Cross Generating Station

Periodic (5-Yr) Run-on and Run-off Control System Plan for CCR Landfills

Document No.: CROSS-0-LI-044-0015 - Rev 0

14 Oct 2021

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Rev	Description	Originator	Reviewer	Approver	Revision Date
0	Issued for Use	Fletcher Wood	Lauren LaVoie	Fletcher Wood	14 Oct 2021
		F. Wood	L. Lavoie	F. Wood	

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Appendices

Fletcher Wood

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1. Introduction

The United States Environmental Protection Agency (EPA) promulgated regulations regarding Coal Combustion Residuals (CCRs). These regulations (40 CFR Part 257) were published in the Federal Register on April 17, 2015. One of the requirements of the regulations (§257.81(c)) is to prepare initial and periodic run-on and run-off control system plans for CCR landfills.

Two sets of revisions to 40 CFR Part 257 have been published in the Federal Register since the 2015 CCR Rule was first published. The first set of revisions was published on July 30, 2018 and the second on November 12, 2020. The 2018 revisions amended §257.81(c)(5) to adopt two alternative performance standards allowing for owners or operators of CCR landfills to obtain approval from either Participating State Directors (in states with approved CCR permit programs) or the EPA (where the EPA is the permitting authority) stating that the initial and periodic run-on and run-off control system plans meet the requirements of §257.81(c) in lieu of a certification from a qualified professional engineer. Neither of these alternative performance standards are applicable in this case. The 2020 revisions did not include any changes to the §257.81(c) requirements addressing initial and periodic run-on and run-off control system plans for CCR landfills.

§257.81(c)(4) requires that run-on-and run-off control system plans are prepared every five years. The date of completing the initial run-on-and run-off control system plan is the basis for establishing the deadline to complete the first subsequent periodic run-on-and run-off control system plan. The initial run-on-and run-off control system plan for the existing solid waste landfill areas at Cross Generating Station was placed in the operating record on October 17, 2016. The first periodic run-on-and run-off control system plan therefore must be completed and placed in the operating record on or before October 17, 2021.

This report presents the first periodic run-on and run-off control system plan for the Solid Waste Landfill at the Cross Generating Station and provides the required certification by a qualified professional engineer. The run-on and run-off control systems for the existing Class Three Landfill Area 1B Cell 1 (operating CCR landfill), Class Three Landfill Area 1B Cell 2 (soon to be constructed), and Class Three Landfill Area 1D (future Cells 1 and 2) are integrated with the run-on and run-off control systems for the existing Class Two Landfill (closed CCR landfill). This periodic run-on and run-off control system plan therefore addresses all CCR landfill areas together.

2. Discussion

§257.81(c)(1) requires that the run-on and run-off control system plan *must document how the run-on and run-off control systems have been designed and constructed to meet the applicable requirements of this section. Each plan must be supported by appropriate engineering calculations.*

The applicable requirements for the run-on and run-off control system plan are listed below, with a description of how the systems are designed and constructed to satisfy each requirement. Appendix A and Appendix B include the appropriate supporting engineering calculations.

§257.81**(a)** states that *the owner or operator of an existing or new CCR landfill or any lateral expansion of a CCR landfill must design, construct, operate, and maintain:*

> *(1) A run-on control system to prevent flow onto the active portion of the CCR unit during the peak discharge from a 24-hour, 25-year storm*

- The active portion of a CCR landfill is defined by §257.53 as the area of the CCR unit that has received or is receiving CCR or non-CCR waste and has not completed closure in accordance with §257.102. The existing Class Two Landfill was certified as closed on August 9, 2016. Therefore, §257.81(a)(1) does not apply to the existing Class Two Landfill because it no longer has an active portion capable of receiving stormwater run-on.
- The existing Class Three Landfill Area 1B (Cell 1) is an operating CCR landfill located immediately east of the existing Class Two Landfill. Area 1B Cell 1 is surrounded on the north, east, and south sides by a raised perimeter berm that prevents run-on from flowing onto the active portion of the landfill. The western limit of Area 1B Cell 1 piggybacks over the previously closed east slope of the Class Two Landfill. Area 1B Cell 2 and both Cells in Area 1D will be developed in the same manner. When the final cover system was installed during closure of the Class Two Landfill, benches were constructed along its side slopes. These benches include drainage terraces that intercept stormwater runoff from the closed upper regions of the Class Two Landfill, divert it before it can run-on to the active portion of the Class Three Landfill, and convey it along the benches around and to the base of the Class Two Landfill through downdrains at the north and south ends of the Class Two Landfill. This non-contact stormwater is then routed through the onsite ditch network to the stormwater retention pond. Engineering calculation CROSS-0-DC-044-CE-0004, included in Appendix A, demonstrates the design of all system conveyances at the most critical phase of development, including terrace channels, downdrains, culverts, riprap protection, peripheral channels around the perimeter of the landfill development, ditches conveying water to the stormwater retention pond, and the stormwater retention pond itself. This calculation is an update to the calculation submitted with the solid waste permit, and accounts for the revised piggyback approach of the Class Three Landfill over the top deck of the Class Two Landfill based on the final Class Two Landfill closure as-built grades. All facilities are designed to handle the peak discharge from a 24-hour, 25-year storm event.

(2) A run-off control system from the active portion of the CCR unit to collect and control at least the water volume resulting from a 24-hour, 25-year storm

- The existing Class Two Landfill was certified as closed on August 9, 2016. Therefore, §257.81(a)(2) does not apply to the existing Class Two Landfill because it no longer has an active portion capable of generating runoff. However, the stormwater runoff control system for the Class Two Landfill is designed to collect and control at least the water volume (and peak flow rate) from the closed surfaces of the landfill resulting from a 24-hour, 25-year storm event, and convey it to the stormwater retention pond, as demonstrated in engineering calculation CROSS-0-DC-044-CE-0004, included in Appendix A.
- The design of each Class Three Landfill cell includes a leachate collection system as well as a decant structure (chimney drain) located within the active portion of the landfill cell. The active portion of each landfill cell is sloped towards the decant structure. The decant structure is designed to intercept stormwater runoff from the active portion of the landfill and convey it directly to the leachate collection pond via gravity piping. The purpose of the decant structure is to minimize leachate generation and to collect and control at least the water volume (and peak flow rate) resulting from a 24-hour, 25-year storm. Engineering calculation CR34-0-DC-LF-CE-007 demonstrates how these requirements are met, and is included in Appendix B. This calculation was submitted with the original solid waste permit application and was reviewed as part of the current evaluation to verify the accuracy of the various design assumptions, inputs, and results. Based on a review of this calculation and observation of the operating Class Three Landfill Area 1B Cell 1 itself, the active portion of the Class Three Landfill has been designed, constructed, operated, and maintained to collect and control at least the water volume (and peak flow rate) resulting from a 24-hour, 25-year storm.

§257.81(b) states that *run-off from the active portion of the CCR unit must be handled in accordance with the surface water requirements under (§257.57.3-3)*

- The existing Class Two Landfill was certified as closed on August 9, 2016. Therefore, §257.81(b) does not apply to the existing Class Two Landfill because it no longer has an active portion capable of generating run-off.
- All run-off generated from the active portion of each Class Three Landfill cell is conveyed by design to the Leachate Collection Pond for initial treatment. The Leachate Collection Pond is designed to hold an average month's-worth of run-off and leachate from the landfill (including active and closed portions as the development progresses), in addition to the volume of run-off resulting from a 24-hour, 25-year storm. The effluent from the Leachate Collection Pond is pumped to the Wastewater Decant Pond for additional treatment, which is then conveyed to a low volume waste wastewater treatment system prior to discharging to permitted outfall NPDES 002 after all water quality requirements are met. Therefore, all run-off from the active portion of the Class Three Landfill Area 1B is handled in accordance with the surface water requirements under §257.57.3-3.

This report satisfies the requirements of §257.81(c) by providing a run-on and run-off control system plan that documents how the integrated run-on and run-off control systems for the Class Two and Class Three CCR Landfills at Cross Generating Station have been designed and constructed to meet the applicable requirements of this section, including supporting engineering calculations.

3. Conclusions

This report presents the first periodic run-on and run-off control system plan for the existing Class Two Landfill (closed CCR landfill), the existing Class Three Landfill Area 1B Cell 1 (operating CCR landfill), Class Three Landfill Area 1B Cell 2 (soon to be constructed CCR landfill cell), and Class Three Landfill Area 1D (two future CCR landfill cells) at Cross Generating Station in Pineville, SC. The run-on and run-off control system plan contained herein is in accordance with the requirements of 40 CFR §257.81.

4. Certification

I, the undersigned Professional Engineer registered in good standing in the State of South Carolina, do hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I certify, for the Cross Generating Station CCR Landfills, that the periodic run-on and run-off control system plan contained herein is in accordance with the requirements of 40 CFR §257.81.

Fletcher Wood

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Fletcher Wood

Printed Name of Professional Engineer

Appendix A. Calculation CROSS-0-DC-044-CE-0004

Periodic (5-yr) CCR Landfill Run-on and Run-Off Control System Plan Calculation

Project Details	
Customer	Santee Cooper
Project Title	Cross Generating Station Class 2 and Class 3 Landfills
Calculation Title	Periodic (5-yr) CCR Landfill Run-on and Run-off Control System Plan Calculation
Calculation Number	CROSS-0-DC-044-CE-0004

Rev	Date	By	Chk	Rev	Date	By	Chk	Rev	Date	By	Chk
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Calculation Objective

The objective of this calculation is to demonstrate how the run-on and run-off control systems have been designed and constructed in accordance with CCR Rule 40 CFR §257.81 and SCDHEC requirements. The systems are designed to manage the stormwater from the existing Class 2 CCR Landfill, as well as Class 3 CCR landfill Areas 1B (operating) and 1D (future). The stormwater collection and conveyance systems are designed for the 25-yr, 24-hr storm event.

Calculation Method

The post developed stormwater runoff quantity will be calculated according to the SCS design methodology for a 25-yr, 24-hr rainfall event, applying Type-III rainfall distribution for the rainfall depth within the project work limits. The drainage collection, conveyance and pond routing calculations are performed using Bentley PondPack software. TR-55 method is used for the time of concentration (TC) computation. The culverts are designed using Bentley CulvertMaster.

Assumptions

All assumptions are included in the calculation. None that require further verification.

Software Used

Title:	Version:	Validation: (Y / N / N/A)
Bentley Pondpack	V8i	N/A
Bentley CulvertMaster	V3.3	N/A

References

1. SCDHEC standards for the stormwater and sediment reduction regulation 72-300 thru 72-316.
2. SCDHEC OCRM stormwater BMPs handbook.
3. SCDHEC solid waste management industrial solid waste landfills regulation DHEC R61-107-19.
4. Existing topographic survey drawing prepared by Parker Land Surveying, LLC, dated at 5/2016.
5. SWPPP calculation report CR34-0-DC-024-CE-002 prepared earlier for the landfill permit.
6. WorleyParsons' Drawings CR34-0-DW-LF-735-0200 THRU 0549.
7. USEPA Final CCR Rule 40 CFR Part 257

Conclusions

The system of stormwater conveyance structures is designed to meet or exceed the regulations and/or standards of South Carolina Department of Health and Environmental Control (SCDHEC) and Ocean and Coastal Resource Management (OCRM). The channels, culverts, down drains, and the ponds all will work together to convey and control the 25-yr, 24-hr design storm event. The pond is adequately designed to manage the peak flow from the 25-yr, 24-hr storm event. The stormwater retention basin is adequate to hold the 25-yr, 24-hr rainfall and release it over a period of 24 hours in accordance with the SCDHEC Water Quality Volume (WQV) criteria. The run-on and run-off control systems have been designed and constructed in accordance with CCR Rule 40 CFR §257.81.

Related to a Safety Critical System? **No** Status of Supplier Data used **N/A**

HOLDS

None.

			Lauren LaVoie	Fletcher Wood	Fletcher Wood
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Rev	**Date**	**Description**	**By**	**Checked**	**Approved**

Project Details	
Customer	Santee Cooper
Project Title	Cross Generating Station Class 2 and Class 3 Landfills
Calculation Title	Periodic (5-yr) CCR Landfill Run-on and Run-off Control System Plan Calculation
Calculation Number	CROSS-0-DC-044-CE-0004

Rev	Date	By	Chk	Rev	Date	By	Chk	Rev	Date	By	Chk
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Please check boxes for all applicable items checked or mark as "N/A" if not appropriate:

Calculations:

Originator	Checker	
☒	☒	Calculation number assigned and registered.
☒	☒	All required information on Cover Sheet provided.
☒	☒	Revision history box complete and signed.
☒	☒	Table of Contents.
☒	☒	Appropriate stamp for preliminary issues.
☒	☒	Source of input data stated (with revision number and date if relevant).
☒	☒	Customer's requirements included/addressed.
☒	☒	Approach used is appropriate for problem being solved.
☒	☒	Method clear and easy to follow.
☒	☒	Input data correct.
☒	☒	Calculation is arithmetically correct, OR software previously verified
☒	☒	Calculation result within expected limits.
☒	☒	Calculation tolerances stated if significant.
☒	☒	Units used as required by customer. Unit conversions correctly performed.
☒	☒	Appropriate cross-references.
☒	☒	Sketches included and clearly labeled, where required.
☒	☒	Appendices included and referenced, as required.
☒	☒	Conclusions and recommendations are appropriate.

Checking records:

☒	☒	Checked and annotated copy of calculation filed (use "Doc Check Print" stamp).
☒	☒	Corrections made as required and calculation dated and signed on cover sheet by checker.

Revisions:

☐	☐	Changes clouded, tracked or highlighted.
☐	☐	Revision history block updated.
☐	☐	Calculation re-checked if required.

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1. Design Criteria

The following design criteria were established in accordance with the requirements of South Carolina Department of Health and Environmental Control (SCDHEC) and Ocean and Coastal Resource Management (OCRM) regulations:

- The stormwater collection, conveyance and retention to be designed to control and convey the 25-yr, 24-hr storm event without flooding the plant roads.
- The two existing fish grow-out ponds have been modified and converted to a wet retention basin for treating non-contact water surface runoff collected from the closed portions of the existing Class 2 landfill and the proposed Class 3 expansion.
- The retention basin has been designed to provide at least 24 hours of retention time for the water quality volume before discharging to the existing diversion canal.
- The retention basin outlet structure was designed to manage the 25-yr, 24-hr design storm event and maintain at least 0.5-ft of free board between the maximum water surface elevation from this storm and the crest elevation of the emergency spillway, which is located in natural ground on the west side of the ditch immediately before entering into the pond.
- The peripheral stormwater channels are designed with a 0.05% slope with 3:1 side slopes and a minimum bottom width of 13.5 ft. Landfill terrace channels (V-ditch) will have a 0.5% slope with a 3:1 side slope on one side and 10.33:1 on the other side.

The above criteria are consistent with 40 CFR §257.81 for run-on and run-off control system plans for CCR landfills.

2. Pre-Development Condition

The following describes the pre-development condition after Class 2 closure, prior to Class 3 landfill construction:

Site topographic conditions are primarily flat terrain with minimal vertical relief. The site near the landfill is predominantly covered with Goldsboro soil. This soil is classified under hydrologic soil group B. Therefore, it has a moderate infiltration rate when thoroughly wetted. Furthermore, it has moderately fine to moderately coarse textures.

The existing Class 2 landfill occupies an approximate area of 96 acres surrounded by peripheral earthen channels. These channels collect stormwater from the landfill and convey it to the stormwater pond. The existing channels are relatively flat with an approximate slope of 0.0005 ft/ft, and are about 2.5 ft deep with a varying bottom width and 3:1 side slopes.

The existing Class 2 landfill has been closed and capped with a composite liner cover system (HDPE geomembrane over a geosynthetic clay liner). Stormwater from the existing landfill drains to the north and south via 3 existing landfill terrace channels. The channels drain to the north and south peripheral stormwater channels via a series of 24" HDPE stormwater downdrain pipes. The peripheral stormwater channels drain to the stormwater pond at the south end of the site, which ultimately discharges into the Diversion Canal. Refer to the aerial image and existing contours in the Appendix A.

3. Post-Development Condition

Class 3 landfill Areas 1B and 1D will be constructed adjacent to the closed Class 2 landfill. Area 1B, to the east of the existing landfill, will be constructed first, and will be constructed in 2 Phases: the north half (Cell 1) first, and the south half (Cell 2) second. Area 1B Cell 1 was constructed in 2015 and began operation in 2016. Area 1B Cell 2 is expected to be constructed and operational by 2025. Area 1D, to the west, will be constructed after Area 1B, and in a similar manner. The Class 3 landfill Areas 1B and 1D will piggyback up the east and west sides (and over the top) of the closed existing Class 2 landfill, respectively, as each Class 3 cell is constructed. Refer to the Phasing sketches in Appendix E. The drainage calculation addresses the range of conditions from prior to development through closure of the landfill complex.

Peripheral drainage ditches are provided around the perimeter of landfill Areas 1B and 1D. These ditches provide continuity for the stormwater runoff from the Class 2 landfill and the undeveloped Class 3 landfill areas, to the retention pond. Additionally, as landfill Areas 1B and 1D are closed, these peripheral ditches will provide drainage for the stormwater from the closed surfaces of the new landfill areas as well.

Culverts are designed to convey the required flow wherever the peripheral ditches cross the roads. Adequate culvert end treatments are provided to curtail erosion and to protect the culvert headwalls.

The water surface elevation at any channel confluence point is computed based on the combined total flow, obtained from PondPack output, for that particular node.

Refer to Appendix B for the drainage plan and PondPack design output, and Appendix C for culvert calculations.

4. Rainfall Data

The project rainfall data obtained from SCDHEC Storm Water Management BMP Handbook is summarized below in Table 1.

Table 1: Berkeley County (North), South Carolina Rainfall Data (inches)

2-year	10-year	25-year	50-year	100-year
3.8	5.9	7.2	8.2	9.4

5. Stormwater Calculation

5.1 Drainage Areas

The stormwater calculations are performed according to the SCS methodology using PondPack software. The computer output and summary of results are enclosed in Appendix B. The proposed drainage system, which includes mainly open channels and culverts, is designed for the most conservative scenario of a fully developed site with the Class 2 landfill and Class 3 landfill Areas 1B and 1D fully constructed and closed, when all landfill areas are contributory to the stormwater runoff pond, as shown in the final phasing sketch in Appendix E.

The drainage contributory area to the existing outfall (Out-20) includes the existing and proposed landfill, approximately 2-acres of open area immediately south of the landfill, all adjacent roads and channels, and the proposed retention basin. The total drainage area is about 220 acres, of which about 190 acres are occupied by the existing and proposed landfill and its adjacent open areas. The peak flows are calculated by assuming a composite curve number of 79 for landfill areas, and 98 for the wet pond area. See Table 2 for a summary of drainage contributory areas included in the fully-developed condition for the Class 3 landfill.

Table 2: Summary of Drainage Areas

Area	Acreage (ac.)	Discharge, Q_{25} (cfs)	Discharge, Q_{100} (cfs)	CN
EX-N6	3.89	15.1	21.4	79
EX-N7	2.56	10.8	15.3	79
EX-S6	1.82	7.5	10.7	79
EX-S7	4.04	15.6	22.1	79
NE	15.93	51.8	73.3	79
NE3	4.18	11.8	16.7	79
NE7	16.18	54.7	77.4	79
NW	20.96	52.3	74.1	79
NW3	4.19	11.0	15.6	79

NW4+EXN4+NE4	11.22	29.4	41.7	79
NW5+EXN5+NE5	12.08	29.7	42.1	79
NW7	15.36	44.2	62.6	79
SE	27.52	78.9	111.7	79
SE3	2.38	8.1	11.5	79
SE4+EXS4+SW4	7.06	24.7	34.9	79
SE7	5.84	19.2	27.2	79
SW	30.66	85.2	120.6	79
SW3	2.19	7.4	10.4	79
SW5+EXS5+SE5	6.40	18.1	25.7	79
SW7	6.52	21.0	29.7	79

5.2 Peripheral Channels and Culvert Design

The new peripheral drainage channels are 13.5 to 15.0 ft wide with 3:1 side slopes and 0.05% longitudinal slope. Runoff collected within these channels flows to the retention basin adjacent to the diversion canal. All the peripheral grass lined channels around the landfill, as well as the channel conveying runoff from the peripheral channels to the retention basin, are designed to have a bottom width of 13.5 ft and 15.0 ft, respectively, with side slopes graded to 3 horizontal to 1 vertical with varying depths from 2.0 ft to 6.0 ft. The average channel slopes are kept relatively flat at about 0.0005 ft/ft. All channels are designed to handle the peak flow during the 25-yr, 24-hr storm event. Culverts are installed wherever these ditches cross the landfill roads or the retention basin embankment.

The overall system is designed to control and convey the 25-yr, 24-hr storm event without overflowing externally anywhere. The top of the roads adjacent to the channels vary in elevation between EL 83.0 and EL 89.0. Ditches are modeled in PondPack. Table 3 summarizes the ditch design. For detailed calculations, refer to PondPack output in Appendix B. See WorleyParsons Drawing CR34-0-DW-LF-735-0280 for the ditch schedule. The Landfill terrace channel (V-ditch) capacities are calculated to be around 16 cfs (See Appendix F).

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Table 3: Summary of Peripheral Channels

Ditch No.	Bottom Width (ft)	Side Slope	Max WSE (Q_{25})	T/Bank Elevation	Discharge, Q_{25} (cfs)	Velocity, Q_{25} (fps)	DWG Label
CH-E1	13.5	3:1	82.2	82.5	74.10	1.3	D-1
CH-E2	13.5	3:1	81.0	82.5	90.84	1.4	D-1
CH-NE1	13.5	3:1	82.9	83.0	82.47	1.3	D-1
CH-NE2	13.5	3:1	82.6	83.0	85.43	1.3	D-1
CH-NW1	13.5	3:1	82.95	83.0	88.31	1.4	D-6
CH-NW2	13.5	3:1	82.6	83.0	89.97	1.4	D-6
CH-S1	13.5	3:1	79.3	87.5	96.42*	1.4	D-7A
CH-S2	13.5	3:1	80.5	83.0	209.97	1.7	D-8
CH-S3	13.5	3:1	78.1	87.5	5.43	0.6	D-5A
CH-SE1	13.5	3:1	80.5	83.0	96.80	1.4	D-2
CH-SE2	13.5	3:1	80.8	83.0	269.42	1.8	D-5
CH-SW1	13.5	3:1	79.2	83.0	99.83	1.4	D-6
CH-SW2	13.5	3:1	79.7	83.0	185.92*	1.7	D-9
CH-SW3	15	3:1	80.5	83.0	130.97	1.9	D-10
CH-W1	13.5	3:1	82.1	82.5	80.16	1.3	D-6
CH-W2	13.5	3:1	80.9	82.5	94.44	1.4	D-6

*85 cfs is added as it will be diverted to CH-S1 over the compacted random fill berm during the peak flow.

The peak discharge from the downdrains (JCT SE-6) on the south slope of the landfill during the 25-yr, 24-hr storm is 215.6 cfs. During the peak discharge, about 85 cfs will overflow the top of the stabilized compacted fill berm by design, to an adjacent stormwater channel. The top of this berm will be at EL. 86.5. The overflow will remain in the stormwater channels and will not flood adjacent roads. The maximum water surface elevation over the berm will be EL 87.6. The maximum velocity of the flow on the top of berm will be 3.0 cfs. See Appendix C for weir flow calculations. The weir overflow is not modeled in Pondpack. Instead, this overflow was conservatively added as additional flow to culverts and channels as required. See Table 3 and Table 4.

Bentley CulvertMaster is utilized to size the culverts by inputting the peak flow data obtained from PondPack. See Appendix C for detailed culvert design calculations. Table 4 summarizes the culvert design.

New pipe P-2 is omitted from Table 4. P-2 is a 42-in culvert provided to replace an existing 36-in culvert that drains an existing storage area near the landfill project. The location of the culvert and associated ditch was moved slightly to maintain separation from the landfill project, but the drainage area was not otherwise modified. The larger culvert size is provided as a conservative approach. For pipe P-10, a flow of 10 cfs is assumed as the contributing drainage area is less than two acres.

Table 4: Summary of Culverts

Pipe	Size (inches)	INV in	INV Out	No. of Pipes	Length (ft)	Junction	Discharge, Q_{25} (cfs)	Velocity, Q_{25} (fps)	DWG
P-1	42	78.78	78.73	3	100	E-1	100.2	6.8	LF-735-0221
P-3	42	77.99	77.87	3	100	SE-4	98.2	6.7	LF-735-0221
P-4	42	77.02	76.20	4	90	SE-2	99.1	8.2	LF-735-0221
P-5	42	76.13	75.78	4	70	SE-5	293.4	9.3	LF-735-0221
P-5A	24	80.00	78.00	1	56	SE-1	7.5	9.9	LF-735-0221
P-5B	30	84.50	84.00	4	70	SE-6	130.6*	8.0	LF-735-0301
P-6	42	77.84	77.80	3	90	W-1	101.8	6.8	LF-735-0223
P-7	42	77.65	77.37	3	100	SW-4	99.8	6.7	LF-735-0223
P-8	42	75.74	75.38	3	70	SW-2	187.8**	8.6	LF-735-0223
P-8A	30	76.00	75.00	2	54	SW-1	100.6**	12.1	LF-735-0223
P-9	42	74.20	74.10	4	88	SW-8	341.0	10.1	LF-735-0250
P-10	18	83.00	82.80	1	25	-	10.0	5.7	LF-735-0250

*85 cfs is removed as it will be diverted to CH-S1 over the internal compacted random fill berm during the peak flow.
**85 cfs is added to account for the additional water to CH-S1

5.3 Riprap Design

Riprap aprons are designed at the culvert upstream and downstream ends to minimize erosion. The SCDHEC riprap design nomograph for minimum tail water condition is utilized to size the riprap. The summary of the riprap design is shown below. The dimension of the Rip-Rap aprons are listed on

WorleyParsons drawing CR34-0-DW-LF-735-0281. Refer to Appendix D for SCDHEC riprap design nomographs.

Table 5: Summary of Riprap

Location	Pipe Diameter (in)	No. of Pipes	Junction	Discharge, Q_{25} (cfs)	DWG
RA-B-6	30	4	SE-6	215.6	LF-735-0301
RA-EX-N	24	10	NE-1+NW-1	179.9	LF-735-0222
RA-EX-S	24	10	SE-6	215.6	LF-735-0301
RA-P-1	42	3	E-1	100.2	LF-735-0221
RA-P-2	42	1	-	45.0	LF-735-0221
RA-P-3	42	3	SE-4	98.2	LF-735-0221
RA-P-4	42	4	SE-2	99.1	LF-735-0221
RA-P-5	42	4	SE-5	293.4	LF-735-0221
RA-P-5A	24	1	SE-1	7.5	LF-735-0221
RA-P-6	42	3	W-1	101.8	LF-735-0223
RA-P-7	42	3	SW-4	99.8	LF-735-0223
RA-P-8	42	3	SW-2	102.8	LF-735-0223
RA-P-8A	30	1	SW-1	15.6	LF-735-0223
RA-P-9	42	4	SW-8	341.0	LF-735-0250
RA-P-10	18	1	-	10.0	LF-735-0250

5.4 Landfill Down Drain Design

The down drains are designed to handle the required runoff from each bench of the existing Class 2 landfill, as well as from each bench of the proposed Class 3 landfill areas (and their top decks) after their subsequent phased closure with the final cover system, as the drainage becomes integrated. Down drains consist of 24" HDPE pipes with HDPE inlets installed at the low point of each landfill terrace or top deck area. The inlet rims will be at least 2.0 ft lower than the grade along the adjacent edge of terrace to prevent the accumulated runoff from overflowing the terrace edge during peak flow conditions. These

down drains collect the runoff from each terrace/top deck and discharge into the peripheral ditch located at the toe of the of either the north or south end of the Class 2 landfill. This terrace and down drain system intercepts runoff from the surface of the closed Class 2 landfill such that run-on to the active surface of the individual Class 3 landfill areas is minimized at all times.

A summary of the down drain design is shown below. Refer to Appendix B for down drain calculations included in the PondPack design output.

Table 6: Summary of Down Drains

Down Drain No.	Location	No. of Pipes	Size (inches)	Full Flow Capacity (cfs)	Actual Discharge, Q_{25} (cfs)	Velocity, Q_{25} (fps)
DDNE	North - Top	2	24	155.00	51.8	22.2
DDNW	North – Top	2	24	155.00	52.3	22.3
DDNE3	North – L3	1	24	77.50	11.8	17.1
DDNW3	North – L3	1	24	77.50	11.0	17.0
DDN4	North – L4	2	24	155.00	29.4	19.1
DDN5	North – L5	2	24	155.00	29.7	19.1
DDSE	South – Top	2	24	155.00	78.9	24.8
DDSW	South – Top	2	24	155.00	85.2	25.2
DDSE3	South – L3	1	24	77.50	8.1	15.6
DDSW3	South – L3	1	24	77.50	7.4	15.4
DDS4	South – L4	2	24	155.00	24.7	18.3
DDS5	South – L5	2	24	155.00	18.1	16.5

5.5 Pond Design

The old fish grow-out ponds have been modified and converted to a wet retention basin by excavating the bottom and reshaping the sides to the required grade & elevation, and by removing a small segment of the dike at the north end of the existing pond. Refer to the SWPPP drainage calculation report (CR34-O-DC-024-CE-002) for retention basin plan and details.

The bottom of the basin is at EL 71.5 and the top of the basin embankment is kept at EL 86.0 to match the surrounding terrain. The lowest value of EL 83.0 for the basin embankment is chosen in the design to be consistent with the top of ditch elevations, which are basically a controlling factor throughout the proposed landfill drainage system design. The permanent pool of the pond is EL 75.5.

The stormwater retention basin is designed to control a 25-yr 24-hr storm event. The maximum capacity of the basin is approximately 130 ac-ft with more than 2 ft of freeboard and 4 ft of permanent pool below the basin outlet orifice at EL 75.5. Effluent from the retention basin is discharged through an outfall (Out-20) located at the existing diversion canal.

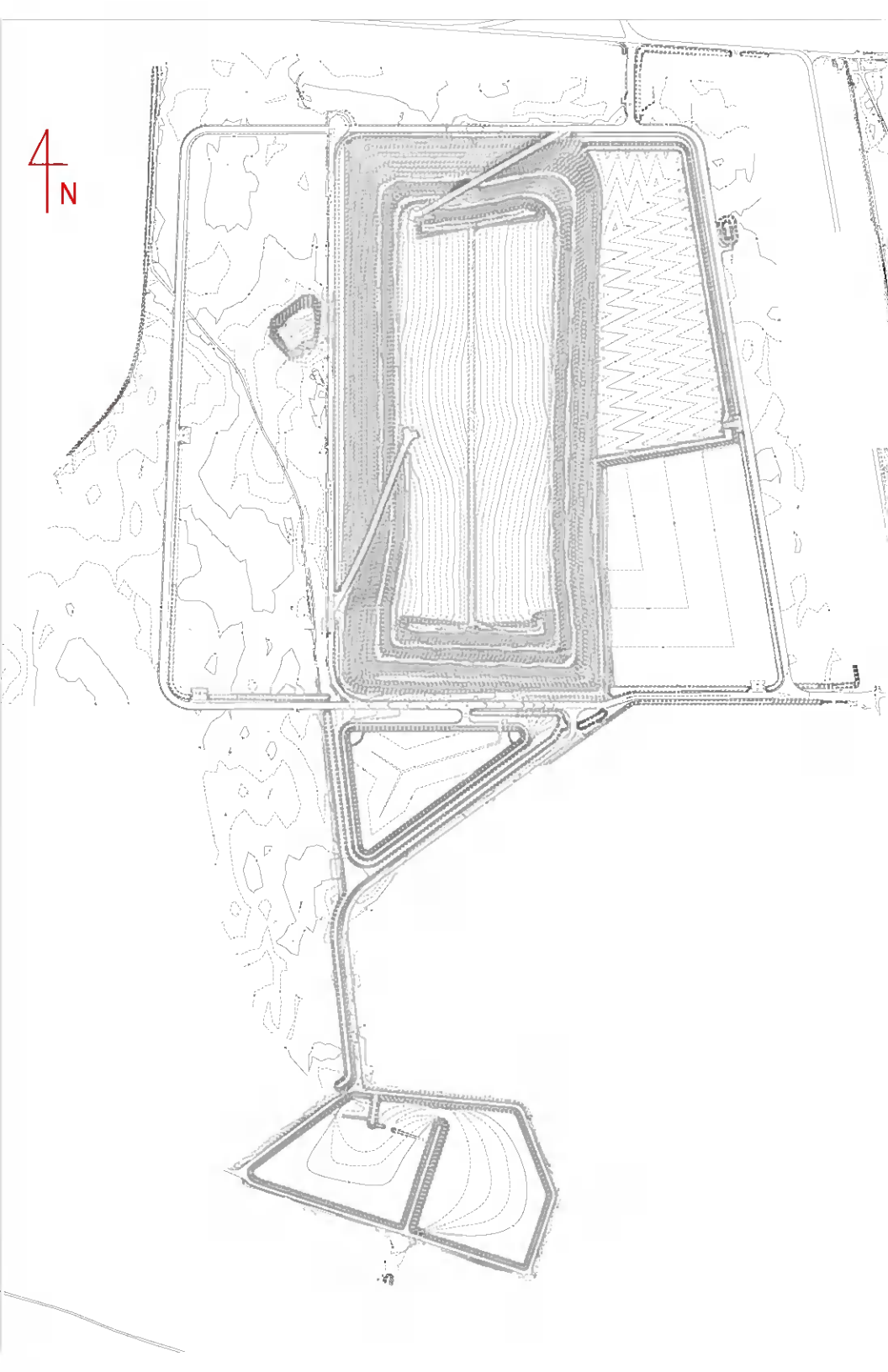
The basin outlet structure consists of a precast riser box (7' x 7') with a rectangular orifice opening and two 30-in HDPE pipes connecting the riser box to the outfall structure (Out-20) at the diversion canal. The outlet structure is designed to regulate the discharge rate from the basin, and its location is chosen in the basin such that it provides the longest flow path through the basin to give maximum possible duration for the sediment to settle down. The primary weir opening of 2.0' x 0.5' is located with a crest at EL 75.5. The primary weir opening will handle the 25 yr, 24-hr and release it at a controlled rate varying between 0.0 cfs and 9.6 cfs.

The previous outfall located in the diversion canal has been demolished and a new outfall was constructed with two 30" dia pipes connected to the new retention basin outlet structure. The new pipes were installed at EL 73.5. The high water at EL 75.5 in the diversion canal will keep the new outfall pipes submerged underwater during peak flow in the diversion canal. (Refer to the document CR34-0-DC-024-CE-002 for anti-seep collar and outfall design information).

The pond routing calculations are performed using Bentley PondPack. The analysis shows that a 25-yr, 24-hr storm results in a maximum water surface at EL 79.5 and a peak outflow of 30.8 cfs. The maximum water surface elevation for a 100-yr 24-hr storm is EL 80.3 with a peak flow of 87.8 cfs. See Appendix B for the full drainage report. The primary orifice opening is designed to convey the 25-yr, 24-hr storm and the 7' x 7' opening at the top of the box to convey the 100-yr, 24-hr storm. The 7' x7' opening at the top of the box is maintained and protected with a trash rack. In the worst-case scenario, if the outfall pipes get clogged, the stormwater will naturally overflow to the wetlands, which are located at the west side of the pond, near the pond entrance.

Appendix A. Existing Topography

(2 Total Pages)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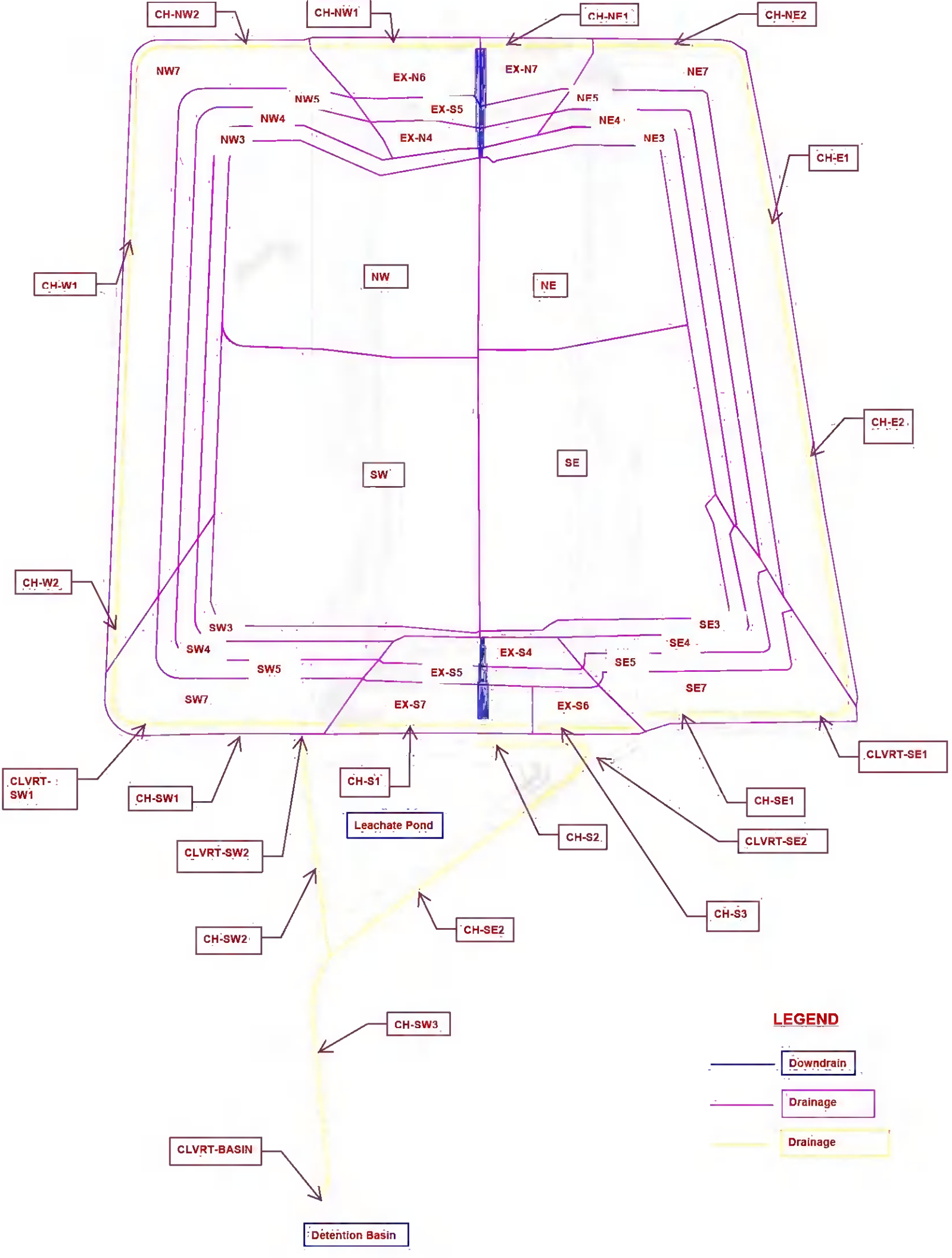
Appendix B. Pondpack Results

(341 Total Pages)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NW5
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NE4
NW3
EX-N4
NE3
CH-E1
CH-W1
NW
NE
CH-E2
SW
SE
CH-W2
SW3
SE3
SW4
SE4
EX-S4
SE5
SW5
EX-S5
SE7
SW7
EX-S7
EX-S6
CLVRT-SE1
CLVRT-SW1
CH-SW1
CH-S1
CH-SE1
Leachate Pond
CH-S2
CLVRT-SE2
CLVRT-SW2
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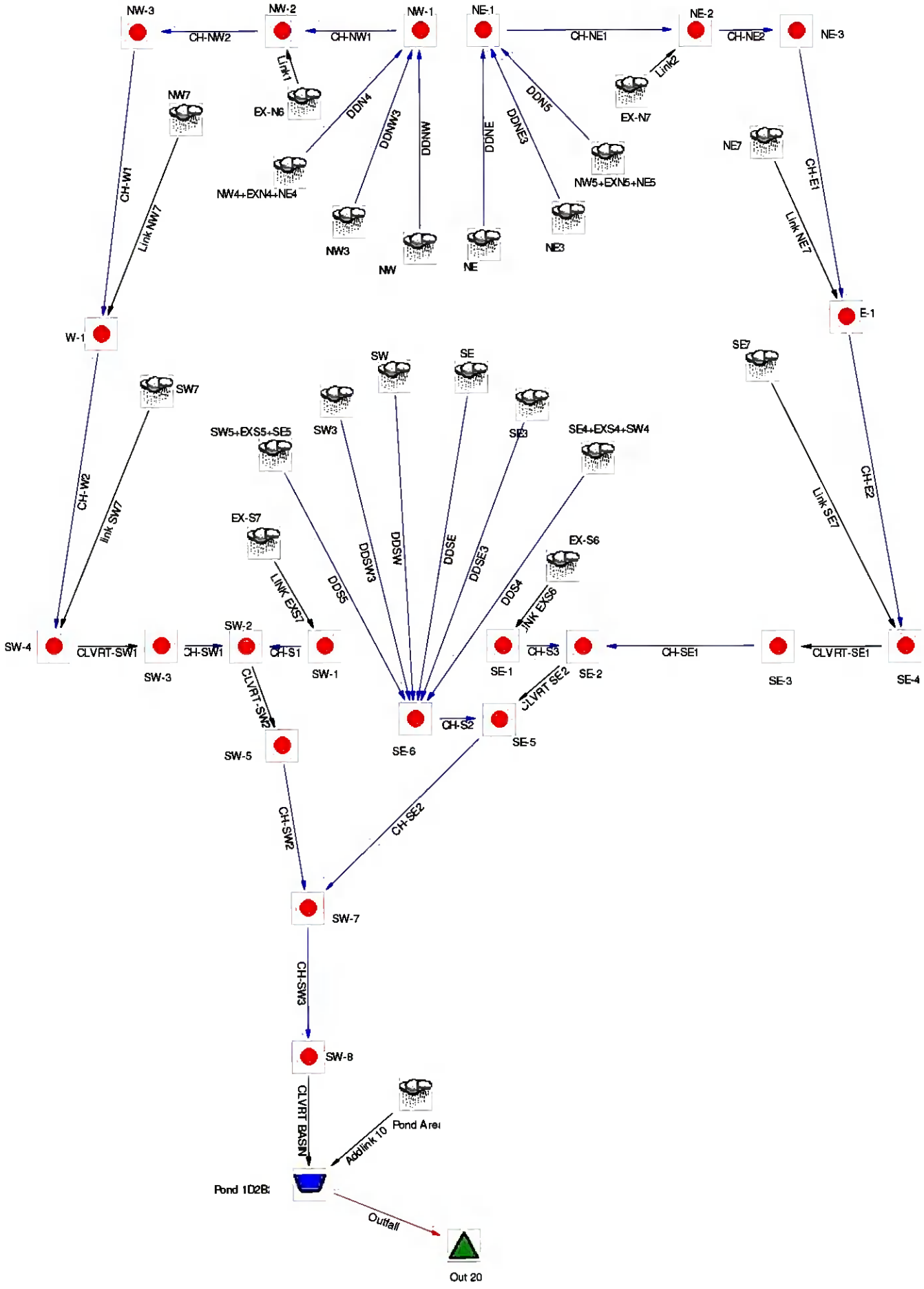
LEGEND
Downdrain
Drainage
Drainage
CLVRT-BASIN
Detention Basin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NW
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NE3
NE7
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SE
SE7
SW3
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Link SE7
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EX-S7
EX-S6
LINK EXS7
DDS5
DDSW3
DDSW
DDSE
DDSE3
DDS4
LINK EXS6
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SW-1
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SE-2
CH-SE1
SE-3
CLVRT-SE1
SE-4
CLVRT-SW2
CLVRT SE2
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SE-5
CH-SW2
CH-SE2
SW-7
CH-SW3
SW-8
CLVRT BASIN
Addlink 10
Pond Area
Pond 1D2B
Outfall
Out 20

Subsection: Time of Concentration Calculations
Label: EX-N6
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	225.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.67 ft/s
Segment Time of Concentration	0.093 hours

Segment #2: TR-55 Channel Flow	
Flow Area	27.0 ft²
Hydraulic Length	725.00 ft
Manning's n	0.040
Slope	0.001 ft/ft
Wetted Perimeter	22.98 ft
Average Velocity	0.93 ft/s
Segment Time of Concentration	0.217 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.311 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: EX-N7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	215.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.66 ft/s
Segment Time of Concentration	0.090 hours

Segment #2: TR-55 Channel Flow	
Flow Area	27.0 ft²
Hydraulic Length	475.00 ft
Manning's n	0.040
Slope	0.001 ft/ft
Wetted Perimeter	22.98 ft
Average Velocity	0.93 ft/s
Segment Time of Concentration	0.142 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.232 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: EX-S6
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	150.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.62 ft/s
Segment Time of Concentration	0.068 hours

Segment #2: TR-55 Channel Flow	
Flow Area	27.0 ft²
Hydraulic Length	615.00 ft
Manning's n	0.040
Slope	0.001 ft/ft
Wetted Perimeter	22.98 ft
Average Velocity	0.93 ft/s
Segment Time of Concentration	0.184 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.252 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: EX-S7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	150.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.62 ft/s
Segment Time of Concentration	0.068 hours

Segment #2: TR-55 Channel Flow	
Flow Area	27.0 ft²
Hydraulic Length	830.00 ft
Manning's n	0.040
Slope	0.001 ft/ft
Wetted Perimeter	22.98 ft
Average Velocity	0.93 ft/s
Segment Time of Concentration	0.249 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.316 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: NE
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.150
Slope	0.030 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.22 ft/s
Segment Time of Concentration	0.127 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	308.00 ft
Is Paved?	False
Slope	0.030 ft/ft
Average Velocity	2.79 ft/s
Segment Time of Concentration	0.031 hours

Segment #3: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	1,250.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.342 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.500 hours

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:
Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: NE3
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	50.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.50 ft/s
Segment Time of Concentration	0.028 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	2,420.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.662 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.691 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: NE7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	80.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.54 ft/s
Segment Time of Concentration	0.041 hours

Segment #2: TR-55 Channel Flow	
Flow Area	27.0 ft²
Hydraulic Length	1,385.00 ft
Manning's n	0.040
Slope	0.001 ft/ft
Wetted Perimeter	22.98 ft
Average Velocity	0.93 ft/s
Segment Time of Concentration	0.415 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.456 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: NW
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.150
Slope	0.030 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.22 ft/s
Segment Time of Concentration	0.127 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	2,620.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.717 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	330.00 ft
Is Paved?	False
Slope	0.030 ft/ft
Average Velocity	2.79 ft/s
Segment Time of Concentration	0.033 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.877 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc =	Unpaved surface:
	V = 16.1345 * (Sf**0.5)
	Paved Surface:
	V = 20.3282 * (Sf**0.5)
	(Lf / V) / 3600
Where:	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: NW3
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	50.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.50 ft/s
Segment Time of Concentration	0.028 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	2,785.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.762 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.790 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: NW4+EXN4+NE4
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	80.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.54 ft/s
Segment Time of Concentration	0.041 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	2,760.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.756 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.796 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: NW5+EXN5+NE5
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	80.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.54 ft/s
Segment Time of Concentration	0.041 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	3,150.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.10 ft
Average Velocity	1.02 ft/s
Segment Time of Concentration	0.860 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.901 hours

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:
Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: NW7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	80.00 ft
Manning's n	0.150
Slope	0.310 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.53 ft/s
Segment Time of Concentration	0.042 hours

Segment #2: TR-55 Channel Flow	
Flow Area	6.3 ft²
Hydraulic Length	1,360.00 ft
Manning's n	0.040
Slope	0.001 ft/ft
Wetted Perimeter	9.95 ft
Average Velocity	0.61 ft/s
Segment Time of Concentration	0.616 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.658 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: Pond Area
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.083 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

Subsection: Time of Concentration Calculations
Label: Pond Area
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

==== User Defined

Tc =	Value entered by user
Where:	Tc= Time of concentration, hours

Subsection: Time of Concentration Calculations
Label: SE
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.150
Slope	0.030 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.22 ft/s
Segment Time of Concentration	0.127 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	1,870.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.512 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	250.00 ft
Is Paved?	False
Slope	0.030 ft/ft
Average Velocity	2.79 ft/s
Segment Time of Concentration	0.025 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.664 hours

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:
Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: SE3
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	50.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.50 ft/s
Segment Time of Concentration	0.028 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	1,520.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.416 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.444 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: SE4+EXS4+SW4
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	80.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.54 ft/s
Segment Time of Concentration	0.041 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	1,380.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.378 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.419 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: SE7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	80.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.54 ft/s
Segment Time of Concentration	0.041 hours

Segment #2: TR-55 Channel Flow	
Flow Area	27.0 ft²
Hydraulic Length	1,480.00 ft
Manning's n	0.040
Slope	0.001 ft/ft
Wetted Perimeter	22.98 ft
Average Velocity	0.93 ft/s
Segment Time of Concentration	0.443 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.484 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: SW
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.150
Slope	0.030 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.22 ft/s
Segment Time of Concentration	0.127 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	1,900.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.520 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	620.00 ft
Is Paved?	False
Slope	0.030 ft/ft
Average Velocity	2.79 ft/s
Segment Time of Concentration	0.062 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.709 hours

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:
Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: SW3
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	50.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.50 ft/s
Segment Time of Concentration	0.028 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	1,580.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.433 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.461 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: SW5+EXS5+SE5
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	80.00 ft
Manning's n	0.150
Slope	0.005 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.10 ft/s
Segment Time of Concentration	0.218 hours

Segment #2: TR-55 Channel Flow	
Flow Area	10.0 ft²
Hydraulic Length	1,690.00 ft
Manning's n	0.065
Slope	0.005 ft/ft
Wetted Perimeter	20.19 ft
Average Velocity	1.01 ft/s
Segment Time of Concentration	0.463 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.681 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Time of Concentration Calculations
Label: SW7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	80.00 ft
Manning's n	0.150
Slope	0.330 ft/ft
2 Year 24 Hour Depth	3.8 in
Average Velocity	0.54 ft/s
Segment Time of Concentration	0.041 hours

Segment #2: TR-55 Channel Flow	
Flow Area	27.0 ft²
Hydraulic Length	1,580.00 ft
Manning's n	0.040
Slope	0.001 ft/ft
Wetted Perimeter	22.98 ft
Average Velocity	0.93 ft/s
Segment Time of Concentration	0.473 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.514 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp
	V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n
	(Lf / V) / 3600
Where:	R= Hydraulic radius
	Aq= Flow area, square feet
	Wp= Wetted perimeter, feet
	V= Velocity, ft/sec
	Sf= Slope, ft/ft
	n= Manning's n
	Tc= Time of concentration, hours
	Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours
	n= Manning's n
	Lf= Flow length, feet
	P= 2yr, 24hr Rain depth, inches
	Sf= Slope, %

Subsection: Runoff CN-Area
Label: EX-N6
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	3.890	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	3.890	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: EX-N7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	2.560	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	2.560	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: EX-S6
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	1.820	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	1.820	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: EX-S7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	4.040	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	4.040	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: NE
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	15.930	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	15.930	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: NE3
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	4.180	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	4.180	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: NE7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	16.180	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	16.180	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: NW
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	20.960	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	20.960	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: NW3
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	4.190	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	4.190	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: NW4+EXN4+NE4
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	11.220	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	11.220	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: NW5+EXN5+NE5
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	12.080	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	12.080	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: NW7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	15.360	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	15.360	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: Pond Area
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	98.000	21.500	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	21.500	(N/A)	(N/A)	98.000

Subsection: Runoff CN-Area
Label: SE
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	27.520	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	27.520	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: SE3
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	2.380	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	2.380	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: SE4+EXS4+SW4
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	7.060	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	7.060	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: SE7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	5.840	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	5.840	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: SW
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	30.660	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	30.660	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: SW3
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	2.190	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	2.190	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: SW5+EXS5+SE5
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	6.400	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	6.400	(N/A)	(N/A)	79.000

Subsection: Runoff CN-Area
Label: SW7
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
	79.000	6.520	0.0	0.0	79.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	6.520	(N/A)	(N/A)	79.000

Subsection: Elevation-Area Volume Curve
Label: Pond 1D2B2
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Elevation (ft)	Planimeter (ft^2)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
71.50	0.0	4.000	0.000	0.000	0.000
72.00	0.0	15.910	27.887	4.648	4.648
83.00	0.0	19.700	53.314	195.484	200.132

Pond Volume Equations
*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Subsection: Outlet Input Data
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Requested Pond Water Surface Elevations	
Minimum (Headwater)	71.50 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	83.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Inlet Box	R1	Forward	C0	79.15	83.00
Orifice-Circular	O0	Forward + Reverse	C0	75.50	83.00
Culvert-Circular	C0	Forward + Reverse	TW	73.50	83.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Structure ID: C0 Structure Type: Culvert-Circular	
Number of Barrels	2
Diameter	30.0 in
Length	300.00 ft
Length (Computed Barrel)	300.00 ft
Slope (Computed)	0.003 ft/ft

Outlet Control Data	
Manning's n	0.012
Ke	0.500
Kb	0.008
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0098
M	2.0000
C	0.0398
Y	0.6700
T1 ratio (HW/D)	1.159
T2 ratio (HW/D)	1.305
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	76.40 ft	T1 Flow	27.16 ft³/s
T2 Elevation	76.76 ft	T2 Flow	31.05 ft³/s

Structure ID: R1 Structure Type: Inlet Box	
Number of Openings	1
Elevation	79.15 ft
Orifice Area	79.0 ft²
Orifice Coefficient	0.600
Weir Length	28.00 ft
Weir Coefficient	3.30 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

Structure ID: O0 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	75.50 ft
Orifice Diameter	13.5 in
Orifice Coefficient	0.600

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
EX-N6	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	1.546	12.215	15.13
EX-N7	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	1.017	12.170	10.84
EX-S6	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	0.723	12.180	7.54
EX-S7	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	1.605	12.220	15.63
NE	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	6.329	12.340	51.78
NE3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	1.661	12.465	11.76
NE7	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	6.429	12.310	54.66
NW	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	8.328	12.585	52.27
NW3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	1.665	12.530	11.03
NW4+EXN4+NE4	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	4.458	12.535	29.43
NW5+EXN5+NE5	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	4.800	12.600	29.71
NW7	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	6.103	12.445	44.23

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Pond Area	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	12.471	12.100	130.44
SE	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	10.934	12.450	78.88
SE3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	0.946	12.305	8.12
SE4+EXS4+SW4	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	2.805	12.285	24.66
SE7	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	2.320	12.330	19.24
SW	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	12.182	12.480	85.18
SW3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	0.870	12.315	7.37
SW5+EXS5+SE5	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	2.543	12.460	18.13
SW7	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	2.590	12.350	20.95

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
E-1	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	20.233	12.610	100.15

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
J-NE	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	6.329	12.340	51.78
J-NE3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	1.661	12.465	11.76
J-NW	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	8.328	12.585	52.27
J-NW3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	1.665	12.530	11.03
J-NW4+EXN4+NE4	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	4.458	12.535	29.43
J-NW5+EXN5+NE5	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	4.800	12.600	29.71
J-SE	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	10.934	12.450	78.88
J-SE3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	0.946	12.305	8.12
J-SE4+EXS4+SW4	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	2.805	12.285	24.66
J-SW	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	12.182	12.480	85.18
J-SW3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	0.870	12.315	7.37
J-SW5+EXS5+SE5	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	2.543	12.460	18.13

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
NE-1	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	12.790	12.410	87.41
NE-2	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	13.807	12.510	86.64
NE-3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	13.807	12.575	85.43
NW-1	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	14.450	12.565	92.50
NW-2	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	15.996	12.655	93.15
NW-3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	15.996	12.765	89.97
Out 20	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	40.034	18.725	30.84
SE-1	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	0.723	12.180	7.54
SE-2	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	23.270	12.880	99.09
SE-3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	22.549	12.785	98.18
SE-4	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	22.549	12.785	98.18
SE-5	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	53.549	12.560	293.36

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
SE-6	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	30.279	12.435	215.61
SW-1	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	1.605	12.220	15.63
SW-2	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	26.285	13.105	102.76
SW-3	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	24.682	13.040	99.78
SW-4	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	24.682	13.040	99.78
SW-5	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	26.285	13.105	102.76
SW-7	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	79.827	12.795	350.02
SW-8	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	79.823	12.930	340.97
W-1	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	22.096	12.850	101.80

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pond 1D2B2 (IN)	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	92.294	12.920	354.47	(N/A)	(N/A)
Pond 1D2B2 (OUT)	Cross - Berkley County (North) - Synthetic Curve, 25 yrs	25	40.034	18.725	30.84	79.53	133.986

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Time-Depth Curve
Return Event: 25 years
Label: Cross - Berkley County (North)
Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Time-Depth Curve: TypeIII 24hr (7.2 in)	
Label	TypeIII 24hr (7.2 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.3
3.500	0.3	0.3	0.3	0.3	0.3
4.000	0.3	0.3	0.3	0.3	0.3
4.500	0.4	0.4	0.4	0.4	0.4
5.000	0.4	0.4	0.4	0.4	0.5
5.500	0.5	0.5	0.5	0.5	0.5
6.000	0.5	0.5	0.5	0.6	0.6
6.500	0.6	0.6	0.6	0.6	0.6
7.000	0.7	0.7	0.7	0.7	0.7
7.500	0.7	0.7	0.8	0.8	0.8
8.000	0.8	0.8	0.9	0.9	0.9
8.500	0.9	0.9	1.0	1.0	1.0
9.000	1.0	1.1	1.1	1.1	1.2
9.500	1.2	1.2	1.3	1.3	1.3
10.000	1.4	1.4	1.4	1.5	1.5
10.500	1.6	1.6	1.7	1.7	1.7
11.000	1.8	1.9	1.9	2.0	2.1
11.500	2.1	2.3	2.4	2.7	3.0
12.000	3.6	4.2	4.5	4.8	4.9
12.500	5.1	5.1	5.2	5.3	5.3
13.000	5.4	5.5	5.5	5.5	5.6
13.500	5.6	5.7	5.7	5.8	5.8
14.000	5.8	5.9	5.9	5.9	6.0
14.500	6.0	6.0	6.1	6.1	6.1
15.000	6.2	6.2	6.2	6.2	6.3
15.500	6.3	6.3	6.3	6.3	6.4
16.000	6.4	6.4	6.4	6.4	6.5

