Structures.” (ASCE/SEI 7-22). American Society of Civil Engineers. Reston, Virginia.

Carlson, C.P., Zhu, M., and Ebrahimi, A. 2019. “Hydrologic Performance of Synthetic Turf Cover Systems and Their Equivalency to Prescriptive Cover Systems.” 2019 Geosynthetics Conference Proceedings, Houston, Texas, pp. 843–850.

Comer, A.I., Sculli, M.L., and Hsuan, Y.G. 1996. “Freeze-Thaw Cycling and Cold Temperature Effects on Geomembrane Sheets and Seams.” United States Environmental Protection Agency, National Risk Management Research Laboratory, Cincinnati, Ohio. EPA/600/S-96/004

De Abreu, R.C. and Franklin, J. 2014. “Design and Installation of a Geosynthetic Final Cover Utilizing Artificial Turf in Louisiana.” *7th International Congress on Environmental Geotechnics 2014*. Melbourne, Australia, 10–14 November. pp. 1397–1404.

Dedrick, A.R. 1973. “Air Pressures Over Reservoir, Canal, and Water Catchment Surfaces Exposed to Wind.” Ph.D. diss., Utah State University.

FHWA 2006. “Hydraulic Design of Energy Dissipators for Culvers and Channels.” Circular Number 14 (HEC-14), Department of Transportation, Third Edition. July. Revised October 2021.

FHWA 2009. “Urban Drainage Design Manual.” Circular Number 22 (HEC-22), Department of Transportation, Third Edition. September. Revised August 2013.

Geosyntec Consultants 2015. “Literature Review and Assessment of ClosureTurf UV Longevity.” Letter Report Prepared by Geosyntec Consultants for Watershed Geo, 15 May 2015.

Geosyntec Consultants 2022. “Assessment of ClosureTurf UV Longevity.” Letter Report Prepared by Geosyntec Consultants for Watershed Geo, 22 November 2022.

Geosynthetics Research Institute (GRI) 2019. “Exposed Lifetime Prediction of Geosynthetics Using Laboratory Weathering Devices.” Folsom, Pennsylvania. August 19.

Giroud, J.P., Bachus, R.C., and Bonaparte R. 1995a. “Influence of Water Flow on the Stability of Geosynthetic-Soil Layered Systems on Slopes.” *Geosynthetics International* 2:6, pp. 1149–1180.

Giroud, J.P., Pelte, T., and Bathurst, R.J. 1995b. “Uplift of Geomembranes by Wind.” *Geosynthetics International* 2:6, pp. 897–952.

Giroud, J.P. and Zornberg, J.G. 1997. “Uplift of Geomembranes by Wind – Extension of Equations.” *Geosynthetics International* 4:2, pp. 187–207.

Gobla, M.J. 2014. “Design Standards No. 13 – Embankment Dams, Chapter 19: Geotextiles.” United States Department of Interior, Bureau of Reclamation, Washington D.C., USA.

GSI 2016. “Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes.” Rev. 14. Geosynthetic Institute, Folsom, Pennsylvania.

Joshi, R. 2023. “Environmental, Social, and Governance (ESG) Offerings of an Engineered Turf Final Cover System.” *In Proceedings of Geosynthetics 2023*, pp. 539 – 548.

Koerner, R.M., Husan, G.Y., and Koerner, G.R. 2011. “Geomembrane Lifetime Prediction: Unexposed and Exposed Conditions.” *GRI White Paper No. 6*, Geosynthetic Institute, Folsom, Pennsylvania.

Koerner, R.M. and Soong, T.Y. 1998. “Analysis and Design of Veneer Cover Soils.” *Sixth International Conference on Geosynthetics Conference Proceedings* 1:1–23.

Koerner, R.M., Wilson-Fahmy, R.R., and Narejo, D. 1997. “Puncture Protection of Geomembranes; Part III Examples,” *Geosynthetics International* 3:5, pp. 655-675.

Lutton, R.J., Regan, G.L., and Jones, L.W. 1979. *Design and Construction of Covers for Solid Waste Landfills.* United States Environmental Protection Agency, Office of Research and Development, Municipal Environmental Research Laboratory.

Matasovic, N. 1991. “Selection of Method for Seismic Slope Stability Analysis.” *Proceedings: Second International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics.* St. Louis, Missouri, March 11–15. Paper 7.20, pp. 1057–1062.

Narejo, D., Koerner, R.M., and Wilson-Fahmy, R.R. 1997. "Puncture Protection of Geomembranes; Part II Experimental," *Geosynthetics International* 3:5, pp. 629-653.

NOAA. 2022. Atlas 14 Point Precipitation Frequency Estimates. United States Department of Commerce, National Oceanic and Atmospheric Administration. https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html. Accessed in November 2022.

NRCS. 2010. "National Engineering Handbook." Part 630 Hydrology, United States Department of Agriculture, Natural Resources Conservation Division.

Scheirs, J. 2009. "Key Performance Properties of Geomembranes." In *A Guide to Polymetric Geomembranes: A Practical Approach.* Hoboken: Wiley

Scholl, B., Zhu, M., and Yuan, Z. 2023. "Engineered Turf Landfill Closure: How Long Will It Last?" In Proceedings of the Geosynthetics Conference 2023, pp. 143 – 151.

Schroeder, P.R., Lloyd, C.M., and Zappi, P.A. 1994a. "The Hydrologic Evaluation of Landfill Performance (HELP) Model, User's Guide for Version 3." United States Environmental Protection Agency, Office of Research and Development, Washington, D.C. EPA/600/R-94/168a

Schroeder, P.R., Dozier, T.S., Zappi, P.A., McEnroe, B.M., Sjostrom, J.W., and Peyton, R.L. 1994b. "The Hydrologic Evaluation of Landfill Performance (HELP) Model Engineering Documentation for Version 3." United States Environmental Protection Agency, Office of Research and Development, Washington, D.C. EPA/600/R-94/168b

Thiel, R.S. and Stewart, M.G. 1993. "Geosynthetic Landfill Cover Design Methodology and Construction Experience in the Pacific Northwest." *Geosynthetics 93 Conference Proceedings.* International Fabrics Association International. St. Paul, Minnesota, pp. 1131–1144.

Tolaymat, T. and Krause, M. 2020. "Hydrologic Evaluation of Landfill Performance (HELP) 4.0 User Manual." United States Environmental Protection Agency Office of Research and Development, Washington, D.C. EPA/600/B-20/2019

USBR 2014. "Design Standard No. 13 Embankment Dams, Chapter 20: Geomembranes." Phase 4 (Final). United States Bureau of Reclamation, Washington, D.C.

USEPA. 2005. “Landfill Gas Emissions Model (LandGEM).” United States Environmental Protection Agency, Washington, D.C. EPA/600/R-05/047

Watershed Geo. 2014. “Technical Submittal for ClosureTurf — Alternative Final Cover, Closure of Municipal Solid Waste Landfill Units.” December 2.

Wayne, M.H. and Koerner, R.M. 1988. “Effect of Wind Uplift on Liner Systems.” *Geotechnical Fabrics Report*, July/August.

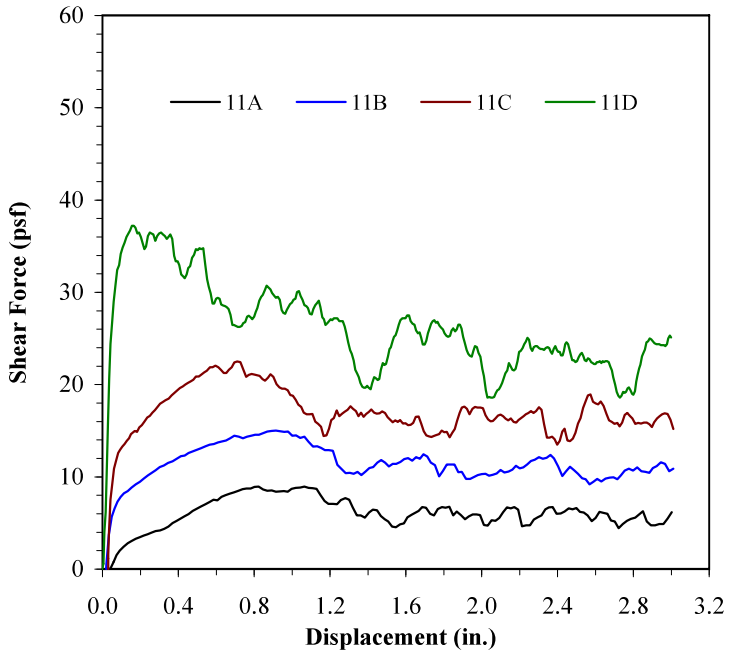
Wilson-Fahmy, R.F., Narejo, D., and Koerner, R.M. 1997. “Puncture Protection of Geomembranes; Part I Theory,” *Geosynthetics International* 3:5, pp. 605-628.

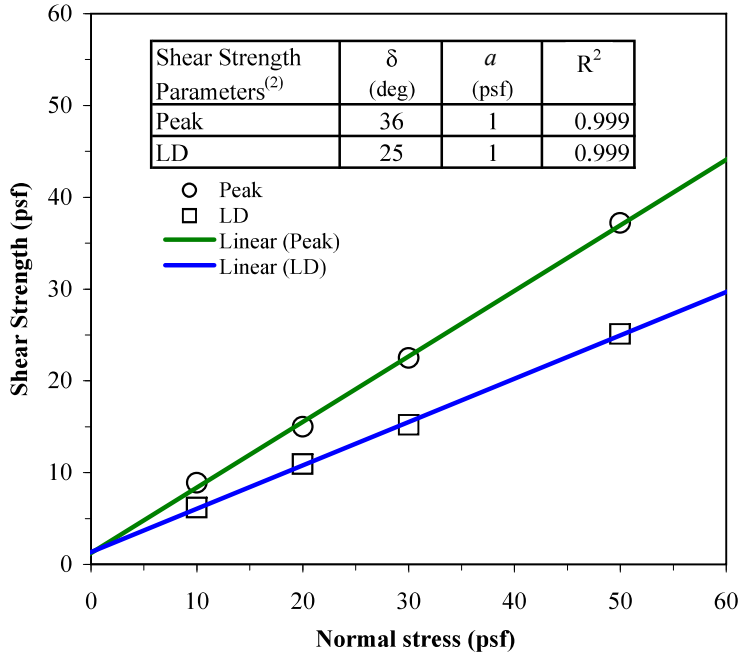
Appendix A
ClosureTurf Interface Shear Strength Test Results

WATERSHED GEOSYNTHETICS LLC
INTERFACE DIRECT SHEAR TESTING (ASTM D 5321)

Upper Shear Box: Concrete sand
CT32 Synthetic Turf with base geotextile side down against
Agru 50-mil Super Gripnet LLDPE geomembrane with stud side up
Lower Shear Box: Concrete sand

Note: The CT turf is denoted as the "CT32 Synthetic Turf" in this test report.





Test No.	Shear Box Size (in. x in.)	Normal Stress (psf)	Shear Rate (in./min)	Soaking		Consolidation		Lower Soil			Upper Soil			Soil Shear Strength		Shear Strengths		Failure Mode
				Stress (psf)	Time (hour)	Stress (psf)	Time (hour)	γ_d (pcf)	ω_i (%)	ω_f (%)	γ_d (pcf)	ω_i (%)	ω_f (%)	ϕ (deg)	c (psf)	τ_P (psf)	τ_{LD} (psf)	
11A	12 x 12	10	0.04	10	24	-	-	-	-	-	-	-	-	-	-	8.9	6.2	(1)
11B	12 x 12	20	0.04	20	24	-	-	-	-	-	-	-	-	-	-	15.0	10.9	(1)
11C	12 x 12	30	0.04	30	24	-	-	-	-	-	-	-	-	-	-	22.5	15.2	(1)
11D	12 x 12	50	0.04	50	24	-	-	-	-	-	-	-	-	-	-	37.2	25.1	(1)

NOTES:
(1) Sliding (i.e., shear failure) occurred at the interface between the geotextile side of the turf and the stud side of Agru 50-mil Super Gripnet.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. Caution should be exercised in using these strength parameters for applications involving normal stresses outside the range of the stresses covered by the test series. The large-displacement (LD) shear strength was calculated using the shear force measured at the end of the test.

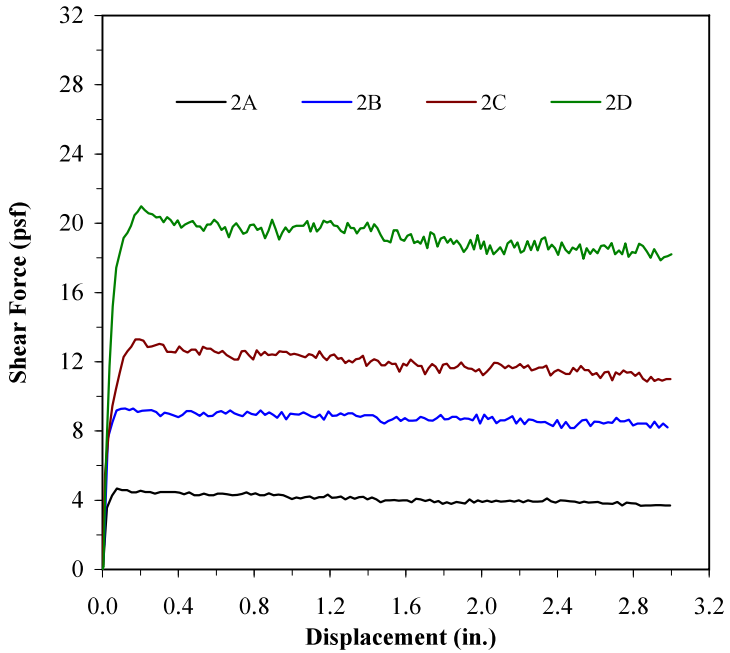
DATE OF TEST:	5/28/2019
FIGURE NO.	1
PROJECT NO.	SGI19014
DOCUMENT NO.	
FILE NO.	

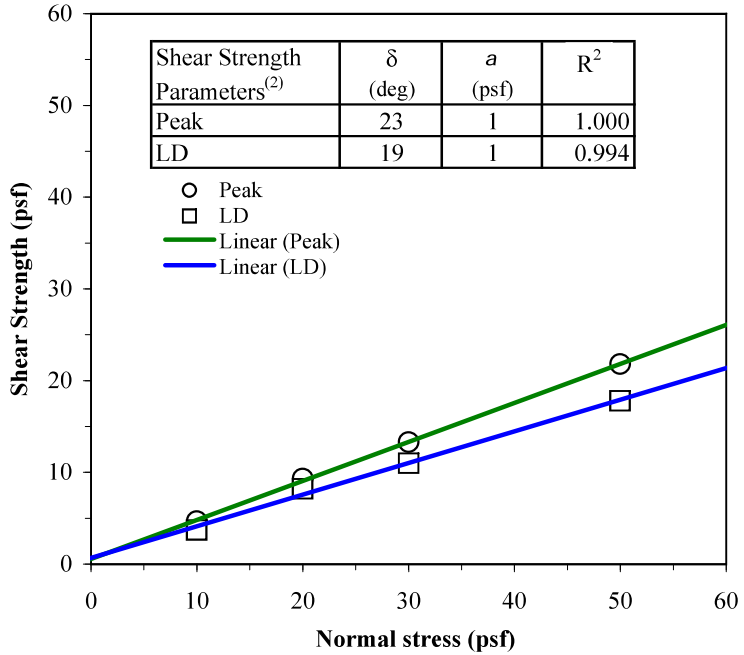
SGI TESTING SERVICES, LLC

WATERSHED GEOSYNTHETICS LLC
INTERFACE DIRECT SHEAR TESTING (ASTM D 5321)

Upper Shear Box: Concrete sand
CT32 Synthetic Turf with base geotextile side down against
Agru 40-mil Microspike LLDPE geomembrane with dull side up
Lower Shear Box: Concrete sand

Note: The CT turf is denoted as the "CT32 Synthetic Turf" in this test report.





Shear Strength Parameters[2]	δ (deg)	a (psf)	R^2
Peak	23	1	1.000
LD	19	1	0.994

Test No.	Shear Box Size (in. x in.)	Normal Stress (psf)	Shear Rate (in./min)	Soaking		Consolidation		Lower Soil			Upper Soil			Soil Shear Strength		Shear Strengths		Failure Mode
				Stress (psf)	Time (hour)	Stress (psf)	Time (hour)	γ_d (pcf)	ω_i (%)	ω_f (%)	γ_d (pcf)	ω_i (%)	ω_f (%)	ϕ (deg)	c (psf)	τ_P (psf)	τ_{LD} (psf)	
2A	12 x 12	10	0.04	10	24	-	-	-	-	-	-	-	-	-	-	4.7	3.7	(1)
2B	12 x 12	20	0.04	20	24	-	-	-	-	-	-	-	-	-	-	9.3	8.2	(1)
2C	12 x 12	30	0.04	30	24	-	-	-	-	-	-	-	-	-	-	13.3	11.0	(1)
2D	12 x 12	50	0.04	50	24	-	-	-	-	-	-	-	-	-	-	21.8	17.8	(1)

NOTES:
(1) Sliding (i.e., shear failure) occurred at the interface between the geotextile side of heavy closure turf and the dull side of agru 40-mil microspike LLDPE geomembrane.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. Caution should be exercised in using these strength parameters for applications involving normal stresses outside the range of the stresses covered by the test series. The large-displacement (LD) shear strength was calculated using the shear force measured at the end of the test.

DATE OF TEST: 5/6/2019

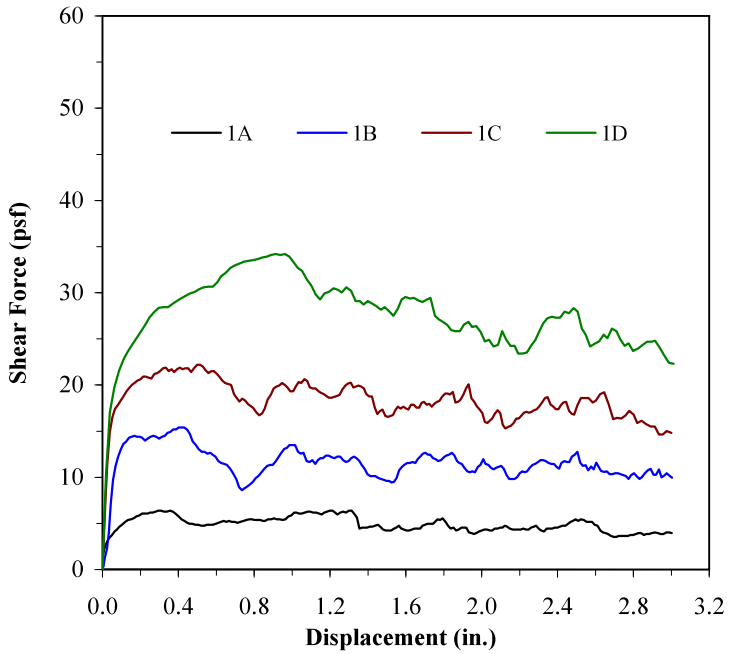
SGI TESTING SERVICES, LLC

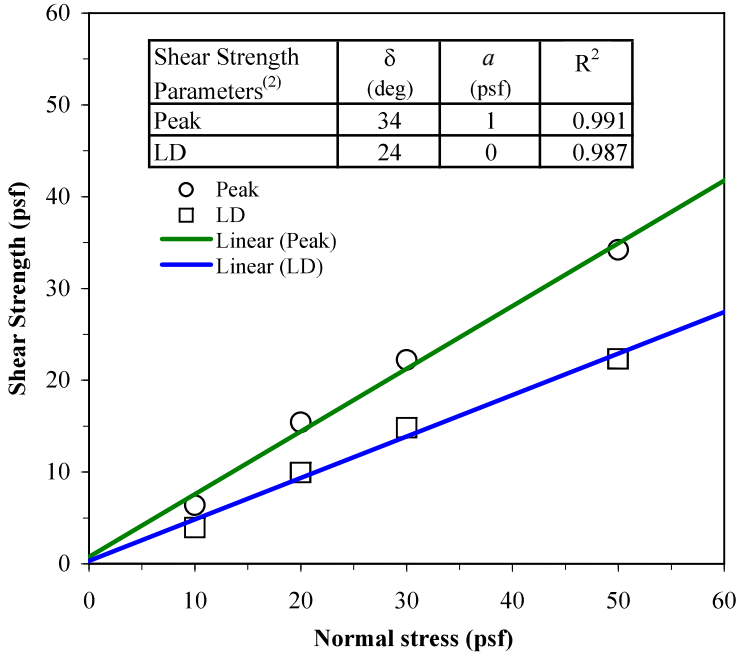
FIGURE NO.	1
PROJECT NO.	SGI19014
DOCUMENT NO.	
FILE NO.	

WATERSHED GEOSYNTHETICS LLC
INTERFACE DIRECT SHEAR TESTING (ASTM D 5321)

Upper Shear Box: Concrete sand /
New ClosureTurf with geotextile side down /
Agru 50-mil SuperGripnet with studs side up /
Lower Shear Box: Concrete sand

Note: The CT-HD turf is denoted as the "New ClosureTurf" in this test report.





Shear Strength Parameters[2]	δ (deg)	*a* (psf)	R^2
Peak	34	1	0.991
LD	24	0	0.987

Test No.	Shear Box Size (in. x in.)	Normal Stress (psf)	Shear Rate (in./min)	Soaking Stress (psf)	Soaking Time (hour)	Consolidation Stress (psf)	Consolidation Time (hour)	Lower Soil γ_d (pcf)	Lower Soil ω_i (%)	Lower Soil ω_f (%)	Upper Soil γ_d (pcf)	Upper Soil ω_i (%)	Upper Soil ω_f (%)	Soil Shear Strength ϕ (deg)	Soil Shear Strength c (psf)	Shear Strengths τ_P (psf)	Shear Strengths τ_{LD} (psf)	Failure Mode
1A	12 x 12	10	0.04					-	-	-						6.4	3.9	(1)
1B	12 x 12	20	0.04					-	-	-						15.4	9.9	(1)
1C	12 x 12	30	0.04					-	-	-						22.2	14.8	(1)
1D	12 x 12	50	0.04					-	-	-						34.2	22.3	(1)

NOTES:
(1) Sliding (i.e., shear failure) occurred at the interface between the base geotextile of ClosureTurf and studs side of Agru SuperGripnet geomembrane.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. Caution should be exercised in using these strength parameters for applications involving normal stresses outside the range of the stresses covered by the test series. The large-displacement (LD) shear strength was calculated using the shear force measured at the end of the test.

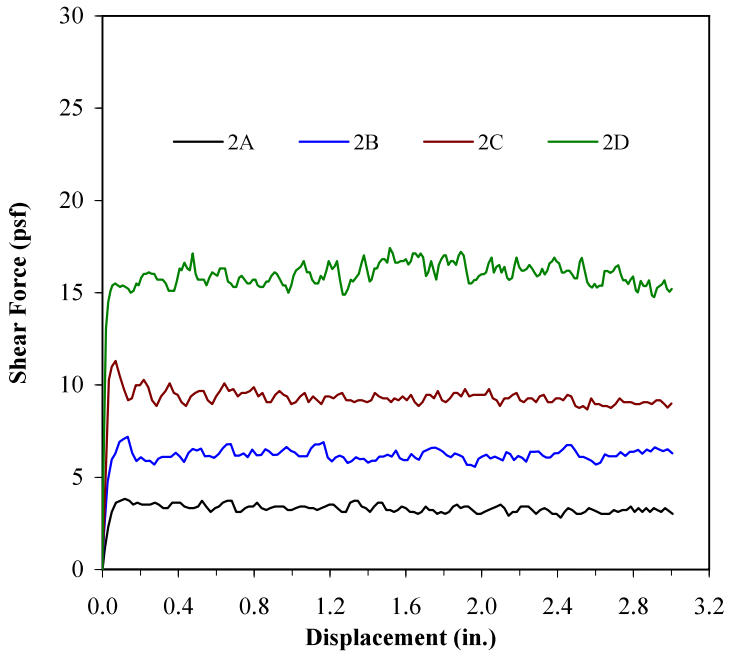
SGI TESTING SERVICES, LLC

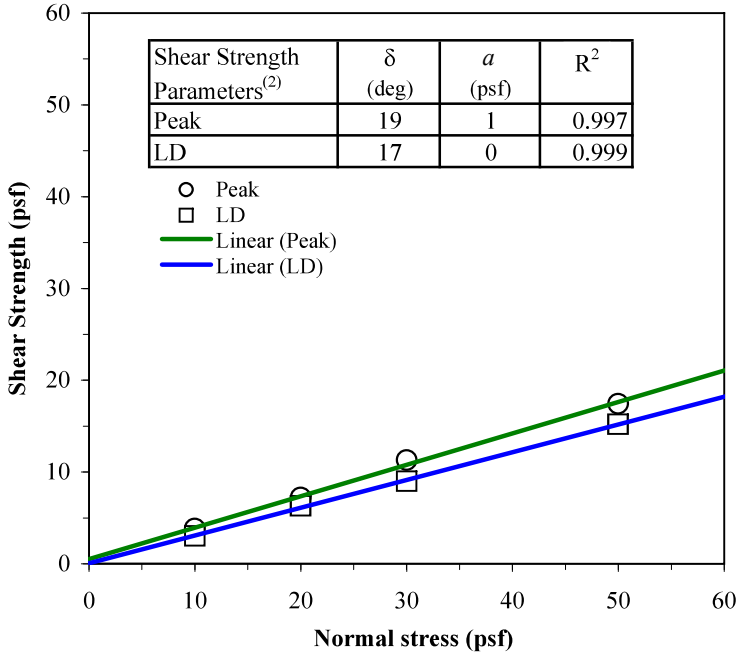
DATE OF TEST:	6/7/2018
FIGURE NO.	1
PROJECT NO.	SGI18014
DOCUMENT NO.	
FILE NO.	

WATERSHED GEOSYNTHETICS LLC
INTERFACE DIRECT SHEAR TESTING (ASTM D 5321)

Upper Shear Box: Concrete sand/
New ClosureTurf with geotextile side down /
Agru 40-mil Microspike HDPE geomembrane with dull side up and shiny side down/
Lower Shear Box: Concrete sand

Note: The CT-HD turf is denoted as the "New ClosureTurf" in this test report.





Shear Strength Parameters[2]	δ (deg)	*a* (psf)	R^2
Peak	19	1	0.997
LD	17	0	0.999

Test No.	Shear Box Size (in. x in.)	Normal Stress (psf)	Shear Rate (in./min)	Soaking Stress (psf)	Soaking Time (hour)	Consolidation Stress (psf)	Consolidation Time (hour)	Lower Soil γ_d (pcf)	Lower Soil ω_i (%)	Lower Soil ω_f (%)	Upper Soil γ_d (pcf)	Upper Soil ω_i (%)	Upper Soil ω_f (%)	Soil Shear Strength ϕ (deg)	Soil Shear Strength c (psf)	Shear Strengths τ_P (psf)	Shear Strengths τ_{LD} (psf)	Failure Mode
2A	12 x 12	10	0.04					-	-	-						3.8	3.0	(1)
2B	12 x 12	20	0.04					-	-	-						7.2	6.3	(1)
2C	12 x 12	30	0.04					-	-	-						11.3	9.0	(1)
2D	12 x 12	50	0.04					-	-	-						17.4	15.2	(1)

NOTES:
(1) Sliding (i.e., shear failure) occurred at the interface between the base geotextile of ClosureTurf and dull side of Agru Microspike HDPE geomembrane.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. Caution should be exercised in using these strength parameters for applications involving normal stresses outside the range of the stresses covered by the test series. The large-displacement (LD) shear strength was calculated using the shear force measured at the end of the test.

SGI TESTING SERVICES, LLC

DATE OF TEST:	6/28/2018
FIGURE NO.	2
PROJECT NO.	SGI18014
DOCUMENT NO.	
FILE NO.	

Appendix B
Example Calculation for ClosureTurf Veneer Slope Stability

EXAMPLE CALCULATION FOR CLOSURETURF VENEER SLOPE STABILITY

PURPOSE

This example calculation evaluates the veneer stability of a ClosureTurf installed as a final cover system for a hypothetical landfill. The analysis presented herein is based on the procedure presented in Chapter 9 of the document titled "*Geotechnical and Stability Analyses for Ohio Waste Containment Facilities"* (OEPA 2004).

METHODOLOGY

Static and Seismic Veneer Slope Stability

Slope stability of a final cover system can be evaluated based on infinite slope or finite slope methods. The infinite slope method considers an infinite slope length whereby driving and resisting forces occur only parallel to an interface (i.e., slip plane). The finite slope method considers a slope of finite length and additionally accounts for the toe-buttressing effect. For this example calculation, static and seismic slope stability analyses of the ClosureTurf system is performed using an infinite slope method developed by Matasovic [1991]. This method was selected because of the simplicity of its equation.

$$FS = \frac{\frac{a}{\gamma_c\, z_c\, cos^2\beta} + \tan\delta\,\left(1 - \frac{\gamma_w\,(z_c - d_w)}{\gamma_c\, z_c}\right) - k_s \tan\beta \tan\delta}{k_s + \tan\beta}$$

where:

FS	=	factor of safety;
β	=	slope inclination angle;
δ	=	friction angle along the critical slip surface;
a	=	adhesion intercept along the critical slip surface;
z_c	=	depth of the critical slip surface measured from the top of final cover (i.e., thickness of sand infill);
γ_c	=	unit weight of sand infill;
γ_w	=	unit weight of water = 62.4 pcf;
d_w	=	depth to water surface measured from the top of final cover (i.e., $z_c - h_{avg}$); and
k_s	=	seismic coefficient.

Evaluate the hydraulic head acting on the geomembrane

The average hydraulic head acting on the geomembrane is computed using equations presented in OEPA (2004). These equations are:

$$h_{avg} = \frac{P\,(1 - RC)L\,(\cos\beta)}{k_d\,(Sin\,\beta)}$$

or if h_{avg} from the above calculations is greater than T_d then use: $h_{avg} = T_d + T_c$

$$h_{avg} = \frac{k_c\,L\,(\cos\beta)}{k_d\,(Sin\,\beta)}$$

Where:

h_{avg}	=	average hydraulic head;
P	=	precipitation;
β	=	slope inclination angle;
L	=	slope length;
T_c	=	thickness of cover soil (i.e., sand infill);
RC	=	runoff coefficient (SCS Runoff Curve Number/100);
k_d	=	hydraulic conductivity of drainage layer;
T_d	=	thickness of drainage layer; and
k_c	=	hydraulic conductivity of cover soil (i.e., sand infill).

Veneer Slope Stability with Equipment Load

Slope stability of the ClosureTurf system with equipment load can be evaluated using a similar approach (i.e., infinite slope method) as presented above. The weights of the ClosureTurf system and equipment as well as dynamic load from equipment acceleration or deceleration act as driving forces, while the adhesive and frictional interface shear strengths of the ClosureTurf system provide resisting forces. The FS is calculated as the ratio of the resisting forces to the driving forces:

$$FS_{equip} = \frac{F_a + F_r}{(W_s + W_v) \cdot \sin(\beta) + F_d}$$

where:

F_a	=	adhesive resistance along the critical slip surface;
F_r	=	frictional resistance along the critical slip surface;
F_d	=	dynamic equipment force along the slope surface;
W_s	=	weight of ClosureTurf;
W_v	=	weight of equipment; and
β	=	slope inclination angle.

The adhesive and frictional resistances of the ClosureTurf system interfaces are calculated using the following equations, respectively.

$$F_a = b \cdot l \cdot a$$

$$F_r = (W_s + W_v) \cdot \cos(\beta) \cdot \tan(\delta)$$

where:

b = equipment contact width;
l = equipment contact length;
a = adhesion intercept along the critical slip surface;
β = slope inclination angle; and
δ = friction angle along the critical slip surface.

The dynamic equipment force (F_d) can be calculated using the following equation:

$$F_d = m \cdot \frac{v}{t}$$

where:

m = equipment mass;
v = equipment velocity; and
t = duration of acceleration/deceleration.

INPUT PARAMETERS AND ANALYSIS ASSUMPTIONS

Veneer stability analyses will be performed for a slope that is considered the longest and steepest of the design grades of the landfill final cover system. For the purpose of this example, the following input parameters were assumed.

Slope Geometry [1]

slope inclination angle, β = 18.43° (i.e., 3 horizontal to 1 vertical)
slope maximum height, H = 63 ft
slope Length, L = 63/sin 18.43° = 200 ft = 6,096 cm

ClosureTurf

sand infill thickness, z_c = 0.5 in
total unit weight of sand infill, γ_c = 115 pcf

critical interface friction angle, δ = 36° (see Attachment B-1)[2]
critical interface adhesion intercept, a = 0 psf
runoff curve number (CN): varies from 91 to 96 - a value of 95 was selected (Attachment B-2)
drainage stud height, T_d = 3.3 mm (see Attachment B-3)

[1] Slope geometry is typically obtained from the final cover system grading plan
[2] For this example, it is assumed that the critical interface is between the CT turf and Super GripNet geomembrane. Interface shear test should be performed between the geomembrane and site-specific subgrade soils to assess the critical interface.

Transmissivity, θ = 3.86 x 10^{-3} m^2/sec (see Attachment B-4)

Precipitation Data [3]

precipitation, *P*= 4.34 in/hour (or 11.02 cm/3600 sec =3.06 x 10^{-3} cm/sec)

Seismic Parameters

The seismic coefficient at the site = 0.05g

Equipment Parameters

Equipment weight	= 8,000 lb
Equipment mass	= 8,000 lb/32.2 ft/sec^2 = 248 lb/ft/sec^2
Equipment velocity	= 10 miles per hour = 14.7 ft/sec
Deceleration time	= 2 sec

CALCULATIONS AND RESULTS

Calculate the hydraulic head on the geomembrane

Step 1 - Calculate the Long-term Transmissivity of the ClosureTurf® Drainage Layer

$$\theta_L = \frac{\theta}{FS_I \text{ x } FS_{Cr} \text{ x } FS_{CC} \text{x } FS_B \text{ x } FS_S}$$

θ_L = long-term transmissivity;
θ = tested transmissivity;
FS_I = reduction factor to account for intrusion;
FS_{Cr} = reduction factor to account for creep;
FS_{CC} = reduction factor to account for chemical clogging;
FS_B = reduction factor to account for biological clogging; and
FS_S = reduction factor to account for clogging due to infiltration of fines.

The reduction factors FS_s of 4.0 was considered to account for potential clogging due to infiltration of fines[4]. The other reduction factors are not considered to be applicable to ClosureTurf and therefore, were assumed to be 1.0.

$$\theta_L = \frac{3.86 \text{ x } 10^{-3}}{1.0 \text{ x } 1.0 \text{ x } 1.0 \text{ x } 1.0 \text{ x } 4.0} = 9.65 \text{ x } 10^{-4} \ m^2/\text{sec} = 9.65 \ cm^2/\text{sec}$$

[3] In the Ohio EPA Procedure, the 100-yr, 1-hr storm was used to calculate the head on the interface for *final slopes* under the saturated static conditions).
[4] The reduction factor of 4.0 is considered for typical soil-geosynthetic cover and is conservative for ClosureTurf as there is no soil layer on top that could clog the internal drainage layer.

Step 2 - Convert the Transmissivity to Hydraulic Conductivity

$$K_d = \frac{\theta_L}{T_d} = \frac{9.65}{0.33} = 29.24\ cm/sec$$

Step 3 – Calculate the Average Hydraulic Head

Check if $P(1\text{-}RC) > K_c$

$$P(1\text{-}RC) = 3.06 \times 10^{-3} \times (1 - 95/100) = 1.53 \times 10^{-4} \text{ cm/sec}$$

This value is less than the permeability of the sand infill, which has a typical permeability in the order of 10^{-2} cm/sec. Therefore, the following equation is used to calculate the hydraulic head:

$$h_{avg} = \frac{P\ (1 - RC)\ \times\ L\ (\cos\beta)}{k_d(\sin\beta)} = \frac{1.53\ \times\ 10^{-4}\ \times\ 6{,}096\ \times\ (\cos 18.43^o)}{29.24\ \times\ (\sin 18.43^o)} = 0.096\ cm$$
$$= 0.038\ in$$

The calculated hydraulic head is less than the thickness of the internal drainage layer (T_d), which is 0.33 cm.

Step 2 – Calculate the static and seismic FS

Depth to water surface, $d_w = z_c - h_{avg} = 0.5 - 0.038 = 0.462$ *inch*

Static Veneer Slope Stability

$$FS_{Static} = \frac{0 + \tan 36^o \left(1 - \frac{62.4\ (0.5 - 0.462)}{115\ \times\ 0.5}\right) - 0}{0 + \tan 18.43^o} = 2.1$$

Seismic Veneer Slope Stability

For veneer stability analysis of ClosureTurf, the seismic coefficient on the top of the landfill should be used. Therefore, the seismic coefficient for the final cover is estimated from Figure E.1 (Attachment B-5). Using the seismic coefficient at the site and assuming 100 ft of waste, the seismic coefficient at the final cover surface is estimated to be 0.10g.

$$FS_{Seismic} = \frac{0 + \tan 36^o \left(1 - \frac{62.4\ (0.5 - 0.462)}{115\ \times 0.5}\right) - 0.10\ \times \tan 18.43^o \times \tan 36^o}{0.10 + \tan 18.43^o} = 1.6$$

Veneer Slope Stability for ClosureTurf with Equipment Load

The following was assumed in the evaluation of slope stability for ClosureTurf with equipment load:

- No hydraulic head (i.e., equipment operation during dry weather)
- No seismic load.

The frictional resistance (F_r) and dynamic equipment load (F_d) are calculated as follows.

$$F_r \approx 8{,}000 \times \cos 18.43^o \times \tan 36^o = 5{,}514 \text{ lb}$$

$$F_d = m \cdot \frac{v}{t} = 248 \times \frac{14.7}{2} = 1{,}823 \text{ lb}$$

Note that the weight of ClosureTurf (less than one percent of the equipment load) was ignored for simplicity. Then FS was calculated as

$$FS_{equip} = \frac{F_a + F_r}{(W_s + W_v) \cdot \sin(\beta) + F_d} = \frac{0 + 5{,}514}{(8{,}000) \times \sin 18.43^o + 1{,}823} = 1.3$$

SUMMARY AND CONCLUSIONS

The factor of safety against veneer stability was calculated for a 3 horizontal to 1 vertical slope, which is a typical slope for a municipal solid waste landfill. The computed factors of safety are equal to or greater than the typical target factors of safety of 1.5, 1.3, and 1.0 for long-term static, temporary static, and seismic conditions, respectively.

It is noted that the approaches presented in this calculation package are for reference purposes. The design engineer may choose other commonly accepted approaches to evaluate the veneer slope stability of ClosureTurf.

REFERENCES

Matasovic, N. (1991). "Selection of Method for Seismic Slope Stability Analysis," Proc. of the 2nd International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics (2), St. Louis, MO, pp. 1057-1062.

Ohio Environmental Protection Agency (OEPA) (2004), "Geotechnical and Stability Analyses for Ohio Waste Containment Facilities", Geotechnical Resource Group, September 14, 2004.

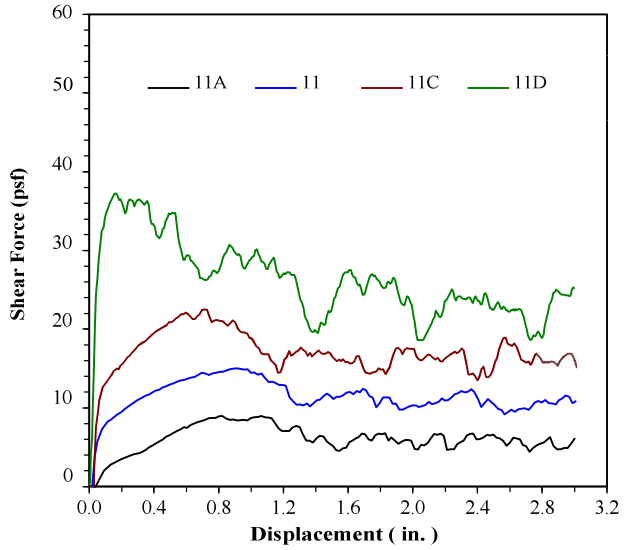
Attachment B-1
ClosureTurf Interface Shear Strength Test Report

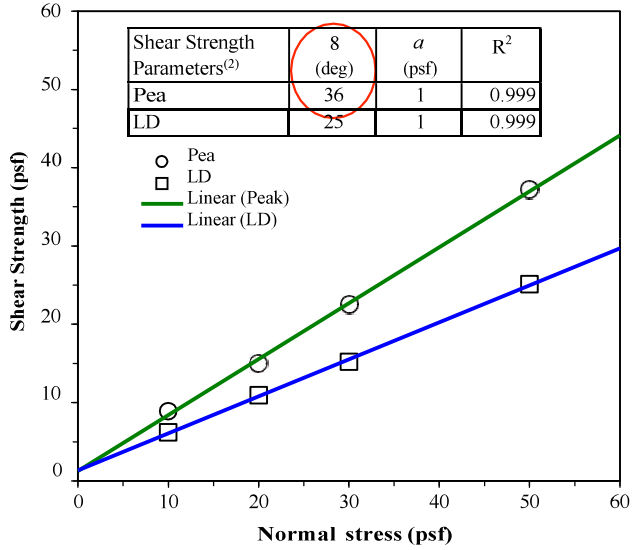
WATERSHED GEOSYNTHETICS LLC

INTERFACE DIRECT SHEAR TESTING (ASTM D 5321)

Upper Shear Box: Concrete sand
CT32 Synthetic Turf with base geotextile side down against
Agru 50-mil Super Gripnet LLDPE geomembrane with stud side up
Lower Shear Box: Concrete sand

Engineered Turf against Super Gripnet
(Note: Super Gripnet and MicroDrain have the same studs.)





Test No.	Shear Box Size (in. x in.)	Normal Stress (psf)	Shear Rate (in./min)	Soaking		Consolidation		Lower Soil			Upper Soil			Soil Shear Strength		Shear Strengths		Failure Mode
				Stress (psf)	Time (hour)	Stress (psf)	Time (hour)	d (pcf)	i (%)	f (%)	d (pcf)	i (%)	f (%)	(deg)	c (psf)	P (psf)	LD (psf)	
11A	12 x 12	10	0.04	10	24	-	-	-	-	-	-	-	-	-	-	8.9	6.2	(1)
11	12 x 12	20	0.04	20	24	-	-	-	-	-	-	-	-	-	-	15.0	10.9	(1)
11C	12 x 12	30	0.04	30	24	-	-	-	-	-	-	-	-	-	-	22.5	15.2	(1)
11D	12 x 12	50	0.04	50	24	-	-	-	-	-	-	-	-	-	-	3 .2	25.1	(1)

NOTES:
(1) Sliding (i.e., shear failure) occurred at the interface between the geotextile side of the turf and the stud side of Agru 50-mil Super Gripnet.
(2) The reported total-stress parameters of friction angle and adhesion were determined from a best-fit line drawn through the test data. Caution should be exercised in using these strength parameters for applications involving normal stresses outside the range of the stresses covered by the test series. The large-displacement (LD) shear strength was calculated using the shear force measured at the end of the test.

DATE OF TEST: 5/28/2019
FIGURE NO. 1
PROJECT NO. SGI19014
DOCUMENT NO.
FILE NO.

SGI TESTING SERVICES, LLC

S19014-011RRRR.ds.xls

Attachment B-2

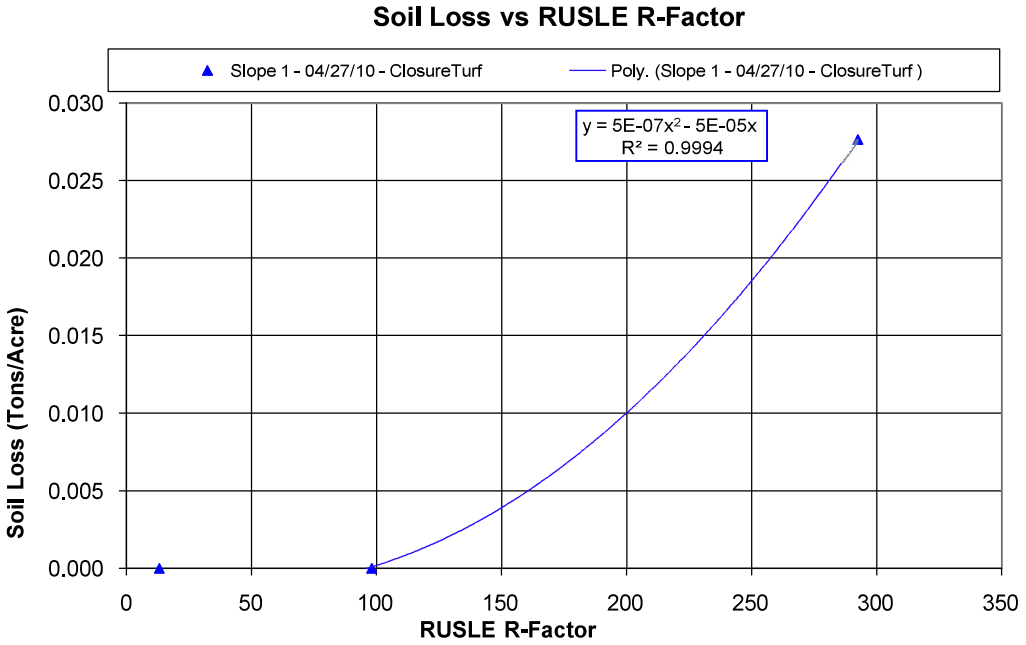
ClosureTurf Rainfall Test Report

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

Project: ASTM D 6459
Client: RPH
Test Date: 4/26/2010
Rainfall Rates: 2,4,6 in/hr (target); 20 minutes at each intensity (60 min. total)
Bed Size & Slope: 8-ft wide x 40-ft long; 3H:1V
Sand Ballast Layer, lbs: 1130 (approximately 1/2-inch thick, hand spread)

Plot	Intensity (in/hr)	Runoff (gallons)	Cumm. R-Factor	Soil Loss (lbs/slope)	Sediment Yield (tons/acre)	% of Ballast in Runoff/Seepage
ClosureTurf	2.36	93	13.13	0.00	0.00	0.04%
	4.65	258	97.99	0.00	0.00	
	6.57	360	292.43	0.41	0.03	

Time (min)	Cumm. Rainfall (in)	Cumm. Runoff (in)	Peak Runoff (cfs)	CN[1]	Rational "C"[2]
20	0.79	0.46	0.013	96.2	0.74
40	2.34	1.76	0.026	94.5	0.76
60	4.53	3.56	0.038	91.3	0.78



1. The effective runoff curve number was determined by solving for S in the equation Q = [(P-0.2S)2/(P+0.8S)] where Q is the depth of runoff (in) and P is the rainfall depth (in). Then, CN = 1000/(S+10).

2. The rational "C" coefficient was determined by solving for C in Q = C I A where Q is the peak discharge rate (cfs), I is the peak rainfall intensity (in/hr) and A is the drainage area (acre).

Note: The testing is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose

CJS 5/5/10
Quality Review / Date

Attachment B-3

ClosureTurf Product Datasheet

ClosureTurf® w 50 mil MicroDrain® Liner

Product Data	Test Method	LLDPE Values	HDPE Values
Thickness (nominal), mil (mm)	ASTM D5994	50 (1.25)	50 (1.25)
Thickness (min. avg.), mil (mm)	ASTM D5994	47.5 (1.19)	47.5 (1.19)
Thickness (lowest indiv.), mil (mm)	ASTM D5994	42.5 (1.06)	42.5 (1.06)
Drainage Stud Height (min. avg.), mil (mm)	ASTM D7466	130 (3.3)	130 (3.3)
MicroDrain® Asperity Height (min. avg.), mil (mm)	ASTM D7466	20 (0.51)	20 (0.51)
Density, g/cc	ASTM D792, Method B	0.939 (max.)	0.94 (min.)
Tensile Properties (avg. both directions)	ASTM D6693, Type IV		
Strength @Yield (min. avg.), lb/in. width (N/mm)		N/A	110 (19.3)
Elongation @ Yield (min. avg.), % (GL=1.3 in.)		N/A	12
Strength@Break (min. avg.), lb./in. width (N/mm)		105 (18.4)	110 (19.3)
Elongation@Break (min. avg.), %(GL=2.0 in.)		300	300
Tear Resistance (min. avg.), lbs. (N)	ASTM D1004	30 (133)	38 (169)
Puncture Resistance (min. avg.) lbs. (N)	ASTM D4833	55 (245)	80 (356)
Carbon Black Content (range %)	ASTM D4218	2-3	2-3
Carbon Black Dispersion (Category)	ASTM D5596	Only near spherical agglomerates for 10 views in Cat. 1 or 2	
Stress Crack Resistance (Single Point NCTL), hours	ASTM D5397, Appendix	N/A	500
Oxidative Induction Time, minutes	ASTM D3895, 200°C, 1 atm O_2	≥140	≥140

Agru America's geomembranes are certified to pass Low Temp. Brittleness via. ASTM D746 (-80°C), and Dimensional Stability via. ASTM D1204 (± 2% @ 100°C)

ENGINEERED TURF COMPONENT (CT)

Product Data	Test Method	Values
Yarn Type	N/A	Polyethylene, Fibrillated
Yarn Color	N/A	Olive Green, Play Green, Tan
Yarn Weight (Total Product Weight)	ASTM D5261 (sample size, 1 yd^2)	≥20 oz. / sq. yd. (32 oz. / sq. yd. + 2 oz.)
Tensile Strength of Yarn	ASTM D2256	15 lbs. min.
CBR Puncture	ASTM D6241	1,500 lb. (MARV)
Tensile Product (MD/XD)	ASTM D4595	2,100 MD / 1,600 XD lb/ft (MARV)
Interface Friction between ClosureTurf CT and MicroDrain®	ASTM D5321	35°, min. Peak
Engineered Turf Fiber UV Stability	ASTM G147	>60% retained tensile strength at 100 yrs. (projected)
Backing System UV Stability (Exposed)	ASTM G154 Modified Cycle 1., UVA340	110 lbs./ft. retained tensile strength at 6,500 hrs (projected)
Aerodynamic Evaluation	GTRI Wind Tunnel	120 mph with max. uplift of 0.12 lb/sf
Rainfall Induced Erosion	ASTM D6459	Infill Loss 0.1% at 6 in./hr. Rainfall
Steady State Hydraulic Overtopping (ClosureTurf® w/ HydroBinder®)	ASTM D7277/D7276	5 ft. overtopping resulting in 29 ft/s velocity and 8.8 psf shear stress for Manning's *n* value of 0.02
Full Scale Wave Overtopping Test Cumulative Volume (ClosureTurf® with HydroBinder®)	Colorado State University Wave Simulator	165,000 ft^3/ft
Full Scale Wave Overtopping Test Discharge (ClosureTurf® with HydroBinder®)	Colorado State University Wave Simulator	4.0 ft^3/s/ft
HydroBinder® Infill Mix	ASTM C387 / ASTM C109	3/4 in. infill 5,000 psi (min. at 28 days)

SUPPLY INFORMATION (Standard Roll Dimensions)

	Thickness		Width		Length		Area (approx.)		Weight (avg.)	
	mil	mm	ft.	m	ft.	m	ft^2	m^2	lbs	kg
MicroDrain®	50	1.25	23	7	500	152	11,500	1,068	~5,000	~2,268
Turf Component	N/A	N/A	15	4.6	300	91.44	4,500	418	~1,000	~454

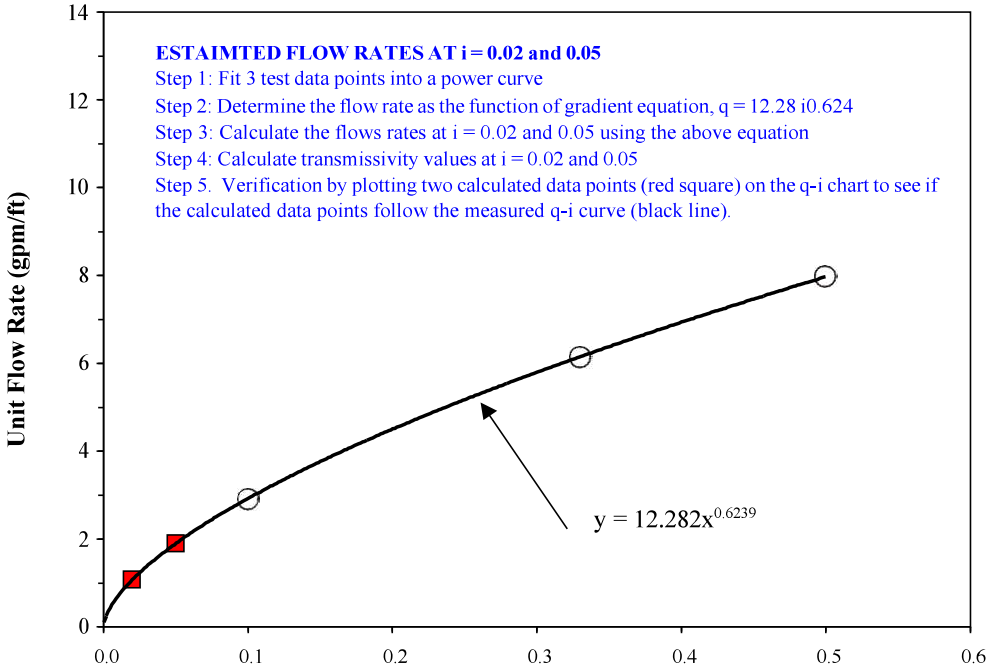
ClosureTurf®/and HydroTurf®/ products (US Patent No. 7,682,105, 8,585,322, 9,163,375, and 9,199,287; Canadian Patent No. 2,663,170; and other Patents Pending) and trademarks are the property of Watershed Geosynthetics LLC. All information, recommendations and suggestions appearing in this literature concerning the use of our products are based upon tests and data believed to be reliable; however, this information should not be used or relied upon for any specific application without independent professional examination and verification of its accuracy, suitability and applicability. Since the actual use by others is beyond our control, no guarantee or warranty of any kind, expressed or implied, is made by Watershed Geosynthetics LLC as to the effects of such use or the results to be obtained, nor does Watershed Geosynthetics LLC assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. Nothing herein is to be construed as permission or as a recommendation to infringe any patent.

Attachment B-4

ClosureTurf Transmissivity Test Report

CLOSURETURF LLC -LANDFILL COVER SYSTEM
HYDRAULIC TRANSMISSIVITY TESTING (ASTM D 4716)

Test Configuration (from Top to Bottom): Sand Layer/Polytex Artificial Grass with Geotextile Side Down/ Agru 50-mil Super Gripnet LLDPE Geomembrane with Studs Side Up



Test No.	Flow Direction	Specimen Size Width x Length (in. x in.)	Total Normal Stress[1] σ_n (psf)	Seating Time t (hour)	Hydraulic Gradient i (-)	Transmissivity $\theta = 0.00020697(q/i)$ (m^2/sec)	Flow Rate $q = 12.28i^{0.624}$ (gpm/ft)	Flow Rate q' (l/min/m)
					0.02	1.11E-02	1.07	
					0.05	7.84E-03	1.89	
1	MD	12 x12	47	0.25	0.10	6.04E-03	2.92	36.3
2	MD	12 x12	47	0.25	0.33	3.86E-03	6.15	76.4
3	MD	12 x12	47	0.25	0.50	3.30E-03	7.97	99.0

NOTE:
Total normal stress = total weight (sand + steel plate + surcharge) divided by the plan area of test specimen (1 square ft). A normal stress of 47 psf is approximately the minimum total stress required to keep the specimen from uplifting.

DATE TESTED:	1/11/2013
FIGURE NO.	A-1
PROJECT NO.	SGI10007
DOCUMENT NO.	
FILE NO.	

SGI TESTING SERVICES, LLC

Attachment B-5

Seismic Hazard Data

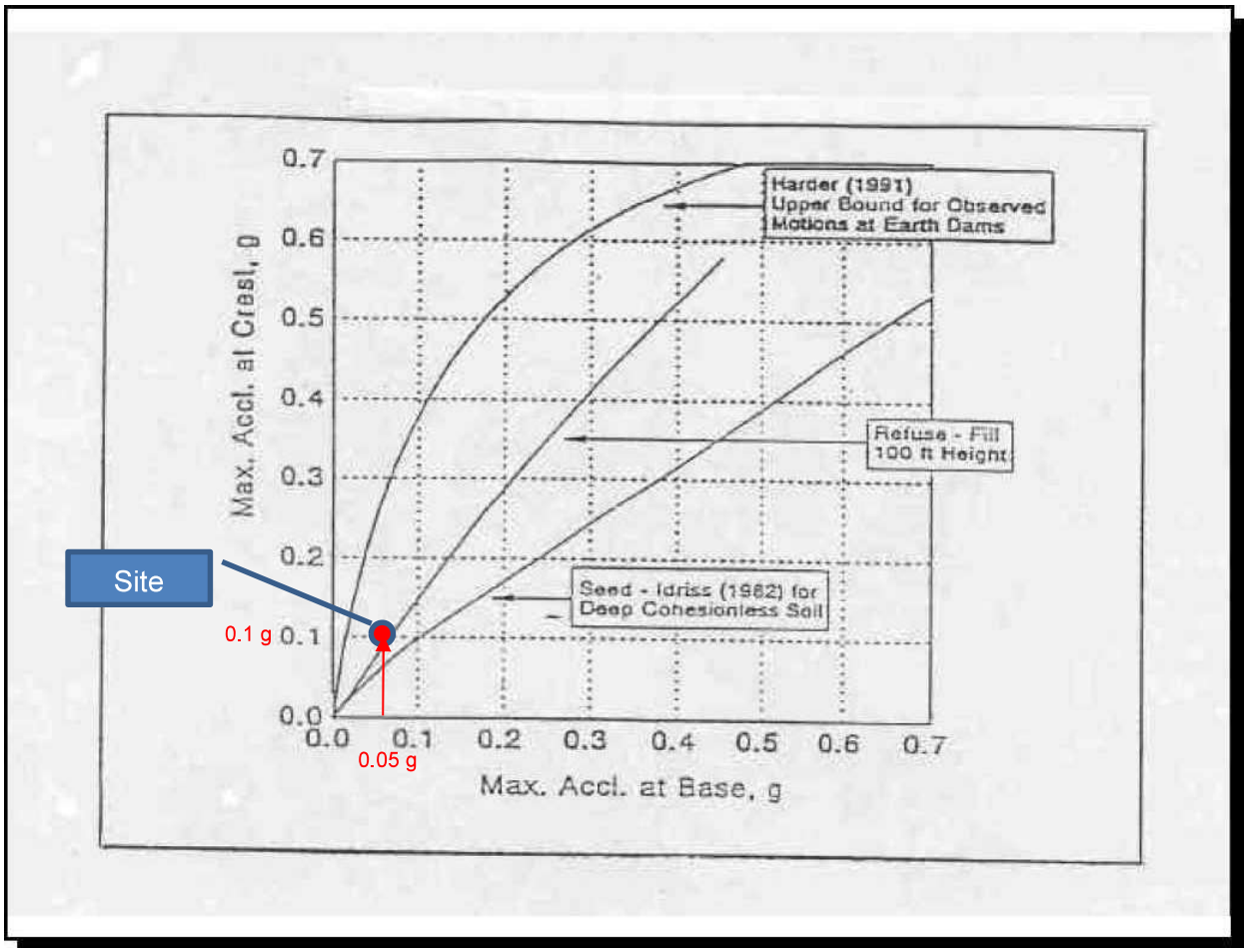


Figure B.1. The relationship between maximum horizontal seismic acceleration at the base and crest of 100 feet of refuse, on top of deep cohesionless soils, and on top of earth dams. (Singh and Sun, 1995)

Appendix C
Example Calculation for Wind Uplift of ClosureTurf

WG WatershedGeo® Unearthing Solutions

Technical Note

WIND UPLIFT ANALYSIS OF CLOSURETURF®

1. Introduction

This technical note presents design methodologies and example calculations for evaluating wind loads on ClosureTurf® final cover system (ClosureTurf). ClosureTurf consists of a structured geomembrane, an engineered turf, and a specified infill (Figure 1).

