

Post Construction Stormwater Management Calculations

BOHLER //

Project: Proposed Warehouse Facility
Allentown Pike (S.R. 222)
Maidencreek Township
Berks County, PA

**Project
Number:** PP213222

Client: Maiden Creek Associates, L.P.
120 W. Germantown Pike, Suite 120
Plymouth Meeting, PA 19462

Date: September 29th, 2023

Professional
Engineer: Cornelius Brown
PA License #PE075317



Table of Contents

Existing Karst Features, Sink holes, and Carbonate Rock Considerations	1
BMPs Selected for Volume Control.....	2
BMPs Considered for Volume Control	2
Off-Site Discharge Analysis.....	4
PCSWM Standard Worksheets (1 & 2)	5
USGS Map.....	7
DEP PCSM Spreadsheet.....	9
Pre-Development	15
Pre-Development Tc Calculations.....	17
Pre-Development Hydrographs.....	21
Pre-Development 1-Year to MRC Calculations	45
Post-Development.....	49
Post-Development Hydrographs.....	51
MRC BMP Design Summaries	95
Supporting Calculations	103
Swale Design	105
Riprap Aprons	107
Spillway Designs	113
Level Spreaders	117
Loading Ratios	123
Anti-Seep Collars.....	125
Equivalent Impervious Calculations	129
Underdrain Capacity Calculations	131
Dewatering Calculations	133
Conveyance Calculations.....	139
Appendix	157
Preliminary Geotechnical Investigation & SWM Area Evaluation	159
Maidencreek Township Appendix B	296
Web Soil Survey.....	308
Stage-Storage Calculations.....	311

EXISTING KARST FEATURES, SINK HOLES, AND CARBONATE ROCK CONSIDERATIONS

Whitestone Associates, Inc. completed a geotechnical investigation and stormwater management area evaluation at the property. Portions of those findings is listed in the subsequent paragraphs. And a copy of the report is included in the Appendix.

Whitestone conducted a reconnaissance of the site in attempt to identify existing karst features such as closed surface depressions, rock outcrops, and open sinkholes. Whitestone identified 15 undocumented closed depressions and two sinkholes during the site reconnaissance.

In addition to the site reconnaissance and subsurface investigation, Whitestone reviewed the 1990 Open File Report - Sinkholes and Karst-Related Features of Berks County, Pennsylvania (Open File Report) prepared by William E. Kochanov for the Commonwealth of Pennsylvania to further develop an understanding of the geologic conditions within the overall site development and evaluate risk potential for sinkhole development with the proposed warehouse site.

The Open-File Report (1990) revealed several closed depressions in all directions away from the site. Utilizing online mapping software in association with the Pennsylvania Department of Conservation and Natural Resources, there were a total of approximately 146 closed surface depressions and one sinkhole mapped within one half mile of the site. These surface features along with features identified by Whitestone, and mapped faults are shown on Figure 2 - Karst Figures Map.

According to the Commonwealth of Pennsylvania, Department of Environmental Resources, Bureau of Topographic and Geologic Survey Geologic Map of Pennsylvania dated 1980, the site is located within the Lowland Section of the Piedmont Physiographic Province of Pennsylvania. Specifically, the subject property is underlain at the confluence of three carbonate rock formations that include the Epler Formation, the Ontelaunee Formation, and the Rickenbach Formation.

These geologic formations could contain solution cavities and voids that are susceptible to sinkhole formation. Residual soils weathered from the parent bedrock generally consist of fine-grained clay and silt with lesser amounts of sand and variable amounts of rock fragments. The subsurface conditions encountered during this investigation generally were consistent within these formations.

The results of the subsurface investigation indicated that site soils are predominantly impermeable with minor lenses of permeable soil. The subsurface investigation and document review also indicated that the site has an elevated risk of sinkhole development due to the presence of very loose/very soft soil conditions above bedrock (i.e., raveling), highly variable rock depths, documentation of sinkhole activity, and several faults (as shown on Figure 2). Because water infiltration into the substrata increases risk of sinkhole development, Whitestone recommended that the proposed SWM facilities be lined with an impermeable clay soil or geosynthetic membrane.

Based on the recommendations of the geotechnical, no stormwater infiltration is proposed to support the development.

BMPs Selected for Volume Control

The PCSWM and BMP approach of this development is meant to prevent adverse stormwater impacts and provide the necessary treatment of runoff close to the origin of the impact. The primary goal of this development's stormwater management program was to mimic, as best as possible, the pre-development site hydrology by using both structural and non-structural BMP's to prevent or minimize changes in stormwater runoff. Construction of the site is sequenced with appropriate temporary stabilization methods to minimize the duration of earth disturbance.

Generally, the proposed BMP's were selected to:

- Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
- Prevent an increase in rate of stormwater runoff.
- Minimize any increase in stormwater runoff volume.

Specifically, the following BMP's were incorporated into the design:

BMP 6.6.3 MRC Dry Extended Detention Basin: A dry extended detention basin is an earthen structure constructed either by impoundment of a natural depression or runoff and functions hydraulically to attenuate stormwater runoff peaks. Due to site limitations, no infiltration is proposed on-site, which limits this BMP's benefits for volume reduction and water quality. As a solution, these BMP shall be designed to Managed Release Concept (MRC) standards. MRC basins provide volume control by storing stormwater within the basin and soil layers and very slowly releasing it downstream to minimize impacts. The basins shall consist of plug planting with a mix of native woody, herbaceous, and grass species. A seed mix shall also be used along the basin bed. Stormwater held within the basin shall be used for evapotranspiration by the extensive vegetation.

BMP 6.8.1 Level Spreader: Level Spreaders are measures that reduce the erosive energy of concentrated flows by distributing runoff as sheet flow to stabilized vegetative surfaces. The existing site conditions (vacant, agricultural land) consists of (3) points of interest of shallow concentrated flow. To avoid point-source discharging in these areas, level spreaders are proposed at each POI to evenly distribute the post-development flow and replicate the existing conditions on site.

BMP 6.4.8 Vegetated Swale: A vegetated swale is a broad, shallow, trapezoidal, or parabolic channel, densely planted with a variety of trees, shrubs, and/or grasses. They can be designed to attenuate and in some cases infiltrate runoff volume, however for this project this BMP's primary function is to redirect drainage area away from the site's conveyance system to better mimic the pre-development condition.

BMPs Considered for Volume Control

- **BMP 5.4.1 Protect Sensitive and Special Value Resources:** There are no existing floodplains, riparian areas, wetlands or woodlands located on-site to protect. There are no existing steep slopes to protect.
- **BMP 5.4.2 Protect/Conserve/Enhance Riparian Areas:** There are no existing riparian areas on-site to protect, conserve or enhance.
- **BMP 5.4.3 Protect/Utilize Natural Flow Pathways in Overall Stormwater Planning and Design:** The site has been developed to maintain the existing points of interest. The natural flow pathways to Peter's Creek shall be used and protected by reducing volume and flow to each location.
- **BMP 5.5.1 Cluster Uses at Each Site; Build on the Smallest Area Possible:** Based upon the proposed uses on-site and the Township zoning requirements, clustering the uses will not

provide a noticeable difference in site disturbance. Most of the site is comprised of Township required parking areas.

- **BMP 5.5.2 Concentrate Uses Area wide through Smart Growth Practices:** This BMP is described as taking place “on a municipal or multi-municipal or areawide basis”. The property owner only has control over their property, therefore this BMP is not applicable to this site.
- **BMP 5.6.2 Minimize Soil Compaction in Disturbed Areas:** Due to the existing conditions of the, existing soils have already been compacted, and therefore this BMP is infeasible for the site.
- **BMP 5.6.3 Re-vegetate and re-forest disturbed areas, using native species:** This BMP has a low/medium volume reduction as indicated in the manual and would not provide this site with the necessary volume to meet the reduction requirements. However, a significant amount of landscaping is proposed on-site, more than what is required by code. Also, a meadow mix is specified in areas of bypass to establish dense vegetative cover and lower curve numbers.
- **BMP 5.7.1 Reduce Street Imperviousness:** The site has been designed to minimize the amount of impervious areas required for truck circulation. However, this has very little impact on the overall volume requirements for the site.
- **BMP 5.7.2 Reduce Parking Imperviousness:** Parking on-site has been designed per Township zoning requirements. The number and size of stalls and the width of drive aisles are designed to meet the Township Zoning requirements.
- **BMP 5.8.1 Rooftop Disconnection:** As specified in the Geotechnical report, the site is in a location with carbonate geology and infiltration is not recommended. For this reason, disconnected runoff from roof areas would have minimal advantages.
- **BMP 5.8.2 Disconnection from Storm Sewers:** As specified in the Geotechnical report, the site is in a location with carbonate geology and infiltration is not recommended. Utilizing infiltration trenches to disconnect driveway or roadways is infeasible due to the lack of infiltration. Most of the site shall drain to the (3) MRC raingardens proposed on-site.
- **BMP 5.9.1 Streetsweeping:** This BMP provides no volume control component. The other BMPs that have been selected for this site meet the Runoff Quality and Peak Rate requirements.
- **BMP 6.4.1 Pervious Pavement with Infiltration Bed:** As specified in the Geotechnical report, the site is in a location with carbonate geology and infiltration is not recommended.
- **BMP 6.4.2 Infiltration Basin:** As specified in the Geotechnical report, the site is in a location with carbonate geology and infiltration is not recommended.
- **BMP 6.4.3 Subsurface Infiltration Bed:** As specified in the Geotechnical report, the site is in a location with carbonate geology and infiltration is not recommended.
- **BMP 6.4.4. Infiltration Trench:** As specified in the Geotechnical report, the site is in a location with carbonate geology and infiltration is not recommended.
- **BMP 6.4.6 Dry Well/ Seepage Pit:** As specified in the Geotechnical report, the site is in a location with carbonate geology and infiltration is not recommended.
- **BMP 6.4.7 Constructed Filter:** As specified in the Geotechnical report, the site is in a location with carbonate geology and infiltration is not recommended.
- **BMP 6.4.9 Vegetated Filter Strip:** As specified in the Geotechnical report, the site is in a location with carbonate geology and infiltration is not recommended. Therefore, this BMP provides no volume control component. The other BMPs that have been selected for this site meet the Runoff Quality and Peak Rate requirements. Additionally, (3) MRC rain gardens have been proposed in all available vegetated areas on-site.

- **BMP 6.4.10 Infiltration Berm & Retentive Grading:** As specified in the Geotechnical report, the site is in a location with carbonate geology and infiltration is not recommended.
- **BMP 6.5.1 Vegetated Roof:** Based on the BMP manual the volume credit for vegetated roofs were minimal and would not provide this site with the necessary volume to meet the reduction requirements. The site has significant area to use surface BMPs.
- **BMP 6.5.2 Runoff Capture and Reuse:** The reuse potential for this development is minimal because the landscape plantings that are proposed are native species that will not be irrigated. In addition, grey water re-use systems are cost prohibitive for all the anticipated uses of this development.
- **BMP 6.6.1 Constructed Wetland:** This BMP provides no volume control component. The other BMPs that have been selected for this site meet the Runoff Quality and Peak Rate requirements. For these reasons this BMP was not implemented on this project.
- **BMP 6.6.2 Wet Pond/Retention Basin:** This BMP provides no volume control component. The other BMPs that have been selected for this site meet the Runoff Quality and Peak Rate requirements. For these reasons this BMP was not implemented on this project.
- **BMP 6.7.1 Riparian Buffer Restoration:** There are no streams, lakes, ponds, wetlands or existing riparian buffers located on site. For this reason, this BMP was not implemented on this project.
- **BMP 6.7.2 Landscape Restoration:** Native planting species have been selected for the on-site landscaping. In addition to well planted grass areas, a meadow seed mix is proposed around the perimeter of the property for dense vegetation.
- **BMP 6.7.4 Floodplain Restoration:** There are no existing floodplains on site. For this reason, this BMP was not implemented on this project.
- **BMP 6.8.2 Special Detention Areas – Parking Lot, Rooftop:** This BMP provides no volume control or water quality components. The other BMPs that have been selected for this site meet the Peak Rate requirements.

Off-Site Discharge Analysis

The pre-development vs. post-development calculations provided here-in demonstrate that there is a reduction of peak flow to each existing discharge point. Geotechnical testing has determined that the site is not feasible for infiltration due to karst geology. As such, the net increase in volume to the discharge point is detained and discharged utilizing MRC design over an extended period after a storm event has ended. By significantly extending the detention time, downstream flooding and erosion are less likely occur. Also, detained water shall be evapotranspired by the extensive vegetation in each basin. The DEP PSCM spreadsheets attached herein demonstrate that adequate volume and water quality credits shall be provided by the three MRC basins. Additionally, the level spreaders proposed at each discharge point shall closely replicate the existing flow at each discharge point by converting the point-source discharge from each basin to a sheet flow condition. With the implementation of the above, there will not be any risk of further erosion or downstream impacts.

PCSWM STANDARD WORKSHEET

STANDARD WORKSHEET # 1 **COVER SHEET**

A. DEVELOPMENT NAME: Redstone at Baederwood DATE: 10/28/2019

1. LOCATION: Abington Township Montgomery
(Municipality) (County)

2. FACILITY OWNER: Baederwood Residential Partners, L.P.
[102.4(A)] (Name)

1301 Lancaster Ave.
(Address)

Berwyn, PA 19312
(Zip)

Telephone #: (610) 727-6023

3. PERSON(S) RESPONSIBLE FOR CONSTRUCTION AND MAINTENANCE OF STORMWATER
MANAGEMENT CONTROLS: Note: List all responsible parties if duties are assigned to more than
one party.

[102.4(A)] TBD
(Name)

_____
(Address)

_____
(Zip)

Telephone #: ( ) -

4. POST CONSTRUCTION STORMWATER MANAGEMENT PLAN PREPARER

[102.4(A)] Bohler Engineering PA, LLC
(Name)

1515 Market Street, Suite 920
(Address)

Philadelphia, PA 19102
(Zip)

Telephone #: (267) 402 - 3400

STANDARD WORKSHEET # 2
RECORD OF TRAINING AND EXPERIENCE**IN EROSION AND SEDIMENTATION CONTROL METHODS AND TECHNIQUE**NAME OF PLAN PREPARER: Cornelius Brown, P.E.

FORMAL EDUCATION:

Name of College or Technical Institute: University of MarylandCurriculum or program: Civil EngineeringDates of Attendance: From: September 1995 to: August 2000Degree received: B.S. in Civil Engineering

OTHER TRAINING:

Name of Training: E&S/NPDESPresented by: PADEP/Villanova UniversityDate: 2004

EMPLOYMENT HISTORY:

Current Employer: Bohler Engineering PA LLCTelephone: (267) 402-3400Former Employer: N/A

Telephone:

RECENT POST CONSTRUCTION STORMWATER MANAGEMENT PLANS PREPARED:

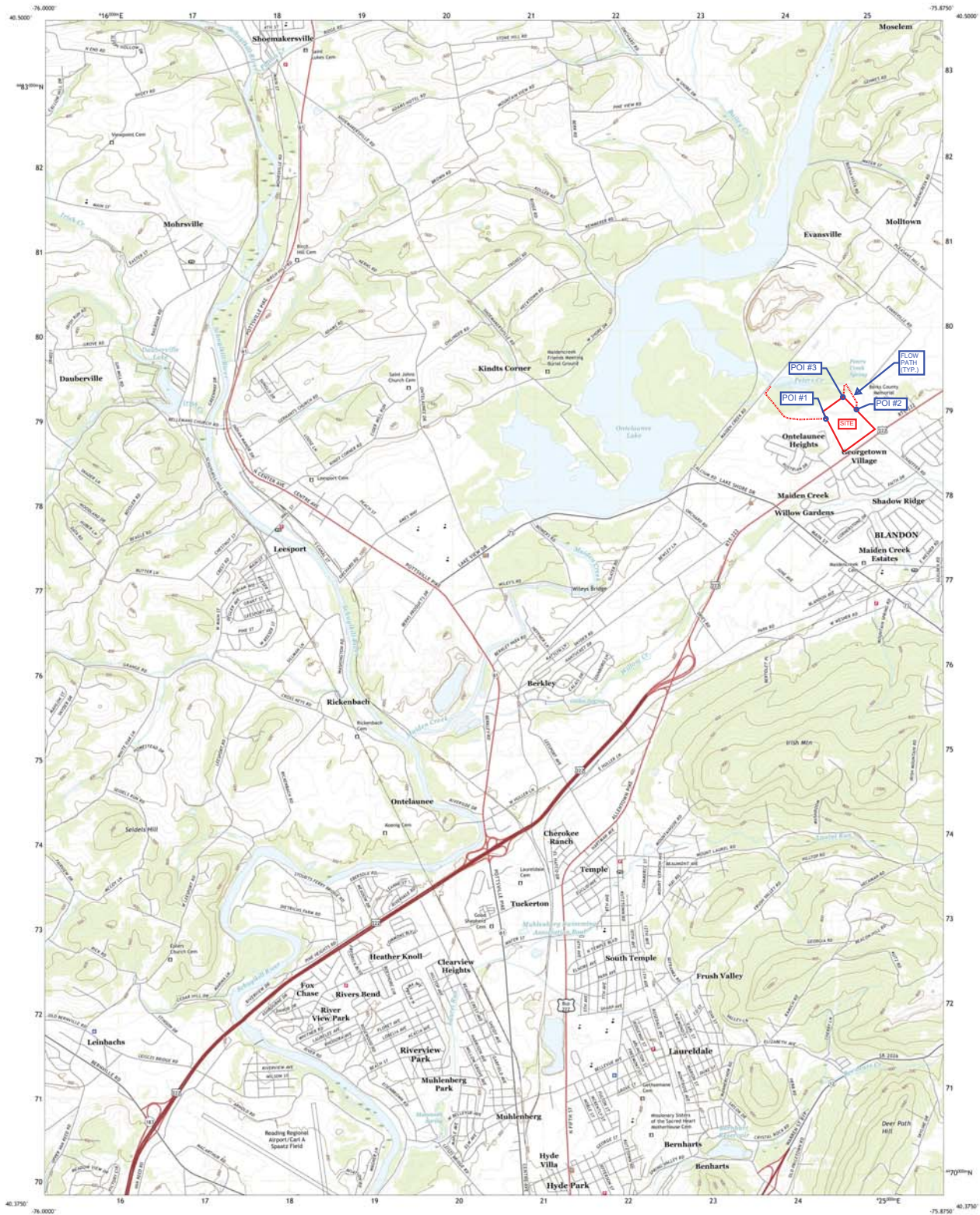
Name of Project Cheltenham Square Mall Springfield Mall Valley Forge MarketplaceCounty: Montgomery Delaware MontgomeryMunicipality: Cheltenham Township Springfield Township West Norriton TownshipPermit Number: PAG2004607194 PAG2002308008 PAG2004605169-1
(If Applicable)Approving Agency: MCCD DCCD MCCD



U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY



TEMPLE QUADRANGLE
PENNSYLVANIA - BERKS COUNTY
7.5-MINUTE SERIES



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84) Projection and
1:50,000 scale and contour interval. Contour interval is 20 feet.
This map is not a legal document. Boundaries may be
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.

Imagery: NADP, June 2017, December 2017
Base: U.S. Census, 2010
Roads: National Hydrography Dataset, 2010
Contours: National Elevation Dataset, 2011
Boundaries: Multiple sources, including the 2017
Wetlands: FWS National Wetlands Inventory, 1981 - 1982



Imagery: NADP, June 2017, December 2017
Base: U.S. Census, 2010
Roads: National Hydrography Dataset, 2010
Contours: National Elevation Dataset, 2011
Boundaries: Multiple sources, including the 2017
Wetlands: FWS National Wetlands Inventory, 1981 - 1982



Imagery: NADP, June 2017, December 2017
Base: U.S. Census, 2010
Roads: National Hydrography Dataset, 2010
Contours: National Elevation Dataset, 2011
Boundaries: Multiple sources, including the 2017
Wetlands: FWS National Wetlands Inventory, 1981 - 1982



TEMPLE, PA
2019

DEP PCSM Spreadsheet

General Information

Instructions **General** **Volume** **Rate** **Quality**

Project Name: **Maidencreek Redevelopment**

Application Type: **Individual NPDES Application**

County: **Berks**

Municipality: **Maidencreek Township**

Project Type: **Redevelopment**

☒ New Project ☐ Minor / Major Amendment

Total Project Site Area: **83.70** acres
(In Watershed)

Total Earth Disturbance: **83.70** acres
(In Watershed)

No. of Post-Construction Discharge Points: **3**

Start DP Numbering at: **001**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
001	4.26	4.26	0.00	0.00	Discharge to Non-Surface Waters	EV, MF	Yes
002	51.80	51.80	0.00	39.44	Discharge to Non-Surface Waters	EV, MF	Yes
003	15.44	15.44	0.00	9.66	Discharge to Non-Surface Waters	EV, MF	Yes
Undetained Areas	12.20	12.20	0.00	0.99	Discharge to Non-Surface Waters	EV, MF	

Totals: 83.70 83.70 50.09

Volume Management

Project: Maidencreek Redevelopment

Instructions General **Volume** Rate Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): inches Alternative 2-Year / 24-Hour Storm Event: inches

Alternative Source:

Pre-Construction Conditions: No. Rows: ☐ Exempt from Meadow in Good Condition ☒ Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Forested (Good Condition)	3.98	B	55	1.636	0.16	2,371
Pervious as Meadow	79.72	B	58	1.448	0.24	68,394
TOTAL (ACRES):		83.70		TOTAL (CF):		70,765

Post-Construction Conditions: No. Rows:

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	15.47	B	58	1.448	0.24	13,272
Impervious Areas: Industrial	50.09	B	98	0.041	2.65	481,620
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	18.14	B	61	1.279	0.32	21,120
TOTAL (ACRES):		83.70		TOTAL (CF):		516,012

NET CHANGE IN VOLUME TO MANAGE (CF):

Non-Structural BMP Volume Credits:

☒ Tree Planting Credit

Number of new deciduous trees that will be planted within disturbed area:

CREDIT (CF):

Number of new evergreen trees that will be planted within disturbed area:

CREDIT (CF):

☐ Other (attach calculations):

Structural BMP Volume Credits: No. Structural BMPs: Start BMP Numbering at:

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
002	1	Dry Extended Detention Basin	Y	Off-Site	27.24	200,637	70,005	0.00	96	Yes	2.5	77,644	0	45,153
002	2	Dry Extended Detention Basin	Y	Off-Site	24.56	192,971	65,195	0.00	96	Yes	2.5	72,364	0	42,051
003	3	Dry Extended Detention Basin	Y	Off-Site	15.44	99,622	51,300	0.00	96	Yes	2.5	43,739	0	33,089
Totals:													120,293	

INFILTRATION & ET CREDITS (CF):

MANAGED RELEASE CREDIT (CF):

NET CHANGE IN VOLUME TO MANAGE (CF):

TOTAL CREDITS (CF):

VOLUME REQUIREMENT SATISFIED

Rate Control

Project: Maidencreek Redevelopment

Instructions

General

Volume

Rate

Quality

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):

NOAA 10-Year 24-Hour Storm Event (in):

NOAA 50-Year 24-Hour Storm Event (in):

NOAA 100-Year 24-Hour Storm Event (in):

Alternative 2-Year 24-Hour Storm Event (in):

Alternative 10-Year 24-Hour Storm Event (in):

4.56

Alternative 50-Year 24-Hour Storm Event (in):

6.48

Alternative 100-Year 24-Hour Storm Event (in):

7.44

☒ Report Summary of Peak Rates Only

Attach model input and output data or other calculations to support the rates reported below.

Peak Discharge Rates (cfs)			
	Pre-Construction	Post-Construction	Net Change
2-Year Storm:	31.81	9.32	-22.49
10-Year Storm:	95.89	41.98	-53.91
50-Year Storm:	183.90	91.60	-92.30
100-Year Storm:	231.10	132.36	-98.74

Rate Control Satisfied

Rate Control Satisfied

Rate Control Satisfied

Rate Control Satisfied

Water Quality

Project: Maiden Creek Redevelopment

PRINT

Instructions General Volume Rate **Quality**

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	3.98	B	2,371	45.0	0.13	1.05	6.66	0.02	0.16
Pervious as Meadow	Grassland/Herbaceous	79.72	B	68,394	48.8	0.22	2.30	208.41	0.94	9.82
TOTAL (ACRES):		83.70			TOTALS:			215.07	0.96	9.98

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	15.47	B	13,272	48.8	0.22	2.30	40.44	0.18	1.91
Impervious Areas: Industrial	Industrial	50.09	B	481,620	81.0	0.24	2.01	#####	7.22	60.45
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	18.14	B	21,120	78.0	0.25	1.25	102.86	0.33	1.65
TOTAL (ACRES):		83.70			TOTALS:			#####	7.73	64.00

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS): ##### 6.77 54.02

☒ Characterize Undetained Areas (for Untreated Stormwater)

No. Rows: 2

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.99	B	98	0.041	2.65	9,519
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	11.21	B	58	1.448	0.24	9,617

Non-Structural BMP Water Quality Credits:

☒ Pervious Undetained Area Credit

TSS	TP	TN
7.33	0.03	0.21

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☒ Use default BMP Outflows and Median BMP Outflow Concentrations

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
002	1	Dry Extended Detention Basin	Y	27.24	200,637	45,153		155,484	-	-	-	-	-	-
002	2	Dry Extended Detention Basin	Y	24.56	192,971	42,051		150,920	-	-	-	-	-	-
003	3	Dry Extended Detention Basin	Y	15.44	99,622	33,089		66,534	-	-	-	-	-	-

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	0.00	0.00	0.00
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	67.94	0.30	2.60
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):	7.33	0.03	0.21
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	60.61	0.28	2.39
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	215.07	0.96	9.98

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Stephen J. Amato

Spreadsheet User Name

6/30/2023

Date

Pre-Development

Time of Concentration (Tc) or (Tt) Calculations

Project: **PP213222 - Maidencreek Warehouse**

Description: **Pre-Development POI #2**

Note: Space for as many as three segments per flow type can be used for each worksheet.

Sheet Flow (Applicable to Tc only)

1. Surface Description (table 3-1)
  2. Manning's roughness coeff., n (table 3-1)
  3. Flow length, L (total L ≤ 150 ft)
  4. Two-yr 24-hr rainfall, P₂
  5. Land slope, s*
  6. $T_t = 0.007(nL)^{0.8} / P_2^{0.5} s^{0.4}$
- *S is averaged

Segment ID

Compute Tt hr

AB			
Pasture			
0.350			
ft			
100			
in			
3.20			
ft/ft			
0.0177			
0.3377	+		+
			= 0.3377

Shallow Concentrated Flow

7. Surface Description (paved or unpaved)
8. Flow length, L
9. Watercourse slope, s*
10. Average velocity, V
11. $T_t = L / 3600V$

Segment ID

ft

ft/ft

ft/sec

BC	CD	
Unpaved	Unpaved	
806	621	
ft	ft	
0.0270	0.0110	
ft/ft	ft/ft	
2.65	1.68	
ft/sec	ft/sec	
0.0846	+	0.1025
		+
		= 0.1871

Channel Flow

12. Cross sectional flow area, a
13. Wetted perimeter, p
14. Hydraulic radius, r = a/wp
15. Channel Slope, s
16. Manning's roughness coeff., n
17. $V = 1.49r^{2/3}s^{1/2} / n$
18. Flow length, L
19. $T_t = L / 3600V$

Segment ID

ft²

ft

ft

ft/ft

ft

DE		
50.00		
ft ²		
80.03		
ft		
0.6247		
ft		
0.0070		
ft/ft		
0.035		
ft		
2.6030		
ft		
1385		
ft		
0.1478	+	
		+
		= 0.1478
		0.6727

20. Watershed or subarea T_c or T_t (add T_t in steps 6,11, and 19)

T_c = **40.4** minutes

Time of Concentration (Tc) or (Tt) Calculations

Project: **PP213222 - Maidencreek Warehouse**

Description: **Pre-Development POI #3**

Note: Space for as many as three segments per flow type can be used for each worksheet.

Sheet Flow (Applicable to Tc only)

1. Surface Description (table 3-1)
  2. Manning's roughness coeff., n (table 3-1)
  3. Flow length, L (total L ≤ 150 ft)
  4. Two-yr 24-hr rainfall, P₂
  5. Land slope, s*
  6. $T_t = 0.007(nL)^{0.8} / P_2^{0.5} s^{0.4}$
- *S is averaged

Segment ID

Compute Tt hr

AB			
Pasture			
0.350			
ft			
100			
in			
3.20			
ft/ft			
0.0340			
0.2601	+		+
			=
			0.2601

Shallow Concentrated Flow

7. Surface Description (paved or unpaved)
8. Flow length, L
9. Watercourse slope, s*
10. Average velocity, V
11. $T_t = L / 3600V$

Segment ID

ft/sec

BC			
Unpaved			
740			
ft			
0.0470			
ft/ft			
3.50			
0.0588	+		+
			=
			0.0588

Channel Flow

12. Cross sectional flow area, a
13. Wetted perimeter, p
14. Hydraulic radius, r = a/wp
15. Channel Slope, s
16. Manning's roughness coeff., n
17. $V = 1.49r^{2/3}s^{1/2} / n$
18. Flow length, L
19. $T_t = L / 3600V$

Segment ID

ft²

ft

ft

ft/ft

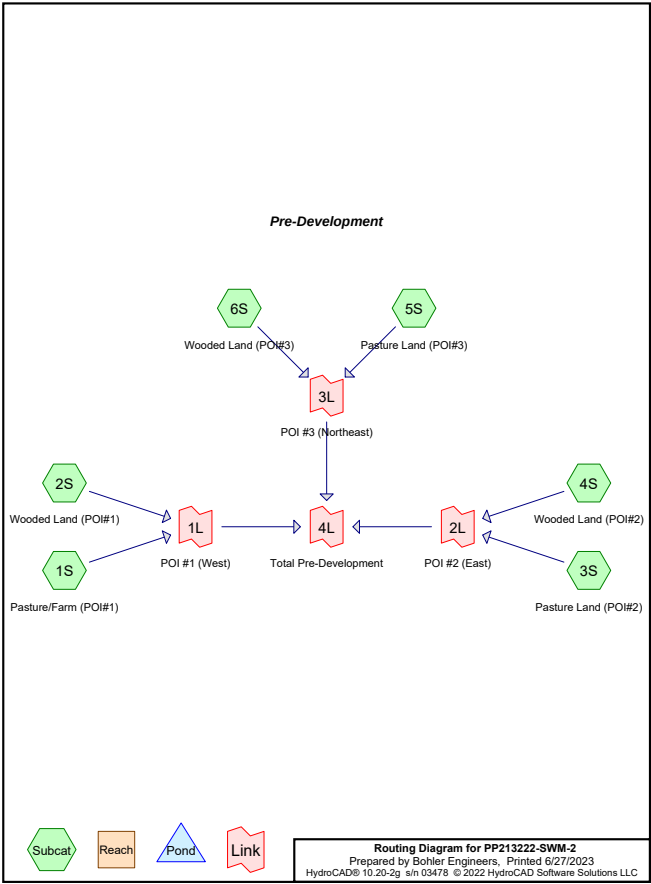
ft

0.0070			
0.035			
1385			
	+		+
			=
			0.3189

20. Watershed or subarea T_c or T_t (add T_t in steps 6,11, and 19)

Tc = **19.1** minutes

Rainfall Events Listing								
Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 Year	Type II 24-hr		Default	24.00	1	2.40	2
2	2 Year	Type II 24-hr		Default	24.00	1	2.88	2
3	5 Year	Type II 24-hr		Default	24.00	1	3.60	2
4	10 Year	Type II 24-hr		Default	24.00	1	4.56	2
5	25 Year	Type II 24-hr		Default	24.00	1	5.76	2
6	50 Year	Type II 24-hr		Default	24.00	1	6.48	2
7	100 Year	Type II 24-hr		Default	24.00	1	7.44	2
8	WQ	Type II 24-hr		Scale	2.00	1	1.20	2



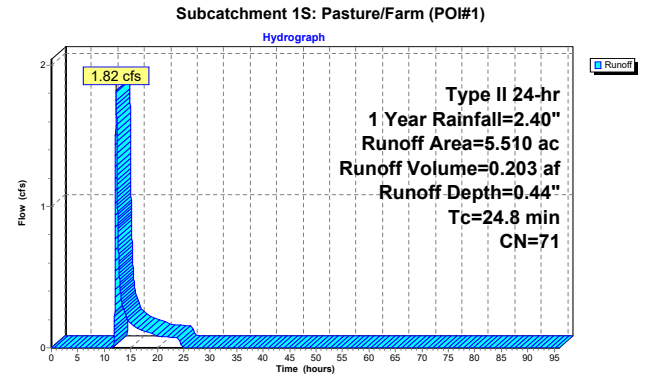
Area Listing (selected nodes)		
Area (acres)	CN	Description (subcatchment-numbers)
79.720	71	Agricultural (1S, 3S, 5S)
3.980	60	Woods, Good, HSG B (2S, 4S, 6S)
83.700	70	TOTAL AREA

Soil Listing (selected nodes)		
Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.980	HSG B	2S, 4S, 6S
0.000	HSG C	
0.000	HSG D	
79.720	Other	1S, 3S, 5S
83.700		TOTAL AREA

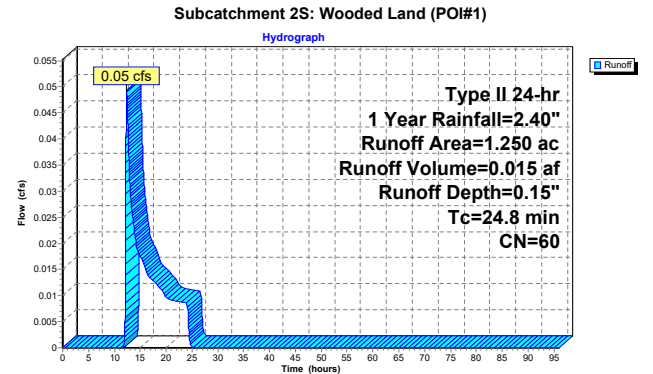
Ground Covers (selected nodes)							
HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	79.720	79.720	Agricultural	1S, 3S, 5S
0.000	3.980	0.000	0.000	0.000	3.980	Woods, Good	2S, 4S, 6S
0.000	3.980	0.000	0.000	79.720	83.700	TOTAL AREA	

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points Runoff by SCS TR-20 method, UH=SCS, Weighted-Q Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method	
Subcatchment 1S: Pasture/Farm (POI#1)	Runoff Area=5.510 ac 0.00% Impervious Runoff Depth=0.44" Tc=24.8 min CN=71 Runoff=1.82 cfs 0.203 af
Subcatchment 2S: Wooded Land (POI#1)	Runoff Area=1.250 ac 0.00% Impervious Runoff Depth=0.15" Tc=24.8 min CN=60 Runoff=0.05 cfs 0.015 af
Subcatchment 3S: Pasture Land (POI#2)	Runoff Area=60.450 ac 0.00% Impervious Runoff Depth=0.44" Tc=40.4 min CN=71 Runoff=14.12 cfs 2.228 af
Subcatchment 4S: Wooded Land (POI#2)	Runoff Area=0.990 ac 0.00% Impervious Runoff Depth=0.15" Tc=40.4 min CN=60 Runoff=0.03 cfs 0.012 af
Subcatchment 5S: Pasture Land (POI#3)	Runoff Area=13.760 ac 0.00% Impervious Runoff Depth=0.44" Tc=19.1 min CN=71 Runoff=5.47 cfs 0.507 af
Subcatchment 6S: Wooded Land (POI#3)	Runoff Area=1.740 ac 0.00% Impervious Runoff Depth=0.15" Tc=19.1 min CN=60 Runoff=0.08 cfs 0.021 af
Link 1L: POI #1 (West)	Inflow=1.86 cfs 0.218 af Primary=1.86 cfs 0.218 af
Link 2L: POI #2 (East)	Inflow=14.14 cfs 2.240 af Primary=14.14 cfs 2.240 af
Link 3L: POI #3 (Northeast)	Inflow=5.54 cfs 0.528 af Primary=5.54 cfs 0.528 af
Link 4L: Total Pre-Development	Inflow=17.85 cfs 2.986 af Primary=17.85 cfs 2.986 af
Total Runoff Area = 83.700 ac Runoff Volume = 2.986 af Average Runoff Depth = 0.43" 100.00% Pervious = 83.700 ac 0.00% Impervious = 0.000 ac	

Summary for Subcatchment 1S: Pasture/Farm (POI#1)	
Runoff = 1.82 cfs @ 12.23 hrs, Volume= 0.203 af, Depth= 0.44"	
Routed to Link 1L : POI #1 (West)	
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs Type II 24-hr 1 Year Rainfall=2.40"	
Area (ac)	CN Description
* 5.510 71	Agricultural
5.510	100.00% Pervious Area
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	
24.8	Direct Entry,



Summary for Subcatchment 2S: Wooded Land (POI#1)	
Runoff = 0.05 cfs @ 12.37 hrs, Volume= 0.015 af, Depth= 0.15"	
Routed to Link 1L : POI #1 (West)	
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs Type II 24-hr 1 Year Rainfall=2.40"	
Area (ac)	CN Description
* 1.250 60	Woods, Good, HSG B
1.250	100.00% Pervious Area
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	
24.8	Direct Entry, Tc-2



Summary for Subcatchment 3S: Pasture Land (POI#2)

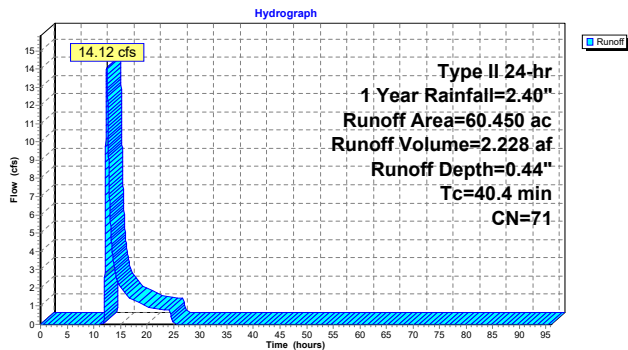
Runoff = 14.12 cfs @ 12.44 hrs, Volume= 2.228 af, Depth= 0.44"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 60.450	71	Agricultural
60.450		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 3S: Pasture Land (POI#2)



Summary for Subcatchment 4S: Wooded Land (POI#2)

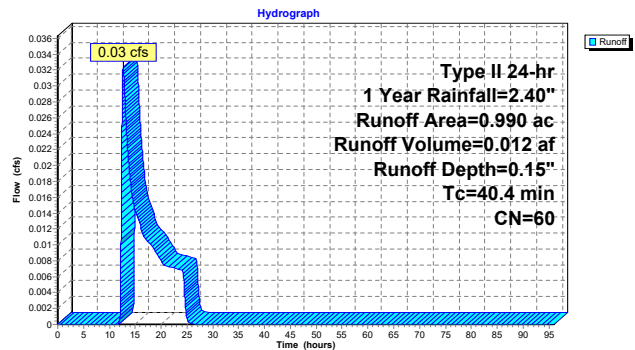
Runoff = 0.03 cfs @ 12.66 hrs, Volume= 0.012 af, Depth= 0.15"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 0.990	60	Woods, Good, HSG B
0.990		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 4S: Wooded Land (POI#2)



Summary for Subcatchment 5S: Pasture Land (POI#3)

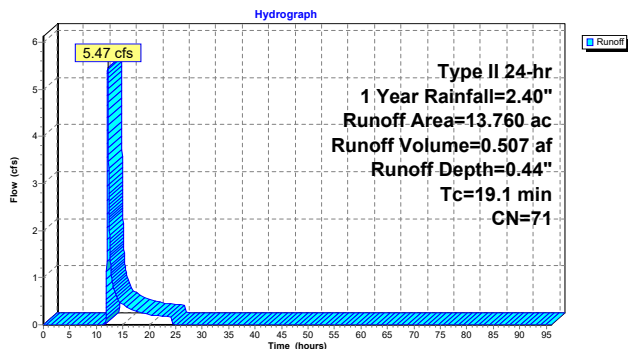
Runoff = 5.47 cfs @ 12.16 hrs, Volume= 0.507 af, Depth= 0.44"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 13.760	71	Agricultural
13.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 5S: Pasture Land (POI#3)



Summary for Subcatchment 6S: Wooded Land (POI#3)

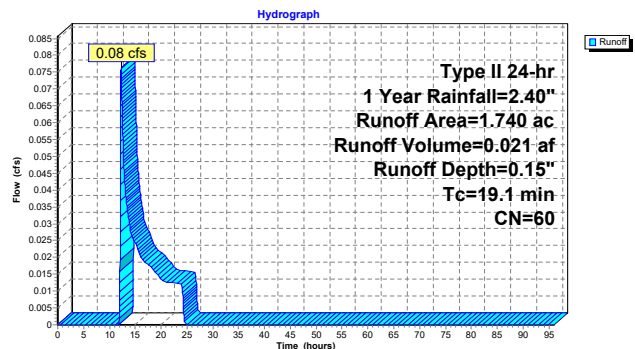
Runoff = 0.08 cfs @ 12.25 hrs, Volume= 0.021 af, Depth= 0.15"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 1.740	60	Woods, Good, HSG B
1.740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 6S: Wooded Land (POI#3)

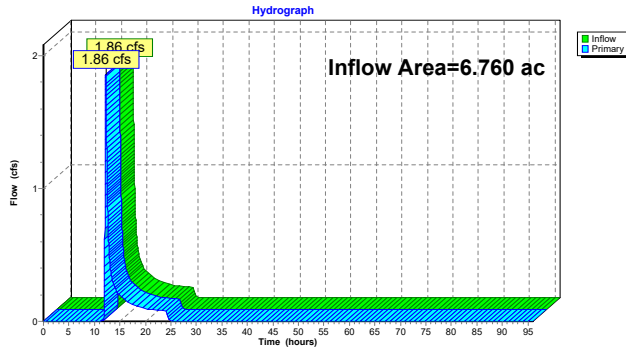


Summary for Link 1L: POI #1 (West)

Inflow Area = 6.760 ac, 0.00% Impervious, Inflow Depth = 0.39" for 1 Year event
 Inflow = 1.86 cfs @ 12.23 hrs, Volume= 0.218 af
 Primary = 1.86 cfs @ 12.23 hrs, Volume= 0.218 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: POI #1 (West)

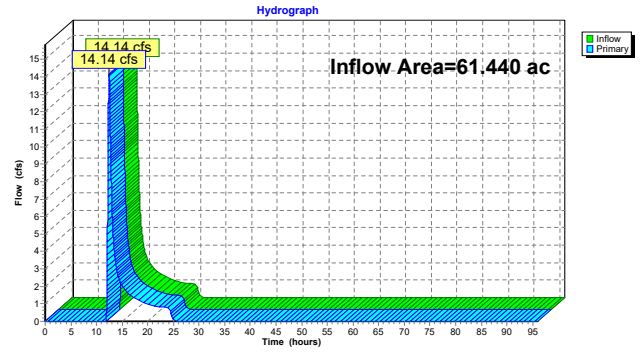


Summary for Link 2L: POI #2 (East)

Inflow Area = 61.440 ac, 0.00% Impervious, Inflow Depth = 0.44" for 1 Year event
 Inflow = 14.14 cfs @ 12.44 hrs, Volume= 2.240 af
 Primary = 14.14 cfs @ 12.44 hrs, Volume= 2.240 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: POI #2 (East)

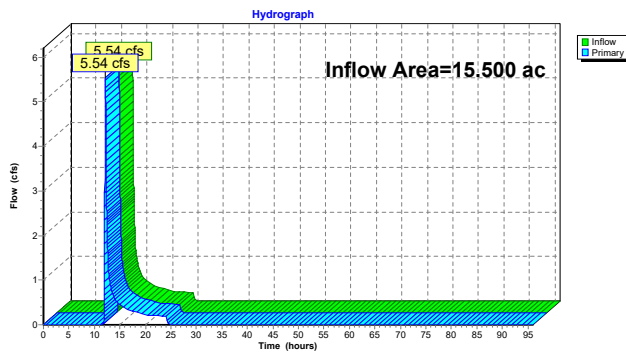


Summary for Link 3L: POI #3 (Northeast)

Inflow Area = 15.500 ac, 0.00% Impervious, Inflow Depth = 0.41" for 1 Year event
 Inflow = 5.54 cfs @ 12.16 hrs, Volume= 0.528 af
 Primary = 5.54 cfs @ 12.16 hrs, Volume= 0.528 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: POI #3 (Northeast)

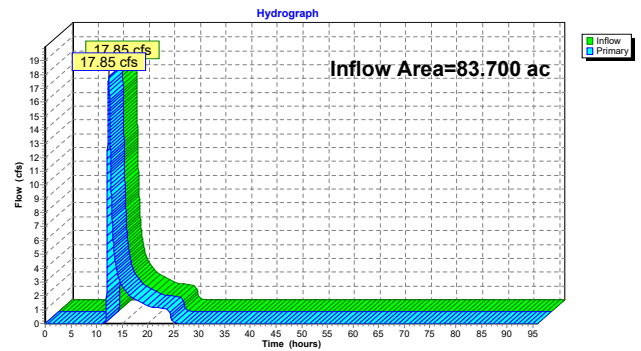


Summary for Link 4L: Total Pre-Development

Inflow Area = 83.700 ac, 0.00% Impervious, Inflow Depth = 0.43" for 1 Year event
 Inflow = 17.85 cfs @ 12.39 hrs, Volume= 2.986 af
 Primary = 17.85 cfs @ 12.39 hrs, Volume= 2.986 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: Total Pre-Development



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pasture/Farm (POI#1)	Runoff Area=5.510 ac 0.00% Impervious Runoff Depth=0.69" Tc=24.8 min CN=71 Runoff=3.22 cfs 0.318 af
Subcatchment 2S: Wooded Land (POI#1)	Runoff Area=1.250 ac 0.00% Impervious Runoff Depth=0.29" Tc=24.8 min CN=60 Runoff=0.18 cfs 0.030 af
Subcatchment 3S: Pasture Land (POI#2)	Runoff Area=60.450 ac 0.00% Impervious Runoff Depth=0.69" Tc=40.4 min CN=71 Runoff=24.93 cfs 3.488 af
Subcatchment 4S: Wooded Land (POI#2)	Runoff Area=0.990 ac 0.00% Impervious Runoff Depth=0.29" Tc=40.4 min CN=60 Runoff=0.10 cfs 0.024 af
Subcatchment 5S: Pasture Land (POI#3)	Runoff Area=13.760 ac 0.00% Impervious Runoff Depth=0.69" Tc=19.1 min CN=71 Runoff=9.56 cfs 0.794 af
Subcatchment 6S: Wooded Land (POI#3)	Runoff Area=1.740 ac 0.00% Impervious Runoff Depth=0.29" Tc=19.1 min CN=60 Runoff=0.29 cfs 0.042 af
Link 1L: POI #1 (West)	Inflow=3.39 cfs 0.348 af Primary=3.39 cfs 0.348 af
Link 2L: POI #2 (East)	Inflow=25.03 cfs 3.512 af Primary=25.03 cfs 3.512 af
Link 3L: POI #3 (Northeast)	Inflow=9.83 cfs 0.836 af Primary=9.83 cfs 0.836 af
Link 4L: Total Pre-Development	Inflow=31.81 cfs 4.696 af Primary=31.81 cfs 4.696 af

Total Runoff Area = 83.700 ac Runoff Volume = 4.696 af Average Runoff Depth = 0.67"
 100.00% Pervious = 83.700 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pasture/Farm (POI#1)

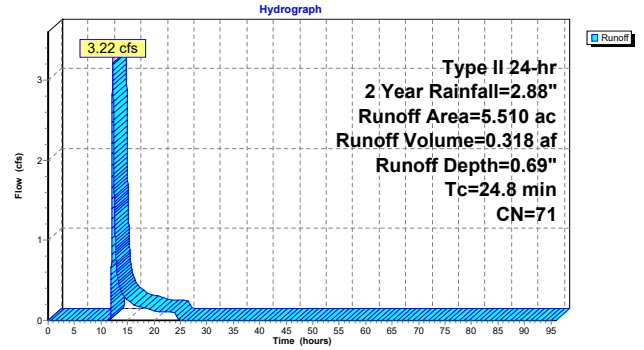
Runoff = 3.22 cfs @ 12.21 hrs, Volume= 0.318 af, Depth= 0.69"
 Routed to Link 1L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 5.510	71	Agricultural
5.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 1S: Pasture/Farm (POI#1)



Summary for Subcatchment 2S: Wooded Land (POI#1)

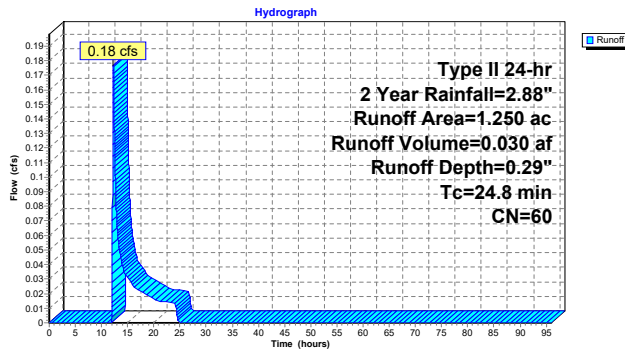
Runoff = 0.18 cfs @ 12.27 hrs, Volume= 0.030 af, Depth= 0.29"
 Routed to Link 1L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 1.250	60	Woods, Good, HSG B
1.250		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry, Tc-2

Subcatchment 2S: Wooded Land (POI#1)



Summary for Subcatchment 3S: Pasture Land (POI#2)

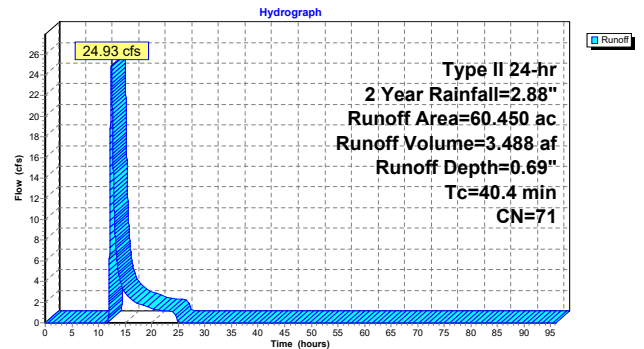
Runoff = 24.93 cfs @ 12.43 hrs, Volume= 3.488 af, Depth= 0.69"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 60.450	71	Agricultural
60.450		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 3S: Pasture Land (POI#2)



Summary for Subcatchment 4S: Wooded Land (POI#2)

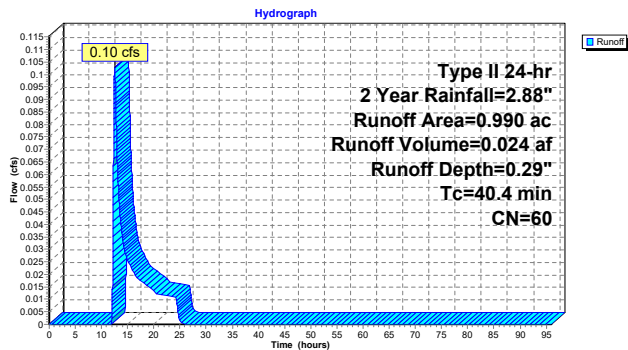
Runoff = 0.10 cfs @ 12.53 hrs, Volume= 0.024 af, Depth= 0.29"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 0.990	60	Woods, Good, HSG B
0.990		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 4S: Wooded Land (POI#2)



Summary for Subcatchment 5S: Pasture Land (POI#3)

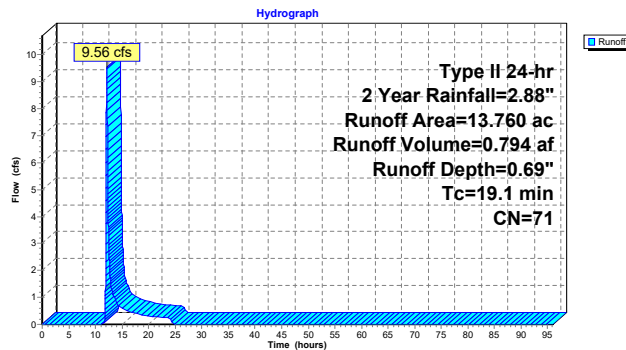
Runoff = 9.56 cfs @ 12.14 hrs, Volume= 0.794 af, Depth= 0.69"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 13.760	71	Agricultural
13.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 5S: Pasture Land (POI#3)



Summary for Subcatchment 6S: Wooded Land (POI#3)

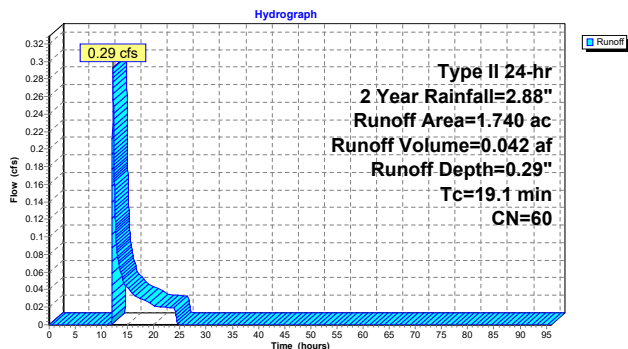
Runoff = 0.29 cfs @ 12.19 hrs, Volume= 0.042 af, Depth= 0.29"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 1.740	60	Woods, Good, HSG B
1.740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 6S: Wooded Land (POI#3)

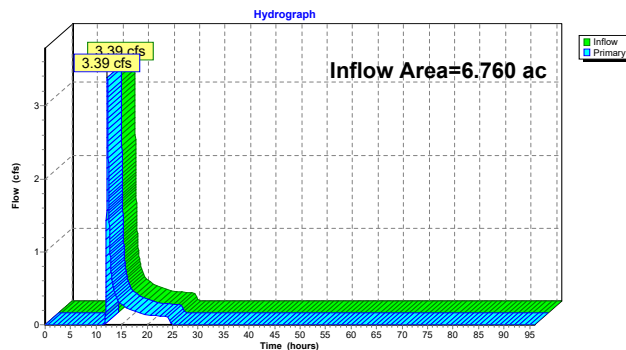


Summary for Link 1L: POI #1 (West)

Inflow Area = 6.760 ac, 0.00% Impervious, Inflow Depth = 0.62" for 2 Year event
 Inflow = 3.39 cfs @ 12.21 hrs, Volume= 0.348 af
 Primary = 3.39 cfs @ 12.21 hrs, Volume= 0.348 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: POI #1 (West)

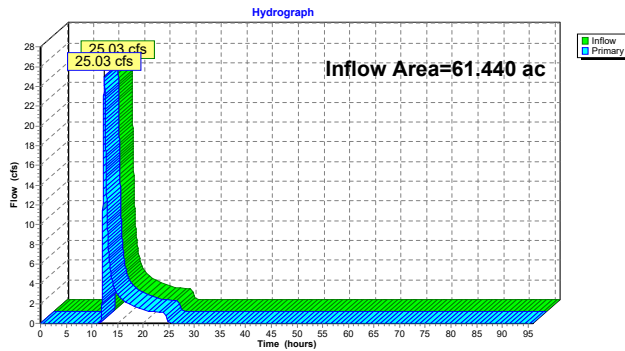


Summary for Link 2L: POI #2 (East)

Inflow Area = 61.440 ac, 0.00% Impervious, Inflow Depth = 0.69" for 2 Year event
 Inflow = 25.03 cfs @ 12.43 hrs, Volume= 3.512 af
 Primary = 25.03 cfs @ 12.43 hrs, Volume= 3.512 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: POI #2 (East)

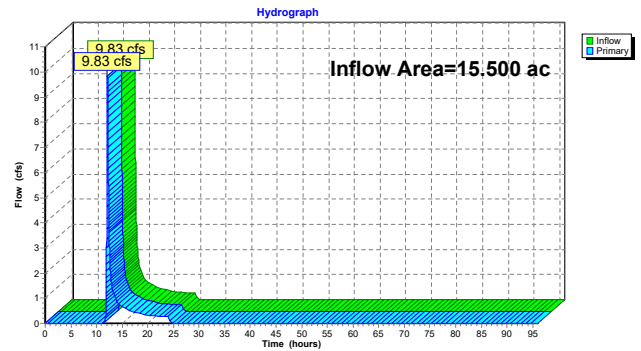


Summary for Link 3L: POI #3 (Northeast)

Inflow Area = 15.500 ac, 0.00% Impervious, Inflow Depth = 0.65" for 2 Year event
 Inflow = 9.83 cfs @ 12.14 hrs, Volume= 0.836 af
 Primary = 9.83 cfs @ 12.14 hrs, Volume= 0.836 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: POI #3 (Northeast)

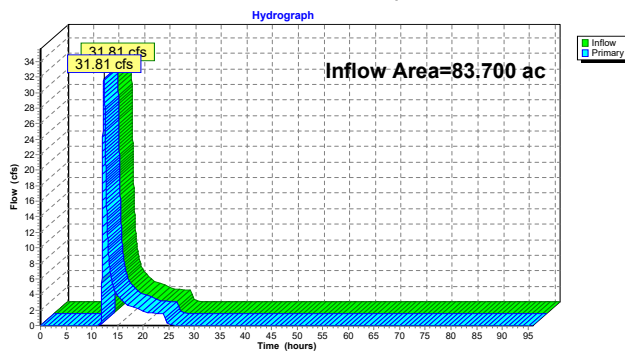


Summary for Link 4L: Total Pre-Development

Inflow Area = 83.700 ac, 0.00% Impervious, Inflow Depth = 0.67" for 2 Year event
 Inflow = 31.81 cfs @ 12.34 hrs, Volume= 4.696 af
 Primary = 31.81 cfs @ 12.34 hrs, Volume= 4.696 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: Total Pre-Development



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pasture/Farm (POI#1)	Runoff Area=5.510 ac 0.00% Impervious Runoff Depth=1.13" Tc=24.8 min CN=71 Runoff=5.67 cfs 0.518 af
Subcatchment 2S: Wooded Land (POI#1)	Runoff Area=1.250 ac 0.00% Impervious Runoff Depth=0.58" Tc=24.8 min CN=60 Runoff=0.50 cfs 0.060 af
Subcatchment 3S: Pasture Land (POI#2)	Runoff Area=60.450 ac 0.00% Impervious Runoff Depth=1.13" Tc=40.4 min CN=71 Runoff=44.13 cfs 5.682 af
Subcatchment 4S: Wooded Land (POI#2)	Runoff Area=0.990 ac 0.00% Impervious Runoff Depth=0.58" Tc=40.4 min CN=60 Runoff=0.28 cfs 0.047 af
Subcatchment 5S: Pasture Land (POI#3)	Runoff Area=13.760 ac 0.00% Impervious Runoff Depth=1.13" Tc=19.1 min CN=71 Runoff=16.73 cfs 1.293 af
Subcatchment 6S: Wooded Land (POI#3)	Runoff Area=1.740 ac 0.00% Impervious Runoff Depth=0.58" Tc=19.1 min CN=60 Runoff=0.83 cfs 0.083 af
Link 1L: POI #1 (West)	Inflow=6.16 cfs 0.578 af Primary=6.16 cfs 0.578 af
Link 2L: POI #2 (East)	Inflow=44.40 cfs 5.729 af Primary=44.40 cfs 5.729 af
Link 3L: POI #3 (Northeast)	Inflow=17.52 cfs 1.377 af Primary=17.52 cfs 1.377 af
Link 4L: Total Pre-Development	Inflow=56.97 cfs 7.683 af Primary=56.97 cfs 7.683 af

Total Runoff Area = 83.700 ac Runoff Volume = 7.683 af Average Runoff Depth = 1.10"
 100.00% Pervious = 83.700 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pasture/Farm (POI#1)

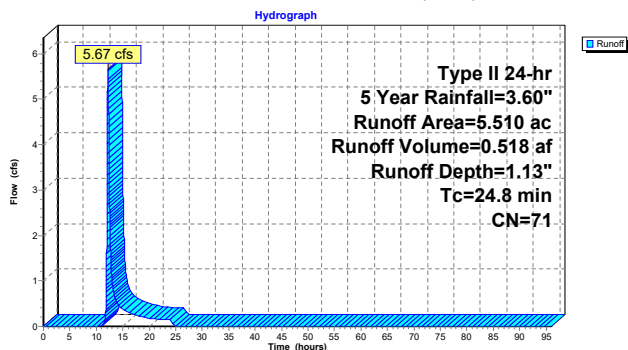
Runoff = 5.67 cfs @ 12.20 hrs, Volume= 0.518 af, Depth= 1.13"
 Routed to Link 1L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 5.510	71	Agricultural
5.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 1S: Pasture/Farm (POI#1)



Summary for Subcatchment 2S: Wooded Land (POI#1)

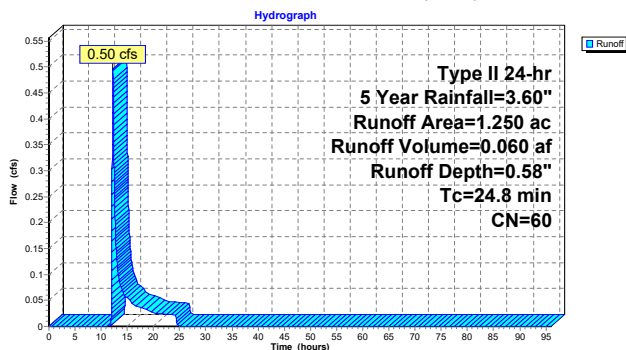
Runoff = 0.50 cfs @ 12.24 hrs, Volume= 0.060 af, Depth= 0.58"
 Routed to Link 1L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 1.250	60	Woods, Good, HSG B
1.250		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry, Tc=2