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Time-Depth Curve
Return Event: 25 years
Label: Cross - Berkley County (North)
Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	6.5	6.5	6.5	6.5	6.5
17.000	6.5	6.6	6.6	6.6	6.6
17.500	6.6	6.6	6.6	6.7	6.7
18.000	6.7	6.7	6.7	6.7	6.7
18.500	6.7	6.7	6.8	6.8	6.8
19.000	6.8	6.8	6.8	6.8	6.8
19.500	6.8	6.9	6.9	6.9	6.9
20.000	6.9	6.9	6.9	6.9	6.9
20.500	6.9	6.9	7.0	7.0	7.0
21.000	7.0	7.0	7.0	7.0	7.0
21.500	7.0	7.0	7.0	7.0	7.1
22.000	7.1	7.1	7.1	7.1	7.1
22.500	7.1	7.1	7.1	7.1	7.1
23.000	7.1	7.1	7.1	7.2	7.2
23.500	7.2	7.2	7.2	7.2	7.2
24.000	7.2	(N/A)	(N/A)	(N/A)	(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHE1 (CH-E1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	79.46 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
79.46	0.0	0.00	0.00	0.0	0.00	0.00	0.0
79.47	0.1	0.01	0.04	0.1	13.56	13.56	0.1
79.52	0.7	0.10	0.13	0.8	13.86	13.88	0.7
79.58	1.4	0.33	0.20	1.7	14.22	14.26	1.4
79.64	2.2	0.65	0.26	2.5	14.58	14.64	2.1
79.70	2.9	1.06	0.31	3.4	14.94	15.02	2.7
79.76	3.6	1.54	0.36	4.3	15.30	15.40	3.4
79.82	4.3	2.09	0.40	5.2	15.66	15.78	4.0
79.88	5.0	2.72	0.44	6.2	16.02	16.16	4.6
79.94	5.8	3.41	0.48	7.2	16.38	16.54	5.3
80.00	6.5	4.17	0.51	8.2	16.74	16.92	5.9
80.06	7.2	5.00	0.54	9.2	17.10	17.29	6.4
80.12	7.9	5.89	0.58	10.2	17.46	17.67	7.0
80.18	8.6	6.84	0.61	11.3	17.82	18.05	7.6
80.24	9.4	7.86	0.64	12.4	18.18	18.43	8.2
80.30	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.36	10.8	10.08	0.69	14.6	18.90	19.19	9.3
80.42	11.5	11.29	0.72	15.7	19.26	19.57	9.8
80.48	12.2	12.56	0.74	16.9	19.62	19.95	10.3
80.54	13.0	13.89	0.77	18.1	19.98	20.33	10.9
80.60	13.7	15.28	0.79	19.3	20.34	20.71	11.4
80.66	14.4	16.74	0.82	20.5	20.70	21.09	11.9
80.72	15.1	18.26	0.84	21.8	21.06	21.47	12.4
80.78	15.8	19.84	0.86	23.0	21.42	21.85	12.9
80.84	16.6	21.48	0.88	24.3	21.78	22.23	13.4
80.90	17.3	23.19	0.90	25.7	22.14	22.61	13.9
80.96	18.0	24.97	0.92	27.0	22.50	22.99	14.4
81.02	18.7	26.81	0.95	28.4	22.86	23.37	14.9
81.08	19.4	28.71	0.97	29.7	23.22	23.75	15.4
81.14	20.2	30.68	0.98	31.1	23.58	24.13	15.9

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHE1 (CH-E1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.20	20.9	32.71	1.00	32.6	23.94	24.50	16.3	0.000
81.26	21.6	34.81	1.02	34.0	24.30	24.88	16.8	0.068
81.32	22.3	36.97	1.04	35.5	24.66	25.26	17.3	0.091
81.38	23.0	39.21	1.06	37.0	25.02	25.64	17.7	0.102
81.44	23.8	41.51	1.08	38.5	25.38	26.02	18.2	0.109
81.50	24.5	43.87	1.10	40.0	25.74	26.40	18.7	0.114
81.56	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.118
81.62	25.9	48.81	1.13	43.2	26.46	27.16	19.6	0.121
81.68	26.6	51.39	1.15	44.8	26.82	27.54	20.0	0.124
81.74	27.4	54.03	1.17	46.4	27.18	27.92	20.5	0.127
81.80	28.1	56.74	1.18	48.0	27.54	28.30	20.9	0.129
81.86	28.8	59.52	1.20	49.7	27.90	28.68	21.4	0.131
81.92	29.5	62.38	1.21	51.4	28.26	29.06	21.8	0.133
81.98	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.135
82.04	31.0	68.30	1.25	54.8	28.98	29.82	22.7	
82.10	31.7	71.36	1.26	56.5	29.34	30.20	23.1	
82.16	32.4	74.51	1.28	58.3	29.70	30.58	23.6	
82.22	33.1	77.72	1.29	60.1	30.06	30.96	24.0	
82.28	33.8	81.01	1.31	61.9	30.42	31.34	24.4	
82.34	34.6	84.37	1.32	63.8	30.78	31.71	24.9	
82.40	35.3	87.81	1.34	65.6	31.14	32.09	25.3	
82.46	36.0	91.32	1.35	67.5	31.50	32.47	25.7	
82.50	36.5	93.71	1.36	68.8	31.74	32.73	26.0	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHE1 (CH-E1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.136
0.137
0.139
0.140
0.141
0.142
0.143
0.144
0.145
0.146
0.147
0.148
0.149
0.150
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0.161
0.162
0.162
0.163
0.163
0.163

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHE2 (CH-E2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	78.77 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
78.77	0.0	0.00	0.00	0.0	0.00	0.00	0.0
78.78	0.1	0.01	0.04	0.1	13.56	13.56	0.1
78.84	0.8	0.13	0.14	1.0	13.92	13.94	0.8
78.91	1.7	0.43	0.22	1.9	14.34	14.39	1.6
78.98	2.5	0.84	0.28	3.0	14.76	14.83	2.4
79.05	3.4	1.37	0.34	4.0	15.18	15.27	3.2
79.12	4.2	2.00	0.39	5.1	15.60	15.71	3.9
79.19	5.0	2.72	0.44	6.2	16.02	16.16	4.6
79.26	5.9	3.54	0.48	7.3	16.44	16.60	5.4
79.33	6.7	4.44	0.52	8.5	16.86	17.04	6.1
79.40	7.6	5.44	0.56	9.7	17.28	17.48	6.7
79.47	8.4	6.52	0.60	10.9	17.70	17.93	7.4
79.54	9.2	7.69	0.63	12.2	18.12	18.37	8.1
79.61	10.1	8.94	0.66	13.5	18.54	18.81	8.7
79.68	10.9	10.28	0.70	14.8	18.96	19.26	9.3
79.75	11.8	11.70	0.73	16.1	19.38	19.70	10.0
79.82	12.6	13.21	0.76	17.5	19.80	20.14	10.6
79.89	13.4	14.81	0.78	18.9	20.22	20.58	11.2
79.96	14.3	16.49	0.81	20.3	20.64	21.03	11.8
80.03	15.1	18.26	0.84	21.8	21.06	21.47	12.4
80.10	16.0	20.11	0.86	23.3	21.48	21.91	13.0
80.17	16.8	22.05	0.89	24.8	21.90	22.35	13.6
80.24	17.6	24.07	0.91	26.3	22.32	22.80	14.2
80.31	18.5	26.19	0.94	27.9	22.74	23.24	14.7
80.38	19.3	28.39	0.96	29.5	23.16	23.68	15.3
80.45	20.2	30.68	0.98	31.1	23.58	24.13	15.9
80.52	21.0	33.06	1.01	32.8	24.00	24.57	16.4
80.59	21.8	35.52	1.03	34.5	24.42	25.01	17.0
80.66	22.7	38.08	1.05	36.2	24.84	25.45	17.5
80.73	23.5	40.73	1.07	38.0	25.26	25.90	18.0

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHE2 (CH-E2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.80	24.4	43.48	1.09	39.8	25.68	26.34	18.6	0.000
80.87	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.068
80.94	26.0	49.24	1.13	43.4	26.52	27.22	19.6	0.094
81.01	26.9	52.26	1.15	45.3	26.94	27.67	20.2	0.105
81.08	27.7	55.38	1.17	47.2	27.36	28.11	20.7	0.112
81.15	28.6	58.59	1.19	49.1	27.78	28.55	21.2	0.117
81.22	29.4	61.90	1.21	51.1	28.20	29.00	21.7	0.121
81.29	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.124
81.36	31.1	68.80	1.25	55.1	29.04	29.88	22.8	0.127
81.43	31.9	72.40	1.27	57.1	29.46	30.32	23.3	0.130
81.50	32.8	76.10	1.29	59.2	29.88	30.77	23.8	0.132
81.57	33.6	79.90	1.30	61.3	30.30	31.21	24.3	
81.64	34.4	83.81	1.32	63.5	30.72	31.65	24.8	
81.71	35.3	87.81	1.34	65.6	31.14	32.09	25.3	
81.78	36.1	91.91	1.36	67.8	31.56	32.54	25.8	
81.85	37.0	96.12	1.37	70.0	31.98	32.98	26.3	
81.92	37.8	100.43	1.39	72.3	32.40	33.42	26.8	
81.99	38.6	104.85	1.41	74.6	32.82	33.87	27.3	
82.06	39.5	109.37	1.42	76.9	33.24	34.31	27.8	
82.13	40.3	114.00	1.44	79.2	33.66	34.75	28.2	
82.20	41.2	118.74	1.46	81.6	34.08	35.19	28.7	
82.27	42.0	123.58	1.47	84.0	34.50	35.64	29.2	
82.34	42.8	128.54	1.49	86.4	34.92	36.08	29.7	
82.41	43.7	133.60	1.50	88.9	35.34	36.52	30.2	
82.48	44.5	138.77	1.52	91.4	35.76	36.96	30.7	
82.50	44.8	140.27	1.52	92.1	35.88	37.09	30.8	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years
Label: CHE2 (CH-E2) Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.134
0.136
0.137
0.139
0.140
0.142
0.143
0.144
0.145
0.146
0.147
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0.164
0.164
0.165
0.165
0.166

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHE2 (CH-E2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.166
0.167
0.167
0.167
0.168

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNE1 (CH-NE1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	80.00 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
80.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
80.01	0.1	0.01	0.04	0.1	13.56	13.56	0.1
80.06	0.7	0.10	0.13	0.8	13.86	13.88	0.7
80.12	1.4	0.33	0.20	1.7	14.22	14.26	1.4
80.18	2.2	0.65	0.26	2.5	14.58	14.64	2.1
80.24	2.9	1.06	0.31	3.4	14.94	15.02	2.7
80.30	3.6	1.54	0.36	4.3	15.30	15.40	3.4
80.36	4.3	2.09	0.40	5.2	15.66	15.78	4.0
80.42	5.0	2.72	0.44	6.2	16.02	16.16	4.6
80.48	5.8	3.41	0.48	7.2	16.38	16.54	5.3
80.54	6.5	4.17	0.51	8.2	16.74	16.92	5.9
80.60	7.2	5.00	0.54	9.2	17.10	17.29	6.4
80.66	7.9	5.89	0.58	10.2	17.46	17.67	7.0
80.72	8.6	6.84	0.61	11.3	17.82	18.05	7.6
80.78	9.4	7.86	0.64	12.4	18.18	18.43	8.2
80.84	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.90	10.8	10.08	0.69	14.6	18.90	19.19	9.3
80.96	11.5	11.29	0.72	15.7	19.26	19.57	9.8
81.02	12.2	12.56	0.74	16.9	19.62	19.95	10.3
81.08	13.0	13.89	0.77	18.1	19.98	20.33	10.9
81.14	13.7	15.28	0.79	19.3	20.34	20.71	11.4
81.20	14.4	16.74	0.82	20.5	20.70	21.09	11.9
81.26	15.1	18.26	0.84	21.8	21.06	21.47	12.4
81.32	15.8	19.84	0.86	23.0	21.42	21.85	12.9
81.38	16.6	21.48	0.88	24.3	21.78	22.23	13.4
81.44	17.3	23.19	0.90	25.7	22.14	22.61	13.9
81.50	18.0	24.97	0.92	27.0	22.50	22.99	14.4
81.56	18.7	26.81	0.95	28.4	22.86	23.37	14.9
81.62	19.4	28.71	0.97	29.7	23.22	23.75	15.4
81.68	20.2	30.68	0.98	31.1	23.58	24.13	15.9

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNE1 (CH-NE1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.74	20.9	32.71	1.00	32.6	23.94	24.50	16.3	0.000
81.80	21.6	34.81	1.02	34.0	24.30	24.88	16.8	0.068
81.86	22.3	36.97	1.04	35.5	24.66	25.26	17.3	0.091
81.92	23.0	39.21	1.06	37.0	25.02	25.64	17.7	0.102
81.98	23.8	41.51	1.08	38.5	25.38	26.02	18.2	0.109
82.04	24.5	43.87	1.10	40.0	25.74	26.40	18.7	0.114
82.10	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.118
82.16	25.9	48.81	1.13	43.2	26.46	27.16	19.6	0.121
82.22	26.6	51.39	1.15	44.8	26.82	27.54	20.0	0.124
82.28	27.4	54.03	1.17	46.4	27.18	27.92	20.5	0.127
82.34	28.1	56.74	1.18	48.0	27.54	28.30	20.9	0.129
82.40	28.8	59.52	1.20	49.7	27.90	28.68	21.4	0.131
82.46	29.5	62.38	1.21	51.4	28.26	29.06	21.8	0.133
82.52	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.135
82.58	31.0	68.30	1.25	54.8	28.98	29.82	22.7	0.136
82.64	31.7	71.36	1.26	56.5	29.34	30.20	23.1	
82.70	32.4	74.51	1.28	58.3	29.70	30.58	23.6	
82.76	33.1	77.72	1.29	60.1	30.06	30.96	24.0	
82.82	33.8	81.01	1.31	61.9	30.42	31.34	24.4	
82.88	34.6	84.37	1.32	63.8	30.78	31.71	24.9	
82.94	35.3	87.81	1.34	65.6	31.14	32.09	25.3	
83.00	36.0	91.32	1.35	67.5	31.50	32.47	25.7	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNE1 (CH-NE1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.137
0.139
0.140
0.141
0.142
0.143
0.144
0.145
0.146
0.147
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0.163

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNE2 (CH-NE2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	79.65 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
79.65	0.0	0.00	0.00	0.0	0.00	0.00	0.0
79.66	0.1	0.01	0.04	0.1	13.56	13.56	0.1
79.72	0.8	0.13	0.14	1.0	13.92	13.94	0.8
79.79	1.7	0.43	0.22	1.9	14.34	14.39	1.6
79.86	2.5	0.84	0.28	3.0	14.76	14.83	2.4
79.93	3.4	1.37	0.34	4.0	15.18	15.27	3.2
80.00	4.2	2.00	0.39	5.1	15.60	15.71	3.9
80.07	5.0	2.72	0.44	6.2	16.02	16.16	4.6
80.14	5.9	3.54	0.48	7.3	16.44	16.60	5.4
80.21	6.7	4.44	0.52	8.5	16.86	17.04	6.1
80.28	7.6	5.44	0.56	9.7	17.28	17.48	6.7
80.35	8.4	6.52	0.60	10.9	17.70	17.93	7.4
80.42	9.2	7.69	0.63	12.2	18.12	18.37	8.1
80.49	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.56	10.9	10.28	0.70	14.8	18.96	19.26	9.3
80.63	11.8	11.70	0.73	16.1	19.38	19.70	10.0
80.70	12.6	13.21	0.76	17.5	19.80	20.14	10.6
80.77	13.4	14.81	0.78	18.9	20.22	20.58	11.2
80.84	14.3	16.49	0.81	20.3	20.64	21.03	11.8
80.91	15.1	18.26	0.84	21.8	21.06	21.47	12.4
80.98	16.0	20.11	0.86	23.3	21.48	21.91	13.0
81.05	16.8	22.05	0.89	24.8	21.90	22.35	13.6
81.12	17.6	24.07	0.91	26.3	22.32	22.80	14.2
81.19	18.5	26.19	0.94	27.9	22.74	23.24	14.7
81.26	19.3	28.39	0.96	29.5	23.16	23.68	15.3
81.33	20.2	30.68	0.98	31.1	23.58	24.13	15.9
81.40	21.0	33.06	1.01	32.8	24.00	24.57	16.4
81.47	21.8	35.52	1.03	34.5	24.42	25.01	17.0
81.54	22.7	38.08	1.05	36.2	24.84	25.45	17.5
81.61	23.5	40.73	1.07	38.0	25.26	25.90	18.0

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNE2 (CH-NE2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.68	24.4	43.48	1.09	39.8	25.68	26.34	18.6	0.000
81.75	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.068
81.82	26.0	49.24	1.13	43.4	26.52	27.22	19.6	0.094
81.89	26.9	52.26	1.15	45.3	26.94	27.67	20.2	0.105
81.96	27.7	55.38	1.17	47.2	27.36	28.11	20.7	0.112
82.03	28.6	58.59	1.19	49.1	27.78	28.55	21.2	0.117
82.10	29.4	61.90	1.21	51.1	28.20	29.00	21.7	0.121
82.17	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.124
82.24	31.1	68.80	1.25	55.1	29.04	29.88	22.8	0.127
82.31	31.9	72.40	1.27	57.1	29.46	30.32	23.3	0.130
82.38	32.8	76.10	1.29	59.2	29.88	30.77	23.8	0.132
82.45	33.6	79.90	1.30	61.3	30.30	31.21	24.3	0.134
82.52	34.4	83.81	1.32	63.5	30.72	31.65	24.8	0.136
82.59	35.3	87.81	1.34	65.6	31.14	32.09	25.3	0.137
82.66	36.1	91.91	1.36	67.8	31.56	32.54	25.8	0.139
82.73	37.0	96.12	1.37	70.0	31.98	32.98	26.3	0.140
82.80	37.8	100.43	1.39	72.3	32.40	33.42	26.8	0.142
82.87	38.6	104.85	1.41	74.6	32.82	33.87	27.3	
82.94	39.5	109.37	1.42	76.9	33.24	34.31	27.8	
83.00	40.2	113.34	1.44	78.9	33.60	34.69	28.2	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNE2 (CH-NE2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.143
0.144
0.145
0.146
0.147
0.148
0.149
0.150
0.151
0.152
0.153
0.153
0.154
0.155
0.156
0.156
0.157
0.158
0.158
0.159
0.159
0.160
0.160
0.161
0.161
0.162
0.163
0.163
0.163
0.164
0.164
0.165
0.165

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNW1 (CH-NW1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	80.00 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
80.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
80.01	0.1	0.01	0.04	0.1	13.56	13.56	0.1
80.06	0.7	0.10	0.13	0.8	13.86	13.88	0.7
80.12	1.4	0.33	0.20	1.7	14.22	14.26	1.4
80.18	2.2	0.65	0.26	2.5	14.58	14.64	2.1
80.24	2.9	1.06	0.31	3.4	14.94	15.02	2.7
80.30	3.6	1.54	0.36	4.3	15.30	15.40	3.4
80.36	4.3	2.09	0.40	5.2	15.66	15.78	4.0
80.42	5.0	2.72	0.44	6.2	16.02	16.16	4.6
80.48	5.8	3.41	0.48	7.2	16.38	16.54	5.3
80.54	6.5	4.17	0.51	8.2	16.74	16.92	5.9
80.60	7.2	5.00	0.54	9.2	17.10	17.29	6.4
80.66	7.9	5.89	0.58	10.2	17.46	17.67	7.0
80.72	8.6	6.84	0.61	11.3	17.82	18.05	7.6
80.78	9.4	7.86	0.64	12.4	18.18	18.43	8.2
80.84	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.90	10.8	10.08	0.69	14.6	18.90	19.19	9.3
80.96	11.5	11.29	0.72	15.7	19.26	19.57	9.8
81.02	12.2	12.56	0.74	16.9	19.62	19.95	10.3
81.08	13.0	13.89	0.77	18.1	19.98	20.33	10.9
81.14	13.7	15.28	0.79	19.3	20.34	20.71	11.4
81.20	14.4	16.74	0.82	20.5	20.70	21.09	11.9
81.26	15.1	18.26	0.84	21.8	21.06	21.47	12.4
81.32	15.8	19.84	0.86	23.0	21.42	21.85	12.9
81.38	16.6	21.48	0.88	24.3	21.78	22.23	13.4
81.44	17.3	23.19	0.90	25.7	22.14	22.61	13.9
81.50	18.0	24.97	0.92	27.0	22.50	22.99	14.4
81.56	18.7	26.81	0.95	28.4	22.86	23.37	14.9
81.62	19.4	28.71	0.97	29.7	23.22	23.75	15.4
81.68	20.2	30.68	0.98	31.1	23.58	24.13	15.9

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNW1 (CH-NW1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.74	20.9	32.71	1.00	32.6	23.94	24.50	16.3	0.000
81.80	21.6	34.81	1.02	34.0	24.30	24.88	16.8	0.068
81.86	22.3	36.97	1.04	35.5	24.66	25.26	17.3	0.091
81.92	23.0	39.21	1.06	37.0	25.02	25.64	17.7	0.102
81.98	23.8	41.51	1.08	38.5	25.38	26.02	18.2	0.109
82.04	24.5	43.87	1.10	40.0	25.74	26.40	18.7	0.114
82.10	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.118
82.16	25.9	48.81	1.13	43.2	26.46	27.16	19.6	0.121
82.22	26.6	51.39	1.15	44.8	26.82	27.54	20.0	0.124
82.28	27.4	54.03	1.17	46.4	27.18	27.92	20.5	0.127
82.34	28.1	56.74	1.18	48.0	27.54	28.30	20.9	0.129
82.40	28.8	59.52	1.20	49.7	27.90	28.68	21.4	0.131
82.46	29.5	62.38	1.21	51.4	28.26	29.06	21.8	0.133
82.52	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.135
82.58	31.0	68.30	1.25	54.8	28.98	29.82	22.7	0.136
82.64	31.7	71.36	1.26	56.5	29.34	30.20	23.1	
82.70	32.4	74.51	1.28	58.3	29.70	30.58	23.6	
82.76	33.1	77.72	1.29	60.1	30.06	30.96	24.0	
82.82	33.8	81.01	1.31	61.9	30.42	31.34	24.4	
82.88	34.6	84.37	1.32	63.8	30.78	31.71	24.9	
82.94	35.3	87.81	1.34	65.6	31.14	32.09	25.3	
83.00	36.0	91.32	1.35	67.5	31.50	32.47	25.7	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNW1 (CH-NW1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.137
0.139
0.140
0.141
0.142
0.143
0.144
0.145
0.146
0.147
0.148
0.149
0.150
0.150
0.151
0.152
0.152
0.153
0.154
0.154
0.155
0.156
0.156
0.157
0.157
0.158
0.158
0.159
0.159
0.160
0.160
0.161
0.161
0.162
0.162
0.163
0.163

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNW2 (CH-NW2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	79.63 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
79.63	0.0	0.00	0.00	0.0	0.00	0.00	0.0
79.64	0.1	0.01	0.04	0.1	13.56	13.56	0.1
79.70	0.8	0.13	0.14	1.0	13.92	13.94	0.8
79.77	1.7	0.43	0.22	1.9	14.34	14.39	1.6
79.84	2.5	0.84	0.28	3.0	14.76	14.83	2.4
79.91	3.4	1.37	0.34	4.0	15.18	15.27	3.2
79.98	4.2	2.00	0.39	5.1	15.60	15.71	3.9
80.05	5.0	2.72	0.44	6.2	16.02	16.16	4.6
80.12	5.9	3.54	0.48	7.3	16.44	16.60	5.4
80.19	6.7	4.44	0.52	8.5	16.86	17.04	6.1
80.26	7.6	5.44	0.56	9.7	17.28	17.48	6.7
80.33	8.4	6.52	0.60	10.9	17.70	17.93	7.4
80.40	9.2	7.69	0.63	12.2	18.12	18.37	8.1
80.47	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.54	10.9	10.28	0.70	14.8	18.96	19.26	9.3
80.61	11.8	11.70	0.73	16.1	19.38	19.70	10.0
80.68	12.6	13.21	0.76	17.5	19.80	20.14	10.6
80.75	13.4	14.81	0.78	18.9	20.22	20.58	11.2
80.82	14.3	16.49	0.81	20.3	20.64	21.03	11.8
80.89	15.1	18.26	0.84	21.8	21.06	21.47	12.4
80.96	16.0	20.11	0.86	23.3	21.48	21.91	13.0
81.03	16.8	22.05	0.89	24.8	21.90	22.35	13.6
81.10	17.6	24.07	0.91	26.3	22.32	22.80	14.2
81.17	18.5	26.19	0.94	27.9	22.74	23.24	14.7
81.24	19.3	28.39	0.96	29.5	23.16	23.68	15.3
81.31	20.2	30.68	0.98	31.1	23.58	24.13	15.9
81.38	21.0	33.06	1.01	32.8	24.00	24.57	16.4
81.45	21.8	35.52	1.03	34.5	24.42	25.01	17.0
81.52	22.7	38.08	1.05	36.2	24.84	25.45	17.5
81.59	23.5	40.73	1.07	38.0	25.26	25.90	18.0

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNW2 (CH-NW2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.66	24.4	43.48	1.09	39.8	25.68	26.34	18.6	0.000
81.73	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.068
81.80	26.0	49.24	1.13	43.4	26.52	27.22	19.6	0.094
81.87	26.9	52.26	1.15	45.3	26.94	27.67	20.2	0.105
81.94	27.7	55.38	1.17	47.2	27.36	28.11	20.7	0.112
82.01	28.6	58.59	1.19	49.1	27.78	28.55	21.2	0.117
82.08	29.4	61.90	1.21	51.1	28.20	29.00	21.7	0.121
82.15	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.124
82.22	31.1	68.80	1.25	55.1	29.04	29.88	22.8	0.127
82.29	31.9	72.40	1.27	57.1	29.46	30.32	23.3	0.130
82.36	32.8	76.10	1.29	59.2	29.88	30.77	23.8	0.132
82.43	33.6	79.90	1.30	61.3	30.30	31.21	24.3	0.134
82.50	34.4	83.81	1.32	63.5	30.72	31.65	24.8	0.136
82.57	35.3	87.81	1.34	65.6	31.14	32.09	25.3	0.137
82.64	36.1	91.91	1.36	67.8	31.56	32.54	25.8	0.139
82.71	37.0	96.12	1.37	70.0	31.98	32.98	26.3	0.140
82.78	37.8	100.43	1.39	72.3	32.40	33.42	26.8	
82.85	38.6	104.85	1.41	74.6	32.82	33.87	27.3	
82.92	39.5	109.37	1.42	76.9	33.24	34.31	27.8	
82.99	40.3	114.00	1.44	79.2	33.66	34.75	28.2	
83.00	40.4	114.67	1.44	79.6	33.72	34.81	28.3	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHNW2 (CH-NW2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.142
0.143
0.144
0.145
0.146
0.147
0.148
0.149
0.150
0.151
0.152
0.153
0.153
0.154
0.155
0.156
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0.164
0.164
0.165
0.165
0.165

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHS1 (CH-S1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	76.20 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
76.20	0.0	0.00	0.00	0.0	0.00	0.00	0.0
76.21	0.1	0.01	0.04	0.1	13.56	13.56	0.1
76.34	1.7	0.43	0.22	1.9	14.34	14.39	1.6
76.48	3.4	1.37	0.34	4.0	15.18	15.27	3.2
76.62	5.0	2.72	0.44	6.2	16.02	16.16	4.6
76.76	6.7	4.44	0.52	8.5	16.86	17.04	6.1
76.90	8.4	6.52	0.60	10.9	17.70	17.93	7.4
77.04	10.1	8.94	0.66	13.5	18.54	18.81	8.7
77.18	11.8	11.70	0.73	16.1	19.38	19.70	10.0
77.32	13.4	14.81	0.78	18.9	20.22	20.58	11.2
77.46	15.1	18.26	0.84	21.8	21.06	21.47	12.4
77.60	16.8	22.05	0.89	24.8	21.90	22.35	13.6
77.74	18.5	26.19	0.94	27.9	22.74	23.24	14.7
77.88	20.2	30.68	0.98	31.1	23.58	24.13	15.9
78.02	21.8	35.52	1.03	34.5	24.42	25.01	17.0
78.16	23.5	40.73	1.07	38.0	25.26	25.90	18.0
78.30	25.2	46.31	1.11	41.6	26.10	26.78	19.1
78.44	26.9	52.26	1.15	45.3	26.94	27.67	20.2
78.58	28.6	58.59	1.19	49.1	27.78	28.55	21.2
78.72	30.2	65.30	1.23	53.1	28.62	29.44	22.3
78.86	31.9	72.40	1.27	57.1	29.46	30.32	23.3
79.00	33.6	79.90	1.30	61.3	30.30	31.21	24.3
79.14	35.3	87.81	1.34	65.6	31.14	32.09	25.3
79.28	37.0	96.12	1.37	70.0	31.98	32.98	26.3
79.42	38.6	104.85	1.41	74.6	32.82	33.87	27.3
79.56	40.3	114.00	1.44	79.2	33.66	34.75	28.2
79.70	42.0	123.58	1.47	84.0	34.50	35.64	29.2
79.84	43.7	133.60	1.50	88.9	35.34	36.52	30.2
79.98	45.4	144.05	1.53	93.9	36.18	37.41	31.1
80.12	47.0	154.96	1.56	99.0	37.02	38.29	32.1

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHS1 (CH-S1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.26	48.7	166.31	1.60	104.3	37.86	39.18	33.0	0.000
80.40	50.4	178.13	1.62	109.6	38.70	40.06	34.0	0.068
80.54	52.1	190.41	1.65	115.1	39.54	40.95	34.9	0.105
80.68	53.8	203.17	1.68	120.7	40.38	41.83	35.9	0.117
80.82	55.4	216.40	1.71	126.4	41.22	42.72	36.8	0.124
80.96	57.1	230.12	1.74	132.2	42.06	43.60	37.7	0.130
81.10	58.8	244.33	1.77	138.2	42.90	44.49	38.7	0.134
81.24	60.5	259.04	1.80	144.2	43.74	45.38	39.6	0.137
81.38	62.2	274.25	1.82	150.4	44.58	46.26	40.5	0.140
81.52	63.8	289.97	1.85	156.7	45.42	47.15	41.4	0.143
81.66	65.5	306.21	1.88	163.1	46.26	48.03	42.3	0.145
81.80	67.2	322.97	1.90	169.7	47.10	48.92	43.2	0.147
81.94	68.9	340.26	1.93	176.3	47.94	49.80	44.1	0.149
82.08	70.6	358.08	1.96	183.1	48.78	50.69	45.0	0.151
82.22	72.2	376.43	1.98	190.0	49.62	51.57	45.9	0.153
82.36	73.9	395.34	2.01	197.0	50.46	52.46	46.8	0.154
82.50	75.6	414.80	2.03	204.1	51.30	53.34	47.7	
82.64	77.3	434.81	2.06	211.4	52.14	54.23	48.6	
82.78	79.0	455.39	2.08	218.7	52.98	55.12	49.5	
82.92	80.6	476.54	2.11	226.2	53.82	56.00	50.4	
83.00	81.6	488.88	2.12	230.5	54.30	56.51	50.9	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHS1 (CH-S1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.156
0.157
0.158
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Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHS2 (CH-S2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	75.91 ft
Bottom Width	13.00 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
75.91	0.0	0.00	0.00	0.0	0.00	0.00	0.0
75.92	0.1	0.01	0.04	0.1	13.06	13.06	0.1
76.05	1.7	0.41	0.22	1.9	13.84	13.89	1.6
76.19	3.4	1.32	0.34	3.9	14.68	14.77	3.2
76.33	5.0	2.62	0.44	6.0	15.52	15.66	4.6
76.47	6.7	4.28	0.52	8.2	16.36	16.54	6.0
76.61	8.4	6.29	0.60	10.6	17.20	17.43	7.4
76.75	10.1	8.63	0.66	13.0	18.04	18.31	8.7
76.89	11.8	11.31	0.72	15.6	18.88	19.20	9.9
77.03	13.4	14.32	0.78	18.3	19.72	20.08	11.2
77.17	15.1	17.66	0.84	21.1	20.56	20.97	12.3
77.31	16.8	21.34	0.89	24.1	21.40	21.85	13.5
77.45	18.5	25.36	0.93	27.1	22.24	22.74	14.6
77.59	20.2	29.72	0.98	30.3	23.08	23.63	15.8
77.73	21.8	34.44	1.02	33.6	23.92	24.51	16.9
77.87	23.5	39.51	1.07	37.0	24.76	25.40	17.9
78.01	25.2	44.94	1.11	40.5	25.60	26.28	19.0
78.15	26.9	50.74	1.15	44.2	26.44	27.17	20.0
78.29	28.6	56.91	1.19	47.9	27.28	28.05	21.1
78.43	30.2	63.46	1.22	51.8	28.12	28.94	22.1
78.57	31.9	70.39	1.26	55.8	28.96	29.82	23.1
78.71	33.6	77.72	1.30	59.9	29.80	30.71	24.1
78.85	35.3	85.44	1.33	64.2	30.64	31.59	25.1
78.99	37.0	93.57	1.37	68.5	31.48	32.48	26.1
79.13	38.6	102.11	1.40	73.0	32.32	33.37	27.1
79.27	40.3	111.07	1.43	77.5	33.16	34.25	28.1
79.41	42.0	120.45	1.46	82.3	34.00	35.14	29.0
79.55	43.7	130.26	1.50	87.1	34.84	36.02	30.0
79.69	45.4	140.51	1.53	92.0	35.68	36.91	30.9
79.83	47.0	151.20	1.56	97.1	36.52	37.79	31.9

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHS2 (CH-S2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
79.97	48.7	162.34	1.59	102.2	37.36	38.68	32.8	0.000
80.11	50.4	173.93	1.62	107.5	38.20	39.56	33.8	0.068
80.25	52.1	185.99	1.65	112.9	39.04	40.45	34.7	0.105
80.39	53.8	198.51	1.68	118.5	39.88	41.33	35.6	0.117
80.53	55.4	211.51	1.70	124.1	40.72	42.22	36.6	0.124
80.67	57.1	224.99	1.73	129.9	41.56	43.10	37.5	0.130
80.81	58.8	238.95	1.76	135.7	42.40	43.99	38.4	0.134
80.95	60.5	253.41	1.79	141.7	43.24	44.88	39.3	0.137
81.09	62.2	268.37	1.82	147.8	44.08	45.76	40.2	0.140
81.23	63.8	283.83	1.84	154.1	44.92	46.65	41.2	0.143
81.37	65.5	299.80	1.87	160.4	45.76	47.53	42.1	0.145
81.51	67.2	316.30	1.90	166.9	46.60	48.42	43.0	0.147
81.65	68.9	333.31	1.92	173.5	47.44	49.30	43.9	0.149
81.79	70.6	350.86	1.95	180.2	48.28	50.19	44.8	0.151
81.93	72.2	368.94	1.97	187.0	49.12	51.07	45.7	
82.07	73.9	387.56	2.00	193.9	49.96	51.96	46.6	
82.21	75.6	406.73	2.02	201.0	50.80	52.84	47.5	
82.35	77.3	426.45	2.05	208.1	51.64	53.73	48.4	
82.49	79.0	446.74	2.07	215.4	52.48	54.62	49.3	
82.63	80.6	467.58	2.10	222.8	53.32	55.50	50.2	
82.77	82.3	489.00	2.12	230.4	54.16	56.39	51.0	
82.91	84.0	511.00	2.15	238.0	55.00	57.27	51.9	
83.00	85.1	525.45	2.16	243.0	55.54	57.84	52.5	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHS2 (CH-S2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.152
0.154
0.155
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Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHS3 (CH-S3) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	77.42 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
77.42	0.0	0.00	0.00	0.0	0.00	0.00	0.0
77.43	0.1	0.01	0.04	0.1	13.56	13.56	0.1
77.53	1.3	0.29	0.19	1.5	14.16	14.20	1.3
77.64	2.6	0.91	0.29	3.1	14.82	14.89	2.5
77.75	4.0	1.81	0.38	4.8	15.48	15.59	3.7
77.86	5.3	2.94	0.45	6.5	16.14	16.28	4.8
77.97	6.6	4.31	0.52	8.3	16.80	16.98	6.0
78.08	7.9	5.89	0.58	10.2	17.46	17.67	7.0
78.19	9.2	7.69	0.63	12.2	18.12	18.37	8.1
78.30	10.6	9.70	0.68	14.2	18.78	19.07	9.1
78.41	11.9	11.91	0.73	16.3	19.44	19.76	10.1
78.52	13.2	14.34	0.78	18.5	20.10	20.46	11.0
78.63	14.5	16.99	0.82	20.7	20.76	21.15	12.0
78.74	15.8	19.84	0.86	23.0	21.42	21.85	12.9
78.85	17.2	22.90	0.90	25.4	22.08	22.54	13.8
78.96	18.5	26.19	0.94	27.9	22.74	23.24	14.7
79.07	19.8	29.68	0.98	30.4	23.40	23.94	15.6
79.18	21.1	33.40	1.01	33.1	24.06	24.63	16.5
79.29	22.4	37.34	1.04	35.7	24.72	25.33	17.3
79.40	23.8	41.51	1.08	38.5	25.38	26.02	18.2
79.51	25.1	45.90	1.11	41.3	26.04	26.72	19.0
79.62	26.4	50.52	1.14	44.2	26.70	27.41	19.9
79.73	27.7	55.38	1.17	47.2	27.36	28.11	20.7
79.84	29.0	60.47	1.20	50.2	28.02	28.81	21.5
79.95	30.4	65.79	1.23	53.4	28.68	29.50	22.3
80.06	31.7	71.36	1.26	56.5	29.34	30.20	23.1
80.17	33.0	77.18	1.29	59.8	30.00	30.89	23.9
80.28	34.3	83.24	1.32	63.1	30.66	31.59	24.7
80.39	35.6	89.56	1.35	66.6	31.32	32.28	25.5
80.50	37.0	96.12	1.37	70.0	31.98	32.98	26.3

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHS3 (CH-S3) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.61	38.3	102.95	1.40	73.6	32.64	33.68	27.1	0.000
80.72	39.6	110.03	1.42	77.2	33.30	34.37	27.8	0.068
80.83	40.9	117.38	1.45	80.9	33.96	35.07	28.6	0.101
80.94	42.2	124.99	1.48	84.7	34.62	35.76	29.4	0.113
81.05	43.6	132.87	1.50	88.5	35.28	36.46	30.1	0.120
81.16	44.9	141.02	1.53	92.5	35.94	37.15	30.9	0.125
81.27	46.2	149.45	1.55	96.4	36.60	37.85	31.6	0.129
81.38	47.5	158.16	1.57	100.5	37.26	38.55	32.4	0.133
81.49	48.8	167.14	1.60	104.6	37.92	39.24	33.1	0.136
81.60	50.2	176.41	1.62	108.8	38.58	39.94	33.9	0.138
81.71	51.5	185.97	1.64	113.1	39.24	40.63	34.6	0.141
81.82	52.8	195.82	1.67	117.5	39.90	41.33	35.3	0.143
81.93	54.1	205.97	1.69	121.9	40.56	42.02	36.1	0.145
82.04	55.4	216.40	1.71	126.4	41.22	42.72	36.8	0.146
82.15	56.8	227.14	1.73	131.0	41.88	43.42	37.5	
82.26	58.1	238.18	1.76	135.6	42.54	44.11	38.3	
82.37	59.4	249.53	1.78	140.3	43.20	44.81	39.0	
82.48	60.7	261.18	1.80	145.1	43.86	45.50	39.7	
82.59	62.0	273.15	1.82	150.0	44.52	46.20	40.4	
82.70	63.4	285.43	1.84	154.9	45.18	46.89	41.1	
82.81	64.7	298.03	1.86	159.9	45.84	47.59	41.9	
82.92	66.0	310.95	1.88	165.0	46.50	48.29	42.6	
83.00	67.0	320.54	1.90	168.7	46.98	48.79	43.1	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHS3 (CH-S3) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.148
0.149
0.151
0.152
0.153
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Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSE1 (CH-SE1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	77.45 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
77.45	0.0	0.00	0.00	0.0	0.00	0.00	0.0
77.46	0.1	0.01	0.04	0.1	13.56	13.56	0.1
77.56	1.3	0.29	0.19	1.5	14.16	14.20	1.3
77.67	2.6	0.91	0.29	3.1	14.82	14.89	2.5
77.78	4.0	1.81	0.38	4.8	15.48	15.59	3.7
77.89	5.3	2.94	0.45	6.5	16.14	16.28	4.8
78.00	6.6	4.31	0.52	8.3	16.80	16.98	6.0
78.11	7.9	5.89	0.58	10.2	17.46	17.67	7.0
78.22	9.2	7.69	0.63	12.2	18.12	18.37	8.1
78.33	10.6	9.70	0.68	14.2	18.78	19.07	9.1
78.44	11.9	11.91	0.73	16.3	19.44	19.76	10.1
78.55	13.2	14.34	0.78	18.5	20.10	20.46	11.0
78.66	14.5	16.99	0.82	20.7	20.76	21.15	12.0
78.77	15.8	19.84	0.86	23.0	21.42	21.85	12.9
78.88	17.2	22.90	0.90	25.4	22.08	22.54	13.8
78.99	18.5	26.19	0.94	27.9	22.74	23.24	14.7
79.10	19.8	29.68	0.98	30.4	23.40	23.94	15.6
79.21	21.1	33.40	1.01	33.1	24.06	24.63	16.5
79.32	22.4	37.34	1.04	35.7	24.72	25.33	17.3
79.43	23.8	41.51	1.08	38.5	25.38	26.02	18.2
79.54	25.1	45.90	1.11	41.3	26.04	26.72	19.0
79.65	26.4	50.52	1.14	44.2	26.70	27.41	19.9
79.76	27.7	55.38	1.17	47.2	27.36	28.11	20.7
79.87	29.0	60.47	1.20	50.2	28.02	28.81	21.5
79.98	30.4	65.79	1.23	53.4	28.68	29.50	22.3
80.09	31.7	71.36	1.26	56.5	29.34	30.20	23.1
80.20	33.0	77.18	1.29	59.8	30.00	30.89	23.9
80.31	34.3	83.24	1.32	63.1	30.66	31.59	24.7
80.42	35.6	89.56	1.35	66.6	31.32	32.28	25.5
80.53	37.0	96.12	1.37	70.0	31.98	32.98	26.3

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSE1 (CH-SE1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.64	38.3	102.95	1.40	73.6	32.64	33.68	27.1	0.000
80.75	39.6	110.03	1.42	77.2	33.30	34.37	27.8	0.068
80.86	40.9	117.38	1.45	80.9	33.96	35.07	28.6	0.101
80.97	42.2	124.99	1.48	84.7	34.62	35.76	29.4	0.113
81.08	43.6	132.87	1.50	88.5	35.28	36.46	30.1	0.120
81.19	44.9	141.02	1.53	92.5	35.94	37.15	30.9	0.125
81.30	46.2	149.45	1.55	96.4	36.60	37.85	31.6	0.129
81.41	47.5	158.16	1.57	100.5	37.26	38.55	32.4	0.133
81.52	48.8	167.14	1.60	104.6	37.92	39.24	33.1	0.136
81.63	50.2	176.41	1.62	108.8	38.58	39.94	33.9	0.138
81.74	51.5	185.97	1.64	113.1	39.24	40.63	34.6	0.141
81.85	52.8	195.82	1.67	117.5	39.90	41.33	35.3	0.143
81.96	54.1	205.97	1.69	121.9	40.56	42.02	36.1	0.145
82.07	55.4	216.40	1.71	126.4	41.22	42.72	36.8	0.146
82.18	56.8	227.14	1.73	131.0	41.88	43.42	37.5	
82.29	58.1	238.18	1.76	135.6	42.54	44.11	38.3	
82.40	59.4	249.53	1.78	140.3	43.20	44.81	39.0	
82.51	60.7	261.18	1.80	145.1	43.86	45.50	39.7	
82.62	62.0	273.15	1.82	150.0	44.52	46.20	40.4	
82.73	63.4	285.43	1.84	154.9	45.18	46.89	41.1	
82.84	64.7	298.03	1.86	159.9	45.84	47.59	41.9	
82.95	66.0	310.95	1.88	165.0	46.50	48.29	42.6	
83.00	66.6	316.92	1.89	167.3	46.80	48.60	42.9	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSE1 (CH-SE1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.148
0.149
0.151
0.152
0.153
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Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSE2 (CH-SE2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	75.61 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
75.61	0.0	0.00	0.00	0.0	0.00	0.00	0.0
75.62	0.1	0.01	0.04	0.1	13.56	13.56	0.1
75.76	1.8	0.48	0.23	2.1	14.40	14.45	1.7
75.91	3.6	1.54	0.36	4.3	15.30	15.40	3.4
76.06	5.4	3.06	0.46	6.7	16.20	16.35	5.0
76.21	7.2	5.00	0.54	9.2	17.10	17.29	6.4
76.36	9.0	7.34	0.62	11.8	18.00	18.24	7.9
76.51	10.8	10.08	0.69	14.6	18.90	19.19	9.3
76.66	12.6	13.21	0.76	17.5	19.80	20.14	10.6
76.81	14.4	16.74	0.82	20.5	20.70	21.09	11.9
76.96	16.2	20.65	0.87	23.7	21.60	22.04	13.2
77.11	18.0	24.97	0.92	27.0	22.50	22.99	14.4
77.26	19.8	29.68	0.98	30.4	23.40	23.94	15.6
77.41	21.6	34.81	1.02	34.0	24.30	24.88	16.8
77.56	23.4	40.35	1.07	37.7	25.20	25.83	18.0
77.71	25.2	46.31	1.11	41.6	26.10	26.78	19.1
77.86	27.0	52.70	1.16	45.6	27.00	27.73	20.3
78.01	28.8	59.52	1.20	49.7	27.90	28.68	21.4
78.16	30.6	66.79	1.24	53.9	28.80	29.63	22.5
78.31	32.4	74.51	1.28	58.3	29.70	30.58	23.6
78.46	34.2	82.68	1.32	62.8	30.60	31.52	24.6
78.61	36.0	91.32	1.35	67.5	31.50	32.47	25.7
78.76	37.8	100.43	1.39	72.3	32.40	33.42	26.8
78.91	39.6	110.03	1.42	77.2	33.30	34.37	27.8
79.06	41.4	120.11	1.46	82.3	34.20	35.32	28.9
79.21	43.2	130.69	1.49	87.5	35.10	36.27	29.9
79.36	45.0	141.78	1.53	92.8	36.00	37.22	30.9
79.51	46.8	153.37	1.56	98.3	36.90	38.17	32.0
79.66	48.6	165.49	1.59	103.9	37.80	39.11	33.0
79.81	50.4	178.13	1.62	109.6	38.70	40.06	34.0

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSE2 (CH-SE2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
79.96	52.2	191.31	1.66	115.5	39.60	41.01	35.0	0.000
80.11	54.0	205.03	1.69	121.5	40.50	41.96	36.0	0.068
80.26	55.8	219.30	1.72	127.6	41.40	42.91	37.0	0.106
80.41	57.6	234.13	1.75	133.9	42.30	43.86	38.0	0.118
80.56	59.4	249.53	1.78	140.3	43.20	44.81	39.0	0.126
80.71	61.2	265.50	1.81	146.9	44.10	45.76	40.0	0.131
80.86	63.0	282.05	1.84	153.6	45.00	46.70	41.0	0.135
81.01	64.8	299.19	1.87	160.4	45.90	47.65	41.9	0.139
81.16	66.6	316.92	1.89	167.3	46.80	48.60	42.9	0.142
81.31	68.4	335.26	1.92	174.4	47.70	49.55	43.9	0.144
81.46	70.2	354.21	1.95	181.6	48.60	50.50	44.9	0.147
81.61	72.0	373.78	1.98	189.0	49.50	51.45	45.8	0.149
81.76	73.8	393.97	2.01	196.5	50.40	52.40	46.8	0.151
81.91	75.6	414.80	2.03	204.1	51.30	53.34	47.7	0.152
82.06	77.4	436.26	2.06	211.9	52.20	54.29	48.7	0.154
82.21	79.2	458.37	2.09	219.8	53.10	55.24	49.7	
82.36	81.0	481.14	2.11	227.8	54.00	56.19	50.6	
82.51	82.8	504.57	2.14	236.0	54.90	57.14	51.6	
82.66	84.6	528.67	2.16	244.3	55.80	58.09	52.5	
82.81	86.4	553.44	2.19	252.7	56.70	59.04	53.5	
82.96	88.2	578.90	2.22	261.3	57.60	59.99	54.4	
83.00	88.7	585.80	2.22	263.6	57.84	60.24	54.7	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSE2 (CH-SE2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.156
0.157
0.158
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Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years
Label: CHSW1 (CH-SW1) Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	76.06 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
76.06	0.0	0.00	0.00	0.0	0.00	0.00	0.0
76.07	0.1	0.01	0.04	0.1	13.56	13.56	0.1
76.20	1.7	0.43	0.22	1.9	14.34	14.39	1.6
76.34	3.4	1.37	0.34	4.0	15.18	15.27	3.2
76.48	5.0	2.72	0.44	6.2	16.02	16.16	4.6
76.62	6.7	4.44	0.52	8.5	16.86	17.04	6.1
76.76	8.4	6.52	0.60	10.9	17.70	17.93	7.4
76.90	10.1	8.94	0.66	13.5	18.54	18.81	8.7
77.04	11.8	11.70	0.73	16.1	19.38	19.70	10.0
77.18	13.4	14.81	0.78	18.9	20.22	20.58	11.2
77.32	15.1	18.26	0.84	21.8	21.06	21.47	12.4
77.46	16.8	22.05	0.89	24.8	21.90	22.35	13.6
77.60	18.5	26.19	0.94	27.9	22.74	23.24	14.7
77.74	20.2	30.68	0.98	31.1	23.58	24.13	15.9
77.88	21.8	35.52	1.03	34.5	24.42	25.01	17.0
78.02	23.5	40.73	1.07	38.0	25.26	25.90	18.0
78.16	25.2	46.31	1.11	41.6	26.10	26.78	19.1
78.30	26.9	52.26	1.15	45.3	26.94	27.67	20.2
78.44	28.6	58.59	1.19	49.1	27.78	28.55	21.2
78.58	30.2	65.30	1.23	53.1	28.62	29.44	22.3
78.72	31.9	72.40	1.27	57.1	29.46	30.32	23.3
78.86	33.6	79.90	1.30	61.3	30.30	31.21	24.3
79.00	35.3	87.81	1.34	65.6	31.14	32.09	25.3
79.14	37.0	96.12	1.37	70.0	31.98	32.98	26.3
79.28	38.6	104.85	1.41	74.6	32.82	33.87	27.3
79.42	40.3	114.00	1.44	79.2	33.66	34.75	28.2
79.56	42.0	123.58	1.47	84.0	34.50	35.64	29.2
79.70	43.7	133.60	1.50	88.9	35.34	36.52	30.2
79.84	45.4	144.05	1.53	93.9	36.18	37.41	31.1
79.98	47.0	154.96	1.56	99.0	37.02	38.29	32.1

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSW1 (CH-SW1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.12	48.7	166.31	1.60	104.3	37.86	39.18	33.0	0.000
80.26	50.4	178.13	1.62	109.6	38.70	40.06	34.0	0.068
80.40	52.1	190.41	1.65	115.1	39.54	40.95	34.9	0.105
80.54	53.8	203.17	1.68	120.7	40.38	41.83	35.9	0.117
80.68	55.4	216.40	1.71	126.4	41.22	42.72	36.8	0.124
80.82	57.1	230.12	1.74	132.2	42.06	43.60	37.7	0.130
80.96	58.8	244.33	1.77	138.2	42.90	44.49	38.7	0.134
81.10	60.5	259.04	1.80	144.2	43.74	45.38	39.6	0.137
81.24	62.2	274.25	1.82	150.4	44.58	46.26	40.5	0.140
81.38	63.8	289.97	1.85	156.7	45.42	47.15	41.4	0.143
81.52	65.5	306.21	1.88	163.1	46.26	48.03	42.3	0.145
81.66	67.2	322.97	1.90	169.7	47.10	48.92	43.2	0.147
81.80	68.9	340.26	1.93	176.3	47.94	49.80	44.1	0.149
81.94	70.6	358.08	1.96	183.1	48.78	50.69	45.0	0.151
82.08	72.2	376.43	1.98	190.0	49.62	51.57	45.9	0.153
82.22	73.9	395.34	2.01	197.0	50.46	52.46	46.8	
82.36	75.6	414.80	2.03	204.1	51.30	53.34	47.7	
82.50	77.3	434.81	2.06	211.4	52.14	54.23	48.6	
82.64	79.0	455.39	2.08	218.7	52.98	55.12	49.5	
82.78	80.6	476.54	2.11	226.2	53.82	56.00	50.4	
82.92	82.3	498.26	2.13	233.8	54.66	56.89	51.3	
83.00	83.3	510.93	2.15	238.2	55.14	57.39	51.8	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years
Label: CHSW1 (CH-SW1) Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.154
0.156
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Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years
Label: CHSW2 (CH-SW2) Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	75.35 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
75.35	0.0	0.00	0.00	0.0	0.00	0.00	0.0
75.36	0.1	0.01	0.04	0.1	13.56	13.56	0.1
75.50	1.8	0.48	0.23	2.1	14.40	14.45	1.7
75.65	3.6	1.54	0.36	4.3	15.30	15.40	3.4
75.80	5.4	3.06	0.46	6.7	16.20	16.35	5.0
75.95	7.2	5.00	0.54	9.2	17.10	17.29	6.4
76.10	9.0	7.34	0.62	11.8	18.00	18.24	7.9
76.25	10.8	10.08	0.69	14.6	18.90	19.19	9.3
76.40	12.6	13.21	0.76	17.5	19.80	20.14	10.6
76.55	14.4	16.74	0.82	20.5	20.70	21.09	11.9
76.70	16.2	20.65	0.87	23.7	21.60	22.04	13.2
76.85	18.0	24.97	0.92	27.0	22.50	22.99	14.4
77.00	19.8	29.68	0.98	30.4	23.40	23.94	15.6
77.15	21.6	34.81	1.02	34.0	24.30	24.88	16.8
77.30	23.4	40.35	1.07	37.7	25.20	25.83	18.0
77.45	25.2	46.31	1.11	41.6	26.10	26.78	19.1
77.60	27.0	52.70	1.16	45.6	27.00	27.73	20.3
77.75	28.8	59.52	1.20	49.7	27.90	28.68	21.4
77.90	30.6	66.79	1.24	53.9	28.80	29.63	22.5
78.05	32.4	74.51	1.28	58.3	29.70	30.58	23.6
78.20	34.2	82.68	1.32	62.8	30.60	31.52	24.6
78.35	36.0	91.32	1.35	67.5	31.50	32.47	25.7
78.50	37.8	100.43	1.39	72.3	32.40	33.42	26.8
78.65	39.6	110.03	1.42	77.2	33.30	34.37	27.8
78.80	41.4	120.11	1.46	82.3	34.20	35.32	28.9
78.95	43.2	130.69	1.49	87.5	35.10	36.27	29.9
79.10	45.0	141.78	1.53	92.8	36.00	37.22	30.9
79.25	46.8	153.37	1.56	98.3	36.90	38.17	32.0
79.40	48.6	165.49	1.59	103.9	37.80	39.11	33.0
79.55	50.4	178.13	1.62	109.6	38.70	40.06	34.0

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSW2 (CH-SW2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
79.70	52.2	191.31	1.66	115.5	39.60	41.01	35.0	0.000
79.85	54.0	205.03	1.69	121.5	40.50	41.96	36.0	0.068
80.00	55.8	219.30	1.72	127.6	41.40	42.91	37.0	0.106
80.15	57.6	234.13	1.75	133.9	42.30	43.86	38.0	0.118
80.30	59.4	249.53	1.78	140.3	43.20	44.81	39.0	0.126
80.45	61.2	265.50	1.81	146.9	44.10	45.76	40.0	0.131
80.60	63.0	282.05	1.84	153.6	45.00	46.70	41.0	0.135
80.75	64.8	299.19	1.87	160.4	45.90	47.65	41.9	0.139
80.90	66.6	316.92	1.89	167.3	46.80	48.60	42.9	0.142
81.05	68.4	335.26	1.92	174.4	47.70	49.55	43.9	0.144
81.20	70.2	354.21	1.95	181.6	48.60	50.50	44.9	0.147
81.35	72.0	373.78	1.98	189.0	49.50	51.45	45.8	0.149
81.50	73.8	393.97	2.01	196.5	50.40	52.40	46.8	0.151
81.65	75.6	414.80	2.03	204.1	51.30	53.34	47.7	0.152
81.80	77.4	436.26	2.06	211.9	52.20	54.29	48.7	
81.95	79.2	458.37	2.09	219.8	53.10	55.24	49.7	
82.10	81.0	481.14	2.11	227.8	54.00	56.19	50.6	
82.25	82.8	504.57	2.14	236.0	54.90	57.14	51.6	
82.40	84.6	528.67	2.16	244.3	55.80	58.09	52.5	
82.55	86.4	553.44	2.19	252.7	56.70	59.04	53.5	
82.70	88.2	578.90	2.22	261.3	57.60	59.99	54.4	
82.85	90.0	605.04	2.24	270.0	58.50	60.93	55.4	
83.00	91.8	631.89	2.27	278.8	59.40	61.88	56.3	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSW2 (CH-SW2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.154
0.156
0.157
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Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSW3 (CH-SW3) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	74.90 ft
Bottom Width	15.00 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
74.90	0.0	0.00	0.00	0.0	0.00	0.00	0.0
74.91	0.1	0.01	0.04	0.2	15.06	15.06	0.1
75.06	1.9	0.59	0.24	2.5	15.96	16.01	1.9
75.22	3.8	1.90	0.37	5.1	16.92	17.02	3.6
75.38	5.8	3.78	0.48	7.9	17.88	18.04	5.3
75.54	7.7	6.17	0.57	10.8	18.84	19.05	6.9
75.70	9.6	9.06	0.65	13.9	19.80	20.06	8.4
75.86	11.5	12.44	0.72	17.2	20.76	21.07	9.9
76.02	13.4	16.29	0.79	20.6	21.72	22.08	11.4
76.18	15.4	20.62	0.85	24.1	22.68	23.10	12.8
76.34	17.3	25.43	0.91	27.8	23.64	24.11	14.1
76.50	19.2	30.72	0.97	31.7	24.60	25.12	15.5
76.66	21.1	36.50	1.02	35.7	25.56	26.13	16.8
76.82	23.0	42.78	1.07	39.9	26.52	27.14	18.0
76.98	25.0	49.55	1.12	44.2	27.48	28.16	19.3
77.14	26.9	56.84	1.17	48.7	28.44	29.17	20.5
77.30	28.8	64.65	1.21	53.3	29.40	30.18	21.7
77.46	30.7	72.98	1.26	58.1	30.36	31.19	22.9
77.62	32.6	81.85	1.30	63.0	31.32	32.20	24.1
77.78	34.6	91.26	1.34	68.1	32.28	33.21	25.3
77.94	36.5	101.22	1.38	73.3	33.24	34.23	26.5
78.10	38.4	111.74	1.42	78.7	34.20	35.24	27.6
78.26	40.3	122.83	1.46	84.3	35.16	36.25	28.8
78.42	42.2	134.51	1.50	90.0	36.12	37.26	29.9
78.58	44.2	146.77	1.53	95.8	37.08	38.27	31.0
78.74	46.1	159.62	1.57	101.8	38.04	39.29	32.1
78.90	48.0	173.09	1.60	108.0	39.00	40.30	33.2
79.06	49.9	187.17	1.64	114.3	39.96	41.31	34.3
79.22	51.8	201.87	1.67	120.8	40.92	42.32	35.4
79.38	53.8	217.21	1.70	127.4	41.88	43.33	36.5

