Run-on/Run-off Control System Plan:

Coal Combustion Residuals (CCR) Disposal Facility – Monroe Vertical Extension Landfill

Prepared for:

DTE

October 15, 2021

Run-On/Run-Off Control System Plan:
Coal Combustion Residuals (CCR) Disposal Facility – Monroe Vertical Extension Landfill

Prepared for:

DTE Energy
One Energy Plaza
Detroit, MI 48226

Prepared by:

AECOM

Project No. 60662907

Table of Contents

Appendices

List of Acronyms and Abbreviations

3H:1V	3 horizontal feet to 1 vertical foot
CCR	coal combustion residuals
DTE	DTE Energy
EPA	U.S. Environmental Protection Agency
EGLE	Michigan Department of Environment, Great Lakes, and Energy
FGD	flue gas desulfurization
H&H	hydrologic and hydraulic
NPDES	National Pollutant Discharge Elimination System
MDEQ	Michigan Department of Environmental Quality
MPP	Monroe Power Plant
Plan	Run-on/Run-off Control System Plan
WSE	water surface elevation

1 Introduction

This Run-on/Run-off Control System Plan (Plan) was prepared for an existing coal combustion residuals (CCR) disposal facility located at the DTE Electric Company (DTE) Monroe Power Plant (MPP) in Monroe, Michigan. This Plan serves as the five-year update to the initial Plan issued on October 17, 2016. The CCR disposal facility consists of a landfill located on top of an existing ash basin. The disposal facility currently accepts bottom ash, fly ash, flue gas desulfurization (FGD) sludge, scrubber water sludge solidified with fly ash or bottom ash, synthetic gypsum, and inert materials.

The plan was prepared in accordance with 40 CFR Part 257 and specifically addresses the requirements under Subpart D, §257.81 of the U.S. Environmental Protection Agency (EPA) CCR Rule. It is noted that the disposal facility is an existing landfill operating under an operating license approved by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), on December 4, 2019. The operating license was granted in accordance with Part 115 of the Natural Resources and Protection Act of 1994, as amended, which adopts §257.81 by reference. Accordingly, run-on and run-off control system requirements for the disposal facility must meet or exceed those of the CCR Rule.

1.1 Site Location and Description

The CCR disposal facility is located on land currently owned by DTE at the MPP. The landfill is operated by DTE. The MPP is located at 3500 East Front Street in Monroe Township, on the west bank of Lake Erie, approximately one and a half miles east of Interstate Highway 75 (I-75). While the landfill operations have continued since the initial Plan was issued, the run-on/run-off control system at the site has generally remained unchanged. The CCR disposal facility site consists of the landfill within the limits of an existing 410-acre Ash Basin. The disposal site is located approximately 1 mile southwest of MPP and is bounded by Lake Erie and the plant discharge channel on the east, I-75 on the west, a residential property and Plum Creek on the north, and an agricultural field on the south.

The plant has been in operation since 1971, and currently consists of four coal-fired electric generating units producing for a total output of approximately 3,400 megawatts (MW). Management of CCR at this facility currently consists of a combination of wet sluicing material to the ash basin and placing dry material into the landfill.

1.2 Description of CCR Landfill Operations

The landfill is designed to cover approximately 79 acres and be constructed in two phases sequentially moving west to east. The depth of fly ash was identified to be approximately 40 feet below the preconstruction ground surface. Graded sluiced fly ash makes up the subgrade for the landfill. A pore pressure relief layer is constructed on top of the subgrade. This layer consists of the following from bottom to top: 24-inches of bottom ash or equivalent, a network of perforated piping encased in filter fabric, a layer of non-woven geotextile, and a 6-inch embedment layer of fill. Pore water that exists below the subgrade discharges through the network of perforated pipes into perimeter swales. Likewise, stormwater is routed through the same pipe network as the

landfill is being filled. As final grades are met, surface water runoff will be directed to control berms and to perimeter swales. The perimeter swales convey all water to the ash basin, where the water is ultimately discharged under a Michigan National Pollutant Discharge Elimination System (NPDES) permit number MI0001848, previously issued by EGLE on April 4, 2014.

1.3 CCR Rule Requirements

(40 CFR) *257.81(a) The owner or operator of an existing or new CCR landfill or any lateral expansion of a CCR landfill must 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; and

(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.

(b) Run-off from the active portion of the CCR unit must be handled in accordance with the surface water requirements under § 257.3–3.

The MPP disposal facility is an existing landfill that was designed to incorporate run-on and run-off controls systems, which prevent flow onto and control flow from the active portion of the unit during a 24-hour, 25-year storm.

1.4 Plan Content

(40 CFR) *257.81(c) Run-on and run-off control system plan—*

(1) Content of the plan. The owner or operator must prepare initial and periodic run-on and run-off control system plans for the CCR unit according to the timeframes specified in paragraphs (c)(3) and (4) of this section. These plans 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 owner or operator has completed the initial run-on and run-off control system plan when the plan has been placed in the facility's operating record as required by § 257.105(g)(3).

This Plan is the five-year update to the initial run-on/run-off control plan, and it describes how the run-on and run-off control systems have been designed and constructed to meet the applicable requirements of the CCR Rule. A certification statement from a qualified professional engineer verifying that this Plan meets the requirements of this section § 257.81, In accordance with §257.81(c)(1), this Plan will be amended each time there is a change in conditions that substantially affect the written plan in effect.

1.5 Documents Reviewed

Background information, design basis information, and other data used in preparing this plan have been provided to AECOM by DTE. AECOM is not responsible for the accuracy of the documents

prepared by others and has prepared this plan by practicing good engineering judgement based upon the best available information. The following documents and design drawings were reviewed in the preparation of this plan:

- AECOM, October 17, 2016. *Run-on/Run-off Control System Plan For Coal Combustion Residuals (CCR) Disposal Facility – Monroe Fly Ash Basin Vertical Extension.*
- Commonwealth Associates Inc., June 1977. *Layout – On-site Fly Ash Disposal Facility Discharge Structure,* Design Drawings.
- Detroit Edison's Surveying Services, June 2016. *Discharge Structure – Existing & Proposed Conditions,* Design Drawings.
- Geosyntec Consultants, January 2021. *2020 Annual Inspection Report: Vertical Extension Landfill*.
- Golder Associates Inc., April 2015. *Permit Modification, DTE Energy Monroe Power Plant Ash Basin*
- Golder Associates Inc., September 2015. *DTE Energy Monroe Fly Ash Basin, 2015 Phase I Record Drawings*
- Golder Associates Inc., November 2017. *DTE Energy Monroe Fly Ash Basin,2017 Phase 2 Record Drawings*

Additional information on the references utilized for this plan can be found in **Section 4**.

2 Overview of Run-on/Run-off Control Systems

The run-on and run-off control systems share multiple common control measures and are both required to control the peak flows resulting from a 25-year/24-hour storm. Due to these similarities, one hydrologic and hydraulic (H&H) model was constructed in HydroCAD (version 10.00-20) to analyze both systems in order to evaluate the run-on and run-off control systems' abilities to control the design storm. The H&H model utilized in the initial run-on/run-off control plan was found to sufficiently represent current site conditions, and therefore was used in this Plan with relatively minor changes[1]. The resulting output from this model can be found in **Appendix B2.** The components that make up the run-on and run-off control systems are described in detail below.

2.1 Run-on Controls

Run-on controls consist of diversion berms which divert stormwater away from active disposal areas and also direct surface water to receiving flumes or drainage ditches. In addition, the proposed cap system is graded at a minimum of 5% to drain stormwater flows away from active portions of the landfill. The active area of any phase will be minimized to reduce contact water and the potential for fugitive dust emissions. Furthermore, the areas immediately outside of the landfill's perimeter are sloped away from the perimeter ditch system, preventing run-on from adjacent land from entering the facility.

2.2 Permanent Run-off Management Features

Permanent run-off management features are shown on Sheet 6 of the *2015 Phase 1 Record Drawings* and Sheet 6 of the *2017 Phase 2 Record Drawings* (**Appendix A2**). Associated details are provided on Sheets 9 and 10 of the *2015 Phase 1 Record Drawings* and Sheets 9 and 10 of *the Phase 2 Record Drawings* (**Appendix A2**). The cap system's grade ranges from a slope of 5% at the top to 4 horizontal feet to 1 vertical foot (4H:1V) along the perimeter. Surface water control berms sloped at 2% are designed on the 4H:1V portion of the cap. These berms create small v-shaped channels 2 feet deep with 3H:1V side slopes that direct stormwater flows into the perimeter swales while minimizing erosive velocities. The perimeter swales are sloped at approximately 0.1% with a 12-foot bottom width and 3H:1V side slopes and they direct stormwater flows into the existing ash basin.

All permanent run-off measures are designed to collect and control the peak flow resulting from a 25-year/24-hour storm under final design conditions. Supporting calculations for the surface water control structures are provided in **Appendix B2**.

2.3 Erosion Control

The entire cap system of the landfill is designed with a minimum of 6 inches of vegetative cover. This vegetative cover is sufficient to minimize potential erosion on all areas of the cap system.

[1] Note that the H&H model represents a combination of existing conditions around the perimeter of the landfill and proposed final buildout/closed conditions internal to the landfill, which is the most conservative scenario.

2.4 Collection and Holding Facilities

Finally, all resultant stormwater flows are conveyed from the perimeter swales into the existing ash basin. Stormwater runoff settles within the ash basin and ultimately discharges through a permitted NPDES outfall at its eastern end (permit number MI0001848 issued by EGLE. The existing water surface elevation (WSE) of the ash basin is approximately 609.0 feet. The starting WSE of 609.0 feet was used to model the tailwater conditions for the perimeter swales.

3 Frequency for Revising the Plan

(40 CFR) *257.81(c)(4). The owner or operator of the CCR unit must prepare periodic run-on and runoff control system plans required by paragraph (c)(1) of this section every five years. The date of completing the initial plan is the basis for establishing the deadline to complete the first subsequent plan. The owner or operator may complete any required plan prior to the required deadline provided the owner or operator places the completed plan into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing a subsequent plan is based on the date of completing the previous plan. For purposes of this paragraph (c)(4), the owner or operator has completed a periodic run-on and run-off control system plan when the plan has been placed in the facility's operating record as required by § 257.105(g)(3).*

This Plan represents the first five-year update subsequent to the initial run-on/run-off control system plan published in 2016 as outlined in §257.81(c)(4). As such, the initial run-on/run-off control system plan is superseded by this Plan, and DTE will place it in the facility's operating record.

DTE will continue to update periodic run-on and runoff control system plans every five years and will place the Plan in the facility's operating record. DTE will obtain a certification from a qualified professional engineer stating that the periodic run-on and run-off control system plans meet the requirements of this section.

4 References

AECOM, October 17, 2016. *Run-on/Run-off Control System Plan For Coal Combustion Residuals (CCR) Disposal Facility – Monroe Fly Ash Basin Vertical Extension.*

Commonwealth Associates Inc., June 1977. *Layout – On-site Fly Ash Disposal Facility Discharge Structure,* Design Drawings.

Detroit Edison's Surveying Services, June 2016. *Discharge Structure – Existing & Proposed Conditions,* Design Drawings.

Geosyntec Consultants, January 2021. *2020 Annual Inspection Report: Vertical Extension Landfill*.

Golder Associates Inc., April 2015. *Permit Modification, DTE Energy Monroe Power Plant Ash Basin*

Golder Associates Inc., March 2015. *DTE Energy Monroe Fly Ash Basin, Construction Permit Application Modification, Design Drawings*

Golder Associates Inc., May 2015. *DTE Energy Monroe Fly Ash Basin, 2015 Construction Drawing, Design Drawings*

HydroCAD Software Solutions LLC 2017. *HydroCAD*, Version 10.00-20 Computer Program.

National Oceanic and Atmospheric Administration (NOAA) 2017. *Point Precipitation Frequency Estimates,* Atlas 14, Volume 8, Version 2, for Monroe, Michigan.

APPENDIX A: PLAN DRAWINGS & CERTIFICATION

Appendix A.1: CCR Rule Engineer's Certification

Certification Statement 40 CFR § 257.81(c)(5) –Run-on and Run-Off Control System Plan for an Existing CCR Landfill

CCR Unit: DTE Energy Range Road Landfill

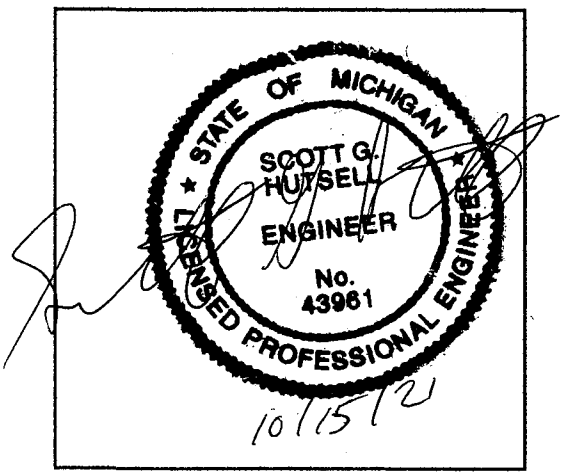
I, Scott G. Hutsell, being a Registered Professional Engineer in good standing in the State of Michigan, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the information contained in the run-on and run-off control system plan dated October 15, 2021 meets the requirements of 40 CFR § 257.81.

Scott G. Hutsell

Printed Name

10/15/21

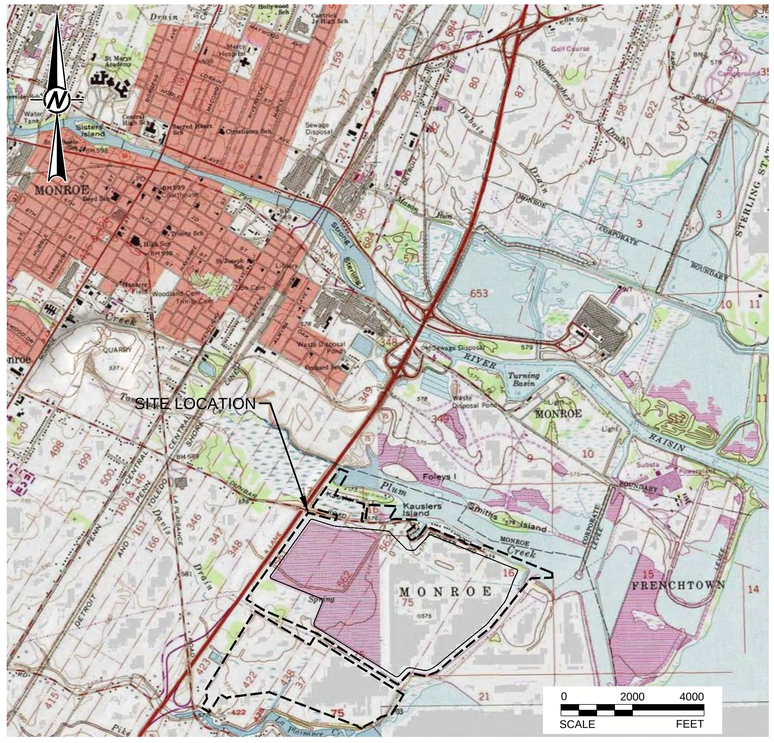
Date



APPENDIX B: PLAN DRAWINGS & CERTIFICATION

Appendix A.2: Historic Design Drawings

DTE ENERGY
MONROE FLY ASH BASIN
2015 PHASE 1 RECORD DRAWINGS



Prepared for:

DTE ENERGY
One Energy Plaza
Detroit, MI 48226

Prepared by:

Golder Associates Inc.
15851 S. US 27 Suite 50
Lansing, Michigan USA 48906

INDEX OF DRAWINGS

Sheet Number	Drawing Title	Current Revision	Date
1	Title Sheet	0	
2	Legend, References and General Notes	0	
3	Site Plan	0	
4	Record Top of Subgrade Plan	0	
5	Record Pore Water Relief Piping Plan	0	
6	Record Pore Water Relief System and Berm Plan	0	
7	Construction Control / QA/QC Points	0	
8	Record Monitoring Locations for Phase 1	0	
9	General Details - Sheet 1	0	
10	General Details - Sheet 2	0	

RECORD DRAWING

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-09-10
PREPARED	JJS
DESIGN	JJS
REVIEW	JJS
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2015 PHASE 1 RECORD DRAWINGS

TITLE
TITLE SHEET

PROJECT No.	CONTROL	Rev.	FIGURE
1521809B			1

LEGEND

- PROPERTY BOUNDARY
- ASH BASIN EXISTING TOPOGRAPHY (1' AND 5' CONTOURS)
- WATER BOUNDARY
- FENCE LINE
- ELECTRIC TOWER
- ELECTRIC POLE
- UNDERGROUND ELECTRIC LINE
- CONSUMERS ENERGY ELECTRIC LINE
- ITC ELECTRIC LINE
- RIGHT OF WAY
- DRAINAGE DIRECTION
- SAMPLE LOCATION
- DECOMMISSIONED SLURRY PIPELINES
- ACTIVE SLURRY PIPELINES
- WETLAND
- STRUCTURE (RESIDENCE, BUSINESS)
- CULVERT
- BENCHMARK LOCATION
- WATER LINE
- VEHICLE CROSSING
- PROPOSED DRAINAGE CHANNEL
- PROPOSED PERFORATED, FILTER SOCKED, CORRUGATED PLASTIC PIPE (6" OR 8"Ï)
- AREA OF CLAY COVER
- AREA OF FILL TICK MARK
- AREA OF CUT TICK MARK
- CONTROL POINT
- CULVERT

MATERIALS LEGEND

- SLUICED FLY ASH
- BOTTOM ASH OR EQUIVALENT
- 8 oz/sy GEOTEXTILE
- LOW PERMEABILITY SOILS COVER MATERIAL
- STRUCTURAL FILL
- TOPSOIL

GENERAL NOTES

1. EXISTING TOPOGRAPHY IS AN AMALGAM OF GRADES FROM 2009 BASE MAP (DRAWING 6SE-0695-070-REVB) AND AS-BUILT GRADES FROM MITIGATED SECTIONS OF THE EMBANKMENT, PROVIDED BY DTE, DRAWING CREATED BY GEOSYNTEC CONSULTANTS, DATED 02/08/2013.
2. HORIZONTAL GRID COORDINATE SYSTEM UNITS ARE IN FEET AND REFERENCED TO MICHIGAN SOUTH STATE PLANE COORDINATES SYSTEM (NAD83). ELEVATIONS ARE IN FEET AND REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM (NGVD29). NGVD29 DATUM IS 1.47 FT HIGHER THAN THE PLANT DATUM.
3. AREA OF CLAY COVER ADAPTED FROM "ATTACHMENT A" OF THE DTE ELECTRIC COMPANY SOLID WASTE OPERATING LICENSE APPLICATION, DATED DECEMBER 3, 2014.

SECTION, DETAIL AND VIEW DESIGNATIONS

SECTION OR DETAIL DESIGNATION — A / 100-2 — SECTION-DETAIL TAKEN/REFERENCE — DRAWING NUMBER WHERE SHOWN

SECTION OR DETAIL DESIGNATION — A / 100-2 — SECTION-DETAIL OR VIEW NAME — DRAWING NUMBER WHERE SHOWN

RECORD DRAWING

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-09-10
PREPARED	JJS
DESIGN	JJS
REVIEW	JJS
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2015 PHASE 1 RECORD DRAWINGS

TITLE
LEGEND, REFERENCES AND GENERAL NOTES

PROJECT No.	CONTROL	Rev.	FIGURE
1521809B			2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

0 1in

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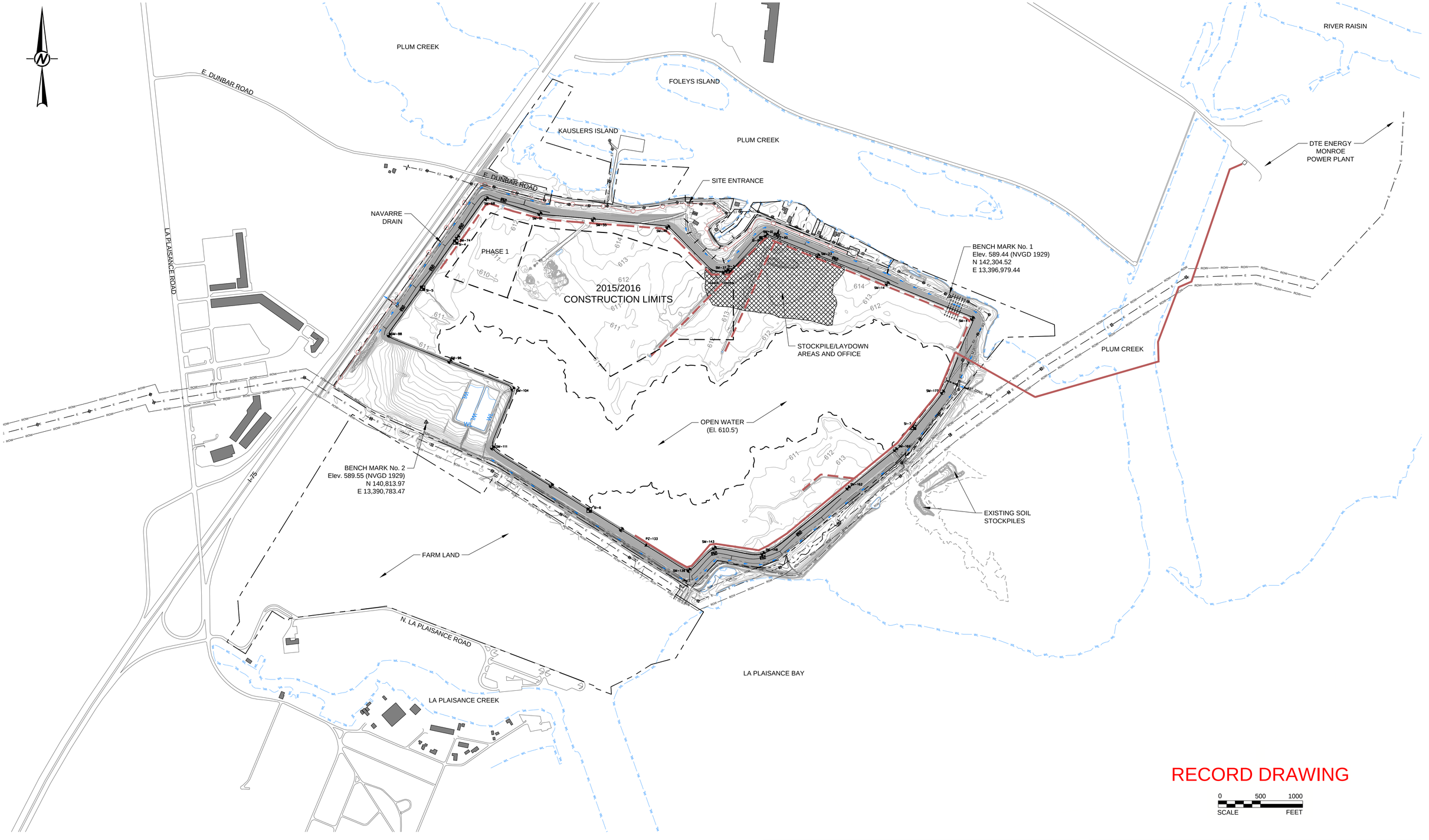

RECORD DRAWING

0 500 1000
SCALE FEET

CLIENT	DTE ENERGY MONROE POWER PLANT MONROE, MI
CONSULTANT	Golder Associates
YYYY-MM-DD	2015-09-10
PREPARED	JJS
DESIGN	JJS
REVIEW	JJS
APPROVED	DML
PROJECT	MONROE POWER PLANT ASH BASIN 2015 PHASE 1 RECORD DRAWINGS
TITLE	**SITE PLAN**
PROJECT No.	1521809B
CONTROL	
Rev.	
FIGURE	3

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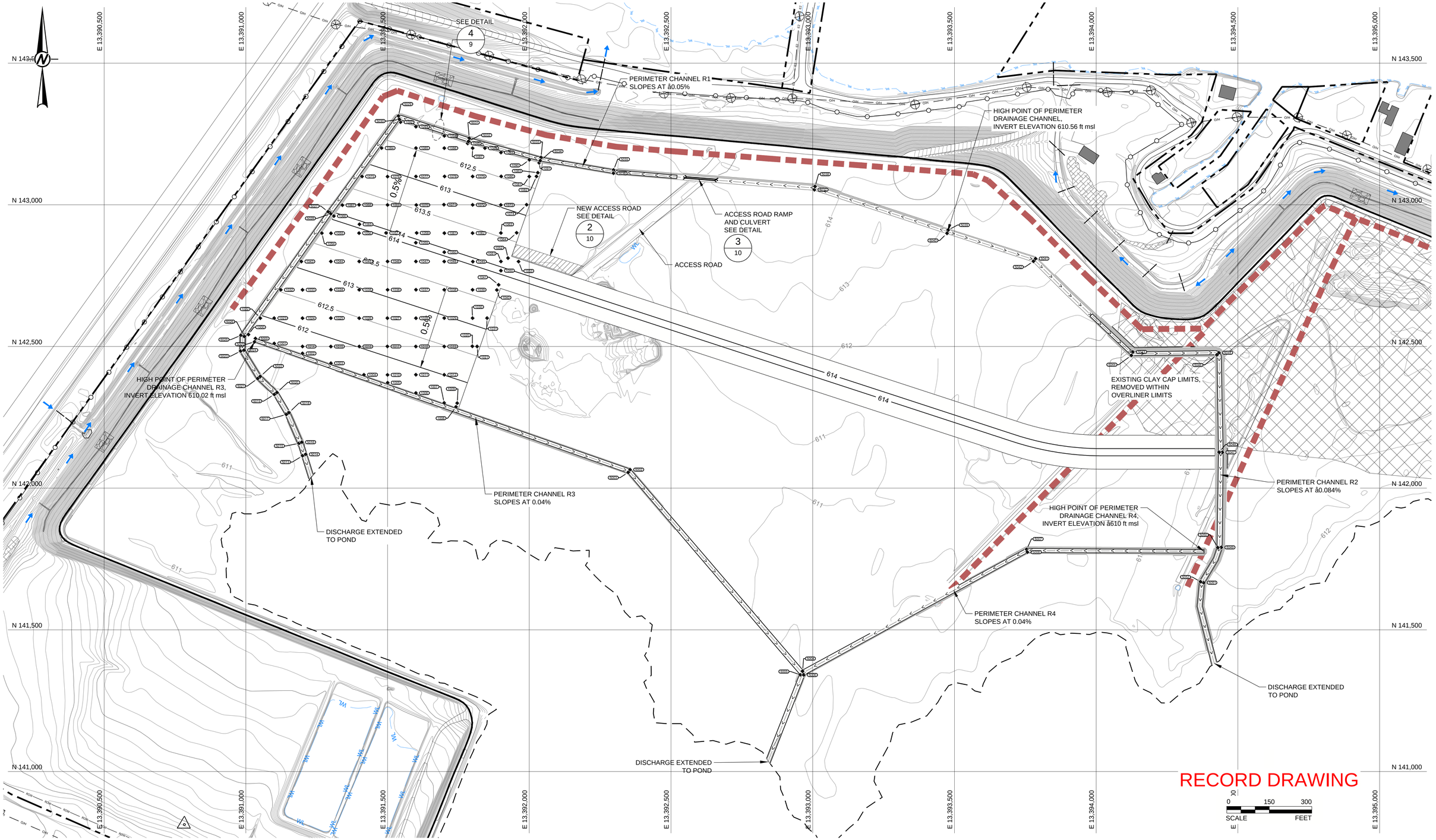
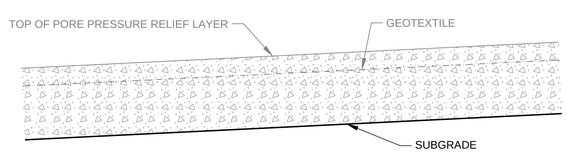


NOTE(S)

1. ABANDONED PIPING WITHIN LIMITS OF SUBGRADE WAS REMOVED.
2. CLAY COVER WITHIN LIMITS OF SUBGRADE WAS REMOVED.



LAYER PROFILE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-09-10
PREPARED	JJS
DESIGN	JJS
REVIEW	JJS
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2015 PHASE 1 RECORD DRAWINGS

TITLE
RECORD TOP OF SUBGRADE AND SWALE PLAN

PROJECT No.	CONTROL	Rev.	FIGURE
1521809B			4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

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E 13,391,000
E 13,391,500
E 13,392,000
E 13,392,500
N 143,000
N 142,500
N 142,000

ACCESS ROAD RAMP AND CULVERT

ACCESS ROAD

CORRUGATED PLASTIC PIPE CENTERLINE CONNECTION SEE DETAIL 6/9

6"ǿ PERFORATED, FILTER SOCKED, CORRUGATED PLASTIC PIPE SEE DETAIL 2/9

TYPICAL PIPE OUTLET SEE DETAIL 3/9

0.53% 0.54% 0.50% 0.55% 0.51% 0.47%

0.51% 0.49% 0.49% 0.50% 0.52% 0.53% 0.49% 0.51%

RECORD DRAWING

SCALE 0 80 160 FEET

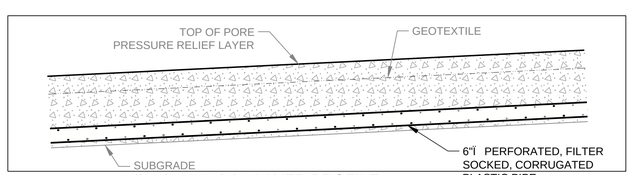
NOTE(S)

1. RECORD POINTS PROVIDED BY KemTech, HOWEVER, CERTAIN POINTS WERE UPDATED BY EAGLE EXCAVATING USING A GPS SYSTEM, FOLLOWING ADDITIONAL FIELD WORK.

LEGEND

614.96 AS BUILT 6" PIPE ELEVATION

614.96 AS BUILT 8" PIPE ELEVATION



LAYER PROFILE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-09-10
PREPARED	JJS
DESIGN	JJS
REVIEW	JJS
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2015 PHASE 1 RECORD DRAWINGS

TITLE
RECORD PORE WATER RELIEF PIPING PLAN

PROJECT No. 1521809B | CONTROL | Rev. | FIGURE 5

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E 13,391,000
E 13,391,500
E 13,392,000
E 13,392,500
E 13,393,000
N 143,000
N 142,500
N 142,000

PERIMETER CHANNEL R1

ACCESS ROAD RAMP
AND CULVERT
SEE DETAIL

SEE DETAILS
1/9 & 2/9

ACCESS ROAD

PERIMETER CHANNEL R3

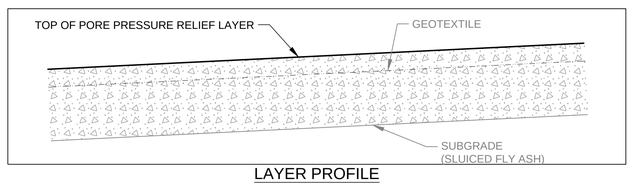
615
615.5
616
616.5
614.5
0.5%
611

SCALE 0 150 300 FEET

TOP OF BERM CONTROL POINTS

0 100 200 FEET

RECORD DRAWING



LAYER PROFILE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-09-10
PREPARED	JJS
DESIGN	JJS
REVIEW	JJS
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2015 PHASE 1 RECORD DRAWINGS

TITLE
RECORD PORE WATER RELIEF SYSTEM AND BERMPLAN

PROJECT No.	CONTROL	Rev.	FIGURE
1521809B			6

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D
0 1 in

2015 SUBGRADE CONSTRUCTION CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	RECORD ELEVATION	DIFFERENCE Ñ
1000	142,542.18	13,391,009.15	611.61	611.66	0.05
1001	142,510.58	13,391,100.12	611.60	611.52	-0.08
1002	142,475.44	13,391,200.04	611.59	611.01	-0.58
1003	142,440.88	13,391,300.16	611.58	611.54	-0.04
1004	142,400.13	13,391,416.70	611.57	611.59	0.03
1005	142,372.08	13,391,500.44	611.56	611.62	0.06
1006	142,335.77	13,391,599.85	611.55	611.09	-0.45
1007	142,300.86	13,391,699.60	611.54	611.54	0.01
1008	142,286.99	13,391,741.49	611.53	611.48	-0.05
1009	142,300.04	13,391,745.81	611.60	611.62	0.02
1010	142,399.75	13,391,499.91	611.70	611.65	-0.04
1011	142,400.22	13,391,599.98	611.85	611.85	0.00
1012	142,400.11	13,391,699.84	612.01	611.96	-0.05
1013	142,400.00	13,391,780.95	612.13	612.13	NOTE 2
1014	142,500.01	13,391,200.04	611.70	611.56	-0.15
1015	142,499.88	13,391,299.97	611.86	611.82	-0.04
1016	142,499.94	13,391,400.30	612.02	612.02	0.01
1017	142,500.19	13,391,499.46	612.17	612.23	0.06
1018	142,499.95	13,391,599.83	612.33	612.27	-0.06
1019	142,499.93	13,391,699.85	612.48	612.38	-0.10
1020	142,500.70	13,391,799.22	612.64	612.59	-0.05
1021	142,500.01	13,391,816.00	612.66	611.93	-0.73
1022	142,599.98	13,391,051.07	611.95	611.85	-0.09
1023	142,600.00	13,391,100.04	612.03	612.06	0.04
1024	142,599.83	13,391,200.02	612.18	612.12	-0.06
1025	142,599.94	13,391,299.97	612.34	612.27	-0.07
1026	142,599.82	13,391,399.96	612.49	612.48	-0.01
1027	142,599.91	13,391,499.39	612.65	612.64	0.00
1028	142,599.78	13,391,600.19	612.80	612.80	0.00
1029	142,600.14	13,391,700.04	612.96	612.92	-0.03
1030	142,600.08	13,391,800.07	613.11	612.96	-0.16
1031	142,600.08	13,391,851.09	613.19	611.96	-1.23
1032	142,699.95	13,391,123.36	612.54	612.53	-0.01
1033	142,699.82	13,391,200.05	612.66	612.56	-0.10
1034	142,700.58	13,391,300.16	612.81	612.71	-0.10
1035	142,699.99	13,391,399.95	612.97	612.94	-0.02
1036	142,699.97	13,391,500.14	613.12	613.05	-0.07
1037	142,700.17	13,391,600.21	613.28	613.28	0.00
1038	142,699.90	13,391,700.02	613.43	613.36	-0.07
1039	142,699.94	13,391,799.97	613.59	613.49	-0.10
1040	142,699.29	13,391,885.59	613.72	613.72	NOTE 2
1041	142,717.52	13,391,891.89	613.81	613.81	NOTE 2
1043	142,799.87	13,391,195.73	613.12	613.05	-0.07
1044	142,799.98	13,391,299.97	613.29	613.20	-0.08
1045	142,800.04	13,391,400.05	613.44	613.36	-0.08
1046	142,800.09	13,391,499.99	613.60	613.61	0.01
1047	142,800.01	13,391,600.01	613.75	613.69	-0.07
1048	142,799.78	13,391,699.86	613.91	613.90	-0.01
1049	142,799.47	13,391,800.90	614.06	614.05	-0.02
1050	142,767.54	13,391,899.82	614.06	614.06	NOTE 2
1051	142,800.06	13,391,900.02	613.91	613.91	NOTE 2
1052	142,811.93	13,391,924.96	613.81	613.81	NOTE 2
1053	142,799.70	13,391,962.18	613.81	613.81	NOTE 2
1054	142,900.02	13,391,268.15	613.71	613.07	-0.64
1055	142,899.45	13,391,300.58	613.76	613.79	0.03
1056	142,900.03	13,391,399.45	613.92	613.86	-0.06
1057	142,900.61	13,391,494.80	614.06	614.03	-0.04
1058	142,900.61	13,391,602.66	613.90	613.89	-0.01
1059	142,866.12	13,391,599.65	614.06	614.02	-0.05
1060	142,832.85	13,391,700.16	614.06	614.00	-0.07
1061	142,899.85	13,391,700.43	613.74	613.69	-0.06
1062	142,900.07	13,391,799.84	613.59	613.69	0.10
1063	142,900.58	13,391,899.94	613.43	613.48	0.05
1064	142,901.15	13,391,955.49	613.35	613.41	0.06
1065	142,931.20	13,391,400.87	614.06	614.02	-0.04
1066	142,960.25	13,391,310.61	614.06	614.04	-0.03
1067	142,998.74	13,391,340.72	613.83	613.85	0.02
1068	142,999.91	13,391,399.59	613.73	613.79	0.06
1069	142,999.39	13,391,500.01	613.58	613.54	-0.04
1070	142,999.20	13,391,601.45	613.42	613.43	0.01
1071	143,000.45	13,391,698.92	613.27	613.31	0.04
1072	142,999.79	13,391,800.24	613.11	613.11	0.00
1073	142,999.42	13,391,899.64	612.96	612.95	-0.01
1074	143,000.29	13,391,990.81	612.82	612.79	-0.03
1075	143,099.98	13,391,409.86	613.24	613.23	-0.01
1076	143,099.46	13,391,500.08	613.10	613.08	-0.02
1077	143,099.92	13,391,600.18	612.95	612.95	0.00
1078	143,100.13	13,391,701.08	612.79	612.82	0.03
1079	143,100.05	13,391,800.14	612.64	612.73	0.09
1080	143,100.22	13,391,900.88	612.48	612.53	0.04
1081	143,099.67	13,392,000.06	612.33	612.36	0.03
1082	143,100.20	13,392,025.55	612.29	612.28	-0.01
1083	143,113.21	13,392,030.22	612.22	612.20	-0.01
1084	143,200.32	13,391,478.96	612.66	612.72	0.06
1085	143,200.09	13,391,600.29	612.47	612.46	-0.02
1086	143,199.94	13,391,700.28	612.32	612.31	-0.01
1087	143,199.87	13,391,800.16	612.16	612.19	0.03
1088	143,199.88	13,391,843.46	612.10	612.16	0.06
1089	143,184.44	13,391,900.07	612.08	612.09	0.01
1090	143,158.76	13,392,000.31	612.05	612.03	-0.02
1091	143,147.70	13,392,034.95	612.04	612.04	0.00
1092	143,291.88	13,391,545.80	612.11	612.21	0.10
1093	143,275.58	13,391,600.00	612.11	612.11	NOTE 2
1094	143,243.10	13,391,700.09	612.11	612.11	NOTE 2
1095	143,216.53	13,391,782.68	612.11	612.07	-0.04