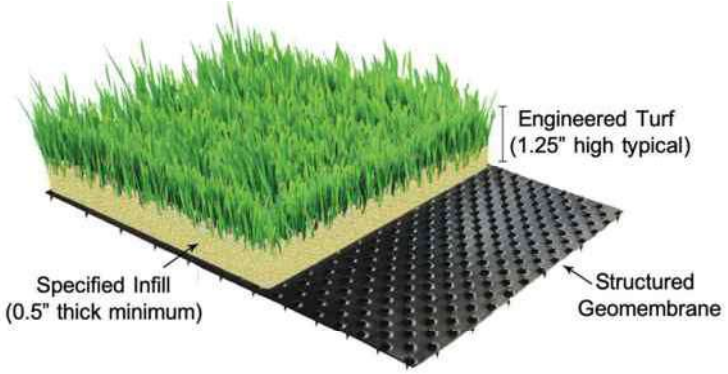


Figure 1. ClosureTurf® Final Cover System

2. Design Methodology

2.1 Wind Pressure Equation

Wind pressure acting on the ClosureTurf surface can be calculated using the following equation (e.g., Dedrick, 1973; Giroud et al., 1995; Wayne and Koerner, 1988; Zheng, et al., 2020; Zhu, et al. 2022):

$$P = \frac{1}{2} \cdot C_p \cdot \rho \cdot U(H)^2 \cdot K_e \cdot K_d$$

where,

P = wind-generated pressure normal to the ClosureTurf surface (pounds per square foot [psf]);

C_p = wind pressure coefficient (dimensionless);

ρ = air density (ρ = 0.0024 slug/cubic foot [ft^3] at 59ºF and sea level);

$U(H)$ = upstream mean wind speed (feet/second [ft/s]) at the height of slope H (feet [ft]);

K_d = wind directionality factor (K_d = 1.1); and

K_e, = ground elevation factor (ASCE, 2022), $K_e = e^{-0.0000362 \cdot Z_e}$, where Z_e is the ground elevation above sea level (ft).

2.2 Design Wind Speed

The design wind speed $U(H)$ at a height of slope H can be estimated from the basic wind speed following the recommendations in ASCE 7-22 (ASCE, 2022). The basic wind speed at locations in the U.S. can be obtained from the online database provided by the ASCE (https://asce7hazardtool.online/). The database can be used to search for wind speed based on location and Mean Recurrence Interval (MRI) or Risk Category. The basic wind speed corresponds to the 3-second gust speed at 32.8 ft (or 10 m) above ground in open terrain, and it is denoted as $U_3(32.8\ ft)$. An example of basic wind speeds for structures located in Atlanta, GA is shown in Figure 2. Basic wind speeds increase as the MRI increases from 10 years (i.e., MRI 10-Year) to approximately 3,000 years for Risk Category IV.

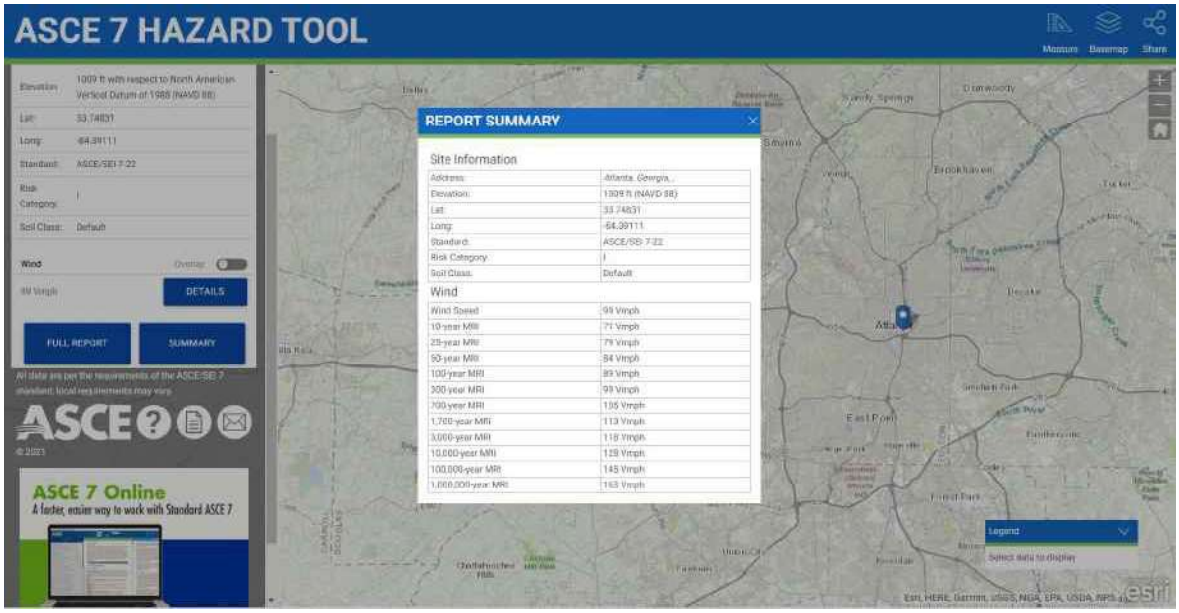


Figure 2. Basic Wind Speeds for Structures Located in Atlanta, GA based on ASCE Database

The professional engineer designing the ClosureTurf should consult with the site owner/operator to select a basic wind speed for design that corresponds to an appropriate MRI, based on any applicable federal, state, or local regulations, industry standards, historical wind records, and the owner/operator's long-term maintenance strategy for the site.

Basic wind speed, which, as previously noted, corresponds to a 3-second gust, can be converted to mean hourly wind speed at 32.8 ft above ground, $U(32.8\ ft)$, using a factor of approximately 1.5 for open terrain (Vickery and Skerlj, 2005):

$$U(32.8\ ft) = U_3(32.8\ ft)\ /\ 1.5$$

Using $U(32.8\ ft)$ as the reference wind speed, the mean hourly wind speed at the top of a landfill, $U(H)$, with H being the height of landfill slope, is calculated using the Power-Law equation for atmospheric boundary layers (Peterson and Hennessey, 1978):

$$\frac{U(H)}{U(32.8\,ft)} = \left(\frac{H}{32.8}\right)^{\alpha}$$

where, α is the Power-Law exponent. A value of 0.14 is used herein based on the wind tunnel test results of ClosureTurf. This exponent corresponds to an open terrain boundary condition. Therefore, the equation above can be re-arranged as follows:

$$U(H) = U(32.8\,ft) \cdot \left(\frac{H}{32.8}\right)^{0.14}$$

2.3 Wind-Pressure Coefficient

Profiles of the wind-pressure coefficient, C_p, developed based on the wind tunnel test results of ClosureTurf are presented in Figures 3 and 4 for landfills with 4H:1V and 3H:1V slopes, respectively. The corresponding C_p values are listed in Tables 1 and 2. Two types of engineered turf were tested, specifically, CT with standard density turf and CT-HD with higher density turf.

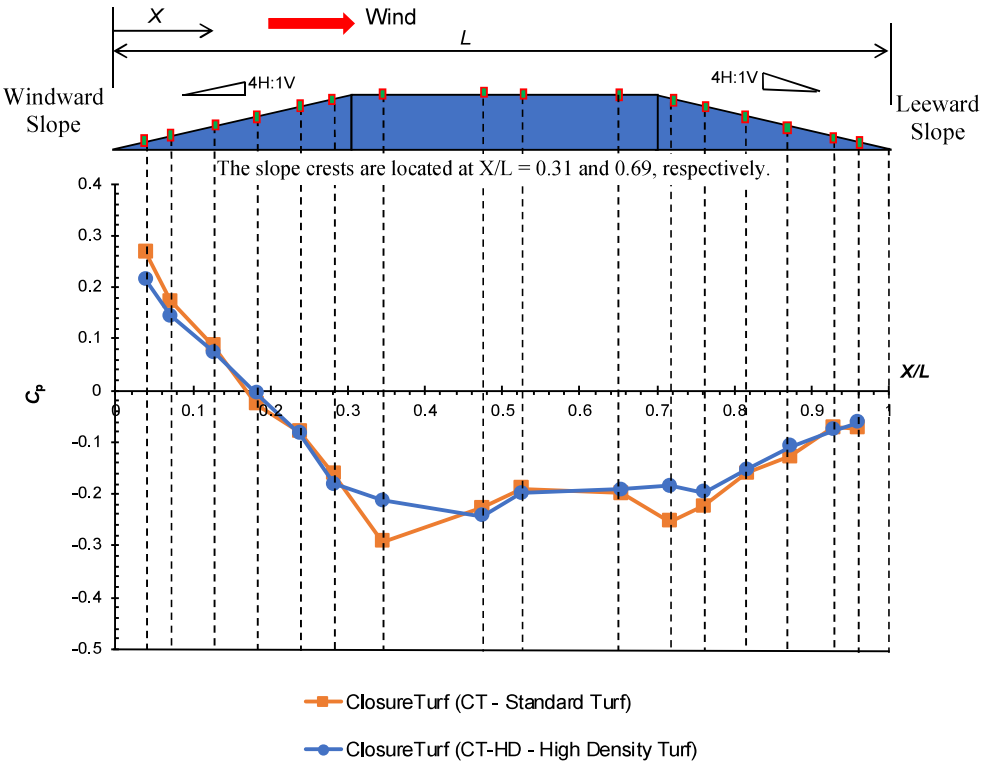


Figure 3. Average Wind-Pressure Coefficient Profiles for ClosureTurf (4H:1V Slopes)

Note: Positive values correspond to wind load acting toward the surface (i.e., downward pressure or compression). Negative values correspond to wind load acting away from the surface (i.e., uplift pressure or suction). This note applies to the other figures and tables of C_p in this Technical Note.

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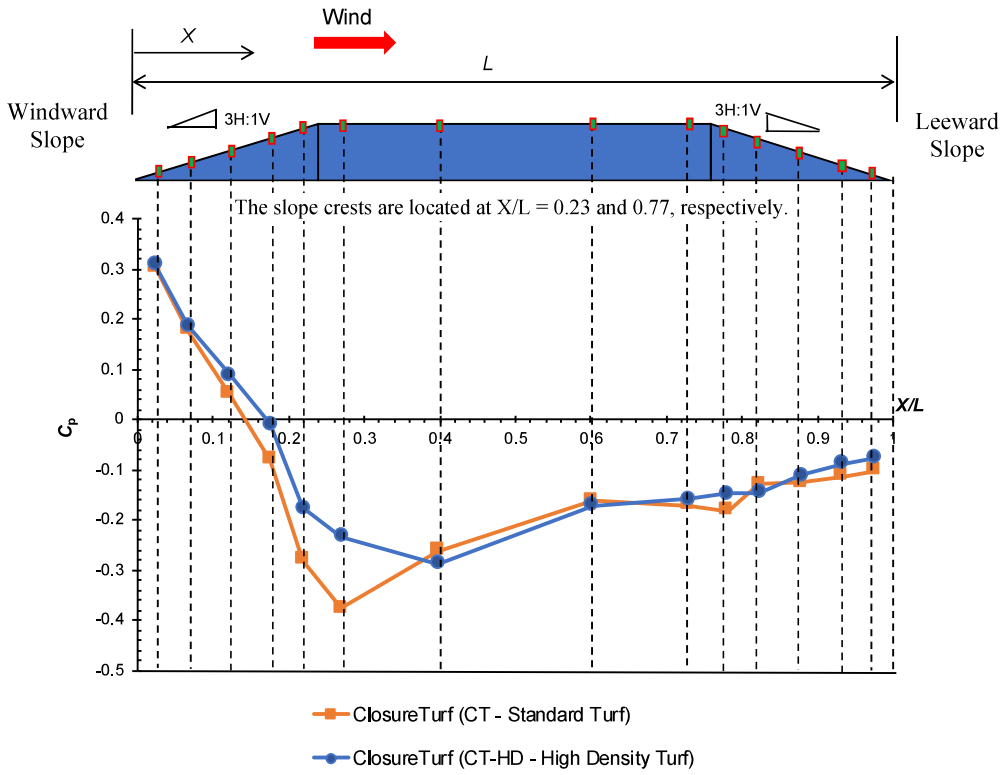

Figure 4. Average Wind-Pressure Coefficient Profiles for ClosureTurf (3H:1V Slopes)

Table 1. Average Wind-Pressure Coefficients for ClosureTurf (4H:1V Slopes)

X/L	Wind Pressure Coefficient, *Cp* (4H:1V Slope)	
	CT (Standard Turf)	CT-HD (High Density Turf)
0.04	0.27	0.22
0.07	0.17	0.15
0.13	0.09	0.08
0.18	-0.03	-0.01
0.24	-0.08	-0.08
0.28	-0.16	-0.18
0.35	-0.29	-0.21
0.47	-0.23	-0.24
0.53	-0.19	-0.20
0.65	-0.20	-0.19
0.72	-0.25	-0.18
0.76	-0.22	-0.20
0.82	-0.16	-0.15
0.87	-0.13	-0.11
0.93	-0.07	-0.08
0.96	-0.07	-0.06

Note: The slope crests are located at X/L = 0.31 and 0.69, respectively.

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Table 2. Average Wind-Pressure Coefficients for ClosureTurf (3H:1V Slopes)

X/L	Wind Pressure Coefficient, Cp (3H:1V Slope)	
	CT (Standard Turf)	CT-HD (High Density Turf)
0.02	0.30	0.31
0.07	0.18	0.19
0.12	0.05	0.09
0.18	-0.08	-0.01
0.22	-0.28	-0.18
0.27	-0.38	-0.23
0.40	-0.26	-0.29
0.60	-0.16	-0.17
0.73	-0.17	-0.16
0.78	-0.18	-0.15
0.82	-0.13	-0.15
0.88	-0.12	-0.11
0.93	-0.11	-0.09
0.98	-0.10	-0.08

Note: The slope crests are located at X/L = 0.23 and 0.77, respectively.

3. ClosureTurf Wind Uplift Analysis Example

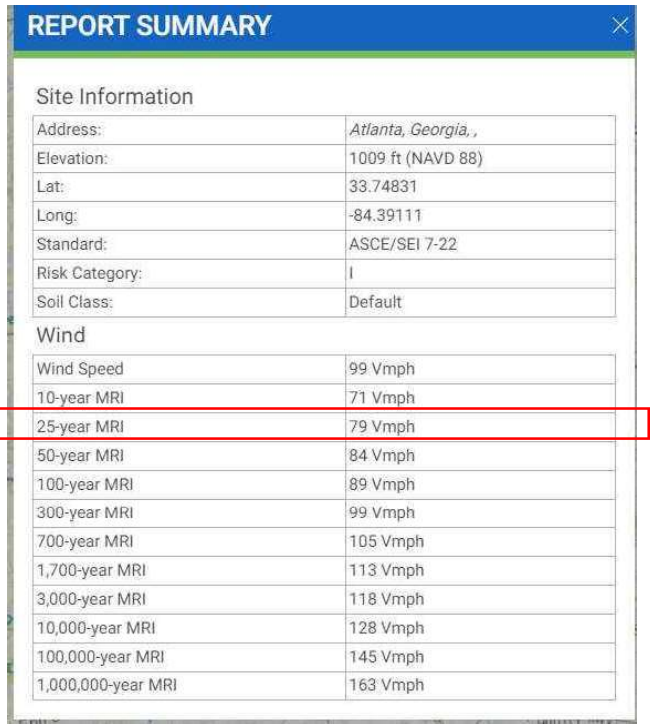
This section provides a wind uplift analysis example of ClosureTurf. For convenience, the C_p values are reported in the example as absolute values and the context of the value (i.e., uplift or compression) in each case is made clear.

Example 1: A hypothetical landfill site is located in Atlanta, GA. It has a slope of 3H:1V with a maximum height of 100 ft. The top deck of the landfill is at El. 1,150 ft above mean sea level. The maximum length of top deck is 200 ft with a maximum slope of 5%. ClosureTurf is selected to close the site with the standard-density engineered turf CT and 50-mil Super Gripnet geomembrane. The specified thickness of sand infill is 0.5 in. minimum, not to exceed 0.75 in. Perform a wind uplift analysis for the proposed ClosureTurf final cover system.

Solution:

Step 1: Select $U_3(32.8\ ft)$ according to ASCE 7-22

Go to https://asce7hazardtool.online/ and search for Atlanta, GA. The results are:



REPORT SUMMARY

Site Information

Address:	*Atlanta, Georgia, ,*
Elevation:	1009 ft (NAVD 88)
Lat:	33.74831
Long:	-84.39111
Standard:	ASCE/SEI 7-22
Risk Category:	I
Soil Class:	Default

Wind

Wind Speed	99 Vmph
10-year MRI	71 Vmph
25-year MRI	79 Vmph
50-year MRI	84 Vmph
100-year MRI	89 Vmph
300-year MRI	99 Vmph
700-year MRI	105 Vmph
1,700-year MRI	113 Vmph
3,000-year MRI	118 Vmph
10,000-year MRI	128 Vmph
100,000-year MRI	145 Vmph
1,000,000-year MRI	163 Vmph

For the purpose of illustrating the wind uplift design methodology, MRI 25-Year (i.e., a 25-year recurrence interval) is used in the example. The basic wind speed for MRI 25-Year is 79 mph (equal to 115.9 ft/s), which corresponds to the 3-second gust speed at 32.8 ft above ground. Therefore, $U_3(32.8\ ft)$ = 79 mph = 115.9 ft/s.

Step 2: Calculate $U(H)$ with H = 100 ft

The mean hourly wind speed for open terrain is:

$$U(32.8\ ft) = \frac{U_3(32.8\ ft)}{1.5} = \frac{115.9}{1.5} = 77.3\ ft/s$$

The mean hourly wind speed at the top of the landfill is:

$$U(H) = U(32.8\ ft) \cdot \left(\frac{H}{32.8\ ft}\right)^{0.14} = 77.3 \times \left(\frac{100}{32.8}\right)^{0.14} = 90.4\ ft/s$$

Therefore, at the height of H = 100 ft, the mean hourly wind speed $U(H)$ = 90.4 ft/s.

Step 3: Select Wind-Pressure Coefficient (C_p) Values

Because the landfill slope is 3H:1V and the engineering turf is the standard turf CT, the C_p profile in Figure 4 (and Table 2) for CT is used for calculation of wind uplift pressure. According to Table 2, the maximum C_p value, $C_{p,max}$, is 0.38 (uplift).

Step 4: Calculate Ground Elevation Factor

$$K_e = e^{-0.0000362 \cdot z_e} = e^{-0.0000362 \times 1150} = 0.959$$

Step 5: Calculate Maximum Wind Uplift Pressure

$$P_{max} = \frac{1}{2} \cdot C_{p,max} \cdot \rho \cdot U(H)^2 \cdot K_e \cdot K_d$$
$$= 0.5 \times 0.38 \times 0.0024 \times 90.4^2 \times 0.959 \times 1.1 = 3.93\, psf$$

The maximum wind uplift is expected to occur on the top deck near the crest of slope.

Step 6: Estimate Self-Weight of ClosureTurf

Using the minimum sand thickness of 0.5 in. and a unit weight of sand of 115 pcf, the calculated self-weight of the sand infill layer is: (0.5/12) x 115 = 4.79 psf. (Note: It has been observed that contractors typically provide more than the minimum amount of sand infill to assure the minimum 0.5 in. sand thickness specification is met. Based on experience, typical final infill thicknesses have been in the range of 0.50 to 0.75 in. Overfill is not considered in the wind load calculation, which provides a degree of conservatism to the analysis.)

According to the ClosureTurf datasheet (see excerpt below), CT turf weighs about 1,000 pounds (lbs) over 4,500 ft^2 and the 50-mil Super Gripnet weighs about 5,000 lbs over 11,500 ft^2. Therefore, the self-weights per unit area of these two materials are, respectively, 1000 lbs/4,500 ft^2 = 0.22 psf (for CT turf) and 5,000 lbs/11,500 ft^2 = 0.43 psf (for 50-mil Super Gripnet).

	Thickness		Width		Length		Area (approx.)		Weight (avg.)	
	mil	mm	ft.	m	ft.	m	ft^2	m^2	lbs	kg
Super Gripnet®	50	1.25	23	7	500	152	11,500	1,068	~5,000	~2,268
Turf Component	N/A	N/A	15	4.6	300	91.44	4,500	418	~1,000	~454

The total self-weight of the ClosureTurf is therefore: 4.79 + 0.22 + 0.43 = 5.44 psf > 3.93 psf.

Step 7: Calculate Factor of Safety against Wind Uplift

The factor of safety (FS) against the initiation of uplift, FS (uplift) is calculated to be 1.38 (i.e., 5.44 psf/3.93 psf).

Due to the combination of small uncertainty in the design parameters, limited consequences of failure, and conservatism in the analysis, a minimum FS in the range of 1.1 to 1.2 is considered adequate for purposes of design. Therefore, the ClosureTurf cover is anticipated to have sufficient resistance against potential initiation of wind uplift for the considered conditions.

4. Remarks

It is suggested that if the design engineer wishes to increase the level of conservatism, it can be achieved by selecting a larger FS or starting the analysis using a more conservative basic wind speed. The final decision on selecting these parameters is the responsibility of the design engineer.

If the calculated maximum wind uplift pressure becomes greater than the self-weight of ClosureTurf, the following design measures can be considered:

1. Tension-strain analysis – A tension-strain analysis can be performed to evaluate whether the wind-induced tension in the ClosureTurf is acceptable. The methodology presented in the technical paper by Giroud et al. (1995) for evaluation of tension and strain in exposed geomembranes due to wind uplift can be used to evaluate ClosureTurf. The design methodology and an analysis example are presented in Attachment C-1 of this Technical Note.
2. Thicker sand infill – The C_p profiles in Figure 3 or Figure 4, depending on the slope, can be used to identify any area (which is likely to be limited to the vicinity of the slope crest) where thicker sand infill is required to provide the necessary ballast. It is suggested, however, that the maximum sand thickness not exceed 1.0 in., since turf fiber height is about 1.25 in. and sand infill close to or above the turf surface is subject to movement by wind.
3. Rock ballast – In some cases a stormwater diversion berm or conveyance ditch on the landfill top deck may be considered for the effect that it has on ballasting the ClosureTurf. The ballasting effect of rock- or gravel-lined swales near the slope crest can also be accounted for in the wind load calculation.
4. Anchor trench – An anchor trench may be considered on the top deck near the slope crest to provide additional resistance to wind load, if necessary. In some cases, the anchor trench may be required for other reasons, for example, phased construction of the final cover system.
5. A combination of the above-mentioned design measures can be considered.

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Attachment C-1
ClosureTurf Wind-Induced Tension-Strain Analysis

A.1. Design Methodology

A published and widely accepted methodology from the technical literature for evaluating wind uplift of exposed geomembranes is adopted herein to evaluate the wind-induced tension of ClosureTurf when uplifted, with modifications made to include the engineered turf component.

The wind-induced "uplift tension-strain relationship" of a geomembrane has been developed by Giroud et al. (1995), which is expressed as:

$$\varepsilon_w = \frac{2T_w}{S_e L} sin^{-1}\left[\frac{S_e L}{2T_w}\right] - 1 \quad \ldots\ldots (1)$$

Where, ε_w is the strain in the geomembrane induced by wind uplift; T_w, lb/ft, is the tension in the geomembrane induced by wind uplift; L, ft, is the length of geomembrane exposed to wind between two anchors (measured along the slope); and S_e is the effective suction, lb/ft^2.

A schematic representation of an uplifted geomembrane used by Giroud et al. (1995) to develop the above governing equation is shown in Figure A-1. Note that the notation T in the figure is changed to T_w in Eq. (1) to indicate the tension induced by wind uplift. The wind-induced uplift is assumed to be 2-dimensional (i.e., plane strain conditions) in order to develop the equation.

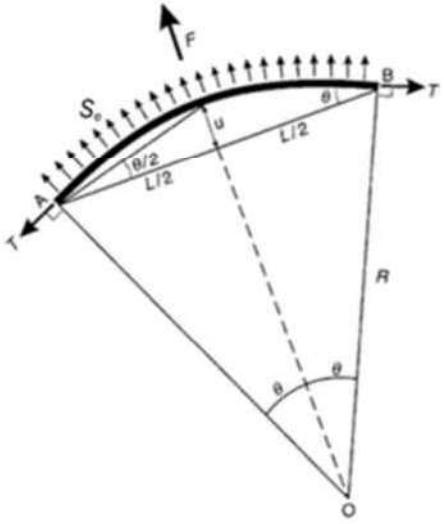

Figure A-1. Schematic Representation of Uplifted Geomembrane (after Giroud et al., 1995)

The effective suction, S_e, is the difference between the wind uplift pressure P, lb/ft^2, and the normal component of the unit weight of geomembrane per unit area W, lb/ft^2 (see Figure A-2):

$$S_e = P - W cos\beta \quad \ldots\ldots (2)$$

where β is the slope angle.

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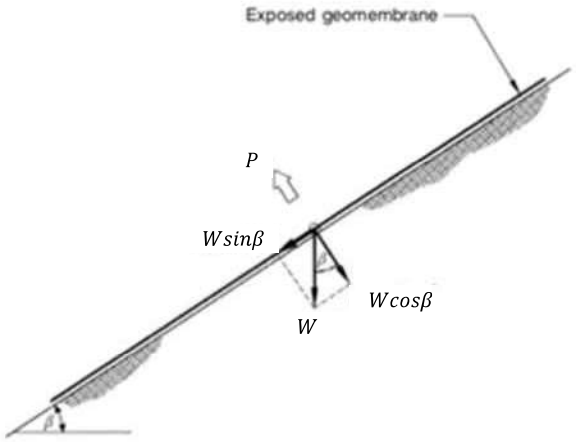

Figure A-2. Geomembrane on a Slope and Subject to Wind-Induced Uplift
(after Zornberg and Giroud, 1997)

Assuming the geomembrane has a linear elastic tension-strain relationship (i.e., the strain is within the range of elastic deformations):

$$T_w = J\varepsilon_w \quad \ldots\ldots (3)$$

where *J*, lb/ft, is the tensile stiffness of geomembrane (i.e., the product of the tensile modulus and thickness).

The "uplift tension-strain relationship" expressed in Eq. (1) can be re-written as:

$$\frac{S_e L}{2J\varepsilon_w} = sin\left[\frac{S_e L}{2J}(1+\frac{1}{\varepsilon_w})\right] \quad \ldots\ldots (4)$$

This equation has no explicit solution and therefore, the calculated wind-induced tensile strain must be determined by iteration. However, Giroud (2009) provided a quasi-exact, explicit solution to the above equation to facilitate calculations:

$$\varepsilon_w = \frac{0.3467\left(\frac{S_e L}{J}\right)^{2/3}}{1-0.3103\left(\frac{S_e L}{J}\right)^{2/3}} \quad \ldots\ldots (5)$$

The difference between the value of strain obtained from the quasi-exact solution and the exact solution is less than 0.01% for strains between 0 and 20% and less than 0.2% for a strain of 40% (Giroud, 2009). Note that the maximum allowable tensile strain for design is in the range of 5 to 15% depending on the type of geomembrane being considered (Peggs, et al., 2005). Typical design tensile strains will be less than these maximum allowable values. Hence the range of tensile strains considered herein is within the range of high accuracy for the quasi-exact solution.

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After the tensile strain is obtained using Eq. (5), the tension in the uplifted geomembrane can be calculated using Eq. (3). The factor of safety (FS) against yield of the geomembrane, FS_y, is calculated using the tension at yield divided by the tension in the uplifted geomembrane:

$$FS_y = \frac{T_y}{T_w} \ldots\ldots (6)$$

where T_y, lb/ft, is the tension at yield, which can be found in the geomembrane product data sheet provided by the manufacturer. Note that the tension at yield approximately defines the limit of elastic behavior of the geomembrane.

During wind tunnel testing conducted on ClosureTurf, it was observed that the engineered turf and underlying geomembrane were lifted together due to wind loads (in other words, they did not separate). For purposes of the tension analysis, it is assumed that the engineered turf has the same elongation and hence, the same tensile strain as the geomembrane. Tension in the engineered turf can be calculated using Eq. (3) with the tensile stiffness for the engineered turf. Similar to the geomembrane, the FS against yield of the engineered turf can be calculated using Eq. (6) with the tension at yield for the engineered turf.

An example calculation is presented in the section below to illustrate the analysis procedure and use of the above equations.

A.2. Wind Uplift and Tension-Strain Analysis Example:

Problem: A hypothetical landfill site is located in Pensacola, FL. It has a side slope of 3H:1V with a maximum vertical height of 100 ft. The top deck of the landfill is at El. 200 ft above mean sea level. The maximum length of top deck is 200 ft with a maximum slope of 5%. ClosureTurf is selected as the final cover to close the site that consists of the standard-density engineered turf CT and 50-mil LLDPE Super Gripnet geomembrane. The specified thickness of sand infill is 0.5 in. minimum, not to exceed 0.75 in. Perform a wind uplift analysis for the proposed ClosureTurf final cover system.

Solution:

Part 1 – Calculate Maximum Wind Uplift Pressure

Step 1: Select basic wind speed according to ASCE 7-22

The basic wind speed, $U_3(32.8\,ft)$, corresponds to the 3-second gust speed at 32.8 ft above ground. It can be obtained from the online database: https://asce7hazardtool.online/. Using this database and searching for Pensacola, FL, the results are shown in the figure below. For the purposes of illustrating the tension-strain analysis presented in the second part of the example, the basic wind speed for Mean Return Interval (MRI) 50-Year is selected, which is 110 mph. Therefore, $U_3(32.8\,ft)$ = 110 mph = 161.3 ft/s.

REPORT SUMMARY

Site Information

Address:	Pensacola, Florida, ,
Elevation:	63 ft (NAVD 88)
Lat:	30.42099
Long:	-87.21726
Standard:	ASCE/SEI 7-22
Risk Category:	I
Soil Class:	Default

Wind

Wind Speed	142 Vmph
10-year MRI	80 Vmph
25-year MRI	98 Vmph
50-year MRI	110 Vmph
100-year MRI	129 Vmph
300-year MRI	142 Vmph
700-year MRI	157 Vmph
1,700-year MRI	171 Vmph
3,000-year MRI	180 Vmph
10,000-year MRI	190 Vmph
100,000-year MRI	217 Vmph
1,000,000-year MRI	241 Vmph

Figure A-3. Selection of Basic Wind Speed According to ASCE 7-22

Step 2: Calculate mean hourly wind speed at top of landfill

The mean hourly wind speed that corresponds to the selected basic wind speed is:

$$U(32.8\ ft) = \frac{U_3(32.8\ ft)}{1.5} = \frac{161.3}{1.5} = 107.5\ ft/s$$

The mean hourly wind speed at the top of the landfill (i.e., H = 100 ft) is:

$$U(H) = U(32.8\ ft) \cdot \left(\frac{H}{32.8\ ft}\right)^{0.14} = 107.5 \times \left(\frac{100}{32.8}\right)^{0.14} = 125.7\ ft/s$$

Therefore, at a height of H = 100 ft, the mean hourly wind speed $U(H)$ = 125.7 ft/s.

Step 3: Select maximum wind pressure coefficient value

Because the landfill slope is 3H:1V and the engineering turf is the standard turf CT, the C_p profile in Figure 4 (and Table 2) for CT, as presented in Section 2.3 of this Technical Note, is used for calculation of wind uplift pressure. According to Table 2, the maximum C_p value, $C_{p,max}$, is 0.38 (uplift). Note that for convenience, the C_p value is reported as an absolute value and the context of the value (i.e., uplift) is made clear.

Step 4: Calculate maximum wind uplift pressure

The maximum wind uplift is expected to occur on the top deck near the crest of slope.

$$P_{max} = \frac{1}{2} \cdot C_{p,max} \cdot \rho \cdot U(H)^2 \cdot K_e \cdot K_d$$

The ground elevation factor corresponding to El. 200 ft is calculated as:

$$K_e = e^{-0.0000362 \cdot Z_e} = e^{-0.0000362 \times 200} = 0.993$$

The wind directionality factor, K_d, is selected as 1.1.

The maximum wind uplift pressure is calculated as:

$$P_{max} = 0.5 \times 0.38 \times 0.0024 \times 125.7^2 \times 0.993 \times 1.1 = 7.87\ psf$$

Step 5: Estimate self-weight of ClosureTurf

Using the minimum sand thickness of 0.5 in. and a unit weight of sand of 115 pcf, the calculated self-weight of the sand infill layer is: (0.5/12) x 115 = 4.79 psf. (Note: It has been observed that contractors typically provide more than the minimum amount of sand infill to assure the minimum 0.5 in. sand thickness specification is met. Based on experience, typical final infill thicknesses have been in the range of 0.50 to 0.75 in. Overfill is not considered in the wind load calculation, which provides a degree of conservatism to the analysis.)

According to the ClosureTurf datasheet (see Table A-1), CT turf weighs about 1,000 lbs over 4,500 ft^2 and the 50-mil Super Gripnet weighs about 5,000 lbs over 11,500 ft^2. Therefore, the self-weights per unit area of these two materials are, respectively, 1000 lbs/4,500 ft^2 = 0.22 psf (for CT turf) and 5,000 lbs/11,500 ft^2 = 0.43 psf (for 50-mil Super Gripnet).

Table A-1. Dimensions and Weights of ClosureTurf Components

	Thickness		Width		Length		Area (approx.)		Weight (avg.)	
	mil	mm	ft.	m	ft.	m	ft^2	m^2	lbs	kg
Super Gripnet®	50	1.25	23	7	500	152	11,500	1,068	~5,000	~2,268
Turf Component	N/A	N/A	15	4.6	300	91.44	4,500	418	~1,000	~454

The total self-weight of the ClosureTurf is therefore: W = 4.79 + 0.22 + 0.43 = 5.44 psf .

Step 6: Calculate factor of safety against wind uplift

The factor of safety (FS) against the initiation of uplift, *FS (uplift)* is calculated to be:

$$FS\ (uplift) = W/P_{max} = 5.44/7.87 = 0.69$$

The calculated FS is less than 1.0; therefore, the ClosureTurf cover is anticipated to experience wind uplift under the selected basic wind speed. A tension-strain analysis is performed next.

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Part 2 – Tension-Strain Analysis

Step 7: Back-calculate critical wind pressure coefficient

The critical wind pressure coefficient (i.e., the wind pressure coefficient required to just initiate uplift at the design wind speed), C_p', is back-calculated for the condition where the maximum wind uplift pressure, P'_{max}, equals the self-weight of ClosureTurf:

$$W = P'_{max} = \frac{1}{2} \cdot C_p' \cdot \rho \cdot U(H)^2 \cdot K_d \cdot K_e$$

$$C_p' = \frac{2W}{\rho \cdot U(H)^2 \cdot K_d \cdot K_e} = \frac{2 \times 5.44}{0.0024 \times 125.7^2 \times 0.993 \times 1.1} = 0.26 \text{ (uplift)}$$

Step 8: Identify area subject to wind uplift (i.e., "uplifted zone")

The line representing the critical wind pressure coefficient intercepts the wind pressure coefficient profile for the standard-density turf at X/L of approximately 0.21 and 0.42, respectively, as shown in the figure below.

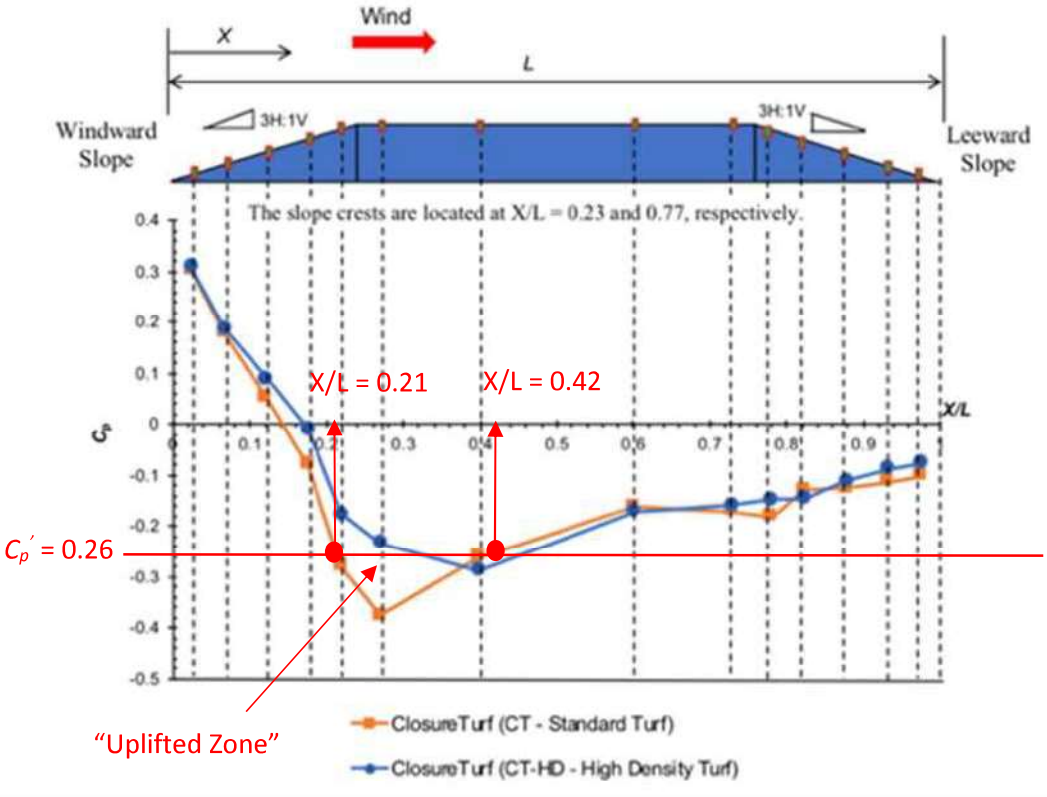

Figure A-4. Wind Pressure Coefficient Profile for 3H:1V Slopes

The area below the critical coefficient line (i.e., X/L between 0.21 and 0.42) is considered to be

the "uplifted zone", where the wind-induced uplift pressure exceeds the self-weight of ClosureTurf and therefore, ClosureTurf is expected to be lifted. The remaining area is not expected to experience uplift because the uplift pressure induced by wind is less than the self-weight of ClosureTurf.

Step 9: Calculate average wind pressure coefficient in the "uplifted zone"

By simplifying the wind pressure profile of the "uplifted zone" as a triangle, the average wind coefficient in this zone can be estimated as:

$$\overline{C_p} = C_p' + \frac{1}{2}\left(C_{p,max} - C_p'\right) = 0.26 + \frac{1}{2}(0.38 - 0.26) = 0.32 \text{ (uplift)}$$

Step 10: Calculate average wind uplift pressure in "uplifted zone"

It is noted that the maximum C_p is used in Step 4 to evaluate the initiation of wind uplift. In contrast, the average C_p is used in this step to estimate the average wind uplift pressure in the "uplifted zone" and the average tensile strains in ClosureTurf in the subsequent steps.

The average wind uplift pressure in the "uplifted zone" is calculated as:

$$\bar{P} = \frac{1}{2} \cdot \overline{C_p} \cdot \rho \cdot U(H)^2 \cdot K_e \cdot K_d = 0.5 \times 0.32 \times 0.0024 \times 125.7^2 \times 0.993 \times 1.10 = 6.63\ psf$$

Step 11: Calculate normal component of average wind uplift pressure in "uplifted zone"

A majority of the "uplifted zone" is located on the top deck (i.e., X/L between 0.42 and 0.23 [crest]) and a small portion is located on the windward slope (i.e., X/L between 0.21 and 0.23[crest]). The slope of top deck is 5% (or β_{top} = 2.9 degrees) and the slope of the sideslope is 3H:1V (or β_{side} = 18.4 degrees). The weighted average of the normal component of the unit weight of ClosureTurf (see Figure A-2) in the "uplifted zone" is calculated as:

$$\overline{W cos\beta} = \frac{W cos 2.9^{\circ} \times (0.42 - 0.23) + W cos 18.4^{\circ} \times (0.23 - 0.21)}{0.42 - 0.21} = 0.994W$$

Because a majority of the "uplifted zone" is on the top deck, the normal component of the unit weight of ClosureTurf is very close to the total unit weight.

Step 12: Calculate effective suction

To account for a target wind resistance FS of 1.1, as discussed at the end of Section 3 of this Technical Note, the reduced unit weight of ClosureTurf (i.e., W/1.1) is used to calculate the effective suction, S_e, in the "uplifted zone":

$$S_e = \bar{P} - \frac{\overline{W cos\beta}}{1.1} = \bar{P} - \frac{0.994W}{1.1} = 6.63 - \frac{0.994 \times 5.44}{1.1} = 1.71\ psf$$

Step 13: Calculate slope distance of "uplifted zone"

Based on the site geometry, the total horizontal distance at the base of the landfill is:

$$L_{landfill} = 2 \times (3 \times 100) + 200 = 800\ ft$$

The horizontal distance of the "uplifted zone" on the windward slope is: (0.23 – 0.21) x 800 ft = 16 ft. The horizontal distance of the "uplifted zone" on the top deck is: (0.42 – 0.23) x 800 ft = 152 ft.

The slope distance on the windward slope is: 16/cos18.4° = 16.9 ft. The slope distance on the top deck is: 152/cos2.9° = 152.2 ft.

The total slope distance of the "uplifted zone", *L*, is: 16.9 + 152.2 = 169.1 ft.

Step 14: Calculate ClosureTurf tensile stiffness

Assuming linear elastic deformation, the tension-strain relationship is expressed as:

$$T_w = J\varepsilon_w$$

ClosureTurf consists of the geomembrane and engineered turf components. The wind-induced tension in the ClosureTurf system is the sum of the tension in these two components:

$$T_w = T_{w,GM} + T_{w,ET} = J_{GM}\varepsilon_{w,GM} + J_{ET}\varepsilon_{w,ET}$$

where, GM denotes the geomembrane component and ET denotes the engineered turf component. Based on observations during wind tunnel testing showing that the engineered turf and underlying geomembrane were lifted together, it is assumed that the engineered turf and geomembrane have the same elongation and hence, the same tensile strain:

$$\varepsilon_{w,GM} = \varepsilon_{w,ET} = \varepsilon_w$$

Hence,

$$T_w = J_{GM}\varepsilon_{w,GM} + J_{ET}\varepsilon_{w,ET} = (J_{GM} + J_{ET})\varepsilon_w$$

Therefore, the total stiffness of ClosureTurf is:

$$J = J_{GM} + J_{ET}$$

Given that only 2-dimensional wind uplift is considered herein and the wind-uplift loading is short term, wide width tensile test results are considered appropriate for wind-uplift design. The wide width tensile testing according to ASTM D4885 was conducted on samples of the structured geomembranes of ClosureTurf (i.e., MicroSpike®, MicroDrain®, and Super Gripnet®). The results of this test program are summarized in Table A-2. Examples of the test results are included in Attachment C-2.

Table A-2. Wide Width Tensile Properties of Structured Geomembranes of ClosureTurf

Structured Geomembrane			Stiffness (lb/in)	Yield Strength (lb/in)	Yield Strain (%)	Maximum Strength (lb/in)	Elongation at Break (%)
HDPE	40-mil MicroSpike®	MD	2,681	100.8	15.9	105.7	485.9
		XD	3,059	108.6	10.6	108.6	413.1
	50-mil MicroDrain®	MD	2,739	124.3	29.8	147.4	393.6
		XD	4,053	146.3	10.9	146.3	458.2
	50-mil Super Gripnet®	MD	3,189	152.6	41.4	191.1	414.8
		XD	4,002	161.9	10.3	161.9	404.5
LLDPE	40-mil MicroSpike®	MD	1,193	69.7	22.5	80.2	476.9
		XD	1,391	69.9	17.8	74.2	487.6
	50-mil MicroDrain®	MD	1,972	106.4	24.8	130.2	466.4
		XD	2,192	110.1	14.3	119.2	483.2
	50-mil Super Gripnet®	MD	1,576	89.3	36.5	119.6	446.7
		XD	2,096	98.1	15.2	113.4	487.4

Notes: (1) MD = Machine Direction; XD = Cross-Machine Direction; (2) The stiffness values are the mean values of "Initial Tangent Modulus (lbs/in)" in the test reports.

Based on the wide width tensile test results, the stiffness values for the 50-mil HDPE and LLDPE Super Gripnet geomembranes are:

- For 50-mil HDPE Super Gripnet:
  - Machine Direction: $J_{GM,\ 50\text{-}mil\ HDPE\ SG,\ MD}$ = 3198 lb/in = 3.8×10^4 lb/ft
  - Cross-Machine Direction: $J_{GM,\ 50\text{-}mil\ HDPE\ SG,\ XD}$ = 4002 lb/in = 4.8×10^4 lb/ft

- For 50-mil LLDPE Super Gripnet:
  - Machine Direction: $J_{GM,\ 50\text{-}mil\ LLDPE\ SG,\ MD}$ = 1576 lb/in = 1.9×10^4 lb/ft
  - Cross-Machine Direction: $J_{GM,\ 50\text{-}mil\ LLDPE\ SG,\ XD}$ = 2096 lb/in = 2.5×10^4 lb/ft

The wide width tensile testing was also conducted on the standard-density engineered turf (see Attachment C-3). The average peak tensile strength was reported as 3,633 lb/ft at 28.2% strain on MD and 2,300 lb/ft at 9.8% strain on XD. The tension-strain curve before the peak is approximately linear. Therefore, the stiffness of the standard engineered turf is calculated as:

$$J_{ET,\ MD} = 3633 \text{ lb/ft} / 0.282 = 1.3 \times 10^4 \text{ lb/ft}$$

$$J_{ET,\,XD} = 2300 \text{ lb/ft} / 0.098 = 2.3\text{x}10^4 \text{ lb/ft}$$

For the hypothetical project in this example, the 50-mil LLDPE geomembrane and standard-density engineered turf are considered. Since during panel layout the machine direction of the engineered turf usually aligns with the machine direction of the engineered turf, the total stiffness of ClosureTurf is calculated as follows:

- $J = J_{GM,50-mil\ LLDPE\ SG,MD} + J_{ET,MD} = 1.9 \times 10^4 + 1.3 \times 10^4 = 3.2 \times 10^4$, along MD of engineered turf and structured geomembrane
- $J = J_{GM,50-mi\ \ LLDPE\ SG,XD} + J_{ET,XD} = 2.5 \times 10^4 + 2.3 \times 10^4 = 4.8 \times 10^4$, along XD of engineered turf and structured geomembrane

Step 15: Calculate tensile strain in ClosureTurf

The tensile strain in ClosureTurf is calculated along both the MD and XD of the engineered turf and structured geomembrane, as tension may be induced in either direction depending on the panel layout and wind direction.

The strain in ClosureTurf along the MD of the engineered turf and structured geomembrane is calculated as:

$$\varepsilon_{w,MD} = \frac{0.3467\left(\frac{S_e L}{J}\right)^{2/3}}{1 - 0.3103\left(\frac{S_e L}{J}\right)^{2/3}} = \frac{0.3467\left(\frac{1.71 \times 169.1}{3.2 \times 10^4}\right)^{2/3}}{1 - 0.3103\left(\frac{1.71 \times 169.1}{3.2 \times 10^4}\right)^{2/3}} = 0.015 = 1.5\%$$

The strain in ClosureTurf along the XD of the engineered turf and structured geomembrane is calculated as:

$$\varepsilon_{w,XD} = \frac{0.3467\left(\frac{S_e L}{J}\right)^{2/3}}{1 - 0.3103\left(\frac{S_e L}{J}\right)^{2/3}} = \frac{0.3467\left(\frac{1.71 \times 169.1}{4.8 \times 10^4}\right)^{2/3}}{1 - 0.3103\left(\frac{1.71 \times 169.1}{4.8 \times 10^4}\right)^{2/3}} = 0.012 = 1.2\%$$

The calculated tensile strain values are significantly less than the tensile strain at yield of the 50-mil LLDPE Super Gripnet in either MD (i.e., 36.5%) or XD (i.e., 15.2%) (see Table A-2). These values are also significantly less than the tensile strain at yield in either MD (i.e., 28.2%) or XD (i.e., 9.8%) of the engineered turf. The calculated tensile strain values indicate that both the geomembrane and engineered turf are within the range of elastic deformations.

Step 16: Calculate tension in ClosureTurf

The tension in ClosureTurf along the MD of the engineered turf and structured geomembrane is calculated as:

$$T_{w,GM,MD} = 1.9 \times 10^4 \times 0.015 = 285\ lb/ft \text{ (Geomembrane)}$$

$$T_{w,ET,MD} = 1.3 \times 10^4 \times 0.015 = 195\ lb/ft \text{ (Engineered Turf)}$$

The total tension along MD is: $T_{w,MD} = 285 + 195 = 480\ lb/ft$

The tension in ClosureTurf along the XD of the engineered turf is calculated as:

$$T_{w,GM,XD} = 2.5 \times 10^4 \times 0.012 = 300\ lb/ft \text{ (Geomembrane)}$$

$$T_{w,ET,XD} = 2.3 \times 10^4 \times 0.012 = 276\ lb/ft \text{ (Engineered Turf)}$$

The total tension along XD is: $T_{w,XD} = 300 + 276 = 576\ lb/ft$

Step 17: Calculate factor of safety (FS) against yield

For the 50-mil LLDPE Super Gripnet geomembrane, the wide width tensile strength at yield is 89.3 lb/in (or 1,072 lb/ft) in the MD and 98.1 lb/in (or 1,177 lb/ft) in the XD, as presented in Table A-2. The FS against yield is calculated as:

$$FS_{y,GM} = \frac{T_y}{T_w} = \frac{1072}{285} = 3.8 \text{ (MD)}$$

$$FS_{y,GM} = \frac{T_y}{T_w} = \frac{1177}{300} = 3.9 \text{ (XD)}$$

For the standard-density engineered turf, the wide width tensile strength at yield is 3,633 lb/ft (MD) and 2,300 lb/ft (XD). The FS against yield is calculated as:

$$FS_{y,ET} = \frac{T_y}{T_w} = \frac{3633}{195} = 18.6\ (MD)$$

$$FS_{y,ET} = \frac{T_y}{T_w} = \frac{2300}{276} = 8.3\ (XD)$$

A minimum acceptable FS of 2.0 is selected in this example to incorporate both a global FS of 1.5 and possible minor reductions in ClosureTurf stiffness due to construction-related and long-term exposure-related effects. The above calculated FSs against yield of the geomembrane and engineered turf are greater than the minimum acceptable FS. Therefore, tensile yield of the geomembrane and engineered turf components of ClosureTurf in the "uplifted zone" due to

wind-induced loads should not occur. The ClosureTurf located outside the "uplifted zone" is not expected to experience uplift based on the analysis results. In addition, the ClosureTurf final cover system is required to be terminated in an anchor trench along the perimeter of the landfill, providing additional wind uplift resistance in areas proximal to the anchor trench.

Based on the analysis results for the hypothetical example landfill, wind uplift in a local area near the landfill slope crest is expected under the selected design wind speed; however, no damage to the engineered turf or underlying structured geomembrane is anticipated due to the wind-induced loads. The ClosureTurf final cover system at this hypothetical landfill site is judged to have an adequate FS against tensile yield due to wind uplift.

Attachment C-2

Examples of Wide Width Tensile Test Results
of Structured Geomembranes of ClosureTurf

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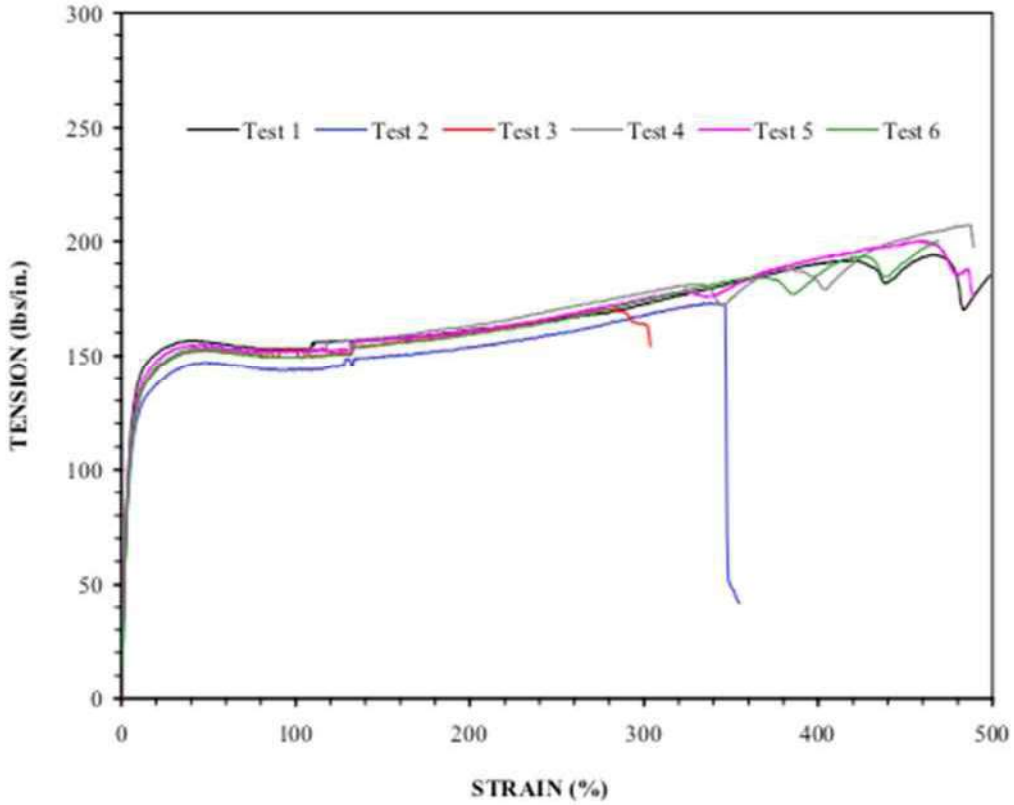
WATERSHED GEOSYNTHETICS LLC
WIDE-WIDTH TENSILE TESTING OF GEOMEMBRANE (ASTM D 4885)
Agru 50-mil HDPE Super Gripnet Geomembarne # GTA 0068830036 in MD
SGI Lab Sample ID: S23273



Test No.	Initial Tangent Modulus (lbs/in)	Tension at 5% (lbs/in)	Tension at 10% (lbs/in)	Yield Strength (lbs/in)	Yield Strain (%)	Max Strength (lbs/in)	Elongation at Breaking (%)
1	3004	112.1	139.1	156.7	37.2	194.1	464.2
2	3125	100.2	124.7	146.9	46.4	173.0	334.4
3	3251	106.0	130.7	151.8	43.0	170.0	271.3
4	3045	103.8	129.7	153.2	39.5	206.9	483.0
5	3501	109.5	134.2	154.7	38.8	200.0	456.1
6	3207	106.2	131.2	152.3	43.5	202.6	479.9
Mean	3189	106.3	131.6	152.6	41.4	191.1	414.8
STD	179	4.2	4.8	3.3	3.5	15.8	89.5

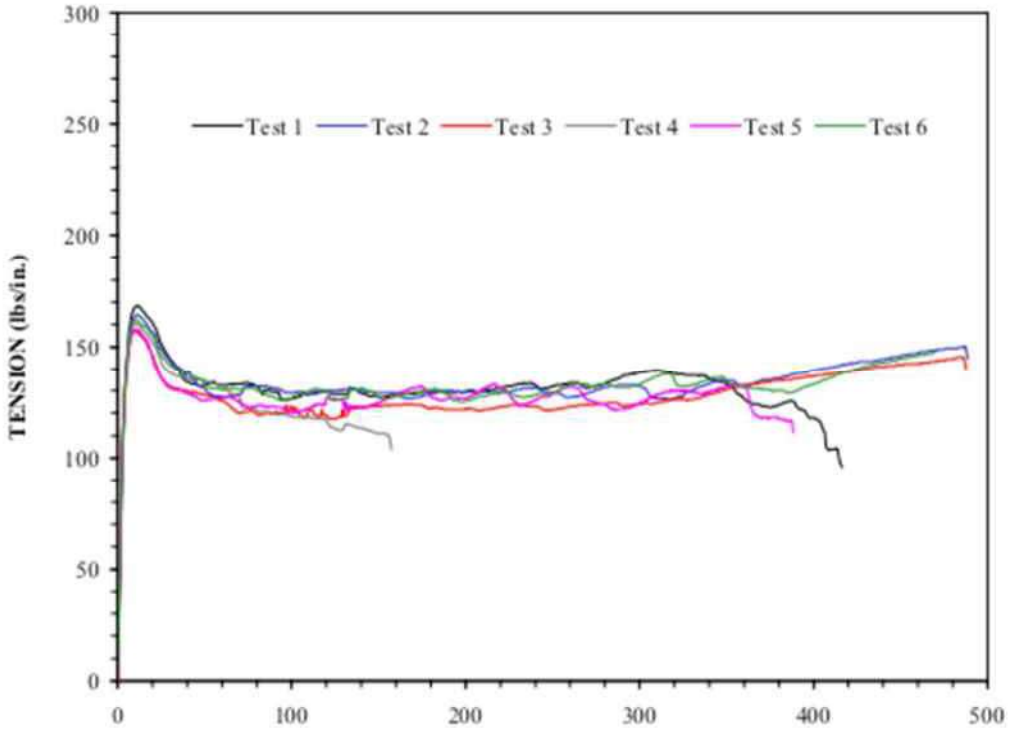
NOTES:

Clamp:	Curtis Sure Grip with cushion
Specimen Width (in.):	8.0
Specimen Length (in.):	8.0
Gage Length (in.)	4.0
Strain Rate (% per minute):	10

SGI TESTING SERVICES, LLC

DATE OF REPORT:	11/3/2021
FIGURE NO.	9
PROJECT NO.	SGI21014
DOCUMENT NO.	
FILE NO.	

WATERSHED GEOSYNTHETICS LLC
WIDE-WIDTH TENSILE TESTING OF GEOMEMBRANE (ASTM D 4885)
Agru 50-mil HDPE Super Gripnet Geomembarne # GTA 0068830036 in XD
SGI Lab Sample ID: S23273



Test No.	Initial Tangent Modulus (lbs/in)	Tension at 5% (lbs/in)	Tension at 10% (lbs/in)	Yield Strength (lbs/in)	Yield Strain (%)	Max Strength (lbs/in)	Elongation at Breaking (%)
1	3855	140.5	167.8	168.6	11.3	168.6	416.2
2	3779	139.3	163.8	164.6	10.9	164.6	488.5
3	4218	138.6	157.2	157.2	9.4	157.2	487.7
4	4195	140.6	160.6	160.6	9.7	160.6	157.3
5	3981	135.7	157.7	158.2	10.4	158.2	388.5
6	3983	138.5	161.9	162.1	10.2	162.1	489.0
Mean	4002	138.9	161.5	161.9	10.3	161.9	404.5
STD	177	1.8	4.0	4.2	0.7	4.2	128.5

NOTES:

Clamp:	Curtis Sure Grip with cushion
Specimen Width (in.):	8.0
Specimen Length (in.):	8.0
Gage Length (in.)	4.0
Strain Rate (% per minute):	10

SGI TESTING SERVICES, LLC

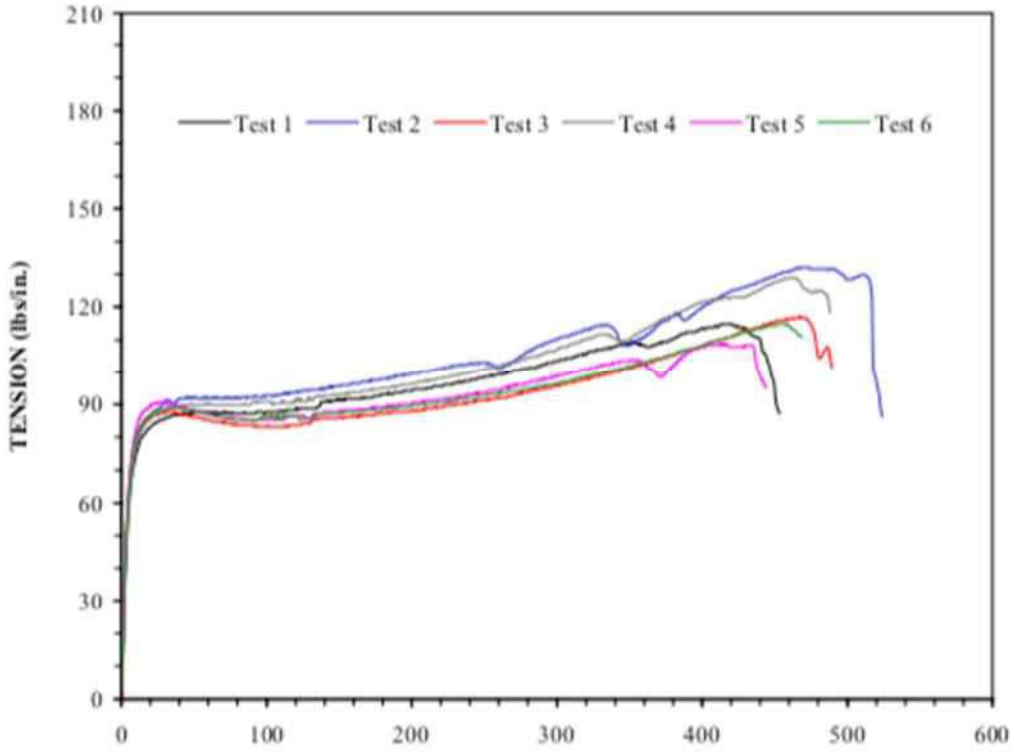
DATE OF REPORT:	11/4/2021
FIGURE NO.	10
PROJECT NO.	SGI21014
DOCUMENT NO.	
FILE NO.	