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSW3 (CH-SW3) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
79.54	55.7	233.19	1.74	134.2	42.84	44.35	37.6	0.000
79.70	57.6	249.82	1.77	141.1	43.80	45.36	38.7	0.068
79.86	59.5	267.12	1.80	148.2	44.76	46.37	39.7	0.107
80.02	61.4	285.08	1.83	155.4	45.72	47.38	40.8	0.119
80.18	63.4	303.72	1.87	162.8	46.68	48.39	41.9	0.127
80.34	65.3	323.05	1.90	170.4	47.64	49.41	42.9	0.133
80.50	67.2	343.08	1.93	178.1	48.60	50.42	44.0	0.137
80.66	69.1	363.81	1.96	185.9	49.56	51.43	45.0	0.140
80.82	71.0	385.25	1.99	193.9	50.52	52.44	46.1	0.144
80.98	73.0	407.42	2.02	202.1	51.48	53.45	47.1	0.146
81.14	74.9	430.32	2.05	210.4	52.44	54.47	48.1	0.149
81.30	76.8	453.96	2.07	218.9	53.40	55.48	49.2	0.151
81.46	78.7	478.35	2.10	227.5	54.36	56.49	50.2	0.153
81.62	80.6	503.50	2.13	236.3	55.32	57.50	51.3	0.154
81.78	82.6	529.41	2.16	245.2	56.28	58.51	52.3	
81.94	84.5	556.10	2.19	254.3	57.24	59.52	53.3	
82.10	86.4	583.57	2.21	263.5	58.20	60.54	54.3	
82.26	88.3	611.84	2.24	272.9	59.16	61.55	55.4	
82.42	90.2	640.90	2.27	282.5	60.12	62.56	56.4	
82.58	92.2	670.77	2.30	292.1	61.08	63.57	57.4	
82.74	94.1	701.46	2.32	302.0	62.04	64.58	58.4	
82.90	96.0	732.98	2.35	312.0	63.00	65.60	59.4	
83.00	97.2	753.10	2.37	318.3	63.60	66.23	60.1	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHSW3 (CH-SW3) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.156
0.157
0.159
0.160
0.162
0.163
0.164
0.165
0.166
0.167
0.168
0.169
0.170
0.171
0.171
0.172
0.173
0.174
0.175
0.175
0.176
0.177
0.177
0.178
0.179
0.179
0.180
0.181
0.181
0.182
0.182
0.183
0.183
0.184
0.185
0.185
0.186
0.186
0.186

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHW1 (CH-W1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	79.27 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
79.27	0.0	0.00	0.00	0.0	0.00	0.00	0.0
79.28	0.1	0.01	0.04	0.1	13.56	13.56	0.1
79.33	0.7	0.10	0.13	0.8	13.86	13.88	0.7
79.39	1.4	0.33	0.20	1.7	14.22	14.26	1.4
79.45	2.2	0.65	0.26	2.5	14.58	14.64	2.1
79.51	2.9	1.06	0.31	3.4	14.94	15.02	2.7
79.57	3.6	1.54	0.36	4.3	15.30	15.40	3.4
79.63	4.3	2.09	0.40	5.2	15.66	15.78	4.0
79.69	5.0	2.72	0.44	6.2	16.02	16.16	4.6
79.75	5.8	3.41	0.48	7.2	16.38	16.54	5.3
79.81	6.5	4.17	0.51	8.2	16.74	16.92	5.9
79.87	7.2	5.00	0.54	9.2	17.10	17.29	6.4
79.93	7.9	5.89	0.58	10.2	17.46	17.67	7.0
79.99	8.6	6.84	0.61	11.3	17.82	18.05	7.6
80.05	9.4	7.86	0.64	12.4	18.18	18.43	8.2
80.11	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.17	10.8	10.08	0.69	14.6	18.90	19.19	9.3
80.23	11.5	11.29	0.72	15.7	19.26	19.57	9.8
80.29	12.2	12.56	0.74	16.9	19.62	19.95	10.3
80.35	13.0	13.89	0.77	18.1	19.98	20.33	10.9
80.41	13.7	15.28	0.79	19.3	20.34	20.71	11.4
80.47	14.4	16.74	0.82	20.5	20.70	21.09	11.9
80.53	15.1	18.26	0.84	21.8	21.06	21.47	12.4
80.59	15.8	19.84	0.86	23.0	21.42	21.85	12.9
80.65	16.6	21.48	0.88	24.3	21.78	22.23	13.4
80.71	17.3	23.19	0.90	25.7	22.14	22.61	13.9
80.77	18.0	24.97	0.92	27.0	22.50	22.99	14.4
80.83	18.7	26.81	0.95	28.4	22.86	23.37	14.9
80.89	19.4	28.71	0.97	29.7	23.22	23.75	15.4
80.95	20.2	30.68	0.98	31.1	23.58	24.13	15.9

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHW1 (CH-W1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.01	20.9	32.71	1.00	32.6	23.94	24.50	16.3	0.000
81.07	21.6	34.81	1.02	34.0	24.30	24.88	16.8	0.068
81.13	22.3	36.97	1.04	35.5	24.66	25.26	17.3	0.091
81.19	23.0	39.21	1.06	37.0	25.02	25.64	17.7	0.102
81.25	23.8	41.51	1.08	38.5	25.38	26.02	18.2	0.109
81.31	24.5	43.87	1.10	40.0	25.74	26.40	18.7	0.114
81.37	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.118
81.43	25.9	48.81	1.13	43.2	26.46	27.16	19.6	0.121
81.49	26.6	51.39	1.15	44.8	26.82	27.54	20.0	0.124
81.55	27.4	54.03	1.17	46.4	27.18	27.92	20.5	0.127
81.61	28.1	56.74	1.18	48.0	27.54	28.30	20.9	0.129
81.67	28.8	59.52	1.20	49.7	27.90	28.68	21.4	
81.73	29.5	62.38	1.21	51.4	28.26	29.06	21.8	
81.79	30.2	65.30	1.23	53.1	28.62	29.44	22.3	
81.85	31.0	68.30	1.25	54.8	28.98	29.82	22.7	
81.91	31.7	71.36	1.26	56.5	29.34	30.20	23.1	
81.97	32.4	74.51	1.28	58.3	29.70	30.58	23.6	
82.03	33.1	77.72	1.29	60.1	30.06	30.96	24.0	
82.09	33.8	81.01	1.31	61.9	30.42	31.34	24.4	
82.15	34.6	84.37	1.32	63.8	30.78	31.71	24.9	
82.21	35.3	87.81	1.34	65.6	31.14	32.09	25.3	
82.27	36.0	91.32	1.35	67.5	31.50	32.47	25.7	
82.33	36.7	94.91	1.37	69.4	31.86	32.85	26.1	
82.39	37.4	98.57	1.38	71.3	32.22	33.23	26.6	
82.45	38.2	102.31	1.40	73.3	32.58	33.61	27.0	
82.50	38.8	105.49	1.41	74.9	32.88	33.93	27.3	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years
Label: CHW1 (CH-W1) Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.131
0.133
0.135
0.136
0.137
0.139
0.140
0.141
0.142
0.143
0.144
0.145
0.146
0.147
0.148
0.149
0.150
0.150
0.151
0.152
0.152
0.153
0.154
0.154
0.155
0.156
0.156
0.157
0.157
0.158
0.158
0.159
0.159
0.160
0.160
0.161
0.161
0.162
0.162
0.163

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHW1 (CH-W1) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.163
0.163
0.164
0.164
0.165

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years
Label: CHW2 (CH-W2) Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	77.83 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
77.83	0.0	0.00	0.00	0.0	0.00	0.00	0.0
77.84	0.1	0.01	0.04	0.1	13.56	13.56	0.1
77.92	1.1	0.20	0.16	1.2	14.04	14.07	1.1
78.01	2.2	0.65	0.26	2.5	14.58	14.64	2.1
78.10	3.2	1.29	0.33	3.9	15.12	15.21	3.1
78.19	4.3	2.09	0.40	5.2	15.66	15.78	4.0
78.28	5.4	3.06	0.46	6.7	16.20	16.35	5.0
78.37	6.5	4.17	0.51	8.2	16.74	16.92	5.9
78.46	7.6	5.44	0.56	9.7	17.28	17.48	6.7
78.55	8.6	6.84	0.61	11.3	17.82	18.05	7.6
78.64	9.7	8.39	0.65	12.9	18.36	18.62	8.4
78.73	10.8	10.08	0.69	14.6	18.90	19.19	9.3
78.82	11.9	11.91	0.73	16.3	19.44	19.76	10.1
78.91	13.0	13.89	0.77	18.1	19.98	20.33	10.9
79.00	14.0	16.00	0.80	19.9	20.52	20.90	11.6
79.09	15.1	18.26	0.84	21.8	21.06	21.47	12.4
79.18	16.2	20.65	0.87	23.7	21.60	22.04	13.2
79.27	17.3	23.19	0.90	25.7	22.14	22.61	13.9
79.36	18.4	25.88	0.93	27.7	22.68	23.18	14.6
79.45	19.4	28.71	0.97	29.7	23.22	23.75	15.4
79.54	20.5	31.68	0.99	31.9	23.76	24.31	16.1
79.63	21.6	34.81	1.02	34.0	24.30	24.88	16.8
79.72	22.7	38.08	1.05	36.2	24.84	25.45	17.5
79.81	23.8	41.51	1.08	38.5	25.38	26.02	18.2
79.90	24.8	45.08	1.10	40.8	25.92	26.59	18.9
79.99	25.9	48.81	1.13	43.2	26.46	27.16	19.6
80.08	27.0	52.70	1.16	45.6	27.00	27.73	20.3
80.17	28.1	56.74	1.18	48.0	27.54	28.30	20.9
80.26	29.2	60.94	1.21	50.5	28.08	28.87	21.6
80.35	30.2	65.30	1.23	53.1	28.62	29.44	22.3

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHW2 (CH-W2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.44	31.3	69.82	1.25	55.7	29.16	30.01	22.9	0.000
80.53	32.4	74.51	1.28	58.3	29.70	30.58	23.6	0.068
80.62	33.5	79.36	1.30	61.0	30.24	31.15	24.2	0.098
80.71	34.6	84.37	1.32	63.8	30.78	31.71	24.9	0.109
80.80	35.6	89.56	1.35	66.6	31.32	32.28	25.5	0.116
80.89	36.7	94.91	1.37	69.4	31.86	32.85	26.1	0.121
80.98	37.8	100.43	1.39	72.3	32.40	33.42	26.8	0.126
81.07	38.9	106.13	1.41	75.2	32.94	33.99	27.4	0.129
81.16	40.0	112.01	1.43	78.2	33.48	34.56	28.0	0.132
81.25	41.0	118.06	1.45	81.3	34.02	35.13	28.7	0.135
81.34	42.1	124.28	1.47	84.3	34.56	35.70	29.3	0.137
81.43	43.2	130.69	1.49	87.5	35.10	36.27	29.9	0.139
81.52	44.3	137.28	1.51	90.7	35.64	36.84	30.5	0.141
81.61	45.4	144.05	1.53	93.9	36.18	37.41	31.1	
81.70	46.4	151.01	1.55	97.2	36.72	37.98	31.8	
81.79	47.5	158.16	1.57	100.5	37.26	38.55	32.4	
81.88	48.6	165.49	1.59	103.9	37.80	39.11	33.0	
81.97	49.7	173.01	1.61	107.3	38.34	39.68	33.6	
82.06	50.8	180.72	1.63	110.8	38.88	40.25	34.2	
82.15	51.8	188.63	1.65	114.3	39.42	40.82	34.8	
82.24	52.9	196.73	1.67	117.9	39.96	41.39	35.4	
82.33	54.0	205.03	1.69	121.5	40.50	41.96	36.0	
82.42	55.1	213.53	1.71	125.2	41.04	42.53	36.6	
82.50	56.0	221.25	1.72	128.5	41.52	43.04	37.1	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHW2 (CH-W2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.142
0.144
0.145
0.147
0.148
0.149
0.150
0.151
0.152
0.153
0.154
0.155
0.156
0.157
0.158
0.159
0.159
0.160
0.161
0.161
0.162
0.163
0.163
0.164
0.165
0.165
0.166
0.166
0.167
0.167
0.168
0.168
0.169
0.169
0.170
0.170
0.171
0.171
0.172
0.172

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 25 years

Label: CHW2 (CH-W2) Storm Event: TypeIII 24hr (7.2 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.173

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDEXS4 (DDS4)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	145.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
145.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
145.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
145.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
145.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
145.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
145.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
145.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
145.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
145.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
145.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
145.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
145.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
145.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
145.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
145.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
145.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
145.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
145.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
145.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
145.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
145.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
145.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
145.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
145.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
145.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
146.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
146.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
146.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
146.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
146.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
146.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
146.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDEXS4 (DDS4) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
146.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
146.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
146.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
146.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
146.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
146.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
146.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
146.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
146.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
146.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
146.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
146.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
146.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
146.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
146.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
146.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
146.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
146.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
146.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
147.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDEXS4 (DDS4)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDN4 (DDN4)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	145.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
145.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
145.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
145.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
145.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
145.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
145.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
145.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
145.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
145.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
145.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
145.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
145.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
145.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
145.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
145.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
145.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
145.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
145.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
145.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
145.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
145.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
145.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
145.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
145.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
145.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
146.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
146.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
146.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
146.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
146.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
146.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
146.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDN4 (DDN4)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
146.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
146.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
146.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
146.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
146.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
146.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
146.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
146.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
146.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
146.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
146.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
146.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
146.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
146.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
146.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
146.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
146.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
146.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
146.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
147.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDN4 (DDN4)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDN5 (DDN5)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	124.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
124.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
124.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
124.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
124.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
124.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
124.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
124.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
124.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
124.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
124.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
124.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
124.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
124.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
124.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
124.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
124.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
124.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
124.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
124.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
124.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
124.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
124.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
124.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
124.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
124.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
125.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
125.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
125.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
125.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
125.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
125.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
125.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDN5 (DDN5) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
125.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
125.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
125.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
125.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
125.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
125.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
125.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
125.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
125.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
125.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
125.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
125.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
125.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
125.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
125.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
125.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
125.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
125.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
125.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
126.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDN5 (DDN5)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDNE (DDNE)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	160.00 ft
Diameter	30.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
160.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
160.05	0.6	0.09	4.03	0.0	0.70	0.71	0.4
160.10	1.2	0.42	6.36	0.1	0.98	1.01	0.8
160.15	1.8	1.00	8.28	0.1	1.19	1.24	1.2
160.20	2.4	1.83	9.96	0.2	1.36	1.43	1.6
160.25	3.0	2.93	11.48	0.3	1.50	1.61	2.0
160.30	3.6	4.30	12.88	0.3	1.62	1.77	2.5
160.35	4.2	5.92	14.18	0.4	1.73	1.92	2.9
160.40	4.8	7.80	15.39	0.5	1.83	2.06	3.3
160.45	5.4	9.93	16.53	0.6	1.92	2.19	3.8
160.50	6.0	12.30	17.61	0.7	2.00	2.32	4.2
160.55	6.6	14.91	18.62	0.8	2.07	2.44	4.6
160.60	7.2	17.75	19.59	0.9	2.14	2.56	5.1
160.65	7.8	20.80	20.51	1.0	2.19	2.68	5.5
160.70	8.4	24.06	21.38	1.1	2.24	2.79	6.0
160.75	9.0	27.52	22.22	1.2	2.29	2.90	6.5
160.80	9.6	31.16	23.01	1.4	2.33	3.01	7.0
160.85	10.2	34.98	23.77	1.5	2.37	3.11	7.5
160.90	10.8	38.95	24.49	1.6	2.40	3.22	8.0
160.95	11.4	43.08	25.17	1.7	2.43	3.32	8.5
161.00	12.0	47.35	25.82	1.8	2.45	3.42	9.0
161.05	12.6	51.74	26.44	2.0	2.47	3.53	9.5
161.10	13.2	56.24	27.03	2.1	2.48	3.63	10.1
161.15	13.8	60.83	27.59	2.2	2.49	3.73	10.6
161.20	14.4	65.51	28.12	2.3	2.50	3.83	11.2
161.25	15.0	70.25	28.62	2.5	2.50	3.93	11.8
161.30	15.6	75.05	29.10	2.6	2.50	4.03	12.4
161.35	16.2	79.88	29.54	2.7	2.49	4.13	13.0
161.40	16.8	84.72	29.95	2.8	2.48	4.23	13.7
161.45	17.4	89.57	30.34	3.0	2.47	4.33	14.4
161.50	18.0	94.40	30.70	3.1	2.45	4.43	15.1
161.55	18.6	99.20	31.03	3.2	2.43	4.53	15.8

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDNE (DDNE) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
161.60	19.2	103.94	31.33	3.3	2.40	4.64	16.6	0.000
161.65	19.8	108.61	31.60	3.4	2.37	4.74	17.4	3.884
161.70	20.4	113.18	31.84	3.6	2.33	4.85	18.3	4.323
161.75	21.0	117.64	32.05	3.7	2.29	4.96	19.2	4.585
161.80	21.6	121.96	32.23	3.8	2.24	5.07	20.2	4.769
161.85	22.2	126.12	32.38	3.9	2.19	5.18	21.3	4.905
161.90	22.8	130.09	32.50	4.0	2.14	5.29	22.5	5.011
161.95	23.4	133.84	32.58	4.1	2.07	5.41	23.8	5.094
162.00	24.0	137.34	32.62	4.2	2.00	5.54	25.3	5.159
162.05	24.6	140.57	32.63	4.3	1.92	5.66	26.9	5.211
162.10	25.2	143.47	32.59	4.4	1.83	5.80	28.8	5.251
162.15	25.8	146.01	32.51	4.5	1.73	5.94	31.1	5.281
162.20	26.4	148.12	32.38	4.6	1.62	6.09	33.8	5.303
162.25	27.0	149.75	32.18	4.7	1.50	6.25	37.2	5.317
162.30	27.6	150.81	31.92	4.7	1.36	6.42	41.8	5.325
162.35	28.1	151.15	31.60	4.8	1.20	6.60	47.7	5.327
162.35	28.2	151.14	31.56	4.8	1.19	6.62	48.4	5.324
162.40	28.8	150.54	31.08	4.8	0.98	6.85	59.3	
162.45	29.4	148.47	30.39	4.9	0.70	7.14	83.7	
162.50	30.0	140.51	28.62	4.9	0.00	7.85	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Return Event: 25 years
Label: DDNE (DDNE)
Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.315
5.302
5.284
5.262
5.236
5.206
5.172
5.134
5.093
5.048
4.999
4.947
4.890
4.830
4.766
4.697
4.625
4.547
4.465
4.377
4.284
4.185
4.078
3.964
3.841
3.708
3.562
3.402
3.221
3.015
2.795
2.771
2.465
2.028
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDNE3 (DDNE3)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	155.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
155.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
155.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
155.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
155.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
155.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
155.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
155.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
155.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
155.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
155.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
155.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
155.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
155.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
155.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
155.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
155.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
155.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
155.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
155.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
155.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
155.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
155.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
155.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
155.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
155.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
156.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
156.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
156.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
156.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
156.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
156.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
156.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDNE3 (DDNE3)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
156.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
156.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
156.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
156.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
156.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
156.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
156.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
156.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
156.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
156.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
156.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
156.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
156.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
156.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
156.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
156.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
156.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
156.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
156.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
157.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Return Event: 25 years
Label: DDNE3 (DDNE3)
Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDNW (DDNW)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	160.00 ft
Diameter	30.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
160.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
160.05	0.6	0.09	4.03	0.0	0.70	0.71	0.4
160.10	1.2	0.42	6.36	0.1	0.98	1.01	0.8
160.15	1.8	1.00	8.28	0.1	1.19	1.24	1.2
160.20	2.4	1.83	9.96	0.2	1.36	1.43	1.6
160.25	3.0	2.93	11.48	0.3	1.50	1.61	2.0
160.30	3.6	4.30	12.88	0.3	1.62	1.77	2.5
160.35	4.2	5.92	14.18	0.4	1.73	1.92	2.9
160.40	4.8	7.80	15.39	0.5	1.83	2.06	3.3
160.45	5.4	9.93	16.53	0.6	1.92	2.19	3.8
160.50	6.0	12.30	17.61	0.7	2.00	2.32	4.2
160.55	6.6	14.91	18.62	0.8	2.07	2.44	4.6
160.60	7.2	17.75	19.59	0.9	2.14	2.56	5.1
160.65	7.8	20.80	20.51	1.0	2.19	2.68	5.5
160.70	8.4	24.06	21.38	1.1	2.24	2.79	6.0
160.75	9.0	27.52	22.22	1.2	2.29	2.90	6.5
160.80	9.6	31.16	23.01	1.4	2.33	3.01	7.0
160.85	10.2	34.98	23.77	1.5	2.37	3.11	7.5
160.90	10.8	38.95	24.49	1.6	2.40	3.22	8.0
160.95	11.4	43.08	25.17	1.7	2.43	3.32	8.5
161.00	12.0	47.35	25.82	1.8	2.45	3.42	9.0
161.05	12.6	51.74	26.44	2.0	2.47	3.53	9.5
161.10	13.2	56.24	27.03	2.1	2.48	3.63	10.1
161.15	13.8	60.83	27.59	2.2	2.49	3.73	10.6
161.20	14.4	65.51	28.12	2.3	2.50	3.83	11.2
161.25	15.0	70.25	28.62	2.5	2.50	3.93	11.8
161.30	15.6	75.05	29.10	2.6	2.50	4.03	12.4
161.35	16.2	79.88	29.54	2.7	2.49	4.13	13.0
161.40	16.8	84.72	29.95	2.8	2.48	4.23	13.7
161.45	17.4	89.57	30.34	3.0	2.47	4.33	14.4
161.50	18.0	94.40	30.70	3.1	2.45	4.43	15.1
161.55	18.6	99.20	31.03	3.2	2.43	4.53	15.8

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDNW (DDNW)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
161.60	19.2	103.94	31.33	3.3	2.40	4.64	16.6	0.000
161.65	19.8	108.61	31.60	3.4	2.37	4.74	17.4	3.884
161.70	20.4	113.18	31.84	3.6	2.33	4.85	18.3	4.323
161.75	21.0	117.64	32.05	3.7	2.29	4.96	19.2	4.585
161.80	21.6	121.96	32.23	3.8	2.24	5.07	20.2	4.769
161.85	22.2	126.12	32.38	3.9	2.19	5.18	21.3	4.905
161.90	22.8	130.09	32.50	4.0	2.14	5.29	22.5	5.011
161.95	23.4	133.84	32.58	4.1	2.07	5.41	23.8	5.094
162.00	24.0	137.34	32.62	4.2	2.00	5.54	25.3	5.159
162.05	24.6	140.57	32.63	4.3	1.92	5.66	26.9	5.211
162.10	25.2	143.47	32.59	4.4	1.83	5.80	28.8	5.251
162.15	25.8	146.01	32.51	4.5	1.73	5.94	31.1	5.281
162.20	26.4	148.12	32.38	4.6	1.62	6.09	33.8	5.303
162.25	27.0	149.75	32.18	4.7	1.50	6.25	37.2	5.317
162.30	27.6	150.81	31.92	4.7	1.36	6.42	41.8	5.325
162.35	28.1	151.15	31.60	4.8	1.20	6.60	47.7	5.327
162.35	28.2	151.14	31.56	4.8	1.19	6.62	48.4	5.324
162.40	28.8	150.54	31.08	4.8	0.98	6.85	59.3	
162.45	29.4	148.47	30.39	4.9	0.70	7.14	83.7	
162.50	30.0	140.51	28.62	4.9	0.00	7.85	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDNW (DDNW) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.315
5.302
5.284
5.262
5.236
5.206
5.172
5.134
5.093
5.048
4.999
4.947
4.890
4.830
4.766
4.697
4.625
4.547
4.465
4.377
4.284
4.185
4.078
3.964
3.841
3.708
3.562
3.402
3.221
3.015
2.795
2.771
2.465
2.028
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDNW3 (DDNW3)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	155.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
155.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
155.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
155.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
155.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
155.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
155.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
155.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
155.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
155.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
155.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
155.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
155.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
155.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
155.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
155.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
155.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
155.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
155.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
155.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
155.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
155.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
155.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
155.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
155.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
155.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
156.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
156.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
156.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
156.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
156.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
156.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
156.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDNW3 (DDNW3)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
156.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
156.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
156.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
156.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
156.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
156.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
156.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
156.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
156.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
156.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
156.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
156.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
156.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
156.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
156.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
156.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
156.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
156.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
156.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
157.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Return Event: 25 years
Label: DDNW3 (DDNW3)
Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDS5 (DDS5)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	124.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
124.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
124.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
124.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
124.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
124.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
124.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
124.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
124.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
124.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
124.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
124.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
124.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
124.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
124.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
124.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
124.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
124.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
124.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
124.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
124.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
124.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
124.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
124.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
124.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
124.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
125.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
125.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
125.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
125.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
125.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
125.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
125.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDS5 (DDS5)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
125.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
125.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
125.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
125.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
125.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
125.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
125.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
125.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
125.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
125.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
125.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
125.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
125.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
125.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
125.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
125.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
125.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
125.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
125.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
126.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDS5 (DDS5)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDSE (DDSE)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	168.00 ft
Diameter	30.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
168.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
168.05	0.6	0.09	4.03	0.0	0.70	0.71	0.4
168.10	1.2	0.42	6.36	0.1	0.98	1.01	0.8
168.15	1.8	1.00	8.28	0.1	1.19	1.24	1.2
168.20	2.4	1.83	9.96	0.2	1.36	1.43	1.6
168.25	3.0	2.93	11.48	0.3	1.50	1.61	2.0
168.30	3.6	4.30	12.88	0.3	1.62	1.77	2.5
168.35	4.2	5.92	14.18	0.4	1.73	1.92	2.9
168.40	4.8	7.80	15.39	0.5	1.83	2.06	3.3
168.45	5.4	9.93	16.53	0.6	1.92	2.19	3.8
168.50	6.0	12.30	17.61	0.7	2.00	2.32	4.2
168.55	6.6	14.91	18.62	0.8	2.07	2.44	4.6
168.60	7.2	17.75	19.59	0.9	2.14	2.56	5.1
168.65	7.8	20.80	20.51	1.0	2.19	2.68	5.5
168.70	8.4	24.06	21.38	1.1	2.24	2.79	6.0
168.75	9.0	27.52	22.22	1.2	2.29	2.90	6.5
168.80	9.6	31.16	23.01	1.4	2.33	3.01	7.0
168.85	10.2	34.98	23.77	1.5	2.37	3.11	7.5
168.90	10.8	38.95	24.49	1.6	2.40	3.22	8.0
168.95	11.4	43.08	25.17	1.7	2.43	3.32	8.5
169.00	12.0	47.35	25.82	1.8	2.45	3.42	9.0
169.05	12.6	51.74	26.44	2.0	2.47	3.53	9.5
169.10	13.2	56.24	27.03	2.1	2.48	3.63	10.1
169.15	13.8	60.83	27.59	2.2	2.49	3.73	10.6
169.20	14.4	65.51	28.12	2.3	2.50	3.83	11.2
169.25	15.0	70.25	28.62	2.5	2.50	3.93	11.8
169.30	15.6	75.05	29.10	2.6	2.50	4.03	12.4
169.35	16.2	79.88	29.54	2.7	2.49	4.13	13.0
169.40	16.8	84.72	29.95	2.8	2.48	4.23	13.7
169.45	17.4	89.57	30.34	3.0	2.47	4.33	14.4
169.50	18.0	94.40	30.70	3.1	2.45	4.43	15.1
169.55	18.6	99.20	31.03	3.2	2.43	4.53	15.8

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDSE (DDSE)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
169.60	19.2	103.94	31.33	3.3	2.40	4.64	16.6	0.000
169.65	19.8	108.61	31.60	3.4	2.37	4.74	17.4	3.884
169.70	20.4	113.18	31.84	3.6	2.33	4.85	18.3	4.323
169.75	21.0	117.64	32.05	3.7	2.29	4.96	19.2	4.585
169.80	21.6	121.96	32.23	3.8	2.24	5.07	20.2	4.769
169.85	22.2	126.12	32.38	3.9	2.19	5.18	21.3	4.905
169.90	22.8	130.09	32.50	4.0	2.14	5.29	22.5	5.011
169.95	23.4	133.84	32.58	4.1	2.07	5.41	23.8	5.094
170.00	24.0	137.34	32.62	4.2	2.00	5.54	25.3	5.159
170.05	24.6	140.57	32.63	4.3	1.92	5.66	26.9	5.211
170.10	25.2	143.47	32.59	4.4	1.83	5.80	28.8	5.251
170.15	25.8	146.01	32.51	4.5	1.73	5.94	31.1	5.281
170.20	26.4	148.12	32.38	4.6	1.62	6.09	33.8	5.303
170.25	27.0	149.75	32.18	4.7	1.50	6.25	37.2	5.317
170.30	27.6	150.81	31.92	4.7	1.36	6.42	41.8	5.325
170.35	28.1	151.15	31.60	4.8	1.20	6.60	47.7	5.327
170.35	28.2	151.14	31.56	4.8	1.19	6.62	48.4	5.324
170.40	28.8	150.54	31.08	4.8	0.98	6.85	59.3	
170.45	29.4	148.47	30.39	4.9	0.70	7.14	83.7	
170.50	30.0	140.51	28.62	4.9	0.00	7.85	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDSE (DDSE) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.315
5.302
5.284
5.262
5.236
5.206
5.172
5.134
5.093
5.048
4.999
4.947
4.890
4.830
4.766
4.697
4.625
4.547
4.465
4.377
4.284
4.185
4.078
3.964
3.841
3.708
3.562
3.402
3.221
3.015
2.795
2.771
2.465
2.028
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDSE3 (DDSE3)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	155.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
155.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
155.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
155.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
155.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
155.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
155.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
155.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
155.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
155.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
155.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
155.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
155.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
155.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
155.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
155.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
155.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
155.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
155.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
155.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
155.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
155.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
155.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
155.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
155.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
155.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
156.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
156.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
156.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
156.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
156.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
156.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
156.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDSE3 (DDSE3) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
156.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
156.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
156.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
156.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
156.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
156.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
156.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
156.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
156.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
156.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
156.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
156.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
156.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
156.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
156.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
156.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
156.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
156.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
156.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
157.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDSE3 (DDSE3) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDSW (DDSW)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	168.00 ft
Diameter	30.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
168.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
168.05	0.6	0.09	4.03	0.0	0.70	0.71	0.4
168.10	1.2	0.42	6.36	0.1	0.98	1.01	0.8
168.15	1.8	1.00	8.28	0.1	1.19	1.24	1.2
168.20	2.4	1.83	9.96	0.2	1.36	1.43	1.6
168.25	3.0	2.93	11.48	0.3	1.50	1.61	2.0
168.30	3.6	4.30	12.88	0.3	1.62	1.77	2.5
168.35	4.2	5.92	14.18	0.4	1.73	1.92	2.9
168.40	4.8	7.80	15.39	0.5	1.83	2.06	3.3
168.45	5.4	9.93	16.53	0.6	1.92	2.19	3.8
168.50	6.0	12.30	17.61	0.7	2.00	2.32	4.2
168.55	6.6	14.91	18.62	0.8	2.07	2.44	4.6
168.60	7.2	17.75	19.59	0.9	2.14	2.56	5.1
168.65	7.8	20.80	20.51	1.0	2.19	2.68	5.5
168.70	8.4	24.06	21.38	1.1	2.24	2.79	6.0
168.75	9.0	27.52	22.22	1.2	2.29	2.90	6.5
168.80	9.6	31.16	23.01	1.4	2.33	3.01	7.0
168.85	10.2	34.98	23.77	1.5	2.37	3.11	7.5
168.90	10.8	38.95	24.49	1.6	2.40	3.22	8.0
168.95	11.4	43.08	25.17	1.7	2.43	3.32	8.5
169.00	12.0	47.35	25.82	1.8	2.45	3.42	9.0
169.05	12.6	51.74	26.44	2.0	2.47	3.53	9.5
169.10	13.2	56.24	27.03	2.1	2.48	3.63	10.1
169.15	13.8	60.83	27.59	2.2	2.49	3.73	10.6
169.20	14.4	65.51	28.12	2.3	2.50	3.83	11.2
169.25	15.0	70.25	28.62	2.5	2.50	3.93	11.8
169.30	15.6	75.05	29.10	2.6	2.50	4.03	12.4
169.35	16.2	79.88	29.54	2.7	2.49	4.13	13.0
169.40	16.8	84.72	29.95	2.8	2.48	4.23	13.7
169.45	17.4	89.57	30.34	3.0	2.47	4.33	14.4
169.50	18.0	94.40	30.70	3.1	2.45	4.43	15.1
169.55	18.6	99.20	31.03	3.2	2.43	4.53	15.8

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDSW (DDSW) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
169.60	19.2	103.94	31.33	3.3	2.40	4.64	16.6	0.000
169.65	19.8	108.61	31.60	3.4	2.37	4.74	17.4	3.884
169.70	20.4	113.18	31.84	3.6	2.33	4.85	18.3	4.323
169.75	21.0	117.64	32.05	3.7	2.29	4.96	19.2	4.585
169.80	21.6	121.96	32.23	3.8	2.24	5.07	20.2	4.769
169.85	22.2	126.12	32.38	3.9	2.19	5.18	21.3	4.905
169.90	22.8	130.09	32.50	4.0	2.14	5.29	22.5	5.011
169.95	23.4	133.84	32.58	4.1	2.07	5.41	23.8	5.094
170.00	24.0	137.34	32.62	4.2	2.00	5.54	25.3	5.159
170.05	24.6	140.57	32.63	4.3	1.92	5.66	26.9	5.211
170.10	25.2	143.47	32.59	4.4	1.83	5.80	28.8	5.251
170.15	25.8	146.01	32.51	4.5	1.73	5.94	31.1	5.281
170.20	26.4	148.12	32.38	4.6	1.62	6.09	33.8	5.303
170.25	27.0	149.75	32.18	4.7	1.50	6.25	37.2	5.317
170.30	27.6	150.81	31.92	4.7	1.36	6.42	41.8	5.325
170.35	28.1	151.15	31.60	4.8	1.20	6.60	47.7	5.327
170.35	28.2	151.14	31.56	4.8	1.19	6.62	48.4	5.324
170.40	28.8	150.54	31.08	4.8	0.98	6.85	59.3	
170.45	29.4	148.47	30.39	4.9	0.70	7.14	83.7	
170.50	30.0	140.51	28.62	4.9	0.00	7.85	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDSW (DDSW) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.315
5.302
5.284
5.262
5.236
5.206
5.172
5.134
5.093
5.048
4.999
4.947
4.890
4.830
4.766
4.697
4.625
4.547
4.465
4.377
4.284
4.185
4.078
3.964
3.841
3.708
3.562
3.402
3.221
3.015
2.795
2.771
2.465
2.028
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel
Label: DDSW3 (DDSW3)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	155.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
155.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
155.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
155.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
155.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
155.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
155.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
155.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
155.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
155.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
155.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
155.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
155.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
155.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
155.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
155.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
155.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
155.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
155.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
155.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
155.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
155.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
155.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
155.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
155.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
155.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
156.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
156.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
156.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
156.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
156.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
156.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
156.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDSW3 (DDSW3) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
156.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
156.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
156.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
156.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
156.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
156.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
156.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
156.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
156.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
156.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
156.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
156.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
156.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
156.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
156.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
156.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
156.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
156.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
156.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
157.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Circular Channel | Return Event: 25 years
Label: DDSW3 (DDSW3) | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
71.50	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
71.60	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
71.70	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
71.80	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
71.90	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.00	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.10	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.20	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.30	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.40	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.50	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.60	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.70	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.80	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.90	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.00	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.10	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.20	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.30	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.40	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.50	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.60	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.70	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.80	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.90	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.00	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.10	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.20	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.30	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.40	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.50	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.60	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.70	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.80	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
74.90	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.00	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.10	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.20	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.30	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.40	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.60	1.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.70	1.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.80	1.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.90	1.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.00	1.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.10	1.01	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.20	1.01	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.30	2.01	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.40	2.52	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.50	3.03	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.60	3.54	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.70	4.57	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.80	5.08	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.90	4.57	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.00	5.09	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.10	5.35	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.20	5.61	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.30	5.35	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.40	5.61	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.50	5.87	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.60	6.41	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.70	6.67	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.80	6.40	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.90	6.95	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.00	7.21	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.10	6.94	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.20	7.22	75.50	75.50	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
78.30	7.21	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.40	7.35	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.50	7.76	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.60	7.74	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.70	8.04	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.80	8.03	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.90	8.44	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.00	8.30	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.10	8.72	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.15	8.45	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.20	9.57	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.30	14.02	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.40	20.32	75.76	75.50	75.50	0.00	0.02	75.50	0.00
79.50	28.05	75.99	75.50	75.50	0.00	0.00	75.50	0.00
79.60	36.55	76.33	75.50	75.50	0.00	0.04	75.50	0.00
79.70	45.85	76.81	75.50	75.50	0.00	0.02	75.50	0.00
79.80	55.79	77.43	75.50	75.50	0.00	0.03	75.50	0.00
79.90	66.20	78.22	75.50	75.50	0.00	0.04	75.50	0.00
80.00	76.74	79.16	75.50	75.50	0.00	0.07	75.50	0.00
80.10	85.94	80.09	75.50	75.50	0.00	0.03	75.50	0.00
80.20	86.95	80.20	75.50	75.50	0.00	12.47	75.50	0.00
80.30	87.87	80.30	75.50	75.50	0.00	26.08	75.50	0.00
80.40	88.77	80.40	75.50	75.50	0.00	40.36	75.50	0.00
80.50	89.67	80.50	75.50	75.50	0.00	55.26	75.50	0.00
80.60	90.57	80.60	75.50	75.50	0.00	70.76	75.50	0.00
80.70	91.45	80.70	75.50	75.50	0.00	86.85	75.50	0.00
80.80	92.33	80.80	75.50	75.50	0.00	103.51	75.50	0.00
80.90	93.19	80.90	75.50	75.50	0.00	120.72	75.50	0.00
81.00	94.05	81.00	75.50	75.50	0.00	138.46	75.50	0.00
81.10	94.90	81.10	75.50	75.50	0.00	156.70	75.50	0.00
81.20	95.76	81.20	75.50	75.50	0.00	175.45	75.50	0.00
81.30	96.58	81.30	75.50	75.50	0.00	194.71	75.50	0.00
81.40	97.41	81.40	75.50	75.50	0.00	214.44	75.50	0.00
81.50	98.24	81.50	75.50	75.50	0.00	234.63	75.50	0.00

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)	Message
81.60	99.05	81.60	75.50	75.50	0.00	255.29	75.50	0.00	REMARKS: Water level below an invert; no flow.
81.70	99.86	81.70	75.50	75.50	0.00	276.39	75.50	0.00	REMARKS: Water level below an invert; no flow.
81.80	100.67	81.80	75.50	75.50	0.00	297.94	75.50	0.00	REMARKS: Water level below an invert; no flow.
81.90	101.46	81.90	75.50	75.50	0.00	319.92	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.00	102.25	82.00	75.50	75.50	0.00	342.32	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.10	103.03	82.10	75.50	75.50	0.00	365.14	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.20	103.80	82.20	75.50	75.50	0.00	388.37	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.30	104.58	82.30	75.50	75.50	0.00	412.01	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.40	105.35	82.40	75.50	75.50	0.00	436.03	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.50	106.10	82.50	75.50	75.50	0.00	460.45	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.60	106.86	82.60	75.50	75.50	0.00	485.25	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.70	107.62	82.70	75.50	75.50	0.00	510.42	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.80	108.36	82.80	75.50	75.50	0.00	535.97	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.90	109.10	82.90	75.50	75.50	0.00	561.89	75.50	0.00	REMARKS: Water level below an invert; no flow.
83.00	109.84	83.00	75.50	75.50	0.00	588.18	75.50	0.00	REMARKS: Water level below an invert; no flow.

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft^3/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
HW=TW; no flow.
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves | Return Event: 25 years
Label: Outfall | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft^3/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
BACKWATER CONTROL.. Vh= .080ft hwDi= 2.136ft Lbw= 122.1ft Hev= .00ft
BACKWATER CONTROL.. Vh= .139ft hwDi= 2.277ft Lbw= 86.1ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=.215ft HL=.831ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=.339ft HL=1.307ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=.502ft HL=1.935ft Hev= .00ft

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FULL FLOW...Lfull=300.00ft Vh=.707ft HL=2.725ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=.950ft HL=3.662ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.191ft HL=4.592ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.219ft HL=4.701ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.245ft HL=4.800ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.271ft HL=4.899ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.296ft HL=4.999ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.323ft HL=5.100ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.349ft HL=5.200ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.374ft HL=5.300ft Hev= .00ft

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FULL FLOW...Lfull=300.00ft Vh=1.400ft HL=5.400ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.426ft HL=5.499ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.452ft HL=5.600ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.478ft HL=5.701ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.504ft HL=5.799ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.530ft HL=5.899ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.556ft HL=6.000ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.582ft HL=6.100ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.608ft HL=6.200ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.634ft HL=6.301ft Hev= .00ft

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FULL FLOW...Lfull=300.00ft Vh=1.660ft HL=6.400ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.686ft HL=6.500ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.712ft HL=6.600ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.737ft HL=6.699ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.763ft HL=6.799ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.789ft HL=6.900ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.815ft HL=6.999ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.841ft HL=7.099ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.867ft HL=7.201ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.893ft HL=7.301ft Hev= .00ft

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FULL FLOW...Lfull=300.00ft Vh=1.919ft HL=7.400ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.945ft HL=7.501ft Hev= .00ft

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
71.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
71.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
71.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
71.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
71.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
75.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.50	0.00	0.00	0.00	0.00	0.00	0.00	75.50	0.00
75.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
78.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
79.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
79.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
79.15	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
79.20	1.03	79.20	Free Outfall	75.50	0.00	0.00	75.50	0.00
79.30	5.37	79.30	Free Outfall	75.50	0.00	0.00	75.50	0.00
79.40	11.55	79.40	Free Outfall	75.76	0.00	0.00	75.50	0.00
79.50	19.13	79.50	Free Outfall	75.99	0.00	0.00	75.50	0.00
79.60	27.89	79.60	Free Outfall	76.33	0.00	0.00	75.50	0.00
79.70	37.69	79.70	Free Outfall	76.81	0.00	0.00	75.50	0.00
79.80	48.42	79.80	Free Outfall	77.43	0.00	0.00	75.50	0.00
79.90	60.02	79.90	Free Outfall	78.22	0.00	0.00	75.50	0.00
80.00	72.41	80.00	79.16	79.16	0.00	0.00	75.50	0.00
80.10	85.56	80.10	80.09	80.09	0.00	0.00	75.50	0.00
80.20	99.42	80.20	80.20	80.20	0.00	0.00	75.50	0.00
80.30	113.95	80.30	80.30	80.30	0.00	0.00	75.50	0.00
80.40	129.13	80.40	80.40	80.40	0.00	0.00	75.50	0.00
80.50	144.93	80.50	80.50	80.50	0.00	0.00	75.50	0.00
80.60	161.33	80.60	80.60	80.60	0.00	0.00	75.50	0.00
80.70	178.31	80.70	80.70	80.70	0.00	0.00	75.50	0.00
80.80	195.84	80.80	80.80	80.80	0.00	0.00	75.50	0.00
80.90	213.91	80.90	80.90	80.90	0.00	0.00	75.50	0.00
81.00	232.50	81.00	81.00	81.00	0.00	0.00	75.50	0.00
81.10	251.61	81.10	81.10	81.10	0.00	0.00	75.50	0.00
81.20	271.21	81.20	81.20	81.20	0.00	0.00	75.50	0.00
81.30	291.29	81.30	81.30	81.30	0.00	0.00	75.50	0.00
81.40	311.85	81.40	81.40	81.40	0.00	0.00	75.50	0.00
81.50	332.87	81.50	81.50	81.50	0.00	0.00	75.50	0.00
81.60	354.34	81.60	81.60	81.60	0.00	0.00	75.50	0.00
81.70	376.25	81.70	81.70	81.70	0.00	0.00	75.50	0.00
81.80	398.60	81.80	81.80	81.80	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)	Message
81.90	421.38	81.90	81.90	81.90	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
82.00	444.57	82.00	82.00	82.00	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
82.10	468.17	82.10	82.10	82.10	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
82.20	492.18	82.20	82.20	82.20	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
82.30	516.58	82.30	82.30	82.30	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
82.40	541.37	82.40	82.40	82.40	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
82.50	566.55	82.50	82.50	82.50	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
82.60	592.11	82.60	82.60	82.60	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
82.70	618.04	82.70	82.70	82.70	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
82.80	644.33	82.80	82.80	82.80	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
82.90	670.99	82.90	82.90	82.90	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off
83.00	698.01	83.00	83.00	83.00	0.00	0.00	75.50	0.00	REVERSE: Flow is closed off

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
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REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
HW=TW; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
Weir: H =0.05ft
Weir: H =0.15ft
Weir: H =0.25ft
Weir: H =0.35ft
Weir: H =0.45ft
Weir: H =0.55ft
Weir: H =0.65ft
Weir: H =0.75ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =0.85ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =0.95ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =1.05ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =1.15ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =1.25ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =1.35ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =1.45ft

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
71.50	0.00	71.50	75.50	75.50	0.00	0.00	75.50	0.00
71.60	0.00	71.60	75.50	75.50	0.00	0.00	75.50	0.00
71.70	0.00	71.70	75.50	75.50	0.00	0.00	75.50	0.00
71.80	0.00	71.80	75.50	75.50	0.00	0.00	75.50	0.00
71.90	0.00	71.90	75.50	75.50	0.00	0.00	75.50	0.00
72.00	0.00	72.00	75.50	75.50	0.00	0.00	75.50	0.00
72.10	0.00	72.10	75.50	75.50	0.00	0.00	75.50	0.00
72.20	0.00	72.20	75.50	75.50	0.00	0.00	75.50	0.00
72.30	0.00	72.30	75.50	75.50	0.00	0.00	75.50	0.00
72.40	0.00	72.40	75.50	75.50	0.00	0.00	75.50	0.00
72.50	0.00	72.50	75.50	75.50	0.00	0.00	75.50	0.00
72.60	0.00	72.60	75.50	75.50	0.00	0.00	75.50	0.00
72.70	0.00	72.70	75.50	75.50	0.00	0.00	75.50	0.00
72.80	0.00	72.80	75.50	75.50	0.00	0.00	75.50	0.00
72.90	0.00	72.90	75.50	75.50	0.00	0.00	75.50	0.00
73.00	0.00	73.00	75.50	75.50	0.00	0.00	75.50	0.00
73.10	0.00	73.10	75.50	75.50	0.00	0.00	75.50	0.00
73.20	0.00	73.20	75.50	75.50	0.00	0.00	75.50	0.00
73.30	0.00	73.30	75.50	75.50	0.00	0.00	75.50	0.00
73.40	0.00	73.40	75.50	75.50	0.00	0.00	75.50	0.00
73.50	0.00	73.50	75.50	75.50	0.00	0.00	75.50	0.00
73.60	0.00	73.60	75.50	75.50	0.00	0.00	75.50	0.00
73.70	0.00	73.70	75.50	75.50	0.00	0.00	75.50	0.00
73.80	0.00	73.80	75.50	75.50	0.00	0.00	75.50	0.00
73.90	0.00	73.90	75.50	75.50	0.00	0.00	75.50	0.00
74.00	0.00	74.00	75.50	75.50	0.00	0.00	75.50	0.00
74.10	0.00	74.10	75.50	75.50	0.00	0.00	75.50	0.00
74.20	0.00	74.20	75.50	75.50	0.00	0.00	75.50	0.00
74.30	0.00	74.30	75.50	75.50	0.00	0.00	75.50	0.00
74.40	0.00	74.40	75.50	75.50	0.00	0.00	75.50	0.00
74.50	0.00	74.50	75.50	75.50	0.00	0.00	75.50	0.00
74.60	0.00	74.60	75.50	75.50	0.00	0.00	75.50	0.00
74.70	0.00	74.70	75.50	75.50	0.00	0.00	75.50	0.00
74.80	0.00	74.80	75.50	75.50	0.00	0.00	75.50	0.00
74.90	0.00	74.90	75.50	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
75.00	0.00	75.00	75.50	75.50	0.00	0.00	75.50	0.00
75.10	0.00	75.10	75.50	75.50	0.00	0.00	75.50	0.00
75.20	0.00	75.20	75.50	75.50	0.00	0.00	75.50	0.00
75.30	0.00	75.30	75.50	75.50	0.00	0.00	75.50	0.00
75.40	0.00	75.40	75.50	75.50	0.00	0.00	75.50	0.00
75.50	0.00	0.00	0.00	0.00	0.00	0.00	75.50	0.00
75.60	0.04	75.60	Free Outfall	75.50	0.00	0.00	75.50	0.00
75.70	0.14	75.70	Free Outfall	75.50	0.00	0.00	75.50	0.00
75.80	0.31	75.80	Free Outfall	75.50	0.00	0.00	75.50	0.00
75.90	0.54	75.90	Free Outfall	75.50	0.00	0.00	75.50	0.00
76.00	0.83	76.00	Free Outfall	75.50	0.00	0.00	75.50	0.00
76.10	1.16	76.10	76.06	75.50	0.00	0.00	75.50	0.00
76.20	1.54	76.20	76.06	75.50	0.00	0.00	75.50	0.00
76.30	1.95	76.30	76.06	75.50	0.00	0.00	75.50	0.00
76.40	2.39	76.40	76.06	75.50	0.00	0.00	75.50	0.00
76.50	2.86	76.50	76.06	75.50	0.00	0.00	75.50	0.00
76.60	3.35	76.60	76.06	75.50	0.00	0.00	75.50	0.00
76.70	3.84	76.70	76.06	75.50	0.00	0.00	75.50	0.00
76.80	4.13	76.80	76.06	75.50	0.00	0.00	75.50	0.00
76.90	4.40	76.90	76.06	75.50	0.00	0.00	75.50	0.00
77.00	4.65	77.00	76.06	75.50	0.00	0.00	75.50	0.00
77.10	4.90	77.10	76.06	75.50	0.00	0.00	75.50	0.00
77.20	5.13	77.20	76.06	75.50	0.00	0.00	75.50	0.00
77.30	5.35	77.30	76.06	75.50	0.00	0.00	75.50	0.00
77.40	5.56	77.40	76.06	75.50	0.00	0.00	75.50	0.00
77.50	5.76	77.50	76.06	75.50	0.00	0.00	75.50	0.00
77.60	5.96	77.60	76.06	75.50	0.00	0.00	75.50	0.00
77.70	6.15	77.70	76.06	75.50	0.00	0.00	75.50	0.00
77.80	6.34	77.80	76.06	75.50	0.00	0.00	75.50	0.00
77.90	6.52	77.90	76.06	75.50	0.00	0.00	75.50	0.00
78.00	6.69	78.00	76.06	75.50	0.00	0.00	75.50	0.00
78.10	6.86	78.10	76.06	75.50	0.00	0.00	75.50	0.00
78.20	7.03	78.20	76.06	75.50	0.00	0.00	75.50	0.00
78.30	7.19	78.30	76.06	75.50	0.00	0.00	75.50	0.00
78.40	7.35	78.40	76.06	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
78.50	7.51	78.50	76.06	75.50	0.00	0.00	75.50	0.00
78.60	7.66	78.60	76.06	75.50	0.00	0.00	75.50	0.00
78.70	7.81	78.70	76.06	75.50	0.00	0.00	75.50	0.00
78.80	7.96	78.80	76.06	75.50	0.00	0.00	75.50	0.00
78.90	8.10	78.90	76.06	75.50	0.00	0.00	75.50	0.00
79.00	8.24	79.00	76.06	75.50	0.00	0.00	75.50	0.00
79.10	8.38	79.10	76.06	75.50	0.00	0.00	75.50	0.00
79.15	8.45	79.15	76.06	75.50	0.00	0.00	75.50	0.00
79.20	8.52	79.20	76.06	75.50	0.00	0.00	75.50	0.00
79.30	8.65	79.30	76.06	75.50	0.00	0.00	75.50	0.00
79.40	8.78	79.40	75.76	75.76	0.00	0.00	75.50	0.00
79.50	8.92	79.50	75.99	75.99	0.00	0.00	75.50	0.00
79.60	8.70	79.60	76.33	76.33	0.00	0.00	75.50	0.00
79.70	8.18	79.70	76.81	76.81	0.00	0.00	75.50	0.00
79.80	7.40	79.80	77.43	77.43	0.00	0.00	75.50	0.00
79.90	6.23	79.90	78.22	78.22	0.00	0.00	75.50	0.00
80.00	4.40	80.00	79.16	79.16	0.00	0.00	75.50	0.00
80.10	0.41	80.10	80.09	80.09	0.00	0.00	75.50	0.00
80.20	0.00	80.20	80.20	80.20	0.00	0.00	75.50	0.00
80.30	0.00	80.30	80.30	80.30	0.00	0.00	75.50	0.00
80.40	0.00	80.40	80.40	80.40	0.00	0.00	75.50	0.00
80.50	0.00	80.50	80.50	80.50	0.00	0.00	75.50	0.00
80.60	0.00	80.60	80.60	80.60	0.00	0.00	75.50	0.00
80.70	0.00	80.70	80.70	80.70	0.00	0.00	75.50	0.00
80.80	0.00	80.80	80.80	80.80	0.00	0.00	75.50	0.00
80.90	0.00	80.90	80.90	80.90	0.00	0.00	75.50	0.00
81.00	0.00	81.00	81.00	81.00	0.00	0.00	75.50	0.00
81.10	0.00	81.10	81.10	81.10	0.00	0.00	75.50	0.00
81.20	0.00	81.20	81.20	81.20	0.00	0.00	75.50	0.00
81.30	0.00	81.30	81.30	81.30	0.00	0.00	75.50	0.00
81.40	0.00	81.40	81.40	81.40	0.00	0.00	75.50	0.00
81.50	0.00	81.50	81.50	81.50	0.00	0.00	75.50	0.00
81.60	0.00	81.60	81.60	81.60	0.00	0.00	75.50	0.00
81.70	0.00	81.70	81.70	81.70	0.00	0.00	75.50	0.00
81.80	0.00	81.80	81.80	81.80	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves — Return Event: 25 years
Label: Outfall — Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
81.90	0.00	81.90	81.90	81.90	0.00	0.00	75.50	0.00
82.00	0.00	82.00	82.00	82.00	0.00	0.00	75.50	0.00
82.10	0.00	82.10	82.10	82.10	0.00	0.00	75.50	0.00
82.20	0.00	82.20	82.20	82.20	0.00	0.00	75.50	0.00
82.30	0.00	82.30	82.30	82.30	0.00	0.00	75.50	0.00
82.40	0.00	82.40	82.40	82.40	0.00	0.00	75.50	0.00
82.50	0.00	82.50	82.50	82.50	0.00	0.00	75.50	0.00
82.60	0.00	82.60	82.60	82.60	0.00	0.00	75.50	0.00
82.70	0.00	82.70	82.70	82.70	0.00	0.00	75.50	0.00
82.80	0.00	82.80	82.80	82.80	0.00	0.00	75.50	0.00
82.90	0.00	82.90	82.90	82.90	0.00	0.00	75.50	0.00
83.00	0.00	83.00	83.00	83.00	0.00	0.00	75.50	0.00

Message
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
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CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
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CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
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CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
HW=TW; no flow.
CRIT.DEPTH CONTROL Vh= .025ft Dcr= .075ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .051ft Dcr= .149ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .078ft Dcr= .222ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .105ft Dcr= .296ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .133ft Dcr= .367ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .163ft Dcr= .437ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .194ft Dcr= .507ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .226ft Dcr= .573ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .261ft Dcr= .639ft CRIT.DEPTH Hev= .00ft

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (7.2 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
CRIT.DEPTH CONTROL
Vh= .299ft Dcr= .702ft
CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL
Vh= .339ft Dcr= .761ft
CRIT.DEPTH Hev= .00ft
H =.64
H =.74
H =.84
H =.94
H =1.04
H =1.14
H =1.24
H =1.34
H =1.44
H =1.54
H =1.64
H =1.74
H =1.84
H =1.94
H =2.04
H =2.14
H =2.24
H =2.34
H =2.44
H =2.54
H =2.64
H =2.74
H =2.84
H =2.94
H =3.04
H =3.09
H =3.14
H =3.24
H =3.34
H =3.44
H =3.27
H =2.89
H =2.37