Subcatchment 2S: Wooded Land (POI#1)



Summary for Subcatchment 3S: Pasture Land (POI#2)

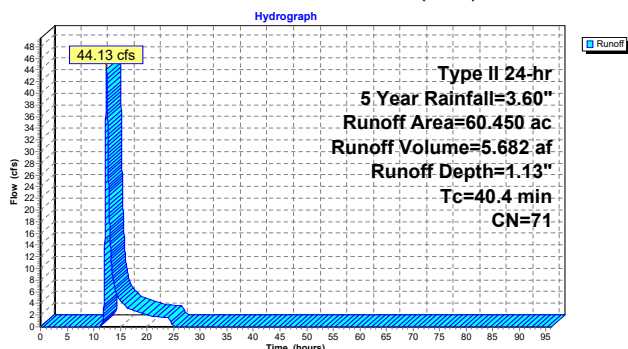
Runoff = 44.13 cfs @ 12.43 hrs, Volume= 5.682 af, Depth= 1.13"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 60.450	71	Agricultural
60.450		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 3S: Pasture Land (POI#2)



Summary for Subcatchment 4S: Wooded Land (POI#2)

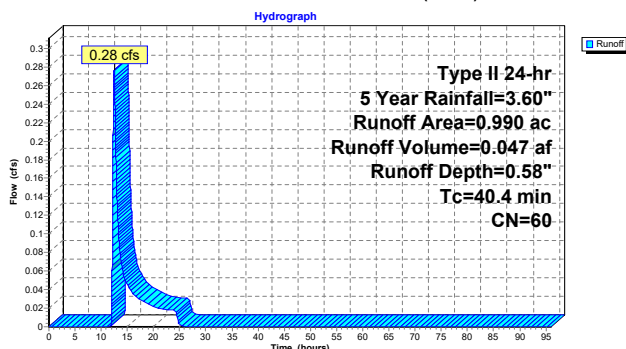
Runoff = 0.28 cfs @ 12.47 hrs, Volume= 0.047 af, Depth= 0.58"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 0.990	60	Woods, Good, HSG B
0.990		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 4S: Wooded Land (POI#2)



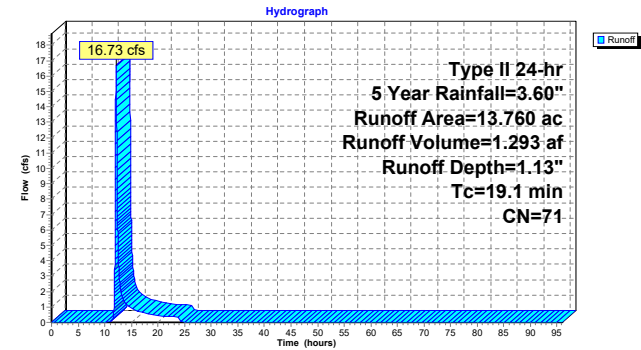
Summary for Subcatchment 5S: Pasture Land (POI#3)

Runoff = 16.73 cfs @ 12.12 hrs, Volume= 1.293 af, Depth= 1.13"
Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description			
* 13.760	71	Agricultural			
13.760		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 5S: Pasture Land (POI#3)



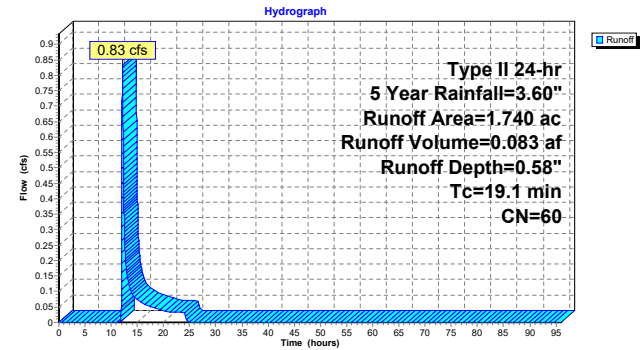
Summary for Subcatchment 6S: Wooded Land (POI#3)

Runoff = 0.83 cfs @ 12.16 hrs, Volume= 0.083 af, Depth= 0.58"
Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description			
* 1.740	60	Woods, Good, HSG B			
1.740		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 6S: Wooded Land (POI#3)

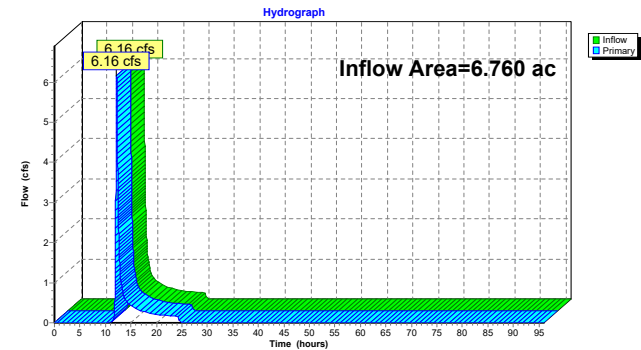


Summary for Link 1L: POI #1 (West)

Inflow Area = 6.760 ac, 0.00% Impervious, Inflow Depth = 1.03" for 5 Year event
Inflow = 6.16 cfs @ 12.21 hrs, Volume= 0.578 af
Primary = 6.16 cfs @ 12.21 hrs, Volume= 0.578 af, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: POI #1 (West)

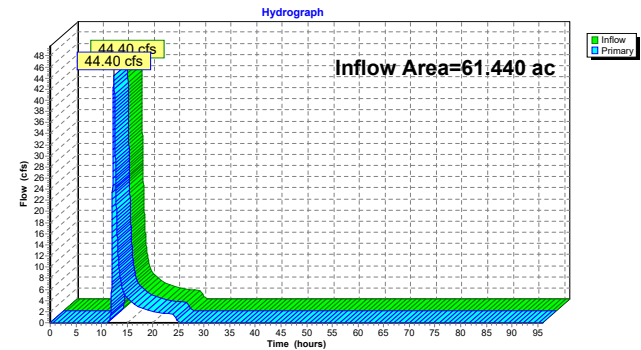


Summary for Link 2L: POI #2 (East)

Inflow Area = 61.440 ac, 0.00% Impervious, Inflow Depth = 1.12" for 5 Year event
Inflow = 44.40 cfs @ 12.43 hrs, Volume= 5.729 af
Primary = 44.40 cfs @ 12.43 hrs, Volume= 5.729 af, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

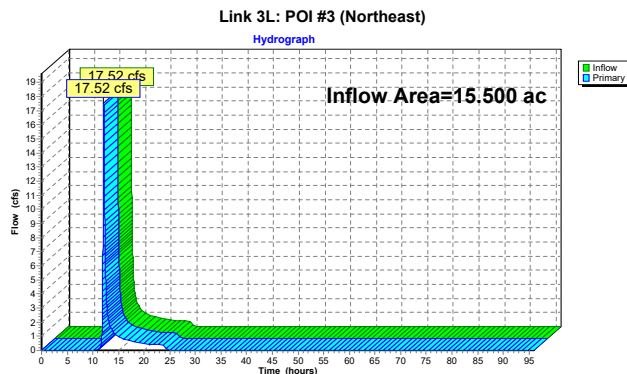
Link 2L: POI #2 (East)



Summary for Link 3L: POI #3 (Northeast)

Inflow Area = 15.500 ac, 0.00% Impervious, Inflow Depth = 1.07" for 5 Year event
Inflow = 17.52 cfs @ 12.13 hrs, Volume= 1.377 af
Primary = 17.52 cfs @ 12.13 hrs, Volume= 1.377 af, Atten= 0%, Lag= 0.0 min
Routed to Link 4L: Total Pre-Development

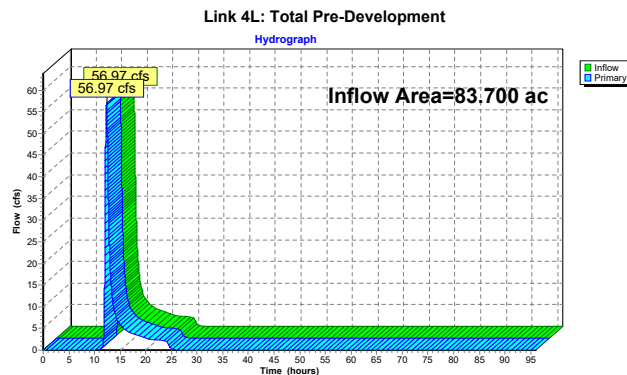
Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs



Summary for Link 4L: Total Pre-Development

Inflow Area = 83.700 ac, 0.00% Impervious, Inflow Depth = 1.10" for 5 Year event
Inflow = 56.97 cfs @ 12.34 hrs, Volume= 7.683 af
Primary = 56.97 cfs @ 12.34 hrs, Volume= 7.683 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pasture/Farm (POI#1) Runoff Area=5.510 ac 0.00% Impervious Runoff Depth=1.79"
Tc=24.8 min CN=71 Runoff=9.37 cfs 0.822 af

Subcatchment 2S: Wooded Land (POI#1) Runoff Area=1.250 ac 0.00% Impervious Runoff Depth=1.05"
Tc=24.8 min CN=60 Runoff=1.09 cfs 0.110 af

Subcatchment 3S: Pasture Land (POI#2) Runoff Area=60.450 ac 0.00% Impervious Runoff Depth=1.79"
Tc=40.4 min CN=71 Runoff=73.63 cfs 9.017 af

Subcatchment 4S: Wooded Land (POI#2) Runoff Area=0.990 ac 0.00% Impervious Runoff Depth=1.05"
Tc=40.4 min CN=60 Runoff=0.61 cfs 0.087 af

Subcatchment 5S: Pasture Land (POI#3) Runoff Area=13.760 ac 0.00% Impervious Runoff Depth=1.79"
Tc=19.1 min CN=71 Runoff=27.57 cfs 2.052 af

Subcatchment 6S: Wooded Land (POI#3) Runoff Area=1.740 ac 0.00% Impervious Runoff Depth=1.05"
Tc=19.1 min CN=60 Runoff=1.81 cfs 0.153 af

Link 1L: POI #1 (West) Inflow=10.46 cfs 0.931 af
Primary=10.46 cfs 0.931 af

Link 2L: POI #2 (East) Inflow=74.23 cfs 9.104 af
Primary=74.23 cfs 9.104 af

Link 3L: POI #3 (Northeast) Inflow=29.37 cfs 2.205 af
Primary=29.37 cfs 2.205 af

Link 4L: Total Pre-Development Inflow=95.89 cfs 12.240 af
Primary=95.89 cfs 12.240 af

Total Runoff Area = 83.700 ac Runoff Volume = 12.240 af Average Runoff Depth = 1.75"
100.00% Pervious = 83.700 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pasture/Farm (POI#1)

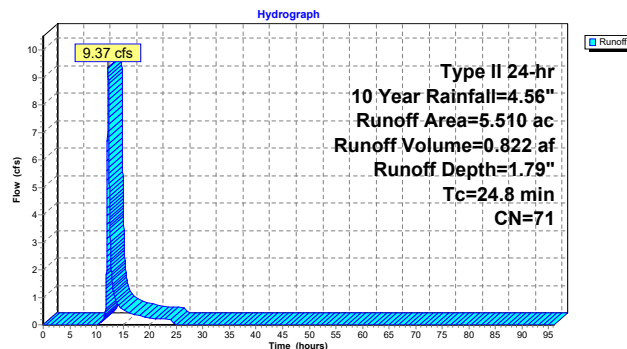
Runoff = 9.37 cfs @ 12.20 hrs, Volume= 0.822 af, Depth= 1.79"
Routed to Link 1L: POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
5.510	71	Agricultural
5.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 1S: Pasture/Farm (POI#1)



Summary for Subcatchment 2S: Wooded Land (POI#1)

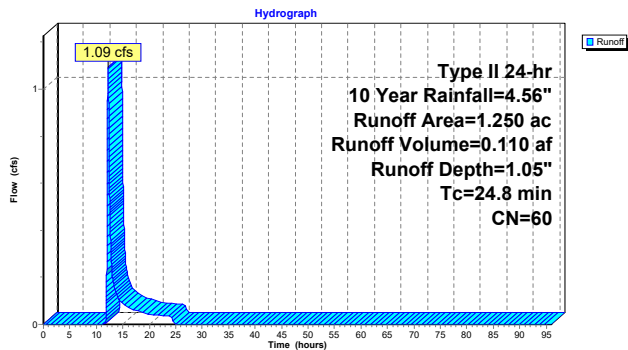
Runoff = 1.09 cfs @ 12.21 hrs, Volume= 0.110 af, Depth= 1.05"
 Routed to Link 1L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 1.250	60	Woods, Good, HSG B
1.250		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry, Tc-2

Subcatchment 2S: Wooded Land (POI#1)



Summary for Subcatchment 3S: Pasture Land (POI#2)

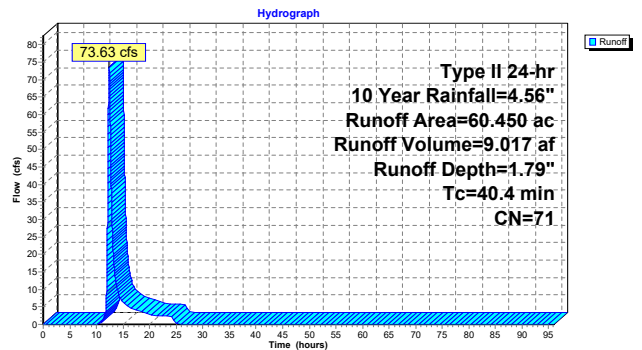
Runoff = 73.63 cfs @ 12.39 hrs, Volume= 9.017 af, Depth= 1.79"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 60.450	71	Agricultural
60.450		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 3S: Pasture Land (POI#2)



Summary for Subcatchment 4S: Wooded Land (POI#2)

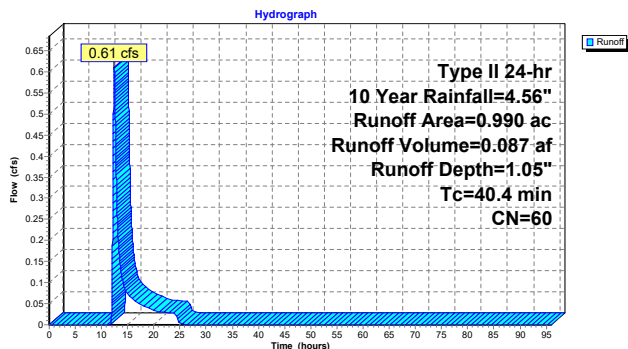
Runoff = 0.61 cfs @ 12.43 hrs, Volume= 0.087 af, Depth= 1.05"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 0.990	60	Woods, Good, HSG B
0.990		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 4S: Wooded Land (POI#2)



Summary for Subcatchment 5S: Pasture Land (POI#3)

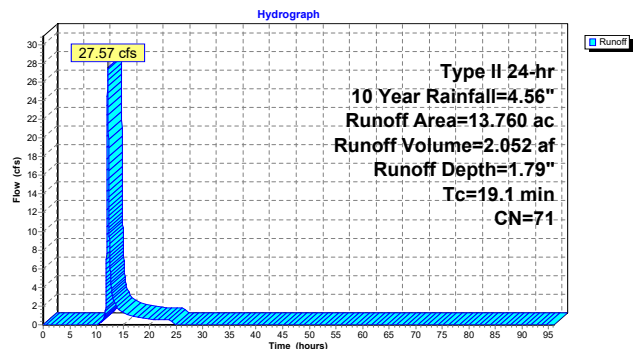
Runoff = 27.57 cfs @ 12.12 hrs, Volume= 2.052 af, Depth= 1.79"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 13.760	71	Agricultural
13.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 5S: Pasture Land (POI#3)



Summary for Subcatchment 6S: Wooded Land (POI#3)

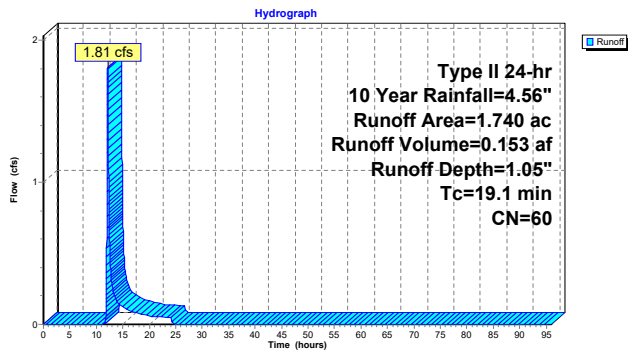
Runoff = 1.81 cfs @ 12.14 hrs, Volume= 0.153 af, Depth= 1.05"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
1.740	60	Woods, Good, HSG B
1.740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 6S: Wooded Land (POI#3)

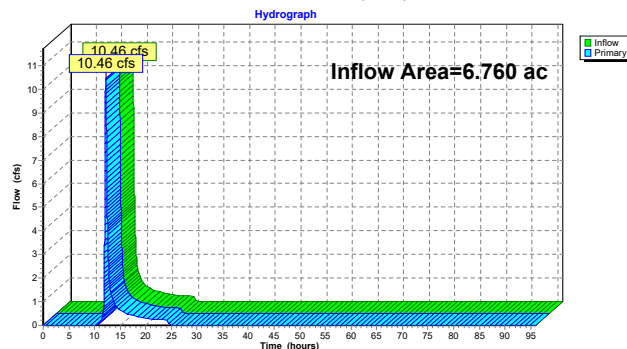


Summary for Link 1L: POI #1 (West)

Inflow Area = 6.760 ac, 0.00% Impervious, Inflow Depth = 1.65" for 10 Year event
 Inflow = 10.46 cfs @ 12.20 hrs, Volume= 0.931 af
 Primary = 10.46 cfs @ 12.20 hrs, Volume= 0.931 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: POI #1 (West)

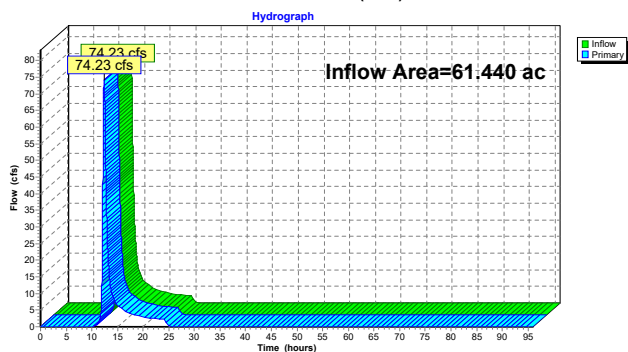


Summary for Link 2L: POI #2 (East)

Inflow Area = 61.440 ac, 0.00% Impervious, Inflow Depth = 1.78" for 10 Year event
 Inflow = 74.23 cfs @ 12.39 hrs, Volume= 9.104 af
 Primary = 74.23 cfs @ 12.39 hrs, Volume= 9.104 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: POI #2 (East)

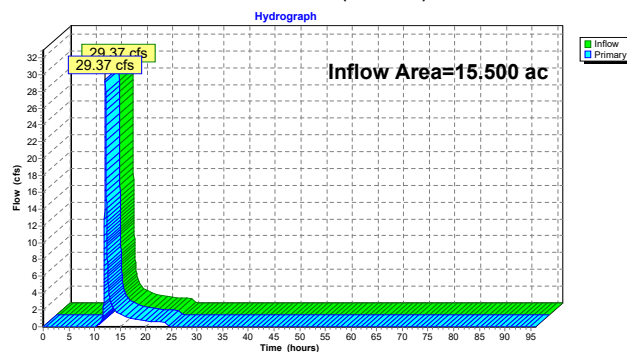


Summary for Link 3L: POI #3 (Northeast)

Inflow Area = 15.500 ac, 0.00% Impervious, Inflow Depth = 1.71" for 10 Year event
 Inflow = 29.37 cfs @ 12.12 hrs, Volume= 2.205 af
 Primary = 29.37 cfs @ 12.12 hrs, Volume= 2.205 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: POI #3 (Northeast)

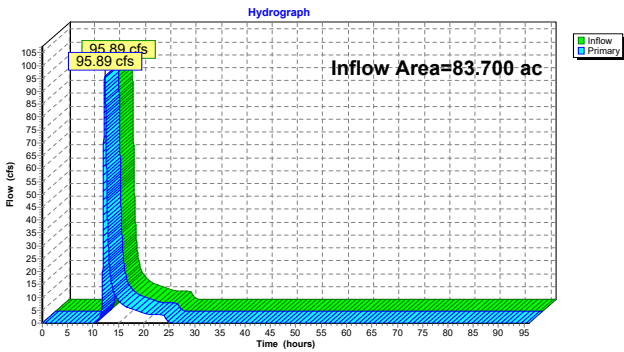


Summary for Link 4L: Total Pre-Development

Inflow Area = 83.700 ac, 0.00% Impervious, Inflow Depth = 1.75" for 10 Year event
Inflow = 95.89 cfs @ 12.30 hrs, Volume= 12.240 af
Primary = 95.89 cfs @ 12.30 hrs, Volume= 12.240 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: Total Pre-Development



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pasture/Farm (POI#1) Runoff Area=5.510 ac 0.00% Impervious Runoff Depth=2.71"
Tc=24.8 min CN=71 Runoff=14.46 cfs 1.243 af
Subcatchment 2S: Wooded Land (POI#1) Runoff Area=1.250 ac 0.00% Impervious Runoff Depth=1.77"
Tc=24.8 min CN=60 Runoff=2.01 cfs 0.184 af
Subcatchment 3S: Pasture Land (POI#2) Runoff Area=60.450 ac 0.00% Impervious Runoff Depth=2.71"
Tc=40.4 min CN=71 Runoff=114.18 cfs 13.635 af
Subcatchment 4S: Wooded Land (POI#2) Runoff Area=0.990 ac 0.00% Impervious Runoff Depth=1.77"
Tc=40.4 min CN=60 Runoff=1.13 cfs 0.146 af
Subcatchment 5S: Pasture Land (POI#3) Runoff Area=13.760 ac 0.00% Impervious Runoff Depth=2.71"
Tc=19.1 min CN=71 Runoff=42.40 cfs 3.104 af
Subcatchment 6S: Wooded Land (POI#3) Runoff Area=1.740 ac 0.00% Impervious Runoff Depth=1.77"
Tc=19.1 min CN=60 Runoff=3.29 cfs 0.256 af

Link 1L: POI #1 (West) Inflow=16.45 cfs 1.427 af
Primary=16.45 cfs 1.427 af

Link 2L: POI #2 (East) Inflow=115.31 cfs 13.780 af
Primary=115.31 cfs 13.780 af

Link 3L: POI #3 (Northeast) Inflow=45.69 cfs 3.360 af
Primary=45.69 cfs 3.360 af

Link 4L: Total Pre-Development Inflow=149.65 cfs 18.567 af
Primary=149.65 cfs 18.567 af

Total Runoff Area = 83.700 ac Runoff Volume = 18.567 af Average Runoff Depth = 2.66"
100.00% Pervious = 83.700 ac 0.00% Impervious = 0.000 ac

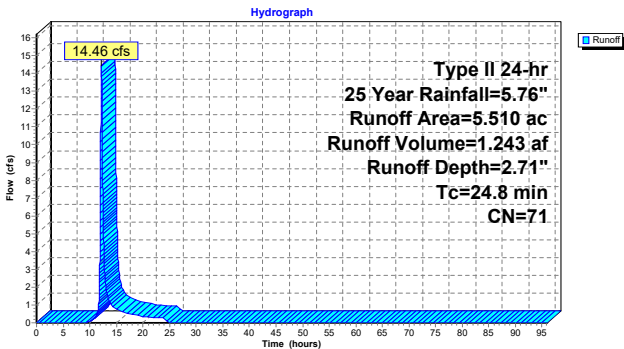
Summary for Subcatchment 1S: Pasture/Farm (POI#1)

Runoff = 14.46 cfs @ 12.18 hrs, Volume= 1.243 af, Depth= 2.71"
Routed to Link 1L: POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description			
* 5.510	71	Agricultural			
5.510		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 1S: Pasture/Farm (POI#1)



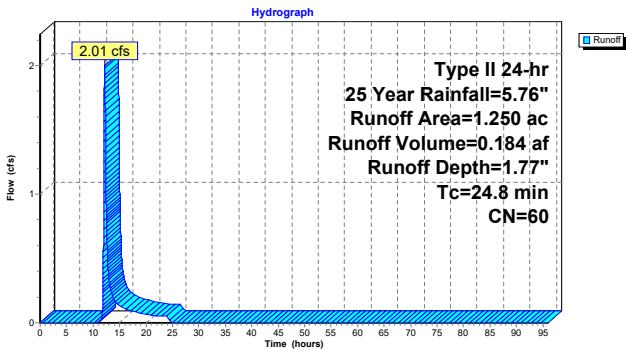
Summary for Subcatchment 2S: Wooded Land (POI#1)

Runoff = 2.01 cfs @ 12.21 hrs, Volume= 0.184 af, Depth= 1.77"
Routed to Link 1L: POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description			
* 1.250	60	Woods, Good, HSG B			
1.250		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry, Tc-2

Subcatchment 2S: Wooded Land (POI#1)



Summary for Subcatchment 3S: Pasture Land (POI#2)

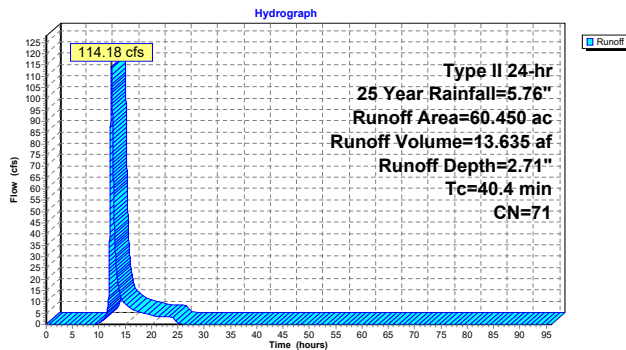
Runoff = 114.18 cfs @ 12.39 hrs, Volume= 13.635 af, Depth= 2.71"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 60.450	71	Agricultural
60.450		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 3S: Pasture Land (POI#2)



Summary for Subcatchment 4S: Wooded Land (POI#2)

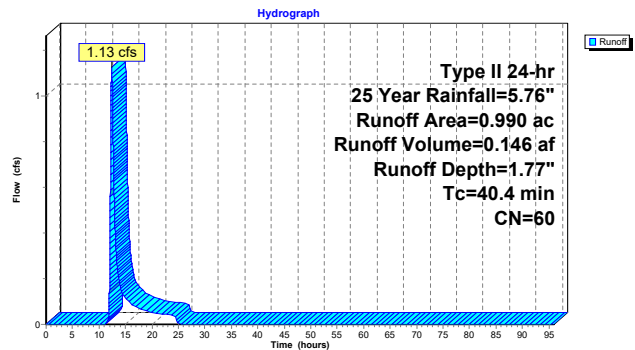
Runoff = 1.13 cfs @ 12.43 hrs, Volume= 0.146 af, Depth= 1.77"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 0.990	60	Woods, Good, HSG B
0.990		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 4S: Wooded Land (POI#2)



Summary for Subcatchment 5S: Pasture Land (POI#3)

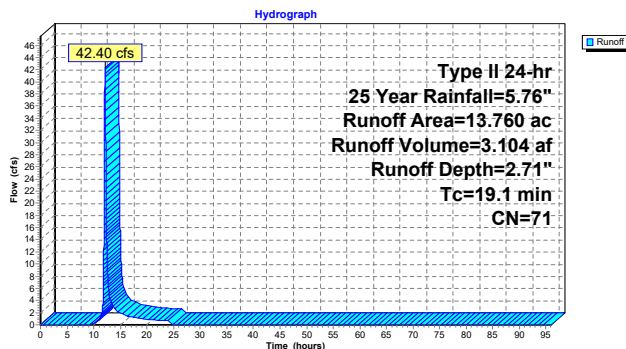
Runoff = 42.40 cfs @ 12.12 hrs, Volume= 3.104 af, Depth= 2.71"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 13.760	71	Agricultural
13.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 5S: Pasture Land (POI#3)



Summary for Subcatchment 6S: Wooded Land (POI#3)

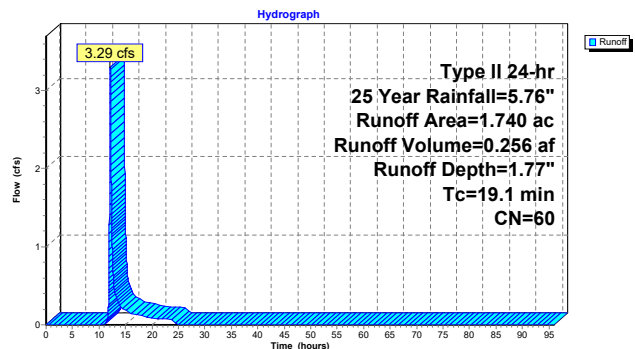
Runoff = 3.29 cfs @ 12.13 hrs, Volume= 0.256 af, Depth= 1.77"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 1.740	60	Woods, Good, HSG B
1.740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 6S: Wooded Land (POI#3)

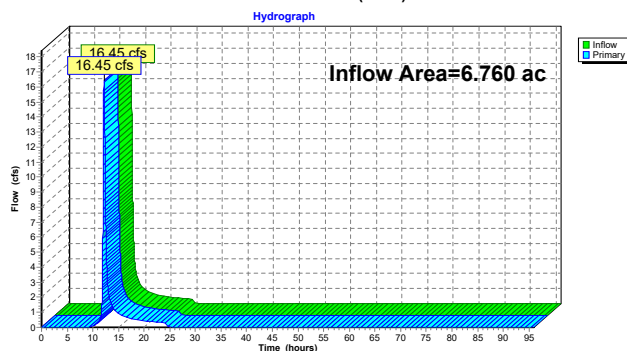


Summary for Link 1L: POI #1 (West)

Inflow Area = 6.760 ac, 0.00% Impervious, Inflow Depth = 2.53" for 25 Year event
 Inflow = 16.45 cfs @ 12.19 hrs, Volume= 1.427 af
 Primary = 16.45 cfs @ 12.19 hrs, Volume= 1.427 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: POI #1 (West)

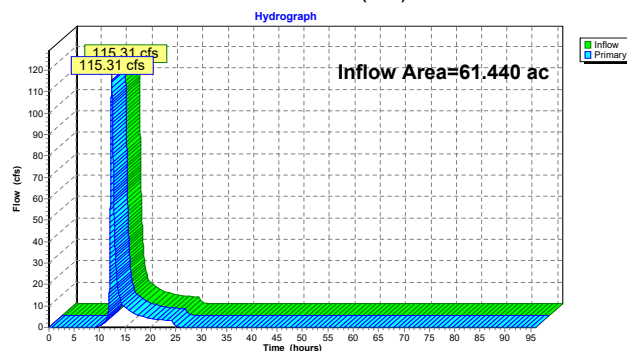


Summary for Link 2L: POI #2 (East)

Inflow Area = 61.440 ac, 0.00% Impervious, Inflow Depth = 2.69" for 25 Year event
 Inflow = 115.31 cfs @ 12.39 hrs, Volume= 13.780 af
 Primary = 115.31 cfs @ 12.39 hrs, Volume= 13.780 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: POI #2 (East)

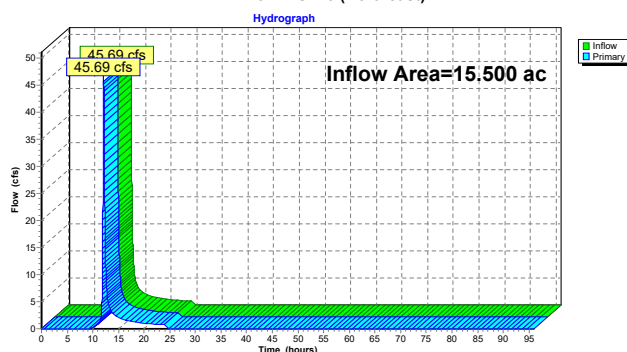


Summary for Link 3L: POI #3 (Northeast)

Inflow Area = 15.500 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Year event
 Inflow = 45.69 cfs @ 12.12 hrs, Volume= 3.360 af
 Primary = 45.69 cfs @ 12.12 hrs, Volume= 3.360 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: POI #3 (Northeast)

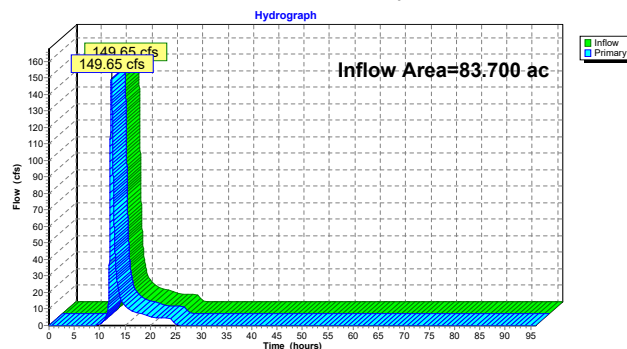


Summary for Link 4L: Total Pre-Development

Inflow Area = 83.700 ac, 0.00% Impervious, Inflow Depth = 2.66" for 25 Year event
 Inflow = 149.65 cfs @ 12.30 hrs, Volume= 18.567 af
 Primary = 149.65 cfs @ 12.30 hrs, Volume= 18.567 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: Total Pre-Development



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pasture/Farm (POI#1)	Runoff Area=5.510 ac 0.00% Impervious Runoff Depth=3.29" Tc=24.8 min CN=71 Runoff=17.68 cfs 1.511 af
Subcatchment 2S: Wooded Land (POI#1)	Runoff Area=1.250 ac 0.00% Impervious Runoff Depth=2.24" Tc=24.8 min CN=60 Runoff=2.61 cfs 0.234 af
Subcatchment 3S: Pasture Land (POI#2)	Runoff Area=60.450 ac 0.00% Impervious Runoff Depth=3.29" Tc=40.4 min CN=71 Runoff=139.78 cfs 16.574 af
Subcatchment 4S: Wooded Land (POI#2)	Runoff Area=0.990 ac 0.00% Impervious Runoff Depth=2.24" Tc=40.4 min CN=60 Runoff=1.47 cfs 0.185 af
Subcatchment 5S: Pasture Land (POI#3)	Runoff Area=13.760 ac 0.00% Impervious Runoff Depth=3.29" Tc=19.1 min CN=71 Runoff=51.73 cfs 3.773 af
Subcatchment 6S: Wooded Land (POI#3)	Runoff Area=1.740 ac 0.00% Impervious Runoff Depth=2.24" Tc=19.1 min CN=60 Runoff=4.29 cfs 0.325 af
Link 1L: POI #1 (West)	Inflow=20.28 cfs 1.744 af Primary=20.28 cfs 1.744 af
Link 2L: POI #2 (East)	Inflow=141.24 cfs 16.759 af Primary=141.24 cfs 16.759 af
Link 3L: POI #3 (Northeast)	Inflow=56.01 cfs 4.098 af Primary=56.01 cfs 4.098 af
Link 4L: Total Pre-Development	Inflow=183.90 cfs 22.601 af Primary=183.90 cfs 22.601 af
Total Runoff Area = 83.700 ac Runoff Volume = 22.601 af Average Runoff Depth = 3.24" 100.00% Pervious = 83.700 ac 0.00% Impervious = 0.000 ac	

Summary for Subcatchment 1S: Pasture/Farm (POI#1)

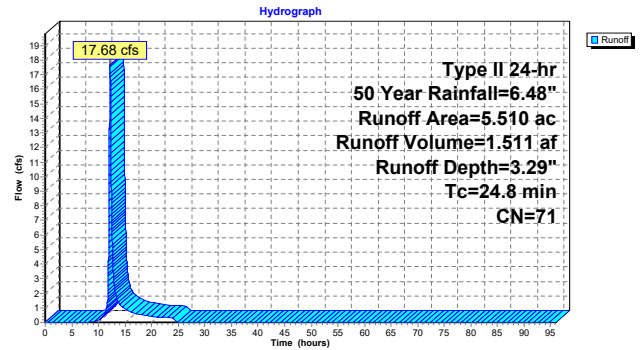
Runoff = 17.68 cfs @ 12.18 hrs, Volume= 1.511 af, Depth= 3.29"
 Routed to Link 1L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 5.510	71	Agricultural
5.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 1S: Pasture/Farm (POI#1)



Summary for Subcatchment 2S: Wooded Land (POI#1)

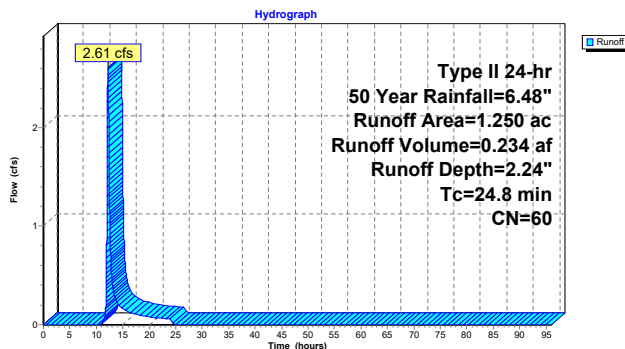
Runoff = 2.61 cfs @ 12.20 hrs, Volume= 0.234 af, Depth= 2.24"
 Routed to Link 1L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 1.250	60	Woods, Good, HSG B
1.250		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry, Tc-2

Subcatchment 2S: Wooded Land (POI#1)



Summary for Subcatchment 3S: Pasture Land (POI#2)

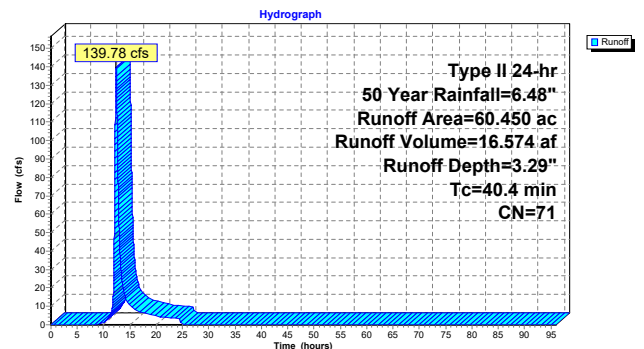
Runoff = 139.78 cfs @ 12.38 hrs, Volume= 16.574 af, Depth= 3.29"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 60.450	71	Agricultural
60.450		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 3S: Pasture Land (POI#2)



Summary for Subcatchment 4S: Wooded Land (POI#2)

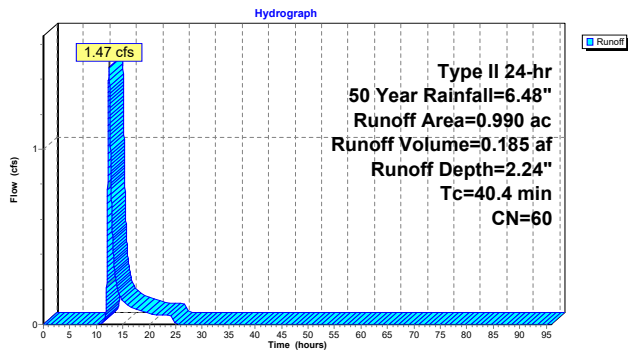
Runoff = 1.47 cfs @ 12.39 hrs, Volume= 0.185 af, Depth= 2.24"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 0.990	60	Woods, Good, HSG B
0.990		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 4S: Wooded Land (POI#2)



Summary for Subcatchment 5S: Pasture Land (POI#3)

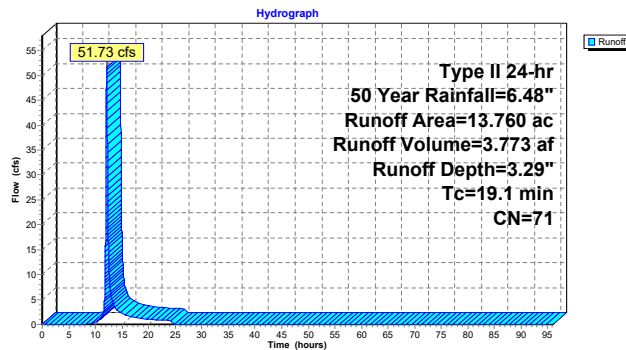
Runoff = 51.73 cfs @ 12.12 hrs, Volume= 3.773 af, Depth= 3.29"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 13.760	71	Agricultural
13.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 5S: Pasture Land (POI#3)



Summary for Subcatchment 6S: Wooded Land (POI#3)

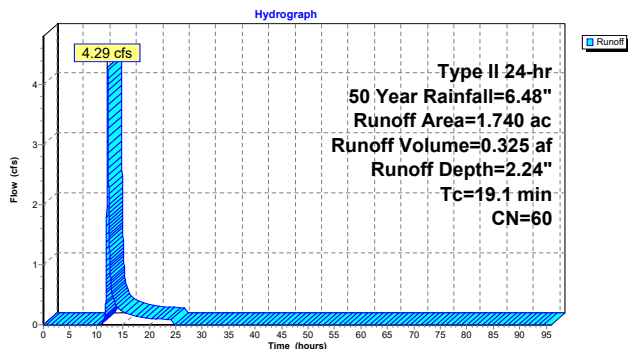
Runoff = 4.29 cfs @ 12.12 hrs, Volume= 0.325 af, Depth= 2.24"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 1.740	60	Woods, Good, HSG B
1.740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 6S: Wooded Land (POI#3)

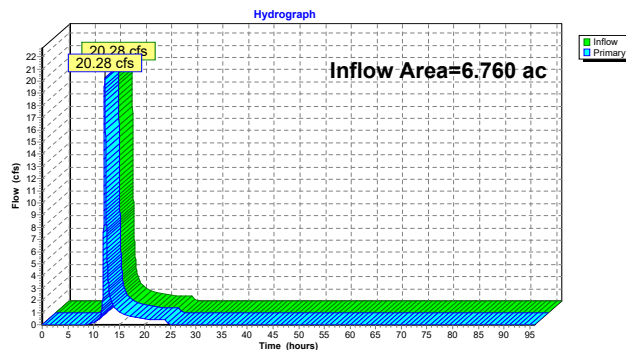


Summary for Link 1L: POI #1 (West)

Inflow Area = 6.760 ac, 0.00% Impervious, Inflow Depth = 3.10" for 50 Year event
 Inflow = 20.28 cfs @ 12.18 hrs, Volume= 1.744 af
 Primary = 20.28 cfs @ 12.18 hrs, Volume= 1.744 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: POI #1 (West)

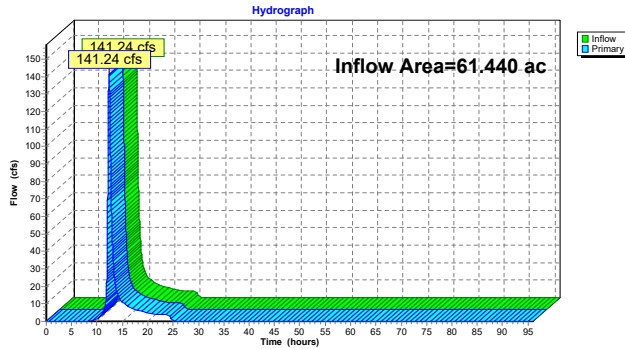


Summary for Link 2L: POI #2 (East)

Inflow Area = 61.440 ac, 0.00% Impervious, Inflow Depth = 3.27" for 50 Year event
 Inflow = 141.24 cfs @ 12.38 hrs, Volume= 16.759 af
 Primary = 141.24 cfs @ 12.38 hrs, Volume= 16.759 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: POI #2 (East)

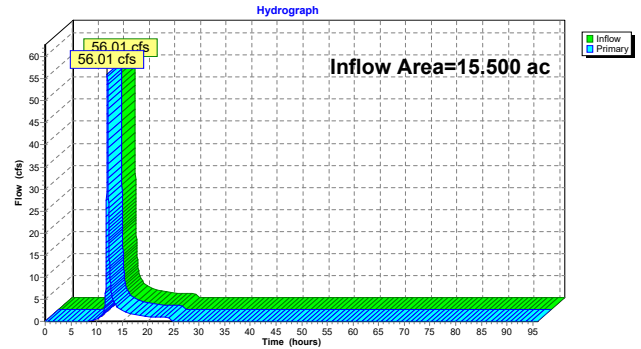


Summary for Link 3L: POI #3 (Northeast)

Inflow Area = 15.500 ac, 0.00% Impervious, Inflow Depth = 3.17" for 50 Year event
 Inflow = 56.01 cfs @ 12.12 hrs, Volume= 4.098 af
 Primary = 56.01 cfs @ 12.12 hrs, Volume= 4.098 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: POI #3 (Northeast)

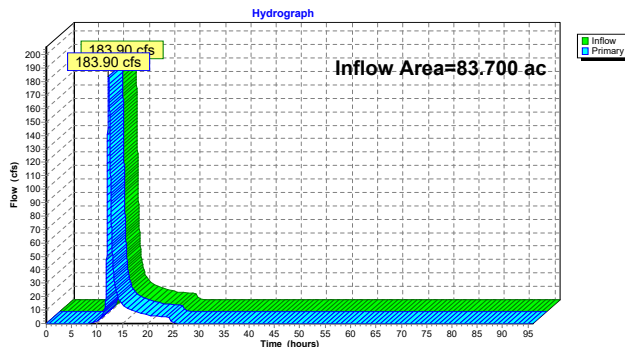


Summary for Link 4L: Total Pre-Development

Inflow Area = 83.700 ac, 0.00% Impervious, Inflow Depth = 3.24" for 50 Year event
 Inflow = 183.90 cfs @ 12.26 hrs, Volume= 22.601 af
 Primary = 183.90 cfs @ 12.26 hrs, Volume= 22.601 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: Total Pre-Development



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pasture/Farm (POI#1)	Runoff Area=5.510 ac 0.00% Impervious Runoff Depth=4.10" Tc=24.8 min CN=71 Runoff=22.08 cfs 1.881 af
Subcatchment 2S: Wooded Land (POI#1)	Runoff Area=1.250 ac 0.00% Impervious Runoff Depth=2.92" Tc=24.8 min CN=60 Runoff=3.47 cfs 0.304 af
Subcatchment 3S: Pasture Land (POI#2)	Runoff Area=60.450 ac 0.00% Impervious Runoff Depth=4.10" Tc=40.4 min CN=71 Runoff=175.16 cfs 20.637 af
Subcatchment 4S: Wooded Land (POI#2)	Runoff Area=0.990 ac 0.00% Impervious Runoff Depth=2.92" Tc=40.4 min CN=60 Runoff=1.97 cfs 0.241 af
Subcatchment 5S: Pasture Land (POI#3)	Runoff Area=13.760 ac 0.00% Impervious Runoff Depth=4.10" Tc=19.1 min CN=71 Runoff=64.50 cfs 4.698 af
Subcatchment 6S: Wooded Land (POI#3)	Runoff Area=1.740 ac 0.00% Impervious Runoff Depth=2.92" Tc=19.1 min CN=60 Runoff=5.69 cfs 0.423 af
Link 1L: POI #1 (West)	Inflow=25.54 cfs 2.185 af Primary=25.54 cfs 2.185 af
Link 2L: POI #2 (East)	Inflow=177.06 cfs 20.878 af Primary=177.06 cfs 20.878 af
Link 3L: POI #3 (Northeast)	Inflow=70.18 cfs 5.121 af Primary=70.18 cfs 5.121 af
Link 4L: Total Pre-Development	Inflow=231.10 cfs 28.184 af Primary=231.10 cfs 28.184 af

Total Runoff Area = 83.700 ac Runoff Volume = 28.184 af Average Runoff Depth = 4.04"
 100.00% Pervious = 83.700 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pasture/Farm (POI#1)

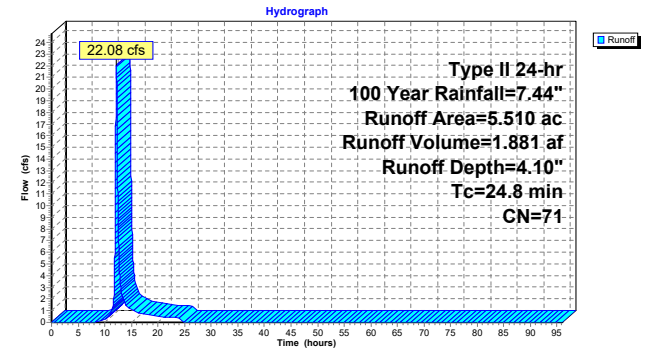
Runoff = 22.08 cfs @ 12.18 hrs, Volume= 1.881 af, Depth= 4.10"
Routed to Link 1L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 5.510	71	Agricultural
5.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 1S: Pasture/Farm (POI#1)



Summary for Subcatchment 2S: Wooded Land (POI#1)

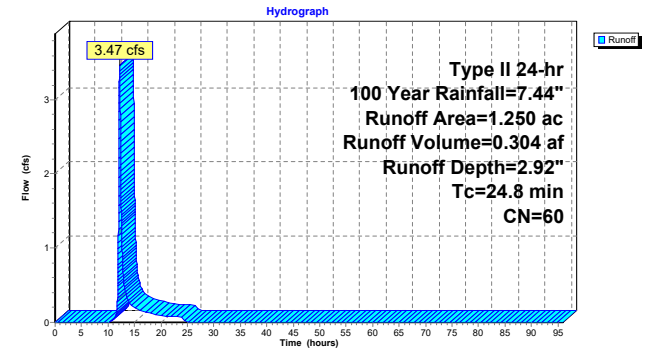
Runoff = 3.47 cfs @ 12.20 hrs, Volume= 0.304 af, Depth= 2.92"
Routed to Link 1L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 1.250	60	Woods, Good, HSG B
1.250		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry, Tc-2

Subcatchment 2S: Wooded Land (POI#1)



Summary for Subcatchment 3S: Pasture Land (POI#2)

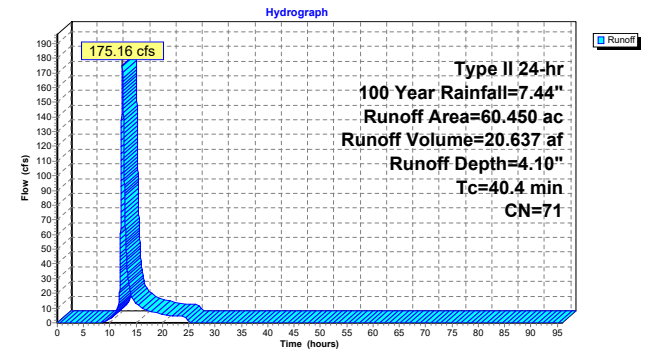
Runoff = 175.16 cfs @ 12.35 hrs, Volume= 20.637 af, Depth= 4.10"
Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 60.450	71	Agricultural
60.450		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 3S: Pasture Land (POI#2)



Summary for Subcatchment 4S: Wooded Land (POI#2)

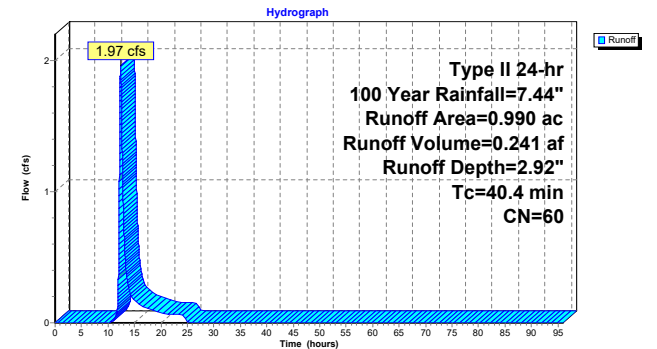
Runoff = 1.97 cfs @ 12.39 hrs, Volume= 0.241 af, Depth= 2.92"
Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 0.990	60	Woods, Good, HSG B
0.990		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 4S: Wooded Land (POI#2)



Summary for Subcatchment 5S: Pasture Land (POI#3)

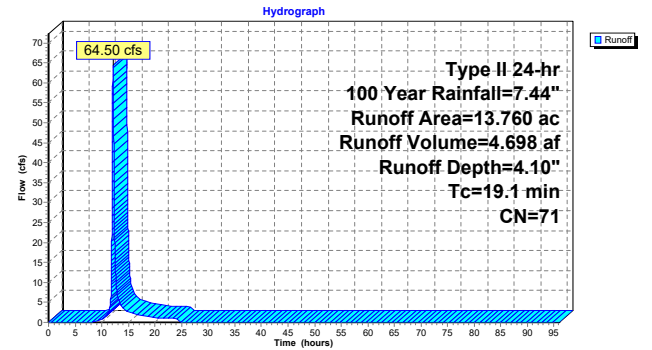
Runoff = 64.50 cfs @ 12.12 hrs, Volume= 4.698 af, Depth= 4.10"
Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 13.760	71	Agricultural
13.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 5S: Pasture Land (POI#3)



Summary for Subcatchment 6S: Wooded Land (POI#3)

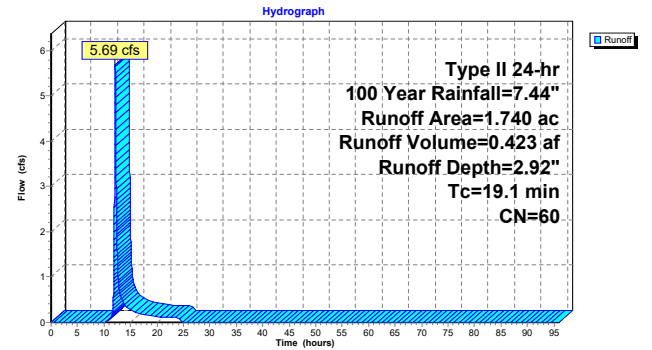
Runoff = 5.69 cfs @ 12.12 hrs, Volume= 0.423 af, Depth= 2.92"
Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 1.740	60	Woods, Good, HSG B
1.740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 6S: Wooded Land (POI#3)

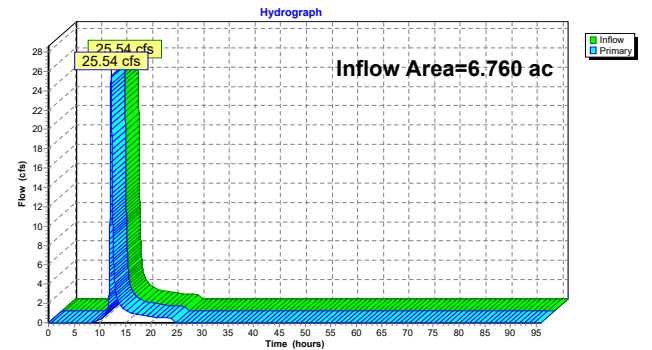


Summary for Link 1L: POI #1 (West)

Inflow Area = 6.760 ac, 0.00% Impervious, Inflow Depth = 3.88" for 100 Year event
Inflow = 25.54 cfs @ 12.18 hrs, Volume= 2.185 af
Primary = 25.54 cfs @ 12.18 hrs, Volume= 2.185 af, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: POI #1 (West)

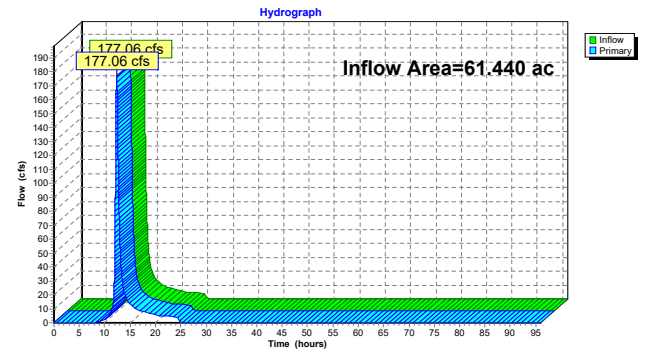


Summary for Link 2L: POI #2 (East)

Inflow Area = 61.440 ac, 0.00% Impervious, Inflow Depth = 4.08" for 100 Year event
Inflow = 177.06 cfs @ 12.35 hrs, Volume= 20.878 af
Primary = 177.06 cfs @ 12.35 hrs, Volume= 20.878 af, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: POI #2 (East)

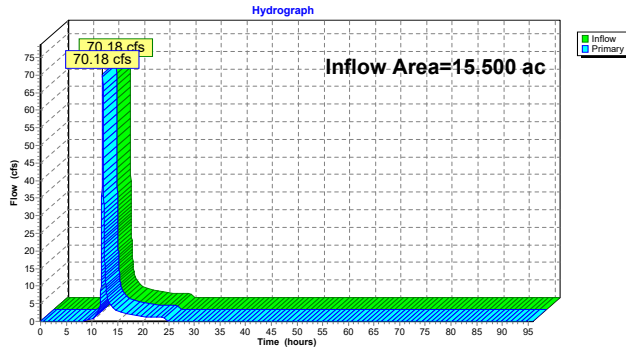


Summary for Link 3L: POI #3 (Northeast)

Inflow Area = 15.500 ac, 0.00% Impervious, Inflow Depth = 3.96" for 100 Year event
Inflow = 70.18 cfs @ 12.12 hrs, Volume= 5.121 af
Primary = 70.18 cfs @ 12.12 hrs, Volume= 5.121 af, Atten= 0%, Lag= 0.0 min
Routed to Link 4L: Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: POI #3 (Northeast)

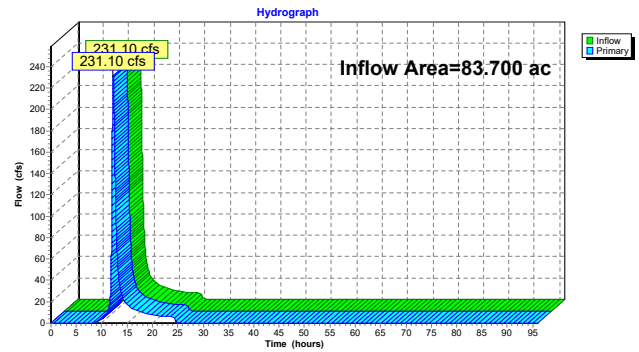


Summary for Link 4L: Total Pre-Development

Inflow Area = 83.700 ac, 0.00% Impervious, Inflow Depth = 4.04" for 100 Year event
Inflow = 231.10 cfs @ 12.26 hrs, Volume= 28.184 af
Primary = 231.10 cfs @ 12.26 hrs, Volume= 28.184 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: Total Pre-Development



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pasture/Farm (POI#1) Runoff Area=5.510 ac 0.00% Impervious Runoff Depth=0.03"
Tc=24.8 min CN=71 Runoff=0.19 cfs 0.015 af

Subcatchment 2S: Wooded Land (POI#1) Runoff Area=1.250 ac 0.00% Impervious Runoff Depth=0.00"
Tc=24.8 min CN=60 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Pasture Land (POI#2) Runoff Area=60.450 ac 0.00% Impervious Runoff Depth=0.03"
Tc=40.4 min CN=71 Runoff=1.85 cfs 0.165 af

Subcatchment 4S: Wooded Land (POI#2) Runoff Area=0.990 ac 0.00% Impervious Runoff Depth=0.00"
Tc=40.4 min CN=60 Runoff=0.00 cfs 0.000 af

Subcatchment 5S: Pasture Land (POI#3) Runoff Area=13.760 ac 0.00% Impervious Runoff Depth=0.03"
Tc=19.1 min CN=71 Runoff=0.50 cfs 0.038 af

Subcatchment 6S: Wooded Land (POI#3) Runoff Area=1.740 ac 0.00% Impervious Runoff Depth=0.00"
Tc=19.1 min CN=60 Runoff=0.00 cfs 0.000 af

Link 1L: POI #1 (West) Inflow=0.19 cfs 0.015 af
Primary=0.19 cfs 0.015 af

Link 2L: POI #2 (East) Inflow=1.85 cfs 0.165 af
Primary=1.85 cfs 0.165 af

Link 3L: POI #3 (Northeast) Inflow=0.50 cfs 0.038 af
Primary=0.50 cfs 0.038 af

Link 4L: Total Pre-Development Inflow=2.43 cfs 0.218 af
Primary=2.43 cfs 0.218 af

Total Runoff Area = 83.700 ac Runoff Volume = 0.218 af Average Runoff Depth = 0.03"
100.00% Pervious = 83.700 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pasture/Farm (POI#1)

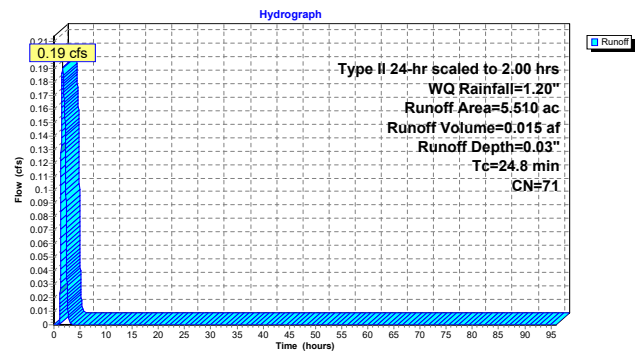
Runoff = 0.19 cfs @ 1.65 hrs, Volume= 0.015 af, Depth= 0.03"
Routed to Link 1L: POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
5.510	71	Agricultural
5.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 1S: Pasture/Farm (POI#1)



Summary for Subcatchment 2S: Wooded Land (POI#1)

