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## Regulation Compliance Report Run-on and Run-off Control Plan

Pleasant Prairie Power Plant Ash Landfill  
Pleasant Prairie, Wisconsin

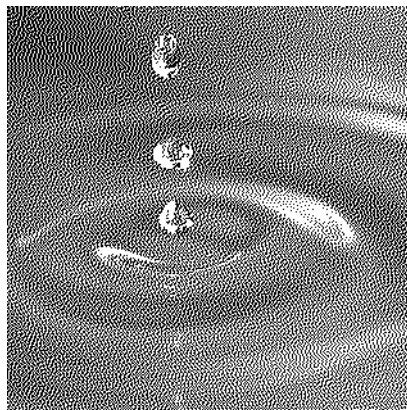
**Submitted to:**

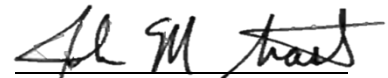
WEC Energy Group – Business Services  
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June 2022, Revision 2  
Project 2103683



  
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### Revision Schedule

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Revision 0 October 2016

Revision 1 October 2021: This plan was updated in accordance with § 257.81(c)(4) which required the owner or operator of the CCR unit to prepare periodic run-on and run-off control system plans every five years. Updated the existing site conditions and engineering calculations.

Revision 2 June 2022: Update of the October 2021 Run-on and Run-off Control Plan. This plan was updated in accordance with § 257.81(c)(2) which required the owner or operator of the CCR unit to amend the plan whenever there is a change in conditions that would substantially affect the written plan in effect. The landfill is now closed. The Wisconsin Department of Natural Resources approved the construction documentation report on June 17, 2022.

WSR:cah

K:\WEC Energy Group\2103683\_WEC CCR Facility Engineering Assistance\05\_In\_Progress\PPPP\257.81 Runon and Runoff Control Plan\Rev2 Closure\00\_R2103683\_P4\_Runon Runoff Mgmt Plan\_June\_2022\_r2.docx

# 1. Introduction

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WEC Energy Group (WEC) owns and operates a solid waste disposal facility adjacent to the Pleasant Prairie Power Plant (PPPP) in Section 9, Township 1 North, Range 22 East, in the village of Pleasant Prairie, Kenosha County, Wisconsin. The landfill property is bounded on the north by State Highway 50 (75th Street), on the south by Bain Station Road, and on the east and west by active rail lines. The WEC PPPP Ash Landfill is regulated as an industrial waste landfill by the Wisconsin Department of Natural Resources (WDNR) under the provisions of Chapter 289 Wisconsin State Statutes, and all applicable requirements of Chapters NR 500 of the Wisconsin Administrative Code. The design, construction, operation, closure, and post-closure care requirements are specified in the WDNR conditionally approved Plan of Operations, License No. 2786, FID# 230056310. PPPP consists of one cell that went into operation during the 4th Quarter of 2014. Under normal conditions and circumstances, nearly 100 percent of CCR generated at the PPPP was beneficially used. Disposal activities at the landfill were generally limited to CCR system cleanings during PPPP outages and other special events. PPPP ceased commercial operation in early 2018. Final cover was installed over the eastern 2.6 acres of Cell 1 in 2018, the middle 3.2 acres of final cover was installed in 2020, and the final western 1.3 acres of final cover was installed over the landfill in 2021. The landfill began the 40-year long-term care period with the issuance of the Phase 3 Documentation Report approval from the Wisconsin Department of Natural Resources dated June 17, 2022.

In addition to the state regulations, the landfill is also required to comply with 40 CFR Part 257 Subpart D – *Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments* and is defined as a CCR unit and existing CCR landfill in accordance with § 257.53.

This report fulfills the requirements of § 257.81 - *Run-on and run-off controls for CCR landfills* for the PPPP Ash Landfill Cell 1. In accordance with 257.81(c)(1), this report describes how the run-on and run-off control systems have been designed and constructed to meet the applicable requirements and are supported by appropriate engineering calculations. This report has been updated to reflect the final closure of PPPP Ash Landfill Cell 1.

This run-off and run-on system control plan includes the following sections:

- Section 1 – Introduction
- Section 2 – Storm and Stormwater Volume Determination
- Section 3 – Run-on Control System
- Section 4 – Run-off Control System
- Section 5 – Conclusion and Certification
- Section 6 – References

## 2. Storm and Stormwater Volume Determination

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§ 257.81 *Run-on and run-off controls for CCR landfills* requires 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 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; and 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.

PPPP Ash Landfill Cell 1 is approximately 7.1 acres in total size. At the date of this report, all 7.1 acres have received final cover, no active portions of the landfill exist, and any precipitation that falls on the final cover system is directed away from the closed landfill. Approximately 2.04 acres of land to the south of the covered waste also need drainage, bringing the total to 9.14 acres of run-off. This report documents the adequacy of the closed landfill stormwater management system to properly collect and control run-off flows. Drawing 1 – Final Cover Grades (Appendix A), shows the documented final landfill grades as of December 8, 2021.

The rainfall depth estimate for a 24-hour, 25-year storm for the PPPP Ash Landfill was determined following the procedures outlined in Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 8, Version 2: Wisconsin. For the PPPP Ash Landfill a 24-hour, 25-year storm will result in 4.52 inches of rainfall. Calculations for determining the 24-hour, 25-year storm event are included in Appendix B: NOAA 14, Vol. 8 Rainfall Analysis and Run-off Volume.

Table 2-1 summarizes the storm recurrence interval, rainfall depth, lined area of the CCR landfill, and minimum stormwater volume required to be managed within Cell 1.

**Table 2-1 Summary of Rainfall Precipitation and Run-off Volume Data**

Storm Recurrence Interval	Rainfall Depth (inches)	Extents of Run-off (acres)	Run-off Volume (acre-ft)
24-hour, 25-year	4.52	9.14	3.44

### 3. Run-on Control System

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§ 257.81(a)(1) requires a run-on control system to prevent flow onto the active portions of the CCR unit during the peak discharge from a 24-hour, 25-year storm. The federal rule defines “Run-on” as *“any rainwater, leachate, or other liquid that drains over land onto any part of a CCR landfill.”*

Final cover was installed over the eastern 2.6 acres of Cell 1 in 2018, the middle 3.2 acres in 2020, and the final western 1.3 acres in 2021. Run-on control systems for PPPP Ash Landfill Cell 1 are not applicable to preventing flow onto active portions of the CCR during 24-hour, 25-year storm since there are no active portions of the landfill.

The perimeters on the north, west, and east sides of the landfill slope downward to convey stormwater away from the covered waste. Along the south side of the landfill, an intercell berm was constructed to prevent run-on from south of the landfill. A perimeter ditch along the outboard edge of the intercell berm directs run-on stormwater to the west and southwest away from the landfill as shown by the grades on Drawing 1 in Appendix A. Stormwater drainage in the perimeter ditch is then directed away from the landfill and eventually flows southward discharging to the unnamed tributaries of Jerome Creek.

Because Cell 1 is graded in such a way that does not allow run-on onto the cell, a HydroCAD model is not provided for this section. These features prevent run-on to the landfill system, so a numerical stormwater model was not completed to confirm that the current run-on control system for the closed landfill adequately manages a 24-hour, 25-year precipitation event. No active landfill surface is exposed to the atmosphere; therefore, contact stormwater cannot be generated.

The south side of the landfill, including the area permitted by the state of Wisconsin for future lateral expansion, is protected from the 1-percent-annual-chance or greater flood hazard by a levee system that has been accredited by the Federal Emergency Management Agency (FEMA), as shown in Appendix D: FEMA National Flood Insurance Rate Maps. The floodplain levee was constructed to protect a portion of the permitted landfill space from being within the 100-year floodplain of the Unnamed Tributary No. 2 and No. 3 to Jerome Creek. Based on a review of current topography and FEMA Flood Levee Certification (GEI, 2013) the PPPP Ash Landfill has an acceptable run-on control system that follows current engineering standards and is in compliance with § 257.81(a)(1).

## 4. Run-off Control System

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§ 257.81(a)(2) requires 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 federal rule defines “Run-off” as *“any rainwater, leachate, or other liquid that drains over land from any part of a CCR landfill.”*

A stormwater run-off model was completed to confirm that the current run-off control system for the operation of PPPP Ash Landfill Cell 1 can adequately manage a 24-hour, 25-year precipitation event of 4.52 inches. Stormwater flow was modeled using HydroCAD 10.0 to evaluate the landfill in its post-closure condition. The stormwater model details and run-off calculations are included in Attachment D – Stormwater Run-off Calculations.