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Individual Outlet Curves | Return Event: 25 years
Label: Outfall | Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
H =1.68
H =.84
H =.01
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 25 years
Label: Pond 1D2B2 Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	75.50 ft
Volume (Initial)	62.355 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.005 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (acres)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
71.50	0.00	0.000	4.000	0.00	0.00	0.00
71.60	0.00	0.485	5.749	0.00	0.00	2,346.54
71.70	0.00	1.160	7.815	0.00	0.00	5,616.26
71.80	0.00	2.058	10.197	0.00	0.00	9,962.30
71.90	0.00	3.210	12.895	0.00	0.00	15,537.80
72.00	0.00	4.648	15.910	0.00	0.00	22,495.89
72.10	0.00	6.241	15.943	0.00	0.00	30,204.23
72.20	0.00	7.836	15.975	0.00	0.00	37,928.36
72.30	0.00	9.436	16.008	0.00	0.00	45,668.32
72.40	0.00	11.038	16.041	0.00	0.00	53,424.11
72.50	0.00	12.644	16.073	0.00	0.00	61,195.75
72.60	0.00	14.253	16.106	0.00	0.00	68,983.26
72.70	0.00	15.865	16.139	0.00	0.00	76,786.65
72.80	0.00	17.481	16.172	0.00	0.00	84,605.95
72.90	0.00	19.099	16.205	0.00	0.00	92,441.15
73.00	0.00	20.722	16.238	0.00	0.00	100,292.29
73.10	0.00	22.347	16.271	0.00	0.00	108,159.38
73.20	0.00	23.976	16.304	0.00	0.00	116,042.43
73.30	0.00	25.608	16.337	0.00	0.00	123,941.46
73.40	0.00	27.243	16.370	0.00	0.00	131,856.48
73.50	0.00	28.882	16.403	0.00	0.00	139,787.52
73.60	0.00	30.524	16.436	0.00	0.00	147,734.59
73.70	0.00	32.169	16.469	0.00	0.00	155,697.71
73.80	0.00	33.818	16.503	0.00	0.00	163,676.88
73.90	0.00	35.469	16.536	0.00	0.00	171,672.13
74.00	0.00	37.125	16.569	0.00	0.00	179,683.48
74.10	0.00	38.783	16.602	0.00	0.00	187,710.93
74.20	0.00	40.445	16.636	0.00	0.00	195,754.51
74.30	0.00	42.110	16.669	0.00	0.00	203,814.23

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 25 years
Label: Pond 1D2B2 Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (acres)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
74.40	0.00	43.779	16.702	0.00	0.00	211,890.12
74.50	0.00	45.451	16.736	0.00	0.00	219,982.17
74.60	0.00	47.126	16.769	0.00	0.00	228,090.42
74.70	0.00	48.805	16.803	0.00	0.00	236,214.87
74.80	0.00	50.487	16.836	0.00	0.00	244,355.54
74.90	0.00	52.172	16.870	0.00	0.00	252,512.46
75.00	0.00	53.861	16.904	0.00	0.00	260,685.63
75.10	0.00	55.553	16.937	0.00	0.00	268,875.07
75.20	0.00	57.248	16.971	0.00	0.00	277,080.80
75.30	0.00	58.947	17.005	0.00	0.00	285,302.83
75.40	0.00	60.649	17.038	0.00	0.00	293,541.19
75.50	0.00	62.355	17.072	0.00	0.00	301,795.87
75.60	0.04	64.063	17.106	0.00	0.04	310,066.95
75.70	0.14	65.776	17.140	0.00	0.14	318,354.47
75.80	0.31	67.491	17.174	0.00	0.31	326,658.43
75.90	0.54	69.210	17.207	0.00	0.54	334,978.86
76.00	0.83	70.933	17.241	0.00	0.83	343,315.75
76.10	1.16	72.659	17.275	0.00	1.16	351,669.13
76.20	1.54	74.388	17.309	0.00	1.54	360,039.01
76.30	1.95	76.121	17.343	0.00	1.95	368,425.38
76.40	2.39	77.857	17.377	0.00	2.39	376,828.27
76.50	2.86	79.596	17.412	0.00	2.86	385,247.68
76.60	3.35	81.339	17.446	0.00	3.35	393,683.62
76.70	3.84	83.085	17.480	0.00	3.84	402,136.09
76.80	4.13	84.835	17.514	0.00	4.13	410,604.92
76.90	4.40	86.588	17.548	0.00	4.40	419,090.28
77.00	4.65	88.345	17.583	0.00	4.65	427,592.21
77.10	4.90	90.105	17.617	0.00	4.90	436,110.72
77.20	5.13	91.868	17.651	0.00	5.13	444,645.83
77.30	5.35	93.635	17.686	0.00	5.35	453,197.56
77.40	5.56	95.405	17.720	0.00	5.56	461,765.93
77.50	5.76	97.179	17.754	0.00	5.76	470,350.94
77.60	5.96	98.956	17.789	0.00	5.96	478,952.63
77.70	6.15	100.737	17.823	0.00	6.15	487,571.00
77.80	6.34	102.521	17.858	0.00	6.34	496,206.07
77.90	6.52	104.308	17.893	0.00	6.52	504,857.86
78.00	6.69	106.099	17.927	0.00	6.69	513,526.39
78.10	6.86	107.894	17.962	0.00	6.86	522,211.67
78.20	7.03	109.691	17.996	0.00	7.03	530,913.72
78.30	7.19	111.493	18.031	0.00	7.19	539,632.55
78.40	7.35	113.298	18.066	0.00	7.35	548,368.19
78.50	7.51	115.106	18.101	0.00	7.51	557,120.65
78.60	7.66	116.918	18.135	0.00	7.66	565,889.94

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 25 years
Label: Pond 1D2B2 Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (acres)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
78.70	7.81	118.733	18.170	0.00	7.81	574,676.08
78.80	7.96	120.552	18.205	0.00	7.96	583,479.08
78.90	8.10	122.374	18.240	0.00	8.10	592,298.98
79.00	8.24	124.200	18.275	0.00	8.24	601,135.77
79.10	8.38	126.029	18.310	0.00	8.38	609,989.48
79.15	8.45	126.945	18.327	0.00	8.45	614,422.68
79.20	9.55	127.862	18.345	0.00	9.55	618,861.15
79.30	14.02	129.698	18.380	0.00	14.02	627,753.07
79.40	20.32	131.538	18.415	0.00	20.32	636,663.79
79.50	28.05	133.381	18.450	0.00	28.05	645,592.93
79.60	36.55	135.228	18.485	0.00	36.55	654,539.84
79.70	45.85	137.078	18.521	0.00	45.85	663,504.56
79.80	55.79	138.932	18.556	0.00	55.79	672,486.95
79.90	66.20	140.789	18.591	0.00	66.20	681,486.86
80.00	76.74	142.650	18.626	0.00	76.74	690,503.97
80.10	85.94	144.515	18.662	0.00	85.94	699,536.82
80.20	86.95	146.383	18.697	0.00	86.95	708,578.56
80.30	87.87	148.254	18.732	0.00	87.87	717,637.34
80.40	88.77	150.129	18.768	0.00	88.77	726,713.22
80.50	89.67	152.008	18.803	0.00	89.67	735,806.26
80.60	90.57	153.890	18.839	0.00	90.57	744,916.44
80.70	91.45	155.775	18.874	0.00	91.45	754,043.80
80.80	92.33	157.664	18.910	0.00	92.33	763,188.33
80.90	93.19	159.557	18.945	0.00	93.19	772,350.07
81.00	94.05	161.454	18.981	0.00	94.05	781,529.03
81.10	94.90	163.353	19.016	0.00	94.90	790,725.22
81.20	95.76	165.257	19.052	0.00	95.76	799,938.68
81.30	96.58	167.164	19.088	0.00	96.58	809,169.37
81.40	97.41	169.074	19.124	0.00	97.41	818,417.37
81.50	98.24	170.989	19.159	0.00	98.24	827,682.67
81.60	99.05	172.906	19.195	0.00	99.05	836,965.28
81.70	99.86	174.828	19.231	0.00	99.86	846,265.23
81.80	100.67	176.752	19.267	0.00	100.67	855,582.52
81.90	101.46	178.681	19.303	0.00	101.46	864,917.17
82.00	102.25	180.613	19.339	0.00	102.25	874,269.21
82.10	103.03	182.549	19.375	0.00	103.03	883,638.65
82.20	103.80	184.488	19.411	0.00	103.80	893,025.50
82.30	104.58	186.431	19.447	0.00	104.58	902,429.78
82.40	105.35	188.377	19.483	0.00	105.35	911,851.52
82.50	106.10	190.327	19.519	0.00	106.10	921,290.70
82.60	106.86	192.281	19.555	0.00	106.86	930,747.37
82.70	107.62	194.238	19.591	0.00	107.62	940,221.56
82.80	108.36	196.199	19.627	0.00	108.36	949,713.24

Cross LandFill Area 1D & 1B (25-year Analyses)

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 25 years
Label: Pond 1D2B2 Storm Event: TypeIII 24hr (7.2 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 25 yrs

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (acres)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
82.90	109.10	198.164	19.664	0.00	109.10	959,222.44
83.00	109.84	200.132	19.700	0.00	109.84	968,749.20

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
EX-N6	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	2.212	12.210	21.40
EX-N7	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	1.456	12.170	15.31
EX-S6	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	1.035	12.180	10.66
EX-S7	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	2.297	12.215	22.10
NE	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	9.058	12.335	73.30
NE3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	2.377	12.460	16.66
NE7	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	9.200	12.305	77.35
NW	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	11.918	12.580	74.07
NW3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	2.382	12.525	15.63
NW4+EXN4+NE4	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	6.380	12.530	41.69
NW5+EXN5+NE5	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	6.869	12.595	42.10
NW7	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	8.734	12.440	62.63

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Pond Area	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	16.411	12.100	170.48
SE	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	15.648	12.445	111.69
SE3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	1.353	12.300	11.50
SE4+EXS4+SW4	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	4.014	12.280	34.90
SE7	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	3.321	12.325	27.24
SW	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	17.433	12.475	120.63
SW3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	1.245	12.310	10.42
SW5+EXS5+SE5	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	3.639	12.455	25.67
SW7	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	3.707	12.345	29.66

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
E-1	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	29.005	12.445	139.74

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
J-NE	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	9.058	12.335	73.30
J-NE3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	2.377	12.460	16.66
J-NW	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	11.918	12.580	74.07
J-NW3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	2.382	12.525	15.63
J-NW4+EXN4+NE4	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	6.380	12.530	41.69
J-NW5+EXN5+NE5	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	6.869	12.595	42.10
J-SE	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	15.648	12.445	111.69
J-SE3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	1.353	12.300	11.50
J-SE4+EXS4+SW4	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	4.014	12.280	34.90
J-SW	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	17.433	12.475	120.63
J-SW3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	1.245	12.310	10.42
J-SW5+EXS5+SE5	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	3.639	12.455	25.67

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
NE-1	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	18.303	12.405	123.94
NE-2	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	19.807	12.300	102.59
NE-3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	19.807	12.425	99.14
NW-1	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	20.680	12.560	131.07
NW-2	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	22.940	12.390	106.68
NW-3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	22.940	12.595	99.88
Out 20	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	77.933	15.925	87.82
SE-1	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	1.035	12.180	10.66
SE-2	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	33.354	12.730	139.95
SE-3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	32.321	12.640	138.27
SE-4	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	32.321	12.640	138.27
SE-5	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	76.687	12.540	426.33

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
SE-6	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	43.333	12.425	305.37
SW-1	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	2.297	12.215	22.10
SW-2	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	37.668	12.875	139.91
SW-3	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	35.373	12.825	133.63
SW-4	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	35.373	12.825	133.63
SW-5	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	37.668	12.875	139.91
SW-7	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	114.348	12.740	517.06
SW-8	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	114.344	12.855	503.44
W-1	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	31.671	12.630	134.45

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pond 1D2B2 (IN)	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	130.754	12.845	522.34	(N/A)	(N/A)
Pond 1D2B2 (OUT)	Cross - Berkley County (North) - Synthetic Curve, 100 yrs	100	77.933	15.925	87.82	80.29	148.153

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Time-Depth Curve
Return Event: 100 years
Label: Cross - Berkley County (North)
Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Time-Depth Curve: TypeIII 24hr (9.4 in)	
Label	TypeIII 24hr (9.4 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.1	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.2	0.2	0.2	0.2
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.3	0.3	0.3
3.000	0.3	0.3	0.3	0.3	0.3
3.500	0.3	0.4	0.4	0.4	0.4
4.000	0.4	0.4	0.4	0.4	0.5
4.500	0.5	0.5	0.5	0.5	0.5
5.000	0.5	0.5	0.6	0.6	0.6
5.500	0.6	0.6	0.6	0.6	0.7
6.000	0.7	0.7	0.7	0.7	0.7
6.500	0.8	0.8	0.8	0.8	0.8
7.000	0.9	0.9	0.9	0.9	0.9
7.500	1.0	1.0	1.0	1.0	1.0
8.000	1.1	1.1	1.1	1.1	1.2
8.500	1.2	1.2	1.3	1.3	1.3
9.000	1.4	1.4	1.4	1.5	1.5
9.500	1.6	1.6	1.6	1.7	1.7
10.000	1.8	1.8	1.9	1.9	2.0
10.500	2.0	2.1	2.2	2.2	2.3
11.000	2.4	2.4	2.5	2.6	2.7
11.500	2.8	3.0	3.2	3.5	3.9
12.000	4.7	5.5	5.9	6.2	6.4
12.500	6.6	6.7	6.8	6.9	7.0
13.000	7.1	7.1	7.2	7.2	7.3
13.500	7.4	7.4	7.5	7.5	7.6
14.000	7.6	7.7	7.7	7.8	7.8
14.500	7.8	7.9	7.9	8.0	8.0
15.000	8.0	8.1	8.1	8.1	8.2
15.500	8.2	8.2	8.3	8.3	8.3
16.000	8.3	8.4	8.4	8.4	8.4

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Time-Depth Curve
Return Event: 100 years
Label: Cross - Berkley County (North)
Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	8.4	8.5	8.5	8.5	8.5
17.000	8.5	8.6	8.6	8.6	8.6
17.500	8.6	8.7	8.7	8.7	8.7
18.000	8.7	8.7	8.8	8.8	8.8
18.500	8.8	8.8	8.8	8.8	8.9
19.000	8.9	8.9	8.9	8.9	8.9
19.500	8.9	8.9	9.0	9.0	9.0
20.000	9.0	9.0	9.0	9.0	9.0
20.500	9.1	9.1	9.1	9.1	9.1
21.000	9.1	9.1	9.1	9.1	9.2
21.500	9.2	9.2	9.2	9.2	9.2
22.000	9.2	9.2	9.2	9.2	9.3
22.500	9.3	9.3	9.3	9.3	9.3
23.000	9.3	9.3	9.3	9.3	9.4
23.500	9.4	9.4	9.4	9.4	9.4
24.000	9.4	(N/A)	(N/A)	(N/A)	(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHE1 (CH-E1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	79.46 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
79.46	0.0	0.00	0.00	0.0	0.00	0.00	0.0
79.47	0.1	0.01	0.04	0.1	13.56	13.56	0.1
79.52	0.7	0.10	0.13	0.8	13.86	13.88	0.7
79.58	1.4	0.33	0.20	1.7	14.22	14.26	1.4
79.64	2.2	0.65	0.26	2.5	14.58	14.64	2.1
79.70	2.9	1.06	0.31	3.4	14.94	15.02	2.7
79.76	3.6	1.54	0.36	4.3	15.30	15.40	3.4
79.82	4.3	2.09	0.40	5.2	15.66	15.78	4.0
79.88	5.0	2.72	0.44	6.2	16.02	16.16	4.6
79.94	5.8	3.41	0.48	7.2	16.38	16.54	5.3
80.00	6.5	4.17	0.51	8.2	16.74	16.92	5.9
80.06	7.2	5.00	0.54	9.2	17.10	17.29	6.4
80.12	7.9	5.89	0.58	10.2	17.46	17.67	7.0
80.18	8.6	6.84	0.61	11.3	17.82	18.05	7.6
80.24	9.4	7.86	0.64	12.4	18.18	18.43	8.2
80.30	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.36	10.8	10.08	0.69	14.6	18.90	19.19	9.3
80.42	11.5	11.29	0.72	15.7	19.26	19.57	9.8
80.48	12.2	12.56	0.74	16.9	19.62	19.95	10.3
80.54	13.0	13.89	0.77	18.1	19.98	20.33	10.9
80.60	13.7	15.28	0.79	19.3	20.34	20.71	11.4
80.66	14.4	16.74	0.82	20.5	20.70	21.09	11.9
80.72	15.1	18.26	0.84	21.8	21.06	21.47	12.4
80.78	15.8	19.84	0.86	23.0	21.42	21.85	12.9
80.84	16.6	21.48	0.88	24.3	21.78	22.23	13.4
80.90	17.3	23.19	0.90	25.7	22.14	22.61	13.9
80.96	18.0	24.97	0.92	27.0	22.50	22.99	14.4
81.02	18.7	26.81	0.95	28.4	22.86	23.37	14.9
81.08	19.4	28.71	0.97	29.7	23.22	23.75	15.4
81.14	20.2	30.68	0.98	31.1	23.58	24.13	15.9

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHE1 (CH-E1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.20	20.9	32.71	1.00	32.6	23.94	24.50	16.3	0.000
81.26	21.6	34.81	1.02	34.0	24.30	24.88	16.8	0.068
81.32	22.3	36.97	1.04	35.5	24.66	25.26	17.3	0.091
81.38	23.0	39.21	1.06	37.0	25.02	25.64	17.7	0.102
81.44	23.8	41.51	1.08	38.5	25.38	26.02	18.2	0.109
81.50	24.5	43.87	1.10	40.0	25.74	26.40	18.7	0.114
81.56	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.118
81.62	25.9	48.81	1.13	43.2	26.46	27.16	19.6	0.121
81.68	26.6	51.39	1.15	44.8	26.82	27.54	20.0	0.124
81.74	27.4	54.03	1.17	46.4	27.18	27.92	20.5	0.127
81.80	28.1	56.74	1.18	48.0	27.54	28.30	20.9	0.129
81.86	28.8	59.52	1.20	49.7	27.90	28.68	21.4	0.131
81.92	29.5	62.38	1.21	51.4	28.26	29.06	21.8	0.133
81.98	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.135
82.04	31.0	68.30	1.25	54.8	28.98	29.82	22.7	
82.10	31.7	71.36	1.26	56.5	29.34	30.20	23.1	
82.16	32.4	74.51	1.28	58.3	29.70	30.58	23.6	
82.22	33.1	77.72	1.29	60.1	30.06	30.96	24.0	
82.28	33.8	81.01	1.31	61.9	30.42	31.34	24.4	
82.34	34.6	84.37	1.32	63.8	30.78	31.71	24.9	
82.40	35.3	87.81	1.34	65.6	31.14	32.09	25.3	
82.46	36.0	91.32	1.35	67.5	31.50	32.47	25.7	
82.50	36.5	93.71	1.36	68.8	31.74	32.73	26.0	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHE1 (CH-E1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.136
0.137
0.139
0.140
0.141
0.142
0.143
0.144
0.145
0.146
0.147
0.148
0.149
0.150
0.150
0.151
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0.159
0.159
0.160
0.160
0.161
0.161
0.162
0.162
0.163
0.163
0.163

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHE2 (CH-E2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	78.77 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
78.77	0.0	0.00	0.00	0.0	0.00	0.00	0.0
78.78	0.1	0.01	0.04	0.1	13.56	13.56	0.1
78.84	0.8	0.13	0.14	1.0	13.92	13.94	0.8
78.91	1.7	0.43	0.22	1.9	14.34	14.39	1.6
78.98	2.5	0.84	0.28	3.0	14.76	14.83	2.4
79.05	3.4	1.37	0.34	4.0	15.18	15.27	3.2
79.12	4.2	2.00	0.39	5.1	15.60	15.71	3.9
79.19	5.0	2.72	0.44	6.2	16.02	16.16	4.6
79.26	5.9	3.54	0.48	7.3	16.44	16.60	5.4
79.33	6.7	4.44	0.52	8.5	16.86	17.04	6.1
79.40	7.6	5.44	0.56	9.7	17.28	17.48	6.7
79.47	8.4	6.52	0.60	10.9	17.70	17.93	7.4
79.54	9.2	7.69	0.63	12.2	18.12	18.37	8.1
79.61	10.1	8.94	0.66	13.5	18.54	18.81	8.7
79.68	10.9	10.28	0.70	14.8	18.96	19.26	9.3
79.75	11.8	11.70	0.73	16.1	19.38	19.70	10.0
79.82	12.6	13.21	0.76	17.5	19.80	20.14	10.6
79.89	13.4	14.81	0.78	18.9	20.22	20.58	11.2
79.96	14.3	16.49	0.81	20.3	20.64	21.03	11.8
80.03	15.1	18.26	0.84	21.8	21.06	21.47	12.4
80.10	16.0	20.11	0.86	23.3	21.48	21.91	13.0
80.17	16.8	22.05	0.89	24.8	21.90	22.35	13.6
80.24	17.6	24.07	0.91	26.3	22.32	22.80	14.2
80.31	18.5	26.19	0.94	27.9	22.74	23.24	14.7
80.38	19.3	28.39	0.96	29.5	23.16	23.68	15.3
80.45	20.2	30.68	0.98	31.1	23.58	24.13	15.9
80.52	21.0	33.06	1.01	32.8	24.00	24.57	16.4
80.59	21.8	35.52	1.03	34.5	24.42	25.01	17.0
80.66	22.7	38.08	1.05	36.2	24.84	25.45	17.5
80.73	23.5	40.73	1.07	38.0	25.26	25.90	18.0

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHE2 (CH-E2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.80	24.4	43.48	1.09	39.8	25.68	26.34	18.6	0.000
80.87	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.068
80.94	26.0	49.24	1.13	43.4	26.52	27.22	19.6	0.094
81.01	26.9	52.26	1.15	45.3	26.94	27.67	20.2	0.105
81.08	27.7	55.38	1.17	47.2	27.36	28.11	20.7	0.112
81.15	28.6	58.59	1.19	49.1	27.78	28.55	21.2	0.117
81.22	29.4	61.90	1.21	51.1	28.20	29.00	21.7	0.121
81.29	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.124
81.36	31.1	68.80	1.25	55.1	29.04	29.88	22.8	0.127
81.43	31.9	72.40	1.27	57.1	29.46	30.32	23.3	0.130
81.50	32.8	76.10	1.29	59.2	29.88	30.77	23.8	0.132
81.57	33.6	79.90	1.30	61.3	30.30	31.21	24.3	
81.64	34.4	83.81	1.32	63.5	30.72	31.65	24.8	
81.71	35.3	87.81	1.34	65.6	31.14	32.09	25.3	
81.78	36.1	91.91	1.36	67.8	31.56	32.54	25.8	
81.85	37.0	96.12	1.37	70.0	31.98	32.98	26.3	
81.92	37.8	100.43	1.39	72.3	32.40	33.42	26.8	
81.99	38.6	104.85	1.41	74.6	32.82	33.87	27.3	
82.06	39.5	109.37	1.42	76.9	33.24	34.31	27.8	
82.13	40.3	114.00	1.44	79.2	33.66	34.75	28.2	
82.20	41.2	118.74	1.46	81.6	34.08	35.19	28.7	
82.27	42.0	123.58	1.47	84.0	34.50	35.64	29.2	
82.34	42.8	128.54	1.49	86.4	34.92	36.08	29.7	
82.41	43.7	133.60	1.50	88.9	35.34	36.52	30.2	
82.48	44.5	138.77	1.52	91.4	35.76	36.96	30.7	
82.50	44.8	140.27	1.52	92.1	35.88	37.09	30.8	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHE2 (CH-E2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.134
0.136
0.137
0.139
0.140
0.142
0.143
0.144
0.145
0.146
0.147
0.148
0.149
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0.164
0.164
0.165
0.165
0.166

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHE2 (CH-E2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.166
0.167
0.167
0.167
0.168

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNE1 (CH-NE1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	80.00 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
80.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
80.01	0.1	0.01	0.04	0.1	13.56	13.56	0.1
80.06	0.7	0.10	0.13	0.8	13.86	13.88	0.7
80.12	1.4	0.33	0.20	1.7	14.22	14.26	1.4
80.18	2.2	0.65	0.26	2.5	14.58	14.64	2.1
80.24	2.9	1.06	0.31	3.4	14.94	15.02	2.7
80.30	3.6	1.54	0.36	4.3	15.30	15.40	3.4
80.36	4.3	2.09	0.40	5.2	15.66	15.78	4.0
80.42	5.0	2.72	0.44	6.2	16.02	16.16	4.6
80.48	5.8	3.41	0.48	7.2	16.38	16.54	5.3
80.54	6.5	4.17	0.51	8.2	16.74	16.92	5.9
80.60	7.2	5.00	0.54	9.2	17.10	17.29	6.4
80.66	7.9	5.89	0.58	10.2	17.46	17.67	7.0
80.72	8.6	6.84	0.61	11.3	17.82	18.05	7.6
80.78	9.4	7.86	0.64	12.4	18.18	18.43	8.2
80.84	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.90	10.8	10.08	0.69	14.6	18.90	19.19	9.3
80.96	11.5	11.29	0.72	15.7	19.26	19.57	9.8
81.02	12.2	12.56	0.74	16.9	19.62	19.95	10.3
81.08	13.0	13.89	0.77	18.1	19.98	20.33	10.9
81.14	13.7	15.28	0.79	19.3	20.34	20.71	11.4
81.20	14.4	16.74	0.82	20.5	20.70	21.09	11.9
81.26	15.1	18.26	0.84	21.8	21.06	21.47	12.4
81.32	15.8	19.84	0.86	23.0	21.42	21.85	12.9
81.38	16.6	21.48	0.88	24.3	21.78	22.23	13.4
81.44	17.3	23.19	0.90	25.7	22.14	22.61	13.9
81.50	18.0	24.97	0.92	27.0	22.50	22.99	14.4
81.56	18.7	26.81	0.95	28.4	22.86	23.37	14.9
81.62	19.4	28.71	0.97	29.7	23.22	23.75	15.4
81.68	20.2	30.68	0.98	31.1	23.58	24.13	15.9

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNE1 (CH-NE1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.74	20.9	32.71	1.00	32.6	23.94	24.50	16.3	0.000
81.80	21.6	34.81	1.02	34.0	24.30	24.88	16.8	0.068
81.86	22.3	36.97	1.04	35.5	24.66	25.26	17.3	0.091
81.92	23.0	39.21	1.06	37.0	25.02	25.64	17.7	0.102
81.98	23.8	41.51	1.08	38.5	25.38	26.02	18.2	0.109
82.04	24.5	43.87	1.10	40.0	25.74	26.40	18.7	0.114
82.10	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.118
82.16	25.9	48.81	1.13	43.2	26.46	27.16	19.6	0.121
82.22	26.6	51.39	1.15	44.8	26.82	27.54	20.0	0.124
82.28	27.4	54.03	1.17	46.4	27.18	27.92	20.5	0.127
82.34	28.1	56.74	1.18	48.0	27.54	28.30	20.9	0.129
82.40	28.8	59.52	1.20	49.7	27.90	28.68	21.4	0.131
82.46	29.5	62.38	1.21	51.4	28.26	29.06	21.8	0.133
82.52	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.135
82.58	31.0	68.30	1.25	54.8	28.98	29.82	22.7	0.136
82.64	31.7	71.36	1.26	56.5	29.34	30.20	23.1	
82.70	32.4	74.51	1.28	58.3	29.70	30.58	23.6	
82.76	33.1	77.72	1.29	60.1	30.06	30.96	24.0	
82.82	33.8	81.01	1.31	61.9	30.42	31.34	24.4	
82.88	34.6	84.37	1.32	63.8	30.78	31.71	24.9	
82.94	35.3	87.81	1.34	65.6	31.14	32.09	25.3	
83.00	36.0	91.32	1.35	67.5	31.50	32.47	25.7	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNE1 (CH-NE1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.137
0.139
0.140
0.141
0.142
0.143
0.144
0.145
0.146
0.147
0.148
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0.163

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNE2 (CH-NE2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	79.65 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
79.65	0.0	0.00	0.00	0.0	0.00	0.00	0.0
79.66	0.1	0.01	0.04	0.1	13.56	13.56	0.1
79.72	0.8	0.13	0.14	1.0	13.92	13.94	0.8
79.79	1.7	0.43	0.22	1.9	14.34	14.39	1.6
79.86	2.5	0.84	0.28	3.0	14.76	14.83	2.4
79.93	3.4	1.37	0.34	4.0	15.18	15.27	3.2
80.00	4.2	2.00	0.39	5.1	15.60	15.71	3.9
80.07	5.0	2.72	0.44	6.2	16.02	16.16	4.6
80.14	5.9	3.54	0.48	7.3	16.44	16.60	5.4
80.21	6.7	4.44	0.52	8.5	16.86	17.04	6.1
80.28	7.6	5.44	0.56	9.7	17.28	17.48	6.7
80.35	8.4	6.52	0.60	10.9	17.70	17.93	7.4
80.42	9.2	7.69	0.63	12.2	18.12	18.37	8.1
80.49	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.56	10.9	10.28	0.70	14.8	18.96	19.26	9.3
80.63	11.8	11.70	0.73	16.1	19.38	19.70	10.0
80.70	12.6	13.21	0.76	17.5	19.80	20.14	10.6
80.77	13.4	14.81	0.78	18.9	20.22	20.58	11.2
80.84	14.3	16.49	0.81	20.3	20.64	21.03	11.8
80.91	15.1	18.26	0.84	21.8	21.06	21.47	12.4
80.98	16.0	20.11	0.86	23.3	21.48	21.91	13.0
81.05	16.8	22.05	0.89	24.8	21.90	22.35	13.6
81.12	17.6	24.07	0.91	26.3	22.32	22.80	14.2
81.19	18.5	26.19	0.94	27.9	22.74	23.24	14.7
81.26	19.3	28.39	0.96	29.5	23.16	23.68	15.3
81.33	20.2	30.68	0.98	31.1	23.58	24.13	15.9
81.40	21.0	33.06	1.01	32.8	24.00	24.57	16.4
81.47	21.8	35.52	1.03	34.5	24.42	25.01	17.0
81.54	22.7	38.08	1.05	36.2	24.84	25.45	17.5
81.61	23.5	40.73	1.07	38.0	25.26	25.90	18.0

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNE2 (CH-NE2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.68	24.4	43.48	1.09	39.8	25.68	26.34	18.6	0.000
81.75	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.068
81.82	26.0	49.24	1.13	43.4	26.52	27.22	19.6	0.094
81.89	26.9	52.26	1.15	45.3	26.94	27.67	20.2	0.105
81.96	27.7	55.38	1.17	47.2	27.36	28.11	20.7	0.112
82.03	28.6	58.59	1.19	49.1	27.78	28.55	21.2	0.117
82.10	29.4	61.90	1.21	51.1	28.20	29.00	21.7	0.121
82.17	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.124
82.24	31.1	68.80	1.25	55.1	29.04	29.88	22.8	0.127
82.31	31.9	72.40	1.27	57.1	29.46	30.32	23.3	0.130
82.38	32.8	76.10	1.29	59.2	29.88	30.77	23.8	0.132
82.45	33.6	79.90	1.30	61.3	30.30	31.21	24.3	0.134
82.52	34.4	83.81	1.32	63.5	30.72	31.65	24.8	0.136
82.59	35.3	87.81	1.34	65.6	31.14	32.09	25.3	0.137
82.66	36.1	91.91	1.36	67.8	31.56	32.54	25.8	0.139
82.73	37.0	96.12	1.37	70.0	31.98	32.98	26.3	0.140
82.80	37.8	100.43	1.39	72.3	32.40	33.42	26.8	0.142
82.87	38.6	104.85	1.41	74.6	32.82	33.87	27.3	
82.94	39.5	109.37	1.42	76.9	33.24	34.31	27.8	
83.00	40.2	113.34	1.44	78.9	33.60	34.69	28.2	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNE2 (CH-NE2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.143
0.144
0.145
0.146
0.147
0.148
0.149
0.150
0.151
0.152
0.153
0.153
0.154
0.155
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0.156
0.157
0.158
0.158
0.159
0.159
0.160
0.160
0.161
0.161
0.162
0.163
0.163
0.163
0.164
0.164
0.165
0.165

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNW1 (CH-NW1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	80.00 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
80.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
80.01	0.1	0.01	0.04	0.1	13.56	13.56	0.1
80.06	0.7	0.10	0.13	0.8	13.86	13.88	0.7
80.12	1.4	0.33	0.20	1.7	14.22	14.26	1.4
80.18	2.2	0.65	0.26	2.5	14.58	14.64	2.1
80.24	2.9	1.06	0.31	3.4	14.94	15.02	2.7
80.30	3.6	1.54	0.36	4.3	15.30	15.40	3.4
80.36	4.3	2.09	0.40	5.2	15.66	15.78	4.0
80.42	5.0	2.72	0.44	6.2	16.02	16.16	4.6
80.48	5.8	3.41	0.48	7.2	16.38	16.54	5.3
80.54	6.5	4.17	0.51	8.2	16.74	16.92	5.9
80.60	7.2	5.00	0.54	9.2	17.10	17.29	6.4
80.66	7.9	5.89	0.58	10.2	17.46	17.67	7.0
80.72	8.6	6.84	0.61	11.3	17.82	18.05	7.6
80.78	9.4	7.86	0.64	12.4	18.18	18.43	8.2
80.84	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.90	10.8	10.08	0.69	14.6	18.90	19.19	9.3
80.96	11.5	11.29	0.72	15.7	19.26	19.57	9.8
81.02	12.2	12.56	0.74	16.9	19.62	19.95	10.3
81.08	13.0	13.89	0.77	18.1	19.98	20.33	10.9
81.14	13.7	15.28	0.79	19.3	20.34	20.71	11.4
81.20	14.4	16.74	0.82	20.5	20.70	21.09	11.9
81.26	15.1	18.26	0.84	21.8	21.06	21.47	12.4
81.32	15.8	19.84	0.86	23.0	21.42	21.85	12.9
81.38	16.6	21.48	0.88	24.3	21.78	22.23	13.4
81.44	17.3	23.19	0.90	25.7	22.14	22.61	13.9
81.50	18.0	24.97	0.92	27.0	22.50	22.99	14.4
81.56	18.7	26.81	0.95	28.4	22.86	23.37	14.9
81.62	19.4	28.71	0.97	29.7	23.22	23.75	15.4
81.68	20.2	30.68	0.98	31.1	23.58	24.13	15.9

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNW1 (CH-NW1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.74	20.9	32.71	1.00	32.6	23.94	24.50	16.3	0.000
81.80	21.6	34.81	1.02	34.0	24.30	24.88	16.8	0.068
81.86	22.3	36.97	1.04	35.5	24.66	25.26	17.3	0.091
81.92	23.0	39.21	1.06	37.0	25.02	25.64	17.7	0.102
81.98	23.8	41.51	1.08	38.5	25.38	26.02	18.2	0.109
82.04	24.5	43.87	1.10	40.0	25.74	26.40	18.7	0.114
82.10	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.118
82.16	25.9	48.81	1.13	43.2	26.46	27.16	19.6	0.121
82.22	26.6	51.39	1.15	44.8	26.82	27.54	20.0	0.124
82.28	27.4	54.03	1.17	46.4	27.18	27.92	20.5	0.127
82.34	28.1	56.74	1.18	48.0	27.54	28.30	20.9	0.129
82.40	28.8	59.52	1.20	49.7	27.90	28.68	21.4	0.131
82.46	29.5	62.38	1.21	51.4	28.26	29.06	21.8	0.133
82.52	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.135
82.58	31.0	68.30	1.25	54.8	28.98	29.82	22.7	0.136
82.64	31.7	71.36	1.26	56.5	29.34	30.20	23.1	
82.70	32.4	74.51	1.28	58.3	29.70	30.58	23.6	
82.76	33.1	77.72	1.29	60.1	30.06	30.96	24.0	
82.82	33.8	81.01	1.31	61.9	30.42	31.34	24.4	
82.88	34.6	84.37	1.32	63.8	30.78	31.71	24.9	
82.94	35.3	87.81	1.34	65.6	31.14	32.09	25.3	
83.00	36.0	91.32	1.35	67.5	31.50	32.47	25.7	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNW1 (CH-NW1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.137
0.139
0.140
0.141
0.142
0.143
0.144
0.145
0.146
0.147
0.148
0.149
0.150
0.150
0.151
0.152
0.152
0.153
0.154
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0.156
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0.159
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0.160
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0.161
0.161
0.162
0.162
0.163
0.163

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNW2 (CH-NW2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	79.63 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
79.63	0.0	0.00	0.00	0.0	0.00	0.00	0.0
79.64	0.1	0.01	0.04	0.1	13.56	13.56	0.1
79.70	0.8	0.13	0.14	1.0	13.92	13.94	0.8
79.77	1.7	0.43	0.22	1.9	14.34	14.39	1.6
79.84	2.5	0.84	0.28	3.0	14.76	14.83	2.4
79.91	3.4	1.37	0.34	4.0	15.18	15.27	3.2
79.98	4.2	2.00	0.39	5.1	15.60	15.71	3.9
80.05	5.0	2.72	0.44	6.2	16.02	16.16	4.6
80.12	5.9	3.54	0.48	7.3	16.44	16.60	5.4
80.19	6.7	4.44	0.52	8.5	16.86	17.04	6.1
80.26	7.6	5.44	0.56	9.7	17.28	17.48	6.7
80.33	8.4	6.52	0.60	10.9	17.70	17.93	7.4
80.40	9.2	7.69	0.63	12.2	18.12	18.37	8.1
80.47	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.54	10.9	10.28	0.70	14.8	18.96	19.26	9.3
80.61	11.8	11.70	0.73	16.1	19.38	19.70	10.0
80.68	12.6	13.21	0.76	17.5	19.80	20.14	10.6
80.75	13.4	14.81	0.78	18.9	20.22	20.58	11.2
80.82	14.3	16.49	0.81	20.3	20.64	21.03	11.8
80.89	15.1	18.26	0.84	21.8	21.06	21.47	12.4
80.96	16.0	20.11	0.86	23.3	21.48	21.91	13.0
81.03	16.8	22.05	0.89	24.8	21.90	22.35	13.6
81.10	17.6	24.07	0.91	26.3	22.32	22.80	14.2
81.17	18.5	26.19	0.94	27.9	22.74	23.24	14.7
81.24	19.3	28.39	0.96	29.5	23.16	23.68	15.3
81.31	20.2	30.68	0.98	31.1	23.58	24.13	15.9
81.38	21.0	33.06	1.01	32.8	24.00	24.57	16.4
81.45	21.8	35.52	1.03	34.5	24.42	25.01	17.0
81.52	22.7	38.08	1.05	36.2	24.84	25.45	17.5
81.59	23.5	40.73	1.07	38.0	25.26	25.90	18.0

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNW2 (CH-NW2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.66	24.4	43.48	1.09	39.8	25.68	26.34	18.6	0.000
81.73	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.068
81.80	26.0	49.24	1.13	43.4	26.52	27.22	19.6	0.094
81.87	26.9	52.26	1.15	45.3	26.94	27.67	20.2	0.105
81.94	27.7	55.38	1.17	47.2	27.36	28.11	20.7	0.112
82.01	28.6	58.59	1.19	49.1	27.78	28.55	21.2	0.117
82.08	29.4	61.90	1.21	51.1	28.20	29.00	21.7	0.121
82.15	30.2	65.30	1.23	53.1	28.62	29.44	22.3	0.124
82.22	31.1	68.80	1.25	55.1	29.04	29.88	22.8	0.127
82.29	31.9	72.40	1.27	57.1	29.46	30.32	23.3	0.130
82.36	32.8	76.10	1.29	59.2	29.88	30.77	23.8	0.132
82.43	33.6	79.90	1.30	61.3	30.30	31.21	24.3	0.134
82.50	34.4	83.81	1.32	63.5	30.72	31.65	24.8	0.136
82.57	35.3	87.81	1.34	65.6	31.14	32.09	25.3	0.137
82.64	36.1	91.91	1.36	67.8	31.56	32.54	25.8	0.139
82.71	37.0	96.12	1.37	70.0	31.98	32.98	26.3	0.140
82.78	37.8	100.43	1.39	72.3	32.40	33.42	26.8	
82.85	38.6	104.85	1.41	74.6	32.82	33.87	27.3	
82.92	39.5	109.37	1.42	76.9	33.24	34.31	27.8	
82.99	40.3	114.00	1.44	79.2	33.66	34.75	28.2	
83.00	40.4	114.67	1.44	79.6	33.72	34.81	28.3	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHNW2 (CH-NW2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.142
0.143
0.144
0.145
0.146
0.147
0.148
0.149
0.150
0.151
0.152
0.153
0.153
0.154
0.155
0.156
0.156
0.157
0.158
0.158
0.159
0.159
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0.160
0.161
0.161
0.162
0.163
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0.164
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0.165
0.165
0.165

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHS1 (CH-S1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	76.20 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
76.20	0.0	0.00	0.00	0.0	0.00	0.00	0.0
76.21	0.1	0.01	0.04	0.1	13.56	13.56	0.1
76.34	1.7	0.43	0.22	1.9	14.34	14.39	1.6
76.48	3.4	1.37	0.34	4.0	15.18	15.27	3.2
76.62	5.0	2.72	0.44	6.2	16.02	16.16	4.6
76.76	6.7	4.44	0.52	8.5	16.86	17.04	6.1
76.90	8.4	6.52	0.60	10.9	17.70	17.93	7.4
77.04	10.1	8.94	0.66	13.5	18.54	18.81	8.7
77.18	11.8	11.70	0.73	16.1	19.38	19.70	10.0
77.32	13.4	14.81	0.78	18.9	20.22	20.58	11.2
77.46	15.1	18.26	0.84	21.8	21.06	21.47	12.4
77.60	16.8	22.05	0.89	24.8	21.90	22.35	13.6
77.74	18.5	26.19	0.94	27.9	22.74	23.24	14.7
77.88	20.2	30.68	0.98	31.1	23.58	24.13	15.9
78.02	21.8	35.52	1.03	34.5	24.42	25.01	17.0
78.16	23.5	40.73	1.07	38.0	25.26	25.90	18.0
78.30	25.2	46.31	1.11	41.6	26.10	26.78	19.1
78.44	26.9	52.26	1.15	45.3	26.94	27.67	20.2
78.58	28.6	58.59	1.19	49.1	27.78	28.55	21.2
78.72	30.2	65.30	1.23	53.1	28.62	29.44	22.3
78.86	31.9	72.40	1.27	57.1	29.46	30.32	23.3
79.00	33.6	79.90	1.30	61.3	30.30	31.21	24.3
79.14	35.3	87.81	1.34	65.6	31.14	32.09	25.3
79.28	37.0	96.12	1.37	70.0	31.98	32.98	26.3
79.42	38.6	104.85	1.41	74.6	32.82	33.87	27.3
79.56	40.3	114.00	1.44	79.2	33.66	34.75	28.2
79.70	42.0	123.58	1.47	84.0	34.50	35.64	29.2
79.84	43.7	133.60	1.50	88.9	35.34	36.52	30.2
79.98	45.4	144.05	1.53	93.9	36.18	37.41	31.1
80.12	47.0	154.96	1.56	99.0	37.02	38.29	32.1

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHS1 (CH-S1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.26	48.7	166.31	1.60	104.3	37.86	39.18	33.0	0.000
80.40	50.4	178.13	1.62	109.6	38.70	40.06	34.0	0.068
80.54	52.1	190.41	1.65	115.1	39.54	40.95	34.9	0.105
80.68	53.8	203.17	1.68	120.7	40.38	41.83	35.9	0.117
80.82	55.4	216.40	1.71	126.4	41.22	42.72	36.8	0.124
80.96	57.1	230.12	1.74	132.2	42.06	43.60	37.7	0.130
81.10	58.8	244.33	1.77	138.2	42.90	44.49	38.7	0.134
81.24	60.5	259.04	1.80	144.2	43.74	45.38	39.6	0.137
81.38	62.2	274.25	1.82	150.4	44.58	46.26	40.5	0.140
81.52	63.8	289.97	1.85	156.7	45.42	47.15	41.4	0.143
81.66	65.5	306.21	1.88	163.1	46.26	48.03	42.3	0.145
81.80	67.2	322.97	1.90	169.7	47.10	48.92	43.2	0.147
81.94	68.9	340.26	1.93	176.3	47.94	49.80	44.1	0.149
82.08	70.6	358.08	1.96	183.1	48.78	50.69	45.0	0.151
82.22	72.2	376.43	1.98	190.0	49.62	51.57	45.9	0.153
82.36	73.9	395.34	2.01	197.0	50.46	52.46	46.8	0.154
82.50	75.6	414.80	2.03	204.1	51.30	53.34	47.7	
82.64	77.3	434.81	2.06	211.4	52.14	54.23	48.6	
82.78	79.0	455.39	2.08	218.7	52.98	55.12	49.5	
82.92	80.6	476.54	2.11	226.2	53.82	56.00	50.4	
83.00	81.6	488.88	2.12	230.5	54.30	56.51	50.9	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHS1 (CH-S1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.156
0.157
0.158
0.159
0.160
0.161
0.163
0.163
0.164
0.165
0.166
0.167
0.168
0.169
0.169
0.170
0.171
0.172
0.172
0.173
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0.176
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0.177
0.178
0.179
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0.180
0.180
0.181
0.181
0.181

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHS2 (CH-S2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	75.91 ft
Bottom Width	13.00 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
75.91	0.0	0.00	0.00	0.0	0.00	0.00	0.0
75.92	0.1	0.01	0.04	0.1	13.06	13.06	0.1
76.05	1.7	0.41	0.22	1.9	13.84	13.89	1.6
76.19	3.4	1.32	0.34	3.9	14.68	14.77	3.2
76.33	5.0	2.62	0.44	6.0	15.52	15.66	4.6
76.47	6.7	4.28	0.52	8.2	16.36	16.54	6.0
76.61	8.4	6.29	0.60	10.6	17.20	17.43	7.4
76.75	10.1	8.63	0.66	13.0	18.04	18.31	8.7
76.89	11.8	11.31	0.72	15.6	18.88	19.20	9.9
77.03	13.4	14.32	0.78	18.3	19.72	20.08	11.2
77.17	15.1	17.66	0.84	21.1	20.56	20.97	12.3
77.31	16.8	21.34	0.89	24.1	21.40	21.85	13.5
77.45	18.5	25.36	0.93	27.1	22.24	22.74	14.6
77.59	20.2	29.72	0.98	30.3	23.08	23.63	15.8
77.73	21.8	34.44	1.02	33.6	23.92	24.51	16.9
77.87	23.5	39.51	1.07	37.0	24.76	25.40	17.9
78.01	25.2	44.94	1.11	40.5	25.60	26.28	19.0
78.15	26.9	50.74	1.15	44.2	26.44	27.17	20.0
78.29	28.6	56.91	1.19	47.9	27.28	28.05	21.1
78.43	30.2	63.46	1.22	51.8	28.12	28.94	22.1
78.57	31.9	70.39	1.26	55.8	28.96	29.82	23.1
78.71	33.6	77.72	1.30	59.9	29.80	30.71	24.1
78.85	35.3	85.44	1.33	64.2	30.64	31.59	25.1
78.99	37.0	93.57	1.37	68.5	31.48	32.48	26.1
79.13	38.6	102.11	1.40	73.0	32.32	33.37	27.1
79.27	40.3	111.07	1.43	77.5	33.16	34.25	28.1
79.41	42.0	120.45	1.46	82.3	34.00	35.14	29.0
79.55	43.7	130.26	1.50	87.1	34.84	36.02	30.0
79.69	45.4	140.51	1.53	92.0	35.68	36.91	30.9
79.83	47.0	151.20	1.56	97.1	36.52	37.79	31.9

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHS2 (CH-S2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
79.97	48.7	162.34	1.59	102.2	37.36	38.68	32.8	0.000
80.11	50.4	173.93	1.62	107.5	38.20	39.56	33.8	0.068
80.25	52.1	185.99	1.65	112.9	39.04	40.45	34.7	0.105
80.39	53.8	198.51	1.68	118.5	39.88	41.33	35.6	0.117
80.53	55.4	211.51	1.70	124.1	40.72	42.22	36.6	0.124
80.67	57.1	224.99	1.73	129.9	41.56	43.10	37.5	0.130
80.81	58.8	238.95	1.76	135.7	42.40	43.99	38.4	0.134
80.95	60.5	253.41	1.79	141.7	43.24	44.88	39.3	0.137
81.09	62.2	268.37	1.82	147.8	44.08	45.76	40.2	0.140
81.23	63.8	283.83	1.84	154.1	44.92	46.65	41.2	0.143
81.37	65.5	299.80	1.87	160.4	45.76	47.53	42.1	0.145
81.51	67.2	316.30	1.90	166.9	46.60	48.42	43.0	0.147
81.65	68.9	333.31	1.92	173.5	47.44	49.30	43.9	0.149
81.79	70.6	350.86	1.95	180.2	48.28	50.19	44.8	0.151
81.93	72.2	368.94	1.97	187.0	49.12	51.07	45.7	
82.07	73.9	387.56	2.00	193.9	49.96	51.96	46.6	
82.21	75.6	406.73	2.02	201.0	50.80	52.84	47.5	
82.35	77.3	426.45	2.05	208.1	51.64	53.73	48.4	
82.49	79.0	446.74	2.07	215.4	52.48	54.62	49.3	
82.63	80.6	467.58	2.10	222.8	53.32	55.50	50.2	
82.77	82.3	489.00	2.12	230.4	54.16	56.39	51.0	
82.91	84.0	511.00	2.15	238.0	55.00	57.27	51.9	
83.00	85.1	525.45	2.16	243.0	55.54	57.84	52.5	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHS2 (CH-S2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.152
0.154
0.155
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Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHS3 (CH-S3) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	77.42 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
77.42	0.0	0.00	0.00	0.0	0.00	0.00	0.0
77.43	0.1	0.01	0.04	0.1	13.56	13.56	0.1
77.53	1.3	0.29	0.19	1.5	14.16	14.20	1.3
77.64	2.6	0.91	0.29	3.1	14.82	14.89	2.5
77.75	4.0	1.81	0.38	4.8	15.48	15.59	3.7
77.86	5.3	2.94	0.45	6.5	16.14	16.28	4.8
77.97	6.6	4.31	0.52	8.3	16.80	16.98	6.0
78.08	7.9	5.89	0.58	10.2	17.46	17.67	7.0
78.19	9.2	7.69	0.63	12.2	18.12	18.37	8.1
78.30	10.6	9.70	0.68	14.2	18.78	19.07	9.1
78.41	11.9	11.91	0.73	16.3	19.44	19.76	10.1
78.52	13.2	14.34	0.78	18.5	20.10	20.46	11.0
78.63	14.5	16.99	0.82	20.7	20.76	21.15	12.0
78.74	15.8	19.84	0.86	23.0	21.42	21.85	12.9
78.85	17.2	22.90	0.90	25.4	22.08	22.54	13.8
78.96	18.5	26.19	0.94	27.9	22.74	23.24	14.7
79.07	19.8	29.68	0.98	30.4	23.40	23.94	15.6
79.18	21.1	33.40	1.01	33.1	24.06	24.63	16.5
79.29	22.4	37.34	1.04	35.7	24.72	25.33	17.3
79.40	23.8	41.51	1.08	38.5	25.38	26.02	18.2
79.51	25.1	45.90	1.11	41.3	26.04	26.72	19.0
79.62	26.4	50.52	1.14	44.2	26.70	27.41	19.9
79.73	27.7	55.38	1.17	47.2	27.36	28.11	20.7
79.84	29.0	60.47	1.20	50.2	28.02	28.81	21.5
79.95	30.4	65.79	1.23	53.4	28.68	29.50	22.3
80.06	31.7	71.36	1.26	56.5	29.34	30.20	23.1
80.17	33.0	77.18	1.29	59.8	30.00	30.89	23.9
80.28	34.3	83.24	1.32	63.1	30.66	31.59	24.7
80.39	35.6	89.56	1.35	66.6	31.32	32.28	25.5
80.50	37.0	96.12	1.37	70.0	31.98	32.98	26.3

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHS3 (CH-S3) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.61	38.3	102.95	1.40	73.6	32.64	33.68	27.1	0.000
80.72	39.6	110.03	1.42	77.2	33.30	34.37	27.8	0.068
80.83	40.9	117.38	1.45	80.9	33.96	35.07	28.6	0.101
80.94	42.2	124.99	1.48	84.7	34.62	35.76	29.4	0.113
81.05	43.6	132.87	1.50	88.5	35.28	36.46	30.1	0.120
81.16	44.9	141.02	1.53	92.5	35.94	37.15	30.9	0.125
81.27	46.2	149.45	1.55	96.4	36.60	37.85	31.6	0.129
81.38	47.5	158.16	1.57	100.5	37.26	38.55	32.4	0.133
81.49	48.8	167.14	1.60	104.6	37.92	39.24	33.1	0.136
81.60	50.2	176.41	1.62	108.8	38.58	39.94	33.9	0.138
81.71	51.5	185.97	1.64	113.1	39.24	40.63	34.6	0.141
81.82	52.8	195.82	1.67	117.5	39.90	41.33	35.3	0.143
81.93	54.1	205.97	1.69	121.9	40.56	42.02	36.1	0.145
82.04	55.4	216.40	1.71	126.4	41.22	42.72	36.8	0.146
82.15	56.8	227.14	1.73	131.0	41.88	43.42	37.5	
82.26	58.1	238.18	1.76	135.6	42.54	44.11	38.3	
82.37	59.4	249.53	1.78	140.3	43.20	44.81	39.0	
82.48	60.7	261.18	1.80	145.1	43.86	45.50	39.7	
82.59	62.0	273.15	1.82	150.0	44.52	46.20	40.4	
82.70	63.4	285.43	1.84	154.9	45.18	46.89	41.1	
82.81	64.7	298.03	1.86	159.9	45.84	47.59	41.9	
82.92	66.0	310.95	1.88	165.0	46.50	48.29	42.6	
83.00	67.0	320.54	1.90	168.7	46.98	48.79	43.1	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHS3 (CH-S3) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.148
0.149
0.151
0.152
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Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSE1 (CH-SE1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	77.45 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
77.45	0.0	0.00	0.00	0.0	0.00	0.00	0.0
77.46	0.1	0.01	0.04	0.1	13.56	13.56	0.1
77.56	1.3	0.29	0.19	1.5	14.16	14.20	1.3
77.67	2.6	0.91	0.29	3.1	14.82	14.89	2.5
77.78	4.0	1.81	0.38	4.8	15.48	15.59	3.7
77.89	5.3	2.94	0.45	6.5	16.14	16.28	4.8
78.00	6.6	4.31	0.52	8.3	16.80	16.98	6.0
78.11	7.9	5.89	0.58	10.2	17.46	17.67	7.0
78.22	9.2	7.69	0.63	12.2	18.12	18.37	8.1
78.33	10.6	9.70	0.68	14.2	18.78	19.07	9.1
78.44	11.9	11.91	0.73	16.3	19.44	19.76	10.1
78.55	13.2	14.34	0.78	18.5	20.10	20.46	11.0
78.66	14.5	16.99	0.82	20.7	20.76	21.15	12.0
78.77	15.8	19.84	0.86	23.0	21.42	21.85	12.9
78.88	17.2	22.90	0.90	25.4	22.08	22.54	13.8
78.99	18.5	26.19	0.94	27.9	22.74	23.24	14.7
79.10	19.8	29.68	0.98	30.4	23.40	23.94	15.6
79.21	21.1	33.40	1.01	33.1	24.06	24.63	16.5
79.32	22.4	37.34	1.04	35.7	24.72	25.33	17.3
79.43	23.8	41.51	1.08	38.5	25.38	26.02	18.2
79.54	25.1	45.90	1.11	41.3	26.04	26.72	19.0
79.65	26.4	50.52	1.14	44.2	26.70	27.41	19.9
79.76	27.7	55.38	1.17	47.2	27.36	28.11	20.7
79.87	29.0	60.47	1.20	50.2	28.02	28.81	21.5
79.98	30.4	65.79	1.23	53.4	28.68	29.50	22.3
80.09	31.7	71.36	1.26	56.5	29.34	30.20	23.1
80.20	33.0	77.18	1.29	59.8	30.00	30.89	23.9
80.31	34.3	83.24	1.32	63.1	30.66	31.59	24.7
80.42	35.6	89.56	1.35	66.6	31.32	32.28	25.5
80.53	37.0	96.12	1.37	70.0	31.98	32.98	26.3