[45] Hint: Runoff=Zero

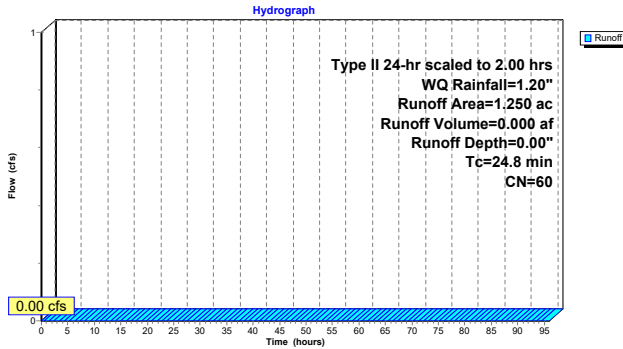
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Link 1L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 1.250	60	Woods, Good, HSG B
1.250		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry, Tc-2

Subcatchment 2S: Wooded Land (POI#1)



Summary for Subcatchment 3S: Pasture Land (POI#2)

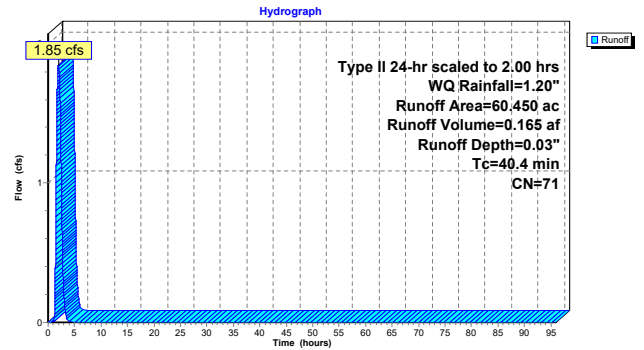
Runoff = 1.85 cfs @ 1.93 hrs, Volume= 0.165 af, Depth= 0.03"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 60.450	71	Agricultural
60.450		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 3S: Pasture Land (POI#2)



Summary for Subcatchment 4S: Wooded Land (POI#2)

[45] Hint: Runoff=Zero

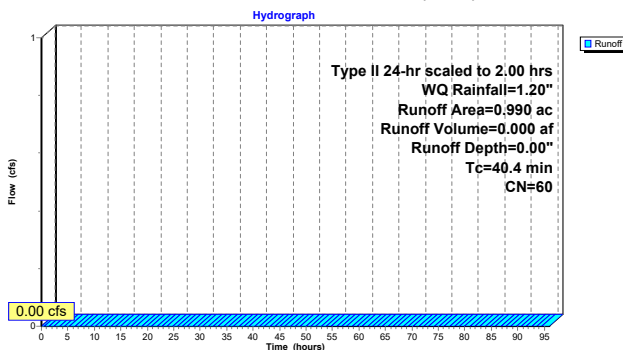
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Link 2L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 0.990	60	Woods, Good, HSG B
0.990		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.4					Direct Entry, TC-1

Subcatchment 4S: Wooded Land (POI#2)



Summary for Subcatchment 5S: Pasture Land (POI#3)

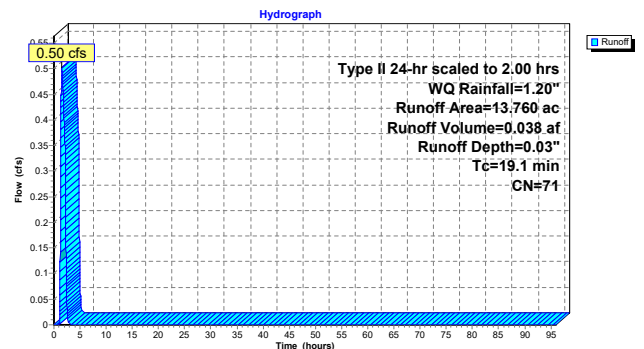
Runoff = 0.50 cfs @ 1.51 hrs, Volume= 0.038 af, Depth= 0.03"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 13.760	71	Agricultural
13.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 5S: Pasture Land (POI#3)



Summary for Subcatchment 6S: Wooded Land (POI#3)

[45] Hint: Runoff=Zero

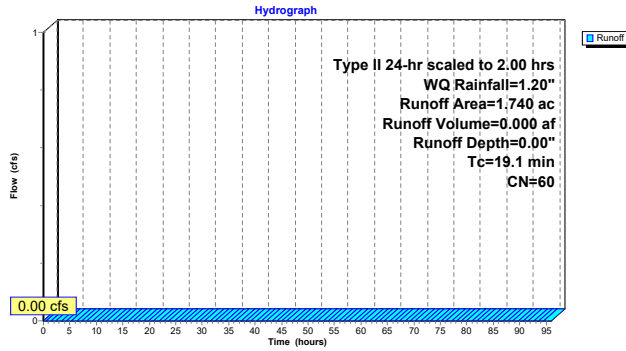
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Link 3L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 1.740	60	Woods, Good, HSG B
1.740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					Direct Entry,

Subcatchment 6S: Wooded Land (POI#3)

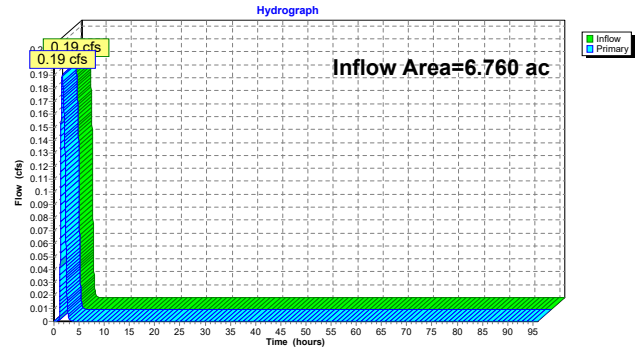


Summary for Link 1L: POI #1 (West)

Inflow Area = 6.760 ac, 0.00% Impervious, Inflow Depth = 0.03" for WQ event
 Inflow = 0.19 cfs @ 1.65 hrs, Volume= 0.015 af
 Primary = 0.19 cfs @ 1.65 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: POI #1 (West)

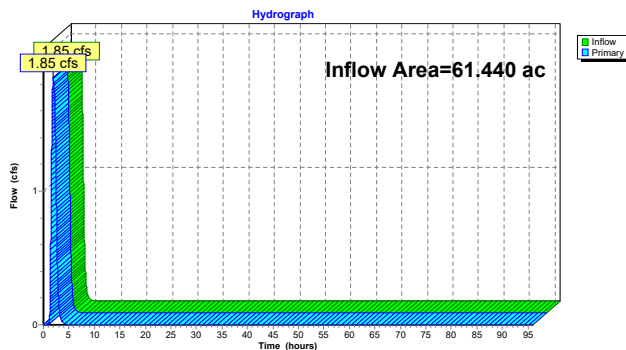


Summary for Link 2L: POI #2 (East)

Inflow Area = 61.440 ac, 0.00% Impervious, Inflow Depth = 0.03" for WQ event
 Inflow = 1.85 cfs @ 1.93 hrs, Volume= 0.165 af
 Primary = 1.85 cfs @ 1.93 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: POI #2 (East)

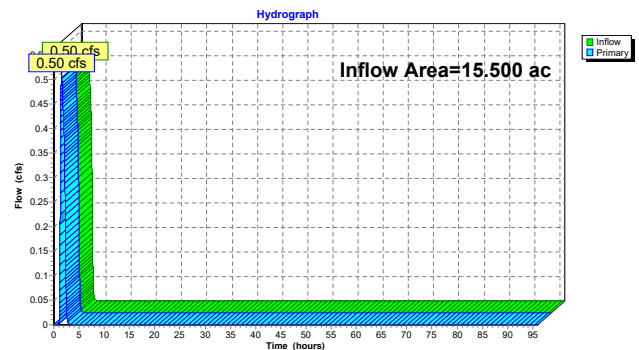


Summary for Link 3L: POI #3 (Northeast)

Inflow Area = 15.500 ac, 0.00% Impervious, Inflow Depth = 0.03" for WQ event
 Inflow = 0.50 cfs @ 1.51 hrs, Volume= 0.038 af
 Primary = 0.50 cfs @ 1.51 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : Total Pre-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

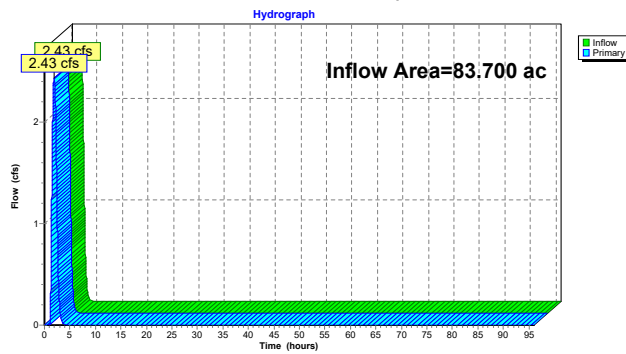
Link 3L: POI #3 (Northeast)



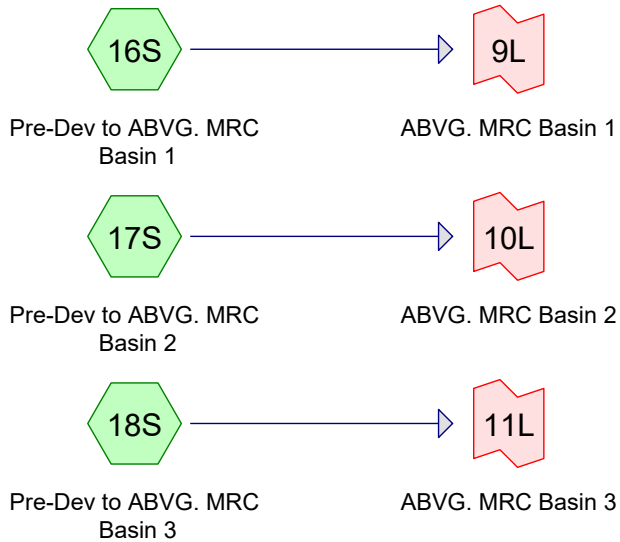
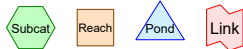
Summary for Link 4L: Total Pre-Development

Inflow Area = 83.700 ac, 0.00% Impervious, Inflow Depth = 0.03" for WQ event
Inflow = 2.43 cfs @ 1.85 hrs, Volume= 0.218 af
Primary = 2.43 cfs @ 1.85 hrs, Volume= 0.218 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: Total Pre-Development

1-YR MRC Basin Release Rate



Routing Diagram for PP213222-SWM-2
Prepared by Bohler Engineers, Printed 6/27/2023
HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

PP213222-SWM-2

Prepared by Bohler Engineers
HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Printed 6/27/2023
Page 2

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 Year	Type II 24-hr		Default	24.00	1	2.40	2

PP213222-SWM-2

Prepared by Bohler Engineers
HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Printed 6/27/2023
Page 3

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
42.680	71	Agricultural (16S, 18S)
24.560	71	Agriculture (17S)
67.240	71	TOTAL AREA

PP213222-SWM-2

Prepared by Bohler Engineers
HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Printed 6/27/2023
Page 4

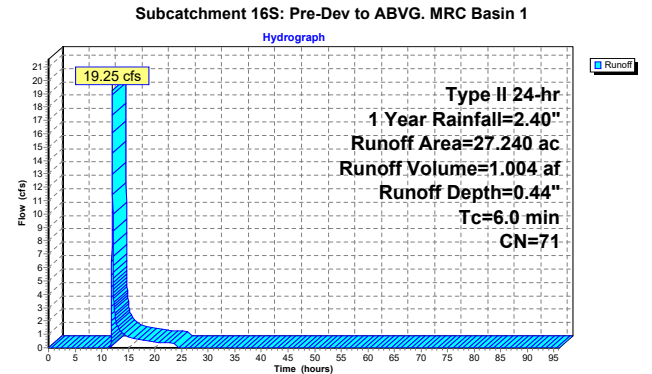
Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
67.240	Other	16S, 17S, 18S
67.240		TOTAL AREA

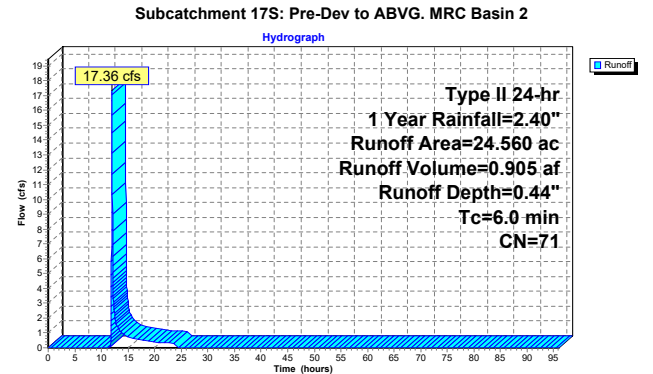
Ground Covers (selected nodes)							
HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	42.680	42.680	Agricultural	16S, 18S
0.000	0.000	0.000	0.000	24.560	24.560	Agriculture	17S
0.000	0.000	0.000	0.000	67.240	67.240	TOTAL AREA	

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points	
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q	
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method	
Subcatchment 16S: Pre-Dev to ABVG. MRC	Runoff Area=27.240 ac 0.00% Impervious Runoff Depth=0.44" Tc=6.0 min CN=71 Runoff=19.25 cfs 1.004 af
Subcatchment 17S: Pre-Dev to ABVG. MRC	Runoff Area=24.560 ac 0.00% Impervious Runoff Depth=0.44" Tc=6.0 min CN=71 Runoff=17.36 cfs 0.905 af
Subcatchment 18S: Pre-Dev to ABVG. MRC	Runoff Area=15.440 ac 0.00% Impervious Runoff Depth=0.44" Tc=6.0 min CN=71 Runoff=10.91 cfs 0.569 af
Link 9L: ABVG. MRC Basin 1	Inflow=19.25 cfs 1.004 af Primary=19.25 cfs 1.004 af
Link 10L: ABVG. MRC Basin 2	Inflow=17.36 cfs 0.905 af Primary=17.36 cfs 0.905 af
Link 11L: ABVG. MRC Basin 3	Inflow=10.91 cfs 0.569 af Primary=10.91 cfs 0.569 af
Total Runoff Area = 67.240 ac Runoff Volume = 2.478 af Average Runoff Depth = 0.44" 100.00% Pervious = 67.240 ac 0.00% Impervious = 0.000 ac	

Summary for Subcatchment 16S: Pre-Dev to ABVG. MRC Basin 1						
Runoff	=	19.25 cfs @	11.99 hrs,	Volume=	1.004 af,	Depth= 0.44"
Routed to Link 9L : ABVG. MRC Basin 1						
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs						
Type II 24-hr 1 Year Rainfall=2.40"						
Area (ac)		CN	Description			
*	27.240	71	Agricultural			
27.240		100.00% Pervious Area				
Tc	Length	Slope	Velocity	Capacity	Description	
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
6.0					Direct Entry,	



Summary for Subcatchment 17S: Pre-Dev to ABVG. MRC Basin 2						
Runoff	=	17.36 cfs @	11.99 hrs,	Volume=	0.905 af,	Depth= 0.44"
Routed to Link 10L : ABVG. MRC Basin 2						
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs						
Type II 24-hr 1 Year Rainfall=2.40"						
Area (ac)	CN	Description				
* 24.560	71	Agriculture				
24.560		100.00% Pervious Area				
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
6.0					Direct Entry,	



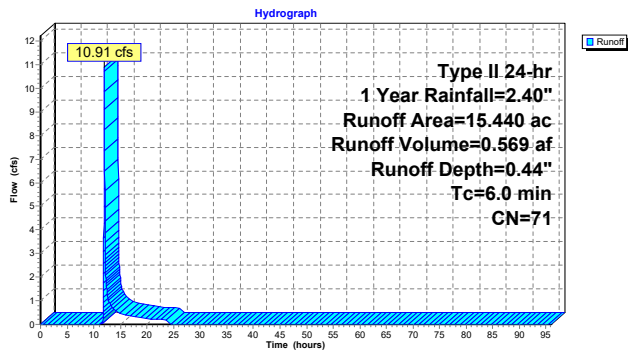
Summary for Subcatchment 18S: Pre-Dev to ABVG. MRC Basin 3

Runoff = 10.91 cfs @ 11.99 hrs, Volume= 0.569 af, Depth= 0.44"
 Routed to Link 11L: ABVG. MRC Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description			
* 15.440	71	Agricultural			
15.440		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry.

Subcatchment 18S: Pre-Dev to ABVG. MRC Basin 3

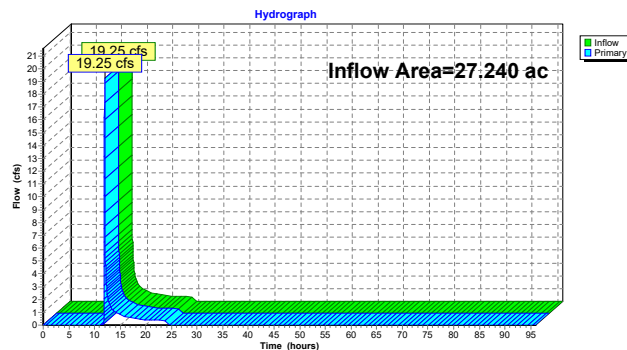


Summary for Link 9L: ABVG. MRC Basin 1

Inflow Area = 27.240 ac, 0.00% Impervious, Inflow Depth = 0.44" for 1 Year event
 Inflow = 19.25 cfs @ 11.99 hrs, Volume= 1.004 af
 Primary = 19.25 cfs @ 11.99 hrs, Volume= 1.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 9L: ABVG. MRC Basin 1

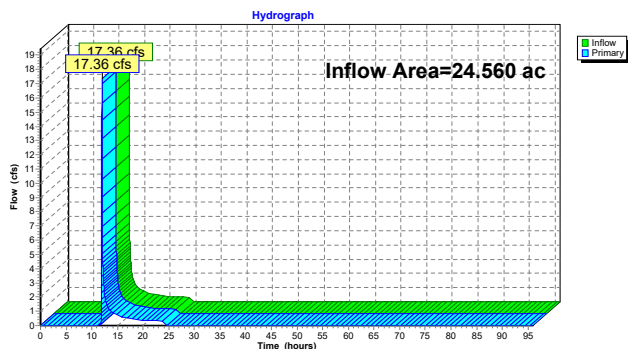


Summary for Link 10L: ABVG. MRC Basin 2

Inflow Area = 24.560 ac, 0.00% Impervious, Inflow Depth = 0.44" for 1 Year event
 Inflow = 17.36 cfs @ 11.99 hrs, Volume= 0.905 af
 Primary = 17.36 cfs @ 11.99 hrs, Volume= 0.905 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 10L: ABVG. MRC Basin 2

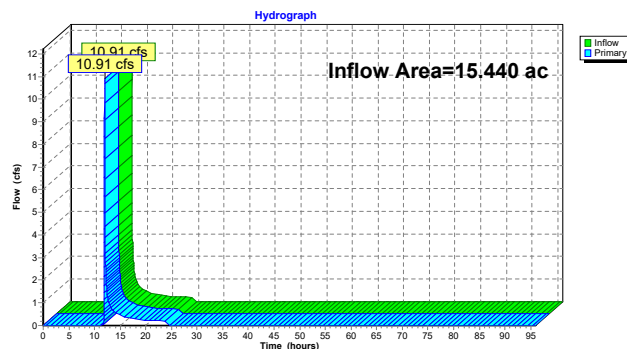


Summary for Link 11L: ABVG. MRC Basin 3

Inflow Area = 15.440 ac, 0.00% Impervious, Inflow Depth = 0.44" for 1 Year event
 Inflow = 10.91 cfs @ 11.99 hrs, Volume= 0.569 af
 Primary = 10.91 cfs @ 11.99 hrs, Volume= 0.569 af, Atten= 0%, Lag= 0.0 min

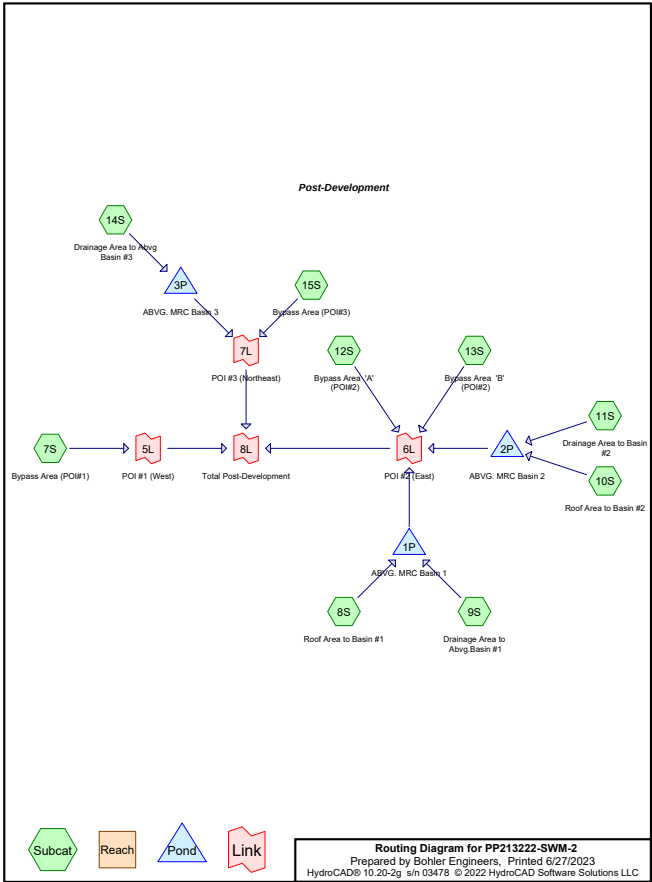
Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 11L: ABVG. MRC Basin 3



Post Development

Rainfall Events Listing								
Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 Year	Type II 24-hr		Default	24.00	1	2.40	2
2	2 Year	Type II 24-hr		Default	24.00	1	2.88	2
3	5 Year	Type II 24-hr		Default	24.00	1	3.60	2
4	10 Year	Type II 24-hr		Default	24.00	1	4.56	2
5	25 Year	Type II 24-hr		Default	24.00	1	5.76	2
6	50 Year	Type II 24-hr		Default	24.00	1	6.48	2
7	100 Year	Type II 24-hr		Default	24.00	1	7.44	2
8	WQ	Type II 24-hr		Scale	2.00	1	1.20	2



Area Listing (selected nodes)		
Area (acres)	CN	Description (subcatchment-numbers)
18.140	61	Grass Cover (9S, 11S, 14S)
10.650	98	Impervious (13S, 14S)
18.100	98	Impervious Area (9S, 11S)
15.470	58	Meadow Seed Mix (7S, 12S, 13S, 15S)
21.340	98	Roof Area (8S, 10S)
83.700	83	TOTAL AREA

Soil Listing (selected nodes)		
Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
83.700	Other	7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S
83.700		TOTAL AREA

PP213222-SWM-2 Prepared by Bohler Engineers
HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLCPrinted 6/27/2023
Page 5**Ground Covers (selected nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	18.140	18.140	Grass Cover	9S, 11S, 14S
0.000	0.000	0.000	0.000	10.650	10.650	Impervious	13S, 14S
0.000	0.000	0.000	0.000	18.100	18.100	Impervious Area	9S, 11S
0.000	0.000	0.000	0.000	15.470	15.470	Meadow Seed Mix	7S, 12S, 13S, 15S
0.000	0.000	0.000	0.000	21.340	21.340	Roof Area	8S, 10S
0.000	0.000	0.000	0.000	83.700	83.700	TOTAL AREA	

PP213222-SWM-2 Prepared by Bohler Engineers
HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLCPrinted 6/27/2023
Page 6**Pipe Listing (selected nodes)**

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	1P	336.50	333.83	219.3	0.0122	0.012	0.0000	30.0000	0.0000
2	2P	326.50	323.00	45.6	0.0768	0.012	0.0000	42.0000	0.0000
3	3P	327.50	323.50	97.0	0.0412	0.012	0.0000	36.0000	0.0000

PP213222-SWM-2 Prepared by Bohler Engineers
HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 1 Year Rainfall=2.40"

Printed 6/27/2023
Page 7Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 7S: Bypass Area (POI#1)	Runoff Area=4.260 ac 0.00% Impervious Runoff Depth=0.11" Tc=24.8 min CN=58 Runoff=0.09 cfs 0.039 af
Subcatchment 8S: Roof Area to Basin #1	Runoff Area=9.340 ac 100.00% Impervious Runoff Depth=2.17" Tc=6.0 min CN=98 Runoff=31.43 cfs 1.690 af
Subcatchment 9S: Drainage Area to	Runoff Area=17.900 ac 59.50% Impervious Runoff Depth=1.36" Tc=6.0 min CN=WQ Runoff=36.27 cfs 2.028 af
Subcatchment 10S: Roof Area to Basin #2	Runoff Area=12.000 ac 100.00% Impervious Runoff Depth=2.17" Tc=6.0 min CN=98 Runoff=40.36 cfs 2.171 af
Subcatchment 11S: Drainage Area to	Runoff Area=12.560 ac 59.32% Impervious Runoff Depth=1.36" Tc=6.0 min CN=WQ Runoff=25.37 cfs 1.419 af
Subcatchment 12S: Bypass Area 'A' (POI#2)	Runoff Area=3.080 ac 0.00% Impervious Runoff Depth=0.11" Tc=6.0 min CN=58 Runoff=0.09 cfs 0.028 af
Subcatchment 13S: Bypass Area 'B'	Runoff Area=6.520 ac 15.18% Impervious Runoff Depth=0.42" Tc=6.0 min CN=WQ Runoff=3.34 cfs 0.230 af
Subcatchment 14S: Drainage Area to	Runoff Area=15.440 ac 62.56% Impervious Runoff Depth=1.42" Tc=6.0 min CN=WQ Runoff=32.85 cfs 1.829 af
Subcatchment 15S: Bypass Area (POI#3)	Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=0.11" Tc=6.0 min CN=58 Runoff=0.08 cfs 0.024 af
Pond 1P: ABVG. MRC Basin 1	Peak Elev=338.98' Storage=113,171 cf Inflow=67.69 cfs 3.718 af Outflow=2.15 cfs 2.861 af
Pond 2P: ABVG. MRC Basin 2	Peak Elev=331.04' Storage=109,957 cf Inflow=65.74 cfs 3.591 af Outflow=2.01 cfs 2.762 af
Pond 3P: ABVG. MRC Basin 3	Peak Elev=330.58' Storage=61,523 cf Inflow=32.85 cfs 1.829 af Outflow=0.57 cfs 1.192 af
Link 5L: POI #1 (West)	Inflow=0.09 cfs 0.039 af Primary=0.09 cfs 0.039 af
Link 6L: POI #2 (East)	Inflow=4.37 cfs 5.881 af Primary=4.37 cfs 5.881 af
Link 7L: POI #3 (Northeast)	Inflow=0.59 cfs 1.216 af Primary=0.59 cfs 1.216 af
Link 8L: Total Post-Development	Inflow=4.92 cfs 7.136 af Primary=4.92 cfs 7.136 af

PP213222-SWM-2 Prepared by Bohler Engineers
HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 1 Year Rainfall=2.40"

Printed 6/27/2023
Page 8**Total Runoff Area = 83.700 ac Runoff Volume = 9.459 af Average Runoff Depth = 1.36"**
40.16% Pervious = 33.610 ac 59.84% Impervious = 50.090 ac

Summary for Subcatchment 7S: Bypass Area (POI#1)

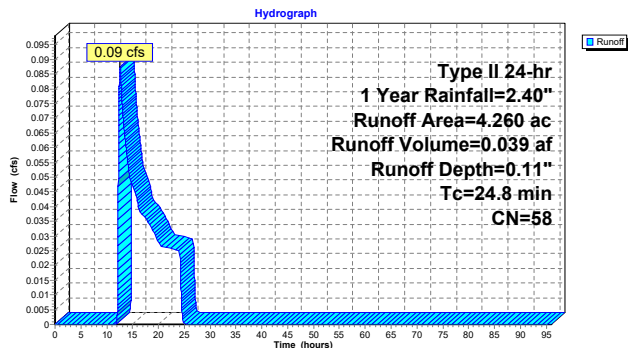
Runoff = 0.09 cfs @ 12.59 hrs, Volume= 0.039 af, Depth= 0.11"
 Routed to Link 5L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 4.260	58	Meadow Seed Mix
4.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 7S: Bypass Area (POI#1)



Summary for Subcatchment 8S: Roof Area to Basin #1

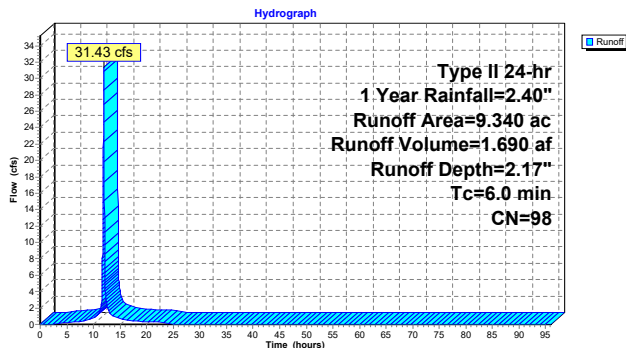
Runoff = 31.43 cfs @ 11.97 hrs, Volume= 1.690 af, Depth= 2.17"
 Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 9.340	98	Roof Area
9.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 8S: Roof Area to Basin #1



Summary for Subcatchment 9S: Drainage Area to Abvg.Basin #1

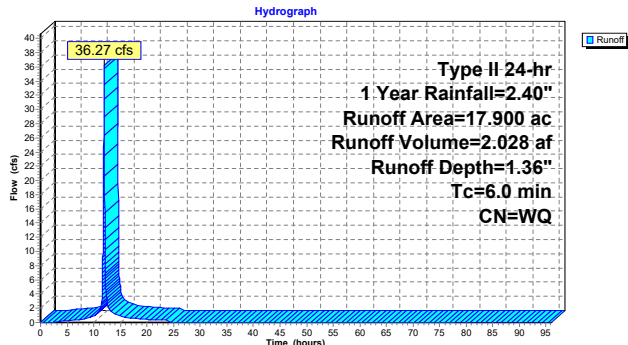
Runoff = 36.27 cfs @ 11.97 hrs, Volume= 2.028 af, Depth= 1.36"
 Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 7.250	61	Grass Cover
* 10.650	98	Impervious Area
17.900		Weighted Average
7.250		40.50% Pervious Area
10.650		59.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 9S: Drainage Area to Abvg.Basin #1



Summary for Subcatchment 10S: Roof Area to Basin #2

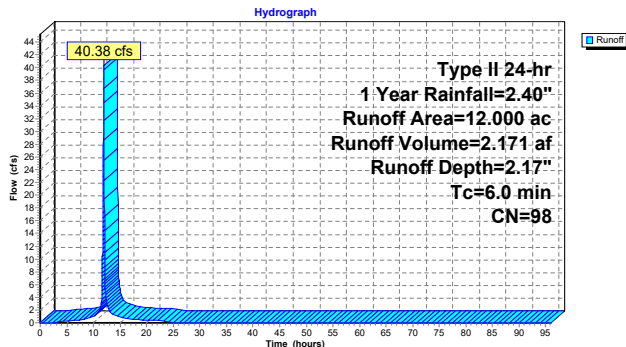
Runoff = 40.38 cfs @ 11.97 hrs, Volume= 2.171 af, Depth= 2.17"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 12.000	98	Roof Area
12.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 10S: Roof Area to Basin #2



Summary for Subcatchment 11S: Drainage Area to Basin #2

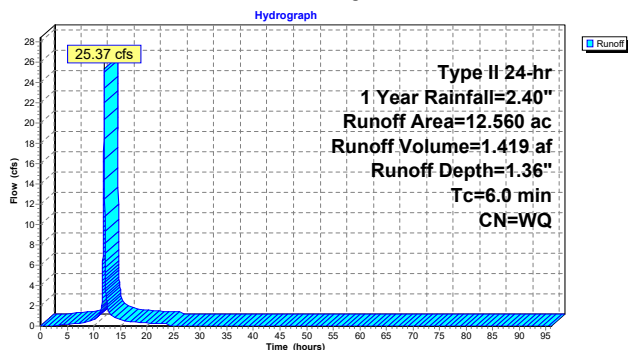
Runoff = 25.37 cfs @ 11.97 hrs, Volume= 1.419 af, Depth= 1.36"
 Routed to Pond 2P : ABVG, MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 5.110	61	Grass Cover
* 7.450	98	Impervious Area
12.560		Weighted Average
5.110		40.68% Pervious Area
7.450		59.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 11S: Drainage Area to Basin #2



Summary for Subcatchment 12S: Bypass Area 'A' (POI#2)

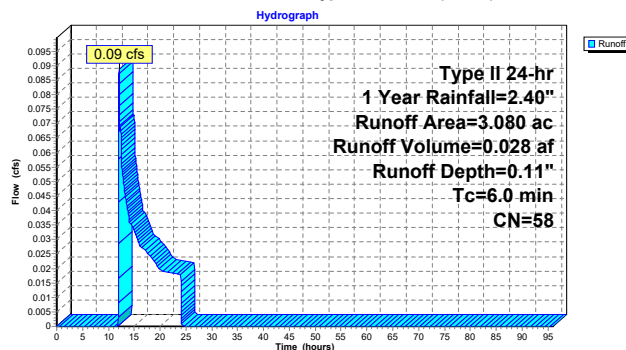
Runoff = 0.09 cfs @ 12.05 hrs, Volume= 0.028 af, Depth= 0.11"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 3.080	58	Meadow Seed Mix
3.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 12S: Bypass Area 'A' (POI#2)



Summary for Subcatchment 13S: Bypass Area 'B' (POI#2)

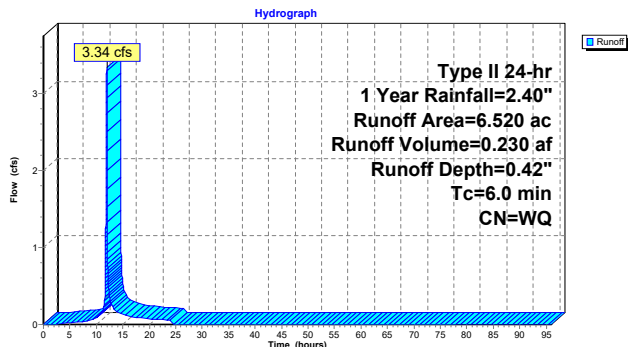
Runoff = 3.34 cfs @ 11.97 hrs, Volume= 0.230 af, Depth= 0.42"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 5.530	58	Meadow Seed Mix
* 0.990	98	Impervious
6.520		Weighted Average
5.530		84.82% Pervious Area
0.990		15.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 13S: Bypass Area 'B' (POI#2)



Summary for Subcatchment 14S: Drainage Area to Abvg Basin #3

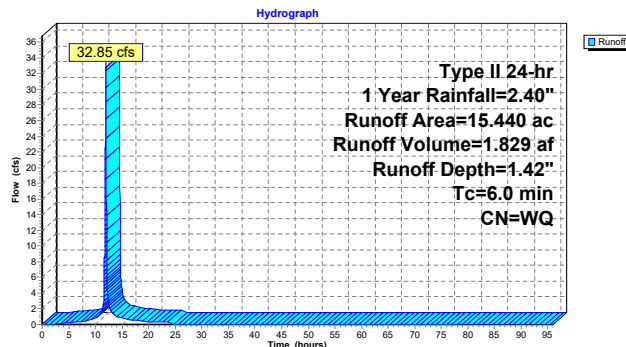
Runoff = 32.85 cfs @ 11.97 hrs, Volume= 1.829 af, Depth= 1.42"
 Routed to Pond 3P : ABVG, MRC Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
* 5.780	61	Grass Cover
* 9.660	98	Impervious
15.440		Weighted Average
5.780		37.44% Pervious Area
9.660		62.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 14S: Drainage Area to Abvg Basin #3



Summary for Subcatchment 15S: Bypass Area (POI#3)

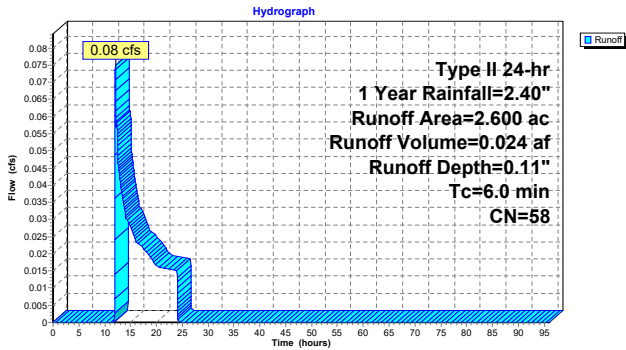
Runoff = 0.08 cfs @ 12.05 hrs, Volume= 0.024 af, Depth= 0.11"
Routed to Link 7L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1 Year Rainfall=2.40"

Area (ac)	CN	Description
2.600	58	Meadow Seed Mix
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 15S: Bypass Area (POI#3)



Summary for Pond 1P: ABVG. MRC Basin 1

Inflow Area = 27.240 ac, 73.38% Impervious, Inflow Depth = 1.64" for 1 Year event
Inflow = 67.69 cfs @ 11.97 hrs, Volume= 3.718 af
Outflow = 2.15 cfs @ 13.84 hrs, Volume= 2.861 af, Atten= 97%, Lag= 112.4 min
Primary = 2.15 cfs @ 13.84 hrs, Volume= 2.861 af
Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 338.98' @ 13.84 hrs Surf.Area= 215,025 sf Storage= 113,171 cf

Plug-Flow detention time= 1,377.4 min calculated for 2.861 af (77% of inflow)
Center-of-Mass det. time= 1,289.4 min (2,054.1 - 764.8)

Volume	Invert	Avail.Storage	Storage Description
#1	338.00'	366,705 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	335.50'	10,501 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	336.50'	31,502 cf	70,005 cf Overall x 15.0% Voids
			MRC Soil (30% Voids) (Prismatic) Listed below (Recalc)
			105,008 cf Overall x 30.0% Voids
		408,708 cf	Total Available Storage

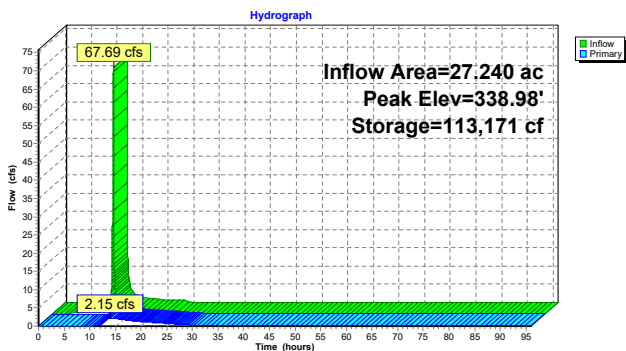
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
338.00	70,005	0	0
342.50	92,975	366,705	366,705
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
335.50	70,005	0	0
336.50	70,005	70,005	70,005
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
336.50	70,005	0	0
338.00	70,005	105,008	105,008

Device	Routing	Invert	Outlet Devices
#1	Primary	336.50'	30.0000" Round Culvert L= 219.3' Ke= 0.500 Inlet / Outlet Invert= 336.50' / 333.83' S= 0.0122' /' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	336.50'	2.3750" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	338.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.50 Width (feet) 1.75 1.75
#4	Device 1	341.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.14 cfs @ 13.84 hrs HW=338.98' (Free Discharge)

- 1=Culvert (Passes 2.14 cfs of 26.30 cfs potential flow)
- 2=MRC Orifice (Orifice Controls 0.23 cfs @ 7.43 fps)
- 3=Weir (Weir Controls 1.91 cfs @ 2.27 fps)
- 4=Grate (Controls 0.00 cfs)

Pond 1P: ABVG. MRC Basin 1



Summary for Pond 2P: ABVG. MRC Basin 2

Inflow Area = 24.560 ac, 79.19% Impervious, Inflow Depth = 1.75" for 1 Year event
Inflow = 66.74 cfs @ 11.97 hrs, Volume= 3.591 af
Outflow = 2.01 cfs @ 13.88 hrs, Volume= 2.762 af, Atten= 97%, Lag= 114.9 min
Primary = 2.01 cfs @ 13.88 hrs, Volume= 2.762 af
Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 331.04' @ 13.88 hrs Surf.Area= 201,005 sf Storage= 109,957 cf

Plug-Flow detention time= 1,357.5 min calculated for 2.762 af (77% of inflow)
Center-of-Mass det. time= 1,269.7 min (2,032.9 - 763.2)

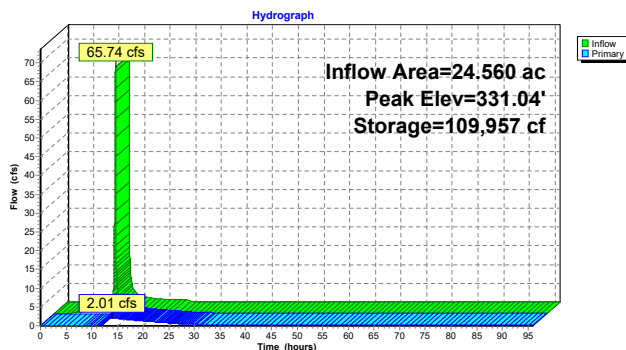
Volume	Invert	Avail.Storage	Storage Description
#1	330.00'	446,558 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	9,779 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	29,338 cf	65,195 cf Overall x 15.0% Voids
			MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			97,793 cf Overall x 30.0% Voids
		485,675 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	65,195	0	0
335.60	94,290	446,558	446,558
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
327.50	65,195	0	0
328.50	65,195	65,195	65,195
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	42.0000" Round Culvert L= 45.6' Ke= 0.500 Inlet / Outlet Invert= 326.50' / 323.00' S= 0.0768' /' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	328.50'	2.2813" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	333.50'	72.0000" x 72.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	330.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 1.37 1.37

Primary OutFlow Max=2.01 cfs @ 13.88 hrs HW=331.04' TW=328.50' (Fixed TW Elev= 328.50')
 1=Culvert (Passes 2.01 cfs of 73.88 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.21 cfs @ 7.53 fps)
 3=Grate (Controls 0.00 cfs)
 4=Weir (Weir Controls 1.80 cfs @ 2.41 fps)

Pond 2P: ABVG. MRC Basin 2



Summary for Pond 3P: ABVG. MRC Basin 3

Inflow Area = 15.440 ac, 62.56% Impervious, Inflow Depth = 1.42" for 1 Year event
 Inflow = 32.85 cfs @ 11.97 hrs, Volume= 1.829 af
 Outflow = 0.57 cfs @ 16.71 hrs, Volume= 1.192 af, Atten= 98%, Lag= 284.3 min
 Primary = 0.57 cfs @ 16.71 hrs, Volume= 1.192 af
 Routed to Link 7L : POI #3 (Northeast)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 330.58' @ 16.71 hrs Surf.Area= 156,406 sf Storage= 61,523 cf

Plug-Flow detention time= 1.658.9 min calculated for 1.192 af (65% of inflow)
 Center-of-Mass det. time= 1,551.6 min (2,319.8 - 768.3)

Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	384,915 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	7,695 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	23,085 cf	51,300 cf Overall x 15.0% Voids
			MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			76,950 cf Overall x 30.0% Voids
		415,695 cf	Total Available Storage

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
330.00	51,300	0	0
336.00	77,005	384,915	384,915

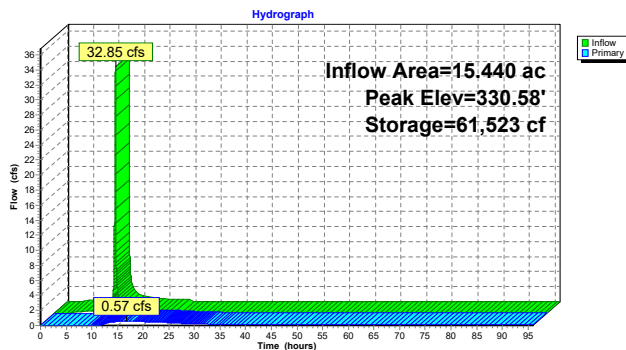
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
327.50	51,300	0	0
328.50	51,300	51,300	51,300

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Device	Routing	Invert	Outlet Devices
#1	Primary	327.50'	36.0000" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Inverts= 327.50' / 323.50' S= 0.0412 ' /' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	328.50'	1.6875" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	330.25'	12.0000" Vert. Main Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	333.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	332.00'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 3.00 3.00

Primary OutFlow Max=0.56 cfs @ 16.71 hrs HW=330.58' TW=328.00' (Fixed TW Elev= 328.00')
 1=Culvert (Passes 0.56 cfs of 42.85 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.11 cfs @ 6.83 fps)
 3=Main Orifice (Orifice Controls 0.45 cfs @ 1.97 fps)
 4=Grate (Controls 0.00 cfs)
 5=Weir (Controls 0.00 cfs)

Pond 3P: ABVG. MRC Basin 3

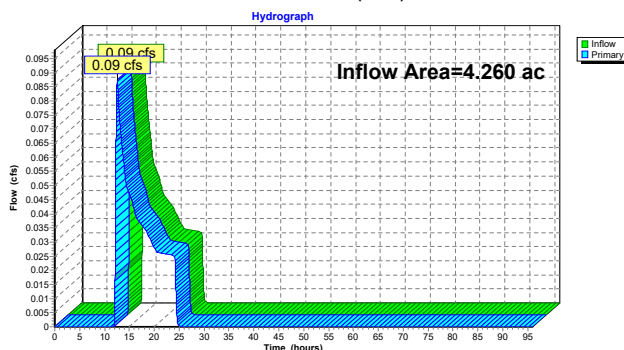


Summary for Link 5L: POI #1 (West)

Inflow Area = 4.260 ac, 0.00% Impervious, Inflow Depth = 0.11" for 1 Year event
 Inflow = 0.09 cfs @ 12.59 hrs, Volume= 0.039 af
 Primary = 0.09 cfs @ 12.59 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: POI #1 (West)

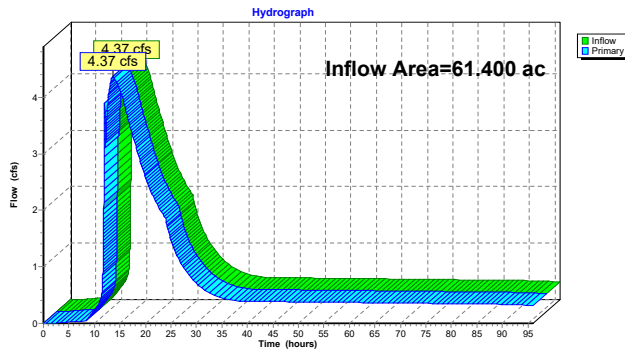


Summary for Link 6L: POI #2 (East)

Inflow Area = 61.400 ac, 65.85% Impervious, Inflow Depth > 1.15" for 1 Year event
 Inflow = 4.37 cfs @ 13.71 hrs, Volume= 5.881 af
 Primary = 4.37 cfs @ 13.71 hrs, Volume= 5.881 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 6L: POI #2 (East)

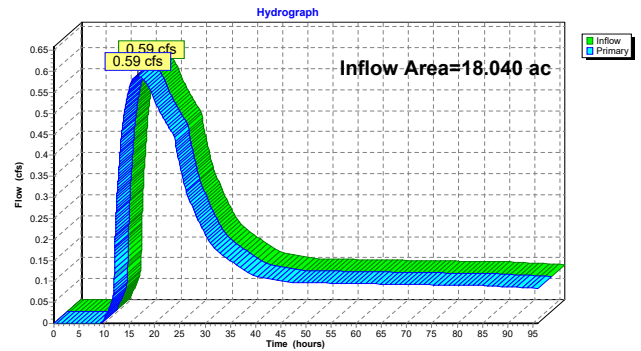


Summary for Link 7L: POI #3 (Northeast)

Inflow Area = 18.040 ac, 53.55% Impervious, Inflow Depth > 0.81" for 1 Year event
 Inflow = 0.59 cfs @ 16.62 hrs, Volume= 1.216 af
 Primary = 0.59 cfs @ 16.62 hrs, Volume= 1.216 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7L: POI #3 (Northeast)

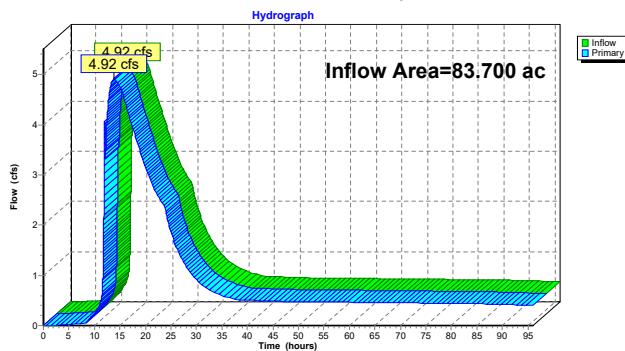


Summary for Link 8L: Total Post-Development

Inflow Area = 83.700 ac, 59.84% Impervious, Inflow Depth > 1.02" for 1 Year event
 Inflow = 4.92 cfs @ 13.82 hrs, Volume= 7.136 af
 Primary = 4.92 cfs @ 13.82 hrs, Volume= 7.136 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 8L: Total Post-Development



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 7S: Bypass Area (POI#1)	Runoff Area=4.260 ac 0.00% Impervious Runoff Depth=0.24" Tc=24.8 min CN=58 Runoff=0.39 cfs 0.084 af
Subcatchment 8S: Roof Area to Basin #1	Runoff Area=9.340 ac 100.00% Impervious Runoff Depth=2.65" Tc=6.0 min CN=98 Runoff=37.93 cfs 2.062 af
Subcatchment 9S: Drainage Area to	Runoff Area=17.900 ac 59.50% Impervious Runoff Depth=1.71" Tc=6.0 min CN=WQ Runoff=45.65 cfs 2.545 af
Subcatchment 10S: Roof Area to Basin #2	Runoff Area=12.000 ac 100.00% Impervious Runoff Depth=2.65" Tc=6.0 min CN=98 Runoff=48.73 cfs 2.649 af
Subcatchment 11S: Drainage Area to	Runoff Area=12.560 ac 59.32% Impervious Runoff Depth=1.70" Tc=6.0 min CN=WQ Runoff=31.95 cfs 1.781 af
Subcatchment 12S: Bypass Area 'A' (POI#2)	Runoff Area=3.080 ac 0.00% Impervious Runoff Depth=0.24" Tc=6.0 min CN=58 Runoff=0.67 cfs 0.061 af
Subcatchment 13S: Bypass Area 'B'	Runoff Area=6.520 ac 15.18% Impervious Runoff Depth=0.60" Tc=6.0 min CN=WQ Runoff=4.92 cfs 0.327 af
Subcatchment 14S: Drainage Area to	Runoff Area=15.440 ac 62.56% Impervious Runoff Depth=1.78" Tc=6.0 min CN=WQ Runoff=41.14 cfs 2.287 af
Subcatchment 15S: Bypass Area (POI#3)	Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=0.24" Tc=6.0 min CN=58 Runoff=0.56 cfs 0.051 af
Pond 1P: ABVG. MRC Basin 1	Peak Elev=339.24' Storage=132,600 cf Inflow=83.56 cfs 4.606 af Outflow=3.88 cfs 3.735 af
Pond 2P: ABVG. MRC Basin 2	Peak Elev=331.31' Storage=129,108 cf Inflow=80.66 cfs 4.430 af Outflow=3.51 cfs 3.586 af
Pond 3P: ABVG. MRC Basin 3	Peak Elev=330.76' Storage=71,002 cf Inflow=41.14 cfs 2.287 af Outflow=1.09 cfs 1.637 af
Link 5L: POI #1 (West)	Inflow=0.39 cfs 0.084 af Primary=0.39 cfs 0.084 af
Link 6L: POI #2 (East)	Inflow=8.47 cfs 7.710 af Primary=8.47 cfs 7.710 af
Link 7L: POI #3 (Northeast)	Inflow=1.15 cfs 1.688 af Primary=1.15 cfs 1.688 af
Link 8L: Total Post-Development	Inflow=9.32 cfs 9.482 af Primary=9.32 cfs 9.482 af

Total Runoff Area = 83.700 ac   Runoff Volume = 11.846 af   Average Runoff Depth = 1.70"
40.16% Pervious = 33.610 ac   59.84% Impervious = 50.090 ac

Summary for Subcatchment 7S: Bypass Area (POI#1)

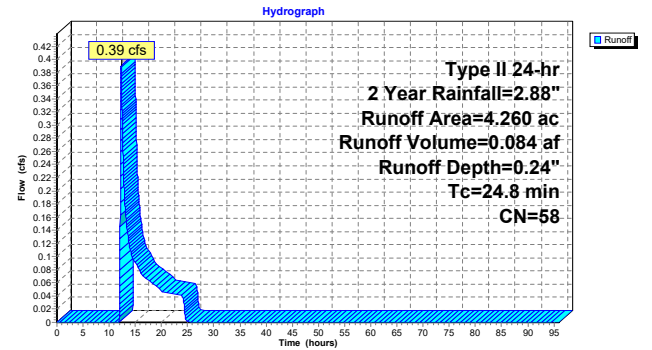
Runoff = 0.39 cfs @ 12.31 hrs, Volume= 0.084 af, Depth= 0.24"
Routed to Link 5L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 4.260	58	Meadow Seed Mix
4.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 7S: Bypass Area (POI#1)



Summary for Subcatchment 8S: Roof Area to Basin #1

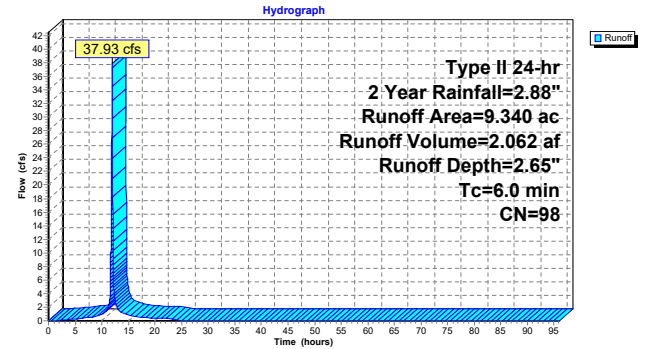
Runoff = 37.93 cfs @ 11.97 hrs, Volume= 2.062 af, Depth= 2.65"
Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 9.340	98	Roof Area
9.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 8S: Roof Area to Basin #1



Summary for Subcatchment 9S: Drainage Area to Abvg.Basin #1

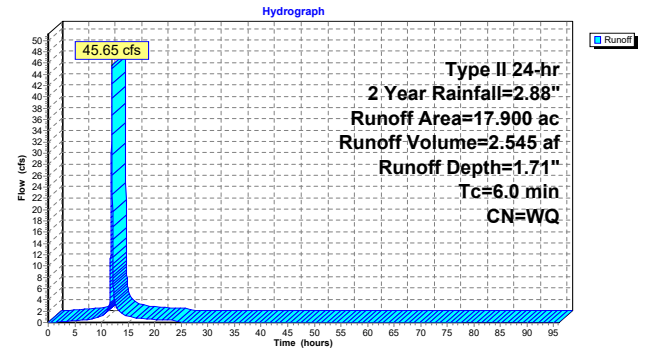
Runoff = 45.65 cfs @ 11.97 hrs, Volume= 2.545 af, Depth= 1.71"
Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 7.250	61	Grass Cover
* 10.650	98	Impervious Area
17.900		Weighted Average
7.250		40.50% Pervious Area
10.650		59.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 9S: Drainage Area to Abvg.Basin #1



Summary for Subcatchment 10S: Roof Area to Basin #2

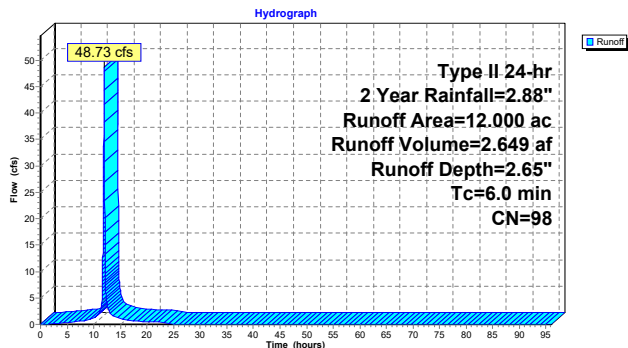
Runoff = 48.73 cfs @ 11.97 hrs, Volume= 2.649 af, Depth= 2.65"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 12.000	98	Roof Area
12.000		100.00% Impervious Area

Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					Direct Entry,

Subcatchment 10S: Roof Area to Basin #2



Summary for Subcatchment 11S: Drainage Area to Basin #2

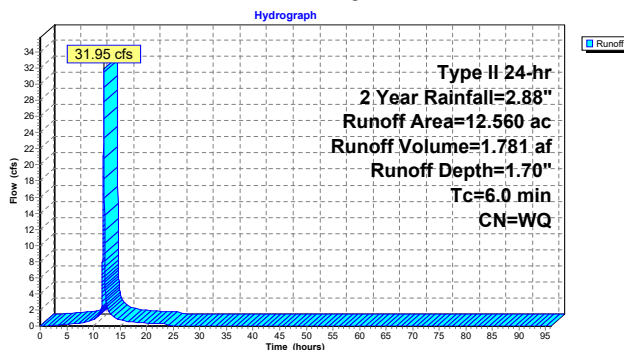
Runoff = 31.95 cfs @ 11.97 hrs, Volume= 1.781 af, Depth= 1.70"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 5.110	61	Grass Cover
* 7.450	98	Impervious Area
12.560		Weighted Average
5.110		40.68% Pervious Area
7.450		59.32% Impervious Area

Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					Direct Entry,

Subcatchment 11S: Drainage Area to Basin #2



Summary for Subcatchment 12S: Bypass Area 'A' (POI#2)

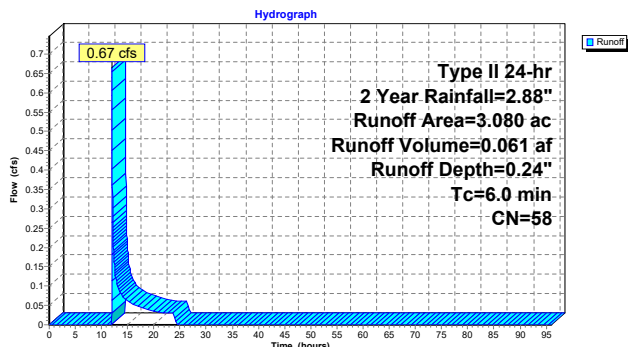
Runoff = 0.67 cfs @ 12.02 hrs, Volume= 0.061 af, Depth= 0.24"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 3.080	58	Meadow Seed Mix
3.080		100.00% Pervious Area

Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					Direct Entry,

Subcatchment 12S: Bypass Area 'A' (POI#2)



Summary for Subcatchment 13S: Bypass Area 'B' (POI#2)

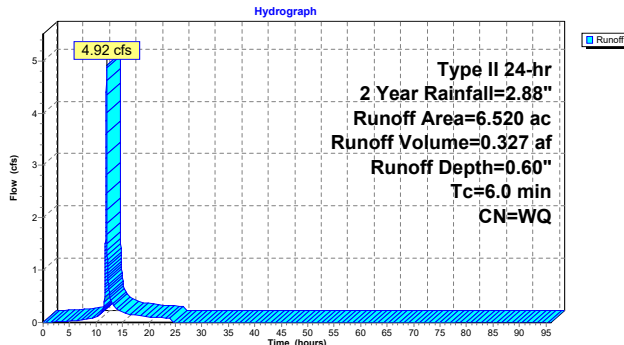
Runoff = 4.92 cfs @ 11.98 hrs, Volume= 0.327 af, Depth= 0.60"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 5.530	58	Meadow Seed Mix
* 0.990	98	Impervious
6.520		Weighted Average
5.530		84.82% Pervious Area
0.990		15.18% Impervious Area

Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					Direct Entry,

Subcatchment 13S: Bypass Area 'B' (POI#2)



Summary for Subcatchment 14S: Drainage Area to Abvg Basin #3

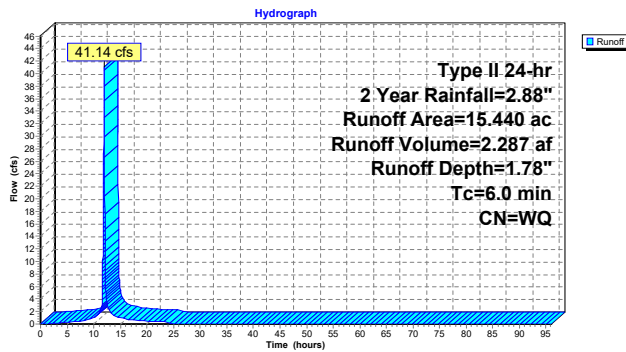
Runoff = 41.14 cfs @ 11.97 hrs, Volume= 2.287 af, Depth= 1.78"
 Routed to Pond 3P : ABVG. MRC Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 5.780	61	Grass Cover
* 9.660	98	Impervious
15.440		Weighted Average
5.780		37.44% Pervious Area
9.660		62.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 14S: Drainage Area to Abvg Basin #3



Summary for Subcatchment 15S: Bypass Area (POI#3)