Stormwater on the closed cell was divided into two subcatchments. The first consists of the northern 4.46 acres of final cover area and flow from here is directed away from the covered waste and is allowed to infiltrate into the ground. The second subcatchment includes the southern 2.64 acres of final cover and an additional 2.04 acres of conveyance ditch area. Run-off from here goes to the west outlet ditch which is directed southward away from the landfill discharging to unnamed tributaries of Jerome Creek.

Based on the analysis, the run-off control system for PPPP Ash Landfill Cell 1 is able to manage and control the run-off from a 24-hour, 25-year precipitation event. The estimated peak water level in the west conveyance channel is 0.94 feet. The minimum depth of the channel is 2 feet. Based on stormwater run-off analysis, the current run-off control system for Cell 1 will be able to handle the 24-hour, 25-year precipitation event without the west outlet ditch overflowing.

## 5. Conclusion and Certification

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The PPPP Ash Landfill is regulated under 40 CFR Part 257 Subpart D as an existing CCR landfill. The rule specifies that an existing CCR landfill must develop plans to meet certain meet operating criteria designated by October 17, 2016, and that the owner or operator must also conduct and complete the assessments required by this section every five (5) years maximum based on the completion date of this plan. In addition, the written plan must be amended whenever there is a change in conditions that would substantially affect the current written plan. This revision is due to the closure of the landfill. The revised plan must be placed in the facility's operating record as required by §257.105(g). The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(g), the notification requirements specified in § 257.106(g), and the internet requirements specified in § 257.107(g).

This report documents the PPPP Ash Landfill has an established run-on and run-off control system design capable of controlling the peak discharge from a 25-year, 24-hour storm event and complies with § 257.81 *Run-on and run-off controls for CCR landfills*. All leachate that is collected at the PPPP Landfill is hauled to the Kenosha Water Utility wastewater treatment facility; thus, it complies with § 257.3-3.

This plan was completed under the direction of John, M. Trast, P.E. I am a licensed professional engineer in the State of Wisconsin in accordance with the requirements of ch. A-E 4, Wisconsin Administrative Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wisconsin Administrative Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in 40 CFR Part 257 Subpart D.



## 6. References

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AECOM (2012). Plan of Operation Modification, Pleasant Prairie Power Plant Ash Landfill, WDNR License #2786; FID # 230056310, Pleasant Prairie, Wisconsin. April 4, 2012.

GEI (2013). FEMA Floodplain Levee Certification. We Energies Pleasant Prairie Ash Landfill Floodplain Levee Certification, Pleasant Prairie, Wisconsin. June 5, 2013.

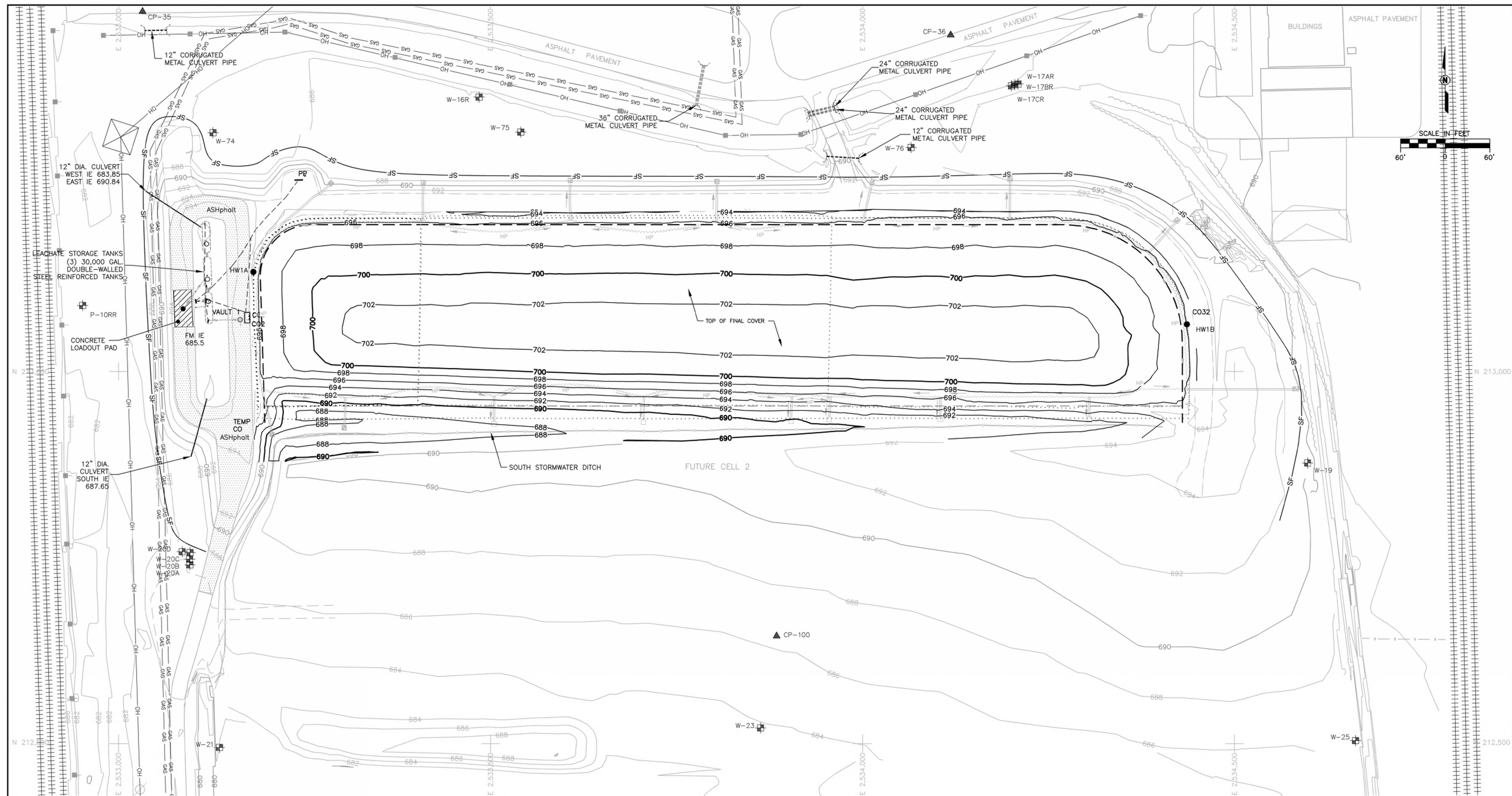
Perica, S., D. Martin, S. Pavlovic, I. Roy, M. St. Laurent, C. Trypaluk, D. Unruh, M. Yekta, G. Bonnin (2013). NOAA Atlas 14 Volume 8 Version 2.0, *Precipitation-Frequency Atlas of the United States, Midwestern States*. National Oceanic and Atmospheric Administration, National Weather Service, Silver Spring, Maryland.



# Appendix A

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## Drawings



**LEGEND**

690	EXISTING GROUND SURFACE CONTOUR	■	RAILROAD TELEPHONE POLE MONUMENT FOUND
---	ROAD, NON PAVED	.....	GEMEMBRANE ANCHOR TRENCH
---	ROAD, PAVED	.....	LEACHATE COLLECTION CLEANOUT
-x-x-x-	FENCE	□	VAULT 1
	TREES/BRUSH	○	LEACHATE TRANSFER PIPE
—	CULVERT	●	LEACHATE HEADWELL
□	BUILDINGS	■	WSDOT E1 BITUMINOUS ASPHALT PAVEMENT
— GAS —	GAS PIPE	---	ASH CONTOUR (5/18/2021)
— FIB —	FIBER COMMUNICATIONS	---	SILT FENCE
OH	OVERHEAD ELECTRIC	---	FINAL COVER CONTOUR WITHIN FINAL COVER AREA (12/8/2021)
⊗	ELECTRIC TOWER	.....	DOCUMENTATION POINT NUMBER & DESCRIPTION
	RAILROAD TRACKS	.....	FINAL COVER GEMEMBRANE LIMIT
---	LANDFILL LIMIT OF WASTE	---	COVER DRAIN PIPE & TOP OF PIPE ELEV. (PERFORATED)
---	LANDFILL CELL BOUNDARY	---	COVER OUTLET DRAIN PIPE & TOP OF PIPE ELEV. (NON-PERFORATED)
⊕	W-21 MONITORING WELL		
▲	CP-100 SURVEY CONTROL MONUMENT		
⊗	STEEL POLE ELECTRIC TRANSMISSION TOWER		