WATERSHED GEOSYNTHETICS LLC

WIDE-WIDTH TENSILE TESTING OF GEOMEMBRANE (ASTM D 4885)

Agru 50-mil LLDPE Super Gripnet Geomembarne #FNA0039890078 in MD

SGI Lab Sample ID: S23269



Test No.	Initial Tangent Modulus (lbs/in)	Tension at 5% (lbs/in)	Tension at 10% (lbs/in)	Yield Strength (lbs/in)	Yield Strain (%)	Max Strength (lbs/in)	Elongation at Breaking (%)
1	1593	57.9	74.8	87.2	41.3	115.3	417.7
2	1815	62.8	78.6	91.8	39.0	132.5	470.0
3	1694	63.7	80.0	87.6	33.5	117.3	467.4
4	1514	60.6	77.1	89.8	40.8	129.1	460.4
5	1383	64.2	82.5	90.7	27.8	108.9	412.7
6	1460	60.9	79.4	88.6	36.8	114.8	451.7
Mean	1576	61.7	78.7	89.3	36.5	119.6	446.7
STD	159	2.3	2.6	1.8	5.1	9.1	25.3

NOTES:

Clamp:	Curtis Sure Grip with cushion
Specimen Width (in.):	8.0
Specimen Length (in.):	8.0
Gage Length (in.)	4.0
Strain Rate (% per minute):	10

SGI TESTING SERVICES, LLC

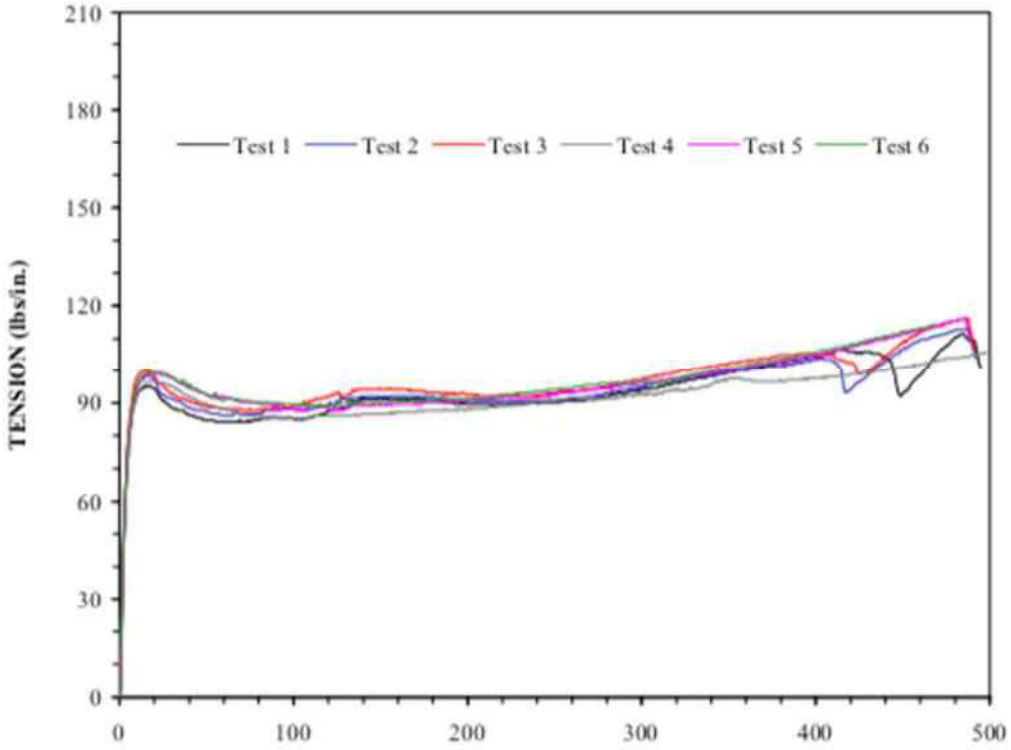
DATE OF REPORT:	10/24/2021
FIGURE NO.	1
PROJECT NO.	SGI21014
DOCUMENT NO.	
FILE NO.	

WATERSHED GEOSYNTHETICS LLC

WIDE-WIDTH TENSILE TESTING OF GEOMEMBRANE (ASTM D 4885)

Agru 50-mil LLDPE Super Gripnet Geomembarne #FNA0039890078 in XD

SGI Lab Sample ID: S23269



Test No.	Initial Tangent Modulus (lbs/in)	Tension at 5% (lbs/in)	Tension at 10% (lbs/in)	Yield Strength (lbs/in)	Yield Strain (%)	Max Strength (lbs/in)	Elongation at Breaking (%)
1	2034	75.3	92.6	95.1	14.4	111.3	482.8
2	2180	79.3	95.2	98.5	15.9	113.3	486.7
3	2064	80.5	97.7	100.0	13.5	116.8	487.4
4	2149	74.5	92.2	96.6	16.0	105.9	497.1
5	2048	75.4	94.0	99.0	17.0	116.3	485.4
6	2102	77.3	95.2	99.5	14.3	116.8	485.0
Mean	2096	77.1	94.5	98.1	15.2	113.4	487.4
STD	58	2.4	2.0	1.9	1.3	4.3	5.0

NOTES:

Clamp:	Curtis Sure Grip with cushion
Specimen Width (in.):	8.0
Specimen Length (in.):	8.0
Gage Length (in.)	4.0
Strain Rate (% per minute):	10

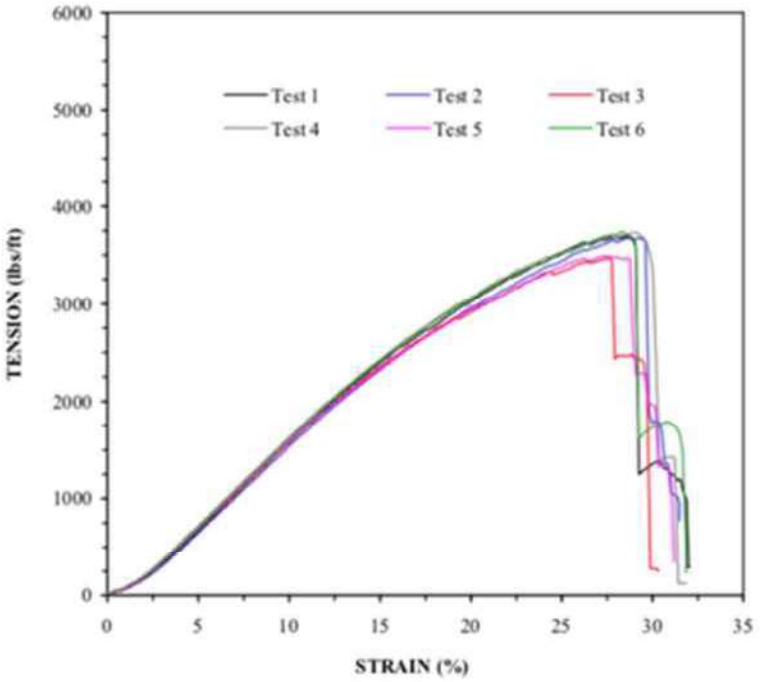
DATE OF REPORT:	11/3/2021
FIGURE NO.	2
PROJECT NO.	SGI21014
DOCUMENT NO.	
FILE NO.	

SGI TESTING SERVICES, LLC

Attachment C-3

Wide Width Tensile Test Results of Standard-Density Engineered Turf

WATERSHED GEOSYNTHETICS LLC
WIDE-WIDTH TENSILE TESTING (ASTM D 4595)
CT32 Synthetic Turf Sample in MD
SGI Sample ID No. S22008



Test No.	Tension at 2% (lb/ft)	Tension at 5% (lb/ft)	Tension at 10% (lb/ft)	Ultimate Strength (lb/ft)	Strain at Ultimate (%)
1	177	670	1580	3689	28.4
2	166	650	1541	3675	28.6
3	185	683	1571	3464	27.4
4	205	725	1636	3734	29.0
5	191	701	1583	3494	27.3
6	193	699	1605	3741	28.3
Mean	186	688	1586	3633	28.2
STD	13	26	32	122	0.7

NOTES:

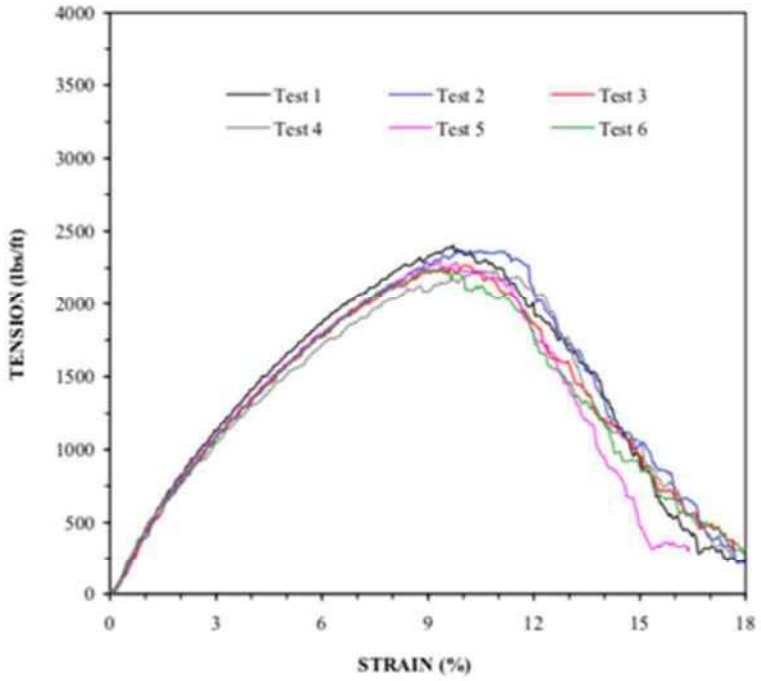
Clamp:	Curtis
Specimen Width (in.):	8.0
Yarn Count (yarns/in.):	Not Measured
Specimen Length (in.):	8
Preload (lbs):	1% of breaking load
Strain Rate (% per minute):	10

SGI TESTING SERVICES, LLC

DATE TESTED:	4/10/2019
FIGURE NO.	2
PROJECT NO.	SGI19014
DOCUMENT NO.	
FILE NO.	

Note: “CT32 Synthetic Turf” denoted in the test report is the standard-density engineered turf, CT.

WATERSHED GEOSYNTHETICS LLC
WIDE-WIDTH TENSILE TESTING (ASTM D 4595)
CT32 Synthetic Turf Sample in XD
SGI Sample ID No. S22008



Test No.	Tension at 2% (lb/ft)	Tension at 5% (lb/ft)	Tension at 10% (lb/ft)	Ultimate Strength (lb/ft)	Strain at Ultimate (%)
1	825	1662	NA	2405	9.7
2	772	1584	2359	2368	10.2
3	769	1577	NA	2265	10.0
4	786	1514	2182	2228	10.6
5	809	1582	NA	2284	9.3
6	792	1570	NA	2247	9.3
Mean	792	1582	NC	2300	9.8
STD	22	47	NC	71	0.5

NOTES:

Clamp:	Curtis
Specimen Width (in.):	8.0
Yarn Count (yarns/in.):	Not Measured
Specimen Length (in.):	8
Preload (lbs):	1% of breaking load
Strain Rate (% per minute):	10

SGI TESTING SERVICES, LLC

DATE TESTED:	4/10/2019
FIGURE NO.	3
PROJECT NO.	SGI19014
DOCUMENT NO.	
FILE NO.	

Note: “CT32 Synthetic Turf” denoted in the test report is the standard-density engineered turf, CT.

References

American Society of Civil Engineers (ASCE) (2022). "Minimum Design Loads and Associated Criteria for Buildings and Other Structures," ASCE standard, ASCE/ SEI 7-22.

Dedrick, A.R. (1973). "Air Pressures Over Reservoir, Canal, and Water Catchment Surfaces Exposed to Wind," Ph.D. Dissertation, Utah State University, Logan, Utah.

Giroud, J.P. (2009). "An Explicit expression for strain in geomembrane uplifted by wind." *Geosynthetics International*, Vol. 16, No. 6, 500-502.

Giroud, J.P., Pelte, T. and Bathurst, R.J. (1995). "Uplift of Geomembranes by Wind," Geosynthetics International, Vol. 2, No. 6, pp. 897-952.

Peggs, I.D., Schmucker, B., and Carey, P. (2005). "Assessment of maximum allowable strains in polyethylene and polypropylene geomembranes." *Geo-Frontiers Congress 2005*, January 24-26, 2005, Austin, Texas.

Peterson, E.W. and Hennessey, Jr., J.P. (1978). "On the Use of Power Laws for Estimates of Wind Power Potential," J. Appl. Meteorology, Vol. 17, pp. 390-394.

Vickery, P.J., and Skerlj, P.F. (2005). "Hurricane Gust Factors Revisited," J. Struct. Eng., 131(5), 825–832.

Wayne, M.H. and Koerner, R.M. (1988). "Effect of Wind Uplift on Liner Systems," Geotechnical Fabrics Report, July/August.

Zheng, J., Sarkar, P., Jafari, M., Hou, F., Li, Z., Sun, Q., and Zhu, M. (2020). "Wind Tunnel Study of ClosureTurf Landfill Final Cover System," Geo-Congress 2020, ASCE GSP 316, pp. 650-658.

Zornberg, J. and Giroud, J.P. (1997). "Uplift of geomembranes by wind – extension of equations." *Geosynthetics International*, Vol. 4, No. 2: 187-207.

Zhu, M., Sarkar, P., Hou, F., and Zheng, J. (2022). "Wind Tunnel Study and Uplift Analysis of Geosynthetic Covers.", Geo-Congress 2022, GSP 331: 543-553.

LIMITATIONS

ClosureTurf®, HydroTurf®, VersaCap®, TerraArmor® and PowerCap™ are U.S. registered trademarks which designate products from Watershed Geosynthetics LLC and/or its affiliated companies (collectively, "WG") that are the subject of issued and/or pending U.S. and foreign patents and patent applications. All information provided herein by WG concerning these products are based upon data derived from independent third-party testing. This information, however, should not be used or relied upon for any specific use without first consulting with an independent professional engineer licensed in the geographic area in which a project is located. Since the actual site conditions, and the installation and use of these products are beyond our control, no guaranty or warranty of any kind, expressed or implied, is made by WG with respect to these products.

Appendix D
ClosureTurf Hydrostatic Puncture Test Report

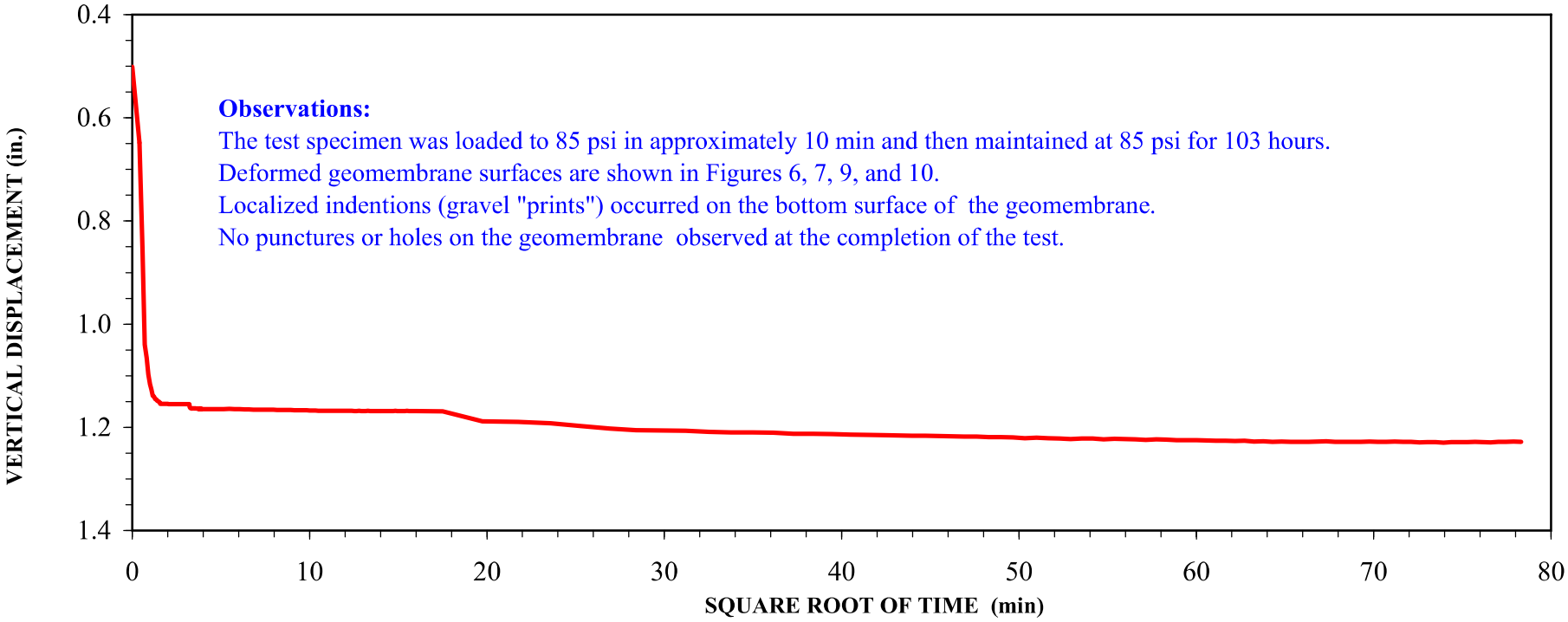
Hydrostatic Puncture Test Report

Notes:

1. The testing was performed on the HydroTurf sample; however, the test results are applicable to ClosureTurf because they both consist of structured geomembrane and engineered turf.
2. The testing was performed on a 40-mil MicroSpike geomembrane. If a thicker (i.e., 50-mil) MicroDrain or Super Gripnet geomembrane is used in ClosureTurf, th epuncture performance is expected to be improved.
3. The testing was performed at a maximum loading of 85 psi. Since no punctures or holes were observed, the ultimate static puncture strength of the system was not reached and therefore, should be greater than 85 psi.

WATERSHED GEOSYNTHETICS LLC- VIRGINIA PROJECT
HYDROSTATIC PUNCTURE TESTING (ASTM D 5514[(1)])

Concrete sand
HydroeTurf (2.25" long monofilament) #ZH37391 with geotextile (straight stitching pattern) down
Agru 40-mil Microspike HDPE geomembrane #G18C000439 with dull side up and shiny side down
VDOT #57 stone nominally compacted



Test	Test Specimen Size				Normal	Total	Concrete sand			#57 Stone		
	Length	Width	Upper Soil Thickness	Lower Soil Thickness	Stress	Duration	γ_d	ω_i	ω_f	γ_d	ω_i	ω_f
No.	(in.)	(in.)	(in.)	(in.)	(psi)	(hours)	(pcf)	(%)	(%)	(pcf)	(%)	(%)
1	12.0	12.0	3.0	6.0	85	102						

NOTE: (1) *Localized strains of the deformed geomembrane not calculated.*

DATE OF REPORT: 3/2/2018

SGI TESTING SERVICES, LLC

FIGURE NO.	A-2
PROJECT NO.	SGI18014
DOCUMENT NO.	
FILE NO.	

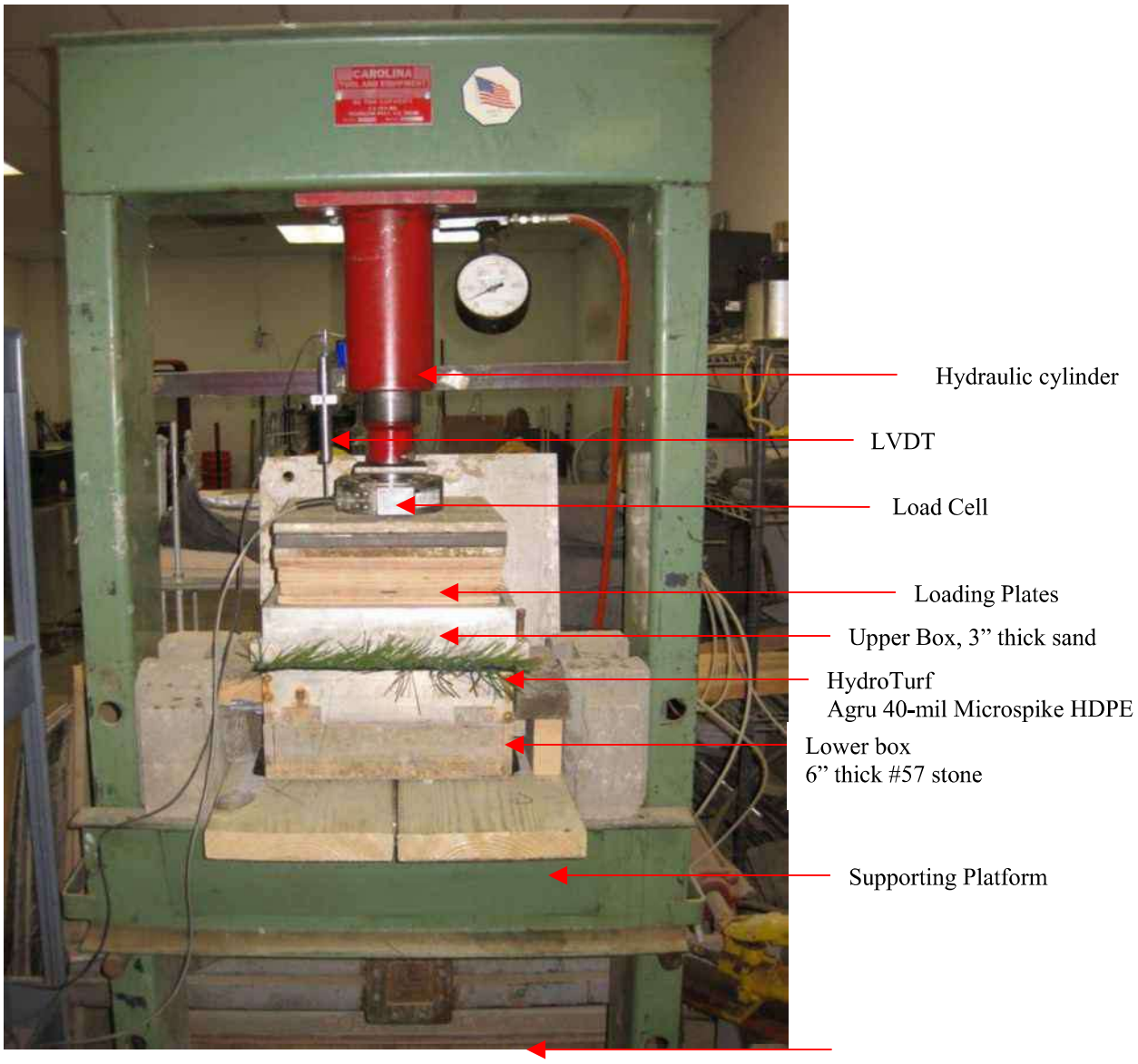


Figure 1. View of hydrostatic puncture test setup.

Figure 2. Compacted VDOT #57 stone in the lower box.

Figure 3. HydroTurf and geomembrane placed on top of compacted #57 stone.

Figure 4. Concrete sand placed in the upper box on top of HydroTurf.

Figure 5. Bottom surface of HydroTurf after the completion of test.

Figure 6. Deformed top surface of the geomembrane after the completion of test. No punctures or holes observed.

Figure 7. Deformed bottom surface of the geomembrane in contact with #57 stone after the completion of test. No punctures or holes observed.

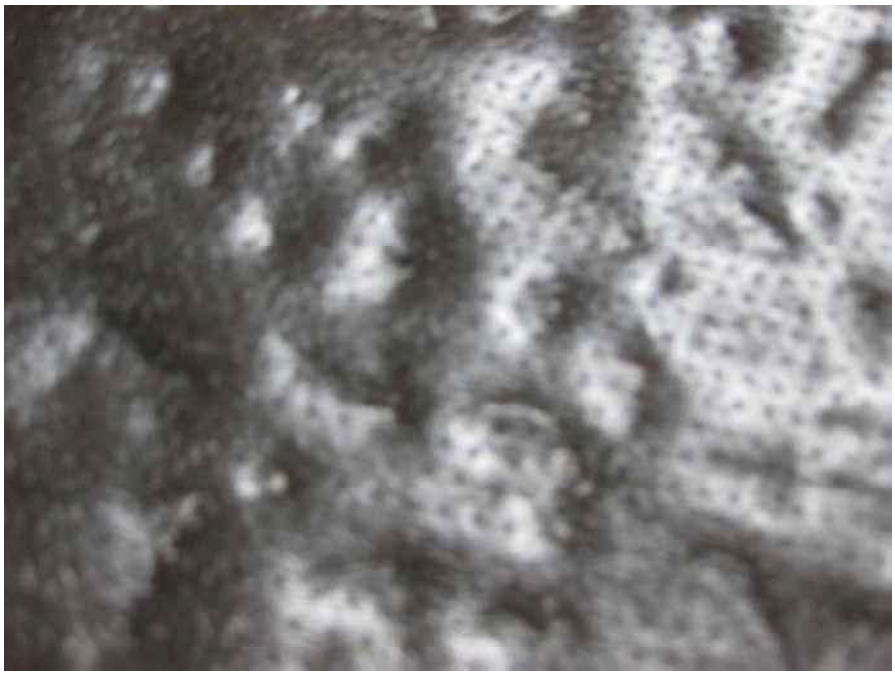


Figure 8. Deformed bottom surface of the geomembrane in contact with #57 stone after the completion of test. No punctures or holes observed.

Figure 9. Deformed top surface of the geomembrane after the completion of test. No punctures or holes observed.

Appendix E
Parametric Study Results for Pond Design

Comparing Stormwater Pond Design for Traditional Soil Cover versus Engineered Synthetic Turf Cover

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CONFERENCE: 2019 World of Coal Ash – (www.worldofcoalash.org)

KEYWORDS: Landfill Final Cover, Stormwater Pond Design, Engineered Synthetic Turf Cover

ABSTRACT: A parametric study is performed to compare the stormwater pond design of a conceptual waste disposal site with two final cover systems: a traditional soil cover system and an engineered synthetic turf cover system, ClosureTurf®. The geometry of the conceptual site and the design storm events are varied in the study. Two representative runoff curve numbers (CN) are considered for the traditional soil cover system. The stormwater pond is designed with the capacity to attenuate the stormwater runoff flows, as well as to promote water quality treatment through settling of suspended solids. Because the runoff from the ClosureTurf cover system carries little to no solids, the analysis is also performed without the requirement of sediment storage volume for ClosureTurf.

The stormwater analysis results of the traditional soil cover system and the ClosureTurf cover system are compared, including the time of concentration, the perimeter channel peak flow depth, and the stormwater pond peak depth, peak discharge, and peak storage. The analysis results of the conceptual site indicate that the ClosureTurf cover system generates higher peak runoff flow rates than the traditional soil cover system. Under the 25-year (yr), 24-hour (hr) design storm event, the calculated peak storage of the stormwater pond for the ClosureTurf cover system increases by approximately 5% and 10%, respectively, compared to the traditional soil cover system with a CN of 84 and 74; while under the 100-yr, 24-hr design storm event, it increases by approximately 10% and 20%, respectively.

INTRODUCTION

The final cover system is critical to environmental closures of waste disposal facilities, e.g., landfills and coal combustion residual (CCR) impoundments. A traditional soil cover system is typically comprised of (from top to bottom): (i) a topsoil layer; (ii) a vegetative soil layer; (iii) a geocomposite drainage layer; and (iv) a geomembrane barrier layer. The traditional soil cover system design necessitates a construction process with a steady supply of final cover soils. Furthermore, on-going maintenance of the traditional soil cover system is required to establish vegetative cover, which often

includes repairing erosion and addressing sedimentation issues during construction and operation of the final cover system.

ClosureTurf is a relatively new alternative to traditional soil cover systems that has been used in the past 10 years. It is comprised of (from bottom to top): (i) a structured geomembrane, (ii) an engineered turf, and (iii) a specialized sand infill (bonded or unbonded). This system replaces the topsoil and vegetative soil layers thereby mitigating the need for a supply of final cover soils. It has also demonstrated other benefits, including faster construction speed, improved runoff quality, reduced post-closure maintenance cost, and less environmental and community impact (e.g., no land disturbance for borrow soils and less truck trips through neighboring communities).

This study presents a comparative analysis of the stormwater pond design between the traditional soil cover system and the ClosureTurf cover system. The sections below discuss the design criteria, design methodology, input parameters, and analysis results.

DESIGN CRITERIA

The following criteria are used in designing the stormwater pond.

Peak Flow Management

A fundamental aspect of landfill engineering is the design of stormwater pond to satisfy local and state regulatory requirements for pre-development versus post-development hydrology. The stormwater pond is designed such that the pre-development peak discharge flow rate is less than the post-development for the 2-, 5-, 10-, 25-, and 100-yr, 24-hr storm events.

Wet Detention Pond

The stormwater pond is designed as a wet detention pond to achieve water quality and quantity performance. A wet detention pond is an impounded area with the capacity to attenuate the stormwater runoff flows and promote water quality treatment through settling of suspended solids. The wet detention pond for the traditional soil cover system is required to include the sediment storage volume within the permanent pool volume. For ClosureTurf, the sediment storage volume is not needed because the runoff carries little to no solids.

The wet detention pond is designed with a primary spillway to manage flows up to the 25-yr, 24-hr storm event and an emergency spillway to support managing flows up to the 100-yr, 24-hr storm event without overtopping. Under the 25-yr, 24-hr storm event, the pond is designed without overtopping into the emergency spillway. Under the 100-yr, 24-hr storm event, the pond is designed to have at least 1.0 feet (ft) (0.3 meters, m) of freeboard. A pre-treatment forebay is not considered in the study.

Water Quality Volume (WQV)

WQV is the storage needed to capture and treat the runoff from 90% of the average annual rainfall. For the purposes of this study, the WQV for the site is assumed to be runoff for the 1.0-inch (2.5 centimeters, or cm) rainfall event and the design treatment is the release of the WQV over 24 to 72 hr after the storm event.

Sediment Storage Volume

For a traditional soil cover system, the permanent pool within the stormwater pond is typically required to include the sediment storage volume for erosion and sedimentation management. The sediment storage volume used in this study is equivalent to 67 cubic yards per acre of drainage area (or 127 cubic meters per hectare). As discussed previously, this volume is not needed for ClosureTurf. For the purposes of this study, ClosureTurf is analyzed with and without the sediment storage volume to evaluate its effect on the overall stormwater pond design.

Channel Geometry

Stormwater runoff and concentrated discharges from the final cover are conveyed to the wet detention pond via perimeter channels. In this study, the perimeter channels are designed to convey the flow for the 25-yr, 24-hr storm event with at least 0.5 ft (0.15 m) of freeboard.

DESIGN METHODOLOGY

Modeling Software

The design calculations for the drainage areas, channels, and ponds are performed using the hydrology and hydraulic procedures in the Soil Conservation Service (SCS) Technical Release (TR-55) [SCS, 1986] and other recognized engineering procedures and equations, such as the Manning's kinematic equation, that are encoded in the HydroCAD™ software [HydroCAD, 2018].

Runoff Curve Number

SCS TR-55 includes the Runoff Curve Number Method for estimating runoff flow depth.

$$Q = \frac{(P-0.2S)^2}{P+0.8S} \quad (1)$$

$$S = \frac{1000}{CN} - 10 \quad (2)$$

Where, Q = runoff (inches, in.); P = rainfall (in.); S = potential maximum retention after runoff begins (in.); and CN = curve number. S expresses the soil and cover conditions of the drainage area through the variable CN, which has a range of 0 to 100.

Travel Time

SCS TR-55 includes the travel time methods for sheet flow, shallow concentrated flow, and open channel flow. For the purposes of this study, it is assumed that sheet flow and shallow concentrated flow characterize the stormwater runoff over the cover systems. Travel time for sheet flow is calculated as follows [SCS, 1986]:

$$T_S = \frac{0.007\ (nL)^{0.8}}{(P_2{}^{0.5})s^{0.4}} \quad (3)$$

Where, T_s = sheet flow travel time (hr); n = Manning's roughness coefficient; L = sheet flow length (ft); P_2 = 2-yr, 24-hr rainfall (in.); and s = slope of hydraulic grade line (land slope, ft/ft).

After a maximum of 100 ft, sheet flow is assumed to become shallow concentrated flow. Travel time for shallow concentrated flow is calculated [SCS, 1986] as follows:

$$T_{sc} = \frac{L}{3600V} \quad (4)$$

$$V = Ks^{0.5} \quad (5)$$

Where, T_{sc} = shallow concentrated flow travel time (hr); L = shallow concentrated flow length (ft); V = unpaved surface flow velocity (ft per second, or fps); K is the velocity factor (fps); and s = slope of hydraulic grade line (land slope, ft/ft).

Time of Concentration

The sum of T_s and T_{sc} for a drainage area is the time of concentration, which is the total duration time for runoff to travel from the hydraulically most distant point in the drainage to a point of interest, such as an outfall or confluence.

INPUT PARAMETERS

ClosureTurf exhibits a reduced potential for evapotranspiration and stormwater infiltration due to absence of soil layers in the final cover system. Therefore, it is important to summarize the difference in input parameters used for the traditional soil cover system and ClosureTurf cover system to calculate the stormwater runoff.

Rainfall

For the purposes of the study, Effingham, South Carolina is selected as the site location. The vicinity of the site is classified as either a Type II or III rainfall distribution [SCS, 1986]. Table 1 [NOAA, 2019] lists the rainfall depths associated with the 24-hr design storm events.

Table 1. Rainfall Depths for 24-hr Storm Events

24-hr Storm Event	Rainfall Depth (in.; cm in parentheses)
2-yr	3.54 (9.0)
5-yr	4.52 (11.5)
10-yr	5.38 (13.7)
25-yr	6.71 (17.0)
100-yr	9.20 (23.4)

Existing Conditions and Site Design

The site is assumed to be a 40-acre (16-hectare) area with a combined woods and grass land cover under the existing conditions. The site soils are assumed to be of the hydrologic soil group (HSG) 'B' classification, which is designated for moderately deep and well-draining soils with fine to course texture. The drainage within the site is characterized by a 1% land slope from the headwaters of the site down to the outfall.

The conceptual site design for both the final cover systems is assumed to be a simple landfill design comprised of a singular peak elevation with a shallow top deck that drains onto steeper side slopes. The side slopes do not include benches because their length is less than 100 ft (30.5 m), which is the maximum sheet flow length. The stormwater runoff from the side slopes is collected and conveyed by channels that discharge into the stormwater pond. For the purposes of this study, the top deck slopes and side slopes vary to assess the effect on the stormwater pond design. Table 2 lists the top deck and side slope variations for each scenario. A schematic of the site stormwater management system is presented in Figure 1.

Table 2. Site Geometry Scenarios

Scenario	Side Slopes	Top Deck Slopes
1	5H:1V	1%
2	5H:1V	2%
3	5H:1V	5%
4	5H:1V	8%
5	3H:1V	1%
6	3H:1V	2%
7	3H:1V	5%
8	3H:1V	8%

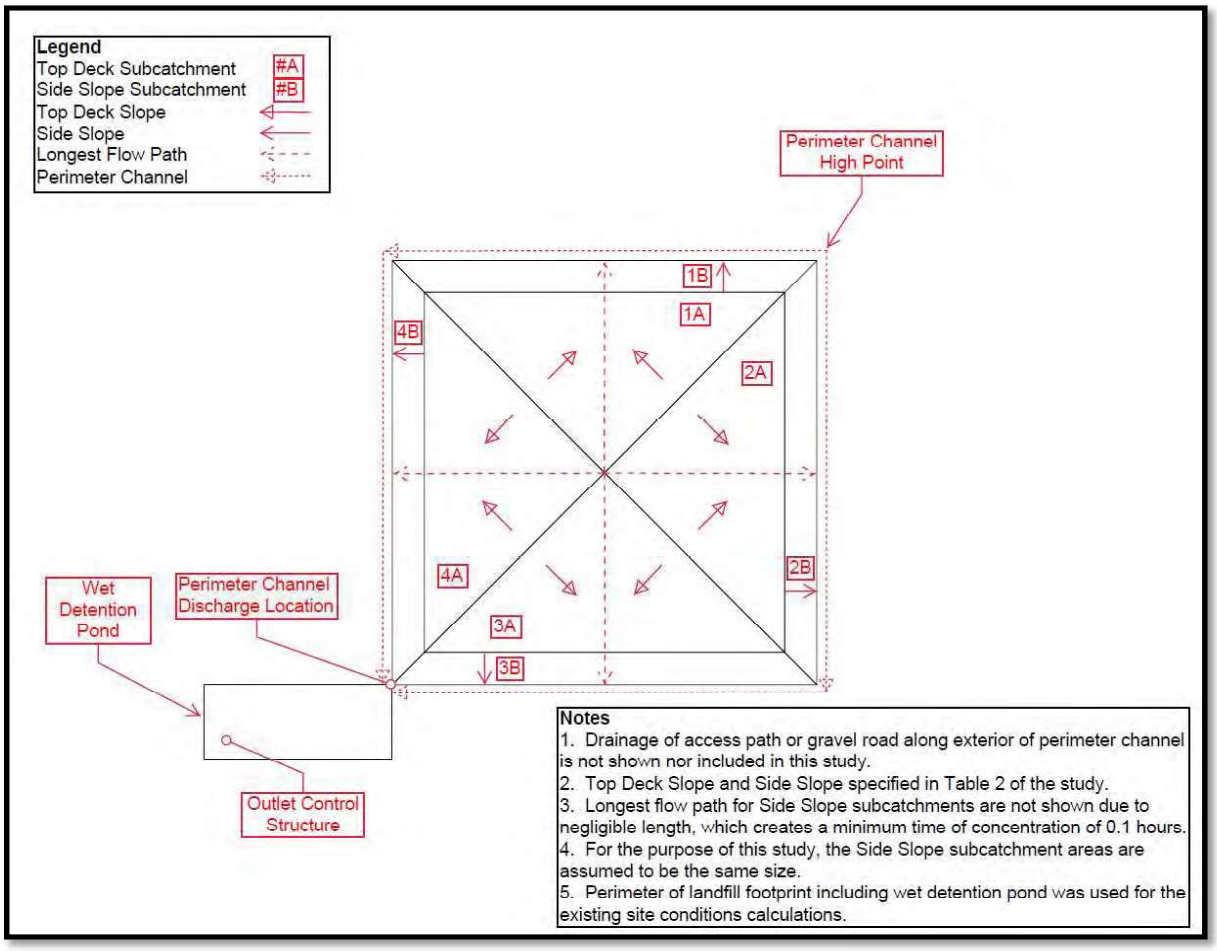

Figure 1. Final Cover Stormwater Management System Schematic

Runoff Curve Number

The CN is determined by the hydrologic soil group (HSG), cover type, treatment, and hydrologic condition, and antecedent runoff condition (ARC). For the existing site conditions, a CN value of 58 corresponds to a "woods and grass in good conditions" land use for HSG B. For the traditional soil cover, two CN values are considered in the study to represent a typical range used in the landfill design: (1) A CN value of 74 corresponds to "open space in good condition" land use for HSG C. HSG C is comprised of moderately fine to fine texture soils with low infiltration rates and they consist chiefly of soils with a layer that mitigate infiltration; and (2) A CN value of 84 corresponds to "open space in fair condition" land use for HSG D, which have clay soils and lower infiltration rates. For ClosureTurf, a CN value ranges from 92 to 95 for high intensity and normal intensity rainfall events [Watershed Geosynthetics, 2018]. A CN value of 95 is a conservative assumption for runoff calculations and thus considered in the study.

The CN values for the drainage areas under each site condition are summarized in Table 3 [Watershed Geosynthetics, 2018; HydroCAD™, 2018].

Table 3. Curve Numbers Used in Analyses

Condition	Curve Number (CN)
Existing Conditions	58
Traditional Soil Cover System (HSG C, good condition)	74
Traditional Soil Cover System (HSG D, fair condition)	84
ClosureTurf Cover System	95
Stormwater Pond	98

Manning's Roughness Coefficient for Sheet Flow

The Manning's roughness coefficients are selected for the existing conditions, the traditional soil cover system, and ClosureTurf cover system, as presented in Table 4. The existing conditions are characterized as woods with light underbrush. The traditional soil cover system is characterized as dense grass. The ClosureTurf cover system parameters are selected from the ClosureTurf Design Manual [Watershed Geosynthetics, 2018].

Table 4. Manning's Roughness Coefficient for Sheet Flow

Condition	Manning's Roughness Coefficient, n
Existing Conditions	0.40
Traditional Soil Cover System	0.15
ClosureTurf Cover System	0.12 (for slopes > 10%) 0.22 (for slopes < 10%)

Velocity Factors for Shallow Concentrated Flow

The conditions associated with selecting the velocity factors for the existing conditions, traditional soil cover, and ClosureTurf are characterized as woodland, short grass pasture, and unpaved [Watershed Geosynthetics, 2018], respectively. The selected velocity factors are summarized in Table 5.

Table 5. Velocity Factors for Shallow Concentrated Flow

Shallow Concentrated Flow Land Use	Velocity Factor, K, (fps; mps in parentheses)
Existing Conditions	5 (1.5)
Traditional Soil Cover System	7 (2.1)
ClosureTurf Cover System	16.1 (4.9)

The relationship between the shallow concentrated flow velocity, the velocity factor, and slope is shown in Equation (5) in the previous section.

Wet Detention Pond

In this study, the wet detention pond is designed as a rectangular prismatoid with a length to width ratio (at bottom) of 3 to 1 to avoid short circuiting of inflows that can reduce the potential for settling of suspended solids. The side slopes of bottom dimensions are fixed at 175-ft (53.3 m) wide and 525-ft (160 m) long, and the side slopes are fixed at 3 Horizontal to 1 Vertical (3H:1V).

Outlet Control Structures

The outlet control structure is selected to be a perforated vertical riser structure with circular vertical orifice perforations and a singular horizontal orifice. In addition, an emergency spillway is included to manage the high intensity storm (i.e., the 100-yr, 24-hr storm event).

Channel Geometry and Lining

Typical landfill design includes perimeter channels that capture runoff or concentrated discharges from the final cover system. These flows are then conveyed to the stormwater pond. The perimeter channels were designed using a cross-sectional geometry with a 4-ft (1.2-m) bottom width, a 4-ft (1.2-m) depth, 3H:1V side slopes, and a 0.5% longitudinal slope. The perimeter channel design includes the selection of a channel lining design of either vegetation or riprap lining, which depends on the degree of erosional forces within the channels. Riprap channel lining is selected for both the traditional soil cover and ClosureTurf. A 15-in. thick channel lining comprised of a 6-in. (15.2-cm) d_{50} riprap is considered for both design scenarios, which corresponds to a Manning's roughness coefficient of 0.069 [HydroCAD^{TM}, 2018].

ANALYSIS RESULTS

The following results are presented for a 10-ft (3-m) deep wet detention pond design that includes a primary spillway comprised of a 4-in. (10.2-cm) diameter vertical low-flow orifice and a 36-in. (91-cm) diameter horizontal orifice as well as a 20-ft (16-m) wide weir as an emergency spillway. The 4-in. (10.2-cm) diameter vertical low-flow orifice satisfies the 24- to 72-hr drawdown requirement. They are located at depths of 0.8 ft (0.2 m), 5.5 ft (1.7 m), and 7.5 ft (2.3 m), respectively, from the bottom of the pond to satisfy the design criteria for the wet detention ponds that include a sediment storage volume. When the sediment storage volume is not included, the low-flow orifice depth is lowered to the bottom of the pond at 0.0 ft.

Time of Concentration

Table 6 presents the calculated times of concentration of the top deck subcatchments by varying the slope from 1% to 8%.

Table 6. Time of Concentration for Varying Top Deck Subcatchments

Top Deck Slope	Time of Concentration (minutes)	
	Traditional Soil Cover System	ClosureTurf Cover System
1%	26.1	20.7
2%	17.6	14.1
5%	11.4	9.2
8%	9.2	7.5

The side slope subcatchments have a travel time set as the minimum value of 0.1 hr (or 6 minutes) given the short flow lengths. The differences in calculated travel times of the side slope subcatchments are negligible (i.e., less than 0.1 minutes) by varying the slope from 5H:1V to 3H:1V. Furthermore, the analysis results indicate that, generally, the variations in the top deck slopes and side slopes have a negligible impact on the design of the wet detention pond. These results are expected given that the side slope lengths are short and steep for the assumed conceptual site. Although the calculated total time of concentration of flow from the top deck and side slopes varies, the discharges are concentrated into the large and long perimeter channels that provide additional flow rate attenuation prior to discharging to the wet detention pond.

The site geometry with the 8% top deck and 3H:1V side slopes is used to evaluate the stormwater pond design presented in the sections below.

Peak Flow Depth in Perimeter Channels

The calculated peak flow depth within the perimeter channels are presented in Table 7.

Table 7. Perimeter Channel Peak Flow Depth

24-hr Storm Event	Peak Flow Depth (ft; m in parentheses)		
	Traditional Soil Cover System		ClosureTurf Cover System
	CN = 74	CN = 84	
2-yr	1.3 (0.4)	2.0 (0.6)	2.2 (0.7)
5-yr	1.7 (0.5)	2.3 (0.7)	2.5 (0.8)
10-yr	2.0 (0.6)	2.6 (0.8)	2.7 (0.8)
25-yr	2.4 (0.7)	2.9 (0.9)	3.1 (0.9)
100-yr	3.1 (0.9)	3.4 (1.0)	3.6 (1.1)

The results indicate that ClosureTurf cover system requires slightly deeper perimeter channels than the traditional soil cover system.

Peak Discharge (Pre- versus Post-Development)

Table 8 presents the calculated peak discharge flow rates from the site under the pre-development condition (i.e., the existing conditions) and the post-development condition (i.e., after the site is closed with either the traditional soil cover or ClosureTurf).

Table 8. Comparison of Peak Discharge

24-hr Storm Event	Peak Discharge (cfs; cms in parentheses)				
	Existing Conditions	Traditional Soil Cover System		ClosureTurf Cover System	
		CN = 74	CN = 84	With Sediment Storage[1]	No Sediment Storage
2-yr	5 (0.14)	1 (0.03)	1 (0.03)	1 (0.03)	1 (0.03)
5-yr	13 (0.4)	1 (0.03)	1 (0.03)	3 (0.09)	1 (0.03)
10-yr	22 (0.6)	1 (0.03)	3 (0.09)	10 (0.28)	6 (0.17)
25-yr	37 (1.0)	4 (0.11)	11 (0.3)	31 (0.88)	20 (0.6)
100-yr	70 (2.0)	26 (0.7)	43 (1.2)	65 (1.8)	50 (1.4)

Note: [1]. The case with sediment storage is analyzed to show its effect on the stormwater pond design of the ClosureTurf cover system. Sediment storage volume is not needed for the ClosureTurf cover system because the runoff carries little to no suspended solids.

The results indicate that the ClosureTurf cover system generally generates more peak discharges than the traditional soil cover system. However, both final cover systems generate lower peak discharges than the existing conditions and thus satisfy the pre- and post-development design criteria.

Peak Flow Depth in Pond

Table 9 presents the calculated peak depth within the wet detention pond.

Table 9. Wet Detention Pond Peak Depth

24-hr Storm Event	Peak Depth (ft; m in parentheses)			
	Traditional Soil Cover System		ClosureTurf Cover System	
	CN = 74	CN = 84	With Sediment Storage[1]	No Sediment Storage
2-yr	2.8 (0.9)	3.7 (1.1)	4.9 (1.5)	4.2 (1.3)
5-yr	3.8 (1.2)	4.8 (1.5)	5.7 (1.7)	5.5 (1.7)
10-yr	4.7 (1.4)	5.6 (1.7)	5.9 (1.8)	5.8 (1.8)
25-yr	5.7 (1.7)	6.0 (1.8)	6.5 (2.0)	6.2 (1.9)
100-yr	6.4 (2.0)	7.0 (2.1)	7.9 (2.4)	7.5 (2.3)

See Note 1 under Table 8.

Peak Storage in Pond

The peak storage in the wet detention pond is calculated based on the peak flow depth presented in Table 9 using the stage-storage relationship of the wet detention pond and the results are presented in Table 10.

Table 10. Wet Detention Pond Peak Storage

24-hr Storm Event	Peak Storage, (acre-ft; 1,000 cubic meters in parentheses)			
	Traditional Soil Cover System		ClosureTurf Cover System	
	CN = 74	CN = 84	With Sediment Storage[1]	No Sediment Storage
2-yr	6.3 (7.8)	8.4 (10.4)	11.5 (14.2)	9.8 (12.1)
5-yr	8.7 (10.7)	11.4 (14.1)	13.6 (16.8)	13.1 (16.2)
10-yr	11.0 (13.6)	13.5 (16.7)	14.2 (17.5)	13.9 (17.1)
25-yr	13.6 (16.8)	14.3 (17.6)	15.8 (19.5)	15.1 (18.6)
100-yr	15.5 (19.1)	17.2 (21.2)	19.8 (24.4)	18.8 (23.2)

See Note 1 under Table 8.

The calculated peak storage volumes for the ClosureTurf cover system are greater than those for the traditional soil cover system. With no sediment storage volume required for the ClosureTurf cover system, the calculated peak storage of the pond increases by approximately 5% and 10%, respectively, compared to the traditional soil cover system with a CN of 84 and 74 under the 25-yr, 24-hr design storm event; while under the 100-yr, 24-hr design storm event, it increases by approximately 10% and 20%, respectively.

SUMMARY

This paper presents a parametric study to compare the stormwater pond design of a conceptual waste disposal site with two final cover systems: the traditional soil cover system and the ClosureTurf cover system. As expected, the study indicates that the stormwater pond design is largely affected by the selected runoff curve number (CN) for the final cover system. The ClosureTurf cover system, which usually has a higher CN than the traditional soil cover system, generates higher peak runoff rates and volumes, which results in the need for a slightly deeper perimeter drainage channel and a moderately larger stormwater pond. Because the ClosureTurf cover system has no soil layers and the runoff carries little to no suspended solids, the sediment storage volume is not needed, which offsets a portion of the increase in the stormwater pond size due to the higher CN of ClosureTurf.

The analysis results presented in this paper indicate that, under the assumed 25- or 100-yr, 24-hr design storm event, the stormwater pond size for the ClosureTurf cover

system may increase by approximately 5% to 20% depending on the selected CN for the traditional soil cover system, which is assumed to vary from 74 to 84 in the analyses. When a higher CN is used in the stormwater pond design for the traditional soil cover system, the increase in the pond size is smaller when the ClosureTurf cover system is considered.

It should be noted that the study presented in the paper is based on the assumed conceptual site plan and hydrologic and hydraulic conditions. A site-specific analysis should be performed to evaluate difference in the stormwater pond design for these two final cover systems, especially for a site where the stormwater pond has already been constructed according to the original closure design of the traditional soil cover system. Furthermore, when selecting the final cover system for waste disposal facilities, other factors should be evaluated too, including regulatory requirements, technical performance, construction and post-closure maintenance costs, environmental and community impact, etc., to achieve safe, economical, and sustainable closures.

REFERENCES

HydroCAD™ Software Solutions, LLC (2018), *HydroCAD™ Stormwater Modeling System Version 10*. Chocorua, New Hampshire.

National Oceanic and Atmospheric Administration (NOAA) (2019), *Precipitation Frequency Data Server (PFDS).* NOAA, Hydrologic Design Studies Center. Washington, D.C.

Soil Conservation Service (SCS) (1986), *Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55), 2nd Edition.* United States Department of Agriculture, SCS. Washington, D.C.

Watershed Geosynthetics (2018), *ClosureTurf® Design Guidelines Manual.* Alpharetta, Georgia.

Appendix F
Evaluation of Sand Infill Criteria for ClosureTurf

Watershed Geo®
Unearthing Solutions

Technical Note

EVALUATION OF SAND INFILL CRITERIA FOR CLOSURETURF®

Fine aggregate infill (sand) is one component of the ClosureTurf® three component system. An extensive testing program was implemented to evaluate the criteria and performance properties for the sand infill in the ClosureTurf system. The program included large scale performance testing by an independent third party laboratory, TRI Environmental (TRI) at the Denver Downs Research facility in Greeneville, South Carolina. A description of the testing procedures and results are provided in this document.

SAND INFILL FUNCTION

The sand infill component of ClosureTurf is utilized as a protective layer for the geotextile backing of the engineered turf component. The polypropylene geotextile backing material contains ultraviolet (UV) radiation degradation inhibitors protecting it against UV damage. Sand infill functions as an additional protective layer against UV degradation of the geotextile backing. Optimal sand infill performance occurs with minimal sand movement.

TRI tested sand infill mobilization in ClosureTurf in general accordance with ASTM D 6460, *Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion* and ASTM D 6459 *Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Hillslopes from Rainfall-Induced Erosion*. The results of the testing were also analyzed in accordance with each Standard to quantify infill mobilization during tested conditions. Photographs of tested sands are provided as Attachment A.

SAND INFILL LARGE SCALE HYDRAULICS TESTING

The TRI large-scale hydraulic testing (ASTM D 6460) was conducted in a rectangular flume having a 0.10 ft/ft slope. The subgrade was a loamy soil over which ClosureTurf with a ½ inch sand infill was installed following installation guidelines. Water is supplied to the facility by gravity flow and controlled and measured through upstream sluice gates as presented in Figure 1.

A test consists of measuring infill thickness, opening the sluice gates a predetermined amount allowing overtopping flow on the ClosureTurf for a period of 30 minutes, closing the sluice gate to stop overtopping flow and measuring infill depth to evaluate sand loss. The test procedure is repeated a minimum of four times with increasing overtopping flow amounts or until enough sand infill has been removed to expose the majority of the geotextile backing.

Figure 1. ClosureTurf® TRI Flume Test Installation

Reported test results include sand infill loss during each 30-minute overtopping period and the corresponding hydraulic shear stress during the 30-minute test period. The testing was conducted on six different sand infills having a range of grain size distributions, fine aggregate angularities and specific gravities. Sand infill angularity and specific gravity are presented in Table 1. Tested sand infill grain size distributions are presented in Figure 2. Hydraulic shear stress results are presented in Figure 3.

Table 1. Tested Sand Infill Angularity and Specific Gravity

Test Sand No.	Fine Aggregate Angularity (FAA) (%) (ASTM C 1252 / AASHTO T 304) (Method A)	Bulk Specific Gravity, Dry (SG) (ASTM C 128 / AASHTO T 84)
1	47.2	2.64
2	40.5	2.60
3	43.1	2.59
4	45.7	2.64
5	47.1	2.85
6	43.7	1.96

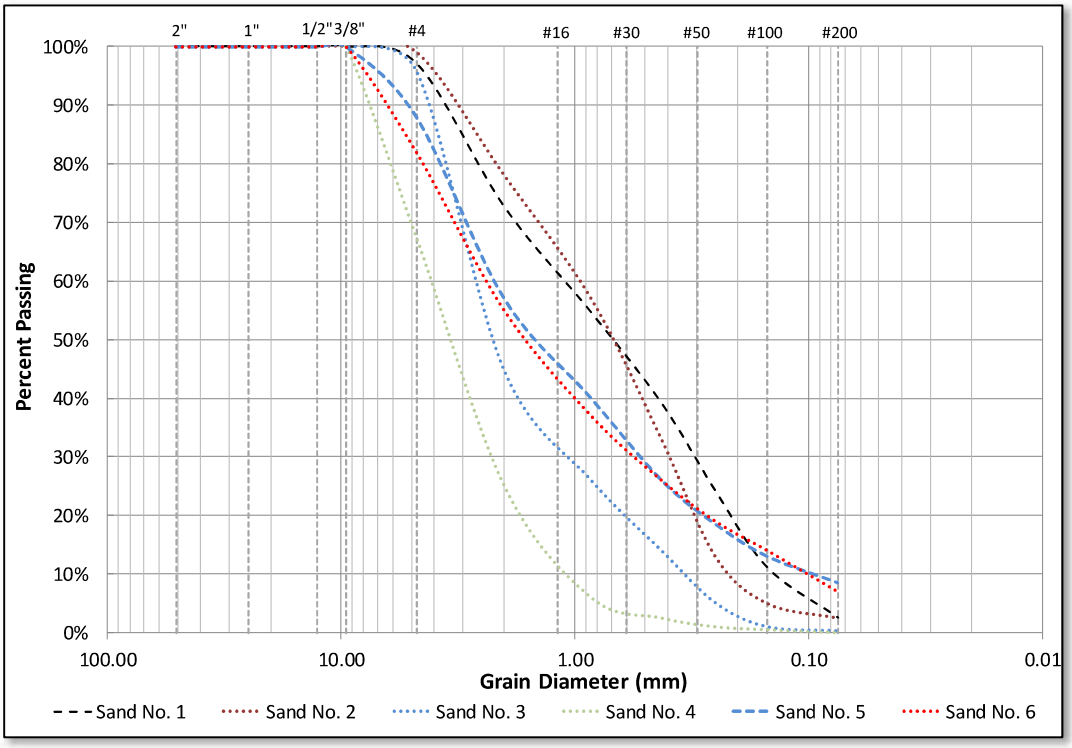

Figure 2. Tested Sand Infill Grain Size Distributions (ASTM C 136 / AASHTO T 27)

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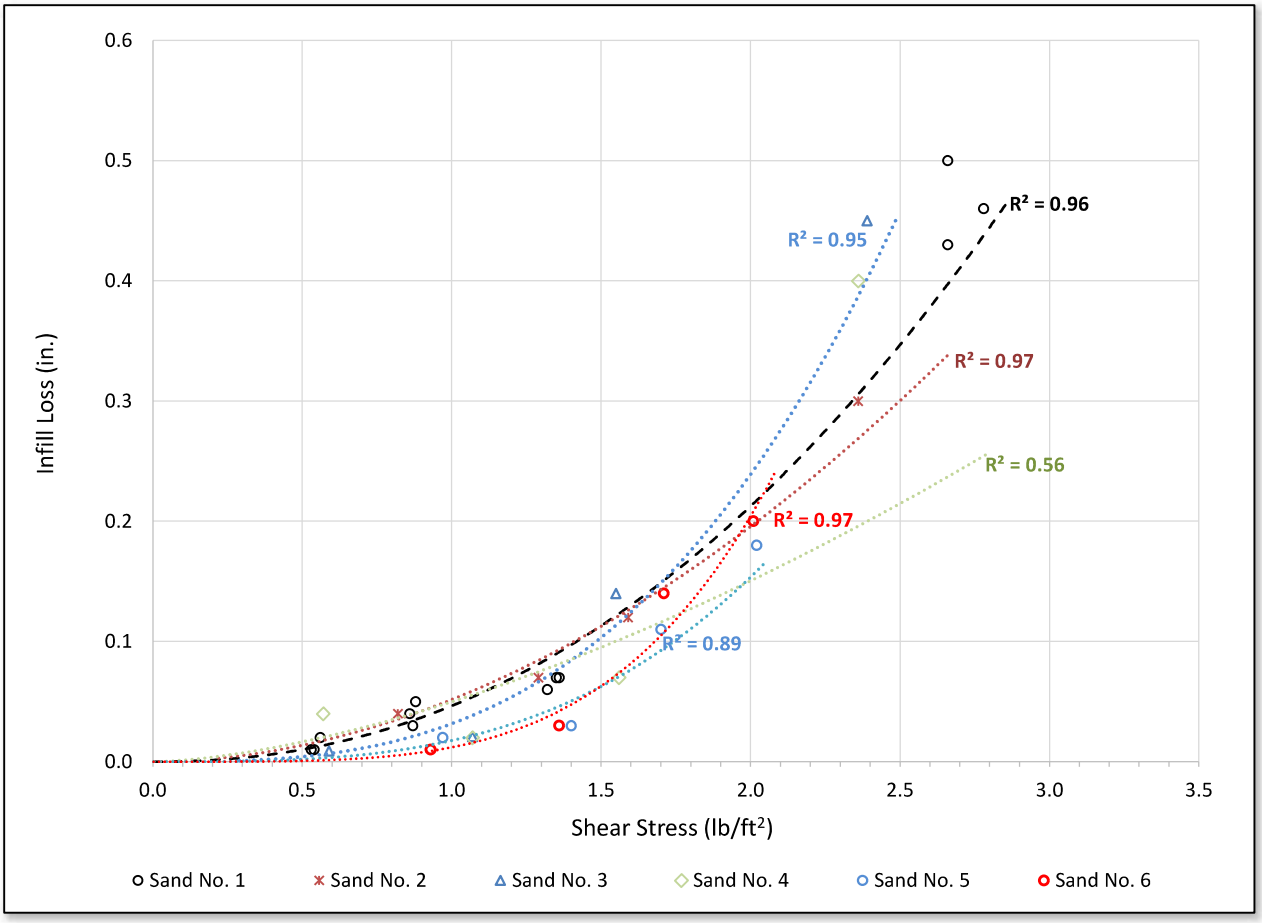

Figure 3. Infill Loss Due to Hydraulic Shear

SAND INFILL LARGE SCALE RAINFALL EROSION TESTING

The TRI large-scale rainfall erosion testing (ASTM D 6459) was conducted on a rectangular plot measuring 40 feet by 8 feet (length x width) and having a 0.33 ft/ft slope. The subgrade was a loamy soil over which ClosureTurf with a ½ inch sand infill was installed following installation guidelines as presented in Figure 4a. Artificial rainfall is produced by ten "rain trees" arranged around the perimeter of the test slope. Each rain tree has four sprinkler heads atop a 15 ft. riser pipe. The rainfall system produces target rainfall intensities of 2-, 4-and 6-inches per hour at pre-calibrated rain drop size distributions for a period of 20 minutes per intensity resulting in a one hour test. Testing in progress is presented in Figure 4b. All runoff was collected during testing to quantify sediment mobilization. Incremental infill losses are presented in Table 2.