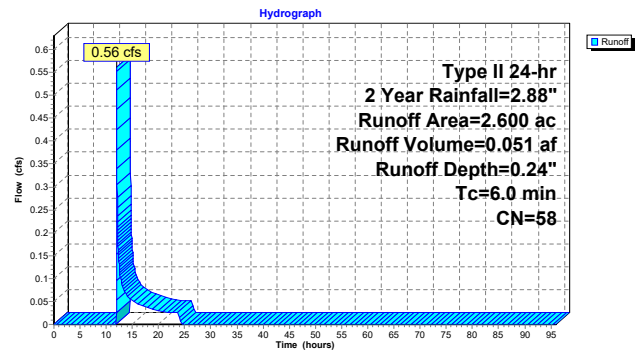
Runoff = 0.56 cfs @ 12.02 hrs, Volume= 0.051 af, Depth= 0.24"
 Routed to Link 7L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2 Year Rainfall=2.88"

Area (ac)	CN	Description
* 2.600	58	Meadow Seed Mix
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 15S: Bypass Area (POI#3)



Summary for Pond 1P: ABVG. MRC Basin 1

Inflow Area = 27.240 ac, 73.38% Impervious, Inflow Depth = 2.03" for 2 Year event
 Inflow = 83.56 cfs @ 11.97 hrs, Volume= 4.606 af
 Outflow = 3.88 cfs @ 13.08 hrs, Volume= 3.735 af, Atten= 95%, Lag= 66.7 min
 Primary = 3.88 cfs @ 13.08 hrs, Volume= 3.735 af
 Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 339.24' @ 13.08 hrs Surf.Area= 216,336 sf Storage= 132,600 cf

Plug-Flow detention time= 1,127.4 min calculated for 3.735 af (81% of inflow)
 Center-of-Mass det. time= 1,047.1 min (1,809.3 - 762.2)

Volume	Invert	Avail. Storage	Storage Description
#1	338.00'	366,705 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	335.50'	10,501 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	336.50'	31,502 cf	MRC Soil (30% Voids) (Prismatic) Listed below (Recalc)
		105,008 cf Overall x 30.0% Voids	
		408,708 cf	Total Available Storage

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
338.00	70,005	0	0
342.50	92,975	366,705	366,705

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
335.50	70,005	0	0
336.50	70,005	70,005	70,005

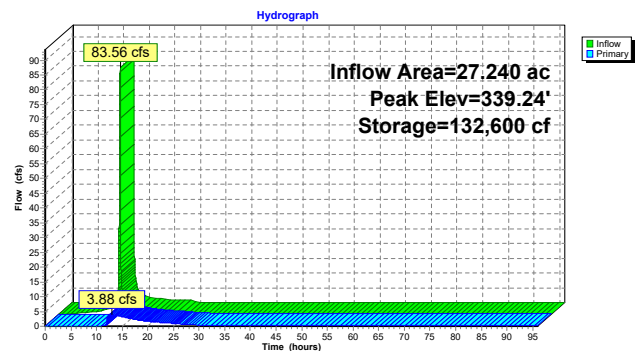
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
336.50	70,005	0	0
338.00	70,005	105,008	105,008

Device	Routing	Invert	Outlet Devices
#1	Primary	336.50'	30.0000" Round Culvert L= 219.3' Ke= 0.500 Inlet / Outlet Invert= 336.50' / 333.83' S= 0.0122 ' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	336.50'	2.3750" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	338.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.50 Width (feet) 1.75 1.75
#4	Device 1	341.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads

Primary Outflow Max=3.88 cfs @ 13.08 hrs HW=339.24' (Free Discharge)

- 1=Culvert (Passes 3.88 cfs of 28.83 cfs potential flow)
- 2=MRC Orifice (Orifice Controls 0.24 cfs @ 7.82 fps)
- 3=Weir (Weir Controls 3.64 cfs @ 2.81 fps)
- 4=Grate (Controls 0.00 cfs)

Pond 1P: ABVG. MRC Basin 1



Summary for Pond 2P: ABVG. MRC Basin 2

Inflow Area = 24.560 ac, 79.19% Impervious, Inflow Depth = 2.16" for 2 Year event
Inflow = 80.66 cfs @ 11.97 hrs, Volume= 4.430 af
Outflow = 3.51 cfs @ 13.17 hrs, Volume= 3.586 af, Atten= 96%, Lag= 72.4 min
Primary = 3.51 cfs @ 13.17 hrs, Volume= 3.586 af
Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 331.31' @ 13.17 hrs Surf.Area= 202,400 sf Storage= 129,108 cf

Plug-Flow detention time= 1,121.8 min calculated for 3.586 af (81% of inflow)
Center-of-Mass det. time= 1,042.2 min (1,802.4 - 760.2)

Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	446,558 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	9,779 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	29,338 cf	65,195 cf Overall x 15.0% Voids MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
		97,793 cf Overall x 30.0% Voids	
		485,675 cf	Total Available Storage

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
330.00	65,195	0	0
335.60	94,290	446,558	446,558

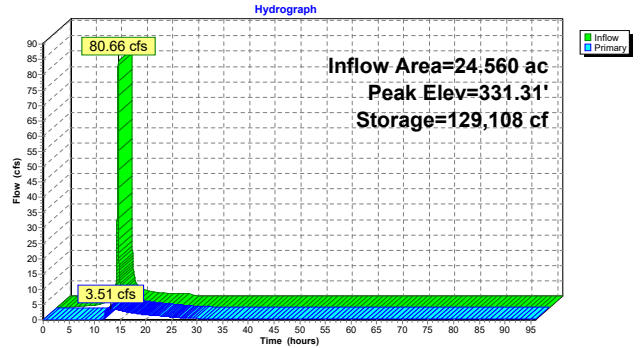
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
327.50	65,195	0	0
328.50	65,195	65,195	65,195

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	42.0000" Round Culvert L= 45.6' Ke= 0.500 Inlet / Outlet Invert= 328.50' / 323.00' S= 0.0768 ' C= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	328.50'	2.2813" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	333.50'	72.0000" x 72.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	330.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 1.37 1.37

Primary OutFlow Max=3.51 cfs @ 13.17 hrs HW=331.31' TW=328.50' (Fixed TW Elev= 328.50')
1=Culvert (Passes 3.51 cfs of 77.68 cfs potential flow)
2=MRC Orifice (Orifice Controls 0.23 cfs @ 7.94 fps)
3=Grate (Controls 0.00 cfs)
4=Weir (Weir Controls 3.28 cfs @ 2.95 fps)

Pond 2P: ABVG. MRC Basin 2



Summary for Pond 3P: ABVG. MRC Basin 3

Inflow Area = 15.440 ac, 62.56% Impervious, Inflow Depth = 1.78" for 2 Year event
Inflow = 41.14 cfs @ 11.97 hrs, Volume= 2.287 af
Outflow = 1.09 cfs @ 14.58 hrs, Volume= 1.637 af, Atten= 97%, Lag= 156.8 min
Primary = 1.09 cfs @ 14.58 hrs, Volume= 1.637 af
Routed to Link 7L : POI #3 (Northeast)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 330.76' @ 14.58 hrs Surf.Area= 157,156 sf Storage= 71,002 cf

Plug-Flow detention time= 1,329.6 min calculated for 1.637 af (72% of inflow)
Center-of-Mass det. time= 1,229.6 min (1,996.2 - 766.6)

Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	384,915 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	7,695 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	23,085 cf	51,300 cf Overall x 15.0% Voids MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
		76,950 cf Overall x 30.0% Voids	
		415,695 cf	Total Available Storage

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
330.00	51,300	0	0
336.00	77,005	384,915	384,915

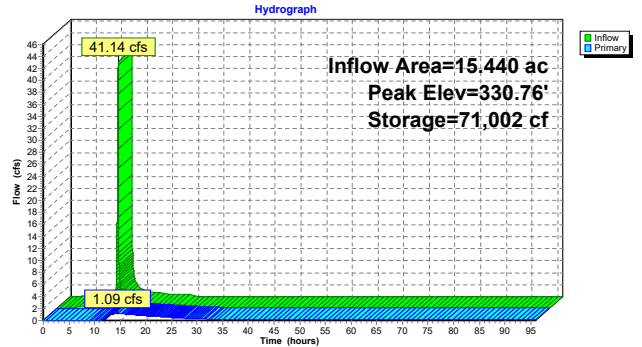
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
327.50	51,300	0	0
328.50	51,300	51,300	51,300

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Device	Routing	Invert	Outlet Devices
#1	Primary	327.50'	36.0000" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 323.50' S= 0.0412 ' C= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	328.50'	1.6875" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	330.25'	12.0000" Vert. Main Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	333.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	332.00'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 3.00 3.00

Primary OutFlow Max=1.09 cfs @ 14.58 hrs HW=330.76' TW=328.00' (Fixed TW Elev= 328.00')
1=Culvert (Passes 1.09 cfs of 45.15 cfs potential flow)
2=MRC Orifice (Orifice Controls 0.11 cfs @ 7.12 fps)
3=Main Orifice (Orifice Controls 0.98 cfs @ 2.43 fps)
4=Grate (Controls 0.00 cfs)
5=Weir (Controls 0.00 cfs)

Pond 3P: ABVG. MRC Basin 3

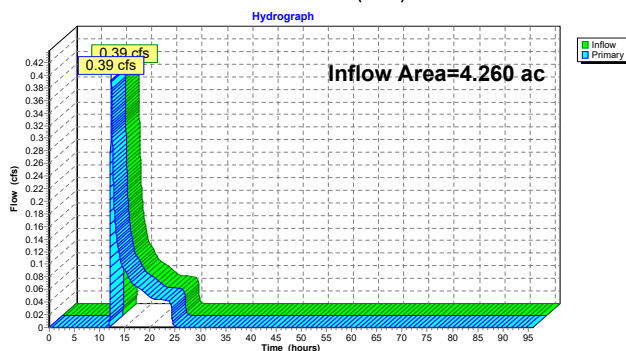


Summary for Link 5L: POI #1 (West)

Inflow Area = 4.260 ac, 0.00% Impervious, Inflow Depth = 0.24" for 2 Year event
 Inflow = 0.39 cfs @ 12.31 hrs, Volume= 0.084 af
 Primary = 0.39 cfs @ 12.31 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: POI #1 (West)

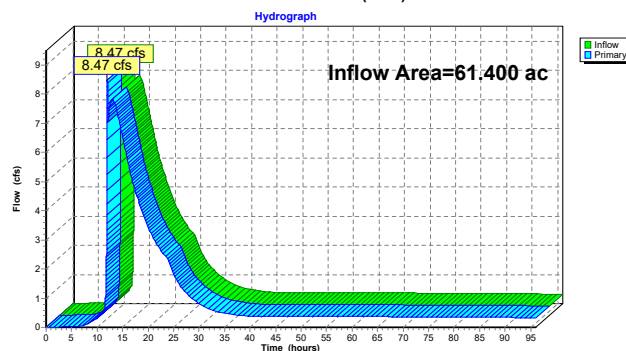


Summary for Link 6L: POI #2 (East)

Inflow Area = 61.400 ac, 65.85% Impervious, Inflow Depth > 1.51" for 2 Year event
 Inflow = 8.47 cfs @ 12.02 hrs, Volume= 7.710 af
 Primary = 8.47 cfs @ 12.02 hrs, Volume= 7.710 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 6L: POI #2 (East)

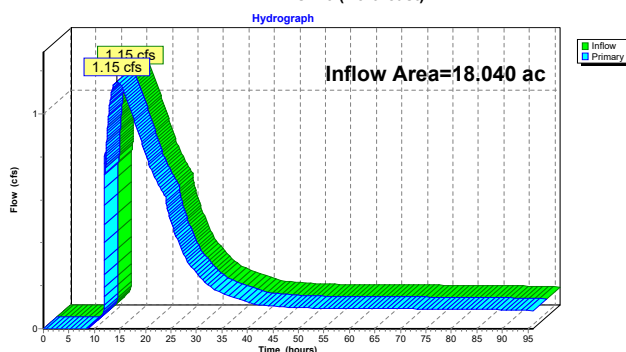


Summary for Link 7L: POI #3 (Northeast)

Inflow Area = 18.040 ac, 53.55% Impervious, Inflow Depth > 1.12" for 2 Year event
 Inflow = 1.15 cfs @ 14.46 hrs, Volume= 1.688 af
 Primary = 1.15 cfs @ 14.46 hrs, Volume= 1.688 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7L: POI #3 (Northeast)

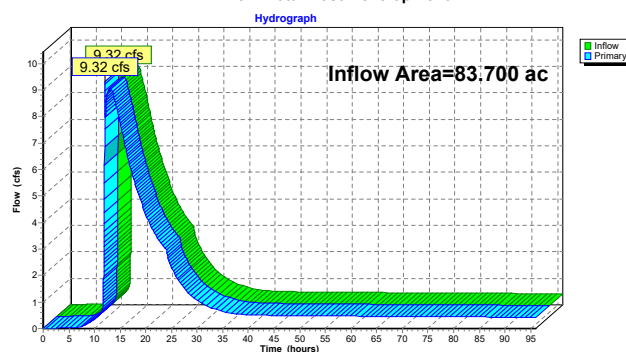


Summary for Link 8L: Total Post-Development

Inflow Area = 83.700 ac, 59.84% Impervious, Inflow Depth > 1.36" for 2 Year event
 Inflow = 9.32 cfs @ 12.02 hrs, Volume= 9.482 af
 Primary = 9.32 cfs @ 12.02 hrs, Volume= 9.482 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 8L: Total Post-Development



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 7S: Bypass Area (POI#1)	Runoff Area=4.260 ac 0.00% Impervious Runoff Depth=0.49" Tc=24.8 min CN=58 Runoff=1.31 cfs 0.175 af
Subcatchment 8S: Roof Area to Basin #1	Runoff Area=9.340 ac 100.00% Impervious Runoff Depth=3.37" Tc=6.0 min CN=98 Runoff=47.64 cfs 2.620 af
Subcatchment 9S: Drainage Area to	Runoff Area=17.900 ac 59.50% Impervious Runoff Depth=2.25" Tc=6.0 min CN=WQ Runoff=60.94 cfs 3.361 af
Subcatchment 10S: Roof Area to Basin #2	Runoff Area=12.000 ac 100.00% Impervious Runoff Depth=3.37" Tc=6.0 min CN=98 Runoff=61.21 cfs 3.366 af
Subcatchment 11S: Drainage Area to	Runoff Area=12.560 ac 59.32% Impervious Runoff Depth=2.25" Tc=6.0 min CN=WQ Runoff=42.66 cfs 2.353 af
Subcatchment 12S: Bypass Area 'A' (POI#2)	Runoff Area=3.080 ac 0.00% Impervious Runoff Depth=0.49" Tc=6.0 min CN=58 Runoff=2.14 cfs 0.127 af
Subcatchment 13S: Bypass Area 'B'	Runoff Area=6.520 ac 15.18% Impervious Runoff Depth=0.93" Tc=6.0 min CN=WQ Runoff=8.69 cfs 0.505 af
Subcatchment 14S: Drainage Area to	Runoff Area=15.440 ac 62.56% Impervious Runoff Depth=2.34" Tc=6.0 min CN=WQ Runoff=54.54 cfs 3.008 af
Subcatchment 15S: Bypass Area (POI#3)	Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=0.49" Tc=6.0 min CN=58 Runoff=1.81 cfs 0.107 af
Pond 1P: ABVG. MRC Basin 1	Peak Elev=339.65' Storage=164,174 cf Inflow=108.55 cfs 5.981 af Outflow=7.29 cfs 5.096 af
Pond 2P: ABVG. MRC Basin 2	Peak Elev=331.73' Storage=159,638 cf Inflow=103.85 cfs 5.719 af Outflow=6.36 cfs 4.861 af
Pond 3P: ABVG. MRC Basin 3	Peak Elev=331.05' Storage=87,229 cf Inflow=54.54 cfs 3.008 af Outflow=2.18 cfs 2.346 af
Link 5L: POI #1 (West)	Inflow=1.31 cfs 0.175 af Primary=1.31 cfs 0.175 af
Link 6L: POI #2 (East)	Inflow=18.28 cfs 10.589 af Primary=18.28 cfs 10.589 af
Link 7L: POI #3 (Northeast)	Inflow=2.68 cfs 2.453 af Primary=2.68 cfs 2.453 af
Link 8L: Total Post-Development	Inflow=21.24 cfs 13.217 af Primary=21.24 cfs 13.217 af

Total Runoff Area = 83.700 ac Runoff Volume = 15.621 af Average Runoff Depth = 2.24"
40.16% Pervious = 33.610 ac 59.84% Impervious = 50.090 ac

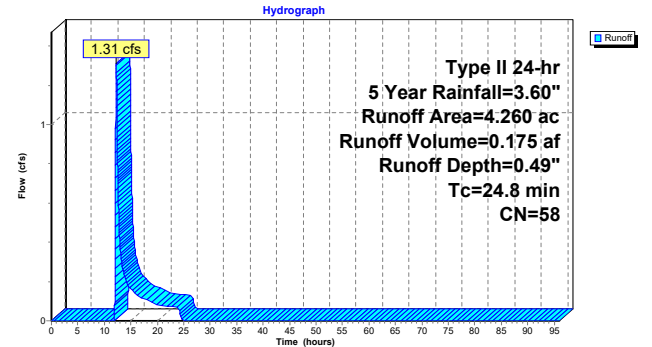
Summary for Subcatchment 7S: Bypass Area (POI#1)

Runoff = 1.31 cfs @ 12.26 hrs, Volume= 0.175 af, Depth= 0.49"
Routed to Link 5L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description			
* 4.260	58	Meadow Seed Mix			
4.260		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 7S: Bypass Area (POI#1)



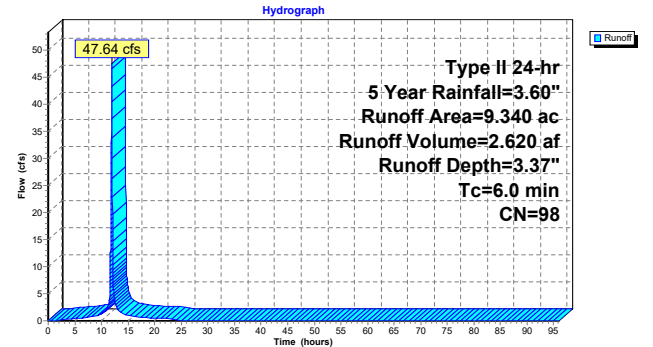
Summary for Subcatchment 8S: Roof Area to Basin #1

Runoff = 47.64 cfs @ 11.97 hrs, Volume= 2.620 af, Depth= 3.37"
Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description			
* 9.340	98	Roof Area			
9.340		100.00% Impervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 8S: Roof Area to Basin #1



Summary for Subcatchment 9S: Drainage Area to Abvg.Basin #1

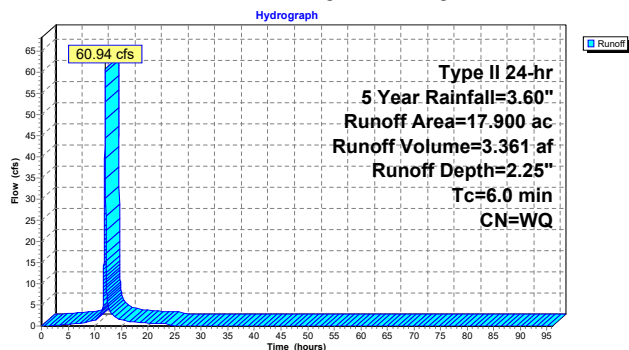
Runoff = 60.94 cfs @ 11.97 hrs, Volume= 3.361 af, Depth= 2.25"
 Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 7.250	61	Grass Cover
* 10.650	98	Impervious Area
17.900		Weighted Average
7.250		40.50% Pervious Area
10.650		59.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 9S: Drainage Area to Abvg.Basin #1



Summary for Subcatchment 10S: Roof Area to Basin #2

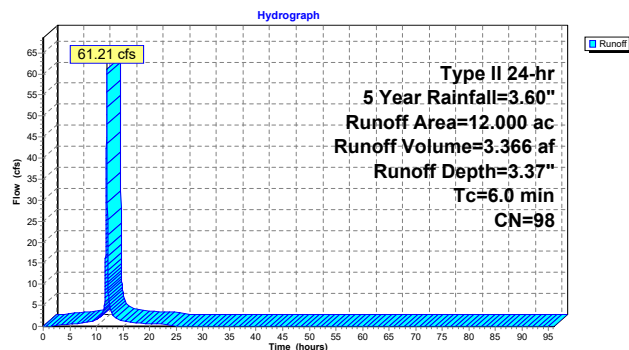
Runoff = 61.21 cfs @ 11.97 hrs, Volume= 3.366 af, Depth= 3.37"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 12.000	98	Roof Area
12.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 10S: Roof Area to Basin #2



Summary for Subcatchment 11S: Drainage Area to Basin #2

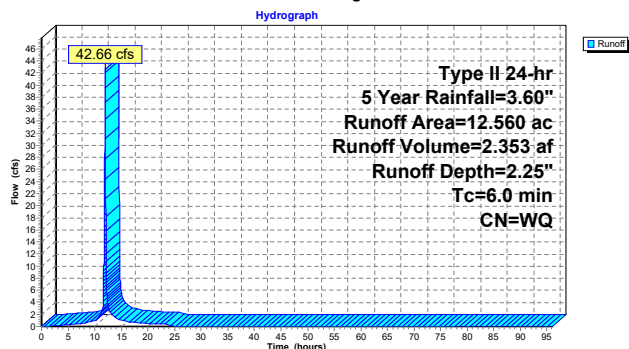
Runoff = 42.66 cfs @ 11.97 hrs, Volume= 2.353 af, Depth= 2.25"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 5.110	61	Grass Cover
* 7.450	98	Impervious Area
12.560		Weighted Average
5.110		40.68% Pervious Area
7.450		59.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 11S: Drainage Area to Basin #2



Summary for Subcatchment 12S: Bypass Area 'A' (POI#2)

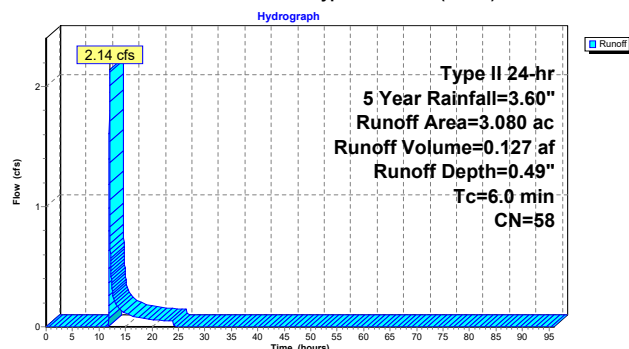
Runoff = 2.14 cfs @ 12.00 hrs, Volume= 0.127 af, Depth= 0.49"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 3.080	58	Meadow Seed Mix
3.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 12S: Bypass Area 'A' (POI#2)



Summary for Subcatchment 13S: Bypass Area 'B' (POI#2)

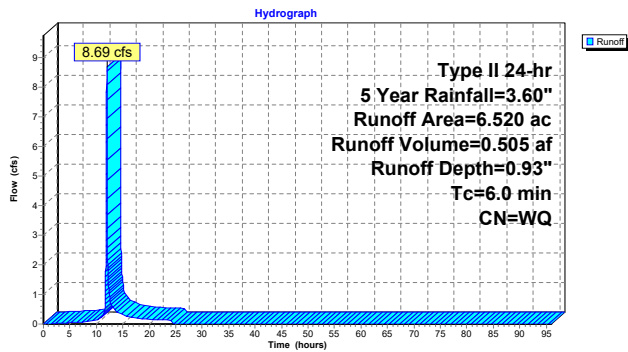
Runoff = 8.69 cfs @ 11.98 hrs, Volume= 0.505 af, Depth= 0.93"
Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 5.530	58	Meadow Seed Mix
* 0.990	98	Impervious
6.520		Weighted Average
5.530		84.82% Pervious Area
0.990		15.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 13S: Bypass Area 'B' (POI#2)



Summary for Subcatchment 14S: Drainage Area to Abvg Basin #3

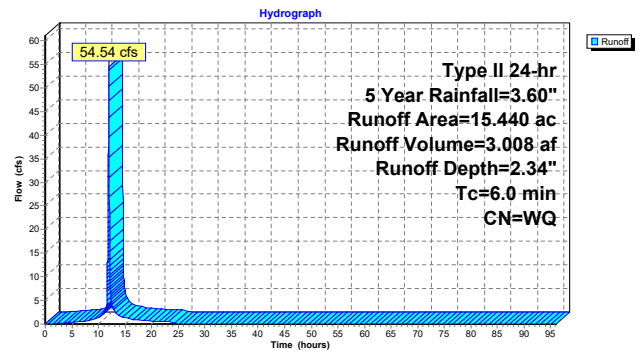
Runoff = 54.54 cfs @ 11.97 hrs, Volume= 3.008 af, Depth= 2.34"
Routed to Pond 3P : ABVG. MRC Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 5.780	61	Grass Cover
* 9.660	98	Impervious
15.440		Weighted Average
5.780		37.44% Pervious Area
9.660		62.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 14S: Drainage Area to Abvg Basin #3



Summary for Subcatchment 15S: Bypass Area (POI#3)

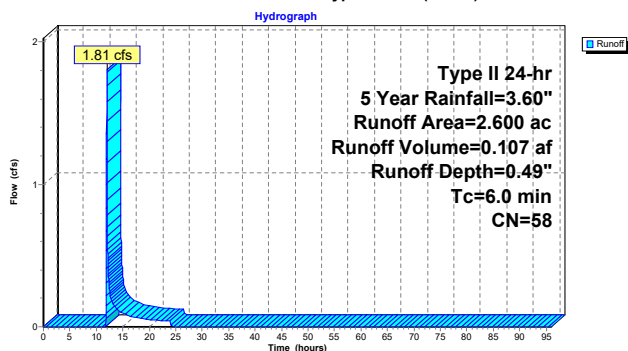
Runoff = 1.81 cfs @ 12.00 hrs, Volume= 0.107 af, Depth= 0.49"
Routed to Link 7L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5 Year Rainfall=3.60"

Area (ac)	CN	Description
* 2.600	58	Meadow Seed Mix
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 15S: Bypass Area (POI#3)



Summary for Pond 1P: ABVG. MRC Basin 1

Inflow Area = 27.240 ac, 73.38% Impervious, Inflow Depth = 2.63" for 5 Year event
Inflow = 108.55 cfs @ 11.97 hrs, Volume= 5.981 af
Outflow = 7.29 cfs @ 12.59 hrs, Volume= 5.096 af, Atten= 93%, Lag= 37.2 min
Primary = 7.29 cfs @ 12.59 hrs, Volume= 5.096 af
Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 339.65' @ 12.59 hrs Surf.Area= 218,419 sf Storage= 164,174 cf

Plug-Flow detention time= 897.1 min calculated for 5.096 af (85% of inflow)
Center-of-Mass det. time= 827.4 min (1,586.8 - 759.3)

Volume	Invert	Avail. Storage	Storage Description
#1	338.00'	366,705 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	335.50'	10,501 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	336.50'	31,502 cf	70,005 cf Overall x 15.0% Voids MRC Soil (30% Voids) (Prismatic) Listed below (Recalc) 105,008 cf Overall x 30.0% Voids
408,708 cf Total Available Storage			

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
338.00	70,005	0	0
342.50	92,975	366,705	366,705

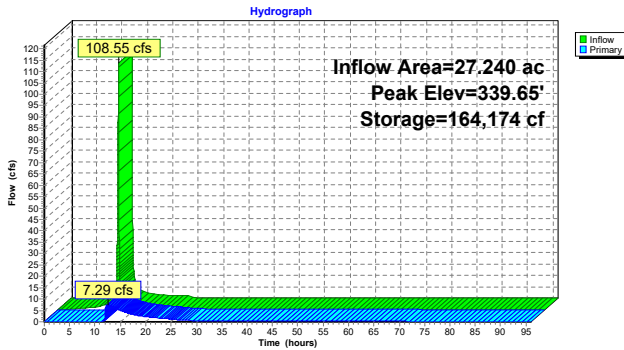
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
335.50	70,005	0	0
336.50	70,005	70,005	70,005

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
336.50	70,005	0	0
338.00	70,005	105,008	105,008

Device	Routing	Invert	Outlet Devices
#1	Primary	336.50'	30.0000" Round Culvert L= 219.3' Ke= 0.500 Inlet / Outlet Invert= 336.50' / 333.83' S= 0.0122 1' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	336.50'	2.3750" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	338.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.50 Width (feet) 1.75 1.75
#4	Device 1	341.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.29 cfs @ 12.59 hrs HW=339.65' (Free Discharge)
1=Culvert (Passes 7.29 cfs of 32.55 cfs potential flow)
2=MRC Orifice (Orifice Controls 0.26 cfs @ 8.41 fps)
3=Weir (Weir Controls 7.03 cfs @ 3.51 fps)
4=Grate (Controls 0.00 cfs)

Pond 1P: ABVG. MRC Basin 1



Summary for Pond 2P: ABVG. MRC Basin 2

Inflow Area = 24.560 ac, 79.19% Impervious, Inflow Depth = 2.79" for 5 Year event
Inflow = 103.85 cfs @ 11.97 hrs, Volume= 5,719 af
Outflow = 6.36 cfs @ 12.67 hrs, Volume= 4,861 af, Atten= 94%, Lag= 42.1 min
Primary = 6.36 cfs @ 12.67 hrs, Volume= 4,861 af
Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 331.73' @ 12.67 hrs Surf.Area= 204,570 sf Storage= 159,638 cf

Plug-Flow detention time= 904.4 min calculated for 4,861 af (85% of inflow)
Center-of-Mass det. time= 834.5 min (1,591.4 - 756.9)

Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	446,558 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	9,779 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	29,338 cf	MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			97,793 cf Overall x 30.0% Voids
			485,675 cf Total Available Storage

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
330.00	65,195	0	0
335.60	94,290	446,558	446,558

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
327.50	65,195	0	0
328.50	65,195	65,195	65,195

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

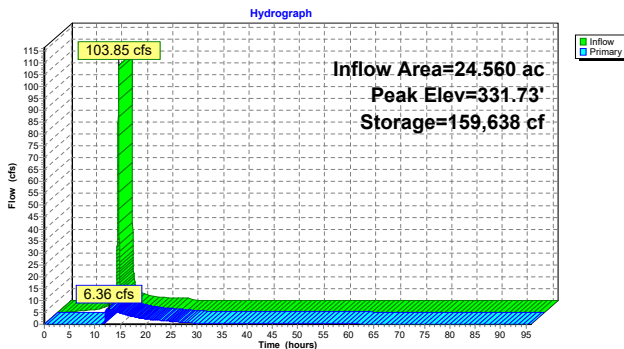
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	42.0000" Round Culvert L= 45.6' Ke= 0.500 Inlet / Outlet Invert= 326.50' / 323.00' S= 0.0768 'f' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	328.50'	2.2813" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	333.50'	72.0000" x 72.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	330.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 1.37 1.37

Primary OutFlow Max=6.36 cfs @ 12.67 hrs HW=331.73' TW=328.50' (Fixed TW Elev= 328.50')
1=Culvert (Passes 6.36 cfs of 83.25 cfs potential flow)
2=MRC Orifice (Orifice Controls 0.24 cfs @ 8.52 fps)
3=Grate (Controls 0.00 cfs)
4=Weir (Weir Controls 6.12 cfs @ 3.63 fps)

Pond 2P: ABVG. MRC Basin 2



Summary for Pond 3P: ABVG. MRC Basin 3

Inflow Area = 15.440 ac, 62.56% Impervious, Inflow Depth = 2.34" for 5 Year event
Inflow = 54.54 cfs @ 11.97 hrs, Volume= 3,008 af
Outflow = 2.18 cfs @ 13.43 hrs, Volume= 2,346 af, Atten= 96%, Lag= 87.6 min
Primary = 2.18 cfs @ 13.43 hrs, Volume= 2,346 af
Routed to Link 7L : POI #3 (Northeast)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 331.05' @ 13.43 hrs Surf.Area= 158,415 sf Storage= 87,229 cf

Plug-Flow detention time= 1,039.8 min calculated for 2,346 af (78% of inflow)
Center-of-Mass det. time= 951.1 min (1,715.9 - 764.8)

Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	384,915 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	7,695 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	23,085 cf	MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			76,950 cf Overall x 30.0% Voids
			415,695 cf Total Available Storage

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
330.00	51,300	0	0
336.00	77,005	384,915	384,915

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
327.50	51,300	0	0
328.50	51,300	51,300	51,300

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

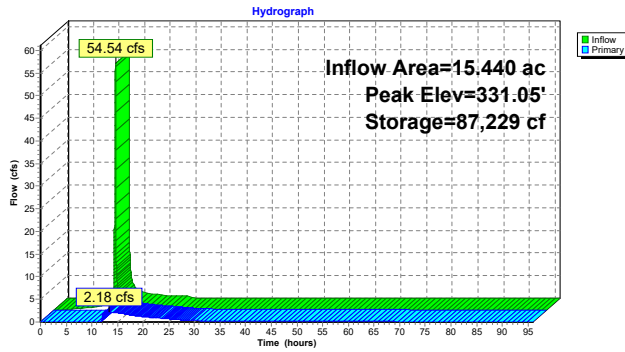
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Device	Routing	Invert	Outlet Devices
#1	Primary	327.50'	36.0000" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 323.50' S= 0.0412 'f' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	328.50'	1.6875" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	330.25'	12.0000" Vert. Main Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	333.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	332.00'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 3.00 3.00

Primary OutFlow Max=2.18 cfs @ 13.43 hrs HW=331.05' TW=328.00' (Fixed TW Elev= 328.00')
 1=Culvert (Passes 2.18 cfs of 48.78 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.12 cfs @ 7.59 fps)
 3=Main Orifice (Orifice Controls 2.07 cfs @ 3.05 fps)
 4=Grate (Controls 0.00 cfs)
 5=Weir (Controls 0.00 cfs)

Pond 3P: ABVG. MRC Basin 3

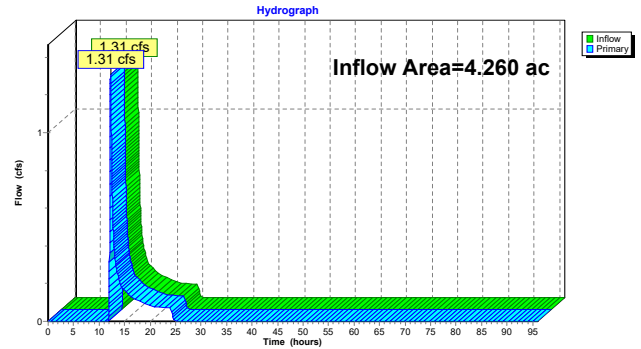


Summary for Link 5L: POI #1 (West)

Inflow Area = 4.260 ac, 0.00% Impervious, Inflow Depth = 0.49" for 5 Year event
 Inflow = 1.31 cfs @ 12.26 hrs, Volume= 0.175 af
 Primary = 1.31 cfs @ 12.26 hrs, Volume= 0.175 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: POI #1 (West)

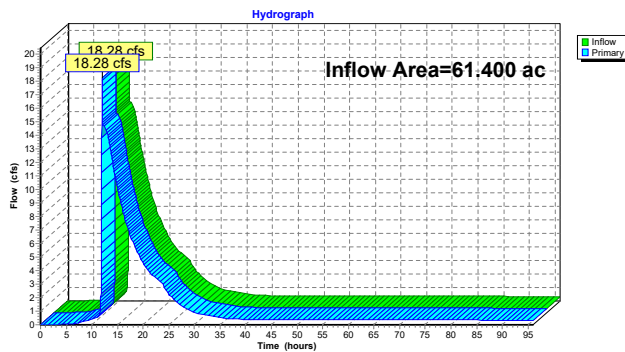


Summary for Link 6L: POI #2 (East)

Inflow Area = 61.400 ac, 65.85% Impervious, Inflow Depth > 2.07" for 5 Year event
 Inflow = 18.28 cfs @ 12.01 hrs, Volume= 10.589 af
 Primary = 18.28 cfs @ 12.01 hrs, Volume= 10.589 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 6L: POI #2 (East)

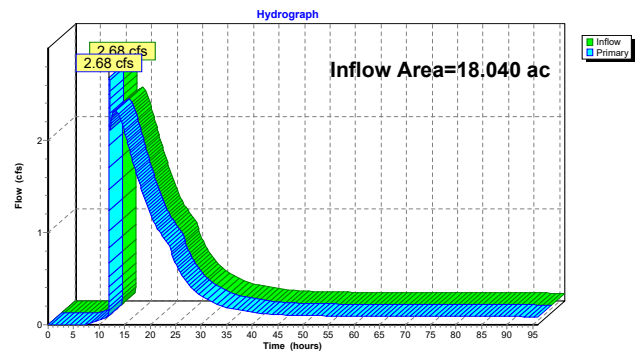


Summary for Link 7L: POI #3 (Northeast)

Inflow Area = 18.040 ac, 53.55% Impervious, Inflow Depth > 1.63" for 5 Year event
 Inflow = 2.68 cfs @ 12.02 hrs, Volume= 2.453 af
 Primary = 2.68 cfs @ 12.02 hrs, Volume= 2.453 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

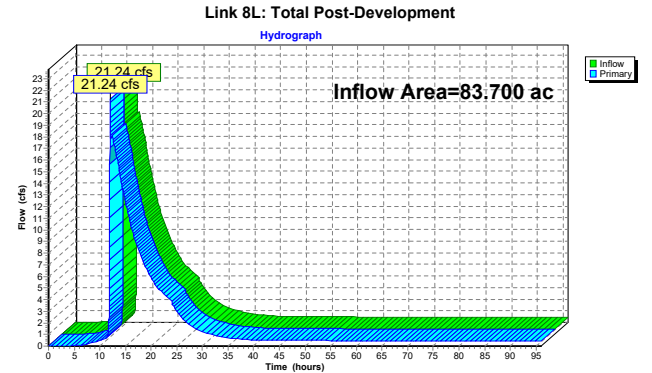
Link 7L: POI #3 (Northeast)



Summary for Link 8L: Total Post-Development

Inflow Area = 83.700 ac, 59.84% Impervious, Inflow Depth > 1.89" for 5 Year event
Inflow = 21.24 cfs @ 12.02 hrs, Volume= 13.217 af
Primary = 21.24 cfs @ 12.02 hrs, Volume= 13.217 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 7S: Bypass Area (POI#1) Runoff Area=4.260 ac 0.00% Impervious Runoff Depth=0.94"
Tc=24.8 min CN=58 Runoff=3.15 cfs 0.332 af

Subcatchment 8S: Roof Area to Basin #1 Runoff Area=9.340 ac 100.00% Impervious Runoff Depth=4.32"
Tc=6.0 min CN=98 Runoff=60.56 cfs 3.365 af

Subcatchment 9S: Drainage Area to Runoff Area=17.900 ac 59.50% Impervious Runoff Depth=3.02"
Tc=6.0 min CN=WQ Runoff=82.53 cfs 4.510 af

Subcatchment 10S: Roof Area to Basin #2 Runoff Area=12.000 ac 100.00% Impervious Runoff Depth=4.32"
Tc=6.0 min CN=98 Runoff=77.81 cfs 4.324 af

Subcatchment 11S: Drainage Area to Runoff Area=12.560 ac 59.32% Impervious Runoff Depth=3.02"
Tc=6.0 min CN=WQ Runoff=57.80 cfs 3.158 af

Subcatchment 12S: Bypass Area 'A' (POI#2) Runoff Area=3.080 ac 0.00% Impervious Runoff Depth=0.94"
Tc=6.0 min CN=58 Runoff=4.75 cfs 0.240 af

Subcatchment 13S: Bypass Area 'B' Runoff Area=6.520 ac 15.18% Impervious Runoff Depth=1.45"
Tc=6.0 min CN=WQ Runoff=14.80 cfs 0.788 af

Subcatchment 14S: Drainage Area to Runoff Area=15.440 ac 62.56% Impervious Runoff Depth=3.12"
Tc=6.0 min CN=WQ Runoff=73.37 cfs 4.017 af

Subcatchment 15S: Bypass Area (POI#3) Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=0.94"
Tc=6.0 min CN=58 Runoff=4.01 cfs 0.203 af

Pond 1P: ABVG. MRC Basin 1 Peak Elev=340.20' Storage=208,160 cf Inflow=143.05 cfs 7.875 af
Outflow=12.96 cfs 6.978 af

Pond 2P: ABVG. MRC Basin 2 Peak Elev=332.29' Storage=202,031 cf Inflow=135.58 cfs 7.482 af
Outflow=11.01 cfs 6.611 af

Pond 3P: ABVG. MRC Basin 3 Peak Elev=331.51' Storage=112,988 cf Inflow=73.37 cfs 4.017 af
Outflow=3.42 cfs 3.344 af

Link 5L: POI #1 (West) Inflow=3.15 cfs 0.332 af
Primary=3.15 cfs 0.332 af

Link 6L: POI #2 (East) Inflow=34.78 cfs 14.617 af
Primary=34.78 cfs 14.617 af

Link 7L: POI #3 (Northeast) Inflow=6.16 cfs 3.546 af
Primary=6.16 cfs 3.546 af

Link 8L: Total Post-Development Inflow=41.98 cfs 18.495 af
Primary=41.98 cfs 18.495 af

Total Runoff Area = 83.700 ac Runoff Volume = 20.937 af Average Runoff Depth = 3.00"
40.16% Pervious = 33.610 ac 59.84% Impervious = 50.090 ac

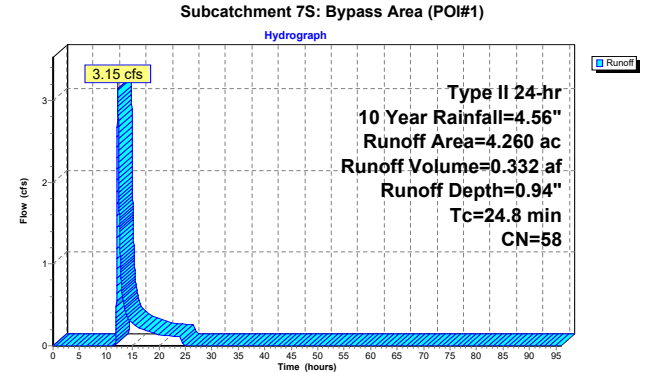
Summary for Subcatchment 7S: Bypass Area (POI#1)

Runoff = 3.15 cfs @ 12.21 hrs, Volume= 0.332 af, Depth= 0.94"
Routed to Link 5L: POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
4.260	58	Meadow Seed Mix
4.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,



Summary for Subcatchment 8S: Roof Area to Basin #1

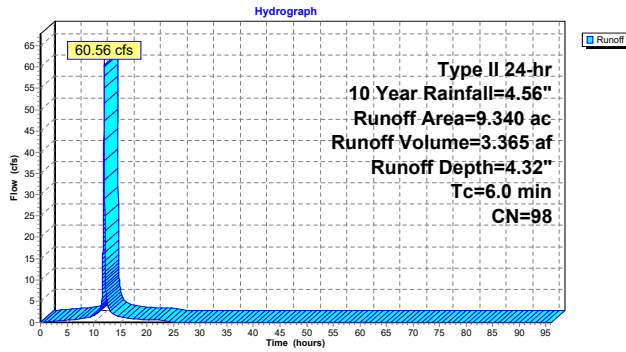
Runoff = 60.56 cfs @ 11.97 hrs, Volume= 3.365 af, Depth= 4.32"
 Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 9.340	98	Roof Area
9.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 8S: Roof Area to Basin #1



Summary for Subcatchment 9S: Drainage Area to Abvg.Basin #1

Runoff = 82.53 cfs @ 11.97 hrs, Volume= 4.510 af, Depth= 3.02"
 Routed to Pond 1P : ABVG. MRC Basin 1

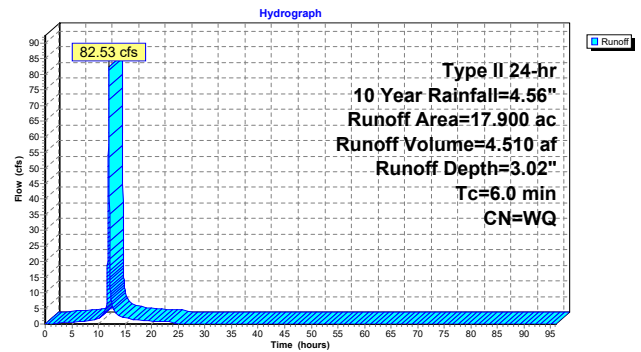
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 7.250	61	Grass Cover
* 10.650	98	Impervious Area

17.900		Weighted Average
7.250		40.50% Pervious Area
10.650		59.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 9S: Drainage Area to Abvg.Basin #1



Summary for Subcatchment 10S: Roof Area to Basin #2

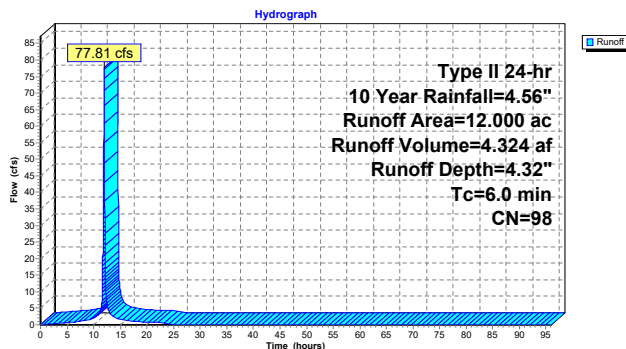
Runoff = 77.81 cfs @ 11.97 hrs, Volume= 4.324 af, Depth= 4.32"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 12.000	98	Roof Area
12.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 10S: Roof Area to Basin #2



Summary for Subcatchment 11S: Drainage Area to Basin #2

Runoff = 57.80 cfs @ 11.97 hrs, Volume= 3.158 af, Depth= 3.02"
 Routed to Pond 2P : ABVG. MRC Basin 2

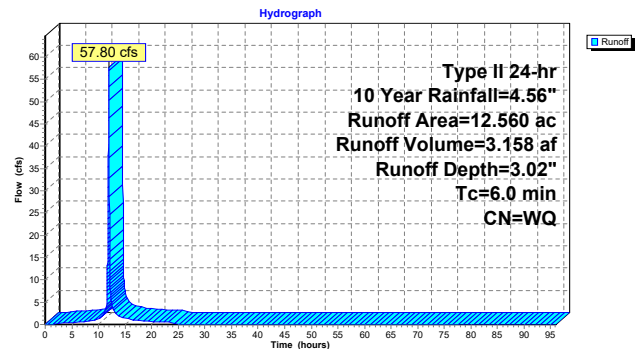
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 5.110	61	Grass Cover
* 7.450	98	Impervious Area

12.560		Weighted Average
5.110		40.68% Pervious Area
7.450		59.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 11S: Drainage Area to Basin #2



Summary for Subcatchment 12S: Bypass Area 'A' (POI#2)

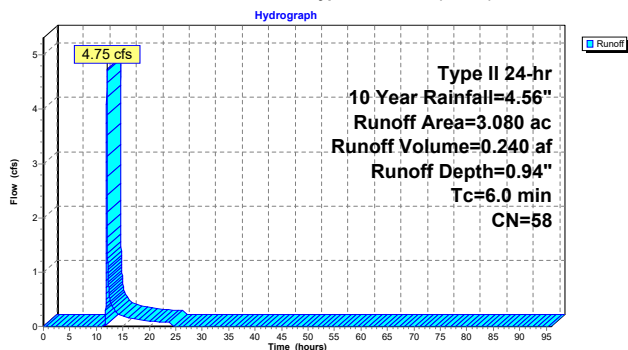
Runoff = 4.75 cfs @ 11.99 hrs, Volume= 0.240 af, Depth= 0.94"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 3.080	58	Meadow Seed Mix
3.080		100.00% Pervious Area

Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					Direct Entry,

Subcatchment 12S: Bypass Area 'A' (POI#2)



Summary for Subcatchment 13S: Bypass Area 'B' (POI#2)

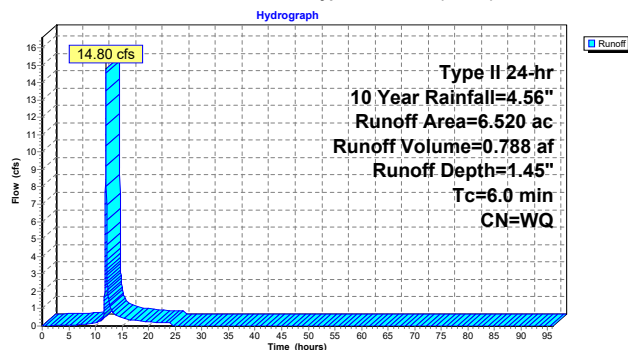
Runoff = 14.80 cfs @ 11.98 hrs, Volume= 0.788 af, Depth= 1.45"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 5.530	58	Meadow Seed Mix
* 0.990	98	Impervious
6.520		Weighted Average
5.530		84.82% Pervious Area
0.990		15.18% Impervious Area

Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					Direct Entry,

Subcatchment 13S: Bypass Area 'B' (POI#2)



Summary for Subcatchment 14S: Drainage Area to Abvg Basin #3

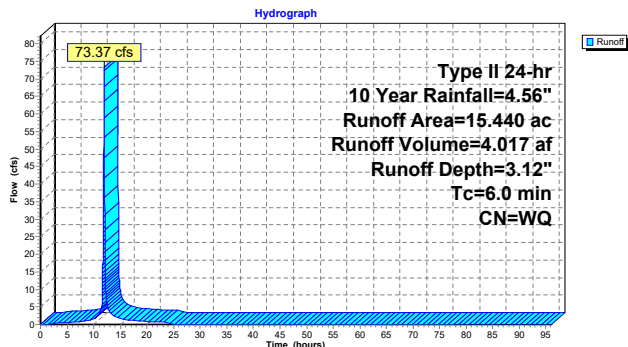
Runoff = 73.37 cfs @ 11.97 hrs, Volume= 4.017 af, Depth= 3.12"
 Routed to Pond 3P : ABVG. MRC Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 5.780	61	Grass Cover
* 9.660	98	Impervious
15.440		Weighted Average
5.780		37.44% Pervious Area
9.660		62.56% Impervious Area

Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					Direct Entry,

Subcatchment 14S: Drainage Area to Abvg Basin #3



Summary for Subcatchment 15S: Bypass Area (POI#3)

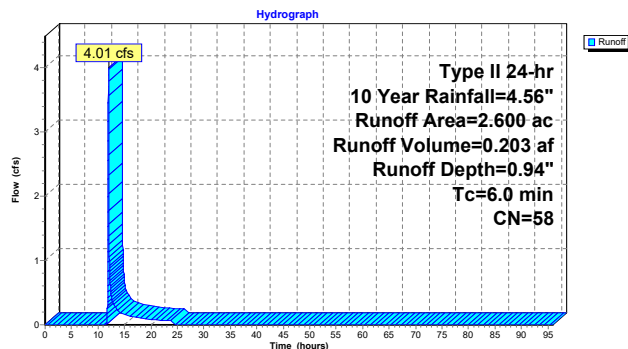
Runoff = 4.01 cfs @ 11.99 hrs, Volume= 0.203 af, Depth= 0.94"
 Routed to Link 7L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10 Year Rainfall=4.56"

Area (ac)	CN	Description
* 2.600	58	Meadow Seed Mix
2.600		100.00% Pervious Area

Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					Direct Entry,

Subcatchment 15S: Bypass Area (POI#3)



Summary for Pond 1P: ABVG. MRC Basin 1

Inflow Area = 27.240 ac, 73.38% Impervious, Inflow Depth = 3.47" for 10 Year event
 Inflow = 143.05 cfs @ 11.97 hrs, Volume= 7.875 af
 Outflow = 12.96 cfs @ 12.44 hrs, Volume= 6.978 af, Atten= 91%, Lag= 28.0 min
 Primary = 12.96 cfs @ 12.44 hrs, Volume= 6.978 af
 Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 340.20' @ 12.44 hrs Surf.Area= 221,232 sf Storage= 208,160 cf

Plug-Flow detention time= 716.7 min calculated for 6.977 af (89% of inflow)
 Center-of-Mass det. time= 658.6 min (1,415.3 - 756.7)

Volume	Invert	Avail. Storage	Storage Description
#1	338.00'	366,705 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	335.50'	10,501 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	336.50'	31,502 cf	MRC Soil (30% Voids) (Prismatic) Listed below (Recalc)
		105,008 cf Overall x 30.0% Voids	
		408,708 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
338.00	70,005	0	0
342.50	92,975	366,705	366,705

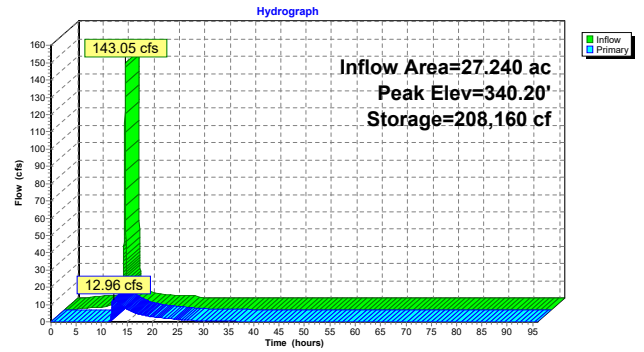
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
335.50	70,005	0	0
336.50	70,005	70,005	70,005

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
336.50	70,005	0	0
338.00	70,005	105,008	105,008

Device	Routing	Invert	Outlet Devices
#1	Primary	336.50'	30.0000" Round Culvert L= 219.3' Ke= 0.500 Inlet / Outlet Invert= 336.50' / 333.83' S= 0.0122 ' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	336.50'	2.3750" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	338.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.50 Width (feet) 1.75 1.75
#4	Device 1	341.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=12.96 cfs @ 12.44 hrs HW=340.20' (Free Discharge)
 1=Culvert (Passes 12.96 cfs of 36.98 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.28 cfs @ 9.13 fps)
 3=Weir (Weir Controls 12.67 cfs @ 4.27 fps)
 4=Grate (Controls 0.00 cfs)

Pond 1P: ABVG. MRC Basin 1



Summary for Pond 2P: ABVG. MRC Basin 2

Inflow Area = 24.560 ac, 79.19% Impervious, Inflow Depth = 3.66" for 10 Year event
 Inflow = 135.58 cfs @ 11.97 hrs, Volume= 7.482 af
 Outflow = 11.01 cfs @ 12.49 hrs, Volume= 6.611 af, Atten= 92%, Lag= 31.1 min
 Primary = 11.01 cfs @ 12.49 hrs, Volume= 6.611 af
 Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 332.29' @ 12.49 hrs Surf.Area= 207,482 sf Storage= 202,031 cf

Plug-Flow detention time= 732.7 min calculated for 6.611 af (88% of inflow)
 Center-of-Mass det. time= 673.5 min (1,427.3 - 753.8)

Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	446,558 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	9,779 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	29,338 cf	MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
		97,793 cf Overall x 30.0% Voids	
		485,675 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	65,195	0	0
335.60	94,290	446,558	446,558

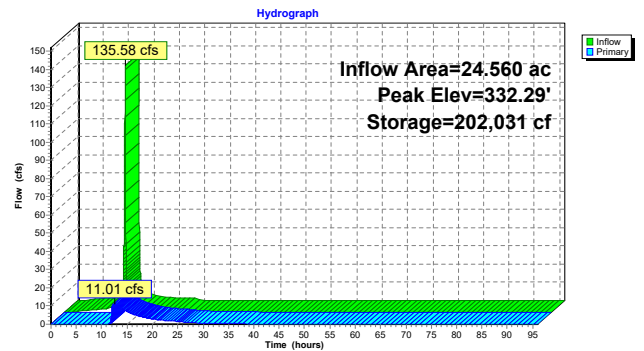
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
327.50	65,195	0	0
328.50	65,195	65,195	65,195

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	42.0000" Round Culvert L= 45.6' Ke= 0.500 Inlet / Outlet Invert= 326.50' / 323.00' S= 0.0768 ' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	328.50'	2.2813" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	333.50'	72.0000" x 72.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	330.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 1.37 1.37

Primary OutFlow Max=11.01 cfs @ 12.49 hrs HW=332.29' TW=328.50' (Fixed TW Elev= 328.50')
 1=Culvert (Passes 11.01 cfs of 90.19 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.26 cfs @ 9.26 fps)
 3=Grate (Controls 0.00 cfs)
 4=Weir (Weir Controls 10.74 cfs @ 4.38 fps)

Pond 2P: ABVG. MRC Basin 2



Summary for Pond 3P: ABVG. MRC Basin 3

Inflow Area = 15,440 ac, 62.56% Impervious, Inflow Depth = 3.12" for 10 Year event
 Inflow = 73.37 cfs @ 11.97 hrs, Volume= 4,017 af
 Outflow = 3.42 cfs @ 13.11 hrs, Volume= 3,344 af, Atten= 95%, Lag= 68.5 min
 Primary = 3.42 cfs @ 13.11 hrs, Volume= 3,344 af
 Routed to Link 7L : POI #3 (Northeast)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 331.51' @ 13.11 hrs Surf.Area= 160,359 sf Storage= 112,988 cf

Plug-Flow detention time= 841.1 min calculated for 3,343 af (83% of inflow)
 Center-of-Mass det. time= 765.1 min (1,528.1 - 763.0)

Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	384,915 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	7,695 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
			51,300 cf Overall x 15.0% Voids
#3	328.50'	23,085 cf	MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			76,950 cf Overall x 30.0% Voids
		415,695 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	51,300	0	0
336.00	77,005	384,915	384,915

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
327.50	51,300	0	0
328.50	51,300	51,300	51,300

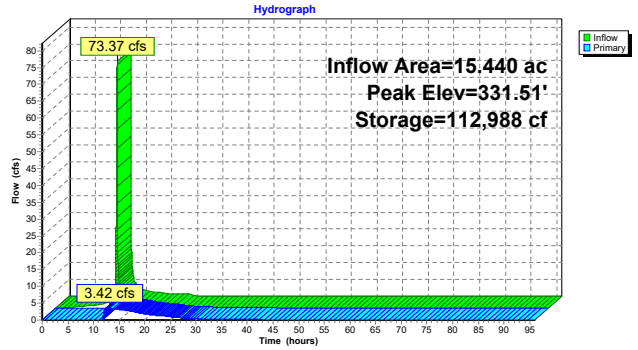
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Device	Routing	Invert	Outlet Devices
#1	Primary	327.50'	36.0000" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 323.50' S= 0.0412 ' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	328.50'	1.6875" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	330.25'	12.0000" Vert. Main Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	333.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	332.00'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 3.00 3.00

Primary OutFlow Max=3.42 cfs @ 13.11 hrs HW=331.51' TW=328.00' (Fixed TW Elev= 328.00')

- 1=Culvert (Passes 3.42 cfs of 53.90 cfs potential flow)
- 2=MRC Orifice (Orifice Controls 0.13 cfs @ 8.25 fps)
- 3=Main Orifice (Orifice Controls 3.29 cfs @ 4.19 fps)
- 4=Grate (Controls 0.00 cfs)
- 5=Weir (Controls 0.00 cfs)

Pond 3P: ABVG. MRC Basin 3

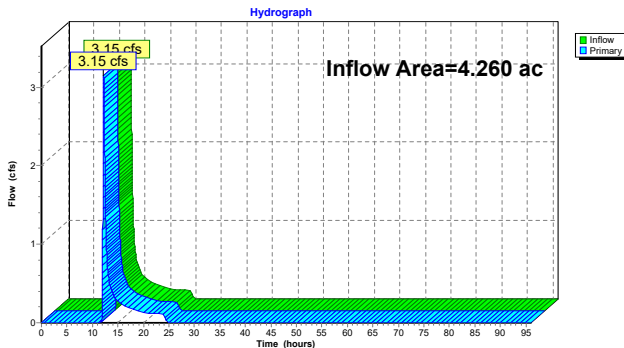


Summary for Link 5L: POI #1 (West)

Inflow Area = 4,260 ac, 0.00% Impervious, Inflow Depth = 0.94" for 10 Year event
 Inflow = 3.15 cfs @ 12.21 hrs, Volume= 0.332 af
 Primary = 3.15 cfs @ 12.21 hrs, Volume= 0.332 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: POI #1 (West)

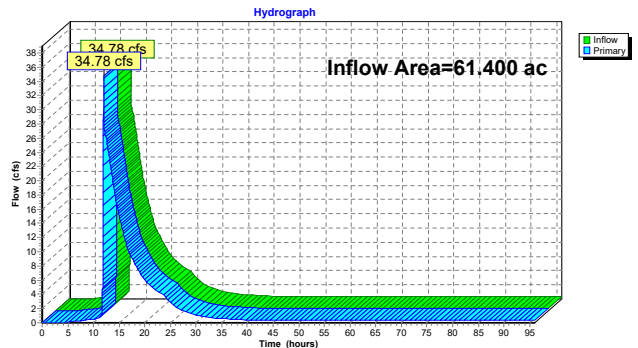


Summary for Link 6L: POI #2 (East)

Inflow Area = 61,400 ac, 65.85% Impervious, Inflow Depth > 2.86" for 10 Year event
 Inflow = 34.78 cfs @ 12.01 hrs, Volume= 14.617 af
 Primary = 34.78 cfs @ 12.01 hrs, Volume= 14.617 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 6L: POI #2 (East)