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSE1 (CH-SE1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.64	38.3	102.95	1.40	73.6	32.64	33.68	27.1	0.000
80.75	39.6	110.03	1.42	77.2	33.30	34.37	27.8	0.068
80.86	40.9	117.38	1.45	80.9	33.96	35.07	28.6	0.101
80.97	42.2	124.99	1.48	84.7	34.62	35.76	29.4	0.113
81.08	43.6	132.87	1.50	88.5	35.28	36.46	30.1	0.120
81.19	44.9	141.02	1.53	92.5	35.94	37.15	30.9	0.125
81.30	46.2	149.45	1.55	96.4	36.60	37.85	31.6	0.129
81.41	47.5	158.16	1.57	100.5	37.26	38.55	32.4	0.133
81.52	48.8	167.14	1.60	104.6	37.92	39.24	33.1	0.136
81.63	50.2	176.41	1.62	108.8	38.58	39.94	33.9	0.138
81.74	51.5	185.97	1.64	113.1	39.24	40.63	34.6	0.141
81.85	52.8	195.82	1.67	117.5	39.90	41.33	35.3	0.143
81.96	54.1	205.97	1.69	121.9	40.56	42.02	36.1	0.145
82.07	55.4	216.40	1.71	126.4	41.22	42.72	36.8	0.146
82.18	56.8	227.14	1.73	131.0	41.88	43.42	37.5	
82.29	58.1	238.18	1.76	135.6	42.54	44.11	38.3	
82.40	59.4	249.53	1.78	140.3	43.20	44.81	39.0	
82.51	60.7	261.18	1.80	145.1	43.86	45.50	39.7	
82.62	62.0	273.15	1.82	150.0	44.52	46.20	40.4	
82.73	63.4	285.43	1.84	154.9	45.18	46.89	41.1	
82.84	64.7	298.03	1.86	159.9	45.84	47.59	41.9	
82.95	66.0	310.95	1.88	165.0	46.50	48.29	42.6	
83.00	66.6	316.92	1.89	167.3	46.80	48.60	42.9	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSE1 (CH-SE1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.148
0.149
0.151
0.152
0.153
0.154
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Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSE2 (CH-SE2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	75.61 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
75.61	0.0	0.00	0.00	0.0	0.00	0.00	0.0
75.62	0.1	0.01	0.04	0.1	13.56	13.56	0.1
75.76	1.8	0.48	0.23	2.1	14.40	14.45	1.7
75.91	3.6	1.54	0.36	4.3	15.30	15.40	3.4
76.06	5.4	3.06	0.46	6.7	16.20	16.35	5.0
76.21	7.2	5.00	0.54	9.2	17.10	17.29	6.4
76.36	9.0	7.34	0.62	11.8	18.00	18.24	7.9
76.51	10.8	10.08	0.69	14.6	18.90	19.19	9.3
76.66	12.6	13.21	0.76	17.5	19.80	20.14	10.6
76.81	14.4	16.74	0.82	20.5	20.70	21.09	11.9
76.96	16.2	20.65	0.87	23.7	21.60	22.04	13.2
77.11	18.0	24.97	0.92	27.0	22.50	22.99	14.4
77.26	19.8	29.68	0.98	30.4	23.40	23.94	15.6
77.41	21.6	34.81	1.02	34.0	24.30	24.88	16.8
77.56	23.4	40.35	1.07	37.7	25.20	25.83	18.0
77.71	25.2	46.31	1.11	41.6	26.10	26.78	19.1
77.86	27.0	52.70	1.16	45.6	27.00	27.73	20.3
78.01	28.8	59.52	1.20	49.7	27.90	28.68	21.4
78.16	30.6	66.79	1.24	53.9	28.80	29.63	22.5
78.31	32.4	74.51	1.28	58.3	29.70	30.58	23.6
78.46	34.2	82.68	1.32	62.8	30.60	31.52	24.6
78.61	36.0	91.32	1.35	67.5	31.50	32.47	25.7
78.76	37.8	100.43	1.39	72.3	32.40	33.42	26.8
78.91	39.6	110.03	1.42	77.2	33.30	34.37	27.8
79.06	41.4	120.11	1.46	82.3	34.20	35.32	28.9
79.21	43.2	130.69	1.49	87.5	35.10	36.27	29.9
79.36	45.0	141.78	1.53	92.8	36.00	37.22	30.9
79.51	46.8	153.37	1.56	98.3	36.90	38.17	32.0
79.66	48.6	165.49	1.59	103.9	37.80	39.11	33.0
79.81	50.4	178.13	1.62	109.6	38.70	40.06	34.0

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSE2 (CH-SE2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
79.96	52.2	191.31	1.66	115.5	39.60	41.01	35.0	0.000
80.11	54.0	205.03	1.69	121.5	40.50	41.96	36.0	0.068
80.26	55.8	219.30	1.72	127.6	41.40	42.91	37.0	0.106
80.41	57.6	234.13	1.75	133.9	42.30	43.86	38.0	0.118
80.56	59.4	249.53	1.78	140.3	43.20	44.81	39.0	0.126
80.71	61.2	265.50	1.81	146.9	44.10	45.76	40.0	0.131
80.86	63.0	282.05	1.84	153.6	45.00	46.70	41.0	0.135
81.01	64.8	299.19	1.87	160.4	45.90	47.65	41.9	0.139
81.16	66.6	316.92	1.89	167.3	46.80	48.60	42.9	0.142
81.31	68.4	335.26	1.92	174.4	47.70	49.55	43.9	0.144
81.46	70.2	354.21	1.95	181.6	48.60	50.50	44.9	0.147
81.61	72.0	373.78	1.98	189.0	49.50	51.45	45.8	0.149
81.76	73.8	393.97	2.01	196.5	50.40	52.40	46.8	0.151
81.91	75.6	414.80	2.03	204.1	51.30	53.34	47.7	0.152
82.06	77.4	436.26	2.06	211.9	52.20	54.29	48.7	0.154
82.21	79.2	458.37	2.09	219.8	53.10	55.24	49.7	
82.36	81.0	481.14	2.11	227.8	54.00	56.19	50.6	
82.51	82.8	504.57	2.14	236.0	54.90	57.14	51.6	
82.66	84.6	528.67	2.16	244.3	55.80	58.09	52.5	
82.81	86.4	553.44	2.19	252.7	56.70	59.04	53.5	
82.96	88.2	578.90	2.22	261.3	57.60	59.99	54.4	
83.00	88.7	585.80	2.22	263.6	57.84	60.24	54.7	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSE2 (CH-SE2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.156
0.157
0.158
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Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSW1 (CH-SW1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	76.06 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
76.06	0.0	0.00	0.00	0.0	0.00	0.00	0.0
76.07	0.1	0.01	0.04	0.1	13.56	13.56	0.1
76.20	1.7	0.43	0.22	1.9	14.34	14.39	1.6
76.34	3.4	1.37	0.34	4.0	15.18	15.27	3.2
76.48	5.0	2.72	0.44	6.2	16.02	16.16	4.6
76.62	6.7	4.44	0.52	8.5	16.86	17.04	6.1
76.76	8.4	6.52	0.60	10.9	17.70	17.93	7.4
76.90	10.1	8.94	0.66	13.5	18.54	18.81	8.7
77.04	11.8	11.70	0.73	16.1	19.38	19.70	10.0
77.18	13.4	14.81	0.78	18.9	20.22	20.58	11.2
77.32	15.1	18.26	0.84	21.8	21.06	21.47	12.4
77.46	16.8	22.05	0.89	24.8	21.90	22.35	13.6
77.60	18.5	26.19	0.94	27.9	22.74	23.24	14.7
77.74	20.2	30.68	0.98	31.1	23.58	24.13	15.9
77.88	21.8	35.52	1.03	34.5	24.42	25.01	17.0
78.02	23.5	40.73	1.07	38.0	25.26	25.90	18.0
78.16	25.2	46.31	1.11	41.6	26.10	26.78	19.1
78.30	26.9	52.26	1.15	45.3	26.94	27.67	20.2
78.44	28.6	58.59	1.19	49.1	27.78	28.55	21.2
78.58	30.2	65.30	1.23	53.1	28.62	29.44	22.3
78.72	31.9	72.40	1.27	57.1	29.46	30.32	23.3
78.86	33.6	79.90	1.30	61.3	30.30	31.21	24.3
79.00	35.3	87.81	1.34	65.6	31.14	32.09	25.3
79.14	37.0	96.12	1.37	70.0	31.98	32.98	26.3
79.28	38.6	104.85	1.41	74.6	32.82	33.87	27.3
79.42	40.3	114.00	1.44	79.2	33.66	34.75	28.2
79.56	42.0	123.58	1.47	84.0	34.50	35.64	29.2
79.70	43.7	133.60	1.50	88.9	35.34	36.52	30.2
79.84	45.4	144.05	1.53	93.9	36.18	37.41	31.1
79.98	47.0	154.96	1.56	99.0	37.02	38.29	32.1

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSW1 (CH-SW1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.12	48.7	166.31	1.60	104.3	37.86	39.18	33.0	0.000
80.26	50.4	178.13	1.62	109.6	38.70	40.06	34.0	0.068
80.40	52.1	190.41	1.65	115.1	39.54	40.95	34.9	0.105
80.54	53.8	203.17	1.68	120.7	40.38	41.83	35.9	0.117
80.68	55.4	216.40	1.71	126.4	41.22	42.72	36.8	0.124
80.82	57.1	230.12	1.74	132.2	42.06	43.60	37.7	0.130
80.96	58.8	244.33	1.77	138.2	42.90	44.49	38.7	0.134
81.10	60.5	259.04	1.80	144.2	43.74	45.38	39.6	0.137
81.24	62.2	274.25	1.82	150.4	44.58	46.26	40.5	0.140
81.38	63.8	289.97	1.85	156.7	45.42	47.15	41.4	0.143
81.52	65.5	306.21	1.88	163.1	46.26	48.03	42.3	0.145
81.66	67.2	322.97	1.90	169.7	47.10	48.92	43.2	0.147
81.80	68.9	340.26	1.93	176.3	47.94	49.80	44.1	0.149
81.94	70.6	358.08	1.96	183.1	48.78	50.69	45.0	0.151
82.08	72.2	376.43	1.98	190.0	49.62	51.57	45.9	0.153
82.22	73.9	395.34	2.01	197.0	50.46	52.46	46.8	
82.36	75.6	414.80	2.03	204.1	51.30	53.34	47.7	
82.50	77.3	434.81	2.06	211.4	52.14	54.23	48.6	
82.64	79.0	455.39	2.08	218.7	52.98	55.12	49.5	
82.78	80.6	476.54	2.11	226.2	53.82	56.00	50.4	
82.92	82.3	498.26	2.13	233.8	54.66	56.89	51.3	
83.00	83.3	510.93	2.15	238.2	55.14	57.39	51.8	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSW1 (CH-SW1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.154
0.156
0.157
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Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSW2 (CH-SW2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	75.35 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
75.35	0.0	0.00	0.00	0.0	0.00	0.00	0.0
75.36	0.1	0.01	0.04	0.1	13.56	13.56	0.1
75.50	1.8	0.48	0.23	2.1	14.40	14.45	1.7
75.65	3.6	1.54	0.36	4.3	15.30	15.40	3.4
75.80	5.4	3.06	0.46	6.7	16.20	16.35	5.0
75.95	7.2	5.00	0.54	9.2	17.10	17.29	6.4
76.10	9.0	7.34	0.62	11.8	18.00	18.24	7.9
76.25	10.8	10.08	0.69	14.6	18.90	19.19	9.3
76.40	12.6	13.21	0.76	17.5	19.80	20.14	10.6
76.55	14.4	16.74	0.82	20.5	20.70	21.09	11.9
76.70	16.2	20.65	0.87	23.7	21.60	22.04	13.2
76.85	18.0	24.97	0.92	27.0	22.50	22.99	14.4
77.00	19.8	29.68	0.98	30.4	23.40	23.94	15.6
77.15	21.6	34.81	1.02	34.0	24.30	24.88	16.8
77.30	23.4	40.35	1.07	37.7	25.20	25.83	18.0
77.45	25.2	46.31	1.11	41.6	26.10	26.78	19.1
77.60	27.0	52.70	1.16	45.6	27.00	27.73	20.3
77.75	28.8	59.52	1.20	49.7	27.90	28.68	21.4
77.90	30.6	66.79	1.24	53.9	28.80	29.63	22.5
78.05	32.4	74.51	1.28	58.3	29.70	30.58	23.6
78.20	34.2	82.68	1.32	62.8	30.60	31.52	24.6
78.35	36.0	91.32	1.35	67.5	31.50	32.47	25.7
78.50	37.8	100.43	1.39	72.3	32.40	33.42	26.8
78.65	39.6	110.03	1.42	77.2	33.30	34.37	27.8
78.80	41.4	120.11	1.46	82.3	34.20	35.32	28.9
78.95	43.2	130.69	1.49	87.5	35.10	36.27	29.9
79.10	45.0	141.78	1.53	92.8	36.00	37.22	30.9
79.25	46.8	153.37	1.56	98.3	36.90	38.17	32.0
79.40	48.6	165.49	1.59	103.9	37.80	39.11	33.0
79.55	50.4	178.13	1.62	109.6	38.70	40.06	34.0

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSW2 (CH-SW2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
79.70	52.2	191.31	1.66	115.5	39.60	41.01	35.0	0.000
79.85	54.0	205.03	1.69	121.5	40.50	41.96	36.0	0.068
80.00	55.8	219.30	1.72	127.6	41.40	42.91	37.0	0.106
80.15	57.6	234.13	1.75	133.9	42.30	43.86	38.0	0.118
80.30	59.4	249.53	1.78	140.3	43.20	44.81	39.0	0.126
80.45	61.2	265.50	1.81	146.9	44.10	45.76	40.0	0.131
80.60	63.0	282.05	1.84	153.6	45.00	46.70	41.0	0.135
80.75	64.8	299.19	1.87	160.4	45.90	47.65	41.9	0.139
80.90	66.6	316.92	1.89	167.3	46.80	48.60	42.9	0.142
81.05	68.4	335.26	1.92	174.4	47.70	49.55	43.9	0.144
81.20	70.2	354.21	1.95	181.6	48.60	50.50	44.9	0.147
81.35	72.0	373.78	1.98	189.0	49.50	51.45	45.8	0.149
81.50	73.8	393.97	2.01	196.5	50.40	52.40	46.8	0.151
81.65	75.6	414.80	2.03	204.1	51.30	53.34	47.7	0.152
81.80	77.4	436.26	2.06	211.9	52.20	54.29	48.7	
81.95	79.2	458.37	2.09	219.8	53.10	55.24	49.7	
82.10	81.0	481.14	2.11	227.8	54.00	56.19	50.6	
82.25	82.8	504.57	2.14	236.0	54.90	57.14	51.6	
82.40	84.6	528.67	2.16	244.3	55.80	58.09	52.5	
82.55	86.4	553.44	2.19	252.7	56.70	59.04	53.5	
82.70	88.2	578.90	2.22	261.3	57.60	59.99	54.4	
82.85	90.0	605.04	2.24	270.0	58.50	60.93	55.4	
83.00	91.8	631.89	2.27	278.8	59.40	61.88	56.3	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSW2 (CH-SW2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.154
0.156
0.157
0.158
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Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSW3 (CH-SW3) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	74.90 ft
Bottom Width	15.00 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
74.90	0.0	0.00	0.00	0.0	0.00	0.00	0.0
74.91	0.1	0.01	0.04	0.2	15.06	15.06	0.1
75.06	1.9	0.59	0.24	2.5	15.96	16.01	1.9
75.22	3.8	1.90	0.37	5.1	16.92	17.02	3.6
75.38	5.8	3.78	0.48	7.9	17.88	18.04	5.3
75.54	7.7	6.17	0.57	10.8	18.84	19.05	6.9
75.70	9.6	9.06	0.65	13.9	19.80	20.06	8.4
75.86	11.5	12.44	0.72	17.2	20.76	21.07	9.9
76.02	13.4	16.29	0.79	20.6	21.72	22.08	11.4
76.18	15.4	20.62	0.85	24.1	22.68	23.10	12.8
76.34	17.3	25.43	0.91	27.8	23.64	24.11	14.1
76.50	19.2	30.72	0.97	31.7	24.60	25.12	15.5
76.66	21.1	36.50	1.02	35.7	25.56	26.13	16.8
76.82	23.0	42.78	1.07	39.9	26.52	27.14	18.0
76.98	25.0	49.55	1.12	44.2	27.48	28.16	19.3
77.14	26.9	56.84	1.17	48.7	28.44	29.17	20.5
77.30	28.8	64.65	1.21	53.3	29.40	30.18	21.7
77.46	30.7	72.98	1.26	58.1	30.36	31.19	22.9
77.62	32.6	81.85	1.30	63.0	31.32	32.20	24.1
77.78	34.6	91.26	1.34	68.1	32.28	33.21	25.3
77.94	36.5	101.22	1.38	73.3	33.24	34.23	26.5
78.10	38.4	111.74	1.42	78.7	34.20	35.24	27.6
78.26	40.3	122.83	1.46	84.3	35.16	36.25	28.8
78.42	42.2	134.51	1.50	90.0	36.12	37.26	29.9
78.58	44.2	146.77	1.53	95.8	37.08	38.27	31.0
78.74	46.1	159.62	1.57	101.8	38.04	39.29	32.1
78.90	48.0	173.09	1.60	108.0	39.00	40.30	33.2
79.06	49.9	187.17	1.64	114.3	39.96	41.31	34.3
79.22	51.8	201.87	1.67	120.8	40.92	42.32	35.4
79.38	53.8	217.21	1.70	127.4	41.88	43.33	36.5

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSW3 (CH-SW3) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
79.54	55.7	233.19	1.74	134.2	42.84	44.35	37.6	0.000
79.70	57.6	249.82	1.77	141.1	43.80	45.36	38.7	0.068
79.86	59.5	267.12	1.80	148.2	44.76	46.37	39.7	0.107
80.02	61.4	285.08	1.83	155.4	45.72	47.38	40.8	0.119
80.18	63.4	303.72	1.87	162.8	46.68	48.39	41.9	0.127
80.34	65.3	323.05	1.90	170.4	47.64	49.41	42.9	0.133
80.50	67.2	343.08	1.93	178.1	48.60	50.42	44.0	0.137
80.66	69.1	363.81	1.96	185.9	49.56	51.43	45.0	0.140
80.82	71.0	385.25	1.99	193.9	50.52	52.44	46.1	0.144
80.98	73.0	407.42	2.02	202.1	51.48	53.45	47.1	0.146
81.14	74.9	430.32	2.05	210.4	52.44	54.47	48.1	0.149
81.30	76.8	453.96	2.07	218.9	53.40	55.48	49.2	0.151
81.46	78.7	478.35	2.10	227.5	54.36	56.49	50.2	0.153
81.62	80.6	503.50	2.13	236.3	55.32	57.50	51.3	0.154
81.78	82.6	529.41	2.16	245.2	56.28	58.51	52.3	
81.94	84.5	556.10	2.19	254.3	57.24	59.52	53.3	
82.10	86.4	583.57	2.21	263.5	58.20	60.54	54.3	
82.26	88.3	611.84	2.24	272.9	59.16	61.55	55.4	
82.42	90.2	640.90	2.27	282.5	60.12	62.56	56.4	
82.58	92.2	670.77	2.30	292.1	61.08	63.57	57.4	
82.74	94.1	701.46	2.32	302.0	62.04	64.58	58.4	
82.90	96.0	732.98	2.35	312.0	63.00	65.60	59.4	
83.00	97.2	753.10	2.37	318.3	63.60	66.23	60.1	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHSW3 (CH-SW3) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.156
0.157
0.159
0.160
0.162
0.163
0.164
0.165
0.166
0.167
0.168
0.169
0.170
0.171
0.171
0.172
0.173
0.174
0.175
0.175
0.176
0.177
0.177
0.178
0.179
0.179
0.180
0.181
0.181
0.182
0.182
0.183
0.183
0.184
0.185
0.185
0.186
0.186
0.186

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHW1 (CH-W1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	79.27 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
79.27	0.0	0.00	0.00	0.0	0.00	0.00	0.0
79.28	0.1	0.01	0.04	0.1	13.56	13.56	0.1
79.33	0.7	0.10	0.13	0.8	13.86	13.88	0.7
79.39	1.4	0.33	0.20	1.7	14.22	14.26	1.4
79.45	2.2	0.65	0.26	2.5	14.58	14.64	2.1
79.51	2.9	1.06	0.31	3.4	14.94	15.02	2.7
79.57	3.6	1.54	0.36	4.3	15.30	15.40	3.4
79.63	4.3	2.09	0.40	5.2	15.66	15.78	4.0
79.69	5.0	2.72	0.44	6.2	16.02	16.16	4.6
79.75	5.8	3.41	0.48	7.2	16.38	16.54	5.3
79.81	6.5	4.17	0.51	8.2	16.74	16.92	5.9
79.87	7.2	5.00	0.54	9.2	17.10	17.29	6.4
79.93	7.9	5.89	0.58	10.2	17.46	17.67	7.0
79.99	8.6	6.84	0.61	11.3	17.82	18.05	7.6
80.05	9.4	7.86	0.64	12.4	18.18	18.43	8.2
80.11	10.1	8.94	0.66	13.5	18.54	18.81	8.7
80.17	10.8	10.08	0.69	14.6	18.90	19.19	9.3
80.23	11.5	11.29	0.72	15.7	19.26	19.57	9.8
80.29	12.2	12.56	0.74	16.9	19.62	19.95	10.3
80.35	13.0	13.89	0.77	18.1	19.98	20.33	10.9
80.41	13.7	15.28	0.79	19.3	20.34	20.71	11.4
80.47	14.4	16.74	0.82	20.5	20.70	21.09	11.9
80.53	15.1	18.26	0.84	21.8	21.06	21.47	12.4
80.59	15.8	19.84	0.86	23.0	21.42	21.85	12.9
80.65	16.6	21.48	0.88	24.3	21.78	22.23	13.4
80.71	17.3	23.19	0.90	25.7	22.14	22.61	13.9
80.77	18.0	24.97	0.92	27.0	22.50	22.99	14.4
80.83	18.7	26.81	0.95	28.4	22.86	23.37	14.9
80.89	19.4	28.71	0.97	29.7	23.22	23.75	15.4
80.95	20.2	30.68	0.98	31.1	23.58	24.13	15.9

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHW1 (CH-W1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
81.01	20.9	32.71	1.00	32.6	23.94	24.50	16.3	0.000
81.07	21.6	34.81	1.02	34.0	24.30	24.88	16.8	0.068
81.13	22.3	36.97	1.04	35.5	24.66	25.26	17.3	0.091
81.19	23.0	39.21	1.06	37.0	25.02	25.64	17.7	0.102
81.25	23.8	41.51	1.08	38.5	25.38	26.02	18.2	0.109
81.31	24.5	43.87	1.10	40.0	25.74	26.40	18.7	0.114
81.37	25.2	46.31	1.11	41.6	26.10	26.78	19.1	0.118
81.43	25.9	48.81	1.13	43.2	26.46	27.16	19.6	0.121
81.49	26.6	51.39	1.15	44.8	26.82	27.54	20.0	0.124
81.55	27.4	54.03	1.17	46.4	27.18	27.92	20.5	0.127
81.61	28.1	56.74	1.18	48.0	27.54	28.30	20.9	0.129
81.67	28.8	59.52	1.20	49.7	27.90	28.68	21.4	
81.73	29.5	62.38	1.21	51.4	28.26	29.06	21.8	
81.79	30.2	65.30	1.23	53.1	28.62	29.44	22.3	
81.85	31.0	68.30	1.25	54.8	28.98	29.82	22.7	
81.91	31.7	71.36	1.26	56.5	29.34	30.20	23.1	
81.97	32.4	74.51	1.28	58.3	29.70	30.58	23.6	
82.03	33.1	77.72	1.29	60.1	30.06	30.96	24.0	
82.09	33.8	81.01	1.31	61.9	30.42	31.34	24.4	
82.15	34.6	84.37	1.32	63.8	30.78	31.71	24.9	
82.21	35.3	87.81	1.34	65.6	31.14	32.09	25.3	
82.27	36.0	91.32	1.35	67.5	31.50	32.47	25.7	
82.33	36.7	94.91	1.37	69.4	31.86	32.85	26.1	
82.39	37.4	98.57	1.38	71.3	32.22	33.23	26.6	
82.45	38.2	102.31	1.40	73.3	32.58	33.61	27.0	
82.50	38.8	105.49	1.41	74.9	32.88	33.93	27.3	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHW1 (CH-W1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.131
0.133
0.135
0.136
0.137
0.139
0.140
0.141
0.142
0.143
0.144
0.145
0.146
0.147
0.148
0.149
0.150
0.150
0.151
0.152
0.152
0.153
0.154
0.154
0.155
0.156
0.156
0.157
0.157
0.158
0.158
0.159
0.159
0.160
0.160
0.161
0.161
0.162
0.162
0.163

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHW1 (CH-W1) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.163
0.163
0.164
0.164
0.165

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHW2 (CH-W2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Trapezoidal Channel.	
Slope	0.001 ft/ft
Manning's n	0.013
Invert (Upstream)	77.83 ft
Bottom Width	13.50 ft
Right Side Slope	3.000 H:V
Left Side Slope	3.000 H:V

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
77.83	0.0	0.00	0.00	0.0	0.00	0.00	0.0
77.84	0.1	0.01	0.04	0.1	13.56	13.56	0.1
77.92	1.1	0.20	0.16	1.2	14.04	14.07	1.1
78.01	2.2	0.65	0.26	2.5	14.58	14.64	2.1
78.10	3.2	1.29	0.33	3.9	15.12	15.21	3.1
78.19	4.3	2.09	0.40	5.2	15.66	15.78	4.0
78.28	5.4	3.06	0.46	6.7	16.20	16.35	5.0
78.37	6.5	4.17	0.51	8.2	16.74	16.92	5.9
78.46	7.6	5.44	0.56	9.7	17.28	17.48	6.7
78.55	8.6	6.84	0.61	11.3	17.82	18.05	7.6
78.64	9.7	8.39	0.65	12.9	18.36	18.62	8.4
78.73	10.8	10.08	0.69	14.6	18.90	19.19	9.3
78.82	11.9	11.91	0.73	16.3	19.44	19.76	10.1
78.91	13.0	13.89	0.77	18.1	19.98	20.33	10.9
79.00	14.0	16.00	0.80	19.9	20.52	20.90	11.6
79.09	15.1	18.26	0.84	21.8	21.06	21.47	12.4
79.18	16.2	20.65	0.87	23.7	21.60	22.04	13.2
79.27	17.3	23.19	0.90	25.7	22.14	22.61	13.9
79.36	18.4	25.88	0.93	27.7	22.68	23.18	14.6
79.45	19.4	28.71	0.97	29.7	23.22	23.75	15.4
79.54	20.5	31.68	0.99	31.9	23.76	24.31	16.1
79.63	21.6	34.81	1.02	34.0	24.30	24.88	16.8
79.72	22.7	38.08	1.05	36.2	24.84	25.45	17.5
79.81	23.8	41.51	1.08	38.5	25.38	26.02	18.2
79.90	24.8	45.08	1.10	40.8	25.92	26.59	18.9
79.99	25.9	48.81	1.13	43.2	26.46	27.16	19.6
80.08	27.0	52.70	1.16	45.6	27.00	27.73	20.3
80.17	28.1	56.74	1.18	48.0	27.54	28.30	20.9
80.26	29.2	60.94	1.21	50.5	28.08	28.87	21.6
80.35	30.2	65.30	1.23	53.1	28.62	29.44	22.3

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHW2 (CH-W2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
80.44	31.3	69.82	1.25	55.7	29.16	30.01	22.9	0.000
80.53	32.4	74.51	1.28	58.3	29.70	30.58	23.6	0.068
80.62	33.5	79.36	1.30	61.0	30.24	31.15	24.2	0.098
80.71	34.6	84.37	1.32	63.8	30.78	31.71	24.9	0.109
80.80	35.6	89.56	1.35	66.6	31.32	32.28	25.5	0.116
80.89	36.7	94.91	1.37	69.4	31.86	32.85	26.1	0.121
80.98	37.8	100.43	1.39	72.3	32.40	33.42	26.8	0.126
81.07	38.9	106.13	1.41	75.2	32.94	33.99	27.4	0.129
81.16	40.0	112.01	1.43	78.2	33.48	34.56	28.0	0.132
81.25	41.0	118.06	1.45	81.3	34.02	35.13	28.7	0.135
81.34	42.1	124.28	1.47	84.3	34.56	35.70	29.3	0.137
81.43	43.2	130.69	1.49	87.5	35.10	36.27	29.9	0.139
81.52	44.3	137.28	1.51	90.7	35.64	36.84	30.5	0.141
81.61	45.4	144.05	1.53	93.9	36.18	37.41	31.1	
81.70	46.4	151.01	1.55	97.2	36.72	37.98	31.8	
81.79	47.5	158.16	1.57	100.5	37.26	38.55	32.4	
81.88	48.6	165.49	1.59	103.9	37.80	39.11	33.0	
81.97	49.7	173.01	1.61	107.3	38.34	39.68	33.6	
82.06	50.8	180.72	1.63	110.8	38.88	40.25	34.2	
82.15	51.8	188.63	1.65	114.3	39.42	40.82	34.8	
82.24	52.9	196.73	1.67	117.9	39.96	41.39	35.4	
82.33	54.0	205.03	1.69	121.5	40.50	41.96	36.0	
82.42	55.1	213.53	1.71	125.2	41.04	42.53	36.6	
82.50	56.0	221.25	1.72	128.5	41.52	43.04	37.1	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years
Label: CHW2 (CH-W2) Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.142
0.144
0.145
0.147
0.148
0.149
0.150
0.151
0.152
0.153
0.154
0.155
0.156
0.157
0.158
0.159
0.159
0.160
0.161
0.161
0.162
0.163
0.163
0.164
0.165
0.165
0.166
0.166
0.167
0.167
0.168
0.168
0.169
0.169
0.170
0.170
0.171
0.171
0.172
0.172

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Trapezoidal Channel. Return Event: 100 years

Label: CHW2 (CH-W2) Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Trapezoidal Cross Section

Froude No.
0.173

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDEXS4 (DDS4)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	145.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
145.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
145.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
145.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
145.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
145.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
145.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
145.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
145.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
145.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
145.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
145.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
145.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
145.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
145.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
145.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
145.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
145.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
145.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
145.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
145.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
145.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
145.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
145.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
145.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
145.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
146.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
146.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
146.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
146.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
146.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
146.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
146.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDEXS4 (DDS4) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
146.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
146.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
146.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
146.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
146.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
146.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
146.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
146.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
146.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
146.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
146.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
146.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
146.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
146.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
146.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
146.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
146.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
146.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
146.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
147.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDEXS4 (DDS4) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDN4 (DDN4)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	145.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
145.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
145.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
145.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
145.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
145.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
145.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
145.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
145.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
145.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
145.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
145.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
145.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
145.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
145.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
145.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
145.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
145.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
145.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
145.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
145.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
145.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
145.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
145.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
145.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
145.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
146.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
146.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
146.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
146.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
146.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
146.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
146.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDN4 (DDN4) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
146.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
146.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
146.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
146.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
146.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
146.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
146.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
146.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
146.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
146.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
146.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
146.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
146.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
146.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
146.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
146.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
146.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
146.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
146.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
147.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Return Event: 100 years
Label: DDN4 (DDN4)
Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDN5 (DDN5)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	124.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
124.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
124.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
124.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
124.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
124.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
124.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
124.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
124.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
124.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
124.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
124.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
124.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
124.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
124.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
124.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
124.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
124.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
124.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
124.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
124.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
124.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
124.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
124.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
124.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
124.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
125.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
125.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
125.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
125.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
125.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
125.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
125.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDN5 (DDN5) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
125.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
125.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
125.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
125.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
125.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
125.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
125.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
125.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
125.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
125.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
125.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
125.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
125.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
125.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
125.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
125.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
125.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
125.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
125.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
126.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDN5 (DDN5) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDNE (DDNE)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	160.00 ft
Diameter	30.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
160.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
160.05	0.6	0.09	4.03	0.0	0.70	0.71	0.4
160.10	1.2	0.42	6.36	0.1	0.98	1.01	0.8
160.15	1.8	1.00	8.28	0.1	1.19	1.24	1.2
160.20	2.4	1.83	9.96	0.2	1.36	1.43	1.6
160.25	3.0	2.93	11.48	0.3	1.50	1.61	2.0
160.30	3.6	4.30	12.88	0.3	1.62	1.77	2.5
160.35	4.2	5.92	14.18	0.4	1.73	1.92	2.9
160.40	4.8	7.80	15.39	0.5	1.83	2.06	3.3
160.45	5.4	9.93	16.53	0.6	1.92	2.19	3.8
160.50	6.0	12.30	17.61	0.7	2.00	2.32	4.2
160.55	6.6	14.91	18.62	0.8	2.07	2.44	4.6
160.60	7.2	17.75	19.59	0.9	2.14	2.56	5.1
160.65	7.8	20.80	20.51	1.0	2.19	2.68	5.5
160.70	8.4	24.06	21.38	1.1	2.24	2.79	6.0
160.75	9.0	27.52	22.22	1.2	2.29	2.90	6.5
160.80	9.6	31.16	23.01	1.4	2.33	3.01	7.0
160.85	10.2	34.98	23.77	1.5	2.37	3.11	7.5
160.90	10.8	38.95	24.49	1.6	2.40	3.22	8.0
160.95	11.4	43.08	25.17	1.7	2.43	3.32	8.5
161.00	12.0	47.35	25.82	1.8	2.45	3.42	9.0
161.05	12.6	51.74	26.44	2.0	2.47	3.53	9.5
161.10	13.2	56.24	27.03	2.1	2.48	3.63	10.1
161.15	13.8	60.83	27.59	2.2	2.49	3.73	10.6
161.20	14.4	65.51	28.12	2.3	2.50	3.83	11.2
161.25	15.0	70.25	28.62	2.5	2.50	3.93	11.8
161.30	15.6	75.05	29.10	2.6	2.50	4.03	12.4
161.35	16.2	79.88	29.54	2.7	2.49	4.13	13.0
161.40	16.8	84.72	29.95	2.8	2.48	4.23	13.7
161.45	17.4	89.57	30.34	3.0	2.47	4.33	14.4
161.50	18.0	94.40	30.70	3.1	2.45	4.43	15.1
161.55	18.6	99.20	31.03	3.2	2.43	4.53	15.8

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDNE (DDNE) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
161.60	19.2	103.94	31.33	3.3	2.40	4.64	16.6	0.000
161.65	19.8	108.61	31.60	3.4	2.37	4.74	17.4	3.884
161.70	20.4	113.18	31.84	3.6	2.33	4.85	18.3	4.323
161.75	21.0	117.64	32.05	3.7	2.29	4.96	19.2	4.585
161.80	21.6	121.96	32.23	3.8	2.24	5.07	20.2	4.769
161.85	22.2	126.12	32.38	3.9	2.19	5.18	21.3	4.905
161.90	22.8	130.09	32.50	4.0	2.14	5.29	22.5	5.011
161.95	23.4	133.84	32.58	4.1	2.07	5.41	23.8	5.094
162.00	24.0	137.34	32.62	4.2	2.00	5.54	25.3	5.159
162.05	24.6	140.57	32.63	4.3	1.92	5.66	26.9	5.211
162.10	25.2	143.47	32.59	4.4	1.83	5.80	28.8	5.251
162.15	25.8	146.01	32.51	4.5	1.73	5.94	31.1	5.281
162.20	26.4	148.12	32.38	4.6	1.62	6.09	33.8	5.303
162.25	27.0	149.75	32.18	4.7	1.50	6.25	37.2	5.317
162.30	27.6	150.81	31.92	4.7	1.36	6.42	41.8	5.325
162.35	28.1	151.15	31.60	4.8	1.20	6.60	47.7	5.327
162.35	28.2	151.14	31.56	4.8	1.19	6.62	48.4	5.324
162.40	28.8	150.54	31.08	4.8	0.98	6.85	59.3	
162.45	29.4	148.47	30.39	4.9	0.70	7.14	83.7	
162.50	30.0	140.51	28.62	4.9	0.00	7.85	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDNE (DDNE) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.315
5.302
5.284
5.262
5.236
5.206
5.172
5.134
5.093
5.048
4.999
4.947
4.890
4.830
4.766
4.697
4.625
4.547
4.465
4.377
4.284
4.185
4.078
3.964
3.841
3.708
3.562
3.402
3.221
3.015
2.795
2.771
2.465
2.028
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDNE3 (DDNE3)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	155.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
155.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
155.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
155.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
155.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
155.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
155.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
155.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
155.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
155.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
155.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
155.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
155.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
155.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
155.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
155.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
155.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
155.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
155.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
155.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
155.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
155.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
155.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
155.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
155.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
155.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
156.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
156.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
156.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
156.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
156.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
156.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
156.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDNE3 (DDNE3) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
156.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
156.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
156.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
156.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
156.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
156.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
156.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
156.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
156.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
156.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
156.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
156.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
156.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
156.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
156.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
156.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
156.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
156.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
156.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
157.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDNE3 (DDNE3) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDNW (DDNW)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	160.00 ft
Diameter	30.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
160.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
160.05	0.6	0.09	4.03	0.0	0.70	0.71	0.4
160.10	1.2	0.42	6.36	0.1	0.98	1.01	0.8
160.15	1.8	1.00	8.28	0.1	1.19	1.24	1.2
160.20	2.4	1.83	9.96	0.2	1.36	1.43	1.6
160.25	3.0	2.93	11.48	0.3	1.50	1.61	2.0
160.30	3.6	4.30	12.88	0.3	1.62	1.77	2.5
160.35	4.2	5.92	14.18	0.4	1.73	1.92	2.9
160.40	4.8	7.80	15.39	0.5	1.83	2.06	3.3
160.45	5.4	9.93	16.53	0.6	1.92	2.19	3.8
160.50	6.0	12.30	17.61	0.7	2.00	2.32	4.2
160.55	6.6	14.91	18.62	0.8	2.07	2.44	4.6
160.60	7.2	17.75	19.59	0.9	2.14	2.56	5.1
160.65	7.8	20.80	20.51	1.0	2.19	2.68	5.5
160.70	8.4	24.06	21.38	1.1	2.24	2.79	6.0
160.75	9.0	27.52	22.22	1.2	2.29	2.90	6.5
160.80	9.6	31.16	23.01	1.4	2.33	3.01	7.0
160.85	10.2	34.98	23.77	1.5	2.37	3.11	7.5
160.90	10.8	38.95	24.49	1.6	2.40	3.22	8.0
160.95	11.4	43.08	25.17	1.7	2.43	3.32	8.5
161.00	12.0	47.35	25.82	1.8	2.45	3.42	9.0
161.05	12.6	51.74	26.44	2.0	2.47	3.53	9.5
161.10	13.2	56.24	27.03	2.1	2.48	3.63	10.1
161.15	13.8	60.83	27.59	2.2	2.49	3.73	10.6
161.20	14.4	65.51	28.12	2.3	2.50	3.83	11.2
161.25	15.0	70.25	28.62	2.5	2.50	3.93	11.8
161.30	15.6	75.05	29.10	2.6	2.50	4.03	12.4
161.35	16.2	79.88	29.54	2.7	2.49	4.13	13.0
161.40	16.8	84.72	29.95	2.8	2.48	4.23	13.7
161.45	17.4	89.57	30.34	3.0	2.47	4.33	14.4
161.50	18.0	94.40	30.70	3.1	2.45	4.43	15.1
161.55	18.6	99.20	31.03	3.2	2.43	4.53	15.8

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDNW (DDNW) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
161.60	19.2	103.94	31.33	3.3	2.40	4.64	16.6	0.000
161.65	19.8	108.61	31.60	3.4	2.37	4.74	17.4	3.884
161.70	20.4	113.18	31.84	3.6	2.33	4.85	18.3	4.323
161.75	21.0	117.64	32.05	3.7	2.29	4.96	19.2	4.585
161.80	21.6	121.96	32.23	3.8	2.24	5.07	20.2	4.769
161.85	22.2	126.12	32.38	3.9	2.19	5.18	21.3	4.905
161.90	22.8	130.09	32.50	4.0	2.14	5.29	22.5	5.011
161.95	23.4	133.84	32.58	4.1	2.07	5.41	23.8	5.094
162.00	24.0	137.34	32.62	4.2	2.00	5.54	25.3	5.159
162.05	24.6	140.57	32.63	4.3	1.92	5.66	26.9	5.211
162.10	25.2	143.47	32.59	4.4	1.83	5.80	28.8	5.251
162.15	25.8	146.01	32.51	4.5	1.73	5.94	31.1	5.281
162.20	26.4	148.12	32.38	4.6	1.62	6.09	33.8	5.303
162.25	27.0	149.75	32.18	4.7	1.50	6.25	37.2	5.317
162.30	27.6	150.81	31.92	4.7	1.36	6.42	41.8	5.325
162.35	28.1	151.15	31.60	4.8	1.20	6.60	47.7	5.327
162.35	28.2	151.14	31.56	4.8	1.19	6.62	48.4	5.324
162.40	28.8	150.54	31.08	4.8	0.98	6.85	59.3	
162.45	29.4	148.47	30.39	4.9	0.70	7.14	83.7	
162.50	30.0	140.51	28.62	4.9	0.00	7.85	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDNW (DDNW)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.315
5.302
5.284
5.262
5.236
5.206
5.172
5.134
5.093
5.048
4.999
4.947
4.890
4.830
4.766
4.697
4.625
4.547
4.465
4.377
4.284
4.185
4.078
3.964
3.841
3.708
3.562
3.402
3.221
3.015
2.795
2.771
2.465
2.028
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDNW3 (DDNW3)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	155.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
155.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
155.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
155.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
155.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
155.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
155.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
155.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
155.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
155.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
155.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
155.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
155.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
155.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
155.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
155.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
155.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
155.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
155.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
155.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
155.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
155.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
155.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
155.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
155.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
155.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
156.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
156.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
156.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
156.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
156.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
156.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
156.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDNW3 (DDNW3) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
156.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
156.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
156.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
156.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
156.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
156.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
156.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
156.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
156.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
156.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
156.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
156.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
156.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
156.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
156.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
156.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
156.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
156.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
156.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
157.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDNW3 (DDNW3) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDS5 (DDS5)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	124.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
124.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
124.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
124.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
124.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
124.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
124.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
124.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
124.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
124.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
124.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
124.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
124.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
124.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
124.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
124.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
124.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
124.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
124.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
124.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
124.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
124.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
124.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
124.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
124.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
124.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
125.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
125.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
125.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
125.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
125.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
125.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
125.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDS5 (DDS5) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
125.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
125.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
125.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
125.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
125.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
125.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
125.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
125.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
125.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
125.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
125.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
125.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
125.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
125.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
125.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
125.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
125.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
125.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
125.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
126.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Return Event: 100 years
Label: DDS5 (DDS5)
Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDSE (DDSE)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	168.00 ft
Diameter	30.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
168.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
168.05	0.6	0.09	4.03	0.0	0.70	0.71	0.4
168.10	1.2	0.42	6.36	0.1	0.98	1.01	0.8
168.15	1.8	1.00	8.28	0.1	1.19	1.24	1.2
168.20	2.4	1.83	9.96	0.2	1.36	1.43	1.6
168.25	3.0	2.93	11.48	0.3	1.50	1.61	2.0
168.30	3.6	4.30	12.88	0.3	1.62	1.77	2.5
168.35	4.2	5.92	14.18	0.4	1.73	1.92	2.9
168.40	4.8	7.80	15.39	0.5	1.83	2.06	3.3
168.45	5.4	9.93	16.53	0.6	1.92	2.19	3.8
168.50	6.0	12.30	17.61	0.7	2.00	2.32	4.2
168.55	6.6	14.91	18.62	0.8	2.07	2.44	4.6
168.60	7.2	17.75	19.59	0.9	2.14	2.56	5.1
168.65	7.8	20.80	20.51	1.0	2.19	2.68	5.5
168.70	8.4	24.06	21.38	1.1	2.24	2.79	6.0
168.75	9.0	27.52	22.22	1.2	2.29	2.90	6.5
168.80	9.6	31.16	23.01	1.4	2.33	3.01	7.0
168.85	10.2	34.98	23.77	1.5	2.37	3.11	7.5
168.90	10.8	38.95	24.49	1.6	2.40	3.22	8.0
168.95	11.4	43.08	25.17	1.7	2.43	3.32	8.5
169.00	12.0	47.35	25.82	1.8	2.45	3.42	9.0
169.05	12.6	51.74	26.44	2.0	2.47	3.53	9.5
169.10	13.2	56.24	27.03	2.1	2.48	3.63	10.1
169.15	13.8	60.83	27.59	2.2	2.49	3.73	10.6
169.20	14.4	65.51	28.12	2.3	2.50	3.83	11.2
169.25	15.0	70.25	28.62	2.5	2.50	3.93	11.8
169.30	15.6	75.05	29.10	2.6	2.50	4.03	12.4
169.35	16.2	79.88	29.54	2.7	2.49	4.13	13.0
169.40	16.8	84.72	29.95	2.8	2.48	4.23	13.7
169.45	17.4	89.57	30.34	3.0	2.47	4.33	14.4
169.50	18.0	94.40	30.70	3.1	2.45	4.43	15.1
169.55	18.6	99.20	31.03	3.2	2.43	4.53	15.8

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Return Event: 100 years
Label: DDSE (DDSE)
Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
169.60	19.2	103.94	31.33	3.3	2.40	4.64	16.6	0.000
169.65	19.8	108.61	31.60	3.4	2.37	4.74	17.4	3.884
169.70	20.4	113.18	31.84	3.6	2.33	4.85	18.3	4.323
169.75	21.0	117.64	32.05	3.7	2.29	4.96	19.2	4.585
169.80	21.6	121.96	32.23	3.8	2.24	5.07	20.2	4.769
169.85	22.2	126.12	32.38	3.9	2.19	5.18	21.3	4.905
169.90	22.8	130.09	32.50	4.0	2.14	5.29	22.5	5.011
169.95	23.4	133.84	32.58	4.1	2.07	5.41	23.8	5.094
170.00	24.0	137.34	32.62	4.2	2.00	5.54	25.3	5.159
170.05	24.6	140.57	32.63	4.3	1.92	5.66	26.9	5.211
170.10	25.2	143.47	32.59	4.4	1.83	5.80	28.8	5.251
170.15	25.8	146.01	32.51	4.5	1.73	5.94	31.1	5.281
170.20	26.4	148.12	32.38	4.6	1.62	6.09	33.8	5.303
170.25	27.0	149.75	32.18	4.7	1.50	6.25	37.2	5.317
170.30	27.6	150.81	31.92	4.7	1.36	6.42	41.8	5.325
170.35	28.1	151.15	31.60	4.8	1.20	6.60	47.7	5.327
170.35	28.2	151.14	31.56	4.8	1.19	6.62	48.4	5.324
170.40	28.8	150.54	31.08	4.8	0.98	6.85	59.3	
170.45	29.4	148.47	30.39	4.9	0.70	7.14	83.7	
170.50	30.0	140.51	28.62	4.9	0.00	7.85	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDSE (DDSE) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.315
5.302
5.284
5.262
5.236
5.206
5.172
5.134
5.093
5.048
4.999
4.947
4.890
4.830
4.766
4.697
4.625
4.547
4.465
4.377
4.284
4.185
4.078
3.964
3.841
3.708
3.562
3.402
3.221
3.015
2.795
2.771
2.465
2.028
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDSE3 (DDSE3)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	155.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
155.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
155.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
155.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
155.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
155.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
155.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
155.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
155.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
155.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
155.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
155.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
155.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
155.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
155.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
155.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
155.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
155.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
155.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
155.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
155.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
155.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
155.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
155.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
155.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
155.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
156.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
156.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
156.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
156.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
156.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
156.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
156.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDSE3 (DDSE3) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
156.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
156.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
156.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
156.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
156.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
156.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
156.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
156.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
156.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
156.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
156.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
156.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
156.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
156.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
156.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
156.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
156.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
156.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
156.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
157.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDSE3 (DDSE3) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDSW (DDSW)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	168.00 ft
Diameter	30.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
168.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
168.05	0.6	0.09	4.03	0.0	0.70	0.71	0.4
168.10	1.2	0.42	6.36	0.1	0.98	1.01	0.8
168.15	1.8	1.00	8.28	0.1	1.19	1.24	1.2
168.20	2.4	1.83	9.96	0.2	1.36	1.43	1.6
168.25	3.0	2.93	11.48	0.3	1.50	1.61	2.0
168.30	3.6	4.30	12.88	0.3	1.62	1.77	2.5
168.35	4.2	5.92	14.18	0.4	1.73	1.92	2.9
168.40	4.8	7.80	15.39	0.5	1.83	2.06	3.3
168.45	5.4	9.93	16.53	0.6	1.92	2.19	3.8
168.50	6.0	12.30	17.61	0.7	2.00	2.32	4.2
168.55	6.6	14.91	18.62	0.8	2.07	2.44	4.6
168.60	7.2	17.75	19.59	0.9	2.14	2.56	5.1
168.65	7.8	20.80	20.51	1.0	2.19	2.68	5.5
168.70	8.4	24.06	21.38	1.1	2.24	2.79	6.0
168.75	9.0	27.52	22.22	1.2	2.29	2.90	6.5
168.80	9.6	31.16	23.01	1.4	2.33	3.01	7.0
168.85	10.2	34.98	23.77	1.5	2.37	3.11	7.5
168.90	10.8	38.95	24.49	1.6	2.40	3.22	8.0
168.95	11.4	43.08	25.17	1.7	2.43	3.32	8.5
169.00	12.0	47.35	25.82	1.8	2.45	3.42	9.0
169.05	12.6	51.74	26.44	2.0	2.47	3.53	9.5
169.10	13.2	56.24	27.03	2.1	2.48	3.63	10.1
169.15	13.8	60.83	27.59	2.2	2.49	3.73	10.6
169.20	14.4	65.51	28.12	2.3	2.50	3.83	11.2
169.25	15.0	70.25	28.62	2.5	2.50	3.93	11.8
169.30	15.6	75.05	29.10	2.6	2.50	4.03	12.4
169.35	16.2	79.88	29.54	2.7	2.49	4.13	13.0
169.40	16.8	84.72	29.95	2.8	2.48	4.23	13.7
169.45	17.4	89.57	30.34	3.0	2.47	4.33	14.4
169.50	18.0	94.40	30.70	3.1	2.45	4.43	15.1
169.55	18.6	99.20	31.03	3.2	2.43	4.53	15.8

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDSW (DDSW) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
169.60	19.2	103.94	31.33	3.3	2.40	4.64	16.6	0.000
169.65	19.8	108.61	31.60	3.4	2.37	4.74	17.4	3.884
169.70	20.4	113.18	31.84	3.6	2.33	4.85	18.3	4.323
169.75	21.0	117.64	32.05	3.7	2.29	4.96	19.2	4.585
169.80	21.6	121.96	32.23	3.8	2.24	5.07	20.2	4.769
169.85	22.2	126.12	32.38	3.9	2.19	5.18	21.3	4.905
169.90	22.8	130.09	32.50	4.0	2.14	5.29	22.5	5.011
169.95	23.4	133.84	32.58	4.1	2.07	5.41	23.8	5.094
170.00	24.0	137.34	32.62	4.2	2.00	5.54	25.3	5.159
170.05	24.6	140.57	32.63	4.3	1.92	5.66	26.9	5.211
170.10	25.2	143.47	32.59	4.4	1.83	5.80	28.8	5.251
170.15	25.8	146.01	32.51	4.5	1.73	5.94	31.1	5.281
170.20	26.4	148.12	32.38	4.6	1.62	6.09	33.8	5.303
170.25	27.0	149.75	32.18	4.7	1.50	6.25	37.2	5.317
170.30	27.6	150.81	31.92	4.7	1.36	6.42	41.8	5.325
170.35	28.1	151.15	31.60	4.8	1.20	6.60	47.7	5.327
170.35	28.2	151.14	31.56	4.8	1.19	6.62	48.4	5.324
170.40	28.8	150.54	31.08	4.8	0.98	6.85	59.3	
170.45	29.4	148.47	30.39	4.9	0.70	7.14	83.7	
170.50	30.0	140.51	28.62	4.9	0.00	7.85	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDSW (DDSW) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.315
5.302
5.284
5.262
5.236
5.206
5.172
5.134
5.093
5.048
4.999
4.947
4.890
4.830
4.766
4.697
4.625
4.547
4.465
4.377
4.284
4.185
4.078
3.964
3.841
3.708
3.562
3.402
3.221
3.015
2.795
2.771
2.465
2.028
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel
Label: DDSW3 (DDSW3)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

Circular Channel	
Slope	0.100 ft/ft
Manning's n	0.013
Invert (Upstream)	155.00 ft
Diameter	24.0 in

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)
155.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0
155.04	0.5	0.05	3.47	0.0	0.56	0.57	0.3
155.08	1.0	0.23	5.48	0.0	0.78	0.81	0.6
155.12	1.4	0.55	7.13	0.1	0.95	0.99	1.0
155.16	1.9	1.01	8.58	0.1	1.09	1.15	1.3
155.20	2.4	1.62	9.90	0.2	1.20	1.29	1.6
155.24	2.9	2.37	11.10	0.2	1.30	1.41	2.0
155.28	3.4	3.27	12.22	0.3	1.39	1.53	2.3
155.32	3.8	4.30	13.26	0.3	1.47	1.65	2.7
155.36	4.3	5.48	14.24	0.4	1.54	1.75	3.0
155.40	4.8	6.79	15.17	0.4	1.60	1.85	3.4
155.44	5.3	8.22	16.05	0.5	1.66	1.95	3.7
155.48	5.8	9.79	16.88	0.6	1.71	2.05	4.1
155.52	6.2	11.47	17.67	0.6	1.75	2.14	4.4
155.56	6.7	13.27	18.43	0.7	1.80	2.23	4.8
155.60	7.2	15.18	19.15	0.8	1.83	2.32	5.2
155.64	7.7	17.19	19.83	0.9	1.87	2.41	5.6
155.68	8.2	19.29	20.48	0.9	1.89	2.49	6.0
155.72	8.6	21.48	21.10	1.0	1.92	2.57	6.4
155.76	9.1	23.76	21.69	1.1	1.94	2.66	6.8
155.80	9.6	26.12	22.25	1.2	1.96	2.74	7.2
155.84	10.1	28.54	22.79	1.3	1.97	2.82	7.6
155.88	10.6	31.02	23.30	1.3	1.99	2.90	8.0
155.92	11.0	33.55	23.78	1.4	1.99	2.98	8.5
155.96	11.5	36.13	24.24	1.5	2.00	3.06	9.0
156.00	12.0	38.75	24.67	1.6	2.00	3.14	9.4
156.04	12.5	41.39	25.07	1.7	2.00	3.22	9.9
156.08	13.0	44.05	25.46	1.7	1.99	3.30	10.4
156.12	13.4	46.73	25.81	1.8	1.99	3.38	10.9
156.16	13.9	49.40	26.15	1.9	1.97	3.46	11.5
156.20	14.4	52.06	26.45	2.0	1.96	3.54	12.1
156.24	14.9	54.71	26.74	2.0	1.94	3.63	12.6

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDSW3 (DDSW3) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Elevation (ft)	Depth (in)	Flow (ft^3/s)	Velocity (ft/s)	Area (ft^2)	Top Width (ft)	Wetted Perimeter (ft)	Head (in)	Froude No.
156.28	15.4	57.33	27.00	2.1	1.92	3.71	13.3	0.000
156.32	15.8	59.90	27.23	2.2	1.89	3.79	13.9	3.742
156.36	16.3	62.42	27.44	2.3	1.87	3.88	14.6	4.165
156.40	16.8	64.88	27.62	2.3	1.83	3.96	15.4	4.418
156.44	17.3	67.27	27.78	2.4	1.80	4.05	16.2	4.595
156.48	17.8	69.56	27.91	2.5	1.75	4.14	17.0	4.726
156.52	18.2	71.75	28.01	2.6	1.71	4.24	18.0	4.828
156.56	18.7	73.82	28.08	2.6	1.66	4.33	19.0	4.908
156.60	19.2	75.75	28.11	2.7	1.60	4.43	20.2	4.971
156.64	19.7	77.53	28.12	2.8	1.54	4.53	21.5	5.020
156.68	20.2	79.13	28.09	2.8	1.47	4.64	23.1	5.059
156.72	20.6	80.53	28.02	2.9	1.39	4.75	24.9	5.088
156.76	21.1	81.70	27.90	2.9	1.30	4.87	27.0	5.109
156.80	21.6	82.59	27.73	3.0	1.20	5.00	29.8	5.123
156.84	22.1	83.17	27.51	3.0	1.09	5.14	33.4	5.131
156.88	22.5	83.36	27.23	3.1	0.96	5.28	38.1	5.133
156.88	22.6	83.36	27.20	3.1	0.95	5.29	38.7	5.129
156.92	23.0	83.03	26.79	3.1	0.78	5.48	47.5	
156.96	23.5	81.89	26.19	3.1	0.56	5.72	67.0	
157.00	24.0	77.50	24.67	3.1	0.00	6.28	(N/A)	

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Circular Channel | Return Event: 100 years
Label: DDSW3 (DDSW3) | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

Circular Cross Section

Froude No.
5.121
5.108
5.091
5.070
5.045
5.016
4.983
4.947
4.907
4.864
4.817
4.766
4.712
4.654
4.592
4.526
4.456
4.381
4.302
4.218
4.128
4.032
3.930
3.820
3.701
3.573
3.432
3.277
3.104
2.905
2.693
2.670
2.375
1.954
(N/A)

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
71.50	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
71.60	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
71.70	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
71.80	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
71.90	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.00	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.10	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.20	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.30	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.40	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.50	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.60	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.70	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.80	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
72.90	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.00	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.10	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.20	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.30	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.40	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.50	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.60	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.70	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.80	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
73.90	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.00	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.10	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.20	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.30	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.40	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.50	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.60	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.70	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
74.80	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
74.90	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.00	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.10	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.20	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.30	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.40	0.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.60	1.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.70	1.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.80	1.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
75.90	1.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.00	1.00	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.10	1.01	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.20	1.01	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.30	2.01	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.40	2.52	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.50	3.03	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.60	3.54	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.70	4.57	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.80	5.08	75.50	75.50	75.50	0.00	0.00	75.50	0.00
76.90	4.57	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.00	5.09	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.10	5.35	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.20	5.61	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.30	5.35	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.40	5.61	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.50	5.87	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.60	6.41	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.70	6.67	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.80	6.40	75.50	75.50	75.50	0.00	0.00	75.50	0.00
77.90	6.95	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.00	7.21	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.10	6.94	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.20	7.22	75.50	75.50	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
78.30	7.21	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.40	7.35	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.50	7.76	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.60	7.74	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.70	8.04	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.80	8.03	75.50	75.50	75.50	0.00	0.00	75.50	0.00
78.90	8.44	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.00	8.30	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.10	8.72	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.15	8.45	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.20	9.57	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.30	14.02	75.50	75.50	75.50	0.00	0.00	75.50	0.00
79.40	20.32	75.76	75.50	75.50	0.00	0.02	75.50	0.00
79.50	28.05	75.99	75.50	75.50	0.00	0.00	75.50	0.00
79.60	36.57	76.33	75.50	75.50	0.00	0.02	75.50	0.00
79.70	45.85	76.81	75.50	75.50	0.00	0.02	75.50	0.00
79.80	55.79	77.43	75.50	75.50	0.00	0.03	75.50	0.00
79.90	66.20	78.22	75.50	75.50	0.00	0.04	75.50	0.00
80.00	76.74	79.16	75.50	75.50	0.00	0.07	75.50	0.00
80.10	85.94	80.09	75.50	75.50	0.00	0.03	75.50	0.00
80.20	86.95	80.20	75.50	75.50	0.00	12.47	75.50	0.00
80.30	87.87	80.30	75.50	75.50	0.00	26.08	75.50	0.00
80.40	88.77	80.40	75.50	75.50	0.00	40.36	75.50	0.00
80.50	89.67	80.50	75.50	75.50	0.00	55.26	75.50	0.00
80.60	90.57	80.60	75.50	75.50	0.00	70.76	75.50	0.00
80.70	91.45	80.70	75.50	75.50	0.00	86.85	75.50	0.00
80.80	92.33	80.80	75.50	75.50	0.00	103.51	75.50	0.00
80.90	93.19	80.90	75.50	75.50	0.00	120.72	75.50	0.00
81.00	94.05	81.00	75.50	75.50	0.00	138.46	75.50	0.00
81.10	94.90	81.10	75.50	75.50	0.00	156.70	75.50	0.00
81.20	95.76	81.20	75.50	75.50	0.00	175.45	75.50	0.00
81.30	96.58	81.30	75.50	75.50	0.00	194.71	75.50	0.00
81.40	97.41	81.40	75.50	75.50	0.00	214.44	75.50	0.00
81.50	98.24	81.50	75.50	75.50	0.00	234.63	75.50	0.00

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)	Message
81.60	99.05	81.60	75.50	75.50	0.00	255.29	75.50	0.00	REMARKS: Water level below an invert; no flow.
81.70	99.86	81.70	75.50	75.50	0.00	276.39	75.50	0.00	REMARKS: Water level below an invert; no flow.
81.80	100.67	81.80	75.50	75.50	0.00	297.94	75.50	0.00	REMARKS: Water level below an invert; no flow.
81.90	101.46	81.90	75.50	75.50	0.00	319.92	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.00	102.25	82.00	75.50	75.50	0.00	342.32	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.10	103.03	82.10	75.50	75.50	0.00	365.14	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.20	103.80	82.20	75.50	75.50	0.00	388.37	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.30	104.58	82.30	75.50	75.50	0.00	412.01	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.40	105.35	82.40	75.50	75.50	0.00	436.03	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.50	106.10	82.50	75.50	75.50	0.00	460.45	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.60	106.86	82.60	75.50	75.50	0.00	485.25	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.70	107.62	82.70	75.50	75.50	0.00	510.42	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.80	108.36	82.80	75.50	75.50	0.00	535.97	75.50	0.00	REMARKS: Water level below an invert; no flow.
82.90	109.10	82.90	75.50	75.50	0.00	561.89	75.50	0.00	REMARKS: Water level below an invert; no flow.
83.00	109.84	83.00	75.50	75.50	0.00	588.18	75.50	0.00	REMARKS: Water level below an invert; no flow.