(a) Infill Installation **(b) Testing in Progress**

Figure 4. ClosureTurf® TRI Rainfall Erosion Testing

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Table 2. Tested Sand Infill Rainfall Erosion Results

Test Sand No.	Rainfall Intensity (in./hr)	Incremental Infill Loss (%)
1	2.0	0.01
1	4.0	0.02
1	6.1	0.04
3	2.0	0.00
3	4.2	0.00
3	6.1	0.00
4	2.1	0.00
4	4.1	0.00
4	6.0	0.00

Based on the TRI large scale rainfall erosion and hydraulic shear test results and sand infill material properties, a sand infill specification was developed as summarized in Figure 5 and as appears in the WatershedGeo CSI specification, SECTION 31 05 16, *ClosureTurf® SAND INFILL COMPONENT*.

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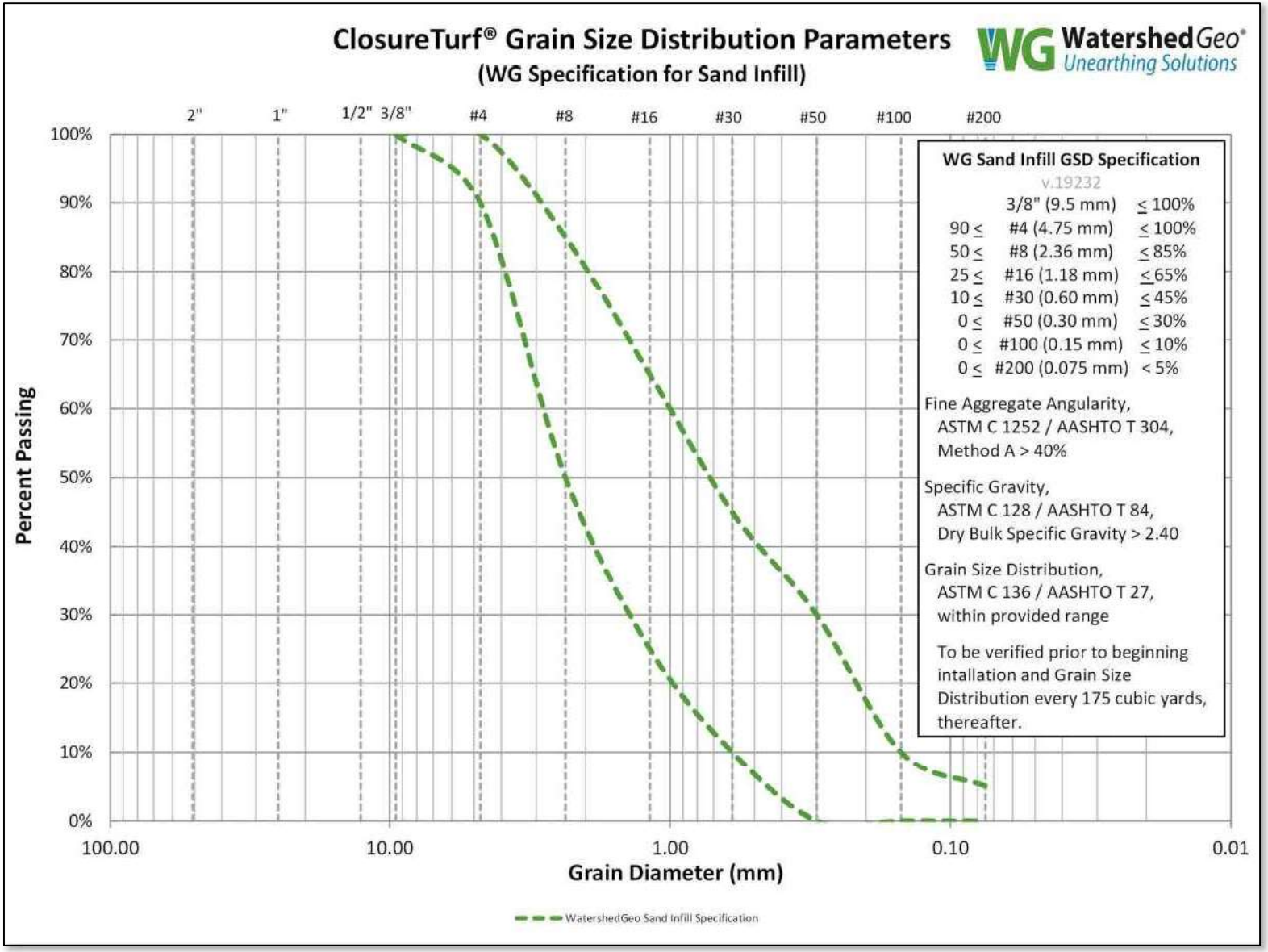

Figure 5. ClosureTurf® Sand Infill Specification

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Attachment A

Figure A1. Tested Sand No. 1

Figure A2. Tested Sand No. 2

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Figure A3. Tested Sand No. 3

Figure A4. Tested Sand No. 4

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Figure A5. Tested Sand No. 5

Figure A6. Tested Sand No. 6

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LIMITATIONS

ClosureTurf® is a U.S. registered trademark which designates a product from Watershed Geosynthetics LLC. This product is the subject of issued U.S. and foreign patents and/or pending U.S. and foreign patent applications. All information, recommendations and suggestions appearing in this literature concerning the use of our products are based upon tests and data believed to be reliable; however, this information should not be used or relied upon for any specific application without independent professional examination and verification of its accuracy, suitability and applicability. Since the actual use by others is beyond our control, no guarantee or warranty of any kind, expressed or implied, is made by Watershed Geosynthetics LLC as to the effects of such use or the results to be obtained, nor does Watershed Geosynthetics LLC assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. Nothing herein is to be construed as permission or as a recommendation to infringe any patent.

Appendix G
Example Sand Infill Hydraulic Shear Calculations

Technical Note

EXAMPLE SAND INFILL HYDRAULIC SHEAR CALCULATIONS

INTRODUCTION

Sand infill hydraulic stability in ClosureTurf® has been independently tested by the third-party laboratory, TRI Environmental. Test results demonstrate minimal sand infill mobilization at hydraulic shear values exceeding 1.5 lb/ft^2. The suggested design value for evaluating the potential for infill mobilization is 0.8 lb/ft^2.

An example set of calculations utilizing site specific parameters to estimate hydraulic shear from rainfall runoff are provided. The purpose of the calculations is to evaluate whether the calculated maximum hydraulic shear stress in the sand infill of ClosureTurf exceeds the suggested critical hydraulic shear stress. The calculations that follow are meant to serve as a suggested method to estimate the maximum hydraulic shear stress possible at potential ClosureTurf installations.

Two different hydraulic shear calculations are evaluated, differentiated by location and the choice of geomembrane liner used in the ClosureTurf system. The drainage length details are as follows, and the calculation results are summarized in Table 1.

1. Top deck with MicroSpike® + side slope with Super Gripnet® or MicroDrain®.
2. Side slope with Super Gripnet® or MicroDrain®.

Table 1. Summary of Hydraulic Shear Calculation Results

Drainage Path No.	Segment No.	Slope (%)	Length (ft)	Geomembrane Liner	Calculated Maximum Hydraulic Shear Stress (psf)	Suggested Critical Hydraulic Shear Stress (psf)	Hydraulic Shear Stress (Meets or Does Not Meet)
1	1	3	208	MicroSpike	0.15	0.8	meets suggested criteria
	2	32	111	Super Gripnet/ MicroDrain	0.48	0.8	meets suggested criteria
2	1	27	383	Super Gripnet	0.53	0.8	meets suggested criteria

Drainage Path 1 – MicroSpike® on Top Deck & Super Gripnet®/MicroDrain® on the Side Slope – 100-year, 60-minute Design Storm

Drainage Path 1 consists of a top deck with a 3.0% slope and a drainage length of approximately 208 ft which drains to a side slope with a drainage length of approximately 111 ft at a 32% slope (3.1H:1V). The calculation assumes MicroSpike geomembrane for the top deck and Super Gripnet or MicroDrain geomembrane for the side slope.

Design Parameters:

Top Deck:

- Drainage length: L_1 = 208 ft (See Figure 1)
- Slope: S_1 = 3%
- Slope angle: $\alpha_1 = \tan^{-1}(3/100) = 1.72°$
- Hydraulic gradient: i_1 = 3.0% or 0.03
- Manning's roughness coefficient: n_1 = 0.22 (for slope ≤ 10%; See Watershed Geo ClosureTurf Design Guidance Manual)
- Geomembrane type: MicroSpike (without internal drainage layer)

Side Slope:

- Drainage length: L_2 = 111 ft (see Figure 1)
- Slope: S_2 = 3.1H:1V (32.3%)
- Slope angle: $\alpha_2 = \tan^{-1}(1/3.1) = 17.9°$
- Hydraulic gradient: i_2 = 32.3% or 0.323
- Manning's roughness coefficient: n_2 = 0.12 (for slope > 10%; See Watershed Geo ClosureTurf Design Guidance Manual)
- Geomembrane type: Super Gripnet or MicroDrain (with internal drainage layer)
- Transmissivity of ClosureTurf with Super Gripnet or MicroDrain (use the data in Figure 4, the ClosureTurf transmissivity test report by SGI to calculate the transmissivity at the slope of 32.3% or i = 0.323):
    - Flow Rate: $q = 12.28 \times i^{0.624} = 12.28 \times 0.323^{0.624} = 6.07\ gpm/ft$
    - Transmissivity: $\theta_{i=0.323} = 0.00020697 \times \frac{q}{i} = 0.00020697 \times \frac{6.07}{0.323} = 3.89 \times 10^{-3}\ m^2/sec$

Other Design Parameters:

- Design rainfall intensity (see Figures 2 and 3, the 100-yr, 1-hr rainfall intensity map):

$$R = 3.78\frac{in}{hr} = 0.315\frac{ft}{hr}$$

- Critical hydraulic shear stress of ClosureTurf with manufactured sand infill:

$$\tau_C = 0.8\ psf$$

Step 1: Calculate the maximum hydraulic shear stress of flow on the top deck:

Flow rate on the top deck under the design rainfall intensity (assuming unit width of 1 ft of final cover):

$$q_1 = L_1 \cdot R \cdot \cos\alpha_1 = 208\ ft \times 0.315\frac{ft}{hr} \times \cos 1.72° = 65.49\frac{ft^2}{hr} = 0.0182\frac{ft^2}{s}$$

The flow rate:

$$q_1 = v_1 \cdot A_1 = v_1 \cdot (H_1 \times 1\ ft) = v_1 \cdot H_1$$

Where, H_1 is flow depth on the top deck (ft). Using the Manning's Equation and assuming the hydraulic radius equals to the flow depth (in ft):

$$v_1 = \frac{1.49}{n_1} H_1^{\frac{2}{3}} \sqrt{S_1}$$

Therefore,

$$q_1 = v_1 \cdot H_1 = \frac{1.49}{n_1} H_1^{\frac{2}{3}} \sqrt{S_1} \cdot H_1 = \frac{1.49}{n_1} H_1^{\frac{5}{3}} \sqrt{S_1}$$

Solve the above equation for H_1,

$$H_1 = \left(\frac{q_1 \cdot n_1}{1.49 \cdot \sqrt{S_1}}\right)^{\frac{3}{5}} = \left(\frac{0.0182 \times 0.22}{1.49 \cdot \sqrt{0.03}}\right)^{\frac{3}{5}} = 0.0821 ft$$

The maximum hydraulic shear stress by the water flow on slope:

$$\tau_1 = \gamma_w \cdot H_1 \cdot S_1 = 62.4\frac{lb}{ft^3} \times 0.0821 ft \times 0.03 = 0.15\ psf < \tau_c (= 0.8\ psf) \quad \checkmark$$

The calculated maximum hydraulic shear stress on the sand infill is less than the suggested critical hydraulic shear stress, indicating minimal sand infill mobilization is expected to occur.

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Step 2: Calculate the maximum hydraulic shear stress of flow on the side slope

Water from the top deck will flow onto the side slope. The total flow at the end of the side slope is:

$$q_{total} = q_1 + q_2 = q_1 + L_2 \cdot R \cdot \cos\alpha_2 = 65.49\frac{ft^2}{hr} + \left(111ft \times 0.315\frac{ft}{hr} \times \cos 17.9°\right)$$
$$= 98.76\frac{ft^2}{hr} = 0.0274\frac{ft^2}{s}$$

Part of the flow is expected to be through the internal drainage channel of the Super Gripnet or MicroDrain (i.e., the space within the drainage studs of Super Gripnet or MicroDrain). The internal flow capacity of ClosureTurf with Super Gripnet or MicroDrain is:

$$q_{int} = \theta_{i=0.323} \cdot i_2 = 3.89 \times 10^{-3}\frac{m^2}{sec} \times 0.323$$
$$= 3.89 \times 10^{-3} \times \frac{(3.28ft)^2}{\left(\frac{1}{3600}\right)hr} \times 0.323 = 48.66\frac{ft^2}{hr}$$

The remaining flow will be through the turf and sand infill:

$$q'_{total} = q_{total} - q_{int} = 98.76\frac{ft^2}{hr} - 48.66\frac{ft^2}{hr} = 50.10\frac{ft^2}{hr} = 0.0139\frac{ft^2}{s}$$

The flow rate:

$$q'_{total} = v_2 \cdot A_2 = v_2 \cdot (H_2 \times 1\,ft) = v_2 \cdot H_2$$

Where, H_2 is flow depth on the slope (ft). Using the Manning's Equation and assuming the hydraulic radius equals to the flow depth (in ft):

$$v_2 = \frac{1.49}{n_2} H_2^{\frac{2}{3}} \sqrt{S_2}$$

Therefore,

$$q'_{total} = v_2 \cdot H_2 = \frac{1.49}{n_2} H_2^{\frac{2}{3}} \sqrt{S_2} \cdot H_2 = \frac{1.49}{n_2} H_2^{\frac{5}{3}} \sqrt{S_2}$$

Solve the above equation for H_2,

$$H_2 = \left(\frac{q'_{total} \cdot n_2}{1.49 \cdot \sqrt{S_2}}\right)^{\frac{3}{5}} = \left(\frac{0.0139 \times 0.12}{1.49 \cdot \sqrt{0.323}}\right)^{\frac{3}{5}} = 0.0238ft$$

The maximum hydraulic shear stress by the water flow on the slope:

$$\tau_2 = \gamma_w \cdot H_2 \cdot S_2 = 62.4\frac{lb}{ft^3} \times 0.0238ft \times 0.323 = 0.48\,psf < \tau_c (= 0.8\,psf) \quad ✓$$

The calculated maximum hydraulic shear stress on the sand infill is less than the suggested critical hydraulic shear stress, indicating minimal sand infill mobilization is expected to occur.

Drainage Path 2 – Side Slope with Super Gripnet® – 100-year, 60-minute Design Storm

Drainage Path 2 consists of a side slope with a drainage length of approximately 383 ft at a 3.7H:1V slope. This calculation assumes Super Gripnet geomembrane for the side slope.

Design Parameters:

Side Slope:

- Drainage length: L_1 = 383 ft (See Figure 1)
- Slope: S_1 = 3.7H:1V (27.0%)
- Slope angle: $\alpha_1 = \tan^{-1}(1/3.7) = 15.12°$
- Hydraulic gradient: i_1 = 27.0% or 0.270
- Manning's roughness coefficient: n_2 = 0.12 (for slope > 10%; See Watershed Geo ClosureTurf Design Guidance Manual)
- Geomembrane type: Super Gripnet (with internal drainage layer)
- Transmissivity of ClosureTurf with Super Gripnet or MicroDrain (use the data in Figure 4, the ClosureTurf transmissivity test report by SGI to calculate the transmissivity at the slope of 27.0% or i = 0.270):
  - Flow Rate: $q = 12.28 \times i^{0.624} = 12.28 \times 0.270^{0.624} = 5.42\ gpm/ft$
  - Transmissivity: $\theta_{i=0.270} = 0.00020697 \times \frac{q}{i} = 0.00020697 \times \frac{5.42}{0.270} = 4.15 \times 10^{-3}\ m^2/sec$

Other Design Parameters:

- Design rainfall intensity (see Figures 2 and 3, the 100-yr, 1-hr rainfall intensity map):

$$R = 3.78\frac{in}{hr} = 0.315\frac{ft}{hr}$$

- Critical hydraulic shear stress of ClosureTurf with manufactured sand infill:

$$\tau_C = 0.8\ psf$$

Step 1: Calculate the maximum hydraulic shear stress of flow on the side slope:

Flow rate on the side slope under the design rainfall intensity (assuming unit width of 1 ft of final cover):

$$q_1 = L_1 \cdot R \cdot \cos\alpha_1 = 383\ ft \times 0.315\frac{ft}{hr} \times \cos 15.12° = 116.5\frac{ft^2}{hr} = 0.0324\frac{ft^2}{s}$$

Part of the flow is expected to be through the internal drainage channel of the Super Gripnet (i.e., the space within the drainage studs of Super Gripnet). The internal flow capacity of ClosureTurf with Super Gripnet is:

$$q_{int} = \theta_{i=0.270} \cdot i_1 = 4.15 \times 10^{-3}\frac{m^2}{sec} \times 0.270$$
$$= 4.15 \times 10^{-3} \times \frac{(3.28ft)^2}{\left(\frac{1}{3600}\right)hr} \times 0.270 = 43.40\frac{ft^2}{hr}$$

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The remaining flow will be through the turf and sand infill:

$$q'_{total} = q_{total} - q_{int} = 116.5\frac{ft^2}{hr} - 43.40\frac{ft^2}{hr} = 73.10\frac{ft^2}{hr} = 0.0203\frac{ft^2}{s}$$

The flow rate:

$$q'_{total} = v_1 \cdot A_1 = v_1 \cdot (H_1 \times 1\ ft) = v_1 \cdot H_1$$

Where, H_1 is flow depth on the slope (ft). Using the Manning's Equation and assuming the hydraulic radius equals to the flow depth (in ft):

$$v_1 = \frac{1.49}{n_1} H_1^{\frac{2}{3}} \sqrt{S_1}$$

Therefore,

$$q'_{total} = v_1 \cdot H_1 = \frac{1.49}{n_1} H_2^{\frac{2}{3}} \sqrt{S_1} \cdot H_1 = \frac{1.49}{n_1} H_1^{\frac{5}{3}} \sqrt{S_1}$$

Solve the above equation for H_1,

$$H_1 = \left(\frac{q'_{total} \cdot n_1}{1.49 \cdot \sqrt{S_1}}\right)^{\frac{3}{5}} = \left(\frac{0.0203 \times 0.12}{1.49 \cdot \sqrt{0.270}}\right)^{\frac{3}{5}} = 0.0315\ ft$$

The maximum hydraulic shear stress by the water flow on the slope:

$$\tau_1 = \gamma_w \cdot H_1 \cdot S_1 = 62.4\frac{lb}{ft^3} \times 0.0315 ft \times 0.270 = 0.53\ psf < \tau_c (= 0.8\ psf) \quad \checkmark$$

The calculated maximum hydraulic shear stress on the sand infill is less than the suggested critical hydraulic shear stress, indicating minimal sand infill mobilization is expected to occur.

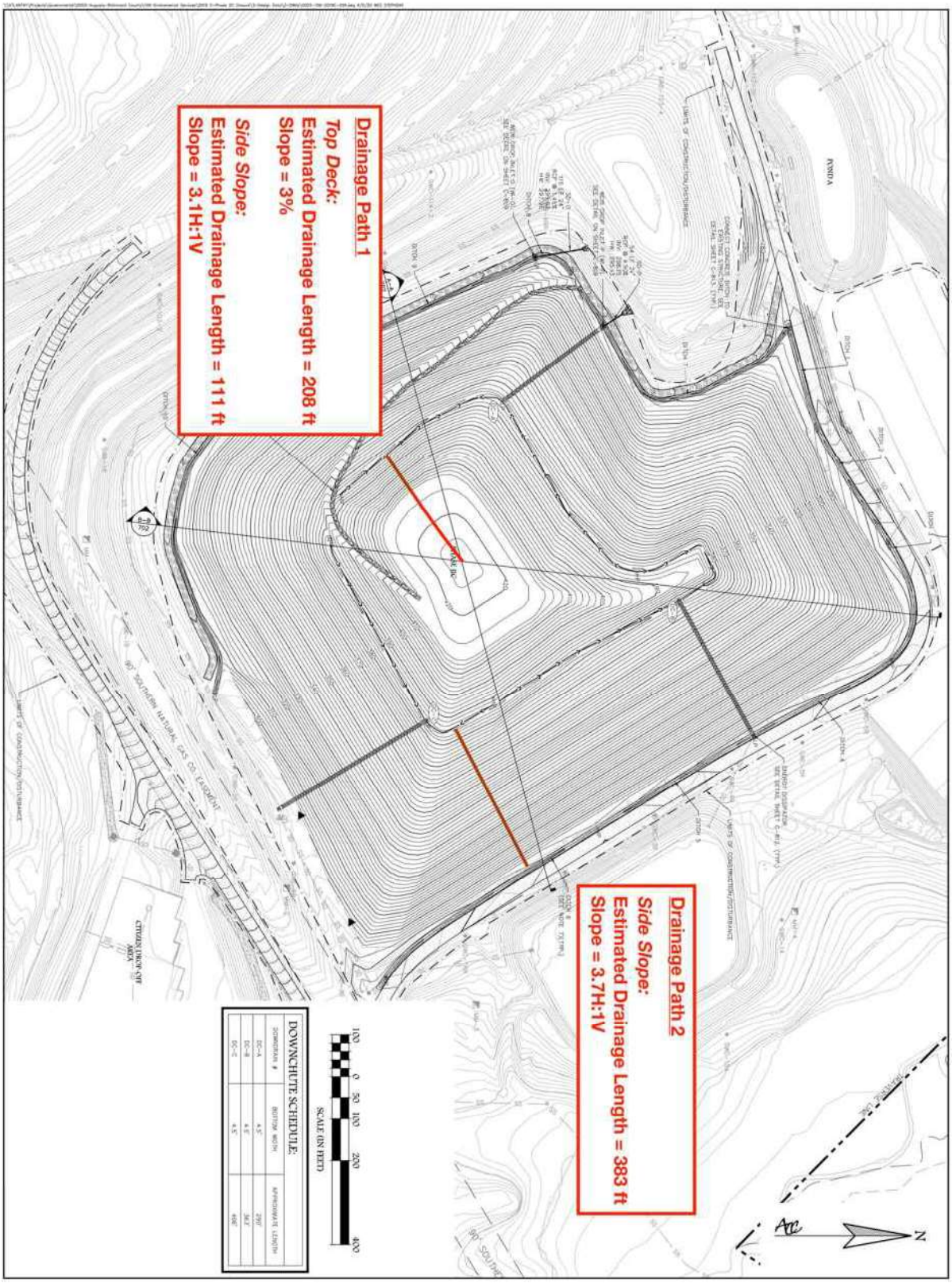


Figure 1. Grading plan with drainage path identified

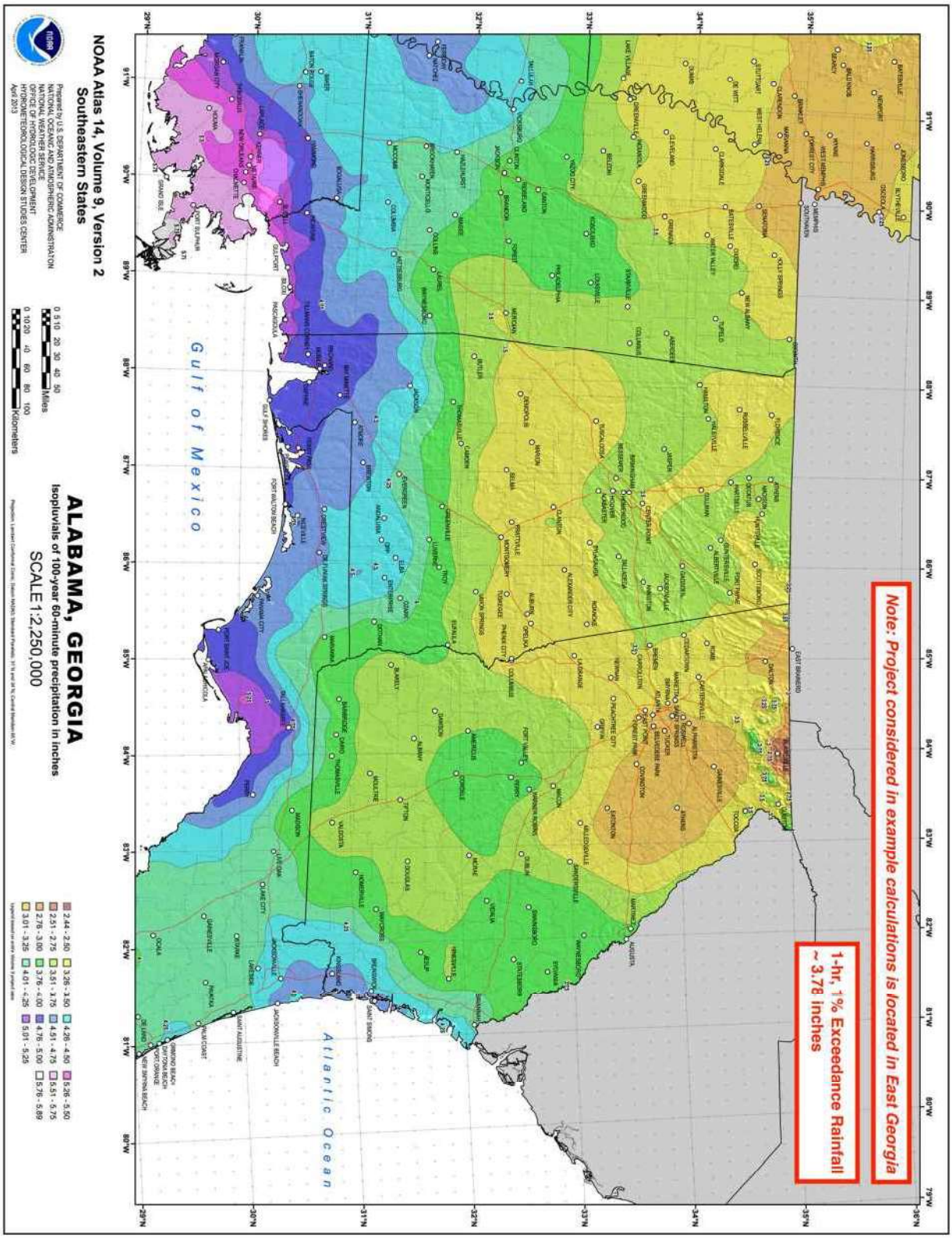


Figure 2. Alabama & Georgia Isopluvials (NOAA Atlas 14)

NOAA Atlas 14, Volume 9, Version 2

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.414 (0.346-0.502)	0.485 (0.405-0.589)	0.604 (0.502-0.736)	0.705 (0.582-0.863)	0.849 (0.674-1.07)	0.963 (0.743-1.23)	1.08 (0.800-1.42)	1.20 (0.846-1.62)	1.36 (0.920-1.89)	1.49 (0.975-2.09)
10-min	0.606 (0.506-0.736)	0.710 (0.593-0.863)	0.885 (0.735-1.08)	1.03 (0.852-1.26)	1.24 (0.987-1.57)	1.41 (1.09-1.81)	1.58 (1.17-2.07)	1.76 (1.24-2.37)	2.00 (1.35-2.76)	2.18 (1.43-3.06)
15-min	0.739 (0.618-0.897)	0.866 (0.723-1.05)	1.08 (0.896-1.31)	1.26 (1.04-1.54)	1.52 (1.20-1.92)	1.72 (1.33-2.20)	1.93 (1.43-2.53)	2.14 (1.51-2.89)	2.44 (1.64-3.37)	2.66 (1.74-3.73)
30-min	1.09 (0.908-1.32)	1.27 (1.06-1.55)	1.58 (1.32-1.93)	1.85 (1.53-2.26)	2.23 (1.77-2.82)	2.53 (1.95-3.24)	2.83 (2.10-3.72)	3.15 (2.22-4.25)	3.59 (2.42-4.96)	3.93 (2.57-5.50)
60-min	1.41 (1.18-1.71)	1.64 (1.37-1.99)	2.03 (1.69-2.47)	2.38 (1.96-2.91)	2.90 (2.31-3.69)	3.32 (2.57-4.28)	3.78 (2.81-4.98)	4.26 (3.01-5.76)	4.93 (3.34-6.85)	5.48 (3.58-7.68)
2-hr	1.74 (1.46-2.09)	2.00 (1.68-2.41)	2.48 (2.08-2.99)	2.91 (2.42-3.52)	3.57 (2.88-4.52)	4.12 (3.23-5.28)	4.72 (3.55-6.18)	5.36 (3.84-7.21)	6.28 (4.29-8.66)	7.03 (4.64-9.77)
3-hr	1.92 (1.63-2.29)	2.19 (1.86-2.62)	2.70 (2.28-3.24)	3.19 (2.67-3.83)	3.94 (3.21-4.99)	4.58 (3.62-5.86)	5.29 (4.00-6.92)	6.07 (4.37-8.14)	7.19 (4.95-9.89)	8.11 (5.39-11.2)
6-hr	2.28 (1.95-2.69)	2.57 (2.19-3.05)	3.14 (2.67-3.73)	3.70 (3.12-4.41)	4.59 (3.78-5.78)	5.37 (4.28-6.82)	6.24 (4.77-8.11)	7.20 (5.25-9.60)	8.62 (6.00-11.8)	9.79 (6.56-13.4)
12-hr	2.71 (2.33-3.17)	3.04 (2.62-3.56)	3.68 (3.16-4.33)	4.30 (3.67-5.08)	5.30 (4.41-6.60)	6.17 (4.97-7.75)	7.13 (5.51-9.18)	8.21 (6.04-10.8)	9.78 (6.87-13.2)	11.1 (7.50-15.0)
24-hr	3.17 (2.76-3.67)	3.56 (3.09-4.13)	4.30 (3.72-5.00)	5.00 (4.30-5.84)	6.09 (5.10-7.48)	7.03 (5.71-8.73)	8.06 (6.28-10.2)	9.20 (6.83-12.0)	10.8 (7.69-14.5)	12.2 (8.35-16.4)
2-day	3.65 (3.20-4.19)	4.11 (3.61-4.72)	4.96 (4.33-5.71)	5.74 (4.98-6.64)	6.95 (5.86-8.42)	7.97 (6.52-9.77)	9.08 (7.13-11.4)	10.3 (7.70-13.3)	12.0 (8.61-15.9)	13.4 (9.29-17.9)
3-day	3.99 (3.52-4.55)	4.48 (3.95-5.12)	5.37 (4.72-6.15)	6.20 (5.41-7.13)	7.46 (6.33-8.99)	8.53 (7.02-10.4)	9.69 (7.66-12.1)	11.0 (8.25-14.0)	12.8 (9.19-16.8)	14.2 (9.91-18.9)
4-day	4.29 (3.80-4.87)	4.80 (4.25-5.45)	5.72 (5.05-6.53)	6.58 (5.77-7.54)	7.90 (6.72-9.47)	9.01 (7.45-10.9)	10.2 (8.11-12.7)	11.5 (8.72-14.7)	13.4 (9.71-17.6)	15.0 (10.4-19.7)
7-day	5.03 (4.50-5.67)	5.61 (5.00-6.33)	6.65 (5.91-7.52)	7.61 (6.72-8.64)	9.06 (7.77-10.8)	10.3 (8.57-12.4)	11.6 (9.29-14.3)	13.1 (9.95-16.5)	15.1 (11.0-19.6)	16.8 (11.8-22.0)
10-day	5.70 (5.12-6.39)	6.33 (5.67-7.10)	7.45 (6.65-8.38)	8.47 (7.51-9.57)	10.0 (8.62-11.8)	11.3 (9.45-13.5)	12.7 (10.2-15.5)	14.2 (10.9-17.8)	16.3 (12.0-21.1)	18.1 (12.8-23.5)
20-day	7.65 (6.94-8.49)	8.39 (7.59-9.31)	9.66 (8.71-10.8)	10.8 (9.66-12.1)	12.4 (10.8-14.4)	13.8 (11.6-16.2)	15.2 (12.3-18.3)	16.7 (12.9-20.7)	18.8 (13.9-24.0)	20.5 (14.7-26.5)
30-day	9.36 (8.53-10.3)	10.2 (9.29-11.3)	11.6 (10.6-12.9)	12.9 (11.6-14.3)	14.6 (12.7-16.7)	16.0 (13.5-18.6)	17.4 (14.1-20.7)	18.8 (14.6-23.1)	20.8 (15.5-26.3)	22.4 (16.1-28.7)
45-day	11.6 (10.6-12.7)	12.6 (11.6-13.9)	14.3 (13.1-15.8)	15.7 (14.3-17.4)	17.6 (15.3-20.0)	19.0 (16.2-21.9)	20.4 (16.7-24.1)	21.8 (17.0-26.5)	23.6 (17.6-29.6)	25.0 (18.1-31.9)
60-day	13.6 (12.5-14.8)	14.8 (13.6-16.2)	16.8 (15.4-18.4)	18.4 (16.7-20.2)	20.4 (17.8-22.9)	21.9 (18.7-25.0)	23.3 (19.1-27.3)	24.6 (19.3-29.7)	26.3 (19.7-32.7)	27.5 (20.0-34.9)

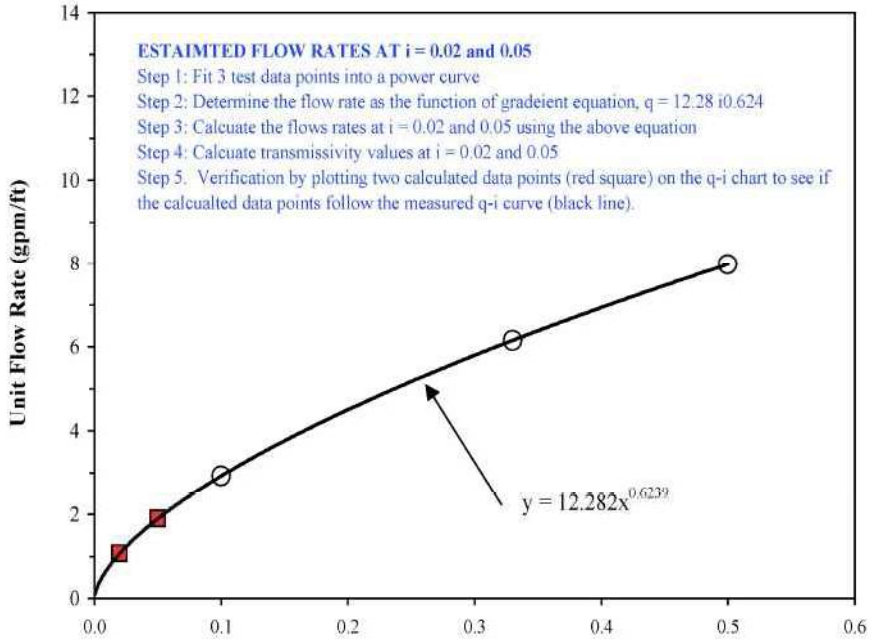
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Figure 3. NOAA Precipitation Data

CLOSURETURF LLC -LANDFILL COVER SYSTEM
HYDRAULIC TRANSMISSIVITY TESTING (ASTM D 4716)
Test Configuration (from Top to Bottom): Sand Layer/Polytex Artificial Grass with Geotextile Side Down/ Agru 50-mil Super Gripnet LLDPE Geomembrane with Studs Side Up



Test No.	Flow Direction	Specimen Size Width x Length (in. x in.)	Total Normal Stress[1] σ_n (psf)	Seating Time t (hour)	Hydraulic Gradient i (-)	Transmissivity $\theta = 0.00020697\left(\frac{q}{i}\right)$ (m^2/sec)	Flow Rate $q = 12.28i^{0.624}$ (gpm/ft)	Flow Rate q' (l/min/m)
					0.02	1.11E-02	1.07	
					0.05	7.84E-03	1.89	
1	MD	12 x12	47	0.25	0.10	6.04E-03	2.92	36.3
2	MD	12 x12	47	0.25	0.33	3.86E-03	6.15	76.4
3	MD	12 x12	47	0.25	0.50	3.30E-03	7.97	99.0

NOTE:
Total normal stress = total weight (sand + steel plate + surcharge) divided by the plan area of test specimen (1 square ft). A normal stress of 47 psf is approximately the minimum total stress required to keep the specimen from uplifting.

SGI TESTING SERVICES, LLC

DATE TESTED:	1/11/2013
FIGURE NO.	A-1
PROJECT NO.	SGI10007
DOCUMENT NO.	
FILE NO.	

Figure 4. Transmissivity test report of ClosureTurf with internal drainage layer

v.21110

Appendix H
ClosureTurf UV Longevity Evaluation Reports

2022 Evaluation Report

Geosyntec consultants

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22 November 2022

José Urrutia, P.E.
Vice President of Engineering
Watershed Geosynthetics
11400 Atlantis Place, Suite 200
Alpharetta, GA 30022

Subject: Assessment of ClosureTurf® UV Longevity

Dear Mr. Urrutia:

Watershed Geosynthetics, Inc. (Watershed) has patented an alternative landfill closure system termed ClosureTurf®. ClosureTurf® consists of high-density polyethylene (HDPE) grass blades tufted through a double-layer polypropylene (PP) geotextile backing which overlies an HDPE or linear low-density polyethylene (LLDPE) structured geomembrane (i.e., Super Gripnet®, MicroDrain®, or MicroSpike®) manufactured by AGRU America Inc. The addition of a layer of sand ballast during installation completes the system. The sand ballast provides cover for the lower portion of the HDPE grass blades, the PP geotextile backing, and the structured geomembrane (Figure 1).

A report titled "Literature Review and Assessment of ClosureTurf® UV Longevity" was prepared by Geosyntec Consultants, Inc. (Geosyntec) and dated 15 May 2015 (Geosyntec, 2015). Watershed has requested that Geosyntec provide an updated assessment of the longevity of the ClosureTurf® system with regard to ultraviolet (UV) exposure and degradation. This report (Report) supersedes the Geosyntec (2015) report. Since ClosureTurf® has elements (i.e., the HDPE grass blades) that are permanently exposed to UV radiation, this Report will be focused on the exposed portion of the system.

Geosyntec's approach to this Report incorporates updated laboratory and field data from samples at multiple sites throughout the Southeastern United States (U.S.) and Arizona into the assessment of HDPE grass blade longevity. This Report concludes with a summary of the analysis along with brief discussion for recommendations.

EXECUTIVE SUMMARY

This Report incorporates updated laboratory and field data regarding the retained tensile strength of HDPE geomembrane and synthetic grass blade materials as a function of exposure to ultraviolet (UV) radiation to estimate the longevity of the exposed grass blades of the ClosureTurf® product.

The laboratory update includes a release of additional data from a Geosynthetics Research Institute (GRI) testing program measuring the effects of UV radiation on HDPE geomembrane strips. The test program incubates HDPE geomembrane strip samples under a UV lamp at elevated temperatures (60°C, 70°C, and 80°C) to accelerate the degradation. The tensile strength and elongation of each strip are then measured after a given period of exposure. Data from this test program for HDPE geomembrane can be converted to field exposure for a given site following the method presented in Richgels (2016). Such a conversion was performed for this Report for five sites, where field test data for the ClosureTurf® HDPE grass blades were also obtained. The five sites are: (i) Atlas Testing Facility, New River, Arizona; (ii) Saufley Field Landfill, Pensacola, Florida; (iii) LaSalle-Grant Landfill in Jena, Louisiana; (iv) Baldwin County Landfill, Georgia; and (v) Berkely County Landfill, South Carolina.

Once the conversion from the GRI laboratory UV exposure to the field UV exposure at each site was completed, extrapolations of retained tensile strength of HDPE geomembrane as a function of UV exposure were made to obtain estimates of half-life (i.e., 50% retained tensile strength) and 12.5% retained tensile strength. The 12.5% value was selected to illustrate extended longevity when performance requirements support the selection of service-life tensile strength values lower than the half-life tensile strength values. The extrapolations included an upper bound (Arrhenius) and a lower bound (linear) of retained tensile strength as a function of UV exposure. Based on the GRI laboratory data for HDPE geomembrane, the resulting upper bound estimate of the half-life of an HDPE grass blade is 93 years in New River, Arizona with a lower bound estimate of 75 years, assuming that the laboratory results of HDPE geomembrane are applicable to HDPE grass blades. For the sites in the Southeastern U.S., the upper bound half-life estimate is 157 years, while the lower bound estimate is 83 years. If the 12.5% retained strength is considered for the HDPE grass blades, rather than the half-life, the upper and lower bound estimates for the New River, Arizona site are 216 years and 181 years, respectively. For the Southeastern U.S., if the 12.5% retained strength is considered, the upper bound and lower bound estimates are 376 and 204 years, respectively.

The field test data from the five sites consisted of measurements of the tensile strength of the ClosureTurf® HDPE grass blades at given durations of field exposure. The New River, Arizona site is a field weathering testing facility where samples of ClosureTurf® HDPE grass blades were exposed to sunlight concentrated by an array of mirrors to accelerate the degradation process by a factor of seven. The remaining four sites in the Southeastern U.S. are waste facilities where ClosureTurf® was installed. The field test data of ClosureTurf® HDPE grass blades from the New River, Arizona site (i.e., the accelerated weathering testing site) as well as the four Southeastern U.S. sites (i.e., the real-world weathering sites) consistently plotted above the upper bound curve developed from the GRI laboratory data for HDPE geomembrane. This suggests that the length of time required to reach half-life (or any

other value of the percent retained tensile strength) of the HDPE grass blades in the field is longer than indicated by the estimates from the conversion of GRI laboratory data. The disparity is likely due to ignoring the antioxidant depletion phase in the laboratory data as well as site environmental factors (e.g., moisture, shading, slopes, etc.) that are not included in the method of conversion from laboratory exposure to field exposure.

Given these factors and results it is reasonable to expect that the half-life of the HDPE grass blades of the ClosureTurf® product is on the order of 100 years under the New River, Arizona climatic conditions. Since the New River, Arizona site has the highest levels of UV irradiance and temperature in the United States, sites located elsewhere will have greater half-life estimates in general proportion to the ratio of UV irradiance. Furthermore, performance requirements of the ClosureTurf® HDPE grass blades may permit evaluation of longevity beyond the half-life, thereby extending the expected duration of field performance.

DATA SUMMARY

Data sets currently available when this Report is prepared represent an expansion over what was available during the Geosyntec (2015) study. The current data includes measurements of tensile strength of HDPE grass blades after UV exposure from multiple sites where ClosureTurf® has been installed and tensile strength of HDPE geomembrane and grass blades from additional accelerated weathering tests. The data sets of direct measurement of tensile strength as a function of UV exposure utilized in this Report include:

1. Geosynthetics Research Institute (GRI) laboratory data release on the effects of accelerated weathering of HDPE geomembrane strips presented by Dr. Robert Koerner at GeoAmericas (2016). The effects are measured in terms of changes to tensile strength as a function of UV exposure under a fluorescent lamp at various temperatures. The data contains updates from GRI in addition to what was included in the Geosyntec (2015) Report.

2. Data from the New River, Arizona field testing facility. The data includes measurements of retained tensile strength of HDPE grass blades exposed to full spectrum radiation using sunlight concentrated by mirrors to accelerate the weathering process. The testing setup accelerates the effects of exposure duration by a factor of seven.

3. Tensile strength test results of HDPE grass blade samples retrieved from the following ClosureTurf® sites: (i) Saufley Field Landfill, Pensacola, Florida; (ii) LaSalle-Grant Landfill, Jena, Louisiana; (iii) Baldwin County Landfill, Georgia; and (iv) Berkely County Landfill,

South Carolina. The data include measurements of retained tensile strength as a function of real-world sunlight exposure in years.

DATA DISCUSSION

The GRI data set involves controlled exposure of geosynthetic samples to temperature and UV radiation simulating solar maximum exposure with a UV source at three constant temperatures (60°C, 70°C, and 80°C). The testing program is performed in accordance with ASTM D7238 procedures for *Standard Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus.* Charts were produced with this updated data in Richgels (2016), which presents the retained tensile strength of the HDPE geomembrane test samples incubated at each temperature set as a function of the cumulative UV exposure (Figure 2). Stages A to B (antioxidant depletion and transition periods) and Stage C (polymer oxidation) are distinguished in the charts, and the Stage C data points were selected for the regression.

The application of the GRI laboratory data to individual field sites requires conversion of the exposure conditions of the laboratory to local site conditions. While site specific exposure information for the Atlas Testing Facility in New River, Arizona was included in Richgels (2015a, 2015b), exposure conversion to other sites had to be developed. Richgels (2016) performed such a conversion from the GRI laboratory data to several sites in Florida using solar radiation and temperature data from the National Renewable Energy Laboratory (NREL). The temperature and radiation data for each site is expressed by NREL in a Total Meteorological Year (TMY3), a multiyear dataset from which 12 months are chosen that best represent the median conditions. Geosyntec adopted this same procedure for the sites included in this Report.

The Geosyntec (2015) report presented tensile property testing of the field samples of the HDPE grass blades exposed to the New River, Arizona environment at the Atlas Testing Facility for approximate exposure periods of 1, 5, 7, and 10 years. The average values for tensile strength retained at each corresponding period was determined to be 97.2%, 89.7%, 83.8%, and 82.5%, respectively. Watershed is conducting additional accelerated weathering testing at the same facility using the Equatorial Mount with Mirrors for Acceleration (EMMA) solar concentration device, which provides approximately seven years of UV radiation exposure in one calendar year. Additional tensile property testing was performed on samples of the HDPE grass blades collected from the accelerated weathering testing. The approximate exposure periods for these samples were one, two, and three calendar years, which correspond to accelerated exposure periods of approximately 7, 14, and 21 years, respectively. The average values for tensile strength retained for these exposure periods are 92.2%, 83.3%, and 80.7%, respectively (Figure 3).

Similar data was collected for field samples of the HDPE grass blades weathered under climatic conditions at the landfills in Berkley County, South Carolina, Baldwin County, Georgia, Pensacola, Florida, and Jena, Louisiana. The exposure periods of the samples for these sites were:

- Berkley County, 2 years
- Baldwin County, 3 years
- Pensacola, Florida, 5 years
- Jean, Louisiana, 7 and 8 years

The average values for tensile strength retained for these exposure periods were 100%, 99.1%, 97.3%, 85.4%, and 96.8%, respectively (Figure 4). Because the yearly irradiation is fairly uniform in the Southeastern region of the U.S. (Figure 5), the field data obtained from sites in this region were grouped together on a single plot, as shown in Figure 4. The new EMMA and field test data were added onto the figure of half-life projections presented in the Geosyntec (2015) Report, as shown in Figure 6. The new data, which are plotted at or above the trend lines, support the longevity of ClosureTurf projected in the Geosyntec (2015) Report.

PERFORMANCE REQUIREMENTS

The acceptable level of degradation for a given property of polyolefins due to exposure to UV radiation should be based on the performance requirements of that particular aspect of the product. In the case of HDPE grass blades of the ClosureTurf® system, performance requirements for tensile strength may be as low as 2.5 to 3.5 pounds (lbs.) based on the applied loads of pullout forces from equipment operation and water runoff (Diguilo, 2013). Since the original manufactured strength of an HDPE grass blade is a minimum of approximately 20 lbs., the performance requirement is approximately 12.5%, if no factor of safety is included. Both the original manufactured strength of the product and the performance requirement should be evaluated for each individual application. However, for the purposes of this Report, Geosyntec utilized 12.5% of original strength as the performance requirement to illustrate the difference in duration with the half-life criterion.

HDPE GRASS BLADE LONGEVITY EVALUATION

In order to develop a prediction for the longevity of the HDPE grass blades with respect to UV degradation for each of the sites from which field data was collected, Geosyntec implemented the method found in Richgels (2016) for two levels of retained tensile strength (i.e., 50% and 12.5% of the

original property value). The method uses the same calculation procedure used in Richgels (2015a and 2015b) but incorporates the updated data from GRI and UV irradiance and temperature data collected from NREL for each site. In the Geosyntec (2015) Report, Geosyntec performed the calculations in accordance with the Richgels (2015a and 2015b) procedure for Arizona climatic conditions and compared the results with the results presented therein, which were generally in agreement. Once the half-life estimates were calculated, Geosyntec repeated the calculations for 12.5% of retained strength. The same two levels of retained tensile strength (i.e., 50% and 12.5%) were utilized in this Report.

Half-Life Estimation (50% of Retained Strength)

The assessment of half-life is based on the updated data from GRI using retained tensile strength of HDPE geomembrane samples incubated under a UV lamp at elevated temperatures. The elevated temperatures accelerate the UV weathering process in accordance with ASTM D7238.

The GRI data includes samples tested at three elevated temperatures: (i) 80 degrees Celsius (°C); (ii) 70°C; and (iii) 60°C. The 80°C data set reached 50% retained strength, the 70°C data set reached approximately 60% retained strength, and the 60°C data set reached approximately 80% retained strength. Logarithmic extrapolations to 50% retained strength were performed for each temperature data set. The amount of exposure time (on a log scale) corresponding to the 50% retained strength plotted vs. the inverse of the corresponding temperature (80°C, 70°C and 60°C) is shown in Figure 7. Figure 7 allows for extrapolation to find the laboratory exposure time required to achieve 50% retained strength at temperatures lower than the test temperatures (i.e., actual field temperatures).

Once the relationship between temperature and laboratory exposure is defined, a relationship between laboratory exposure and field exposure for a particular site can be constructed. Sites included in this Report are: (i) Atlas Testing Facility, New River, Arizona; (ii) Saufley Field Landfill, Pensacola, Florida; (iii) Lasalle-Grant Landfill, Jena, Louisiana; (iv) Berkley County Landfill, South Carolina; and (v) Baldwin County Landfill, Georgia. These locations correspond to the sites where Watershed has obtained tensile strength measurements on HDPE grass blade samples.

Richgels (2015a and 2015b) presents monthly averages at the Arizona site for: (i) peak turf temperature; and (ii) irradiance as a fraction of the laboratory lamp irradiance. The monthly averages of these parameters for the sites outside of Arizona were obtained from NREL, and the irradiance as a fraction of the laboratory lamp irradiance was determined for each site. The average turf temperature was conservatively estimated by increasing the measured ambient temperature by a factor of two (Richgels, 2016). Using these two parameters for a given month combined with the Arrhenius function, an estimate of half-life loss per month is obtained. Summation of the half-life lost per month over a year yields the annual half-life loss. The inverse of the annual half-life loss is the predicted half-life in years. Using this method to estimate the

half-life for the Pensacola region, Richgels obtained a half-life of approximately 200 years, while Geosyntec obtained a half-life of 132 years (Table 1). The difference is attributable to rounding errors in the logarithmic projections and updates to the solar radiation and temperature information used in NREL datasets. The half-life estimates for the sites in New River, Arizona, Jena, Louisiana, Berkley County, South Carolina, and Baldwin County, Georgia were calculated by Geosyntec as 93, 151, 157, and 157 years, respectively.

Following the suggestion of Koerner et al. (2015), Richgels (2016) treated the results of the half-life mentioned above as an upper bound estimate. For the lower bound estimate, Koerner et al. (2015) suggested performing a linear extrapolation of the laboratory data to lower field temperatures, rather than using the Arrhenius function. With the linear extrapolation, the ratio of monthly irradiance to laboratory lamp irradiance is scaled linearly to calculate the number of months required to reach half-life at 80ºC, 70ºC and 60ºC. Linear extrapolations per month are made from the elevated lab temperatures to the corresponding average turf temperature in that month (Table 2 and Figures 8 through 12). The resulting half-life loss per month is summed to obtain half-life loss per year. The inverse of that result is the half-life in years. For the Pensacola region, Richgels (2016) calculates a half-life of 118 years using this linear model. Geosyntec's calculation resulted in a half-life of 83 years. The half-life estimates for the sites located in New River, Arizona, Jena, Louisiana, Berkley County, South Carolina, and Baldwin County, Georgia were calculated as 75, 91, 90, and 90 years, respectively.

Figure 13 shows the upper (Arrhenius - logarithmic) and lower (linear) bound curves calculated by Geosyntec along with the field data on the HDPE grass blades provided by Watershed (2014 and 2022) for the New River, AZ site. Because of the uniformity of the annual irradiance among the southeastern sites (Figure 5), little variation was observed in the calculated upper and lower bound curves for these sites. Therefore, Figure 14 shows the limits of the calculated upper and lower bound curves for the southeastern sites along with the field data from these sites. As shown in these figures, the field data falls above the upper and lower bound curves. Note that the first point from the field data collected from the Atlas Testing Facility in Arizona at approximately 1 year is omitted from the trend line (Figure 13). This is because the first data point is assumed to be within the antioxidant phase of degradation rather than the polymer oxidation stage as suggested by Rowe et al. (2010). Additional discussion regarding the stages of degradation for polyolefin materials can be found in CUR 243 (2012).

Service Life Estimation Based on Performance Requirements (12.5% of Retained Strength)

Geosyntec repeated the calculations discussed above but extrapolated the GSI laboratory data down to 12.5% retained strength rather than 50% at 80ºC, 70ºC and 60ºC for the sites located in New River, Arizona, Pensacola, Florida, Jena, Louisiana, Berkley County, South Carolina, and Baldwin County, Georgia. The upper bound (Arrhenius - logarithmic) estimates were 216, 314, 359, 376, and 376 years, respectively. The lower bound (linear) estimates were 181, 204, 223, 236, and 221 years, respectively.

The estimates of service life at 12.5% retained strength provided in the Geosyntec (2015) Report were too large to be reasonable. A likely explanation is that the samples tested at 80ºC, 70ºC and 60ºC had not degraded enough to produce accurate predictions at 12.5% retained strength. Given that the updated data from GRI included additional exposure at each of the three test temperatures, a better estimate for time of exposure to reach 12.5% strength was obtained for this Report. However, if the retained strength for laboratory samples approaches 12.5% retained strength in future data releases, the estimates for the corresponding time of exposure may be further refined.

SUMMARY AND CONCLUSIONS

Watershed has provided Geosyntec with supplemental ClosureTurf® accelerated weathering test data from the Atlas Testing Facility, New River, AZ and new field test data from four ClosureTurf® sites located in the Southeastern U.S. Following the laboratory to field conversion method presented in Richgels (2016), Geosyntec calculated the expected exposure duration at the 50% and 12.5% retained tensile strengths of HDPE grass blades under the exposure conditions at the five locations, based on the GRI laboratory UV test results for HDPE geomembrane and then compared them with the test results of field samples of HDPE grass blades.

The method included upper bound and lower bound calculations for each site. The results of the upper bound calculations using the GRI laboratory data yielded exposure durations for 50% retained tensile strength of: (i) 132 years for Saufley Field Landfill in Pensacola, Florida; (ii) 151 years for LaSalle-Grant Landfill in Jena, Louisiana; (iii) 157 years for the Berkely County Landfill; (iv) 157 years for the Baldwin County Landfill; and (v) 93 years for the Atlas Testing Facility in New River, Arizona.

The results of the lower bound calculations using the GRI laboratory data yielded exposure durations for 50% retained tensile strength of: (i) 83 years for Saufley Field Landfill in Pensacola, Florida; (ii) 91 years for LaSalle-Grant Landfill in Jena, Louisiana; (iii) 90 years for the Berkely County Landfill; (iv) 90 years for the Baldwin County Landfill; and (v) 75 years for the Atlas Testing Facility in New River, Arizona.

These calculations were repeated using 12.5% retained tensile strength to illustrate the difference in exposure duration if a performance-based criteria is used rather than half-life. The results of the upper bound calculations yielded exposure durations of: (i) 314 years for Saufley Field Landfill in Pensacola, Florida; (ii) 359 years for LaSalle-Grant Landfill in Jena, Louisiana; (iii) 376 years for the Berkely County Landfill; (iv) 376 years for the Baldwin County Landfill; and (v) 216 years for the Atlas Testing Facility in New River, Arizona.

The lower bound calculations yielded exposure durations for 12.5% retained tensile strength of: (i) 204, years for Saufley Field Landfill in Pensacola, Florida; (ii) 223 years for LaSalle-Grant Landfill in Jena,

Louisiana; (iii) 236 years for the Berkely County Landfill; (iv) 221 years for the Baldwin County Landfill; and (v) 181 years for the Atlas Testing Facility in New River, Arizona.

The results above for the Saufley Field Landfill site in Pensacola, Florida were compared with the results given in Richgels (2016) where a similar conversion was performed. Richgels (2016) obtained an upper bound duration for 50% retained strength of 200 years and a lower bound result of 118 years, compared with Geosyntec's results of 132 years and 83 years, respectively. The differences between Geosyntec and Richgels calculations were attributed to rounding and updates to solar radiation and temperature information used in NREL datasets. However, the comparison generally demonstrates agreement between Geosyntec and Richgels (2016).

Plots of the field data and the upper and lower bound half-life estimates based on the GRI data for the New River, AZ site and the sites in the Southeastern U.S. are shown in Figures 13 and 14, respectively. As displayed in the figures, the field data consistently plots above the upper bound estimates. This difference may be attributable to environmental factors not accounted for in the laboratory or laboratory to field conversion method. These environmental factors may include orientation of the samples in the field, shading from slopes or adjacent grass blades, moisture conditions, etc. (GRI, 2019). Furthermore, as demonstrated in GRI (2019), it is seen that the laboratory lifetimes are somewhat lower than the field lifetimes, indicating that the laboratory incubation devices are more severe in their exposure and radiation when compared to field conditions. Additionally, field samples in the early stages of weathering may be within the antioxidant phase of degradation rather than the polymer oxidation stage as suggested by Rowe *et. al.* (2010). As indicated in Koerner (2011), the duration of the antioxidant depletion phase is dependent upon the type and amount of the various antioxidants present in the formulation. Furthermore, the physical loss of antioxidants involves the distribution of antioxidants in the material and their volatility and extractability to the site-specific environment (Koerner, 2011). Therefore, variations between the field data and the half-life estimates using the GRI laboratory data may be attributable to differences in the rate at which the proprietary antioxidant formulation present in the HDPE grass blades degrades due to site-specific environmental conditions. Finally, because the extrapolation performed to estimate laboratory exposure time required to reach 50% degradation was based upon the regression of the polymer oxidation data points (Stage C) from the GRI data, the half-life projections herein represent a conservative estimate which do not account for the antioxidant depletion phase.

Therefore, a 100-year half-life estimate for the HDPE grass blades of ClosureTurf® is supported for sites in the Southeastern U.S., given that the upper and lower bound estimates bracket a 100-year half-life and the field data regressions plot above the upper bound (Figure 14). While the estimated upper-bound half-life for New River, AZ falls slightly below 100 years due to the higher solar irradiance, the trends observed in the field data also support a half-life estimate that is also on the order of 100 years (Figure 13). The slight disparity between the upper bound estimate and field data is consistent with the discussion provided above. Furthermore, performance requirements of the ClosureTurf® HDPE grass blades may permit

evaluation of longevity beyond the half-life, thereby extending the expected duration of field performance with a longer service life.

CLOSING

Geosyntec appreciates the opportunity to assist Watershed in the development of its ClosureTurf® products. Questions and comments may be directed to either of the undersigned at 678-202-9500.

Sincerely,

Will Tanner, P.E.
Principal Engineer (GA, NC, SC, AL, FL)

Chris Abdeen, E.I.T.
Senior Staff Engineer

Attachments: References
Tables
Figures

Copies to: Bryan Scholl (Watershed)
Mike Ayers (Watershed)

REFERENCES

CUR 243 (2012) "Durability of Geosynthetics". Stichting CURNET, Gouda, The Netherlands.

Diguilo, D. (2013) "ClosureTurf™ – The Next Generation Closure System". Northern New England SWANA Conference, Lebanon, New Hampshire, September 25, 2013.