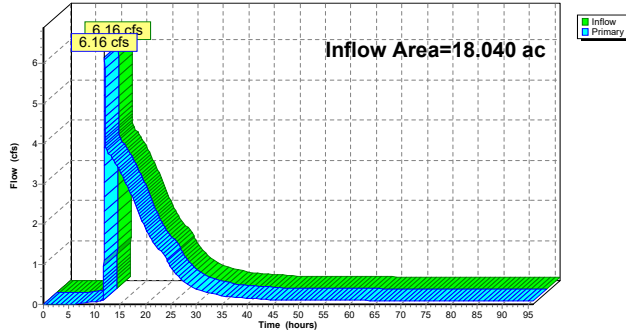
Summary for Link 7L: POI #3 (Northeast)

Inflow Area = 18.040 ac, 53.55% Impervious, Inflow Depth > 2.36" for 10 Year event
Inflow = 6.16 cfs @ 12.00 hrs, Volume= 3.546 af
Primary = 6.16 cfs @ 12.00 hrs, Volume= 3.546 af, Atten= 0%, Lag= 0.0 min
Routed to Link 8L: Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7L: POI #3 (Northeast)

Hydrograph



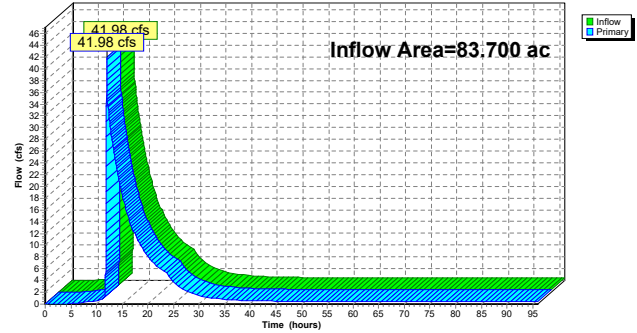
Summary for Link 8L: Total Post-Development

Inflow Area = 83.700 ac, 59.84% Impervious, Inflow Depth > 2.65" for 10 Year event
Inflow = 41.98 cfs @ 12.01 hrs, Volume= 18.495 af
Primary = 41.98 cfs @ 12.01 hrs, Volume= 18.495 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 8L: Total Post-Development

Hydrograph



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 7S: Bypass Area (POI#1) Runoff Area=4.260 ac 0.00% Impervious Runoff Depth=1.61"
Tc=24.8 min CN=58 Runoff=6.08 cfs 0.571 af

Subcatchment 8S: Roof Area to Basin #1 Runoff Area=9.340 ac 100.00% Impervious Runoff Depth=5.52"
Tc=6.0 min CN=98 Runoff=76.67 cfs 4.298 af

Subcatchment 9S: Drainage Area to Runoff Area=17.900 ac 59.50% Impervious Runoff Depth=4.03"
Tc=6.0 min CN=WQ Runoff=110.85 cfs 6.017 af

Subcatchment 10S: Roof Area to Basin #2 Runoff Area=12.000 ac 100.00% Impervious Runoff Depth=5.52"
Tc=6.0 min CN=98 Runoff=98.50 cfs 5.522 af

Subcatchment 11S: Drainage Area to Runoff Area=12.560 ac 59.32% Impervious Runoff Depth=4.03"
Tc=6.0 min CN=WQ Runoff=77.67 cfs 4.215 af

Subcatchment 12S: Bypass Area 'A' (POI#2) Runoff Area=3.080 ac 0.00% Impervious Runoff Depth=1.61"
Tc=6.0 min CN=58 Runoff=8.66 cfs 0.413 af

Subcatchment 13S: Bypass Area 'B' Runoff Area=6.520 ac 15.18% Impervious Runoff Depth=2.20"
Tc=6.0 min CN=WQ Runoff=23.57 cfs 1.197 af

Subcatchment 14S: Drainage Area to Runoff Area=15.440 ac 62.56% Impervious Runoff Depth=4.15"
Tc=6.0 min CN=WQ Runoff=97.97 cfs 5.335 af

Subcatchment 15S: Bypass Area (POI#3) Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=1.61"
Tc=6.0 min CN=58 Runoff=7.31 cfs 0.349 af

Pond 1P: ABVG. MRC Basin 1 Peak Elev=340.87' Storage=263,662 cf Inflow=187.48 cfs 10.315 af
Outflow=21.17 cfs 9.406 af

Pond 2P: ABVG. MRC Basin 2 Peak Elev=332.96' Storage=254,925 cf Inflow=176.14 cfs 9.737 af
Outflow=17.61 cfs 8.854 af

Pond 3P: ABVG. MRC Basin 3 Peak Elev=332.11' Storage=148,507 cf Inflow=97.97 cfs 5.335 af
Outflow=4.92 cfs 4.649 af

Link 5L: POI #1 (West) Inflow=6.08 cfs 0.571 af
Primary=6.08 cfs 0.571 af

Link 6L: POI #2 (East) Inflow=59.03 cfs 19.871 af
Primary=59.03 cfs 19.871 af

Link 7L: POI #3 (Northeast) Inflow=10.67 cfs 4.997 af
Primary=10.67 cfs 4.997 af

Link 8L: Total Post-Development Inflow=72.10 cfs 25.439 af
Primary=72.10 cfs 25.439 af

Total Runoff Area = 83.700 ac Runoff Volume = 27.916 af Average Runoff Depth = 4.00"
40.16% Pervious = 33.610 ac 59.84% Impervious = 50.090 ac

Summary for Subcatchment 7S: Bypass Area (POI#1)

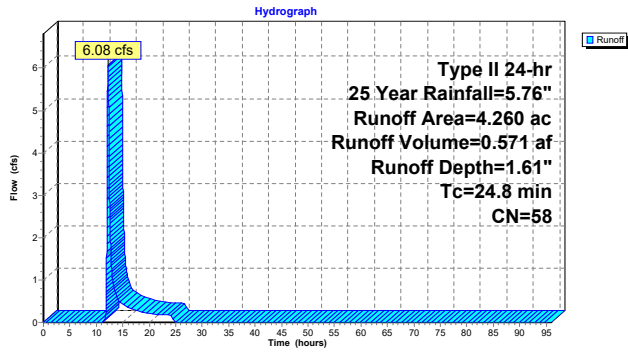
Runoff = 6.08 cfs @ 12.21 hrs, Volume= 0.571 af, Depth= 1.61"
 Routed to Link 5L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 4.260	58	Meadow Seed Mix
4.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 7S: Bypass Area (POI#1)



Summary for Subcatchment 8S: Roof Area to Basin #1

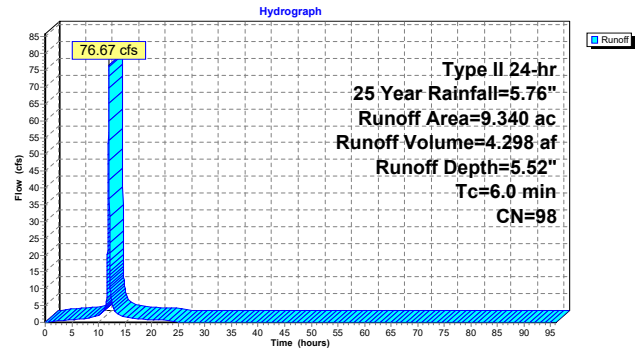
Runoff = 76.67 cfs @ 11.97 hrs, Volume= 4.298 af, Depth= 5.52"
 Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 9.340	98	Roof Area
9.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 8S: Roof Area to Basin #1



Summary for Subcatchment 9S: Drainage Area to Abvg.Basin #1

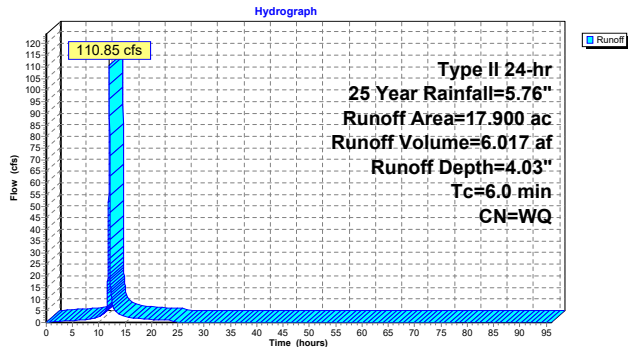
Runoff = 110.85 cfs @ 11.97 hrs, Volume= 6.017 af, Depth= 4.03"
 Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 7.250	61	Grass Cover
* 10.650	98	Impervious Area
17.900		Weighted Average
7.250		40.50% Pervious Area
10.650		59.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 9S: Drainage Area to Abvg.Basin #1



Summary for Subcatchment 10S: Roof Area to Basin #2

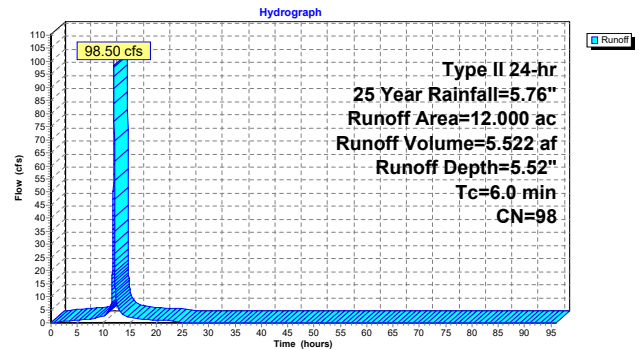
Runoff = 98.50 cfs @ 11.97 hrs, Volume= 5.522 af, Depth= 5.52"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 12.000	98	Roof Area
12.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 10S: Roof Area to Basin #2



Summary for Subcatchment 11S: Drainage Area to Basin #2

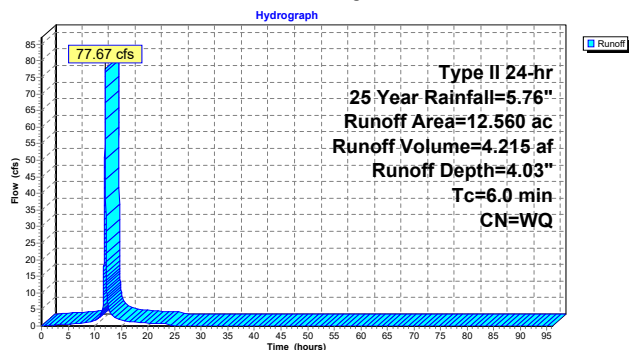
Runoff = 77.67 cfs @ 11.97 hrs, Volume= 4.215 af, Depth= 4.03"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 5.110	61	Grass Cover
* 7.450	98	Impervious Area
12.560		Weighted Average
5.110		40.68% Pervious Area
7.450		59.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 11S: Drainage Area to Basin #2



Summary for Subcatchment 12S: Bypass Area 'A' (POI#2)

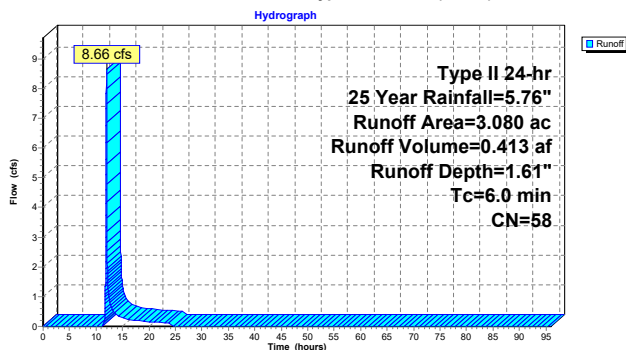
Runoff = 8.66 cfs @ 11.98 hrs, Volume= 0.413 af, Depth= 1.61"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 3.080	58	Meadow Seed Mix
3.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 12S: Bypass Area 'A' (POI#2)



Summary for Subcatchment 13S: Bypass Area 'B' (POI#2)

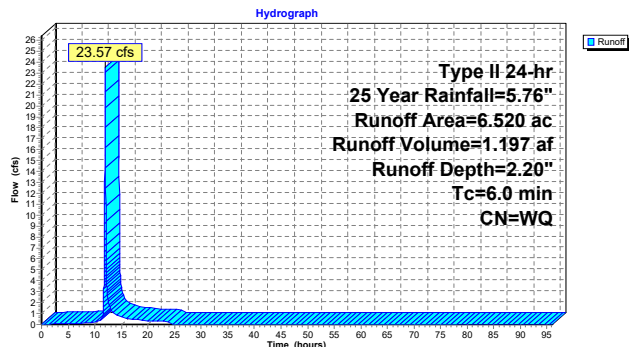
Runoff = 23.57 cfs @ 11.98 hrs, Volume= 1.197 af, Depth= 2.20"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 5.530	58	Meadow Seed Mix
* 0.990	98	Impervious
6.520		Weighted Average
5.530		84.82% Pervious Area
0.990		15.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 13S: Bypass Area 'B' (POI#2)



Summary for Subcatchment 14S: Drainage Area to Abvg Basin #3

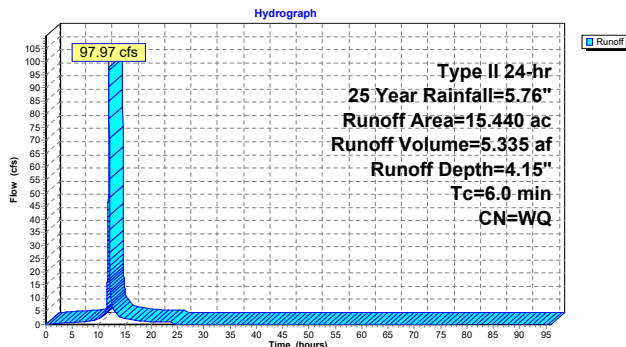
Runoff = 97.97 cfs @ 11.97 hrs, Volume= 5.335 af, Depth= 4.15"
 Routed to Pond 3P : ABVG. MRC Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
* 5.780	61	Grass Cover
* 9.660	98	Impervious
15.440		Weighted Average
5.780		37.44% Pervious Area
9.660		62.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 14S: Drainage Area to Abvg Basin #3



Summary for Subcatchment 15S: Bypass Area (POI#3)

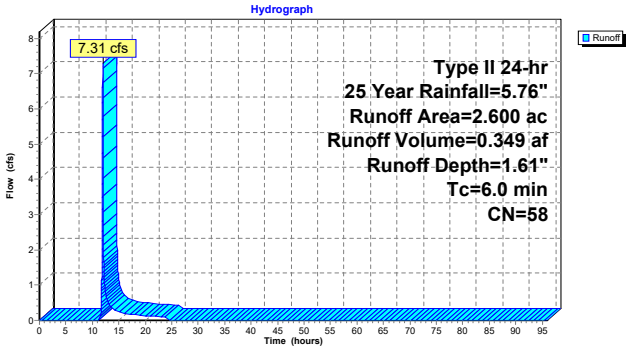
Runoff = 7.31 cfs @ 11.98 hrs, Volume= 0.349 af, Depth= 1.61"
Routed to Link 7L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25 Year Rainfall=5.76"

Area (ac)	CN	Description
2.600	58	Meadow Seed Mix
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 15S: Bypass Area (POI#3)



Summary for Pond 1P: ABVG. MRC Basin 1

Inflow Area = 27.240 ac, 73.38% Impervious, Inflow Depth = 4.54" for 25 Year event
Inflow = 187.48 cfs @ 11.97 hrs, Volume= 10.315 af
Outflow = 21.17 cfs @ 12.30 hrs, Volume= 9.406 af, Atten= 89%, Lag= 19.8 min
Primary = 21.17 cfs @ 12.30 hrs, Volume= 9.406 af
Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 340.87' @ 12.30 hrs Surf.Area= 224,648 sf Storage= 263,662 cf

Plug-Flow detention time= 584.2 min calculated for 9.406 af (91% of inflow)
Center-of-Mass det. time= 535.7 min (1,290.1 - 754.4)

Volume	Invert	Avail.Storage	Storage Description
#1	338.00'	366,705 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	335.50'	10,501 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	336.50'	31,502 cf	70,005 cf Overall x 15.0% Voids
			MRC Soil (30% Voids) (Prismatic) Listed below (Recalc)
			105,008 cf Overall x 30.0% Voids
		408,708 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
338.00	70,005	0	0
342.50	92,975	366,705	366,705

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
335.50	70,005	0	0
336.50	70,005	70,005	70,005

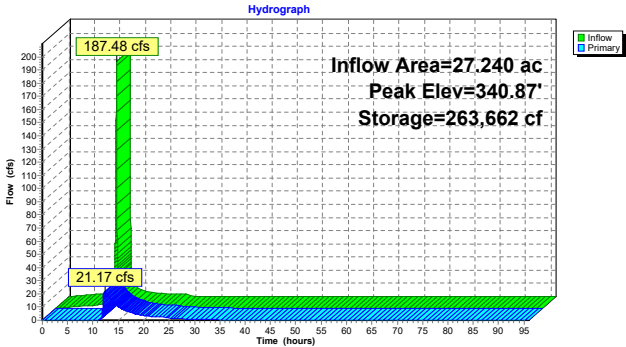
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
336.50	70,005	0	0
338.00	70,005	105,008	105,008

Device	Routing	Invert	Outlet Devices
#1	Primary	336.50'	30.0000" Round Culvert L= 219.3' Ke= 0.500 Inlet / Outlet Invert= 336.50' / 333.83' S= 0.0122' /' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	336.50'	2.3750" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	338.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.50 Width (feet) 1.75 1.75
#4	Device 1	341.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=21.17 cfs @ 12.30 hrs HW=340.87' (Free Discharge)

1=Culvert (Passes 21.17 cfs of 41.73 cfs potential flow)
2=MRC Orifice (Orifice Controls 0.31 cfs @ 9.95 fps)
3=Weir (Weir Controls 20.87 cfs @ 5.04 fps)
4=Grate (Controls 0.00 cfs)

Pond 1P: ABVG. MRC Basin 1



Summary for Pond 2P: ABVG. MRC Basin 2

Inflow Area = 24.560 ac, 79.19% Impervious, Inflow Depth = 4.76" for 25 Year event
Inflow = 176.14 cfs @ 11.97 hrs, Volume= 9.737 af
Outflow = 17.61 cfs @ 12.37 hrs, Volume= 8.854 af, Atten= 90%, Lag= 24.2 min
Primary = 17.61 cfs @ 12.37 hrs, Volume= 8.854 af
Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 332.96' @ 12.37 hrs Surf.Area= 210,968 sf Storage= 254,925 cf

Plug-Flow detention time= 604.6 min calculated for 8.854 af (91% of inflow)
Center-of-Mass det. time= 555.1 min (1,306.2 - 751.1)

Volume	Invert	Avail.Storage	Storage Description
#1	330.00'	446,558 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	9,779 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	29,338 cf	65,195 cf Overall x 15.0% Voids
			MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			97,793 cf Overall x 30.0% Voids
		485,675 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	65,195	0	0
335.60	94,290	446,558	446,558

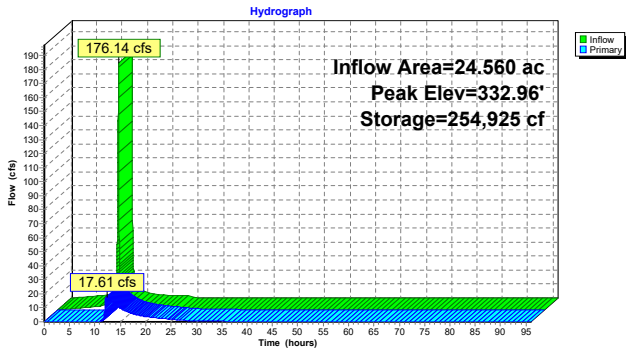
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
327.50	65,195	0	0
328.50	65,195	65,195	65,195

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	42.0000" Round Culvert L= 45.6' Ke= 0.500 Inlet / Outlet Invert= 326.50' / 323.00' S= 0.0768' /' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	328.50'	2.2813" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	333.50'	72.0000" x 72.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	330.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 1.37 1.37

Primary OutFlow Max=17.61 cfs @ 12.37 hrs HW=332.96' TW=328.50' (Fixed TW Elev= 328.50')
1=Culvert (Passes 17.61 cfs of 97.84 cfs potential flow)
2=MRC Orifice (Orifice Controls 0.29 cfs @ 10.06 fps)
3=Grate (Controls 0.00 cfs)
4=Weir (Weir Controls 17.32 cfs @ 5.14 fps)

Pond 2P: ABVG. MRC Basin 2



Summary for Pond 3P: ABVG. MRC Basin 3

Inflow Area = 15.440 ac, 62.56% Impervious, Inflow Depth = 4.15" for 25 Year event
Inflow = 97.97 cfs @ 11.97 hrs, Volume= 5.335 af
Outflow = 4.92 cfs @ 13.00 hrs, Volume= 4.649 af, Atten= 95%, Lag= 61.5 min
Primary = 4.92 cfs @ 13.00 hrs, Volume= 4.649 af
Routed to Link 7L : POI #3 (Northeast)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 332.11' @ 13.00 hrs Surf.Area= 162,936 sf Storage= 148,507 cf

Plug-Flow detention time= 723.6 min calculated for 4.649 af (87% of inflow)
Center-of-Mass det. time= 659.4 min (1,420.6 - 761.3)

Volume	Invert	Avail.Storage	Storage Description
#1	330.00'	384,915 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	7,695 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	23,085 cf	51,300 cf Overall x 15.0% Voids
			MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			76,950 cf Overall x 30.0% Voids
		415,695 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	51,300	0	0
336.00	77,005	384,915	384,915

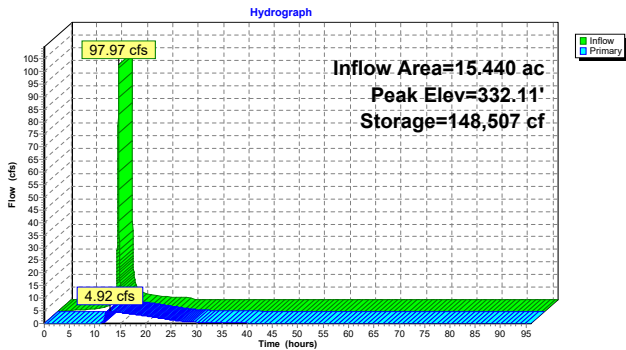
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
327.50	51,300	0	0
328.50	51,300	51,300	51,300

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Device	Routing	Invert	Outlet Devices
#1	Primary	327.50'	36.0000" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 323.50' S= 0.0412' /' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	328.50'	1.6875" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	330.25'	12.0000" Vert. Main Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	333.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	332.00'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 3.00 3.00

Primary OutFlow Max=4.90 cfs @ 13.00 hrs HW=332.11' TW=328.00' (Fixed TW Elev= 328.00')
1=Culvert (Passes 4.90 cfs of 60.01 cfs potential flow)
2=MRC Orifice (Orifice Controls 0.14 cfs @ 9.06 fps)
3=Main Orifice (Orifice Controls 4.41 cfs @ 5.61 fps)
4=Grate (Controls 0.00 cfs)
5=Weir (Weir Controls 0.35 cfs @ 1.08 fps)

Pond 3P: ABVG. MRC Basin 3

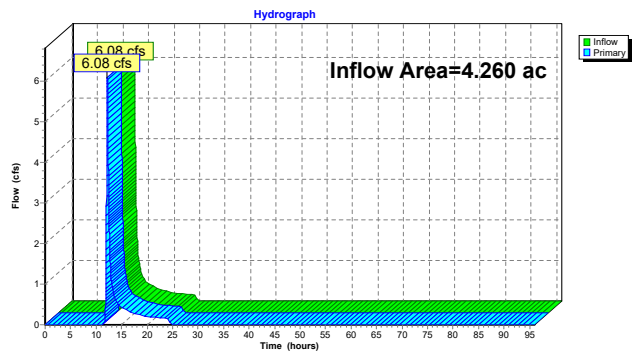


Summary for Link 5L: POI #1 (West)

Inflow Area = 4.260 ac, 0.00% Impervious, Inflow Depth = 1.61" for 25 Year event
Inflow = 6.08 cfs @ 12.21 hrs, Volume= 0.571 af
Primary = 6.08 cfs @ 12.21 hrs, Volume= 0.571 af, Atten= 0%, Lag= 0.0 min
Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: POI #1 (West)

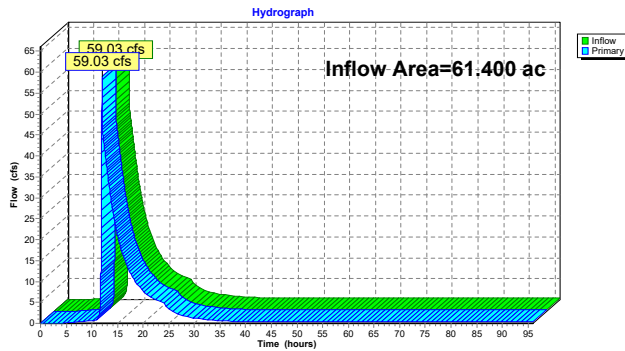


Summary for Link 6L: POI #2 (East)

Inflow Area = 61.400 ac, 65.85% Impervious, Inflow Depth > 3.88" for 25 Year event
 Inflow = 59.03 cfs @ 12.00 hrs, Volume= 19.871 af
 Primary = 59.03 cfs @ 12.00 hrs, Volume= 19.871 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 6L: POI #2 (East)

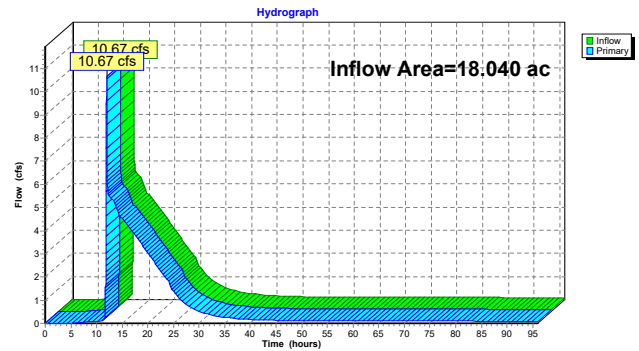


Summary for Link 7L: POI #3 (Northeast)

Inflow Area = 18.040 ac, 53.55% Impervious, Inflow Depth > 3.32" for 25 Year event
 Inflow = 10.67 cfs @ 11.99 hrs, Volume= 4.997 af
 Primary = 10.67 cfs @ 11.99 hrs, Volume= 4.997 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7L: POI #3 (Northeast)

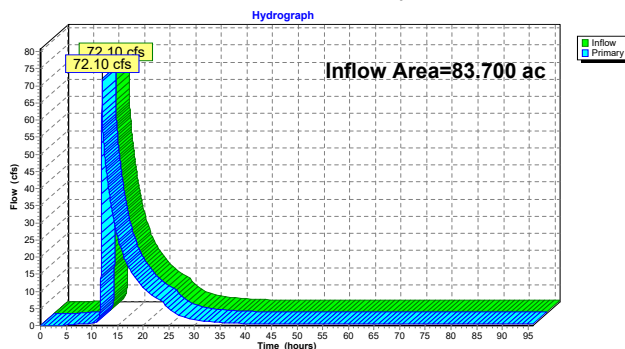


Summary for Link 8L: Total Post-Development

Inflow Area = 83.700 ac, 59.84% Impervious, Inflow Depth > 3.65" for 25 Year event
 Inflow = 72.10 cfs @ 12.00 hrs, Volume= 25.439 af
 Primary = 72.10 cfs @ 12.00 hrs, Volume= 25.439 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 8L: Total Post-Development



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 7S: Bypass Area (POI#1)	Runoff Area=4.260 ac 0.00% Impervious Runoff Depth=2.06" Tc=24.8 min CN=58 Runoff=8.05 cfs 0.732 af
Subcatchment 8S: Roof Area to Basin #1	Runoff Area=9.340 ac 100.00% Impervious Runoff Depth=6.24" Tc=6.0 min CN=98 Runoff=86.32 cfs 4.858 af
Subcatchment 9S: Drainage Area to	Runoff Area=17.900 ac 59.50% Impervious Runoff Depth=4.66" Tc=6.0 min CN=WQ Runoff=128.36 cfs 6.949 af
Subcatchment 10S: Roof Area to Basin #2	Runoff Area=12.000 ac 100.00% Impervious Runoff Depth=6.24" Tc=6.0 min CN=98 Runoff=110.91 cfs 6.241 af
Subcatchment 11S: Drainage Area to	Runoff Area=12.560 ac 59.32% Impervious Runoff Depth=4.65" Tc=6.0 min CN=WQ Runoff=89.95 cfs 4.868 af
Subcatchment 12S: Bypass Area 'A' (POI#2)	Runoff Area=3.080 ac 0.00% Impervious Runoff Depth=2.06" Tc=6.0 min CN=58 Runoff=11.25 cfs 0.529 af
Subcatchment 13S: Bypass Area 'B'	Runoff Area=6.520 ac 15.18% Impervious Runoff Depth=2.70" Tc=6.0 min CN=WQ Runoff=29.26 cfs 1.466 af
Subcatchment 14S: Drainage Area to	Runoff Area=15.440 ac 62.56% Impervious Runoff Depth=4.78" Tc=6.0 min CN=WQ Runoff=113.13 cfs 6.148 af
Subcatchment 15S: Bypass Area (POI#3)	Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=2.06" Tc=6.0 min CN=58 Runoff=9.50 cfs 0.447 af
Pond 1P: ABVG. MRC Basin 1	Peak Elev=341.22' Storage=293,979 cf Inflow=214.64 cfs 11.807 af Outflow=32.30 cfs 10.893 af
Pond 2P: ABVG. MRC Basin 2	Peak Elev=333.35' Storage=286,271 cf Inflow=200.82 cfs 11.110 af Outflow=21.83 cfs 10.222 af
Pond 3P: ABVG. MRC Basin 3	Peak Elev=332.40' Storage=166,212 cf Inflow=113.13 cfs 6.148 af Outflow=7.49 cfs 5.457 af
Link 5L: POI #1 (West)	Inflow=8.05 cfs 0.732 af Primary=8.05 cfs 0.732 af
Link 6L: POI #2 (East)	Inflow=74.81 cfs 23.110 af Primary=74.81 cfs 23.110 af
Link 7L: POI #3 (Northeast)	Inflow=13.41 cfs 5.904 af Primary=13.41 cfs 5.904 af
Link 8L: Total Post-Development	Inflow=91.60 cfs 29.746 af Primary=91.60 cfs 29.746 af

Total Runoff Area = 83.700 ac Runoff Volume = 32.239 af Average Runoff Depth = 4.62"
40.16% Pervious = 33.610 ac 59.84% Impervious = 50.090 ac

Summary for Subcatchment 7S: Bypass Area (POI#1)

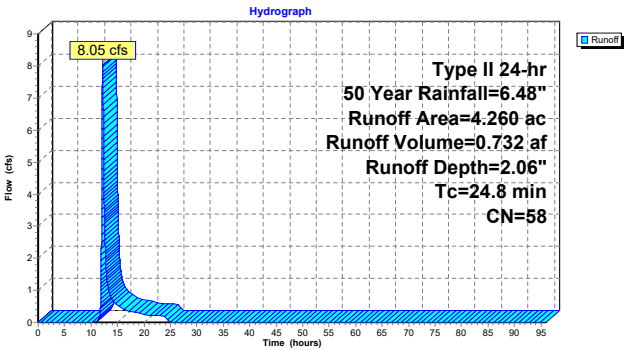
Runoff = 8.05 cfs @ 12.20 hrs, Volume= 0.732 af, Depth= 2.06"
Routed to Link 5L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 4.260	58	Meadow Seed Mix
4.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 7S: Bypass Area (POI#1)



Summary for Subcatchment 8S: Roof Area to Basin #1

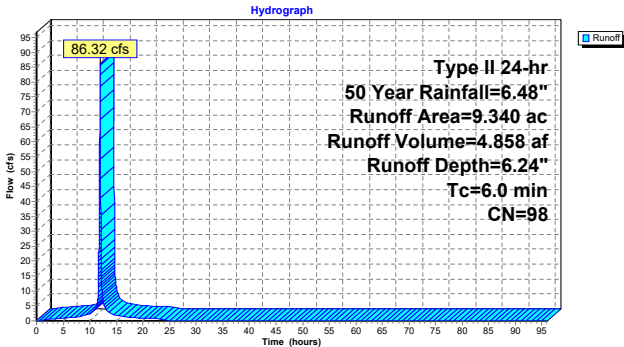
Runoff = 86.32 cfs @ 11.97 hrs, Volume= 4.858 af, Depth= 6.24"
Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 9.340	98	Roof Area
9.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 8S: Roof Area to Basin #1



Summary for Subcatchment 9S: Drainage Area to Abvg.Basin #1

Runoff = 128.36 cfs @ 11.97 hrs, Volume= 6.949 af, Depth= 4.66"
Routed to Pond 1P : ABVG. MRC Basin 1

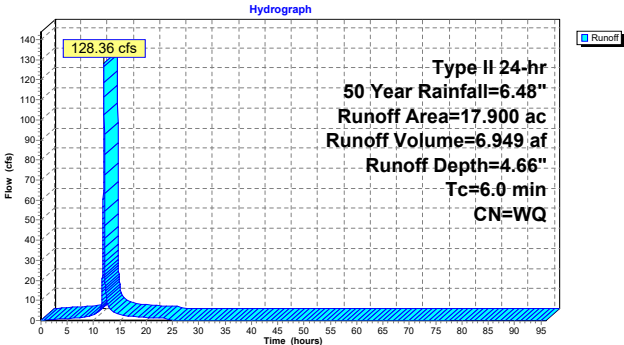
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 7.250	61	Grass Cover
* 10.650	98	Impervious Area

17.900 Weighted Average
7.250 40.50% Pervious Area
10.650 59.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 9S: Drainage Area to Abvg.Basin #1



Summary for Subcatchment 10S: Roof Area to Basin #2

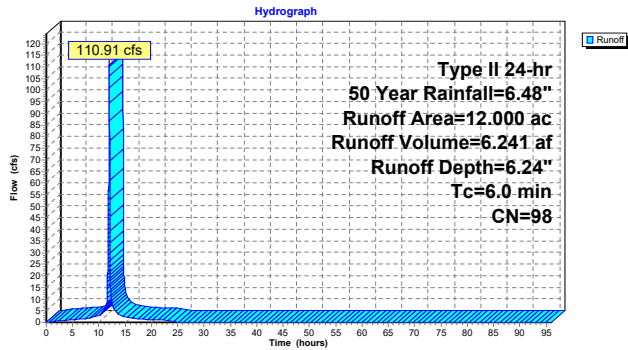
Runoff = 110.91 cfs @ 11.97 hrs, Volume= 6.241 af, Depth= 6.24"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 12.000	98	Roof Area
12.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 10S: Roof Area to Basin #2



Summary for Subcatchment 11S: Drainage Area to Basin #2

Runoff = 89.95 cfs @ 11.97 hrs, Volume= 4.868 af, Depth= 4.65"
 Routed to Pond 2P : ABVG. MRC Basin 2

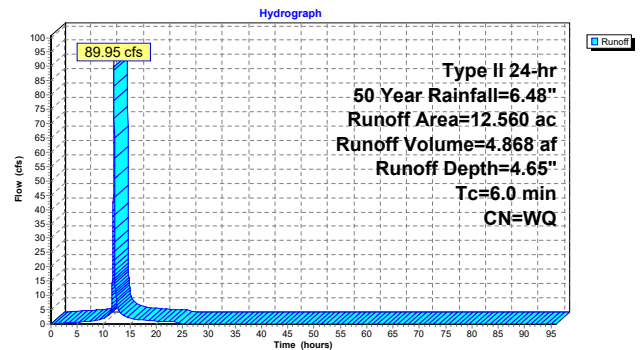
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 5.110	61	Grass Cover
* 7.450	98	Impervious Area

12.560		Weighted Average
5.110		40.68% Pervious Area
7.450		59.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 11S: Drainage Area to Basin #2



Summary for Subcatchment 12S: Bypass Area 'A' (POI#2)

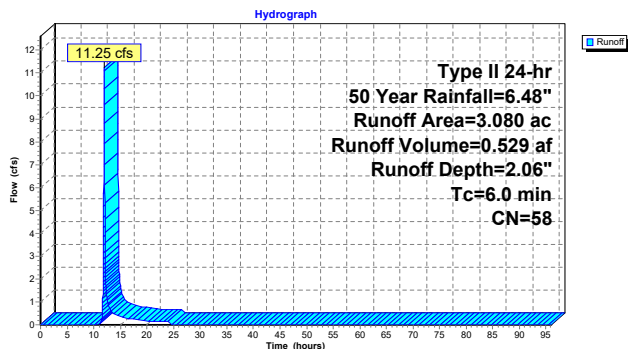
Runoff = 11.25 cfs @ 11.98 hrs, Volume= 0.529 af, Depth= 2.06"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 3.080	58	Meadow Seed Mix
3.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 12S: Bypass Area 'A' (POI#2)



Summary for Subcatchment 13S: Bypass Area 'B' (POI#2)

Runoff = 29.26 cfs @ 11.98 hrs, Volume= 1.466 af, Depth= 2.70"
 Routed to Link 6L : POI #2 (East)

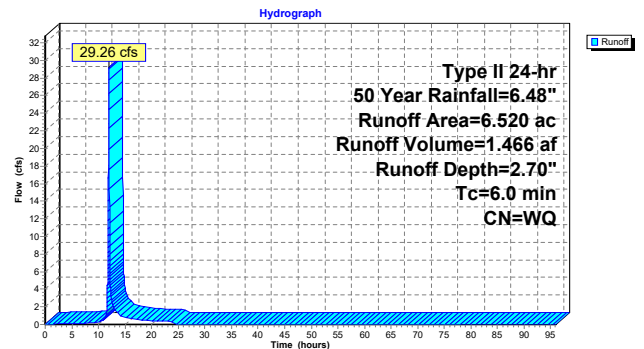
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 5.530	58	Meadow Seed Mix
* 0.990	98	Impervious

6.520		Weighted Average
5.530		84.82% Pervious Area
0.990		15.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 13S: Bypass Area 'B' (POI#2)



Summary for Subcatchment 14S: Drainage Area to Abvg Basin #3

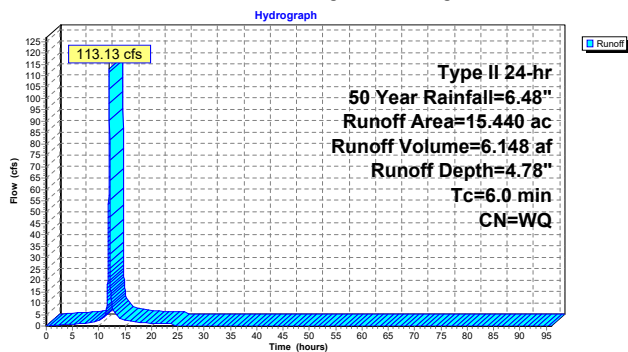
Runoff = 113.13 cfs @ 11.97 hrs, Volume= 6.148 af, Depth= 4.78"
 Routed to Pond 3P : ABVG. MRC Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 5.780	61	Grass Cover
* 9.660	98	Impervious
15.440		Weighted Average
5.780		37.44% Pervious Area
9.660		62.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 14S: Drainage Area to Abvg Basin #3



Summary for Subcatchment 15S: Bypass Area (POI#3)

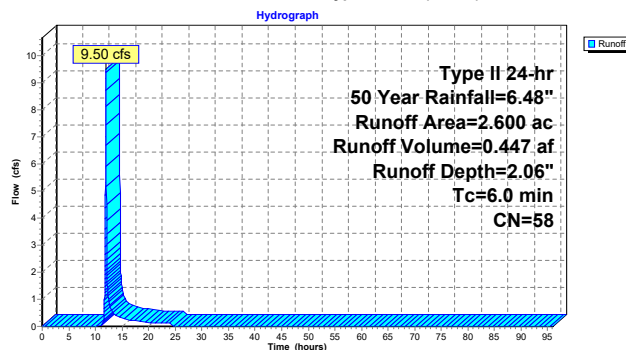
Runoff = 9.50 cfs @ 11.98 hrs, Volume= 0.447 af, Depth= 2.06"
 Routed to Link 7L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50 Year Rainfall=6.48"

Area (ac)	CN	Description
* 2.600	58	Meadow Seed Mix
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 15S: Bypass Area (POI#3)



Summary for Pond 1P: ABVG. MRC Basin 1

Inflow Area = 27.240 ac, 73.38% Impervious, Inflow Depth = 5.20" for 50 Year event
 Inflow = 214.64 cfs @ 11.97 hrs, Volume= 11.807 af
 Outflow = 32.30 cfs @ 12.18 hrs, Volume= 10.893 af, Atten= 85%, Lag= 12.7 min
 Primary = 32.30 cfs @ 12.18 hrs, Volume= 10.893 af
 Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 341.22' @ 12.18 hrs Surf.Area= 226,457 sf Storage= 293,979 cf

Plug-Flow detention time= 527.0 min calculated for 10.892 af (92% of inflow)
 Center-of-Mass det. time= 483.6 min (1,236.9 - 753.3)

Volume	Invert	Avail. Storage	Storage Description
#1	338.00'	366,705 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	335.50'	10,501 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	336.50'	31,502 cf	MRC Soil (30% Voids) (Prismatic) Listed below (Recalc)
		408,708 cf	Total Available Storage

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
338.00	70,005	0	0
342.50	92,975	366,705	366,705

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
335.50	70,005	0	0
336.50	70,005	70,005	70,005

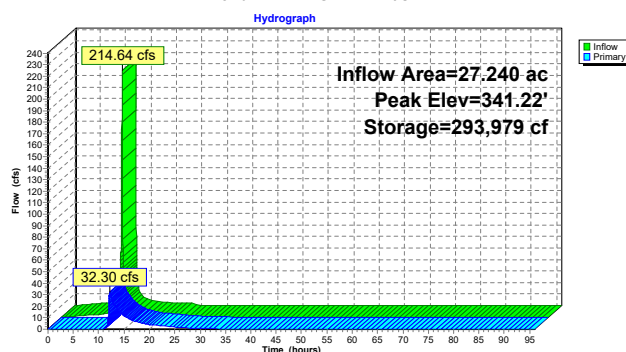
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
336.50	70,005	0	0
338.00	70,005	105,008	105,008

Device	Routing	Invert	Outlet Devices
#1	Primary	336.50'	30.0000" Round Culvert L= 219.3' Ke= 0.500 Inlet / Outlet Invert= 336.50' / 333.83' S= 0.0122 ' /' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	336.50'	2.3750" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	338.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.50 Width (feet) 1.75 1.75
#4	Device 1	341.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=32.25 cfs @ 12.18 hrs HW=341.22' (Free Discharge)

- 1=Culvert (Passes 32.25 cfs of 44.04 cfs potential flow)
- 2=MRC Orifice (Orifice Controls 0.32 cfs @ 10.35 fps)
- 3=Weir (Orifice Controls 25.13 cfs @ 5.74 fps)
- 4=Grate (Weir Controls 6.80 cfs @ 1.54 fps)

Pond 1P: ABVG. MRC Basin 1



Summary for Pond 2P: ABVG. MRC Basin 2

Inflow Area = 24.560 ac, 79.19% Impervious, Inflow Depth = 5.43" for 50 Year event
 Inflow = 200.82 cfs @ 11.97 hrs, Volume= 11,110 af
 Outflow = 21.83 cfs @ 12.32 hrs, Volume= 10,222 af, Atten= 89%, Lag= 20.9 min
 Primary = 21.83 cfs @ 12.32 hrs, Volume= 10,222 af
 Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 333.35' @ 12.32 hrs Surf.Area= 212,965 sf Storage= 286,271 cf

Plug-Flow detention time= 551.6 min calculated for 10,222 af (92% of inflow)
 Center-of-Mass det. time= 506.7 min (1,256.6 - 749.9)

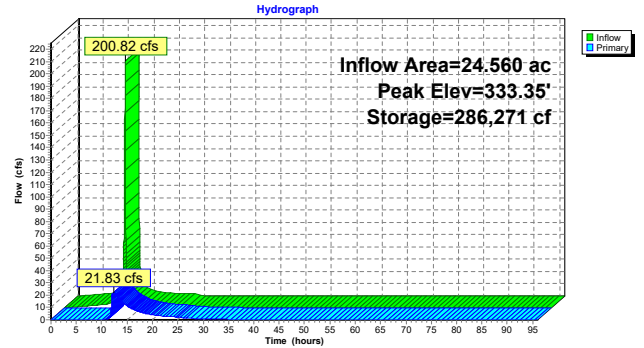
Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	446,558 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	9,779 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
			65,195 cf Overall x 15.0% Voids
#3	328.50'	29,338 cf	MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			97,793 cf Overall x 30.0% Voids
		485,675 cf	Total Available Storage

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
330.00	65,195	0	0
335.60	94,290	446,558	446,558
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
327.50	65,195	0	0
328.50	65,195	65,195	65,195
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	42.0000" Round Culvert L= 45.6' Ke= 0.500 Inlet / Outlet Invert= 326.50' / 323.00' S= 0.0768 ' C= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	328.50'	2.2813" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	333.50'	72.0000" x 72.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	330.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 1.37 1.37

Primary OutFlow Max=21.83 cfs @ 12.32 hrs HW=333.35' TW=328.50' (Fixed TW Elev= 328.50')
 1=Culvert (Passes 21.83 cfs of 101.97 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.30 cfs @ 10.49 fps)
 3=Grate (Controls 0.00 cfs)
 4=Weir (Weir Controls 21.53 cfs @ 5.52 fps)

Pond 2P: ABVG. MRC Basin 2



Summary for Pond 3P: ABVG. MRC Basin 3

Inflow Area = 15.440 ac, 62.56% Impervious, Inflow Depth = 4.78" for 50 Year event
 Inflow = 113.13 cfs @ 11.97 hrs, Volume= 6,148 af
 Outflow = 7.49 cfs @ 12.61 hrs, Volume= 5,457 af, Atten= 93%, Lag= 38.3 min
 Primary = 7.49 cfs @ 12.61 hrs, Volume= 5,457 af
 Routed to Link 7L : POI #3 (Northeast)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 332.40' @ 12.61 hrs Surf.Area= 164,180 sf Storage= 166,212 cf

Plug-Flow detention time= 659.9 min calculated for 5,456 af (89% of inflow)
 Center-of-Mass det. time= 602.0 min (1,362.3 - 760.4)

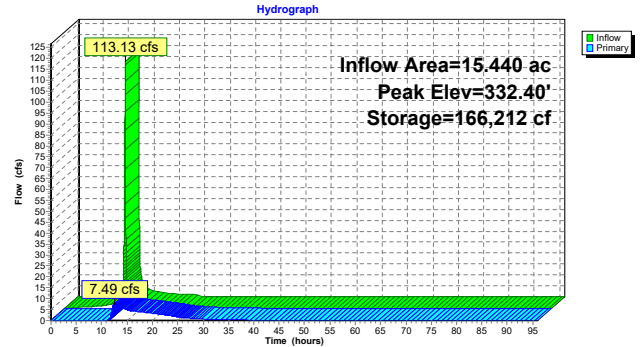
Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	384,915 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	7,695 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
			51,300 cf Overall x 15.0% Voids
#3	328.50'	23,085 cf	MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			76,950 cf Overall x 30.0% Voids
		415,695 cf	Total Available Storage

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
330.00	51,300	0	0
336.00	77,005	384,915	384,915
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
327.50	51,300	0	0
328.50	51,300	51,300	51,300
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Device	Routing	Invert	Outlet Devices
#1	Primary	327.50'	36.0000" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 323.50' S= 0.0412 ' C= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	328.50'	1.6875" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	330.25'	12.0000" Vert. Main Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	333.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	332.00'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 3.00 3.00

Primary OutFlow Max=7.48 cfs @ 12.61 hrs HW=332.40' TW=328.00' (Fixed TW Elev= 328.00')
 1=Culvert (Passes 7.48 cfs of 62.75 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.15 cfs @ 9.42 fps)
 3=Main Orifice (Orifice Controls 4.86 cfs @ 6.18 fps)
 4=Grate (Controls 0.00 cfs)
 5=Weir (Weir Controls 2.48 cfs @ 2.07 fps)

Pond 3P: ABVG. MRC Basin 3

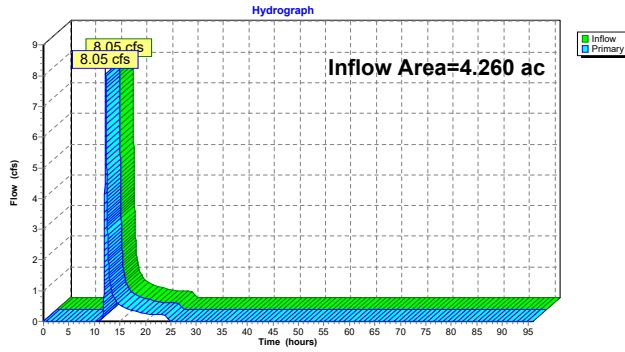


Summary for Link 5L: POI #1 (West)

Inflow Area = 4.260 ac, 0.00% Impervious, Inflow Depth = 2.06" for 50 Year event
 Inflow = 8.05 cfs @ 12.20 hrs, Volume= 0.732 af
 Primary = 8.05 cfs @ 12.20 hrs, Volume= 0.732 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: POI #1 (West)

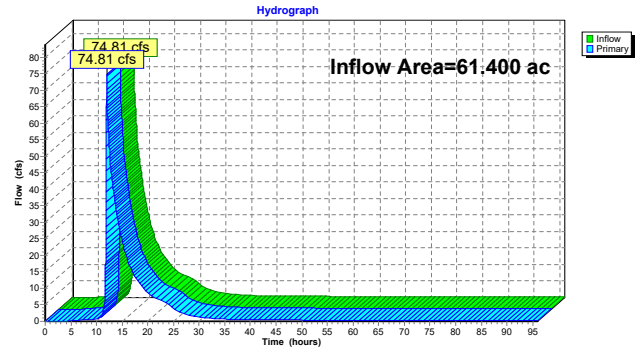


Summary for Link 6L: POI #2 (East)

Inflow Area = 61.400 ac, 65.85% Impervious, Inflow Depth > 4.52" for 50 Year event
 Inflow = 74.81 cfs @ 12.00 hrs, Volume= 23.110 af
 Primary = 74.81 cfs @ 12.00 hrs, Volume= 23.110 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 6L: POI #2 (East)

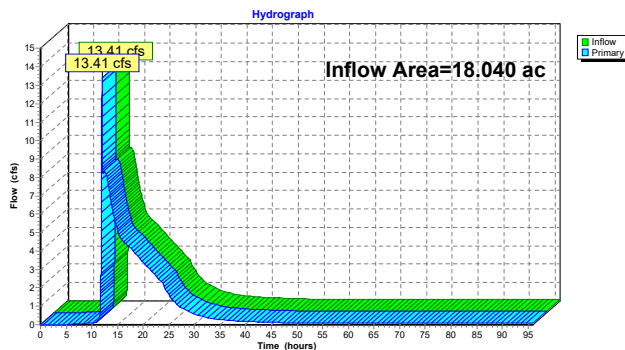


Summary for Link 7L: POI #3 (Northeast)

Inflow Area = 18.040 ac, 53.55% Impervious, Inflow Depth > 3.93" for 50 Year event
 Inflow = 13.41 cfs @ 11.99 hrs, Volume= 5.904 af
 Primary = 13.41 cfs @ 11.99 hrs, Volume= 5.904 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7L: POI #3 (Northeast)

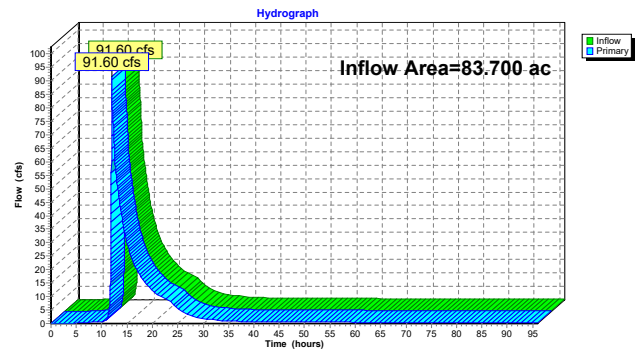


Summary for Link 8L: Total Post-Development

Inflow Area = 83.700 ac, 59.84% Impervious, Inflow Depth > 4.26" for 50 Year event
 Inflow = 91.60 cfs @ 12.00 hrs, Volume= 29.746 af
 Primary = 91.60 cfs @ 12.00 hrs, Volume= 29.746 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 8L: Total Post-Development



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 7S: Bypass Area (POI#1)	Runoff Area=4.260 ac 0.00% Impervious Runoff Depth=2.71" Tc=24.8 min CN=58 Runoff=10.86 cfs 0.963 af
Subcatchment 8S: Roof Area to Basin #1	Runoff Area=9.340 ac 100.00% Impervious Runoff Depth=7.20" Tc=6.0 min CN=98 Runoff=99.18 cfs 5.604 af
Subcatchment 9S: Drainage Area to	Runoff Area=17.900 ac 59.50% Impervious Runoff Depth=5.51" Tc=6.0 min CN=WQ Runoff=152.14 cfs 8.217 af
Subcatchment 10S: Roof Area to Basin #2	Runoff Area=12.000 ac 100.00% Impervious Runoff Depth=7.20" Tc=6.0 min CN=98 Runoff=127.43 cfs 7.201 af
Subcatchment 11S: Drainage Area to	Runoff Area=12.560 ac 59.32% Impervious Runoff Depth=5.50" Tc=6.0 min CN=WQ Runoff=106.63 cfs 5.758 af
Subcatchment 12S: Bypass Area 'A' (POI#2)	Runoff Area=3.080 ac 0.00% Impervious Runoff Depth=2.71" Tc=6.0 min CN=58 Runoff=14.93 cfs 0.696 af
Subcatchment 13S: Bypass Area 'B'	Runoff Area=6.520 ac 15.18% Impervious Runoff Depth=3.39" Tc=6.0 min CN=WQ Runoff=37.24 cfs 1.844 af
Subcatchment 14S: Drainage Area to	Runoff Area=15.440 ac 62.56% Impervious Runoff Depth=5.64" Tc=6.0 min CN=WQ Runoff=133.70 cfs 7.253 af
Subcatchment 15S: Bypass Area (POI#3)	Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=2.71" Tc=6.0 min CN=58 Runoff=12.61 cfs 0.588 af
Pond 1P: ABVG. MRC Basin 1	Peak Elev=341.65' Storage=331,948 cf Inflow=251.28 cfs 13.822 af Outflow=46.70 cfs 12.903 af
Pond 2P: ABVG. MRC Basin 2	Peak Elev=333.78' Storage=322,456 cf Inflow=234.03 cfs 12.959 af Outflow=37.83 cfs 12.065 af
Pond 3P: ABVG. MRC Basin 3	Peak Elev=332.77' Storage=189,053 cf Inflow=133.70 cfs 7.253 af Outflow=12.11 cfs 6.557 af
Link 5L: POI #1 (West)	Inflow=10.86 cfs 0.963 af Primary=10.86 cfs 0.963 af
Link 6L: POI #2 (East)	Inflow=108.55 cfs 27.508 af Primary=108.55 cfs 27.508 af
Link 7L: POI #3 (Northeast)	Inflow=18.02 cfs 7.145 af Primary=18.02 cfs 7.145 af
Link 8L: Total Post-Development	Inflow=132.36 cfs 35.616 af Primary=132.36 cfs 35.616 af

Total Runoff Area = 83.700 ac Runoff Volume = 38.125 af Average Runoff Depth = 5.47"
 40.16% Pervious = 33.610 ac 59.84% Impervious = 50.090 ac

Summary for Subcatchment 7S: Bypass Area (POI#1)

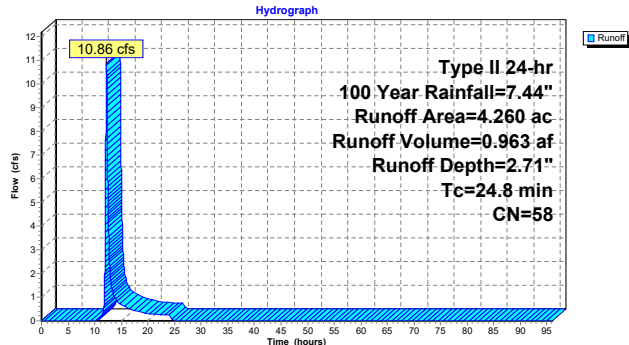
Runoff = 10.86 cfs @ 12.20 hrs, Volume= 0.963 af, Depth= 2.71"
 Routed to Link 5L: POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 4.260	58	Meadow Seed Mix
4.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,

Subcatchment 7S: Bypass Area (POI#1)



Summary for Subcatchment 8S: Roof Area to Basin #1

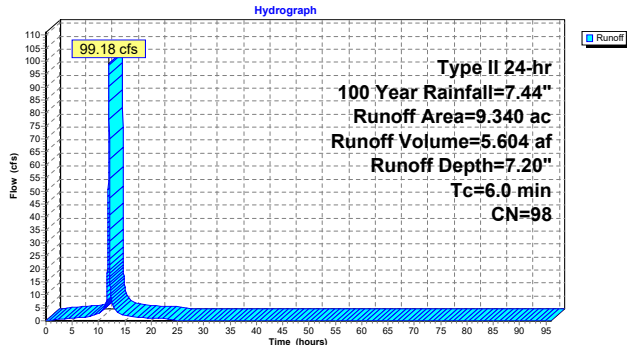
Runoff = 99.18 cfs @ 11.97 hrs, Volume= 5.604 af, Depth= 7.20"
 Routed to Pond 1P: ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 9.340	98	Roof Area
9.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 8S: Roof Area to Basin #1



Summary for Subcatchment 9S: Drainage Area to Abvg.Basin #1

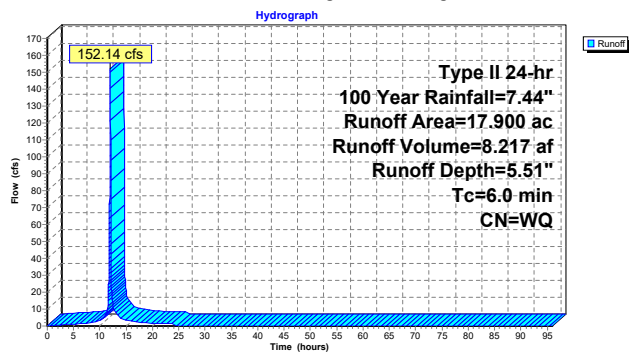
Runoff = 152.14 cfs @ 11.97 hrs, Volume= 8.217 af, Depth= 5.51"
 Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 7.250	61	Grass Cover
* 10.650	98	Impervious Area
17.900		Weighted Average
7.250		40.50% Pervious Area
10.650		59.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 9S: Drainage Area to Abvg.Basin #1



Summary for Subcatchment 10S: Roof Area to Basin #2

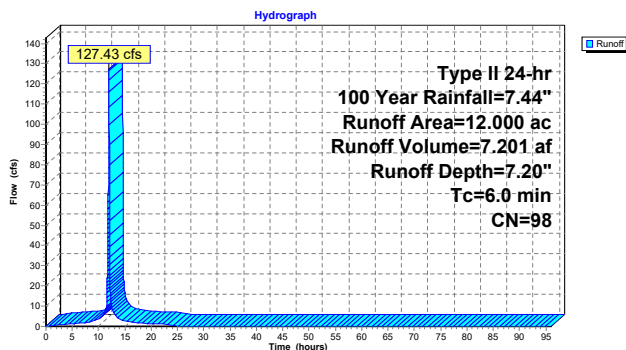
Runoff = 127.43 cfs @ 11.97 hrs, Volume= 7.201 af, Depth= 7.20"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 12.000	98	Roof Area
12.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 10S: Roof Area to Basin #2



Summary for Subcatchment 11S: Drainage Area to Basin #2

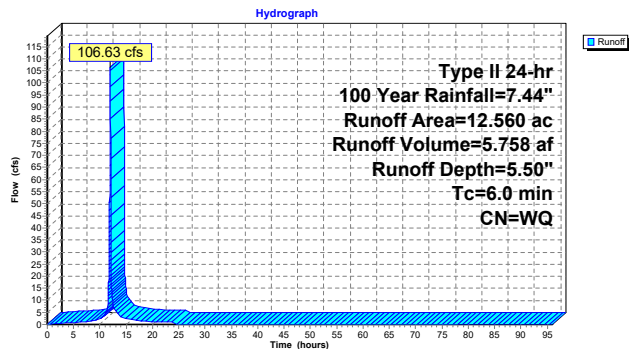
Runoff = 106.63 cfs @ 11.97 hrs, Volume= 5.758 af, Depth= 5.50"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 5.110	61	Grass Cover
* 7.450	98	Impervious Area
12.560		Weighted Average
5.110		40.68% Pervious Area
7.450		59.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 11S: Drainage Area to Basin #2



Summary for Subcatchment 12S: Bypass Area 'A' (POI#2)

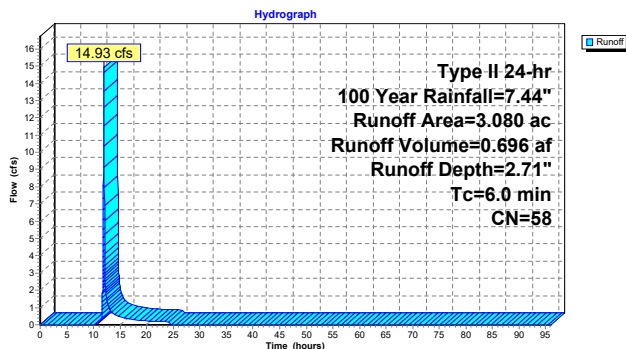
Runoff = 14.93 cfs @ 11.98 hrs, Volume= 0.696 af, Depth= 2.71"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 3.080	58	Meadow Seed Mix
3.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 12S: Bypass Area 'A' (POI#2)