2015 TOP OF PORE PRESSURE RELIEF LAYER CONSTRUCTION CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	Record Elevation	Difference Ñ
2000	142,546.20	13,391,021.66	614.15	614.10	-0.05
2001	142,518.60	13,391,100.06	614.14	614.15	0.02
2002	142,483.57	13,391,199.65	614.13	614.20	0.07
2003	142,449.03	13,391,299.92	614.12	614.14	0.02
2004	142,413.90	13,391,400.17	614.11	614.07	-0.04
2005	142,379.14	13,391,499.65	614.09	614.13	0.04
2006	142,343.88	13,391,600.04	614.08	614.06	-0.03
2007	142,309.32	13,391,700.02	614.07	614.01	-0.06
2008	142,297.72	13,391,743.78	614.07	614.05	-0.02
2009	142,320.49	13,391,737.43	614.21	614.23	0.02
2010	142,339.07	13,391,700.00	614.22	614.25	0.03
2011	142,373.75	13,391,600.26	614.23	614.23	0.01
2012	142,409.06	13,391,500.25	614.24	614.23	-0.01
2013	142,399.99	13,391,600.45	614.35	614.33	-0.02
2014	142,400.02	13,391,699.82	614.51	614.46	-0.05
2015	142,400.03	13,391,767.34	614.63	614.60	-0.03
2016	142,443.68	13,391,400.28	614.25	614.27	0.02
2017	142,478.61	13,391,300.18	614.26	614.26	0.00
2018	142,513.84	13,391,200.04	614.27	614.31	0.04
2019	142,499.82	13,391,299.81	614.36	614.32	-0.04
2020	142,500.09	13,391,399.68	614.52	614.57	0.06
2021	142,499.86	13,391,498.86	614.67	614.66	-0.01
2022	142,500.05	13,391,600.18	614.83	614.89	0.06
2023	142,499.56	13,391,699.77	614.98	614.91	-0.07
2024	142,500.18	13,391,800.00	615.14	615.17	0.03
2025	142,499.85	13,391,808.22	615.16	615.20	0.04
2026	142,548.48	13,391,100.19	614.28	614.26	-0.03
2027	142,560.42	13,391,066.90	614.28	614.22	-0.07
2028	142,599.60	13,391,060.56	614.46	614.45	-0.02
2029	142,599.89	13,391,096.41	614.52	614.53	0.01
2030	142,599.55	13,391,199.77	614.68	614.68	0.00
2031	142,600.12	13,391,300.08	614.84	614.88	0.05
2032	142,600.07	13,391,399.80	614.99	614.98	-0.01
2033	142,600.13	13,391,499.98	615.15	615.13	-0.02
2034	142,600.23	13,391,600.00	615.30	615.25	-0.05
2035	142,599.73	13,391,699.99	615.46	615.45	-0.01
2036	142,599.91	13,391,799.74	615.61	615.56	-0.05
2037	142,599.95	13,391,846.04	615.69	615.68	-0.01
2038	142,700.32	13,391,132.82	615.05	615.03	-0.02
2039	142,700.27	13,391,168.10	615.11	615.08	-0.02
2040	142,699.80	13,391,200.05	615.16	615.15	-0.01
2041	142,700.16	13,391,300.01	615.31	615.36	0.05
2042	142,699.69	13,391,400.13	615.47	615.44	-0.03
2043	142,699.74	13,391,500.15	615.62	615.68	0.06
2044	142,699.83	13,391,599.77	615.78	615.79	0.01
2045	142,700.24	13,391,700.02	615.93	615.95	0.02
2046	142,700.36	13,391,800.08	616.09	616.03	-0.06
2047	142,700.22	13,391,885.64	616.22	616.20	-0.02
2048	142,717.46	13,391,891.88	616.31	616.29	-0.02
2049	142,799.95	13,391,205.54	615.64	615.59	-0.05
2050	142,799.95	13,391,240.57	615.69	615.71	0.01
2051	142,799.88	13,391,300.34	615.79	615.82	0.04
2052	142,800.07	13,391,400.07	615.94	615.91	-0.03
2053	142,800.17	13,391,499.87	616.10	616.06	-0.04
2054	142,800.41	13,391,600.20	616.25	616.26	0.01
2055	142,799.82	13,391,700.37	616.41	616.45	0.04
2056	142,799.85	13,391,801.07	616.56	616.57	0.01
2057	142,767.53	13,391,900.05	616.56	616.58	0.02
2058	142,765.02	13,391,908.55	616.56	616.60	0.03
2059	142,800.31	13,391,900.15	616.41	616.46	0.05
2060	142,799.91	13,391,921.03	616.38	616.34	-0.04
2061	142,811.45	13,391,924.59	616.31	616.30	-0.01
2062	142,833.23	13,391,699.84	616.56	616.52	-0.04
2063	142,865.59	13,391,599.85	616.56	616.56	0.00
2064	142,899.72	13,391,277.86	616.23	616.28	0.06
2065	142,899.86	13,391,313.01	616.28	616.34	0.06
2066	142,899.84	13,391,400.20	616.42	616.43	0.01
2067	142,899.89	13,391,494.15	616.56	616.50	-0.06
2068	142,899.60	13,391,600.12	616.40	616.39	-0.01
2069	142,900.12	13,391,700.15	616.24	616.22	-0.02
2070	142,899.68	13,391,799.61	616.09	616.08	-0.01
2071	142,899.76	13,391,900.09	615.93	615.97	0.04
2072	142,899.87	13,391,955.67	615.85	615.80	-0.05
2073	142,930.54	13,391,399.94	616.56	616.57	0.01
2074	142,948.13	13,391,347.62	616.56	616.54	-0.03
2075	142,957.72	13,391,319.24	616.56	616.52	-0.04
2076	143,000.04	13,391,350.58	616.31	616.25	-0.06
2077	143,000.06	13,391,384.77	616.26	616.26	0.01
2078	143,000.15	13,391,399.93	616.23	616.26	0.02
2079	142,999.81	13,391,500.09	616.08	616.10	0.02
2080	143,000.04	13,391,599.85	615.92	615.97	0.04
2081	143,000.04	13,391,699.70	615.77	615.80	0.03
2082	143,000.02	13,391,800.17	615.61	615.67	0.06
2083	143,000.13	13,391,899.75	615.46	615.44	-0.02
2084	142,999.93	13,391,991.02	615.32	615.31	0.00
2085	143,100.01	13,391,419.33	615.73	615.70	-0.03
2086	143,100.10	13,391,454.15	615.68	615.70	0.03
2087	143,100.39	13,391,500.24	615.60	615.61	0.00
2088	143,100.26	13,391,600.02	615.45	615.44	0.00
2089	143,099.94	13,391,699.60	615.29	615.27	-0.03
2090	143,100.51	13,391,799.87	615.14	615.16	0.02
2091	143,100.04	13,391,900.23	614.98	614.99	0.01
2092	143,099.95	13,392,000.11	614.83	614.82	-0.01
2093	143,100.53	13,392,026.08	614.79	614.77	-0.02
2094	143,113.13	13,392,029.60	614.72	614.72	0.00
2095	143,141.63	13,392,034.86	614.58	614.58	0.00
2096	143,121.22	13,391,999.91	614.73	614.78	0.05
2097	143,150.43	13,391,999.62	614.59	614.64	0.05
2098	143,147.75	13,391,900.11	614.76	614.76	0.01
2099	143,176.98	13,391,900.08	614.62	614.60	-0.02
2100	143,203.58	13,391,799.79	614.65	614.72	0.07
2101	143,174.68	13,391,799.95	614.78	614.76	-0.02
2102	143,181.65	13,391,772.98	614.79	614.79	-0.01
2103	143,208.75	13,391,780.41	614.65	614.69	0.04
2104	143,199.87	13,391,700.21	614.82	614.83	0.01
2105	143,205.56	13,391,700.14	614.79	614.76	-0.03
2106	143,235.02	13,391,700.08	614.65	614.69	0.04
2107	143,200.19	13,391,599.94	614.97	615.00	0.03
2108	143,237.94	13,391,599.80	614.79	614.84	0.05
2109	143,267.38	13,391,600.01	614.65	614.64	-0.01
2110	143,200.18	13,391,523.20	615.09	615.10	0.01
2111	143,200.34	13,391,487.79	615.15	615.18	0.03
2112	143,251.50	13,391,558.87	614.79	614.78	-0.01
2113	143,284.56	13,391,547.68	614.65	614.64	-0.01

2015 TOP OF PERIMETER BERM CONSTRUCTION CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	RECORD ELEVATION	DIFFERENCE Ñ
3000	142,308.59	13,391,736.34	618.03	616.06	NOTE 3
3001	142,313.50	13,391,738.19	618.04	615.93	NOTE 3
3002	142,337.85	13,391,653.71	618.04	618.03	-0.01
3003	142,342.79	13,391,654.95	618.05	618.10	0.05
3004	142,371.00	13,391,558.72	618.05	618.03	-0.03
3005	142,375.40	13,391,560.48	618.06	618.00	-0.06
3006	142,403.91	13,391,464.40	618.06	618.04	-0.02
3007	142,408.59	13,391,466.10	618.07	618.05	-0.02
3008	142,436.76	13,391,370.12	618.07	618.01	-0.06
3009	142,441.63	13,391,371.88	618.09	618.07	-0.01
3010	142,469.83	13,391,275.78	618.08	618.13	0.04
3011	142,474.36	13,391,277.30	618.10	618.06	-0.04
3012	142,502.78	13,391,181.30	618.09	618.08	-0.02
3013	142,507.40	13,391,182.87	618.11	618.14	0.03
3014	142,535.76	13,391,086.84	618.10	618.09	-0.01
3015	142,540.48	13,391,088.58	618.12	618.11	-0.01
3016	142,551.96	13,391,040.52	618.11	618.14	0.03
3017	142,554.47	13,391,048.26	618.13	618.11	-0.01
3018	142,598.43	13,391,074.07	618.40	618.36	-0.04
3019	142,595.52	13,391,078.32	618.38	618.35	-0.03
3020	142,679.45	13,391,132.69	618.90	618.86	-0.04
3021	142,676.49	13,391,136.73	618.89	618.90	0.01
3022	142,760.60	13,391,191.39	619.40	619.36	-0.04
3023	142,757.71	13,391,195.26	619.39	619.33	-0.06
3024	142,841.49	13,391,250.33	619.90	619.88	-0.02
3025	142,838.68	13,391,253.78	619.90	619.92	0.02
3026	142,922.24	13,391,308.74	620.40	620.42	0.01
3027	142,919.93	13,391,312.39	620.40	620.43	0.03
3028	142,988.56	13,391,355.76	620.33	620.26	-0.07
3029	142,985.04	13,391,359.95	620.33	620.29	-0.04
3030	143,004.22	13,391,366.57	620.24	620.32	0.08
3031	143,001.55	13,391,370.75	620.24	620.21	-0.03
3032	143,085.94	13,391,423.77	619.74	619.71	-0.03
3033	143,083.50	13,391,427.51	619.74	619.77	0.03
3034	143,168.49	13,391,481.10	619.24	619.23	-0.01
3035	143,165.68	13,391,485.19	619.24	619.21	-0.03
3036	143,250.60	13,391,537.48	618.74	618.67	-0.07
3037	143,247.60	13,391,542.04	618.73	618.67	-0.06
3038	143,270.83	13,391,552.02	618.61	618.60	-0.02
3039	143,265.37	13,391,553.99	618.62	618.61	-0.02
3040	143,247.12	13,391,626.14	618.61	618.57	-0.04
3041	143,242.10	13,391,625.33	618.62	618.65	0.03
3042	143,215.42	13,391,721.45	618.61	618.55	-0.07
3043	143,210.80	13,391,720.38	618.62	618.55	-0.07
3044	143,197.43	13,391,777.41	618.61	618.60	-0.01
3045	143,192.66	13,391,775.68	618.61	618.57	-0.04
3046	143,186.65	13,391,817.36	618.60	618.64	0.04
3047	143,182.40	13,391,815.86	618.60	618.65	0.05
3048	143,160.93	13,391,913.83	618.57	618.58	0.01
3049	143,156.20	13,391,912.65	618.57	618.51	-0.07
3050	143,132.45	13,392,021.50	618.54	618.53	-0.01
3051	143,127.62	13,392,021.09	618.54	618.58	0.03

2015 INVERT OF PERIMETER DITCHES CONSTRUCTION CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	RECORD ELEVATION	DIFFERENCE Ñ
5000	142,528.09	13,391,033.99	609.97	610.02	0.04
5001	142,516.37	13,391,030.63	609.97	609.90	-0.07
5002	142,065.31	13,392,355.59	609.39	609.39	0.00
5003	142,055.25	13,392,348.69	609.39	609.32	-0.07
5004	141,354.29	13,392,964.34	609.01	608.96	-0.05
5005	141,341.34	13,392,955.82	609.03	609.00	-0.03
5006	141,340.69	13,392,968.32	609.02	609.03	0.01
5007	141,786.19	13,393,754.92	609.56	609.34	-0.22
5008	141,774.01	13,393,757.69	609.56	609.22	-0.34
5009	142114.21	13391199.99	609.94	NOTE 1	NOTE 1
5010	142119.43	13391211.30	609.94	NOTE 1	NOTE 1
5011	142158.20	13391187.38	608.99	NOTE 1	NOTE 1
5012	142162.24	13391197.85	609.00	NOTE 1	NOTE 1
5013	142,114.21	13,391,199.99	608.75	608.64	-0.11
5014	142,119.43	13,391,211.30	608.75	608.71	-0.04
5015	142,158.20	13,391,187.38	608.77	608.74	-0.03
5016	142,162.24	13,391,197.85	608.77	608.71	-0.06
5017	142,260.09	13,391,142.74	608.83	608.90	0.07
5018	142,266.52	13,391,152.11	608.83	608.85	0.02
5019	142,330.63	13,391,100.34	608.87	608.92	0.05
5020	142,337.70	13,391,110.02	608.87	608.82	-0.05
5021	142,386.88	13,391,041.66	608.92	608.96	0.04
5022	142,394.20	13,391,051.05	608.92	608.92	0.00
5023	142,483.71	13,390,981.71	608.97	608.89	-0.08
5024	142,487.02	13,390,993.74	608.97	608.99	0.02
5025	142,539.34	13,390,982.85	609.00	608.90	-0.10
5026	142,535.31	13,390,994.56	609.00	608.92	-0.08
5027	142,975.31	13,391,290.26	609.27	609.16	-0.12
5028	142,968.45	13,391,299.77	609.27	609.25	-0.02
5029	143,313.08	13,391,538.42	609.49	609.49	0.00
5030	143,301.38	13,391,541.89	609.49	609.48	-0.01
5031	143,234.85	13,391,788.22	609.62	609.72	0.10
5032	143,223.54	13,391,785.10	609.62	609.63	0.01
5033	143,167.09	13,392,041.63	609.75	609.74	-0.01
5034	143,155.51	13,392,038.79	609.75	609.76	0.00
5035	143,123.05	13,392,297.54	609.89	609.85	-0.03
5036	143,111.39	13,392,296.86	609.89	609.92	0.04
5037	143,053.12	13,393,005.83	610.25	610.31	0.06
5038	143,064.82	13,393,008.32	610.25	610.21	-0.04
5039	142,910.78	13,393,477.61	610.50	610.56	0.06
5040	142,899.46	13,393,473.95	610.50	610.51	0.01
5041	142,810.10	13,393,786.45	610.23	610.25	0.02
5042	142,800.61	13,393,778.64	610.23	610.28	0.04
5043	142,480.62	13,394,129.44	609.83	609.90	0.07
5044	142,468.52	13,394,124.36	609.83	609.80	-0.03
5045	142,477.85	13,394,433.32	609.58	609.63	0.05
5046	142,470.19	13,394,425.92	609.58	609.57	-0.01
5047	142,126.63	13,394,445.26	609.28	609.36	0.08
5048	142,126.74	13,394,433.88	609.28	609.23	-0.05
5049	141,790.96	13,394,441.55	609.00	608.29	-0.71
5050	141,790.17	13,394,429.43	609.00	608.66	-0.34
5051	141,666.42	13,394,379.20	608.88	608.58	-0.31
5052	141,669.74	13,394,368.25	608.88	608.72	-0.16
5053	141,583.43	13,394,371.60	608.81	NOTE 1	NOTE 1
5054	141,582.46	13,394,359.47	608.81	NOTE 1	NOTE 1
5055	141,498.27	13,394,393.22	608.74	NOTE 1	NOTE 1
5056	141,495.32	13,394,381.59	608.74	NOTE 1	NOTE 1

NOTE(S)

1. CERTAIN SWALE SURVEY POINTS WERE BEING OBTAINED AS OF THE WRITING OF THIS REPORT.
2. POINT 1013 SURVEYED BY EAGLE EXCAVATING USING A GPS SYSTEM, FOUND TO BE WITHIN TOLERANCE, HOWEVER NOT RECORDED; DESIGN SUBGRADE ELEVATION USED.
3. BERM CONSTRUCTION TERMINATED SHORT OF DESIGN, THEREFORE POINTS 3000 AND 3001 ARE LOWER THAN DESIGN ELEVATION.
4. SUBGRADE ELEVATIONS LOWER THAN 0.10 FEET BELOW GRADE WERE CONSIDERED ACCEPTABLE DUE TO THE BACKFILLING OF GRANULAR SOILS WITHIN THE PORE WATER RELIEF LAYER.

RECORD DRAWING

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-09-10
PREPARED	JJS
DESIGN	JJS
REVIEW	JJS
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2015 PHASE 1 RECORD DRAWINGS

TITLE
CONSTRUCTION CONTROL / QA/QC POINTS/

PROJECT No. 1521809B | CONTROL | Rev. | FIGURE 7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

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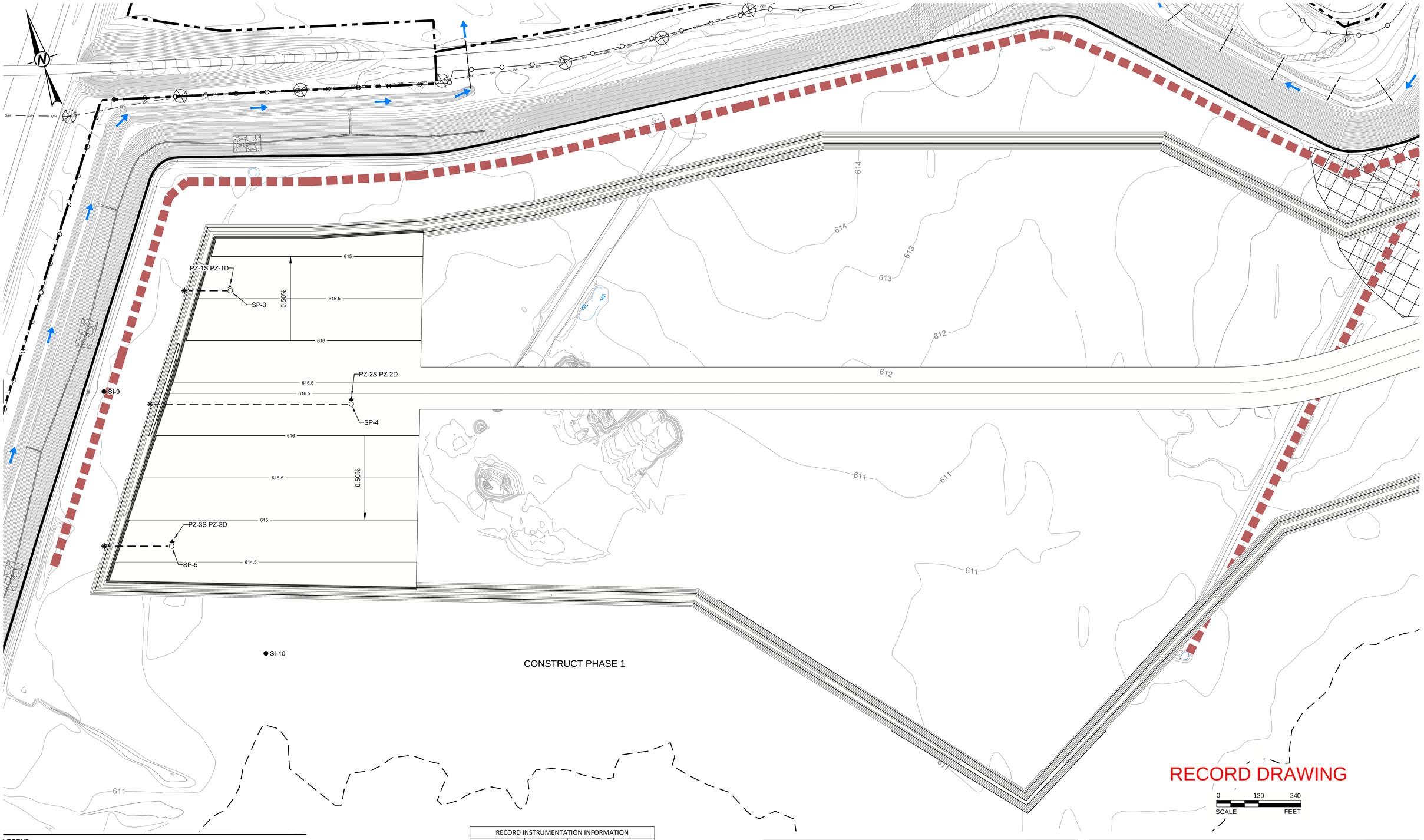

LEGEND

● SI-1	SLOPE INCLINOMETER
▲ PZ-1D PZ-1S	VIBRATING WIRE PIEZOMETER (VWP) PAIR (DEEP & SHALLOW)
○ SP-1	SETTLEMENT PLATE
✱	REMOTE (CABLED) DATA LOGGER LOCATION FOR VWP
– – – –	DATA LOGGER CABLE

RECORD INSTRUMENTATION INFORMATION

INSTRUMENT IDENTIFICATION	NORTHING	EASTING	ELEVATION
PZ-1S PZ-1D	143,132.58	13,391,553.77	614.71
PZ-2S PZ-2D	142,791.36	13,391,744.99	615.92
PZ-3S PZ-3D	142,601.23	13,391,236.06	614.26
SI-10	142,280.24	13,391,364.86	612.45
SI-9	142,989.72	13,391,192.71	611.28
SP-3	143,124.35	13,391,551.76	615.34
SP-4	142,779.81	13,391,741.28	616.31
SP-5	142,591.55	13,391,231.59	614.76

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-09-10
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DESIGN	JJS
REVIEW	JJS
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2015 PHASE 1 RECORD DRAWINGS

TITLE
RECORD MONITORING LOCATIONS FOR PHASE 1

PROJECT No.	CONTROL	Rev.	FIGURE
1521809B			8

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

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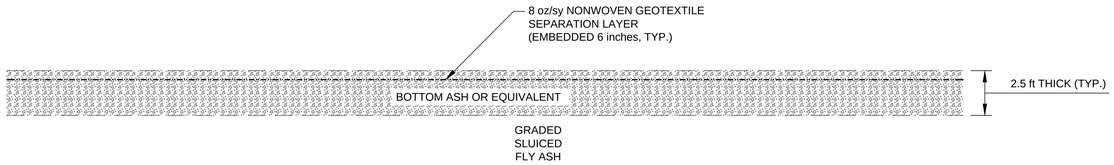
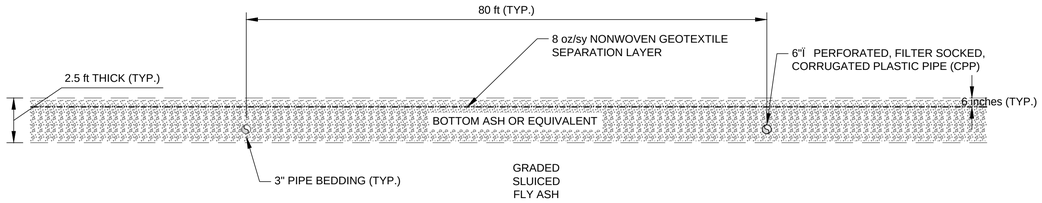
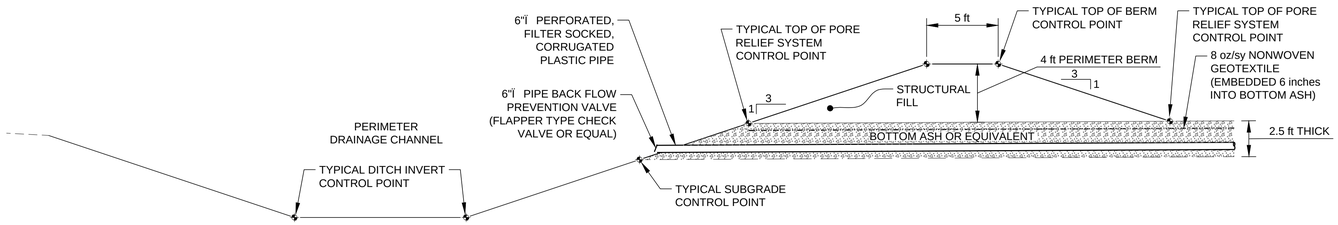


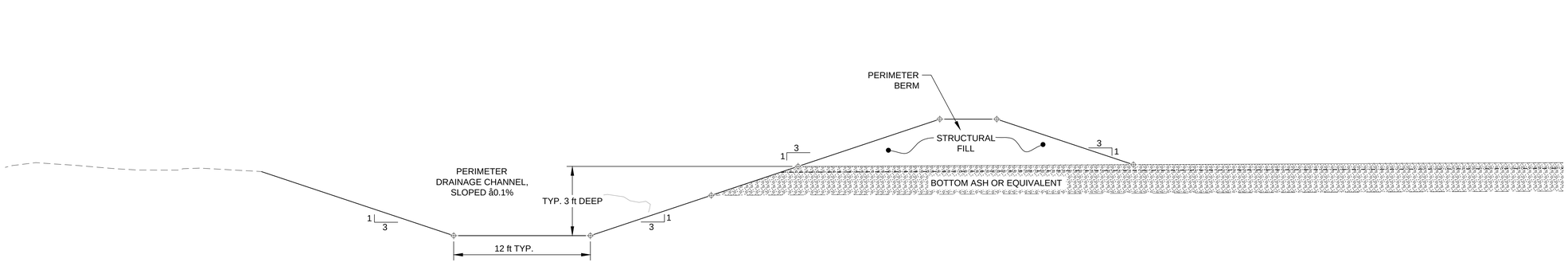
1 9 PORE RELIEF SYSTEM BASE LINER



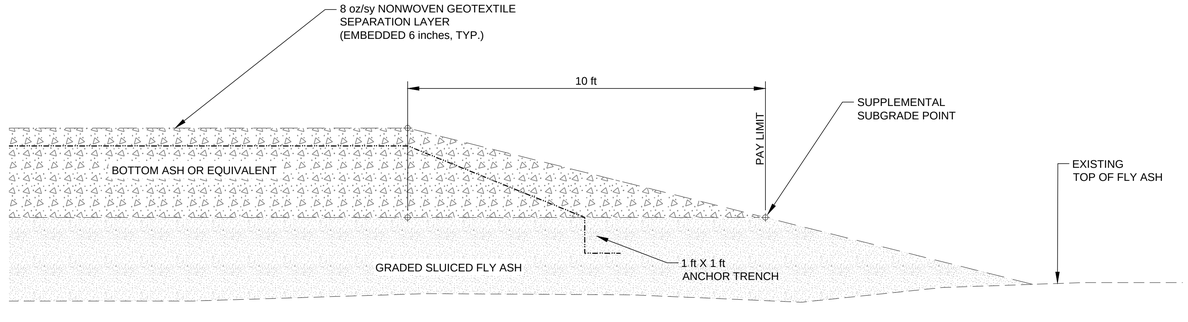
2 9 PORE RELIEF SYSTEM BASE LINER w/PIPES



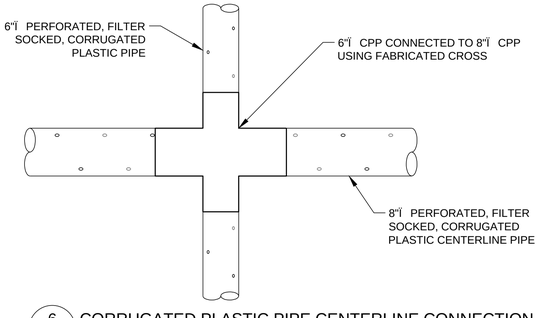
3 9 PERIMETER BERM WITH NORTH-SOUTH PORE RELIEF PIPING SHOWN



4 9 PERIMETER BERM WITHOUT PIPING



5 9 TYPICAL LEADING EDGE DETAIL



6 9 CORRUGATED PLASTIC PIPE CENTERLINE CONNECTION

RECORD DRAWING

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-09-10
PREPARED	JJS
DESIGN	JJS
REVIEW	JJS
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2015 PHASE 1 RECORD DRAWINGS

TITLE
GENERAL DETAILS
SHEET 1

PROJECT No. 1521809B | CONTROL | Rev. | FIGURE 9

0 1 in
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

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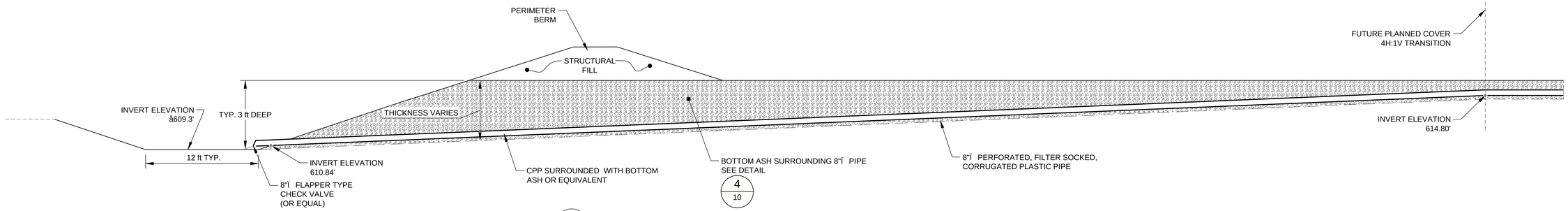
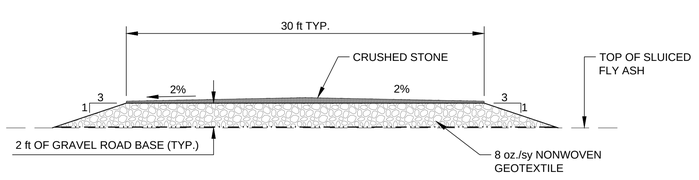
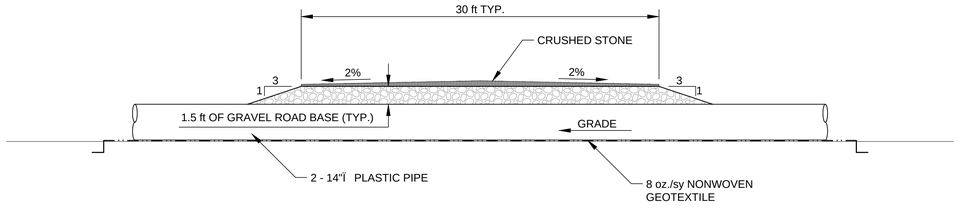


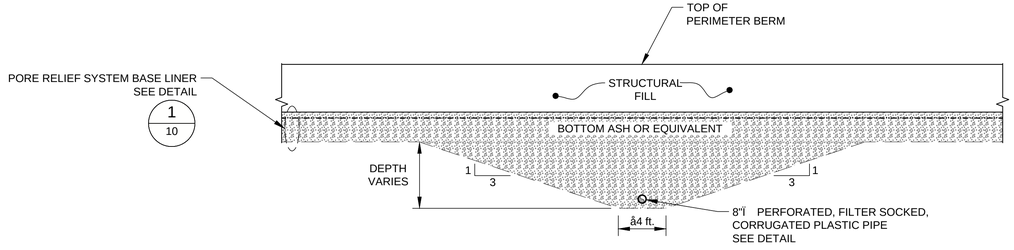
1 10 PERIMETER BERM WITH WESTERN CENTRAL PORE PRESSURE RELIEF PIPE SHOWN



2 10 TYPICAL NEW ROAD SECTION



3 10 TEMPORARY ACCESS ROAD RAMP AND CULVERT DETAIL



4 10 8"ï PIPE TRENCH PAST 4H:1V SLOPE

RECORD DRAWING

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

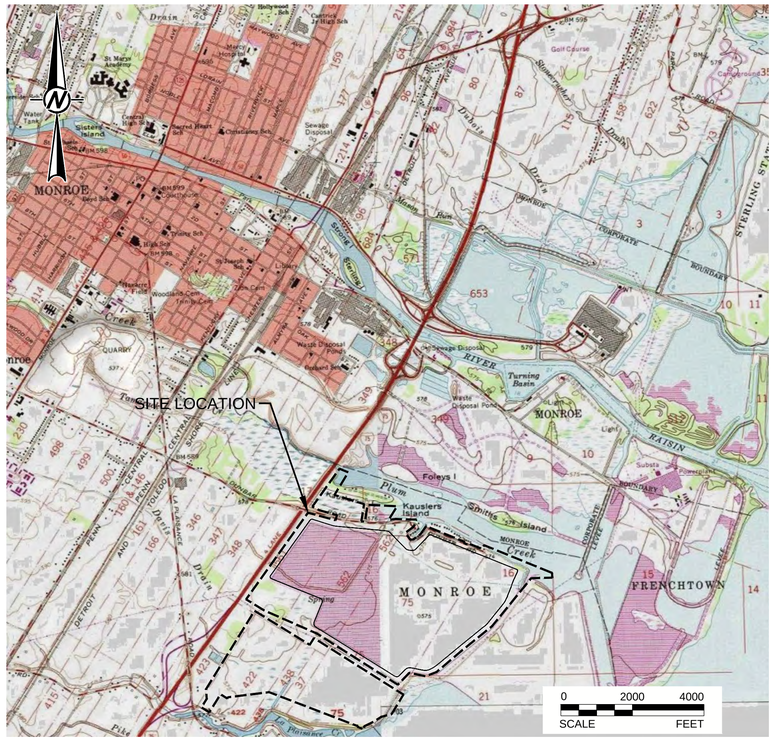
YYYY-MM-DD	2015-09-10
PREPARED	JJS
DESIGN	JJS
REVIEW	JJS
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2015 PHASE 1 RECORD DRAWINGS

TITLE
GENERAL DETAILS
SHEET 2

PROJECT No. 1521809B | CONTROL | Rev. | FIGURE 10

DTE ENERGY
MONROE FLY ASH BASIN
2017 PHASE 2 RECORD DRAWINGS



Prepared for:

DTE ENERGY
One Energy Plaza
Detroit, MI 48226

Prepared by:

Golder Associates Inc.
15851 S. US 27 Suite 50
Lansing, Michigan USA 48906

INDEX OF DRAWINGS

Sheet Number	Drawing Title	Current Revision	Date
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2	Legend, References and General Notes	0	11/20/2017
3	Site Plan	0	11/20/2017
4	Record Top of Subgrade Plan	0	11/20/2017
5	Record Pore Water Relief Piping Plan	0	11/20/2017
6	Record Pore Water Relief System Plan	0	11/20/2017
7	Record Top of Berm Plan	0	11/20/2017
8	Record Top of Subgrade Construction Control / QA/QC Points	0	11/20/2017
9	Record Pore Water Relief System Construction Control / QA/QC Points	0	11/20/2017
10	Record Monitoring Locations for Phase 2	0	11/20/2017
11	General Details - Sheet 1	0	11/20/2017
12	General Details - Sheet 2	0	11/20/2017

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
DESIGN	JJS
REVIEW	SEF
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
TITLE SHEET

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA001.dwg	0	1

LEGEND

- PROPERTY BOUNDARY
- ASH BASIN EXISTING TOPOGRAPHY (1' AND 5' CONTOURS)
- WATER BOUNDARY
- FENCE LINE
- ELECTRIC TOWER
- ELECTRIC POLE
- UNDERGROUND ELECTRIC LINE
- CONSUMERS ENERGY ELECTRIC LINE
- ITC ELECTRIC LINE
- RIGHT OF WAY
- DRAINAGE DIRECTION
- SAMPLE LOCATION
- DECOMMISSIONED SLURRY PIPELINES
- ACTIVE SLURRY PIPELINES
- WETLAND
- STRUCTURE (RESIDENCE, BUSINESS)
- CULVERT
- BENCHMARK LOCATION
- WATER LINE
- VEHICLE CROSSING
- PROPOSED DRAINAGE CHANNEL
- PROPOSED PERFORATED, FILTER SOCKED, CORRUGATED PLASTIC PIPE (6" OR 8"Ø)
- AREA OF CLAY COVER
- AREA OF FILL TICK MARK
- AREA OF CUT TICK MARK
- CONTROL POINT
- CULVERT

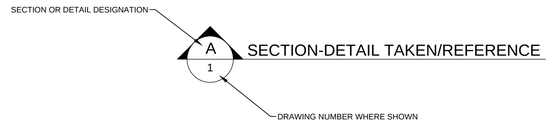
MATERIALS LEGEND

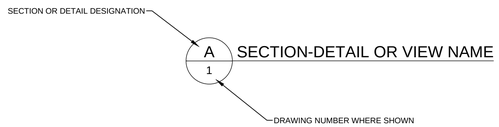
- SLUICED FLY ASH
- BOTTOM ASH OR EQUIVALENT
- 8 oz/sy GEOTEXTILE
- LOW PERMEABILITY SOILS COVER MATERIAL
- STRUCTURAL FILL
- TOPSOIL

GENERAL NOTES

1. EXISTING TOPOGRAPHY IS AN AMALGAM OF GRADES FROM 2009 BASE MAP (DRAWING 6SE-0695-070-REVB) AND AS-BUILT GRADES FROM MITIGATED SECTIONS OF THE EMBANKMENT, PROVIDED BY DTE, DRAWING CREATED BY GEOSYNTEC CONSULTANTS, DATED 02/08/2013.
2. HORIZONTAL GRID COORDINATE SYSTEM UNITS ARE IN FEET AND REFERENCED TO MICHIGAN SOUTH STATE PLANE COORDINATES SYSTEM (NAD83). ELEVATIONS ARE IN FEET AND REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM (NGVD29). NGVD29 DATUM IS 1.47 FT HIGHER THAN THE PLANT DATUM.
3. AREA OF CLAY COVER ADAPTED FROM "ATTACHMENT A" OF THE DTE ELECTRIC COMPANY SOLID WASTE OPERATING LICENSE APPLICATION, DATED DECEMBER 3, 2014.
4. PHASE I AND PERIMETER DRAINAGE SYSTEM WAS CONSTRUCTED, CERTIFIED AND APPROVED BY MDEQ IN 2015.