- NOTES:**
- HORIZONTAL DATUM BASED ON WISCONSIN STATE PLANE COORDINATES SOUTH ZONE, NAD 83.
  - VERTICAL DATUM BASED ON REFERENCE MARK, WISCONSIN DIVISION OF HIGHWAYS. ALUMINUM CAP SET IN TOP OF EAST END OF CONCRETE BRIDGE WALL, 2.7' ABOVE GROUND, ELEVATION 715.42. CAP IS LOCATED 1.2' WEST OF TOP BEVEL. THE CONCRETE BRIDGE IS LOCATED WHERE STH "50" CROSSES THE CP RAILROAD TRACKS ON THE NORTHWEST SIDE OF THE SITE. ELEVATIONS REFERENCED TO NAVD 88.
  - CELL 1 CONSTRUCTION DOCUMENTATION SURVEY PERFORMED BY COM, INC. ON NOVEMBER 21, 2013.
  - CELL 1 TOP OF FINAL COVER AREA DRAINAGE PIPE SURVEY PERFORMED BY EDGERTON ON DECEMBER 1, 2021.
  - CELL 1 TOP OF FINAL COVER SURVEY PERFORMED BY EDGERTON ON DECEMBER 8, 2021.

**CONTROL POINT DATA**

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
10	213741.91	2532958.45	715.42	BM B-30-48-78: ALUMINUM CAP ON TOP OF CONCRETE WALL
30	211877.98	2533092.40	684.09	CUT CROSS
31	210593.02	2533131.43	683.92	CUT CROSS
32	208734.70	2533178.76	681.48	MAG NAIL
33	209470.52	2534928.84	683.53	IP11" W/CAP
34	211916.15	2534703.67	682.90	IP11" W/CAP
35	213483.71	2533032.15	686.41	MAG NAIL
36	213452.09	2534118.49	687.83	MAG NAIL
100	212644.65	2533884.50	691.25	RBR W/CAP

Attention:

0	X	X	X
NO.	DATE	ISSUE/REVISION	APP

If this scale bar does not measure 1" then drawing is not original scale.

Designed: JXT  
 Checked: JXT  
 Drawn: JLC  
 Submittal Date: 2/16/2022



**WE ENERGIES**  
 333 WEST EVERETT STREET, A231  
 MILWAUKEE, WISCONSIN 53203  
 GEI Project 2004112

PLEASANT PRAIRIE POWER PLANT  
 ASH LANDFILL  
 CELL 1 PHASE 3 PARTIAL CLOSURE  
 CONSTRUCTION DOCUMENTATION


FINAL COVER GRADES

DWG. NO. 1  
 SHEET NO. 1

## **Appendix B**

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### **NOAA 14, Vol. 8 Rainfall Analysis and Run-off Volume**

	<b>Client</b>	WEC Energy Group			<b>Page</b>	1 of 4
	<b>Project</b>	PPPP LF Run-on and Run-off Control Plan			<b>Rev.</b>	0
	<b>By</b>	W. Reybrock	<b>Chk.</b>	A. Schwoerer	<b>App.</b>	A. Schwoerer
	<b>Date</b>	02/18/2022	<b>Date</b>	02/23/2022	<b>Date</b>	02/23/2022
<b>GEI Project No.</b>	2103683	<b>Document No.</b>	N/A			
<b>Subject</b>	NOAA 14, Vol. 8 Rainfall Analysis and Run-off Volume					

**Purpose:**

The purpose of this calculation is to estimate the 24-hr, 25-yr precipitation event at Pleasant Prairie Power Plant (PPPP) landfill. The 24-hr, 25-yr precipitation event is required for the run-on and run-off control system plan for the landfill.

**Procedure:**

The rainfall depth estimation follows the procedures outlined in Precipitation-Frequency (PF) Atlas of the United States (Atlas 14, Volume 8, Version 2: Wisconsin).

As instructed in Atlas 14, the user is referred to the NOAA Precipitation Frequency Data Server (PFDS) <http://hdsc.nws.noaa.gov/hdsc/pfds/index.html>. The approximate center of the landfill was inputted into the PFDS and the PF estimates were returned.

**Landfill Centroid Coordinates**

42°33'53.64"N      42.5649°

87°54'6.84"W      -87.9019°





<b>Client</b>	WEC Energy Group			<b>Page</b>	2 of 4
<b>Project</b>	PPPP LF Run-on and Run-off Control Plan			<b>Rev.</b>	0
<b>By</b>	W. Reybrock	<b>Chk.</b>	A. Schwoerer	<b>App.</b>	A. Schwoerer
<b>Date</b>	02/18/2022	<b>Date</b>	02/23/2022	<b>Date</b>	02/23/2022

<b>GEI Project No.</b>	2103683	<b>Document No.</b>	N/A
<b>Subject</b>	NOAA 14, Vol. 8 Rainfall Analysis and Run-off Volume		