Summary for Subcatchment 13S: Bypass Area 'B' (POI#2)

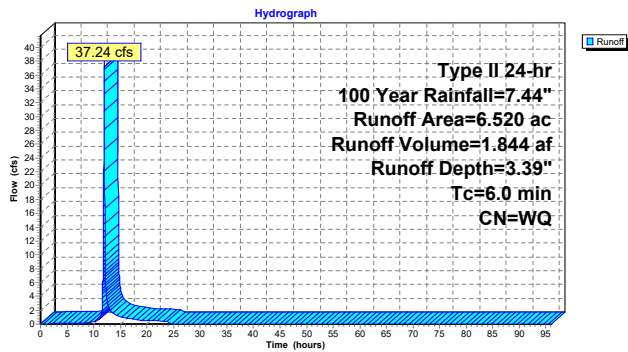
Runoff = 37.24 cfs @ 11.98 hrs, Volume= 1.844 af, Depth= 3.39"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 5.530	58	Meadow Seed Mix
* 0.990	98	Impervious
6.520		Weighted Average
5.530		84.82% Pervious Area
0.990		15.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 13S: Bypass Area 'B' (POI#2)



Summary for Subcatchment 14S: Drainage Area to Abvg Basin #3

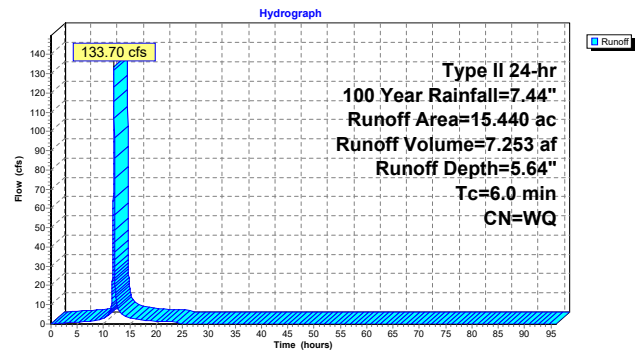
Runoff = 133.70 cfs @ 11.97 hrs, Volume= 7.253 af, Depth= 5.64"
 Routed to Pond 3P : ABVG. MRC Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 5.780	61	Grass Cover
* 9.660	98	Impervious
15.440		Weighted Average
5.780		37.44% Pervious Area
9.660		62.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 14S: Drainage Area to Abvg Basin #3



Summary for Subcatchment 15S: Bypass Area (POI#3)

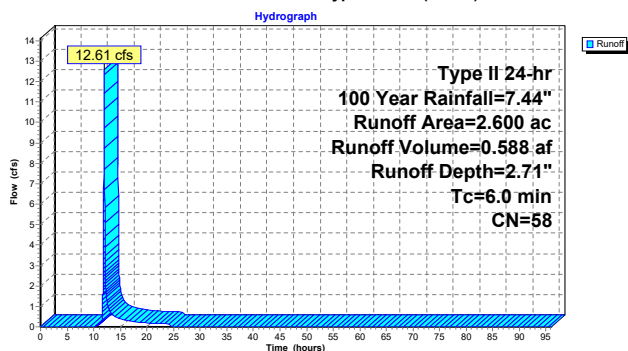
Runoff = 12.61 cfs @ 11.98 hrs, Volume= 0.588 af, Depth= 2.71"
 Routed to Link 7L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 Year Rainfall=7.44"

Area (ac)	CN	Description
* 2.600	58	Meadow Seed Mix
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 15S: Bypass Area (POI#3)



Summary for Pond 1P: ABVG. MRC Basin 1

Inflow Area = 27.240 ac, 73.38% Impervious, Inflow Depth = 6.09" for 100 Year event
 Inflow = 251.28 cfs @ 11.97 hrs, Volume= 13.822 af
 Outflow = 46.70 cfs @ 12.14 hrs, Volume= 12.903 af, Atten= 81%, Lag= 10.4 min
 Primary = 46.70 cfs @ 12.14 hrs, Volume= 12.903 af
 Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 341.65' @ 12.14 hrs Surf.Area= 228,671 sf Storage= 331,948 cf

Plug-Flow detention time= 466.2 min calculated for 12.901 af (93% of inflow)
 Center-of-Mass det. time= 427.8 min (1,179.8 - 752.0)

Volume	Invert	Avail. Storage	Storage Description
#1	338.00'	366,705 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	335.50'	10,501 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	336.50'	31,502 cf	70,005 cf Overall x 15.0% Voids MRC Soil (30% Voids) (Prismatic) Listed below (Recalc) 105,008 cf Overall x 30.0% Voids
408,708 cf Total Available Storage			

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
338.00	70,005	0	0
342.50	92,975	366,705	366,705

Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
335.50	70,005	0	0
336.50	70,005	70,005	70,005

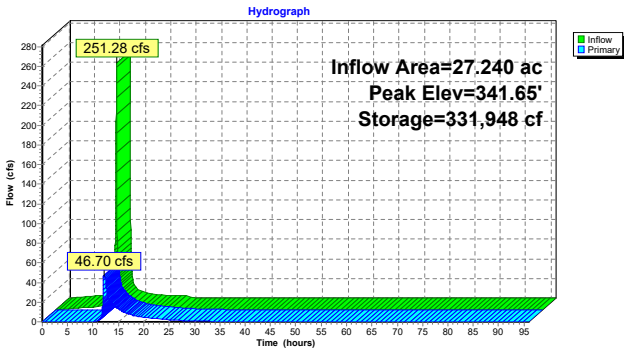
Elevation (feet)	Surf. Area (sq-ft)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
336.50	70,005	0	0
338.00	70,005	105,008	105,008

Device	Routing	Invert	Outlet Devices
#1	Primary	336.50'	30.0000" Round Culvert L= 219.3' Ke= 0.500 Inlet / Outlet Invert= 336.50' / 333.83' S= 0.0122' /' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	336.50'	2.3750" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	338.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.50 Width (feet) 1.75 1.75
#4	Device 1	341.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=46.70 cfs @ 12.14 hrs HW=341.65' (Free Discharge)

- 1=Culvert (Inlet Controls 46.70 cfs @ 9.51 fps)
- 2=MRC Orifice (Passes < 0.33 cfs potential flow)
- 3=Weir (Passes < 29.08 cfs potential flow)
- 4=Grate (Passes < 34.64 cfs potential flow)

Pond 1P: ABVG. MRC Basin 1



Summary for Pond 2P: ABVG. MRC Basin 2

Inflow Area = 24.560 ac, 79.19% Impervious, Inflow Depth = 6.33" for 100 Year event
Inflow = 234.03 cfs @ 11.97 hrs, Volume= 12.959 af
Outflow = 37.83 cfs @ 12.16 hrs, Volume= 12.065 af, Atten= 84%, Lag= 11.7 min
Primary = 37.83 cfs @ 12.16 hrs, Volume= 12.065 af
Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 333.78' @ 12.16 hrs Surf.Area= 215,211 sf Storage= 322,456 cf

Plug-Flow detention time= 493.5 min calculated for 12.065 af (93% of inflow)
Center-of-Mass det. time= 453.5 min (1,202.0 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1	330.00'	446,558 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	9,779 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	29,338 cf	65,195 cf Overall x 15.0% Voids MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			97,793 cf Overall x 30.0% Voids
			485,675 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	65,195	0	0
335.60	94,290	446,558	446,558

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
327.50	65,195	0	0
328.50	65,195	65,195	65,195

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

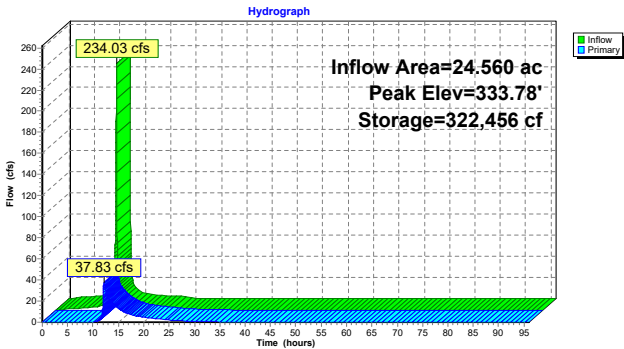
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	42.0000" Round Culvert L= 45.6' Ke= 0.500 Inlet / Outlet Invert= 326.50' / 323.00' S= 0.0768 'f' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	328.50'	2.2813" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	333.50'	72.0000" x 72.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	330.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 1.37 1.37

Primary OutFlow Max=37.74 cfs @ 12.16 hrs HW=333.78' TW=328.50' (Fixed TW Elev= 328.50')

- 1=Culvert (Passes 37.74 cfs of 106.42 cfs potential flow)
- 2=MRC Orifice (Orifice Controls 0.31 cfs @ 10.96 fps)
- 3=Grate (Weir Controls 11.46 cfs @ 1.72 fps)
- 4=Weir (Orifice Controls 25.97 cfs @ 6.32 fps)

Pond 2P: ABVG. MRC Basin 2



Summary for Pond 3P: ABVG. MRC Basin 3

Inflow Area = 15.440 ac, 62.56% Impervious, Inflow Depth = 5.64" for 100 Year event
Inflow = 133.70 cfs @ 11.97 hrs, Volume= 7.253 af
Outflow = 12.11 cfs @ 12.44 hrs, Volume= 6.557 af, Atten= 91%, Lag= 28.3 min
Primary = 12.11 cfs @ 12.44 hrs, Volume= 6.557 af
Routed to Link 7L : POI #3 (Northeast)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 332.77' @ 12.44 hrs Surf.Area= 165,749 sf Storage= 189,053 cf

Plug-Flow detention time= 587.6 min calculated for 6.556 af (90% of inflow)
Center-of-Mass det. time= 536.2 min (1,295.5 - 759.3)

Volume	Invert	Avail.Storage	Storage Description
#1	330.00'	384,915 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	7,695 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	23,085 cf	51,300 cf Overall x 15.0% Voids MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
			76,950 cf Overall x 30.0% Voids
			415,695 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	51,300	0	0
336.00	77,005	384,915	384,915

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
327.50	51,300	0	0
328.50	51,300	51,300	51,300

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

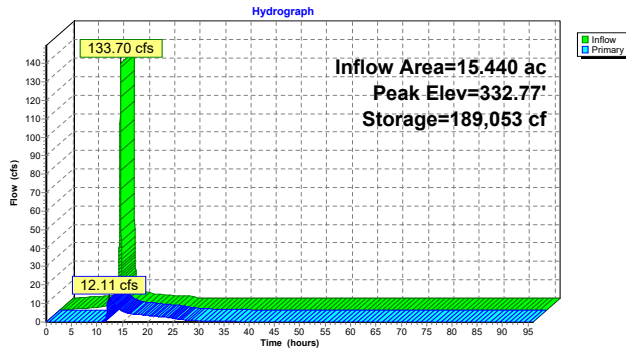
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Device	Routing	Invert	Outlet Devices
#1	Primary	327.50'	36.0000" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 323.50' S= 0.0412 'f' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	328.50'	1.6875" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	330.25'	12.0000" Vert. Main Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	333.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	332.00'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 3.00 3.00

Primary OutFlow Max=12.11 cfs @ 12.44 hrs HW=332.77' TW=328.00' (Fixed TW Elev= 328.00')
 1=Culvert (Passes 12.11 cfs of 66.05 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.15 cfs @ 9.86 fps)
 3=Main Orifice (Orifice Controls 5.37 cfs @ 6.84 fps)
 4=Grate (Controls 0.00 cfs)
 5=Weir (Weir Controls 6.58 cfs @ 2.87 fps)

Pond 3P: ABVG. MRC Basin 3

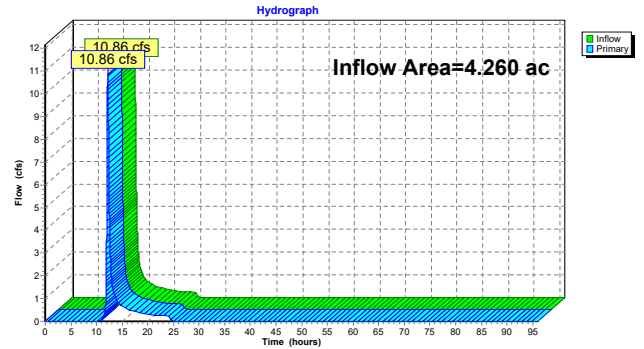


Summary for Link 5L: POI #1 (West)

Inflow Area = 4.260 ac, 0.00% Impervious, Inflow Depth = 2.71" for 100 Year event
 Inflow = 10.86 cfs @ 12.20 hrs, Volume= 0.963 af
 Primary = 10.86 cfs @ 12.20 hrs, Volume= 0.963 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: POI #1 (West)

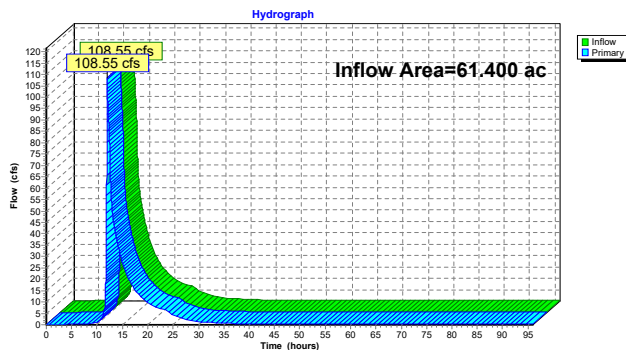


Summary for Link 6L: POI #2 (East)

Inflow Area = 61.400 ac, 65.85% Impervious, Inflow Depth > 5.38" for 100 Year event
 Inflow = 108.55 cfs @ 12.03 hrs, Volume= 27.508 af
 Primary = 108.55 cfs @ 12.03 hrs, Volume= 27.508 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 6L: POI #2 (East)

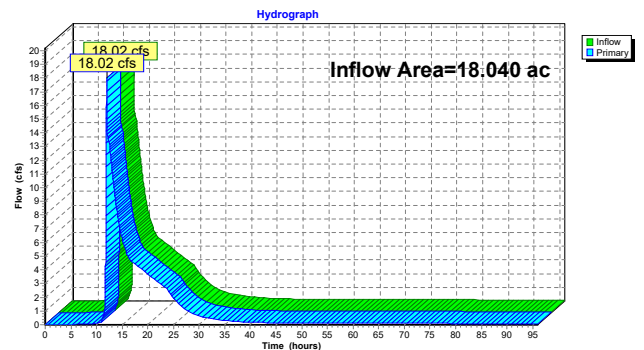


Summary for Link 7L: POI #3 (Northeast)

Inflow Area = 18.040 ac, 53.55% Impervious, Inflow Depth > 4.75" for 100 Year event
 Inflow = 18.02 cfs @ 12.01 hrs, Volume= 7.145 af
 Primary = 18.02 cfs @ 12.01 hrs, Volume= 7.145 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

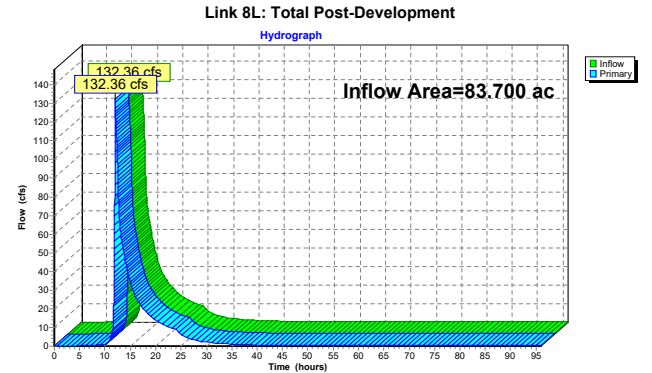
Link 7L: POI #3 (Northeast)



Summary for Link 8L: Total Post-Development

Inflow Area = 83.700 ac, 59.84% Impervious, Inflow Depth > 5.11" for 100 Year event
Inflow = 132.36 cfs @ 12.03 hrs, Volume= 35.616 af
Primary = 132.36 cfs @ 12.03 hrs, Volume= 35.616 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 7S: Bypass Area (POI#1) Runoff Area=4.260 ac 0.00% Impervious Runoff Depth=0.00"
Tc=24.8 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 8S: Roof Area to Basin #1 Runoff Area=9.340 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=98 Runoff=50.34 cfs 0.767 af

Subcatchment 9S: Drainage Area to Runoff Area=17.900 ac 59.50% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=WQ Runoff=57.40 cfs 0.875 af

Subcatchment 10S: Roof Area to Basin #2 Runoff Area=12.000 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=98 Runoff=64.67 cfs 0.986 af

Subcatchment 11S: Drainage Area to Runoff Area=12.560 ac 59.32% Impervious Runoff Depth=0.58"
Tc=6.0 min CN=WQ Runoff=40.15 cfs 0.612 af

Subcatchment 12S: Bypass Area 'A' (POI#2) Runoff Area=3.080 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 13S: Bypass Area 'B' Runoff Area=6.520 ac 15.18% Impervious Runoff Depth=0.15"
Tc=6.0 min CN=WQ Runoff=5.34 cfs 0.081 af

Subcatchment 14S: Drainage Area to Runoff Area=15.440 ac 62.56% Impervious Runoff Depth=0.62"
Tc=6.0 min CN=WQ Runoff=52.06 cfs 0.793 af

Subcatchment 15S: Bypass Area (POI#3) Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=58 Runoff=0.00 cfs 0.000 af

Pond 1P: ABVG. MRC Basin 1 Peak Elev=338.40' Storage=70,720 cf Inflow=107.73 cfs 1.642 af
Outflow=0.20 cfs 1.216 af

Pond 2P: ABVG. MRC Basin 2 Peak Elev=330.45' Storage=68,836 cf Inflow=104.82 cfs 1.598 af
Outflow=0.19 cfs 1.168 af

Pond 3P: ABVG. MRC Basin 3 Peak Elev=330.07' Storage=34,204 cf Inflow=52.06 cfs 0.793 af
Outflow=0.09 cfs 0.515 af

Link 5L: POI #1 (West) Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 6L: POI #2 (East) Inflow=5.57 cfs 2.465 af
Primary=5.57 cfs 2.465 af

Link 7L: POI #3 (Northeast) Inflow=0.09 cfs 0.515 af
Primary=0.09 cfs 0.515 af

Link 8L: Total Post-Development Inflow=5.60 cfs 2.979 af
Primary=5.60 cfs 2.979 af

Total Runoff Area = 83.700 ac Runoff Volume = 4.114 af Average Runoff Depth = 0.59"
40.16% Pervious = 33.610 ac 59.84% Impervious = 50.090 ac

Summary for Subcatchment 7S: Bypass Area (POI#1)

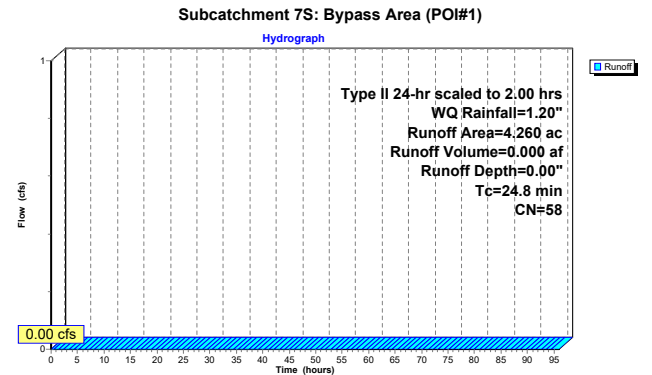
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 5L : POI #1 (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
4.260	58	Meadow Seed Mix
4.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8					Direct Entry,



Summary for Subcatchment 8S: Roof Area to Basin #1

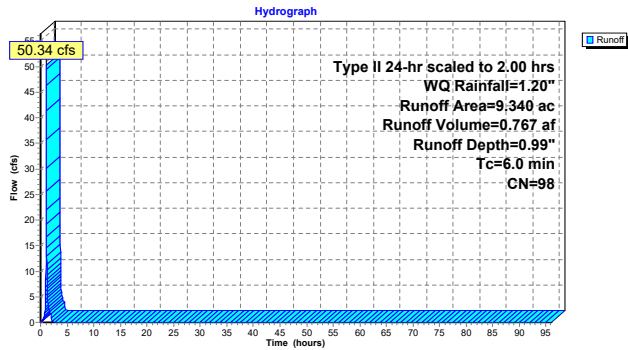
Runoff = 50.34 cfs @ 1.06 hrs, Volume= 0.767 af, Depth= 0.99"
 Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 9.340	98	Roof Area
9.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 8S: Roof Area to Basin #1



Summary for Subcatchment 9S: Drainage Area to Abvg.Basin #1

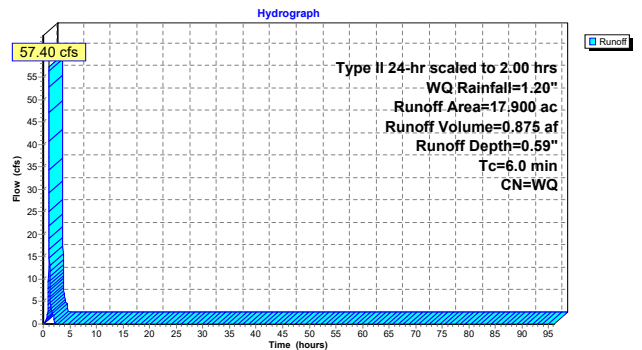
Runoff = 57.40 cfs @ 1.06 hrs, Volume= 0.875 af, Depth= 0.59"
 Routed to Pond 1P : ABVG. MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 7.250	61	Grass Cover
* 10.650	98	Impervious Area
17.900		Weighted Average
7.250		40.50% Pervious Area
10.650		59.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 9S: Drainage Area to Abvg.Basin #1



Summary for Subcatchment 10S: Roof Area to Basin #2

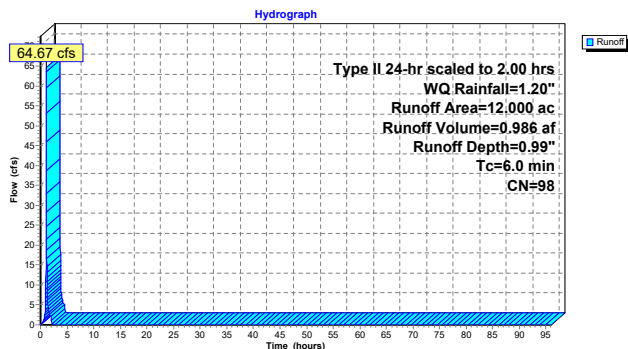
Runoff = 64.67 cfs @ 1.06 hrs, Volume= 0.986 af, Depth= 0.99"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 12.000	98	Roof Area
12.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 10S: Roof Area to Basin #2



Summary for Subcatchment 11S: Drainage Area to Basin #2

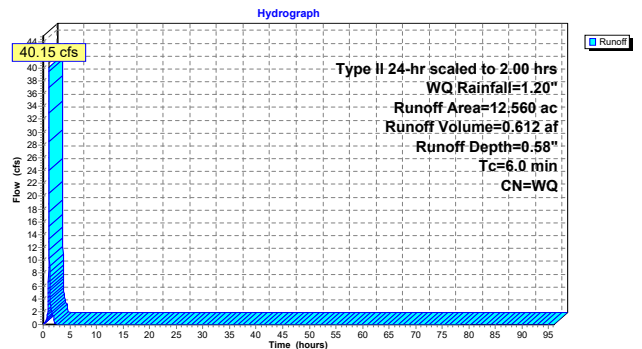
Runoff = 40.15 cfs @ 1.06 hrs, Volume= 0.612 af, Depth= 0.58"
 Routed to Pond 2P : ABVG. MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 5.110	61	Grass Cover
* 7.450	98	Impervious Area
12.560		Weighted Average
5.110		40.68% Pervious Area
7.450		59.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 11S: Drainage Area to Basin #2



Summary for Subcatchment 12S: Bypass Area 'A' (POI#2)

[45] Hint: Runoff=Zero

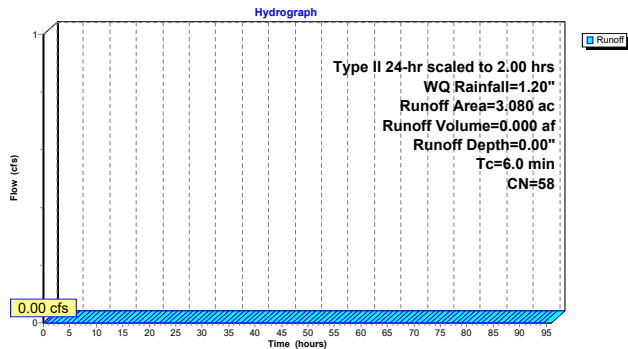
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 3.080	58	Meadow Seed Mix
3.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 12S: Bypass Area 'A' (POI#2)



Summary for Subcatchment 13S: Bypass Area 'B' (POI#2)

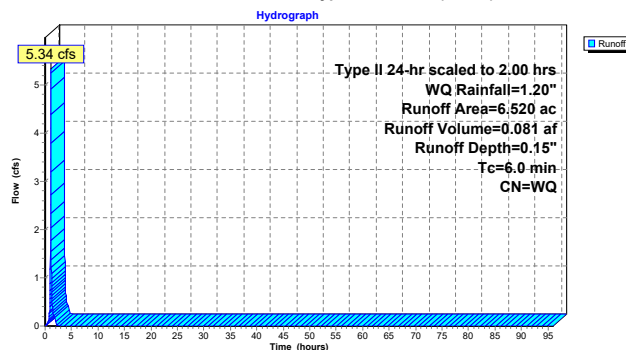
Runoff = 5.34 cfs @ 1.06 hrs, Volume= 0.081 af, Depth= 0.15"
 Routed to Link 6L : POI #2 (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 5.530	58	Meadow Seed Mix
* 0.990	98	Impervious
6.520		Weighted Average
5.530		84.82% Pervious Area
0.990		15.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 13S: Bypass Area 'B' (POI#2)



Summary for Subcatchment 14S: Drainage Area to Abvg Basin #3

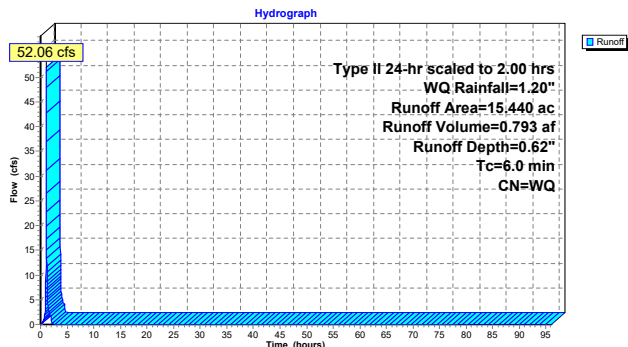
Runoff = 52.06 cfs @ 1.06 hrs, Volume= 0.793 af, Depth= 0.62"
 Routed to Pond 3P : ABVG. MRC Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 5.780	61	Grass Cover
* 9.660	98	Impervious
15.440		Weighted Average
5.780		37.44% Pervious Area
9.660		62.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 14S: Drainage Area to Abvg Basin #3



Summary for Subcatchment 15S: Bypass Area (POI#3)

[45] Hint: Runoff=Zero

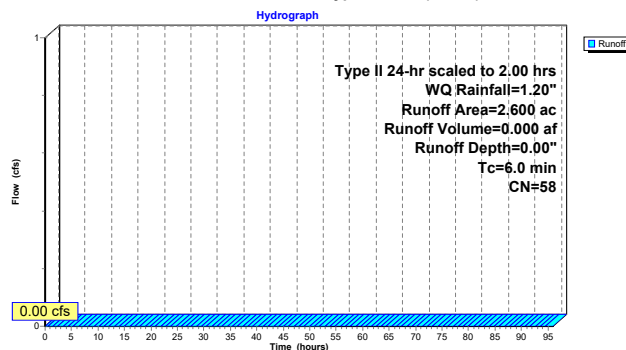
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Link 7L : POI #3 (Northeast)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr scaled to 2.00 hrs WQ Rainfall=1.20"

Area (ac)	CN	Description
* 2.600	58	Meadow Seed Mix
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 15S: Bypass Area (POI#3)



Summary for Pond 1P: ABVG. MRC Basin 1

Inflow Area = 27.240 ac, 73.38% Impervious, Inflow Depth = 0.72" for WQ event
 Inflow = 107.73 cfs @ 1.06 hrs, Volume= 1.642 af
 Outflow = 0.20 cfs @ 2.17 hrs, Volume= 1.216 af, Atten= 100%, Lag= 66.4 min
 Primary = 0.20 cfs @ 2.17 hrs, Volume= 1.216 af
 Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 338.40' @ 2.17 hrs Surf.Area= 212,078 sf Storage= 70,720 cf

Plug-Flow detention time= 2,473.1 min calculated for 1.216 af (74% of inflow)
 Center-of-Mass det. time= 2,465.8 min (2,535.8 - 70.0)

Volume	Invert	Avail. Storage	Storage Description
#1	338.00'	366,705 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	335.50'	10,501 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	336.50'	31,502 cf	MRC Soil (30% Voids) (Prismatic) Listed below (Recalc)
		105,008 cf Overall x 30.0% Voids	
		408,708 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
338.00	70,005	0	0
342.50	92,975	366,705	366,705

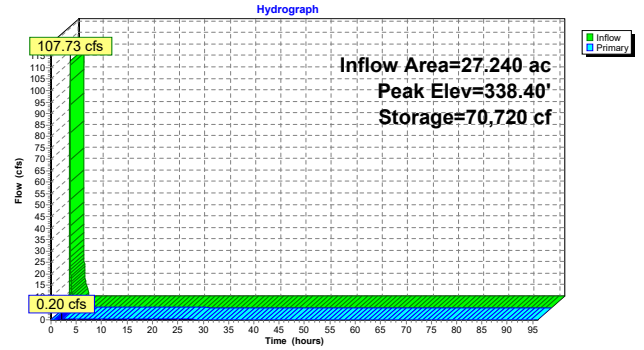
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
335.50	70,005	0	0
336.50	70,005	70,005	70,005

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
336.50	70,005	0	0
338.00	70,005	105,008	105,008

Device	Routing	Invert	Outlet Devices
#1	Primary	336.50'	30.0000" Round Culvert L= 219.3' Ke= 0.500 Inlet / Outlet Invert= 336.50' / 333.83' S= 0.0122 ' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	336.50'	2.3750" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	338.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.50 Width (feet) 1.75 1.75
#4	Device 1	341.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.20 cfs @ 2.17 hrs HW=338.40' (Free Discharge)
 1=Culvert (Passes 0.20 cfs of 18.85 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.20 cfs @ 6.47 fps)
 3=Weir (Controls 0.00 cfs)
 4=Grate (Controls 0.00 cfs)

Pond 1P: ABVG. MRC Basin 1



Summary for Pond 2P: ABVG. MRC Basin 2

Inflow Area = 24.560 ac, 79.19% Impervious, Inflow Depth = 0.78" for WQ event
 Inflow = 104.82 cfs @ 1.06 hrs, Volume= 1.598 af
 Outflow = 0.19 cfs @ 2.17 hrs, Volume= 1.168 af, Atten= 100%, Lag= 66.5 min
 Primary = 0.19 cfs @ 2.17 hrs, Volume= 1.168 af
 Routed to Link 6L : POI #2 (East)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 330.45' @ 2.17 hrs Surf.Area= 197,912 sf Storage= 68,836 cf

Plug-Flow detention time= 2,519.3 min calculated for 1.167 af (73% of inflow)
 Center-of-Mass det. time= 2,511.9 min (2,581.9 - 70.0)

Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	446,558 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	9,779 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	29,338 cf	MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
		97,793 cf Overall x 30.0% Voids	
		485,675 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	65,195	0	0
335.60	94,290	446,558	446,558

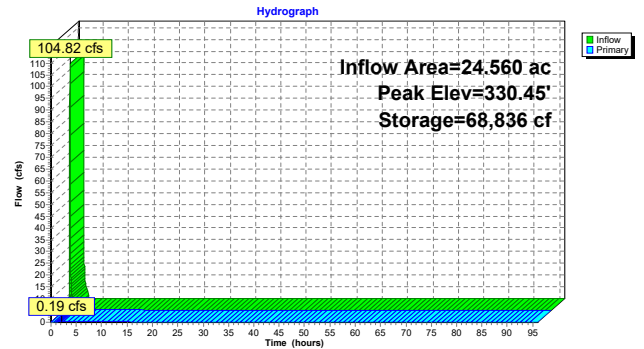
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
327.50	65,195	0	0
328.50	65,195	65,195	65,195

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	65,195	0	0
330.00	65,195	97,793	97,793

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	42.0000" Round Culvert L= 45.6' Ke= 0.500 Inlet / Outlet Invert= 326.50' / 323.00' S= 0.0768 ' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	328.50'	2.2813" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	333.50'	72.0000" x 72.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	330.50'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 1.37 1.37

Primary OutFlow Max=0.19 cfs @ 2.17 hrs HW=330.45' TW=328.50' (Fixed TW Elev= 328.50')
 1=Culvert (Passes 0.19 cfs of 64.65 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.19 cfs @ 6.55 fps)
 3=Grate (Controls 0.00 cfs)
 4=Weir (Controls 0.00 cfs)

Pond 2P: ABVG. MRC Basin 2



Summary for Pond 3P: ABVG. MRC Basin 3

Inflow Area = 15,440 ac, 62.56% Impervious, Inflow Depth = 0.62" for WQ event
 Inflow = 52.06 cfs @ 1.06 hrs, Volume= 0.793 af
 Outflow = 0.09 cfs @ 2.17 hrs, Volume= 0.515 af, Atten= 100%, Lag= 66.5 min
 Primary = 0.09 cfs @ 2.17 hrs, Volume= 0.515 af
 Routed to Link 7L : POI #3 (Northeast)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 330.07' @ 2.17 hrs Surf.Area= 154,185 sf Storage= 34,204 cf

Plug-Flow detention time= 2,416.7 min calculated for 0.515 af (65% of inflow)
 Center-of-Mass det. time= 2,408.0 min (2,478.0 - 70.0)

Volume	Invert	Avail. Storage	Storage Description
#1	330.00'	384,915 cf	Above Soil (Prismatic) Listed below (Recalc)
#2	327.50'	7,695 cf	IWS (15% Voids) (Prismatic) Listed below (Recalc)
#3	328.50'	23,085 cf	MRC Soil Media (30% Voids) (Prismatic) Listed below (Recalc)
		415,695 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	51,300	0	0
336.00	77,005	384,915	384,915

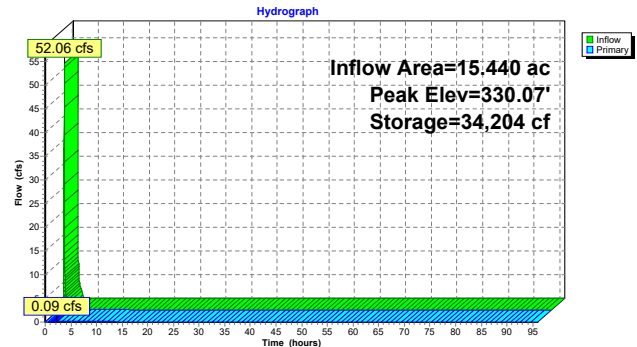
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
327.50	51,300	0	0
328.50	51,300	51,300	51,300

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	51,300	0	0
330.00	51,300	76,950	76,950

Device	Routing	Invert	Outlet Devices
#1	Primary	327.50'	36.0000" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 323.50' S= 0.0412 ' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	328.50'	1.6875" Vert. MRC Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	330.25'	12.0000" Vert. Main Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	333.00'	60.0000" x 60.0000" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#5	Device 1	332.00'	Weir, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 3.00 3.00

Primary OutFlow Max=0.09 cfs @ 2.17 hrs HW=330.07' TW=328.00' (Fixed TW Elev= 328.00')
 1=Culvert (Passes 0.09 cfs of 35.12 cfs potential flow)
 2=MRC Orifice (Orifice Controls 0.09 cfs @ 5.89 fps)
 3=Main Orifice (Controls 0.00 cfs)
 4=Grate (Controls 0.00 cfs)
 5=Weir (Controls 0.00 cfs)

Pond 3P: ABVG. MRC Basin 3

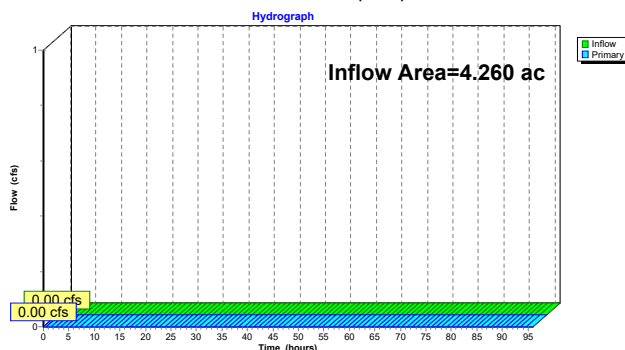


Summary for Link 5L: POI #1 (West)

Inflow Area = 4,260 ac, 0.00% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: POI #1 (West)

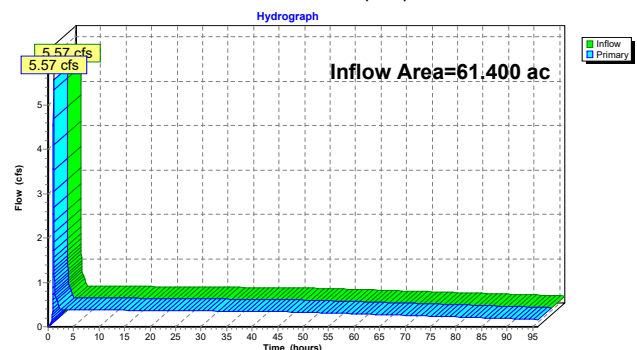


Summary for Link 6L: POI #2 (East)

Inflow Area = 61,400 ac, 65.85% Impervious, Inflow Depth = 0.48" for WQ event
 Inflow = 5.57 cfs @ 1.06 hrs, Volume= 2.465 af
 Primary = 5.57 cfs @ 1.06 hrs, Volume= 2.465 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 8L : Total Post-Development

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

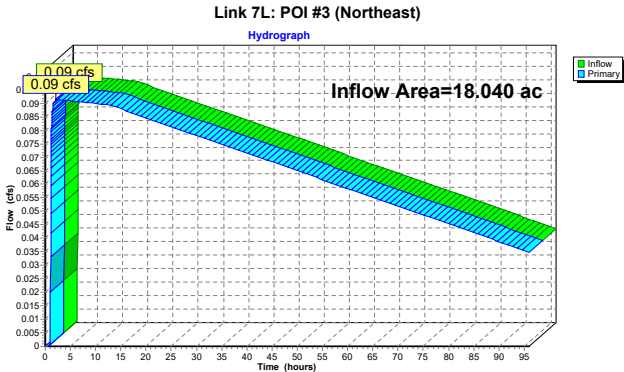
Link 6L: POI #2 (East)



Summary for Link 7L: POI #3 (Northeast)

Inflow Area = 18.040 ac, 53.55% Impervious, Inflow Depth > 0.34" for WQ event
Inflow = 0.09 cfs @ 2.17 hrs, Volume= 0.515 af
Primary = 0.09 cfs @ 2.17 hrs, Volume= 0.515 af, Atten= 0%, Lag= 0.0 min
Routed to Link 8L : Total Post-Development

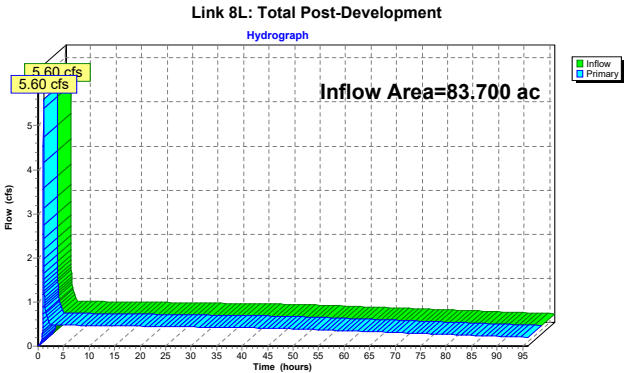
Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs



Summary for Link 8L: Total Post-Development

Inflow Area = 83.700 ac, 59.84% Impervious, Inflow Depth > 0.43" for WQ event
Inflow = 5.60 cfs @ 1.06 hrs, Volume= 2.979 af
Primary = 5.60 cfs @ 1.06 hrs, Volume= 2.979 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs



MRC BMP Design Summaries

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY (BMP #1)

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name: **Maiden Creek Associates, L.P.** Project Name: **Proposed Warehouse Facility**
Applicant Address: **120 W. Germantown Pike, Suite 120** Municipality: **Maidencreek Township**
City, State, Zip: **Plymouth Meeting, PA 19462** County: **Berks County**
Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.00	19.99	+19.99

MRC BMP INFORMATION

MRC BMP Type: **Dry Extended Detention Basin** Stormwater BMP Manual Section: **6.6.3**

Will the BMP Include Vegetation? ☒ Yes ☐ No

If Yes, Identify Proposed Vegetation: **ERNST Retention Basin Wildlife Seed Mix**

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☐ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment: _____

Name of Surface Water to Receive MRC BMP Discharges: **Peters Creek**

Designated Use of Surface Water: **EV, MF** Existing Use of Surface Water (if different): _____

Is the Surface Water Impaired? ☐ Yes ☒ No

If Yes, Identify Cause(s): _____

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Area prone to sinkholes (refer to appendix for geotechnical report)**

BMP Media Description: **Amended Soils (30% Void)**

Are Any Deviations from MRC Design Standards Proposed? ☐ Yes ☒ No

If Yes, Identify Deviations: _____

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	19.99	
Equivalent Contributing Impervious Area to BMP (acres)	19.71	
Total Drainage Area to BMP (acres)	27.24	
MRC BMP Release Rate (cfs)	0.20	No greater than 0.01 cfs / acre of equivalent contributing impervious
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	0.20	<= MRC BMP Release Rate (cfs)
Maximum Storm Event Routed to MRC BMP	100-Year	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft ²)	70,005	
Bottom BMP Elevation (Native Soils) (ft)	335.50	
2-Yr/24-Hr Storm Ponding Depth (ft)	1.24	1 ft (recommended) (2 ft max)
Maximum Ponding Depth (ft)	3.65	4 ft (max)
Overflow Bypass Elevation (ft)	338.50	
Media Depth (ft)	2.5 FT	2 ft (min) – 4 ft (max)
Media Void Space (%)	30%	
Internal Water Storage (IWS) Depth (ft)	1 FT	1 ft recommended
Top of IWS Elevation (ft)	336.50	
Underdrain Pipe Diameter (in)	4"	
Underdrain Orifice Diameter (in)	2-3/8"	
Underdrain Outlet Elevation (ft)	336.50	
IWS Available for Routing (%)	50%	50% max
Separation Distance (Groundwater) (ft)	> 2 FT	1 ft (min) (2 ft recommended)
Infiltration Rate (in/hr)	0	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	0	0 (No overflow allowed)
1-Yr/24-Hr Pre -Development Peak Rate (cfs)	19.25	
2-Yr/24-Hr Post -Development Peak Rate (cfs)	3.88	1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)
10-Yr/24-Hr Post -Development Peak Rate (cfs)	12.96	10-Yr/24-Hr Pre-Development Peak Rate
50-Yr/24-Hr Post -Development Peak Rate (cfs)	32.30	50-Yr/24-Hr Pre-Development Peak Rate
100-Yr/24-Hr Post -Development Peak Rate (cfs)	46.70	100-Yr/24-Hr Pre-Development Peak Rate
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	200,637	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	66	72 hrs (surface), 7 days (underground)
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	68	72 hrs (surface), 7 days (underground)
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	70	72 hrs (surface), 7 days (underground)
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	70	72 hrs (surface), 7 days (underground)

Cornelius Brown
Licensed P.E. Name

Cornelius Brown
Licensed P.E. Signature

PE075317
License No.

09/29/2023
Date



MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY (BMP #2)

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name: **Maiden Creek Associates, L.P.** Project Name: **Proposed Warehouse Facility**
Applicant Address: **120 W. Germantown Pike, Suite 120** Municipality: **Maidencreek Township**
City, State, Zip: **Plymouth Meeting, PA 19462** County: **Berks County**
Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.00	19.45	+19.45

MRC BMP INFORMATION

MRC BMP Type: **Dry Extended Detention Basin** Stormwater BMP Manual Section: **6.6.3**

Will the BMP Include Vegetation? ☒ Yes ☐ No

If Yes, Identify Proposed Vegetation: **ERNST Retention Basin Wildlife Seed Mix**

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☐ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment: _____

Name of Surface Water to Receive MRC BMP Discharges: **Peters Creek**

Designated Use of Surface Water: **EV, MF** Existing Use of Surface Water (if different): _____

Is the Surface Water Impaired? ☐ Yes ☒ No

If Yes, Identify Cause(s): _____

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Area prone to sinkholes (refer to appendix for geotechnical report)**

BMP Media Description: **Amended Soils (30% Void)**

Are Any Deviations from MRC Design Standards Proposed? ☐ Yes ☒ No

If Yes, Identify Deviations: _____

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	19.45	
Equivalent Contributing Impervious Area to BMP (acres)	19.18	
Total Drainage Area to BMP (acres)	24.56	
MRC BMP Release Rate (cfs)	0.19	No greater than 0.01 cfs / acre of equivalent contributing impervious
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	0.19	<= MRC BMP Release Rate (cfs)
Maximum Storm Event Routed to MRC BMP	100-Year	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft ²)	65,195	
Bottom BMP Elevation (Native Soils) (ft)	327.50	
2-Yr/24-Hr Storm Ponding Depth (ft)	1.31	1 ft (recommended) (2 ft max)
Maximum Ponding Depth (ft)	3.78	4 ft (max)
Overflow Bypass Elevation (ft)	330.50	
Media Depth (ft)	2.5 FT	2 ft (min) – 4 ft (max)
Media Void Space (%)	30%	
Internal Water Storage (IWS) Depth (ft)	1 FT	1 ft recommended
Top of IWS Elevation (ft)	328.50	
Underdrain Pipe Diameter (in)	4"	
Underdrain Orifice Diameter (in)	2-9/32"	
Underdrain Outlet Elevation (ft)	328.50	
IWS Available for Routing (%)	50%	50% max
Separation Distance (Groundwater) (ft)	>2 FT	1 ft (min) (2 ft recommended)
Infiltration Rate (in/hr)	0	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	0	0 (No overflow allowed)
1-Yr/24-Hr Pre -Development Peak Rate (cfs)	17.36	
2-Yr/24-Hr Post -Development Peak Rate (cfs)	3.51	1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)
10-Yr/24-Hr Post -Development Peak Rate (cfs)	11.01	10-Yr/24-Hr Pre-Development Peak Rate
50-Yr/24-Hr Post -Development Peak Rate (cfs)	21.83	50-Yr/24-Hr Pre-Development Peak Rate
100-Yr/24-Hr Post -Development Peak Rate (cfs)	37.83	100-Yr/24-Hr Pre-Development Peak Rate
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	192,971	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	68	72 hrs (surface), 7 days (underground)
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	70	72 hrs (surface), 7 days (underground)
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	72	72 hrs (surface), 7 days (underground)
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	72	72 hrs (surface), 7 days (underground)

Cornelius Brown
Licensed P.E. Name

Cornelius Brown
Licensed P.E. Signature

PE075317
License No.

09/29/2023
Date



MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY (BMP #3)

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name: **Maiden Creek Associates, L.P.** Project Name: **Proposed Warehouse Facility**
Applicant Address: **120 W. Germantown Pike, Suite 120** Municipality: **Maidencreek Township**
City, State, Zip: **Plymouth Meeting, PA 19462** County: **Berks County**
Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.00	9.66	+9.66

MRC BMP INFORMATION

MRC BMP Type: **Dry Extended Detention Basin** Stormwater BMP Manual Section: **6.6.3**

Will the BMP Include Vegetation? ☒ Yes ☐ No

If Yes, Identify Proposed Vegetation: **ERNST Retention Basin Wildlife Seed Mix**

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☐ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment: _____

Name of Surface Water to Receive MRC BMP Discharges: **Peters Creek**

Designated Use of Surface Water: **EV, MF** Existing Use of Surface Water (if different): _____

Is the Surface Water Impaired? ☐ Yes ☒ No

If Yes, Identify Cause(s): _____

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Area prone to sinkholes (refer to appendix for geotechnical report)**

BMP Media Description: **Amended Soils (30% Void)**

Are Any Deviations from MRC Design Standards Proposed? ☐ Yes ☒ No

If Yes, Identify Deviations: _____

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	9.66	
Equivalent Contributing Impervious Area to BMP (acres)	9.44	
Total Drainage Area to BMP (acres)	15.44	
MRC BMP Release Rate (cfs)	0.09	No greater than 0.01 cfs / acre of equivalent contributing impervious
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	0.09	<= MRC BMP Release Rate (cfs)
Maximum Storm Event Routed to MRC BMP	100-Year	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft ²)	51,300	
Bottom BMP Elevation (Native Soils) (ft)	327.50	
2-Yr/24-Hr Storm Ponding Depth (ft)	0.76	1 ft (recommended) (2 ft max)
Maximum Ponding Depth (ft)	2.77	4 ft (max)
Overflow Bypass Elevation (ft)	330.25	
Media Depth (ft)	2.5 FT	2 ft (min) – 4 ft (max)
Media Void Space (%)	30%	
Internal Water Storage (IWS) Depth (ft)	1 FT	1 ft recommended
Top of IWS Elevation (ft)	328.50	
Underdrain Pipe Diameter (in)	4"	
Underdrain Orifice Diameter (in)	1-11/16"	
Underdrain Outlet Elevation (ft)	328.50	
IWS Available for Routing (%)	50%	50% max
Separation Distance (Groundwater) (ft)	>2 FT	1 ft (min) (2 ft recommended)
Infiltration Rate (in/hr)	0	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	0	0 (No overflow allowed)
1-Yr/24-Hr Pre -Development Peak Rate (cfs)	10.91	
2-Yr/24-Hr Post -Development Peak Rate (cfs)	1.09	1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)
10-Yr/24-Hr Post -Development Peak Rate (cfs)	3.42	10-Yr/24-Hr Pre-Development Peak Rate
50-Yr/24-Hr Post -Development Peak Rate (cfs)	7.49	50-Yr/24-Hr Pre-Development Peak Rate
100-Yr/24-Hr Post -Development Peak Rate (cfs)	12.11	100-Yr/24-Hr Pre-Development Peak Rate
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	99,622	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	66	72 hrs (surface), 7 days (underground)
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	68	72 hrs (surface), 7 days (underground)
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	70	72 hrs (surface), 7 days (underground)
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	72	72 hrs (surface), 7 days (underground)

Cornelius Brown
Licensed P.E. Name

Cornelius Brown
Licensed P.E. Signature

PE075317
License No.

09/29/2023
Date



Supporting Calculations

Swale Calculations

Project: **PP213222 Maidencreek Warehouse**

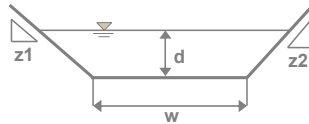
Description: **Vegetated Diversion Swale to POI#1**

Swale Name: **Vegetated Swale #1 (BMP #5)**

Input Channel Parameters

Channel Dimensions

z1	3.00	ft. (horiz to 1' vert.)
z2	3.00	ft. (horiz to 1' vert.)
w	4.00	ft. (bottom width)
d	2.50	ft. (design depth)



Slope Condition

Minimum	0.0100	ft/ft (capacity)
Maximum	0.0530	ft/ft (stability)
Entire	0.0246	ft/ft

Evaluate Temporary & Permanent Conditions

Design Method: **Shear Stress**

☒ **Temporary**

Calculate Design Flow (Q)

		cfs
Area	4.26	acres
x	1.60	cfs/acre

6.82 cfs (design Q)

Results

	n-value	d	v (fps)	τ_d (lb/ft ²)
Min. slope	0.034	0.52	2.36	0.32
Max. slope	0.050	0.41	3.22	1.34
Entire slope	0.050	0.50	2.47	0.77

Select Lining Material

	Lining	Retardance (A, B, C, D)	d ₅₀ Stone Size (in.)	Initial n-value	Allowable Velocity	Allowable τ_d (lb/ft ²)
z1	NAG SC150	N/A	N/A	0.050	8.000	2.000
z2	NAG SC150	N/A	N/A	0.050	8.000	2.000
w	NAG SC150	N/A	N/A	0.050	8.000	2.000

☒ **Permanent**

Calculate Design Flow (Q)

		cfs
Area	4.26	acres
x	2.75	cfs/acre

11.72 cfs (design Q)

Results

	n-value	d	v (fps)	τ_d (lb/ft ²)
Min. slope	0.034	0.70	2.76	0.43
Max. slope	0.050	0.55	3.80	1.81
Entire slope	0.034	0.55	3.80	0.84

Select Lining Material

	Lining	Retardance (A, B, C, D)	d ₅₀ Stone Size (in.)	Initial n-value	Allowable Velocity	Allowable τ_d (lb/ft ²)
z1	NAG SC150	N/A	N/A	0.050	8.000	2.000
z2	NAG SC150	N/A	N/A	0.050	8.000	2.000
w	NAG SC150	N/A	N/A	0.050	8.000	2.000

STANDARD E&S WORKSHEET # 11

Channel Design Data

Project Name : PP213222 - Maidencreek Warehouse

Location: Maidencreek Township, Berks County, PA

Prepared By: Steve Amato Date: 06/30/2023

Checked By: Lindsey Breylinger Date: 06/30/2023

CHANNEL OR CHANNEL SECTION	#1 (MAX)	#1 (MIN)			
TEMPORARY OR PERMANENT? (T OR P)	P	P			
DESIGN STORM (2, 5, OR 10 YR)	5	5			
ACRES (AC)	4.26	4.26			
MULTIPLIER (1.6, 2.25, or 2.75) ¹	2.75	2.75			
Q _r (REQUIRED CAPACITY) (CFS)	11.72	11.72			
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.55	0.7			
PROTECTIVE LINING ²	NAG SC150	NAG SC150			
n (MANNING'S COEFFICIENT) ²	0.05	0.034			
V _a (ALLOWABLE VELOCITY) (FPS)	8	8			
V (CALCULATED AT FLOW DEPTH d) (FPS)	3.8	2.76			
τ_a (MAX ALLOWABLE SHEAR STRESS) (LB/FT) ²	2	2			
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT) ²	1.81	0.43			
CHANNEL BOTTOM WIDTH (FT)	4	4			
CHANNEL SIDE SLOPES (H:V)	3 TO 1	3 TO 1			
D (TOTAL DEPTH) (FT)	2.5	2.5			
CHANNEL TOP WIDTH @ D (FT)	19	19			
d (CALCULATED FLOW DEPTH) (FT)	0.55	0.7			
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	7.3	8.2			
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	7.27 TO 1	5.71 TO 1			
d ₅₀ STONE SIZE (IN)	N/A	N/A			
A (CROSS-SECTIONAL AREA) (SQ. FT.)	3.11	4.27			
R (HYDRAULIC RADIUS)	0.42	0.51			
S (BED SLOPE) ³ (FT/FT)	0.053	0.01			
S _c (CRITICAL SLOPE) (FT/FT)	0.053	0.01			
.7S _c (FT/FT)	0.0371	0.007			
1.3S _c (FT/FT)	0.0689	0.013			
STABLE FLOW? (Y/N)	Y	Y			
FREEBOARD BASED ON UNSTABLE FLOW (FT)	N/A	N/A			
FREEBOARD BASED ON STABLE FLOW (FT)	1.95	1.8			
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.625	0.625			
DESIGN METHOD FOR PROTECTIVE LINING ⁵	S	S			
PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)					

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.

2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.

3. Slopes may not be averaged.

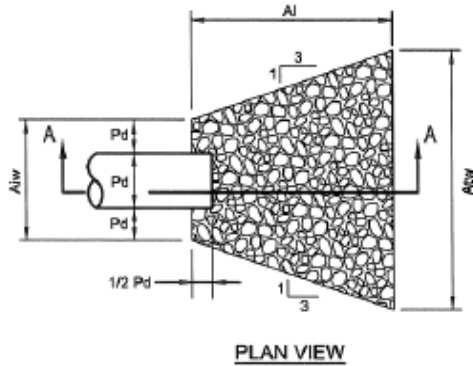
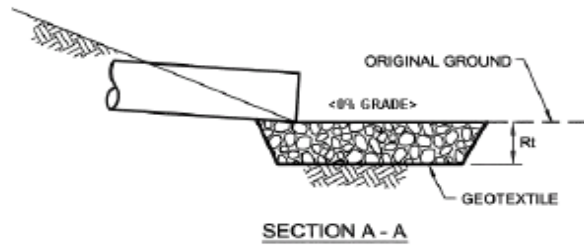
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater

5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design may be used for any channel bed slope.