SECTION, DETAIL AND VIEW DESIGNATIONS





CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
DESIGN	JJS
REVIEW	SEF
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
LEGEND, REFERENCES AND GENERAL NOTES

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA002.dwg	0	2

PLUM CREEK

E. DUNBAR ROAD

FOLEYS ISLAND

KAUSLERS ISLAND

PLUM CREEK

RIVER RAISIN

DTE ENERGY
MONROE
POWER PLANT

E. DUNBAR ROAD

SITE ENTRANCE

NAVARRE
DRAIN

LA PLAISANCE ROAD

PHASE 1
(EXISTING)

PHASE 2
CONSTRUCTION LIMITS

BENCH MARK No. 1
Elev. 589.44 (NVGD 1929)
N 142,304.52
E 13,396,979.44

STOCKPILE/LAYDOWN
AREAS AND OFFICE

PLUM CREEK

OPEN WATER
(El. 610.5')

BENCH MARK No. 2
Elev. 589.55 (NVGD 1929)
N 140,813.97
E 13,390,783.47

EXISTING SOIL
STOCKPILES

FARM LAND

N. LA PLAISANCE ROAD

LA PLAISANCE BAY

LA PLAISANCE CREEK

0 500 1000
SCALE FEET

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT

Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
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REVIEW	SEF
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
SITE PLAN

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA003.dwg	0	3

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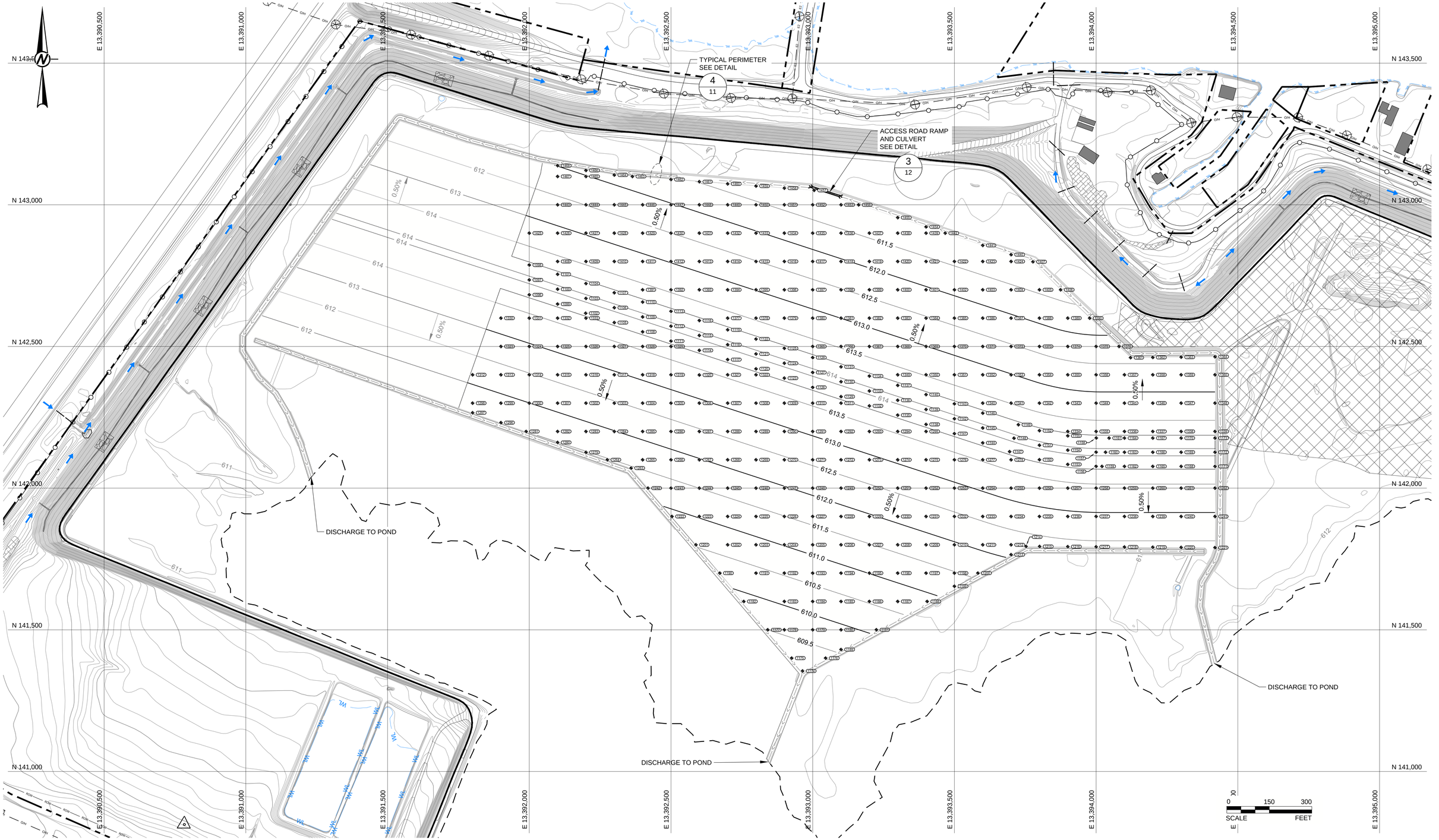
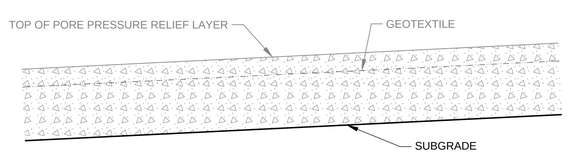


NOTE(S)

1. ABANDONED PIPING WITHIN LIMITS OF SUBGRADE WAS REMOVED.
2. CLAY COVER WITHIN LIMITS OF SUBGRADE WAS REMOVED.



LAYER PROFILE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
DESIGN	JJS
REVIEW	SEF
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
RECORD TOP OF SUBGRADE PLAN

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA004.dwg	0	4

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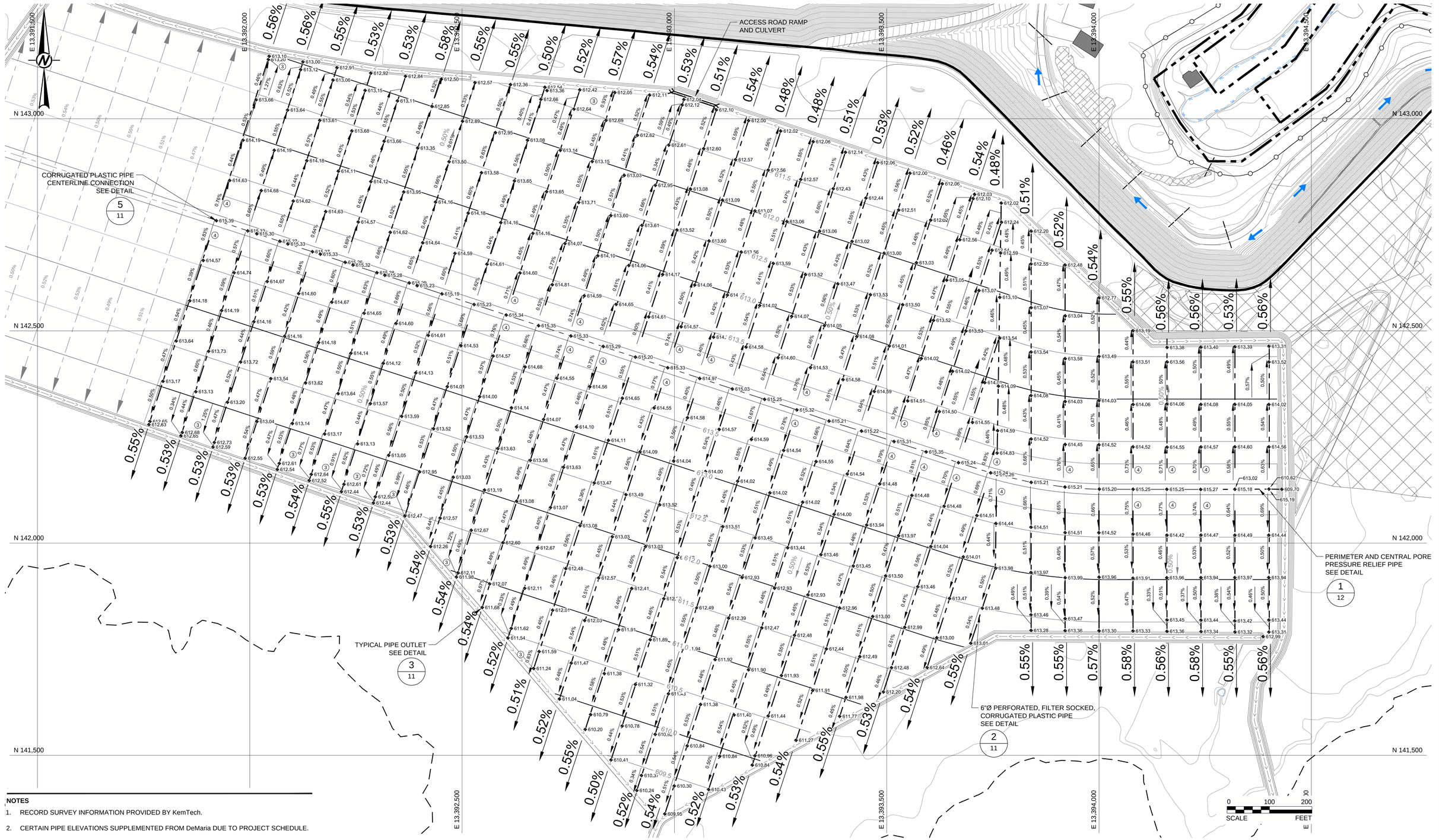
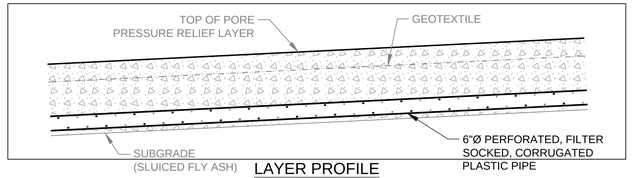


NOTES

1. RECORD SURVEY INFORMATION PROVIDED BY KemTech.
2. CERTAIN PIPE ELEVATIONS SUPPLEMENTED FROM DeMaria DUE TO PROJECT SCHEDULE.
3. SMALL SEGMENTS OF PIPING NEAREST TO THE PERIMETER DITCH ALLOWED TO REMAIN SLIGHTLY STEEPER THAN DESIGN TO PROMOTE DRAINAGE AND DUE TO SMALL ELEVATION CHANGE TO NEXT UPSLOPE MEASUREMENT.
4. INCREMENTAL SLOPE ON FIRST SEGMENT OFF OF CENTERLINE INCLUDES ADJUSTMENT FROM 8-inch TO 6-inch PIPE DIAMETER. INCREMENTAL SLOPE FROM CENTERLINE (8_inch PIPE) TO LATERAL (6-inch PIPE) INCLUDES DIAMETER CHANGE. ACCORDINGLY, SOME SEGMENTS WERE ALLOWED TO REMAIN SLIGHTLY STEEPER THAN DESIGN.

LEGEND

- ■614.96 AS BUILT 6" PIPE ELEVATION
- ■614.96 AS BUILT 8" PIPE ELEVATION



LAYER PROFILE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
DESIGN	JJS
REVIEW	SEF
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
RECORD PORE WATER RELIEF PIPING PLAN

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA004.dwg	0	5

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

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E 13,390,500 E 13,391,000 E 13,391,500 E 13,392,000 E 13,392,500 E 13,393,000 E 13,393,500 E 13,394,000 E 13,394,500 E 13,395,000

N 143,500 N 143,000 N 142,500 N 142,000 N 141,500 N 141,000

ACCESS ROAD RAMP AND CULVERT SEE DETAIL

3
12

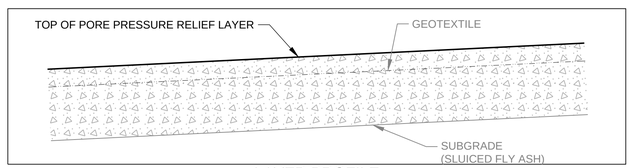
SEE DETAILS

1
11
&
2
11

615.0 615.5 616.0 616.5 614.0 614.5 613.5 613.0 612.5 612.0 611 612

0.50%

0 150 300
SCALE FEET



LAYER PROFILE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
DESIGN	JJS
REVIEW	SEF
APPROVED	DML

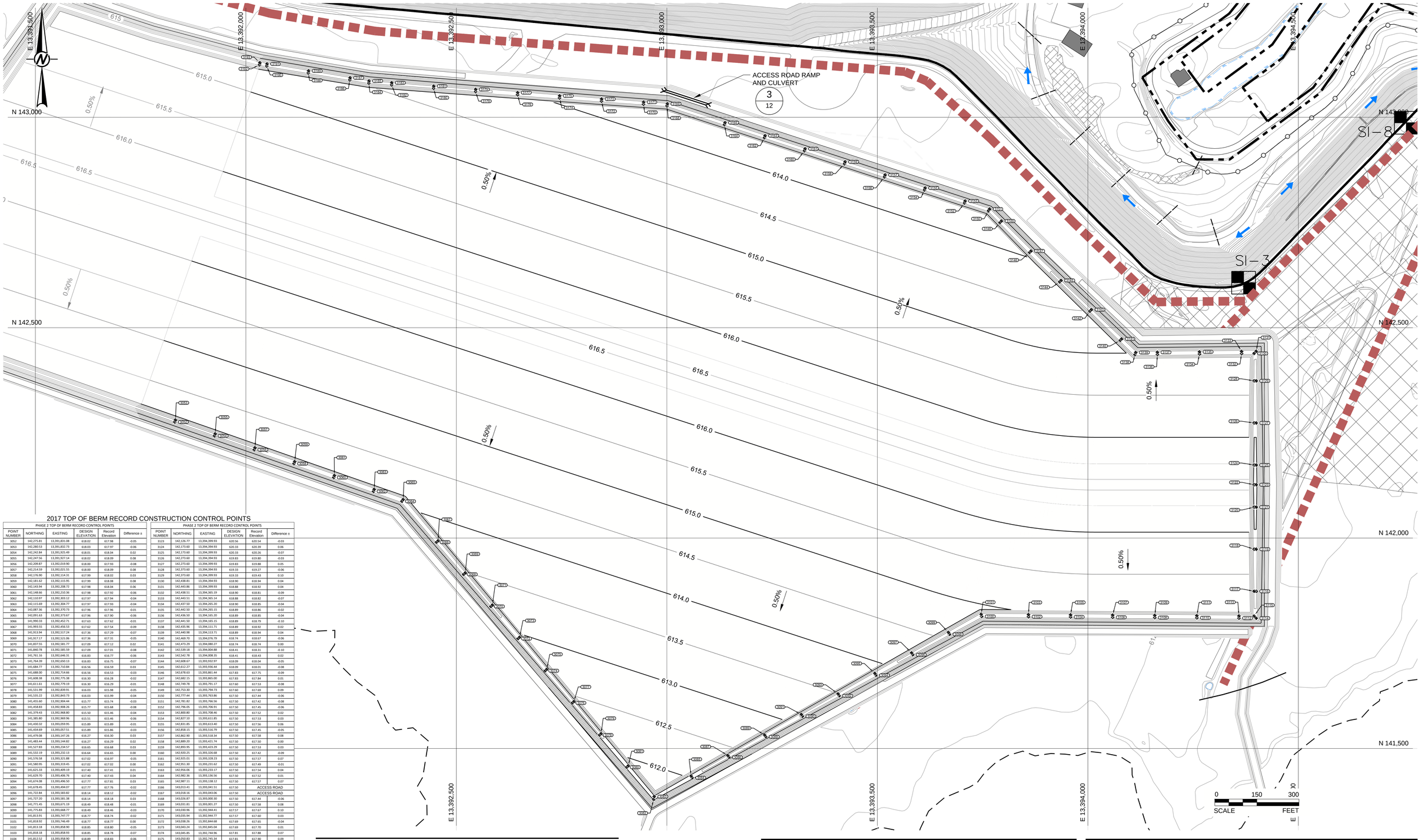
PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
RECORD PORE WATER RELIEF SYSTEM PLAN

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA004.dwg	0	6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

Path: \\langing\cad\Projects\15x-Projects\1521809D_DTE Monroe 2016\PRODUCTION\A-PHASE 2 AS-BUILTs | File Name: 1521809DA004.dwg



2017 TOP OF BERM RECORD CONSTRUCTION CONTROL POINTS

PHASE 2 TOP OF BERM RECORD CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	Record Elevation	Difference ±
3052	142,275.81	13,391,831.08	618.02	617.98	-0.05
3053	142,280.53	13,391,832.73	618.03	617.97	-0.06
3054	142,242.84	13,391,925.49	618.01	618.04	0.02
3055	142,247.56	13,391,927.14	618.02	618.09	0.08
3056	142,209.87	13,392,019.90	618.00	617.93	-0.08
3057	142,214.59	13,392,021.55	618.00	618.09	0.08
3058	142,176.90	13,392,114.31	617.99	618.02	0.03
3059	142,181.62	13,392,115.95	617.99	618.08	0.08
3060	142,143.94	13,392,208.72	617.98	618.04	0.06
3061	142,148.66	13,392,210.36	617.98	617.92	-0.06
3062	142,110.97	13,392,303.12	617.96	617.94	-0.04
3063	142,115.69	13,392,304.77	617.97	617.93	-0.04
3064	142,087.36	13,392,370.73	617.96	617.96	-0.01
3065	142,091.63	13,392,373.67	617.96	617.90	-0.06
3066	141,990.33	13,392,452.71	617.63	617.62	-0.01
3067	141,993.55	13,392,456.53	617.62	617.54	-0.09
3068	141,913.94	13,392,517.24	617.36	617.29	-0.07
3069	141,917.17	13,392,521.06	617.36	617.31	-0.05
3070	141,837.55	13,392,581.77	617.09	617.12	0.02
3071	141,840.78	13,392,585.59	617.09	617.01	-0.08
3072	141,761.16	13,392,646.31	616.83	616.77	-0.06
3073	141,764.39	13,392,650.13	616.83	616.75	-0.07
3074	141,684.77	13,392,710.84	616.56	616.59	0.03
3075	141,688.00	13,392,714.66	616.56	616.53	-0.03
3076	141,608.38	13,392,775.38	616.30	616.28	-0.02
3077	141,611.61	13,392,779.19	616.30	616.29	-0.01
3078	141,531.99	13,392,839.91	616.03	615.98	-0.05
3079	141,535.22	13,392,843.73	616.03	615.99	-0.04
3080	141,455.60	13,392,904.44	615.77	615.74	-0.03
3081	141,458.83	13,392,908.26	615.77	615.68	-0.08
3082	141,379.43	13,392,968.80	615.50	615.46	-0.04
3083	141,385.80	13,392,969.96	615.51	615.46	-0.06
3084	141,430.32	13,393,059.95	615.89	615.89	-0.01
3085	141,434.69	13,393,057.51	615.89	615.86	-0.03
3086	141,479.08	13,393,147.26	616.27	616.30	0.03
3087	141,483.44	13,393,144.82	616.27	616.29	0.02
3088	141,527.83	13,393,234.57	616.65	616.68	0.03
3089	141,532.19	13,393,232.13	616.64	616.65	0.00
3090	141,576.58	13,393,321.88	617.02	616.97	-0.05
3091	141,580.95	13,393,319.45	617.02	617.02	0.00
3092	141,625.33	13,393,409.19	617.40	617.41	0.01
3093	141,629.70	13,393,406.76	617.40	617.43	0.04
3094	141,674.08	13,393,496.50	617.77	617.81	0.03
3095	141,678.45	13,393,494.07	617.77	617.76	-0.02
3096	141,722.84	13,393,583.82	618.14	618.12	-0.02
3097	141,727.20	13,393,581.38	618.14	618.18	0.03
3098	141,771.45	13,393,671.19	618.49	618.48	-0.01
3099	141,775.83	13,393,668.77	618.49	618.46	-0.03
3100	141,813.91	13,393,747.77	618.77	618.74	-0.02
3101	141,818.92	13,393,746.49	618.77	618.77	0.00
3102	141,813.18	13,393,858.90	618.85	618.80	-0.05
3103	141,818.18	13,393,858.93	618.85	618.78	-0.07
3104	141,812.52	13,393,958.90	618.89	618.83	-0.06
3105	141,817.52	13,393,958.93	618.89	618.85	-0.04
3106	141,811.86	13,394,058.89	618.89	618.84	-0.05
3107	141,816.86	13,394,058.93	618.89	618.85	-0.04
3108	141,811.20	13,394,158.89	618.89	618.86	-0.03
3109	141,816.20	13,394,158.92	618.89	618.83	-0.06
3110	141,810.54	13,394,258.89	618.88	618.79	-0.09
3111	141,815.54	13,394,258.92	618.88	618.81	-0.07
3112	141,809.88	13,394,358.89	618.88	618.85	-0.03
3113	141,814.88	13,394,358.92	618.89	618.85	-0.04
3114	141,809.61	13,394,399.93	618.88	618.81	-0.07
3115	141,814.64	13,394,394.93	618.91	618.81	-0.09
3116	141,873.60	13,394,399.93	619.22	619.16	-0.06
3117	141,873.60	13,394,394.93	619.22	619.16	-0.06
3118	141,973.60	13,394,394.93	619.75	619.71	-0.04
3119	141,973.60	13,394,399.93	619.75	619.69	-0.06
3120	142,073.60	13,394,394.93	620.28	620.23	-0.05
3121	142,073.60	13,394,399.93	620.28	620.34	0.06
3122	142,126.77	13,394,394.93	620.56	620.51	-0.05

PHASE 2 TOP OF BERM RECORD CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	Record Elevation	Difference ±
3123	142,126.77	13,394,399.93	620.56	620.54	-0.03
3124	142,173.60	13,394,394.93	620.33	620.39	0.06
3125	142,173.60	13,394,399.93	620.33	620.26	-0.07
3126	142,273.60	13,394,394.93	619.83	619.80	-0.03
3127	142,273.60	13,394,399.93	619.83	619.88	0.05
3128	142,373.60	13,394,394.93	619.33	619.27	-0.06
3129	142,373.60	13,394,399.93	619.33	619.43	0.10
3130	142,438.81	13,394,394.93	618.90	618.94	0.04
3131	142,443.86	13,394,399.93	618.88	618.92	0.04
3132	142,438.53	13,394,365.19	618.90	618.81	-0.09
3133	142,443.51	13,394,365.14	618.88	618.82	-0.07
3134	142,437.50	13,394,265.20	618.90	618.85	-0.04
3135	142,442.50	13,394,265.15	618.89	618.86	-0.02
3136	142,436.50	13,394,165.20	618.89	618.85	-0.04
3137	142,441.50	13,394,165.15	618.89	618.79	-0.10
3138	142,435.96	13,394,111.71	618.89	618.92	0.02
3139	142,440.98	13,394,113.71	618.89	618.94	0.04
3140	142,469.70	13,394,076.79	618.74	618.67	-0.06
3141	142,473.29	13,394,080.37	618.74	618.74	0.00
3142	142,539.18	13,394,004.88	618.41	618.31	-0.10
3143	142,542.78	13,394,008.35	618.41	618.43	0.02
3144	142,608.67	13,393,932.97	618.09	618.04	-0.05
3145	142,612.27	13,393,936.44	618.09	618.01	-0.08
3146	142,678.63	13,393,861.44	617.83	617.75	-0.09
3147	142,682.15	13,393,865.00	617.83	617.84	0.01
3148	142,749.78	13,393,791.17	617.60	617.53	-0.08
3149	142,753.30	13,393,794.73	617.60	617.69	0.09
3150	142,777.44	13,393,763.86	617.50	617.44	-0.06
3151	142,781.82	13,393,766.56	617.50	617.42	-0.08
3152	142,796.05	13,393,706.91	617.50	617.45	-0.06
3153	142,800.80	13,393,708.46	617.50	617.52	0.02
3154	142,827.10	13,393,611.85	617.50	617.53	0.03
3155	142,831.85	13,393,613.40	617.50	617.56	0.06
3156	142,858.15	13,393,516.79	617.50	617.45	-0.05
3157	142,862.90	13,393,518.34	617.50	617.58	0.08
3158	142,889.20	13,393,421.74	617.50	617.50	0.00
3159	142,893.95	13,393,423.29	617.50	617.53	0.03
3160	142,920.25	13,393,326.68	617.50	617.42	-0.09
3161	142,925.01	13,393,328.23	617.50	617.57	0.07
3162	142,951.30	13,393,231.62	617.50	617.48	-0.01
3163	142,956.06	13,393,233.17	617.50	617.54	0.04
3164	142,982.36	13,393,136.56	617.50	617.52	0.01
3165	142,987.11	13,393,138.12	617.50	617.57	0.07
3166	143,013.41	13,393,041.51	617.50	ACCESS ROAD	
3167	143,018.16	13,393,043.06	617.50	ACCESS ROAD	
3168	143,026.87	13,393,000.30	617.50	617.44	-0.06
3169	143,031.83	13,393,001.27	617.50	617.58	0.08
3170	143,030.96	13,392,944.41	617.57	617.67	0.10
3171	143,035.94	13,392,944.77	617.57	617.60	0.03
3172	143,038.26	13,392,844.68	617.69	617.65	-0.04
3173	143,043.24	13,392,845.04	617.69	617.70	0.01
3174	143,045.85	13,392,744.96	617.81	617.88	0.07
3175	143,050.83	13,392,745.34	617.81	617.90	0.09
3176	143,053.47	13,392,645.25	617.93	617.90	-0.03
3177	143,058.46	13,392,645.63	617.93	617.84	-0.09
3178	143,061.09	13,392,545.54	618.05	618.12	0.07
3179	143,066.08	13,392,545.92	618.05	618.09	0.04
3180	143,068.91	13,392,445.84	618.16	618.10	-0.07
3181	143,073.89	13,392,446.23	618.16	618.18	0.01
3182	143,076.83	13,392,346.15	618.28	618.19	-0.09
3183	143,081.82	13,392,346.55	618.28	618.28	-0.01
3184	143,081.15	13,392,291.94	618.34	618.34	-0.01
3185	143,086.11	13,392,292.55	618.34	618.39	0.05
3186	143,088.71	13,392,246.73	618.38	618.37	-0.01
3187	143,093.64	13,392,247.56	618.38	618.40	0.03
3188	143,105.20	13,392,148.10	618.45	618.42	-0.04
3189	143,110.13	13,392,148.93	618.45	618.38	-0.08
3190	143,121.70	13,392,049.47	618.53	618.52	-0.01
3191	143,126.63	13,392,050.30	618.53	618.58	0.05
3192	143,124.58	13,392,032.20	618.54	618.62	0.08
3193	143,129.48	13,392,033.26	618.54	618.49	-0.05

NOTE(S)

1. CONTOURS SHOWN REPRESENT DESIGN GRADES.

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
DESIGN	JJS
REVIEW	SEF
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
RECORD TOP OF BERM PLAN

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA004.dwg	0	7

Path: \\ansing\cad\Projects\15x-Projects\1521809D_DTE Monroe 2016\PRODUCT\ON\A-PHASE 2 AS-BUILT\ | File Name: 1521809DA004.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

PHASE 2 TOP OF SUBGRADE RECORD CONTROL POINTS					
POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	Record Elevation	Difference ±
1096	142,682.28	13,392,000.00	613.81	613.83	0.01
1097	142,734.88	13,392,000.00	614.06	614.02	-0.05
1098	142,787.48	13,392,000.00	613.81	613.87	0.05
1099	142,649.61	13,392,100.00	613.81	613.87	0.05
1100	142,702.21	13,392,100.00	614.06	614.13	0.07
1101	142,754.81	13,392,100.00	613.81	613.86	0.05
1102	142,617.27	13,392,199.01	613.81	613.79	-0.03
1103	142,669.54	13,392,200.00	614.06	614.15	0.09
1104	142,722.14	13,392,200.00	613.81	613.86	0.05
1105	142,584.28	13,392,300.00	613.81	613.85	0.04
1106	142,636.88	13,392,300.00	614.06	614.03	-0.03
1107	142,689.48	13,392,300.00	613.81	613.74	-0.07
1108	142,551.61	13,392,400.00	613.81	613.81	-0.01
1109	142,604.21	13,392,400.00	614.06	614.10	0.04
1110	142,656.81	13,392,400.00	613.81	613.84	0.03
1111	142,518.95	13,392,500.00	613.81	613.86	0.04
1112	142,571.55	13,392,500.00	614.06	614.09	0.03
1113	142,624.15	13,392,500.00	613.81	613.83	0.02
1114	142,486.28	13,392,600.00	613.81	613.84	0.03
1115	142,538.88	13,392,600.00	614.06	614.14	0.07
1116	142,591.48	13,392,600.00	613.81	613.76	-0.06
1117	142,453.61	13,392,700.00	613.81	613.87	0.05
1118	142,506.21	13,392,700.00	614.06	614.10	0.04
1119	142,558.81	13,392,700.00	613.81	613.78	-0.03
1120	142,420.95	13,392,800.00	613.81	613.78	-0.03
1121	142,473.55	13,392,800.00	614.06	614.04	-0.02
1122	142,526.15	13,392,800.00	613.81	613.81	0.00
1123	142,388.28	13,392,900.00	613.81	613.83	0.01
1124	142,440.88	13,392,900.00	614.06	614.11	0.04
1125	142,493.48	13,392,900.00	613.81	613.89	0.08
1126	142,355.62	13,393,000.00	613.81	613.78	-0.03
1127	142,408.22	13,393,000.00	614.06	614.06	-0.01
1128	142,460.82	13,393,000.00	613.81	613.85	0.04
1129	142,322.95	13,393,100.00	613.81	613.83	0.02
1130	142,375.55	13,393,100.00	614.06	614.04	-0.02
1131	142,428.15	13,393,100.00	613.81	613.79	-0.02
1132	142,290.28	13,393,200.00	613.81	613.80	-0.01
1133	142,342.88	13,393,200.00	614.06	614.10	0.04
1134	142,395.48	13,393,200.00	613.81	613.79	-0.03
1135	142,257.62	13,393,300.00	613.81	613.85	0.04
1136	142,310.22	13,393,300.00	614.06	614.11	0.04
1137	142,362.82	13,393,300.00	613.81	613.79	-0.03
1138	142,224.95	13,393,400.00	613.81	613.81	0.00
1139	142,277.55	13,393,400.00	614.06	614.06	-0.01
1140	142,330.15	13,393,400.00	613.81	613.83	0.02
1141	142,192.29	13,393,500.00	613.81	613.85	0.04
1142	142,244.89	13,393,500.00	614.06	614.11	0.05
1143	142,297.49	13,393,500.00	613.81	613.84	0.03
1144	142,159.62	13,393,600.00	613.81	613.80	-0.01
1145	142,212.22	13,393,600.00	614.06	613.47	-0.60
1146	142,264.82	13,393,600.00	613.81	613.77	-0.04
1147	142,128.66	13,393,694.79	613.81	613.80	-0.01
1148	142,176.20	13,393,710.27	614.06	614.16	0.10
1149	142,223.74	13,393,725.76	613.81	613.81	0.00
1150	142,100.25	13,393,800.00	613.81	613.85	0.04
1151	142,151.45	13,393,800.00	614.06	613.97	-0.09
1152	142,202.79	13,393,800.00	613.81	613.81	0.00
1153	142,083.74	13,393,900.00	613.81	613.69	-0.12
1154	142,134.09	13,393,900.00	614.06	614.01	-0.05
1155	142,184.49	13,393,900.00	613.81	613.77	-0.04
1156	142,076.98	13,394,000.00	613.81	613.81	NOTE 2
1157	142,126.98	13,394,000.00	614.06	614.06	NOTE 2
1158	142,177.00	13,394,000.45	613.81	613.86	0.05
1159	142,076.77	13,394,020.78	613.81	613.82	0.01
1160	142,126.77	13,394,033.27	614.06	614.00	-0.06
1161	142,176.77	13,394,045.75	613.81	613.82	0.01
1162	142,076.77	13,394,100.00	613.81	613.78	-0.03
1163	142,126.77	13,394,100.00	614.06	613.45	-0.61
1164	142,176.77	13,394,100.00	613.81	613.85	0.04
1165	142,076.77	13,394,200.00	613.81	613.76	-0.05
1166	142,126.77	13,394,200.00	614.06	614.05	-0.01
1167	142,176.77	13,394,200.00	613.81	613.82	0.01
1168	142,076.77	13,394,300.00	613.81	613.78	-0.03
1169	142,126.77	13,394,300.00	614.06	614.01	-0.05
1170	142,176.77	13,394,300.00	613.81	613.83	0.02
1171	142,076.77	13,394,419.43	613.81	613.86	0.05
1172	142,126.77	13,394,419.43	614.06	614.06	0.00
1173	142,176.77	13,394,419.43	613.81	613.73	-0.08
1174	141,354.56	13,392,964.27	609.00	608.94	-0.06
1175	141,400.00	13,392,925.89	609.16	609.21	0.05
1176	141,400.00	13,393,045.64	609.34	609.34	-0.01
1177	141,500.00	13,392,841.41	609.50	609.56	0.06
1178	141,500.00	13,392,900.00	609.59	609.55	-0.04
1179	141,500.00	13,393,000.00	609.75	609.71	-0.04
1180	141,500.00	13,393,100.00	609.90	609.94	0.04
1181	141,500.00	13,393,224.73	610.10	610.07	-0.03
1182	141,600.00	13,392,756.93	609.84	609.81	-0.04
1183	141,600.00	13,392,900.00	610.07	610.09	0.03
1184	141,600.00	13,393,000.00	610.22	610.22	-0.01
1185	141,600.00	13,393,100.00	610.38	610.37	-0.01
1186	141,600.00	13,393,200.00	610.53	610.53	0.00
1187	141,600.00	13,393,300.00	610.69	610.70	0.01
1188	141,600.00	13,393,403.82	610.85	610.83	-0.02
1189	141,430.35	13,393,100.00	609.57	609.55	-0.03
1190	141,700.00	13,392,672.45	610.19	610.23	0.04
1191	141,700.00	13,392,800.00	610.39	610.43	0.04

PHASE 2 TOP OF SUBGRADE RECORD CONTROL POINTS					
POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	Record Elevation	Difference ±
1192	141,700.00	13,392,900.00	610.54	610.52	-0.02
1193	141,700.00	13,393,000.00	610.70	610.68	-0.02
1194	141,700.00	13,393,100.00	610.85	610.87	0.02
1195	141,700.00	13,393,200.00	611.01	610.97	-0.04
1196	141,700.00	13,393,300.00	611.16	611.15	-0.02
1197	141,700.00	13,393,400.00	611.32	611.31	-0.01
1198	141,700.00	13,393,500.00	611.47	611.42	-0.05
1199	141,653.70	13,393,500.00	611.25	611.22	-0.03
1200	141,700.00	13,393,582.91	611.60	611.62	0.01
1201	141,800.00	13,392,587.97	610.53	610.57	0.04
1202	141,800.00	13,392,700.00	610.71	610.69	-0.01
1203	141,800.00	13,392,800.00	610.86	610.84	-0.02
1204	141,800.00	13,392,900.00	611.02	611.02	0.00
1205	141,800.00	13,393,000.00	611.17	611.12	-0.05
1206	141,800.00	13,393,100.00	611.33	611.30	-0.03
1207	141,800.00	13,393,200.00	611.48	611.52	0.03
1208	141,800.00	13,393,300.00	611.64	611.60	-0.04
1209	141,800.00	13,393,400.00	611.79	611.80	0.01
1210	141,800.00	13,393,500.00	611.95	611.93	-0.02
1211	141,800.00	13,393,600.00	612.10	612.13	0.02
1212	141,800.00	13,393,700.00	612.24	612.21	-0.03
1213	141,765.13	13,393,700.00	612.07	612.04	-0.03
1214	141,794.38	13,393,752.76	612.27	612.27	0.00
1215	141,794.06	13,393,800.64	612.31	612.31	0.00
1216	141,793.41	13,393,900.00	612.37	612.36	-0.01
1217	141,792.75	13,394,000.00	612.39	612.35	-0.04
1218	141,792.09	13,394,100.00	612.39	612.38	-0.01
1219	141,791.43	13,394,200.00	612.39	612.40	0.01
1220	141,790.77	13,394,300.00	612.38	612.38	0.00
1221	141,789.98	13,394,419.43	612.38	612.33	-0.05
1222	141,900.00	13,392,503.49	610.88	610.97	0.09
1223	141,900.00	13,392,600.00	611.03	611.09	0.07
1224	141,900.00	13,392,700.00	611.18	611.21	0.03
1225	141,900.00	13,392,800.00	611.34	611.38	0.04
1226	141,900.00	13,392,900.00	611.49	611.54	0.04
1227	141,900.00	13,393,000.00	611.65	611.61	-0.04
1228	141,900.00	13,393,100.00	611.80	611.79	-0.01
1229	141,900.00	13,393,200.00	611.96	611.95	-0.01
1230	141,900.00	13,393,300.00	612.11	612.13	0.01
1231	141,900.00	13,393,400.00	612.27	612.29	0.02
1232	141,900.00	13,393,500.00	612.42	612.41	-0.02
1233	141,900.00	13,393,600.00	612.58	612.58	0.00
1234	141,900.00	13,393,700.00	612.72	612.70	-0.02
1235	141,900.00	13,393,800.00	612.83	612.84	0.01
1236	141,900.00	13,393,900.00	612.90	612.95	0.05
1237	141,900.00	13,394,000.00	612.93	612.96	0.03
1238	141,900.00	13,394,100.00	612.93	612.94	0.01
1239	141,900.00	13,394,200.00	612.93	612.90	-0.03
1240	141,900.00	13,394,300.00	612.93	612.97	0.04
1241	141,900.00	13,394,419.43	612.93	612.91	-0.02
1242	142,000.00	13,392,419.01	611.22	611.29	0.07
1243	142,000.00	13,392,500.00	611.35	611.45	0.10
1244	142,000.00	13,392,600.00	611.50	611.39	-0.12
1245	142,000.00	13,392,700.00	611.66	611.64	-0.01
1246	142,000.00	13,392,800.00	611.81	611.80	-0.01
1247	142,000.00	13,392,900.00	611.97	612.00	0.03
1248	142,000.00	13,393,000.00	612.12	612.16	0.04
1249	142,000.00	13,393,100.00	612.28	612.26	-0.02
1250	142,000.00	13,393,200.00	612.43	612.47	0.04
1251	142,000.00	13,393,300.00	612.59	612.62	0.03
1252	142,000.00	13,393,400.00	612.74	612.70	-0.04
1253	142,000.00	13,393,500.00	612.90	612.86	-0.04
1254	142,000.00	13,393,600.00	613.05	613.02	-0.03
1255	142,000.00	13,393,700.00	613.21	613.21	0.01
1256	142,000.00	13,393,800.00	613.32	613.34	0.02
1257	142,000.00	13,393,900.00	613.40	613.42	0.02
1258	142,000.00	13,394,000.00	613.43	613.48	0.05
1259	142,000.00	13,394,100.00	613.43	613.47	0.04
1260	142,000.00	13,394,200.00	613.43	613.46	0.03
1261	142,000.00	13,394,300.00	613.43	613.38	-0.05
1262	142,000.00	13,394,419.43	613.43	613.41	-0.02
1263	142,070.71	13,392,359.28	611.46	611.44	-0.02
1264	142,100.00	13,392,275.39	611.47	611.41	-0.06
1265	142,100.00	13,392,400.00	611.67	611.71	0.04
1266	142,100.00	13,392,500.00	611.82	611.86	0.03
1267	142,100.00	13,392,600.00	611.98	611.98	0.01
1268	142,100.00	13,392,700.00	612.13	612.20	0.06
1269	142,100.00	13,392,800.00	612.29	612.33	0.04
1270	142,100.00	13,392,900.00	612.44	612.42	-0.02
1271	142,100.00	13,393,000.00	612.60	612.65	0.05
1272	142,100.00	13,393,100.00	612.75	612.79	0.03
1273	142,100.00	13,393,200.00	612.91	612.94	0.03
1274	142,100.00	13,393,300.00	613.06	613.10	0.03
1275	142,100.00	13,393,400.00	613.22	613.21	-0.01
1276	142,100.00	13,393,500.00	613.37	613.33	-0.05
1277	142,100.00	13,393,600.00	613.53	613.51	-0.02
1278	142,100.00	13,393,700.00	613.68	613.65	-0.04
1279	142,126.33	13,392,200.00	611.48	611.41	-0.07
1280	142,161.25	13,392,100.00	611.49	611.47	-0.03
1281	142,200.00	13,391,989.02	611.50	611.49	-0.01
1282	142,200.00	13,392,100.00	611.68	611.73	0.05
1283	142,200.00	13,392,200.00	611.83	611.85	0.02
1284	142,200.00	13,392,300.00	611.99	612.01	0.02
1285	142,200.00	13,392,400.00	612.14	612.13	-0.01
1286	142,200.00	13,392,500.00	612.30	612.33	0.03
1287	142,200.00	13,392,600.00	612.45	612.53	0.07

PHASE 2 TOP OF SUBGRADE RECORD CONTROL POINTS					
POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	Record Elevation	Difference ±
1288	142,200.00	13,392,700.00	612.61	612.67	0.06
1289	142,200.00	13,392,800.00	612.76	612.76	-0.01
1290	142,200.00	13,392,900.00	612.92	612.93	0.02
1291	142,200.00	13,393,000.00	613.07	613.02	-0.05
1292	142,200.00	13,393,100.00	613.23	613.25	0.02
1293	142,200.00	13,393,200.00	613.38	613.42	0.04
1294	142,200.00	13,393,300.00	613.54	613.54	0.00
1295	142,200.00	13,393,400.00	613.69	613.71	0.02
1296	142,231.09	13,391,900.00	611.51	611.45	-0.06
1297	142,266.01	13,391,800.00	611.52	611.52	0.00
1298	142,300.00	13,391,800.00	611.69	611.79	0.10
1299	142,300.00	13,391,900.00	611.84	611.87	0.03
1300	142,300.00	13,392,000.00	612.00	612.02	0.02
1301	142,300.00	13,392,100.00	612.15	612.18	0.03
1302	142,300.00	13,392,200.00	612.31	612.36	0.06
1303	142,300.00	13,392,300.00	612.46	612.46	0.00
1304	142,300.00	13,392,400.00	612.62	612.69	0.07
1305	142,300.00	13,392,500.00	612.77	612.78	0.01
1306	142,300.00	13,392,600.00	612.93	613.01	0.09
1307	142,300.00	13,392,700.00	613.08	613.11	0.03
1308	142,300.00	13,392,800.00	613.24	613.30	0.06
1309	142,300.00	13,392,900.00	613.39	613.43	0.04
1310	142,300.00	13,393,000.00	613.55	613.59	0.04
1311	142,300.00	13,393,100.00	613.70	613.70	0.00
1312	142,400.00	13,391,800.00	612.16	612.23	0.07
1313	142,400.00	13,391,900.00	612.32	612.36	0.05
1314	142,400.00	13,392,000.00	612.47	612.52	0.04
1315	142,400.00	13,392,100.00	612.63	612.69	0.06
1316	142,400.00	13,392,200.00	612.78	612.78	0.00
1317	142,400.00	13,392,300.00	612.94	612.96	0.03
1318	142,400.00	13,392,400.00	613.09	613.06	-0.03
1319	142,400.00	13,392,500.00	613.25	613.33	0.08
1320	142,399.32	13,392,600.00	613.40	613.42	0.02
1321	142,400.00	13,392,700.00	613.56	613.60	0.04
1322	142,400.00	13,392,800.00	613.71	613.69	-0.02
1323	142,500.00	13,391,900.00	612.79	612.83	0.04
1324	142,500.00	13,392,000.00	612.95	613.02	0.07
1325	142,500.00	13,392,100.00	613.10	613.06	-0.05
1326	142,500.00	13,392,200.00	613.26	613.21	-0.05
1327	142,500.00	13,392,300.00	613.41	613.44	0.03
1328	142,500.00	13,392,400.00	613.57	613.47	-0.10
1329	142,500.00	13,392,500.00	613.72	613.69	-0.03
1330	142,600.00	13,391,900.00	613.27	613.29	0.03
1331	142,600.00	13,392,000.00	613.42	613.41	-0.01
1332	142,600.00	13,392,100.00	613.58	613.57	0.00
1333	142,600.00	13,392,200.00	613.73	613.74	0.01
1334	142,200.00	13,393,900.00	613.74	613.76	0.02
1335	142,200.00	13,394,000.00	613.70	613.76	0.06
1336	142,200.00	13,394,100.00	613.70	613.71	0.01
1337	142,200.00	13,394,200.00	613.70	613.66	-0.04
1338	142,200.00	13,394,300.00	613.70	613.72	0.03
1339	142,200.00	13,394,419.43	613.70	613.67	-0.03
1340	142,300.00	13,393,600.00	613.65	613.68	0.03
1341	142,300.00	13,393,700.00	613.49	613.53	0.04
1342	142,300.00	13,393,800.00	613.34	613.34	0.00
1343	142,300.00	13,393,900.00	613.24	613.27	0.03
1344	142,300.00	13,394,000.00	613.20	613.17	-0.03
1345	142,300.00	13,394,100.00	613.20	613.16	-0.03
1346	142,300.00	13,394,200.00	613.20	613.22	0.02
1347	142,300.00	13,394,300.00	613.20	613.20	0.00
1348	142,300.00	13,394,419.43	613.20	613.25	0.05
1349	142,400.00	13,393,300.00	613.64	613.66	0.03
1350	142,400.00	13,393,400.00	613.48	613.47	-0.02
1351	142,400.00	13,393,500.00	613.33	613.32	0.00
1352	142,400.00	13,393,600.00	613.17	613.20	0.03
1353	142,400.00	13,393,700.00	613.02	613.09	0.07
1354	142,400.00	13,393,800.00	612.86	612.87	0.01
1355	142,400.00	13,393,900.00	612.75	612.76	0.02
1356	142,400.00	13,394,000.00	612.70	612.70	0.00
1357	142,400.00	13,394,100.00	612.70	612.75	0.05
1358	142,400.00	13,394,200.00	612.70	612.73	0.03
1359	142,400.00	13,394,300.00	612.70	612.72	0.02
1360	142,400.00	13,394,419.43	612.70	612.70	0.01
1361	142,460.56	13,394,121.51	612.39	612.44	0.04
1362	142,461.35	13,394,200.00	612.39	612.39	0.00
1363	142,462.36	13,394,300.00	612.39	612.43	0.04
1364	142,463.56	13,394,419.43	612.38	612.33	-0.05
1365	142,500.00	13,393,000.00	613.63	613.57	-0.06
1366	142,500.00	13,393,100.00	613.47	613.51	0.03
1367	142,500.00	13,393,200.00	613.32	613.34	0.02
1368	142,500.00	13,393,300.00	613.16	613.14	-0.02
1369	142,500.00	13,393,400.00	613.01	613.04	0.03
1370	142,500.00	13,393,500.00	612.85	612.86	0.01
1371	142,500.00	13,393,600.00	612.70	612.75	0.05