### Tabular Output from the PFDS:

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.333 (0.266-0.415)	0.392 (0.313-0.488)	0.491 (0.390-0.611)	0.573 (0.453-0.716)	0.690 (0.529-0.879)	0.782 (0.587-1.00)	0.875 (0.636-1.14)	0.971 (0.680-1.28)	1.10 (0.743-1.48)	1.20 (0.791-1.62)
10-min	0.488 (0.390-0.607)	0.575 (0.458-0.715)	0.718 (0.571-0.895)	0.840 (0.664-1.05)	1.01 (0.775-1.29)	1.14 (0.859-1.47)	1.28 (0.932-1.67)	1.42 (0.995-1.88)	1.61 (1.09-2.16)	1.76 (1.16-2.38)
15-min	0.595 (0.475-0.740)	0.701 (0.559-0.872)	0.876 (0.696-1.09)	1.02 (0.810-1.28)	1.23 (0.945-1.57)	1.40 (1.05-1.79)	1.56 (1.14-2.03)	1.73 (1.21-2.29)	1.97 (1.33-2.64)	2.14 (1.41-2.90)
30-min	0.831 (0.663-1.03)	0.982 (0.783-1.22)	1.23 (0.980-1.54)	1.44 (1.14-1.80)	1.74 (1.34-2.22)	1.97 (1.48-2.53)	2.21 (1.61-2.87)	2.45 (1.72-3.24)	2.78 (1.88-3.73)	3.03 (2.00-4.10)
60-min	1.04 (0.833-1.30)	1.26 (1.01-1.57)	1.63 (1.29-2.03)	1.93 (1.53-2.41)	2.36 (1.81-3.02)	2.70 (2.03-3.47)	3.05 (2.22-3.97)	3.41 (2.39-4.50)	3.89 (2.63-5.22)	4.26 (2.81-5.76)
2-hr	1.26 (1.02-1.55)	1.54 (1.24-1.90)	2.02 (1.62-2.49)	2.42 (1.94-2.99)	2.99 (2.32-3.77)	3.43 (2.61-4.36)	3.89 (2.87-5.01)	4.36 (3.10-5.70)	5.00 (3.42-6.64)	5.49 (3.67-7.35)
3-hr	1.38 (1.13-1.69)	1.71 (1.39-2.09)	2.26 (1.83-2.76)	2.73 (2.20-3.35)	3.39 (2.66-4.26)	3.92 (3.00-4.95)	4.46 (3.31-5.71)	5.02 (3.59-6.53)	5.78 (4.00-7.64)	6.37 (4.30-8.48)
6-hr	1.66 (1.37-2.00)	2.01 (1.66-2.43)	2.62 (2.15-3.17)	3.15 (2.57-3.82)	3.92 (3.11-4.88)	4.53 (3.53-5.68)	5.18 (3.91-6.58)	5.86 (4.26-7.56)	6.80 (4.78-8.92)	7.54 (5.16-9.94)
12-hr	2.03 (1.69-2.41)	2.34 (1.95-2.79)	2.91 (2.41-3.47)	3.41 (2.82-4.09)	4.18 (3.38-5.17)	4.81 (3.81-5.98)	5.49 (4.21-6.93)	6.22 (4.61-7.98)	7.26 (5.19-9.45)	8.09 (5.63-10.6)
24-hr	2.39 (2.01-2.81)	2.69 (2.27-3.17)	3.25 (2.72-3.83)	3.75 (3.13-4.44)	4.52 (3.71-5.53)	5.17 (4.14-6.35)	5.86 (4.57-7.32)	6.62 (4.97-8.40)	7.70 (5.59-9.93)	8.57 (6.06-11.1)
2-day	2.69 (2.30-3.13)	3.08 (2.62-3.58)	3.75 (3.19-4.36)	4.34 (3.67-5.07)	5.21 (4.31-6.26)	5.92 (4.80-7.17)	6.67 (5.25-8.20)	7.47 (5.68-9.34)	8.58 (6.32-10.9)	9.47 (6.80-12.1)
3-day	2.94 (2.53-3.40)	3.36 (2.88-3.88)	4.08 (3.49-4.71)	4.71 (4.01-5.46)	5.63 (4.69-6.72)	6.38 (5.21-7.67)	7.17 (5.69-8.75)	8.00 (6.14-9.94)	9.16 (6.80-11.6)	10.1 (7.31-12.8)
4-day	3.17 (2.74-3.63)	3.60 (3.11-4.13)	4.34 (3.74-4.99)	4.99 (4.28-5.76)	5.95 (4.99-7.06)	6.72 (5.52-8.04)	7.54 (6.02-9.16)	8.41 (6.49-10.4)	9.61 (7.18-12.1)	10.6 (7.71-13.4)
7-day	3.73 (3.26-4.24)	4.20 (3.66-4.78)	5.00 (4.35-5.70)	5.71 (4.94-6.52)	6.74 (5.71-7.91)	7.58 (6.29-8.97)	8.45 (6.83-10.2)	9.38 (7.33-11.5)	10.7 (8.08-13.3)	11.7 (8.65-14.7)
10-day	4.25 (3.74-4.80)	4.76 (4.17-5.37)	5.62 (4.92-6.35)	6.37 (5.55-7.22)	7.45 (6.36-8.68)	8.33 (6.97-9.79)	9.24 (7.52-11.0)	10.2 (8.04-12.4)	11.5 (8.81-14.3)	12.6 (9.39-15.8)
20-day	5.82 (5.18-6.49)	6.45 (5.74-7.20)	7.50 (6.66-8.38)	8.39 (7.41-9.39)	9.62 (8.29-11.0)	10.6 (8.96-12.2)	11.6 (9.53-13.6)	12.6 (10.0-15.1)	13.9 (10.8-17.0)	14.9 (11.3-18.5)
30-day	7.20 (6.46-7.96)	7.97 (7.14-8.82)	9.21 (8.23-10.2)	10.2 (9.10-11.4)	11.6 (10.0-13.1)	12.6 (10.7-14.4)	13.6 (11.3-15.9)	14.6 (11.8-17.4)	15.9 (12.4-19.3)	16.9 (12.9-20.8)
45-day	9.02 (8.15-9.89)	9.98 (9.02-11.0)	11.5 (10.4-12.7)	12.7 (11.4-14.0)	14.2 (12.4-15.9)	15.4 (13.2-17.4)	16.4 (13.7-18.9)	17.4 (14.1-20.5)	18.6 (14.6-22.4)	19.5 (15.0-23.8)
60-day	10.6 (9.64-11.6)	11.8 (10.7-12.8)	13.5 (12.3-14.8)	14.9 (13.4-16.4)	16.6 (14.5-18.4)	17.8 (15.3-20.0)	18.9 (15.9-21.6)	19.9 (16.2-23.2)	21.0 (16.6-25.0)	21.7 (16.9-26.4)

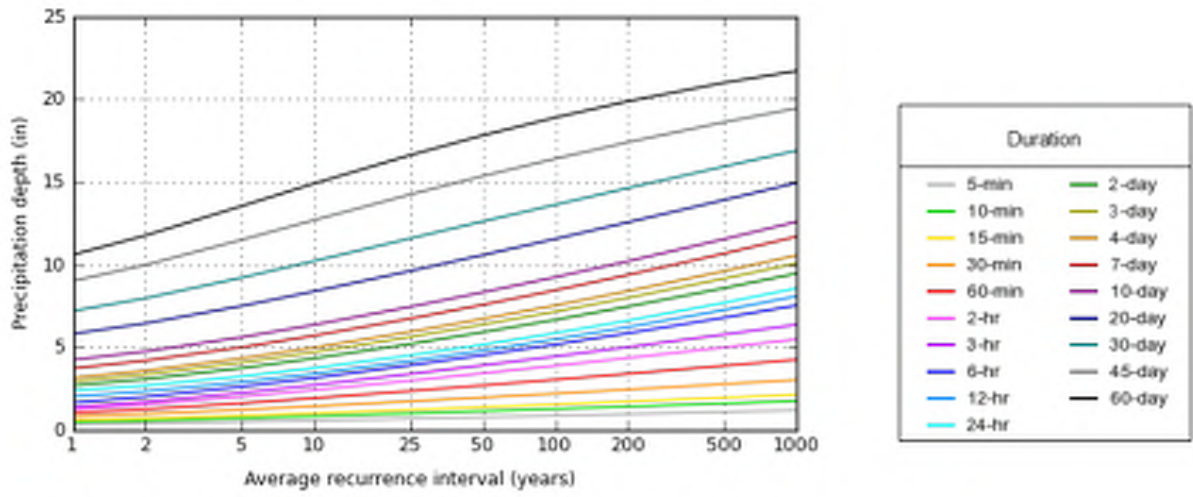
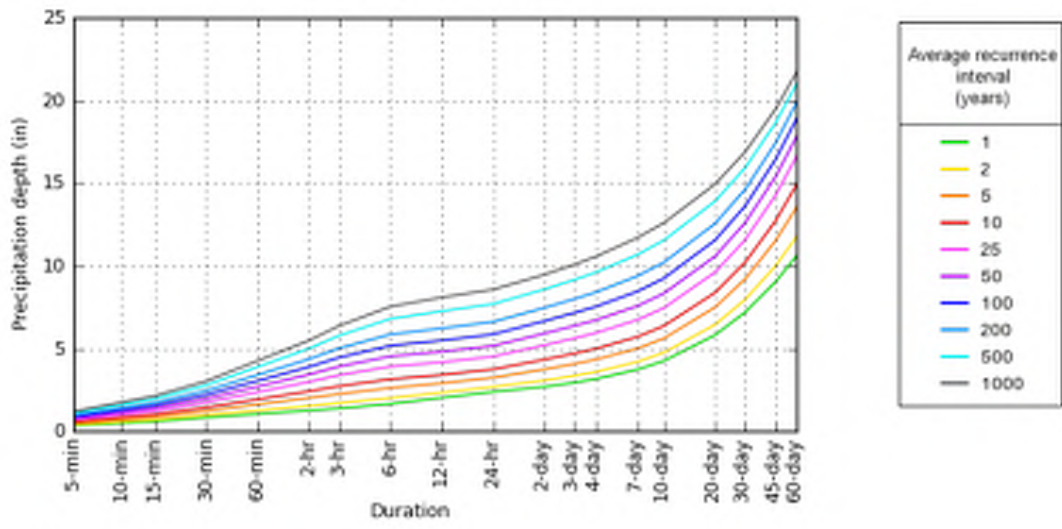
<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.