Geosyntec Consultants (2015) "Literature Review and Assessment of ClosureTurf® UV Longevity". Kennesaw, Georgia, May 15, 2015.

Geosynthetics Research Institute (2019) "Exposed Lifetime Prediction of Geosynthetics Using Laboratory Weathering Devices". Folsom, Pennsylvania, August 19, 2019.

Koerner, R., Hsuan, Y., Koerner, G. (2011) "GSI White Paper 6 - Geomembrane Lifetime Prediction: Unexposed and Exposed Conditions". Geosynthetics Institute, Folsom, Pennsylvania, February 8, 2011.

Koerner, R., Koerner, G., and Hsuan, Y. (2015) "Lifetime Predictions of Covered and Exposed Geomembranes". Webinar GSI-W14, January 14, 2015.

Koerner, R. (2016) "Lifetime Predictions of Covered and Exposed Geomembranes". Keynote Lecture GeoAmericas 2016, Dr. Robert Koerner, Geosynthetics Research Institute. April 2016.

National Renewable Energy Laboratory (2022). NSRDB Data Viewer (nrel.gov). June 2022.

Richgels, C., Ayers, M., and Urrutia, J. (2015a) "Estimation of Geographic Ultraviolet Radiation Levels and Impact on Geosynthetic Cover Systems". Proceedings of Geosynthetics 2015, Portland, Oregon, February 15-18, 2015.

Richgels, C. (2015b) "Estimation of Geographic Ultraviolet Radiation Levels and Impact on Geosynthetic Cover Systems". Geosynthetics 2015, Portland, Oregon, February 15-18, 2015.

Richgels, C. (2016) "ClosureTurf Longevity – State of Florida". October 21, 2016.

Rowe, K., Islam, M., Hsuan, Y. (2010) "Effects of Thickness of the Aging of HDPE Geomembranes". Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 136(2), p.299-309.

Watershed Geosynthetics (2014) "Technical Submittal for ClosureTurf™ – Alternative Final Cover, Closure of Municipal Soild Waste Landfill Units", December 2, 2014.

TABLES

Table 1. HDPE Grass Blade Upper Bound Half-Life Calculations- Saufley Landfill, Pensacola, FL

Month	UV Lamp On[1] (hrs/day)	Average Peak Turf Temp [2] (C)	Average Peak Turf Temp (K)	Average Peak Turf Temp (1/K)	Reaction Rate[3]	Lab Half-Life[4] (lamp hrs)	Field Equivalent[5] (days)	Field Equivalent[6] (months)	Half Life Loss per Month[7]
January	5.19	24.99	298.14	0.0034	-13.72	909876	175241	5653	0.000176899
February	5.42	25.13	298.28	0.0034	-13.71	902464	166396	5943	0.000168273
March	6.80	29.60	302.75	0.0033	-13.45	692347	101754	3282	0.000304656
April	7.09	38.19	311.34	0.0032	-12.96	425411	60016	2001	0.000499866
May	8.83	46.69	319.84	0.0031	-12.50	269585	30519	984	0.001015757
June	7.43	51.58	324.73	0.0031	-12.25	209627	28210	940	0.001063454
July	6.41	54.56	327.71	0.0031	-12.10	180417	28147	908	0.001101362
August	6.15	53.40	326.55	0.0031	-12.16	191246	31118	1037	0.000964064
September	7.15	52.63	325.78	0.0031	-12.20	198737	27785	896	0.001115708
October	7.14	42.52	315.67	0.0032	-12.73	336152	47112	1520	0.000658012
November	6.75	31.70	304.85	0.0033	-13.33	613209	90913	3030	0.000329987
December	5.06	26.43	299.58	0.0033	-13.63	834692	164850	5318	0.000188049
Lab	20							**Yearly Half-life Loss[8]**	0.007586087
								Half-life[9] (years)	131.82

Notes:

(1) UV lamp on (hours per day) is determined as the ratio of UV irradiance determined in accordance with Richgels (2016) to the lamp irradiance used in the laboratory study conducted by GRI (3.05 MJ/m^2/day).

(2) Monthly average ambient temps for Pensacola, FL from NREL database multiplied by a factor of 2 to estimate monthly average peak turf temp (Richgels, 2016).

(3) Reaction rate is calculated from the regression curve shown in Figure 7 for the upper bound (logarithmic) case.

(4) Lab half-life in hours is equal to 1/e^(Reaction Rate).

(5) Field equivalent (days) is calculated by dividing the lab half-life in hours by the UV lamp on hours per day.

(6) Field equivalent in days is converted to months using the given days in that particular month.

(7) Half-life loss per month is the inverse of the corresponding field equivalent in months.

(8) The yearly half-life loss is the sum of each individual months half-life loss.

(9) The half-life in years is the inverse of the yearly half-life loss.

Table 2. HDPE Grass Blade Lower Bound Half-Life Calculations- Saufley Landfill, Pensacola, FL

Month	UV Lamp On[(1)] (hours/day)	Months @ 80 C[(2)]	Months @ 70 C[(2)]	Months @ 60 C[(2)]	Average Peak Turf Temp[(3)] (C.)	Half-life Months (from Regression)	Half-life Loss per month
January	5.19	316	644	787	24.99	1700	0.000588355
February	5.42	334	682	834	25.13	1794	0.000557343
March	6.80	241	491	601	29.60	1208	0.000828074
April	7.09	239	487	596	38.19	1037	0.000963898
May	8.83	185	378	463	46.69	682	0.001465817
June	7.43	228	465	568	51.58	750	0.001333715
July	6.41	256	521	638	54.56	782	0.001279345
August	6.15	267	544	665	53.40	839	0.001192233
September	7.15	237	483	590	52.63	759	0.001316773
October	7.14	230	468	573	42.52	920	0.001086971
November	6.75	251	512	626	31.70	1219	0.000820551
December	5.06	324	660	807	26.43	1706	0.000586084
Lab	20					**Yearly Half-life Loss**	0.01106492
						Half-life (years)	83.20

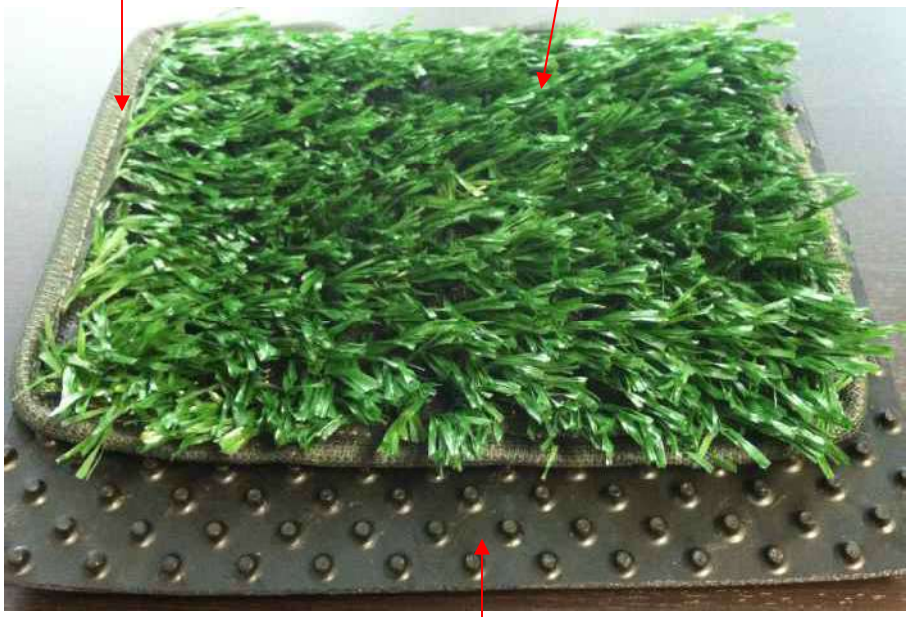
Notes:

(1) UV lamp on (hours per day) is determined as the ratio of UV irradiance determined in accordance with Richgels (2016) to the lamp irradiance used in the laboratory study conducted by GRI (3.05 MJ/m^2/day).

(2) The months required at each temperature is calculated using the regressions from Figure 8 for each temperature, projected down to half-life, then dividing the lamp-hours at half-life by the UV lamp on hours per day for a given month. Once this calculation is done for 80, 70 and 60 C, a linear regression (as shown in Figure 8) is used to obtain the half-life months at the corresponding average peak turf temp.

(3) Monthly average ambient temps for Pensacola, FL from NREL database multiplied by a factor of 2 to estimate monthly average peak turf temp (Richgels, 2016).

FIGURES



Note: The sand ballast infill is not shown in the sample photo on the left, but is shown in a field application photo on the right.

ClosureTurf® Components

Watershed Geosynthetics – ClosureTurf® UV Assessment

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Figure 1

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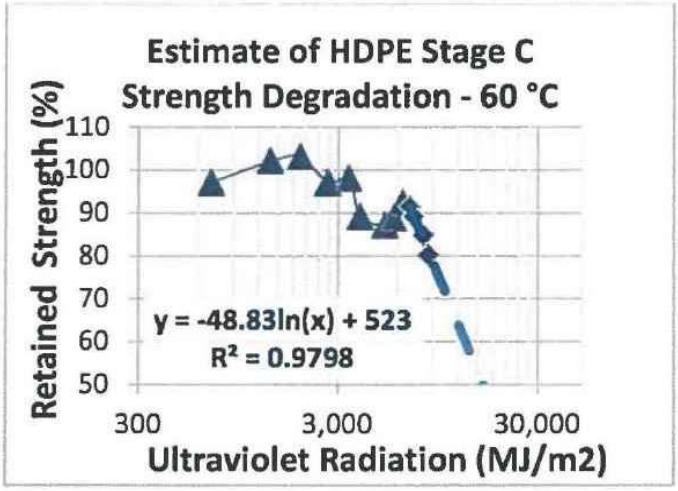

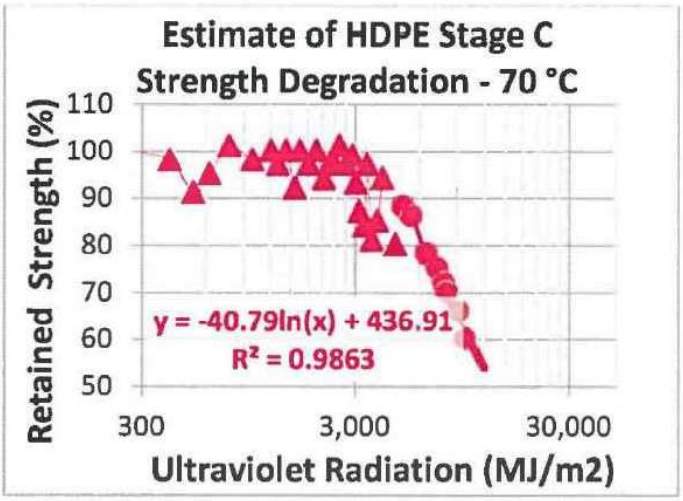

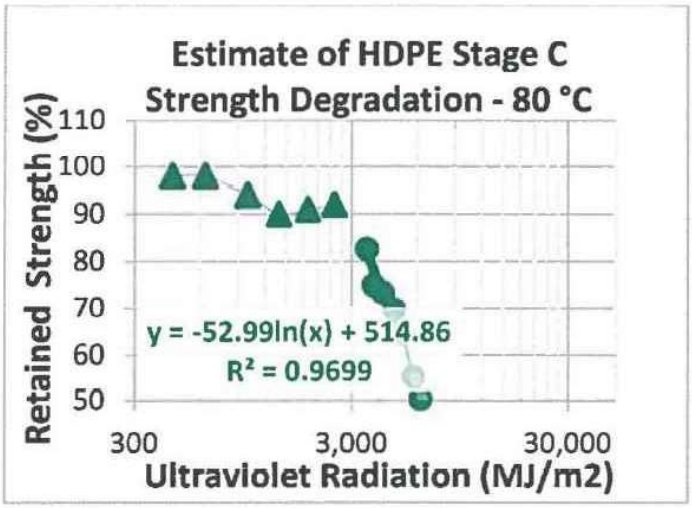

GRI Data Release - Three Stage Oxidation of HDPE for Different Temperatures

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Figure 2

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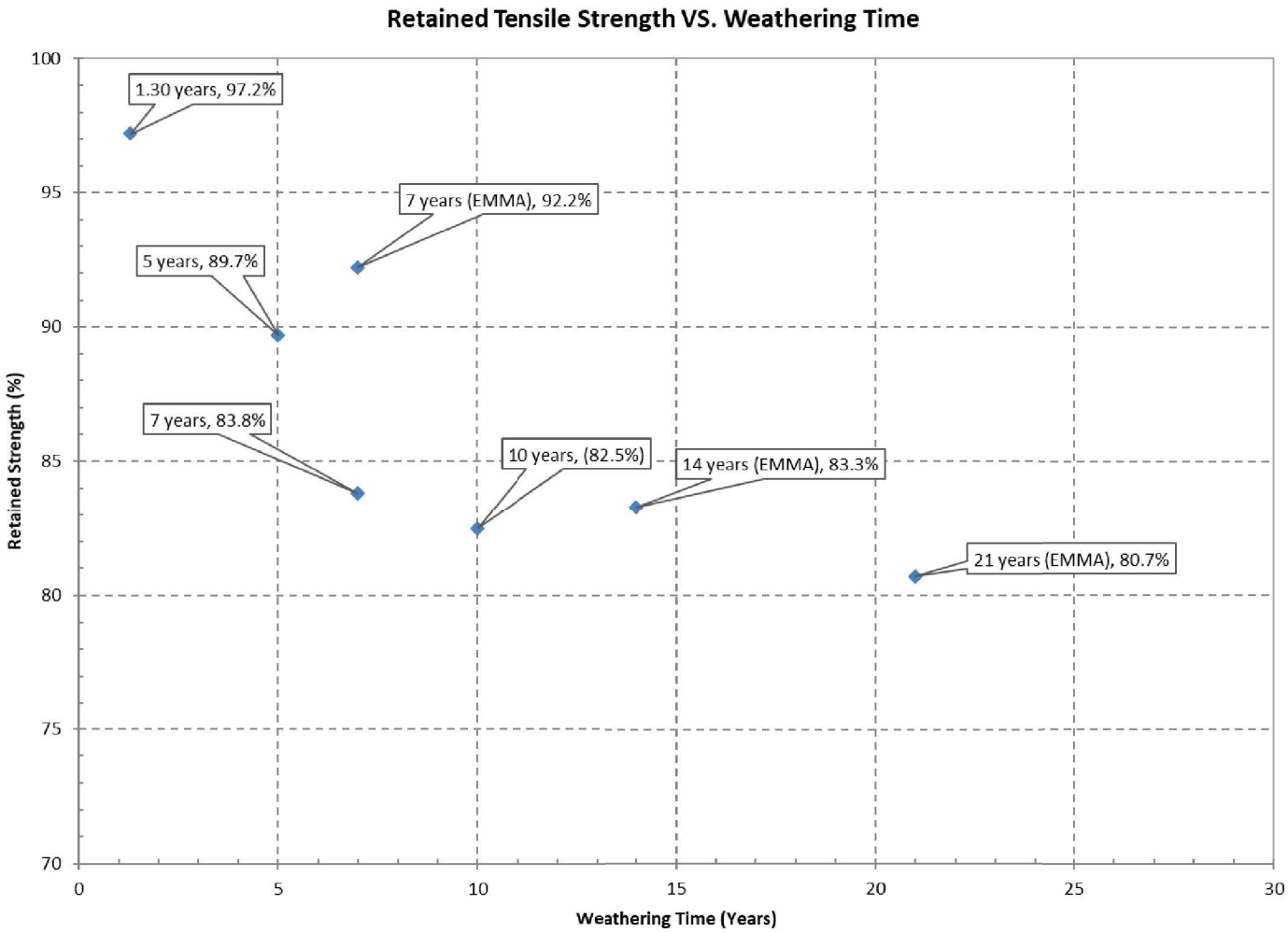

Notes:

1. The first data point at Weathering Time of 1.3 years is considered to be within the initial stage of UV degradation (i.e., anti-oxidant depletion), rather than polymer oxidation which is represented by the final six data points.
2. Each data point represents the average result of 10 tensile strength tests.
3. The accelerated weathering testing is conducted using the Equatorial Mount with Mirrors for Acceleration (EMMA) solar concentration device, which provides approximately seven years of UV radiation exposure in one calendar year.

Field Test Data (Watershed 2014, 2022)
New River, AZ Atlas Testing Facility
Watershed Geosynthetics – ClosureTurf® UV Assessment

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Figure **3**

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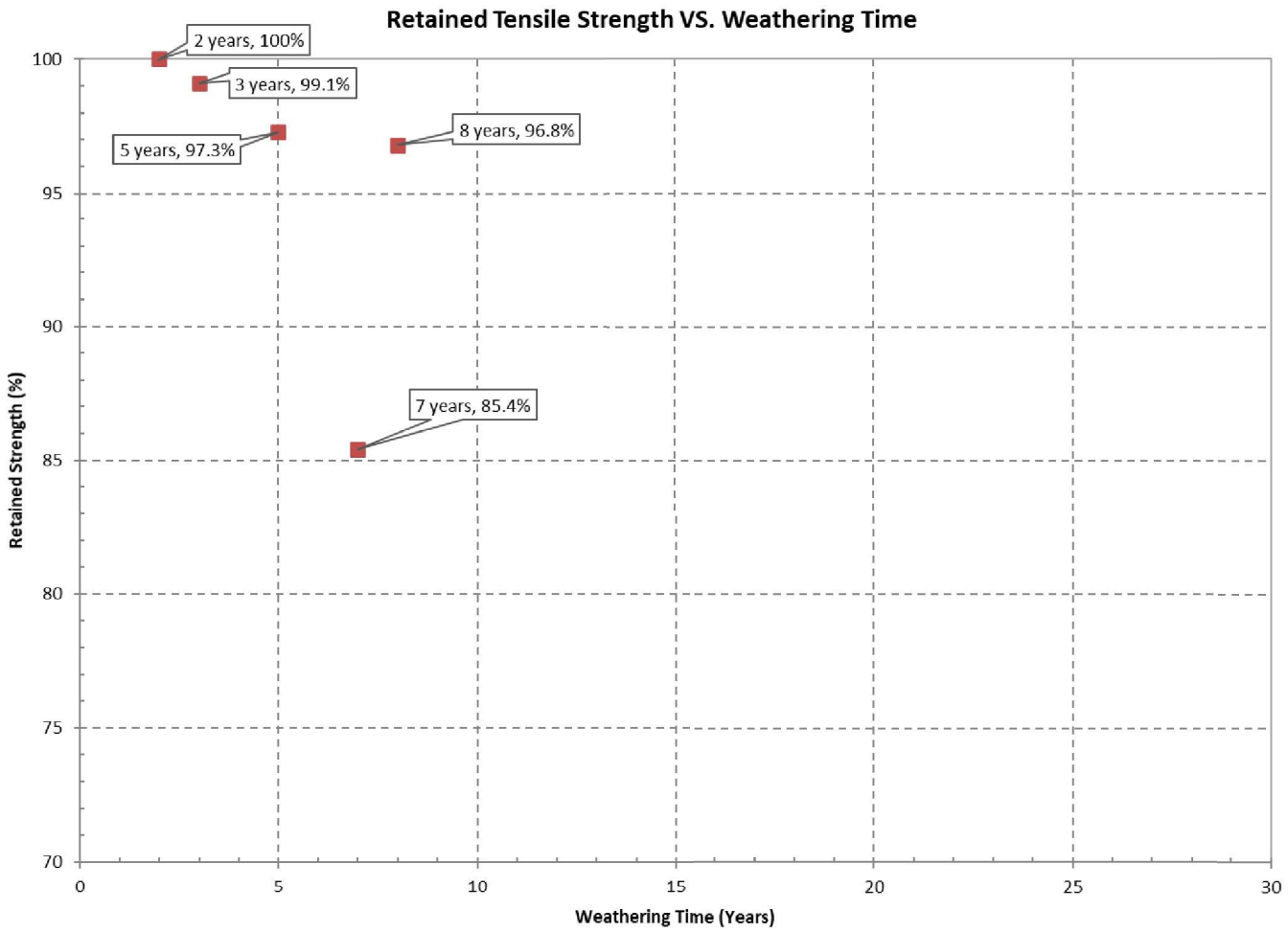

Notes:

1. Each data point represents the average result of 10 tensile strength tests.

Field Test Data (Watershed, 2022)
Southeastern United States Locations
Watershed Geosynthetics – ClosureTurf® UV Assessment

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Figure **4**

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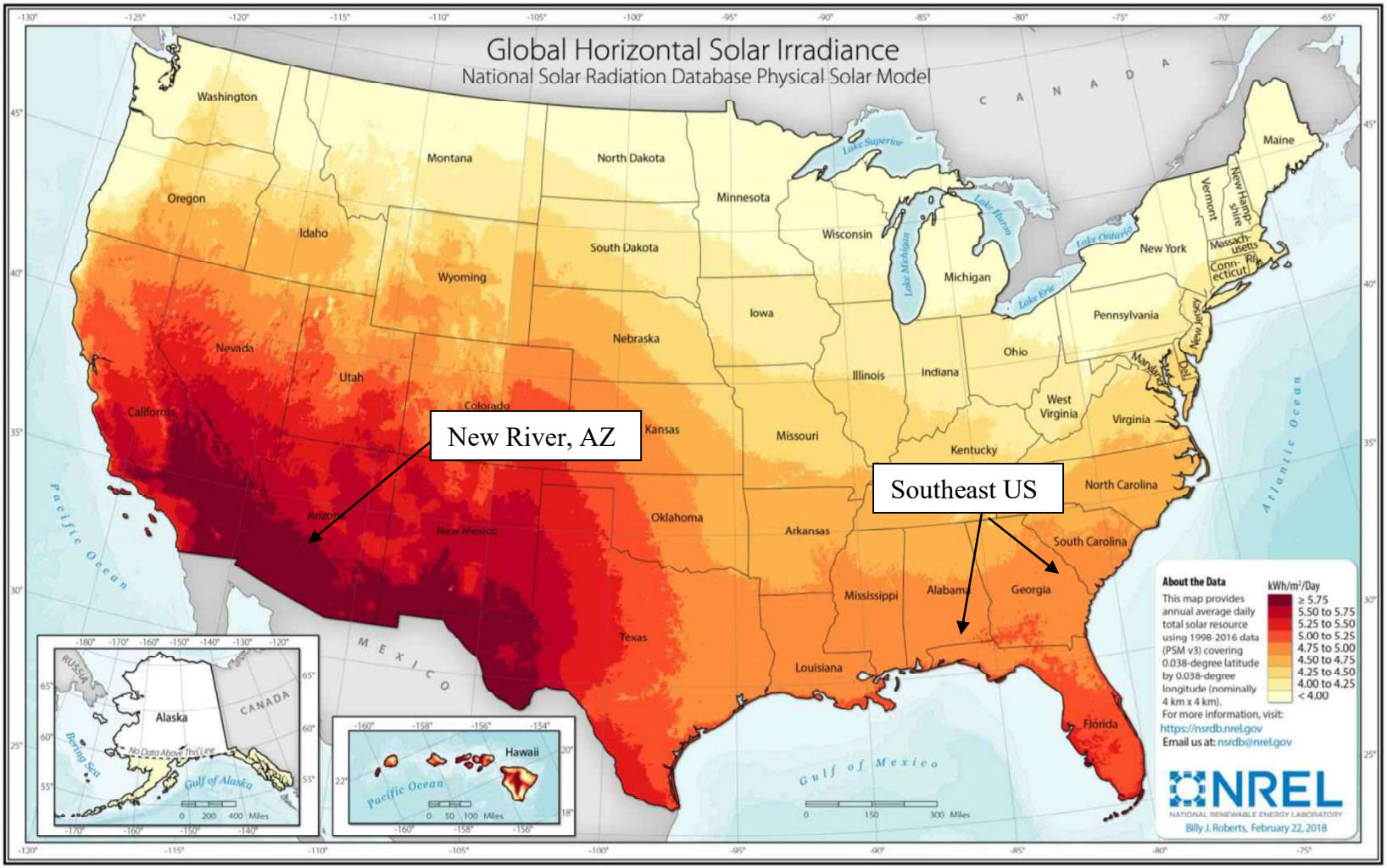

Image available at: https://www.nrel.gov/gis/solar-resource-maps.html

Horizontal Solar Irradiance

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Figure 5

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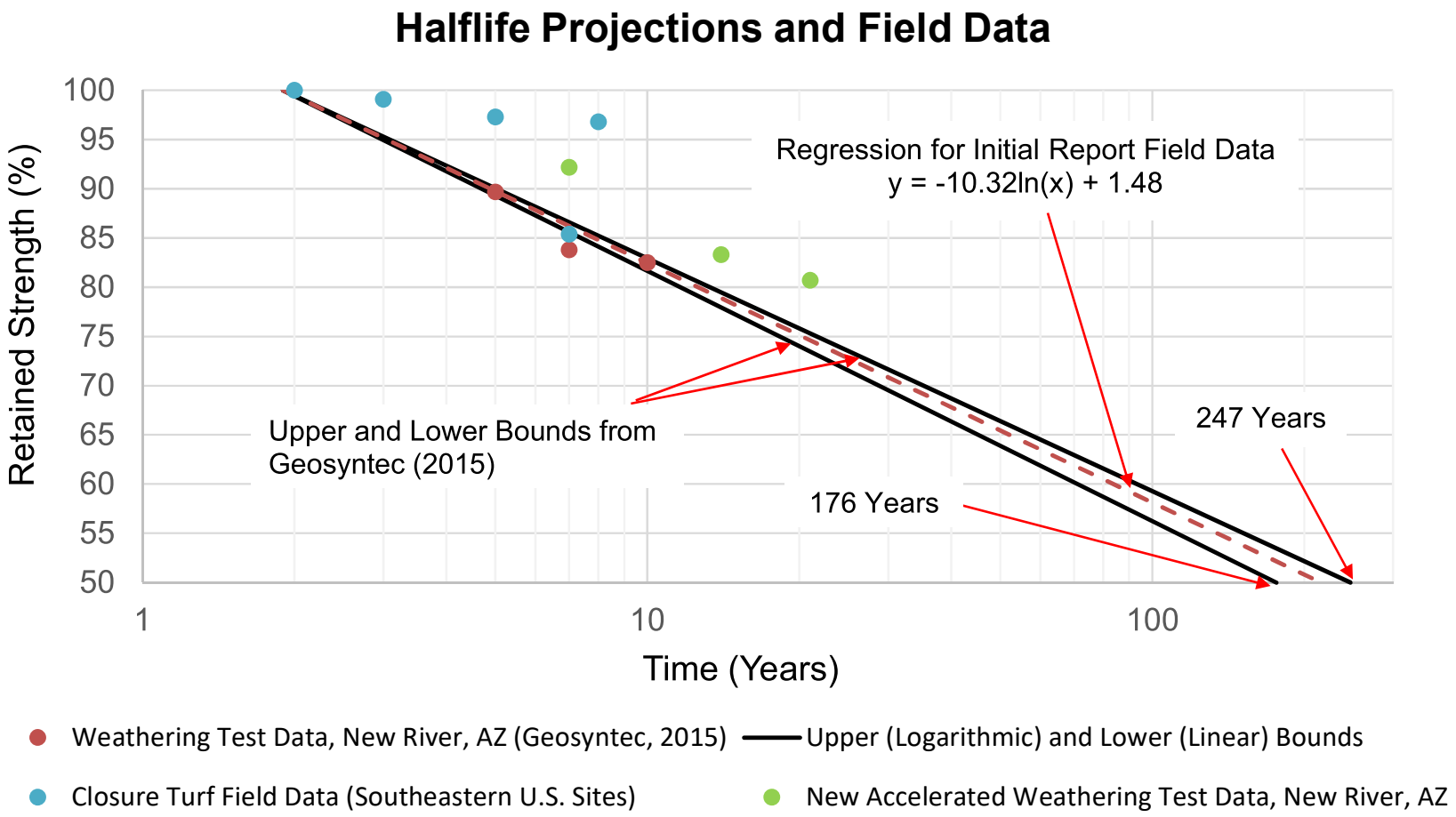

Geosyntec (2015) Halflife Projections
Vs. New Field and Accelerated Weathering Data
Watershed Geosythetics – ClosureTurf® UV Assessment

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Figure **6**

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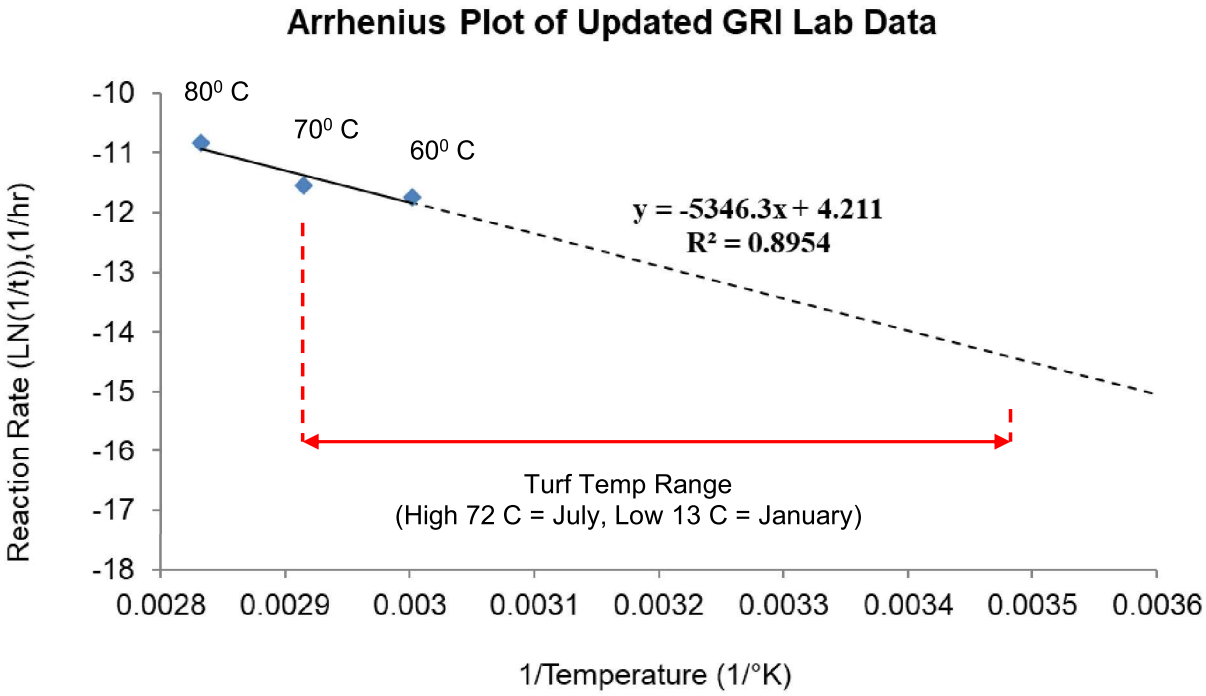

Arrhenius Plot of Lab Data

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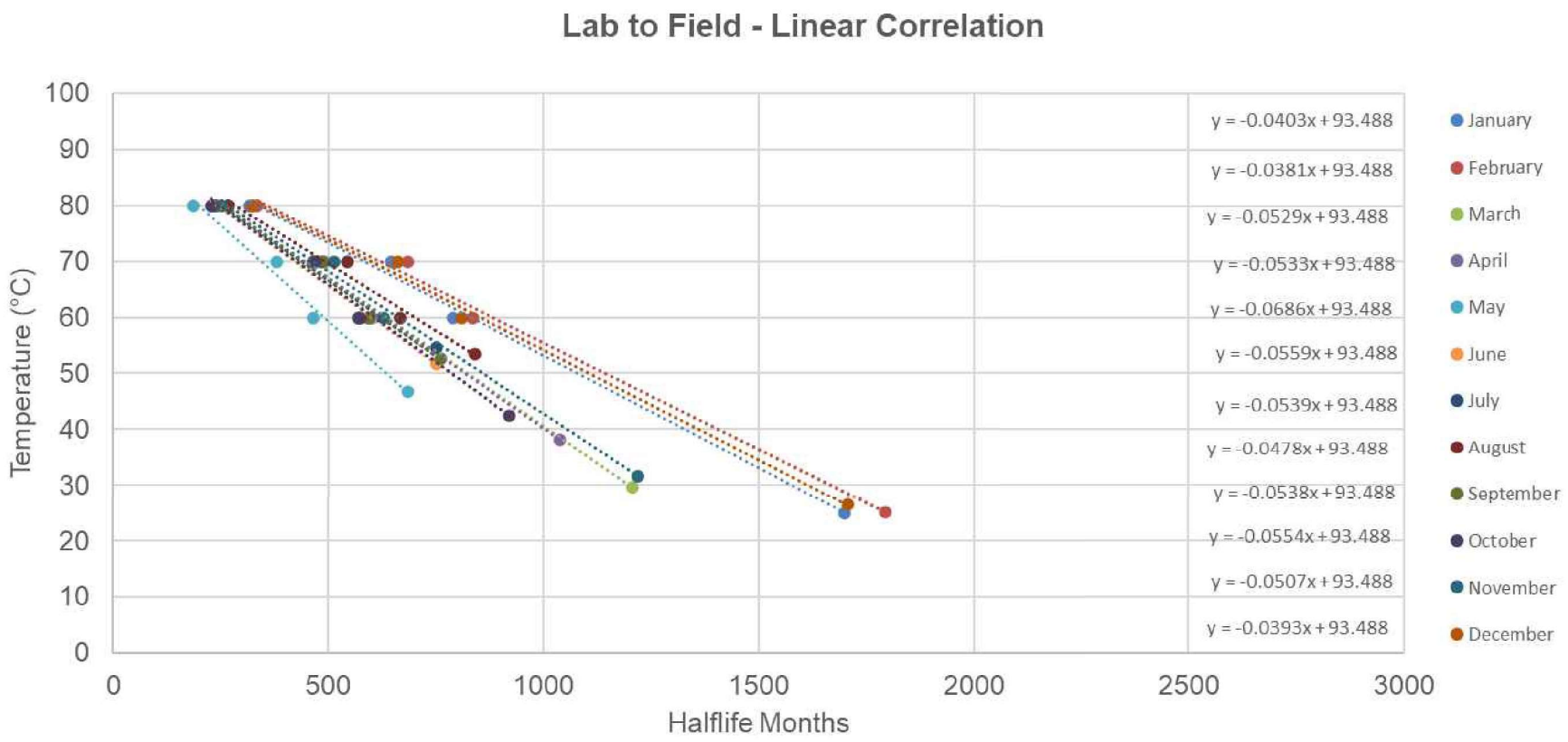
Figure 7



Notes:

1. Each month was projected down to the turf temperature to get the half-life months. The inverse of half-life months is half-life loss per month. The sum of all the half-life losses for each month in a year is the yearly half-life loss, the inverse of which is the half-life. An example calculation for the Saufley Landfill site is provided in Table 2.
2. Trendline equations are listed in order chronologically from January to December.

Linear Extrapolations for Half-life Months – Saufley Field Landfill, Pensacola, FL

Watershed Geosythetics – ClosureTurf® UV Assessment

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Figure **8**

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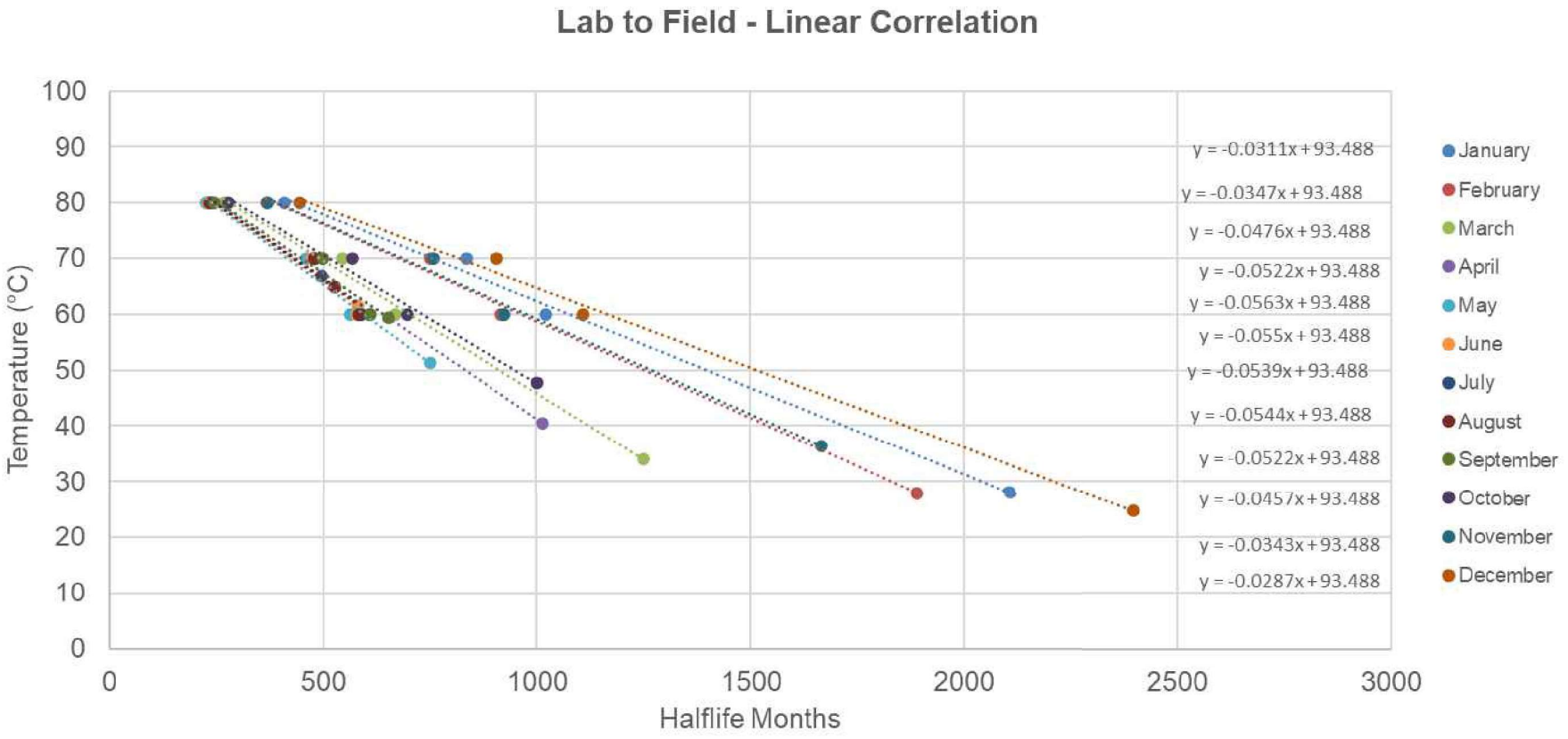

Notes:

1. Each month was projected down to the turf temperature to get the half-life months. The inverse of half-life months is half-life loss per month. The sum of all the half-life losses for each month in a year is the yearly half-life loss, the inverse of which is the half-life. An example calculation for the Saufley Landfill site is provided in Table 2.
2. Trendline equations are listed in order chronologically from January to December.

Linear Extrapolations for Half-life Months – New River, Arizona

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Figure **9**

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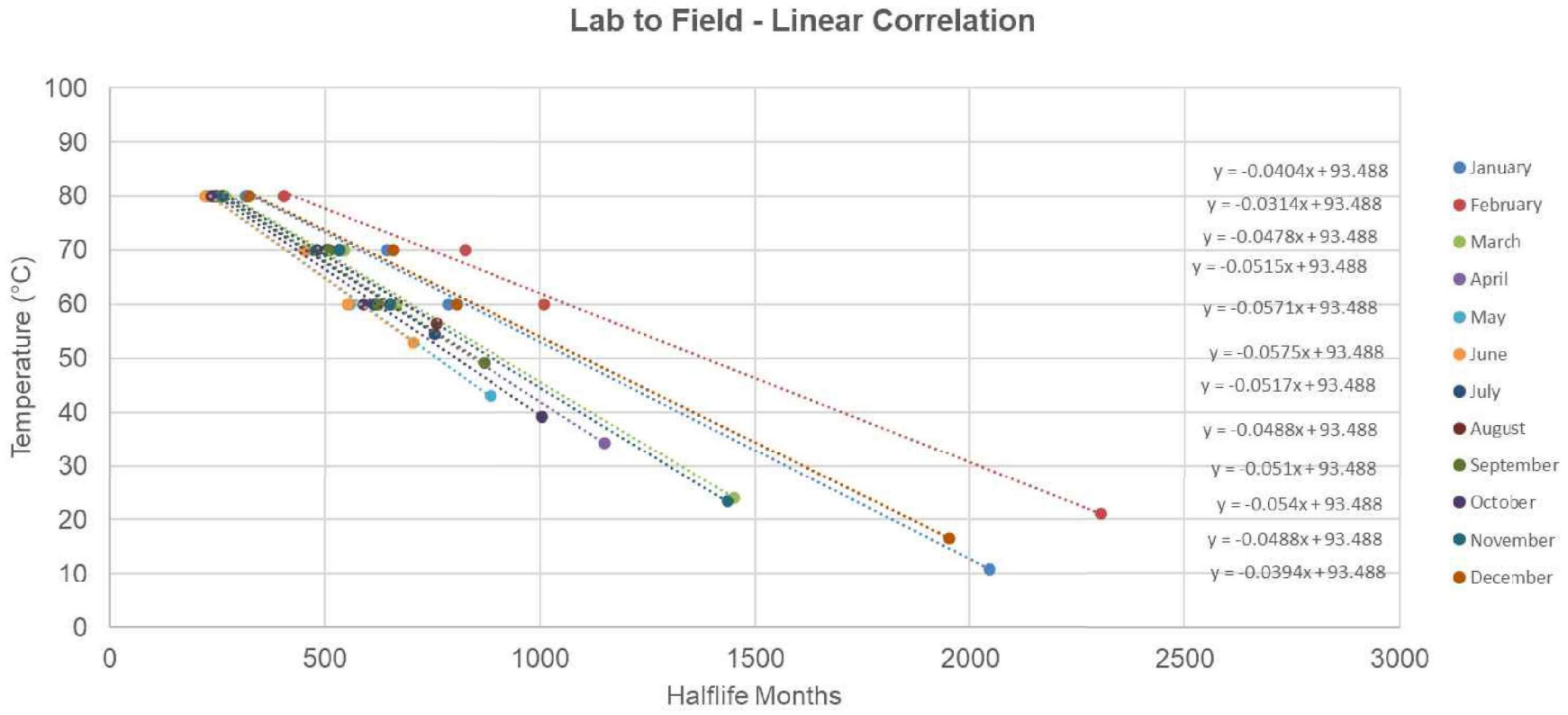

Notes:

1. Each month was projected down to the turf temperature to get the half-life months. The inverse of half-life months is half-life loss per month. The sum of all the half-life losses for each month in a year is the yearly half-life loss, the inverse of which is the half-life. An example calculation for the Saufley Landfill site is provided in Table 2.
2. Trendline equations are listed in order chronologically from January to December.

Linear Extrapolations for Half-life Months – Lasalle-Grant Landfill, Jena, LA

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Figure **10**

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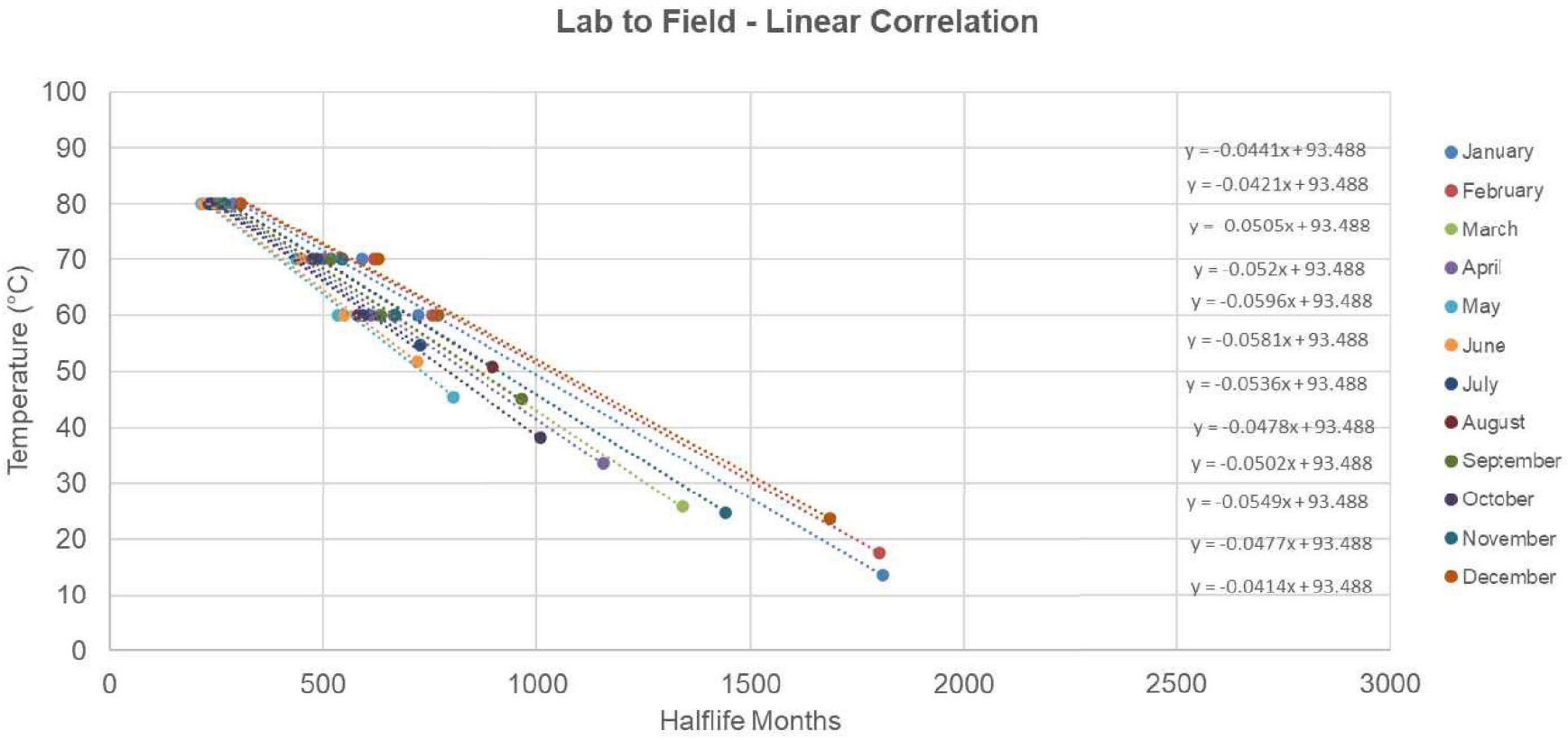

Notes:

1. Each month was projected down to the turf temperature to get the half-life months. The inverse of half-life months is half-life loss per month. The sum of all the half-life losses for each month in a year is the yearly half-life loss, the inverse of which is the half-life. An example calculation for the Saufley Landfill site is provided in Table 2.
2. Trendline equations are listed in order chronologically from January to December.

Linear Extrapolations for Half-life Months – Berkley Co., SC

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Figure **11**

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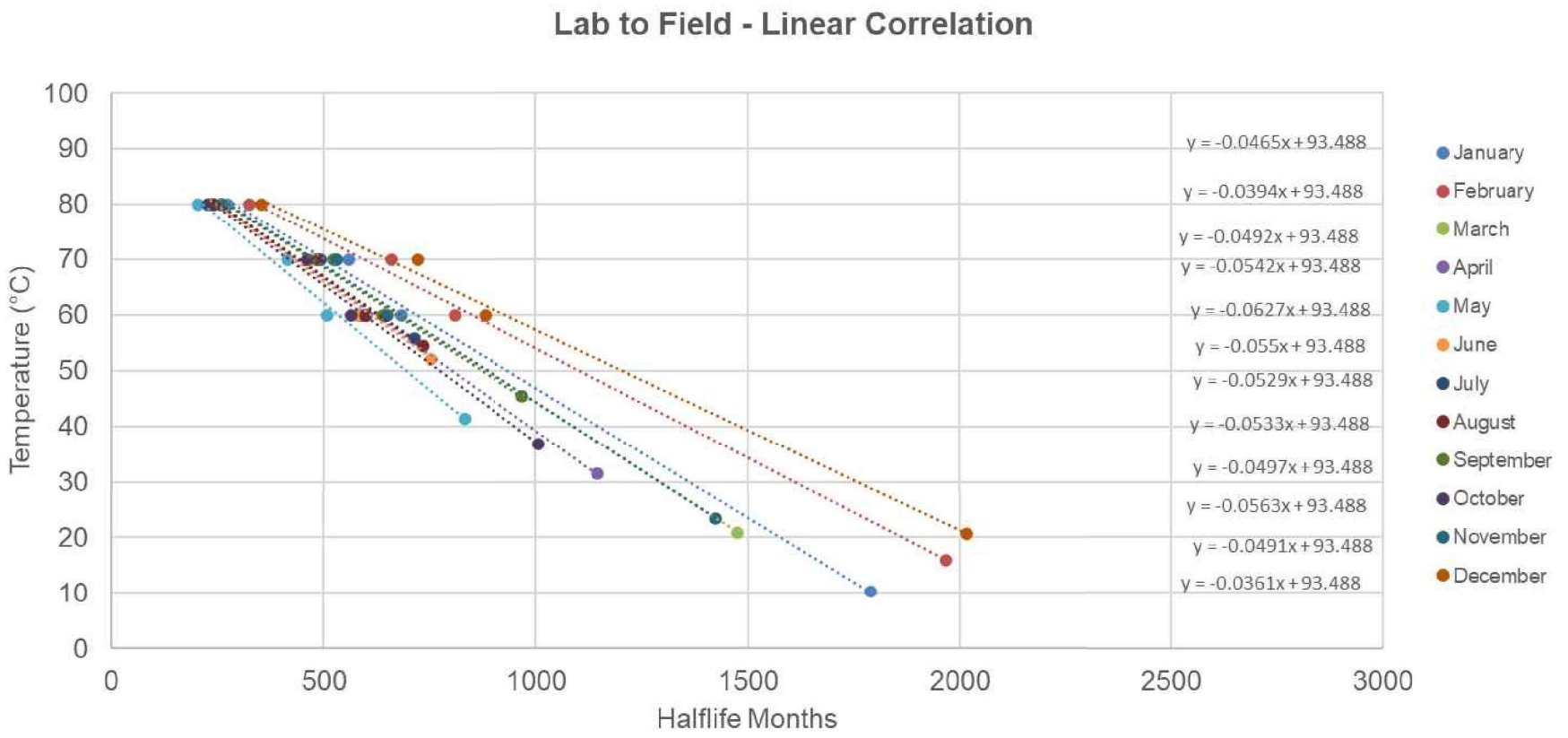

Notes:

1. Each month was projected down to the turf temperature to get the half-life months. The inverse of half-life months is half-life loss per month. The sum of all the half-life losses for each month in a year is the yearly half-life loss, the inverse of which is the half-life. An example calculation for the Saufley Landfill site is provided in Table 2.
2. Trendline equations are listed in order chronologically from January to December.

Linear Extrapolations for Half-life Months – Baldwin Co., GA

Watershed Geosythetics – ClosureTurf® UV Assessment

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Figure **12**

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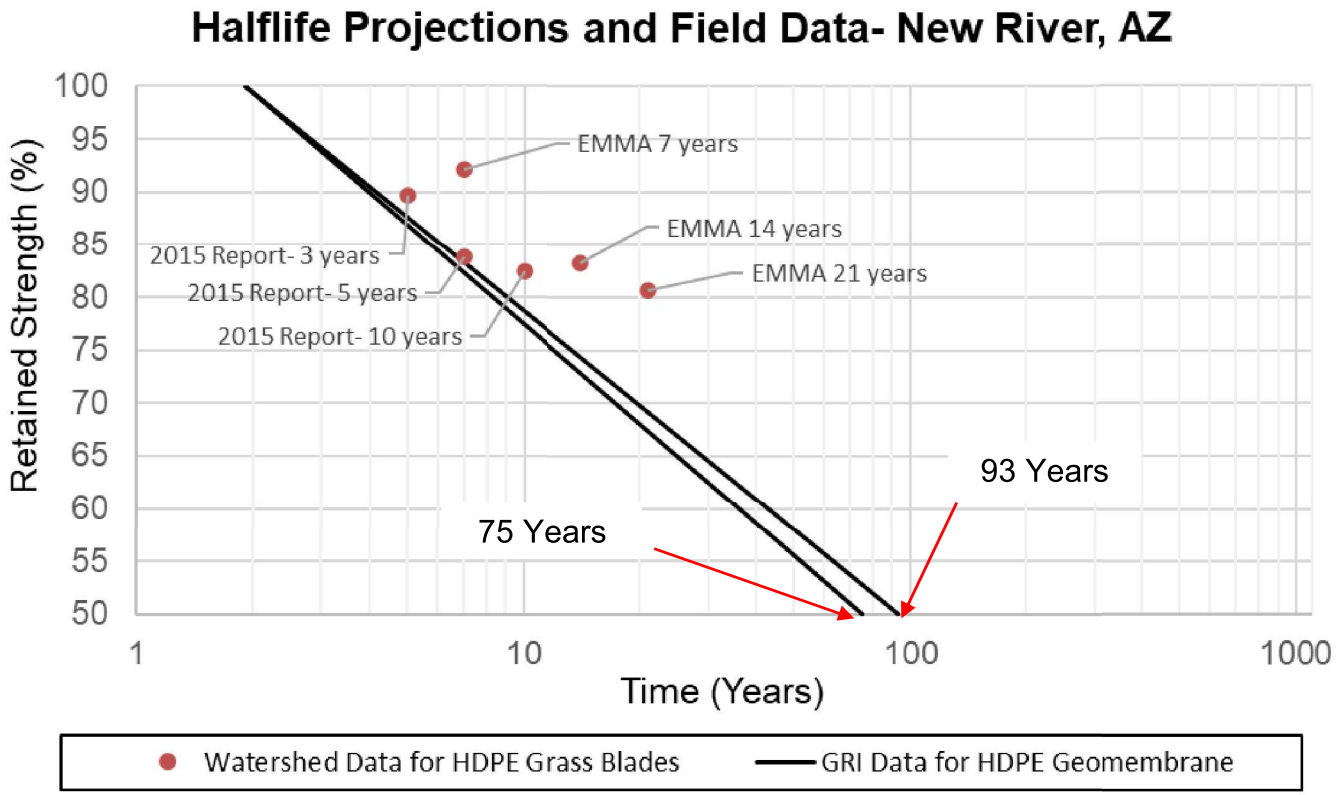

Halflife Projections
Upper and Lower Bound Estimates- New River, AZ

Watershed Geosythetics – ClosureTurf® UV Assessment

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Figure **13**

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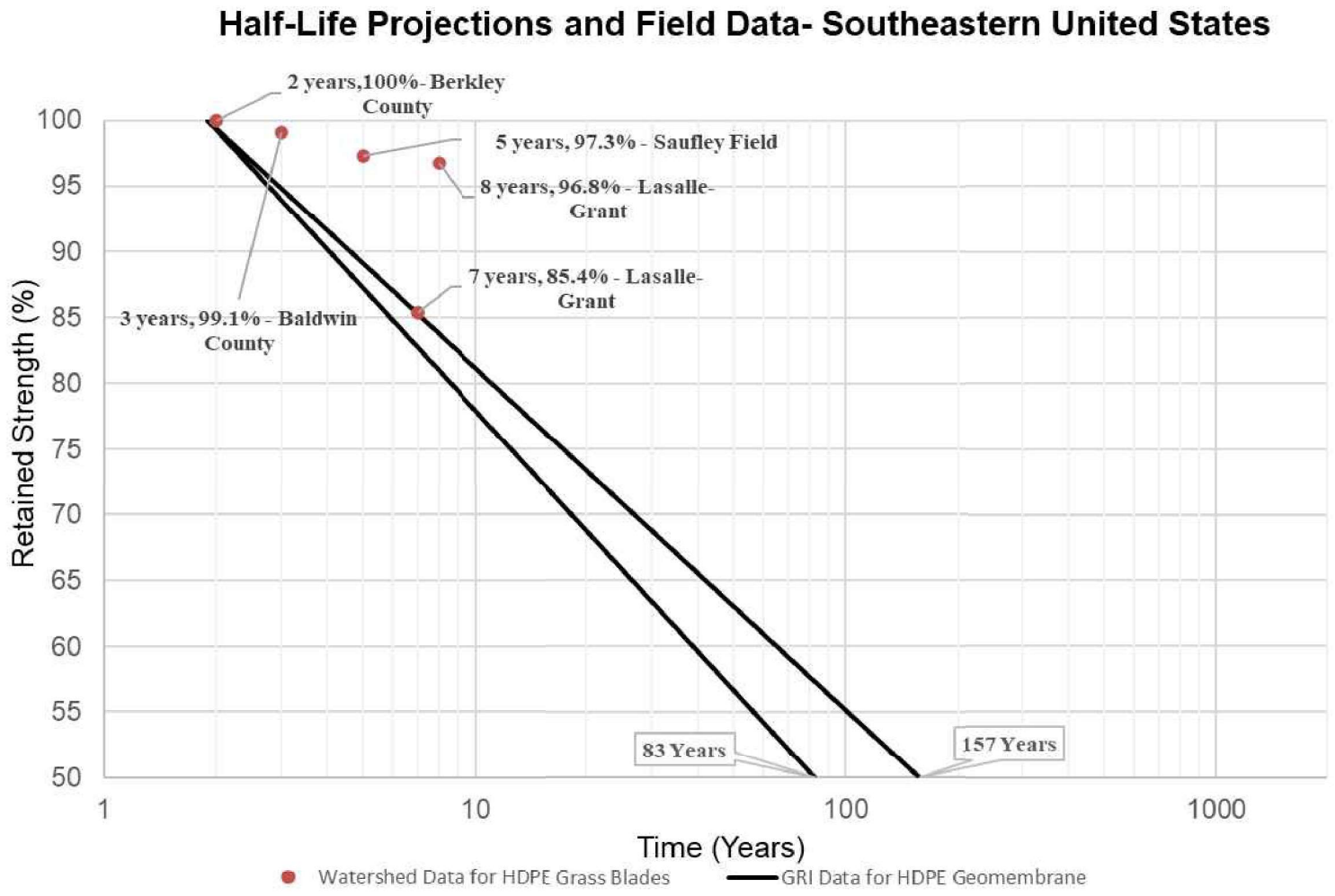

Note: The upper and lower bound half-life estimates represent the limits of the estimates for the sites in the Southeastern United States.

Halflife Projections
Upper and Lower Bound Estimates- SE United States
Watershed Geosythetics – ClosureTurf® UV Assessment

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Figure **14**

Kennesaw, GA | November 2022

2015 Evaluation Report

Geosyntec consultants

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15 May 2015

José Urrutia, P.E.
Vice President of Engineering
Watershed Geosynthetics
11400 Atlantis Place, Suite 200
Alpharetta, GA 30022

Subject: Literature Review and Assessment of ClosureTurf® UV Longevity

Dear Mr. Urrutia:

Watershed Geosynthetics, Inc. (Watershed) has patented an alternative landfill closure system termed, ClosureTurf®. ClosureTurf® consists of high-density polyethylene (HDPE) grass blades tufted through a polypropylene (PP) geotextile backing which overlies Super Gripnet®, an HDPE or linear low-density polyethylene (LLDPE) geomembrane manufactured by AGRU America Inc. The addition of a layer of sand ballast during installation completes the system. The sand ballast provides cover for the lower portion of the HDPE grass blades, the PP geotextile backing, and the Super Gripnet® (Figure 1). The ClosureTurf® system, therefore, is a "hybrid" closure system in the sense that it is neither a traditional soil cover or an exposed geomembrane. ClosureTurf® has been used to close a number of landfills throughout the United States. A select list of sites where it has been used is shown in Table 1. Applications extend to other facilities as well, such as capping of coal ash ponds.

Watershed has requested that Geosyntec Consultants, Inc. (Geosyntec) provide an assessment of the longevity of the ClosureTurf® system with regard to UV degradation. Since ClosureTurf® has elements (i.e., the HDPE grass blades) that are permanently exposed to UV radiation, this assessment will be particularly focused on the exposed portion of the system. However, the UV longevity of the PP geotextile backing and HDPE geomembrane will also be addressed by reference.

Geosyntec's approach to this assessment has been to conduct a literature review of pertinent documents available (journal papers, white papers, presentations, etc.), distill the results of the review, and perform limited analysis. This report concludes with a summary of the review and analysis along with brief discussion for recommendations.