PHASE 2 TOP OF SUBGRADE RECORD CONTROL POINTS					
POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	Record Elevation	Difference ±
1372	142,500.00	13,393,700.00	612.54	612.54	0.00
1373	142,500.00	13,393,800.00	612.39	612.42	0.04
1374	142,500.00	13,393,900.00	612.25	612.30	0.05
1375	142,500.00	13,394,000.00	612.20	612.17	-0.03
1376	142,500.00	13,394,080.69	612.20	612.24	0.04
1377	142,600.00	13,392,700.00	613.62	613.60	-0.01
1378	142,600.00	13,392,800.00	613.46	613.52	0.05
1379	142,600.00	13,392,900.00	613.31	613.31	0.01
1380	142,600.00	13,393,000.00	613.15	613.21	0.06
1381	142,600.00	13,393,100.00	613.00	613.01	0.02
1382	142,600.00	13,393,200.00	612.84	612.88	0.04
1383	142,600.00	13,393,300.00	612.69	612.71	0.02
1384	142,600.00	13,393,400.00	612.53	612.56	0.03
1385	142,600.00	13,393,500.00	612.38	612.36	-0.02
1386	142,600.00	13,393,600.00	612.22	612.23	0.01
1387	142,600.00	13,393,700.00	612.07	612.09	0.02
1388	142,600.00	13,393,800.00	611.91	611.94	0.03
1389	142,600.00	13,393,900.00	611.77	611.81	0.04
1390	142,600.00	13,393,977.20	611.71	611.74	0.04
1391	142,700.00	13,392,400.00	613.61	613.61	0.00
1392	142,700.00	13,392,500.00	613.45	613.42	-0.04
1393	142,700.00	13,392,600.00	613.30	613.32	0.02
1394	142,700.00	13,392,700.00	613.14	613.13	-0.01
1395	142,700.00	13,392,800.00	612.99	612.95	-0.03
1396	142,700.00	13,392,900.00	612.83	612.83	0.00
1397	142,700.00	13,393,000.00	612.68	612.74	0.06
1398	142,700.00	13,393,100.00	612.52	612.53	0.01
1399	142,700.00	13,393,200.00	612.37	612.36	0.00
1400	142,700.00	13,393,300.00	612.21	612.18	-0.04
1401	142,700.00	13,393,400.00	612.06	612.09	0.03
1402	142,700.00	13,393,500.15	611.90	611.93	0.03
1403	142,700.00	13,393,600.00	611.75	611.80	0.05
1404	142,700.00	13,393,700.00	611.59	611.61	0.02
1405	142,700.00	13,393,800.00	611.43	611.45	0.02
1406	142,700.00	13,393,874.77	611.32	611.39	0.07
1407	142,798.89	13,393,777.12	611.00	611.02	0.02
1408	142,800.00	13,392,100.00	613.60	613.66	0.06
1409	142,800.00	13,392,200.00	613.44	613.46	0.02
1410	142,800.00	13,392,300.00	613.29	613.29	0.00
1411	142,800.00	13,392,400.00	613.13	613.14	0.00
1412	142,800.00	13,392,500.00	612.98	612.97	-0.01
1413	142,800.00	13,392,600.00	612.82	612.82	0.00
1414	142,800.00	13,392,700.00	612.67	612.64	-0.03
1415	142,800.00	13,392,800.00	612.51	612.55	0.04
1416	142,800.00	13,392,900.00	612.36	612.33	-0.02
1417	142,800.00	13,393,000.00	612.20	612.25	0.05
1418	142,800.00	13,393,100.00	612.05	612.10	0.05
1419	142,800.00	13,393,200.00	611.89	611.86	-0.03
1420	142,800.00	13,393,300.00	611.74	611.75	0.02
1421	142,800.00	13,393,400.00	611.58	611.61	0.03
1422	142,800.00	13,393,500.00	611.42	611.43	0.01
1423	142,800.00	13,393,600.00	611.27	611.30	0.03
1424	142,800.00	13,393,700.00	611.11	611.11	0.00
1425	142,900.00	13,392,000.00	613.28	613.30	0.02
1426	142,900.00	13,392,100.00	613.12	613.18	0.05
1427	142,900.00	13,392,200.00	612.97	612.96	-0.01
1428	142,900.00	13,392,300.00	612.81	612.85	0.03
1429	142,900.00	13,392,400.00	612.66	612.70	0.04
1430	142,900.00	13,392,500.00	612.50	612.53	0.03
1431	142,900.00	13,392,600.00	612.35	612.36	0.01
1432	142,900.00	13,392,700.00	612.19	612.20	0.01
1433	142,900.00	13,392,800.00	612.04	612.06	0.02
1434	142,900.00	13,392,900.00	611.88	611.90	0.02
1435	142,900.00	13,393,000.00	611.73	611.73	0.00
1436	142,900.00	13,393,100.00	611.57	611.60	0.03
1437	142,900.00	13,393,200.00	611.42	611.41	0.00
1438	142,900.00	13,393,300.00	611.26	611.25	-0.02
1439	142,900.00	13,393,400.00	611.10	611.09	-0.01
1440	142,824.08	13,393,700.00	611.00	611.05	0.04
1441	142,856.74	13,393,600.00	611.00	611.02	0.02
1442	142,900.00	13,393,467.58	611.00	611.01	0.01
1443	143,000.00	13,392,100.00	612.65	612.67	0.02
1444	143,000.00	13,392,200.00	612.49	612.50	0.01
1445	143,000.00	13,392,300.00	612.34	612.37	0.04
1446	143,000.00	13,392,400.00	612.18	612.22	0.04
1447	143,000.00	13,392,500.00	612.03	612.08	0.05
1448	143,000.00	13,392,600.00	611.87	611.91	0.04
1449	143,000.00	13,392,700.00	611.72	611.77	0.05
1450	143,000.00	13,392,800.00	611.56	611.62	0.06
1451	143,000.00	13,392,900.00	611.41	611.43	0.03
1452	143,000.00	13,393,000.00	611.25	611.28	0.03
1453	143,000.00	13,393,100.00	611.10	611.07	-0.03
1454	142,922.08	13,393,400.00	611.00	610.97	-0.03
1455	142,954.74	13,393,300.00	611.00	611.05	0.05

PHASE 2 TOP OF SUBGRADE RECORD CONTROL POINTS					
POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	Record Elevation	Difference ±
1456	142,999.83	13,393,161.97	611.00	611.03	0.02
1457	143,051.09	13,393,005.06	611.00	611.07	0.07
1458	143,058.77	13,392,900.00	611.13	611.19	0.06
1459	143,066.21	13,392,800.00	611.25	611.31	0.07
1460	143,073.86	13,392,700.00	611.37	611.41	0.04
1461	143,081.50	13,392,600.00	611.48	611.54	0.06
1462	143,089.17	13,392,500.00	611.60	611.64	0.03
1463	143,100.00	13,392,363.90	611.76	611.84	0.08
1464	143,105.08	13,392,300.00	611.84	611.91	0.08
1465	143,100.00	13,392,200.00	612.02	612.05	0.04
1466	143,121.36	13,392,200.00	611.92	611.97	0.05
1467	143,100.00	13,392,100.00	612.17	612.26	0.09
1468	143,138.09	13,392,100.00	611.99	611.94	-0.05

NOTE(S)

1. SUBGRADE ELEVATIONS LOWER THAN 0.10 FEET BELOW GRADE WERE CONSIDERED ACCEPTABLE DUE TO THE BACKFILLING OF GRANULAR SOILS WITHIN THE PORE WATER RELIEF LAYER.
2. POINTS 1156 AND 1157 SURVEYED BY EAGLE EXCAVATION INC. USING A GPS SYSTEM, FOUND TO BE WITHIN TOLERANCE, HOWEVER NOT RECORDED; DESIGN SUBGRADE ELEVATION USED.

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT

Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
DESIGN	JJS
REVIEW	SEF
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
RECORD TOP OF SUBGRADE
CONSTRUCTION CONTROL / QA/QC POINTS

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA004.dwg	0	8

PHASE 2 TOP OF PORE RELIEF RECORD CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	RECORD ELEVATION	DIFFERENCE ±
2114	142,700.00	13,391,945.74	616.31	616.37	0.06
2115	142,800.00	13,391,961.66	616.31	616.34	0.03
2116	142,682.28	13,392,000.00	616.31	616.38	0.07
2117	142,734.88	13,392,000.00	616.56	616.63	0.07
2118	142,787.48	13,392,000.00	616.31	616.35	0.04
2119	142,649.61	13,392,100.00	616.31	616.40	0.09
2120	142,702.21	13,392,100.00	616.56	616.55	-0.01
2121	142,754.81	13,392,100.00	616.31	616.38	0.07
2122	142,616.94	13,392,200.00	616.31	616.39	0.08
2123	142,669.54	13,392,200.00	616.56	616.62	0.06
2124	142,722.14	13,392,200.00	616.31	616.38	0.07
2125	142,584.28	13,392,300.00	616.31	616.33	0.02
2126	142,636.88	13,392,300.00	616.56	616.61	0.05
2127	142,689.48	13,392,300.00	616.31	616.37	0.06
2128	142,551.61	13,392,400.00	616.31	616.37	0.06
2129	142,604.21	13,392,400.00	616.56	616.59	0.03
2130	142,656.81	13,392,400.00	616.31	616.33	0.02
2131	142,518.95	13,392,500.00	616.31	616.35	0.04
2132	142,571.55	13,392,500.00	616.56	616.57	0.01
2133	142,624.15	13,392,500.00	616.31	616.29	-0.02
2134	142,486.28	13,392,600.00	616.31	616.32	0.01
2135	142,538.88	13,392,600.00	616.56	616.57	0.01
2136	142,591.48	13,392,600.00	616.31	616.34	0.03
2137	142,453.61	13,392,700.00	616.31	616.40	0.09
2138	142,506.21	13,392,700.00	616.56	616.62	0.06
2139	142,558.81	13,392,700.00	616.31	616.34	0.03
2140	142,420.95	13,392,800.00	616.31	616.34	0.03
2141	142,473.55	13,392,800.00	616.56	616.64	0.08
2142	142,526.15	13,392,800.00	616.31	616.39	0.08
2143	142,388.28	13,392,900.00	616.31	616.38	0.07
2144	142,440.88	13,392,900.00	616.56	616.57	0.01
2145	142,493.48	13,392,900.00	616.31	616.29	-0.02
2146	142,355.62	13,393,000.00	616.31	616.39	0.08
2147	142,408.22	13,393,000.00	616.56	616.56	0.00
2148	142,460.82	13,393,000.00	616.31	616.36	0.05
2149	142,322.95	13,393,100.00	616.31	616.31	0.00
2150	142,375.55	13,393,100.00	616.56	616.60	0.04
2151	142,428.15	13,393,100.00	616.31	616.35	0.04
2152	142,290.28	13,393,200.00	616.31	616.39	0.08
2153	142,342.88	13,393,200.00	616.56	616.61	0.05
2154	142,395.48	13,393,200.00	616.31	616.39	0.08
2155	142,257.62	13,393,300.00	616.31	616.33	0.02
2156	142,310.22	13,393,300.00	616.56	616.59	0.03
2157	142,362.82	13,393,300.00	616.31	616.39	0.08
2158	142,224.95	13,393,400.00	616.31	616.30	-0.01
2159	142,277.55	13,393,400.00	616.56	616.47	-0.09
2160	142,330.15	13,393,400.00	616.31	616.26	-0.05
2161	142,192.29	13,393,500.00	616.31	616.37	0.06
2162	142,244.89	13,393,500.00	616.56	616.62	0.06
2163	142,297.49	13,393,500.00	616.31	616.40	0.09
2164	142,159.62	13,393,600.00	616.31	616.32	0.01
2165	142,212.22	13,393,600.00	616.56	616.57	0.01
2166	142,264.82	13,393,600.00	616.31	616.37	0.06
2167	142,128.66	13,393,694.79	616.31	616.26	-0.05
2168	142,176.20	13,393,710.27	616.56	616.62	0.06
2169	142,223.74	13,393,725.76	616.31	616.41	0.10
2170	142,100.25	13,393,800.00	616.31	616.39	0.08
2171	142,151.45	13,393,800.00	616.56	616.64	0.08
2172	142,202.79	13,393,800.00	616.31	616.36	0.05
2173	142,083.74	13,393,900.00	616.31	616.37	0.06
2174	142,134.09	13,393,900.00	616.56	616.56	0.00
2175	142,184.49	13,393,900.00	616.31	616.34	0.03
2176	142,076.98	13,394,000.00	616.31	616.25	-0.06
2177	142,126.99	13,394,000.00	616.56	616.58	0.02
2178	142,177.01	13,394,000.00	616.31	616.39	0.08
2179	142,076.77	13,394,020.78	616.31	616.30	-0.01
2180	142,126.77	13,394,033.27	616.56	616.55	-0.01
2181	142,176.77	13,394,045.75	616.31	616.38	0.07
2182	142,076.77	13,394,100.00	616.31	616.35	0.04
2183	142,126.77	13,394,100.00	616.56	616.59	0.03
2184	142,176.77	13,394,100.00	616.31	616.39	0.08
2185	142,076.77	13,394,200.00	616.31	616.40	0.09
2186	142,126.77	13,394,200.00	616.56	616.64	0.08
2187	142,176.77	13,394,200.00	616.31	616.40	0.09
2188	142,076.77	13,394,300.00	616.31	616.34	0.03
2189	142,126.77	13,394,300.00	616.56	616.59	0.03
2190	142,176.77	13,394,300.00	616.31	616.41	0.10
2191	142,076.77	13,394,411.13	616.31	616.29	-0.02
2192	142,126.53	13,394,411.93	616.56	616.58	0.02
2193	142,176.77	13,394,411.18	616.31	616.33	0.02
2194	141,625.33	13,393,409.19	613.48	613.56	0.08
2195	141,364.31	13,392,966.05	611.55	611.64	0.09
2196	141,400.00	13,392,935.89	611.67	611.68	0.01
2197	141,400.61	13,392,972.99	611.73	611.66	-0.07
2198	141,400.00	13,393,029.96	611.82	611.90	0.08
2199	141,500.00	13,392,851.40	612.02	612.03	0.01
2200	141,500.00	13,392,888.45	612.07	612.15	0.07
2201	141,500.00	13,393,000.00	612.25	612.29	0.04
2202	141,500.00	13,393,100.00	612.40	612.41	0.01
2203	141,500.00	13,393,150.87	612.48	612.47	-0.01
2204	141,500.00	13,393,209.05	612.57	612.52	-0.05
2205	141,600.00	13,392,766.90	612.36	612.43	0.07
2206	141,600.00	13,392,803.98	612.42	612.47	0.05
2207	141,600.00	13,392,900.00	612.57	612.57	0.00
2208	141,600.00	13,393,000.00	612.72	612.80	0.08

PHASE 2 TOP OF PORE RELIEF RECORD CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	RECORD ELEVATION	DIFFERENCE ±
2209	141,600.00	13,393,100.00	612.88	612.90	0.02
2210	141,600.00	13,393,200.00	613.03	613.09	0.05
2211	141,600.00	13,393,300.00	613.19	613.24	0.05
2212	141,600.00	13,393,329.84	613.23	613.29	0.05
2213	141,600.00	13,393,388.18	613.32	613.23	-0.10
2214	141,700.00	13,392,682.41	612.70	612.70	-0.01
2215	141,700.00	13,392,719.51	612.76	612.86	0.09
2216	141,700.00	13,392,800.00	612.89	612.96	0.07
2217	141,700.00	13,392,900.00	613.04	613.07	0.03
2218	141,700.00	13,393,000.00	613.20	613.24	0.04
2219	141,700.00	13,393,100.00	613.35	613.38	0.02
2220	141,700.00	13,393,200.00	613.51	613.59	0.08
2221	141,700.00	13,393,300.00	613.66	613.67	0.00
2222	141,700.00	13,393,400.00	613.82	613.76	-0.06
2223	141,700.00	13,393,508.82	613.99	613.98	-0.01
2224	141,700.00	13,393,567.37	614.08	614.03	-0.05
2225	141,560.83	13,392,800.00	612.23	612.24	0.02
2226	141,550.79	13,393,300.00	612.95	612.87	-0.09
2227	141,439.11	13,393,100.00	612.11	612.18	0.07
2228	141,442.48	13,392,900.00	611.82	611.89	0.07
2229	141,800.00	13,392,597.93	613.05	613.12	0.07
2230	141,800.00	13,392,635.04	613.11	613.15	0.04
2231	141,800.00	13,392,700.00	613.21	613.30	0.09
2232	141,800.00	13,392,800.00	613.36	613.40	0.03
2233	141,800.00	13,392,900.00	613.52	613.61	0.09
2234	141,800.00	13,393,000.00	613.67	613.75	0.08
2235	141,800.00	13,393,100.00	613.83	613.76	-0.07
2236	141,800.00	13,393,200.00	613.98	613.96	-0.02
2237	141,800.00	13,393,300.00	614.14	614.07	-0.07
2238	141,800.00	13,393,400.00	614.29	614.29	-0.01
2239	141,800.00	13,393,500.00	614.45	614.43	-0.02
2240	141,800.00	13,393,600.00	614.60	614.61	0.01
2241	141,800.00	13,393,688.45	614.72	614.73	0.00
2242	141,800.00	13,393,747.25	614.79	614.80	0.01
2243	141,750.91	13,393,600.00	614.37	614.45	0.08
2244	141,718.22	13,393,600.00	614.21	614.29	0.08
2245	141,830.23	13,393,744.44	614.94	614.86	-0.07
2246	141,801.68	13,393,800.00	614.85	614.80	-0.04
2247	141,830.03	13,393,800.00	614.99	615.00	0.01
2248	141,801.02	13,393,900.00	614.91	614.82	-0.09
2249	141,829.37	13,393,900.00	615.05	615.08	0.03
2250	141,800.36	13,394,000.00	614.93	614.84	-0.10
2251	141,828.71	13,394,000.00	615.07	615.09	0.02
2252	141,799.70	13,394,100.00	614.93	614.84	-0.09
2253	141,828.05	13,394,100.00	615.07	615.17	0.10
2254	141,799.04	13,394,200.00	614.92	614.89	-0.03
2255	141,827.39	13,394,200.00	615.07	615.13	0.06
2256	141,798.38	13,394,300.00	614.92	614.83	-0.09
2257	141,826.73	13,394,300.00	615.06	615.05	-0.01
2258	141,797.65	13,394,411.81	614.92	614.98	0.06
2259	141,826.24	13,394,383.21	615.06	615.10	0.03
2260	141,900.00	13,392,513.45	613.39	613.45	0.06
2261	141,900.00	13,392,550.57	613.45	613.51	0.06
2262	141,900.00	13,392,600.00	613.53	613.58	0.05
2263	141,900.00	13,392,700.00	613.68	613.76	0.08
2264	141,900.00	13,392,800.00	613.84	613.93	0.09
2265	141,900.00	13,392,900.00	613.99	613.90	-0.09
2266	141,900.00	13,393,000.00	614.15	614.15	0.01
2267	141,900.00	13,393,100.00	614.30	614.23	-0.08
2268	141,900.00	13,393,200.00	614.46	614.53	0.07
2269	141,900.00	13,393,300.00	614.61	614.61	-0.01
2270	141,900.00	13,393,400.00	614.77	614.75	-0.02
2271	141,900.00	13,393,500.00	614.92	614.95	0.03
2272	141,900.00	13,393,600.00	615.08	615.06	-0.02
2273	141,900.00	13,393,700.00	615.22	615.28	0.05
2274	141,900.00	13,393,800.00	615.33	615.39	0.06
2275	141,900.00	13,393,900.00	615.40	615.34	-0.06
2276	141,900.00	13,394,000.00	615.43	615.49	0.06
2277	141,900.00	13,394,100.00	615.43	615.48	0.05
2278	141,900.00	13,394,200.00	615.43	615.44	0.01
2279	141,900.00	13,394,300.00	615.43	615.44	0.01
2280	141,900.00	13,394,383.14	615.43	615.39	-0.04
2281	141,900.00	13,394,411.81	615.43	615.50	0.07
2282	142,000.00	13,392,428.97	613.74	613.74	0.01
2283	142,000.00	13,392,466.11	613.79	613.87	0.07
2284	142,000.00	13,392,500.00	613.85	613.94	0.09
2285	142,000.00	13,392,600.00	614.00	614.02	0.02
2286	142,000.00	13,392,700.00	614.16	614.17	0.01
2287	142,000.00	13,392,800.00	614.31	614.31	0.00
2288	142,000.00	13,392,900.00	614.47	614.51	0.04
2289	142,000.00	13,393,000.00	614.62	614.65	0.03
2290	142,000.00	13,393,100.00	614.78	614.82	0.04
2291	142,000.00	13,393,200.00	614.93	614.95	0.01
2292	142,000.00	13,393,300.00	615.09	615.15	0.06
2293	142,000.00	13,393,400.00	615.24	615.21	-0.04
2294	142,000.00	13,393,500.00	615.40	615.39	-0.01
2295	142,000.00	13,393,600.00	615.55	615.55	-0.01
2296	142,000.00	13,393,700.00	615.71	615.80	0.09
2297	142,000.00	13,393,800.00	615.82	615.92	0.10
2298	142,000.00	13,393,900.00	615.90	615.96	0.07
2299	142,000.00	13,394,000.00	615.93	615.94	0.01
2300	142,000.00	13,394,100.00	615.93	616.00	0.07
2301	142,000.00	13,394,200.00	615.93	616.00	0.07
2302	142,000.00	13,394,300.00	615.93	615.98	0.05
2303	142,000.00	13,394,383.05	615.93	615.98	0.05

PHASE 2 TOP OF PORE RELIEF RECORD CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	RECORD ELEVATION	DIFFERENCE ±
2304	142,000.00	13,394,411.81	615.93	615.99	0.06
2305	142,077.21	13,392,363.75	614.00	614.07	0.07
2306	142,078.26	13,392,400.00	614.06	614.10	0.04
2307	142,099.47	13,392,300.00	614.01	614.08	0.07
2308	142,129.50	13,392,300.00	614.15	614.23	0.08
2309	142,100.00	13,392,381.46	614.14	614.20	0.07
2310	142,100.00	13,392,400.00	614.17	614.17	0.00
2311	142,100.00	13,392,500.00	614.32	614.37	0.05
2312	142,100.00	13,392,600.00	614.48	614.47	-0.01
2313	142,100.00	13,392,700.00	614.63	614.70	0.07
2314	142,100.00	13,392,800.00	614.79	614.85	0.06
2315	142,100.00	13,392,900.00	614.94	614.97	0.03
2316	142,100.00	13,393,000.00	615.10	615.11	0.01
2317	142,100.00	13,393,100.00	615.25	615.26	0.00
2318	142,100.00	13,393,200.00	615.41	615.38	-0.03
2319	142,100.00	13,393,300.00	615.56	615.60	0.04
2320	142,100.00	13,393,400.00	615.72	615.78	0.06
2321	142,100.00	13,393,500.00	615.87	615.86	-0.01
2322	142,100.00	13,393,600.00	616.03	616.00	-0.03
2323	142,100.00	13,393,700.00	616.18	616.11	-0.08
2324	142,076.77	13,394,382.98	616.31	616.35	0.03
2325	142,126.77	13,394,382.93	616.56	616.60	0.03
2326	142,176.77	13,394,382.93	616.31	616.39	0.07
2327	142,134.39	13,392,200.00	614.02	613.97	-0.05
2328	142,164.42	13,392,200.00	614.16	614.19	0.03
2329	142,169.31	13,392,100.00	614.03	614.07	0.04
2330	142,199.34	13,392,100.00	614.17	614.26	0.09
2331	142,200.00	13,392,200.00	614.33	614.37	0.04
2332	142,200.00	13,392,300.00	614.49	614.53	0.04
2333	142,200.00	13,392,400.00	614.64	614.57	-0.07
2334	142,200.00	13,392,500.00	614.80	614.79	-0.01
2335	142,200.00	13,392,600.00	614.95	614.99	0.04
2336	142,200.00	13,392,700.00	615.11	615.18	0.08
2337	142,200.00	13,392,800.00	615.26	615.22	-0.04
2338	142,200.00	13,392,900.00	615.42	615.43	0.01
2339	142,200.00	13,393,000.00	615.57	615.62	0.05
2340	142,200.00	13,393,100.00	615.73	615.66	-0.07
2341	142,200.00	13,393,200.00	615.88	615.97	0.08
2342	142,200.00	13,393,300.00	616.04	616.11	0.07
2343	142,200.00	13,393,400.00	616.19	616.19	0.00
2344	142,204.23	13,392,000.00	614.04	614.01	-0.03
2345	142,234.27	13,392,000.00	614.18	614.20	0.01
2346	142,239.15	13,391,900.00	614.05	614.14	0.09
2347	142,269.19	13,391,900.00	614.19	614.20	0.00
2348	142,274.07	13,391,800.00	614.06	614.10	0.04
2349	142,304.12	13,391,800.00	614.21	614.25	0.05
2350	142,300.00	13,391,900.00	614.34	614.41	0.07
2351	142,300.00	13,392,000.00	614.50	614.52	0.02
2352	142,300.00	13,392,100.00	614.65	614.75	0.09
2353	142,300.00	13,392,200.00	614.81	614.89	0.08
2354	142,300.00	13,392,300.00	614.96	614.98	0.01
2355	142,300.00	13,392,400.00	615.12	615.13	0.01
2356	142,300.00	13,392,500.00	615.27	615.33	0.06
2357	142,300.00	13,392,600.00	615.43	615.52	0.10
2358	142,300.00	13,392,700.00	615.58	615.67	0.09
2359	142,300.00	13,392,800.00	615.74	615.69	-0.05
2360	142,300.00	13,392,900.00	615.89	615.97	0.08
2361	142,300.00	13,393,000.00	616.05	616.15	0.10
2362	142,300.00	13,393,100.00	616.20	616.19	-0.01
2363	142,300.00	13,393,600.00	616.15	616.20	0.05
2364	142,300.00	13,393,700.00	615.99	615.93	-0.06
2365	142,300.00	13,393,800.00	615.84	615.92	0.08
2366	142,200.00	13,393,900.00	616.24	616.24	0.00
2367	142,300.00	13,393,900.00	615.74	615.79	0.05
2368	142,200.00	13,394,000.00	616.20	616.26	0.06
2369	142,300.00	13,394,000.00	615.70	615.69	-0.01
2370	142,200.00	13,394,100.00	616.20	616.30	0.10
2371	142,300.00	13,394,100.00	615.70	615.78	0.08
2372	142,200.00	13,394,200.00	616.20	616.27	0.07
2373	142,300.00	13,394,200.00	615.70	615.73	0.03
2374	142,200.00	13,394,300.00	616.20	616.17	-0.03
2375	142,300.00	13,394,300.00	615.70	615.77	0.08
2376	142,200.00	13,394,382.93	616.20	616.29	0.09
2377	142,200.00	13,394,411.93	616.20	616.16	-0.03
2378	142,300.00	13,394,382.93	615.70	615.72	0.03
2379	142,300.00	13,394,411.93	615.70	615.78	0.08
2380	142,400.00	13,391,800.00	614.66	614.76	0.10
2381	142,400.00	13,391,900.00	614.82	614.88	0.06
2382	142,400.00	13,392,000.00	614.97	615.00	0.03
2383	142,400.00	13,392,100.00	615.13	615.20	0.08
2384	142,400.00	13,392,200.00	615.28	615.34	0.06
2385	142,400.00	13,392,300.00	615.44	615.48	0.04
2386	142,400.00	13,392,400.00	615.59	615.65	0.06

PHASE 2 TOP OF PORE RELIEF RECORD CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	RECORD ELEVATION	DIFFERENCE ±
2387	142,400.00	13,392,500.00	615.75	615.81	0.06
2388	142,400.00	13,392,600.00	615.90	615.99	0.09
2389	142,400.00	13,392,700.00	616.06	616.14	0.08
2390	142,400.00	13,392,800.00	616.21	616.25	0.03
2391	142,400.00	13,393,300.00	616.14	616.19	0.05
2392	142,400.00	13,393,400.00	615.98	616.00	0.02
2393	142,400.00	13,393,500.00	615.83	615.90	0.07
2394	142,400.00	13,393,600.00	615.67	615.67	0.00
2395	142,400.00	13,393,700.00	615.52	615.45	-0.06
2396	142,400.00	13,393,800.00	615.36	615.39	0.03
2397	142,400.00	13,393,900.00	615.25	615.22	-0.03
2398	142,400.00	13,394,000.00	615.20	615.22	0.02
2399	142,400.00	13,394,100.00	615.20	615.27	0.07
2400	142,400.00	13,394,200.00	615.20	615.25	0.05
2401	142,400.00	13,394,300.00	615.20	615.27	0.07
2402	142,427.19	13,394,383.18	615.06	615.10	0.04
2403	142,455.87	13,394,411.81	614.92	614.95	0.04
2404	142,426.36	13,394,300.00	615.07	615.15	0.08
2405	142,454.74	13,394,300.00	614.92	614.96	0.03
2406	142,425.37	13,394,200.00	615.07	615.11	0.04
2407	142,453.73	13,394,200.00	614.93	614.87	-0.06
2408	142,424.86	13,394,108.88	615.07	615.04	-0.03
2409	142,452.91	13,394,118.46	614.93	615.02	0.08
2410	142,500.00	13,391,900.00	615.29	615.30	0.01
2411	142,500.00	13,392,000.00	615.45	615.51	0.06
2412	142,500.00	13,392,100.00	615.60	615.68	0.08
2413	142,500.00	13,392,200.00	615.76	615.83	0.08
2414	142,500.00	13,392,300.00	615.91	615.93	0.02
2415	142,500.00	13,392,400.00	616.07	616.01	-0.06
2416	142,500.00	13,392,500.00	616.22	616.28	0.05
2417	142,500.00	13,393,000.00	616.13	616.12	-0.01
2418	142,500.00	13,393,100.00	615.97	616.04	0.07
2419	142,500.00	13,393,200.00	615.82	615.92	0.10
2420	142,500.00	13,393,300.00	615.66	615.72	0.05
2421	142,500.00	13,393,400.00	615.51	615.49	-0.02
2422	142,500.00	13,393,500.00	615.35	615.40	0.05
2423	142,500.00	13,393,600.00	615.20	615.28	0.08
2424	142,500.00	13,393,700.00	615.04	615.09	0.05
2425	142,500.00	13,393,800.00	614.89	614.92	0.03
2426	142,500.00	13,393,900.00	614.75	614.78	0.02
2427	142,500.00	13,394,000.00	614.70	614.66	-0.04
2428	142,500.00	13,394,028.77	614.70	614.62	-0.08
2429	142,500.00	13,394,069.73	614.70	614.68	-0.01
2430	142,470.75	13,394,100.00	614.84	614.89	0.04
2431	142,431.27	13,394,100.00	615.04	615.05	0.01
2432	142,600.00	13,391,900.00	615.77	615.86	0.09
2433	142,600.00	13,392,000.00	615.92	615.92	0.00
2434	142,600.00	13,392,100.00	616.08	616.10	0.02
2435	142,600.00	13,392,200.00	616.23	616.20	-0.03
2436	142,600.00	13,392,700.00	616.12	616.20	0.08
2437	142,600.00	13,392,800.00	615.96	615.97	0.01
2438	142,600.00	13,392,900.00	615.81	615.77	-0.03
2439	142,600.00	13,393,000.00	615.65	615.59	-0.06
2440	142,600.00	13,393,100.00	615.50	615.57	0.08
2441	142,600.00	13,393,200.00	615.34	615.44	0.09
2442	142,600.00	13,393,300.00	615.19	615.23	0.04
2443	142,600.00	13,393,400.00	615.03	614.99	-0.04
2444	142,600.00	13,393,500.00	614.88	614.93	0.06
2445	142,600.00	13,393,600.00	614.72	614.76	0.04
2446	142,600.00	13,393,700.00	614.57	614.62	0.05
2447	142,600.00	13,393,800.00	614.41	614.42	0.01
2448	142,600.00	13,393,900.00	614.27	614.26	0.00
2449	142,600.17	13,393,925.14	614.24	614.27	0.03
2450	142,600.00	13,393,966.28	614.21	614.24	0.03
2451	142,700.00	13,392,400.00	616.11	616.12	0.01
2452	142,700.00	13,392,500.00	615.95	615.98	0.03
2453	142,700.00	13,392,600.00	615.80	615.90	0.10
2454	142,700.00	13,392,700.00	615.64	615.61	-0.04
2455	142,700.00	13,392,800.00	615.49	615.57	0.08
2456	142,700.00	13,392,900.00	615.33	615.29	-0.04
2457	142,700.00	13,393,000.00	615.18	615.13	-0.04
2458	142,700.00	13,393,100.00	615.02	615.00	-0.02
2459	142,700.00	13,393,200.00	614.87	614.92	0.05
2460	142,700.00	13,393,300.00	614.71	614.80	0.09
2461	142,700.00	13,393,400.00	614.55	614.52	-0.03
2462	142,700.00	13,393,500.00	614.40	614.47	0.07
2463	142,700.00	13,393,600.00	614.25	614.29	0.05
2464	142,700.00	13,393,700.00	614.09	614.10	0.01
2465	142,700.00	13,393,800.00	613.93	613.99	0.05
2466	142,700.00	13,393,824.15	613.90	613.85	-0.05
2467	142,700.00	13,393,864.09	613.84	613.89	0.05
2468	142,767.42	13,393,757.61	613.68	613.67	-0.01
2469	142,792.22	13,393,773.00	613.54	613.52	-0.02

PHASE 2 TOP OF PORE RELIEF RECORD CONTROL POINTS

POINT NUMBER	NORTHING	EASTING	DESIGN ELEVATION	RECORD ELEVATION	DIFFERENCE ±
2470	142,800.00	13,392,100.00	616.10	616.17	0.07
2471	142,800.00	13,392,200.00	615.94	616.00	0.06
2472	142,800.00	13,392,300.00	615.79	615.83	0.04
2473	142,800.00	13,392,400.00	615.63	615.64	0.01
2474	142,800.00	13,392,500.00	615.48	615.43	-0.05
2475	142,800.00	13,392,600.00	615.32	615.28	-0.04
2476	142,800.00	13,392,700.00	615.17	615.17	0.00
2477	142,800.00	13,392,800.00	615.01	615.00	-0.01
2478	142,800.00	13,392,900.00	614.86	614.81	-0.05
2479	142,800.00	13,393,000.00	614.70	614.70	0.00
2480	142,800.00	13,393,100.00	614.55	614.63	0.08
2481	142,800.00	13,393,200.00	614.39	614.48	0.09
2482	142,800.00	13,393,300.00	614.24	614.29	0.06
2483	142,800.00	13,393,400.00	614.08	614.08	0.00
2484	142,800.00	13,393,500.00	613.92	614.00	0.07
2485	142,800.00	13,393,600.00	613.77	613.81	0.04
2486	142,786.24	13,393,700.00	613.68	613.76	0.08
2487	142,816.07	13,393,700.00	613.54	613.55	0.01
2488	142,818.90	13,393,600.00	613.68	613.64	-0.04
2489	142,848.73	13,393,600.00	613.54	613.52	-0.02
2490	142,851.57	13,393,500.00	613.68	613.73	0.05
2491	142,881.40	13,393,500.00	613.54	613.53	-0.01
2492	142,900.00	13,392,000.00	615.78	615.80	0.02
2493	142,900.00	13,392,100.00	615.62	615.71	0.08
2494	142,900.00	13,392,200.00	615.47	615.51	0.04
2495	142,900.00	13,392,300.00	615.31	615.39	0.08
2496	142,900.00	13,392,400.00	615.16	615.19	0.03
2497	142,900.00	13,392,500.00	615.00	615.01	0.01
2498	142,900.00	13,392,600.00	614.85	614.87	0.02
2499	142,900.00	13,392,700.00	614.69	614.65	-0.05
2500	142,900.00	13,392,800.00	614.54	614.59	0.05
2501	142,900.00	13,392,900.00	614.38	614.40	0.02
2502	142,900.00	13,393,000.00	614.23	614.24	0.02
2503	142,900.00	13,393,100.00	614.07	614.13	0.06
2504	142,900.00	13,393,200.00	613.92	613.94	0.02
2505	142,900.00	13,393,300.00	613.76	613.81	0.04
2506	142,884.24	13,393,400.00	613.68	613.73	0.05
2507	142,914.07	13,393,400.00	613.54	613.55	0.01
2508	143,000.00	13,392,100.00	615.15	615.13	-0.02
2509	143,000.00	13,392,200.00	614.99	615.04	0.04
2510	143,000.00	13,392,300.00	614.84	614.89	0.06
2511	143,000.00	13,392,400.00	614.68	614.63	-0.06
2512	143,000.00	13,392,500.00	614.53	614.53	0.00
2513	143,000.00	13,392,600.00	614.37	614.28	-0.09
2514	143,000.00	13,392,700.00	614.22	614.27	0.05
2515	143,000.00	13,392,800.00	614.06	614.09	0.02
2516	143,000.00	13,392,900.00	613.91	613.93	0.02
2517	143,000.00	13,393,000.00	613.75	613.76	0.01
2518	142,916.91	13,393,300.00	613.68	613.76	0.08
2519	142,946.73	13,393,300.00	613.54	613.52	-0.02
2520	142,949.57	13,393,200.00	613.68	613.77	0.09
2521	142,979.40	13,393,200.00	613.54	613.61	0.07
2522	142,982.24	13,393,100.00	613.68	613.67	-0.01
2523	143,012.06	13,393,100.00	613.54	613.59	0.05
2524	143,015.53	13,392,998.08	613.68	613.73	0.05
2525	143,043.56	13,393,003.58	613.54	613.48	-0.06
2526	143,022.70	13,392,900.00	613.80	613.87	0.07
2527	143,051.09	13,392,900.70	613.66	613.74	0.08
2528	143,030.13	13,392,800.00	613.92	613.96	0.04
2529	143,058.58	13,392,800.00	613.78	613.82	0.04
2530	143,037.77	13,392,700.00	614.04	614.05	0.01
2531	143,066.22	13,392,700.00	613.90	613.96	0.06
2532	143,045.42	13,392,600.00	614.16	614.24	0.08
2533	143,073.87	13,392,600.00	614.02	614.01	-0.01
2534	143,053.09	13,392,500.00	614.27	614.30	0.03
2535	143,081.54	13,392,500.00	614.14	614.14	0.00
2536	143,061.04	13,392,400.00	614.39	614.33	-0.07
2537	143,089.49	13,392,400.00	614.26	614.30	0.04
2538	143,069.71	13,392,291.03	614.52	614.49	-0.03
2539	143,097.92	13,392,294.00	614.38	614.44	0.06
2540	143,084.90	13,392,200.00	614.59	614.66	0.07
2541	143,113.64	13,392,200.00	614.45	614.48	0.03
2542	143,101.62	13,392,100.00	614.67	614.70	0.04
2543	143,130.37	13,392,100.00	614.53	614.61	0.08