<b>Client</b>	WEC Energy Group			<b>Page</b>	3 of 4
<b>Project</b>	PPPP LF Run-on and Run-off Control Plan			<b>Rev.</b>	0
<b>By</b>	W. Reybrock	<b>Chk.</b>	A. Schwoerer	<b>App.</b>	A. Schwoerer
<b>Date</b>	02/18/2022	<b>Date</b>	02/23/2022	<b>Date</b>	02/23/2022
<b>GEI Project No.</b>	2103683	<b>Document No.</b>	N/A		
<b>Subject</b>	NOAA 14, Vol. 8 Rainfall Analysis and Run-off Volume				

**Graphical Output from the PFDS:**

PDS-based depth-duration-frequency (DDF) curves  
 Latitude: 42.5649°. Longitude: -87.9019°



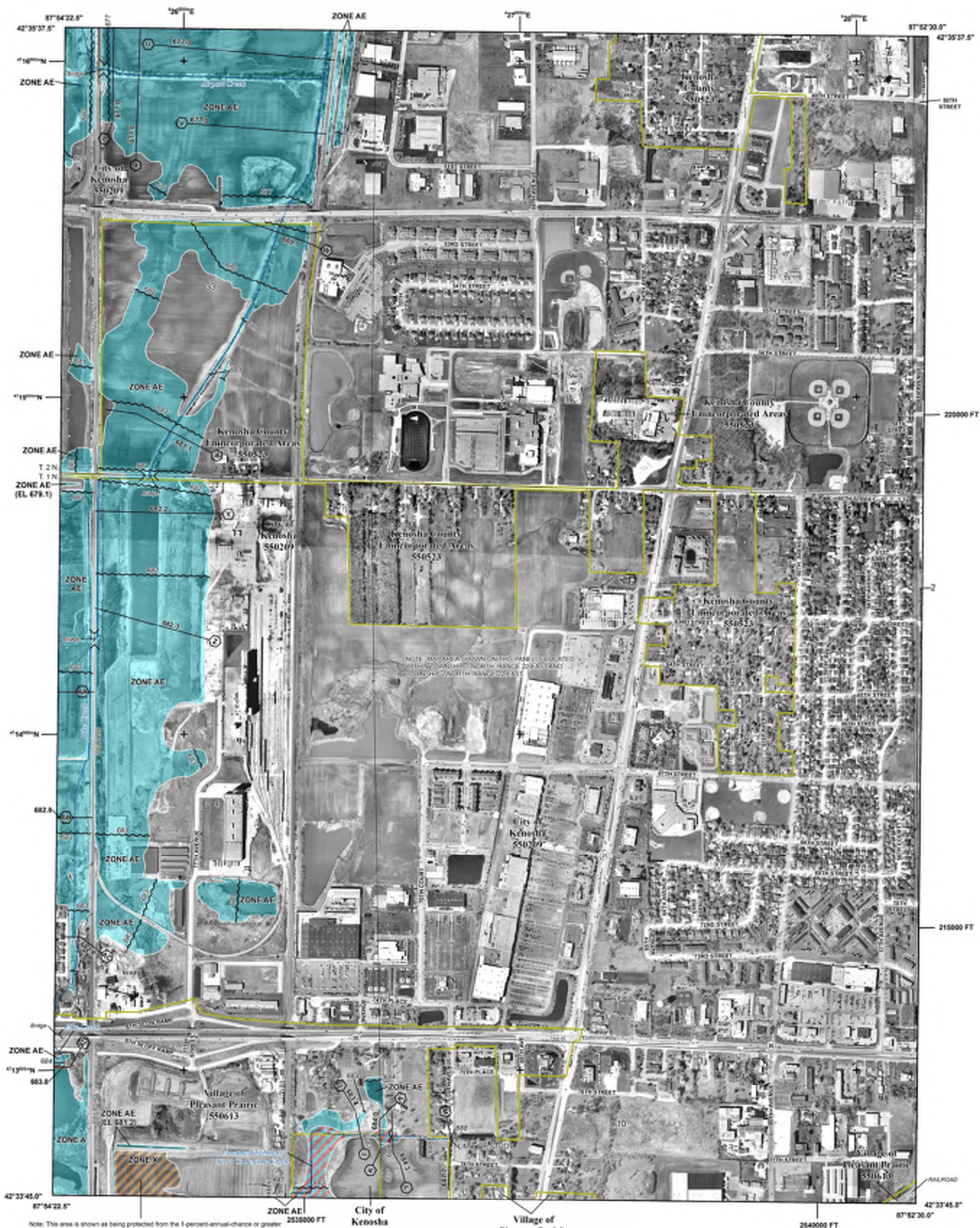
	<b>Client</b>	WEC Energy Group			<b>Page</b>	4 of 4
	<b>Project</b>	PPPP LF Run-on and Run-off Control Plan			<b>Rev.</b>	0
	<b>By</b>	W. Reybrock	<b>Chk.</b>	A. Schwoerer	<b>App.</b>	A. Schwoerer
	<b>Date</b>	02/18/2022	<b>Date</b>	02/23/2022	<b>Date</b>	02/23/2022
<b>GEI Project No.</b>	2103683	<b>Document No.</b>	N/A			
<b>Subject</b>	NOAA 14, Vol. 8 Rainfall Analysis and Run-off Volume					
<p><b>Regulations:</b></p> <p>The PPPP Landfill is regulated under 40 CFR Part 257 Subpart D – Standards for Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments as an existing landfill. The regulations specify that the landfill must have the following plans in place:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul> <p><b>Conclusion:</b></p> <p>The 24-hour, 25-year storm for the PIPP Landfill is 4.52 inches. This value will be utilized in the stormwater run-off model (under a separate calculation package).</p>						

## Appendix C

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### FEMA National Flood Insurance Rate Maps





**FLOOD HAZARD INFORMATION**

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT  
**THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)**

- SPECIAL FLOOD HAZARD AREAS**
  - Without Base Flood Elevation (BFE) Zone A, X, AE
  - With BFE or Depth, Zone AE, AD, AN, LE, AR
  - Regulatory Floodway
- OTHER AREAS OF FLOOD HAZARD**
  - 0.2 % Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
  - Future Conditions 1% Annual Chance Flood Hazard Zone X
  - Area with Reduced Flood Risk due to Levee See Notes, Zone X
- OTHER AREAS**
  - NO SCREEN Areas of Minimal Flood Hazard Zone X
  - Area of Undetermined Flood Hazard Zone D
- GENERAL STRUCTURES**
  - Channel, Culvert, or Storm Sewer
  - Levee, Dike, or Floodwall
- OTHER FEATURES**
  - 18.2 Cross Sections with 1% Annual Chance Water Surface Elevation
  - 17.5 Coastal Transect
  - Coastal Transect Baseline
  - Profile Baseline
  - Hydrographic Feature
  - Base Flood Elevation Line (BFE)
  - Limit of Study
  - Jurisdiction Boundary

**NOTES TO USERS**

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information Exchange at 1-877-FEMA-MAP (1-877-366-2627) or visit the FEMA Map Service Center website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information Exchange.

Communities receiving land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

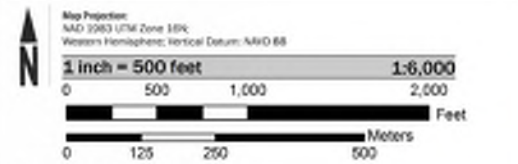
For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6622.

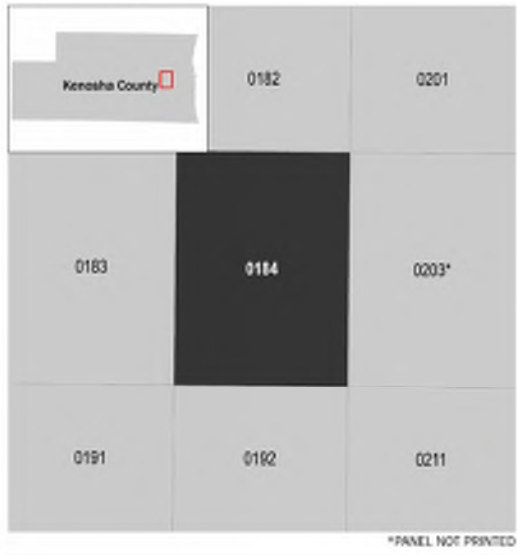
Base map information shown on this FIRM derived from digital orthophotography provided by Southeastern Wisconsin Regional Planning Commission (SEWRPC). The Orthophotography was collected in Spring of 2010 and produced at a resolution of three-inch pixel size.

**ACCREDITED LEVEE NOTES TO USERS:** Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at <http://www.fema.gov/business/info/index.shtml>.