Rip-rap Apron Summary Sheet

Project: [PP213222 - Maiden Creek Warehouse](#)

Description: [Rip-Rap Calculations](#)

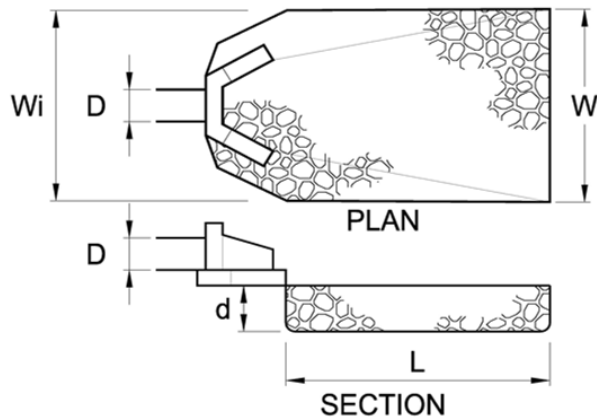


Outlet Name	Pipe						Apron					
	Dia. In.	Tail Water Condition Min or Max	Manning's "n" For Pipe	Slope	Q cfs	V ¹ fps	d ₅₀ R- in.		Rt in.	Al ft.	Aiw ft.	Atw ft.
EW101	48	MIN	0.012	0.0050	55.51	3.73	5	9	27.0	26.00	12.0	38
EW102	42	MIN	0.012	0.0052	45.01	5.46	4	6	18.0	22.00	10.5	32.5
EW201	24	MIN	0.012	0.0050	5.48	3.07	4	6	18.0	13.00	6.0	19
EW202	48	MIN	0.012	0.0050	67.89	7.44	5	9	27.0	26.00	12.0	38
EW301	36	MIN	0.012	0.0052	39.21	3.09	5	9	27.0	21.00	9.0	30

Rip-Rap Apron Worksheet

Project: PP213222 - Maiden Creek Warehouse

Description: EW101



Rip-Rap Dimensions:

$L =$ 26.0 ft
 $W =$ 38.0 ft
 $W_i =$ 12.0 ft

Rip-rap Size = R-5
 $d_{50} =$ 9.0 in
 $d =$ 27.0 in

Design Values:

$n =$ Manning's n
 $D =$ Diameter of Pipe
 $S =$ Slope of Pipe
 $Q_d =$ Design Discharge
 $V_d =$ Velocity
 $T_w =$ Tailwater Condition
 $A =$ Full Flow Area of Pipe

n	0.012
D	48
S	0.0050
Q_d	55.51
V_d	3.73
T_w	MIN
A	12.57

	Rise (in.)	Span (in.)	Barrels
in.	48	48	1
ft/ft			
cfs***	55.51	5.68	6.44
fps***	3.73		
either MIN or MAX			
sf			

*** Formulas based on full-flow capacity.

Full Flow Pipe Discharge:

$Q_f = 0.464/n * D^{8/3} * S^{1/2} =$ 110.23 cfs

Ratio of Part-Full to Full Flow Discharge:

$d/D = Q_d/Q_f =$ 0.50

Figure 20 Ratios:

Area of Flow = 0.50
 Depth of Flow = 0.50

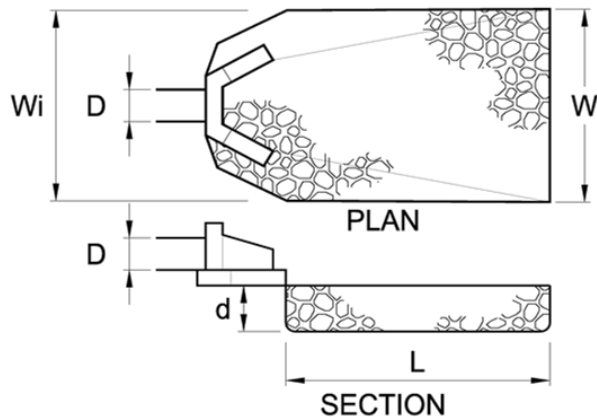
Calculate Equivalent Flow:

$A * Ratio =$ 6.30 sf
 Equivalent Pipe Size full-flow = 30 in (smaller size = larger rip-rap (factor of safety))

Rip-Rap Apron Worksheet

Project: PP213222 - Maiden Creek Warehouse

Description: EW102



Rip-Rap Dimensions:

$L =$ 22.0 ft
 $W =$ 32.5 ft
 $W_i =$ 10.5 ft

Rip-rap Size = R-4
 $d_{50} =$ 6.0 in
 $d =$ 18.0 in

Design Values:

$n =$ Manning's n
 $D =$ Diameter of Pipe
 $S =$ Slope of Pipe
 $Q_d =$ Design Discharge
 $V_d =$ Velocity
 $T_w =$ Tailwater Condition
 $A =$ Full Flow Area of Pipe

n	0.012
D	42
S	0.0052
Q_d	45.01
V_d	5.46
T_w	MIN
A	9.62

	Rise (in.)	Span (in.)	Barrels
in.	42	42	1
ft/ft			
cfs***	45.01	5.68	6.44
fps***	5.46		
either MIN or MAX			
sf			

*** Formulas based on full-flow capacity.

Full Flow Pipe Discharge:

$Q_f = 0.464/n * D^{8/3} * S^{1/2} =$
78.74 cfs

Ratio of Part-Full to Full Flow Discharge:

$d/D = Q_d/Q_f =$
0.57

Figure 20 Ratios:

Area of Flow =	0.55
Depth of Flow =	0.54

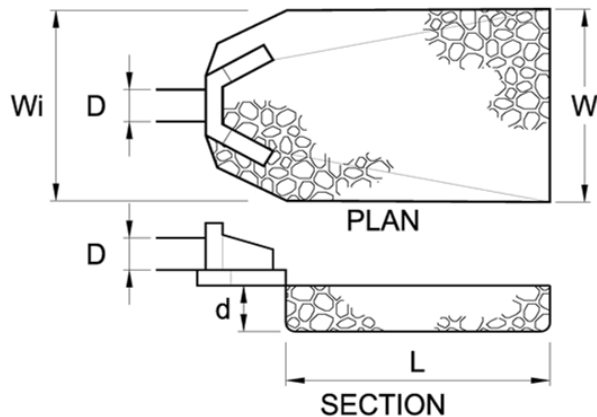
Calculate Equivalent Flow:

$A * Ratio =$ 5.29 sf
 Equivalent Pipe Size full-flow = 30 in (smaller size = larger rip-rap (factor of safety))

Rip-Rap Apron Worksheet

Project: PP213222 - Maiden Creek Warehouse

Description: EW201



Rip-Rap Dimensions:

$L =$ 13.0 ft
 $W =$ 19.0 ft
 $W_i =$ 6.0 ft

Rip-rap Size = R-4
 $d_{50} =$ 6.0 in
 $d =$ 18.0 in

Design Values:

$n =$ Manning's n
 $D =$ Diameter of Pipe
 $S =$ Slope of Pipe
 $Q_d =$ Design Discharge
 $V_d =$ Velocity
 $T_w =$ Tailwater Condition
 $A =$ Full Flow Area of Pipe

n	0.012
D	24
S	0.0050
Q_d	5.48
V_d	3.07
T_w	MIN
A	3.14

	Rise (in.)	Span (in.)	Barrels
in.	24	24	1
ft/ft			
cfs***	5.48	5.68	6.44
fps***	3.07		
either MIN or MAX			
sf			

*** Formulas based on full-flow capacity.

Full Flow Pipe Discharge:

$Q_f = 0.464/n * D^{8/3} * S^{1/2} =$ 17.36 cfs

Ratio of Part-Full to Full Flow Discharge:

$d/D = Q_d/Q_f =$ 0.32

Figure 20 Ratios:

Area of Flow =	0.36
Depth of Flow =	0.39

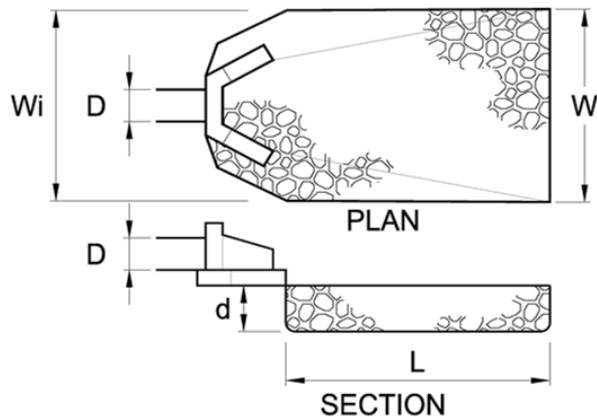
Calculate Equivalent Flow:

$A * Ratio =$ 1.14 sf
 Equivalent Pipe Size full-flow = 12 in (smaller size = larger rip-rap (factor of safety))

Rip-Rap Apron Worksheet

Project: PP213222 - Maiden Creek Warehouse

Description: EW202



Rip-Rap Dimensions:

L = 26.0 ft
W = 38.0 ft
Wi = 12.0 ft

Rip-rap Size = R-5
d50 = 9.0 in
d = 27.0 in

Design Values:

n = Manning's n
D = Diameter of Pipe
S = Slope of Pipe
Q_d = Design Discharge
V_d = Velocity
T_w = Tailwater Condition
A = Full Flow Area of Pipe

n	0.012
D	48
S	0.0050
Q _d	67.89
V _d	7.44
T _w	MIN
A	12.57

	Rise (in.)	Span (in.)	Barrels
	48	48	1
in.			
ft/ft			
cfs***	67.89	5.68	6.44
fps***	7.44		
either MIN or MAX			
sf			

*** Formulas based on full-flow capacity.

Full Flow Pipe Discharge:

Q_f = $0.464/n * D^{8/3} * S^{1/2} =$ 110.23 cfs

Ratio of Part-Full to Full Flow Discharge:

d/D = Q_d/Q_f = 0.62

Figure 20 Ratios:

Area of Flow = 0.58
Depth of Flow = 0.57

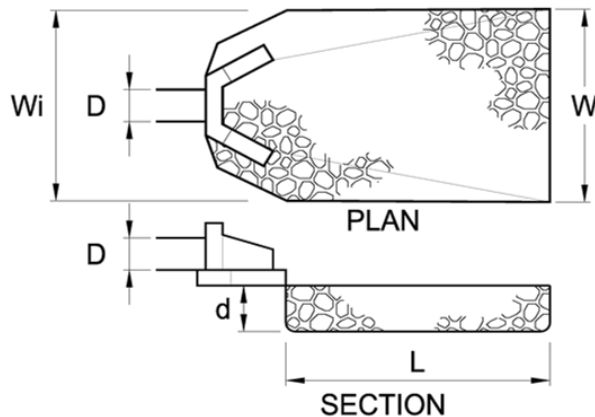
Calculate Equivalent Flow:

A * Ratio = 7.31 sf
Equivalent Pipe Size full-flow = 36 in (smaller size = larger rip-rap (factor of safety))

Rip-Rap Apron Worksheet

Project: PP213222 - Maiden Creek Warehouse

Description: EW301



Rip-Rap Dimensions:

$L =$ 21.0 ft
 $W =$ 30.0 ft
 $W_i =$ 9.0 ft

Rip-rap Size = R-5
 $d_{50} =$ 9.0 in
 $d =$ 27.0 in

Design Values:

$n =$ Manning's n
 $D =$ Diameter of Pipe
 $S =$ Slope of Pipe
 $Q_d =$ Design Discharge
 $V_d =$ Velocity
 $T_w =$ Tailwater Condition
 $A =$ Full Flow Area of Pipe

n	0.012
D	36
S	0.0052
Q_d	39.21
V_d	3.09
T_w	MIN
A	7.07

in. $\leftarrow$ Rise (in.) 36 x Span (in.) 36 $\leftarrow$ Barrels 1
 ft/ft $\leftarrow$ 39.21 5.68 6.44
 cfs*** $\leftarrow$ 3.09
 fps*** $\leftarrow$ 3.09
 either MIN or MAX
 sf
 *** Formulas based on full-flow capacity.

Full Flow Pipe Discharge:

$Q_f = 0.464/n * D^{8/3} * S^{1/2} =$ 52.20 cfs

Ratio of Part-Full to Full Flow Discharge:

$d/D = Q_d/Q_f =$ 0.75

Figure 20 Ratios:

Area of Flow = 0.69
 Depth of Flow = 0.64

Calculate Equivalent Flow:

$A * Ratio =$ 4.89 sf
 Equivalent Pipe Size full-flow = 27 in (smaller size = larger rip-rap (factor of safety))

Spillway Calculations

Project Name: PP213222 - Maidencreek Warehouse

Description: MRC Basin #1 (BMP #1)

Determine Values for Equation $Q = CLH^{1.5}$

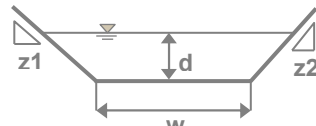
Q = 251.28 Post-development 100-year flow (cfs)
 L = 260 Length (LF)
 C = 2.80 Weir Coefficient
     ↓
 H = 0.49 Flow Depth Over Weir (ft)

Determine Required Top of Berm Elevation

342.50 Spillway Elevation
 + 1.00 Required Freeboard
 + 0.49 Depth of Flow (from above)
     ↓
 = 343.99 Required Top of Berm Elevation

344.00 Provided Top of Berm Elevation

Determine Spillway Lining



Z1 & Z2 = 3.00 ft : ft
 Slope = 0.33 ft/ft (downslope of spillway)

Velocity Design Method

1.95 Calculated Velocity (fps)

NAG SC150 Spillway Lining

    ↓
8.00 Allowable Velocity (fps)

Spillway Calculations

Project Name: **PP213222 - Maidencreek Warehouse**

Description: **MRC Basin #2 (BMP #2)**

Determine Values for Equation $Q = CLH^{1.5}$

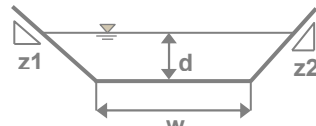
Q = **234.03** Post-development 100-year flow (cfs)
L = **325** Length (LF)
C = **2.80** Weir Coefficient
↓
H = **0.40** Flow Depth Over Weir (ft)

Determine Required Top of Berm Elevation

335.60 Spillway Elevation
+ **1.00** Required Freeboard
+ **0.40** Depth of Flow (from above)
↓
= **337.00** Required Top of Berm Elevation

337.00 Provided Top of Berm Elevation

Determine Spillway Lining



Z1 & Z2 = **3.00** ft : ft
Slope = **0.33** ft/ft (downslope of spillway)

Velocity Design Method

1.77 Calculated Velocity (fps)

NAG SC150 Spillway Lining
↓
8.00 Allowable Velocity (fps)

Spillway Calculations

Project Name: PP213222 - Maidencreek Warehouse

Description: MRC Basin #3 (BMP #3)

Determine Values for Equation $Q = CLH^{1.5}$

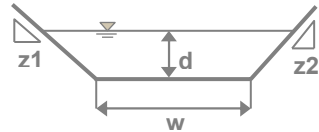
Q = 133.70 Post-development 100-year flow (cfs)
 L = 50 Length (LF)
 C = 2.80 Weir Coefficient
     ↓
 H = 0.97 Flow Depth Over Weir (ft)

Determine Required Top of Berm Elevation

336.00 Spillway Elevation
 + 1.00 Required Freeboard
 + 0.97 Depth of Flow (from above)
     ↓
 = 337.97 Required Top of Berm Elevation

338.00 Provided Top of Berm Elevation

Determine Spillway Lining



Z1 & Z2 = 3.00 ft : ft
 Slope = 0.33 ft/ft (downslope of spillway)

Velocity Design Method

2.61 Calculated Velocity (fps)

NAG SC150 Spillway Lining

8.00 Allowable Velocity (fps)

Level Spreader Calculations

Project Name: PP213222 - Maidencreek Warehouse

Description: Level Spreader LS101 (AG MRC Basin #1)

Subsurface Discharge to Perforated Pipe Level Spreader

Determine Level Spreader Length from $L = 13 \cdot Q$

$Q = 10 \text{ Year Flow}^* \text{ (cfs)}$

$Q =$ cfs

$L =$ feet

Proposed Level Spreader Length = feet

Proposed Perforated Pipe Diameter** = in

*Determined from Hydraflow Hydragraphs 10-year flow included in the report.

**Per the BMP Manual Requirements.

Note: Protective geofabric liner to be used downslope of the level spreader lip to be North American Green SC250 matting.

Level Spreader Calculations

Project Name: PP213222 - Maidencreek Warehouse

Description: Level Spreader LS201 (AG MRC Basin #2)

Subsurface Discharge to Perforated Pipe Level Spreader

Determine Level Spreader Length from $L = 13 \cdot Q$

$Q = 10 \text{ Year Flow}^* \text{ (cfs)}$

$Q =$ cfs

$L =$ feet

Proposed Level Spreader Length = feet

Proposed Perforated Pipe Diameter** = in

*Determined from Hydraflow Hydragraphs 10-year flow included in the report.

**Per the BMP Manual Requirements.

Note: Protective geofabric liner to be used downslope of the level spreader lip to be North American Green SC250 matting.

Level Spreader Calculations

Project Name: PP213222 - Maidencreek Warehouse

Description: Level Spreader LS301 (AG MRC Basin #3)

Subsurface Discharge to Perforated Pipe Level Spreader

Determine Level Spreader Length from $L = 13 \cdot Q$

$Q = 10 \text{ Year Flow}^* \text{ (cfs)}$

$Q =$ cfs

$L =$ feet

Proposed Level Spreader Length = feet

Proposed Perforated Pipe Diameter** = in

*Determined from Hydraflow Hydragraphs 10-year flow included in the report.

**Per the BMP Manual Requirements.

Note: Protective geofabric liner to be used downslope of the level spreader lip to be North American Green SC250 matting.

Level Spreader Calculations

Project Name: PP213222 - Maidencreek Warehouse

Description: Level Spreader LS401 (PennDOT Bypass)

Subsurface Discharge to Perforated Pipe Level Spreader

Determine Level Spreader Length from $L = 13 \cdot Q$

$Q = 10 \text{ Year Flow}^* \text{ (cfs)}$

$Q =$ cfs

$L =$ feet

Proposed Level Spreader Length = feet

Proposed Perforated Pipe Diameter** = in

*Determined from Hydraflow Hydragraphs 10-year flow included in the report.

**Per the BMP Manual Requirements.

Note: Protective geofabric liner to be used downslope of the level spreader lip to be North American Green SC250 matting.

Level Spreader Calculations

Project Name: PP213222 - Maidencreek Warehouse

Description: Earthen Level Spreader LS501

Above Ground Swale to Earthen Level Spreader

Determine Level Spreader Length from $L = 13 \cdot Q$

Q = 10 Year Flow* (cfs)

Q = cfs

L = feet

Proposed Level Spreader Length = feet

Proposed Perforated Pipe Diameter** = in

*Determined from Hydraflow Hydragraphs 10-year flow included in the report.

**Per the BMP Manual Requirements.

Note: Protective geofabric liner to be used downslope of the level spreader lip to be North American Green SC250 matting.

Loading Ratio Calculations

Project Name: PP213222 - Maidencreek Warehouse

Description: Loading Ratio Calculations

Aboveground MRC Basin #1 (BMP #1)	
Impervious Area	19.99 AC
Basin Bottom Area	1.61 AC
<u>Loading Ratio*</u>	12.4
Aboveground MRC Basin #2 (BMP #2)	
Impervious Area	19.45 AC
Basin Bottom Area	1.5 AC
<u>Loading Ratio*</u>	13.0
Aboveground MRC Basin #3 (BMP #3)	
Impervious Area	9.66 AC
Basin Bottom Area	1.18 AC
<u>Loading Ratio*</u>	8.2

* Loading ratios are provided as requested by DEP. These BMPs do NOT infiltrate and have been designed to MRC standards.

ANTI-SEEP COLLAR DESIGN

PROJECT: PP213222 - Maidencreek Warehouse
Aboveground MRC Basin #1
_____

DATE: 6/30/2023
LAST REV: _____
BY: SJA
CHECKED BY: _____

Calculate length of pipe within the saturated zone of the embankment

$$L_s = y * (z + 4) * [1 + (\text{pipe slope}) / (.25 - \text{pipe slope})]$$

L_s = Length of pipe in the saturated zone (ft)

y = Distance in feet from the outlet structure invert to the emergency spillway (highest normal water level expected to occur during the life of the structure)

z = Slope of the upstream embankment (ratio of z horizontal to 1' vertical)

y = 4.5 ft.

z = 3.0 ft.

s = 0.0122 ft./ft. (Outlet Structure Pipe Slope)

L_s = 33.12 ft.

Calculate the minimum number of collars required

$$N = (.075 * L_s) / P$$

N = Number of anti-seep collars required

L_s = Length of pipe in the saturated zone (ft)

P = Vertical projection of collar from pipe (ft)

L_s = 33.12 ft. (from above)

P = 2.0 ft.

N = 1.24

Therefore use 2.00 anti-seep collars

Collar spacing shall be between 5 and 14 times the vertical projection

$5 * P$ = 10.00

$14 * P$ = 28.00

ANTI-SEEP COLLAR DESIGN

PROJECT: PP213222 - Maidencreek Warehouse
Aboveground MRC Basin #2

DATE: 6/30/2023
LAST REV: _____
BY: SJA
CHECKED BY: _____

Calculate length of pipe within the saturated zone of the embankment

$$L_s = y * (z + 4) * [1 + (\text{pipe slope}) / (.25 - \text{pipe slope})]$$

L_s = Length of pipe in the saturated zone (ft)

y = Distance in feet from the outlet structure invert to the emergency spillway (highest normal water level expected to occur during the life of the structure)

z = Slope of the upstream embankment (ratio of z horizontal to 1' vertical)

y = 5.6 ft.

z = 3.0 ft.

s = 0.0768 ft./ft. (Outlet Structure Pipe Slope)

L_s = 56.58 ft.

Calculate the minimum number of collars required

$$N = (.075 * L_s) / P$$

N = Number of anti-seep collars required

L_s = Length of pipe in the saturated zone (ft)

P = Vertical projection of collar from pipe (ft)

L_s = 56.58 ft. (from above)

P = 3.0 ft.

N = 1.41

Therefore use 2.00 anti-seep collars

Collar spacing shall be between 5 and 14 times the vertical projection

$5 * P$ = 15.00

$14 * P$ = 42.00

ANTI-SEEP COLLAR DESIGN

PROJECT: PP213222 - Maidencreek Warehouse
Aboveground MRC Basin #3

DATE: 6/30/2023
LAST REV: _____
BY: SJA
CHECKED BY: _____

Calculate length of pipe within the saturated zone of the embankment

$$L_s = y * (z + 4) * [1 + (\text{pipe slope}) / (.25 - \text{pipe slope})]$$

L_s = Length of pipe in the saturated zone (ft)

y = Distance in feet from the outlet structure invert to the emergency spillway (highest normal water level expected to occur during the life of the structure)

z = Slope of the upstream embankment (ratio of z horizontal to 1' vertical)

y = 6 ft.

z = 3.0 ft.

s = 0.0412 ft./ft. (Outlet Structure Pipe Slope)

L_s = 50.29 ft.

Calculate the minimum number of collars required

$$N = (.075 * L_s) / P$$

N = Number of anti-seep collars required

L_s = Length of pipe in the saturated zone (ft)

P = Vertical projection of collar from pipe (ft)

L_s = 50.29 ft. (from above)

P = 2.0 ft.

N = 1.89

Therefore use 2.00 anti-seep collars

Collar spacing shall be between 5 and 14 times the vertical projection

$5 * P$ = 10.00

$14 * P$ = 28.00

Equivalent Impervious Area Calculation				
DA	Runoff Vol (1.2-in/2-hr) (CF)*	Equivalent Contributing Impervious Area (Acre)	(CF/Ac)	Allowable Release Rate (cfs)
MRC Basin 1	71,526	19.71	0.01	0.20
MRC Basin 2	69,609	19.18	0.01	0.19
MRC Basin 3	34,543	9.52	0.01	0.10

$$EIA (ACRES) = \frac{RUNOFF VOLUME \left(\frac{1.2IN}{2HR} \right) (FT^3)}{0.833FT * 43560 \frac{FT^2}{ACRE}}$$

*This data was gathered by taking the post construction runoff volume for each Drainage Area, for each BMP from the Post- Construction HydroCAD report.

Underdrain Capacity Calculations

Project Name: PP213222 - Maidencreek Warehouse

Description: MRC Underdrain Capacity Calculations

BMP No. 1		BMP No. 2	
Underdrain Pipe Size:	4 in	Underdrain Pipe Size:	4 in
Underdrain Min. Inlet Area ¹ :	1.00 in ² /LF	Underdrain Min. Inlet Area ¹ :	1.00 in ² /LF
Finished Bottom Elev:	338.00 ft	Finished Bottom	330.00 ft
UD Pipe Inv. @ Outlet Structure:	336.50 ft	UD Pipe Inv. @ Outlet Structure:	328.50 ft
Length of Underdrain:	450.00 ft	Length of Underdrain:	715.00 ft
Max Flow Capacity:	0.04 cfs/LF	Max Flow Capacity:	0.04 cfs/LF
Max Flow Capacity:	17.37 cfs	Max Flow Capacity:	27.60 cfs
BMP No. 3		BMP No.	
Underdrain Pipe Size:	4 in	Underdrain Pipe Size:	in
Underdrain Min. Inlet Area ¹ :	1.00 in ² /LF	Underdrain Min. Inlet Area ¹ :	in ² /LF
Finished Bottom	330.00 ft	Finished Bottom	ft
UD Pipe Inv. @ Outlet Structure:	328.50 ft	UD Pipe Inv. @ Outlet Structure:	ft
Length of Underdrain:	555.00 ft	Length of Underdrain:	ft
Max Flow Capacity:	0.04 cfs/LF	Max Flow Capacity:	0.00 cfs/LF
Max Flow Capacity:	21.42 cfs	Max Flow Capacity:	0.00 cfs

$$Q = C_o A \sqrt{2gh}$$

Q = Discharge Rate (Cfs)

C_o = Orifice Coefficient=0.60

g = gravity value = 32.174 ft/sec²

h = difference between the WQ elevation and the center of the underdrain pipe

Notes:

1.) ADS-Pipe Technical Note 1.01 (TN 1.01) for Dual Wall HDPE Perforation Patterns dated January 2015 indicates that the standard AASHTO Class II Perforation Pattern for a 4" diameter pipe results in a minimum inlet area of 1 in²/linear foot (LF) of pipe.

Dewatering Calculations

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 2 Year Rainfall=2.88"

Printed 6/27/2023

Page 1

Hydrograph for Pond 1P: ABVG. MRC Basin 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	335.50	0.00
2.00	0.11	122	335.51	0.00
4.00	0.43	2,140	335.70	0.00
6.00	0.75	6,373	336.11	0.00
8.00	1.06	12,872	336.61	0.02
10.00	2.03	23,271	337.11	0.11
12.00	76.79	103,327	338.85	1.41
14.00	2.46	130,294	339.21	3.65
16.00	1.51	121,102	339.09	2.81
18.00	1.18	113,055	338.98	2.14
20.00	0.86	106,803	338.90	1.66
22.00	0.78	102,047	338.83	1.32
24.00	0.72	98,769	338.79	1.11
26.00	0.00	92,437	338.70	0.74
28.00	0.00	87,965	338.64	0.52
30.00	0.00	84,716	338.60	0.39
32.00	0.00	82,254	338.56	0.31
34.00	0.00	80,226	338.54	0.26
36.00	0.00	78,533	338.51	0.21
38.00	0.00	77,045	338.49	0.20
40.00	0.00	75,582	338.47	0.20
42.00	0.00	74,126	338.45	0.20
44.00	0.00	72,679	338.43	0.20
46.00	0.00	71,239	338.41	0.20
48.00	0.00	69,807	338.39	0.20
50.00	0.00	68,383	338.37	0.20
52.00	0.00	66,967	338.35	0.20
54.00	0.00	65,559	338.33	0.20
56.00	0.00	64,159	338.31	0.19
58.00	0.00	62,766	338.29	0.19
60.00	0.00	61,382	338.27	0.19
62.00	0.00	60,006	338.25	0.19
64.00	0.00	58,637	338.24	0.19
66.00	0.00	57,277	338.22	0.19
68.00	0.00	55,925	338.20	0.19
70.00	0.00	54,580	338.18	0.19
72.00	0.00	53,244	338.16	0.19
74.00	0.00	51,916	338.14	0.18
76.00	0.00	50,595	338.12	0.18
78.00	0.00	49,283	338.10	0.18
80.00	0.00	47,979	338.09	0.18
82.00	0.00	46,683	338.07	0.18
84.00	0.00	45,395	338.05	0.18
86.00	0.00	44,115	338.03	0.18
88.00	0.00	42,843	338.01	0.18
90.00	0.00	41,580	337.98	0.17
92.00	0.00	40,341	337.92	0.17
94.00	0.00	39,128	337.86	0.17
96.00	0.00	37,942	337.81	0.16

Dewatering Time

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 2 Year Rainfall=2.88"

Printed 6/27/2023

Page 2

Hydrograph for Pond 2P: ABVG. MRC Basin 2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	327.50	0.00
2.00	0.11	119	327.51	0.00
4.00	0.42	2,082	327.71	0.00
6.00	0.73	6,201	328.13	0.00
8.00	1.03	12,512	328.64	0.03
10.00	1.98	22,612	329.16	0.10
12.00	73.95	100,327	330.91	1.37
14.00	2.33	127,375	331.29	3.36
16.00	1.43	118,926	331.17	2.68
18.00	1.11	110,976	331.06	2.08
20.00	0.81	104,543	330.97	1.64
22.00	0.74	99,504	330.89	1.32
24.00	0.68	95,910	330.84	1.11
26.00	0.00	89,463	330.75	0.76
28.00	0.00	84,790	330.68	0.55
30.00	0.00	81,357	330.63	0.42
32.00	0.00	78,697	330.59	0.33
34.00	0.00	76,590	330.56	0.27
36.00	0.00	74,777	330.54	0.23
38.00	0.00	73,197	330.51	0.20
40.00	0.00	71,806	330.49	0.19
42.00	0.00	70,455	330.47	0.19
44.00	0.00	69,110	330.45	0.19
46.00	0.00	67,773	330.43	0.19
48.00	0.00	66,443	330.41	0.18
50.00	0.00	65,120	330.39	0.18
52.00	0.00	63,804	330.37	0.18
54.00	0.00	62,496	330.35	0.18
56.00	0.00	61,194	330.33	0.18
58.00	0.00	59,900	330.31	0.18
60.00	0.00	58,614	330.30	0.18
62.00	0.00	57,334	330.28	0.18
64.00	0.00	56,062	330.26	0.18
66.00	0.00	54,797	330.24	0.18
68.00	0.00	53,539	330.22	0.17
70.00	0.00	52,289	330.20	0.17
72.00	0.00	51,046	330.18	0.17
74.00	0.00	49,810	330.16	0.17
76.00	0.00	48,581	330.14	0.17
78.00	0.00	47,360	330.13	0.17
80.00	0.00	46,147	330.11	0.17
82.00	0.00	44,940	330.09	0.17
84.00	0.00	43,741	330.07	0.17
86.00	0.00	42,550	330.05	0.16
88.00	0.00	41,365	330.03	0.16
90.00	0.00	40,189	330.02	0.16
92.00	0.00	39,019	329.99	0.16
94.00	0.00	37,867	329.94	0.16
96.00	0.00	36,740	329.88	0.15

Dewatering Time

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 2 Year Rainfall=2.88"

Printed 6/27/2023

Page 3

Hydrograph for Pond 3P: ABVG. MRC Basin 3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	327.50	0.00
2.00	0.06	59	327.51	0.00
4.00	0.21	1,034	327.63	0.00
6.00	0.36	3,080	327.90	0.00
8.00	0.51	6,230	328.31	0.00
10.00	0.98	11,422	328.74	0.03
12.00	38.01	50,511	330.38	0.18
14.00	1.26	70,859	330.76	1.08
16.00	0.78	70,289	330.75	1.05
18.00	0.61	68,158	330.71	0.92
20.00	0.44	65,803	330.66	0.78
22.00	0.41	63,644	330.62	0.67
24.00	0.38	61,950	330.59	0.59
26.00	0.00	58,458	330.53	0.43
28.00	0.00	55,769	330.48	0.32
30.00	0.00	53,684	330.44	0.26
32.00	0.00	51,991	330.41	0.21
34.00	0.00	50,608	330.38	0.18
36.00	0.00	49,402	330.36	0.16
38.00	0.00	48,331	330.34	0.14
40.00	0.00	47,379	330.32	0.12
42.00	0.00	46,534	330.30	0.11
44.00	0.00	45,746	330.29	0.11
46.00	0.00	44,987	330.27	0.10
48.00	0.00	44,256	330.26	0.10
50.00	0.00	43,551	330.25	0.10
52.00	0.00	42,856	330.23	0.10
54.00	0.00	42,163	330.22	0.10
56.00	0.00	41,473	330.21	0.10
58.00	0.00	40,785	330.19	0.10
60.00	0.00	40,101	330.18	0.09
62.00	0.00	39,419	330.17	0.09
64.00	0.00	38,740	330.15	0.09
66.00	0.00	38,064	330.14	0.09
68.00	0.00	37,390	330.13	0.09
70.00	0.00	36,720	330.12	0.09
72.00	0.00	36,052	330.10	0.09
74.00	0.00	35,387	330.09	0.09
76.00	0.00	34,725	330.08	0.09
78.00	0.00	34,065	330.06	0.09
80.00	0.00	33,409	330.05	0.09
82.00	0.00	32,755	330.04	0.09
84.00	0.00	32,104	330.03	0.09
86.00	0.00	31,456	330.01	0.09
88.00	0.00	30,811	330.00	0.09
90.00	0.00	30,171	329.96	0.09
92.00	0.00	29,541	329.92	0.09
94.00	0.00	28,920	329.88	0.09
96.00	0.00	28,309	329.84	0.08

Dewatering Time

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 10 Year Rainfall=4.56"

Printed 6/27/2023

Page 4

Hydrograph for Pond 1P: ABVG. MRC Basin 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	335.50	0.00
2.00	0.41	833	335.58	0.00
4.00	0.90	5,717	336.04	0.00
6.00	1.39	13,921	336.66	0.04
8.00	1.83	24,958	337.19	0.11
10.00	3.38	42,374	338.01	0.18
12.00	131.38	174,488	339.78	8.54
14.00	4.18	181,797	339.87	9.45
16.00	2.57	151,812	339.49	5.88
18.00	1.99	133,423	339.25	3.96
20.00	1.45	121,595	339.09	2.86
22.00	1.33	113,637	338.99	2.18
24.00	1.22	108,614	338.92	1.79
26.00	0.00	98,764	338.79	1.11
28.00	0.00	92,272	338.70	0.73
30.00	0.00	87,849	338.64	0.52
32.00	0.00	84,629	338.60	0.39
34.00	0.00	82,185	338.56	0.31
36.00	0.00	80,168	338.53	0.26
38.00	0.00	78,485	338.51	0.21
40.00	0.00	77,000	338.49	0.20
42.00	0.00	75,537	338.47	0.20
44.00	0.00	74,081	338.45	0.20
46.00	0.00	72,634	338.43	0.20
48.00	0.00	71,194	338.41	0.20
50.00	0.00	69,763	338.39	0.20
52.00	0.00	68,339	338.37	0.20
54.00	0.00	66,923	338.35	0.20
56.00	0.00	65,515	338.33	0.19
58.00	0.00	64,115	338.31	0.19
60.00	0.00	62,723	338.29	0.19
62.00	0.00	61,339	338.27	0.19
64.00	0.00	59,963	338.25	0.19
66.00	0.00	58,595	338.23	0.19
68.00	0.00	57,235	338.22	0.19
70.00	0.00	55,883	338.20	0.19
72.00	0.00	54,539	338.18	0.19
74.00	0.00	53,202	338.16	0.19
76.00	0.00	51,874	338.14	0.18
78.00	0.00	50,554	338.12	0.18
80.00	0.00	49,242	338.10	0.18
82.00	0.00	47,938	338.08	0.18
84.00	0.00	46,643	338.07	0.18
86.00	0.00	45,355	338.05	0.18
88.00	0.00	44,075	338.03	0.18
90.00	0.00	42,804	338.01	0.18
92.00	0.00	41,541	337.98	0.17
94.00	0.00	40,302	337.92	0.17
96.00	0.00	39,091	337.86	0.17

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 10 Year Rainfall=4.56"

Printed 6/27/2023

Page 5

Hydrograph for Pond 2P: ABVG. MRC Basin 2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	327.50	0.00
2.00	0.40	811	327.58	0.00
4.00	0.88	5,563	328.07	0.00
6.00	1.35	13,529	328.69	0.04
8.00	1.79	24,259	329.24	0.11
10.00	3.29	41,221	330.03	0.16
12.00	124.23	168,317	331.85	7.25
14.00	3.90	180,901	332.01	8.61
16.00	2.39	152,668	331.64	5.67
18.00	1.85	133,901	331.38	3.92
20.00	1.35	121,265	331.20	2.86
22.00	1.23	112,499	331.08	2.19
24.00	1.13	106,767	331.00	1.79
26.00	0.00	96,698	330.85	1.16
28.00	0.00	89,843	330.76	0.78
30.00	0.00	85,063	330.69	0.56
32.00	0.00	81,564	330.63	0.42
34.00	0.00	78,858	330.60	0.33
36.00	0.00	76,723	330.56	0.27
38.00	0.00	74,893	330.54	0.24
40.00	0.00	73,298	330.51	0.21
42.00	0.00	71,899	330.49	0.19
44.00	0.00	70,547	330.47	0.19
46.00	0.00	69,202	330.45	0.19
48.00	0.00	67,864	330.43	0.19
50.00	0.00	66,533	330.41	0.18
52.00	0.00	65,210	330.39	0.18
54.00	0.00	63,894	330.37	0.18
56.00	0.00	62,585	330.35	0.18
58.00	0.00	61,283	330.34	0.18
60.00	0.00	59,988	330.32	0.18
62.00	0.00	58,701	330.30	0.18
64.00	0.00	57,421	330.28	0.18
66.00	0.00	56,148	330.26	0.18
68.00	0.00	54,883	330.24	0.18
70.00	0.00	53,625	330.22	0.17
72.00	0.00	52,374	330.20	0.17
74.00	0.00	51,130	330.18	0.17
76.00	0.00	49,894	330.16	0.17
78.00	0.00	48,665	330.15	0.17
80.00	0.00	47,443	330.13	0.17
82.00	0.00	46,229	330.11	0.17
84.00	0.00	45,022	330.09	0.17
86.00	0.00	43,823	330.07	0.17
88.00	0.00	42,631	330.05	0.17
90.00	0.00	41,446	330.04	0.16
92.00	0.00	40,269	330.02	0.16
94.00	0.00	39,099	330.00	0.16
96.00	0.00	37,945	329.94	0.16

Dewatering Time

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 10 Year Rainfall=4.56"

Printed 6/27/2023

Page 6

Hydrograph for Pond 3P: ABVG. MRC Basin 3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	327.50	0.00
2.00	0.20	403	327.55	0.00
4.00	0.44	2,763	327.86	0.00
6.00	0.67	6,745	328.38	0.00
8.00	0.89	12,252	328.80	0.04
10.00	1.64	20,804	329.35	0.07
12.00	67.71	87,585	331.06	2.21
14.00	2.21	110,981	331.47	3.34
16.00	1.37	101,004	331.30	2.92
18.00	1.06	90,469	331.11	2.39
20.00	0.78	81,972	330.96	1.82
22.00	0.71	75,792	330.85	1.40
24.00	0.65	71,654	330.77	1.13
26.00	0.00	65,181	330.65	0.75
28.00	0.00	60,662	330.57	0.52
30.00	0.00	57,420	330.51	0.39
32.00	0.00	54,983	330.46	0.30
34.00	0.00	53,046	330.43	0.24
36.00	0.00	51,473	330.40	0.20
38.00	0.00	50,166	330.37	0.17
40.00	0.00	49,009	330.35	0.15
42.00	0.00	47,982	330.33	0.13
44.00	0.00	47,070	330.31	0.12
46.00	0.00	46,253	330.30	0.11
48.00	0.00	45,475	330.28	0.11
50.00	0.00	44,726	330.27	0.10
52.00	0.00	44,005	330.26	0.10
54.00	0.00	43,306	330.24	0.10
56.00	0.00	42,611	330.23	0.10
58.00	0.00	41,919	330.22	0.10
60.00	0.00	41,230	330.20	0.10
62.00	0.00	40,543	330.19	0.10
64.00	0.00	39,860	330.18	0.09
66.00	0.00	39,179	330.16	0.09
68.00	0.00	38,501	330.15	0.09
70.00	0.00	37,826	330.14	0.09
72.00	0.00	37,153	330.12	0.09
74.00	0.00	36,484	330.11	0.09
76.00	0.00	35,817	330.10	0.09
78.00	0.00	35,153	330.08	0.09
80.00	0.00	34,492	330.07	0.09
82.00	0.00	33,833	330.06	0.09
84.00	0.00	33,178	330.05	0.09
86.00	0.00	32,525	330.03	0.09
88.00	0.00	31,875	330.02	0.09
90.00	0.00	31,228	330.01	0.09
92.00	0.00	30,584	329.99	0.09
94.00	0.00	29,948	329.95	0.09
96.00	0.00	29,321	329.91	0.09

Dewatering Time

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 50 Year Rainfall=6.48"

Printed 6/27/2023

Page 7

Hydrograph for Pond 1P: ABVG. MRC Basin 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	335.50	0.00
2.00	0.83	2,174	335.71	0.00
4.00	1.47	10,678	336.51	0.00
6.00	2.11	23,156	337.10	0.11
8.00	2.71	39,552	337.88	0.17
10.00	4.91	65,213	338.33	0.19
12.00	196.92	255,608	340.77	19.92
14.00	6.21	228,140	340.44	15.80
16.00	3.81	177,792	339.82	8.95
18.00	2.95	150,512	339.47	5.74
20.00	2.15	134,222	339.26	4.04
22.00	1.96	123,802	339.12	3.05
24.00	1.81	117,533	339.04	2.51
26.00	0.00	104,147	338.86	1.46
28.00	0.00	95,740	338.75	0.93
30.00	0.00	90,244	338.67	0.63
32.00	0.00	86,401	338.62	0.46
34.00	0.00	83,547	338.58	0.34
36.00	0.00	81,305	338.55	0.28
38.00	0.00	79,434	338.52	0.24
40.00	0.00	77,861	338.50	0.21
42.00	0.00	76,393	338.48	0.20
44.00	0.00	74,933	338.46	0.20
46.00	0.00	73,481	338.44	0.20
48.00	0.00	72,037	338.42	0.20
50.00	0.00	70,600	338.40	0.20
52.00	0.00	69,172	338.38	0.20
54.00	0.00	67,752	338.36	0.20
56.00	0.00	66,339	338.34	0.20
58.00	0.00	64,934	338.32	0.19
60.00	0.00	63,538	338.30	0.19
62.00	0.00	62,149	338.28	0.19
64.00	0.00	60,768	338.27	0.19
66.00	0.00	59,395	338.25	0.19
68.00	0.00	58,031	338.23	0.19
70.00	0.00	56,674	338.21	0.19
72.00	0.00	55,325	338.19	0.19
74.00	0.00	53,984	338.17	0.19
76.00	0.00	52,651	338.15	0.18
78.00	0.00	51,327	338.13	0.18
80.00	0.00	50,010	338.11	0.18
82.00	0.00	48,701	338.10	0.18
84.00	0.00	47,401	338.08	0.18
86.00	0.00	46,108	338.06	0.18
88.00	0.00	44,824	338.04	0.18
90.00	0.00	43,548	338.02	0.18
92.00	0.00	42,279	338.00	0.18
94.00	0.00	41,025	337.95	0.17
96.00	0.00	39,797	337.89	0.17

Dewatering Time

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 50 Year Rainfall=6.48"

Printed 6/27/2023

Page 8

Hydrograph for Pond 2P: ABVG. MRC Basin 2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	327.50	0.00
2.00	0.81	2,116	327.72	0.00
4.00	1.43	10,389	328.53	0.00
6.00	2.05	22,508	329.15	0.10
8.00	2.64	38,475	329.97	0.16
10.00	4.78	63,493	330.37	0.18
12.00	183.86	245,041	332.84	16.32
14.00	5.74	233,784	332.70	14.88
16.00	3.51	183,412	332.05	8.88
18.00	2.72	154,048	331.65	5.80
20.00	1.98	135,841	331.40	4.09
22.00	1.81	123,926	331.24	3.08
24.00	1.66	116,513	331.14	2.49
26.00	0.00	102,838	330.94	1.53
28.00	0.00	93,927	330.81	1.00
30.00	0.00	87,945	330.73	0.69
32.00	0.00	83,688	330.67	0.50
34.00	0.00	80,515	330.62	0.39
36.00	0.00	78,039	330.58	0.30
38.00	0.00	76,036	330.55	0.26
40.00	0.00	74,295	330.53	0.23
42.00	0.00	72,777	330.51	0.20
44.00	0.00	71,412	330.49	0.19
46.00	0.00	70,063	330.47	0.19
48.00	0.00	68,721	330.45	0.19
50.00	0.00	67,385	330.43	0.18
52.00	0.00	66,057	330.41	0.18
54.00	0.00	64,737	330.39	0.18
56.00	0.00	63,423	330.37	0.18
58.00	0.00	62,117	330.35	0.18
60.00	0.00	60,817	330.33	0.18
62.00	0.00	59,525	330.31	0.18
64.00	0.00	58,241	330.29	0.18
66.00	0.00	56,963	330.27	0.18
68.00	0.00	55,693	330.25	0.18
70.00	0.00	54,430	330.23	0.17
72.00	0.00	53,175	330.21	0.17
74.00	0.00	51,926	330.19	0.17
76.00	0.00	50,686	330.18	0.17
78.00	0.00	49,452	330.16	0.17
80.00	0.00	48,226	330.14	0.17
82.00	0.00	47,007	330.12	0.17
84.00	0.00	45,795	330.10	0.17
86.00	0.00	44,591	330.08	0.17
88.00	0.00	43,394	330.07	0.17
90.00	0.00	42,204	330.05	0.16
92.00	0.00	41,022	330.03	0.16
94.00	0.00	39,848	330.01	0.16
96.00	0.00	38,682	329.98	0.16

Dewatering Time

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 50 Year Rainfall=6.48"

Printed 6/27/2023

Page 9

Hydrograph for Pond 3P: ABVG. MRC Basin 3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	327.50	0.00
2.00	0.40	1,051	327.64	0.00
4.00	0.71	5,180	328.17	0.00
6.00	1.02	11,332	328.74	0.03
8.00	1.31	19,393	329.26	0.06
10.00	2.37	31,879	330.02	0.09
12.00	104.22	133,203	331.85	4.11
14.00	3.36	156,663	332.24	5.95
16.00	2.07	140,230	331.97	4.32
18.00	1.61	124,057	331.70	3.61
20.00	1.17	108,615	331.43	3.25
22.00	1.07	95,386	331.20	2.66
24.00	0.99	85,729	331.03	2.08
26.00	0.00	74,099	330.82	1.29
28.00	0.00	66,624	330.68	0.83
30.00	0.00	61,661	330.59	0.57
32.00	0.00	58,156	330.52	0.42
34.00	0.00	55,543	330.47	0.31
36.00	0.00	53,500	330.43	0.26
38.00	0.00	51,842	330.40	0.21
40.00	0.00	50,482	330.38	0.18
42.00	0.00	49,290	330.36	0.16
44.00	0.00	48,231	330.34	0.14
46.00	0.00	47,291	330.32	0.12
48.00	0.00	46,455	330.30	0.11
50.00	0.00	45,670	330.29	0.11
52.00	0.00	44,914	330.27	0.10
54.00	0.00	44,185	330.26	0.10
56.00	0.00	43,482	330.25	0.10
58.00	0.00	42,787	330.23	0.10
60.00	0.00	42,094	330.22	0.10
62.00	0.00	41,404	330.21	0.10
64.00	0.00	40,717	330.19	0.10
66.00	0.00	40,033	330.18	0.09
68.00	0.00	39,352	330.17	0.09
70.00	0.00	38,673	330.15	0.09
72.00	0.00	37,997	330.14	0.09
74.00	0.00	37,324	330.13	0.09
76.00	0.00	36,654	330.11	0.09
78.00	0.00	35,986	330.10	0.09
80.00	0.00	35,321	330.09	0.09
82.00	0.00	34,659	330.08	0.09
84.00	0.00	34,000	330.06	0.09
86.00	0.00	33,344	330.05	0.09
88.00	0.00	32,690	330.04	0.09
90.00	0.00	32,040	330.02	0.09
92.00	0.00	31,392	330.01	0.09
94.00	0.00	30,747	330.00	0.09
96.00	0.00	30,108	329.96	0.09

Dewatering Time

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 100 Year Rainfall=7.44"

Printed 6/27/2023

Page 10

Hydrograph for Pond 1P: ABVG. MRC Basin 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	335.50	0.00
2.00	1.05	2,993	335.79	0.00
4.00	1.75	13,345	336.64	0.03
6.00	2.47	27,942	337.33	0.13
8.00	3.15	47,052	338.07	0.18
10.00	5.69	76,891	338.49	0.20
12.00	230.40	294,392	341.23	32.56
14.00	7.24	239,212	340.58	17.43
16.00	4.44	185,566	339.92	9.94
18.00	3.44	156,465	339.55	6.40
20.00	2.50	139,083	339.32	4.53
22.00	2.29	127,980	339.18	3.44
24.00	2.10	121,370	339.09	2.84
26.00	0.00	106,381	338.89	1.63
28.00	0.00	97,140	338.77	1.01
30.00	0.00	91,189	338.69	0.68
32.00	0.00	87,082	338.63	0.48
34.00	0.00	84,056	338.59	0.36
36.00	0.00	81,724	338.56	0.29
38.00	0.00	79,783	338.53	0.25
40.00	0.00	78,161	338.51	0.21
42.00	0.00	76,687	338.49	0.20
44.00	0.00	75,225	338.47	0.20
46.00	0.00	73,772	338.45	0.20
48.00	0.00	72,326	338.43	0.20
50.00	0.00	70,888	338.41	0.20
52.00	0.00	69,458	338.39	0.20
54.00	0.00	68,036	338.37	0.20
56.00	0.00	66,622	338.35	0.20
58.00	0.00	65,216	338.33	0.19
60.00	0.00	63,818	338.31	0.19
62.00	0.00	62,427	338.29	0.19
64.00	0.00	61,045	338.27	0.19
66.00	0.00	59,671	338.25	0.19
68.00	0.00	58,304	338.23	0.19
70.00	0.00	56,946	338.21	0.19
72.00	0.00	55,595	338.19	0.19
74.00	0.00	54,253	338.17	0.19
76.00	0.00	52,918	338.16	0.18
78.00	0.00	51,592	338.14	0.18
80.00	0.00	50,274	338.12	0.18
82.00	0.00	48,964	338.10	0.18
84.00	0.00	47,661	338.08	0.18
86.00	0.00	46,367	338.06	0.18
88.00	0.00	45,081	338.04	0.18
90.00	0.00	43,803	338.03	0.18
92.00	0.00	42,533	338.01	0.18
94.00	0.00	41,275	337.97	0.17
96.00	0.00	40,042	337.91	0.17

Dewatering Time

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 100 Year Rainfall=7.44"

Printed 6/27/2023

Page 11

Hydrograph for Pond 2P: ABVG. MRC Basin 2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	327.50	0.00
2.00	1.02	2,912	327.80	0.00
4.00	1.70	12,974	328.66	0.03
6.00	2.40	27,169	329.39	0.12
8.00	3.06	45,791	330.10	0.17
10.00	5.53	74,863	330.54	0.24
12.00	214.17	261,927	333.29	21.23
14.00	6.67	261,313	332.92	17.13
16.00	4.08	194,227	332.19	10.10
18.00	3.16	161,563	331.76	6.56
20.00	2.30	141,567	331.48	4.61
22.00	2.09	128,613	331.30	3.47
24.00	1.92	120,659	331.19	2.82
26.00	0.00	105,369	330.98	1.70
28.00	0.00	95,560	330.84	1.09
30.00	0.00	89,069	330.74	0.74
32.00	0.00	84,504	330.68	0.54
34.00	0.00	81,141	330.63	0.41
36.00	0.00	78,528	330.59	0.32
38.00	0.00	76,449	330.56	0.27
40.00	0.00	74,654	330.53	0.23
42.00	0.00	73,091	330.51	0.20
44.00	0.00	71,708	330.49	0.19
46.00	0.00	70,357	330.47	0.19
48.00	0.00	69,013	330.45	0.19
50.00	0.00	67,676	330.43	0.19
52.00	0.00	66,346	330.41	0.18
54.00	0.00	65,024	330.39	0.18
56.00	0.00	63,709	330.37	0.18
58.00	0.00	62,401	330.35	0.18
60.00	0.00	61,100	330.33	0.18
62.00	0.00	59,807	330.31	0.18
64.00	0.00	58,520	330.29	0.18
66.00	0.00	57,241	330.27	0.18
68.00	0.00	55,970	330.26	0.18
70.00	0.00	54,705	330.24	0.18
72.00	0.00	53,448	330.22	0.17
74.00	0.00	52,198	330.20	0.17
76.00	0.00	50,955	330.18	0.17
78.00	0.00	49,720	330.16	0.17
80.00	0.00	48,492	330.14	0.17
82.00	0.00	47,272	330.12	0.17
84.00	0.00	46,059	330.11	0.17
86.00	0.00	44,853	330.09	0.17
88.00	0.00	43,654	330.07	0.17
90.00	0.00	42,463	330.05	0.16
92.00	0.00	41,280	330.03	0.16
94.00	0.00	40,103	330.02	0.16
96.00	0.00	38,935	329.99	0.16

Dewatering Time

PP213222-SWM-2

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 100 Year Rainfall=7.44"

Printed 6/27/2023

Page 12

Hydrograph for Pond 3P: ABVG. MRC Basin 3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	327.50	0.00
2.00	0.51	1,446	327.69	0.00
4.00	0.85	6,457	328.34	0.00
6.00	1.19	13,677	328.89	0.04
8.00	1.52	23,045	329.50	0.07
10.00	2.76	37,520	330.13	0.09
12.00	123.06	156,628	332.24	5.95
14.00	3.95	167,997	332.43	7.80
16.00	2.43	147,201	332.09	4.77
18.00	1.88	131,452	331.82	4.05
20.00	1.37	115,856	331.56	3.53
22.00	1.26	101,909	331.31	2.97
24.00	1.15	91,130	331.12	2.43
26.00	0.00	77,448	330.88	1.51
28.00	0.00	68,760	330.72	0.95
30.00	0.00	63,115	330.61	0.64
32.00	0.00	59,207	330.54	0.46
34.00	0.00	56,330	330.49	0.34
36.00	0.00	54,133	330.45	0.27
38.00	0.00	52,356	330.41	0.22
40.00	0.00	50,911	330.39	0.18
42.00	0.00	49,671	330.36	0.16
44.00	0.00	48,570	330.34	0.14
46.00	0.00	47,592	330.32	0.13
48.00	0.00	46,723	330.31	0.11
50.00	0.00	45,928	330.29	0.11
52.00	0.00	45,162	330.28	0.10
54.00	0.00	44,425	330.26	0.10
56.00	0.00	43,714	330.25	0.10
58.00	0.00	43,018	330.24	0.10
60.00	0.00	42,324	330.22	0.10
62.00	0.00	41,634	330.21	0.10
64.00	0.00	40,946	330.20	0.10
66.00	0.00	40,260	330.18	0.09
68.00	0.00	39,578	330.17	0.09
70.00	0.00	38,898	330.16	0.09
72.00	0.00	38,222	330.14	0.09
74.00	0.00	37,548	330.13	0.09
76.00	0.00	36,876	330.12	0.09
78.00	0.00	36,208	330.11	0.09
80.00	0.00	35,542	330.09	0.09
82.00	0.00	34,879	330.08	0.09
84.00	0.00	34,219	330.07	0.09
86.00	0.00	33,562	330.05	0.09
88.00	0.00	32,908	330.04	0.09
90.00	0.00	32,256	330.03	0.09
92.00	0.00	31,607	330.02	0.09
94.00	0.00	30,961	330.00	0.09
96.00	0.00	30,320	329.97	0.09

Dewatering Time

Conveyance Calculations

Line No.	Inlet ID	Inlet Loc	Gnd/Rim El Up	Runoff Coeff	i Inlet	Drng Area	Inlet Time	Q Capt	HGL Jnct	Rim-Hw	
1	MH401	Sag	339.37	0.00	0.00	0.00	0.0	....	334.62	4.75	
2	MH402	Sag	347.50	0.00	0.00	0.00	0.0	....	336.94	10.56	
3	MH403	Sag	349.50	0.00	0.00	0.00	0.0	....	338.40	11.10	
4	MH404	Sag	348.28	0.00	0.00	0.00	0.0	....	339.61	8.67	
5	MH405	Sag	351.24	0.00	0.00	0.00	5.0	....	340.35	10.89	
6	MH406	Sag	357.32	0.00	0.00	0.00	5.0	....	347.72	9.60	
7	MH407	Sag	357.76	0.00	0.00	0.00	5.0	....	350.33	7.43	
8	MH409	Sag	357.52	0.00	0.00	0.00	5.0	....	353.16	4.36	
9	IN402	Sag	356.70	0.95	6.00	0.13	5.0	0.74	353.85	2.85	
10	MH408	Sag	354.04	0.00	0.00	0.00	0.0	....	350.84	3.20	
11	IN401	Sag	354.00	0.40	6.00	0.80	5.0	1.92	351.35	2.65	
12	MH410	Sag	347.93	0.00	0.00	0.00	5.0	....	341.71	6.22	
13	IN201	Sag	339.89	0.95	6.00	0.23	5.0	1.31	333.05	6.84	
14	IN202	Sag	340.30	0.83	6.00	0.75	5.0	3.73	333.39	6.91	
15	IN203	Sag	344.06	0.65	6.00	0.61	5.0	2.38	334.10	9.96	
16	IN204	Sag	349.99	0.55	6.00	0.54	5.0	1.78	347.47	2.52	
17	IN205	Sag	352.77	0.95	6.00	0.01	5.0	0.06	349.86	2.91	
18	IN206	Sag	352.82	0.40	6.00	0.12	5.0	0.29	350.10	2.72	
19	IN101	Sag	350.86	0.00	0.00	0.00	0.0	0.00	340.61	10.25	
20	IN112	Sag	352.03	0.85	6.00	0.09	5.0	0.46	348.82	3.21	
21	IN113	Sag	355.86	0.78	6.00	0.39	5.0	1.82	349.96	5.90	
22	IN114	Sag	355.77	0.79	6.00	0.41	5.0	1.94	353.45	2.32	
23	IN102	Sag	350.30	0.94	6.00	0.70	5.0	3.95	341.35	8.95	
Project File: PP213222_Hydraflow_230627.stm											Number of lines: 88
NOTES: Intensity = 46.48 / (Inlet time + 10.30) ^ 0.75 – Return period = 25 Yrs. ; ** Critical depth											Date: 6/27/2023

Line No.	Inlet ID	Inlet Loc	Gnd/Rim El Up	Runoff Coeff	i Inlet	Drng Area	Inlet Time	Q Capt	HGL Jnct	Rim-Hw	
24	IN103	Sag	350.30	0.93	6.00	1.73	5.0	9.65	342.16	8.14	
25	IN104	Sag	350.30	0.93	6.00	1.73	5.0	9.65	342.85	7.45	
26	IN105	Sag	350.30	0.94	6.00	0.71	5.0	4.00	343.54	6.76	
27	MH101	Sag	350.98	0.81	6.00	0.18	5.0	....	344.06	6.92	
28	IN106	Sag	350.81	0.82	6.00	0.18	5.0	0.89	344.19	6.62	
29	IN107	Sag	351.57	0.86	6.00	0.13	5.0	0.67	348.23	3.34	
30	IN108	Sag	351.36	0.76	6.00	1.21	5.0	5.52	348.43	2.93	
31	IN109	Sag	351.37	0.60	6.00	3.42	5.0	12.31	348.96	2.41	
32	IN110	Sag	351.36	0.68	6.00	1.50	5.0	6.12	349.38	1.98	
33	IN111	Sag	351.36	0.76	6.00	1.22	5.0	5.56	349.63	1.73	
34	RL105	Sag	347.81	0.95	6.00	1.27	5.0	....	345.47	2.34	
35	IN301	Sag	348.48	0.82	6.00	0.18	5.0	0.89	332.19	16.29	
36	IN315	Sag	348.60	0.82	6.00	0.19	5.0	0.93	344.33	4.27	
37	IN316	Sag	348.46	0.82	6.00	0.20	5.0	0.98	345.24	3.22	
38	IN319	Sag	348.72	0.93	6.00	0.53	5.0	2.96	346.81	1.91	
39	IN318	Sag	348.72	0.93	6.00	0.53	5.0	2.96	346.81	1.91	
40	IN317	Sag	348.35	0.82	6.00	0.17	5.0	0.84	346.03	2.32	
41	IN302	Sag	348.59	0.91	6.00	0.13	5.0	0.71	334.31	14.28	
42	IN303	Sag	345.40	0.82	6.00	1.09	5.0	5.36	335.17	10.23	
43	IN304	Sag	345.46	0.92	6.00	0.58	5.0	3.20	335.88	9.58	
44	IN305	Sag	345.46	0.90	6.00	0.63	5.0	3.40	336.59	8.87	
45	IN306	Sag	345.46	0.89	6.00	0.64	5.0	3.42	337.29	8.17	
46	IN307	Sag	345.46	0.89	6.00	0.64	5.0	3.42	338.00	7.46	
Project File: PP213222_Hydraflow_230627.stm											
Number of lines: 88									Date: 6/27/2023		
NOTES: Intensity = 46.48 / (Inlet time + 10.30) ^ 0.75 – Return period = 25 Yrs. ; ** Critical depth											

Line No.	Inlet ID	Inlet Loc	Gnd/Rim El Up	Runoff Coeff	i Inlet	Drng Area	Inlet Time	Q Capt	HGL Jnct	Rim-Hw	
			(ft)	(C)	(in/hr)	(ac)	(min)	(cfs)	(ft)	(ft)	
47	IN308	Sag	345.46	0.89	6.00	0.64	5.0	3.42	338.70	6.76	
48	IN309	Sag	345.46	0.87	6.00	0.67	5.0	3.50	339.40	6.06	
49	IN310	Sag	345.46	0.76	6.00	1.79	5.0	8.16	340.07	5.39	
50	IN314	Sag	351.42	0.45	6.00	1.94	5.0	5.24	346.04	5.38	
51	IN311	Sag	345.52	0.85	6.00	0.81	5.0	4.13	341.80	3.72	
52	IN312	Sag	345.46	0.70	6.00	1.60	5.0	6.72	343.30	2.16	
53	IN313	Sag	349.44	0.92	6.00	0.10	5.0	0.55	345.02	4.42	
54	MH205	Sag	340.32	0.00	0.00	0.00	0.0	....	332.70	7.62	
55	IN209	Sag	345.26	0.93	6.00	0.79	5.0	4.41	333.05	12.21	
56	RL201	Sag	347.80	0.00	0.00	0.00	0.0	....	334.07	13.73	
57	RL208	Sag	347.80	0.95	6.00	1.14	5.0	....	346.05	1.75	
58	IN210	Sag	345.26	0.94	6.00	0.78	5.0	4.40	342.21	3.05	
59	IN211	Sag	345.08	0.91	6.00	0.84	5.0	4.59	343.04	2.04	
60	IN212	Sag	348.61	0.90	6.00	0.13	5.0	0.70	344.88	3.73	
61	RL202	Sag	351.58	0.95	6.00	1.46	5.0	....	335.98	15.60	
62	RL203	Sag	351.88	0.95	6.00	1.00	5.0	....	337.51	14.37	
63	RL204	Sag	351.74	0.95	6.00	1.00	5.0	....	339.18	12.56	
64	RL205	Sag	347.83	0.95	6.00	1.46	5.0	....	341.14	6.69	
65	RL206	Sag	347.80	0.95	6.00	2.55	5.0	....	342.94	4.86	
66	RL207	Sag	347.81	0.95	6.00	3.39	5.0	....	345.05	2.76	
67	IN208	Sag	345.26	0.92	6.00	0.80	5.0	4.42	342.63	2.63	
68	IN207	Sag	345.26	0.92	6.00	0.81	5.0	4.47	343.35	1.91	
69	IN215	Sag	339.42	0.67	6.00	0.46	5.0	1.85	337.32	2.10	
Project File: PP213222_Hydraflow_230627.stm										Number of lines: 88	Date: 6/27/2023
NOTES: Intensity = 46.48 / (Inlet time + 10.30) ^ 0.75 – Return period = 25 Yrs. ; ** Critical depth											