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft^3/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
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REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
REMARKS: Water level below an invert; no flow.
HW=TW; no flow.
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves　　Return Event: 100 years
Label: Outfall　　Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft^3/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves — Return Event: 100 years
Label: Outfall — Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft^3/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft^3/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
BACKWATER CONTROL.. Vh= .080ft hwDi= 2.136ft Lbw= 122.1ft Hev= .00ft
BACKWATER CONTROL.. Vh= .139ft hwDi= 2.277ft Lbw= 86.1ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=.216ft HL=.831ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=.339ft HL=1.307ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=.502ft HL=1.935ft Hev= .00ft

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FULL FLOW...Lfull=300.00ft Vh=.707ft HL=2.725ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=.950ft HL=3.662ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.191ft HL=4.592ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.219ft HL=4.701ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.245ft HL=4.800ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.271ft HL=4.899ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.296ft HL=4.999ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.323ft HL=5.100ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.349ft HL=5.200ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.374ft HL=5.300ft Hev= .00ft

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FULL FLOW...Lfull=300.00ft Vh=1.400ft HL=5.400ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.426ft HL=5.499ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.452ft HL=5.600ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.478ft HL=5.701ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.504ft HL=5.799ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.530ft HL=5.899ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.556ft HL=6.000ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.582ft HL=6.100ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.608ft HL=6.200ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.634ft HL=6.301ft Hev= .00ft

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FULL FLOW...Lfull=300.00ft Vh=1.660ft HL=6.400ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.686ft HL=6.500ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.712ft HL=6.600ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.737ft HL=6.699ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.763ft HL=6.799ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.789ft HL=6.900ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.815ft HL=6.999ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.841ft HL=7.099ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.867ft HL=7.201ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.893ft HL=7.301ft Hev= .00ft

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 27.60 ft³/s
Upstream ID = R1, O0
Downstream ID = Tailwater (Pond Outfall)

Message
FULL FLOW...Lfull=300.00ft Vh=1.919ft HL=7.400ft Hev= .00ft
FULL FLOW...Lfull=300.00ft Vh=1.945ft HL=7.501ft Hev= .00ft

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
71.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
71.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
71.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
71.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
71.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
72.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
73.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
74.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
75.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.50	0.00	0.00	0.00	0.00	0.00	0.00	75.50	0.00
75.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
75.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
76.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
77.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.20	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.30	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.40	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
78.50	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.60	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.70	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.80	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
78.90	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
79.00	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
79.10	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
79.15	0.00	0.00	0.00	75.50	0.00	0.00	75.50	0.00
79.20	1.03	79.20	Free Outfall	75.50	0.00	0.00	75.50	0.00
79.30	5.37	79.30	Free Outfall	75.50	0.00	0.00	75.50	0.00
79.40	11.55	79.40	Free Outfall	75.76	0.00	0.00	75.50	0.00
79.50	19.13	79.50	Free Outfall	75.99	0.00	0.00	75.50	0.00
79.60	27.89	79.60	Free Outfall	76.33	0.00	0.00	75.50	0.00
79.70	37.69	79.70	Free Outfall	76.81	0.00	0.00	75.50	0.00
79.80	48.42	79.80	Free Outfall	77.43	0.00	0.00	75.50	0.00
79.90	60.02	79.90	Free Outfall	78.22	0.00	0.00	75.50	0.00
80.00	72.41	80.00	79.16	79.16	0.00	0.00	75.50	0.00
80.10	85.56	80.10	80.09	80.09	0.00	0.00	75.50	0.00
80.20	99.42	80.20	80.20	80.20	0.00	0.00	75.50	0.00
80.30	113.95	80.30	80.30	80.30	0.00	0.00	75.50	0.00
80.40	129.13	80.40	80.40	80.40	0.00	0.00	75.50	0.00
80.50	144.93	80.50	80.50	80.50	0.00	0.00	75.50	0.00
80.60	161.33	80.60	80.60	80.60	0.00	0.00	75.50	0.00
80.70	178.31	80.70	80.70	80.70	0.00	0.00	75.50	0.00
80.80	195.84	80.80	80.80	80.80	0.00	0.00	75.50	0.00
80.90	213.91	80.90	80.90	80.90	0.00	0.00	75.50	0.00
81.00	232.50	81.00	81.00	81.00	0.00	0.00	75.50	0.00
81.10	251.61	81.10	81.10	81.10	0.00	0.00	75.50	0.00
81.20	271.21	81.20	81.20	81.20	0.00	0.00	75.50	0.00
81.30	291.29	81.30	81.30	81.30	0.00	0.00	75.50	0.00
81.40	311.85	81.40	81.40	81.40	0.00	0.00	75.50	0.00
81.50	332.87	81.50	81.50	81.50	0.00	0.00	75.50	0.00
81.60	354.34	81.60	81.60	81.60	0.00	0.00	75.50	0.00
81.70	376.25	81.70	81.70	81.70	0.00	0.00	75.50	0.00
81.80	398.60	81.80	81.80	81.80	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
81.90	421.38	81.90	81.90	81.90	0.00	0.00	75.50	0.00
82.00	444.57	82.00	82.00	82.00	0.00	0.00	75.50	0.00
82.10	468.17	82.10	82.10	82.10	0.00	0.00	75.50	0.00
82.20	492.18	82.20	82.20	82.20	0.00	0.00	75.50	0.00
82.30	516.58	82.30	82.30	82.30	0.00	0.00	75.50	0.00
82.40	541.37	82.40	82.40	82.40	0.00	0.00	75.50	0.00
82.50	566.55	82.50	82.50	82.50	0.00	0.00	75.50	0.00
82.60	592.11	82.60	82.60	82.60	0.00	0.00	75.50	0.00
82.70	618.04	82.70	82.70	82.70	0.00	0.00	75.50	0.00
82.80	644.33	82.80	82.80	82.80	0.00	0.00	75.50	0.00
82.90	670.99	82.90	82.90	82.90	0.00	0.00	75.50	0.00
83.00	698.01	83.00	83.00	83.00	0.00	0.00	75.50	0.00

Message
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
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REVERSE: Flow is closed off

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
REVERSE: Flow is closed off
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Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
REVERSE: Flow is closed off
HW=TW; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
Weir: H =0.05ft
Weir: H =0.15ft
Weir: H =0.25ft
Weir: H =0.35ft
Weir: H =0.45ft
Weir: H =0.55ft
Weir: H =0.65ft
Weir: H =0.75ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =0.85ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =0.95ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =1.05ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =1.15ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =1.25ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =1.35ft
FULLY CHARGED RISER: ADJUSTED TO WEIR: H =1.45ft

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = R1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000
FULLY CHARGED RISER, DOWNSTREAM CONTROL: Kev=0. Hev=0.000

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
71.50	0.00	71.50	75.50	75.50	0.00	0.00	75.50	0.00
71.60	0.00	71.60	75.50	75.50	0.00	0.00	75.50	0.00
71.70	0.00	71.70	75.50	75.50	0.00	0.00	75.50	0.00
71.80	0.00	71.80	75.50	75.50	0.00	0.00	75.50	0.00
71.90	0.00	71.90	75.50	75.50	0.00	0.00	75.50	0.00
72.00	0.00	72.00	75.50	75.50	0.00	0.00	75.50	0.00
72.10	0.00	72.10	75.50	75.50	0.00	0.00	75.50	0.00
72.20	0.00	72.20	75.50	75.50	0.00	0.00	75.50	0.00
72.30	0.00	72.30	75.50	75.50	0.00	0.00	75.50	0.00
72.40	0.00	72.40	75.50	75.50	0.00	0.00	75.50	0.00
72.50	0.00	72.50	75.50	75.50	0.00	0.00	75.50	0.00
72.60	0.00	72.60	75.50	75.50	0.00	0.00	75.50	0.00
72.70	0.00	72.70	75.50	75.50	0.00	0.00	75.50	0.00
72.80	0.00	72.80	75.50	75.50	0.00	0.00	75.50	0.00
72.90	0.00	72.90	75.50	75.50	0.00	0.00	75.50	0.00
73.00	0.00	73.00	75.50	75.50	0.00	0.00	75.50	0.00
73.10	0.00	73.10	75.50	75.50	0.00	0.00	75.50	0.00
73.20	0.00	73.20	75.50	75.50	0.00	0.00	75.50	0.00
73.30	0.00	73.30	75.50	75.50	0.00	0.00	75.50	0.00
73.40	0.00	73.40	75.50	75.50	0.00	0.00	75.50	0.00
73.50	0.00	73.50	75.50	75.50	0.00	0.00	75.50	0.00
73.60	0.00	73.60	75.50	75.50	0.00	0.00	75.50	0.00
73.70	0.00	73.70	75.50	75.50	0.00	0.00	75.50	0.00
73.80	0.00	73.80	75.50	75.50	0.00	0.00	75.50	0.00
73.90	0.00	73.90	75.50	75.50	0.00	0.00	75.50	0.00
74.00	0.00	74.00	75.50	75.50	0.00	0.00	75.50	0.00
74.10	0.00	74.10	75.50	75.50	0.00	0.00	75.50	0.00
74.20	0.00	74.20	75.50	75.50	0.00	0.00	75.50	0.00
74.30	0.00	74.30	75.50	75.50	0.00	0.00	75.50	0.00
74.40	0.00	74.40	75.50	75.50	0.00	0.00	75.50	0.00
74.50	0.00	74.50	75.50	75.50	0.00	0.00	75.50	0.00
74.60	0.00	74.60	75.50	75.50	0.00	0.00	75.50	0.00
74.70	0.00	74.70	75.50	75.50	0.00	0.00	75.50	0.00
74.80	0.00	74.80	75.50	75.50	0.00	0.00	75.50	0.00
74.90	0.00	74.90	75.50	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
75.00	0.00	75.00	75.50	75.50	0.00	0.00	75.50	0.00
75.10	0.00	75.10	75.50	75.50	0.00	0.00	75.50	0.00
75.20	0.00	75.20	75.50	75.50	0.00	0.00	75.50	0.00
75.30	0.00	75.30	75.50	75.50	0.00	0.00	75.50	0.00
75.40	0.00	75.40	75.50	75.50	0.00	0.00	75.50	0.00
75.50	0.00	0.00	0.00	0.00	0.00	0.00	75.50	0.00
75.60	0.04	75.60	Free Outfall	75.50	0.00	0.00	75.50	0.00
75.70	0.14	75.70	Free Outfall	75.50	0.00	0.00	75.50	0.00
75.80	0.31	75.80	Free Outfall	75.50	0.00	0.00	75.50	0.00
75.90	0.54	75.90	Free Outfall	75.50	0.00	0.00	75.50	0.00
76.00	0.83	76.00	Free Outfall	75.50	0.00	0.00	75.50	0.00
76.10	1.16	76.10	76.06	75.50	0.00	0.00	75.50	0.00
76.20	1.54	76.20	76.06	75.50	0.00	0.00	75.50	0.00
76.30	1.95	76.30	76.06	75.50	0.00	0.00	75.50	0.00
76.40	2.39	76.40	76.06	75.50	0.00	0.00	75.50	0.00
76.50	2.86	76.50	76.06	75.50	0.00	0.00	75.50	0.00
76.60	3.35	76.60	76.06	75.50	0.00	0.00	75.50	0.00
76.70	3.84	76.70	76.06	75.50	0.00	0.00	75.50	0.00
76.80	4.13	76.80	76.06	75.50	0.00	0.00	75.50	0.00
76.90	4.40	76.90	76.06	75.50	0.00	0.00	75.50	0.00
77.00	4.65	77.00	76.06	75.50	0.00	0.00	75.50	0.00
77.10	4.90	77.10	76.06	75.50	0.00	0.00	75.50	0.00
77.20	5.13	77.20	76.06	75.50	0.00	0.00	75.50	0.00
77.30	5.35	77.30	76.06	75.50	0.00	0.00	75.50	0.00
77.40	5.56	77.40	76.06	75.50	0.00	0.00	75.50	0.00
77.50	5.76	77.50	76.06	75.50	0.00	0.00	75.50	0.00
77.60	5.96	77.60	76.06	75.50	0.00	0.00	75.50	0.00
77.70	6.15	77.70	76.06	75.50	0.00	0.00	75.50	0.00
77.80	6.34	77.80	76.06	75.50	0.00	0.00	75.50	0.00
77.90	6.52	77.90	76.06	75.50	0.00	0.00	75.50	0.00
78.00	6.69	78.00	76.06	75.50	0.00	0.00	75.50	0.00
78.10	6.86	78.10	76.06	75.50	0.00	0.00	75.50	0.00
78.20	7.03	78.20	76.06	75.50	0.00	0.00	75.50	0.00
78.30	7.19	78.30	76.06	75.50	0.00	0.00	75.50	0.00
78.40	7.35	78.40	76.06	75.50	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
78.50	7.51	78.50	76.06	75.50	0.00	0.00	75.50	0.00
78.60	7.66	78.60	76.06	75.50	0.00	0.00	75.50	0.00
78.70	7.81	78.70	76.06	75.50	0.00	0.00	75.50	0.00
78.80	7.96	78.80	76.06	75.50	0.00	0.00	75.50	0.00
78.90	8.10	78.90	76.06	75.50	0.00	0.00	75.50	0.00
79.00	8.24	79.00	76.06	75.50	0.00	0.00	75.50	0.00
79.10	8.38	79.10	76.06	75.50	0.00	0.00	75.50	0.00
79.15	8.45	79.15	76.06	75.50	0.00	0.00	75.50	0.00
79.20	8.52	79.20	76.06	75.50	0.00	0.00	75.50	0.00
79.30	8.65	79.30	76.06	75.50	0.00	0.00	75.50	0.00
79.40	8.78	79.40	75.76	75.76	0.00	0.00	75.50	0.00
79.50	8.92	79.50	75.99	75.99	0.00	0.00	75.50	0.00
79.60	8.70	79.60	76.33	76.33	0.00	0.00	75.50	0.00
79.70	8.18	79.70	76.81	76.81	0.00	0.00	75.50	0.00
79.80	7.40	79.80	77.43	77.43	0.00	0.00	75.50	0.00
79.90	6.23	79.90	78.22	78.22	0.00	0.00	75.50	0.00
80.00	4.40	80.00	79.16	79.16	0.00	0.00	75.50	0.00
80.10	0.41	80.10	80.09	80.09	0.00	0.00	75.50	0.00
80.20	0.00	80.20	80.20	80.20	0.00	0.00	75.50	0.00
80.30	0.00	80.30	80.30	80.30	0.00	0.00	75.50	0.00
80.40	0.00	80.40	80.40	80.40	0.00	0.00	75.50	0.00
80.50	0.00	80.50	80.50	80.50	0.00	0.00	75.50	0.00
80.60	0.00	80.60	80.60	80.60	0.00	0.00	75.50	0.00
80.70	0.00	80.70	80.70	80.70	0.00	0.00	75.50	0.00
80.80	0.00	80.80	80.80	80.80	0.00	0.00	75.50	0.00
80.90	0.00	80.90	80.90	80.90	0.00	0.00	75.50	0.00
81.00	0.00	81.00	81.00	81.00	0.00	0.00	75.50	0.00
81.10	0.00	81.10	81.10	81.10	0.00	0.00	75.50	0.00
81.20	0.00	81.20	81.20	81.20	0.00	0.00	75.50	0.00
81.30	0.00	81.30	81.30	81.30	0.00	0.00	75.50	0.00
81.40	0.00	81.40	81.40	81.40	0.00	0.00	75.50	0.00
81.50	0.00	81.50	81.50	81.50	0.00	0.00	75.50	0.00
81.60	0.00	81.60	81.60	81.60	0.00	0.00	75.50	0.00
81.70	0.00	81.70	81.70	81.70	0.00	0.00	75.50	0.00
81.80	0.00	81.80	81.80	81.80	0.00	0.00	75.50	0.00

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves | Return Event: 100 years
Label: Outfall | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
81.90	0.00	81.90	81.90	81.90	0.00	0.00	75.50	0.00
82.00	0.00	82.00	82.00	82.00	0.00	0.00	75.50	0.00
82.10	0.00	82.10	82.10	82.10	0.00	0.00	75.50	0.00
82.20	0.00	82.20	82.20	82.20	0.00	0.00	75.50	0.00
82.30	0.00	82.30	82.30	82.30	0.00	0.00	75.50	0.00
82.40	0.00	82.40	82.40	82.40	0.00	0.00	75.50	0.00
82.50	0.00	82.50	82.50	82.50	0.00	0.00	75.50	0.00
82.60	0.00	82.60	82.60	82.60	0.00	0.00	75.50	0.00
82.70	0.00	82.70	82.70	82.70	0.00	0.00	75.50	0.00
82.80	0.00	82.80	82.80	82.80	0.00	0.00	75.50	0.00
82.90	0.00	82.90	82.90	82.90	0.00	0.00	75.50	0.00
83.00	0.00	83.00	83.00	83.00	0.00	0.00	75.50	0.00

Message
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
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CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves | Return Event: 100 years
Label: Outfall | Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
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CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
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CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
CRIT.DEPTH CONTROL Vh= .000ft Dcr= .009ft REVERSE Hev= .00ft
HW=TW; no flow.
CRIT.DEPTH CONTROL Vh= .025ft Dcr= .075ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .051ft Dcr= .149ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .078ft Dcr= .222ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .105ft Dcr= .296ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .133ft Dcr= .367ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .163ft Dcr= .437ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .194ft Dcr= .507ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .226ft Dcr= .573ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .261ft Dcr= .639ft CRIT.DEPTH Hev= .00ft

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Individual Outlet Curves
Label: Outfall
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.4 in)

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
CRIT.DEPTH CONTROL
Vh= .299ft Dcr= .702ft
CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL
Vh= .339ft Dcr= .761ft
CRIT.DEPTH Hev= .00ft
H =.64
H =.74
H =.84
H =.94
H =1.04
H =1.14
H =1.24
H =1.34
H =1.44
H =1.54
H =1.64
H =1.74
H =1.84
H =1.94
H =2.04
H =2.14
H =2.24
H =2.34
H =2.44
H =2.54
H =2.64
H =2.74
H =2.84
H =2.94
H =3.04
H =3.09
H =3.14
H =3.24
H =3.34
H =3.44
H =3.27
H =2.89
H =2.37

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
H =1.68
H =.84
H =.01
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = O0 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = C0 (Culvert-Circular)

Message
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
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FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years

Label: Pond 1D2B2 Storm Event: TypeIII 24hr (9.4 in)

Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	75.50 ft
Volume (Initial)	62.355 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.005 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (acres)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
71.50	0.00	0.000	4.000	0.00	0.00	0.00
71.60	0.00	0.485	5.749	0.00	0.00	2,346.54
71.70	0.00	1.160	7.815	0.00	0.00	5,616.26
71.80	0.00	2.058	10.197	0.00	0.00	9,962.30
71.90	0.00	3.210	12.895	0.00	0.00	15,537.80
72.00	0.00	4.648	15.910	0.00	0.00	22,495.89
72.10	0.00	6.241	15.943	0.00	0.00	30,204.23
72.20	0.00	7.836	15.975	0.00	0.00	37,928.36
72.30	0.00	9.436	16.008	0.00	0.00	45,668.32
72.40	0.00	11.038	16.041	0.00	0.00	53,424.11
72.50	0.00	12.644	16.073	0.00	0.00	61,195.75
72.60	0.00	14.253	16.106	0.00	0.00	68,983.26
72.70	0.00	15.865	16.139	0.00	0.00	76,786.65
72.80	0.00	17.481	16.172	0.00	0.00	84,605.95
72.90	0.00	19.099	16.205	0.00	0.00	92,441.15
73.00	0.00	20.722	16.238	0.00	0.00	100,292.29
73.10	0.00	22.347	16.271	0.00	0.00	108,159.38
73.20	0.00	23.976	16.304	0.00	0.00	116,042.43
73.30	0.00	25.608	16.337	0.00	0.00	123,941.46
73.40	0.00	27.243	16.370	0.00	0.00	131,856.48
73.50	0.00	28.882	16.403	0.00	0.00	139,787.52
73.60	0.00	30.524	16.436	0.00	0.00	147,734.59
73.70	0.00	32.169	16.469	0.00	0.00	155,697.71
73.80	0.00	33.818	16.503	0.00	0.00	163,676.88
73.90	0.00	35.469	16.536	0.00	0.00	171,672.13
74.00	0.00	37.125	16.569	0.00	0.00	179,683.48
74.10	0.00	38.783	16.602	0.00	0.00	187,710.93
74.20	0.00	40.445	16.636	0.00	0.00	195,754.51
74.30	0.00	42.110	16.669	0.00	0.00	203,814.23

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: Pond 1D2B2 Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (acres)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
74.40	0.00	43.779	16.702	0.00	0.00	211,890.12
74.50	0.00	45.451	16.736	0.00	0.00	219,982.17
74.60	0.00	47.126	16.769	0.00	0.00	228,090.42
74.70	0.00	48.805	16.803	0.00	0.00	236,214.87
74.80	0.00	50.487	16.836	0.00	0.00	244,355.54
74.90	0.00	52.172	16.870	0.00	0.00	252,512.46
75.00	0.00	53.861	16.904	0.00	0.00	260,685.63
75.10	0.00	55.553	16.937	0.00	0.00	268,875.07
75.20	0.00	57.248	16.971	0.00	0.00	277,080.80
75.30	0.00	58.947	17.005	0.00	0.00	285,302.83
75.40	0.00	60.649	17.038	0.00	0.00	293,541.19
75.50	0.00	62.355	17.072	0.00	0.00	301,795.87
75.60	0.04	64.063	17.106	0.00	0.04	310,066.95
75.70	0.14	65.776	17.140	0.00	0.14	318,354.47
75.80	0.31	67.491	17.174	0.00	0.31	326,658.43
75.90	0.54	69.210	17.207	0.00	0.54	334,978.86
76.00	0.83	70.933	17.241	0.00	0.83	343,315.75
76.10	1.16	72.659	17.275	0.00	1.16	351,669.13
76.20	1.54	74.388	17.309	0.00	1.54	360,039.01
76.30	1.95	76.121	17.343	0.00	1.95	368,425.38
76.40	2.39	77.857	17.377	0.00	2.39	376,828.27
76.50	2.86	79.596	17.412	0.00	2.86	385,247.68
76.60	3.35	81.339	17.446	0.00	3.35	393,683.62
76.70	3.84	83.085	17.480	0.00	3.84	402,136.09
76.80	4.13	84.835	17.514	0.00	4.13	410,604.92
76.90	4.40	86.588	17.548	0.00	4.40	419,090.28
77.00	4.65	88.345	17.583	0.00	4.65	427,592.21
77.10	4.90	90.105	17.617	0.00	4.90	436,110.72
77.20	5.13	91.868	17.651	0.00	5.13	444,645.83
77.30	5.35	93.635	17.686	0.00	5.35	453,197.56
77.40	5.56	95.405	17.720	0.00	5.56	461,765.93
77.50	5.76	97.179	17.754	0.00	5.76	470,350.94
77.60	5.96	98.956	17.789	0.00	5.96	478,952.63
77.70	6.15	100.737	17.823	0.00	6.15	487,571.00
77.80	6.34	102.521	17.858	0.00	6.34	496,206.07
77.90	6.52	104.308	17.893	0.00	6.52	504,857.86
78.00	6.69	106.099	17.927	0.00	6.69	513,526.39
78.10	6.86	107.894	17.962	0.00	6.86	522,211.67
78.20	7.03	109.691	17.996	0.00	7.03	530,913.72
78.30	7.19	111.493	18.031	0.00	7.19	539,632.55
78.40	7.35	113.298	18.066	0.00	7.35	548,368.19
78.50	7.51	115.106	18.101	0.00	7.51	557,120.65
78.60	7.66	116.918	18.135	0.00	7.66	565,889.94

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: Pond 1D2B2 Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (acres)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
78.70	7.81	118.733	18.170	0.00	7.81	574,676.08
78.80	7.96	120.552	18.205	0.00	7.96	583,479.08
78.90	8.10	122.374	18.240	0.00	8.10	592,298.98
79.00	8.24	124.200	18.275	0.00	8.24	601,135.77
79.10	8.38	126.029	18.310	0.00	8.38	609,989.48
79.15	8.45	126.945	18.327	0.00	8.45	614,422.68
79.20	9.55	127.862	18.345	0.00	9.55	618,861.15
79.30	14.02	129.698	18.380	0.00	14.02	627,753.07
79.40	20.32	131.538	18.415	0.00	20.32	636,663.79
79.50	28.05	133.381	18.450	0.00	28.05	645,592.93
79.60	36.57	135.228	18.485	0.00	36.57	654,539.85
79.70	45.85	137.078	18.521	0.00	45.85	663,504.56
79.80	55.79	138.932	18.556	0.00	55.79	672,486.95
79.90	66.20	140.789	18.591	0.00	66.20	681,486.86
80.00	76.74	142.650	18.626	0.00	76.74	690,503.97
80.10	85.94	144.515	18.662	0.00	85.94	699,536.82
80.20	86.95	146.383	18.697	0.00	86.95	708,578.56
80.30	87.87	148.254	18.732	0.00	87.87	717,637.34
80.40	88.77	150.129	18.768	0.00	88.77	726,713.22
80.50	89.67	152.008	18.803	0.00	89.67	735,806.26
80.60	90.57	153.890	18.839	0.00	90.57	744,916.44
80.70	91.45	155.775	18.874	0.00	91.45	754,043.80
80.80	92.33	157.664	18.910	0.00	92.33	763,188.33
80.90	93.19	159.557	18.945	0.00	93.19	772,350.07
81.00	94.05	161.454	18.981	0.00	94.05	781,529.03
81.10	94.90	163.353	19.016	0.00	94.90	790,725.22
81.20	95.76	165.257	19.052	0.00	95.76	799,938.68
81.30	96.58	167.164	19.088	0.00	96.58	809,169.37
81.40	97.41	169.074	19.124	0.00	97.41	818,417.37
81.50	98.24	170.989	19.159	0.00	98.24	827,682.67
81.60	99.05	172.906	19.195	0.00	99.05	836,965.28
81.70	99.86	174.828	19.231	0.00	99.86	846,265.23
81.80	100.67	176.752	19.267	0.00	100.67	855,582.52
81.90	101.46	178.681	19.303	0.00	101.46	864,917.17
82.00	102.25	180.613	19.339	0.00	102.25	874,269.21
82.10	103.03	182.549	19.375	0.00	103.03	883,638.65
82.20	103.80	184.488	19.411	0.00	103.80	893,025.50
82.30	104.58	186.431	19.447	0.00	104.58	902,429.78
82.40	105.35	188.377	19.483	0.00	105.35	911,851.52
82.50	106.10	190.327	19.519	0.00	106.10	921,290.70
82.60	106.86	192.281	19.555	0.00	106.86	930,747.37
82.70	107.62	194.238	19.591	0.00	107.62	940,221.56
82.80	108.36	196.199	19.627	0.00	108.36	949,713.24

Cross LandFill Area 1D & 1B (100-year Analyses)

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: Pond 1D2B2 Storm Event: TypeIII 24hr (9.4 in)
Scenario: Cross - Berkley County (North) - Synthetic Curve, 100 yrs

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (acres)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
82.90	109.10	198.164	19.664	0.00	109.10	959,222.44
83.00	109.84	200.132	19.700	0.00	109.84	968,749.20

Appendix C. Culvert Design

(13 Total Pages)

Culvert Calculator Report
P-1

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	82.50	ft	Headwater Depth/Height	0.79	
Computed Headwater Elev	81.55	ft	Discharge	100.20	cfs
Inlet Control HW Elev.	81.33	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	81.55	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	78.78	ft	Downstream Invert	78.73	ft
Length	100.00	ft	Constructed Slope	0.000500	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	1.79	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	1.79	ft
Velocity Downstream	6.75	ft/s	Critical Slope	0.004084	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	3				

Outlet Control Properties					
Outlet Control HW Elev.	81.55	ft	Upstream Velocity Head	0.38	ft
Ke	0.20		Entrance Loss	0.08	ft

Inlet Control Properties					
Inlet Control HW Elev.	81.33	ft	Flow Control	N/A	
Inlet Type	Groove end projecting		Area Full	28.9	ft²
K	0.00450		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	3	
C	0.03170		Equation Form	1	
Y	0.69000				

Culvert Calculator Report
P-3

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	82.50	ft	Headwater Depth/Height	0.77	
Computed Headwater Elev	80.68	ft	Discharge	98.20	cfs
Inlet Control HW Elev.	80.49	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	80.68	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	77.99	ft	Downstream Invert	77.87	ft
Length	100.00	ft	Constructed Slope	0.001200	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	1.77	ft
Slope Type	Mild		Normal Depth	2.69	ft
Flow Regime	Subcritical		Critical Depth	1.77	ft
Velocity Downstream	6.70	ft/s	Critical Slope	0.004065	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	3				

Outlet Control Properties					
Outlet Control HW Elev.	80.68	ft	Upstream Velocity Head	0.41	ft
Ke	0.20		Entrance Loss	0.08	ft

Inlet Control Properties					
Inlet Control HW Elev.	80.49	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	28.9	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Calculator Report
P-4

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	82.50	ft	Headwater Depth/Height	0.64	
Computed Headwater Elev	79.25	ft	Discharge	99.10	cfs
Inlet Control HW Elev.	79.13	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	79.25	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	77.02	ft	Downstream Invert	76.20	ft
Length	90.00	ft	Constructed Slope	0.009111	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.23	ft
Slope Type	Steep		Normal Depth	1.21	ft
Flow Regime	Supercritical		Critical Depth	1.53	ft
Velocity Downstream	8.20	ft/s	Critical Slope	0.003865	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	4				

Outlet Control Properties					
Outlet Control HW Elev.	79.25	ft	Upstream Velocity Head	0.58	ft
Ke	0.20		Entrance Loss	0.12	ft

Inlet Control Properties					
Inlet Control HW Elev.	79.13	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	38.5	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Calculator Report
P-5

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	82.50	ft	Headwater Depth/Height	1.23	
Computed Headwater Elev	80.44	ft	Discharge	293.40	cfs
Inlet Control HW Elev.	80.44	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	80.41	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	76.13	ft	Downstream Invert	75.78	ft
Length	70.00	ft	Constructed Slope	0.005000	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	2.68	ft
Slope Type	Mild		Normal Depth	2.98	ft
Flow Regime	Subcritical		Critical Depth	2.68	ft
Velocity Downstream	9.27	ft/s	Critical Slope	0.006086	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	4				

Outlet Control Properties					
Outlet Control HW Elev.	80.41	ft	Upstream Velocity Head	1.16	ft
Ke	0.20		Entrance Loss	0.23	ft

Inlet Control Properties					
Inlet Control HW Elev.	80.44	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	38.5	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Calculator Report
P-5A

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	82.50	ft	Headwater Depth/Height	0.71	
Computed Headwater Elev	81.43	ft	Discharge	7.50	cfs
Inlet Control HW Elev.	81.33	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	81.43	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	80.00	ft	Downstream Invert	78.00	ft
Length	56.00	ft	Constructed Slope	0.035714	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.58	ft
Slope Type	Steep		Normal Depth	0.57	ft
Flow Regime	Supercritical		Critical Depth	0.97	ft
Velocity Downstream	9.87	ft/s	Critical Slope	0.004821	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	81.43	ft	Upstream Velocity Head	0.38	ft
Ke	0.20		Entrance Loss	0.08	ft

Inlet Control Properties					
Inlet Control HW Elev.	81.33	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	3.1	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Calculator Report
P-5B

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	88.00	ft	Headwater Depth/Height	1.26	
Computed Headwater Elev	87.64	ft	Discharge	130.60	cfs
Inlet Control HW Elev.	87.64	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	87.63	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	84.50	ft	Downstream Invert	84.00	ft
Length	70.00	ft	Constructed Slope	0.007143	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.93	ft
Slope Type	Steep		Normal Depth	1.93	ft
Flow Regime	Supercritical		Critical Depth	1.95	ft
Velocity Downstream	8.03	ft/s	Critical Slope	0.007022	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.50	ft
Section Size	30 inch		Rise	2.50	ft
Number Sections	4				

Outlet Control Properties					
Outlet Control HW Elev.	87.63	ft	Upstream Velocity Head	0.99	ft
Ke	0.20		Entrance Loss	0.20	ft

Inlet Control Properties					
Inlet Control HW Elev.	87.64	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	19.6	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Calculator Report
P-6

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	81.00	ft	Headwater Depth/Height	0.80	
Computed Headwater Elev	80.63	ft	Discharge	101.80	cfs
Inlet Control HW Elev.	80.39	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	80.63	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	77.84	ft	Downstream Invert	77.80	ft
Length	90.00	ft	Constructed Slope	0.000444	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	1.80	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	1.80	ft
Velocity Downstream	6.78	ft/s	Critical Slope	0.004100	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	3				

Outlet Control Properties					
Outlet Control HW Elev.	80.63	ft	Upstream Velocity Head	0.39	ft
Ke	0.20		Entrance Loss	0.08	ft

Inlet Control Properties					
Inlet Control HW Elev.	80.39	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	28.9	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Calculator Report
P-7

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	81.00	ft	Headwater Depth/Height	0.75	
Computed Headwater Elev	80.29	ft	Discharge	99.80	cfs
Inlet Control HW Elev.	80.17	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	80.29	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	77.65	ft	Downstream Invert	77.37	ft
Length	100.00	ft	Constructed Slope	0.002800	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	1.79	ft
Slope Type	Mild		Normal Depth	2.00	ft
Flow Regime	Subcritical		Critical Depth	1.79	ft
Velocity Downstream	6.74	ft/s	Critical Slope	0.004080	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	3				

Outlet Control Properties					
Outlet Control HW Elev.	80.29	ft	Upstream Velocity Head	0.55	ft
Ke	0.20		Entrance Loss	0.11	ft

Inlet Control Properties					
Inlet Control HW Elev.	80.17	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	28.9	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Calculator Report
P-8

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	81.00	ft	Headwater Depth/Height	1.10	
Computed Headwater Elev	79.59	ft	Discharge	187.80	cfs
Inlet Control HW Elev.	79.50	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	79.59	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	75.74	ft	Downstream Invert	75.38	ft
Length	70.00	ft	Constructed Slope	0.005143	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	2.48	ft
Slope Type	Mild		Normal Depth	2.52	ft
Flow Regime	Subcritical		Critical Depth	2.48	ft
Velocity Downstream	8.59	ft/s	Critical Slope	0.005352	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	3				

Outlet Control Properties					
Outlet Control HW Elev.	79.59	ft	Upstream Velocity Head	1.11	ft
Ke	0.20		Entrance Loss	0.22	ft

Inlet Control Properties					
Inlet Control HW Elev.	79.50	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	28.9	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Calculator Report
P-8A

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	84.00	ft	Headwater Depth/Height	1.84	
Computed Headwater Elev	80.60	ft	Discharge	100.60	cfs
Inlet Control HW Elev.	80.60	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	80.41	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	76.00	ft	Downstream Invert	75.00	ft
Length	54.00	ft	Constructed Slope	0.018519	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.97	ft
Slope Type	Steep		Normal Depth	1.86	ft
Flow Regime	Supercritical		Critical Depth	2.30	ft
Velocity Downstream	12.12	ft/s	Critical Slope	0.013048	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.50	ft
Section Size	30 inch		Rise	2.50	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	80.41	ft	Upstream Velocity Head	1.76	ft
Ke	0.20		Entrance Loss	0.35	ft

Inlet Control Properties					
Inlet Control HW Elev.	80.60	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	9.8	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Calculator Report
P-9

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	81.00	ft	Headwater Depth/Height	1.48	
Computed Headwater Elev	79.40	ft	Discharge	341.00	cfs
Inlet Control HW Elev.	79.01	ft	Tailwater Elevation	75.50	ft
Outlet Control HW Elev.	79.40	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	74.20	ft	Downstream Invert	74.10	ft
Length	88.00	ft	Constructed Slope	0.001136	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	2.88	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	2.88	ft
Velocity Downstream	10.08	ft/s	Critical Slope	0.007149	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	4				

Outlet Control Properties					
Outlet Control HW Elev.	79.40	ft	Upstream Velocity Head	1.22	ft
Ke	0.20		Entrance Loss	0.24	ft

Inlet Control Properties					
Inlet Control HW Elev.	79.01	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	38.5	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Calculator Report
P-10

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	85.50	ft	Headwater Depth/Height	1.88	
Computed Headwater Elev	85.82	ft	Discharge	10.00	cfs
Inlet Control HW Elev.	85.02	ft	Tailwater Elevation	85.00	ft
Outlet Control HW Elev.	85.82	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	83.00	ft	Downstream Invert	82.80	ft
Length	25.00	ft	Constructed Slope	0.008000	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	2.20	ft
Slope Type	N/A		Normal Depth	1.35	ft
Flow Regime	N/A		Critical Depth	1.22	ft
Velocity Downstream	5.66	ft/s	Critical Slope	0.009206	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.50	ft
Section Size	18 inch		Rise	1.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	85.82	ft	Upstream Velocity Head	0.50	ft
Ke	0.20		Entrance Loss	0.10	ft

Inlet Control Properties					
Inlet Control HW Elev.	85.02	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	1.8	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Appendix D. Riprap Design

(10 Total Pages)

South Carolina
Department of Health
and Environmental Control

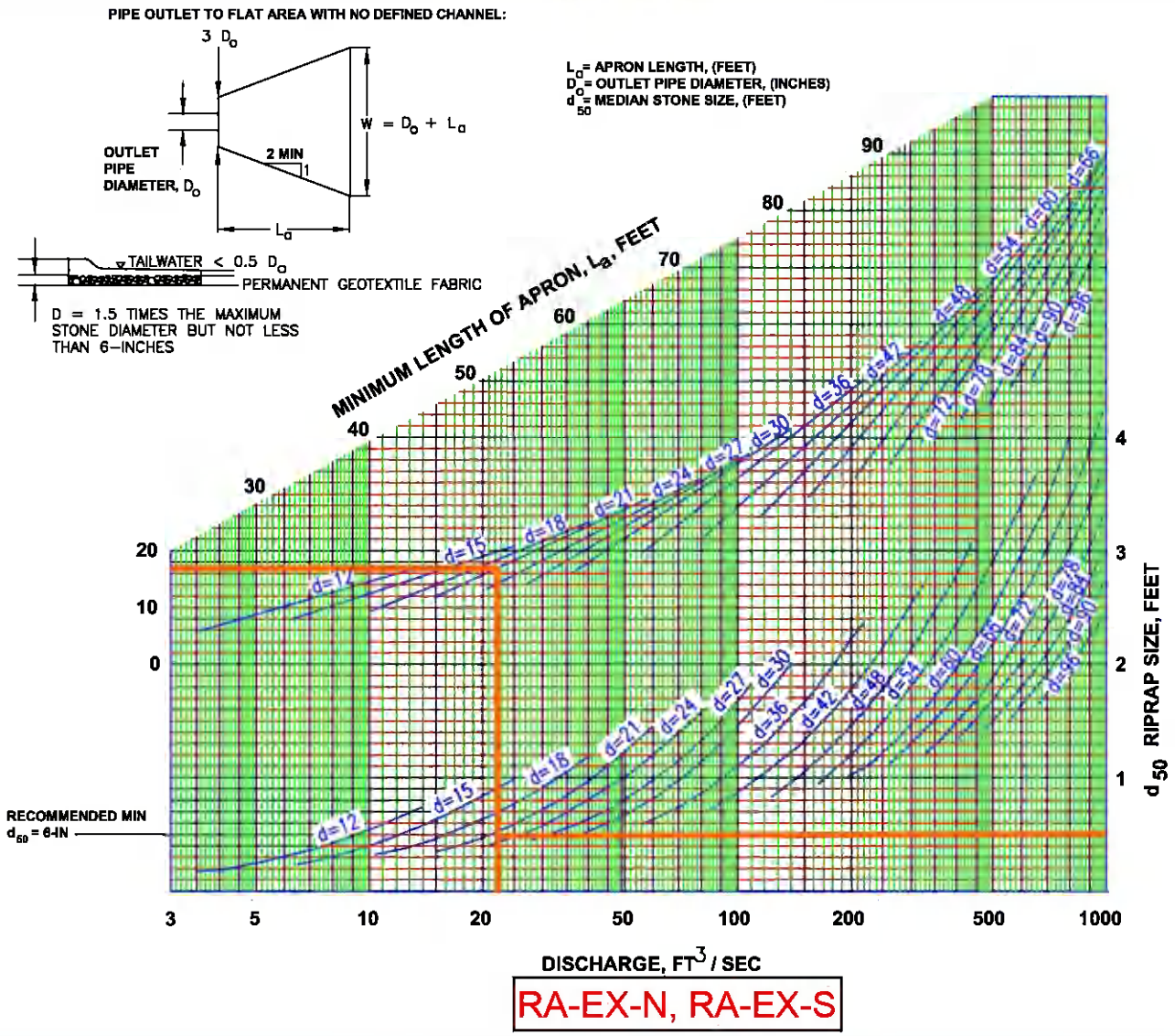
FIGURE RR-6

MINIMUM TAIL WATER CONDITION

EFFECTIVE DATE: AUGUST, 2005

DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL

MINIMUM TAILWATER CONDITION (T_w< 0.5 DIAMETER)



RA-EX-N, RA-EX-S

South Carolina
Department of Health
and Environmental Control

FIGURE RR-6

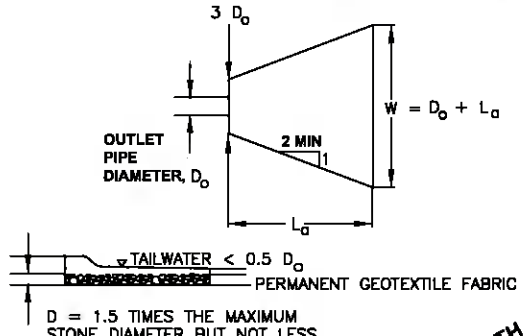
MINIMUM TAIL WATER CONDITION

EFFECTIVE DATE: AUGUST, 2005

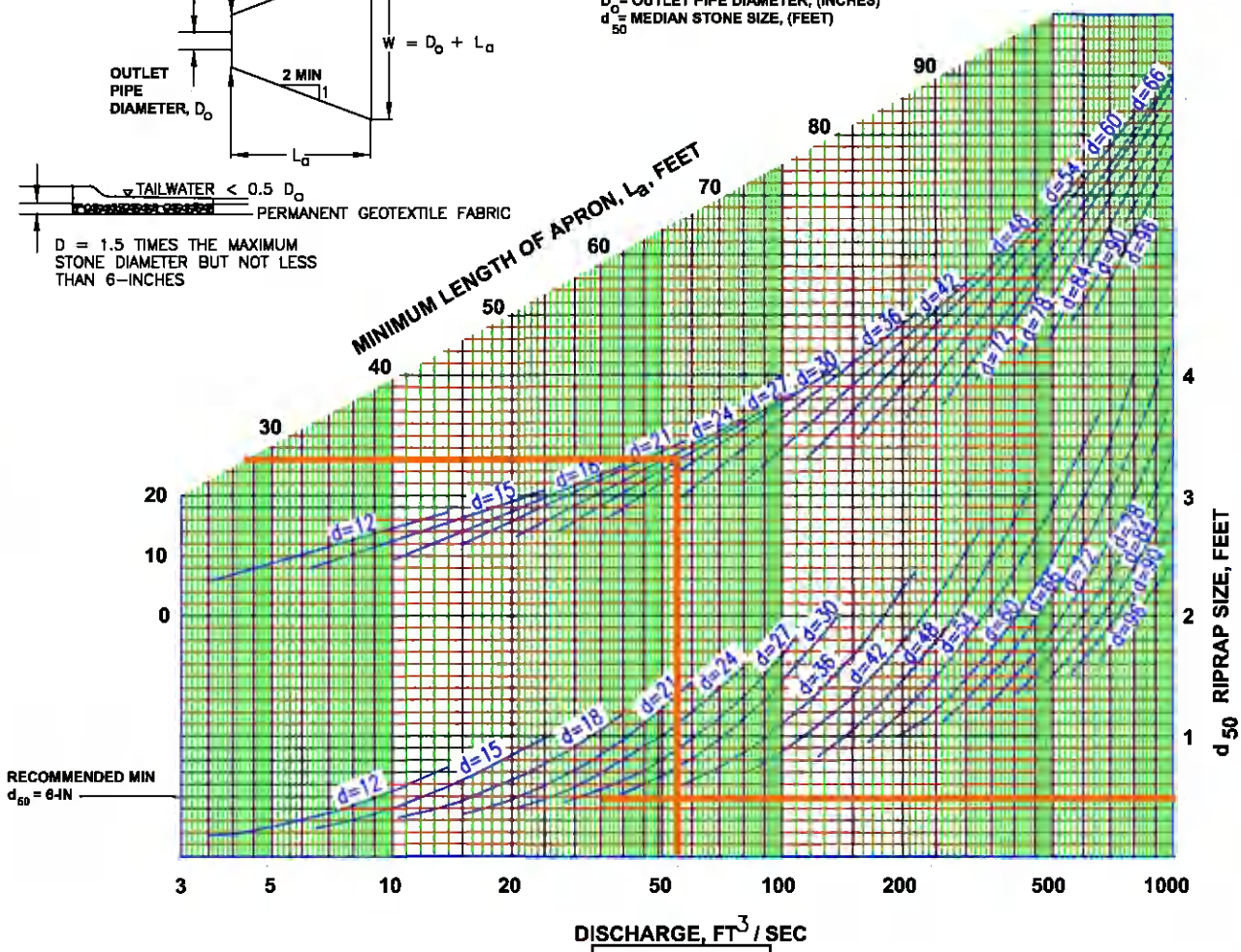
DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL

MINIMUM TAILWATER CONDITION (T_w< 0.5 DIAMETER)

PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL:



L_a = APRON LENGTH, (FEET)
D_o = OUTLET PIPE DIAMETER, (INCHES)
d_{50} = MEDIAN STONE SIZE, (FEET)

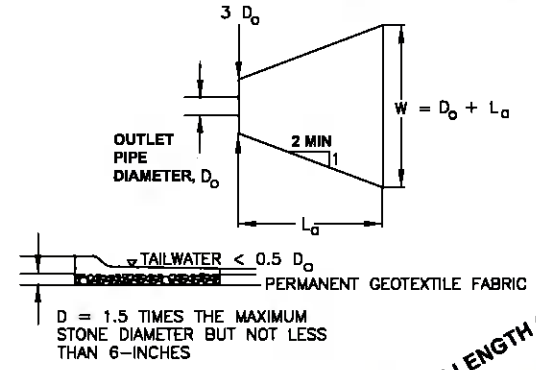


RA-B-6

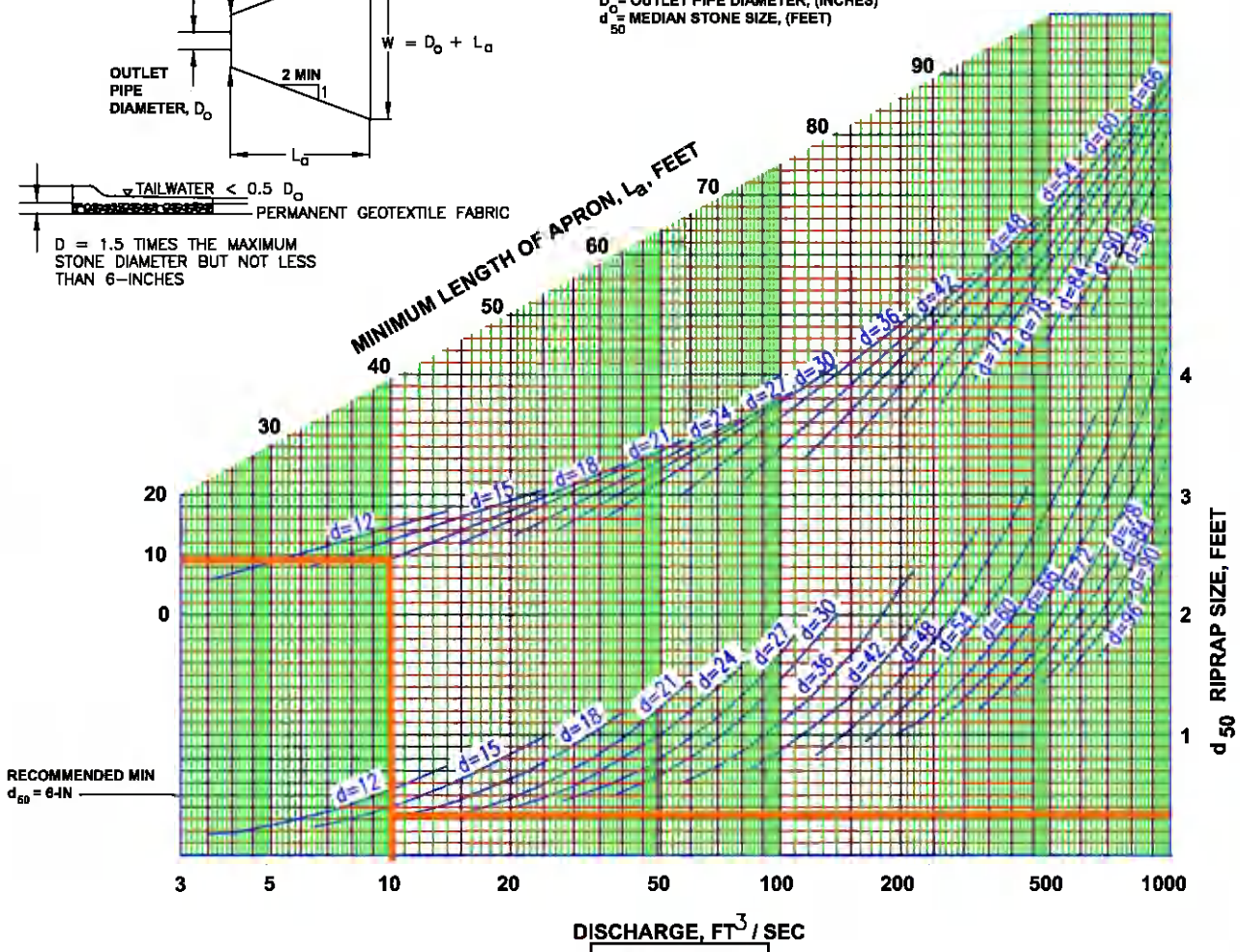
DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL

MINIMUM TAILWATER CONDITION (T_w < 0.5 DIAMETER)

PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL:



L_a = APRON LENGTH, (FEET)
D_o = OUTLET PIPE DIAMETER, (INCHES)
d_{50} = MEDIAN STONE SIZE, (FEET)



RA-P-10

South Carolina Department of Health and Environmental Control

FIGURE RR-6

MINIMUM TAIL WATER CONDITION

EFFECTIVE DATE: AUGUST, 2005

South Carolina
Department of Health
and Environmental Control

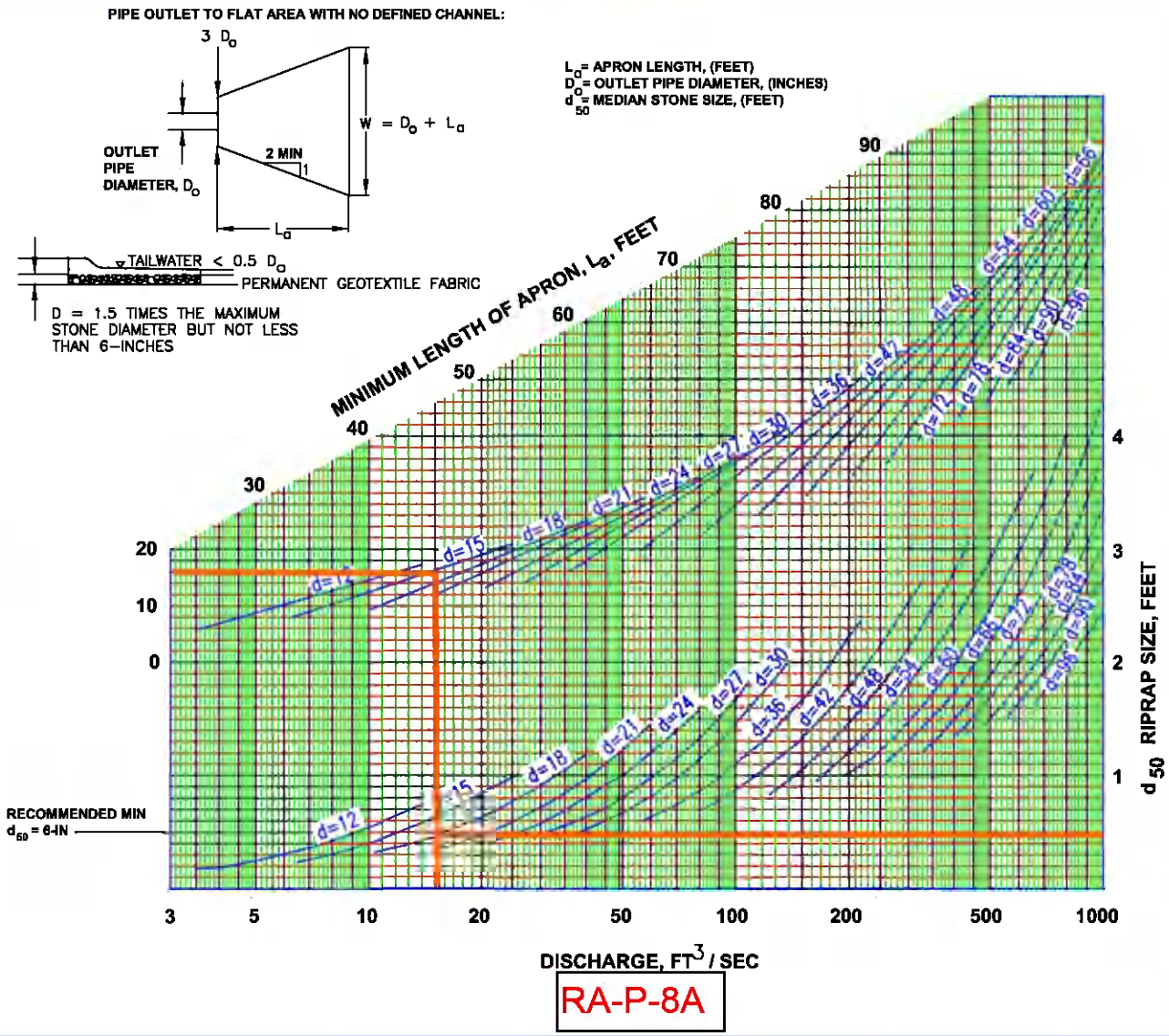
FIGURE RR-6

MINIMUM TAIL WATER CONDITION

EFFECTIVE DATE: AUGUST, 2005

DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL

MINIMUM TAILWATER CONDITION (T_w< 0.5 DIAMETER)