**SCALE**



**PANEL LOCATOR**



**FEMA**

**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
 FLOOD INSURANCE RATE MAP  
 KENOSHA COUNTY, WI  
 and Incorporated Areas

PANEL 184 of 331

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
KENOSHA COUNTY	550523	0184	E
KENOSHA, CITY OF	550209	0184	E
PLEASANT PRAIRIE, VILLAGE OF	550613	0184	E


VERSION NUMBER 2.3.3.0  
 MAP NUMBER 55059C0184E  
 MAP REVISED MARCH 7, 2017

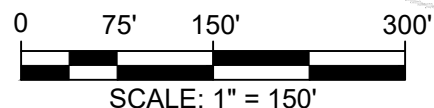
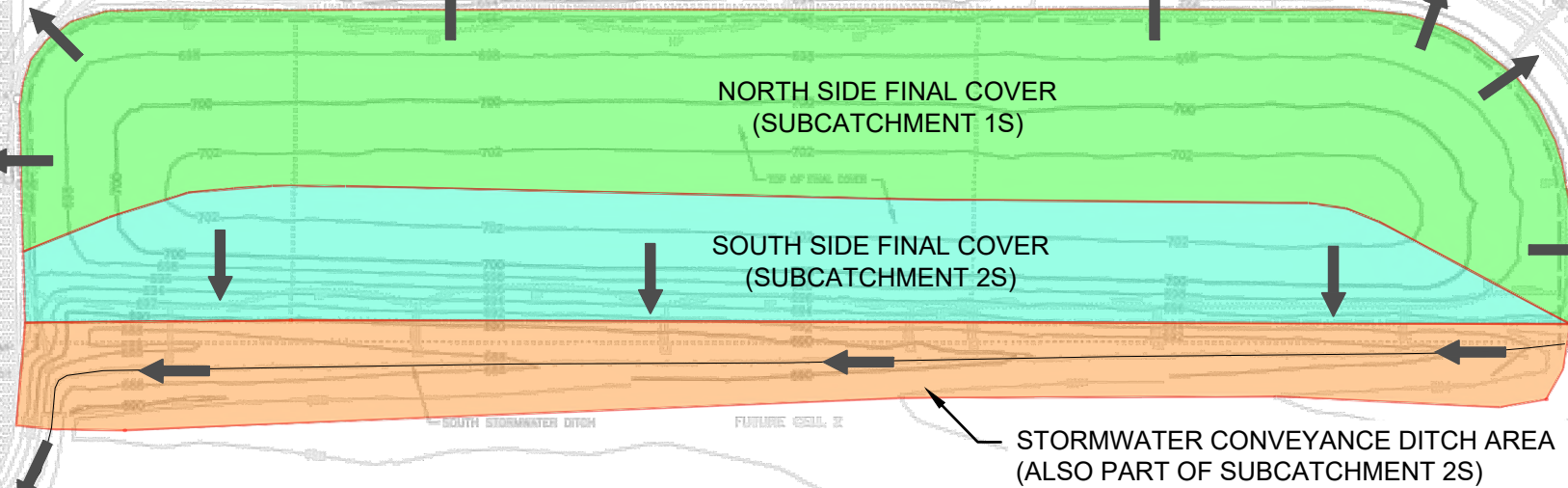


## Appendix D

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### Stormwater Run-off Calculations

	<b>Client</b>	WEC Energy Group			<b>Page</b>	1 of 11
	<b>Project</b>	PPPP LF Run-on and Run-off Control Plan			<b>Rev.</b>	0
	<b>By</b>	W. Reybrock	<b>Chk.</b>	A. Schwoerer	<b>App.</b>	J. Trast
	<b>Date</b>	02/18/2022	<b>Date</b>	02/23/2022	<b>Date</b>	02/23/2022
<b>GEI Project No.</b>	2103683	<b>Document No.</b>	N/A			
<b>Subject</b>	Stormwater Run-off Calculations					
<p><b>Purpose:</b></p> <p>The purpose of this calculation is to model the stormwater run-off associated with 24-hour, 25-year precipitation event at Pleasant Prairie Power Plant (PPPP) Landfill from Cell 1. In addition, this analysis was completed to confirm the current run-off control system for the construction of Cell 1 can adequately manage the 24-hour, 25-year precipitation event.</p> <p><b>Design Criteria and Assumptions:</b></p> <ol style="list-style-type: none"> <li>1. The rainfall depth estimation for the 24-hour, 25-year event was determined to be 4.52 inches (included under a separated calculation package). The rainfall depth was determined by following procedures outlined in Precipitation-Frequency (PF) Atlas of the United States (Atlas 14, Volume 8, Version 2: Wisconsin).</li> <li>2. Stormwater on the active portion of the Cell was divided into two subcatchments. Subcatchment 1S consists of the northern 4.46 acres of final cover area, as shown on Figure 1. Run-off from 1S flows away from the covered waste and is allowed to infiltrate into the ground. Subcatchment 2S includes the southern 2.64 acres of final cover and an additional 2.04 acres of conveyance ditch area. Run-off from 2S goes to the west outlet ditch which is directed southward away from the landfill discharging to unnamed tributaries of Jerome Creek. Stormwater flowlines, subcatchments, and the conveyance ditch area are shown on Figure 1.</li> <li>3. The west outlet ditch is modeled conservatively as 12-feet wide, 2-feet deep, with a bottom width of 2 feet.</li> <li>4. HydroCAD 10.0 was used to model the stormwater associated with Cell 1 of the PPPP landfill.</li> <li>5. Subcatchment, reach, and detention parameters are included in the attached HydroCAD Report.</li> </ol> <p><b>Results:</b></p> <p>The attached HydroCAD report includes input and output for the stormwater run-off model developed for Cell 1 of the PPPP landfill. The estimated peak water level in the west outlet ditch is 0.94 feet, which is less than the minimum depth of 2 feet. Based on stormwater run-off analysis, the current run-off control system for Cell 1 of PPPP landfill will be able to handle the 24-hour, 25-year precipitation event without the west outlet ditch overflowing.</p> <p><b>Attachments:</b></p> <ul style="list-style-type: none"> <li>• Figure 1 –Stormwater Conveyance Diagram</li> <li>• HydroCAD Summary Report</li> </ul>						



**SOURCE:**  
 1. PLAN BASED ON DWG 1,  
 PPPP ASH LANDFILL CELL 1,  
 SUBMITTAL DATE 2/16/2022

Run-on and Run-off Control Plan Revision 2  
 Pleasant Prairie Ash Landfill Cell #1  
 Pleasant Prairie, Wisconsin

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We Energies  
 Milwaukee, Wisconsin

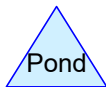
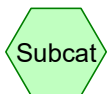
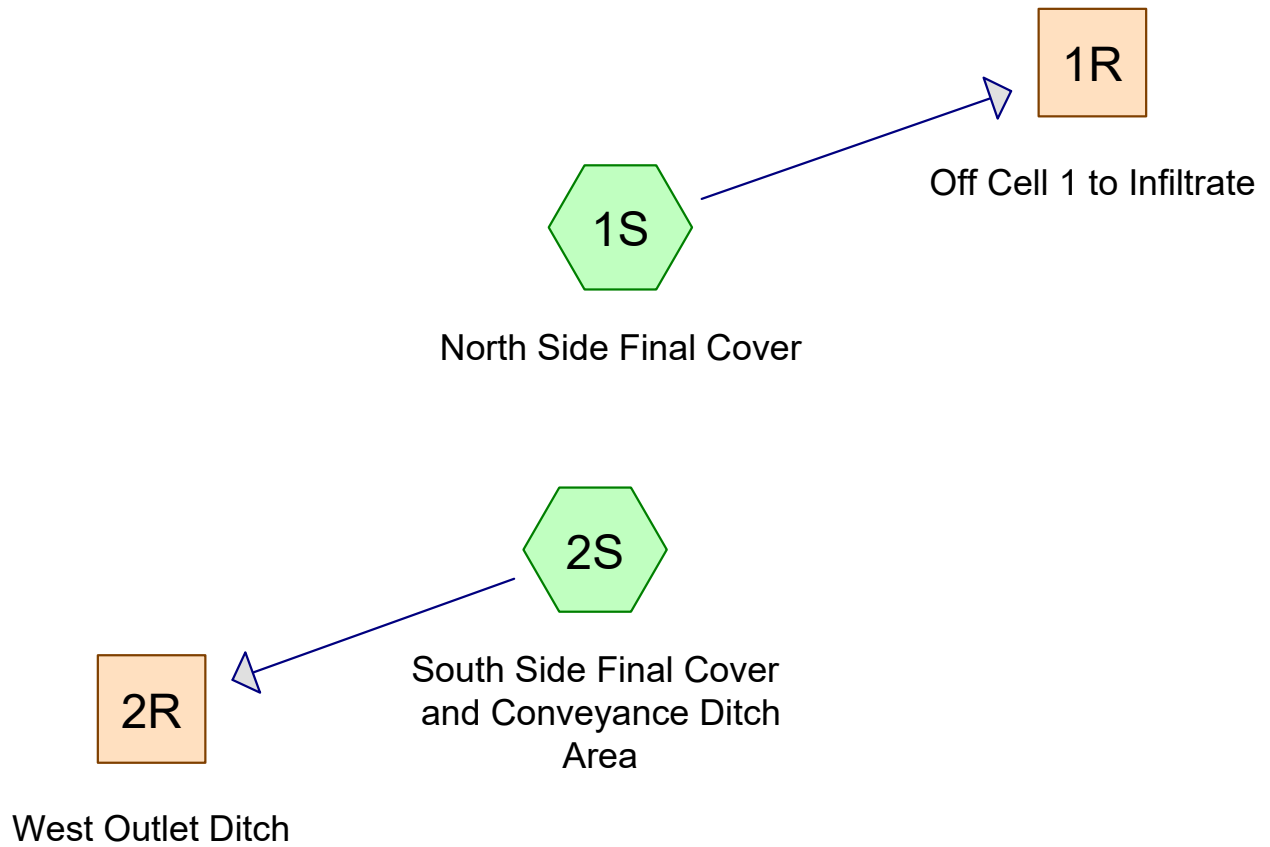