EXECUTIVE SUMMARY

The UV longevity assessment of the ClosureTurf® system (Figure 1) began with a literature review. In general, relatively little published information was discovered regarding exposed HDPE grass blade degradation. The information that is available consists of retained tensile strength test results of HDPE grass blades after exposure (1, 5, 7 and 10 years) at a field test facility in New River, Arizona (Watershed, 2014). Extrapolation of this data by Watershed (2014) resulted in a prediction of 65% retained tensile strength after 100 years of service. In addition, Richgels *et al* (2015) published half-life (i.e., 50% retained tensile strength) predictions of exposed HDPE grass blades using a laboratory data release from the Geosynthetics Institute (GSI) on HDPE geomembrane strips exposed to UV lamp irradiation. Richgels *et al* (2015) obtains an upper bound and lower bound half-life predictions of 247 years and 176 years, respectively. Extrapolation of the field data from New River, Arizona yielded a half-life of 216 years.

Geosyntec checked the calculations shown in Richgels *et al* (2015) and obtained 277 years and 214 years for the upper and lower bound estimates of HDPE grass blade half-life. Differences in the results between Geosyntec and Richgels *et al* (2015) are attributed to rounding. Geosyntec attempted to repeat these calculations for actual performance requirements (i.e., 12.5% of original tensile strength) of the HDPE grass blades rather than a randomly assigned half-life, however the predictions resulted in service lives that were too lengthy to be reasonable. The most likely explanation is that the laboratory data has not degraded enough to allow for service life predictions using 12.5% retained tensile strength. Future data releases from GSI will aid in providing more accurate predictions below the half-life.

Based on Richgels *et al* (2015) predictions, as well as the prediction given in Watershed (2014) it appears that the half-life of the HDPE grass blades exposed to Arizona-like conditions is on the order of 100 years. These results are promising; however additional field test data is needed to improve the half-life predictions, particularly since half-life predictions for exposed HDPE geomembrane are also approximately 100 years (Koerner *et al*, 2015). Understanding the differences in weathering between HDPE grass blades in a synthetic turf and an HDPE geomembrane will provide additional insight into the similar half-life predictions of the two geosynthetics. Finally, the service life of the HDPE grass blades in the ClosureTurf® system should ideally be based on its performance requirements rather than a half-life which will result in a longer service life prediction.

In addition to the HDPE grass blades, there are two unexposed elements of the ClosureTurf® system: (i) the PP geotextile backing for turf component; and (ii) the Super Gripnet® which consist of a HDPE geomembrane (see Figure 1).

Watershed has incorporated UV degradation inhibitors into the PP geotextile backing which, according to Watershed has lead to an improvement in UV resistance by a factor of 14 over the original prediction of 65% retained tensile strength after 100 years (Watershed, 2014). Koerner (2011) has estimated that covered HDPE geomembrane will have a half-life of 446 years at 20 degrees Celsius and 265 years at 25 degrees Celsius.

Therefore, the most critical component of the ClosureTurf® appears to be the exposed HDPE grass blades when it comes to UV degradation. However, degradation of the HDPE grass blades to unserviceable levels can be remediated by replacement of the turf component of the ClosureTurf® system.

BACKGROUND AND LITERATURE REVIEW SUMMARY

In total, Geosyntec has reviewed approximately 40 technical documents to date. The database is a combination of documents provided to Geosyntec by Watershed as well as documents collected by Geosyntec. A complete reference list of the documents in the database can be made available upon request.

In general, relatively little information was found on the topic of exposed HDPE grass blades with respect to degradation due to UV radiation. The documents that were obtained and reviewed are listed below.

1. Field test data provided by Watershed from the New River, Arizona testing facility on the HDPE grass blades (Watershed, 2014).

2. Testing results (Atlas-MTS) discussing the UV longevity of polyethylene and polypropylene grass used for outdoor European athletic facilities.

3. Technical paper by Richgels, *et al.* (2015a) published in the conference proceedings for Geosynthetics 2015 in Portland, Oregon.

4. Presentation by Richgels., C. at the Geosynthetics Conference for 2015 in Portland, Oregon (Richgels, 2015b).

5. Presentation by Diguilio, D. at the Northern New England SWANA Conference on 25 September 2013 (Diguilio, 2013).

The following documents on the topic of HDPE Geomembrane degradation due to UV exposure were reviewed and found to contain useful information regarding this assessment.

1. Geosynthetic Research Institute (GRI) White Paper #6 (Koerner *et al.*, 2011). This white paper contained degradation data (% retained strength and elongation) on laboratory aged samples of 1.5 mm HDPE geomembrane. Aging was completed using a UV Fluorescent device per ASTM D7238 at 70 degrees Celsius (^{o}C).

2. Geosynthetic Institute (GSI) webinar presentation by Koerner *et al.*, (2015). This presentation contained a slide that compared predicted (laboratory vs. field) half-life of geomembranes of various resins, including HDPE, as well as a suggestion for estimating lower bound half-life.

3. Journal paper authored by Rowe *et al.* (2010) published in the Journal of Geotechnical and Geoenvironmental Engineering.

DISCUSSION OF DOCUMENTS AND DATA

The data from the New River, AZ testing facility on the artificial grass component of ClosureTurf® (Watershed, 2014) appears to be the only data set of its kind in our compiled database. The data consists of tensile property testing from field samples exposed to the Arizona environment at approximate exposure periods of 1, 5, 7 and 10 years. At each of the four exposure periods, 20 samples were tested for a total of 80 tests. The average values for tensile strength retained at each corresponding time period is 97%, 90%, 84% and 83%, respectively (Figure 2).

One additional data point was found in the Atlas-MTS document. That data point indicated that approximately 90% of tensile strength of polyethylene grass would be available after 20 years of field exposure assuming average European climatic conditions (temperature, irradiance, etc.). However, the average European irradiance is approximately one-half to one-third that of Arizona (Figure 3) notwithstanding temperature effects. Therefore, the Atlas-MTS data point will be consistent with the data from the New River, AZ facility in the 7 to 10 year time frame once adjusted for the relative levels of exposure and temperature between Europe and Arizona. As such, this data point will not extend the exposure duration covered by the New River, AZ data.

The paper and corresponding presentation by Richgels (2015a, 2015b) utilized the laboratory data released from the GSI on UV degradation of HDPE samples to make upper and lower bound estimates of the field half-life of the HDPE grass blades. The upper bound method utilizes Arrhenius

modeling of lab data to project exposure times at half-life to site temperatures combined with ratios of UV irradiance between the laboratory lamp and monthly average irradiance at New River, AZ to develop half-life loss per month. A similar procedure using a linear extrapolation (rather than Arrhenius) was demonstrated for a lower bound estimate. The Watershed (2014) field data set was plotted in between the upper and lower bound estimates. This method is further discussed in the section below titled, "HDPE Grass Blade Service Life Calculations".

Koerner *et al.* (2011) discusses the UV longevity of both exposed and unexposed geomembranes made from various resins, including HDPE based on GSI's laboratory testing program. This document is particularly useful in regard to the ClosureTurf® elements that are considered non-exposed (i.e., the PP geotextile backing for the turf component and the underlying HDPE geomembrane).

The presentation by Koerner *et al.* (2015) includes estimates of half-life of exposed HDPE geomembranes as well as a recommendation for linear data extrapolation as a lower bound limit that was implemented by Richgels (2015b).

PERFORMANCE REQUIREMENTS

The definition of service life of an HDPE (or other resin) geosynthetic (grass blades and geotextiles/geomembranes) typically invokes the half-life criteria. However, the half-life criteria is arbitrary and while useful as a general indicator for comparison it does not directly relate to any aspect of field performance for ClosureTurf® or any other geosynthetic. Therefore it is more appropriate to define the service life in terms of field requirements placed on the material.

HDPE Grass Blades

For the case of the HDPE grass blades on the ClosureTurf® system, tensile strength requirements fall in the range of 2.5 to 3.5 lbs, based on applied loads of pullout forces from equipment operation and water runoff forces (Diguilo, 2013). The ClosureTurf® HDPE grass blades are manufactured with 20 lbs. of tensile strength immediately following the process (Diguilo, 2013). Therefore, without considering a factor of safety, the required tensile strength of the HDPE grass blade is equal to approximately 12.5% to 17.5% of original strength capacity.

PP Geotextile Backing and HDPE Geomembrane

Performance requirements for the PP geotextile backing and HDPE geomembrane depend on more site-specific parameters (e.g., steepness of slopes, seismicity, etc.) than the HDPE grass blades. Therefore until a parametric study is completed which will define the performance requirements over a range of expected conditions, the half-life will have to be used as a benchmark for degradation of the PP geotextile and HDPE geomembrane.

HDPE GRASS BLADE SERVICE LIFE CALCULATIONS

In order to develop a prediction for the longevity of the HDPE grass blades with respect to UV degradation, Geosyntec implemented the method found in Richgels (2015a, 2015b) for two levels of retained tensile strength. The first level is the 50% of tensile strength, or half-life, criterion that is commonly used as a benchmark for geosynthetic service life. Geosyntec performed this calculation to compare our results with the results presented by Richgels (2015a, 2015b). Once the half-life estimates were calculated, Geosyntec attempted to repeat the calculations using a retained tensile strength of 12.5% of an HPDE grass blade.

Half-Life Estimation (50% of Retained Strength)

The assessment utilized by Richgels (2015a, 2015b) begins with a laboratory data release from GSI (Figure 4). The data includes retained tensile strength of HDPE samples that have been incubated under a UV lamp at elevated temperatures, which accelerates the UV weathering process in accordance with ASTM D7238.

As mentioned, the GSI data includes samples tested at three elevated temperatures: (i) 80 degrees Celsius (^{o}C); (ii) 70^{o}C; and (iii) 60^{o}C. The testing program appears to have originally included only the 70^{o}C data, with the 80 ^{o}C and 60^{o}C testing added at a later date (therefore, weathering is not as advanced). The 70^{o}C data set has reached approximately 66%, while the 80^{o}C and 60^{o}C data sets have reached approximately 78% and 86%, respectively. Nonetheless, logarithmic extrapolations to 50% retained strength were performed for each data set. The amount of exposure time (on a log scale) corresponding to the 50% retained strength plotted vs. the inverse of the corresponding temperature (80^{o}C, 70^{o}C and 60^{o}C) is shown in Figure 5. Figure 5 allows for extrapolation to find the laboratory exposure time required to achieve 50% retained strength at temperatures lower than the test temperatures (i.e., actual field temperatures).

Once the curve is defined relating any temperature to a level of laboratory lamp exposure, the remaining task is to develop a relationship between laboratory exposure and field exposure for a

particular site. In this case, the testing site in New River, AZ where Watershed has performed tests on HDPE grass blades, was selected.

Richgels (2015a, 2015b) presents monthly averages at the site for: (i) peak turf temperature; and (ii) irradiance as a fraction of the laboratory lamp irradiance. Using these two values for a given month combined with the Arrhenius model, an estimate of half-life loss per month is obtained. Summation of the half-life lost per month over a year yields the annual half-life loss. The inverse of the annual half-life loss is the predicted half-life in years. Using this method, Richgels obtains a half-life of approximately 247 years, while Geosyntec obtained a half-life of 277 years using the same data (Table 2). The difference is attributable to rounding errors in the logarithmic projections.

Following the suggestion of Koerner *et al.* (2015), Richgels (2015b) treated the results of the half-life mentioned above as an upper bound estimate. For the lower bound estimate, Koerner *et al.* (2015) suggests performing a linear extrapolation of the laboratory data to lower field temperatures, rather than using the Arrhenius model.

With the linear extrapolation, the ratio of monthly irradiance to laboratory lamp irradiance is scaled linearly to calculate the number of months required to reach half-life at 80C, 70C and 60C. Linear extrapolations per month are made from the elevated temperatures to the corresponding peak turf temperature in that month. The resulting half-life loss per month is summed to obtained half-life loss per year. The inverse of that result is the half-life in years. Richgels (2015b) calculates a half-life of 176 years using this linear model. Geosyntec's calculation using the same data resulted in a half-life of 214 years (Table 3 and Figure 6). The difference in the calculations is approximately the same as with the calculation using the Arrhenius (logarithmic) model.

Figure 7 shows the calculated upper (Arrhenius - logarithmic) and lower (linear) bound curves calculated by Richgels (2015b) along with the field data on the HDPE grass blades provided by Watershed (2014). As shown in Figure 7, the trend line fit to the field data falls in between the upper and lower bound curves produced by Richgels (2015b). Note that the first point from the field data at approximately 1 year is omitted from the trend line. This is because the first data point is assumed to be within the anti-oxidant phase of degradation rather than the polymer oxidation stage as suggested by Rowe *et al.* (2010). Additional discussion regarding the stages of degradation for polyolefin materials can be found in CUR 243 (2012).

Service Life Estimation Based on Performance Requirements (12.5% of Retained Strength)

Geosyntec repeated the calculations discussed above for the estimation of half-life, but extrapolated the GSI laboratory data down to 12.5% rather than 50% at 80C, 70C and 60C. Upper bound

(Arrhenius – logarithmic) and lower bound (linear) estimates were 2,500 years and 2,043 years, respectively.

These estimates of service life are simply too large to be reasonable. A likely explanation is that the samples tested at 80C, 70C and 60C have not degraded enough to produce accurate predictions at 12.5% retained strength. As previously mentioned, the data for 80C has reached 78% retained strength; the data for 70C has reached 66% retained strength; and the data for 60C has reached 86% retained strength. Therefore, the extrapolation for each of these data sets to 50% retained strength will be much more accurate than extrapolations to 12.5%. In addition, small uncertainties in log-based extrapolations will greatly influence results.

For these reasons, it is not practical or useful at this time to quantitatively assess service life in terms of actual performance requirements when those requirements are substantially below the half-life. There is some value, however in a qualitative use of performance requirements in comparisons with half-life estimates (i.e., to establish the factor of safety remaining at 50% degradation).

SUMMARY AND CONCLUSIONS

Geosyntec's literature review of approximately 40 documents yielded few sources of UV degradation data for exposed HDPE grass blades. Relevant data that was found included the field test data from the New River, AZ testing facility provided by Watershed (2014) and one data point from Atlas-MTS. The Atlas-MTS data point indicated that HDPE grass blades in average European climatic conditions would retain approximately 90% of its original strength after 20 years of field exposure. Taking into account the differences in temperature and UV irradiance between New River, AZ and European averages, the data point is consistent with the New River, AZ test data in the 7 to 10 year range.

Following the method presented in Richgels (2015a, 2015b) for HDPE grass blades, Geosyntec calculated an upper bound half-life of 277 years compared with Richgels 247 years using the Arrhenius (semi-log) extrapolations to site temperatures and ratio of laboratory lamp to field irradiance. Geosyntec calculated a lower bound half-life based on linear temperature extrapolations, as suggested by Koerner *et al.* (2015), of 214 years compared with 176 years obtained by Richgels (2015b). The differences between Geosyntec and Richgels calculations were attributed to rounding. As shown in Figure 7, the field data from New River, AZ suggests a half-life of 216 years when considering only the last three data points (i.e., polymer oxidation stage).

Another prediction of HDPE grass blade degradation is included in Watershed (2014) using the same (New River, AZ) field data. That prediction of retained tensile strength at 100 years of service life is 65%.

Therefore, it appears that the half-life of the HDPE grass blades will be on the order of 100 years based on the existing field data set and extrapolation methods found in the literature and presented herein. The results are promising; however additional field test data is needed to improve the half-life prediction, particularly since the half-life predictions for exposed HDPE geomembranes are also approximately 100 years (Koerner, 2015). Half-life predictions presented herein will also need to be revisited when additional labratory data is released from the GSI testing program.

Geosyntec attempted to calculate the service life of the HDPE grass blades using 12.5% of retained strength, rather than an arbitrarily assigned half-life. However, the calculation resulted in unreasonably long service life. This result is likely due to uncertainties in extrapolating the laboratory data released from GSI down to the 12.5% retained strength level. The data release has degraded to 78%, 66% and 86% for the 80 ^{o}C, 70 ^{o}C, and 60 ^{o}C test temperatures. Therefore, extrapolations to 50% may be warranted while extrapolations to 12.5% may not be until additional lab data is available. That being said, it should be recognized that half-life, or 50% of retained strength, has a factor of safety of 2.8 to 4.0 when considering the tensile capacity performance requirements of HDPE grass blades.

With regard to the unexposed elements of the ClosureTurf® system, Watershed (2014) indicates that the retained tensile strength of the PP geotextile backing prior to the addition of UV inhibitors is 65% after 100 years. This estimate is based on exhumed samples of the geotextile from the LaSalle-Grant Landfill in Louisiana. According to Watershed (2014), the addition of proprietary UV inhibitors to the PP geotextile backing has led to an improvement in UV resistance by a factor of 14. The final geosynthetic in the ClosureTurf® system is the covered HDPE geomembrane. Koerner (2011) estimates that the half-life of a covered HDPE geomembrane is 446 years at 20C, and 265 years at 25C. Furthermore, the degradation of the unexposed elements of the ClosureTurf® system invoke the half-life criteria. As discussed with regard the exposed HPDE grass blades, actual performance requirements should ideally be used to determine system longevity. However, the existing testing programs need to be allowed to degrade further before projections to lower values are made.

It is worth reiterating that applications of ClosureTurf® in areas of the United States where the UV irradiance and the temperatures are lower will result in longer half-life predictions than discussed above. In some cases (e.g., the Northeastern States), the differences will likely be quite large when compared with Arizona.

Finally, once UV degradation of the most susceptible component of ClosureTurf® (i.e., the exposed HDPE grass blades) does result in a tensile break, replacement of the HDPE grass and PP geotextile backing can be performed.

CLOSING

Geosyntec appreciates the opportunity to assist Watershed in the development of its ClosureTurf® products. Questions and comments may be directed to either of the undersigned at 678-202-9500.

Sincerely,

Will Tanner, P.E.
Project Engineer

Ming Zhu, Ph.D., P.E.
Senior Engineer

Attachments: References
Tables
Figures

Copies to: Bill Gaffigan (Geosyntec)
Mike Ayers (Watershed)

REFERENCES

Atlas Materials Testing Solutions, (Atlas-MTS). "Artificial Grass Yarns – Improving Sports Performance".

CUR 243, (2012) "Durability of Geosynthetics". Stichting CURNET, Gouda, The Netherlands.

Diguilo, D. (2013), "ClosureTurf™ – The Next Generation Closure System". Northern New England SWANA Conference, Lebanon, New Hampshire, September 25, 2013.

Koerner, R., Hsuan, Y., Koerner, G., (2011) "GSI White Paper 6 - Geomembrane Lifetime Prediction: Unexposed and Exposed Conditions". Geosynthetics Institute, Folsom, Pa., February 8, 2011.

Koerner, R., Koerner, G., and Hsuan, Y. (2015) "Lifetime Predictions of Covered and Exposed Geomembranes". Webinar GSI-W14, January 14, 2015.

Richgels, C., Ayers, M., and Urrutia, J., (2015a) "Estimation of Geographic Ultraviolet Radiation Levels and Impact on Geosynthetic Cover Systems". Proceedings of Geosynthetics 2015, Portland Oregon, February 15-18, 2015.

Richgels, C. (2015b) "Estimation of Geographic Ultraviolet Radiation Levels and Impact on Geosynthetic Cover Systems". Geosynthetics 2015, Portland, Oregon, February 15-18, 2015.

Rowe, K., Islam, M., Hsuan, Y., (2010) "Effects of Thickness of the Aging of HDPE Geomembranes". Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 136(2), p.299-309.

Watershed Geosynthetics, (2014) "Technical Submittal for ClosureTurf™ – Alternative Final Cover, Closure of Municipal Soild Waste Landfill Units", December 2, 2014.

TABLES

Table 1. Selected Sites where ClosureTurf® has been Installed.

Select ClosureTurf® Installations				
Installation	**Type**	**Acres**	**State**	**Year**
Progressive - Weatherford	Public – MSW	8.5	Texas	2010
Progressive - Timberland	Public - MSW	4	Louisiana	2011
Crazy Horse (Salinas SWA – Monterey)	City – MSW	65	California	2012
Saufley Landfill (Escambia)	Public – C&D	22.5	Florida	2012
Georgia Pacific	Independent	70	Georgia	2013
Berkeley County Landfill	City - MSW	12	South Carolina	2013
Lanchester Landfill (Chester)	City - MSW	7	Pennsylvania	2013
Tangipahoa Parish	City – MSW	22	Louisiana	2013
Sandtown – (Berkeley County)	City – MSW	4	Delaware	2013
Si-County Landfill	EPA – Region 6	5	Texas	2014
Holcim Cement Landfill (Kiln Dust)	Independent	46	New York	2015

Table 2. HDPE Grass Blade Upper Bound Half-Life Calculations (Geosyntec)

Month	UV Lamp On[1] (hrs/day)	Peak Turf Temp[2] (C)	Peak Turf Temp (K)	Peak Turf Temp (1/K)	Reaction Rate[3]	Lab Half-Life[4] (lamp hrs)	Field Equivalent[5] (days)	Field Equivalent[6] (months)	Half Life Loss per Month[7]
January	4.00	27.99	301.14	0.0033	-15.67	6385286	1596322	51494	1.94196E-05
February	4.94	27.96	301.11	0.0033	-15.67	6401982	1296604	46307	2.15949E-05
March	6.13	33.94	307.09	0.0033	-15.11	3632197	593012	19129	5.22755E-05
April	6.94	40.58	313.73	0.0032	-14.50	1983742	285945	9531	0.000104915
May	7.25	51.21	324.36	0.0031	-13.58	792646	109330	3527	0.000283544
June	7.31	61.52	334.67	0.0030	-12.75	344593	47124	1571	0.00063662
July	6.94	66.82	339.97	0.0029	-12.34	228887	32993	1064	0.000939599
August	7.00	64.80	337.95	0.0030	-12.50	267230	38176	1273	0.000785841
September	6.94	59.43	332.58	0.0030	-12.91	406208	58553	1889	0.000529439
October	5.88	47.74	320.89	0.0031	-13.88	1062504	180852	5834	0.000171411
November	4.56	36.38	309.53	0.0032	-14.88	2899472	635501	21183	4.72069E-05
December	3.69	24.68	297.83	0.0034	-15.99	8826208	2393548	77211	1.29515E-05
Lab	20							**Yearly Half-life Loss[8]**	0.003604818
								Half-life[9] (years)	277.41

Notes:

(1) UV Lamp On (hours per day) is given in Richgels (2015a, 2015b).
(2) Peak Turf Temps for New River, AZ given in Richgels (2015a, 2015b).
(3) Reaction Rate is calculated from the regression curve shown in Figure 4 for the upper bound (logarithmic) case.
(4) Lab half-life in hours is equal to 1/e^(Reaction Rate).
(5) Field equivalent (days) is calculated by dividing the lab half-life in hours by the UV lamp on hours per day.
(6) Field equivalent in days is converted to months using the given days in that particular month.
(7) Half-life loss per month is the inverse of the corresponding field equivalent in months.
(8) The yearly half-life loss is the sum of each individual months half-life loss.
(9) The half-life in years is the inverse of the yearly half-life loss.

Table 3. HDPE Grass Blade Lower Bound Half-Life Calculations (Geosyntec)

Month	UV Lamp On[(1)] (hours/day)	Months @ 80 C[(2)]	Months @ 70 C[(2)]	Months @ 60 C[(2)]	Peak Turf Temp[(3)] (C.)	Half-life Months (from Regression)	Half-life Loss per month
January	4.00	692	1507	3078	27.99	6948	0.000143933
February	4.94	620	1352	2761	27.96	6256	0.000159849
March	6.13	452	984	2010	33.94	4059	0.00024637
April	6.94	412	898	1834	40.58	3213	0.000311281
May	7.25	382	832	1698	51.21	2248	0.000444747
June	7.31	391	852	1740	61.52	1580	0.000633027
July	6.94	399	869	1775	66.82	1237	0.00080834
August	7.00	395	861	1759	64.80	1371	0.000729293
September	6.94	412	898	1834	59.43	1826	0.000547629
October	5.88	471	1026	2095	47.74	3070	0.000325779
November	4.56	627	1365	2788	36.38	5321	0.000187929
December	3.69	750	1635	3339	24.68	7945	0.000125871
Lab	20					**Yearly Half-life Loss**	0.00466405
						Half-life (years)	214.41

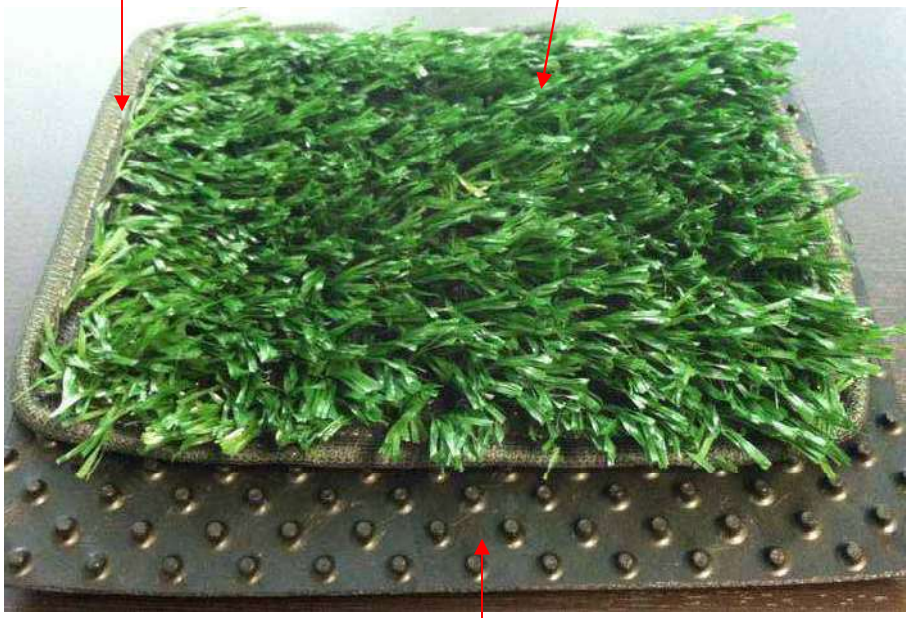
Notes:

(1) UV Lamp On (hours per day) is given in Richgels (2015a, 2015b).

(2) The months required at each temperature is calculated using the regressions from Figure 4 for each temperature, projected down to half-life, then dividing the lamp-hours at half-life by the UV lamp on hours per day for a given month. Once this calculation is done for 80, 70 and 60 C, a linear regression (as shown in Figure 5) is used to obtain the half-life months at the corresponding peak turf temp.

(3) Peak turf temperatures given in Richgels (2015a, 2015b).

FIGURES



Note: The sand ballast infill is not shown in the sample photo on the left, but is shown in a field application photo on the right.

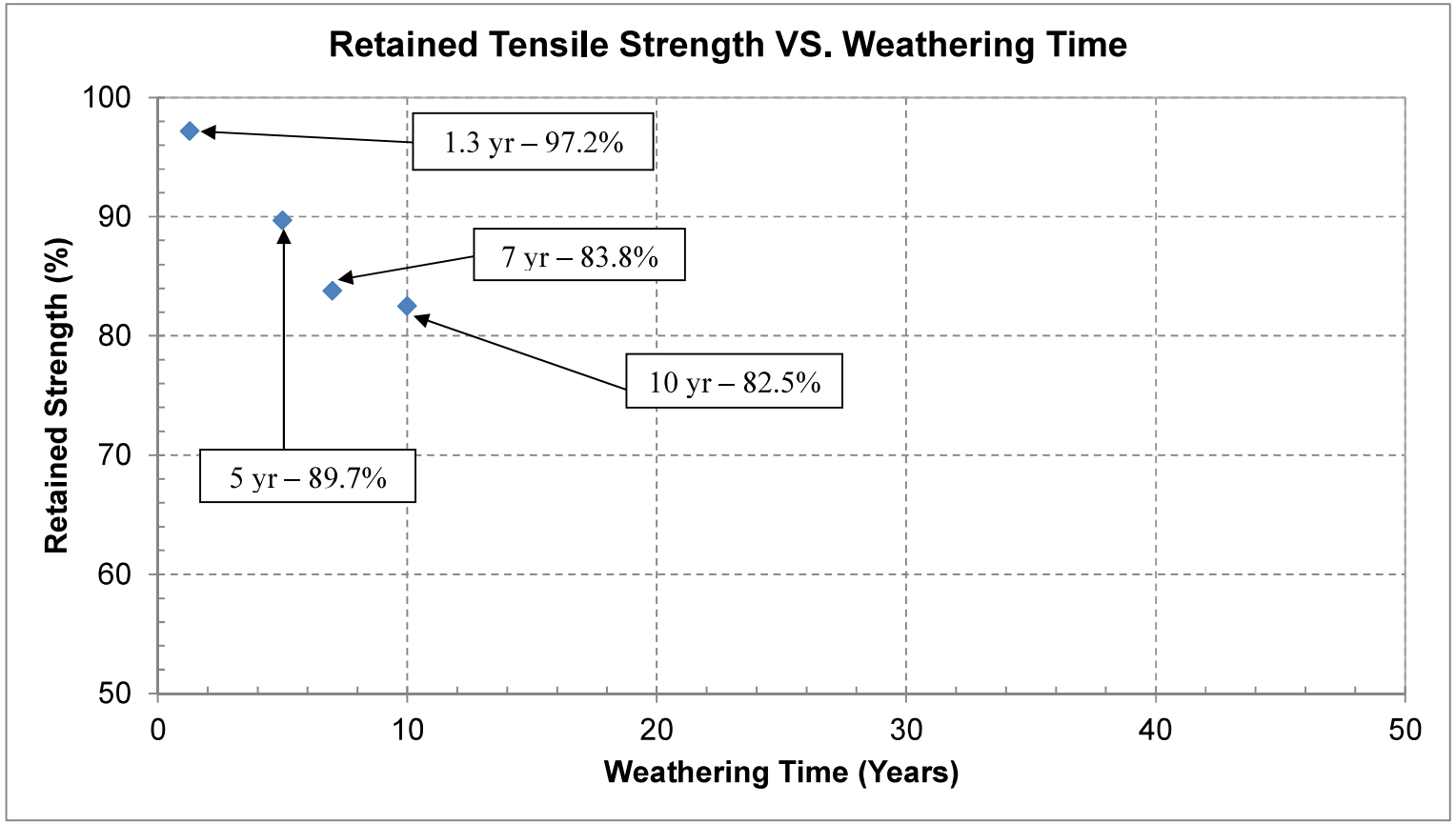
ClosureTurf®Components

Watershed Geosynthetics – ClosureTurf® UV Assessment

Geosyntec consultants

Kennesaw, GA | 23-April-2015

Figure **1**



Notes:

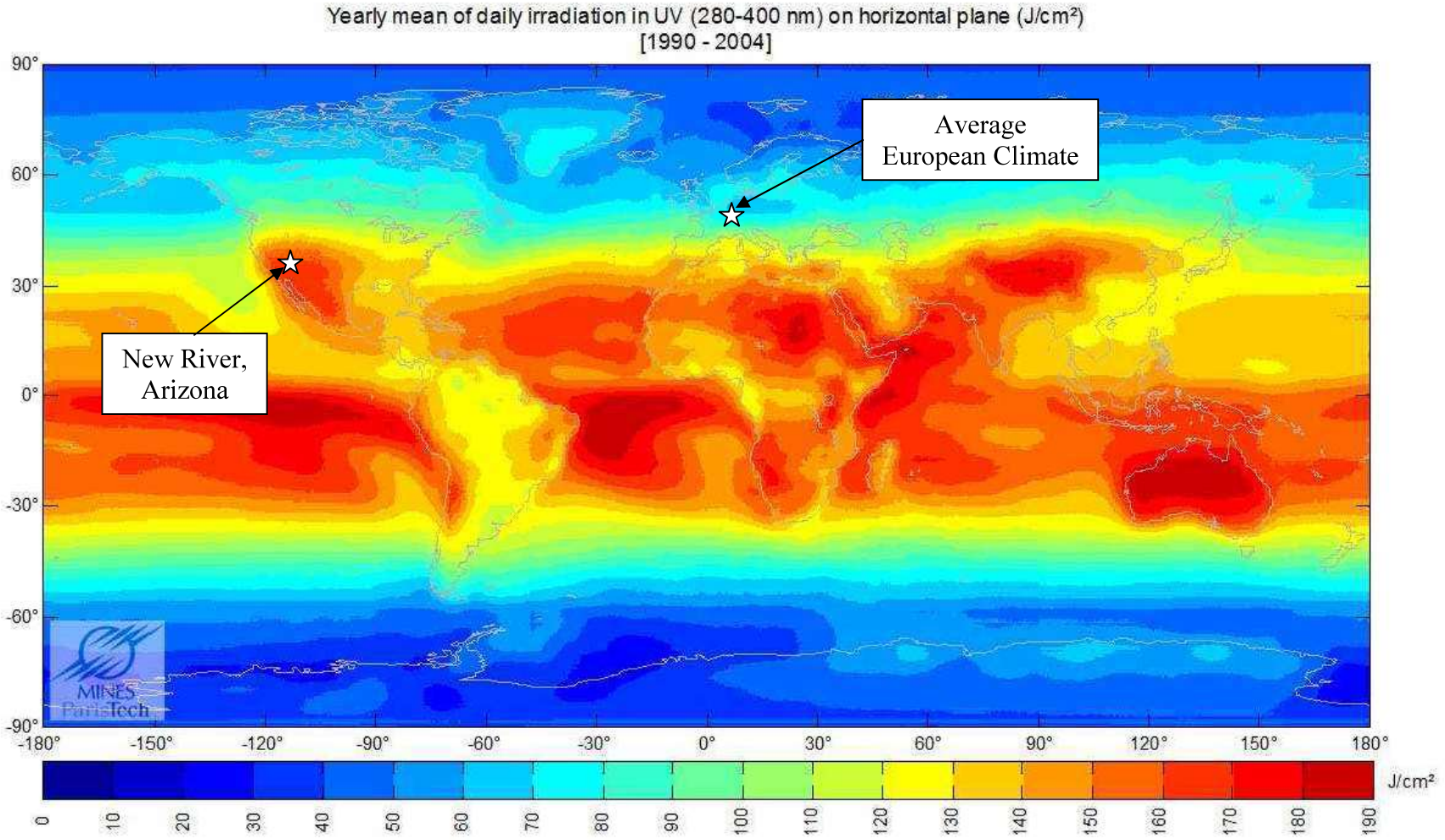
1. The first data point at Weathering Time of 1.3 years is considered to be within the initial stage of UV degradation (i.e., anti-oxidant depletion), rather than polymer oxidation which is represented by the final three data points.
2. Each data point represents the average result of 20 tensile break tests.

Field Test Data (Watershed, 2014)
New River, AZ Atlas Testing Facility
Watershed Geosynthetics – ClosureTurf® UV Assessment

Geosyntec consultants

Figure **2**

Kennesaw, GA | 25-April-2015



1 J/cm^2 = 4.755 ft-lbs/in^2

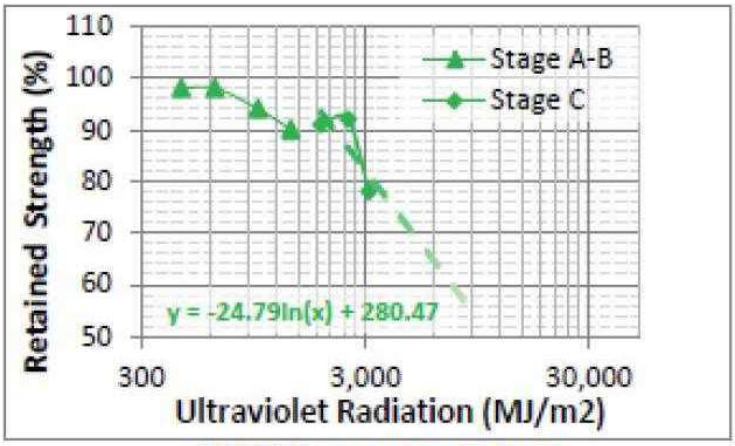
Yearly Irradiation in the Ultraviolet Range

Watershed Geosynthetics – ClosureTurf® UV Assessment

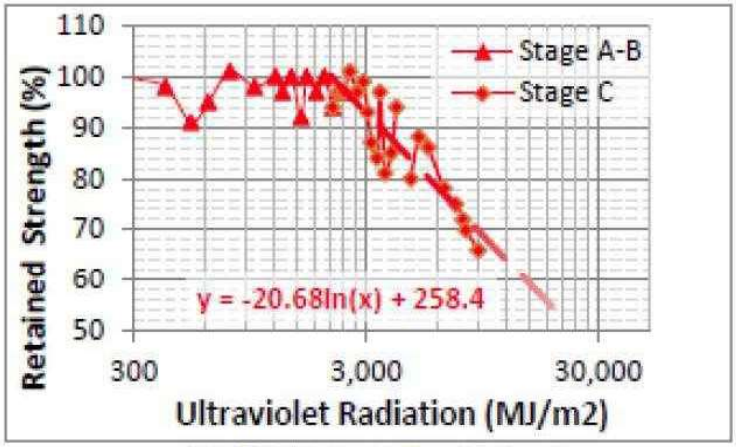
Geosyntec consultants

Figure 3

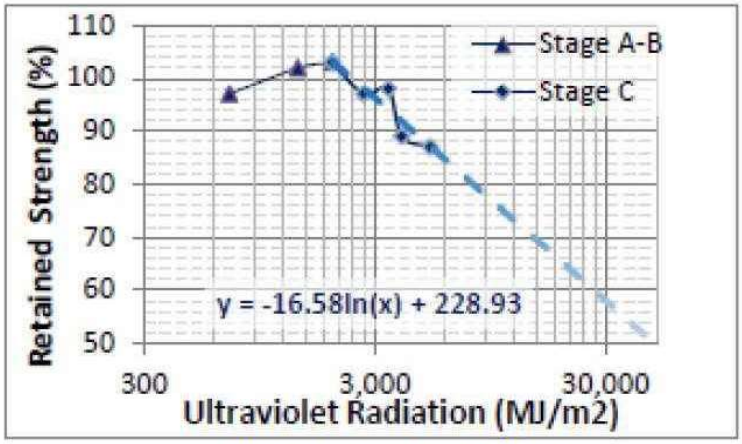
Kennesaw, GA | 23-April-2015



a) 80°C Temperature Dataset



b) 70°C Temperature Dataset



c) 60°C Temperature Dataset

GSI Data Release - Three Stage Oxidation of HDPE for Different Temperatures

Watershed Geosynthetics – ClosureTurf® UV Assessment

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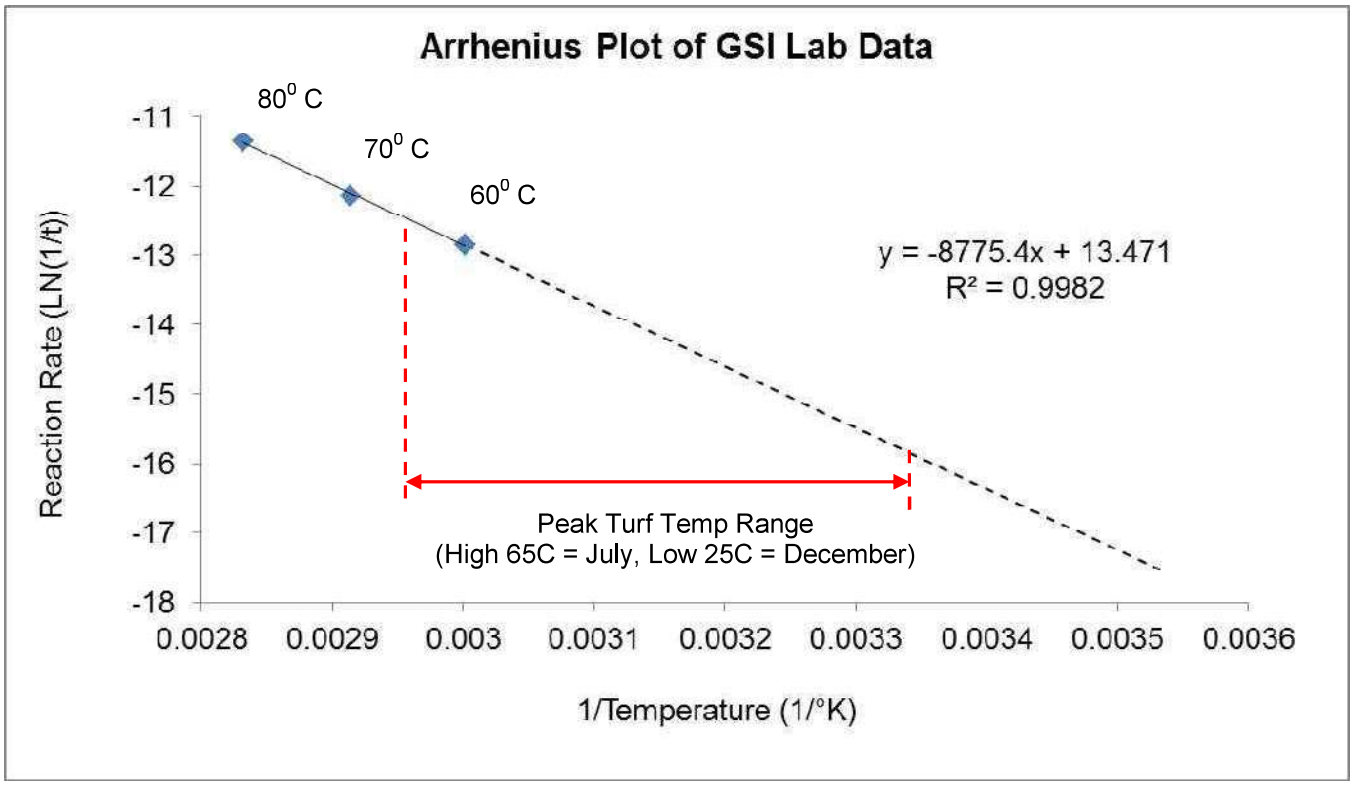
Figure 4

Kennesaw, GA | 23-April-2015



Note: Richgels (2015b) mentions that the use of peak turf temperature is conservative since it only occurs for approximately one hour per day.

Arrhenius Plot of Lab Data
Watershed Geosynthetics – ClosureTurf® UV Assessment

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Figure 5

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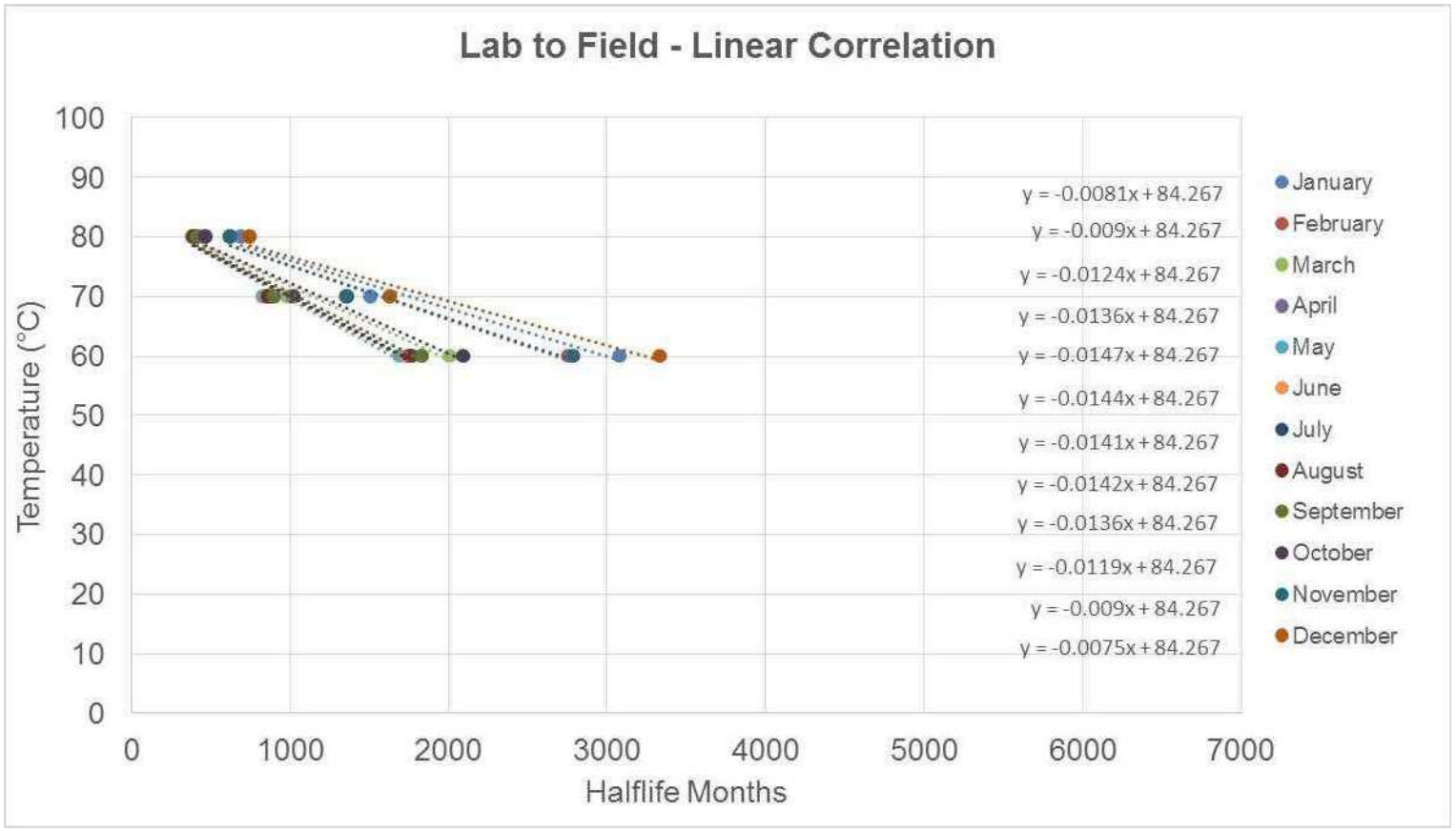

Note: Each month was projected down to the peak turf temperature given in Table 3 to get the half-life months. The inverse of half-life months is half-life loss per month. The sum of all the half-life losses for each month in a year is the yearly half-life loss, the inverse of which is the half-life.

Linear Extrapolations for Half-life Months

Watershed Geosythetics – ClosureTurf® UV Assessment

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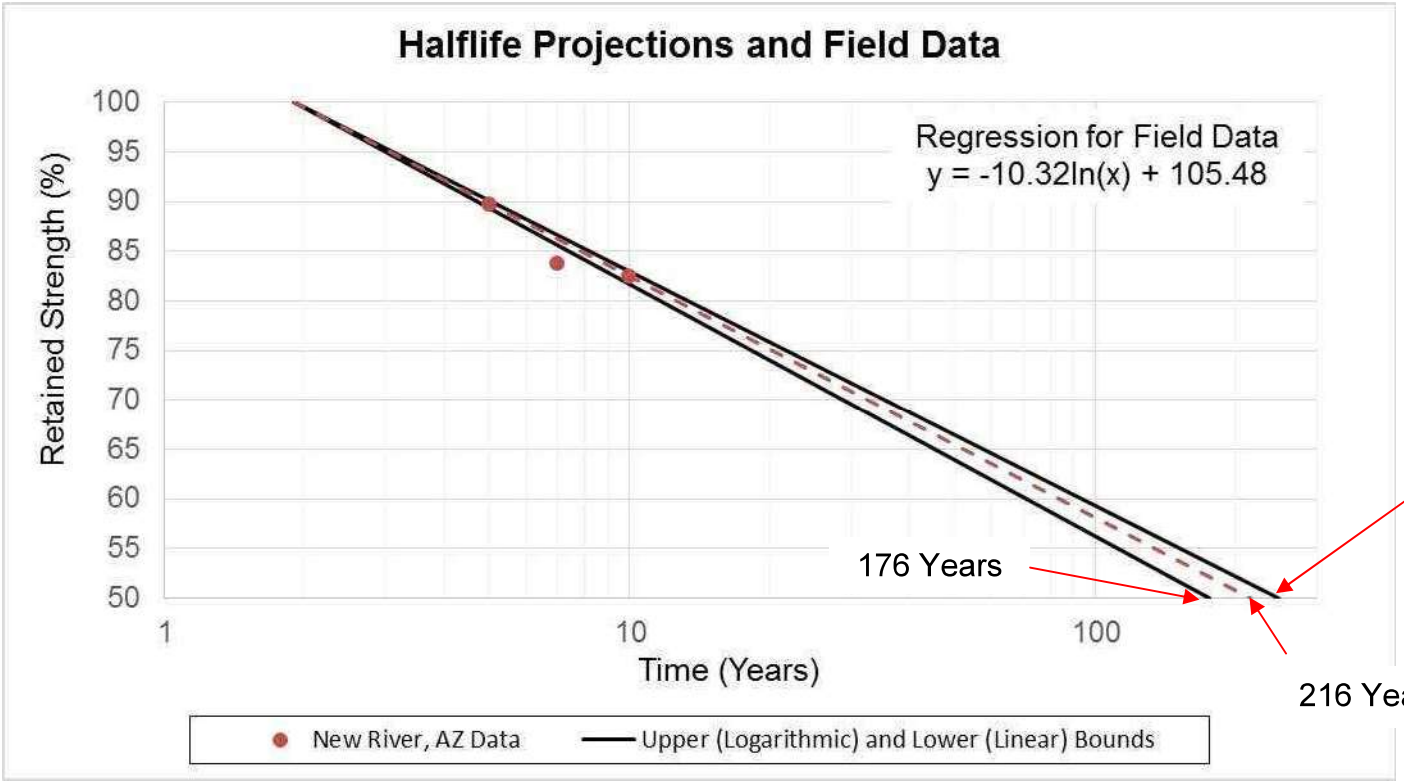
Figure 6

Kennesaw, GA | 23-April-2015



Note: Geosyntec calculated an upper bound half-life of 277 years and a lower bound half-life of 214 years using the same data and method. Difference between Geosyntec and Richgels calculations are attributed to rounding.

Halflife Projections (Richgels, 2015a, 2015b)
Upper and Lower Bound Estimates
Watershed Geosythetics – ClosureTurf® UV Assessment

Geosyntec consultants

Figure **7**

Kennesaw, GA | 23-March-2015

Appendix I
Example Calculation for Pull-Out Resistance of ClosureTurf for Thermal Effects

EXAMPLE CALCULATION FOR PULL-OUT RESISTANCE OF CLOSURETURF FOR THERMAL EFFECTS

PURPOSE

The pull-out resistance of a ClosureTurf termination along a 3H:1V sideslope is evaluated for a 3-foot deep and 2-foot wide anchor trench. The factor of safety against pull-out is estimated by calculating the tensile force induced by thermal contraction of the geomembrane component of ClosureTurf (i.e., 50-mil Super GripNet or MicroDrain) and the resisting forces along the proposed anchor trench.

METHOD

The factor of safety against pull-out of the ClosureTurf geomembrane component of the anchor trench was evaluated based on a force equilibrium analysis as the ratio of the sum of the resisting forces, $F_{resisting}$, to the sum of the driving forces, $F_{driving}$, as follows:

$$FS_{pull\ out} = \frac{\sum F_{resisting}}{\sum F_{driving}} \quad (1)$$

Driving Forces

The driving force consists of the tensile force caused by thermal contraction of the geomembrane component after installation, calculated as follows:

$$T_t = J * \alpha * \Delta T \quad (2)$$

where:

T_t = tensile force due to thermal contraction of geomembrane component [pounds per foot (lb/ft)];

J = elastic modulus of HDPE geomembrane component (lb/ft);

α = coefficient of thermal expansion for HDPE geomembrane component [inverse degrees Fahrenheit (1/°F)]; and

ΔT = temperature change of geomembrane component after installation (°F).

The elastic modulus (J) for the geomembrane component (i.e., Super GripNet or MicroDrain) is not provided in the manufacturer product data sheets; therefore, the elastic modulus was estimated from the tensile yield strength (σ_y) and corresponding yield strain (ε) reported in the product data sheets as follows:

$$J = \frac{\sigma_y}{\varepsilon} \quad (3)$$

where:

J = elastic modulus of geomembrane component (lb/ft);

σ_y = tensile strength at yield for 50-mil HDPE Super GripNet and MicroDrain (i.e., 110 lb/in. = 1,320 lb/ft); and

ε = tensile strain at yield for 50-mil HDPE Super GripNet and MicroDrain (i.e., 13%).

The elastic modulus for the geomembrane component was calculated to be approximately 10,000 lb/ft using Equation 3.

The coefficient of thermal expansion (α) for the geomembrane component was estimated as 6.7×10^{-5} / °F based on typical values for HDPE geomembranes. Tensile force due to thermal contraction of the geomembrane component (T_t) was calculated for a temperature change (ΔT) conservatively selected as 100°F. The tensile force calculation is presented below.

Resisting Forces

For the ClosureTurf termination, the analysis of resisting forces was performed based on a frictionless pulley system (Qian et al. 2002), which allows the geomembrane component to be considered as a continuous member along its entire length. The resisting forces against pull-out were calculated as the frictional forces between both sides of ClosureTurf and the adjacent materials along the anchor trench, as shown in Figure I-1.

The frictional forces that act along flat planes of ClosureTurf were calculated as the product of the normal force acting on the plane and the tangent of the interface friction angle between the ClosureTurf component and the adjacent material. For forces F_1 and F_2, the normal force was taken as the weight of the overlying soil. For forces F_3 and F_4, the normal force was estimated as the at-rest lateral earth pressure at mid-depth within the anchor trench.

The frictional forces F_1 through F_4 were calculated according to Equations 4 through 7, respectively, below and act in the direction shown in Figure I-1.

$$F_1 = \gamma_{at} * d_{at} * w_{at} * \tan(\delta_U) \quad (4)$$

$$F_2 = \gamma_{at} * d_{at} * w_{at} * \tan(\delta_L) \quad (5)$$

$$F_3 = 0.5 * \gamma_{at} * {d_{at}}^2 * K_0 * \tan(\delta_U) \quad (6)$$

$$F_4 = 0.5 * \gamma_{at} * {d_{at}}^2 * K_0 * \tan(\delta_L) \quad (7)$$

where:

γ_{at} = unit weight of anchor trench backfill material [pounds per cubic foot (pcf)];

d_{at} = depth of anchor trench [feet (ft)];

w_{at} = width of anchor trench (ft);

δ_U = interface friction angle between turf and overlying anchor trench backfill material (degrees);

δ_L = interface friction angle between geomembrane component and underlying material (degrees);

K_0 = coefficient of at-rest earth pressure [i.e., 1-sin(ϕ)]; and

ϕ = friction angle of anchor trench backfill material (degrees).

The interface friction angle between the geomembrane component and the underlying material (δ_L) was taken as the internal friction angle of ClosureTurf provided in the manufacturer product data sheets (i.e., 35 degrees). The interface friction angle between the turf and the overlying backfill material (δ_U) is expected to be lower than δ_L, because the grass blades provide a lower frictional resistance on the upper side of ClosureTurf. For this calculation, δ_U was estimated as two thirds of δ_L (i.e., 23.3 degrees).

CALCULATIONS

The tensile force due to thermal contraction of the geomembrane component was calculated using Equation 2:

$$T_t = 10{,}000 \times 6.7\text{x}10^{-5} \times 100 = 67 \text{ lb/ft} \quad (2)$$

The resisting frictional forces acting along the anchor trench were calculated using Equations 4 through 7 for a 3-ft deep and 2-ft wide anchor trench (i.e., d_{at} = 3 ft, w_{at} = 2 ft), as shown below. Typical values of unit weight of backfill (γ_{at}) of 125 pcf and friction angle of 32 degrees were used for this calculation.

$$K_0 = 1 - \sin(\phi) = 0.47$$

$$F_1 = 125 \times 3 \times 2 \times \tan(23.3) = 323 \text{ lb/ft} \quad (4)$$

$$F_2 = 125 \times 3 \times 2 \times \tan(35) = 525 \text{ lb/ft} \quad (5)$$

$$F_3 = 0.5 \times 125 \times (3)^2 \times 0.47 \times \tan(23.3) = 114 \text{ lb/ft} \quad (6)$$

$$F_4 = 0.5 \times 125 \times (3)^2 \times 0.47 \times \tan(35) = 185 \text{ lb/ft} \quad (7)$$

The sum of resisting forces acting along the anchor trench was calculated, as follows:

$$\sum F_{resisting} = 323 + 525 + 114 + 185 = 1147 \text{ lb/ft}$$

The sum of resisting forces was compared to the tensile yield strength of the geomembrane component:

$$1147 < 1320 \quad \text{O.K.}$$

The factor of safety against pull-out was calculated using Equation 1, as follows:

$$FS_{pull\ out} = \frac{1147}{67} = 17.1 \tag{1}$$

SUMMARY AND CONCLUSIONS

The factor of safety against pull-out of a ClosureTurf termination was calculated for a 3-ft deep and 2-ft wide anchor trench. The factor of safety against pull-out is calculated as 17.1, and therefore, the ClosureTurf termination is not expected to pull out of the anchor trench due to forces induced by thermal contraction.

REFERENCES

Qian, X., R.M. Koerner, and D.H. Gray. 2002. *Geotechnical Aspects of Landfill Design and Construction*. Prentice-Hall Inc.

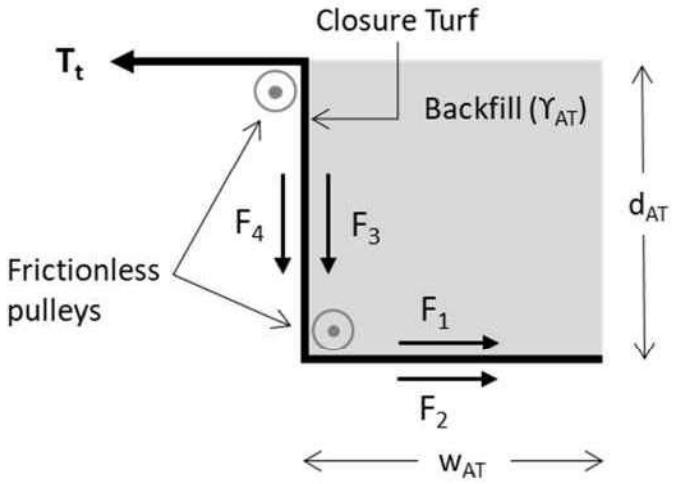


Figure I-1. ClosureTurf Termination within Anchor Trench

Appendix J
ClosureTurf Deep Freeze Test Results

Can you drive on WatershedGeo's ClosureTurf when it is frozen?

George R. Koerner Ph.D., P.E. & CQA
Geosynthetic Institute (GSI) 475 Kedron Ave. Folsom, PA 19033 U.S.A.

Date: September 25, 2018

Introduction

Any engineered barrier should be challenged as to its performance when placed in extreme climates. It is for this reason that we were asked to investigate the performance of WatershedGeo's ClosureTurf when exposed and stressed under extremely cold conditions. This material has been placed in a location where emergency vehicles will need to traffic the material in the depth of winter. Several owners are asking, "will this material hold up under traffic, in such conditions?" This concern is applicable to many locations in the continental United States and has greater significance in Canada and Alaska.

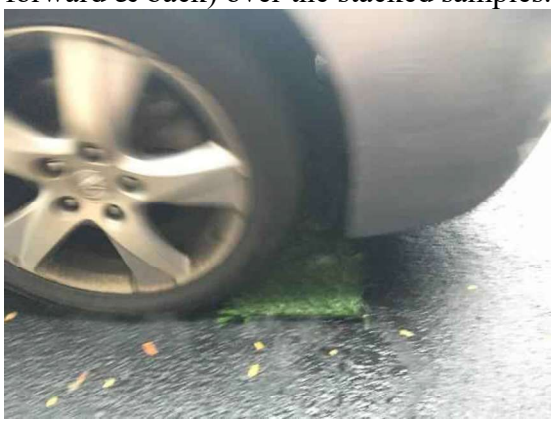
The effects of driving on WatershedGeo's ClosureTurf when it was frozen was studied at the Geosynthetic Institute (GSI) in September of 2018. Samples in the form of 300 mm (12 in.) by 300 mm (12 in.) squares were exposed repeatedly to temperature cycles between -60°C to +20°C. After five thermal cycles, the specimens experienced vehicle traffic and then were observed for damage in the cold condition. After visual inspection, the samples were tested for tensile properties and compared to baseline results. Please note that this mechanical testing was conducted at standard laboratory temperature after the materials reached temperature equilibrium.

It should be clearly stated that this is not a freeze-thaw study. That issue has been investigated by several researchers which include, but are not limited to, the U.S. Bureau of Reclamation, EPA, Comer et. al. (1996) Hsuan et. al. (1994), LaFleur, et. al., (1984) and Rollin et. al., (1984). All these studies show that the geomembrane component of the closure system and their seams performed extremely well even after hundreds of freeze-thaw cycles. The work by Zimmie and LaPlante (1990) shows that compacted clay liners (CCL) do not fair well when exposed to the same extreme conditions.