RA-P-8A

South Carolina
Department of Health
and Environmental Control

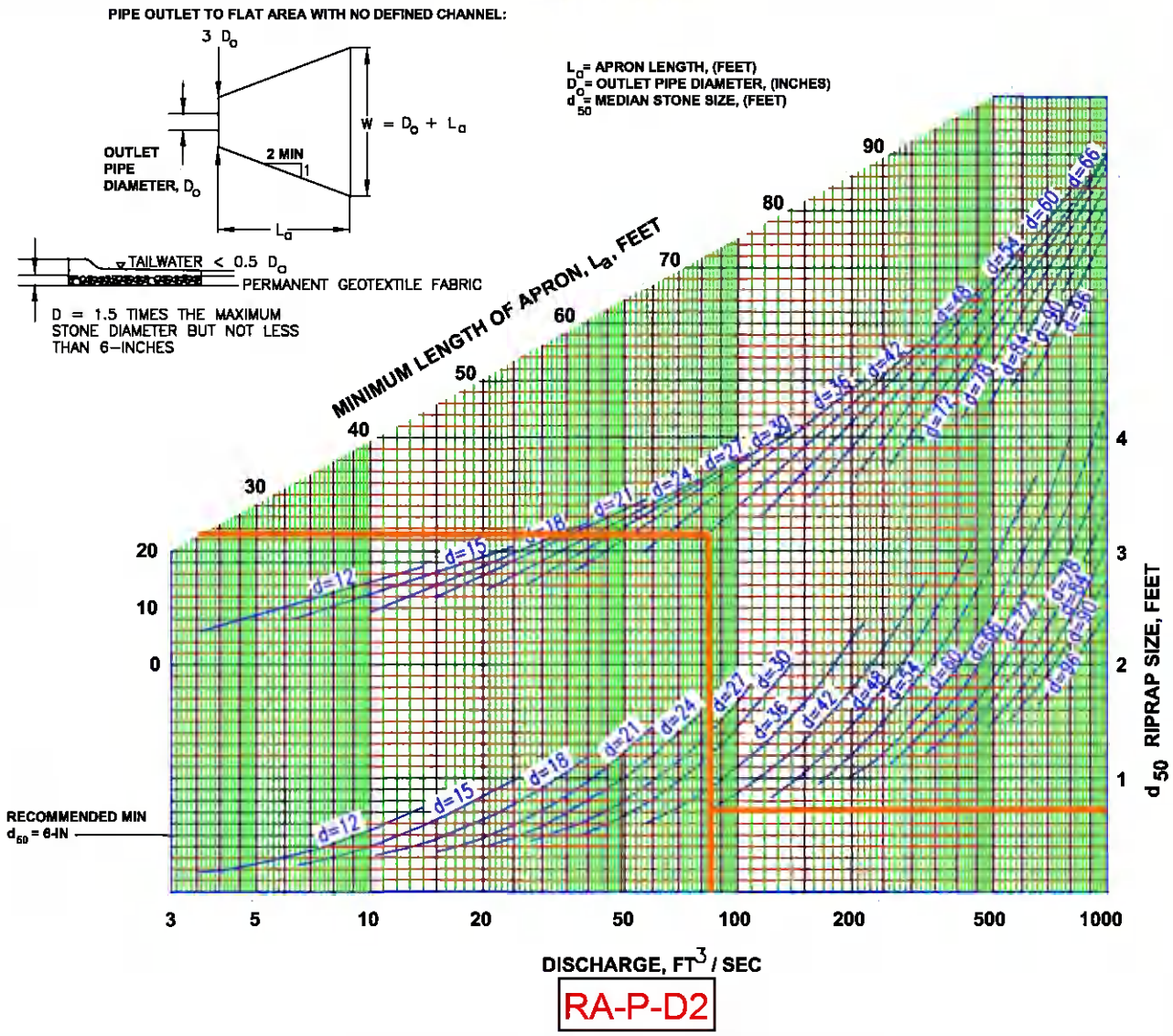
FIGURE RR-6

MINIMUM TAIL WATER CONDITION

EFFECTIVE DATE: AUGUST, 2005

DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL

MINIMUM TAILWATER CONDITION (T_w< 0.5 DIAMETER)



RA-P-D2

South Carolina
Department of Health
and Environmental Control

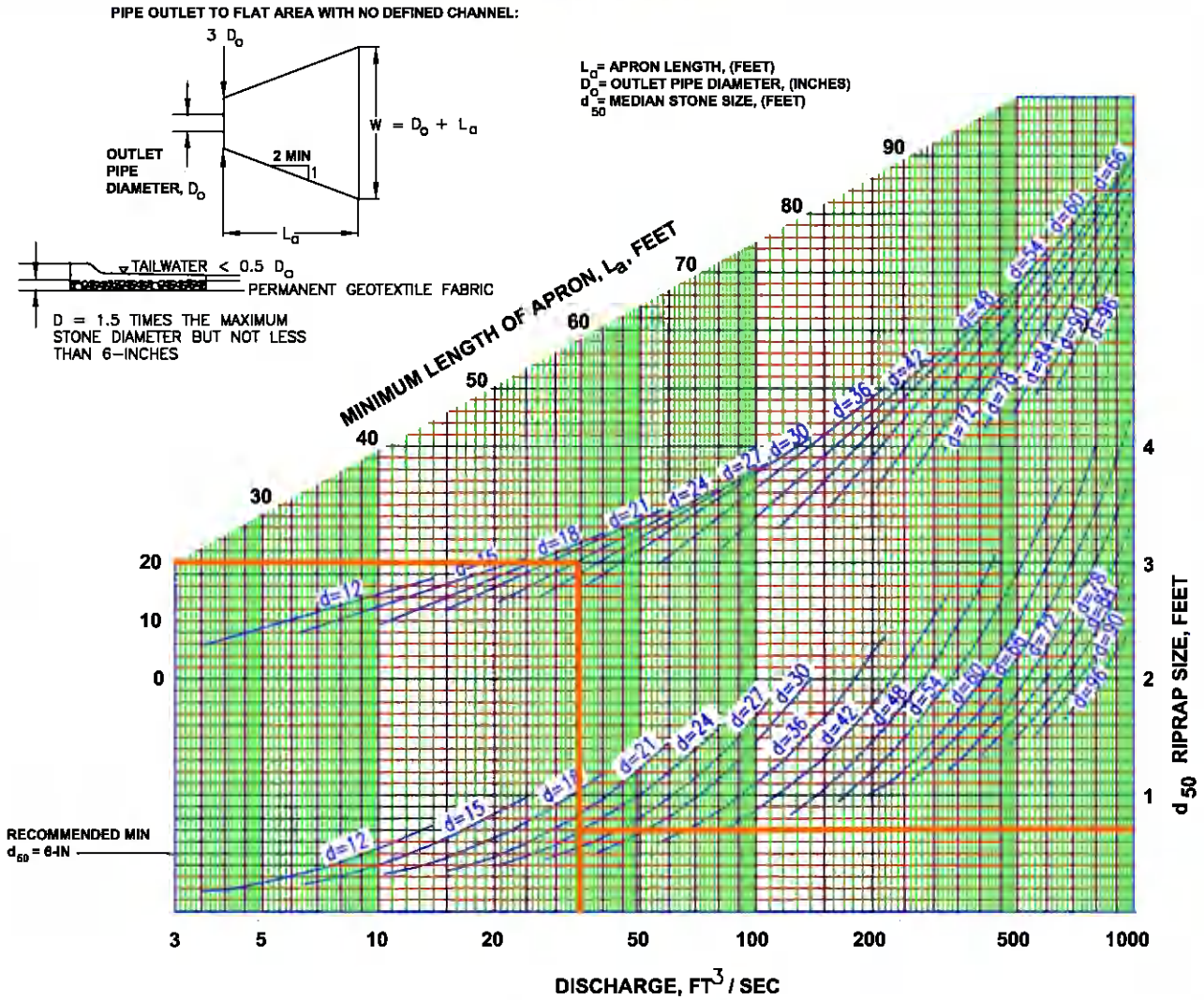
FIGURE RR-6

MINIMUM TAIL WATER CONDITION

EFFECTIVE DATE: AUGUST, 2005

DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL

MINIMUM TAILWATER CONDITION (T_w< 0.5 DIAMETER)



RA-P1,P3,P4,P6,P7

South Carolina
Department of Health
and Environmental Control

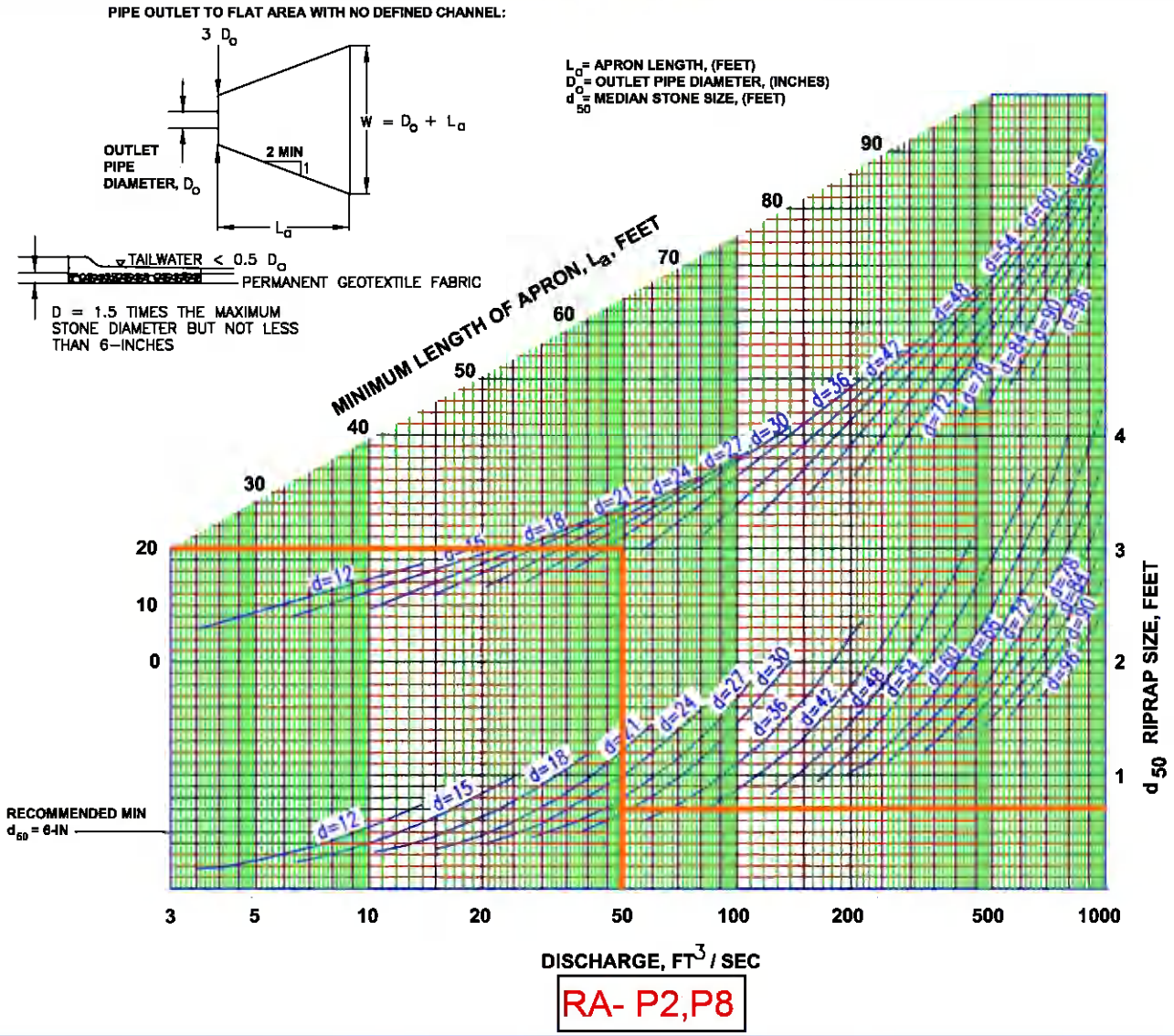
FIGURE RR-6

MINIMUM TAIL WATER CONDITION

EFFECTIVE DATE: AUGUST, 2005

DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL

MINIMUM TAILWATER CONDITION (T_w< 0.5 DIAMETER)



RA- P2,P8

South Carolina
Department of Health
and Environmental Control

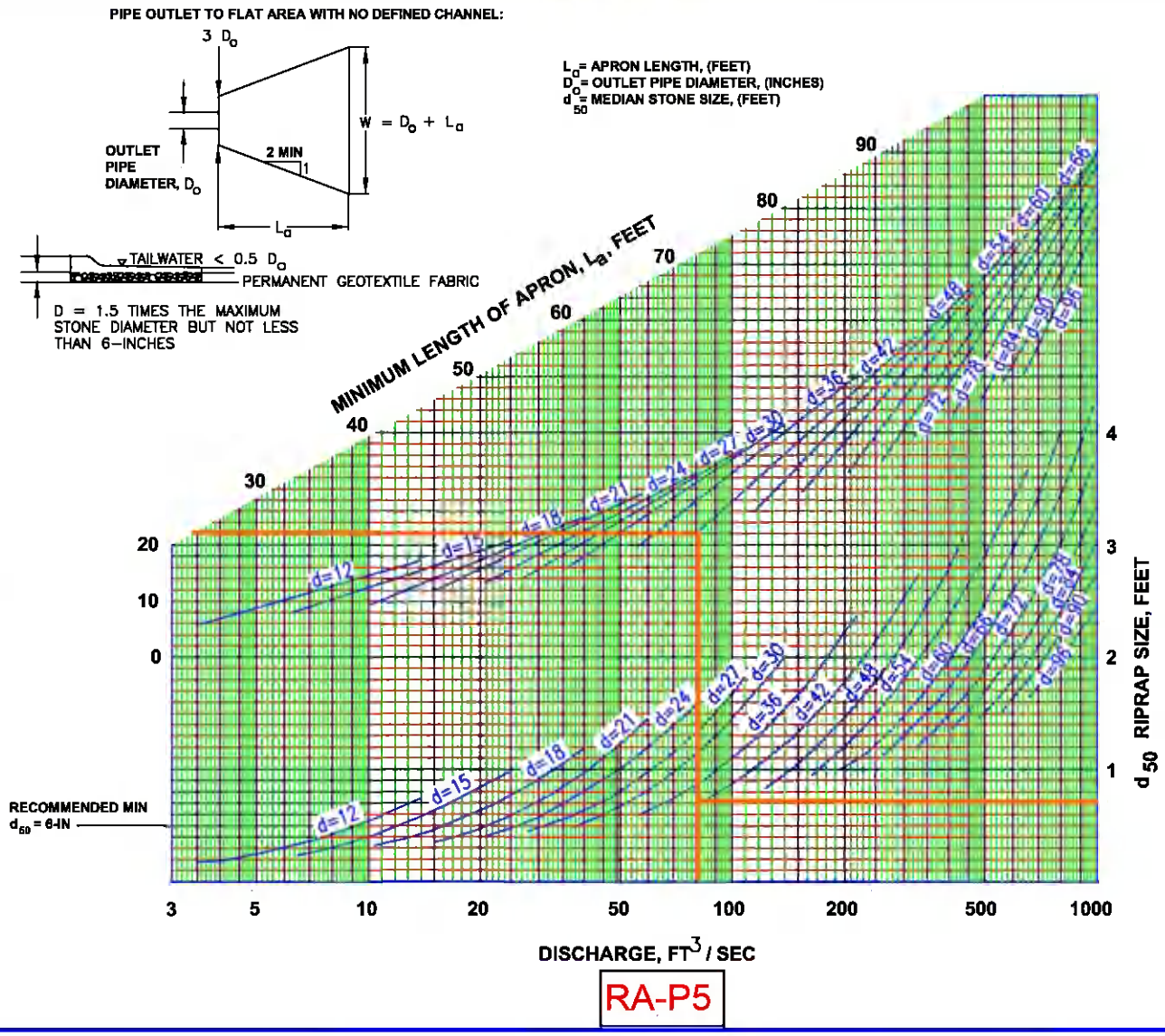
FIGURE RR-6

MINIMUM TAIL WATER CONDITION

EFFECTIVE DATE: AUGUST, 2005

DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL

MINIMUM TAILWATER CONDITION (T_w< 0.5 DIAMETER)



South Carolina
Department of Health
and Environmental Control

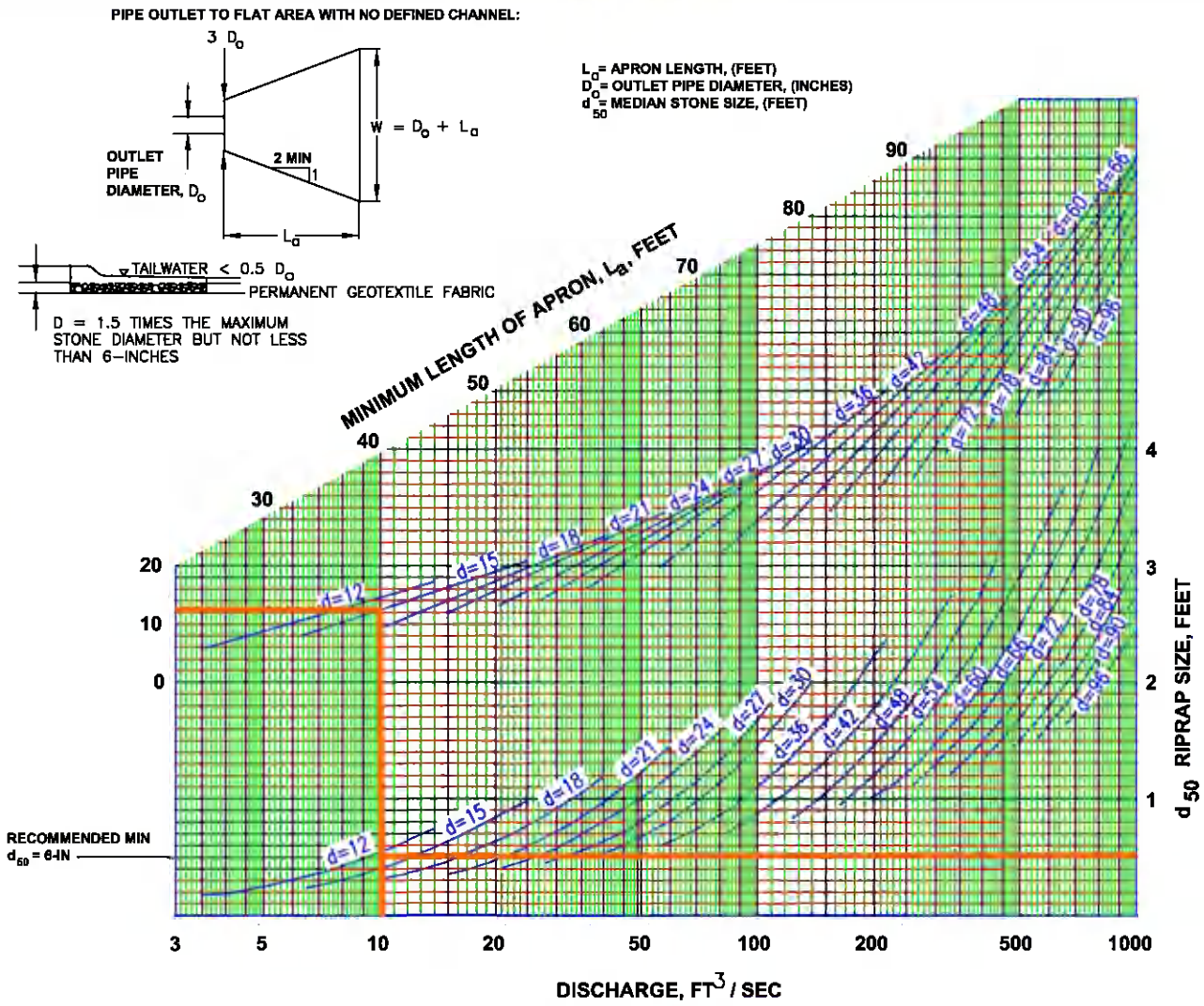
FIGURE RR-6

MINIMUM TAIL WATER CONDITION

EFFECTIVE DATE: AUGUST, 2005

DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL

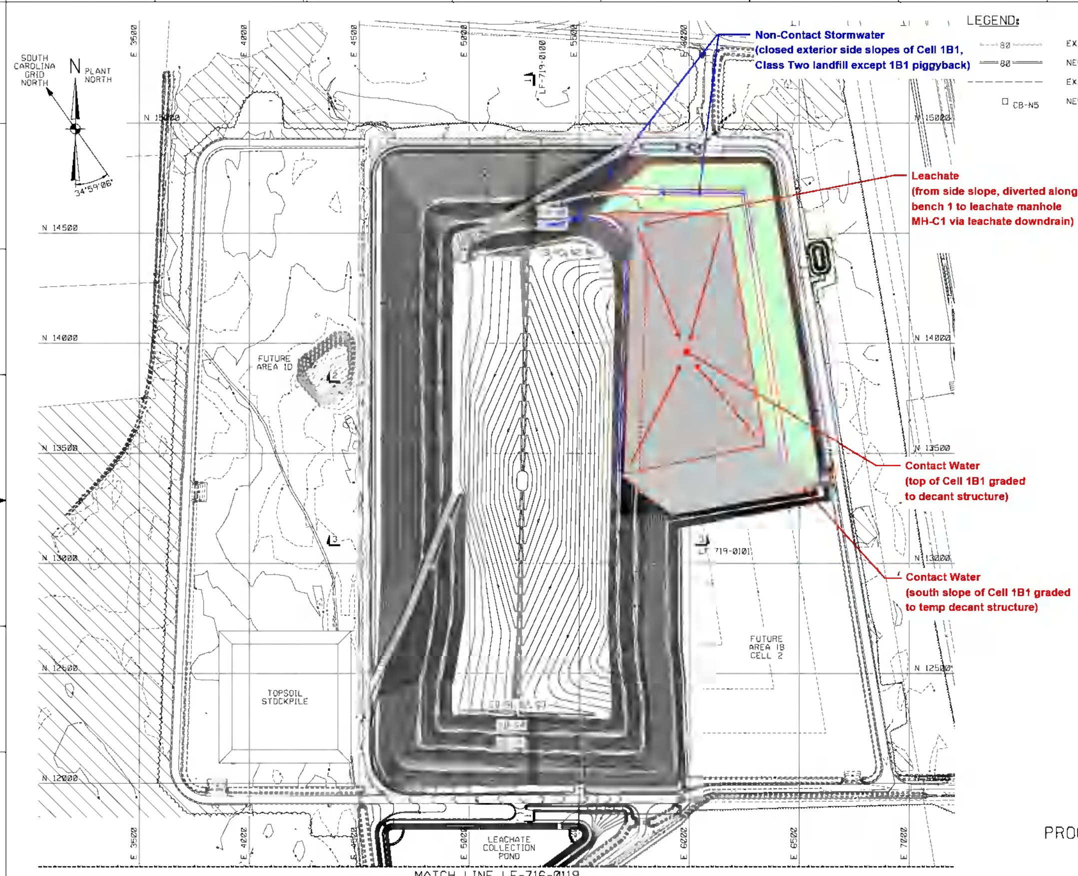
MINIMUM TAILWATER CONDITION (T_w< 0.5 DIAMETER)



RA-P-5A

Appendix E. Phasing Sketches

(10 Total Pages)



PLAN

SCALE:1"=200'

NOTES:

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LF-716-0117	CLOSURE PLAN - PHASE 6
LF-716-0019	FINAL GRADING PLAN
LF-719-0100	EXISTING, PHASING AND FINAL GRADE - CROSS SECTIONS
LF-719-0101	EXISTING, PHASING AND FINAL GRADE - CROSS SECTIONS

200 0 200 400 600

SCALE IN FEET

PROGRESS PLOT
11-20-14

DRAWN BY: KPF	ENGINEER: F.M. WOOD
CHECKED BY	PROJECT ENGINEERING MANAGER: R.E. SKIPTUNAS
LEAD DESIGNER: K.P. FEEG	PROJECT MANAGER: D.F. BECKER
PRELIMINARY STATUS: F.M. WOOD	REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
APPROVED STATUS	REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED 'HOLD' RETAINS PRELIMINARY STATUS.
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WorleyParsons resources & energy

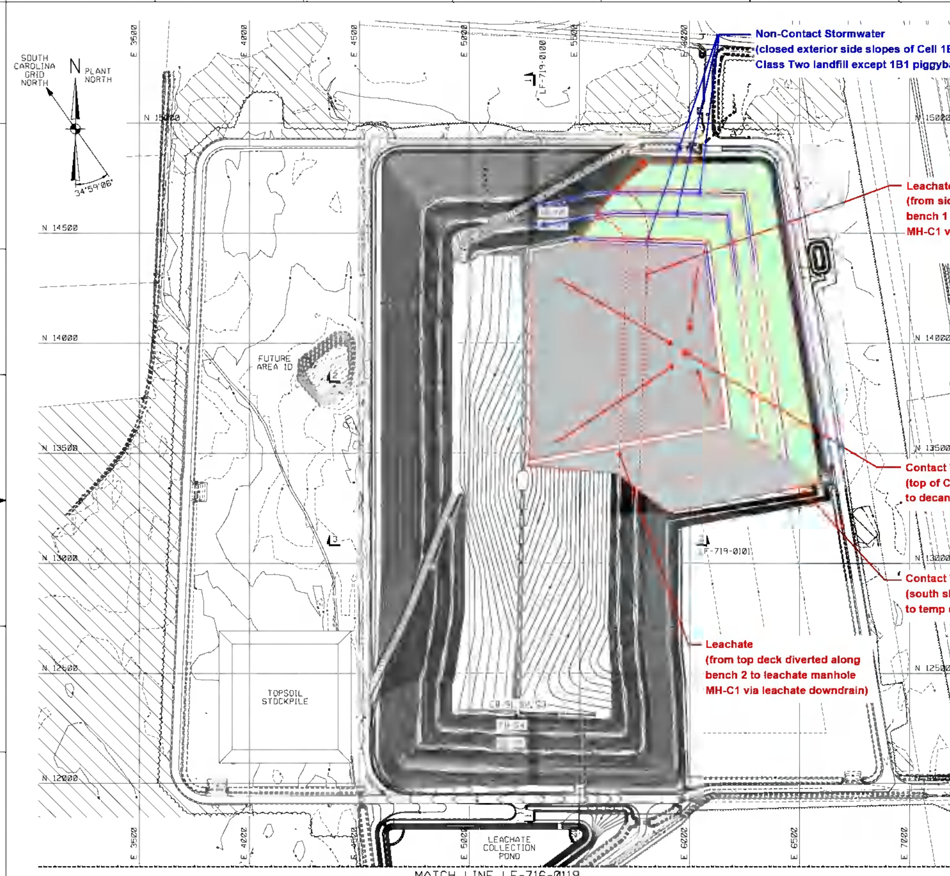
CLASS II SOLID WASTE LANDFILL
CLOSURE PLAN
FINAL GRADING PLAN

SCALE: 1"=200' | DRAWING SIZE: ARCH D (36" x 24")

CR34-0-DW-LF-716-0118 | REV C

REV	DATE	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/TECH. SPEC.	LEAD DISC. ENGINEER
A		KPF	RES	KPF	FMW	FMW
B	02/06/13	KPF	RES	KPF	FMW	FMW
C		KPF		KPF	FMW	FMW

ISSUED FOR REVIEW



MATCH LINE LF-716-0119

PLAN
SCALE: 1"=200'

LEGEND:

80 (dashed)	EXISTING CONTOURS
80 (solid)	NEW CONTOURS
(dashed line)	EXISTING DOWNDRAIN PIPE
□ CB-N5	NEW CATCH BASIN

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LF-719-0100	EXISTING, PHASING AND FINAL GRADE - CROSS SECTIONS
LF-719-0101	EXISTING, PHASING AND FINAL GRADE - CROSS SECTIONS

200 0 200 400 600
SCALE IN FEET

PROGRESS PLOT
11-20-14

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CHECKED BY	PROJECT ENGINEERING MANAGER: R.E. SKIPTUNAS
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CLOSURE PLAN
FINAL GRADING PLAN

SCALE: 1"=200' | DRAWING SIZE: ARCH D (36" x 24")

CR34-0-DW-LF-716-0118 | REV C

REV	DATE		DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/TECH. SPEC.	LEAD DISC. ENGINEER
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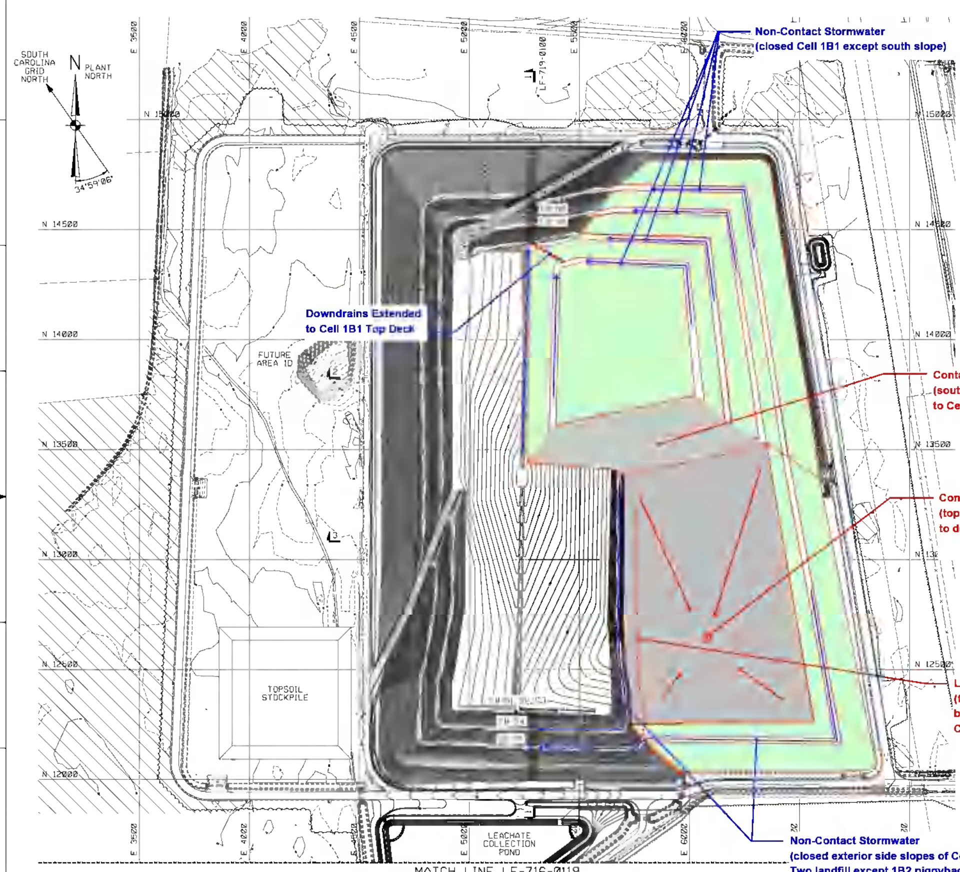
B	02/06/13	ISSUED FOR REVIEW	KPS	RES	KPF	FMW	FMW
C		ISSUED FOR REVIEW	KPS		KPF	FMW	FMW



PLAN
SCALE:1"=200'

LEGEND:

---80---	EXISTING CONTOURS
═80═	NEW CONTOURS
- - - - -	EXISTING DOWNDRAIN PIPE
□ CB-N5	NEW CATCH BASIN

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200 0 200 400 600
SCALE IN FEET

PROGRESS PLOT
11-20-14

DRAWN BY: KPF	ENGINEER: F.M. WOOD
CHECKED BY	PROJECT ENGINEERING MANAGER: R.E. SKIPTUNAS
LEAD DESIGNER: K.P. FEEG	PROJECT MANAGER: D.F. BECKER
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CLASS II SOLID WASTE LANDFILL
CLOSURE PLAN
FINAL GRADING PLAN

SCALE: 1"=200'	DRAWING SIZE: ARCH D (36" x 24")	JOB NO.	
WORLEYPARSONS DWG. NO.: CR34-0-DW-LF-716-0118			REV: C

REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/TECH. SPEC.	LEAD DISC. ENGINEER
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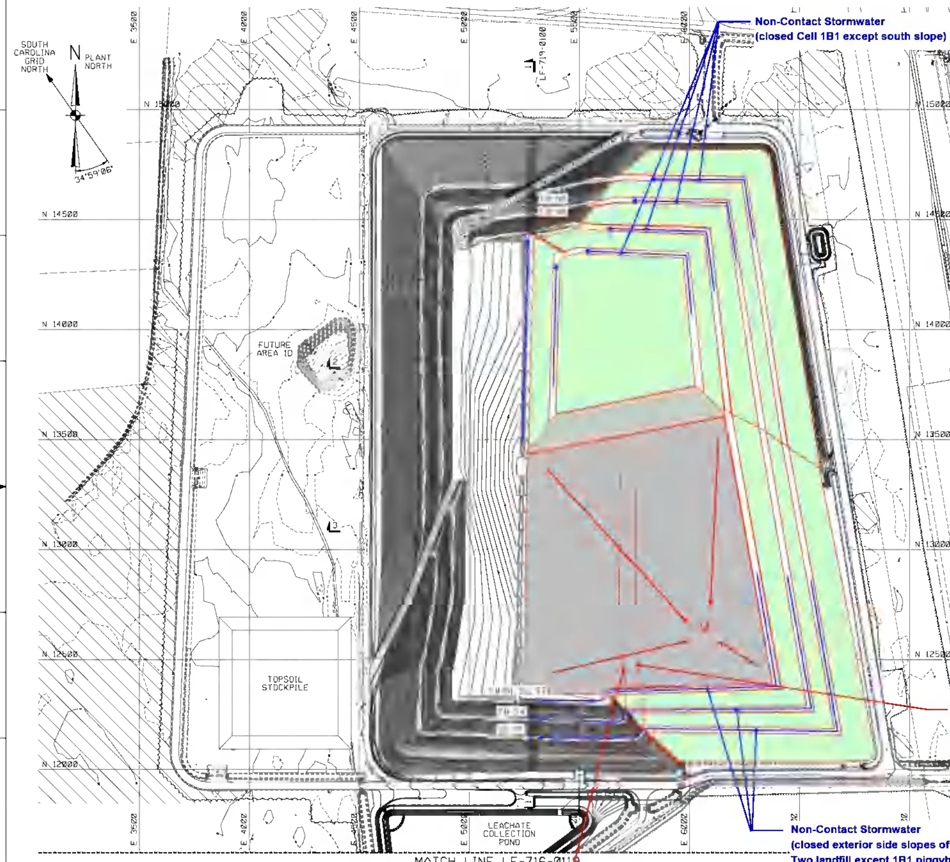
C		ISSUED FOR REVIEW	KPF		KPF	FMW	FMW



MATCH LINE LF-716-0119

PLAN
SCALE:1"=200'

LEGEND:

--- 80 ---	EXISTING CONTOURS
— 80 —	NEW CONTOURS
- - - - - -	EXISTING DOWNDRAIN PIPE
□ CB-N5	NEW CATCH BASIN

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LF-719-0101	EXISTING, PHASING AND FINAL GRADE - CROSS SECTIONS

200 0 200 400 600
SCALE IN FEET

PROGRESS PLOT
11-20-14

DRAWN BY: KPF	ENGINEER: F.M. WOOD
CHECKED BY	PROJECT ENGINEERING MANAGER: R.E. SKIPTUNAS
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CLASS II SOLID WASTE LANDFILL
CLOSURE PLAN
FINAL GRADING PLAN

SCALE: 1"=200' | DRAWING SIZE: ARCH D (36" x 24") | JOB NO.

CR34-0-DW-LF-716-0118 | REV C

REV	DATE	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/TECH. SPEC.	LEAD DISC ENGINEER
A		KPF	RES	KPF	FMW	FMW
B	02/06/13	KPF	RES	KPF	FMW	FMW
C		KPF		KPF	FMW	FMW

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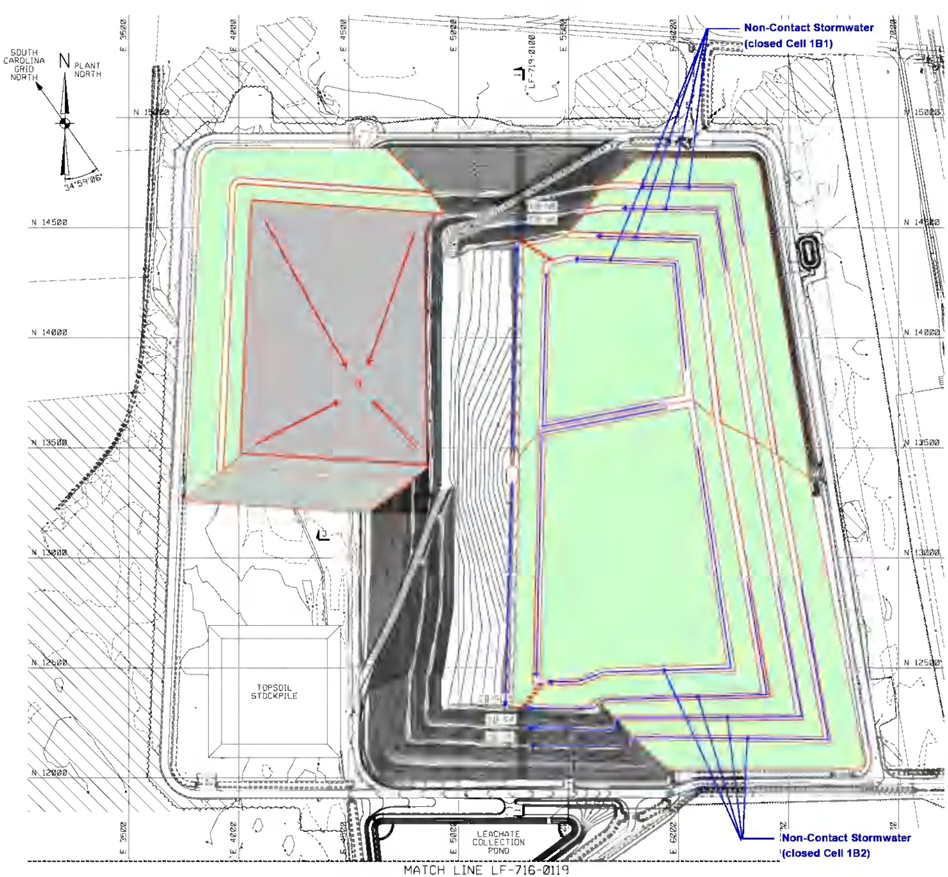

PLAN

SCALE:1"=200'

LEGEND:

---80---	EXISTING CONTOURS
—80—	NEW CONTOURS
-------	EXISTING DOWNDRAIN PIPE
□ CB-N5	NEW CATCH BASIN

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LF-719-0101	EXISTING, PHASING AND FINAL GRADE - CROSS SECTIONS

200 0 200 400 600

SCALE IN FEET

PROGRESS PLOT
11-20-14

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CLASS II SOLID WASTE LANDFILL
CLOSURE PLAN
FINAL GRADING PLAN

SCALE: 1"=200' | DRAWING SIZE: ARCH D (36" x 24")

WORLEYPARSONS DWG. NO. CR34-0-DW-LF-716-0118 | REV C

REV	DATE	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/TECH. SPLC.	LEAD DISC. ENGINEER
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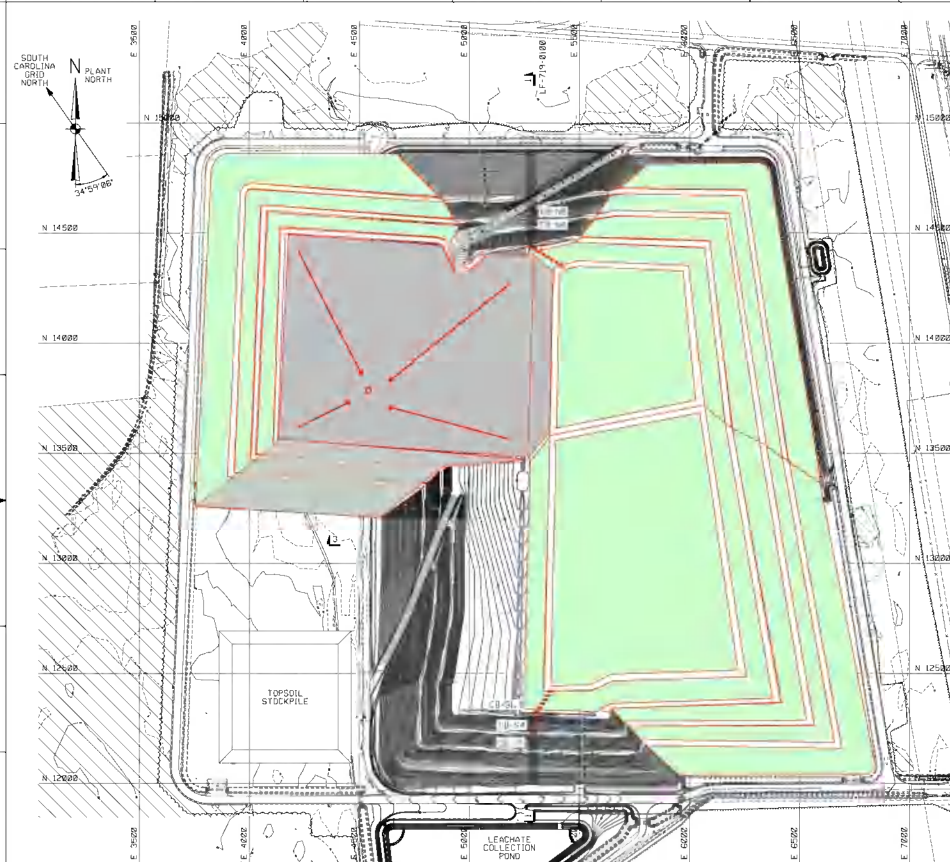
B	02/06/13	KPF	RES	KPF	FMW	FMW
A	8/11/09	KPF	RES	KPF	FMW	FMW

ISSUED FOR REVIEW



MATCH LINE LF-716-0119

PLAN
SCALE:1"=200'

LEGEND:

---80---	EXISTING CONTOURS
—80—	NEW CONTOURS
------	EXISTING DOWNDRAIN PIPE
□ CB-N5	NEW CATCH BASIN

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200 0 200 400 600
SCALE IN FEET

PROGRESS PLOT
11-20-14

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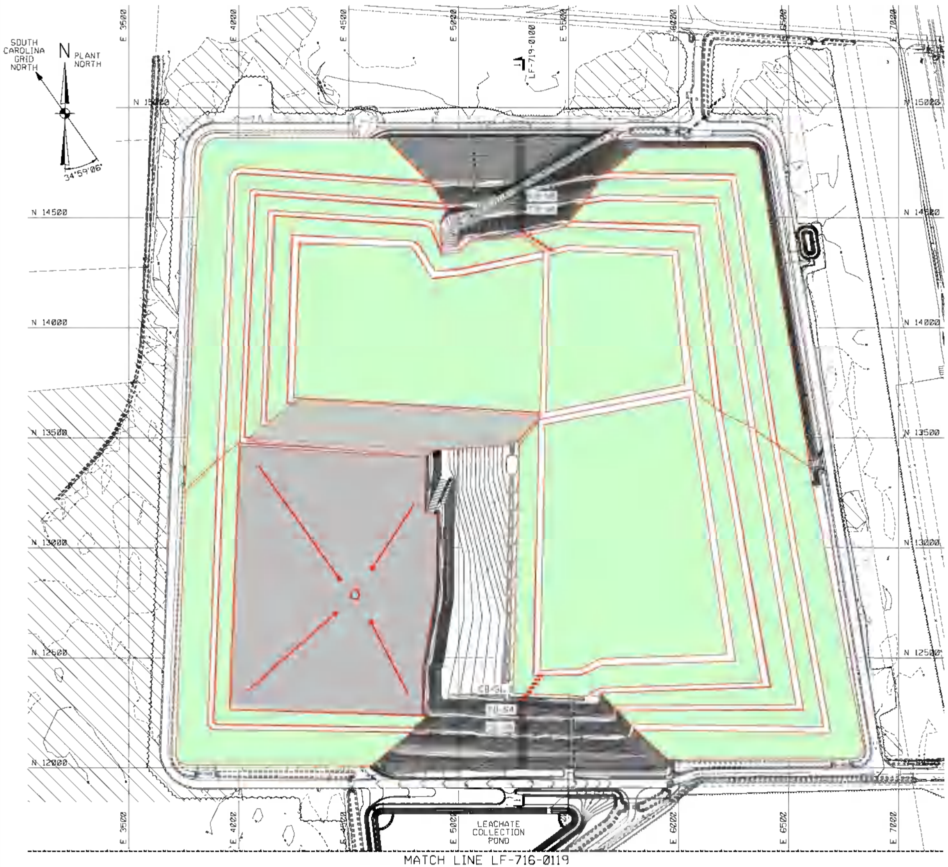
CLASS II SOLID WASTE LANDFILL
CLOSURE PLAN
FINAL GRADING PLAN

SCALE	DRAWING SIZE	JOB NO.
1"=200'	ARCH D (36" x 24")	180888-01338

WORLEYPARSONS DWG. NO.	REV
CR34-0-DW-LF-716-0118	C

REV	DATE	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/TECH. SPEC.	LEAD DISC. ENGINEER
A	8/11/10	KPF	RES	KPF	FMW	FMW
B	02/06/13	KPF	RES	KPF	FMW	FMW
C		KPF		KPF	FMW	FMW

ISSUED FOR REVIEW



PLAN
SCALE:1"=200'

LEGEND:

80	EXISTING CONTOURS
80	NEW CONTOURS
	EXISTING DOWNDRAIN PIPE
CB-N5	NEW CATCH BASIN

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LF-716-0114	CLOSURE PLAN - PHASE 3
LF-716-0115	CLOSURE PLAN - PHASE 4
LF-716-0116	CLOSURE PLAN - PHASE 5
LF-716-0117	CLOSURE PLAN - PHASE 6
LF-715-0019	FINAL GRADING PLAN
LF-719-0100	EXISTING, PHASING AND FINAL GRADE - CROSS SECTIONS
LF-719-0101	EXISTING, PHASING AND FINAL GRADE - CROSS SECTIONS

200 0 200 400 600
SCALE IN FEET

PROGRESS PLOT
11-20-14

DRAWN BY: KPF	ENGINEER: F.M. WOOD
CHECKED BY:	PROJECT ENGINEERING MANAGER: R.E. SKIPTUNAS
LEAD DESIGNER: K.P. FEEG	PROJECT MANAGER: D.F. BECKER
PRELIMINARY STATUS DATE — LDE F.M. WOOD	REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
APPROVED STATUS DATE — LDE	REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
CERTIFICATE OF AUTHORIZATION	PROFESSIONAL ENGINEER'S SEAL

SOUTH CAROLINA — WORLEY PARSONS GROUP INC. No 1606 — CERTIFICATE OF AUTHORIZATION

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CROSS GENERATING STATION

Santee Cooper — SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

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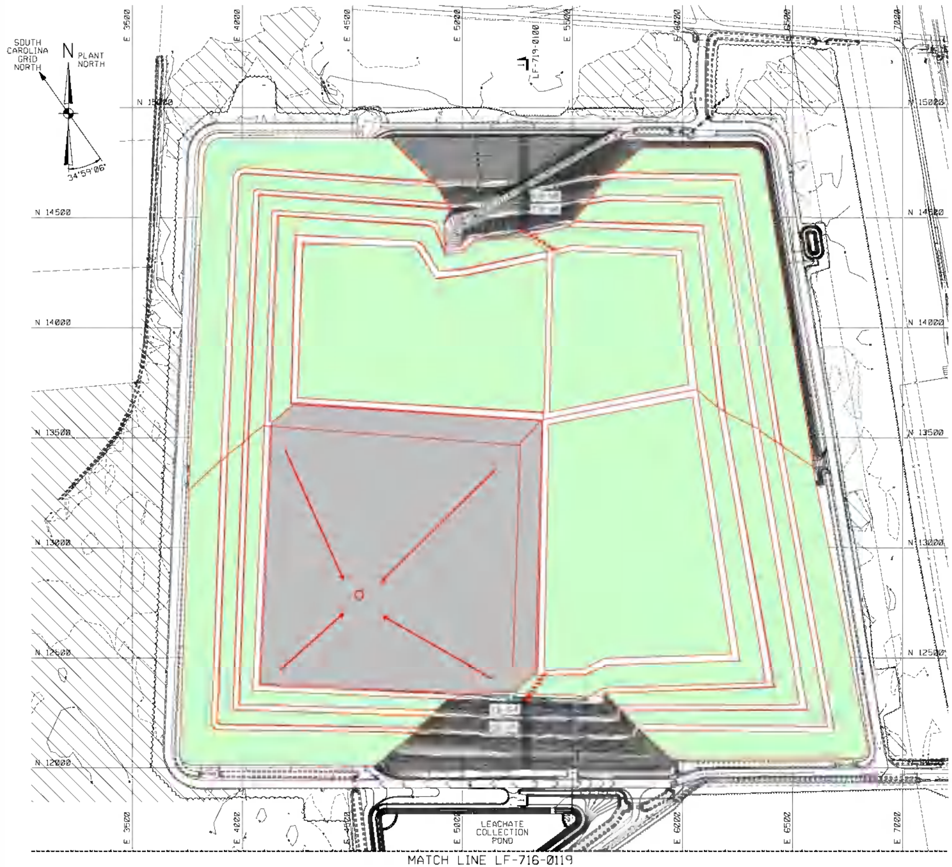
CLASS II SOLID WASTE LANDFILL
CLOSURE PLAN
FINAL GRADING PLAN

SCALE	DRAWING SIZE	JOB NO.
1"=200'	ARCH D (36" x 24")	108088-01330

WORLEYPARSONS DWG. NO.: CR34-0-DW-LF-716-0118 REV: C

REV	DATE	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/ TECH. SPEC.	LEAD DISC ENGINEER	
C		KPF		KPF	FMW	FMW	ISSUED FOR REVIEW
B	02/06/13	KPF	RES	KPF	FMW	FMW	ISSUED FOR REVIEW
A	01/11/13	KPF	RCS	KPF	FMW	FMW	ISSUED FOR REVIEW



PLAN
SCALE:1"=200'

LEGEND:

80 (dashed)	EXISTING CONTOURS
80 (solid)	NEW CONTOURS
- - - -	EXISTING DOWNDRAIN PIPE
□ CB-N5	NEW CATCH BASIN

NOTES:

1. GRID BASED ON THE PLANT COORDINATE SYSTEM.
2. BACKGROUND TOPOGRAPHY IS BASED ON A SURVEY PERFORMED BY STANTEC CONSULTING SERVICES INC., NORTH CHARLESTON, SC DATED 11/10/09.
3. ELEVATIONS BASED ON NGVD 29 DATUM UNLESS OTHERWISE STATED.
4. FINAL GRADING AS-BUILT SURVEY WILL BE PROVIDED WITHIN 180 DAYS AFTER LAST RECEIPT OF WASTE (OR WITHIN 180 DAYS AFTER ACHIEVING FINAL ELEVATIONS).
5. UPON COMPLETION OF ALL CLOSURE ACTIVITIES, A PLAT WITH FINAL BOUNDARIES OF WASTE DISPOSAL, AND DEED NOTATION INDICATING IN PERPETUITY THAT PROPERTY HAS BEEN USED FOR WASTE DISPOSAL, WITH LAT/LONG/TYPE/LOCATION/QUANTITY OF WASTE DISPOSAL WILL BE PROVIDED.

REFERENCES:

LF-716-0110	CLOSURE PLAN - EXISTING CONDITIONS SITE PLAN
LF-716-0112	CLOSURE PLAN - PHASE 1
LF-716-0113	CLOSURE PLAN - PHASE 2
LF-716-0114	CLOSURE PLAN - PHASE 3
LF-716-0115	CLOSURE PLAN - PHASE 4
LF-716-0116	CLOSURE PLAN - PHASE 5
LF-716-0117	CLOSURE PLAN - PHASE 6
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LF-719-0101	EXISTING, PHASING AND FINAL GRADE - CROSS SECTIONS

200 0 200 400 600
SCALE IN FEET

PROGRESS PLOT
11-20-14

DRAWN BY: KPF	ENGINEER: F.M. WOOD
CHECKED BY:	PROJECT ENGINEERING MANAGER: R.E. SKIPTUNAS
LEAD DESIGNER: K.P. FEEG	PROJECT MANAGER: D.F. BECKER
PRELIMINARY STATUS DATE LDE F.M. WOOD	REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
APPROVED STATUS DATE LDE	REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
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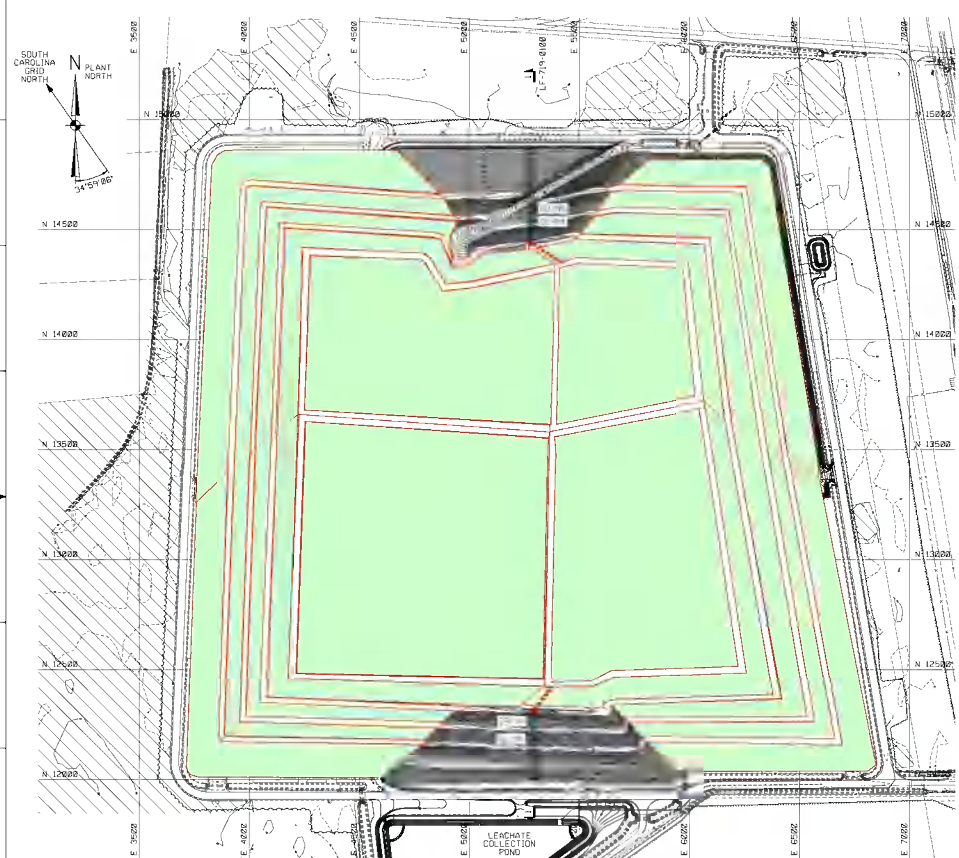
CLASS II SOLID WASTE LANDFILL
CLOSURE PLAN
FINAL GRADING PLAN

REV	DATE	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/TECH. SPLC.	LEAD DISC ENGINEER	
C		KPF		KPF	FMW	FMW	ISSUED FOR REVIEW
B	02/06/13	KPF	RES	KPF	FMW	FMW	ISSUED FOR REVIEW
A	01/11/13	KPF	RES	KPF	FMW	FMW	ISSUED FOR REVIEW

SCALE: 1"=200' | DRAWING SIZE: ARCH D (36" x 24") | JOB NO. 108888-01330

WORLEYPARSONS DWG. NO. CR34-0-DW-LF-716-0118 REV C

11/20/2014 12:15:30 PM



MATCH LINE LF-716-0119

PLAN
SCALE:1"=200'

LEGEND:

80	EXISTING CONTOURS
80	NEW CONTOURS
	EXISTING DOWNDRAIN PIPE
CB-N5	NEW CATCH BASIN

NOTES:

1. GRID BASED ON THE PLANT COORDINATE SYSTEM.
2. BACKGROUND TOPOGRAPHY IS BASED ON A SURVEY PERFORMED BY STANTEC CONSULTING SERVICES INC., NORTH CHARLESTON, SC DATED 11/10/09.
3. ELEVATIONS BASED ON NGVD 29 DATUM UNLESS OTHERWISE STATED.
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200 0 200 400 600
SCALE IN FEET

PROGRESS PLOT
11-20-14

DRAWN BY: KPF	ENGINEER: F.M. WOOD
CHECKED BY	PROJECT ENGINEERING MANAGER: R.E. SKIPTUNAS
LEAD DESIGNER: K.P. FEEG	PROJECT MANAGER: D.F. BECKER
PRELIMINARY STATUS — LDE F.M. WOOD	REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVISED NOT CHECKED.
APPROVED STATUS	REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED 'HOLD' RETAINS PRELIMINARY STATUS.
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WorleyParsons resources & energy

CLASS II SOLID WASTE LANDFILL
CLOSURE PLAN
FINAL GRADING PLAN

SCALE: 1"=200' DRAWING SIZE: ARCH D (36" x 24")

WORLEYPARSONS DWG. NO. CR34-0-DW-LF-716-0118 REV C

REV	DATE	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/TECH. SPLC.	LEAD DISC. ENGINEER
A		KPF	RES	KPF	FMW	FMW
B	12/06/13	KPF	RES	KPF	FMW	FMW
C		KPF		KPF	FMW	FMW

ISSUED FOR REVIEW

Appendix F. Bench Capacity

(5 Total Pages)

SUMMARY OF PEAK FLOWS FOR BENCHES		
Area	Discharge Q_{25}	Description
NW2+EXN2+NE2	15.3	Area 1 - Bench 1 from top (NORTH)
NW3+EXN3+NE3	25.2	Area 1 - Bench 2 from top (NORTH)
NW4+EXN4+NE4	27.9	Area 1 - Bench 3 from top (NORTH)
NW5+EXN5+NE5	33.5	Area 1 - Bench 4 from top (NORTH)
SW2+EXS2+SE2	15.4	Area 1 - Bench 1 from top (SOUTH)
SW3+EXS3+SE3	28.0	Area 1 - Bench 2 from top (SOUTH)
SW4+EXS4+SE4	25.6	Area 1 - Bench 3 from top (SOUTH)
SW5+EXS5+SE5	20.3	Area 1 - Bench 4 from top (SOUTH)

From the table above, the maximum flow occurs in the drainage area, NW5+EXN5+NE5.
Since this flow is carried by the two landfill terrace channels, the flow will be divided into half.