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	DJC
DESIGN	SF
REVIEW	SEF
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
RECORD PORE WATER RELIEF SYSTEM
CONSTRUCTION CONTROL / QA/QC POINTS

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA004.dwg	0	9

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

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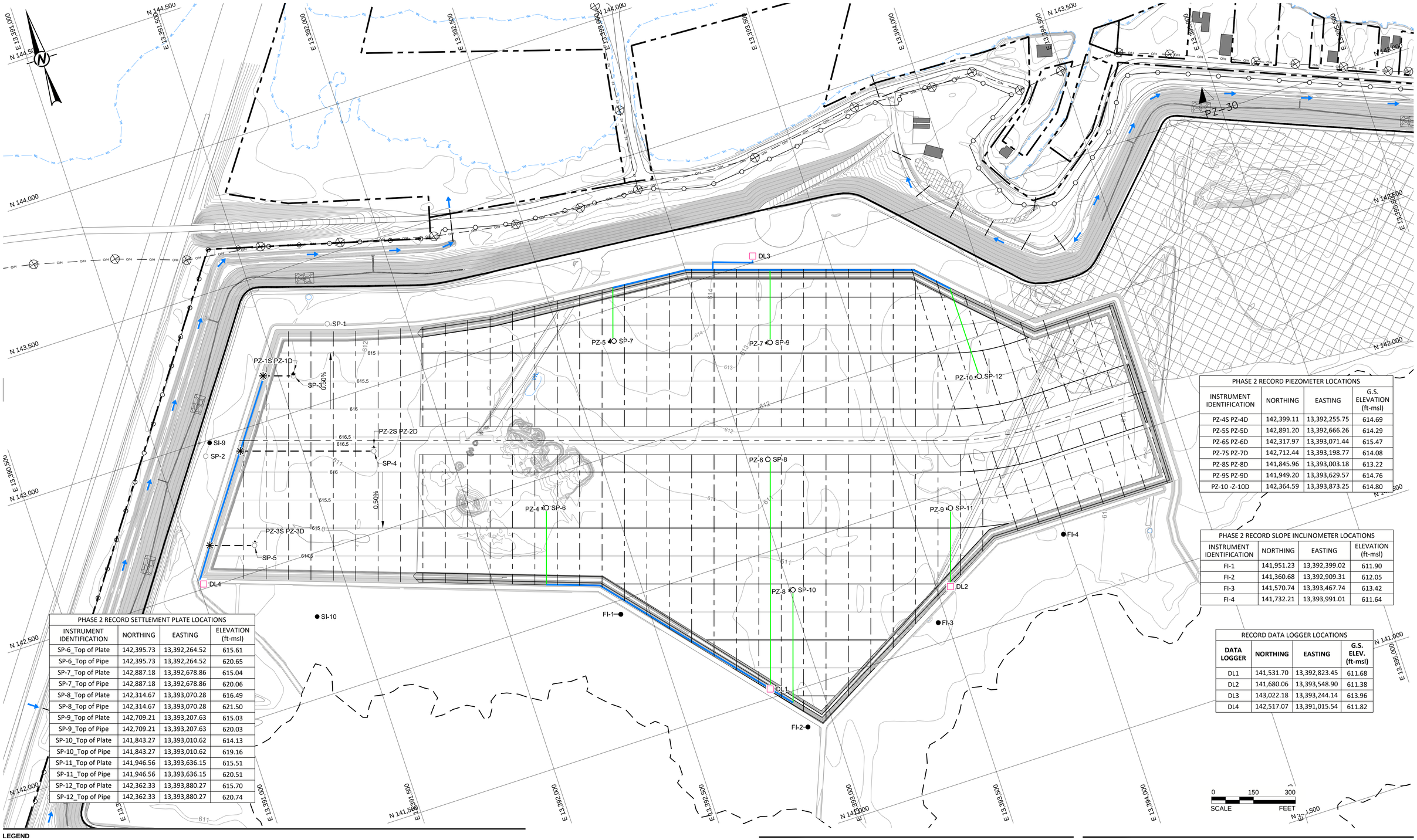

PHASE 2 RECORD SETTLEMENT PLATE LOCATIONS			
INSTRUMENT IDENTIFICATION	NORTHING	EASTING	ELEVATION (ft-msl)
SP-6_Top of Plate	142,395.73	13,392,264.52	615.61
SP-6_Top of Pipe	142,395.73	13,392,264.52	620.65
SP-7_Top of Plate	142,887.18	13,392,678.86	615.04
SP-7_Top of Pipe	142,887.18	13,392,678.86	620.06
SP-8_Top of Plate	142,314.67	13,393,070.28	616.49
SP-8_Top of Pipe	142,314.67	13,393,070.28	621.50
SP-9_Top of Plate	142,709.21	13,393,207.63	615.03
SP-9_Top of Pipe	142,709.21	13,393,207.63	620.03
SP-10_Top of Plate	141,843.27	13,393,010.62	614.13
SP-10_Top of Pipe	141,843.27	13,393,010.62	619.16
SP-11_Top of Plate	141,946.56	13,393,636.15	615.51
SP-11_Top of Pipe	141,946.56	13,393,636.15	620.51
SP-12_Top of Plate	142,362.33	13,393,880.27	615.70
SP-12_Top of Pipe	142,362.33	13,393,880.27	620.74

PHASE 2 RECORD PIEZOMETER LOCATIONS			
INSTRUMENT IDENTIFICATION	NORTHING	EASTING	G.S. ELEVATION (ft-msl)
PZ-4S PZ-4D	142,399.11	13,392,255.75	614.69
PZ-5S PZ-5D	142,891.20	13,392,666.26	614.29
PZ-6S PZ-6D	142,317.97	13,393,071.44	615.47
PZ-7S PZ-7D	142,712.44	13,393,198.77	614.08
PZ-8S PZ-8D	141,845.96	13,393,003.18	613.22
PZ-9S PZ-9D	141,949.20	13,393,629.57	614.76
PZ-10 -Z-10D	142,364.59	13,393,873.25	614.80

PHASE 2 RECORD SLOPE INCLINOMETER LOCATIONS			
INSTRUMENT IDENTIFICATION	NORTHING	EASTING	ELEVATION (ft-msl)
FI-1	141,951.23	13,392,399.02	611.90
FI-2	141,360.68	13,392,909.31	612.05
FI-3	141,570.74	13,393,467.74	613.42
FI-4	141,732.21	13,393,991.01	611.64

RECORD DATA LOGGER LOCATIONS			
DATA LOGGER	NORTHING	EASTING	G.S. ELEV. (ft-msl)
DL1	141,531.70	13,392,823.45	611.68
DL2	141,680.06	13,393,548.90	611.38
DL3	143,022.18	13,393,244.14	613.96
DL4	142,517.07	13,391,015.54	611.82

LEGEND

- SI-1 — PHASE 1 SLOPE INCLINOMETER
- PZ-1D / PZ-1S — PHASE 1 VIBRATING WIRE PIEZOMETER (VWP) PAIR (DEEP & SHALLOW)
- SP-1 — PHASE 1 SETTLEMENT PLATE
- PHASE 1 REMOTE (CABLED) DATA LOGGER LOCATION FOR VWP
- DATA LOGGER CABLE
- RECORD LOCATION OF DRAINAGE PIPING
- FI-1 — 2017 SLOPE INCLINOMETER
- 2017 VIBRATING WIRE PIEZOMETER (VWP) PAIR (DEEP & SHALLOW) AND SETTLEMENT PLATE
- DATA TRANSMISSION LOCATION
- CABLING OUTSIDE OVERLINER
- CABLING INSIDE OVERLINER

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
DESIGN	JJS
REVIEW	SEF
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
RECORD MONITORING LOCATIONS FOR PHASE 2

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA005.dwg	0	10

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

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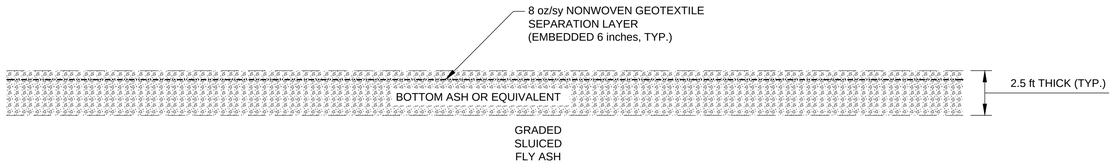
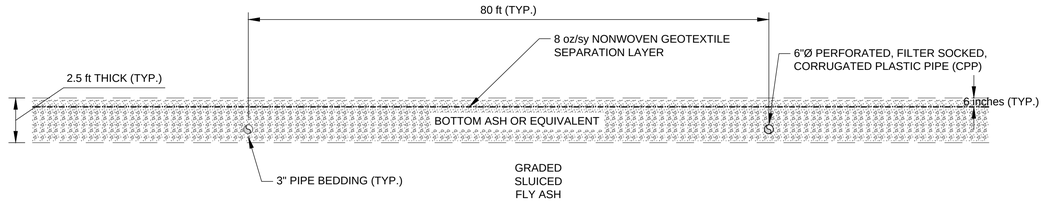
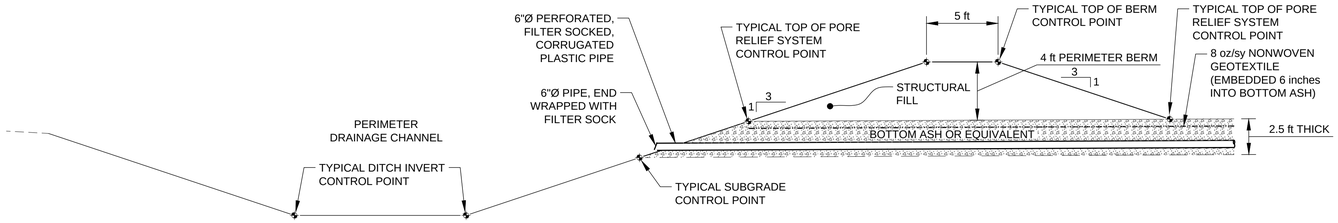


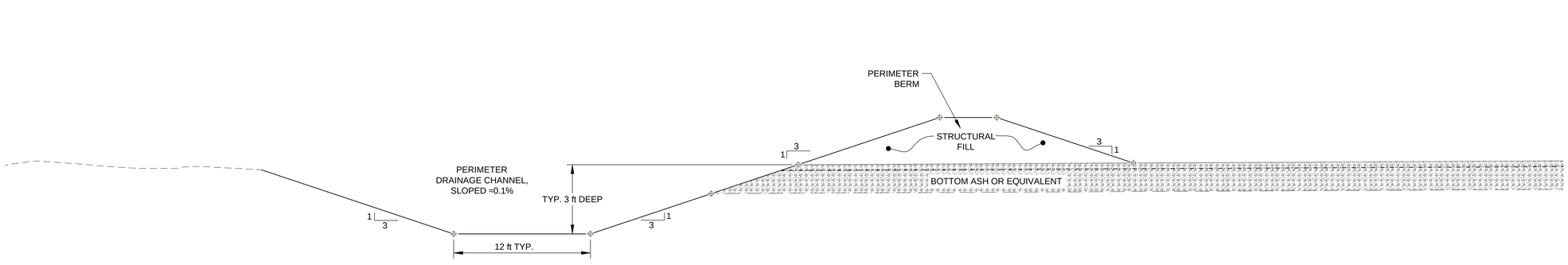
1 / 11 PORE RELIEF SYSTEM BASE LINER



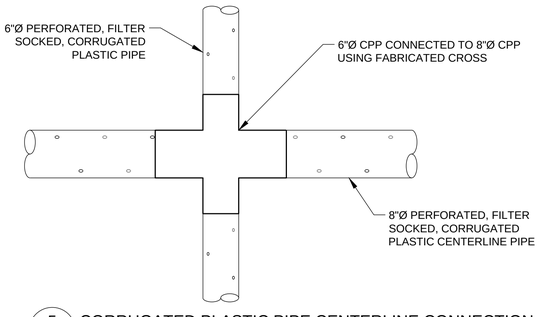
2 / 11 PORE RELIEF SYSTEM BASE LINER w/PIPES



3 / 11 PERIMETER BERM WITH PORE RELIEF PIPING SHOWN



4 / 11 PERIMETER BERM WITHOUT PIPING



5 / 11 CORRUGATED PLASTIC PIPE CENTERLINE CONNECTION

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

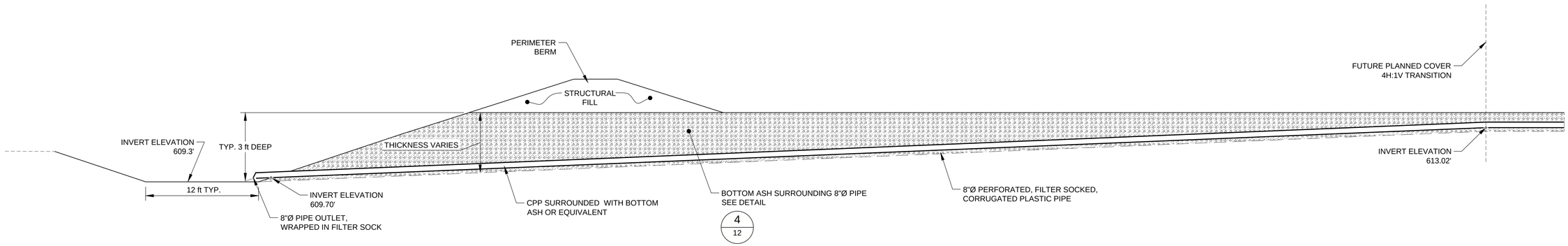
CONSULTANT
Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
DESIGN	JJS
REVIEW	SEF
APPROVED	DML

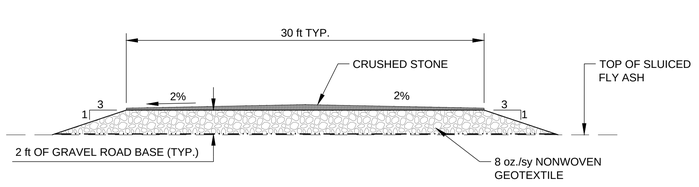
PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
GENERAL DETAILS
SHEET 1

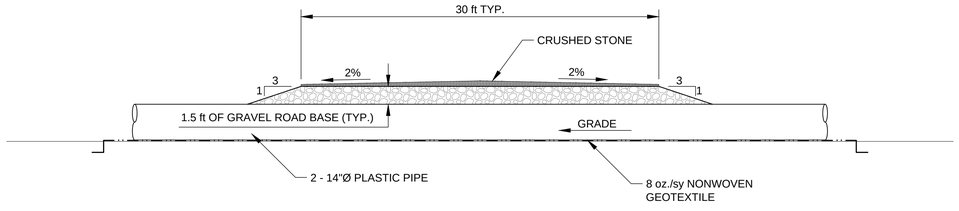
PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA006.dwg	0	11



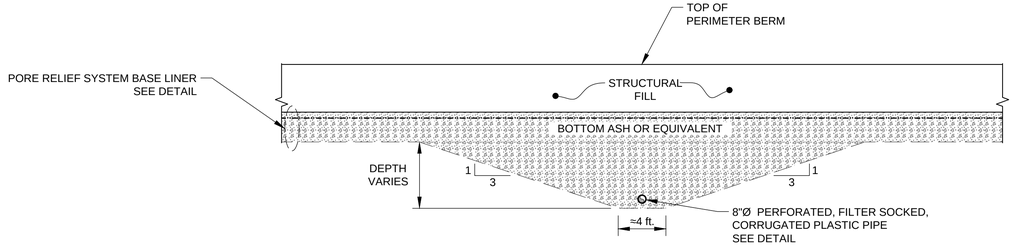
1 / 12 PERIMETER BERM WITH EASTERN CENTRAL PORE PRESSURE RELIEF PIPE SHOWN



2 / 12 TYPICAL ROAD SECTION



3 / 12 ACCESS ROAD RAMP AND CULVERT DETAIL



4 / 12 8"ø PIPE TRENCH PAST 4H 1V SLOPE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-11-20
PREPARED	JJS
DESIGN	JJS
REVIEW	SEF
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
2017 PHASE 2 RECORD DRAWINGS

TITLE
GENERAL DETAILS
SHEET 2

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA006.dwg	0	12

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

Path: \\ansing\cad\Projects\15x-Projects\1521809D_DTE Monroe 2016\PRODUCTION\A-PHASE 2 AS-BUILT\ | File Name: 1521809DA006.dwg

SECTION VI
ADDENDUMS AND SPECIFICATIONS CHANGES

At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

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Asia	+ 852 2562 3658
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

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15851 South US 27, Suite 50
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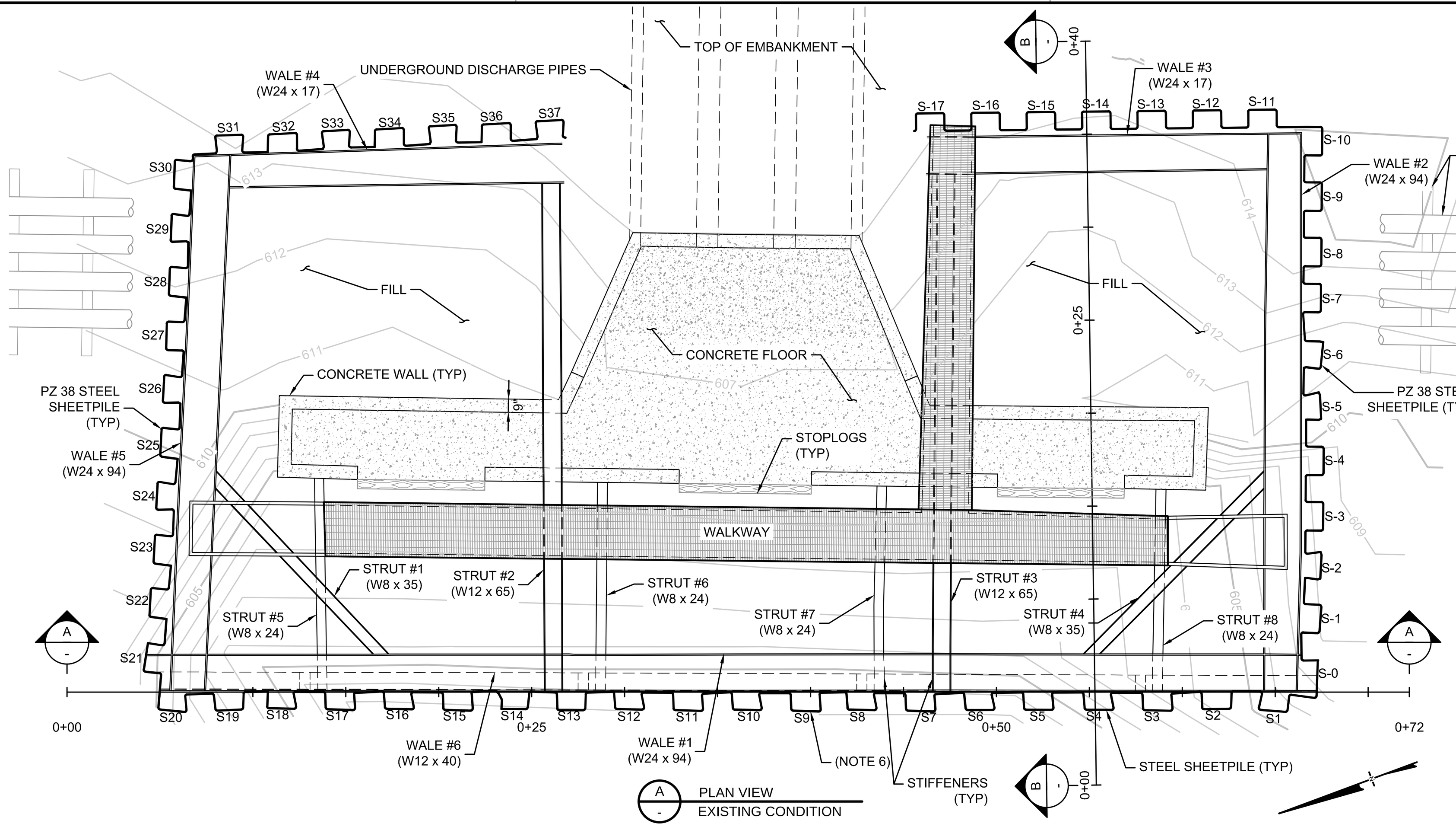
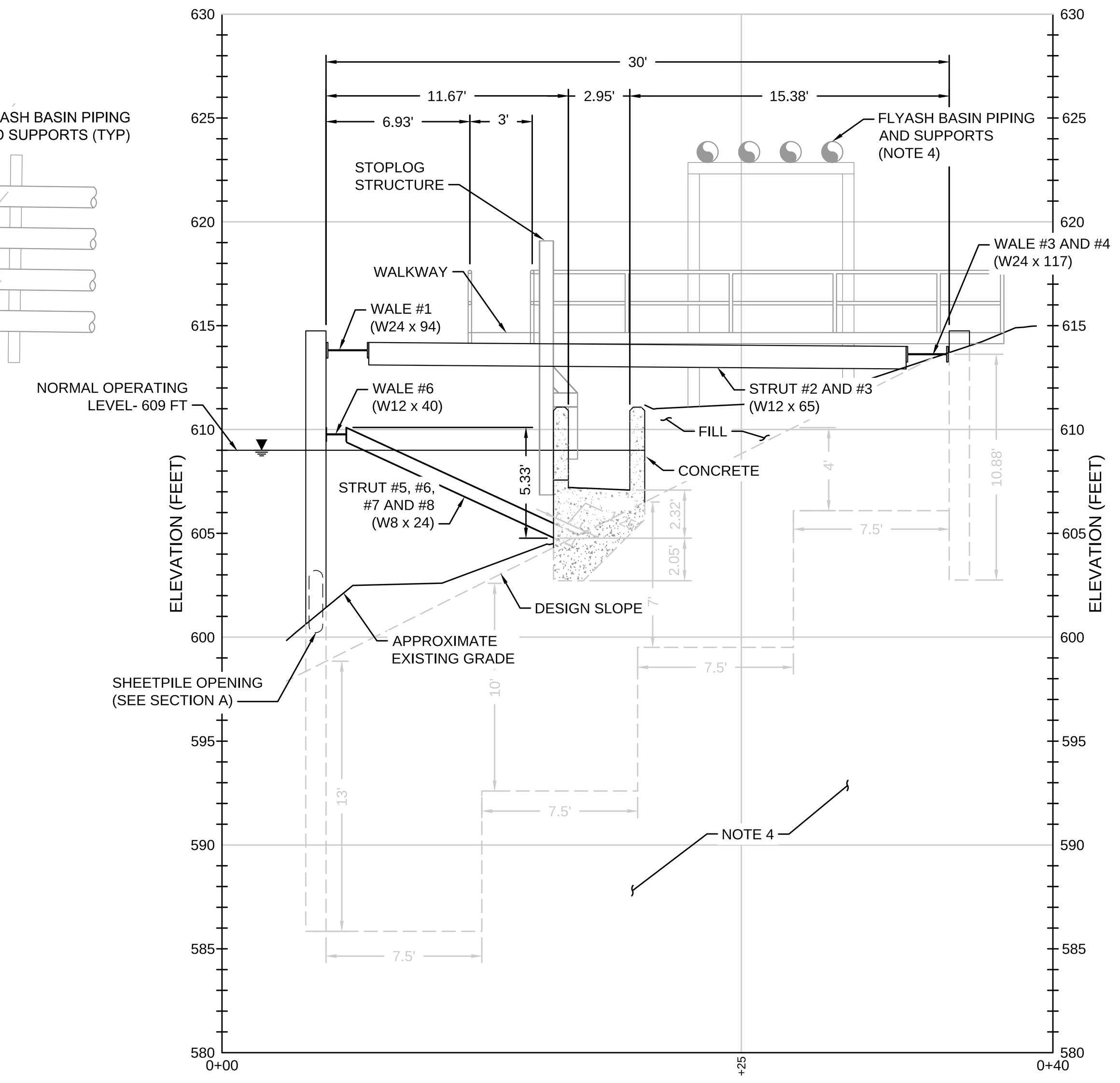
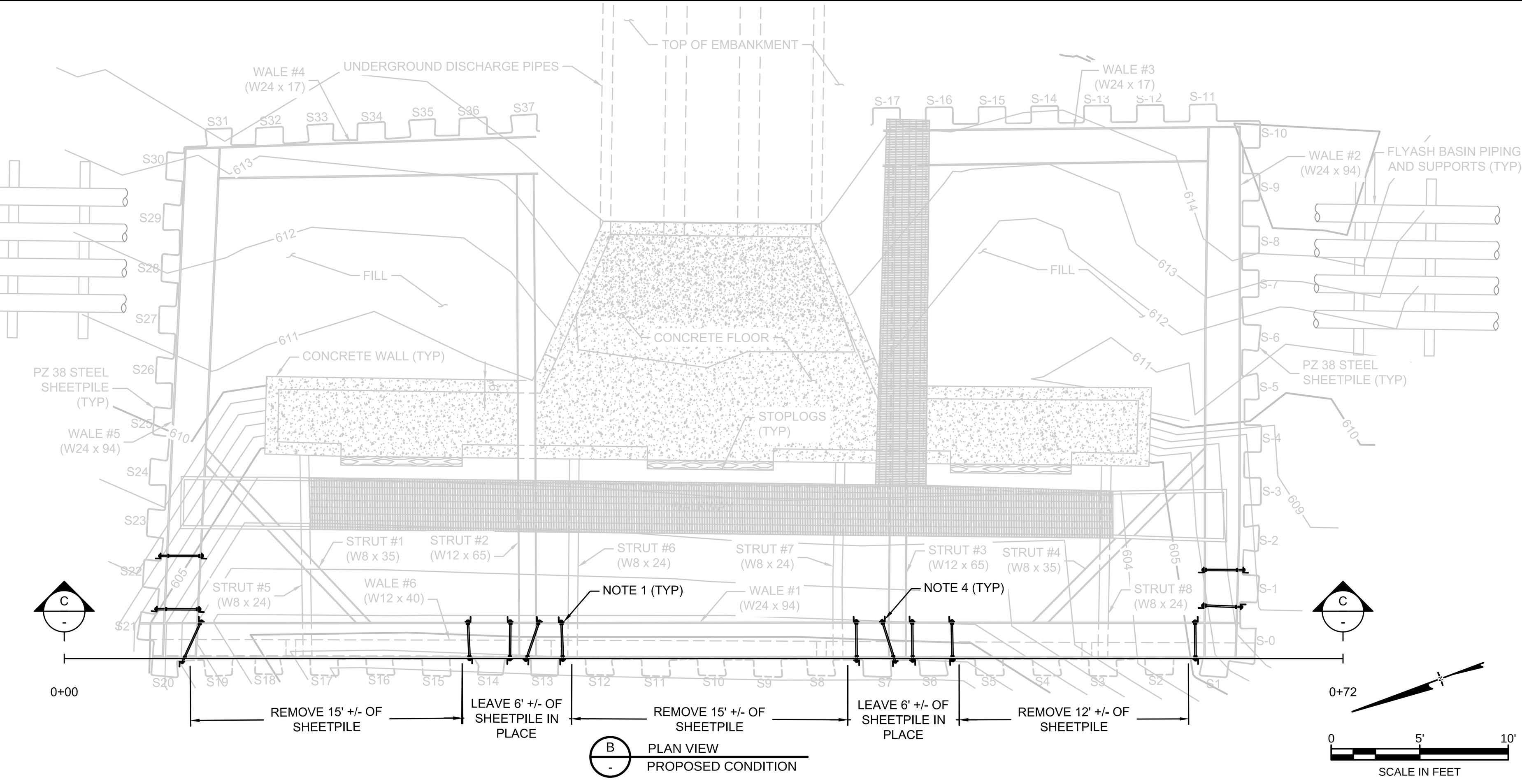
Fax: (517) 482-2460



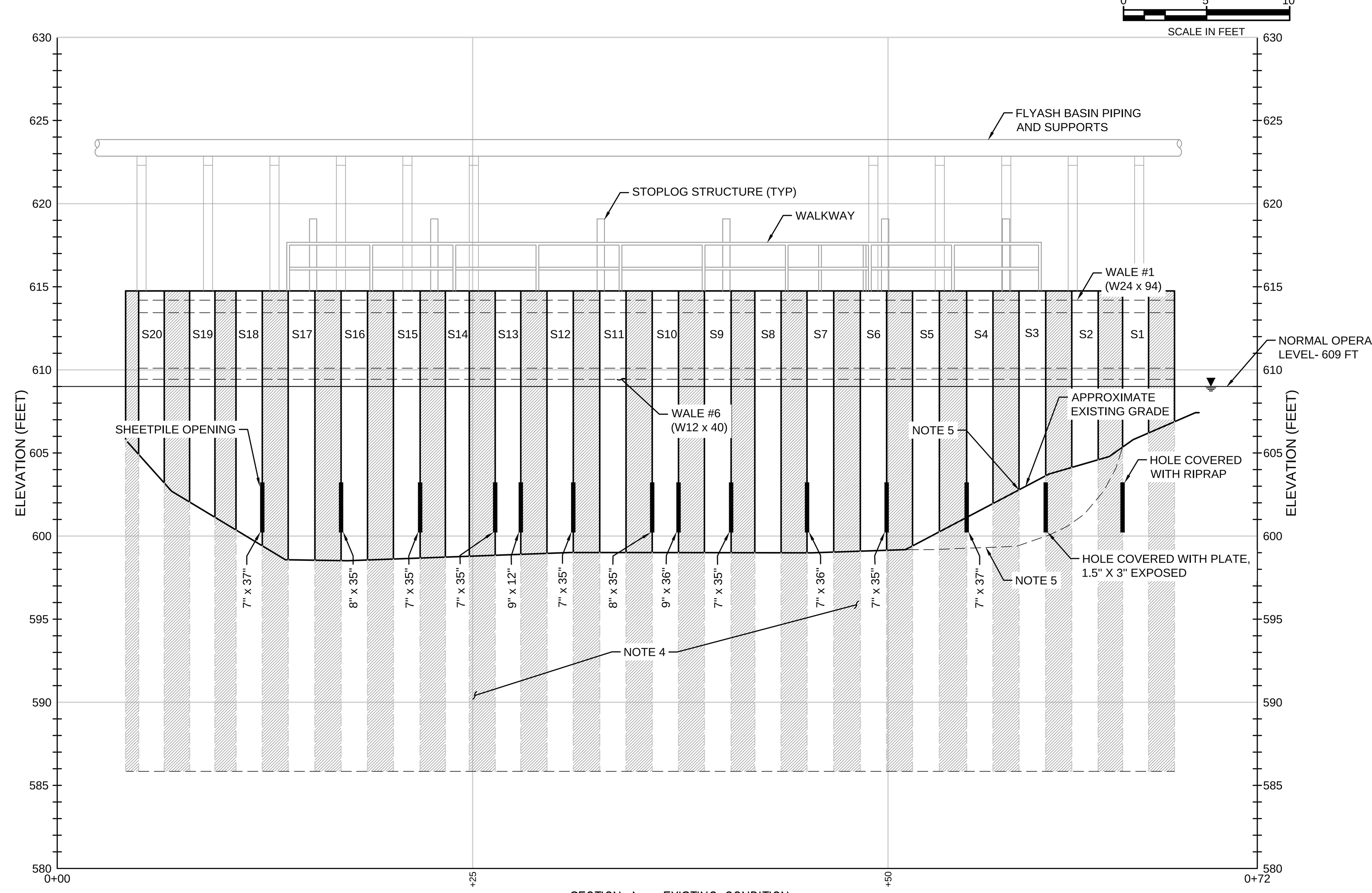
PLAN VIEW
EXISTING CONDITION



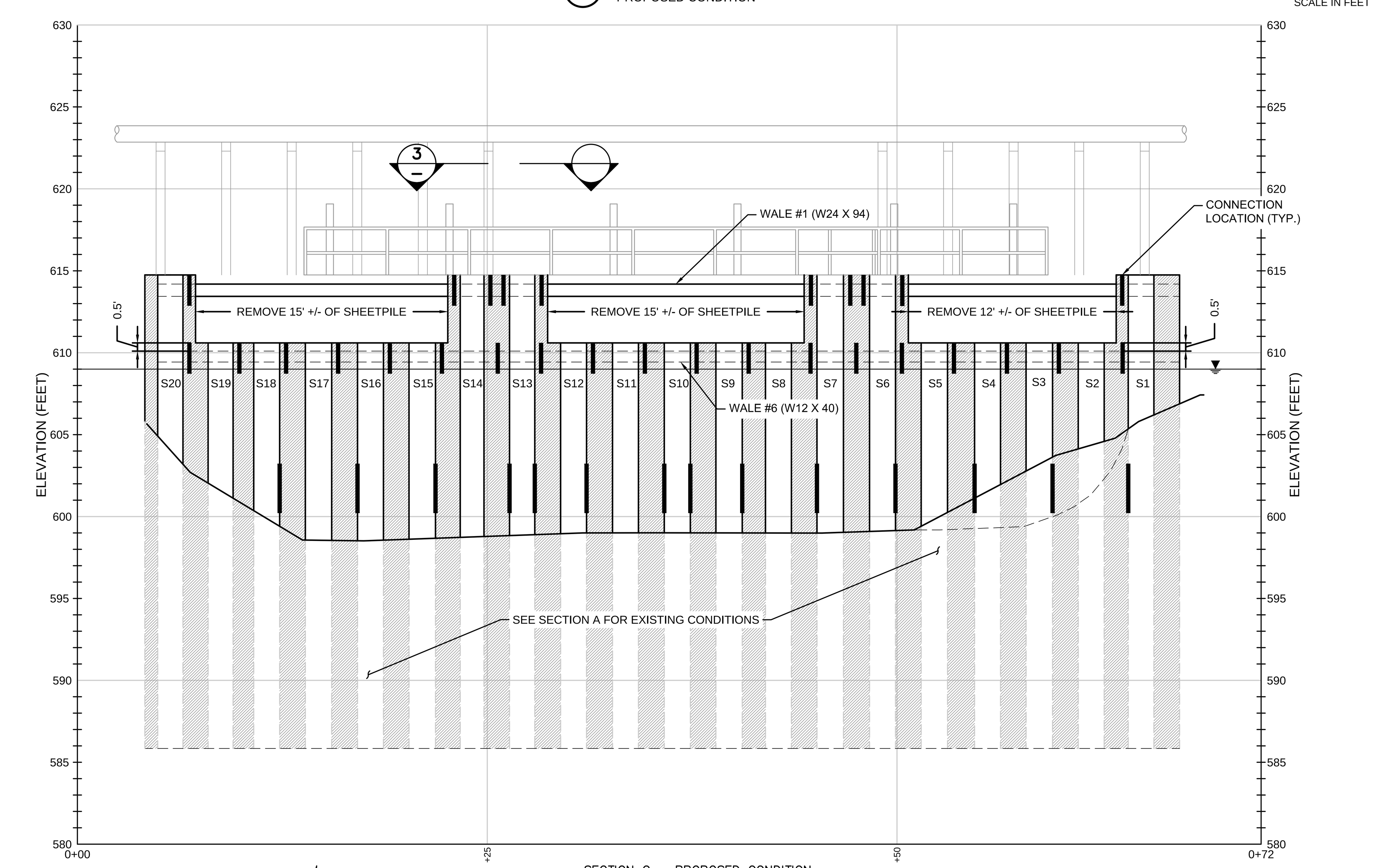
SECTION B – EXISTING CONDITION
HORIZONTAL: 1"=5'
VERTICAL: 1"=5'



PLAN VIEW
PROPOSED CONDITION



SECTION A – EXISTING CONDITION
HORIZONTAL: 1"=5'
VERTICAL: 1"=5'



SECTION C – PROPOSED CONDITION
HORIZONTAL: 1"=5'
VERTICAL: 1"=5'

EXISTING CONDITION NOTES:

1. THIS DRAWING WAS PREPARED BASED ON MEASUREMENTS AND SURVEY OF THE DISCHARGE STRUCTURE PERFORMED BY DTE ON FEBRUARY 8–9, 2016; SURVEY OF SHEETPILE OPENINGS PERFORMED BY COMMERCIAL DIVING AND MARINE SERVICES, INC. ON AUGUST 31, 2015; AND THE FOLLOWING HISTORICAL DRAWINGS:
   - 6C695W–56–REVISION F;
   - 6C695W–57–REVISION E;
   - 6M0695H–0106 THROUGH 0110; AND
   - 80–104–0215.
2. SURVEY INFORMATION IS NOT PROVIDED ON THIS DRAWING FOR CLARITY. DETAILED SURVEY INFORMATION IS PROVIDED ON DRAWING 6SE0695–0698.
3. THE ELEVATIONS ARE IN NATIONAL GEODETIC VERTICAL DATUM (NGVD) OF 1929.
4. FEATURES BELOW GRADE AND THOSE ABOVE GRADE SHOWN IN GRAY ARE BASED ON THE INFORMATION PROVIDED IN THE HISTORICAL DRAWINGS LISTED IN NOTE 1.
5. APPROXIMATE EXISTING GRADE WAS ESTABLISHED BASED ON A FEW SURVEY POINTS TAKEN AT THE SOUTHWEST CORNER OF THE DISCHARGE STRUCTURE. THE EXISTING GRADE IN THIS AREA IS MORE LIKELY TO BE AS SHOWN BY THE DASHED LINE.
6. WALE, STRUT AND SHEETPILE SIZES ARE SUMMARIZED IN DETAILS 1 AND 2.
7. STRUCTURE DESIGNATIONS ARE ASSIGNED BASED ON FIELD MEASUREMENTS AND AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) 13TH EDITION. SOME OF THE DIMENSIONS ARE DIFFERENT THAN THOSE PROVIDED IN AISC; THIS IS MAINLY AS A RESULT OF RUSTING.
8. ONLY CERTAIN SHEETPILE SECTIONS WERE SURVEYED. THE SHEETPILE SECTIONS THAT WERE SURVEYED REPRESENT A RANGE OF TYPICAL DIMENSIONS FOR SHEETPILES. S0, S20 AND S21 ARE LOCATED AT CORNERS.
9. SHEETPILES S0 AND S20 WERE FIELD–FIT TO CONSTRUCT THE CORNER. THEREFORE, THERE ARE NO DIMENSIONS FOR "L" AND "M".

DESIGN NOTES:

1. INSTALL 1" ø A36 GALVANIZED THREADED RODS (RODS) AS SHOWN ON PLAN VIEW AND SECTION VIEW. USE NEW RODS TO PULL EXISTING WALE #1 FLANGE TIGHT TO FACE OF EXISTING SHEETPILE. AT WALE #6, USE GALVANIZED SHIM STACK TO BLOCK OUT GAP BETWEEN WALE FLANGE AND FACE OF SHEETPILE.
2. NEW HOLES TO EXISTING SHEETPILE TO BE FIELD DRILLED. STANDARD HOLES FOR 1" ø ROD AT WALE #1 BEARING SEAT. ALL OTHER HOLES IN EXISTING SHEETPILE MAY BE TORCH CUT (GRIND SURFACE SMOOTH OF SLAG) AT CONTRACTOR'S OPTION WITH ½" X 4" X 4" PLATE WASHER AT INSIDE FACE OF SHEETPILE WITH STANDARD HOLE FOR 1" ø ROD.
3. GRIND AND REMOVE EXISTING WELD (IF PRESENT) TO AVOID INTERFERENCE WITH NEW BEARING SEATS (TYP).
4. SOME OF THE RODS NEED TO BE INSTALLED AT AN ANGLE, SEE PLANVIEW B. USE HORIZONTAL SHORT SLOTTED HOLE IN NEW ANGLE; PROVIDE BEVELED WASHERS TO MATCH SKEW ANGLE.
5. INSTALL THREE PAIRS OF RODS AT CORNERS AS SHOWN ON PLANVIEW B.