Summary of Procedure

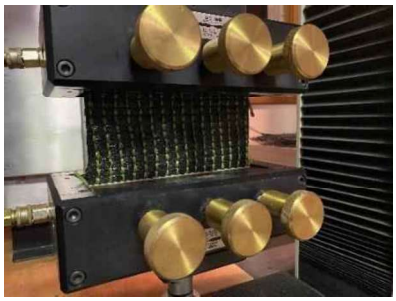
1. A sandwich of turf and geomembrane coupons are exposed to five (5) repetitive cycles of freezing via immersion in a dry ice bath at (-60 Degree Celsius) and then thawing at room temperature. Each exposure lasts for one-hour of freezing followed by an hour of thawing. The process is shown in the figures below.

2. After the fifth quench, the samples were trafficked by a 1 ton, 26 psi tire pressure, 8" wide wheel rubber tire vehicle. The vehicle made two passes as shown in the figures below (i.e., forward & back) over the stacked samples.



3. After the exposure described above, the samples were observed for damage. As can be seen in the figures below, neither the turf nor the geomembrane was damaged. The only observed difference between the before and after specimens was that the spikes on the underside of the geomembrane were bent over from trafficking.

4. The expose and unexposed samples were also tested for retained tensile properties. As can be seen in the figures below the turf was tested via ASTM D4595 "Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method" and the geomembrane specimens were tested via ASTM D4885 " Standard Test Method for Determining Performance Strength of Geomembranes by the Wide Strip Tensile Method."



Three specimens from the centrally located areas of the exposed and unexposed turf and geomembrane coupons were used to determine the tensile properties and calculate the average value for comparison purposes. Pictures of the turf tested before and after failure are shown above. Photographs of the geomembrane testing during different stages of elongation are shown below.

Results

Average exposed coupon results were compared to the unexposed results. As can be seen in the tabular results below, there were no statistical differences between the before and after exposure wide width tensile test results for either the turf or the geomembrane. This holds true for the strength and elongation characteristics of both materials.

Turf Before Exposure

Spec. Number	Break Load (lbs)	Break Strength (ppi)	Break deflection (in)	Break Elongation (%)
1-MD	2025	**253**	1.14	**29**
2-MD	2311	**289**	1.23	**31**
3-MD	2193	**274**	1.19	**30**
Ave.		**272**		**30**
Std.		18.0		1
Cv		6.6		4

Turf After Exposure

Spec. Number	Break Load (lbs)	Break Strength (ppi)	Break deflection (in)	Break Elongation (%)
1-MD	2112	**264**	1.25	**31**
2-MD	2240	**280**	1.29	**32**
3-MD	2138	**267**	1.16	**29**
Ave.		**270**		**31**
Std.		8.5		2
Cv		3.1		5

Geomembrane before exposure

Spec. Number	Yield Load (lbs)	Yield Strength (ppi)	Yield deflection (in)	Yield Elongation (%)	Break Load (lbs)	Break Strength (ppi)	Break deflection (in)	Break Elongation (%)
1-MD	887	**111**	0.26	**7**	1255	**157**	28.1	**703**
2-MD	894	**112**	0.28	**7**	1311	**164**	29.9	**748**
3-MD	899	**112**	0.3	**8**	1274	**159**	29	**725**
Ave.		**112**		**7**		**160**		**725**
Std.		0.8		1		3.6		23
Cv		0.7		7		2.2		3

Geomembrane after exposure

Spec. Number	Yield Load (lbs)	Yield Strength (ppi)	Yield deflection (in)	Yield Elongation (%)	Break Load (lbs)	Break Strength (ppi)	Break deflection (in)	Break Elongation (%)
1-MD	879	**110**	0.32	**8**	1341	**168**	30.2	**755**
2-MD	901	**113**	0.31	**8**	1229	**154**	29.5	**738**
3-MD	882	**110**	0.34	**9**	1315	**164**	30	**750**
Ave.		**111**		**8**		**162**		**748**
Std.		1.5		0		7.3		9
Cv		1.3		5		4.5		1

Conclusions

Like all performance simulation testing, this humble experiment is not completely representative of the entire field conditions. This procedure is only intended to induce property changes associated with the end use conditions due to extreme cold and vehicular traffic. It is not a survivability nor a long-term durability study. It also does not proport to model field conditions such as differential settlement or the case of yielding subgrade under closure systems when trafficked. In addition, note that rather small unrestrained pieces of the materials were exposed to

traffic on rigid asphaltic pavement. The evaluation is limited; however, it is still considered relevant based on the actual conditions tested.

With all the above written, we again ask the question; “Can you drive on WatershedGeo’s ClosureTurf when it is frozen?” We believe the answer is **yes**, cautiously in a pinch with light ground pressure, rubber-tired equipment.

References

Comer, A. I. and Hsuan, Y. G. (1996), “Freeze-Thaw Cycling and Cold Temperature Effects on Geomembrane Sheets and Seams,” U. S. Bureau of Reclamation Report R-96-03, March, 136 pgs.

Comer, A. I., Sculli, M. L. and Hsuan, Y. G. (1995), “Effects of Freeze-Thaw Cycling on Geomembrane Sheets and Their Seams,” Proc. of Geosynthetics ’95, Nashville, TN, pp. 853-866.

EPA (1991) "Technical Guidance Document: "Inspection Techniques for the Fabrication of Geomembrane Field Seams," EPA/530/SW-91/051, May 1991.

Hsuan, Y. G., Sculli, M. L. and Koerner R. M. “EFFECTS OF FREEZE/TUA W CYCLING ON GEOMEMBRANES AND THEIR SEAMS; PART I- STRENGTH TESTS AT +20°C´Proceeding GRI-7 Conference of Geosynthetic Liner Systems at GSI, IFAI, St. Paul, MN 1994, pp. 202-217.

LaFleur, J., Akber, S.Z., Hammamju, Y., and Marcotte, M., (1985) "Tensile Strength of Bonded Geotextile-Geomembrane and Composites," Second Canadian Symposium on Geotextiles and Geomembranes, Canadian Geotechnical Soc., Edmonton, Alberta, Canada, pp. 219-224.

Rollin, A. L., Lafleur, J., Marcotte, M., Dascal, O. and Akber, Z. (1984), “Selection Criteria for the Use of Geomembranes in Dams and Dykes in Northern Climate,” Proc. of the Intl. Conf. on Geomembranes, Denver, CO, pp. 493-499.

Zimmie, T.F., and La Plante, C. (1990)"The Effects of Freeze-thaw Cycles on the Permeability of a Fine-Grained Soil," Proc., 22nd Mid-Atlantic Ind. Waste Conf., Drexel Univ., Philadelphia.

Appendix K
ClosureTurf Fire Resistance Test Report

RICHGELS ENVIRONMENTAL SERVICES

June 15, 2020

Jose Urrutia
Vice President of Engineering
Watershed Geosynthetics.
11400 Atlantis Place
Suite 200
Alpharetta, GA 30022

RE: CLOSURETURF FIRE TEST CT AND CT-HD

Dear Jose:

Richgels Environmental Services (RES) had initially investigated the fire resistance of ClosureTurf CT in June 2015. RES' concern at the time was the State of California had declared wildfire as a "reasonable foreseeable" risk for solid waste landfill surfaces after wildfire events at landfills resulting in destruction of landfill gas collection systems and other supporting infrastructure. The most recent occurrence at Butte County's Neal Road Landfill in 2018 during the Camp Fire (destroyed the town of Paradise, CA). The American Society for Testing and Materials (ASTM) test Method E108 *Standard Test Methods for Fire Tests of Roof Coverings* is designed to test asphalt composite roofs for fire resistance. Section 10 of this test method is similar to field conditions such as large brush or trees adjacent to landfill surfaces from which burning embers could fall thus igniting grasses on the landfill surface.

Thus, this method was chosen to assess fire resistance of both the CT and CT-HD versions of ClosureTurf (data sheets attached). This investigation performed the Burning Brand Test (Section 10 of ASTM E108**)** conducted with 3 different brand sizes, Class A, B and C. The Class A brand is 12 inches square in length, width and nominally 3 inches in depth. The Class B brand is 6 inches square and nominally 3 inches in depth. The Class C brand is a 2-inch cube. The CT test was performed in California in June 2015. After development of the denser CT-HD version, its fire test was conducted in August 2018 under my supervision at Watershed Geo's Research and Development Laboratory in Louisiana.

Test Preparation

Brands for both the Class A and Class B tests were constructed using nominal 1x1 (¾ " x ¾" finished) pine stock and fastened together with 3d finishing nails. Strips were spaced ¼" apart using a ¼" template to provide consistent strip spacing. The Class A brand was built with 36 each 12" long strips. Class B brand was built with 18 each 6" long strips. The Class C brand was made with a 1-1/2" long piece of 2x2 pine stock with perpendicular saw kerfs on opposite sides per ASTM E108 specifications. The completed brands were oven cured overnight. ASTM E108 specifications recommend curing the brands in an oven for 24 hours at an oven temperature between 105°F and 120°F. Home ovens only go as low as 150°F, so the brands were just cured overnight (Figure 1). All brands were judged as nearly "bone dry," which was confirmed by their ignitability (below).

The test site subgrade was stripped of vegetation and bladed smooth with a straight shovel before placing 50-mil, LLDPE Super Gripnet geomembrane samples. ClosureTurf test pads were prepared using dimensions specified in ASTM E108 – 4'-4" by 3'-4." All test pads received 60 pounds of commercially available sand that met ASTM C33 specifications (Figure 2). Sand was poured evenly over the pads and raked in place per recommended construction practice. This is an equivalent application of 4.2 psf, less than the ClosureTurf manufacturer's recommended sand ballast application (5 psf).

Assuming a sand unit weight of 120 pcf,, sand applied at a rate of 5 psf would spread to approximately 0.5 inches deep. An application rate of 4.2 psf would be 0.42 inches. The thickness difference of 0.08 inches would expose that much more of HDPE grass tufting hence is considered conservative for the purposes of this examination.

Figure 1

Figure 2

Test Execution

The Class A brand was ignited over charcoal and propane outdoor grills for the CT and CT-HD tests respectively. Each large face was exposed to the ignition source for 30 seconds. Each side face was exposed for 45 seconds each. The final exposure of the brand faces per ASTM E108 procedures were not done as the brands were fully aflame and the pine stock was beginning to be consumed. The total ignition time was four minutes.

After the prescribed ignition time, the fully aflame brands were placed on the turf samples (Figure 3). Turf blades melted to the top of the sand ballast in proximity of the burning brand, yet the turf did not ignite nor self-propagate flame away from the brand in either test. A slight wind developed during testing fanning flames to one side.

Figure 3

ClosureTurf CT

ClosureTurf CT-HD

The Class B brands were also ignited over outdoor grills as described above for the Class A brands. Each face was placed on the grill for 30 seconds. Each side face was exposed for 30 seconds each. As with the Class A brands, the Class B brands were fully aflame after the last side face was placed against the grills. Total ignition time was 3 minutes.

The Class C brands were ignited over the grills as described above. Four of the brand faces were placed on the grills for 30 seconds for a total of 2 minutes ignition time.

The Class A brand finished burning with open flame approximately 30 minutes after placement. No fire propagation away from brand in the CT nor CT-HD tests occurred. The same was true for the Class B and C brand tests.

Post Test Inspections

The Class A and B brands were nearly entirely consumed. (Figure 4) Only a few pieces of brand were left after fire test completion. Grass tufts in both the CT and CT-HD samples were melted up to 6 inches away from the Brand A (Figure 5) edge in the melt zone. Ballast sand was discolored under the brand within burn zone.

The Class B brands were also nearly entirely consumed. Only a few pieces of brand were left after fire test completion. Grass tufts were melted up to 4 inches away from the brand edge as shown in Figure 6. Sand discolored under brand but retained natural color within melt zone.

The melt zone around the Class C brand was up to 4 inches in the longest dimension (Figure 7).

Figure 4

Brand A Closure CT

Brand A ClosureTurf CT-HD

Figure 5

Figure 6

Brand B ClosureTurf CT

Brand B ClosureTurf CT-HD

Figure 7

Brand C ClosureTurf CT Brand C ClosureTurf CT-HD

Upon peeling back the turf component of the tested samples, it was found the turf had melted on to the SGN and was essentially consumed by the fire within the burn zone of all the Class A and B tests. The SGN drainage studs were intact up to the boundary of the brand and melted down to the geomembrane sheet within the burn zone. The woven geotextile beyond the burn zone – or under the melt zone - was undamaged as shown in Figure 8.

Figure 8

The entire system was pulled back to observe if the fire had burned through the SGN for both tested samples.

The underside of the SGN displayed observable effects from the fire but was not broached. The SGN burn zone boundary for results typical to all Class A and Class B tests is shown in Figure 9. Some of the soil and organic debris beneath the burn zone was dry and adhering to the SGN. Spikes beneath the burn zone were gone, while spikes in areas immediately neighboring the burn zone were intact.

The Class A brand burn zone damage to the SGN was essentially the dimensions of the brand – 12" x 12".

Figure 9

Figure 10

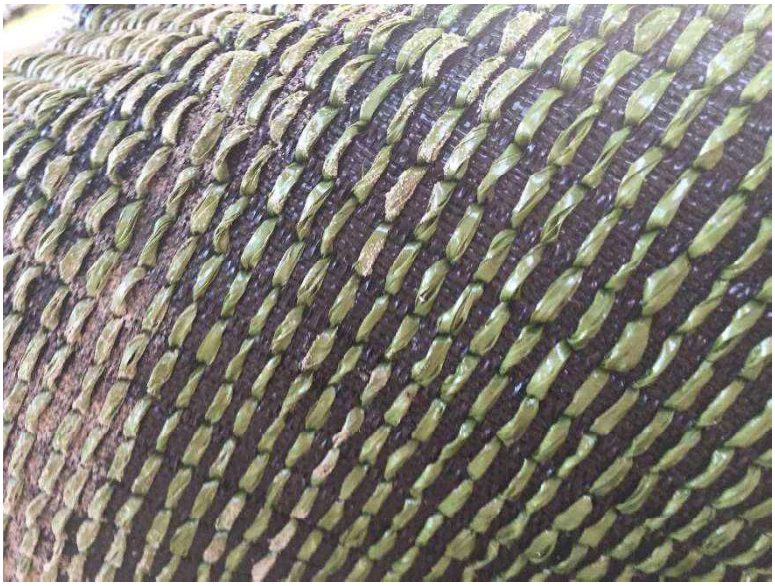
Sand discoloration beneath the burn zone was also observed in the Class B brand test. The underside of the SGN displayed observable melting from the fire but was not broached (Figure 10). Again dry soil and organic debris was found adhering to the SGN underside.

The Class B brand melt zone was slightly larger than the dimensions on the brand – 7-1/2" 7-1/2" for the CT test. For both the Class A and B tests, studs in the immediate vicinity of the burn zone were completely intact. Studs with the burn zone were flattened.

Class C brands were stuck to the underlying grass tufts after the fire had gone out. The CT test brand was not fully consumed by the fire. Note sand discoloration under the brand and minor melting of nearby grass tufts in Figure 7.

For both tests, Class C brands displayed no melting effect on the woven geotextile component in the turf (Figure 11) There were no observable impacts to the SGN either.

Figure 11



Conclusions

1. ClosureTurf exposure to fire is contained to the vicinity of the fire source. It does not spread.
2. None of the ASTM burning brand tests burned through the SGN component of ClosureTurf. This is important when considering active gas control maybe near site perimeter where burning embers may fall.

These results are relevant to concerns in California with respect to wildfire. Wildfire danger is a regulated consideration for closed landfills with surface infrastructure such as landfill gas (LFG) collection wells and piping. California considers wildfire a reasonably foreseeable event for which site owners must provide corrective action cost estimates. Vegetated surfaces provide fuel for fire propagation to other combustible structures such as LFG collection systems. This corrective action requirement could be coming to other states. Use of ClosureTurf as a final cover system should reduce these concerns and related financial burdens for corrective action financial liabilities.

If you have any questions, please call or email the undersigned.

Very Truly Yours

Chris Richgels, PE

Richgels Environmental Service

ATTACHMENT N.4-2
ClosureTurf Installation Manual

ClosureTurf® and HydroTurf®
DELIVERY, HANDLING & STORAGE GUIDELINES

WatershedGeo®
Unearthing Solutions

v.22066

TABLE OF CONTENTS

1.0 INTRODUCTION

2.0 PURPOSE AND SCOPE

3.0 ENGINEERED TURF

4.0 GEOMEMBRANE

5.0 HYDROBINDER®

6.0 EXAMPLE STORAGE LAYOUTS

7.0 LIMITATIONS

1.0 Introduction

This document provides guidance for the delivery, handling, and storage for the components of Watershed Geo's ClosureTurf® and HydroTurf® technologies.

ClosureTurf is a patented, 3-component technology, that serves as a final cover system for landfills and solid waste sites. These components are as follows (from the bottom up):

- Component 1 – Geomembrane Liner, typically, Agru America Super GripNet, MicroDrain or MicroSpike
- Component 2 – Engineered Turf
- Component 3 – Sand Infill Material (alternatively, HydroBinder infill may also be used in ClosureTurf)

HydroTurf is a patented, 3-component technology, that serves as a revetment system which provides erosion control for channels, steep chutes, dams, levee, slopes, outfall structures, and basins. These components are as follows (from the bottom up):

- Component 1 – Geomembrane Liner, typically, Agru America Super GripNet, MicroDrain or MicroSpike (component used in HydroTurf CS)
- Component 2 – Engineered Turf
- Component 3 – HydroBinder Infill

2.0 Purpose and Scope

The ClosureTurf and HydroTurf Delivery, Handling and Storage Guidelines have been prepared to provide the Owner/Engineer/Contractor/Installer general guidance on the proper handling and storage of the components for the ClosureTurf and HydroTurf Systems. This document should be used in conjunction with the Project Specifications, Product Data Sheets, Health and Safety Manual, Installation Guidelines, and industry standards for the proper delivery, handling and storage of these technologies in order to mitigate risks of damage and safety.

This manual is based on our experience and is a basic guideline only. Watershed Geo cannot anticipate the many ways this product may be delivered, stored and handled. It is the responsibility of the Owner/Engineer/Contractor/Installer to properly unload, handle and store the materials. Also, Watershed Geo cannot anticipate the varied and changing site conditions including, but not limited to, terrain, weather, climate and access.

3.0 Engineered Turf

Instructions for the proper Delivery, Handling and Storage of ClosureTurf® and HydroTurf® are in the Installation Guidelines Manual as well as Section 01 19 73 of the CSI Specifications. Both are available upon request.

A. Offloading Guidelines

- Rolls of material shall be unloaded with equipment that will not damage the Engineered Turf.
- Fabric-straps, spreader bars, stinger bars, or other approved equipment shall be used for handling Engineered Turf rolls.
- A carpet probe / pole attachment that will be able to handle the roll dimensions and weight of the Engineered Turf shall be used (please refer to the product data sheets for the roll dimensions and weight).

B. Storage Guidelines

- Materials should be stored in a flat, dry and well drained area.
- The surface shall be free of sharp rocks or other objects that could damage the materials.
- Waterproofing tarps may need to be considered if rolls are on-site longer than one (1) year. Rolls of turf will be delivered with a white UV resistant wrapping. They should be covered with tarps at the one (1) year mark.
- Engineered Turf rolls may be stacked up to three (3) rolls high.
- Product segregation by components, upon delivery, is suggested.

C. Long Term Storage Guidelines

- If rolls must be stored (exposed to UV) for longer than five years, they should be covered by a UV resistant material. This covering should be replaced as necessary.
- Provide secure, UV resistant (indoor) storage for the slings that were provided during shipment.

	Core Size and Type	# of Rolls per Enclosed Van	# of Rolls per Flatbed	# of Rolls per Container
ClosureTurf® CT	4 inch PVC Core	27	9	18
ClosureTurf® CT-X	4 inch PVC Core	27	9	18
ClosureTurf® CT-HD	4 inch PVC Core	18	9	18
HydroTurf® CS	4 inch PVC Core	27	9	18
HydroTurf® Z	4 inch PVC Core	36	9	18

4.0 Geomembrane

A. Handling:

- Prior to unloading, and during deployment, care must be taken that the equipment to be used to unload or handle the material at the jobsite is adequate for the task.
- Rolls should not be moved any more than necessary to avoid possible damage.
- When moving rolls, ensure that the roll is elevated enough to avoid scraping the roll on the ground.
- When removing rolls from a container, care shall be taken so as not to scrape the roll against the top, bottom or sides of the container.
- Care should be taken to avoid damage to the core ends.

Geomembrane on flatbed semi

Removal of geomembrane

Trucks staged for unloading

Placement of geomembrane

B. Storage:

- Roll storage space should be provided in a location or locations close to the area to be covered to minimize additional handling.
- The storage area should be protected from puncture, theft, vehicular traffic, vandalism, chemical exposure, excessive heat and other hazards which might create a source of potential damage to the liner.
- The surface on which the liner will rest should be a flat, firm, prepared surface free of debris and sharp objects (Do NOT store liner on top of wooden pallets).
- If available, geotextile should be placed under the liner rolls to cushion & protect them.
- MicroDrain® and Super GripNet® should not be stacked no more than two (2) high'. MicroSpike® can be stacked no more than three (3) high.
- The ends of cardboard cored rolls should be capped, or taped with weather-resistant tape. If capped, secure the caps with suitable adhesive weather – resistant tape.
- At a minimum, rolls at both ends of a stack should be chocked. Make sure the chocks are large enough to perform the task, and do not dig in to the rolls.
- If Long Term: If rolls must be stored (exposed to UV) for longer than 5 years, they should be covered by a UV resistant material. This covering should be replaced as necessary.
- If Long Term: Provide secure, UV resistant (indoor) storage for the slings that were provided during shipment.

	Core Size and Type	# of Rolls per Flatbed	# of Rolls per Container
Super GripNet®	6"Ø Recycled PE	6	4
MicroDrain®	6"Ø Recycled PE	6	4
MicroSpike®	6"Ø Recycled PE	12	12

5.0 HydroBinder®

Both the Bulk bags and 80 lb. bags are placed on skids/pallets and wrapped in plastic.

A. Delivery:

- HydroBinder is delivered to the site on flatbed trucks.

B. Packaging:

- 3,000 lb. Bulk bags
- 80 lb. bags

C. Storage:

- Watershed Geo suggests that the HydroBinder material be tarped or stored inside when onsite and kept dry.

	# of Skids/Pallets per Flatbed
3,000 lb. Bulk Bags	**16**
80 lb. bags (42 bags per pallet)	**16**

80 lb. HydorBinder® bag

HydroBinder® storage

HydroBinder® bulk bags on flatbed trucks

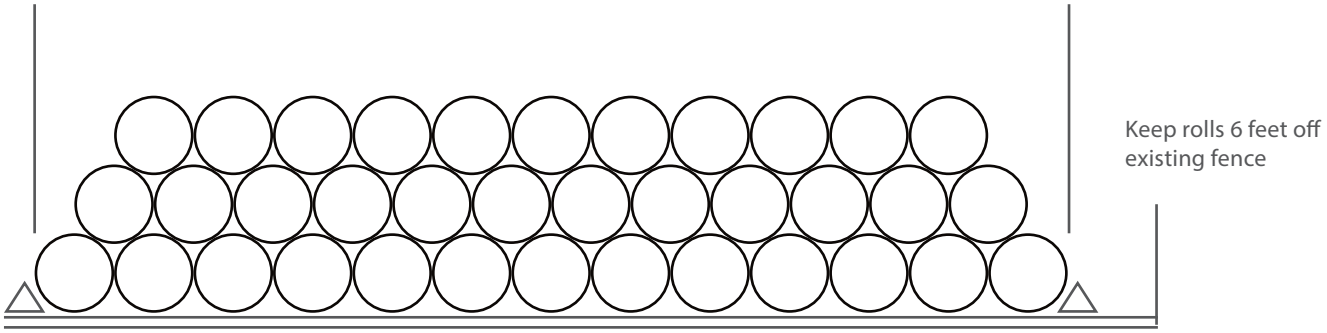
6.0 Example Storage Layouts

Geomembrane liner stacked

Geomembrane liner stacked

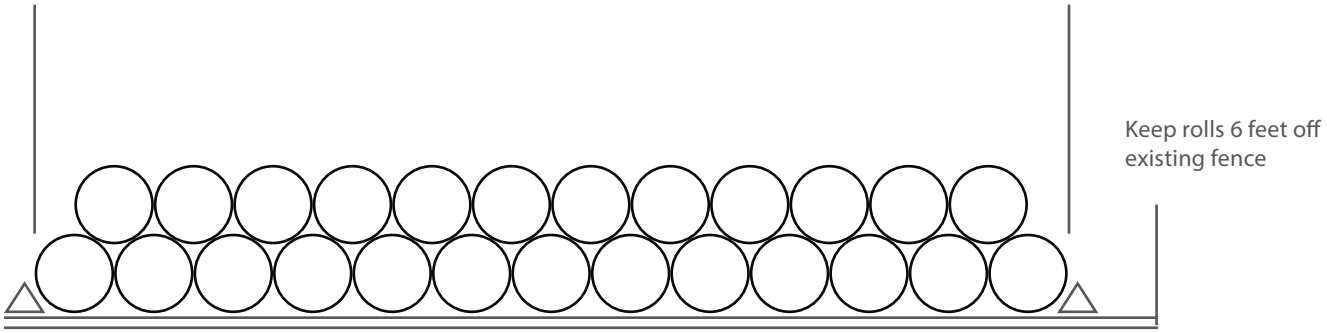
Engineered Turf Component Storage:

Example: Stack 3 Rolls High

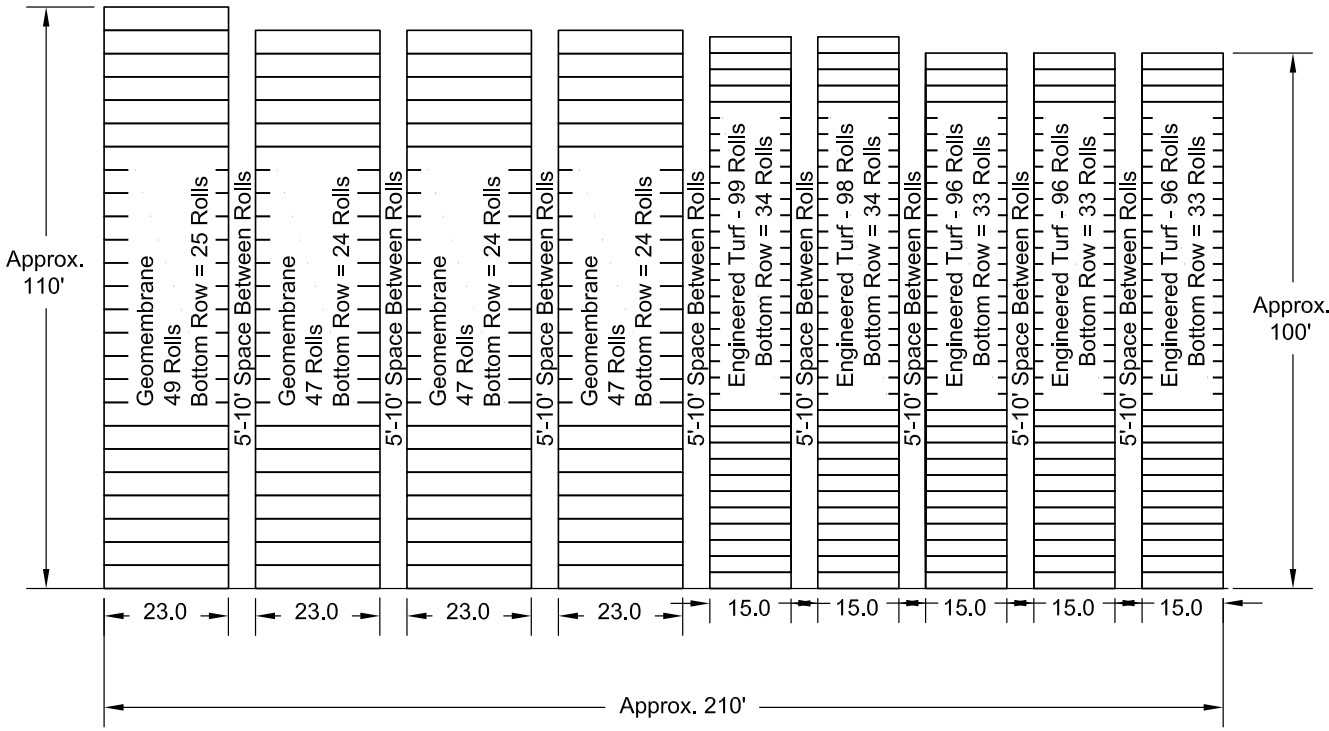


SuperGripnet and MicroDrain Geomembrane Storage:

Example: Stack 2 Rolls High



Nominal 50 Acre Super Gripnet® or MicroDrain® Laydown
Geomembrane Stacked 2 High Max.
Engineered Turf Stacked 3 High Max.



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Notes:

1. Please verify latest revision of drawing by checking at www.watershedgeo.com.
2. Geomembrane nominal roll diameter = 4.3 ft.
3. Engineered Turf nominal roll diameter = 3 ft.

WG WatershedGeo® Unearthing Solutions

PRODUCT ClosureTurf® HydroTurf®

TITLE ClosureTurf® Geomembrane/ Engineered Turf Laydown Area

FILE No. 2020-100-CT-11-R2		
REV. 2	SCALE	AS SHOWN
CADD	T.s.R.	09-2020

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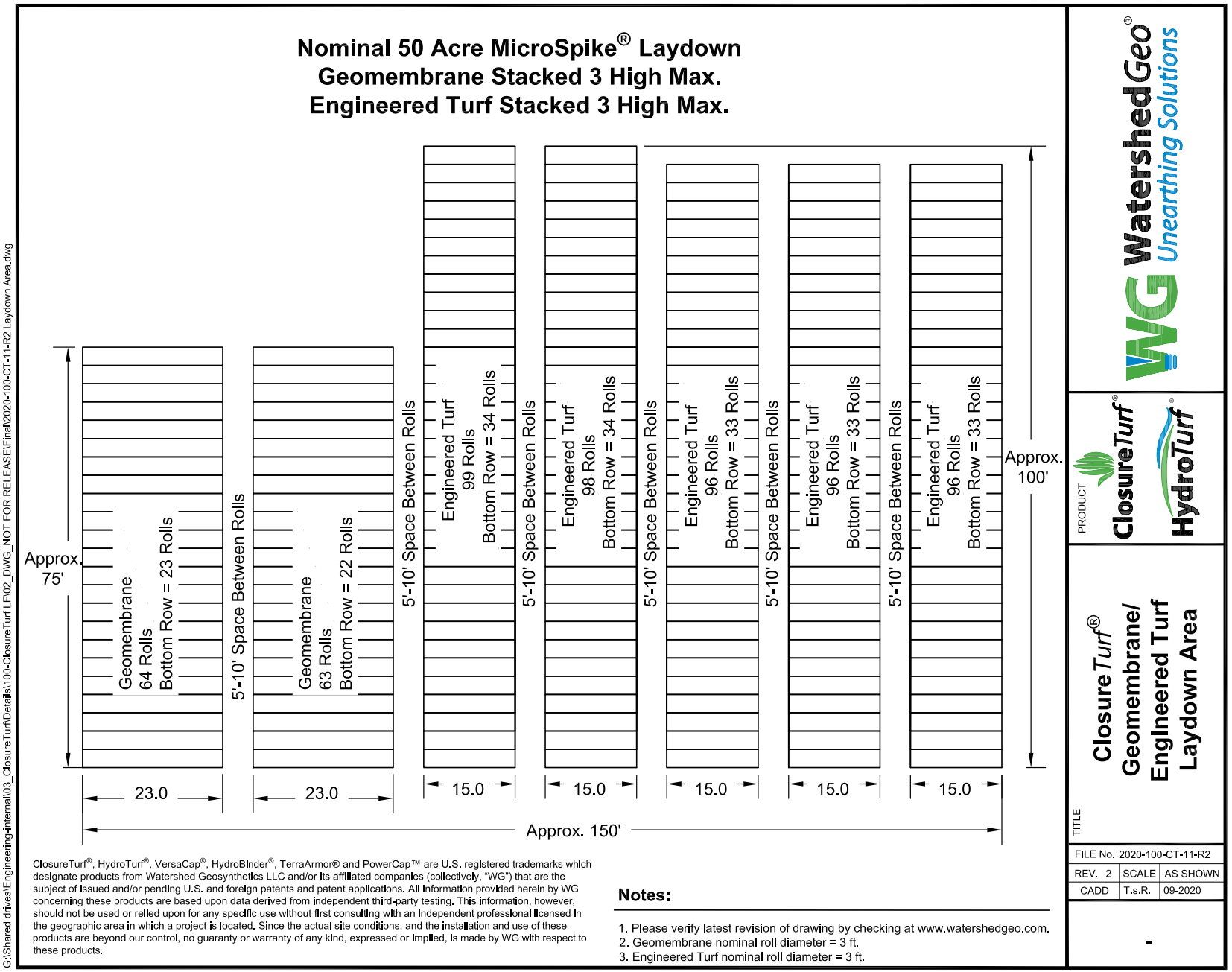

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Notes:

1. Please verify latest revision of drawing by checking at www.watershedgeo.com.
2. Geomembrane nominal roll diameter = 3 ft.
3. Engineered Turf nominal roll diameter = 3 ft.

7.0 Limitations

This document has been prepared to provide the Owner, Design Engineer, Construction Quality Assurance Professional of Record, and the Contractor / Installer with a general guidance for delivery, handling and storage of HydroTurf and ClosureTurf materials. All information, recommendations and suggestions appearing in this document concerning the use of our products are based upon experience, tests and data believed to be reliable; however, this information should not be used or relied upon for any specific application without independent professional examination and verification of its accuracy, suitability and applicability. Since the actual use by others is beyond our control, no guarantee or warranty of any kind, expressed or implied, is made by Watershed Geosynthetics LLC as to the effects of such use or the results to be obtained, nor does Watershed Geosynthetics LLC assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. ClosureTurf® and HydroTurf® are U.S. registered trademarks which designate products from Watershed Geosynthetics LLC. These products are the subject of issued U.S. and foreign patents and/or pending U.S. and foreign patent applications. Nothing herein is to be construed as permission to grant license or as a recommendation to infringe any patent.

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ClosureTurf®

Installation Guidelines Manual

Before utilizing this document as an installation tool, Installer should download the latest version of the Installation Guidelines Manual from the website at www.watershedgeo.com.

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Table of Contents

1.0 Introduction 3

1.1 Purpose and Scope 3

2.0 Definitions 3

3.0 Subgrade Preparation 8

4.0 Installation – Surficial Gas Management System 8

4.1 Minimum Requirements 8

4.2 Surficial Collection Design (Where Applicable) 9

4.2.1 Surficial Strips (Where Applicable) 9

4.2.2 ClosureTurf® Pressure Relief Valve 11

4.2.3 ClosureTurf® Collection Foot 11

4.2.4 ClosureTurf® Passive Gas Vent 12

5.0 Installation - Geomembrane Liner 13

5.1 Delivery – Geomembrane Liner 13

5.2 Installation - Panel Deployment and Field Seaming 13

5.3 Anchor Trench Backfill 15

5.4 Equipment on ClosureTurf® Geomembrane 15

5.5 Wrinkles 16

6.0 Installation – Engineered Turf 16

6.1 Delivery – Engineered Turf 16

6.2 Installation – Engineered Turf - Surface Preparation 16

6.2.1 Installation – Engineered Turf – Deployment & Field Seaming 17

6.2.1.1 Installation – Engineered Turf – Fusion Seaming Method 17

6.2.1.2 Installation – Engineered Turf – Fusion Seaming Method Trial Seam Requirements 17

6.2.1.3 Installation – Engineered Turf – Sewn Seam Method 18

6.2.2 Installation – Engineered Turf Repairs and Tie-In Procedures 19

6.2.3 Installation – Equipment on Engineered Turf 19

7.0 Installation – Sand Infill 19

7.1 Submittals and Testing – Sand Infill 19

7.2 Installation – Sand Infill Deployment 20

7.3 Closure*Turf*® with Rock Rip Rap Infill for Ditches 21

7.3.1 Installation – Alternate Infill - HydroBinder® for Downslope Channels 21
7.3.2 Installation – Brushing in the HydroBinder® Infill 22
7.3.3 Installation – Hydration of the HydroBinder® Infill 22
7.3.4 Installation – Cold Weather Placement and Curing of the HydroBinder® 23
7.3.5 Installation – Alternate Infill - ArmorFill® 24
7.4 Installation – Coverage - ArmorFill® 24
7.4.1 Installation – Coverage - HydroBinder® 24

1.0 Introduction

ClosureTurf® is a patented, 3-component system* that serves as the final cover system on landfills. The 3 components of this unique system are:

Component 1 - An Agru Super Gripnet® LLDPE (or HDPE) geomembrane liner, or other liner approved for use by WatershedGeo.

Component 2 - An Engineered Turf

Component 3 - A sand infill (and/or alternatively, Hydrobinder®)

*A Watershed Geosynthetics® patented (patent no. 8,585,322) gas collection system is a separate component to be utilized on sites that produce gas emissions. Pressure Relief Valves are provided at one per acre of ClosureTurf® on landfills where gas emissions are expected.

1.1 Purpose and Scope

The ClosureTurf® Installation Guidelines document has been prepared to provide the Engineer / Contractor / Installer general guidance to the proper installation of the ClosureTurf® System. This document should be used in conjunction with the ClosureTurf® CSI (Construction Standards Institute) Specifications for the proper installation of the product.

This manual is meant as a guideline only. Watershed Geosynthetics LLC cannot anticipate the many ways this product may be applied either in design or installation. Varying site conditions will require close coordination between the engineer and the installer to account for site conditions and adjust accordingly. When required by state and/or local regulations, a licensed professional engineer or architect will be required.

2.0 Definitions

Whenever the terms listed below are used, the intent and meaning will be interpreted as indicated.

Acclimation

Physiological/thermal adjustment. Required in the geomembrane deployment process.

v. 21126

ArmorFill®

ArmorFill® is a proprietary product used to bind the sand infill component of the ClosureTurf® System.

ASTM

ASTM International, known until 2001 as the American Society for Testing and Materials, is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

ClosureTurf®

A patented 4 component system consisting of a Watershed Geosynthetics specific Gas Management System (if applicable), a Structured Geomembrane (LLDPE or HDPE), an Engineered Turf, and a specific grade of sand infill (or alternatively a HydroBinder®).

Construction Quality Assurance (CQA)

Construction Quality Assurance includes but is not limited to observations and documentation of materials and workmanship necessary to show that a particular project is being constructed according to site-specific specifications and within regulatory guidelines.

Construction Quality Assurance (CQA) Personnel

Construction Quality Assurance (CQA) personnel are representatives of the Professional of Record (POR) who work under direct supervision of the POR. The CQA personnel are responsible for quality assurance monitoring, applicable conformance sampling and performing onsite tests and observations.

Construction Quality Assurance Professional of Record (POR)

The POR is an authorized representative of the Owner and has overall responsibility for CQA efforts and to confirm the project was constructed in general accordance with site-specific specifications approved by the regulatory authority and contract documents. The POR must be licensed as a Professional Engineer in the State the project is located and experienced in geosynthetics.

Construction Quality Control (CQC) Personnel

CQC Personnel are representatives of the Geosynthetics Installer who work under direct supervision of the Geosynthetics Installer. The Geosynthetics Installers' CQC Personnel are responsible for construction quality control, applicable conformance sampling and performing onsite tests and observations.

Contract Documents

Written, printed, or electronic matter that provides information or evidence that serves as an official record and are issued by the owner or operator. The documents include bidding requirements that include but are not limited to, contract forms, contract conditions, contract specifications, CQA plan, contract drawings, addenda, and contract modifications.

Contract Specifications

The requirements which are to be followed in the construction of the ClosureTurf® System. The standard specifications, supplemental specifications, special provisions, and all written or printed agreements and instructions that pertain to the method and manner of performing the work.

Contractor

One that agrees to furnish materials or perform services at a specified price, especially for construction work.

Design Engineer

An individual licensed to practice as a Professional Engineer or a Professional Service Firm that is responsible for the preparation of the project construction drawings and specifications.

Earthwork

A general engineering term relating to the relocation and utilization of soil during the process of construction.

Engineered Turf

A component of the ClosureTurf® System. A synthetic structured material consisting of one or more geotextiles tufted with polyethylene yarns that resemble grass blades.

Final Cover System Evaluation Report (FCSER)

Upon substantial completion of closure activities, the POR is responsible for the documentation of construction activities relating to the project, and any other inspections or verifications required by the regulatory authority. The FCSER will be signed and stamped by the POR and include documentation necessary for certification closure.

Fish Mouth

A semi-conical opening of the seam that is formed by an edge wrinkle in one sheet of the geomembrane component.

Geomembrane

A synthetic lining material that is a component of the ClosureTurf® System. Used as the primary barrier to infiltration and exfiltration of covered materials.

GSI

Geosynthetic Institute
475 Kedron Avenue
Folsom, PA 19033-1208 USA
TEL (610) 522-8440
FAX (610) 522-8441

HydroTurf®

A patented 3 component system consisting of a Structured Geomembrane Liner, a specialized Engineered Turf, and HydroBinder® infill material.

HydroBinder®

A proprietary pozzolanic infill utilized where higher surface water velocities may occur as well as in anchor trenches where specified.

Geosynthetics Contractor / Installer

The entity responsible for geosynthetic installation.

Independent Testing Laboratory

An organization, person, or company that tests products and materials, etc. according to agreed requirements. The entity shall be independent of ownership or control by the Owner or any party to the construction of the final cover or the manufacturer of the final cover products used. The entity shall also have proper legal authority where required to issue opinions and document the results of tests requested by the Owner.

Installation Supervisor

The person on-site who works for the Geosynthetics Installer and is in charge of the Geosynthetics Personnel and following the site specifications for the installation of the geosynthetics.

Manufacturing Quality Control (MQC)

A planned system of inspection and verification to ensure the quality of the final product.

Nonconformance

A deficiency in characteristics, documentation, or procedures that render the quality of an item or activity unacceptable or indeterminate. Examples of non-conformances include, but are not limited to, physical defects, test failures, and inadequate documentation.

Operator

The entity in control and responsible for the facility.

Owner

The entity that owns facility and land.

Owner's or Operators Representative

An official representative of the Owner or Operator responsible for planning, organizing, and controlling construction activities.

Panel

A general reference to a unit area of either the Structured Geomembrane (LLDPE or HDPE), or the Engineered Turf component of the ClosureTurf® System.

Quality Assurance

A planned and systematic pattern of procedures and documentation to ensure that items of work or services meet the requirements of the contract documents.

Quality Control

These actions provide a means to measure and regulate the characteristics of an item or service to comply with the requirements of the contract documents.

Relief Valve

A mechanical device used specifically to relieve gas buildup pressure underneath the ClosureTurf® system.

Representative Sample

(With respect to geomembrane destructive testing) - A random specimen of either the Structured Geomembrane (LLDPE or HDPE) or the Engineered Turf component consisting of 1 or more cut pieces (commonly referred to as coupons) from the same rectangular portion of material, oriented along a seam that is removed for field or laboratory testing purposes.

Ripple

Smaller in nature than a wrinkle. A result of thermal/or manufacturing that cannot be folded over.

Snapping

A manual method to an open-ended seam to remove tenting as a result of the welding of the geomembrane seams.

Spike

A systematic design for interface friction located on the bottom of the Super Gripnet®.

Specimen

(With respect to geomembrane destructive testing) - A specimen is the individual test strip (sometimes called coupon) from a sample location. A sample location can consist of many specimens.

Studs

A systematic design for drainage located on the top side of the Super Gripnet®.

Surficial Collection Foot

A manufactured device utilized specifically for collection of gas beneath the Super Gripnet®.

Surficial Strip

A strip of Super Gripnet® used for gas conveyance below the ClosureTurf® system.

Tenting

A vertical ridge that is caused by wedge welding geomembrane.

Trampolining/Bridging

Loss of intimate contact between the membrane and subgrade due to improper loading at geometry grade breaks.

Wrinkle

A portion of the geomembrane that does not lay relatively flat and is not a result of subgrade irregularity and which can be folded over.

3.0 Subgrade Preparation

Prior to ClosureTurf® system installation, the subgrade (e.g., protective cover soil) will be inspected. Observe the following:

- The protective cover soil is substantially free of surface irregularities and protrusions.
- The protective cover soil surface does not contain stones or other objects that could damage any of the ClosureTurf® components.
- The surface will be substantially smooth and free of foreign and organic material, sharp objects, particles or other deleterious material.
- Maximum particle size (e.g. rocks) will be specified by the by the design and contract specifications.
- The anchor trench dimensions have been checked, and the trenches are free of sharp objects and other deleterious material.
- Construction stakes and hubs have been removed and the resultant holes have been backfilled.
- The geosynthetics contractor, POR or his representative, and the permittee or his representatives have certified in writing that the surface on which the ClosureTurf® System will be installed is acceptable.
- Final grades on the slopes as well as benches dimensions and grades conform to the design grades.
- Survey shots and as-built drawings will be carefully reviewed and evaluated to verify the surface grades will drain as intended in the design drawings.

4.0 Installation – Surficial Gas Management System

4.1 Minimum Requirements

The gas management plan will include at a minimum, the use of provided ClosureTurf® Pressure Relief Valves, (See Figure 3) to meet the specific needs of the intended site. The minimum required gas emission venting devices will be installed at a rate of at least one vent per acre of installed ClosureTurf® (See Figure 1). Watershed Geosynthetics LLC supplies the minimum number of Pressure Relief Valves with delivery of the ClosureTurf® product.

The valves must be installed on sites that produce gas to validate any warranties. Design Engineer will be responsible for designing the correct amount of Pressure Relief Valves as well as any other design elements required for the site.

Pressure Relief Valves are designed to convey approx. 50 SCFM (Standard Cubic Feet Per Minute) under 1 inch of water column. Design Engineer will be responsible for designing the correct amount of Pressure Relief Valves required for the site.

4.2 Surficial Collection Design (Where Applicable)

While it should be noted that not all projects will incorporate a surficial collection design, the ClosureTurf® system serves as an effective tool for control of fugitive emissions and can be incorporated into a conventional gas collection system or in some cases as a standalone gas collection and control system. A ClosureTurf® surficial collection design will incorporate the use of surficial collection strips (See Figure 1) that provide high flow capacity (See Figure 2) and a larger radius of influence. The system design will also incorporate the surficial collection foot (See Figure 4) that serves as a wellhead base, geomembrane interface and gas conveyance path from the strips to the collection wellhead (not provided).

4.2.1 Surficial Strips (Where Applicable)

Surficial strips are to be placed prior to the placement of geomembrane. Surficial Strips may consist of SuperGripnet®, single sided geocomposite or other geosynthetic products that will allow for the proper flow of gas without causing ballooning. The placement of the strips will be determined by the design engineer and included in the gas management plan.

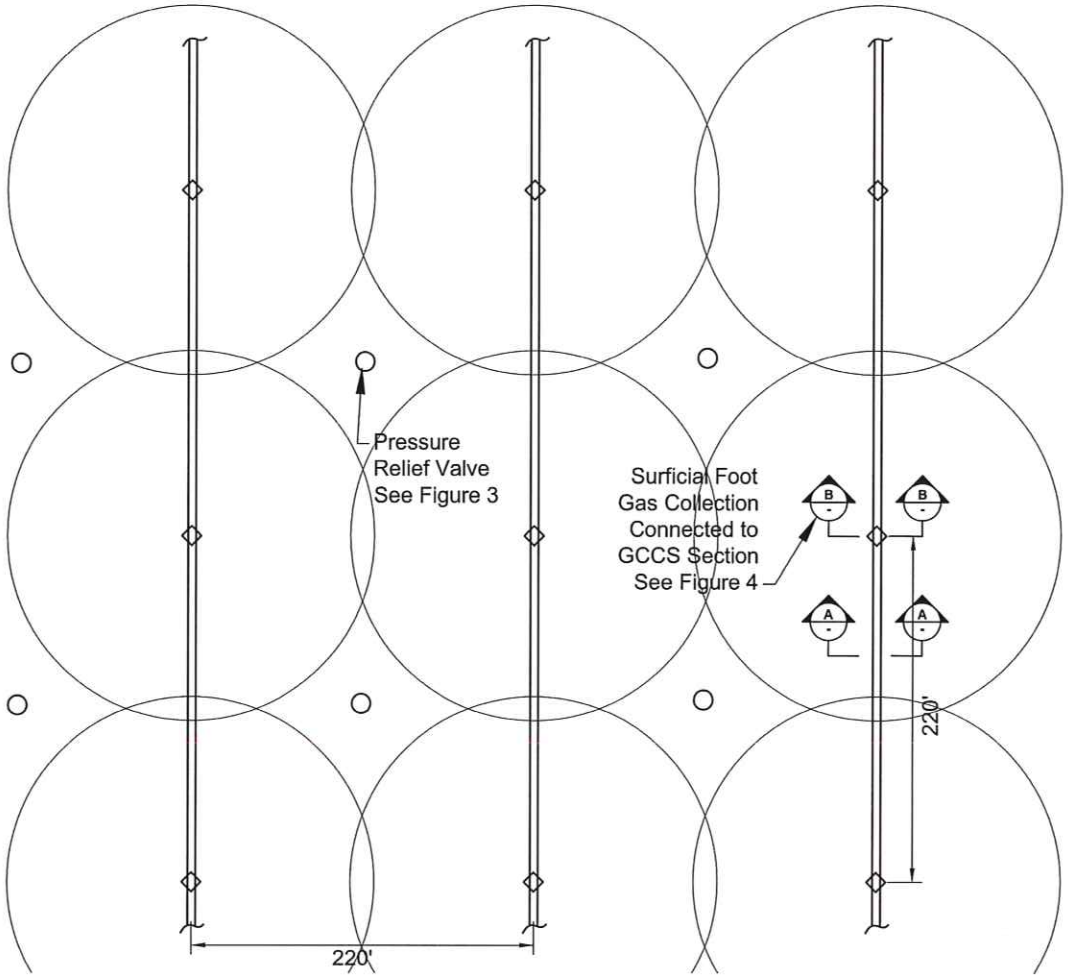
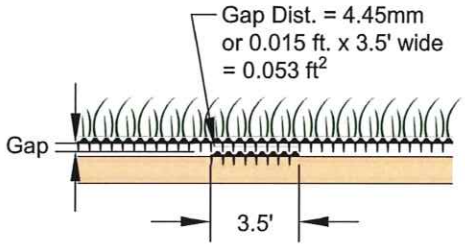


Figure 1: Typical Surficial Collection Strip Placement



Use Super Gripnet or Single Sided
Geocomposite for Strips

Figure 2: Effective Cross Sectional Area: Surficial Strips

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4.2.2 ClosureTurf® Pressure Relief Valve

The Pressure Relief Valve is a mandatory component of the ClosureTurf® System. The primary purpose of this component is to provide for necessary release of pressure in the event the gas collection system malfunctions. The number of Pressure Relief Valves required will be determined by the POR and installed during construction of the **Closure***Turf*® System.

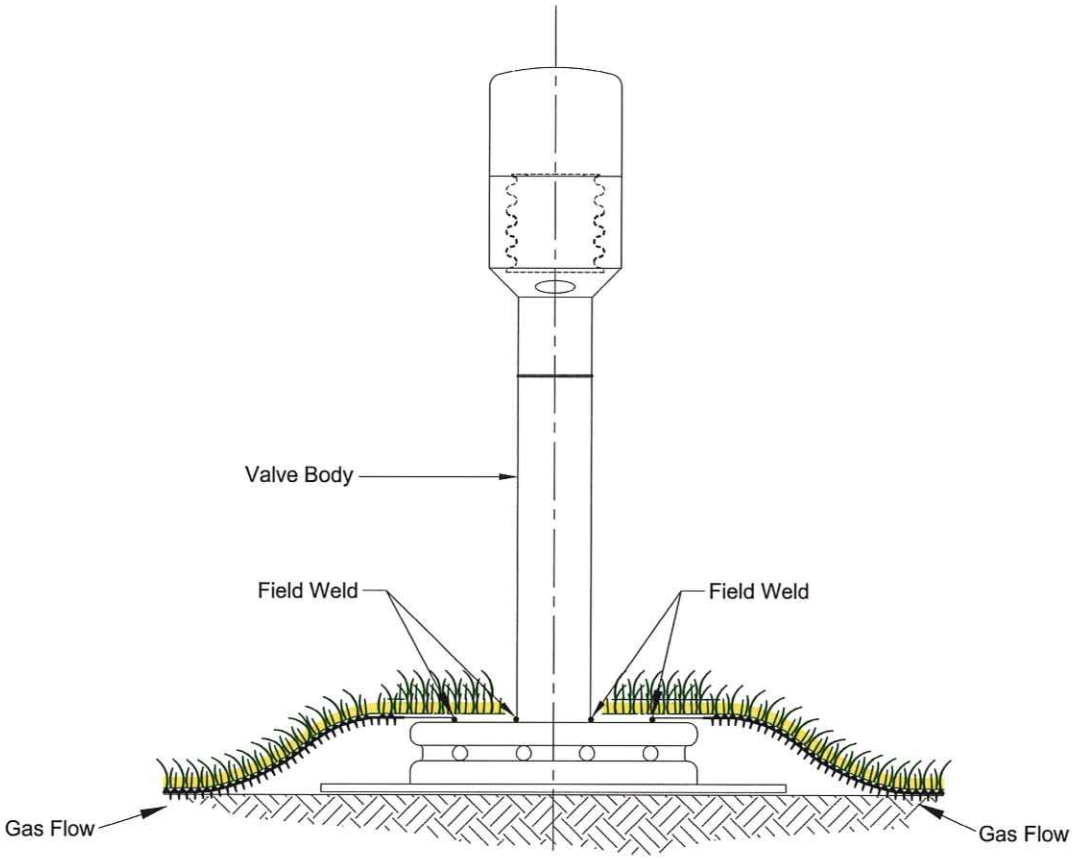


Figure 3: ClosureTurf® Pressure Relief Valve (Patent Pending)

4.2.3 ClosureTurf® Collection Foot

This device is designed to be the interface between the surficial collection strips, the geomembrane and a gas collection wellhead (not provided). The unit allows vacuum to flow in from beneath the geomembrane and from the surficial collection strips to create a larger radius of influence for gas collection. Placement will be determined by the gas collection system design.

When a GCCS system is not required, Passive Gas Vents may be utilized in lieu of the Pressure Relief Valves. The number of Passive Gas Vents required will be determined by the POR and installed during construction of the ClosureTurf® System. (Internal valves need to be removed when utilized as Passive Gas Vents

v. 21126

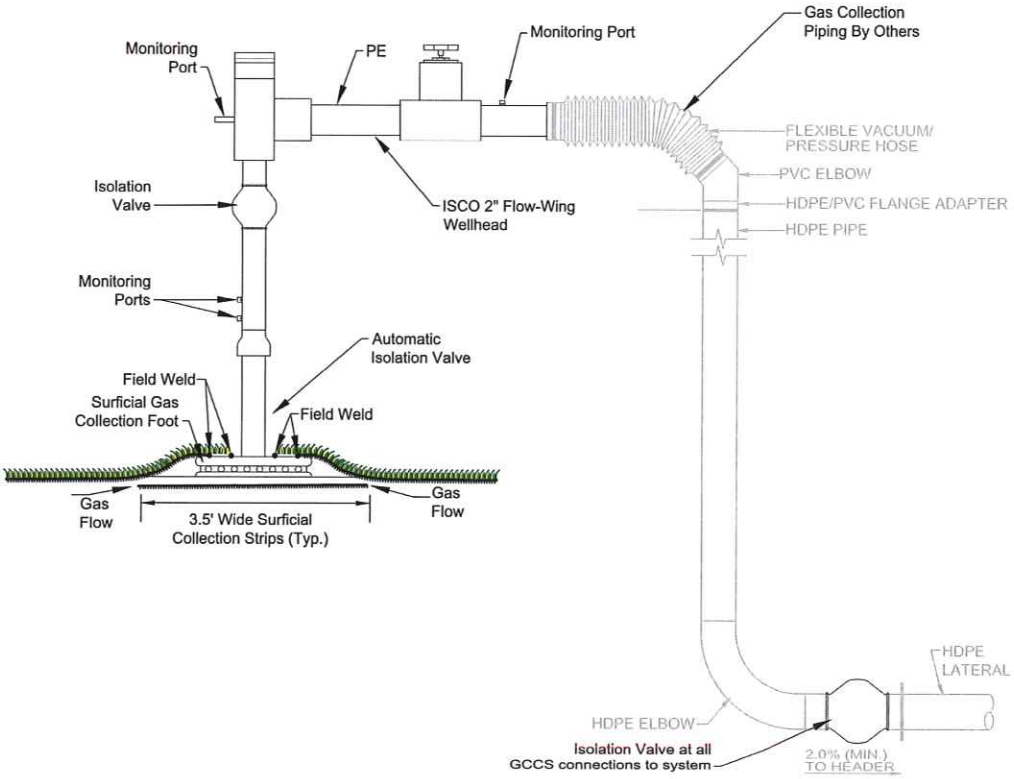


Figure 4: ClosureTurf® Surficial Collection Foot Connection to GCCS System

4.2.4 ClosureTurf® Passive Gas Vent

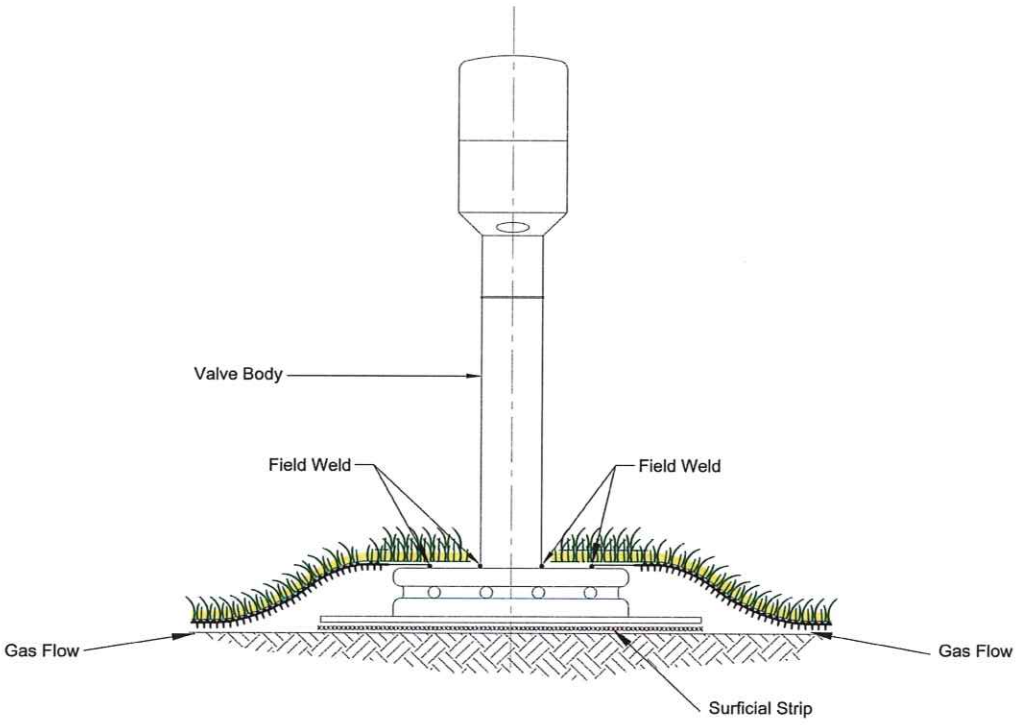


Figure 5: Passive Gas Vent

v. 21126

5.0 Installation - Geomembrane Liner

Installation of the Geomembrane Liner must be completed by a geosynthetics contractor approved by Watershed Geosynthetics. Qualification requirements for geosynthetics personnel are shown in Watershed Geo Installation Specification 01 73 19. Each component of the ClosureTurf® system will require specific testing and submittals before, during and after installation of the component. For information concerning submittals, see contract specifications. It is the responsibility of the contractor to ensure that each prior component installation has been approved by the POR before continuing with installation of the next ClosureTurf® component.

5.1 Delivery – Geomembrane Liner

Upon delivery of the geomembrane, observe that:

- The geomembrane is delivered in rolls and not folded. Any evidence of folding or other shipping damage is cause for rejection of the material.
- Equipment used to unload and store the rolls or pallets does not damage the geomembrane component.
- The geomembrane is stored in an acceptable location in accordance with the specifications and stacked no more than three to five rolls high dependent on available equipment, safety, and site specific requirements.
- The geomembrane component is protected from puncture, dirt, grease, water, moisture, mud, mechanical abrasions, excessive heat, or other damage.
- Manufacturing documentation required by the specifications has been received and reviewed for compliance with the technical specifications. This documentation will be included in the FCSER.
- The geosynthetics receipt log form has been completed for materials received.
- Geomembrane component that is damaged or has been rejected due to improper manufacturer documentation will be removed from the site or stored at a location separate from the accepted geomembrane component.