The maximum flow from the sub areas = 33.5 cfs
The maximum flow per each channel = 16.7 cfs

The capacity of the channel = 16.5 cfs (see next page)

The estimated peak flow is slightly above the capacity of the channel. Since the peak flow calculations are based on conservative estimates, it is acceptable to tolerate 0.2 cfs. See Drawing CR34-0-DW-LF-735-0541 for the cross-section details

Worksheet for Bench Capacity

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.040	
Channel Slope	0.00500	ft/ft
Normal Depth	1.00	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	17.00	ft/ft (H:V)

Results

Discharge	16.44	ft^3/s
Flow Area	10.00	ft^2
Wetted Perimeter	20.19	ft
Hydraulic Radius	0.50	ft
Top Width	20.00	ft
Critical Depth	0.70	ft
Critical Slope	0.03351	ft/ft
Velocity	1.64	ft/s
Velocity Head	0.04	ft
Specific Energy	1.04	ft
Froude Number	0.41	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.00	ft
Critical Depth	0.70	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.03351	ft/ft

Worksheet for 6" Pipe Flow Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00500	ft/ft
Normal Depth	0.50	ft
Diameter	0.50	ft
Discharge	37134.92	ft^3/d

Results

Discharge	37134.92	ft^3/d
Normal Depth	0.50	ft
Flow Area	0.20	ft^2
Wetted Perimeter	1.57	ft
Hydraulic Radius	0.13	ft
Top Width	0.00	ft
Critical Depth	0.33	ft
Percent Full	100.0	%
Critical Slope	0.00809	ft/ft
Velocity	2.19	ft/s
Velocity Head	0.07	ft
Specific Energy	0.57	ft
Froude Number	0.00	
Maximum Discharge	0.46	ft^3/s
Discharge Full	0.43	ft^3/s
Slope Full	0.00500	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for 6" Pipe Flow Capacity

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.33	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00809	ft/ft

Appendix B. Calculation CR34-0-DC-LF-CE-007

Decant Structure Design

WorleyParsons
resources & energy

Calculation Template

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
Elec File Location	P:\SanteeCooper\CR34\Doc\Civil\Cross Generating Station\Class III SWLF Horizontal Expansion\Calculations\CE-007 Decant Structures\CR34-0-DC-LF-CE-007-R0.doc		
Project File Location	See Encompass	**Page**	1 **of** 62

Calculation Objective

Design the decant structures, which will be located on the Solid Waste Landfill Areas 1B, 1D, 2, and 5, to collect stormwater runoff and prevent the transport of sediment from the waste disposal area to the stormwater management facilities.

Calculation Method

Use Haestad Methods Pondpack program to generate runoff hydrographs for a 25-year, 24-hour storm event and to route the storm through the basin and the decant structure.

Software Used

Title	Version	Validated (Yes/No/NA)
Bentley Pondpack	10.1	Yes

Assumptions

All assumptions are included in the calculation. None that require further verification.

References

1. SCDHEC Standards for Storm Water and Sediment Reduction Regulation 72-300 through 72-316.
2. SCDHEC Solid Waste Management Industrial Solid Waste Landfills –Regulation DHEC R61-107-19
3. SCDHEC OCRM Stormwater Best Management Practices. Handbook
4. WorleyParsons' Drawings CR34-0-DW-LF-735-0364 and 450 thru 0455

Professional Engineer Seal

See Page 3

Conclusions

Use perforated 24" ADS N-12 pipe (or equal) for decant structure riser pipe. Use solid 18" and 24" ADS N-12 pipe (or equal) for discharge to the leachate pond. Keep the decant structure a minimum of 5 feet above the ash level. TYPAR 3601 will be used as filter geotextile. Keep the base of the depressed basin area around the decant structure at least 7 percent of the total contributing drainage area, with slopes of 5:1 or flatter upward to the surrounding active work area. Maintain the perimeter of the landfill at least 2 feet above the top of the decant riser pipe.

Rev	Date	Description	By	Checked	Approved
0	14-Feb-2012	Issued for Permitting	P.Velugubantla	E. Leiby	F. Wood

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Calculation Template

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
Elec File Location	P:\SanteeCooper\CR34\Doc\Civil\Cross Generating Station\Class III SWLF Horizontal Expansion\Calculations\CE-007 Decant Structures\CR34-0-DC-LF-CE-007-R0.doc		
Project File Location	See Encompass	**Page** 2 **of** 62	

Please check boxes for all applicable items checked or delete if not appropriate:

Calculations:

- ☒ Calculation number assigned and registered (refer to project numbering system or Document Numbering System EPP-0040 for format).
- ☒ Project title shown.
- ☒ Calculation title shown.
- ☒ Revision history box complete and signed.
- ☒ Index.
- ☐ Appropriate stamp for preliminary issues.
- ☒ Calculation objectives (aims) stated.
- ☒ Calculation method defined or described (including formulae if relevant).
- ☒ Reference made to text, standard or code. Check version/edition with that required for project.
- ☒ Source of input data stated (with revision number and date if relevant).
- ☒ Assumptions stated.
- ☒ Summary of results or conclusions.
- ☒ For software based calculations, reference to software validation if available.
- ☒ Approach used is appropriate for problem being solved.
- ☒ Method clear and easy to follow.
- ☒ Input data correct.
- ☒ Calculation is arithmetically correct OR software previously verified and reference to verification checked.
- ☒ Calculation result within expected limits.
- ☒ Calculation tolerances stated if significant.
- ☒ Units used as required by customer.
- ☒ Abbreviations correct.
- ☒ Appropriate cross-references.
- ☒ Sketches included and clearly labeled, where required.
- ☒ Attachments included and referenced, as required.
- ☒ Considered design reviews, Hazop actions, client input, safety and environmental issues, etc.

Checking records:

- ☒ Checked and annotated copy of calculation filed (use "Check Print" stamp).
- ☒ Corrections made as required and calculation dated and signed on cover sheet by checker.

Revisions:

- ☐ Changes clouded.
- ☐ Revision history block updated.
- ☐ Calculation re-checked if required.

Rev	Date	Description	By	Checked	Approved
0	14-Feb-2012	Issued for Permitting	P.Velugubantla	E. Leiby	F. Wood

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Calculation Template

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
Elec File Location	P:\SanteeCooper\CR34\Doc\Civil\Cross Generating Station\Class III SWLF Horizontal Expansion\Calculations\CE-007 Decant Structures\CR34-0-DC-LF-CE-007-R0.doc		
Project File Location	See Encompass	**Page**	3 of 62

Rev	Date	By	Checked	Rev	Date	By	Checked	Rev	Date	By	Checked
0	14-Feb-2012	P Pedugubanda	E. Leiby								

Table of Contents

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION
WORLEY PARSONS GROUP INC.
No. 1505

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER
No. 24767
FLETCHER M. WOOD
2-14-2012

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
Elec File Location	P:\SanteeCooper\CR34\Doc\Civil\Cross Generating Station\Class III SWLF Horizontal Expansion\Calculations\CE-007 Decant Structures\CR34-0-DC-LF-CE-007-R0.doc		
Project File Location	See Encompass	**Page**	4 **of** 62

Rev	Date	By	Checked	Rev	Date	By	Checked	Rev	Date	By	Checked
0	14-Feb-2012	P.Velugubantla	E. Leiby								

1. DESIGN CRITERIA

The following criteria are used to design the decant structures, which will be located on the Solid Waste Landfill Areas 1B, 1D, 2, and 5:

- Decant structure shall be sized to convey and control the runoff resulting from the 25-Year, 24-Hour storm event.
- Use a runoff curve number of 93 for the landfill (consistent with HELP model assumptions).

2. SITE CONDITIONS

The Class III solid waste landfills consist of gypsum, fly ash, and bottom ash. The decant structures will be placed in the footprint of landfills to collect the stormwater runoff and prevent the transport of sediment from the disposal area into the stormwater management facilities. The stormwater that falls on these landfill and runs off the surface of the waste and enters decant structures is considered a form of leachate (i.e. contact water surface runoff). Therefore, stormwater from the decant structures will be routed directly via gravity decant piping to the leachate collection pond.

3. METHODOLOGY

The decant structure riser pipe is designed to pass the 25-year, 24-hour storm through vertical perforations (after being filtered through the surrounding stone and filtration geotextile), without overtopping the riser pipe. The top of the riser has an open inlet grate so that larger storm events will be controlled without a free release elsewhere around the landfill.

Since all landfill cells are more or less similar in size, the decant structure with the largest drainage area (32 acres), is modeled using Bentley PondPack and the same design will be used for all cells as a conservative approach. The decant structure is modeled assuming that at least one extension has occurred (i.e. the height of solid waste is at least 10 feet within the landfill cell) to represent the majority of time during normal operations. The solid waste in the immediate vicinity of the decant structure must be kept lower than the rest of the active drainage area to assist the structure in attenuating large storm events (this lower area is still graded to drain to the structure). An important objective of this calculation is to determine the size of this lower area as a function of the size of the contributing drainage area for operational purposes.
As an extra check, another run is modeled for the decant structure assuming the surrounding solid waste level is equal to the base of the decant structure. This scenario is used to verify that the decant structure controls the peak stormwater event when it is first opened, the maximum possible area is draining to it, and the available perforations for drainage do not extend below the ground surface. The objective in this case is to ensure the 25-year, 24-hour storm event is still conveyed and controlled without free release, even if such a peak storm event may bypass the filtration mechanism of the structure. The maximum area draining to the structure in this case is 35 Acres. However, this scenario will be valid for the period of time until the first extension of the decant structure.

4. RAINFALL DATA

Rainfall data for Berkeley County (North), South Carolina is obtained from SCDHEC Storm Water Management BMP Handbook, Appendix F. Table 1 below summarizes the rainfall data, which is used in the calculation.

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
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Project File Location	See Encompass	**Page**	5 **of** 62

Rev	Date	By	Checked	Rev	Date	By	Checked	Rev	Date	By	Checked
0	14-Feb-2012	P.Velugubantla	E. Leiby								

TABLE-1
BERKLEY (NORTH) COUNTY, SOUTH CAROLINA
RETURN PERIOD 24 HOUR STORM EVENT (INCHES)

2-yr	10-yr	25-yr	50-yr	100-yr
3.8	5.9	7.2	8.2	9.4

5. CALCULATIONS SUMMARY

The portion of the decant structure used to attenuate peak storm events consists of a vertical perforated riser pipe, (24-in ADS N-12 pipe), and a solid discharge pipe, (18-in ADS N-12 pipe). From Attachment-D, the perforated 24-inch N-12 Class II pipe has 0.313" holes spaced evenly around the pipe circumference. These perforations provide an open area of approximately 2.36 in^2/ft of pipe.

Normal Operations Scenario

In this scenario, the decant structure has been extended one or more times, which means that there are more available pipe perforations because the pipe and surrounding stone extends below grade. Therefore, a reference datum of EL 11 is used for the base of the decant structure so that perforations down to EL 0 can be modeled. In order to attenuate and pass water through the vertical perforations of the riser pipe, a low area 8 feet deep with side slopes of no more than 5:1 up to the surrounding active waste placement area are assumed. The maximum possible 32-acre drainage area will be contributing to the decant structure in this scenario. The following table shows the areas and elevations of this low area (referred to as a "basin" – though not a traditional basin as its base is graded to drain at 0.5 to 1.0 percent to the decant structure at all times and is not intended to retain water, merely attenuate it during very large storm events).

TABLE-2
BASIN SUMMARY

Elevation (ft)	Area (Ac.)
11 (base)	2.1
15 (4 ft deep)	2.6
19 (8 ft deep)	3.2

In this scenario, the bottom of the basin area will be approximately 7 percent of the total open area of the active cell. Since the outer edges of the basin slope up to the surrounding active waste placement area at 5:1 (max),

the basin area is at least 10 percent of the total open area of the active cell when measured at a basin depth of 8 feet.

As the overall landfill elevation increases, the active open area decreases. In order to simplify decant operations during periodic upward expansion, the same proportion of area (7% of active cell) will be used to size the base of the depressed area at all times. Therefore, at any stage, the depressed basin area around the decant structure will always be at least 7 percent of the total open area contributing contact water runoff to the decant structure. The basin area will have slopes of 5:1 or flatter up towards the active waste placement area. In general, these slopes will be flatter initially after the decant is raised, then steepen up towards 5:1 as waste placement outside the basin area continues. As an additional precaution to help manage storms in excess of the design storm event, a continuous portion of the perimeter berm will always be maintained at least two feet above the top of the decant pipe. The exception would be when the decant structure is first installed and drainage is being established to the decant structure. Table-3 below shows the summary of the basin routing results.

TABLE-3
BASIN ROUTING RESULTS SUMMARY

	25-year Storm	100-year Storm
Peak Inflow	151.2 cfs	200.0 cfs
Peak Outflow	3.3 cfs	10.5 cfs
Max. Water Elevation*	16.9 ft	18.0 ft

* Bottom of basin is at reference EL 11.

The decant structure gabions will be maintained a minimum of five feet above the waste level (bottom of basin) and the riser pipe will be six inches above the gabions. This will manage the 25-year storm through the riser pipe perforations. However,the 100-year storm may overtop the riser pipe depending on the waste placement conditions at the time of such an event. For example, when multiple decant extensions have been made, more and more perforations will be available to convey water, and when the active waste placement area is relatively low within a given phase, more 'basin' area may be available to temporarily hold water.

The decant structure will have a block of concrete around the base to support the initial installation of the riser and gabions, to prevent differential movement of the gabion base components, and to direct excess water from within the decant stone column into the decant to the degree possible (rather than into the underlying leachate collection system). Standard 3ft x 3ft x 6ft gabions will be constructed around the riser. The space between the gabions and riser will be filled with stone. The gabions will be wrapped with a filter geotextile, TYPAR 3601. Additionally, filter stone will be placed around the gabions. The overall structure is considered flexible and will move with the overall mass of solid waste in the case of settlement or seismic motion.

Water surface elevations are plotted from the PondPack results in order to observe the dewatering time. Note that the water surface elevations assume a reference elevation of EL 11 for the bottom of the basin area. Elevations below this are within the stone column of the decant structure itself. Figure-1 below shows the plot of the results.

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
Elec File Location	P:\SanteeCooper\CR34\Doc\Civil\Cross Generating Station\Class III SWLF Horizontal Expansion\Calculations\CE-007 Decant Structures\CR34-0-DC-LF-CE-007-R0.doc		
Project File Location	See Encompass	**Page**	7 **of** 62

Rev	Date	By	Checked	Rev	Date	By	Checked	Rev	Date	By	Checked
0	14-Feb-2012	P.Velugubantla	E. Leiby								

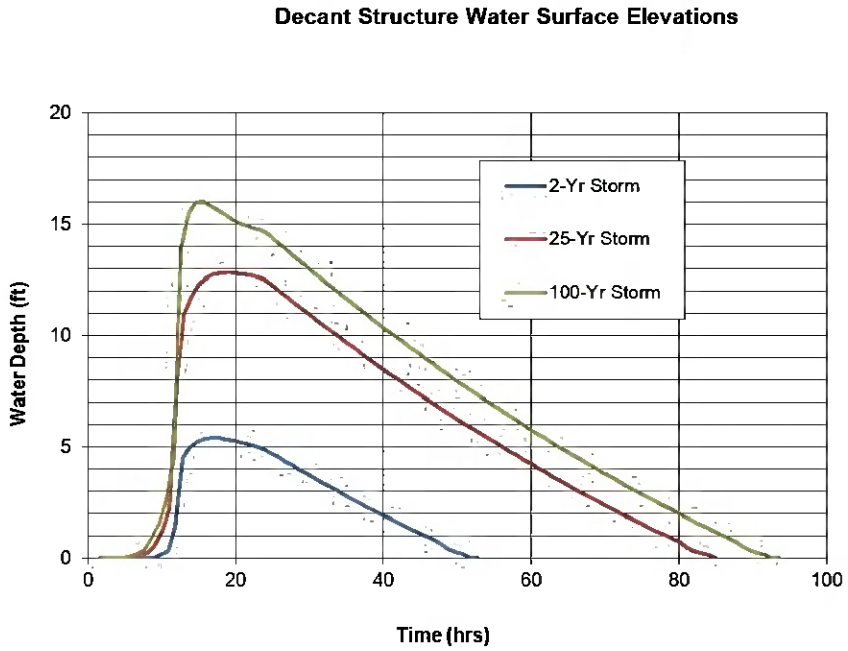

Figure -1: Decant Structure Water Surface Elevations

The dewatering results of this case are a more accurate worst-case representation during typical operations of the decant structure. Therefore, the decant structure will be relatively free draining and will not pond water during the normal operations. However, during the major events such as 25-year, 24-hour storm, it can take up to 3.5 days to dewater the basin area, although as the structure is extended vertically upward this time is expected to decrease significantly. Previous experience with these structures indicates that even for major storm events, drainage typically occurs within the same day.

Initial Scenario

This scenario simulates the decant performance during a short period of time when decant is initially installed to the time the first decant vertical extension is added. This scenario is modeled just to verify that decant still conveys and controls peak storm events when initially installed, even if some of the water passes through the

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
Elec File Location	P:\SanteeCooper\CR34\Doc\Civil\Cross Generating Station\Class III SWLF Horizontal Expansion\Calculations\CE-007 Decant Structures\CR34-0-DC-LF-CE-007-R0.doc		
Project File Location	See Encompass	**Page**	8 **of** 62

Rev	Date	By	Checked	Rev	Date	By	Checked	Rev	Date	By	Checked
0	14-Feb-2012	P.Velugubantla	E. Leiby								

inlet grate on top of the structure. A maximum drainage area of 35 acres will be contributing to decant in this case, which is a little more than the area used in the previous scenario. The following table shows the areas and elevations of the basin.

TABLE-4
BASIN SUMMARY

Elevation (ft)	Area (Ac.)
2 (base)	2.3
6 (4 ft deep)	2.8
10 (8 ft deep)	3.5

The results of the PondPack model show that the decant structure will still convey and control the runoff from the 25-year storm event. However, during initial condition, the 25-year, 24 hour storm may overtop the riser by 0.2 ft. If a 25-Year, 24-Hour storm event or larger were to occur during this time, and a confluence worste-case conditions existed, it's theoretically possible that some very fine particles with insufficient time to settle out within the basin may be carried to the downstream end of the decant piping. A sediment forebay area is included within the leachate collection pond at the decant pipe outlet (and includes concrete revetment over the membrane liner for protection). Manholes with line-of-sight acces along the decant piping also is included for cleanout access, should it ever be required. The following table shows the summary of the PondPack results. The PondPack output is shown in Appendix-A

TABLE-5
BASIN ROUTING RESULTS SUMMARY

	25-year Storm	100-year Storm
Peak Inflow	165.4 cfs	218.8 cfs
Peak Outflow	3.3 cfs	12.0 cfs
Max. Water Elevation	8.7 ft	9.3 ft

* Bottom of basin is at reference EL 2.

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
Elec File Location	P:\SanteeCooper\CR34\Doc\Civil\Cross Generating Station\Class III SWLF Horizontal Expansion\Calculations\CE-007 Decant Structures\CR34-0-DC-LF-CE-007-R0.doc		
Project File Location	See Encompass	**Page**	9 **of** 62

Rev	Date	By	Checked	Rev	Date	By	Checked	Rev	Date	By	Checked
0	14-Feb-2012	P.Velugubantla	E. Leiby								

Geotextile permeability Check

The TYPAR 3601 geotextile specification in Appendix-K shows that the geotextile has a vertical water flow rate of 15 gpm/sf. The total square feet of geotextile around the filter stone is 9 ft x 5 ft x 4 sides = 180 sf/ft of height. Therefore, the geotextile can pass 15 gpm/sf x 180 sf = 2700 gpm ~ 6 cfs/ft of height.

From Table-3, the peak outflow from the 25-year, 24-hour storm is 3.3 cfs. Since TYPAR 3601 can pass nearly two times more flow than the calculated peak outflow per foot of height, the geotextile will not inhibit the ability of the discharge structure to freely drain the site.

WorleyParsons
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Calculation Template

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
Elec File Location	P:\SanteeCooper\CR34\Doc\Civil\Cross Generating Station\Class III SWLF Horizontal Expansion\Calculations\CE-007 Decant Structures\CR34-0-DC-LF-CE-007-R0.doc		
Project File Location	See Encompass	**Page**	1 **of** 36

Rev	Date	By	Checked	Rev	Date	By	Checked	Rev	Date	By	Checked
0	14-Feb-2012	P.Velugubantla	E. Leiby								

Appendix A – PondPack Output

(36 total pages)

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Table of Contents (continued)

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Cross - Berkley

Return Event	Total Depth in	Rainfall Type	RNF ID
2	3.8000	Synthetic Curve	TypeIII 24hr
25	7.2000	Synthetic Curve	TypeIII 24hr
100	9.4000	Synthetic Curve	TypeIII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 20		JCT	2	8.813		24.1000	.46		
*OUT 20		JCT	25	18.566		20.0000	3.29		
*OUT 20		JCT	100	24.936		15.2500	12.10		
POND 10	IN	POND	2	8.824		12.2000	81.76		
POND 10	IN	POND	25	18.577		12.2000	165.41		
POND 10	IN	POND	100	24.947		12.2000	218.78		
POND 10	OUT	POND	2	8.813		24.1000	.46	5.99	8.390
POND 10	OUT	POND	25	18.566		20.0000	3.29	8.66	16.488
POND 10	OUT	POND	100	24.936		15.2500	12.10	9.34	18.726
SUBAREA 10		AREA	2	8.824		12.2000	81.76		
SUBAREA 10		AREA	25	18.577		12.2000	165.41		
SUBAREA 10		AREA	100	24.947		12.2000	218.78		

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: .3000 hrs

Total Tc: .3000 hrs

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Ash Pile	93	35.000			93.00
COMPOSITE AREA & WEIGHTED CN --->		35.000			93.00 (93)

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
2.00	-----	.0023	.0000	.000	.000
3.00	-----	2.3000	2.3750	.792	.792
6.00	-----	2.8000	7.6377	7.638	8.429
10.00	-----	3.5000	9.4305	12.574	21.003

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 2.00 ft
Increment = .50 ft
Max. Elev.= 10.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Orifice-Circular	O2	--->	CV	2.530	10.000
Orifice-Circular	O3	--->	CV	3.050	10.000
Orifice-Circular	O4	--->	CV	3.580	10.000
Orifice-Circular	O5	--->	CV	4.100	10.000
Orifice-Circular	O6	--->	CV	4.630	10.000
Orifice-Circular	O7	--->	CV	5.150	10.000
Orifice-Circular	O8	--->	CV	5.680	10.000
Orifice-Circular	O9	--->	CV	6.200	10.000
Orifice-Circular	10	--->	CV	6.730	10.000
Stand Pipe	SP	--->	CV	8.500	10.000
Orifice-Circular	O1	--->	CV	2.000	10.000
Culvert-Circular	CV	--->	TW	-1.000	10.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID = O2
Structure Type = Orifice-Circular

# of Openings = 16
Invert Elev. = 2.53 ft
Diameter = .0261 ft
Orifice Coeff. = .600

Structure ID = O3
Structure Type = Orifice-Circular

# of Openings = 16
Invert Elev. = 3.05 ft
Diameter = .0261 ft
Orifice Coeff. = .600

Structure ID = O4
Structure Type = Orifice-Circular

# of Openings = 16
Invert Elev. = 3.58 ft
Diameter = .0261 ft
Orifice Coeff. = .600

Structure ID = O5
Structure Type = Orifice-Circular

# of Openings = 16
Invert Elev. = 4.10 ft
Diameter = .0261 ft
Orifice Coeff. = .600

OUTLET STRUCTURE INPUT DATA

Structure ID = O6
Structure Type = Orifice-Circular

# of Openings	=	16
Invert Elev.	=	4.63 ft
Diameter	=	.0261 ft
Orifice Coeff.	=	.600

Structure ID = O7
Structure Type = Orifice-Circular

# of Openings	=	16
Invert Elev.	=	5.15 ft
Diameter	=	.0261 ft
Orifice Coeff.	=	.600

Structure ID = O8
Structure Type = Orifice-Circular

# of Openings	=	16
Invert Elev.	=	5.68 ft
Diameter	=	.0261 ft
Orifice Coeff.	=	.600

Structure ID = O9
Structure Type = Orifice-Circular

# of Openings	=	16
Invert Elev.	=	6.20 ft
Diameter	=	.0261 ft
Orifice Coeff.	=	.600

OUTLET STRUCTURE INPUT DATA

Structure ID = 10
Structure Type = Orifice-Circular

# of Openings	=	32
Invert Elev.	=	6.73 ft
Diameter	=	.0261 ft
Orifice Coeff.	=	.600

Structure ID = SP
Structure Type = Stand Pipe

# of Openings	=	1
Invert Elev.	=	8.50 ft
Diameter	=	2.0000 ft
Orifice Area	=	3.1416 sq.ft
Orifice Coeff.	=	.600
Weir Length	=	6.28 ft
Weir Coeff.	=	3.300
K, Reverse	=	1.000
Mannings n	=	.0000
Kev,Charged Riser	=	.000
Weir Submergence	=	No

Structure ID = O1
Structure Type = Orifice-Circular

# of Openings	=	16
Invert Elev.	=	2.00 ft
Diameter	=	.0261 ft
Orifice Coeff.	=	.600

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = CV
Structure Type    = Culvert-Circular
------------------------------------
No. Barrels       =         1
Barrel Diameter   =    1.5000 ft
Upstream Invert   =     -1.00 ft
Dnstream Invert   =     -8.00 ft
Horiz. Length     =   1400.00 ft
Barrel Length     =   1400.02 ft
Barrel Slope      =    .00500 ft/ft

OUTLET CONTROL DATA...
Mannings n        =     .0100
Ke                =     .5000  (forward entrance loss)
Kb                =   .010777  (per ft of full flow)
Kr                =     .5000  (reverse entrance loss)
HW Convergence    =      .001  +/- ft

INLET CONTROL DATA...
Equation form     =         1
Inlet Control K   =     .0078
Inlet Control M   =    2.0000
Inlet Control c   =    .03790
Inlet Control Y   =     .6900
T1 ratio (HW/D)   =     1.133
T2 ratio (HW/D)   =     1.294
Slope Factor      =     -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use   submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev =       .70 ft  --->  Flow =      7.58 cfs
At T2 Elev =       .94 ft  --->  Flow =      8.66 cfs


Structure ID      = TW
Structure Type    = TW SETUP, DS Channel
------------------------------------
FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations=    40
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .00 cfs
Max.  Q tolerance =    .00 cfs
```

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
2.00	.00	Free Outfall		(no Q: O2,O3,O4,O5,O6,O7,O8,O9,10,SP,O1,CV)
2.50	.03	Free Outfall		O1,CV (no Q: O2,O3,O4,O5,O6,O7,O8,O9,10,SP)
2.53	.03	Free Outfall		O1,CV (no Q: O2,O3,O4,O5,O6,O7,O8,O9,10,SP)
3.00	.07	Free Outfall		O2,O1,CV (no Q: O3,O4,O5,O6,O7,O8,O9,10,SP)
3.05	.07	Free Outfall		O2,O1,CV (no Q: O3,O4,O5,O6,O7,O8,O9,10,SP)
3.50	.12	Free Outfall		O2,O3,O1,CV (no Q: O4,O5,O6,O7,O8,O9,10,SP)
3.58	.12	Free Outfall		O2,O3,O1,CV (no Q: O4,O5,O6,O7,O8,O9,10,SP)
4.00	.17	Free Outfall		O2,O3,O4,O1,CV (no Q: O5,O6,O7,O8,O9,10,SP)
4.10	.18	Free Outfall		O2,O3,O4,O1,CV (no Q: O5,O6,O7,O8,O9,10,SP)
4.50	.24	Free Outfall		O2,O3,O4,O5,O1,CV (no Q: O6,O7,O8,O9,10,SP)
4.63	.25	Free Outfall		O2,O3,O4,O5,O1,CV (no Q: O6,O7,O8,O9,10,SP)
5.00	.30	Free Outfall		O2,O3,O4,O5,O6,O1,CV (no Q: O7,O8,O9,10,SP)
5.15	.32	Free Outfall		O2,O3,O4,O5,O6,O1,CV (no Q: O7,O8,O9,10,SP)
5.50	.38	Free Outfall		O2,O3,O4,O5,O6,O7,O1,CV (no Q: O8,O9,10,SP)
5.68	.40	Free Outfall		O2,O3,O4,O5,O6,O7,O1,CV (no Q: O8,O9,10,SP)
6.00	.46	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O1,CV (no Q: O9,10,SP)
6.20	.48	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O1,CV (no Q: O9,10,SP)
6.50	.54	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O9,O1,CV (no Q: 10,SP)
6.73	.57	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O9,O1,CV (no Q: 10,SP)
7.00	.65	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O9,10,O1,CV (no Q: SP)
7.50	.74	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O9,10,O1,CV (no Q: SP)
8.00	.81	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O9,10,O1,CV (no Q: SP)
8.50	.87	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O9,10,O1,CV (no Q: SP)
9.00	8.26	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O9,10,SP,O1,CV
9.50	13.94	Free Outfall		SP,CV (no Q: O2,O3,O4,O5,O6,O7,O8,O9,10,O1)
10.00	14.16	Free Outfall		SP,CV (no Q: O2,O3,O4,O5,O6,O7,O8,O9,10,O1)

SUMMARY FOR HYDROGRAPH ADDITION
at Node: POND 10 IN

HYG Directory: C:\Session\Decant\Pondpack\Combined\

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 10	SUBAREA 10		SUBAREA 10	25

INFLOWS TO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	SUBAREA 10	25	18.577	12.2000	165.41

TOTAL FLOW INTO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	POND 10 IN	25	18.577	12.2000	165.41

TOTAL NODE INFLOW...
HYG file =
HYG ID = POND 10 IN
HYG Tag = 25

Peak Discharge = 165.41 cfs
Time to Peak = 12.2000 hrs
HYG Volume = 18.577 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
2.1500	.00	.00	.01	.02	.03
2.4000	.05	.07	.09	.12	.14
2.6500	.17	.19	.22	.24	.27
2.9000	.30	.32	.35	.38	.41
3.1500	.43	.46	.49	.52	.54
3.4000	.57	.60	.63	.66	.68
3.6500	.71	.74	.77	.80	.83
3.9000	.86	.89	.91	.94	.97
4.1500	1.00	1.03	1.06	1.09	1.12
4.4000	1.15	1.18	1.21	1.24	1.26
4.6500	1.29	1.32	1.35	1.38	1.41
4.9000	1.44	1.47	1.50	1.53	1.56
5.1500	1.59	1.62	1.65	1.68	1.71
5.4000	1.74	1.77	1.80	1.83	1.86
5.6500	1.88	1.91	1.94	1.97	2.00
5.9000	2.03	2.06	2.09	2.12	2.15
6.1500	2.19	2.23	2.27	2.32	2.37
6.4000	2.42	2.47	2.53	2.58	2.64
6.6500	2.70	2.75	2.81	2.87	2.93
6.9000	2.99	3.05	3.12	3.18	3.24
7.1500	3.30	3.37	3.43	3.49	3.56
7.4000	3.62	3.69	3.75	3.82	3.89
7.6500	3.95	4.02	4.09	4.16	4.22
7.9000	4.29	4.36	4.43	4.50	4.57
8.1500	4.65	4.75	4.85	4.96	5.08
8.4000	5.20	5.33	5.46	5.60	5.73
8.6500	5.87	6.00	6.14	6.29	6.43
8.9000	6.57	6.71	6.86	7.00	7.15
9.1500	7.29	7.44	7.59	7.74	7.89
9.4000	8.04	8.19	8.34	8.49	8.64
9.6500	8.79	8.95	9.10	9.25	9.41

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
9.9000	9.56	9.72	9.88	10.03	10.20
10.1500	10.39	10.59	10.82	11.07	11.34
10.4000	11.62	11.90	12.19	12.49	12.79
10.6500	13.09	13.39	13.70	14.00	14.31
10.9000	14.62	14.93	15.24	15.57	15.96
11.1500	16.43	17.02	17.75	18.60	19.54
11.4000	20.53	21.58	22.68	24.04	25.89
11.6500	28.97	33.45	39.59	47.01	55.65
11.9000	65.31	77.40	94.09	116.53	139.55
12.1500	157.54	165.41	159.33	145.95	129.62
12.4000	113.56	99.43	86.46	74.26	63.13
12.6500	53.61	45.77	39.66	35.01	31.61
12.9000	28.93	26.73	24.87	23.31	21.97
13.1500	20.82	19.85	19.09	18.47	17.96
13.4000	17.53	17.15	16.79	16.46	16.14
13.6500	15.82	15.52	15.21	14.91	14.61
13.9000	14.31	14.01	13.71	13.41	13.13
14.1500	12.86	12.61	12.40	12.20	12.02
14.4000	11.86	11.70	11.55	11.40	11.25
14.6500	11.10	10.96	10.81	10.67	10.53
14.9000	10.38	10.24	10.09	9.95	9.81
15.1500	9.66	9.52	9.38	9.23	9.09
15.4000	8.94	8.80	8.66	8.51	8.37
15.6500	8.22	8.08	7.94	7.79	7.65
15.9000	7.51	7.36	7.22	7.07	6.94
16.1500	6.81	6.70	6.60	6.51	6.42
16.4000	6.35	6.28	6.21	6.15	6.08
16.6500	6.02	5.95	5.89	5.83	5.76
16.9000	5.70	5.64	5.58	5.51	5.45
17.1500	5.39	5.33	5.26	5.20	5.14
17.4000	5.07	5.01	4.95	4.89	4.82
17.6500	4.76	4.70	4.63	4.57	4.51
17.9000	4.45	4.38	4.32	4.26	4.20
18.1500	4.14	4.10	4.06	4.03	4.00
18.4000	3.97	3.95	3.93	3.91	3.89
18.6500	3.87	3.85	3.83	3.81	3.79
18.9000	3.77	3.75	3.74	3.72	3.70
19.1500	3.68	3.66	3.64	3.62	3.60
19.4000	3.59	3.57	3.55	3.53	3.51
19.6500	3.49	3.47	3.45	3.43	3.42
19.9000	3.40	3.38	3.36	3.34	3.32
20.1500	3.30	3.29	3.27	3.26	3.24
20.4000	3.23	3.21	3.20	3.18	3.17
20.6500	3.15	3.14	3.12	3.11	3.09
20.9000	3.08	3.07	3.05	3.04	3.03

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
21.1500	3.02	3.00	2.99	2.97	2.96
21.4000	2.94	2.93	2.91	2.90	2.88
21.6500	2.87	2.86	2.84	2.83	2.82
21.9000	2.80	2.79	2.77	2.76	2.74
22.1500	2.73	2.72	2.70	2.69	2.67
22.4000	2.66	2.64	2.63	2.62	2.60
22.6500	2.59	2.58	2.56	2.55	2.53
22.9000	2.52	2.50	2.49	2.48	2.46
23.1500	2.45	2.43	2.42	2.40	2.39
23.4000	2.38	2.36	2.35	2.34	2.32
23.6500	2.31	2.29	2.28	2.26	2.25
23.9000	2.24	2.22	2.20	2.13	1.94
24.1500	1.60	1.20	.83	.55	.36
24.4000	.24	.16	.10	.07	.04
24.6500	.03	.02	.01	.01	.00
24.9000	.00	.00			

LEVEL POOL ROUTING SUMMARY

HYG Dir = C:\Session\Decant\Pondpack\Combined\
Inflow HYG file = NONE STORED - POND 10 IN 25
Outflow HYG file = NONE STORED - POND 10 OUT 25

Pond Node Data = POND 10
Pond Volume Data = POND 10
Pond Outlet Data = Outfall 001

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	2.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	=	165.41 cfs	at	12.2000 hrs
Peak Outflow	=	3.29 cfs	at	20.0000 hrs
Peak Elevation	=	8.66 ft		
Peak Storage	=	16.488 ac-ft		

MASS BALANCE (ac-ft)

+ Initial Vol	=	.000
+ HYG Vol IN	=	18.577
- Infiltration	=	.000
- HYG Vol OUT	=	18.566
- Retained Vol	=	.000
Unrouted Vol	=	-.011 ac-ft (.059% of Inflow Volume)

Index of Starting Page Numbers for ID Names

Table of Contents

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Cross - Berkley

Return Event	Total Depth in	Rainfall Type	RNF ID
2	3.8000	Synthetic Curve	TypeIII 24hr
25	7.2000	Synthetic Curve	TypeIII 24hr
100	9.4000	Synthetic Curve	TypeIII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 20		JCT	2	8.068		16.8000	2.47		
*OUT 20		JCT	25	16.985		18.6000	3.30		
*OUT 20		JCT	100	22.809		15.4000	10.45		
POND 10	IN	POND	2	8.068		12.2000	74.75		
POND 10	IN	POND	25	16.985		12.2000	151.23		
POND 10	IN	POND	100	22.809		12.2000	200.03		
POND 10	OUT	POND	2	8.068		16.8000	2.47	14.09	5.394
POND 10	OUT	POND	25	16.985		18.6000	3.30	16.88	12.822
POND 10	OUT	POND	100	22.809		15.4000	10.45	17.96	16.047
SUBAREA 10		AREA	2	8.068		12.2000	74.75		
SUBAREA 10		AREA	25	16.985		12.2000	151.23		
SUBAREA 10		AREA	100	22.809		12.2000	200.03		

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: .3000 hrs

Total Tc: .3000 hrs

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Ash Pile	93	32.000			93.00
COMPOSITE AREA & WEIGHTED CN --->		32.000			93.00 (93)

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 2.00 ft
Increment = .50 ft
Max. Elev.= 19.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Orifice-Circular	O2	--->	CV	4.100	19.000
Orifice-Circular	O3	--->	CV	6.200	19.000
Orifice-Circular	O4	--->	CV	8.300	19.000
Orifice-Circular	O5	--->	CV	10.400	19.000
Orifice-Circular	O6	--->	CV	12.500	19.000
Orifice-Circular	O7	--->	CV	14.600	19.000
Orifice-Circular	O8	--->	CV	16.700	19.000
Stand Pipe	SP	--->	CV	17.500	19.000
Orifice-Circular	O1	--->	CV	2.000	19.000
Culvert-Circular	CV	--->	TW	-1.000	19.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID = O2
Structure Type = Orifice-Circular

# of Openings = 64
Invert Elev. = 4.10 ft
Diameter = .0261 ft
Orifice Coeff. = .600

Structure ID = O3
Structure Type = Orifice-Circular

# of Openings = 64
Invert Elev. = 6.20 ft
Diameter = .0261 ft
Orifice Coeff. = .600

Structure ID = O4
Structure Type = Orifice-Circular

# of Openings = 64
Invert Elev. = 8.30 ft
Diameter = .0261 ft
Orifice Coeff. = .600

Structure ID = O5
Structure Type = Orifice-Circular

# of Openings = 64
Invert Elev. = 10.40 ft
Diameter = .0261 ft
Orifice Coeff. = .600

OUTLET STRUCTURE INPUT DATA

Structure ID = O6
Structure Type = Orifice-Circular

# of Openings	=	64
Invert Elev.	=	12.50 ft
Diameter	=	.0261 ft
Orifice Coeff.	=	.600

Structure ID = O7
Structure Type = Orifice-Circular

# of Openings	=	64
Invert Elev.	=	14.60 ft
Diameter	=	.0261 ft
Orifice Coeff.	=	.600

Structure ID = O8
Structure Type = Orifice-Circular

# of Openings	=	64
Invert Elev.	=	16.70 ft
Diameter	=	.0261 ft
Orifice Coeff.	=	.600

Structure ID = SP
Structure Type = Stand Pipe

# of Openings	=	1
Invert Elev.	=	17.50 ft
Diameter	=	2.0000 ft
Orifice Area	=	3.1416 sq.ft
Orifice Coeff.	=	.600
Weir Length	=	6.28 ft
Weir Coeff.	=	3.300
K, Reverse	=	1.000
Mannings n	=	.0000
Kev,Charged Riser	=	.000
Weir Submergence	=	No

OUTLET STRUCTURE INPUT DATA

Structure ID = O1
Structure Type = Orifice-Circular

# of Openings	=	64
Invert Elev.	=	2.00 ft
Diameter	=	.0261 ft
Orifice Coeff.	=	.600

Structure ID = CV
Structure Type = Culvert-Circular

No. Barrels	=	1
Barrel Diameter	=	1.5000 ft
Upstream Invert	=	-1.00 ft
Dnstream Invert	=	-8.00 ft
Horiz. Length	=	1400.00 ft
Barrel Length	=	1400.02 ft
Barrel Slope	=	.00500 ft/ft

OUTLET CONTROL DATA...

Mannings n	=	.0100	
Ke	=	.5000	(forward entrance loss)
Kb	=	.010777	(per ft of full flow)
Kr	=	.5000	(reverse entrance loss)
HW Convergence	=	.001	+/- ft

INLET CONTROL DATA...

Equation form	=	1
Inlet Control K	=	.0078
Inlet Control M	=	2.0000
Inlet Control c	=	.03790
Inlet Control Y	=	.6900
T1 ratio (HW/D)	=	.000
T2 ratio (HW/D)	=	1.294
Slope Factor	=	-.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev = -1.00 ft ---> Flow = 7.58 cfs
At T2 Elev = .94 ft ---> Flow = 8.66 cfs

OUTLET STRUCTURE INPUT DATA

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
2.00	.00	Free Outfall		(no Q: O2,O3,O4,O5,O6,O7,O8,SP,O1,CV)
2.50	.12	Free Outfall		O1,CV (no Q: O2,O3,O4,O5,O6,O7,O8,SP)
3.00	.16	Free Outfall		O1,CV (no Q: O2,O3,O4,O5,O6,O7,O8,SP)
3.50	.20	Free Outfall		O1,CV (no Q: O2,O3,O4,O5,O6,O7,O8,SP)
4.00	.23	Free Outfall		O1,CV (no Q: O2,O3,O4,O5,O6,O7,O8,SP)
4.10	.24	Free Outfall		O1,CV (no Q: O2,O3,O4,O5,O6,O7,O8,SP)
4.50	.36	Free Outfall		O2,O1,CV (no Q: O3,O4,O5,O6,O7,O8,SP)
5.00	.44	Free Outfall		O2,O1,CV (no Q: O3,O4,O5,O6,O7,O8,SP)
5.50	.49	Free Outfall		O2,O1,CV (no Q: O3,O4,O5,O6,O7,O8,SP)
6.00	.54	Free Outfall		O2,O1,CV (no Q: O3,O4,O5,O6,O7,O8,SP)
6.20	.55	Free Outfall		O2,O1,CV (no Q: O3,O4,O5,O6,O7,O8,SP)
6.50	.66	Free Outfall		O2,O3,O1,CV (no Q: O4,O5,O6,O7,O8,SP)
7.00	.75	Free Outfall		O2,O3,O1,CV (no Q: O4,O5,O6,O7,O8,SP)
7.50	.83	Free Outfall		O2,O3,O1,CV (no Q: O4,O5,O6,O7,O8,SP)
8.00	.89	Free Outfall		O2,O3,O1,CV (no Q: O4,O5,O6,O7,O8,SP)
8.30	.93	Free Outfall		O2,O3,O1,CV (no Q: O4,O5,O6,O7,O8,SP)
8.50	1.08	Free Outfall		O2,O3,O4,O1,CV (no Q: O5,O6,O7,O8,SP)
9.00	1.21	Free Outfall		O2,O3,O4,O1,CV (no Q: O5,O6,O7,O8,SP)
9.50	1.31	Free Outfall		O2,O3,O4,O1,CV (no Q: O5,O6,O7,O8,SP)
10.00	1.40	Free Outfall		O2,O3,O4,O1,CV (no Q: O5,O6,O7,O8,SP)
10.40	1.46	Free Outfall		O2,O3,O4,O1,CV (no Q: O5,O6,O7,O8,SP)
10.50	1.53	Free Outfall		O2,O3,O4,O5,O1,CV (no Q: O6,O7,O8,SP)
11.00	1.68	Free Outfall		O2,O3,O4,O5,O1,CV (no Q: O6,O7,O8,SP)
11.50	1.78	Free Outfall		O2,O3,O4,O5,O1,CV (no Q: O6,O7,O8,SP)
12.00	1.89	Free Outfall		O2,O3,O4,O5,O1,CV (no Q: O6,O7,O8,SP)
12.50	1.98	Free Outfall		O2,O3,O4,O5,O1,CV (no Q: O6,O7,O8,SP)
13.00	2.20	Free Outfall		O2,O3,O4,O5,O6,O1,CV (no Q: O7,O8,SP)
13.50	2.33	Free Outfall		O2,O3,O4,O5,O6,O1,CV (no Q: O7,O8,SP)
14.00	2.45	Free Outfall		O2,O3,O4,O5,O6,O1,CV (no Q: O7,O8,SP)
14.50	2.56	Free Outfall		O2,O3,O4,O5,O6,O1,CV (no Q: O7,O8,SP)
14.60	2.58	Free Outfall		O2,O3,O4,O5,O6,O1,CV (no Q: O7,O8,SP)
15.00	2.76	Free Outfall		O2,O3,O4,O5,O6,O7,O1,CV (no Q: O8,SP)
15.50	2.92	Free Outfall		O2,O3,O4,O5,O6,O7,O1,CV (no Q: O8,SP)
16.00	3.04	Free Outfall		O2,O3,O4,O5,O6,O7,O1,CV (no Q: O8,SP)
16.50	3.17	Free Outfall		O2,O3,O4,O5,O6,O7,O1,CV (no Q: O8,SP)
16.70	3.21	Free Outfall		O2,O3,O4,O5,O6,O7,O1,CV (no Q: O8,SP)
17.00	3.37	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O1,CV (no Q: SP)
17.50	3.53	Free Outfall		O2,O3,O4,O5,O6,O7,O8,O1,CV (no Q: SP)

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
18.00	10.98	Free Outfall		O2,O3,O4,O5,O6,O7,O8,SP,O1,CV
18.50	16.82	Free Outfall		O2,O3,O4,O5,O6,O7,O8,SP,O1,CV
19.00	17.58	Free Outfall		SP,CV (no Q: O2,O3,O4,O5,O6,O7,O8,O1)

SUMMARY FOR HYDROGRAPH ADDITION
at Node: POND 10 IN

HYG Directory: C:\Session\Decant\Pondpack\Combined\

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 10	SUBAREA 10		SUBAREA 10	25

INFLOWS TO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	SUBAREA 10	25	16.985	12.2000	151.23

TOTAL FLOW INTO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	POND 10 IN	25	16.985	12.2000	151.23

TOTAL NODE INFLOW...
HYG file =
HYG ID = POND 10 IN
HYG Tag = 25

Peak Discharge =	151.23 cfs
Time to Peak =	12.2000 hrs
HYG Volume =	16.985 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .2000 hrs
Time on left represents time for first value in each row.

Time hrs					
2.0000	.00	.00	.05	.13	.22
3.0000	.32	.42	.52	.63	.73
4.0000	.84	.94	1.05	1.16	1.26
5.0000	1.37	1.48	1.59	1.70	1.80
6.0000	1.91	2.04	2.21	2.41	2.63
7.0000	2.85	3.08	3.31	3.55	3.80
8.0000	4.05	4.34	4.76	5.24	5.75
9.0000	6.27	6.80	7.35	7.90	8.46
10.0000	9.03	9.68	10.62	11.69	12.80
11.0000	13.93	15.56	18.77	23.67	42.98
12.0000	86.01	151.23	103.84	57.73	32.01
13.0000	22.74	18.15	16.03	14.75	13.63
14.0000	12.53	11.53	10.84	10.29	9.76
15.0000	9.23	8.70	8.18	7.65	7.12
16.0000	6.60	6.12	5.81	5.56	5.33
17.0000	5.10	4.87	4.64	4.41	4.18
18.0000	3.95	3.74	3.63	3.55	3.48
19.0000	3.42	3.35	3.28	3.21	3.14
20.0000	3.07	3.01	2.95	2.90	2.84
21.0000	2.79	2.74	2.69	2.64	2.59
22.0000	2.54	2.48	2.43	2.38	2.33
23.0000	2.28	2.22	2.17	2.12	2.07
24.0000	2.02	1.10	.22	.04	.01
25.0000	.00				

LEVEL POOL ROUTING SUMMARY

HYG Dir = C:\Session\Decant\Pondpack\Combined\
Inflow HYG file = NONE STORED - POND 10 IN 25
Outflow HYG file = NONE STORED - POND 10 OUT 25

Pond Node Data = POND 10
Pond Volume Data = POND 10
Pond Outlet Data = Outfall 001

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	2.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.2000 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	=	151.23 cfs	at	12.2000 hrs
Peak Outflow	=	3.30 cfs	at	18.6000 hrs
Peak Elevation	=	16.88 ft		
Peak Storage	=	12.822 ac-ft		

MASS BALANCE (ac-ft)

+ Initial Vol	=	.000
+ HYG Vol IN	=	16.985
- Infiltration	=	.000
- HYG Vol OUT	=	16.985
- Retained Vol	=	.000
Unrouted Vol	=	.000 ac-ft (.000% of Inflow Volume)

Index of Starting Page Numbers for ID Names

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
Elec File Location	P:\SanteeCooper\CR34\Doc\Civil\Cross Generating Station\Class III SWLF Horizontal Expansion\Calculations\CE-007 Decant Structures\CR34-0-DC-LF-CE-007-R0.doc		
Project File Location	See Encompass	**Page**	1 **of** 2

Rev	Date	By	Checked	Rev	Date	By	Checked	Rev	Date	By	Checked
0	14-Feb-2012	P.Velugubantla	E. Leiby								

Appendix B – TYPAR 3601 Geotextile Specification

(2 total pages)

TYPAR English Properties

AASHTO Class M288			-	-	-	-	3	2	2	1	1
			Typar 3151	**Typar 3201**	**Typar 3301**	**Typar 3341**	**Typar 3401**	**Typar 3501**	**Typar 3601**	**Typar 3631**	**Typar 3801**
MECHANICAL (MARV)[1]											
Grab tensile strength	ASTM D4632	lbs	35	60	120	120	130	160	240	250	300
Grab elongation	ASTM D4632	%	60	60	60	60	60	60	60	60	60
Trapezoidal tear strength	ASTM D4533	lbs	15	25	35	40	60	60	90	90	95
Puncture strength	ASTM D4833	lbs	10	18	25	34	41	56	67	81	93
CBR Puncture	ASTM D6241	lbs	-	-	-	-	225	310	370	435	510
ENDURANCE (MARV)[1]											
UV resistance @ 500 hrs	ASTM D4355	%	-	-	-	70	70	70	70	70	70
HYDRAULIC (MARV)[1]											
Apparent opening size[2]	ASTM D4751	US Sieve	20/30	30	50	60	70	70	140	140	170
Permittivity	ASTM D4491	sec^{-1}	1.5	1.0	0.8	0.7	0.7	0.5	0.1	0.2	0.1
Water flow rate	ASTM D4491	$gal/min/ft^2$	235	190	95	85	60	50	15	20	8
PHYSICAL (Typical)											
Unit weight		oz/yd^2	1.6	1.9	3.0	3.4	4.0	5.0	6.0	6.3	8.0
Roll diameter		in	7	7	8	8	9	10	10	10	12
Length		yd	100	100	100	100	100	100	100	100	100
Width		in	151	151	151	151	151	151	151	151	151
Roll area		yd^2	419	419	419	419	419	419	419	419	419
Roll weight gross		lbs	50	58	87	97	113	138	165	173	218
Width		In	-	-	-	-	187	187	187	187	187
Roll area		yd^2	-	-	-	-	519	519	519	519	519
Roll weight gross		lbs	-	-	-	-	142	175	209	219	275

NOTES:
1 Minimum average roll values (MARV) in the weaker principal direction
2 O_{95} Max. ARV

Product Selection Guide

	3151	3201	3301	3341	3401	3501	3601	3631	3801
Paved roads & parking lots				●	●	●	●	●	
Unpaved roads				●	●	●	●	●	
Industrial yards				●	●	●	●	●	
Subsurface drains		●	●	●	●	●	●	●	
Erosion control				●	●	●	●	●	●
Landfills				●	●	●	●	●	●
Recreational facilities		●	●	●	●	●	●	●	
Waste handling systems	●	●	●	●	●	●	●	●	●
Landscaping		●	●	●	●				

Typar also has many other unique related applications.

Customer	Santee Cooper	**Project No.**	108008-01330
Project Title	Cross Generating Station - Class III Solid Waste Landfill	**Calc No.**	CR34-0-DC-LF-CE-007
Calculation Title	Decant Structure Design	**Phase/CTR**	N/A
Elec File Location	P:\SanteeCooper\CR34\Doc\Civil\Cross Generating Station\Class III SWLF Horizontal Expansion\Calculations\CE-007 Decant Structures\CR34-0-DC-LF-CE-007-R0.doc		
Project File Location	See Encompass	**Page**	1 **of** 10

Rev	Date	By	Checked	Rev	Date	By	Checked	Rev	Date	By	Checked
0	14-Feb-2012	P.Velugubantla	E. Leiby								

Appendix C – Dewatering Time

(10 total pages)

Table of Contents

TIME vs. ELEVATION (ft)

Time hrs	Output Time increment = .2000 hrs Time on left represents time for first value in each row.				
3.8000	2.00	2.03	2.12	2.28	2.45
4.8000	2.69	3.02	3.44	3.97	4.38
5.8000	4.60	4.84	5.16	5.62	6.23
6.8000	6.71	7.09	7.62	8.28	8.67
7.8000	8.91	9.38	10.00	10.68	11.01
8.8000	11.04	11.08	11.15	11.23	11.34
9.8000	11.47	11.52	11.55	11.58	11.62
10.8000	11.67	11.72	11.79	11.87	11.97
11.8000	12.09	12.32	12.75	13.21	13.49
12.8000	13.63	13.71	13.77	13.81	13.85
13.8000	13.88	13.91	13.94	13.96	13.98
14.8000	14.00	14.02	14.03	14.04	14.05
15.8000	14.06	14.07	14.08	14.08	14.08
16.8000	14.09	14.09	14.09	14.09	14.09
17.8000	14.08	14.08	14.08	14.08	14.07
18.8000	14.07	14.06	14.06	14.05	14.05
19.8000	14.04	14.04	14.03	14.02	14.02
20.8000	14.01	14.00	14.00	13.99	13.98
21.8000	13.97	13.97	13.96	13.95	13.94
22.8000	13.93	13.92	13.92	13.91	13.90
23.8000	13.89	13.88	13.87	13.85	13.84
24.8000	13.82	13.80	13.79	13.77	13.75
25.8000	13.74	13.72	13.70	13.69	13.67
26.8000	13.65	13.64	13.62	13.60	13.59
27.8000	13.57	13.55	13.54	13.52	13.50
28.8000	13.49	13.47	13.45	13.44	13.42
29.8000	13.40	13.39	13.37	13.35	13.34
30.8000	13.32	13.30	13.29	13.27	13.25
31.8000	13.24	13.22	13.20	13.19	13.17
32.8000	13.15	13.14	13.12	13.11	13.09
33.8000	13.07	13.06	13.04	13.03	13.01
34.8000	12.99	12.98	12.96	12.94	12.93
35.8000	12.91	12.89	12.88	12.86	12.85
36.8000	12.83	12.81	12.80	12.78	12.77
37.8000	12.75	12.73	12.72	12.70	12.69
38.8000	12.67	12.66	12.64	12.62	12.61
39.8000	12.59	12.58	12.56	12.55	12.53
40.8000	12.52	12.50	12.49	12.47	12.46
41.8000	12.44	12.43	12.41	12.39	12.38
42.8000	12.36	12.35	12.33	12.32	12.30
43.8000	12.29	12.27	12.26	12.24	12.23
44.8000	12.21	12.20	12.18	12.17	12.15
45.8000	12.14	12.12	12.10	12.09	12.07

TIME vs. ELEVATION (ft)

Time hrs	Output Time increment = .2000 hrs Time on left represents time for first value in each row.				
46.8000	12.06	12.04	12.03	12.01	12.00
47.8000	11.97	11.95	11.92	11.90	11.87
48.8000	11.85	11.82	11.80	11.77	11.75
49.8000	11.72	11.70	11.67	11.65	11.62
50.8000	11.60	11.58	11.55	11.53	11.50
51.8000	11.36	11.22	11.07	7.84	3.90
52.8000	2.63	2.09	2.01		

TIME vs. ELEVATION (ft)

Time hrs	Output Time increment = .2000 hrs Time on left represents time for first value in each row.				
2.0000	2.00	2.00	2.10	2.35	2.81
3.0000	3.52	4.34	5.02	5.73	6.46
4.0000	7.04	7.65	8.33	8.73	8.98
5.0000	9.45	10.00	10.51	10.90	11.01
6.0000	11.02	11.04	11.08	11.13	11.20
7.0000	11.29	11.39	11.50	11.52	11.55
8.0000	11.58	11.61	11.65	11.69	11.74
9.0000	11.80	11.86	11.93	12.01	12.05
10.0000	12.11	12.17	12.23	12.31	12.39
11.0000	12.48	12.57	12.69	12.83	13.07
12.0000	13.52	14.32	15.13	15.62	15.87
13.0000	16.02	16.12	16.21	16.28	16.34
14.0000	16.40	16.46	16.50	16.55	16.59
15.0000	16.62	16.66	16.69	16.71	16.74
16.0000	16.76	16.78	16.79	16.81	16.82
17.0000	16.83	16.84	16.85	16.86	16.86
18.0000	16.87	16.87	16.87	16.87	16.87
19.0000	16.88	16.88	16.88	16.88	16.87
20.0000	16.87	16.87	16.87	16.87	16.87
21.0000	16.86	16.86	16.86	16.85	16.85
22.0000	16.84	16.84	16.84	16.83	16.83
23.0000	16.82	16.81	16.81	16.80	16.79
24.0000	16.79	16.78	16.76	16.74	16.73
25.0000	16.71	16.69	16.67	16.65	16.63
26.0000	16.61	16.60	16.58	16.56	16.54
27.0000	16.52	16.50	16.48	16.47	16.45
28.0000	16.43	16.41	16.39	16.37	16.35
29.0000	16.34	16.32	16.30	16.28	16.26
30.0000	16.24	16.22	16.21	16.19	16.17
31.0000	16.15	16.13	16.11	16.10	16.08
32.0000	16.06	16.04	16.02	16.01	15.99
33.0000	15.97	15.95	15.93	15.91	15.89
34.0000	15.88	15.86	15.84	15.82	15.80
35.0000	15.78	15.77	15.75	15.73	15.71
36.0000	15.69	15.68	15.66	15.64	15.62
37.0000	15.60	15.59	15.57	15.55	15.53
38.0000	15.51	15.50	15.48	15.46	15.44
39.0000	15.42	15.41	15.39	15.37	15.35
40.0000	15.33	15.32	15.30	15.28	15.26
41.0000	15.24	15.23	15.21	15.19	15.17
42.0000	15.16	15.14	15.12	15.10	15.09
43.0000	15.07	15.05	15.03	15.02	15.00
44.0000	14.98	14.96	14.94	14.93	14.91