Run-Off Stormwater Flow Diagram

Project 2103683

February 2022

Fig. 1



# C2103683\_Cell1 Stormwater Runoff

Prepared by GEI Consultants

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Page 2

## Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
9.132	86	Pasture/grassland/range, Poor, HSG C (1S, 2S)
<b>9.132</b>	<b>86</b>	<b>TOTAL AREA</b>

# C2103683\_Cell1 Stormwater Runoff

Prepared by GEI Consultants

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Page 3

## Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
9.132	HSG C	1S, 2S
0.000	HSG D	
0.000	Other	
<b>9.132</b>		<b>TOTAL AREA</b>



# C2103683\_Cell1 Stormwater Runoff

Prepared by GEI Consultants

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## Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	9.132	0.000	0.000	9.132	Pasture/grassland/range, Poor	1S, 2S
<b>0.000</b>	<b>0.000</b>	<b>9.132</b>	<b>0.000</b>	<b>0.000</b>	<b>9.132</b>	<b>TOTAL AREA</b>	

**C2103683\_Cell1 Stormwater Runoff**

Type II 24-hr 25-yr, 24-hr Rainfall=4.52"

Prepared by GEI Consultants

Printed 2/18/2022

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: North Side Final Cover** Runoff Area=194,197 sf 0.00% Impervious Runoff Depth=3.02"  
Flow Length=150' Slope=0.0500 '/' Tc=10.2 min CN=86 Runoff=19.85 cfs 1.123 af

**Subcatchment2S: South Side Final Cover** Runoff Area=203,581 sf 0.00% Impervious Runoff Depth=3.02"  
Flow Length=1,296' Tc=21.5 min CN=86 Runoff=14.90 cfs 1.177 af

**Reach 1R: Off Cell 1 to Infiltrate** Inflow=19.85 cfs 1.123 af  
Outflow=19.85 cfs 1.123 af

**Reach 2R: West Outlet Ditch** Avg. Flow Depth=0.94' Max Vel=2.33 fps Inflow=14.90 cfs 1.177 af  
n=0.030 L=313.0' S=0.0050 '/' Capacity=88.17 cfs Outflow=14.54 cfs 1.177 af

**Total Runoff Area = 9.132 ac Runoff Volume = 2.299 af Average Runoff Depth = 3.02"**  
**100.00% Pervious = 9.132 ac 0.00% Impervious = 0.000 ac**

# C2103683\_Cell1 Stormwater Runoff

Prepared by GEI Consultants

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Type II 24-hr 25-yr, 24-hr Rainfall=4.52"

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## Summary for Subcatchment 1S: North Side Final Cover

Runoff = 19.85 cfs @ 12.01 hrs, Volume= 1.123 af, Depth= 3.02"

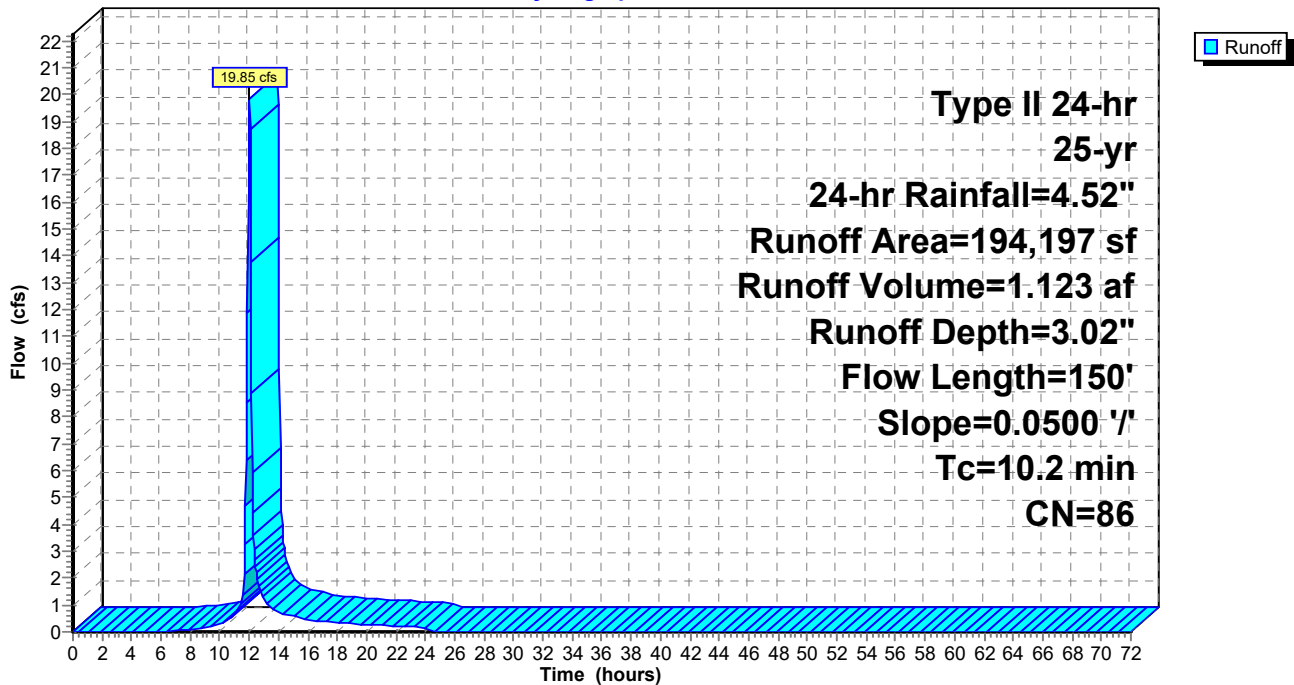
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 25-yr, 24-hr Rainfall=4.52"

Area (sf)	CN	Description
194,197	86	Pasture/grassland/range, Poor, HSG C
194,197		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.0500	0.24		<b>Sheet Flow, Side Slopes</b> Grass: Short n= 0.150 P2= 2.69"

## Subcatchment 1S: North Side Final Cover

Hydrograph



**C2103683\_Cell1 Stormwater Runoff**

Prepared by GEI Consultants

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Type II 24-hr 25-yr, 24-hr Rainfall=4.52"

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**Summary for Subcatchment 2S: South Side Final Cover and Conveyance Ditch Area**

Runoff = 14.90 cfs @ 12.14 hrs, Volume= 1.177 af, Depth= 3.02"