5.2 Installation - Panel Deployment and Field Seaming

ClosureTurf® installation requires some additional care and techniques beyond those of the typical geomembrane installation. General panel deployment techniques as well as special techniques are listed below. All Watershed Geo approved installers and contractors will notify Watershed Geo prior to installing the geomembrane and afford the opportunity to be present at the initial startup to support the approved installer program.

General

- Observe that the geomembrane component is placed in direct and uniform contact with underlying protective cover soil or subgrade soil.
- Observe the sheet surface as it is deployed and record panel defects and repair of the defects (e.g. panel rejected, patch installed, etc.) on the repair sheet. Repairs must be made in accordance with the contract specifications and located on a repair drawing.
- Observe that support equipment is not allowed on the geomembrane component during handling (See Section 5.4).
- Observe that the subgrade beneath the geomembrane component has not deteriorated since previous acceptance.

- Observe that there are no stones, construction debris, soil clogs or other deleterious items on the subgrade that could cause damage to the geomembrane component.
- The geomembrane component will not be deployed during inclement weather conditions as defined in the site-specific specifications.
- Observe that people working on the geomembrane component do not smoke, wear boots/shoes that could damage the ClosureTurf® system components or engage in activities that could damage the ClosureTurf® system components.
- Observe that the method used to deploy the sheet reduces wrinkles but does not cause bridging and that the sheets are anchored to prevent lifting or movement by the wind (geosynthetics contractor is responsible for any damage to or from windblown geomembrane).
- Observe that horizontal or cross seams on the side slopes are staggered so that long horizontal seams across the slope are not produced.
- The POR shall be responsible for approving the integrity of horizontal seams.

Acclimation and Adjustments

- The geomembrane component requires acclimation to ambient temperature after being deployed and before seaming operations begin.
- Acclimation time is dependent on the current weather conditions.
- By allowing the panels to acclimate, excessive wrinkling can be avoided.
- Final panel adjustments can be completed after the panel has properly acclimated to ambient temperature.
- After the panel has acclimated and before seaming operations begin, wrinkles will be worked toward the toe of slope. Either manpower or equipment may be utilized for working out excess material.
- Reduce seam bridging by placing sand bags along concave areas. Wedge welded seams in concave geometry locations (e.g. benches, grade breaks) will have sufficient sand bags to mitigate bridging of the geomembrane regardless of ambient temperature. Sand bags will be replaced following installation of the turf component. Sand bags will remain in place as necessary after placement of sand infill.

Wedge Welding

- After proper acclimation and final adjustments/wrinkle removal, wedge welding may proceed.
- Wedge welding machines are a low-profile machine with a vertical height (wedge height) not to exceed 3 inches, measured from flat surface to top of heating wedge.
- Wedge welding will be completed in accordance with the contract specifications.
- Sandbags will be applied as the wedge welding progresses to reduce tenting.

Snapping

- As a result of wedge welding, "ridges" or "tenting" of the seams may occur. A process called "snapping" must be employed to remove the excess slack caused by the welding process.
- Normally, this technique requires several people lined up along the open seam at the edge of the geomembrane and applying clamps to the edge. The panel is then "snapped" into position and when applied properly, the excess slack is removed. Best results are obtained when similar tension is applied by each person such that additional wrinkles are not created.
- The snapping technique will be applied while the welding seam is still warm.
- Seam snapping must be applied regardless of any visual observation.
- Previously applied sandbags along the wedge welded seam will reduce rebound tenting.

5.3 Anchor Trench Backfill

ClosureTurf® only relies on the anchor trenches to serve as a termination point. Top anchor trenches should be backfilled as quickly as practical after Engineered Turf Component is installed (prior to sand infill placement).

Vertical anchor trenches as well as anchor trenches along the toe will not be backfilled until sand infill of the engineered turf is in place, unless previously approved by the POR. Anchor trench dimensions will be shown in the drawings. Temporary loading will be maintained until anchor trenches are backfilled.

Backfilling or sand bag loading the bottom and side anchor trenches should be considered and applied when cool temperatures are anticipated to assist with creep reduction.

When HDPE material is utilized, additional anchoring methods may be required to reduce wrinkling due to the overnight contraction of the material. Contraction of the HDPE material may be site specific/seasonal and should be discussed onsite to develop an effective method to alleviate potential issues.

5.4 Equipment on ClosureTurf® Geomembrane

Construction equipment on the ClosureTurf® geomembrane component will be limited to reduce the potential for geosynthetics damage. Observe/provide the following:

- Use power source generators capable of providing constant voltage to all required equipment under combined-line load.
- Secondary containment to catch spilled fuel under equipment where applicable.
- No equipment with tire or track ground contact pressure exceeding 5 psi will be allowed on the partially constructed ClosureTurf® system until after the completed installation of the sand infill component.
- ClosureTurf deployment or installation equipment only is allowed. Regular, non-installation traffic is not permitted.
- No equipment will be left running and unattended over the constructed geomembrane component.
- Equipment operators shall check for sharp edges, embedded rocks, or other foreign materials stuck into or protruding from tires prior to operating equipment on the geomembrane component.
- Path driven on geomembrane component will be as straight as possible with no sharp turns, sudden stops or quick starts.

5.5 Wrinkles

Wrinkles occur during the geomembrane installation due to changes in geomembrane temperatures and deployment methods. The wrinkles may interfere with the installation of the engineered turf layer as well as the final appearance of the ClosureTurf® system. Observe that:

- Snapping procedures are followed.
- Wrinkles are repaired if they can be folded over as defined the morning after the seam is developed and the liner is in a cool state.

6.0 Installation – Engineered Turf

Qualification requirements for the personnel who install the Engineered Turf component are shown in Watershed Geo Installation Specification 01 73 19.

6.1 Delivery – Engineered Turf

Box trucks will deliver 27 rolls per truck. Rolls will be strapped in groups of 9 allowing equipment (i.e. pick-up truck, skid steer) to pull the grouped rolls to the front of the truck. Rolls can be pulled directly to the ground or carpet stingers can move the rolls to a designated area. Observe the following:

Observe the following:

- The engineered turf is wrapped in rolls with protective covering.
- The rolls are not stacked more than 3 high.
- The rolls are not damaged during unloading.
- Protect the engineered turf from mud, soil, dirt, dust, debris, cutting, or impact forces.
- Stacking/staging methods will be utilized that will not create creases within the engineered turf.
- Each roll must be marked or tagged with proper identification.
- Rolls that have been rejected due to damage are be removed from the site or stored at a location separate from accepted rolls, designated by the Owner/Operator.
- Rolls that do not have proper manufacturer's documentation will be stored at a separate location until documentation has been received and approved.

6.2 Installation – Engineered Turf - Surface Preparation

Prior to installation of Engineered Turf, observe the following:

- ClosureTurf® geomembrane has been installed in accordance with the contract specifications.
- The geomembrane installation documentation has been completed and approved by the POR for areas were the Engineered Turf is to be installed.
- The supporting surface (i.e., the geomembrane) does not contain stones, debris, membrane grindings or large scraps left over from the installation process that could damage or impede surface water flow through the Engineered Turf.

6.2.1 Installation – Engineered Turf – Deployment & Field Seaming

During deployment of Engineered Turf, observe the following:

- Observe the turf as it is deployed.
- Verify that equipment used does not damage the turf or underlying geomembrane by handling, trafficking, leakage of hydrocarbons, or by other means.
- Verify that during deployment, the Engineered Turf filaments point upslope.
- Verify that the turf is anchored to prevent movement by the wind (the contractor is responsible for any damage resulting to or from windblown Engineered Turf).
- Verify that the turf remains free of contaminants such as soil, grease, fuel, etc.
- Observe that the turf is laid substantially smooth and substantially free of tension, stress, folds, wrinkles, or creases.
- Observe the deployment of the sewn seam panel process to insure proper flipping to expose the turf surface up after seaming operations. After the first panel of the project is deployed, deployment will be done on the adjacent turf panel to avoid damage.
- Horizontal cross seam/panel extension on slopes will be offset a minimum of five feet in the direction perpendicular to the seam (i.e., no adjacent cross seams on slopes).
- At least one complete panel shall separate any horizontal cross seam/panel extension.
- Horizontal cross seam connection will be performed prior to the vertical production seaming.
- Once the horizontal cross seam/panel extension is completed on a sewn seam, the excess seam overlap on the bottom of the weld or seam shall be cut off.

6.2.1.1 Installation – Engineered Turf – Fusion Seaming Method

- Engineered Turf fusion seaming device will be a DemTech VM20/4/A fusion welder only.
- Fusion seams require an approx. 4 inches of overlap.
- Fusion seaming welds will be in in the direction of upslope towards downslope when the tufts are pointing upslope.
- Frayed or loose geotextile strands will be cut off or removed.
- Prior to starting the production fusion seaming, trial seams must be performed as outlined in Section 6.2.1.2 below.
- Demonstrate the preparation methods and equipment utilized for removal of the salvage from the outside edge of the rolls of turf (i.e. trimming & cutting devices).
- Electrical trimming and cutting devices will be utilized for salvage trimming.
- Box blades and knives will not be utilized for salvage trimming.
- Demonstrate and control the fraying of geotextile strands when performing the removal of salvage.
- Any damage that occurs due to production seaming will be repaired as outlined in WG Installation Guidance Documents.
- Any defects, including but not limited to over-melted fusion seams incapable of holding sand infill will be repaired as outlined in 7.2.2.

6.2.1.2 Installation – Engineered Turf – Fusion Seaming Method Trial Seam Requirements

1. Prior to turf component welding, CQA personnel shall observe and document the following:

a. Turf welding apparatus are tested;
b. at daily start-up; and
c. immediately after any break; or
d. anytime the machine is turned off for more than 30 minutes.

2. Procedures:
   a. The turf trial weld will be completed under conditions like the panels that will be welded including but not limited to turf fiber orientation.
   b. If at any time, the CQA Personnel believe that an operator or fusion welding apparatus is not functioning properly, a Field Trial Seam Test must be performed.
   c. Any dispute concerning proper installation techniques, or the proper function of fusion welding equipment will be resolved by the OWNER'S REPRESENTATIVE.
   d. The trial weld must be allowed to cool to ambient temperature before seam testing.
3. Trial Sample Test Results:
   a. Trial weld samples must comply with "VISUAL PASSING CRITERIA" Visual passing criteria is verified when a manual peel/pull test is performed, and the top turf panel tufts transfer to the bottom turf panel. The transfer of approx. 75% of the tufts constitutes a passing trial weld.
4. Field Seam Test Failure:
   a. Less than approx.75% of the top turf panel tufts do not transfer to the bottom turf panel.
5. Additional Trial Sample Testing Requirements:
   a. Two consecutive trial welds meet the visual passing criteria.
6. The trial weld sample must be a minimum of 3 feet long and 12 inches wide, with the seam centered lengthwise.
7. If a welding apparatus exceeds 5 hours in the second half of the day, another trial seam must be performed.
8. CQA documentation of trial seam procedures will include the following:
   a. The names of the seaming personnel;
   b. The name of the fusion seaming technician;
   c. the welding apparatus number, time, date;
   d. ambient air temperature; and
   e. welding apparatus temperature & speed setting.

6.2.1.3 Installation – Engineered Turf – Sewn Seam Method

- A single stitch prayer type seam is constructed using an American Newlong sewing machine or equivalent.
- The thread will be Polyester or equivalent.
- Sewing will occur between the 1st and 2nd row of tufts from the edge.

6.2.2 Installation – Engineered Turf Repairs and Tie-In Procedures

When Repairs and Tie-Ins to Engineered Turf occur, observe the following:

- Tie-In's to Engineered Turf will be completed by using a fusion seam.
- Seaming equipment for Engineered Turf will be a DemTech VM 20/4/A welder.
- Tie-in seams may optionally utilize a Varimat V2.
- A hand-held heat gun should be used in smaller/concentrated areas only.

6.2.3 Installation – Equipment on Engineered Turf

No equipment will be allowed on slopes exceeding 15% until Sand Infill is in place. On slopes less than 15%, such as top decks, ATV type vehicles will be allowed prior to infill placement if the rubber tire or track ground contact pressure is less than 5 psi. Post construction (full specified sand infill thickness) ground contact pressure on slopes greater than 15% should be limited on the ClosureTurf® system to less than 35 psi. On slope less than 15% allowable tire/track ground contact pressures will be limited to less than 85 psi. Allowable tire/track ground contact pressures may be increased with the written approval of the engineer.

In all phases of construction, equipment used on the ClosureTurf® product will not be allowed to change speed or direction in a manner that could displace or damage the ClosureTurf® system. Higher traffic areas will require sand to be placed at the full height of the turf blades. Regularly trafficked areas will be designed and approved by the engineer.

It should be noted that the above-recommended load limits assume that the subgrade, which is not part of the ClosureTurf system, is adequate to support the anticipated vehicle loading without creating rutting or bearing capacity issues.

7.0 Installation – Sand Infill

This component of the ClosureTurf® system is a specialized mixture of sand infill that is placed between the tufts of the Engineered Turf component.

Observe that the following general requirements regarding Sand Infill are met:

- Sand Infill will be in accordance with Watershed Geo® Sand Infill Specification 31 05 16.
- Areas that are to receive sand infill must be inspected and accepted by the POR or CQA Personnel before placement of sand infill takes place.

7.1 Submittals and Testing – Sand Infill

See contract specifications for Sand Infill MQC Submittals and submittal/testing requirements regarding the Sand Infill.

v. 21126

7.2 Installation – Sand Infill Deployment

Observe that the following installation guidelines regarding the Sand Infill:

- Sand infill thickness will be verified at a minimum frequency of 20 measurements per acre of final cover installed.
- The sand infill layer will be placed to a ½ inch minimum thickness.
- The sand infill will be worked into Engineered Turf as infill between the synthetic yarn blades.
- No equipment will be allowed on slopes exceeding 15% until the sand infill is in place.
- Air Blown Conveyance Systems and/or High Speed Conveyor Belt Systems are the preferred method to spread and place the sand infill.
- Contractor shall explain in detail in the pre-construction meeting the method of sand infill deployment to be used.
- The sand infill deployment method will be approved prior to installation of the sand infill.
- For slopes 3H: 1V or steeper the sand infill will be placed using an Air Blown Conveyance System and/or High Speed Conveyor Belt System method that demonstrates achievable results.
- The sand infill placement will be done in front of the deployment equipment to improve the bearing capacity of the previously installed ClosureTurf® components.
- Sand Infill brushing must utilize a light weight low center of gravity machine capable of accessing slopes and achieving proper brushing techniques without prior written approvals.
- Bushing sand infill must be performed before any rain event.
- Sand infill placement cannot occur with snow or ice on the Engineered Turf component.
- Verify that underlying geosynthetics installations are not damaged during placement operations. Mark damaged geosynthetics and verify that damage is repaired.
- Verify no geotextiles are exposed once the sand infill is complete.

The method for measuring the Sand Infill thickness will be performed utilizing a turf infill depth tool or digital caliper with depth rod capabilities, or a POR approved alternate measuring device.

7.3 Closure*Turf*® with Rock Rip Rap Infill for Ditches

When **Closure***Turf* ® is installed in ditches and rock rip rap infill is placed in lieu of sand infill, it creates a ditch lining armor that will allow high flow velocities to convey without damage or maintenance to the liner system. See Figure 5.

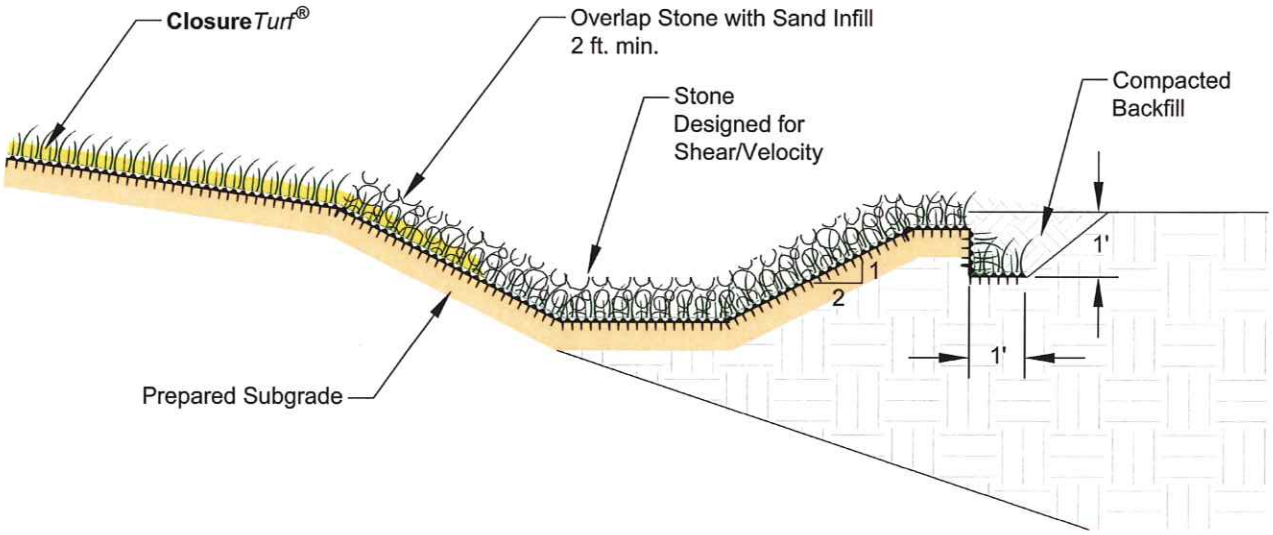


Figure 5: Typical ClosureTurf® with Rip Rap Ditch Section

7.3.1 Installation – Alternate Infill - HydroBinder® for Downslope Channels

HydroBinder® is typically delivered to the jobsite on pallets in either 3000# bulk bags (1 per pallet) or 80# bags (42 per pallet). It is delivered on a flatbed with 16 pallets (typical) per truckload.

Verify the following regarding installation of HydroBinder® Infill:

- The HydroBinder® infill layer may be placed using any appropriate equipment capable of completing the work while meeting loading requirements specified herein.
- Manual hand spreading is acceptable when equipment isn't practical.
- Contractor / Installer will explain in detail in the pre-construction meeting the method of HydroBinder® infill deployment.
- Contractor / Installer will provide training, safety equipment and documentation to be in compliance with any Occupational Safety and Health Administration (OSHA) standards related to respirable crystalline silica in the workplace.
- Installation of HydroBinder® infill will only be performed by a Watershed Geosynthetics' licensed and approved infill installer.
- The HydroBinder® will be installed into the turf while it is in a dry state.
- Prior to placing the HydroBinder®, the engineered turf will be dry.
- If the turf is wet from rain or dew, the installer shall wait until it is dry.
- The installer may attempt to speed up the drying process by using a blower (i.e., leaf blower, industrial blower, etc.).
- The HydroBinder® will be worked into the tufts so the tufts are in an upright position.
- The HydroBinder® infill layer will be placed to a ¾ inch minimum thickness not to exceed 1 inch thick.

v. 21126

- Reduce trapped tufts as much as practical.
- Do not backfill anchor trenches until turf has been installed with HydroBinder® infill unless approved by the POR.
- The hydration process must occur the day of the HydroBinder® infill placement.
- The desired HydroBinder® infill thickness will be achieved prior to the hydration process.
- The cemented infill is hydrated thoroughly however care must be taken to avoid displacement of the non-hydrated infill.
- The objective is to soak the area to start the hydration process but not to inundate with water beyond saturation.
- Once hydration is completed as described, backfill and compaction of the vertical anchor trenches should take place.
- The infill is to be placed / spread using a manual drop spreader, top-dresser and/or drop spreader attached to low ground pressure equipment with adequate dust control.
- If weep holes are required for draining the internal drainage layer through the engineered turf, remove the HydroBinder® in the areas of the weep holes prior to hydration or block the weep hole locations prior to infilling. Blocks may consist of pipe, dowels, etc. Weep holes are typically ½ to ¾-in diameter and are located at the toe of slope on 2-ft centers.

7.3.2 Installation – Brushing in the HydroBinder® Infill

The HydroBinder® infill will need to be worked into the tufted fibers of the engineered turf such that the turf fibers are in an upright position. This can be achieved as follows:

- The infill will be worked into the tuft fibers so the tuft fibers are in an upright position with the infill at a measurable ¾ inch minimum depth. This is achieved with common mechanical turf broom, power broom, shop broom, yard rakes, or greens groomer rakes.
- Brushing should be performed in all four directions starting with the direction against the lay of the fibers. Multiple passes may be required.
- Trapped turf fibers will not remain with Binder left floating on turf fibers.
- The HydroBinder® may need to be placed in 2 to 3 lifts with brushing in between lifts to effectively work the material into the tufts and achieve fibers that are upright.
- The engineered turf will be visually inspected to confirm that the turf fibers are upright and that there are no trapped fibers.
- Thickness measurements of the HydroBinder® infill will be taken using a turf infill depth tool or digital caliper with depth rod or equivalent device.
- Measurements will be taken at a minimum frequency of 10 measurements per 1,000 sf (for smaller projects) or 20 per acre (for larger projects) of installed area.
- The desired HydroBinder® infill thickness will be achieved prior to the hydration process.

ClosureTurf with HydroBinder contains a unique drainage system where some water will drain on the Super Gripnet® liner. This water may build up and cause the Engineered Turf and HydroBinder® infill to lift. This is not normally an issue to the overall performance of the product. However, the geomembrane must be allowed to drain at all times. If surface water flows are pinched off by various construction techniques such as placing rip rap check dams in channels, the Turf and HydroBinder® will lift as needed until the pressure can be alleviated.

7.3.3 Installation – Hydration of the HydroBinder® Infill

The HydroBinder® infill will be hydrated in place as follows:

- The hydration process will occur on the same day as the HydroBinder® infill placement.
- Hydrate the infill thoroughly without causing displacement of the product. This may require another pass after waiting momentarily to allow the initial water application to soak in.
- Estimated application rate is approx. 0.12 to 0.20 gallons per square foot of area depending on site specific conditions. Application rate will be adjusted accordingly to provide adequate hydration as defined in this guidance.
- Verification of adequate hydration will be made 10 to 14 hours after the initial hydration. Additional hydration will be completed if necessary.
- The installer shall not overhydrate the infill so that water begins to runoff and cause loss of cement infill during the process.
- Visual verification can be performed that the HydroBinder® infill has been fully hydrated, and not over hydrated.
- Visually observe that the top of the HydroBinder® has a wet sheen (denoting saturation) but that water is not ponding on top.
- Excavate (with finger or small tool) into the HydroBinder® at a rate of 1 probe per 100 sq. ft. on smaller jobs and 20 per acre on large jobs to confirm full hydration of the section has been achieved.
- An additional method to check saturation is to tap the surface a few minutes after saturation. Water should be brought up and pool at the surface.
- To improve curing, the hydrated area may be covered with plastic sheeting.
- If freezing temperatures are expected, the hydrated area should be covered with burlap and / or plastic sheeting.
- The HydroBinder® infill will harden within 24 hours following hydration.
- The 28-day compressive strength is tested by the HydroBinder® manufacturer before shipping.
- If the HydroBinder® should harden to the touch within 24 hours.
- Personnel access on the HydroBinder® infilled surface will be prohibited for 24-hr following the hydration of the HydroBinder®.
- Once hydration is completed and the HydroBinder® has set up, backfill and compaction of the anchor trenches may be performed.

7.3.4 Installation – Cold Weather Placement and Curing of the HydroBinder®

Cold weather placement and curing techniques for HydroBinder® shall be consistent with industry standard techniques used for concrete and cement products. The following guidelines are suggested:

- Follow the procedures in American Concrete Institute (ACI) 306 – Guide to Cold Weather Concreting.
- ACI 306 defines cold weather as three consecutive days of the following:
  - Average daily temperature falls below 40 deg F; or
  - The air temperature does not rise above 50 deg F for more than half of a day in one 2-hour period.
- At the time of HydroBinder® placement, the subgrade and surface of the engineered turf will be at a temperature of at least 36 deg F and rising.
- Ensure that frost or frozen surfaces are thawed with no standing water.
- If the temperature can fall below 32 °F within 24 hours of application, heated tarps and/or insulated blankets are required to maintain the temperature above 55 deg F for at least 7 days.
- If heated tarps begin to dry out the HydroBinder®, water may need to be added to keep it moist.

The project design engineer and/or resident engineer shall provide technical specifications and guidance for cold weather concreting based upon project specific details (i.e., geographical location, weather, and time of year), and the engineer shall review and approve all proposed installation methods.

7.3.5 Installation – Alternate Infill – Sand Infill with ArmorFill®

Verify the following regarding installation of ArmorFill® Infill:

- Installation of ArmorFill® will be completed by or managed by an infill installer certified by Watershed Geosynthetics.
- Apply ArmorFill® under dry weather conditions and when precipitation is not expected for at least 72 hours after installation.
- Apply ArmorFill® on a previously installed ClosureTurf® system that is free of leaves and other material that may inhibit the penetration of the ArmorFill® into the sand component.
- Apply ArmorFill® only after approval of the finished ClosureTurf® product installation.
- Verify ArmorFill® and water mix ratio by logging volume mixed of each component.
- Verify that ArmorFill® has saturated the sand by inserting a probe and displacing a 1 square inch area of sand for inspection.
- Check saturation randomly at a rate of 20 probes per acre.
- Verify proper application rate by marking a known area and applying the proper volume to that area.
- Adjust delivery rate to match the delivery volume per area.
- Mix in a hydraulic conveyance system such as a water truck or portable tank.
- Utilize a small agitation pump to mix and recirculate the ArmorFill® within the tank to impede separation.
- Reduce the number of equipment set-ups required and take care with the application hose so as previously applied ArmorFill® is not displaced by dragging of the hose.
- Spray product evenly.
- Do not apply ArmorFill® in inclement weather or in freezing temperatures.
- At the completion of ArmorFill® placement activities, clean the equipment thoroughly and purge the tank and hoses of the product.
- All waste product will be disposed of in accordance to site regulations
- Avoid unnecessary foot traffic on the applied product for 24 hours.
- No vehicle traffic is allowed on the applied product for 7 calendar days.

7.4 Installation – Coverage - ArmorFill®

Please contact Watershed Geo regarding ArmorFill and site specific conditions.

7.4.1 Installation – Coverage - HydroBinder®

Approximate Coverage Area for HydroBinder™ Infill

Product	Bag Size	Yield (Cubic Feet)	Coverage in Sq. Ft. for 3/4 in. Thick[1]	Coverage in Sq. Ft. for 1 in. Thick[1]	Amount of Water to Mix per Bag (gal)	Amount of Water (gal) to Apply per Sq. Ft. (3/4 in. Thick)[1]	Amount of Water (gal) to Apply per Sq. Ft. (1 in. Thick)[1]
HydroBinder Infill	40 lbs.	0.3	4.8	3.6	0.6	0.12	0.16
	60 lbs.	0.45	7.2	5.4	0.9	0.12	0.16
	80 lbs.	0.6	9.6	7.2	1.2	0.12	0.16
	1 Cubic Yard (Super Sack)	27	432	324	55	0.13	0.17

[1] - Values are approximate

v. 21126

Geosyntec
consultants

APPENDIX N.5

Closure Turf Wind Uplift Calculation

CALCULATION COVER SHEET

Client: **Anne Arundel County** Project: **Millersville Cell 9 Vertical Expansion** Project No.: **ME1418A** Phase/ Task No. **03/02**

Title of Calculation **ClosureTurf Wind Uplift Analysis**

Calculations by:	Signature		9/12/2024
	Printed Name Title	Daniel Espinoza Senior Staff Professional	Date
Assumptions and Procedures Checked by: (peer reviewer)	Signature		12/04/2024
	Printed Name Title	Sean O'Donnell Senior Engineer	Date
Computations Checked by:	Signature		12/04/2024
	Printed Name Title	Sean O'Donnell Senior Engineer	Date
Computations backchecked by: (originator)	Signature		12/05/2024
	Printed Name Title	Daniel Espinoza Senior Staff Professional	Date
Approved by: (pm or designate)	Signature		12/11/2024
	Printed Name Title	Meena Viswanath Senior Engineer	Date

Approval notes:

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA

CLOSURETURF WIND UPLIFT ANALYSIS

INTRODUCTION AND PURPOSE

This calculation package evaluates wind uplift stress and resistance for the ClosureTurf alternative cover system in support of the design for the vertical expansion of Cell 9 of the Millersville Landfill and Resource Recovery Facility (MLFRRF) located in Severn, Maryland. Cell 9 is an 84-acre cell subdivided into 5 subcells (Subcells 9.1 through 9.5) and is currently the only permitted cell available for waste disposal at MLFRRF. The proposed vertical expansion of MLFRRF will increase the maximum permitted elevation from 244 ft (National Geodetic Vertical Datum of 1929 [NGVD29]) to 285 ft NGVD29 as well as modify the geometry of the liner sideslopes and the final cover slopes. ClosureTurf is an engineered turf and structured membrane composite final cover system that uses sand infill to resist wind uplift stresses (Figure 1).

The objective of this calculation package is to evaluate the susceptibility of the ClosureTurf alternative cover system at MLFRRF to failure by wind uplift by comparing the anticipated wind uplift stresses under the proposed geometry of Cell 9 against the resisting forces provided by the weight of the ClosureTurf system.

DATA AND INFORMATION SOURCES

The sources of information used for this calculation package are summarized below:

1. ASCE 7-22 Hazard Tool (2022) to identify the Mean Recurrence Interval (MRI) wind speeds
2. ClosureTurf Design Guidance Manual (Attachment N.5-1) for the uplift calculation methodology, wind pressure coefficient, and ClosureTurf sheet weight and dimension specifications
3. Permit-level drawings of Cell 9 (Appendix A of the Phase III report). See Figure 1 for the final grades of the landfill.

METHOD AND PARAMETERS

The method used for this analysis follows Section 3 of the ClosureTurf Design Guidance Manual (Watershed Geo 2023). The basis of this methodology, taken from Section 3.3 of the ClosureTurf Guidance Manual, is summarized below:

1. Select the appropriate wind pressure coefficient, Cp, for the landfill geometry, based on the results of wind tunnel testing and the landfill slope configuration presented in the ClosureTurf manual.
2. Select the appropriate design wind speed for the location of the landfill using the ASCE 2022 Hazard Tool database. The database provides the wind speed for 3-second gusts at 32.8 feet above ground level.
3. Calculate the mean hourly design wind speed at the top of the landfill from the value provided from the ASCE 2022 Hazard Tool.
4. Calculate the maximum wind uplift pressure.
5. Calculate the self-weight of the ClosureTurf.
6. Calculate the factor of safety.

Specific excerpts from the ClosureTurf Design Guidance Manual used in this report can be found in Attachment N.5-1. The equations for each of these calculations are described below, in the Analysis and Evaluation Approach section.

EVALUATION/ANALYSIS TOOLS

For this calculation, Microsoft Excel was used to calculate the uplift stress on the geomembrane, the allowable load that can be applied on a geomembrane, and the factor of safety against tensile wind loads. The wind speed was calculated using the ASCE 7-2022 Wind Hazard Analysis Tool (ASCE 2022).

INPUT PARAMETERS AND ASSUMPTIONS

The input data required for the design method includes ClosureTurf weight properties, the windspeed and air density, the landfill geometry, and the wind pressure coefficients and factors.

Landfill Geometry

The final cover geometry is shown in Figure 1. The 3H:1V sideslopes of the landfill vary in height from 85 ft to 160 ft between the landfill toe and the overall landfill maximum elevation of 285 ft NVGD29. The most critical case of 160 ft slope height was selected for this calculation.

ClosureTurf Weight Properties

The alternative final cover will use high-density MicroDrain ClosureTurf. Per the ClosureTurf Design Guideline Manual (Watershed Geo, 2023), MicroDrain ClosureTurf is the recommended

geomembrane to be used at a 3 horizontal to 1 vertical (3H:1V) slope. Additionally, high-density turf provides greater wind uplift resistance than standard turf. The high-density MicroDrain turf specifications are provided in Attachment N.5-1.1. The three components that comprise the MicroDrain ClosureTurf system are:

1. Sand infill: The minimum specified thickness for the sand infill layer is 0.5 inches. However, as indicated in the ClosureTurf Design Guideline Manual, typical final infill thicknesses may range from 0.5 inches to 0.75 inches (Watershed Geo, 2023). For this calculation, the factor of safety against wind uplift is calculated for infill sand thicknesses of 0.5 inches and 0.75 inches. It is assumed that the sand infill has a unit weight of 115 pounds per cubic foot.
2. Engineered turf: Per specifications, each standard roll of ClosureTurf includes a turf component that weighs about 1,000 lb and has an area of 4,500 sf.
3. MicroDrain geomembrane: Per the specifications, each standard roll of ClosureTurf includes a MicroDrain geomembrane component that weighs about 5,000 lb and has an area of 11,500 sf.

Wind Speed and Air Density

The three second wind gust at 32.8 ft above ground level was found using the ASCE 7-22 Hazard tool as shown in Attachment N.5-2 (ASCE, 2022). As indicated in Attachment N.5-2, based on the input location, hazard level, and soil type, the 100-year mean recurrence interval (MRI) windspeed of 95 miles per hour (mph) is used for this calculation. The 100-year MRI was selected as an accurate representation of what the conditions will be like at the site during closure and post-closure conditions. For this calculation, the air density is taken as 0.0024 slugs per cubic foot at 59 degrees Fahrenheit (WatershedGeo 2023).

Wind Pressure Coefficient and Factors

As discussed in the ClosureTurf Design Guidance Manual, WatershedGeo conducted wind tunnel experiments to determine how slope geometry affects the wind pressure over ClosureTurf. A figure demonstrating their findings for 3H:1V sideslopes is shown in Attachment N.5-1.2. As indicated in Attachment N.5-1.2, the location with the most wind uplift (represented by negative values) is directly downwind of the sideslope crest. As such, the wind-pressure coefficient associated with high density turf at this location (measured to be -0.29) was selected for this calculation. Per WatershedGeo's recommendation, a wind directionality factor of 1.1 was used also used in this analysis. The ground elevation factor was calculated using the maximum final elevation of 285 ft NGVD29.

PERFORMANCE CRITERIA

The minimum allowable factor of safety recommended by the ClosureTurf Design Guidance Manual is in the range of 1.1 and 1.2.

ANALYSIS AND EVALUATION APPROACH

The factor of safety against the initiation of uplift is calculated by comparing the wind uplift pressure to the self-weight of the Closure Turf as follows:

$$FS_{uplift} = \frac{P_{self}}{P_{wind}} \quad (1)$$

where

FS_{uplift} = factor of safety against the initiation of uplift

P_{self} = pressure from the weight of the ClosureTurf (psf)

P_{wind} = wind-generated pressure normal to the ClosureTurf surface (psf)

Calculation of Wind Pressure

The wind pressure acting normal to the CloseureTurf surface is calculated using the following equation from Watershed Geo (2023).

$$P_{wind} = \frac{1}{2} \cdot C_p \cdot \rho \cdot U(H)^2 \cdot K_e \cdot K_d \quad (2)$$

where

C_p = wind pressure coefficient

ρ = air density (ρ= 0.0024 slug/cubic ft at 59 degrees F at sea level)

U(H) = upstream mean wind speed (ft/s) at the height of the slope H (ft)

K_d = wind directionality factor (Kd = 1.1)

K_e = ground elevation factor (ASCE, 2022), $K_e = e^{-0.0000362 \times Z_e}$

Z_e = ground elevation above sea level (ft)

The design wind speed U(H) at the height of the slope H is estimated using the mean hourly wind speed at 32.8 ft, the height of the landfill slope, and the power law equation for atmospheric boundary layers as shown below:

$$\frac{U(H)}{U(32.8ft)} = \left(\frac{H}{32.8}\right)^{\alpha} \quad (3)$$

where

U(32.8ft) = mean hourly wind speed at 32.8 ft above the ground (mph)

H = height of the landfill slope (ft)

α = Power-Law exponent (0.14 based on wind tunnel tests performed by Watershed Geo 2023).

The mean hourly wind speed at 32.8 ft above the ground is in turn calculated using the 3-second gust wind speed at 32.8 ft above the ground from the ASCE 7-22 Hazard Tool (Attachment N.5-2) and a factor of safety of approximately 1.5 for open terrain (Watershed Geo, 2023):

$$U(32.8ft) = U_3(32.8ft)/1.5 \quad (4)$$

where

$U_3(32.8ft)$= 3-second gust wind speed at 32.8 ft above the ground (mph)

Calculation of Self Weight of ClosureTurf

The self-weight of ClosureTurf is calculated as follows:

$$P_{self} = t_{sand} \times \gamma_{sand} + \frac{W_{turf}}{A_{turf}} + \frac{W_{MicroDrain}}{A_{MicroDrain}} \quad (5)$$

where

t_{sand} = thickness of sand infill layer (ft)

γ_{sand} = unit weight of sand infill layer (pcf)

W_{turf} = weight of turf component (lb) (taken from spec sheet)

A_{turf} = area of turf component (sf) (taken from spec sheet)

$W_{MicroDrain}$= weight of MicroDrain component (lb) (taken from spec sheet)

$A_{MicroDrain}$=area of MicroDrain component (sf) (taken from spec sheet)

SUMMARY OF RESULTS

The results of this analysis are presented in Table 1 (0.5 inches of sand infill) and Table 2 (0.75 inches of sand infill). The factor of safety against the initiation of uplift was found to be 1.1 for a 0.5-inch-thick sand infill layer and 1.5 for a 0.75-inch-thick sand infill layer. Both values fall within the recommended factor of safety range of 1.1 to 1.2 recommended by WatershedGeo.

CONCLUSIONS AND RECOMMENDATIONS

Based on the design consideration and the results of this analysis, the following recommendations are made with respect to selecting, testing and using the ClosureTurf as a final cover alternative:

- The minimum thickness of the sand infill layer, 0.5 inches, yielded a factor of safety of 1.1. This satisfies the lower bound of the factor of safety recommended by WatershedGeo.
- The maximum thickness of the sand infill layer, 0.75 inches, yielded a factor of safety of 1.5. This surpasses the upper bound of the factor of safety recommended by WatershedGeo. To remain conservative, Geosyntec recommends specifying a sand infill thickness of 0.75 inches.

REFERENCES

ASCE. 2022. *ASCE 7-22 Hazard Tool*. https://ascehazardtool.org/.

Watershed Geo. 2023.*ClosureTurf Design Guidance Manual.* Watershed Geosynthetics. February.

TABLES

Table 1: Wind Uplift Resistence - Minimum Infill Layer

Millersville Landfill and Resource Recovery Facility, Severn, Maryland

Parameter		Value	Units
Calculation of Self Weight of ClosurTurf			
Minimum Thickness of Sand Infill Layer	t_{sand}	0.042	ft
Unit Weight of Sand Infill Layer	γ_{sand}	115.0	pcf
Weight of Turf Component	W_{turf}	1000.0	lbs
Area of Turf Component	A_{turf}	4500.0	sf
Weight of MicroDrain Component	$W_{MicroDrain}$	5000.0	lbs
Area of MicroDrain Component	$A_{MicroDrain}$	11500.0	sf
Pressure From Self Weight of ClosureTurf	P_{self}	5.4	psf
Design Wind Speed Calculation at Height of Slope			
3 Second Wind Gust at 32.8 ft Above Ground	$U_3(32.8ft)$	95.0	mph
3 Second Wind Gust at 32.8 ft Above Ground	$U_3(32.8ft)$	139.3	fps
Mean Hour Wind Speed at 32.8 ft Above Ground	$U(32.8ft)$	92.9	fps
Height of Slope	H	160.0	ft
Power-Law Exponent	α	0.14	-
Upsteam Mean Wind Speed at Height of Slope	$U(H)$	116.0	fps
Calculation of Wind Pressure on ClosureTurf			
Wind Pressure Coefficient	C_p	0.29	-
Air Density	ρ	0.0024	scf
Wind Directionality Factor	K_d	1.10	-
Ground Level Above Sea Level	Z_e	285.00	ft
Ground Elevation Factor	K_e	0.99	-
Wind Pressure on ClosureTurf	P_{wind}	5.09	psf
Factor of Safety			
Factor of Safety - Long Term Condition	FS	1.1	-

Definitions:

ft: feet

pcf: pounds per cubic foot

lbs: pounds

sf: square foot

psf: pounds per square foot

mph: miles per hour

fps: feet per second

scf: slugs per cubic foot

Table 2: Wind Uplift Resistence - Maximum Infill Layer

Millersville Landfill and Resource Recovery Facility, Severn, Maryland

Parameter		Value	Units
Calculation of Self Weight of ClosurTurf			
Minimum Thickness of Sand Infill Layer	t_{sand}	0.063	ft
Unit Weight of Sand Infill Layer	γ_{sand}	115.0	pcf
Weight of Turf Component	W_{turf}	1000.0	lbs
Area of Turf Component	A_{turf}	4500.0	sf
Weight of MicroDrain Component	$W_{MicroDrain}$	5000.0	lbs
Area of MicroDrain Component	$A_{MicroDrain}$	11500.0	sf
Pressure From Self Weight of ClosureTurf	P_{self}	7.8	psf
Design Wind Speed Calculation at Height of Slope			
3 Second Wind Gust at 32.8 ft Above Ground	$U_3(32.8ft)$	95.0	mph
3 Second Wind Gust at 32.8 ft Above Ground	$U_3(32.8ft)$	139.3	fps
Mean Hour Wind Speed at 32.8 ft Above Ground	$U(32.8ft)$	92.9	fps
Height of Slope	H	160.0	ft
Power-Law Exponent	α	0.14	-
Upsteam Mean Wind Speed at Height of Slope	$U(H)$	116.0	fps
Calculation of Wind Pressure on ClosureTurf			
Wind Pressure Coefficient	C_p	0.29	-
Air Density	ρ	0.0024	scf
Wind Directionality Factor	K_d	1.10	-
Ground Level Above Sea Level	Z_e	285.00	ft
Ground Elevation Factor	K_e	0.99	-
Wind Pressure on ClosureTurf	P_{wind}	5.09	psf
Factor of Safety			
Factor of Safety - Long Term Condition	FS	1.5	-

Definitions:

ft: feet

pcf: pounds per cubic foot

lbs: pounds

sf: square foot

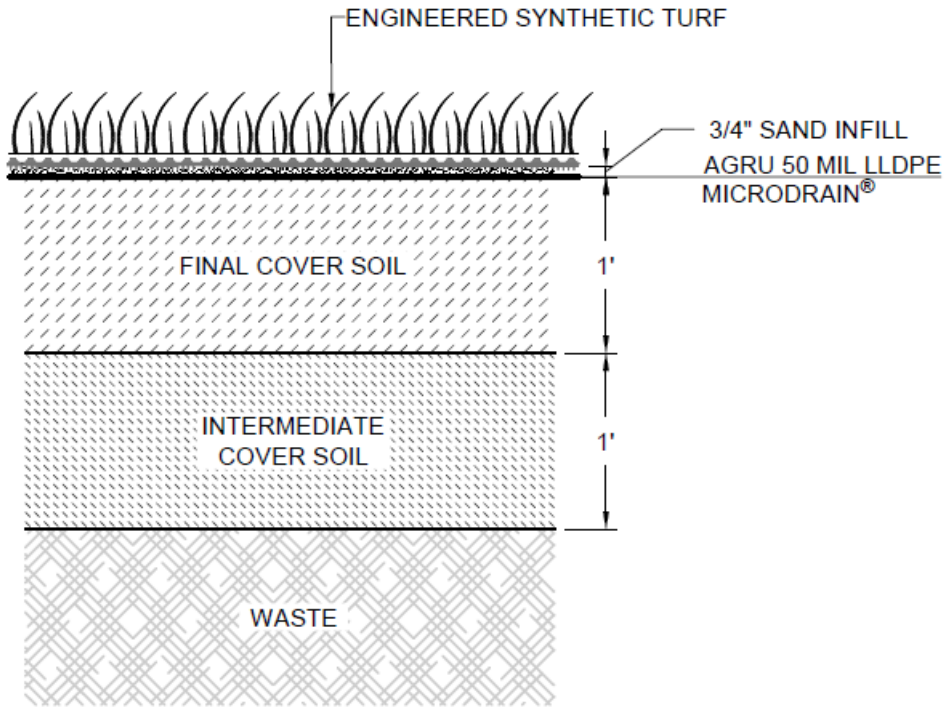
psf: pounds per square foot

mph: miles per hour

fps: feet per second

scf: slugs per cubic foot

FIGURES



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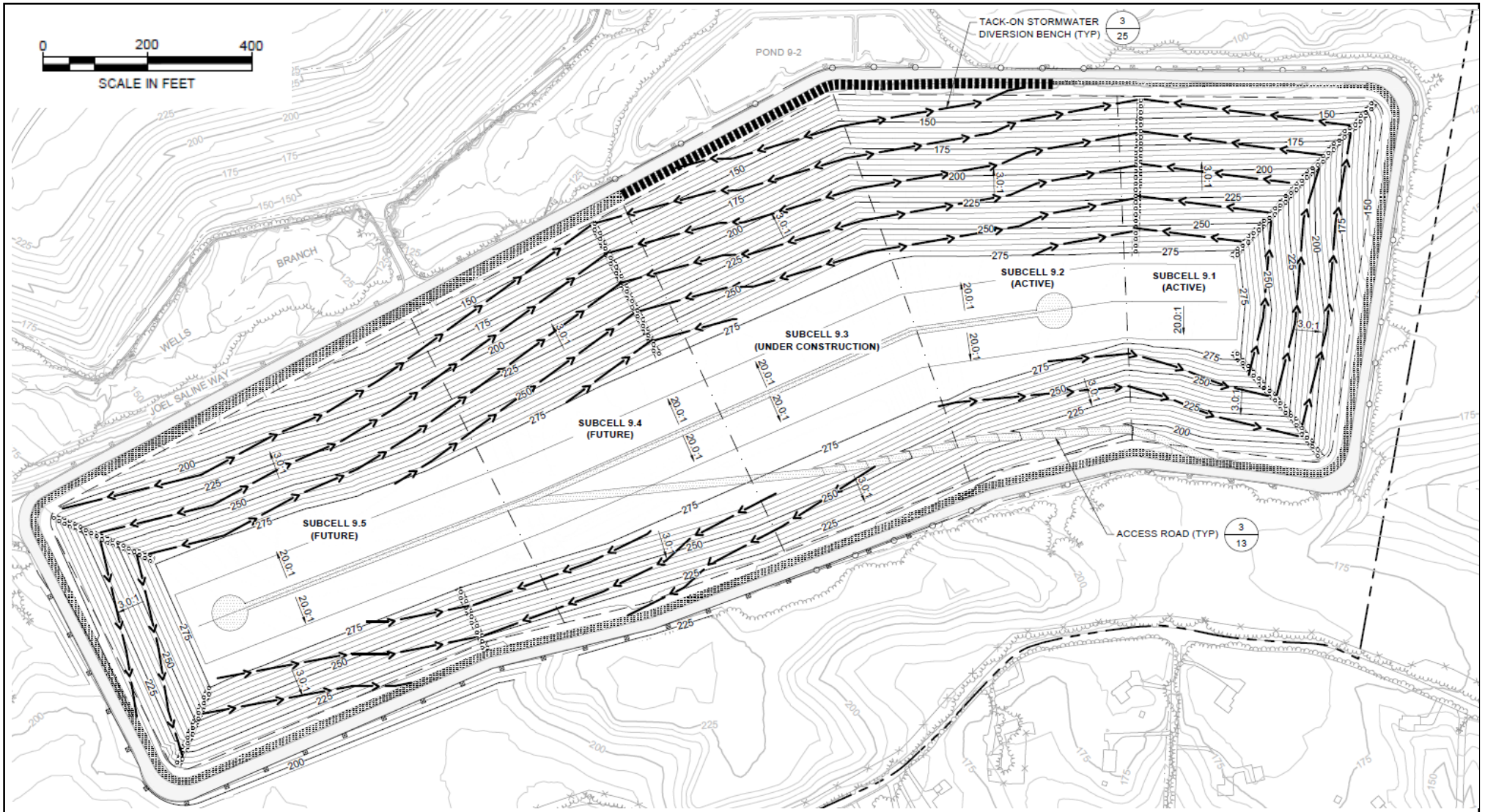
10

DETAIL
ALTERNATIVE FINAL COVER (CLOSURETURF)

SCALE: NTS

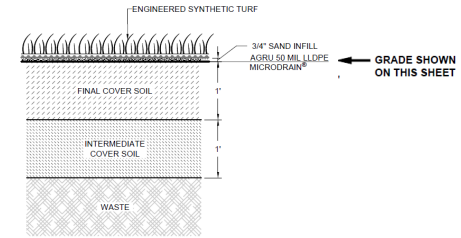
ClosureTurf	
Millersville Landfill and Resource Recovery Facility Cell 9 Vertical Expansion Severn, Maryland	
Geosyntec consultants	Figure 1
Project No. ME1418A	Dec 2024



LEGEND

- PROPERTY BOUNDARY
- EXISTING TOPOGRAPHY CONTOUR (FEET-MSL)
- PROPOSED FINAL GRADE CONTOUR (FEET-MSL)
- STRUCTURE / BUILDING
- FENCE
- PAVED DRIVE
- GRAVEL DRIVE
- TREELINE
- STREAM / WATERLINE
- CELL 9 FOOTPRINT
- SUBCELL BOUNDARY
- LITTER FENCE
- GUARDRAIL
- RIPRAP
- DOWNCHUTE
- TACK-ON STORMWATER DIVERSION BENCH
- ACCESS ROAD
- PERIMETER ROAD

N



2/10 DETAIL
ALTERNATIVE FINAL COVER (CLOSURETURF)
SCALE: NTS

Final Grades

Millersville Landfill and Resource Recovery Facility
Cell 9 Vertical Expansion
Severn, Maryland

Geosyntec consultants

Project No. ME1418A | Dec 2024

Figure 2

ATTACHMENT N.5-1

Excerpt from *Watershed Geo ClosureTurf Guidance Design Manual*
(Watershed Geosynthetics 2023)

ClosureTurf

ClosureTurf® w 50 mil MicroDrain® Liner

Product Data	Test Method	LLDPE Values	HDPE Values
Thickness (nominal), mil (mm)	ASTM D5994	50 (1.25)	50 (1.25)
Thickness (min. avg.), mil (mm)	ASTM D5994	47.5 (1.19)	47.5 (1.19)
Thickness (lowest indiv.), mil (mm)	ASTM D5994	42.5 (1.06)	42.5 (1.06)
Drainage Stud Height (min. avg.), mil (mm)	ASTM D7466	130 (3.3)	130 (3.3)
MicroDrain® Asperity Height (min. avg.), mil (mm)	ASTM D7466	20 (0.51)	20 (0.51)
Density, g/cc	ASTM D792, Method B	0.939 (max.)	0.94 (min.)
Tensile Properties (avg. both directions)	ASTM D6693, Type IV		
Strength @Yield (min. avg.), lb/in. width (N/mm)		N/A	110 (19.3)
Elongation @ Yield (min. avg.), % (GL=1.3 in.)		N/A	12
Strength@Break (min. avg.), lb./in. width (N/mm)		105 (18.4)	110 (19.3)
Elongation@Break (min. avg.), %(GL=2.0 in.)		300	300
Tear Resistance (min. avg.), lbs. (N)	ASTM D1004	30 (133)	38 (169)
Puncture Resistance (min. avg.) lbs. (N)	ASTM D4833	55 (245)	80 (356)
Carbon Black Content (range %)	ASTM D4218	2-3	2-3
Carbon Black Dispersion (Category)	ASTM D5596	Only near spherical agglomerates for 10 views in Cat. 1 or 2	
Stress Crack Resistance (Single Point NCTL), hours	ASTM D5397, Appendix	N/A	500
Oxidative Induction Time, minutes	ASTM D3895, 200°C, 1 atm O_2	≥140	≥140

Agru America's geomembranes are certified to pass Low Temp. Brittleness via. ASTM D746 (-80°C), and Dimensional Stability via. ASTM D1204 (± 2% @ 100°C)

ENGINEERED TURF COMPONENT (CT)

Product Data	Test Method	Values
Yarn Type	N/A	Polyethylene, Fibrillated
Yarn Color	N/A	Olive Green, Play Green, Tan
Yarn Weight (Total Product Weight)	ASTM D5261 (sample size, 1 yd^2)	≥20 oz. / sq. yd. (32 oz. / sq. yd. + 2 oz.)
Tensile Strength of Yarn	ASTM D2256	15 lbs. min.
CBR Puncture	ASTM D6241	1,500 lb. (MARV)
Tensile Product (MD/XD)	ASTM D4595	2,100 MD / 1,600 XD lb/ft (MARV)
Interface Friction between ClosureTurf CT and MicroDrain®	ASTM D5321	35°, min. Peak
Engineered Turf Fiber UV Stability	ASTM G147	>60% retained tensile strength at 100 yrs. (projected)
Backing System UV Stability (Exposed)	ASTM G154 Modified Cycle 1., UVA340	110 lbs./ft. retained tensile strength at 6,500 hrs (projected)
Aerodynamic Evaluation	GTRI Wind Tunnel	120 mph with max. uplift of 0.12 lb/sf
Rainfall Induced Erosion	ASTM D6459	Infill Loss 0.1% at 6 in./hr. Rainfall
Steady State Hydraulic Overtopping (ClosureTurf® w/ HydroBinder®)	ASTM D7277/D7276	5 ft. overtopping resulting in 29 ft/s velocity and 8.8 psf shear stress for Manning's *n* value of 0.02
Full Scale Wave Overtopping Test Cumulative Volume (ClosureTurf® with HydroBinder®)	Colorado State University Wave Simulator	165,000 ft^3/ft
Full Scale Wave Overtopping Test Discharge (ClosureTurf® with HydroBinder®)	Colorado State University Wave Simulator	4.0 ft^3/s/ft
HydroBinder® Infill Mix	ASTM C387 / ASTM C109	3/4 in. infill 5,000 psi (min. at 28 days)

SUPPLY INFORMATION (Standard Roll Dimensions)

	Thickness		Width		Length		Area (approx.)		Weight (avg.)	
	mil	mm	ft.	m	ft.	m	ft^2	m^2	lbs	kg
MicroDrain®	50	1.25	23	7	500	152	11,500	1,068	~5,000	~2,268
Turf Component	N/A	N/A	15	4.6	300	91.44	4,500	418	~1,000	~454

ClosureTurf®/and HydroTurf®/ products (US Patent No. 7,682,105, 8,585,322, 9,163,375, and 9,199,287; Canadian Patent No. 2,663,170; and other Patents Pending) and trademarks are the property of Watershed Geosynthetics LLC. All information, recommendations and suggestions appearing in this literature concerning the use of our products are based upon tests and data believed to be reliable; however, this information should not be used or relied upon for any specific application without independent professional examination and verification of its accuracy, suitability and applicability. Since the actual use by others is beyond our control, no guarantee or warranty of any kind, expressed or implied, is made by Watershed Geosynthetics LLC as to the effects of such use or the results to be obtained, nor does Watershed Geosynthetics LLC assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. Nothing herein is to be construed as permission or as a recommendation to infringe any patent.

Attachment N.5-2.2 – Wind Pressure Coefficient (C_p) Graph and Table for 3H:1V Slopes (Pages C-5 – C-6 of Attachment C in the Manual)

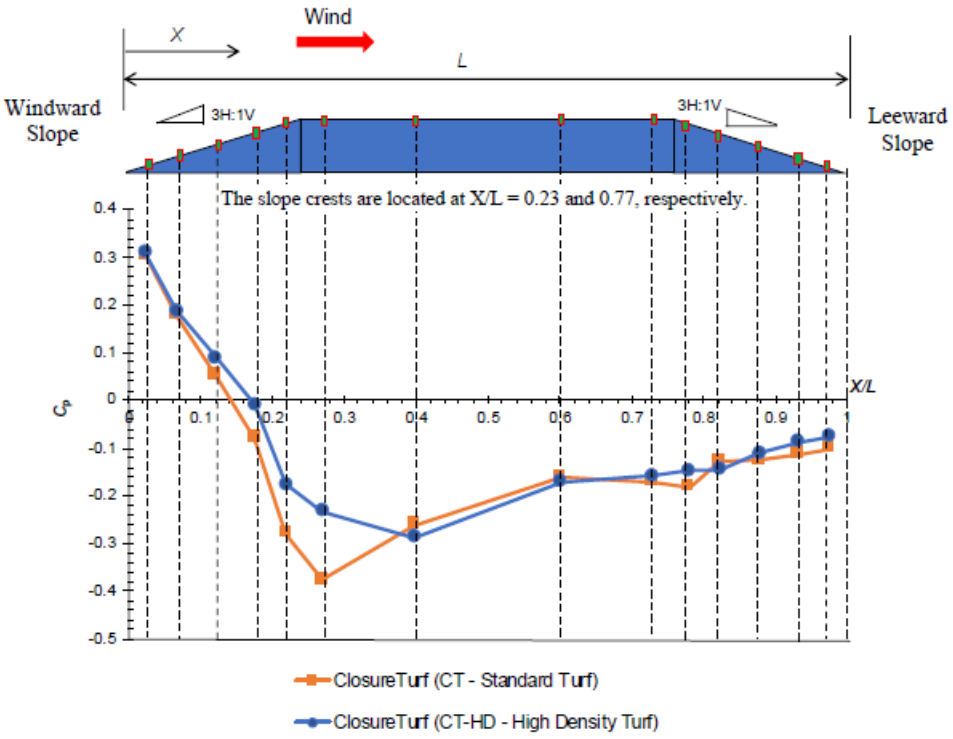


Figure 4. Average Wind-Pressure Coefficient Profiles for ClosureTurf (3H:1V Slopes)

Table 2. Average Wind-Pressure Coefficients for ClosureTurf (3H:1V Slopes)

X/L	Wind Pressure Coefficient, Cp (3H:1V Slope)	
	CT (Standard Turf)	CT-HD (High Density Turf)
0.02	0.30	0.31
0.07	0.18	0.19
0.12	0.05	0.09
0.18	-0.08	-0.01
0.22	-0.28	-0.18
0.27	-0.38	-0.23
0.40	-0.26	-0.29
0.60	-0.16	-0.17
0.73	-0.17	-0.16
0.78	-0.18	-0.15
0.82	-0.13	-0.15
0.88	-0.12	-0.11
0.93	-0.11	-0.09
0.98	-0.10	-0.08

Note: The slope crests are located at X/L = 0.23 and 0.77, respectively.

ATTACHMENT N.5-2

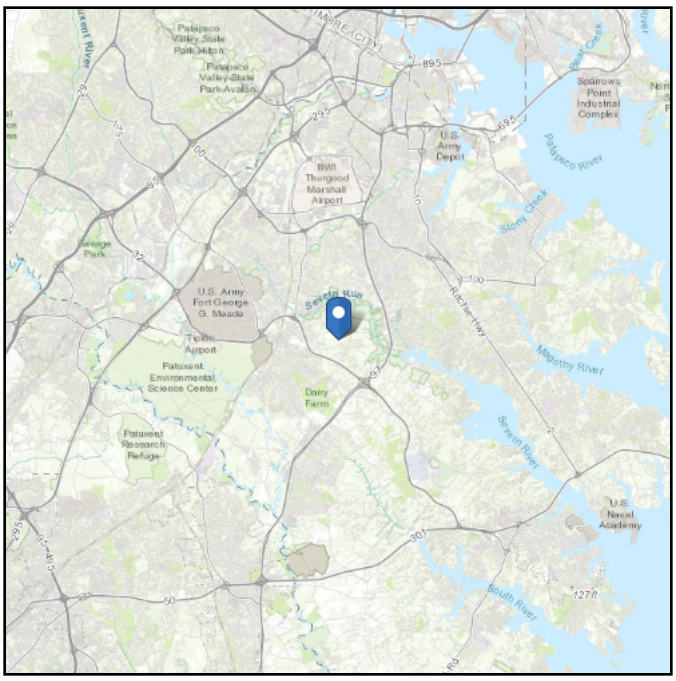
ASCE Hazard Tool

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-22
Risk Category: I
Soil Class: D - Stiff Soil

Latitude: 39.088207
Longitude: -76.662982
Elevation: 174.65767205229992 ft (NAVD 88)



Wind

Results:

Wind Speed	105 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	95 Vmph
300-year MRI	105 Vmph
700-year MRI	113 Vmph
1,700-year MRI	121 Vmph
3,000-year MRI	126 Vmph
10,000-year MRI	137 Vmph
100,000-year MRI	158 Vmph
1,000,000-year MRI	179 Vmph

Data Source: ASCE/SEI 7-22, Fig. 26.5-1A and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Wed Sep 11 2024

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-22 Standard. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (annual exceedance probability = 0.00333, MRI = 300 years). Values for 10-year MRI, 25-year MRI, 50-year MRI and 100-year MRI are Service Level wind speeds, all other wind speeds are Ultimate wind speeds.

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-22 Section 26.2.

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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