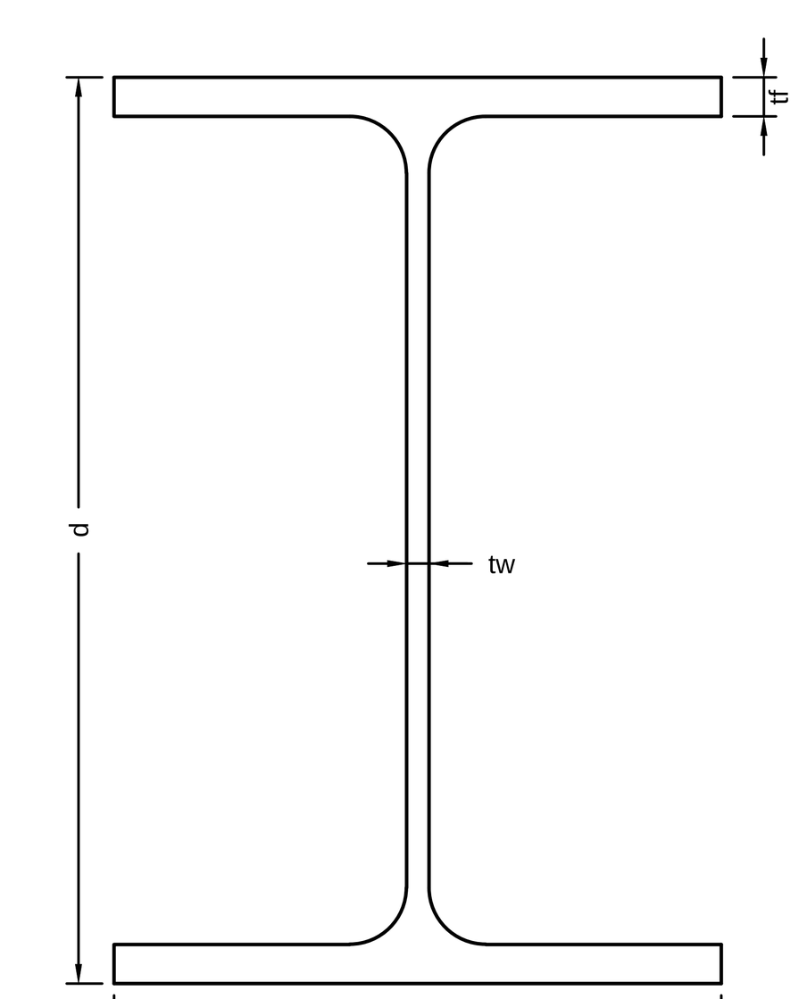
CONSTRUCTION SEQUENCE:

A. DTE WILL MONITOR THE EXISTING DISCHARGE STRUCTURE BEFORE, DURING, AND AFTER THE CONSTRUCTION. THE CONTRACTOR SHALL ASSIST DTE WITH MONITORING. THE MONITORING PROGRAM SHALL CONSIST OF THE FOLLOWING:
   - ESTABLISH MINIMUM OF FOUR SURVEY TARGET ON THE WEST CONCRETE WALL AND FOUR TARGETS ON WALE #6. THE LOCATION OF THE MONITORING POINTS WILL BE SELECTED BY A DTE SITE REPRESENTATIVE.
   - TAKE A BASELINE READING BEFORE COMMENCING THE CONSTRUCTION.
   - MONITOR THE SURVEY TARGETS PRIOR TO CONSTRUCTION AND AT THE END OF CONSTRUCTION.
   - PROVIDE RESULTS TO THE SURVEILLANCE MONITORING COMMITTEE.

B. INSTALL THREADED RODS AS FOLLOWS:
   - GRIND THE SURFACE OF THE SHEET PILE AND WALE AT THE LOCATION OF THE THREADED ROD AS NECESSARY TO HAVE A SMOOTH BEARING SURFACE.
   - INSTALL SNUG–TIGHTENED THREADED RODS IN ACCORDANCE WITH THE DESIGN NOTES, PLAN VIEWS, AND DETAILS.
   - ESTABLISH A TIGHT CONNECTION BETWEEN SHEETPILE AND WALES IN ACCORDANCE WITH THE DESIGN NOTES, PLAN VIEWS, AND DETAILS.
   - OBTAIN THE DTE SITE REPRESENTATIVE'S APPROVAL OF THE INSTALLED THREADED RODS.

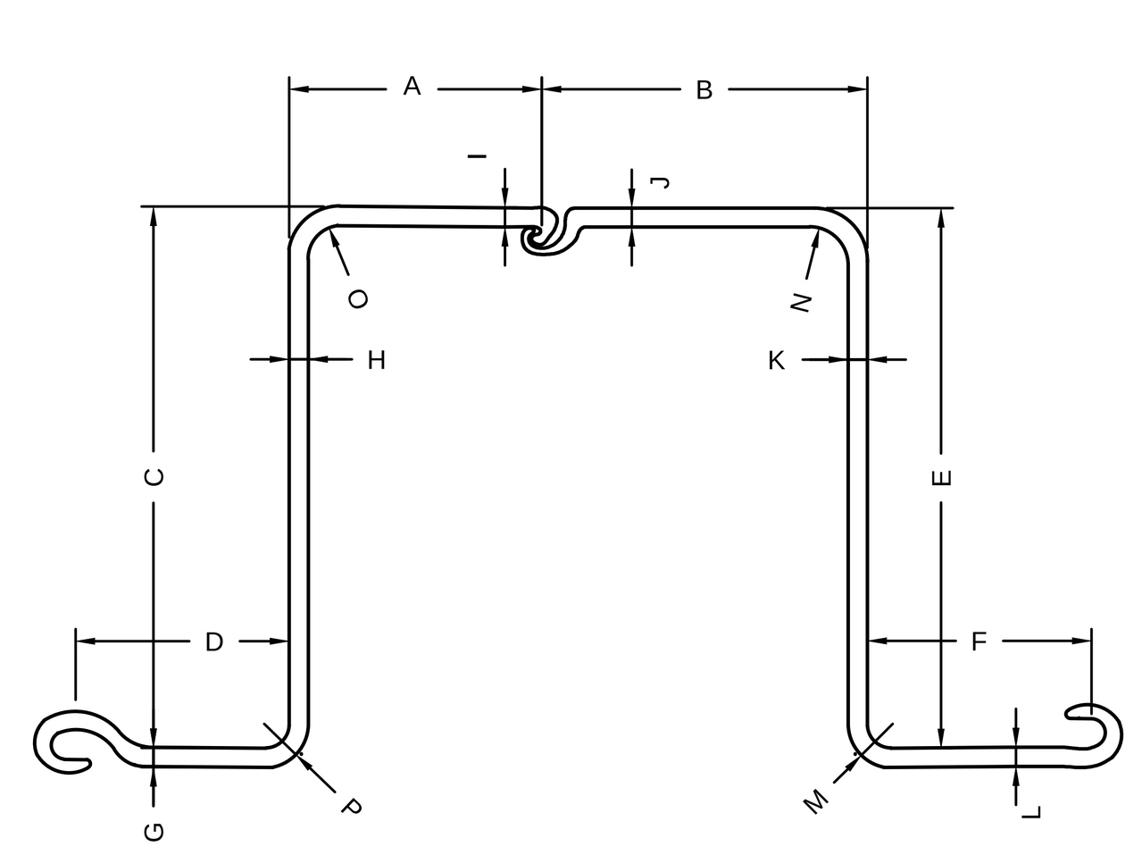
C. CUT SHEETPILES TO DESIGN CONDITION. THERE IS NO RESTRICTION ON THE SIZE OF THE CUT PIECES. THE CONTRACTOR SHALL SUBMIT A PLAN FOR DISPOSING THE CUT PIECES OF THE SHEETPILE FOR APPROVAL BY DTE.

D. INSPECT UNDERWATER SHEETPILE OPENINGS S4 THROUGH 18 FOR CLOGGING AND CLEAN THE OPENINGS AS NECESSARY.



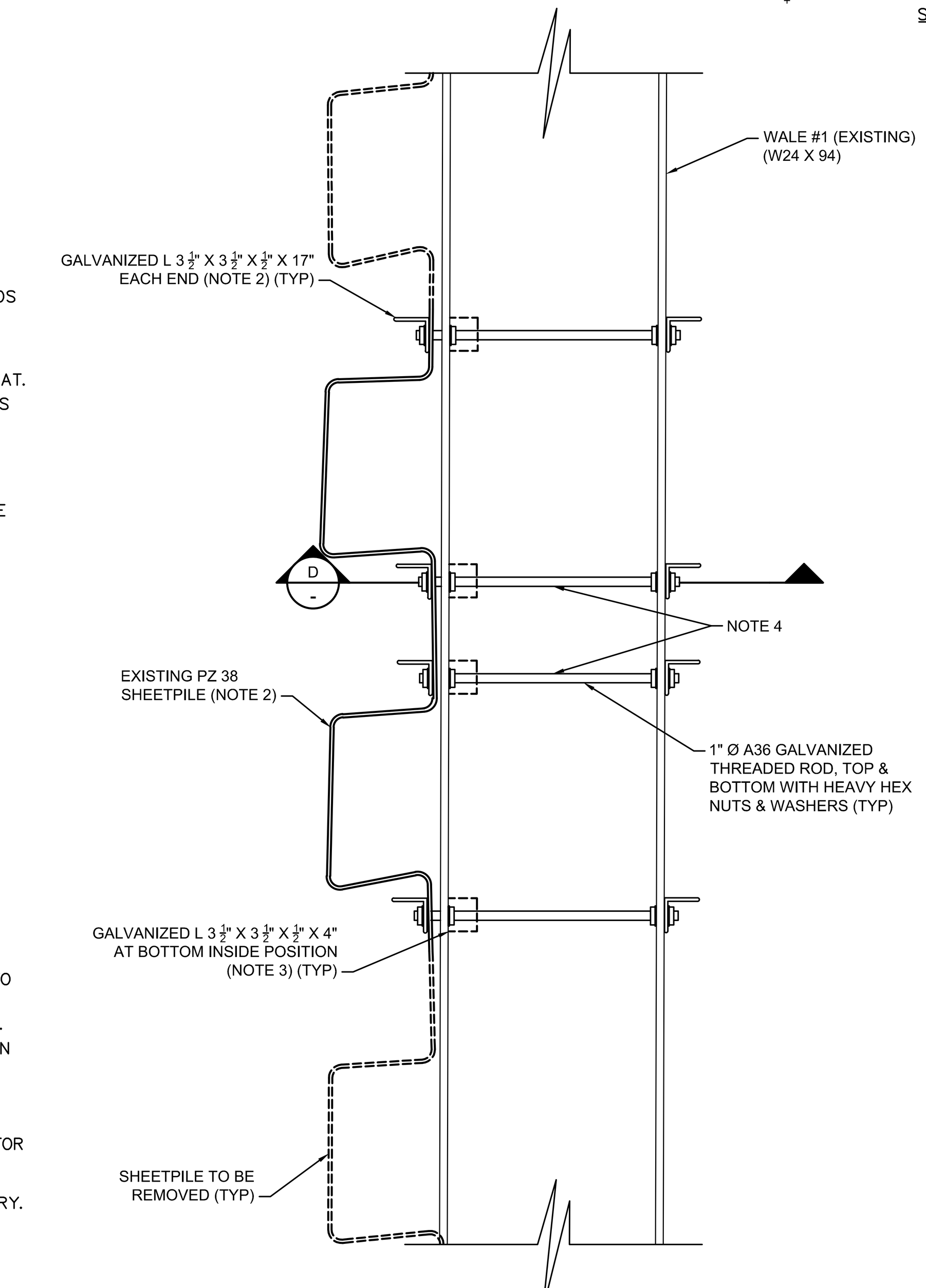
NUMBER	STRUCTURE DESIGNATION (NOTE 7)	bf	d	tf	tw
WALE 1	W24 x 94	9"	24-1/2"	7/8"	1/2"
WALE 2	W24 x 94	8"	24-3/8"	7/8"	1/2"
WALE 3	W24 x 117	12"	24-1/4"	7/8"	1"
WALE 4	W24 x 117	12"	24-1/4"	7/8"	1"
WALE 5	W24 x 94	9"	24-1/2"	7/8"	1/2"
WALE 6	W12 x 40	8"	11-7/8"	3/8"	1/8"
STRUT 1	W8 x 35	8-1/8"	8-3/16"	7/16"	5/8"
STRUT 2	W12 x 65	12-11/16"	12-1/4"	9/16"	9/16"
STRUT 3	W12 x 65	12-1/4"	12-1/4"	5/8"	3/4"
STRUT 4	W8 x 35	8"	8-3/16"	7/16"	1/4"
STRUT 5	W8 x 24	6-9/16"	7-15/16"	3/8"	5/16"
STRUT 6	W8 x 24	6-9/16"	8"	3/8"	3/16"
STRUT 7	W8 x 24	6-9/16"	8"	3/8"	7/16"
STRUT 8	W8 x 24	6-9/16"	8"	3/8"	5/16"

1 DETAIL (TYP)
WALE/STRUT DIMENSIONS

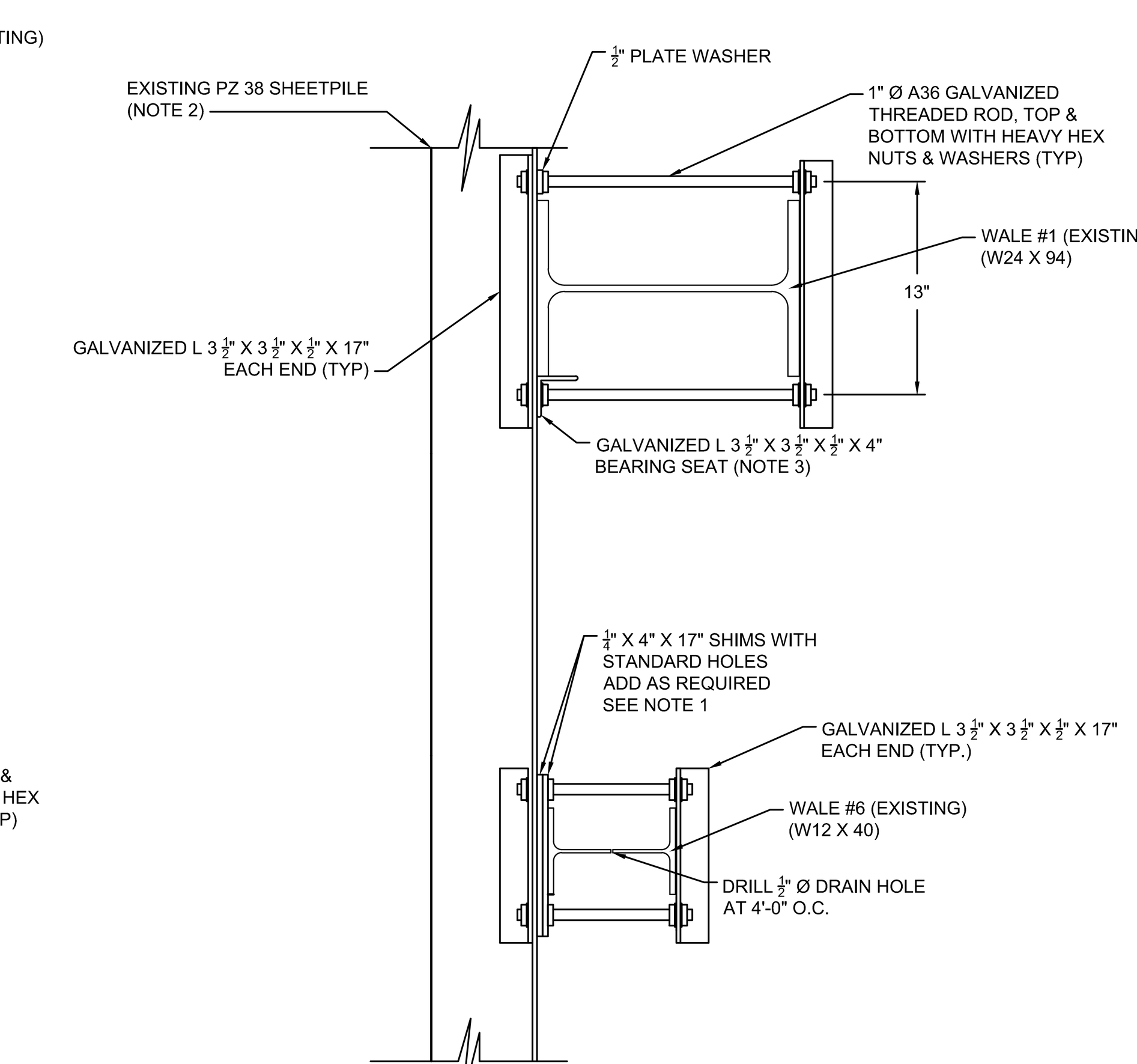


NUMBER	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
S-6	9"	9-3/4"		9-3/8"		8"	1/2"	3/8"	1/2"	1/2"	3/8"	1/2"	1/2"	1/2"	1/2"	1/2"
S0	9-3/8"	15-1/2"	11"	9-3/4"	8-1/2"	0	5/8"	1/2"	5/8"	1/2"	5/8"	NOTE 9	NOTE 9	1/2"	1/2"	1/2"
S1	9"	8"	11-3/8"	9-7/8"	11-3/8"	10"	5/8"	1/2"	3/4"	5/8"	3/8"	5/8"	1/2"	1/2"	1/2"	1/2"
S4	8-7/8"	10"	11-3/8"	9-1/2"	11-3/8"	9-3/4"	5/8"	3/8"	5/8"	5/8"	3/8"	5/8"	1/2"	1/2"	1/2"	1/2"
S20	8-7/8"	10"	11-3/8"	9-1/2"	14-1/2"	0	5/8"	3/8"	5/8"	5/8"	1/2"	NOTE 9	NOTE 9	1/2"	1/2"	1/2"
S21	9"	9-3/4"	11"	9-1/4"	11-3/8"	8-1/4"	5/8"	3/8"	5/8"	5/8"	3/8"	5/8"	1/2"	1/2"	1/2"	1/2"
S22	8-3/4"	10"	11"	9-7/8"	11"	8"	5/8"	3/8"	5/8"	5/8"	3/8"	5/8"	1/2"	1/2"	1/2"	1/2"
S25	8-1/2"	10"	11-3/8"	9-1/4"	11-3/8"	8"	5/8"	3/8"	5/8"	5/8"	3/8"	5/8"	1/2"	1/2"	1/2"	1/2"

2 DETAIL (TYP)
SHEETPILE DIMENSIONS (NOTE 8)



3 DETAIL (TYP)
SHEETPILE AND UPPER WALE CONNECTION



SECTION D
NOT TO SCALE

THREE FULL WORKING DAYS BEFORE YOU DIG, CALL THE MISS DIG SYSTEM AT 1-(800)-482-7171

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DETROIT EDISON'S SURVEYING SERVICES
560 SERVICE BUILDING

Detroit Edison - A DTE Energy Company

TITLE
DISCHARGE STRUCTURE – EXISTING & PROPOSED CONDITIONS
DTE ENERGY
MONROE POWER PLANT ASH SETTLING BASIN

LOCATION NAME
MONROE COUNTY, MICHIGAN

DISTRIBUTION OPERATIONS / Central Design — UNIT NUMBER

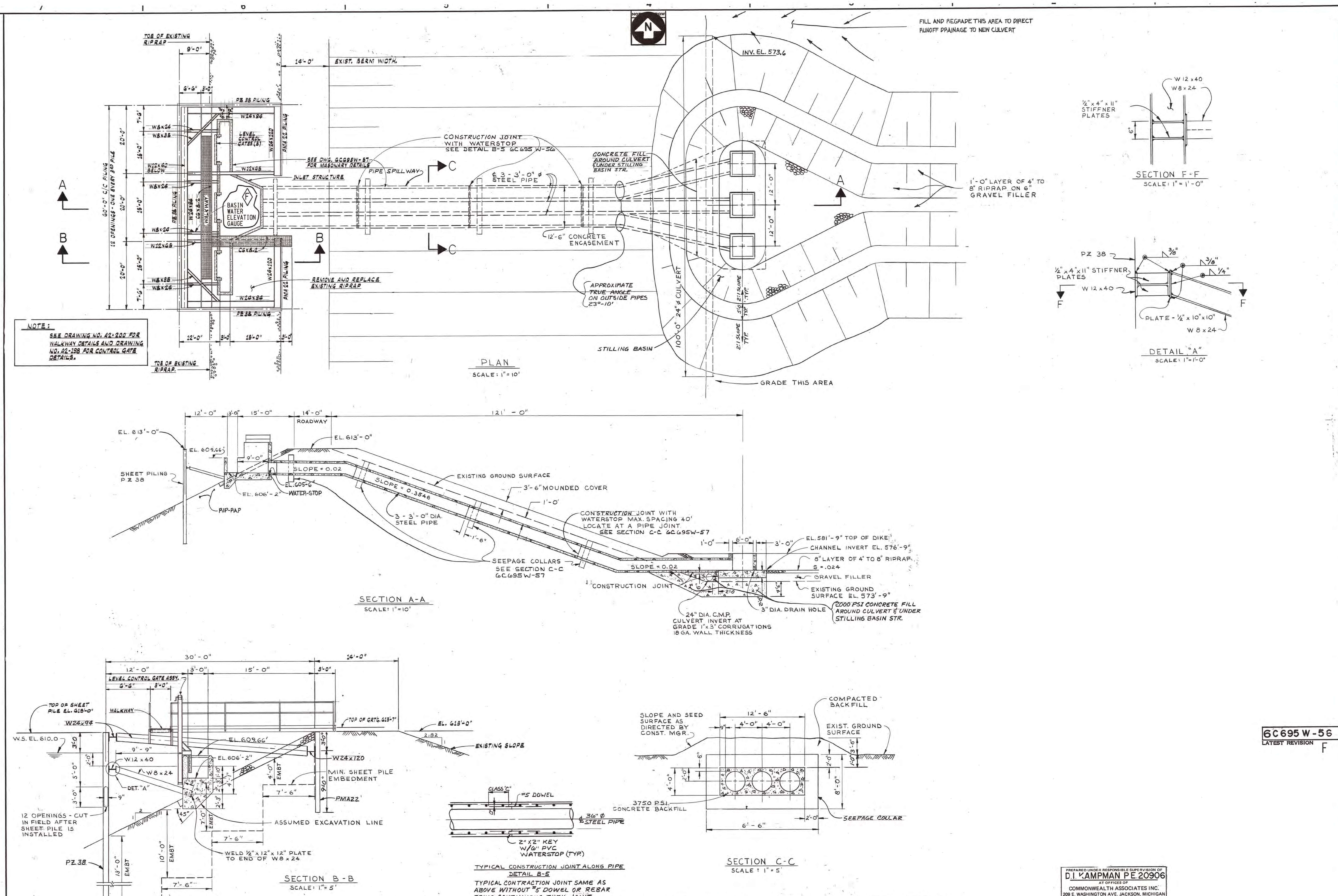
ORIGINATING SOURCE **SURVEYING SERVICES** — SCALE — USE DIMENSIONS ONLY DO NOT SCALE

DRAWING NUMBER — JOB NUMBER

PRODUCED ON AUTOCAD BY: GEOSYNTEC	DATE: 6/20/2016
SURVEYED BY: DTE	DATE: 2/12/2016
CHECKED BY:	DATE:
SURVEY ENGINEER: G STEPHENS	DATE: 2/17/2016
SUPERVISING ENGINEER: JAMES GRICE	DATE: 6/20/2016
DIVISION DIRECTOR:	DATE:

DIVISION / SUPERVISOR / DATE: ARCH–CIVIL; CONTROL & ELECT.; MECH.; STATIONS ENG.
OTHER APPROVALS / DATE; REF.DWGS. / REF.BMS.

SET 1\8242J–001 EXISTING PLAN SHEET MODIFIED–A



FILL AND REGRADE THIS AREA TO DIRECT RUNOFF DRAINAGE TO NEW CULVERT
INV. EL. 573.6
TOP OF EXISTING RIPRAP
EXIST. BERM WIDTH.
PZ 38 PILING
W24x84
LEVEL CONTROL GATES (3)
SEE DWG. 6C695W-57 FOR MASONARY DETAILS
INLET STRUCTURE
CONSTRUCTION JOINT WITH WATERSTOP SEE DETAIL B-5 6C695 W-56
PIPE SPILLWAY
3 - 3'-0" ϕ STEEL PIPE
CONCRETE FILL AROUND CULVERT & UNDER STILLING BASIN STR.
BASIN WATER ELEVATION GAUGE
12'-6" CONCRETE ENCASEMENT
REMOVE AND REPLACE EXISTING RIPRAP
APPROXIMATE TRUE ANGLE ON OUTSIDE PIPES 23°-10'
1'-0" LAYER OF 4" TO 8" RIPRAP ON 6" GRAVEL FILLER
STILLING BASIN
100'-0" 24" ϕ CULVERT
2:1 SLOPE TYP.
GRADE THIS AREA
NOTE: SEE DRAWING NO. A2-200 FOR WALKWAY DETAILS AND DRAWING NO. A2-198 FOR CONTROL GATE DETAILS.
PLAN
SCALE: 1" = 10'
SECTION F-F
SCALE: 1" = 1'-0"
1/2" x 4" x 11" STIFFNER PLATES
W 12 x 40
W 8 x 24
PZ 38
PLATE - 1/2" x 10" x 10"
DETAIL "A"
SCALE: 1" = 1'-0"
EL. 613'-0"
EL. 609.66'
SHEET PILING PZ 38
EL. 606'-2"
EL. 605'-6"
WATER-STOP
RIP-RAP
ROADWAY
SLOPE = 0.02
SLOPE = 0.3546
EXISTING GROUND SURFACE
3'-6" MOUNDED COVER
3 - 3'-0" DIA. STEEL PIPE
CONSTRUCTION JOINT WITH WATERSTOP MAX. SPACING 40' LOCATE AT A PIPE JOINT. SEE SECTION C-C 6C695W-57
SEEPAGE COLLARS SEE SECTION C-C 6C695W-57
CONSTRUCTION JOINT
EL. 581'-9" TOP OF DIKE
CHANNEL INVERT EL. 576'-9"
8" LAYER OF 4" TO 8" RIPRAP
S = .024
GRAVEL FILLER
EXISTING GROUND SURFACE EL. 573'-9"
2000 PSI CONCRETE FILL AROUND CULVERT & UNDER STILLING BASIN STR.
3" DIA. DRAIN HOLE
24" DIA. C.M.P. CULVERT INVERT AT GRADE 1"x3" CORRUGATIONS 18 GA. WALL THICKNESS
SECTION A-A
SCALE: 1" = 10'
LEVEL CONTROL GATE ASSY.
TOP OF SHEET PILE EL. 618-0"
WALKWAY
W24x94
TOP OF GRTG. 613-7"
EL. 613'-0"
EXISTING SLOPE
W.S. EL. 610.0
EL. 609.66'
W12 x 40
W8 x 24
EL. 606'-2"
W24x120
MIN. SHEET PILE EMBEDMENT
PMA22
DET. "A"
12 OPENINGS - CUT IN FIELD AFTER SHEET PILE IS INSTALLED
ASSUMED EXCAVATION LINE
WELD 1/2" x 12" x 12" PLATE TO END OF W8 x 24
PZ 38
SECTION B-B
SCALE: 1" = 5'
CLASS "C"
#5 DOWEL
36" ϕ STEEL PIPE
2" X 2" KEY W/6" PVC WATERSTOP (TYP)
TYPICAL CONSTRUCTION JOINT ALONG PIPE
DETAIL B-5
TYPICAL CONTRACTION JOINT SAME AS ABOVE WITHOUT #5 DOWEL OR REBAR BEING CONTINUOUS THRU JOINT
SLOPE AND SEED SURFACE AS DIRECTED BY CONST. MGR.
COMPACTED BACKFILL
EXIST. GROUND SURFACE
3750 PSI. CONCRETE BACKFILL
SEEPAGE COLLAR
SECTION C-C
SCALE: 1" = 5'

6C695W-56
LATEST REVISION F

PREPARED UNDER RESPONSIBLE SUPERVISION OF D.I. KAMPMAN P.E. 20906 AT OFFICES OF COMMONWEALTH ASSOCIATES INC. 209 E. WASHINGTON AVE. JACKSON, MICHIGAN

Rev.	Description
F	ADDED LOCATION OF WATER LEVEL GAUGE
E	ADDED BASIN LEVEL CONTROL GATES & PLATFORM
D	REVISED DRAWING TO DEPICT AS BUILT CONDITIONS (CUNNINGHAM ENGINEERS INC., PROJ. NO. 79033)
C	ADDED UPPER WHALER AND ANCHORAGE. LOWERED TOP OF SHEET PILING 3'-0 TO EL. 618 — COMMONWEALTH ASSOC. 6EPIAO
B	ADDED SEEPAGE COLLAR, CHANGED PIPE DEPTH, CHANGED ROADWAY WIDTH. ADDED CONCRETE FILL UNDER STILLING BASIN STR. — COMMONWEALTH ASSOC. 6EPIAO
A	ISSUE INLET STR. PIPE SPILLWAY AND STILLING BASIN FOR CONST. 6/24/77 — COMMONWEALTH ASSOC. 6EPIAO

THE DETROIT EDISON CO. — ENGINEERING DEPARTMENTS

DRAWN BY C.T. BERGMAN 6/21/77

TITLE: LAYOUT - ON-SITE FLY ASH DISPOSAL FACILITY DISCHARGE STRUCTURE WASTEWATER TREATMENT FACILITY

LOCATION: MONROE POWER PLANT

DOCUMENT CONTROL NO.

LAYOUT A B DISCHARGE STRUCTURE

DRAWING NUMBER 6C695W-56 — SCALE AS NOTED — ORDER FOR WORK 6EPIAO

MODIFICATIONS TO THE MONROE ASH BASIN EMBANKMENT CREST

9/23/2016

NORTH

NOTE:

THE GRID LINES SHOWN HEREON ARE BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM; SOUTH ZONE (INTERNATIONAL FOOT).

ELEVATIONS ARE TO THE N.G.V.D. 1929 DATUM.

THE PROPERTY LINES INDICATED HEREON ARE FOR REFERENCE ONLY AND NO BOUNDARY SURVEY WORK HAS BEEN PERFORMED ON THIS SITE AT THIS DATE.

SEE SHEETS 2, 3, AND 4 FOR PROFILE VIEW.

INTERSTATE 75 FREEWAY

SOUTHEASTERLY LINE OF INTERSTATE 75 FREEWAY (LIMITED ACCESS)

DUNBAR ROAD

TUNBAR ROAD

PLUM CREEK

CENTERLINE OF GRAVEL ROAD

CENTERLINE OF GRAVEL ROAD

CENTERLINE OF GRAVEL ROAD

CONSUMERS POWER COMPANY CORRIDOR

PRIVATE CLAIM 561

PRIVATE CLAIM 562

PRIVATE CLAIM 75

PRIVATE CLAIM 422

MONROE POWER PLANT
ASH SETTLING BASIN

LOWEST ELEVATION MEASURED IN CENTERLINE OF GRAVEL ROAD

0+00
182+11

INVERT ELEVATION MEASURED IN CENTERLINE OF GRAVEL ROAD

MODIFY PER ATTACHED FIGURE 1

THIS AREA HAS BEEN IDENTIFIED AS NEEDING ADDITIONAL FILL TO THE EMBANKMENT CREST. (NOTE 2)

NOTES:
1) THIS DRAWING HAS BEEN MODIFIED BY GEOSYNTEC TO IDENTIFY AREAS WHERE MODIFICATIONS TO THE EMBANKMENT CREST ARE RECOMMENDED.
2) PLACE ADDITIONAL MDOT 21AA IN THE SHADED AREA SO THAT THE CREST ELEVATION IS AT MINIMUM 614 FT (NGVD 29). COMPACT AGGREGATE TO A DRY DENSITY THAT IS 95 PERCENT OF THE MODIFIED PROCTOR.

STOP THINK ACT REVIEW

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DTE Energy - DTE Electric Company — Central Design

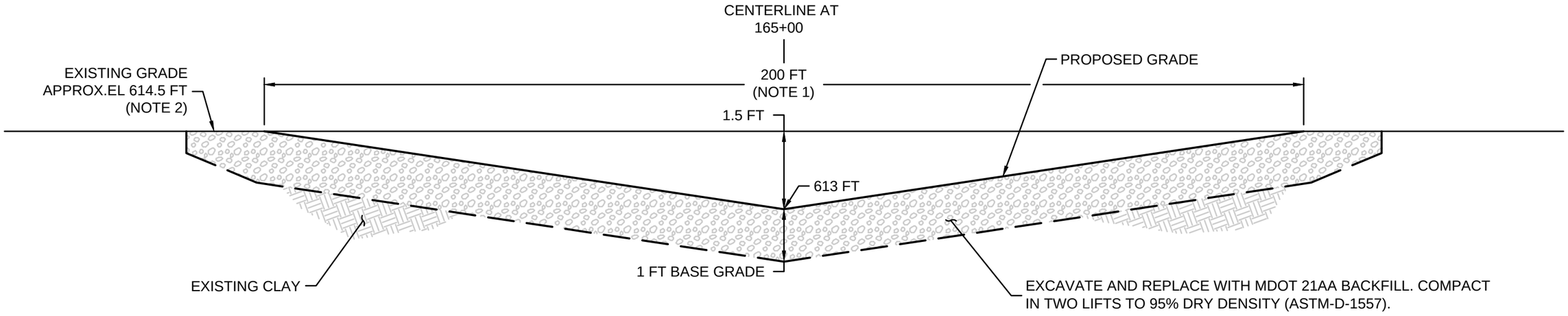
TITLE: PLAN AND PROFILE
OF CENTERLINE OF GRAVEL ROAD AROUND THE TOP OF THE ASH SETTLING BASIN
–PLAN SHEET–

SHEET 1 OF 4

LOCATION NAME: MONROE POWER PLANT ASH SETTLING BASIN

PRODUCED ON AUTOCAD ICH	C. ZBOCH	8/29/2016	
SURVEYED BY	S. WLAZLIK, K. BALL	8/24/2016	
CHECKED BY	S. WLAZLIK, K. BALL	8/29/2016	
SURVEY ENGINEER	G.D. STEPHENS	8/29/2016	
SUPERVISING ENGINEER	M. FAIRLESS		
DIVISION DIRECTOR			

ORIGINATING SOURCE: SURVEYING SERVICES
SCALE: 1" = 200'
USE DIMENSIONS DO NOT SCALE
DRAWING NUMBER: 6SE 0695–099
JOB NUMBER: 201608133



NOTES:

1) PITCH CREST 2% TOWARD THE ASH BASIN.

2) VERTICAL DATUM IS IN NGVD 29.

0 2
VERTICAL SCALE IN FEET

0 20
HORIZONTAL SCALE IN FEET

PROPOSED CREST MODIFICATION
AT STATION 165+00

Geosyntec consultants

PROJECT NO: CHE8242U | SEPTEMBER 2016

FIGURE
1

\\CHICAGO-01\PRJ1$\CWP\CHE8242-DETROIT EDISON\500 - TECHNICAL\502 ASH POND STABILITY & HYDRAULICS
ASSESSMENT\REPORTS REQUESTED BY DTE\HAZARD POTENTIAL LETTER\CREST MODIFICATION INSTRUCTIONS\DTE V-NOTCH