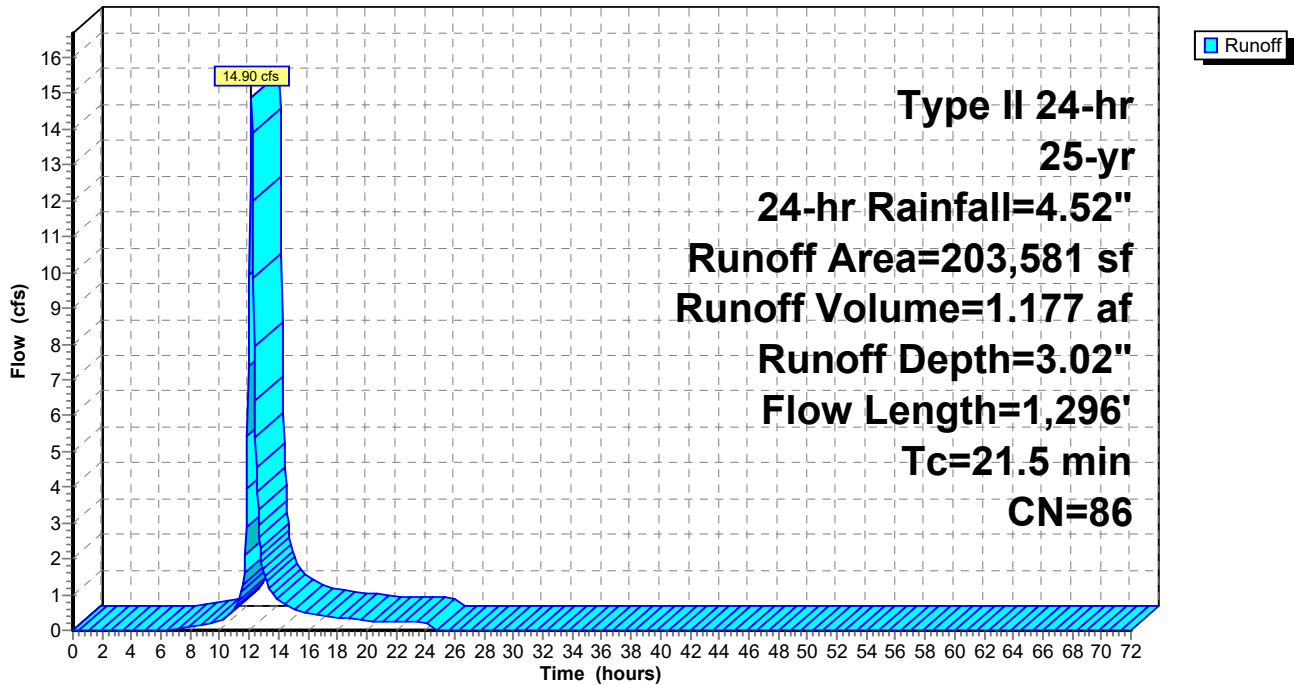
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 25-yr, 24-hr Rainfall=4.52"

Area (sf)	CN	Description
203,581	86	Pasture/grassland/range, Poor, HSG C
203,581		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	32	0.2500	0.34		<b>Sheet Flow, Side Slopes</b> Grass: Short n= 0.150 P2= 2.69"
19.9	1,264	0.0050	1.06		<b>Shallow Concentrated Flow, drainage swale</b> Grassed Waterway Kv= 15.0 fps
21.5	1,296	Total			

**Subcatchment 2S: South Side Final Cover and Conveyance Ditch Area**

Hydrograph



# C2103683\_Cell1 Stormwater Runoff

Prepared by GEI Consultants

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Type II 24-hr 25-yr, 24-hr Rainfall=4.52"

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## Summary for Reach 1R: Off Cell 1 to Infiltrate

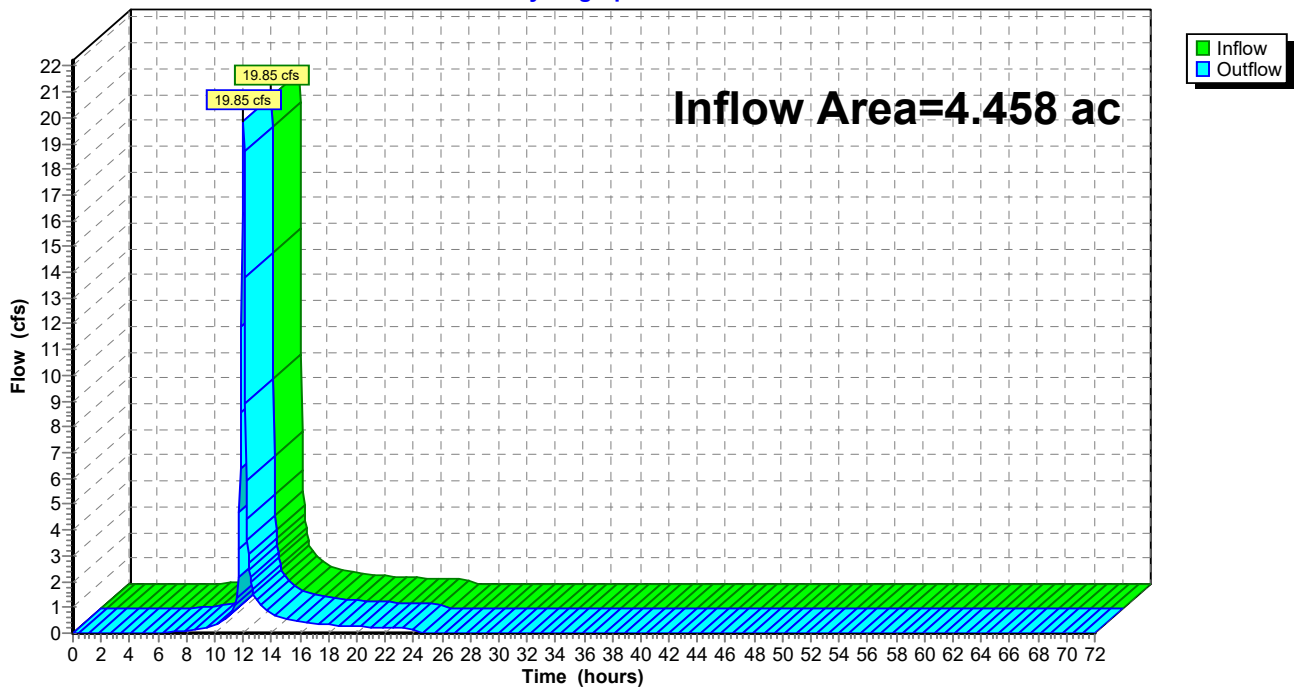
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.458 ac, 0.00% Impervious, Inflow Depth = 3.02" for 25-yr, 24-hr event  
Inflow = 19.85 cfs @ 12.01 hrs, Volume= 1.123 af  
Outflow = 19.85 cfs @ 12.01 hrs, Volume= 1.123 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

### Reach 1R: Off Cell 1 to Infiltrate

Hydrograph



# C2103683\_Cell1 Stormwater Runoff

Prepared by GEI Consultants

HydroCAD® 10.00-25 s/n 11294 © 2019 HydroCAD Software Solutions LLC

Type II 24-hr 25-yr, 24-hr Rainfall=4.52"

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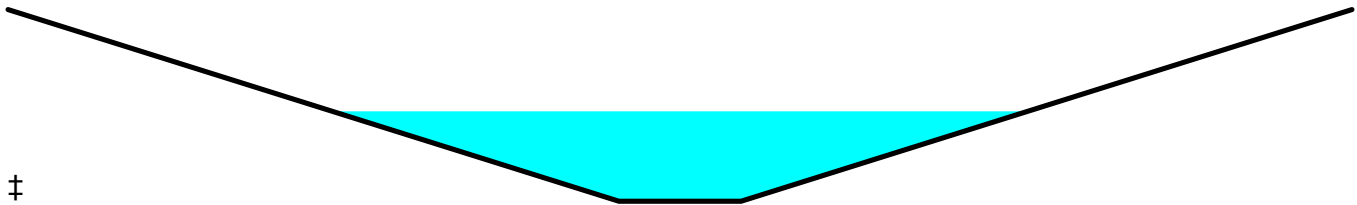
## Summary for Reach 2R: West Outlet Ditch

Inflow Area = 4.674 ac, 0.00% Impervious, Inflow Depth = 3.02" for 25-yr, 24-hr event  
Inflow = 14.90 cfs @ 12.14 hrs, Volume= 1.177 af  
Outflow = 14.54 cfs @ 12.21 hrs, Volume= 1.177 af, Atten= 2%, Lag= 4.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
Max. Velocity= 2.33 fps, Min. Travel Time= 2.2 min  
Avg. Velocity = 0.78 fps, Avg. Travel Time= 6.7 min

Peak Storage= 1,967 cf @ 12.17 hrs  
Average Depth at Peak Storage= 0.94'  
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 88.17 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding  
Side Slope Z-value= 5.0 ' / ' Top Width= 22.00'  
Length= 313.0' Slope= 0.0050 ' / '  
Inlet Invert= 686.00', Outlet Invert= 684.43'



## Reach 2R: West Outlet Ditch

### Hydrograph