APPENDIX A: STORM WATER CALCULATIONS

Appendix B.1: NOAA Rainfall Data

NOAA Atlas 14, Volume 8, Version 2
Location name: Monroe Twp, Michigan, USA*
Latitude: 41.8838°, Longitude: -83.376°
Elevation: 611.75 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.312** (0.247-0.395)	**0.370** (0.293-0.468)	**0.465** (0.367-0.589)	**0.543** (0.427-0.689)	**0.651** (0.497-0.840)	**0.734** (0.551-0.954)	**0.817** (0.597-1.08)	**0.901** (0.637-1.21)	**1.01** (0.694-1.37)	**1.10** (0.737-1.50)
10-min	**0.457** (0.362-0.578)	**0.542** (0.429-0.685)	**0.680** (0.537-0.862)	**0.795** (0.625-1.01)	**0.953** (0.728-1.23)	**1.07** (0.806-1.40)	**1.20** (0.874-1.58)	**1.32** (0.933-1.76)	**1.48** (1.02-2.01)	**1.60** (1.08-2.20)
15-min	**0.557** (0.441-0.705)	**0.661** (0.523-0.836)	**0.829** (0.655-1.05)	**0.969** (0.762-1.23)	**1.16** (0.888-1.50)	**1.31** (0.983-1.70)	**1.46** (1.07-1.92)	**1.61** (1.14-2.15)	**1.81** (1.24-2.45)	**1.96** (1.32-2.68)
30-min	**0.765** (0.606-0.967)	**0.910** (0.720-1.15)	**1.15** (0.904-1.45)	**1.34** (1.05-1.70)	**1.61** (1.23-2.08)	**1.81** (1.36-2.36)	**2.02** (1.47-2.66)	**2.22** (1.57-2.97)	**2.50** (1.71-3.39)	**2.70** (1.82-3.71)
60-min	**0.978** (0.775-1.24)	**1.15** (0.912-1.46)	**1.45** (1.14-1.83)	**1.70** (1.33-2.15)	**2.05** (1.57-2.66)	**2.33** (1.76-3.05)	**2.62** (1.92-3.47)	**2.93** (2.08-3.93)	**3.34** (2.30-4.55)	**3.66** (2.46-5.02)
2-hr	**1.19** (0.956-1.49)	**1.40** (1.12-1.74)	**1.74** (1.39-2.18)	**2.05** (1.63-2.57)	**2.49** (1.94-3.21)	**2.85** (2.18-3.69)	**3.23** (2.40-4.23)	**3.63** (2.61-4.82)	**4.18** (2.91-5.64)	**4.62** (3.14-6.26)
3-hr	**1.32** (1.07-1.64)	**1.53** (1.24-1.90)	**1.91** (1.54-2.37)	**2.24** (1.80-2.79)	**2.74** (2.16-3.52)	**3.16** (2.43-4.07)	**3.61** (2.70-4.70)	**4.08** (2.96-5.41)	**4.76** (3.34-6.39)	**5.30** (3.62-7.14)
6-hr	**1.56** (1.27-1.90)	**1.78** (1.46-2.18)	**2.19** (1.79-2.68)	**2.57** (2.09-3.16)	**3.16** (2.53-4.01)	**3.66** (2.86-4.66)	**4.20** (3.18-5.42)	**4.79** (3.51-6.27)	**5.63** (3.99-7.49)	**6.32** (4.36-8.41)
12-hr	**1.80** (1.49-2.17)	**2.05** (1.70-2.47)	**2.50** (2.06-3.01)	**2.91** (2.40-3.53)	**3.56** (2.88-4.46)	**4.10** (3.24-5.16)	**4.69** (3.60-5.98)	**5.33** (3.95-6.90)	**6.26** (4.48-8.22)	**7.01** (4.88-9.21)
24-hr	**2.06** (1.74-2.45)	**2.35** (1.97-2.79)	**2.85** (2.39-3.40)	**3.31** (2.75-3.95)	**3.99** (3.26-4.91)	**4.56** (3.64-5.64)	**5.16** (4.00-6.48)	**5.82** (4.35-7.42)	**6.75** (4.87-8.73)	**7.49** (5.27-9.73)
2-day	**2.38** (2.03-2.79)	**2.70** (2.30-3.17)	**3.26** (2.77-3.83)	**3.75** (3.17-4.42)	**4.47** (3.69-5.40)	**5.05** (4.08-6.15)	**5.67** (4.43-7.00)	**6.32** (4.76-7.92)	**7.22** (5.26-9.20)	**7.93** (5.63-10.2)
3-day	**2.61** (2.24-3.03)	**2.94** (2.53-3.42)	**3.52** (3.01-4.10)	**4.02** (3.42-4.70)	**4.75** (3.94-5.68)	**5.34** (4.33-6.43)	**5.95** (4.68-7.28)	**6.60** (5.01-8.21)	**7.49** (5.49-9.48)	**8.20** (5.86-10.4)
4-day	**2.80** (2.42-3.24)	**3.15** (2.72-3.64)	**3.73** (3.21-4.32)	**4.24** (3.63-4.93)	**4.98** (4.16-5.93)	**5.58** (4.55-6.68)	**6.19** (4.90-7.53)	**6.84** (5.22-8.46)	**7.74** (5.70-9.74)	**8.45** (6.06-10.7)
7-day	**3.31** (2.89-3.78)	**3.68** (3.21-4.21)	**4.32** (3.76-4.94)	**4.87** (4.21-5.58)	**5.65** (4.75-6.63)	**6.27** (5.16-7.41)	**6.91** (5.52-8.30)	**7.58** (5.83-9.26)	**8.50** (6.30-10.6)	**9.21** (6.66-11.5)
10-day	**3.76** (3.31-4.26)	**4.17** (3.66-4.73)	**4.85** (4.25-5.51)	**5.43** (4.73-6.18)	**6.25** (5.29-7.27)	**6.90** (5.72-8.09)	**7.57** (6.08-9.02)	**8.26** (6.38-10.0)	**9.20** (6.85-11.4)	**9.93** (7.21-12.4)
20-day	**5.12** (4.57-5.71)	**5.60** (5.00-6.26)	**6.41** (5.70-7.17)	**7.08** (6.26-7.95)	**8.01** (6.87-9.17)	**8.74** (7.33-10.1)	**9.47** (7.70-11.1)	**10.2** (7.98-12.2)	**11.2** (8.44-13.6)	**12.0** (8.79-14.7)
30-day	**6.30** (5.67-6.98)	**6.89** (6.19-7.63)	**7.83** (7.02-8.69)	**8.60** (7.67-9.57)	**9.65** (8.32-10.9)	**10.4** (8.82-11.9)	**11.2** (9.17-13.0)	**12.0** (9.43-14.2)	**13.0** (9.85-15.7)	**13.8** (10.2-16.8)
45-day	**7.87** (7.14-8.64)	**8.61** (7.81-9.45)	**9.77** (8.83-10.8)	**10.7** (9.62-11.8)	**11.9** (10.3-13.3)	**12.8** (10.9-14.5)	**13.6** (11.2-15.7)	**14.5** (11.4-16.9)	**15.5** (11.7-18.4)	**16.2** (12.0-19.6)
60-day	**9.24** (8.44-10.1)	**10.1** (9.26-11.1)	**11.5** (10.5-12.6)	**12.6** (11.4-13.8)	**14.0** (12.2-15.5)	**15.0** (12.8-16.8)	**15.8** (13.1-18.0)	**16.7** (13.2-19.3)	**17.6** (13.4-20.9)	**18.3** (13.6-22.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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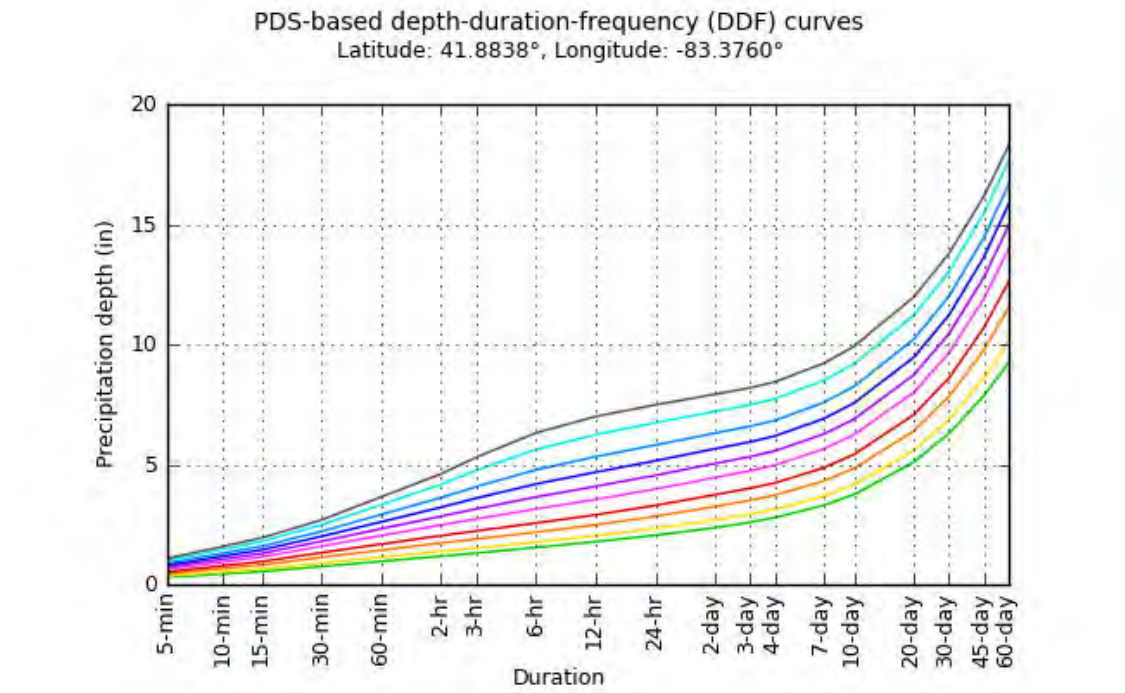
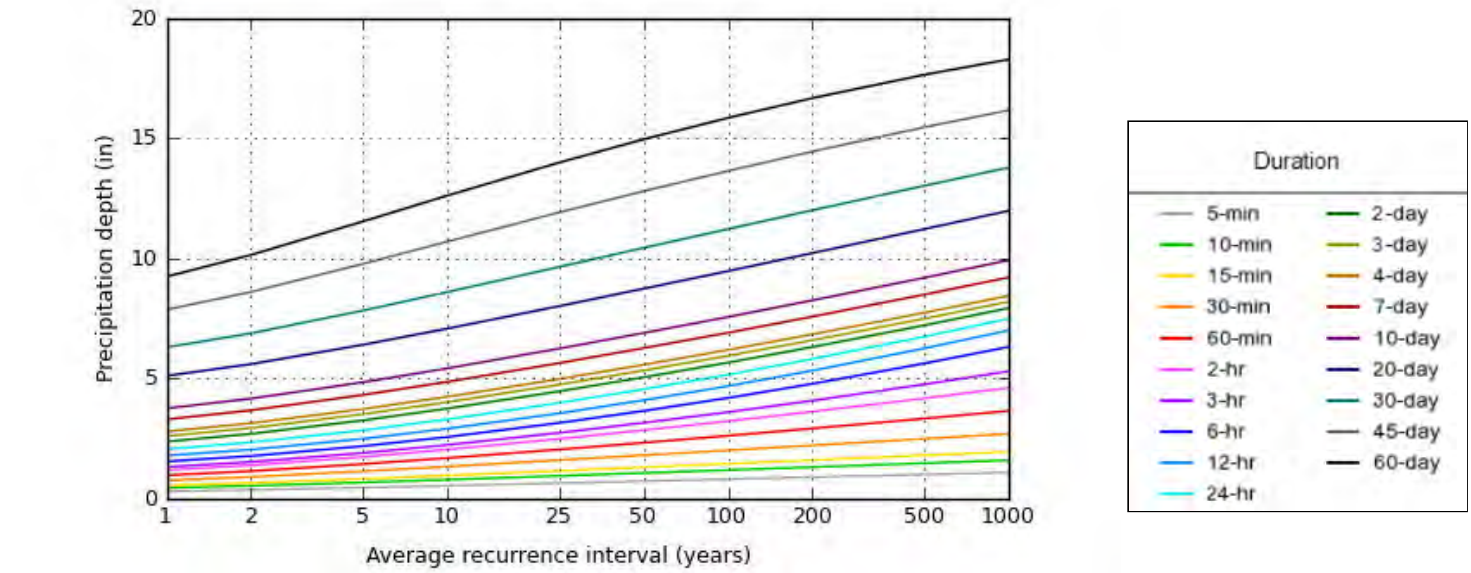
PF graphical





NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Fri Aug 6 02:30:35 2021

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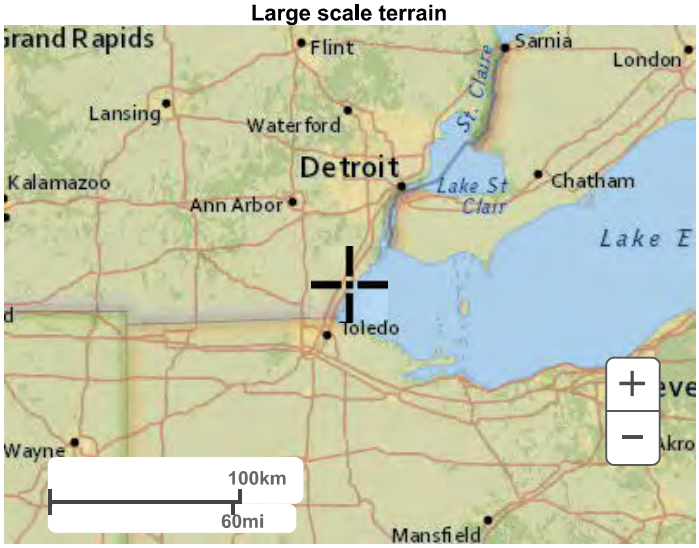
Maps & aerials

Small scale terrain

Large scale terrain



Large scale map

Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX A: STORM WATER CALCULATIONS

Appendix B2: HydroCAD 25-year/24-hour Output

Subcat Reach Pond Link

Routing Diagram for Monroe Fly Ash Basin_RORO_Draft 8.31.21
Prepared by AECOM, Printed 9/1/2021

Summary for Subcatchment 1S: NW Drainage area Upstream culvert

Subcat area, flow length, and slope taken from Construction Permit Application Modification drawing set dated 3-20-2015 as well as a survey completed in 2021.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Length of each channel is included in the time of concentration for their respective subcats.

Exact design locations of the v-shaped channels created by the stormwater control berms are not available. In additon, in a storm event as large as the 25-year/24-hour event, it is assumed that they will be quickly exceeded, therefore they have not been included in this model.

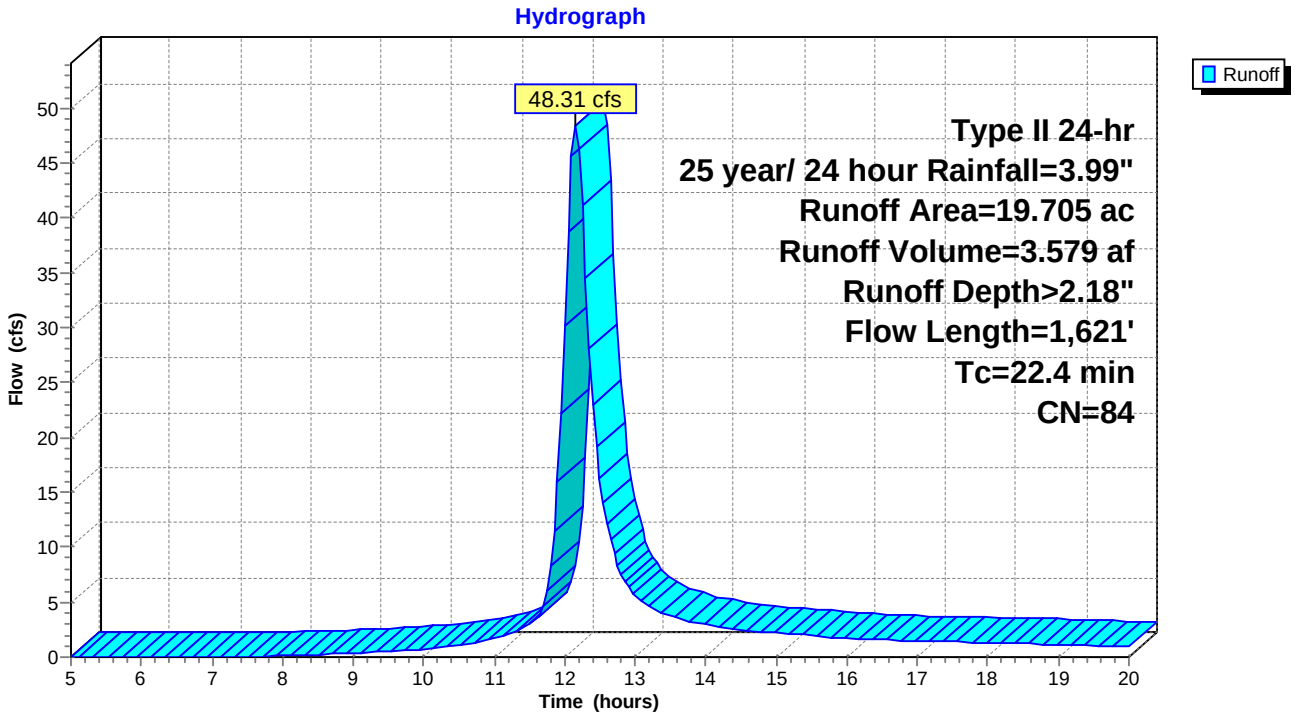
Runoff = 48.31 cfs @ 12.15 hrs, Volume= 3.579 af, Depth> 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year/ 24 hour Rainfall=3.99"

	Area (ac)	CN	Description
*	19.705	84	Clay cap with 6 inches of vegetative cover
	19.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	100	0.0500	0.21		**Sheet Flow, sheet flow 5%** Grass: Short n= 0.150 P2= 2.35"
4.5	418	0.0500	1.57		**Shallow Concentrated Flow, shallow conc 5%** Short Grass Pasture Kv= 7.0 fps
0.6	128	0.2500	3.50		**Shallow Concentrated Flow, shallow conc 4H:1V** Short Grass Pasture Kv= 7.0 fps
9.4	975	0.0010	1.73	62.22	**Trap/Vee/Rect Channel Flow, channel flow** Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.035 Earth, dense weeds
22.4	1,621	Total			

Subcatchment 1S: NW Drainage area Upstream culvert



Summary for Subcatchment 6S: SE Drainage Area

Subcat area, flow length, and slope taken from Construction Permit Application Modification drawing set dated 3-20-2015 as well as a survey completed in 2021.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Length of each channel is included in the time of concentration for their respective subcats.

Exact design locations of the v-shaped channels created by the stormwater control berms are not available. In additon, in a storm event as large as the 25-year/24-hour event, it is assumed that they will be quickly exceeded, therefore they have not been included in this model.

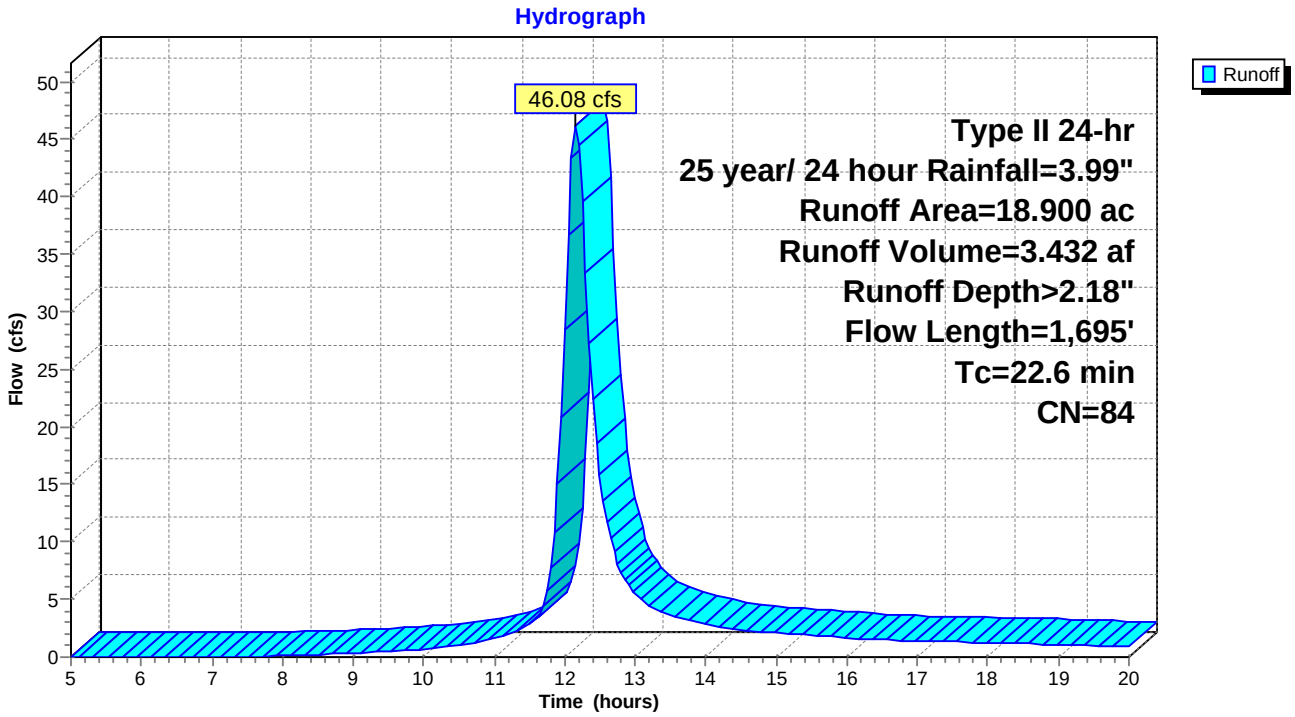
Runoff = 46.08 cfs @ 12.16 hrs, Volume= 3.432 af, Depth> 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year/ 24 hour Rainfall=3.99"

	Area (ac)	CN	Description
*	18.900	84	Clay cap with 6 inches of vegetative cover
	18.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	100	0.0500	0.21		**Sheet Flow, sheet flow 5%** Grass: Short n= 0.150 P2= 2.35"
1.2	115	0.0500	1.57		**Shallow Concentrated Flow, shallow conc 5%** Short Grass Pasture Kv= 7.0 fps
0.7	155	0.2500	3.50		**Shallow Concentrated Flow, shallow conc 4H:1V** Short Grass Pasture Kv= 7.0 fps
12.8	1,325	0.0010	1.73	62.22	**Trap/Vee/Rect Channel Flow, Channel flow** Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.035 Earth, dense weeds
22.6	1,695	Total			

Subcatchment 6S: SE Drainage Area



Summary for Subcatchment 9S: SW Drainage area

Subcat area, flow length, and slope taken from Construction Permit Application Modification drawing set dated 3-20-2015 as well as a survey completed in 2021.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Length of each channel is included in the time of concentration for their respective subcats.

Exact design locations of the v-shaped channels created by the stormwater control berms are not available. In additon, in a storm event as large as the 25-year/24-hour event, it is assumed that they will be quickly exceeded, therefore they have not been included in this model.

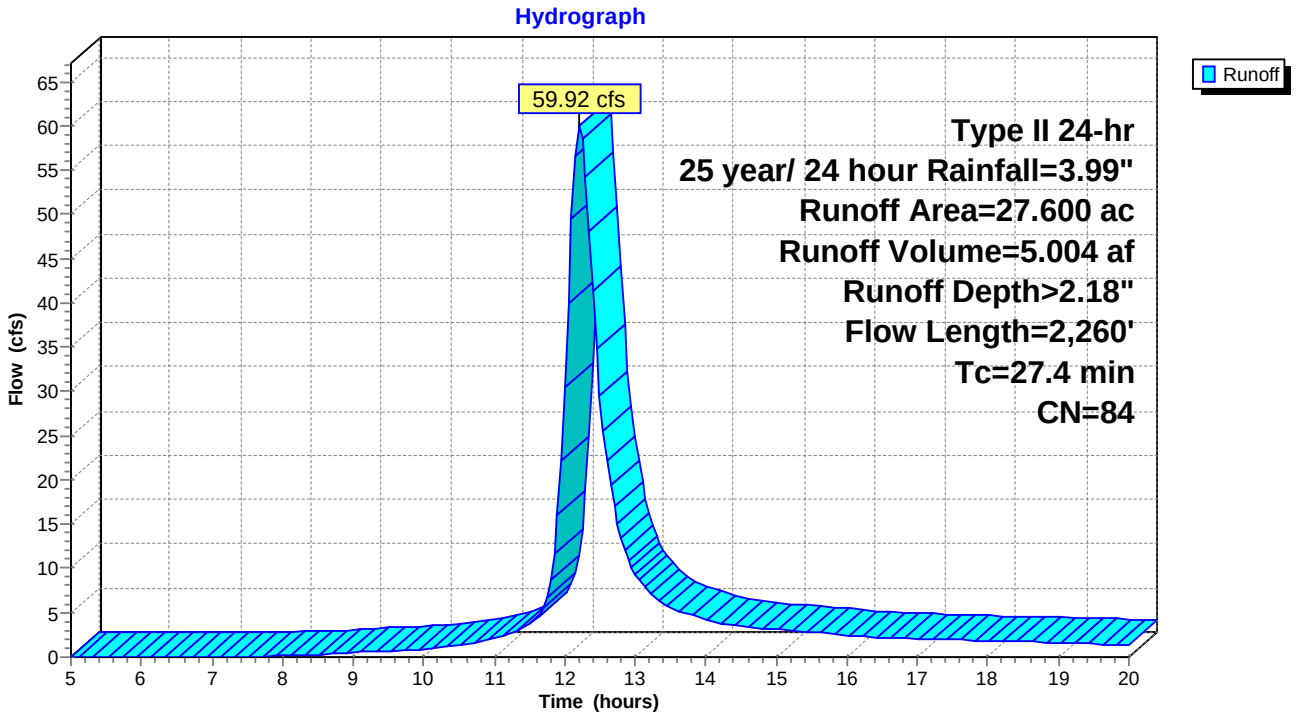
Runoff = 59.92 cfs @ 12.21 hrs, Volume= 5.004 af, Depth> 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year/ 24 hour Rainfall=3.99"

	Area (ac)	CN	Description
*	27.600	84	Clay cap with 6 inches of vegetative coer
	27.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	100	0.0500	0.21		**Sheet Flow, sheet flow 5%** Grass: Short n= 0.150 P2= 2.35"
2.2	210	0.0500	1.57		**Shallow Concentrated Flow, shallow conc 5%** Short Grass Pasture Kv= 7.0 fps
0.7	140	0.2500	3.50		**Shallow Concentrated Flow, shallow conc 4H:1V** Short Grass Pasture Kv= 7.0 fps
16.6	1,810	0.0010	1.82	74.50	**Trap/Vee/Rect Channel Flow, channel flow** Bot.W=12.00' D=2.20' Z= 3.0 '/' Top.W=25.20' n= 0.035 Earth, dense weeds
27.4	2,260	Total			

Subcatchment 9S: SW Drainage area



Summary for Subcatchment 12S: NE Drainage Area

Subcat area, flow length, and slope taken from Construction Permit Application Modification drawing set dated 3-20-2015 as well as a survey completed in 2021.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Length of each channel is included in the time of concentration for their respective subcats.

Exact design locations of the v-shaped channels created by the stormwater control berms are not available. In additon, in a storm event as large as the 25-year/24-hour event, it is assumed that they will be quickly exceeded, therefore they have not been included in this model.

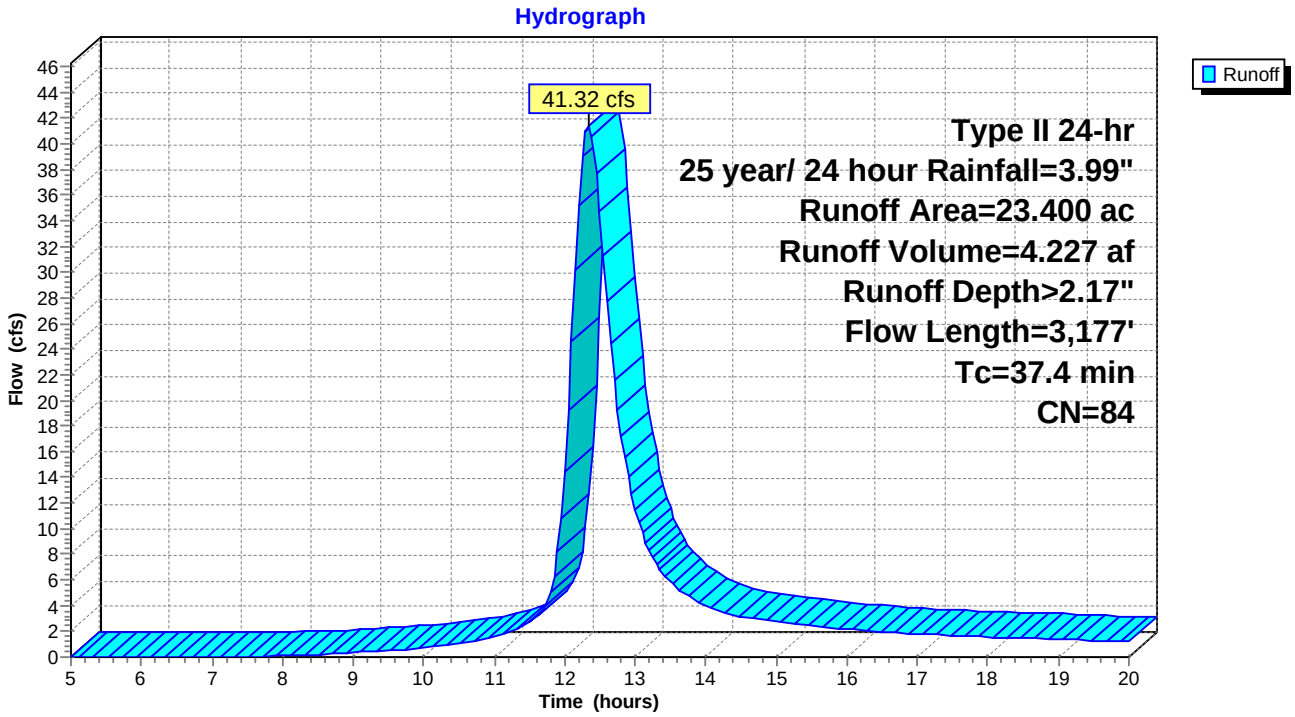
Runoff = 41.32 cfs @ 12.33 hrs, Volume= 4.227 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year/ 24 hour Rainfall=3.99"

	Area (ac)	CN	Description
*	23.400	84	Clay cap with 6 inches of vegetative cover
	23.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	100	0.0500	0.21		**Sheet Flow, sheet flow 5%** Grass: Short n= 0.150 P2= 2.35"
5.2	492	0.0500	1.57		**Shallow Concentrated Flow, shallow conc 5%** Short Grass Pasture Kv= 7.0 fps
0.6	130	0.2500	3.50		**Shallow Concentrated Flow, shallow conc 4H:1V** Short Grass Pasture Kv= 7.0 fps
23.7	2,455	0.0010	1.73	62.22	**Trap/Vee/Rect Channel Flow, Channel flow** Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.035 Earth, dense weeds
37.4	3,177	Total			

Subcatchment 12S: NE Drainage Area



Summary for Subcatchment 15S: Ash Impoundment Drainage Area

Drainage area approximated based on survey completed in 2021. Design drawing did not include complete ash impoundment limits.

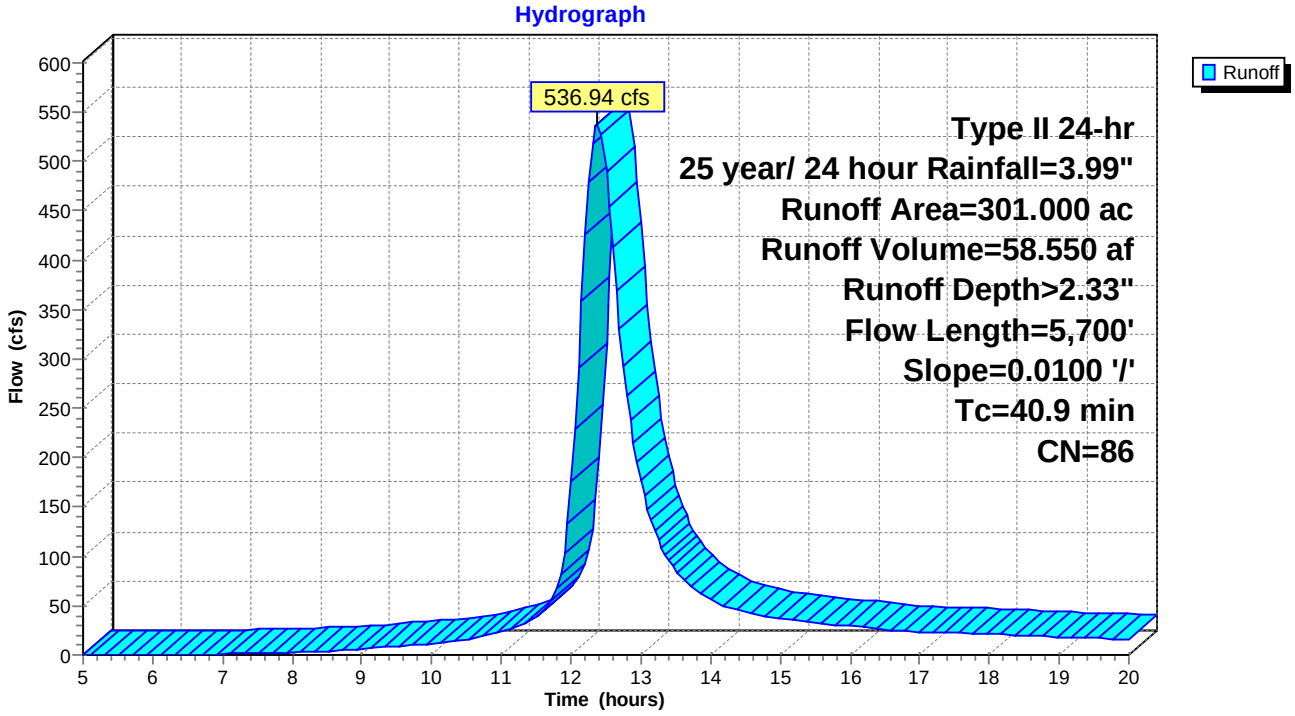
Runoff = 536.94 cfs @ 12.37 hrs, Volume= 58.550 af, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year/ 24 hour Rainfall=3.99"

	Area (ac)	CN	Description
*	105.000	98	Lake
	196.000	79	<50% Grass cover, Poor, HSG B
	301.000	86	Weighted Average
	196.000		65.12% Pervious Area
	105.000		34.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0100	0.11		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 2.35"
21.4	900	0.0100	0.70		**Shallow Concentrated Flow, shallow concentrated f;pw** Short Grass Pasture Kv= 7.0 fps
4.4	4,700		17.94		**Lake or Reservoir, Lake** Mean Depth= 10.00'
40.9	5,700	Total			

Subcatchment 15S: Ash Impoundment Drainage Area



Summary for Subcatchment 16S: NW Drainage area Downstream culvert

Subcat area, flow length, and slope taken from Construction Permit Application Modification drawing set dated 3-20-2015 as well as a survey completed in 2021.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Length of each channel is included in the time of concentration for their respective subcats.

Exact design locations of the v-shaped channels created by the stormwater control berms are not available. In additon, in a storm event as large as the 25-year/24-hour event, it is assumed that they will be quickly exceeded, therefore they have not been included in this model.

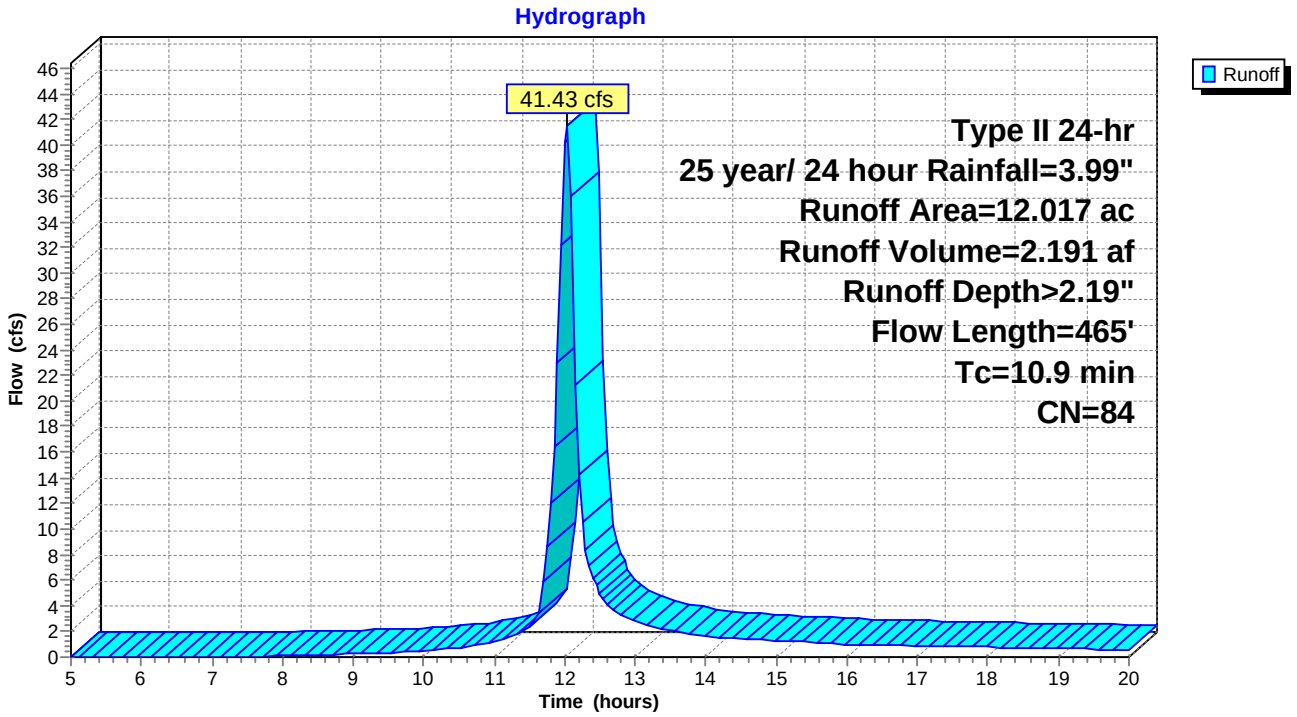
Runoff = 41.43 cfs @ 12.03 hrs, Volume= 2.191 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year/ 24 hour Rainfall=3.99"

	Area (ac)	CN	Description
*	12.017	84	Clay cap with 6 inches of vegetative cover
	12.017		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	100	0.0500	0.21		**Sheet Flow, sheet flow 5%** Grass: Short n= 0.150 P2= 2.35"
2.3	215	0.0500	1.57		**Shallow Concentrated Flow, shallow conc 5%** Short Grass Pasture Kv= 7.0 fps
0.7	150	0.2500	3.50		**Shallow Concentrated Flow, shallow conc 4H:1V** Short Grass Pasture Kv= 7.0 fps
10.9	465	Total			

Subcatchment 16S: NW Drainage area Downstream culvert



Summary for Subcatchment 17S: Channel DA

Subcat area, flow length, and slope taken from Construction Permit Application Modification drawing set dated 3-20-2015 as well as a survey completed in 2021.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Length of each channel is included in the time of concentration for their respective subcats.

Exact design locations of the v-shaped channels created by the stormwater control berms are not available. In additon, in a storm event as large as the 25-year/24-hour event, it is assumed that they will be quickly exceeded, therefore they have not been included in this model.

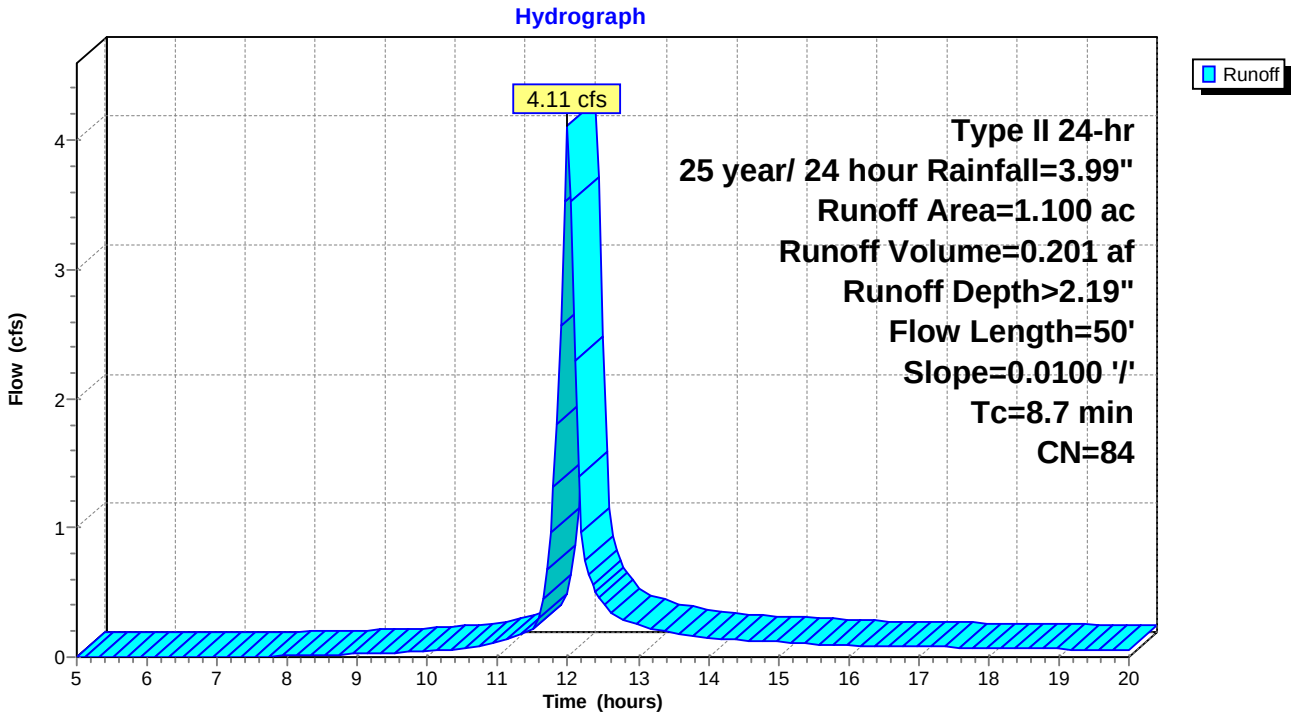
Runoff = 4.11 cfs @ 12.00 hrs, Volume= 0.201 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year/ 24 hour Rainfall=3.99"

	Area (ac)	CN	Description
*	1.100	84	
	1.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	50	0.0100	0.10		**Sheet Flow, shallow conc** Grass: Short n= 0.150 P2= 2.35"

Subcatchment 17S: Channel DA



Summary for Reach 8R: NW Channel Section

Reach slopes of 0.1% and taken from Construction Permit Application Modification drawing set dated 3-20-2015 and outlet invert taken from 2021 survey.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Modeling only last 20 feet of channel as reach to check cross section for average resultant flow depths. The upstream portion of the reach is included in the subcat time of concentration.

Inflow Area = 32.822 ac, 0.00% Impervious, Inflow Depth > 1.77" for 25 year/ 24 hour event
Inflow = 34.47 cfs @ 12.20 hrs, Volume= 4.849 af
Outflow = 35.36 cfs @ 12.10 hrs, Volume= 4.848 af, Atten= 0%, Lag= 0.0 min

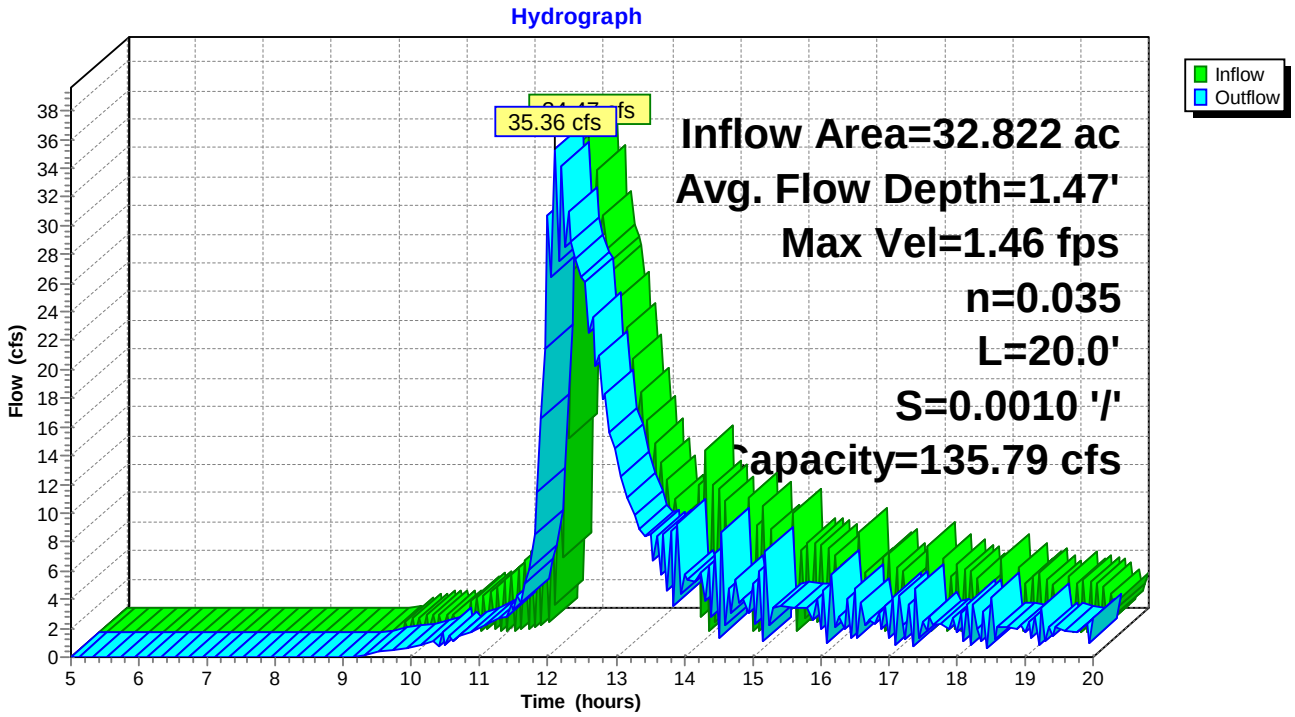
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.46 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 0.6 min

Peak Storage= 484 cf @ 12.10 hrs
Average Depth at Peak Storage= 1.47'
Bank-Full Depth= 3.00' Flow Area= 63.0 sf, Capacity= 135.79 cfs

12.00' x 3.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 30.00'
Length= 20.0' Slope= 0.0010 '/'
Inlet Invert= 610.02', Outlet Invert= 610.00'

‡

Reach 8R: NW Channel Section



Summary for Reach 9R: SW Channel Section

Reach slopes of 0.1% and taken from Construction Permit Application Modification drawing set dated 3-20-2015 and outlet inverts taken from 2021 survey.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Modeling only last 20 feet of channel as reach to check cross section for average resultant flow depths. The upstream portion of the reach is included in the subcat time of concentration.

Inflow Area = 27.600 ac, 0.00% Impervious, Inflow Depth > 2.18" for 25 year/ 24 hour event
Inflow = 59.92 cfs @ 12.21 hrs, Volume= 5.004 af
Outflow = 59.92 cfs @ 12.21 hrs, Volume= 5.003 af, Atten= 0%, Lag= 0.1 min

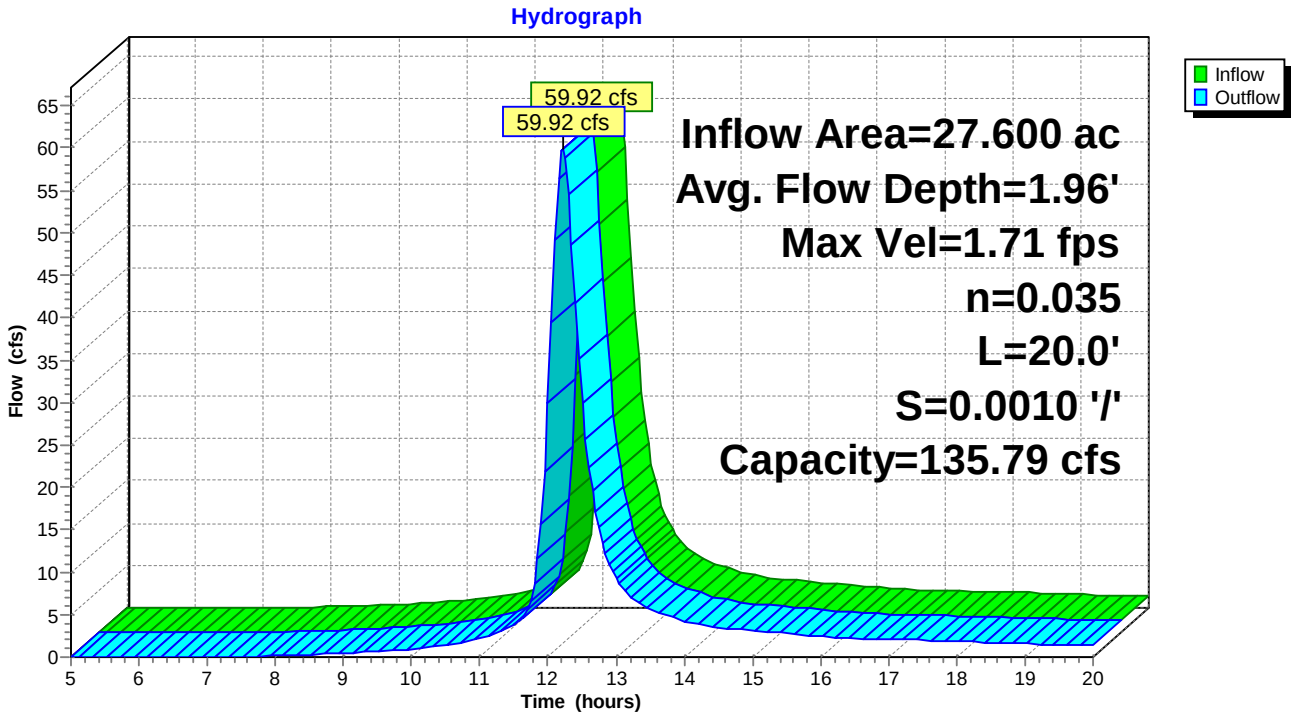
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.71 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 0.6 min

Peak Storage= 701 cf @ 12.21 hrs
Average Depth at Peak Storage= 1.96'
Bank-Full Depth= 3.00' Flow Area= 63.0 sf, Capacity= 135.79 cfs

12.00' x 3.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 30.00'
Length= 20.0' Slope= 0.0010 '/'
Inlet Invert= 610.02', Outlet Invert= 610.00'

‡

Reach 9R: SW Channel Section



Summary for Reach 10R: Small channel

Reach slopes of 0.1% and taken from Construction Permit Application Modification drawing set dated 3-20-2015 and outlet inverts taken from 2021 survey.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Modeling only last 20 feet of channel as reach to check cross section for average resultant flow depths. The upstream portion of the reach is included in the subcat time of concentration.

Inflow Area = 46.500 ac, 0.00% Impervious, Inflow Depth > 1.63" for 25 year/ 24 hour event
Inflow = 47.59 cfs @ 12.11 hrs, Volume= 6.297 af
Outflow = 46.90 cfs @ 12.16 hrs, Volume= 6.275 af, Atten= 1%, Lag= 2.7 min

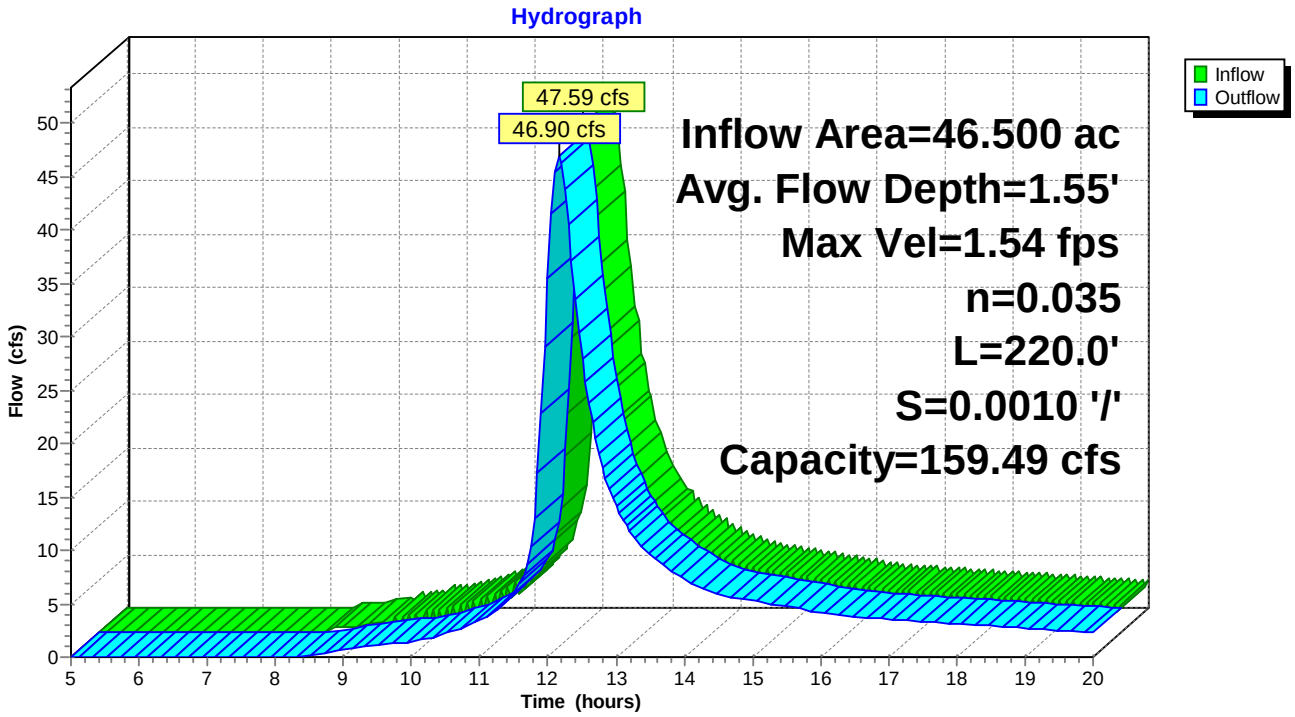
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.54 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.69 fps, Avg. Travel Time= 5.3 min

Peak Storage= 6,701 cf @ 12.16 hrs
Average Depth at Peak Storage= 1.55'
Bank-Full Depth= 3.00' Flow Area= 72.0 sf, Capacity= 159.49 cfs

15.00' x 3.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 33.00'
Length= 220.0' Slope= 0.0010 '/'
Inlet Invert= 610.00', Outlet Invert= 609.78'

‡

Reach 10R: Small channel



Summary for Reach 12R: SE Channel Section

Reach slopes of 0.1% and taken from Construction Permit Application Modification drawing set dated 3-20-2015 and outlet inverts taken from 2021 survey.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Modeling only last 20 feet of channel as reach to check cross section for average resultant flow depths. The upstream portion of the reach is included in the subcat time of concentration.

Inflow Area = 18.900 ac, 0.00% Impervious, Inflow Depth > 2.18" for 25 year/ 24 hour event
Inflow = 46.08 cfs @ 12.16 hrs, Volume= 3.432 af
Outflow = 46.08 cfs @ 12.16 hrs, Volume= 3.431 af, Atten= 0%, Lag= 0.1 min

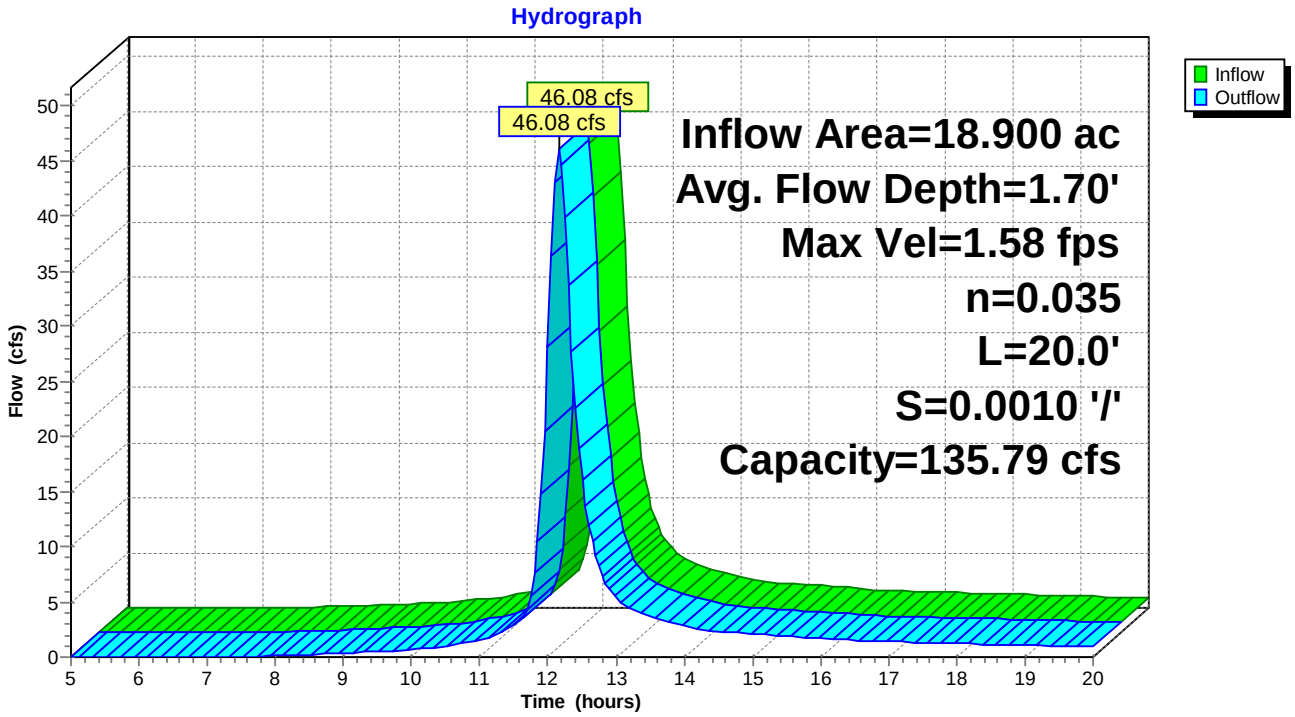
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.58 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 0.7 min

Peak Storage= 583 cf @ 12.16 hrs
Average Depth at Peak Storage= 1.70'
Bank-Full Depth= 3.00' Flow Area= 63.0 sf, Capacity= 135.79 cfs

12.00' x 3.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 30.00'
Length= 20.0' Slope= 0.0010 '/'
Inlet Invert= 610.02', Outlet Invert= 610.00'

‡

Reach 12R: SE Channel Section



Summary for Reach 13R: NE Channel Section

Reach slopes of 0.1% and taken from Construction Permit Application Modification drawing set dated 3-20-2015 and outlet inverts taken from 2021 survey.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Modeling only last 20 feet of channel as reach to check cross section for average resultant flow depths. The upstream portion of the reach is included in the subcat time of concentration.

Inflow Area = 23.400 ac, 0.00% Impervious, Inflow Depth > 2.17" for 25 year/ 24 hour event
Inflow = 41.32 cfs @ 12.33 hrs, Volume= 4.227 af
Outflow = 41.31 cfs @ 12.34 hrs, Volume= 4.226 af, Atten= 0%, Lag= 0.1 min

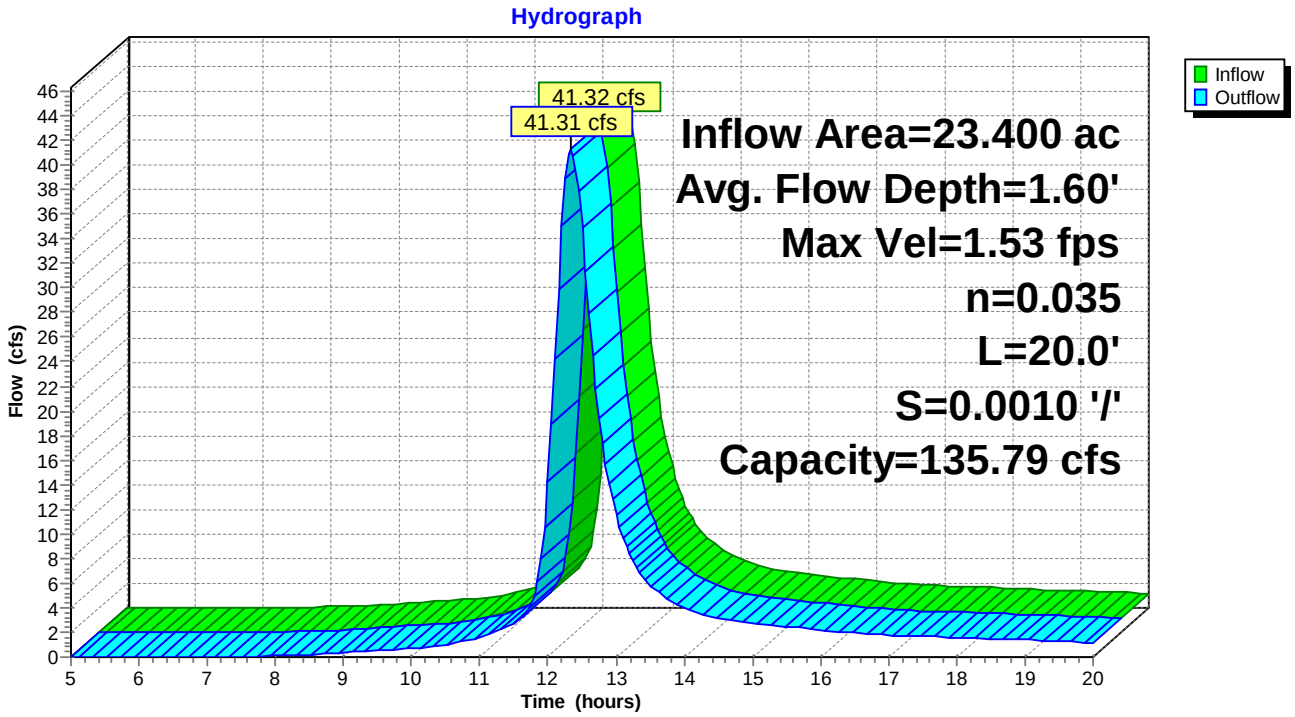
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.53 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 0.6 min

Peak Storage= 540 cf @ 12.34 hrs
Average Depth at Peak Storage= 1.60'
Bank-Full Depth= 3.00' Flow Area= 63.0 sf, Capacity= 135.79 cfs

12.00' x 3.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 30.00'
Length= 20.0' Slope= 0.0010 '/'
Inlet Invert= 609.34', Outlet Invert= 609.32'

‡

Reach 13R: NE Channel Section



Summary for Reach 14R: Swale between culverts

Reach slopes of 0.1% and taken from Construction Permit Application Modification drawing set dated 3-20-2015 and outlet invert taken from 2021 survey.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Inflow Area = 31.722 ac, 0.00% Impervious, Inflow Depth > 2.12" for 25 year/ 24 hour event
Inflow = 76.94 cfs @ 12.06 hrs, Volume= 5.604 af
Outflow = 53.79 cfs @ 12.19 hrs, Volume= 5.502 af, Atten= 30%, Lag= 7.8 min

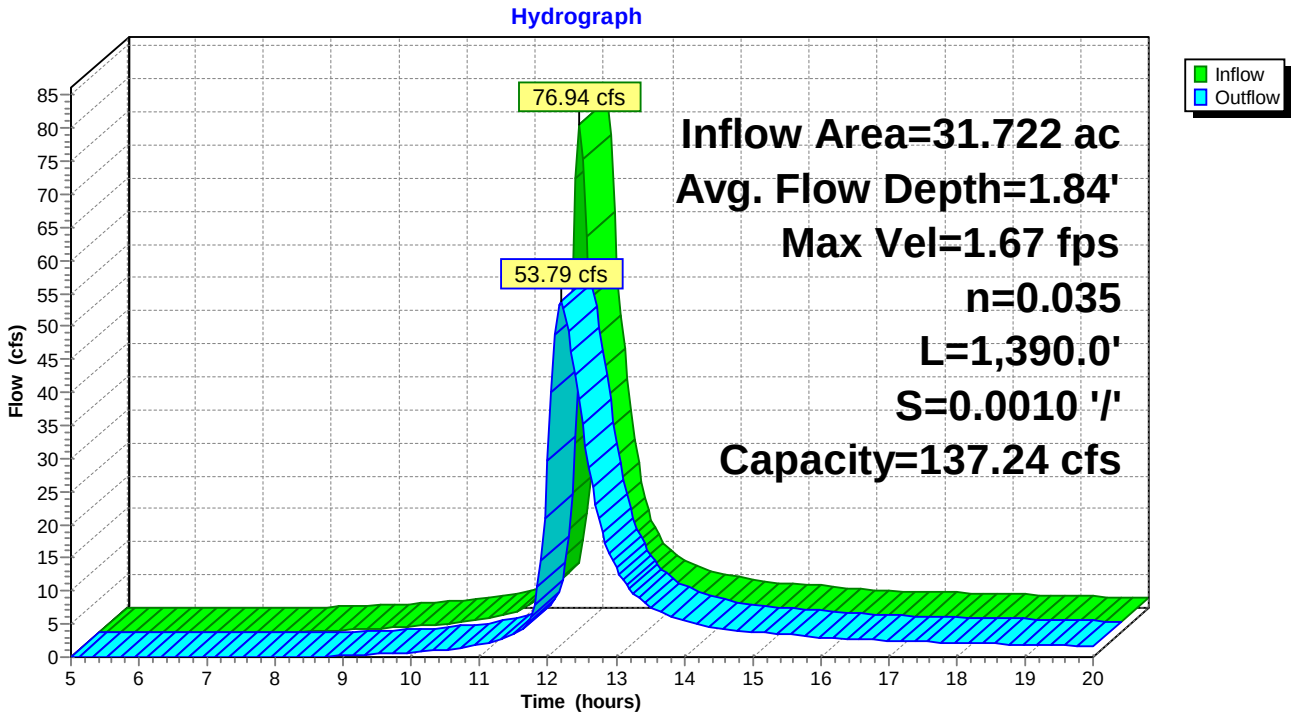
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.67 fps, Min. Travel Time= 13.9 min
Avg. Velocity = 0.60 fps, Avg. Travel Time= 38.4 min

Peak Storage= 44,803 cf @ 12.19 hrs
Average Depth at Peak Storage= 1.84'
Bank-Full Depth= 3.00' Flow Area= 63.0 sf, Capacity= 137.24 cfs

12.00' x 3.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 30.00'
Length= 1,390.0' Slope= 0.0010 '/'
Inlet Invert= 610.60', Outlet Invert= 609.18'

‡

Reach 14R: Swale between culverts



Summary for Reach 15R: N Channel Section

Reach slopes of 0.1% and taken from Construction Permit Application Modification drawing set dated 3-20-2015 and outlet invert taken from 2021 survey.

General erosion matting was proposed which can vary. A manning's n value of 0.045 was used to simulate a grassed erosion matting. A lack of maintenance, or more robust erosion control measures may cause this value to increase potentially overflowing the channel..

Modeling only last 20 feet of channel as reach to check cross section for average resultant flow depths. The upstream portion of the reach is included in the subcat time of concentration.

Inflow Area = 19.705 ac, 0.00% Impervious, Inflow Depth > 2.18" for 25 year/ 24 hour event
Inflow = 48.31 cfs @ 12.15 hrs, Volume= 3.579 af
Outflow = 48.31 cfs @ 12.16 hrs, Volume= 3.578 af, Atten= 0%, Lag= 0.1 min

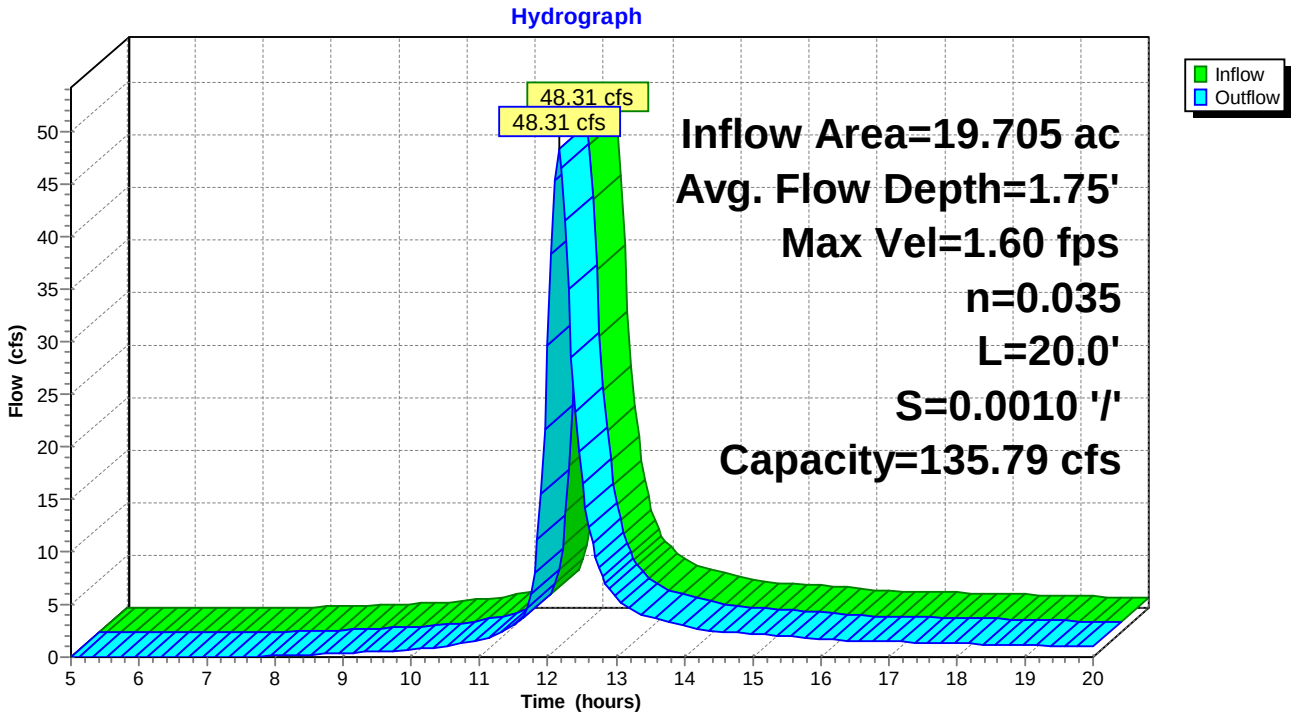
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.60 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 0.6 min

Peak Storage= 602 cf @ 12.16 hrs
Average Depth at Peak Storage= 1.75'
Bank-Full Depth= 3.00' Flow Area= 63.0 sf, Capacity= 135.79 cfs

12.00' x 3.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 30.00'
Length= 20.0' Slope= 0.0010 '/'
Inlet Invert= 610.62', Outlet Invert= 610.60'

‡

Reach 15R: N Channel Section



Summary for Pond 7P: Ash Impoundment

Storage was taken from bathymetric contours in AutoCAD file from Construction Permit Application Modification drawing set dated 3-20-2015 provided by DTE.

Starting WSE and outfall information was determined based on
design drawings titled "Discharge stucture - existing & proposed conditions" by Detroit Edison's surveying services dated 6-20-2016 and "Layout - on-site Fly ash Disposal facility discharge structure wastewater treatment plant" by Commonwealth Associates Inc. dated 6-23-1977.

Inflow Area = 403.722 ac, 26.01% Impervious, Inflow Depth > 3.06" for 25 year/ 24 hour event
Inflow = 665.60 cfs @ 12.36 hrs, Volume= 102.867 af, Incl. 23.29 cfs Base Flow
Outflow = 65.51 cfs @ 15.65 hrs, Volume= 54.825 af, Atten= 90%, Lag= 197.4 min
Primary = 65.51 cfs @ 15.65 hrs, Volume= 54.825 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 609.00' Surf.Area= 154.000 ac Storage= 152.500 af
Peak Elev= 609.34' @ 15.65 hrs Surf.Area= 154.677 ac Storage= 204.707 af (52.207 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 65.2 min (852.9 - 787.7)

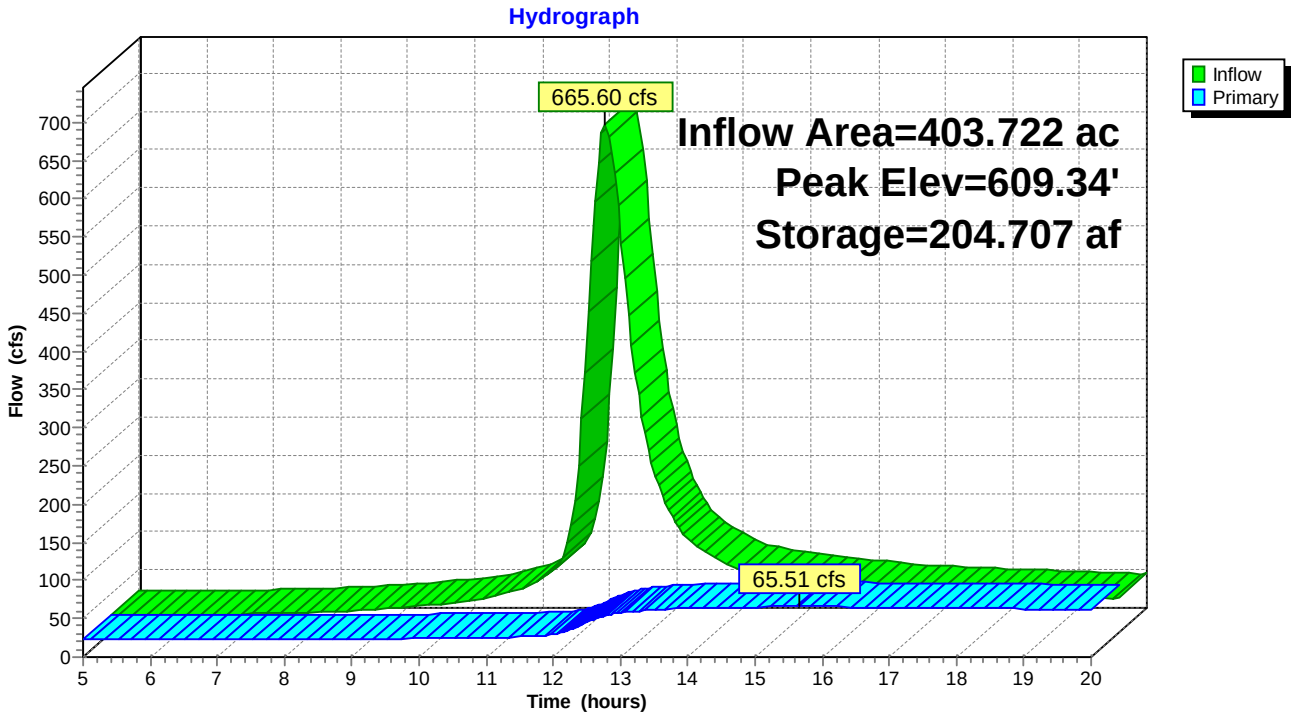
Volume	Invert	Avail.Storage	Storage Description
#1	608.00'	307.500 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
608.00	151.000	0.000	0.000
609.00	154.000	152.500	152.500
610.00	156.000	155.000	307.500

Device	Routing	Invert	Outlet Devices
#1	Primary	605.50'	**36.0" Round Culvert X 3.00** L= 150.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 605.50' / 576.75' S= 0.1917 '/' Cc= 0.900 n= 0.012 Steel, smooth, Flow Area= 7.07 sf
#2	Device 1	608.66'	**36.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	613.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.50 Width (feet) 0.00 200.00

Primary OutFlow Max=65.51 cfs @ 15.65 hrs HW=609.34' (Free Discharge)
- **1=Culvert** (Passes 65.51 cfs of 156.13 cfs potential flow)
  - **2=Sharp-Crested Rectangular Weir** (Weir Controls 65.51 cfs @ 2.69 fps)
- **3=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 7P: Ash Impoundment



Summary for Pond 8P: Reach confluence

Modeled as pond to see if the confluence of the two reaches overflows.

Inflow Area = 46.500 ac, 0.00% Impervious, Inflow Depth > 2.18" for 25 year/ 24 hour event
Inflow = 104.55 cfs @ 12.19 hrs, Volume= 8.434 af
Outflow = 104.96 cfs @ 12.19 hrs, Volume= 8.412 af, Atten= 0%, Lag= 0.3 min
Primary = 47.59 cfs @ 12.11 hrs, Volume= 6.297 af
Secondary = 59.09 cfs @ 12.21 hrs, Volume= 2.115 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 611.56' @ 12.21 hrs Surf.Area= 0.028 ac Storage= 0.052 af

Plug-Flow detention time= 2.1 min calculated for 8.412 af (100% of inflow)
Center-of-Mass det. time= 1.1 min (794.1 - 793.0)

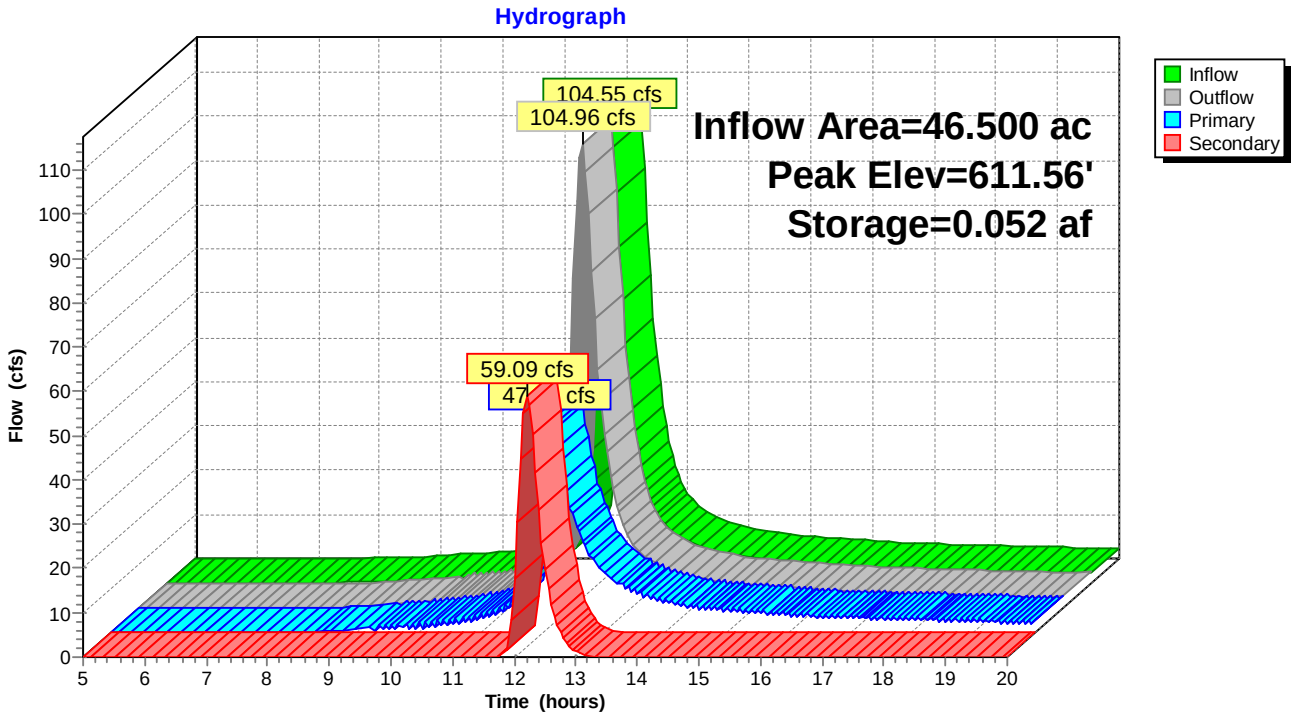
Volume	Invert	Avail.Storage	Storage Description
#1	607.60'	0.053 af	**12.00'W x 10.00'L x 4.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	607.60'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 4.00 Width (feet) 12.00 36.00
#2	Secondary	610.60'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 Width (feet) 0.00 50.00

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=611.48' TW=611.53' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Controls 0.00 cfs)

Secondary OutFlow Max=58.71 cfs @ 12.21 hrs HW=611.56' (Free Discharge)
↑—**2=Custom Weir/Orifice** (Weir Controls 58.71 cfs @ 2.56 fps)

Pond 8P: Reach confluence



Summary for Pond 10P: Culvert test

Modeled as pond to see if the confluence of the two reaches overflows.

Inflow Area = 31.722 ac, 0.00% Impervious, Inflow Depth > 2.08" for 25 year/ 24 hour event
Inflow = 53.79 cfs @ 12.19 hrs, Volume= 5.502 af
Outflow = 55.38 cfs @ 12.19 hrs, Volume= 5.488 af, Atten= 0%, Lag= 0.5 min
Primary = 33.52 cfs @ 12.20 hrs, Volume= 4.649 af
Secondary = 25.87 cfs @ 12.16 hrs, Volume= 0.839 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 611.74' @ 12.16 hrs Surf.Area= 0.025 ac Storage= 0.045 af

Plug-Flow detention time= 2.3 min calculated for 5.488 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (807.2 - 805.9)

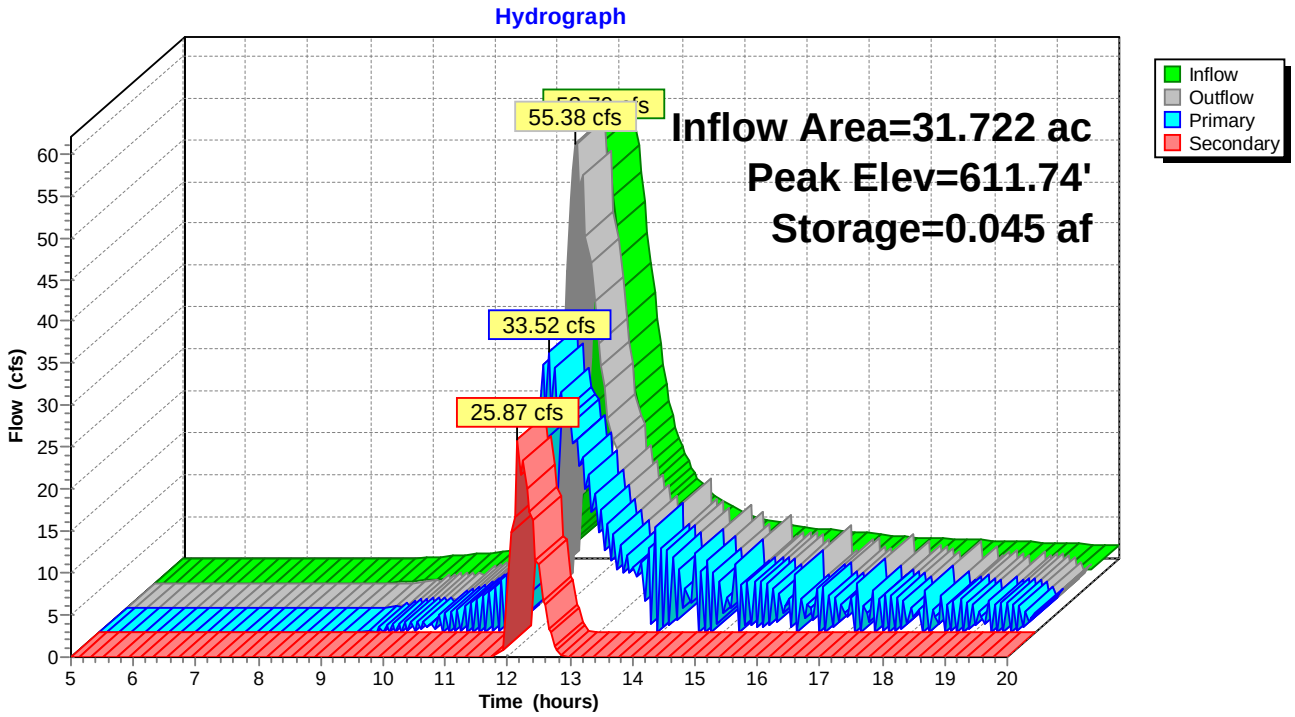
Volume	Invert	Avail.Storage	Storage Description
#1	608.05'	0.053 af	**12.00'W x 10.00'L x 4.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	608.05'	**36.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 608.05' / 608.01' S= 0.0008 '/' Cc= 0.900 n= 0.011, Flow Area= 7.07 sf
#2	Secondary	611.05'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 Width (feet) 0.00 50.00

Primary OutFlow Max=25.86 cfs @ 12.20 hrs HW=611.69' TW=611.46' (Dynamic Tailwater)
1=Culvert (Inlet Controls 25.86 cfs @ 1.83 fps)

Secondary OutFlow Max=24.82 cfs @ 12.16 hrs HW=611.73' (Free Discharge)
2=Custom Weir/Orifice (Weir Controls 24.82 cfs @ 2.16 fps)

Pond 10P: Culvert test



Summary for Pond 11P: Culvert test

Modeled as pond to see if the confluence of the two reaches overflows.

Inflow Area = 19.705 ac, 0.00% Impervious, Inflow Depth > 2.18" for 25 year/ 24 hour event
Inflow = 48.31 cfs @ 12.16 hrs, Volume= 3.578 af
Outflow = 48.31 cfs @ 12.16 hrs, Volume= 3.570 af, Atten= 0%, Lag= 0.2 min
Primary = 40.16 cfs @ 12.11 hrs, Volume= 3.413 af
Secondary = 10.47 cfs @ 12.19 hrs, Volume= 0.157 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 612.88' @ 12.19 hrs Surf.Area= 0.023 ac Storage= 0.038 af

Plug-Flow detention time= 1.9 min calculated for 3.570 af (100% of inflow)
Center-of-Mass det. time= 1.1 min (791.7 - 790.6)

Volume	Invert	Avail.Storage	Storage Description
#1	609.47'	0.053 af	**12.00'W x 10.00'L x 4.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	609.40'	**36.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.40' / 609.36' S= 0.0008 '/' Cc= 0.900 n= 0.011, Flow Area= 7.07 sf
#2	Secondary	612.40'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 Width (feet) 0.00 50.00

Primary OutFlow Max=33.61 cfs @ 12.11 hrs HW=612.75' TW=612.36' (Dynamic Tailwater)
1=Culvert (Inlet Controls 33.61 cfs @ 2.38 fps)

Secondary OutFlow Max=10.20 cfs @ 12.19 hrs HW=612.88' (Free Discharge)
2=Custom Weir/Orifice (Weir Controls 10.20 cfs @ 1.81 fps)

Pond 11P: Culvert test