Line No.	Inlet ID	Inlet Loc	Gnd/Rim El Up	Runoff Coeff	i Inlet	Drng Area	Inlet Time	Q Capt	HGL Jnct	Rim-Hw		
70	IN216	Sag	342.22	0.64	6.00	0.78	5.0	2.99	339.43	2.79		
71	IN214	Sag	339.32	0.68	6.00	0.29	5.0	1.18	336.21	3.11		
72	IN213	Sag	339.45	0.66	6.00	0.43	5.0	1.70	337.10	2.35		
73	MH202	Sag	332.73	0.00	0.00	0.00	0.0	....	326.90	5.83		
74	MH203	Sag	339.16	0.00	0.00	0.00	0.0	....	335.33	3.83		
75	MH204	Sag	347.51	0.00	0.00	0.00	0.0	....	342.17	5.34		
76	IN217	Sag	348.37	0.35	6.00	1.02	5.0	2.14	343.96	4.41		
77	IN218	Sag	346.75	0.39	6.00	0.81	5.0	1.90	343.91	2.84		
78	OS101	Sag	339.90	0.00	0.00	0.00	0.0	....	338.06	1.84		
79	IN115	Sag	345.26	0.91	6.00	0.82	5.0	4.48	340.24	5.02		
80	RL101	Sag	347.80	0.95	0.00	0.00	5.0	....	341.27	6.53		
81	RL104	Sag	351.00	0.95	6.00	1.27	5.0	....	346.44	4.56		
82	IN116	Sag	345.20	0.88	6.00	1.50	5.0	7.92	342.17	3.03		
83	IN117	Sag	349.47	0.86	6.00	0.31	5.0	1.60	345.14	4.33		
84	RL102	Sag	347.80	0.95	6.00	2.19	5.0	....	342.84	4.96		
85	RL103	Sag	347.80	0.95	6.00	2.61	5.0	....	344.40	3.40		
86	IN118	Sag	345.26	0.91	6.00	0.82	5.0	4.48	343.64	1.63		
87	OS301	Sag	328.02	0.00	0.00	0.00	0.0	....	328.56	-0.54		
88	OS201	Sag	330.45	0.00	0.00	0.00	0.0	....	328.57	1.88		
Project File: PP213222_Hydraflow_230627.stm											Number of lines: 88	Date: 6/27/2023
NOTES: Intensity = 46.48 / (Inlet time + 10.30) ^ 0.75 – Return period = 25 Yrs. ; ** Critical depth												

Line No.	DnStm Ln No	Line ID	Invert Up (ft)	Invert Dn (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	Line Type	n-val Pipe	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	HGL Up (ft)	HGL Dn (ft)	EGL Up (ft)	EGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)
1	Outfall	MH401-LS401	333.40	323.00	499.098	2.08	36	Cir	0.012	14.65	104.30	3.75	334.62 j	328.50	335.08	328.57	2.97	0.39
2	1	MH402-MH401	335.72	334.37	270.842	0.50	36	Cir	0.012	14.73	51.01	5.84	336.94	335.47	337.40	335.94	8.78	2.00
3	2	MH403-MH402	337.17	335.82	270.221	0.50	36	Cir	0.012	14.82	51.07	4.80	338.40 j	337.33	338.86	337.80	9.33	8.68
4	3	MH404-MH403	338.38	337.27	221.068	0.50	36	Cir	0.012	14.91	51.20	4.80	339.61 j	338.79	340.07	339.25	6.90	9.23
5	4	MH405-MH404	339.12	338.48	128.881	0.50	36	Cir	0.012	14.96	50.91	4.81	340.35 j	340.00	340.82	340.47	9.12	6.80
6	5	MH406-MH405	346.58	344.24	466.306	0.50	30	Cir	0.012	11.68	31.47	5.63	347.72	345.29	348.17	345.74	8.24	4.50
7	6	MH407-MH406	349.17	346.67	500.000	0.50	30	Cir	0.012	11.94	31.42	4.79	350.33 j	348.07	350.78	348.52	6.09	8.15
8	7	MH409-MH407	352.76	352.56	40.217	0.50	24	Cir	0.012	1.37	17.28	3.15	353.16	352.94	353.31	353.08	2.76	3.20
9	8	IN402-MH409	353.53	353.26	47.344	0.57	18	Cir	0.012	0.74	8.59	2.83	353.85	353.56	353.96	353.67	1.67	2.76
10	7	MH408-MH407	349.74	349.27	94.362	0.50	30	Cir	0.012	10.85	31.36	4.47	350.84 j	350.70	351.26	351.12	1.80	5.99
11	10	IN401-MH408	350.83	350.74	18.768	0.48	18	Cir	0.012	1.92	7.88	3.59	351.35	351.24	351.54	351.44	1.67	1.80
12	5	MH410-MH405	341.00	340.90	19.594	0.51	18	Cir	0.012	3.48	8.13	4.32	341.71	341.59	341.99	341.86	5.43	8.84
13	Outfall	IN201-EW201	330.21	330.00	41.966	0.50	24	Cir	0.012	5.48	17.33	1.75	332.98	332.96	333.03	333.01	7.68	0.28
14	13	IN202-IN201	331.98	331.13	168.685	0.50	18	Cir	0.012	4.81	8.08	2.80	333.32	333.05	333.45	333.17	6.82	7.26
15	14	IN203-IN202	333.31	332.23	216.241	0.50	15	Cir	0.012	2.70	4.94	3.16	333.97	333.44	334.23	333.52	9.50	6.82
16	15	IN204-IN203	347.01	341.19	197.835	2.94	15	Cir	0.012	1.34	12.00	4.88	347.47	341.47	347.64	341.64	1.73	1.62
17	16	IN205-IN204	349.64	347.11	180.638	1.40	15	Cir	0.012	0.31	8.28	1.42	349.86 j	347.64	349.93	347.71	1.88	1.63
18	17	IN206-IN205	349.89	349.74	30.059	0.50	15	Cir	0.012	0.29	4.94	2.17	350.10	349.94	350.17	350.02	1.68	1.78
19	Outfall	IN101-EW101	338.37	338.00	74.499	0.50	48	Cir	0.012	55.51	109.67	6.71	340.61	340.87	341.52	341.78	8.49	-0.38
20	19	IN112-IN101	347.68	347.50	35.655	0.50	15	Cir	0.012	3.36	4.97	4.35	348.43	348.25	348.73	348.55	3.10	2.11
21	20	IN113-IN112	348.94	347.78	232.509	0.50	15	Cir	0.012	3.16	4.94	3.45	349.66 j	349.02	349.95	349.12	5.67	3.00
22	21	IN114-IN113	352.90	349.04	385.513	1.00	15	Cir	0.012	1.94	7.00	2.66	353.45 j	350.21	353.67	350.42	1.62	5.57
23	19	IN102-IN101	339.16	338.47	138.506	0.50	48	Cir	0.012	53.23	109.84	6.64	341.35 j	341.24	342.24	342.13	7.14	8.39

Project File: PP213222_Hydraflow_230627.stm

Date: 6/27/2023

Number of lines: 88

NOTES: ** Critical depth

Line No.	DnStm Ln No	Line ID	Invert Up (ft)	Invert Dn (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	Line Type	n-val Pipe	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	HGL Up (ft)	HGL Dn (ft)	EGL Up (ft)	EGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)
24	23	IN103-IN102	340.01	339.26	150.000	0.50	48	Cir	0.012	51.22	110.04	6.54	342.16 j	341.98	343.02	342.84	6.29	7.04
25	24	IN104-IN103	340.86	340.11	150.008	0.50	48	Cir	0.012	44.49	110.04	6.00	342.85 j	342.83	343.64	343.61	5.44	6.19
26	25	IN105-IN104	341.71	340.96	150.000	0.50	48	Cir	0.012	37.58	110.04	5.60	343.54 j	343.50	344.24	344.20	4.59	5.34
27	26	MH101-IN105	342.30	341.81	99.016	0.49	48	Cir	0.012	34.94	109.47	5.61	344.06 j	344.12	344.73	344.79	4.68	4.49
28	27	IN106-MH101	342.62	342.40	44.862	0.49	48	Cir	0.012	28.19	108.98	5.01	344.19	344.65	344.78	345.24	4.19	4.58
29	28	IN107-IN106	347.91	347.56	35.258	0.99	15	Cir	0.012	0.67	6.97	3.15	348.23	347.82	348.34	347.94	2.41	2.00
30	28	IN108-IN106	344.85	344.12	146.275	0.50	30	Cir	0.012	27.28	31.39	7.20	346.65	345.92	347.46	346.73	4.01	4.19
31	30	IN109-IN108	347.70	347.10	120.000	0.50	24	Cir	0.012	12.31	17.33	4.95	348.96	348.99	349.50	349.54	1.67	2.26
32	30	IN110-IN108	347.00	346.40	120.000	0.50	24	Cir	0.012	11.07	17.33	3.53	349.29	349.04	349.48	349.23	2.36	2.96
33	32	IN111-IN110	347.70	347.10	119.998	0.50	24	Cir	0.012	5.56	17.33	1.79	349.58	349.53	349.63	349.57	1.66	2.26
34	27	RL105-MH101	344.14	342.40	348.083	0.50	24	Cir	0.012	7.24	17.32	3.43	345.15	344.65	345.47	344.73	1.67	6.58
35	Outfall	IN301-EW301	330.15	330.00	29.124	0.52	36	Cir	0.012	39.21	51.85	7.53	332.19	332.11	333.10	333.03	15.33	1.48
36	35	IN315-IN301	343.52	342.63	176.521	0.50	18	Cir	0.012	4.50	8.08	4.65	344.33	343.43	344.66	343.76	3.58	4.35
37	36	IN316-IN315	344.48	343.62	170.761	0.50	18	Cir	0.012	3.92	8.07	3.82	345.24 j	344.59	345.54	344.88	2.48	3.48
38	37	IN319-IN316	345.84	345.38	91.610	0.50	15	Cir	0.012	2.96	4.96	4.22	346.53 j	346.08	346.81	346.35	1.63	1.83
39	35	IN318-IN301	345.84	345.28	112.680	0.50	15	Cir	0.012	2.96	4.93	4.20	346.54	345.98	346.81	346.25	1.63	1.95
40	37	IN317-IN316	345.67	344.73	188.498	0.50	15	Cir	0.012	0.84	4.94	1.95	346.03	345.53	346.16	345.66	1.43	2.48
41	35	IN302-IN301	332.43	331.39	206.320	0.50	36	Cir	0.012	33.66	51.30	7.47	334.31	333.16	335.12	333.97	13.16	14.09
42	41	IN303-IN302	333.29	332.53	152.509	0.50	36	Cir	0.012	33.65	51.00	6.58	335.17 j	334.77	335.98	335.58	9.11	13.06
43	42	IN304-IN303	334.09	333.39	139.515	0.50	36	Cir	0.012	30.51	51.18	6.09	335.88 j	335.69	336.63	336.44	8.37	9.01
44	43	IN305-IN304	334.86	334.19	133.511	0.50	36	Cir	0.012	28.75	51.18	6.01	336.59 j	336.37	337.31	337.09	7.60	8.27
45	44	IN306-IN305	335.62	334.95	133.479	0.50	36	Cir	0.012	26.83	51.19	5.80	337.29 j	337.09	337.97	337.77	6.84	7.51
46	45	IN307-IN306	336.39	335.72	133.513	0.50	36	Cir	0.012	24.87	51.18	5.62	338.00 j	337.78	338.64	338.43	6.07	6.74

Line No.	DnStm Ln No	Line ID	Invert Up (ft)	Invert Dn (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	Line Type	n-val Pipe	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	HGL Up (ft)	HGL Dn (ft)	EGL Up (ft)	EGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)
47	46	IN308-IN307	337.16	336.49	133.479	0.50	36	Cir	0.012	22.87	51.19	5.43	338.70 j	338.48	339.31	339.09	5.30	5.97
48	47	IN309-IN308	337.93	337.26	133.517	0.50	36	Cir	0.012	20.84	51.18	5.23	339.40 j	339.17	339.97	339.75	4.53	5.20
49	48	IN310-IN309	338.69	338.02	133.477	0.50	36	Cir	0.012	18.70	51.19	4.99	340.07 j	339.86	340.61	340.40	3.77	4.44
50	49	IN314-IN310	345.11	342.53	89.394	2.89	15	Cir	0.012	5.24	11.88	7.37	346.04	343.11	346.48	343.56	5.06	1.68
51	49	IN311-IN310	340.74	339.69	210.750	0.50	24	Cir	0.012	8.91	17.30	5.39	341.80	340.71	342.23	341.14	2.78	3.77
52	51	IN312-IN311	341.87	341.24	126.007	0.50	18	Cir	0.012	5.79	8.04	4.95	342.81	342.18	343.19	342.56	2.09	2.78
53	52	IN313-IN312	344.73	342.12	146.131	1.79	15	Cir	0.012	0.55	9.35	1.51	345.02 j	343.68	345.12	343.68	3.46	2.09
54	Outfall	MH205-EW202	330.21	330.00	41.647	0.50	48	Cir	0.013	67.89	102.00	7.54	332.70	332.96	333.76	334.02	6.11	2.94
55	54	IN209-MH205	330.66	330.31	70.471	0.50	48	Cir	0.013	63.08	101.23	7.08	333.05	333.37	334.06	334.37	10.60	6.01
56	55	RL201-IN209	331.90	330.76	228.790	0.50	42	Cir	0.013	48.43	71.02	6.70	334.07 j	333.66	335.00	334.59	12.40	11.00
57	56	RL208-RL201	344.63	343.84	158.173	0.50	18	Cir	0.012	6.50	8.04	5.06	345.65	344.86	346.05	345.26	1.67	2.46
58	55	IN210-IN209	340.84	339.97	174.000	0.50	18	Cir	0.012	7.59	8.04	5.17	342.00	341.13	342.42	341.55	2.92	3.79
59	58	IN211-IN210	341.85	340.94	181.000	0.50	18	Cir	0.012	4.31	8.07	3.06	342.79	342.53	343.00	342.63	1.73	2.82
60	59	IN212-IN211	344.55	342.10	165.100	1.48	15	Cir	0.012	0.70	8.52	1.67	344.88 j	343.24	344.99	343.36	2.81	1.73
61	56	RL202-RL201	333.87	332.00	374.494	0.50	42	Cir	0.012	45.88	77.02	6.72	335.98 j	334.65	336.87	335.53	14.21	12.30
62	61	RL203-RL202	335.51	333.97	307.052	0.50	42	Cir	0.012	41.48	77.19	6.34	337.51 j	336.58	338.34	337.41	12.87	14.11
63	62	RL204-RL203	337.24	335.61	326.735	0.50	42	Cir	0.012	39.05	76.98	6.25	339.18 j	338.08	339.97	338.87	11.00	12.77
64	63	RL205-RL204	339.19	337.34	370.283	0.50	36	Cir	0.012	36.12	51.07	6.92	341.14 j	339.56	342.00	340.42	5.64	11.40
65	64	RL206-RL205	341.14	339.29	370.283	0.50	36	Cir	0.012	30.80	51.07	6.01	342.94 j	341.70	343.69	342.46	3.66	5.54
66	65	RL207-RL206	343.56	341.14	484.096	0.50	30	Cir	0.012	19.32	31.41	5.21	345.05 j	343.45	345.67	344.08	1.75	4.16
67	55	IN208-IN209	341.12	340.25	174.000	0.50	18	Cir	0.012	8.42	8.04	5.16	342.42	341.55	342.84	341.97	2.64	3.51
68	67	IN207-IN208	342.09	341.22	174.000	0.50	18	Cir	0.012	4.47	8.04	2.88	343.19	342.95	343.35	343.04	1.67	2.54
69	54	IN215-MH205	336.21	335.70	101.990	0.50	15	Cir	0.012	4.56	4.95	4.57	337.16	336.65	337.48	336.97	1.96	3.37

Project File: PP213222_Hydraflow_230627.stm

Number of lines: 88

Date: 6/27/2023

NOTES: ** Critical depth

Line No.	DnStm Ln No	Line ID	Invert Up (ft)	Invert Dn (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	Line Type	n-val Pipe	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	HGL Up (ft)	HGL Dn (ft)	EGL Up (ft)	EGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)	
70	69	IN216-IN215	338.73	336.31	190.131	1.27	15	Cir	0.012	2.99	7.89	3.36	339.43 j	337.55	339.71	337.83	2.24	1.86	
71	54	IN214-MH205	335.56	335.12	87.853	0.50	15	Cir	0.012	2.61	4.95	4.08	336.21	335.76	336.46	336.02	2.51	3.95	
72	71	IN213-IN214	336.58	335.66	184.076	0.50	15	Cir	0.012	1.70	4.95	2.84	337.10	336.43	337.29	336.63	1.62	2.41	
73	Outfall	MH202-MH201	325.31	323.00	307.814	0.75	36	Cir	0.012	24.44	62.59	7.36	326.90	324.30	327.54	324.94	4.42	-0.52	
74	73	MH203-MH202	333.73	327.23	307.814	2.11	36	Cir	0.012	24.63	104.99	9.27	335.33	328.22	335.97	328.86	2.43	2.50	
75	74	MH204-MH203	341.40	336.22	268.843	1.93	15	Cir	0.012	3.68	9.71	5.99	342.17	336.75	342.50	337.08	4.86	1.69	
76	75	IN217-MH204	342.98	341.50	270.206	0.55	15	Cir	0.012	3.92	5.18	4.57	343.78 j	342.35	344.13	342.65	4.14	4.76	
77	76	IN218-IN217	343.36	343.08	56.211	0.50	15	Cir	0.012	1.90	4.94	2.64	343.91	344.22	344.12	344.43	2.14	4.04	
78	74	OS101-MH203	336.50	333.83	219.292	1.22	30	Cir	0.012	21.17	49.02	6.00	338.06 j	335.68	338.73	336.35	0.90	2.83	
79	Outfall	IN115-EW102	338.15	338.00	29.117	0.52	42	Cir	0.013	45.01	72.21	6.42	340.24	340.87	341.12	341.75	3.61	-0.60	
80	79	RL101-IN115	339.49	338.65	168.882	0.50	36	Cir	0.012	30.15	50.96	6.19	341.27 j	340.83	342.01	341.58	5.31	3.61	
81	80	RL104-RL101	345.40	341.90	335.743	1.04	18	Cir	0.012	7.24	11.62	6.23	346.44	342.76	346.92	343.23	4.10	4.40	
82	79	IN116-IN115	341.12	340.22	180.001	0.50	24	Cir	0.012	8.65	17.33	5.35	342.17	341.22	342.59	341.64	2.08	3.04	
83	82	IN117-IN116	344.64	341.87	163.049	1.70	15	Cir	0.012	1.60	9.12	2.89	345.14 j	342.56	345.33	342.75	3.58	2.08	
84	80	RL102-RL101	341.14	339.59	308.997	0.50	30	Cir	0.012	24.89	31.47	6.43	342.84 j	341.61	343.60	342.37	4.16	5.71	
85	84	RL103-RL102	343.10	341.23	373.685	0.50	30	Cir	0.012	14.87	31.43	4.50	344.40 j	343.46	344.92	343.98	2.20	4.07	
86	79	IN118-IN115	342.38	341.51	174.000	0.50	15	Cir	0.012	4.48	4.95	4.57	343.31	342.44	343.64	342.77	1.63	2.50	
87	Outfall	OS301-LS301	327.50	323.50	96.993	4.12	36	Cir	0.012	4.92	146.73	1.62	328.45	328.50	328.56	328.51	-2.48	0.43	
88	Outfall	OS201-LS201	326.50	323.00	45.560	7.68	42	Cir	0.012	17.61	302.09	2.56	328.41	328.50	328.57	328.55	0.45	0.45	
Project File: PP213222_Hydraflow_230627.stm										Number of lines: 88				Date: 6/27/2023					
NOTES: ** Critical depth																			

Line No.	Inlet ID	Inlet Loc	Gnd/Rim El Up	Runoff Coeff	i Inlet	Drng Area	Inlet Time	Q Capt	HGL Jnct	Rim-Hw	
			(ft)	(C)	(in/hr)	(ac)	(min)	(cfs)	(ft)	(ft)	
1	MH401	Sag	339.37	0.00	0.00	0.00	0.0	....	335.53	3.84	
2	MH402	Sag	347.50	0.00	0.00	0.00	0.0	....	337.85	9.65	
3	MH403	Sag	349.50	0.00	0.00	0.00	0.0	....	339.30	10.20	
4	MH404	Sag	348.28	0.00	0.00	0.00	0.0	....	340.51	7.77	
5	MH405	Sag	351.24	0.00	0.00	0.00	5.0	....	341.26	9.98	
6	MH406	Sag	357.32	0.00	0.00	0.00	5.0	....	348.15	9.17	
7	MH407	Sag	357.76	0.00	0.00	0.00	5.0	....	350.75	7.01	
8	MH409	Sag	357.52	0.00	0.00	0.00	5.0	....	353.31	4.21	
9	IN402	Sag	356.70	0.95	7.31	0.13	5.0	0.90	353.88	2.82	
10	MH408	Sag	354.04	0.00	0.00	0.00	0.0	....	351.23	2.81	
11	IN401	Sag	354.00	0.40	7.31	0.80	5.0	2.34	351.41	2.59	
12	MH410	Sag	347.93	0.00	0.00	0.00	5.0	....	345.49	2.44	
13	IN201	Sag	339.89	0.95	7.31	0.23	5.0	1.60	333.94	5.95	
14	IN202	Sag	340.30	0.83	7.31	0.75	5.0	4.55	334.57	5.73	
15	IN203	Sag	344.06	0.65	7.31	0.61	5.0	2.90	335.27	8.79	
16	IN204	Sag	349.99	0.55	7.31	0.54	5.0	2.17	347.54	2.45	
17	IN205	Sag	352.77	0.95	7.31	0.01	5.0	0.07	349.88	2.89	
18	IN206	Sag	352.82	0.40	7.31	0.12	5.0	0.35	350.12	2.70	
19	IN101	Sag	350.86	0.00	0.00	0.00	0.0	0.00	340.91	9.95	
20	IN112	Sag	352.03	0.85	7.31	0.09	5.0	0.56	349.00	3.03	
21	IN113	Sag	355.86	0.78	7.31	0.39	5.0	2.22	350.14	5.72	
22	IN114	Sag	355.77	0.79	7.31	0.41	5.0	2.37	353.51	2.26	
23	IN102	Sag	350.30	0.94	7.31	0.70	5.0	4.81	341.64	8.66	
Project File: PP213222_Hydraflow_230627.stm											
Number of lines: 88									Date: 6/27/2023		
NOTES: Intensity = 49.69 / (Inlet time + 9.70) ^ 0.71 -- Return period = 100 Yrs. ; ** Critical depth											

Line No.	Inlet ID	Inlet Loc	Gnd/Rim El Up	Runoff Coeff	i Inlet	Drng Area	Inlet Time	Q Capt	HGL Jnct	Rim-Hw	
			(ft)	(C)	(in/hr)	(ac)	(min)	(cfs)	(ft)	(ft)	
24	IN103	Sag	350.30	0.93	7.31	1.73	5.0	11.76	342.43	7.87	
25	IN104	Sag	350.30	0.93	7.31	1.73	5.0	11.76	343.11	7.19	
26	IN105	Sag	350.30	0.94	7.31	0.71	5.0	4.88	343.76	6.54	
27	MH101	Sag	350.98	0.81	7.31	0.18	5.0	....	344.27	6.71	
28	IN106	Sag	350.81	0.82	7.31	0.18	5.0	1.08	344.38	6.43	
29	IN107	Sag	351.57	0.86	7.31	0.13	5.0	0.82	348.26	3.31	
30	IN108	Sag	351.36	0.76	7.31	1.21	5.0	6.72	348.89	2.47	
31	IN109	Sag	351.37	0.60	7.31	3.42	5.0	15.00	350.13	1.24	
32	IN110	Sag	351.36	0.68	7.31	1.50	5.0	7.46	349.90	1.46	
33	IN111	Sag	351.36	0.76	7.31	1.22	5.0	6.78	350.29	1.07	
34	RL105	Sag	347.81	0.95	7.31	1.27	5.0	....	345.69	2.12	
35	IN301	Sag	348.48	0.82	7.31	0.18	5.0	1.08	335.55	12.93	
36	IN315	Sag	348.60	0.82	7.31	0.19	5.0	1.14	344.64	3.96	
37	IN316	Sag	348.46	0.82	7.31	0.20	5.0	1.20	345.33	3.13	
38	IN319	Sag	348.72	0.93	7.31	0.53	5.0	3.60	346.93	1.79	
39	IN318	Sag	348.72	0.93	7.31	0.53	5.0	3.60	346.93	1.79	
40	IN317	Sag	348.35	0.82	7.31	0.17	5.0	1.02	346.07	2.28	
41	IN302	Sag	348.59	0.91	7.31	0.13	5.0	0.86	336.95	11.64	
42	IN303	Sag	345.40	0.82	7.31	1.09	5.0	6.53	338.25	7.15	
43	IN304	Sag	345.46	0.92	7.31	0.58	5.0	3.90	339.02	6.44	
44	IN305	Sag	345.46	0.90	7.31	0.63	5.0	4.14	339.65	5.81	
45	IN306	Sag	345.46	0.89	7.31	0.64	5.0	4.16	340.20	5.26	
46	IN307	Sag	345.46	0.89	7.31	0.64	5.0	4.16	340.68	4.78	
Project File: PP213222_Hydraflow_230627.stm											
Number of lines: 88									Date: 6/27/2023		
NOTES: Intensity = 49.69 / (Inlet time + 9.70) ^ 0.71 -- Return period = 100 Yrs. ; ** Critical depth											

Line No.	Inlet ID	Inlet Loc	Gnd/Rim El Up	Runoff Coeff	i Inlet	Drng Area	Inlet Time	Q Capt	HGL Jnct	Rim-Hw	
			(ft)	(C)	(in/hr)	(ac)	(min)	(cfs)	(ft)	(ft)	
47	IN308	Sag	345.46	0.89	7.31	0.64	5.0	4.16	341.08	4.38	
48	IN309	Sag	345.46	0.87	7.31	0.67	5.0	4.26	341.42	4.04	
49	IN310	Sag	345.46	0.76	7.31	1.79	5.0	9.95	341.91	3.55	
50	IN314	Sag	351.42	0.45	7.31	1.94	5.0	6.38	346.13	5.29	
51	IN311	Sag	345.52	0.85	7.31	0.81	5.0	5.03	342.44	3.08	
52	IN312	Sag	345.46	0.70	7.31	1.60	5.0	8.19	343.53	1.93	
53	IN313	Sag	349.44	0.92	7.31	0.10	5.0	0.67	345.05	4.39	
54	MH205	Sag	340.32	0.00	0.00	0.00	0.0	....	334.71	5.61	
55	IN209	Sag	345.26	0.93	7.31	0.79	5.0	5.37	336.59	8.67	
56	RL201	Sag	347.80	0.00	0.00	0.00	0.0	....	338.13	9.67	
57	RL208	Sag	347.80	0.95	7.31	1.14	5.0	....	346.26	1.54	
58	IN210	Sag	345.26	0.94	7.31	0.78	5.0	5.36	342.95	2.31	
59	IN211	Sag	345.08	0.91	7.31	0.84	5.0	5.59	343.85	1.23	
60	IN212	Sag	348.61	0.90	7.31	0.13	5.0	0.86	344.91	3.70	
61	RL202	Sag	351.58	0.95	7.31	1.46	5.0	....	339.88	11.70	
62	RL203	Sag	351.88	0.95	7.31	1.00	5.0	....	340.78	11.10	
63	RL204	Sag	351.74	0.95	7.31	1.00	5.0	....	341.92	9.82	
64	RL205	Sag	347.83	0.95	7.31	1.46	5.0	....	343.46	4.37	
65	RL206	Sag	347.80	0.95	7.31	2.55	5.0	....	344.75	3.05	
66	RL207	Sag	347.81	0.95	7.31	3.39	5.0	....	346.56	1.25	
67	IN208	Sag	345.26	0.92	7.31	0.80	5.0	5.38	343.46	1.80	
68	IN207	Sag	345.26	0.92	7.31	0.81	5.0	5.45	344.39	0.87	
69	IN215	Sag	339.42	0.67	7.31	0.46	5.0	2.25	337.77	1.65	
Project File: PP213222_Hydraflow_230627.stm											
Number of lines: 88									Date: 6/27/2023		
NOTES: Intensity = 49.69 / (Inlet time + 9.70) ^ 0.71 -- Return period = 100 Yrs. ; ** Critical depth											

Line No.	Inlet ID	Inlet Loc	Gnd/Rim El Up	Runoff Coeff	i Inlet	Drng Area	Inlet Time	Q Capt	HGL Jnct	Rim-Hw	
70	IN216	Sag	342.22	0.64	7.31	0.78	5.0	3.65	339.50	2.72	
71	IN214	Sag	339.32	0.68	7.31	0.29	5.0	1.44	336.44	2.88	
72	IN213	Sag	339.45	0.66	7.31	0.43	5.0	2.07	337.15	2.30	
73	MH202	Sag	332.73	0.00	0.00	0.00	0.0	....	327.63	5.10	
74	MH203	Sag	339.16	0.00	0.00	0.00	0.0	....	336.05	3.11	
75	MH204	Sag	347.51	0.00	0.00	0.00	0.0	....	342.27	5.24	
76	IN217	Sag	348.37	0.35	7.31	1.02	5.0	2.61	344.11	4.26	
77	IN218	Sag	346.75	0.39	7.31	0.81	5.0	2.31	344.50	2.25	
78	OS101	Sag	339.90	0.00	0.00	0.00	0.0	....	338.75	1.15	
79	IN115	Sag	345.26	0.91	7.31	0.82	5.0	5.45	342.95	2.31	
80	RL101	Sag	347.80	0.95	0.00	0.00	5.0	....	343.94	3.86	
81	RL104	Sag	351.00	0.95	7.31	1.27	5.0	....	346.55	4.45	
82	IN116	Sag	345.20	0.88	7.31	1.50	5.0	9.65	343.86	1.34	
83	IN117	Sag	349.47	0.86	7.31	0.31	5.0	1.95	345.20	4.27	
84	RL102	Sag	347.80	0.95	7.31	2.19	5.0	....	345.52	2.28	
85	RL103	Sag	347.80	0.95	7.31	2.61	5.0	....	346.76	1.04	
86	IN118	Sag	345.26	0.91	7.31	0.82	5.0	5.45	344.54	0.72	
87	OS301	Sag	328.02	0.00	0.00	0.00	0.0	....	328.60	-0.58	
88	OS201	Sag	330.45	0.00	0.00	0.00	0.0	....	328.41	2.04	
Project File: PP213222_Hydraflow_230627.stm											
Number of lines: 88									Date: 6/27/2023		
NOTES: Intensity = 49.69 / (Inlet time + 9.70) ^ 0.71 -- Return period = 100 Yrs. ; ** Critical depth											

Line No.	DnStm Ln No	Line ID	Invert Up (ft)	Invert Dn (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	Line Type	n-val Pipe	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	HGL Up (ft)	HGL Dn (ft)	EGL Up (ft)	EGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)
1	Outfall	MH401-LS401	333.40	323.00	499.098	2.08	36	Cir	0.012	42.82	104.30	7.02	335.53 j	328.50	336.52	329.07	2.97	0.39
2	1	MH402-MH401	335.72	334.37	270.842	0.50	36	Cir	0.012	42.88	51.01	8.03	337.85	336.48	338.84	337.47	8.78	2.00
3	2	MH403-MH402	337.17	335.82	270.221	0.50	36	Cir	0.012	42.94	51.07	7.47	339.30 j	338.27	340.30	339.26	9.33	8.68
4	3	MH404-MH403	338.38	337.27	221.068	0.50	36	Cir	0.012	42.99	51.20	7.48	340.51 j	339.72	341.51	340.71	6.90	9.23
5	4	MH405-MH404	339.12	338.48	128.881	0.50	36	Cir	0.012	43.02	50.91	7.48	341.26 j	340.93	342.25	341.93	9.12	6.80
6	5	MH406-MH405	346.58	344.24	466.306	0.50	30	Cir	0.012	21.37	31.47	6.74	348.15	345.75	348.82	346.42	8.24	4.50
7	6	MH407-MH406	349.17	346.67	500.000	0.50	30	Cir	0.012	21.57	31.42	6.07	350.75 j	348.52	351.43	349.20	6.09	8.15
8	7	MH409-MH407	352.76	352.56	40.217	0.50	24	Cir	0.012	2.51	17.28	3.74	353.31	353.08	353.51	353.27	2.76	3.20
9	8	IN402-MH409	353.53	353.26	47.344	0.57	18	Cir	0.012	0.90	8.59	3.00	353.88	353.59	354.01	353.71	1.67	2.76
10	7	MH408-MH407	349.74	349.27	94.362	0.50	30	Cir	0.012	19.30	31.36	5.56	351.23	351.19	351.85	351.81	1.80	5.99
11	10	IN401-MH408	350.83	350.74	18.768	0.48	18	Cir	0.012	2.34	7.88	2.75	351.41	351.78	351.62	352.00	1.67	1.80
12	5	MH410-MH405	341.00	340.90	19.594	0.51	18	Cir	0.012	21.82	8.13	12.35	343.12	342.40	345.49	344.77	5.43	8.84
13	Outfall	IN201-EW201	330.21	330.00	41.966	0.50	24	Cir	0.012	7.27	17.33	2.31	333.82	333.78	333.90	333.86	7.68	0.28
14	13	IN202-IN201	331.98	331.13	168.685	0.50	18	Cir	0.012	6.37	8.08	3.60	334.47	333.94	334.67	334.14	6.82	7.26
15	14	IN203-IN202	333.31	332.23	216.241	0.50	15	Cir	0.012	3.56	4.94	2.90	335.20	334.64	335.33	334.77	9.50	6.82
16	15	IN204-IN203	347.01	341.19	197.835	2.94	15	Cir	0.012	1.76	12.00	5.28	347.54	341.51	347.74	341.71	1.73	1.62
17	16	IN205-IN204	349.64	347.11	180.638	1.40	15	Cir	0.012	0.39	8.28	1.48	349.88 j	347.73	349.97	347.82	1.88	1.63
18	17	IN206-IN205	349.89	349.74	30.059	0.50	15	Cir	0.012	0.35	4.94	2.30	350.12	349.97	350.20	350.05	1.68	1.78
19	Outfall	IN101-EW101	338.37	338.00	74.499	0.50	48	Cir	0.012	70.51	109.67	7.13	340.91	341.65	342.00	342.74	8.49	-0.38
20	19	IN112-IN101	347.68	347.50	35.655	0.50	15	Cir	0.012	4.26	4.97	4.56	348.57	348.39	348.89	348.71	3.10	2.11
21	20	IN113-IN112	348.94	347.78	232.509	0.50	15	Cir	0.012	3.97	4.94	3.60	349.89	349.16	350.13	349.32	5.67	3.00
22	21	IN114-IN113	352.90	349.04	385.513	1.00	15	Cir	0.012	2.37	7.00	2.94	353.51 j	350.33	353.76	350.38	1.62	5.57
23	19	IN102-IN101	339.16	338.47	138.506	0.50	48	Cir	0.012	67.40	109.84	7.36	341.64	341.55	342.69	342.61	7.14	8.39

Project File: PP213222_Hydraflow_230627.stm

Number of lines: 88

Date: 6/27/2023

NOTES: ** Critical depth

Line No.	DnStm Ln No	Line ID	Invert Up (ft)	Invert Dn (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	Line Type	n-val Pipe	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	HGL Up (ft)	HGL Dn (ft)	EGL Up (ft)	EGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)
24	23	IN103-IN102	340.01	339.26	150.000	0.50	48	Cir	0.012	64.62	110.04	7.23	342.43	342.28	343.46	343.31	6.29	7.04
25	24	IN104-IN103	340.86	340.11	150.008	0.50	48	Cir	0.012	55.88	110.04	6.57	343.11 j	343.15	344.03	344.07	5.44	6.19
26	25	IN105-IN104	341.71	340.96	150.000	0.50	48	Cir	0.012	46.95	110.04	6.07	343.76 j	343.81	344.58	344.62	4.59	5.34
27	26	MH101-IN105	342.30	341.81	99.016	0.49	48	Cir	0.012	43.47	109.47	6.06	344.27 j	344.39	345.04	345.16	4.68	4.49
28	27	IN106-MH101	342.62	342.40	44.862	0.49	48	Cir	0.012	34.96	108.98	6.09	344.38 j	344.39	345.05	345.06	4.19	4.58
29	28	IN107-IN106	347.91	347.56	35.258	0.99	15	Cir	0.012	0.82	6.97	3.33	348.26	347.85	348.39	347.98	2.41	2.00
30	28	IN108-IN106	344.85	344.12	146.275	0.50	30	Cir	0.012	33.73	31.39	7.11	347.16	346.43	347.95	347.22	4.01	4.19
31	30	IN109-IN108	347.70	347.10	120.000	0.50	24	Cir	0.012	15.00	17.33	4.78	349.77	349.32	350.13	349.68	1.67	2.26
32	30	IN110-IN108	347.00	346.40	120.000	0.50	24	Cir	0.012	13.63	17.33	4.34	349.76	349.39	350.05	349.68	2.36	2.96
33	32	IN111-IN110	347.70	347.10	119.998	0.50	24	Cir	0.012	6.78	17.33	2.16	350.22	350.12	350.29	350.20	1.66	2.26
34	27	RL105-MH101	344.14	342.40	348.083	0.50	24	Cir	0.012	8.82	17.32	3.49	345.42	344.92	345.69	345.04	1.67	6.58
35	Outfall	IN301-EW301	330.15	330.00	29.124	0.52	36	Cir	0.012	51.24	51.85	7.55	332.88	332.77	333.78	333.65	15.33	1.48
36	35	IN315-IN301	343.52	342.63	176.521	0.50	18	Cir	0.012	5.71	8.08	4.95	344.45	343.56	344.83	343.94	3.58	4.35
37	36	IN316-IN315	344.48	343.62	170.761	0.50	18	Cir	0.012	4.94	8.07	3.92	345.33 j	344.90	345.69	345.25	2.48	3.48
38	37	IN319-IN316	345.84	345.38	91.610	0.50	15	Cir	0.012	3.60	4.96	4.41	346.63	346.17	346.93	346.47	1.63	1.83
39	35	IN318-IN301	345.84	345.28	112.680	0.50	15	Cir	0.012	3.60	4.93	4.39	346.63	346.07	346.93	346.37	1.63	1.95
40	37	IN317-IN316	345.67	344.73	188.498	0.50	15	Cir	0.012	1.02	4.94	2.04	346.07 j	345.68	346.21	345.82	1.43	2.48
41	35	IN302-IN301	332.43	331.39	206.320	0.50	36	Cir	0.012	43.88	51.30	6.21	336.60	335.84	337.20	336.44	13.16	14.09
42	41	IN303-IN302	333.29	332.53	152.509	0.50	36	Cir	0.012	43.79	51.00	6.20	337.51	336.95	338.11	337.55	9.11	13.06
43	42	IN304-IN303	334.09	333.39	139.515	0.50	36	Cir	0.012	39.61	51.18	5.60	338.78	338.36	339.26	338.84	8.37	9.01
44	43	IN305-IN304	334.86	334.19	133.511	0.50	36	Cir	0.012	37.26	51.18	5.27	339.43	339.08	339.86	339.51	7.60	8.27
45	44	IN306-IN305	335.62	334.95	133.479	0.50	36	Cir	0.012	34.69	51.19	4.91	340.01	339.70	340.39	340.08	6.84	7.51
46	45	IN307-IN306	336.39	335.72	133.513	0.50	36	Cir	0.012	32.08	51.18	4.54	340.52	340.25	340.84	340.57	6.07	6.74

Line No.	DnStm Ln No	Line ID	Invert Up (ft)	Invert Dn (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	Line Type	n-val Pipe	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	HGL Up (ft)	HGL Dn (ft)	EGL Up (ft)	EGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)
47	46	IN308-IN307	337.16	336.49	133.479	0.50	36	Cir	0.012	29.42	51.19	4.16	340.95	340.73	341.22	341.00	5.30	5.97
48	47	IN309-IN308	337.93	337.26	133.517	0.50	36	Cir	0.012	26.72	51.18	3.78	341.31	341.13	341.54	341.35	4.53	5.20
49	48	IN310-IN309	338.69	338.02	133.477	0.50	36	Cir	0.012	23.90	51.19	3.40	341.60	341.47	341.78	341.65	3.77	4.44
50	49	IN314-IN310	345.11	342.53	89.394	2.89	15	Cir	0.012	6.38	11.88	7.91	346.13	343.18	346.68	343.74	5.06	1.68
51	49	IN311-IN310	340.74	339.69	210.750	0.50	24	Cir	0.012	11.33	17.30	3.96	342.29	341.91	342.59	342.11	2.78	3.77
52	51	IN312-IN311	341.87	341.24	126.007	0.50	18	Cir	0.012	7.34	8.04	5.00	342.98	342.46	343.41	342.81	2.09	2.78
53	52	IN313-IN312	344.73	342.12	146.131	1.79	15	Cir	0.012	0.67	9.35	1.63	345.05 j	343.95	345.16	343.95	3.46	2.09
54	Outfall	MH205-EW202	330.21	330.00	41.647	0.50	48	Cir	0.013	88.05	102.00	7.22	333.89	333.78	334.71	334.58	6.11	2.94
55	54	IN209-MH205	330.66	330.31	70.471	0.50	48	Cir	0.013	81.73	101.23	6.50	335.11	334.88	335.77	335.54	10.60	6.01
56	55	RL201-IN209	331.90	330.76	228.790	0.50	42	Cir	0.013	62.52	71.02	6.50	337.47	336.59	338.13	337.24	12.40	11.00
57	56	RL208-RL201	344.63	343.84	158.173	0.50	18	Cir	0.012	7.92	8.04	5.19	345.84	345.05	346.26	345.47	1.67	2.46
58	55	IN210-IN209	340.84	339.97	174.000	0.50	18	Cir	0.012	9.65	8.04	5.46	342.72	341.47	343.18	341.93	2.92	3.79
59	58	IN211-IN210	341.85	340.94	181.000	0.50	18	Cir	0.012	5.44	8.07	3.08	343.68	343.27	343.83	343.42	1.73	2.82
60	59	IN212-IN211	344.55	342.10	165.100	1.48	15	Cir	0.012	0.86	8.52	1.80	344.91 j	343.99	345.04	344.00	2.81	1.73
61	56	RL202-RL201	333.87	332.00	374.494	0.50	42	Cir	0.012	58.81	77.02	6.11	339.29	338.20	339.88	338.78	14.21	12.30
62	61	RL203-RL202	335.51	333.97	307.052	0.50	42	Cir	0.012	52.81	77.19	5.49	340.71	339.99	341.18	340.46	12.87	14.11
63	62	RL204-RL203	337.24	335.61	326.735	0.50	42	Cir	0.012	49.31	76.98	5.13	341.51	340.84	341.92	341.25	11.00	12.77
64	63	RL205-RL204	339.19	337.34	370.283	0.50	36	Cir	0.012	45.25	51.07	6.40	343.37	341.92	344.01	342.55	5.64	11.40
65	64	RL206-RL205	341.14	339.29	370.283	0.50	36	Cir	0.012	38.19	51.07	5.40	344.68	343.65	345.14	344.10	3.66	5.54
66	65	RL207-RL206	343.56	341.14	484.096	0.50	30	Cir	0.012	23.54	31.41	4.80	346.21	344.85	346.56	345.20	1.75	4.16
67	55	IN208-IN209	341.12	340.25	174.000	0.50	18	Cir	0.012	10.36	8.04	5.86	343.19	341.75	343.73	342.28	2.64	3.51
68	67	IN207-IN208	342.09	341.22	174.000	0.50	18	Cir	0.012	5.45	8.04	3.08	344.25	343.85	344.39	343.99	1.67	2.54
69	54	IN215-MH205	336.21	335.70	101.990	0.50	15	Cir	0.012	5.62	4.95	4.58	337.61	336.95	337.93	337.28	1.96	3.37

Line No.	DnStm Ln No	Line ID	Invert Up (ft)	Invert Dn (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	Line Type	n-val Pipe	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	HGL Up (ft)	HGL Dn (ft)	EGL Up (ft)	EGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)
70	69	IN216-IN215	338.73	336.31	190.131	1.27	15	Cir	0.012	3.65	7.89	3.78	339.50 j	337.96	339.83	338.10	2.24	1.86
71	54	IN214-MH205	335.56	335.12	87.853	0.50	15	Cir	0.012	3.24	4.95	4.30	336.30	335.86	336.58	336.14	2.51	3.95
72	71	IN213-IN214	336.58	335.66	184.076	0.50	15	Cir	0.012	2.07	4.95	2.85	337.15 j	336.68	337.38	336.91	1.62	2.41
73	Outfall	MH202-MH201	325.31	323.00	307.814	0.75	36	Cir	0.012	50.91	62.59	9.27	327.63	325.06	328.80	326.23	4.42	-0.52
74	73	MH203-MH202	333.73	327.23	307.814	2.11	36	Cir	0.012	51.03	104.99	11.72	336.05	328.71	337.23	329.88	2.43	2.50
75	74	MH204-MH203	341.40	336.22	268.843	1.93	15	Cir	0.012	4.56	9.71	5.30	342.27	337.01	342.66	337.41	4.86	1.69
76	75	IN217-MH204	342.98	341.50	270.206	0.55	15	Cir	0.012	4.80	5.18	4.79	343.93	342.45	344.29	342.81	4.14	4.76
77	76	IN218-IN217	343.36	343.08	56.211	0.50	15	Cir	0.012	2.31	4.94	1.97	344.44	344.39	344.50	344.44	2.14	4.04
78	74	OS101-MH203	336.50	333.83	219.292	1.22	30	Cir	0.012	46.70	49.02	10.08	338.75	336.05	340.32	337.62	0.90	2.83
79	Outfall	IN115-EW102	338.15	338.00	29.117	0.52	42	Cir	0.013	56.47	72.21	5.87	341.74	341.65	342.28	342.19	3.61	-0.60
80	79	RL101-IN115	339.49	338.65	168.882	0.50	36	Cir	0.012	37.66	50.96	5.33	343.50	343.04	343.94	343.48	5.31	3.61
81	80	RL104-RL101	345.40	341.90	335.743	1.04	18	Cir	0.012	8.82	11.62	5.53	346.55 j	344.00	347.12	344.38	4.10	4.40
82	79	IN116-IN115	341.12	340.22	180.001	0.50	24	Cir	0.012	10.72	17.33	3.41	343.65	343.30	343.83	343.48	2.08	3.04
83	82	IN117-IN116	344.64	341.87	163.049	1.70	15	Cir	0.012	1.95	9.12	2.64	345.20 j	344.00	345.41	344.04	3.58	2.08
84	80	RL102-RL101	341.14	339.59	308.997	0.50	30	Cir	0.012	30.85	31.47	6.29	345.43	343.94	346.05	344.56	4.16	5.71
85	84	RL103-RL102	343.10	341.23	373.685	0.50	30	Cir	0.012	18.13	31.43	3.69	346.55	345.93	346.76	346.14	2.20	4.07
86	79	IN118-IN115	342.38	341.51	174.000	0.50	15	Cir	0.012	5.45	4.95	4.45	344.23	343.18	344.54	343.48	1.63	2.50
87	Outfall	OS301-LS301	327.50	323.50	96.993	4.12	36	Cir	0.012	12.11	146.73	3.42	328.60 j	328.50	329.01	328.55	-2.48	0.43
88	Outfall	OS201-LS201	326.50	323.00	45.560	7.68	42	Cir	0.012	37.83	302.09	5.49	328.41	328.50	329.18	328.74	0.45	0.45
Project File: PP213222_Hydraflow_230627.stm													Number of lines: 88			Date: 6/27/2023		
NOTES: ** Critical depth																		

Appendix



NEW BRITAIN CORPORATE CENTER
1600 MANOR DRIVE
SUITE 220
CHALFONT, PA 18914
215.712.2700
whitestoneassoc.com

February 16, 2022

via email

MAIDEN CREEK ASSOCIATES, L.P.

120 West Germantown Pike

Suite 120

Plymouth Meeting, Pennsylvania 19462

Attention: Mr. Steven B. Wolfson

**Regarding: REPORT OF PRELIMINARY GEOTECHNICAL INVESTIGATION
& SWM AREA EVALUATION
PROPOSED WAREHOUSE
U.S. ROUTE 222 (ALLENTOWN PIKE) & SCHAEFFER ROAD
MAIDENCREEK TOWNSHIP, BERKS COUNTY, PENNSYLVANIA
WHITESTONE PROJECT NO.: GP2118631.000**

Dear Mr. Wolfson:

Whitestone Associates, Inc. (Whitestone) has completed a preliminary geotechnical investigation and stormwater management (SWM) area evaluation at the above referenced site. The results of the limited evaluation and preliminary recommendations presented below are based on the soil conditions disclosed from soil borings, test pits, and soil profile pits conducted during this investigation.

The purpose of the preliminary subsurface exploration was to assess anticipated geologic features, shallow groundwater, refusal depths, existing fill, and the potential feasibility of shallow foundations and/or expected earthwork requirements. This preliminary investigation may be used to assess potentially development impactful geotechnical issues to support preliminary studies regarding the feasibility of developing the property.

This report is based on information provided by Bohler Engineering PA, LLC (Bohler) including an October 27, 2021 *Concept Plan A* and the January 21, 2022 *Grading Plan* both prepared by Bohler.

1.0 PROJECT DESCRIPTION

1.1 Site Location and Existing Conditions

The subject site is located within the northwestern portion of the intersection of U.S. Route 222 (Allentown Pike) and Schaeffer Road in the Township of Maidencreek, Berks County, Pennsylvania. The site is bound to the north by a moderately wooded lot followed by Peters Creek and commercial development, to the east by Berks County Memorial Gardens followed by a vacant land parcel, to the west by commercial development followed by residential development, and to the south by U.S. Route 222 followed by an agricultural parcel and residential developments beyond. The location of the subject site is shown on the *Test Location Plan* included as Figure 1.

Other Office Locations:

WARREN, NJ
908.668.7777

SOUTHBOROUGH, MA
508.485.0755

ROCKY HILL, CT
860.726.7889

WALL, NJ
732.592.2101

PHILADELPHIA, PA
215.848.2323

BEDFORD, NH
603.514.2230

TAMPA, FL
813.851.0690

Environmental & Geotechnical Engineers & Consultants

Based on the aforementioned *Grading Plan* provided by Bohler, the site slopes easterly to northeasterly with grade changes on the order of approximately 55 feet. The elevations range between approximately 372 feet above North American Vertical Datum 1988 (NAVD 88) in the southeastern portion of the site to 317 feet above NAVD 88 in the northeastern corner of the site.

1.2 Site Bedrock Geology

1.2.1 Regional Geology

According to the Commonwealth of Pennsylvania, Department of Environmental Resources, Bureau of Topographic and Geologic Survey *Geologic Map of Pennsylvania* dated 1980, the site is located within the Lowland Section of the Piedmont Physiographic Province of Pennsylvania. Specifically, the subject property is underlain at the confluence of three carbonate rock formations that include the Epler Formation, the Ontelaunee Formation, and the Rickenbach Formation. Several faults associated with these carbonate rock formations are mapped at the site. The approximate locations of the mapped fault lines are shown on Figure 2 - *Karst Figures Map*.

The Epler Formation consists of thick bedded, medium to medium dark gray, finely crystalline limestone, weathering light gray with yellow dolomitic laminae and interbedded medium dark gray, finely crystalline dolomite, weathering yellowish gray with edgewise conglomerate fossil-fragment and oolitic lenses. The Ontelaunee Formation consists of medium dark gray, massive to finely laminated, finely crystalline dolomite and thick-bedded, dark gray chert at the base. The Rickenbach Formation consists of gray, very finely to coarsely crystalline, laminated dolomite with dark gray chert in irregular beds, stringers, and nodules and bands of quartz sand. In addition, a diabase dike is mapped along US Route 222.

These geologic formations could contain solution cavities and voids that are susceptible to sinkhole formation. Residual soils weathered from the parent bedrock generally consist of fine-grained clay and silt with lesser amounts of sand and variable amounts of rock fragments. The subsurface conditions encountered during this investigation generally were consistent within these formations.

1.2.2 Existing Karst Features

Site Reconnaissance: Whitestone conducted a reconnaissance of the site in attempt to identify existing karst features such as closed surface depressions, rock outcrops, and open sinkholes. Whitestone identified 15 undocumented closed depressions and two sinkholes during the site reconnaissance.

Document Review: In addition to the site reconnaissance and subsurface investigation, Whitestone reviewed the 1990 *Open File Report - Sinkholes and Karst-Related Features of Berks County, Pennsylvania (Open File Report)* prepared by William E. Kochanov for the Commonwealth of Pennsylvania to further develop an understanding of the geologic conditions within the overall site development and evaluate risk potential for sinkhole development with the proposed warehouse site.

The *Open-File Report* (1990) revealed several closed depressions in all directions away from the site. Utilizing online mapping software in association with the Pennsylvania Department of Conservation and Natural Resources, there were a total of approximately 146 closed surface depressions and one sinkhole mapped within one half mile of the site. These surface features along with features identified by Whitestone, and mapped faults are shown on Figure 2 - *Karst Figures Map*.

1.3 Proposed Construction

Based on the aforementioned *Concept Plan A* and the aforementioned *Grading Plan*, the proposed site development includes construction of an approximately 930,000-square feet (footprint) warehouse building having a finished floor elevation of 352.00 feet. The proposed construction also will include associated pavements, an approximately 650-foot long retaining wall with a maximum fill height of approximately 25 feet, four SWM facilities totaling approximately six acres of bottom surface area, and utilities.

Proposed site grading is anticipated to require up to 20 feet of fill placement in the building pad and cuts less than approximately eight feet. The proposed SWM system is anticipated to consist of four aboveground basins. Proposed cuts up to approximately 15 feet to 27 feet are anticipated in the two western and northern portions of the site. Minor cuts up to approximately five feet are anticipated in the two SWM areas on the eastern portion of the site. No subsurface building levels are anticipated at the time of this report.

Detailed structural information was not available at the time of this report, however, based on experience with similar projects, Whitestone anticipates that the proposed building will be constructed with exterior precast concrete panels, steel framing, and ground-supported floor slabs. The anticipated design loads are assumed to be less than the 150 kips for columns, 6.0 kips per square foot for walls, and in the range of 400 pounds per square foot (psf) to 800 psf for floor slab loads.

2.0 FIELD EXPLORATION & LABORATORY TESTING

2.1 Field Exploration

Field exploration of the subject site was conducted by means of nine soil borings within the proposed building pad and retaining wall (identified as PB-1 through PB-9 with associated offsets), 10 SWM borings (identified as SWB-1 through SWB-10 with associated offsets), three auger probes (identified as AP-1 through AP-3), seven test pits (identified as PTP-1 through PTP-7), 14 SWM soil profile pits (identified as SPP-1 through SPP-14), and 24 in-situ infiltration tests (identified as I-1 through I-24).

TEST LOCATION SUMMARY		
Proposed Construction	Test Location(s)	Termination Depth (fbgs)
Proposed Warehouse Building and Retaining Wall	PB-1 thru PB-9, PTP-1 thru PTP-7, and associated offset borings.	2.5 to 30.0
Proposed Stormwater Management Areas	SWB-1 thru SWB-10 and associated offset borings, SPP-1 thru SPP14	1.5 to 35.0
Proposed Storage, Parking, and Trailer Spaces	AP-1 thru AP-3	6.5 to 20.0

fbgs: feet below ground surface

The soil borings and auger probes were advanced with an ATV-mounted CME-45 drill rig equipped with hollow-stem augers and utilizing split-spoon sampling techniques. The test pits and soil profile pits were excavated with a track-mounted Wacker ET65 excavator. The test locations were based on the project

information available at the time of the investigation provided by Bohler and were completed within areas of the proposed development that were accessible to ATV-mounted drilling equipment and an excavator.

The test locations are shown on the *Test Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A. The test locations were conducted at the following locations with associated termination depths.

The soil borings, test pits, and soil profile pits were conducted in the presence of a Whitestone engineer who conducted field tests, recorded visual classifications, and collected samples of the various strata encountered. The test areas were located in the field using normal taping procedures and estimated right angles using reference stakes provided by Control Point Associates, Inc. These locations are presumed to be accurate within a few feet. Soil borings and Standard Penetration Tests (SPTs) were conducted in general accordance with ASTM International (ASTM) designation D 1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations.

Rock coring was conducted in accordance with ASTM D 2113 guidelines using an NQ-sized core barrel. As the coring was conducted, pertinent information such as elapsed drilling time, loss of drilling fluids, voids, and other observations were documented and are included in Appendix A on the *Records of Subsurface Exploration*. Upon completion, the percent rock recovery and rock quality designation (RQD) values were recorded. The RQD values reflect the quality and fracture spacing of the rock and are calculated by summing all unbroken samples that are four inches or longer divided by the total length of the run. The percentage of core recovery and RQD values provide an understanding of the physical and engineering properties of the rock.

Groundwater level observations, if encountered, were recorded during and immediately after the completion of field operations prior to backfilling the tests. Seasonal variations, temperature effects, man-made effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

2.2 Laboratory Testing

In addition to the field investigation, a laboratory program was conducted to determine additional, pertinent engineering characteristics of representative samples of on-site soils. The laboratory program was conducted in general accordance with applicable ASTM standard test methods and included physical/textural testing of representative samples of various strata.

Physical/Textural Analyses: Representative samples of a selected strata encountered were subjected to a laboratory testing program that included Atterberg limits determination (ASTM D-4318), moisture content determinations (ASTM D-2216) and washed gradation analyses (ASTM D-422) in order to perform supplementary engineering soil classifications in general accordance with ASTM D-2487.

The soil stratum tested was classified by the Unified Soil Classification System (USCS) and results of the laboratory testing are summarized in the following table. Quantitative test results are provided in Appendix B.

PHYSICAL/TEXTURAL ANALYSES SUMMARY							
Test Location	Sample	Depth (fbgs)	% Passing No. 200 Sieve	Moisture Content (%)	Liquid Limit (%)	Plastic Index (%)	USCS Classification
PB-1	S-3	4.0 - 6.0	83.6	22.6	43	25	CL
PB-6	S-6	13.0 - 15.0	79.9	30.3	54	32	CH
PB-8	S-2	2.0 - 4.0	80.6	29.9	59	34	CH
SWB-10	S-7	18.0 - 20.0	79.5	32.5	Non-Plastic		ML
SPP-5	S-1	1.0 - 3.0	81.9	20.9	41	24	CL
SPP-11	S-1	1.0 - 4.0	93.1	27.0	48	30	CL
SWB-1	S-2	2.0 - 4.0	63.9	17.8	33	15	CL

% - Percent

Pavement and Slab Subgrade Analyses: A representative bulk sample from the anticipated proposed subgrade stratum were collected and tested to determine the soil's suitability for support of proposed pavement and slabs. A California Bearing Ratio (CBR) test was conducted on the representative sample taken at the anticipated subgrade soil levels in general accordance with ASTM D 1883. The CBR value is used in conjunction with climatic factors and design loads to design an appropriate pavement section. A laboratory CBR value of 6.4 was obtained from the selected site bulk sample. A moisture-density relationship per ASTM D 1557 also was conducted. The maximum dry density and optimum moisture content was obtained from the peak value of the moisture-density curve. The maximum dry density and optimum moisture content on the tested sample was 112.7 pounds per cubic foot (pcf) at 17.1 percent. More detailed quantitative results are provided in Appendix B.

3.0 SUBSURFACE CONDITIONS

The subsurface soil conditions encountered within the explorations performed consisted of the following generalized strata in order of increasing depth. *Records of Subsurface Exploration* are provided in Appendix A.

Surface Materials: At the time of the investigation, the subject site was undeveloped and utilized as farmland. Lightly wooded isolated areas were situated within the central and northern portions of the site. The subsurface tests were conducted within the existing agricultural fields and disclosed approximately six to 18 inches of topsoil (ploughed horizon) at the ground surface, averaging approximately 12 inches in thickness.

Residual Soils: Underlying the surface cover, natural fine-grained residual soils consisting of silt (USCS: ML), lean and fat clay (USCS: CL & CH) with varying amounts of sand (USCS: SC) and gravel were encountered.

Pocket penetrometer tests conducted on the cohesive soils indicated unconfined compression strength values ranging between approximately 0.75 tons per square foot (tsf) and greater than 4.0 tsf, generally

indicating medium stiff to hard soil consistencies. The residual soils were generally encountered in a medium stiff to very stiff consistency to depths extending up to 34 fbgs, where weathered rock was encountered as described below.

Loose/Soft Soil/Apparent Voids: Two subsurface test locations, identified as SPP-7 and SPP-13, encountered apparent voids within the excavations and soil conditions indicative of active or incipient karst conditions. A six-inch void was observed in soil profile pit SPP-7, and a 2.0-foot diameter void was observed in soil profile pit SPP-13. The voids were encountered within the existing residual soil stratum at depths ranging from approximately five fbgs to seven fbgs and eight fbgs to 10 fbgs, respectively. Boring location SWB-9A encountered an apparent 24-inch loose/soft soil zone at an approximate depth of 18 fbgs.

Weathered Rock: Underlying the residual soils, weathered limestone rock was encountered within majority of the test locations, with the exception of test locations PTP-2, SPP-13, and AP-2. The top of weathered rock was encountered at a depth ranging between approximately 1.5 fbgs and 34 fbgs. This material was encountered in a very dense relative density. SPT N-values within this stratum were in refusal range (refusal defined as greater than 50 blows per six inches of split-spoon advancement). Based on the conditions encountered within the field such as highly variable refusal depths, deflection of the drilling equipment, and voids encountered within profile pits as described above, the bedrock surface appeared highly pinnacled.

Bedrock: Auger refusal, typically indicative of competent bedrock was encountered within the majority of the boring locations at depths ranging between 1.5 fbgs to 35 fbgs. RQD values obtained from the coring efforts ranged between approximately 37 percent and 100 percent, generally corresponding to poor rock quality to excellent rock quality. The results rock coring efforts are summarized in the following table:

ROCK CORING SUMMARY TABLE						
Boring No.	Top of Depth Rock (fbgs)	Rock Core Data				Rock Quality
		Run	Run Depth (feet)	Recovery (%)	RQD (%)	Classification Based on RQD
PB-2C	17.0	R1	17.0 - 22.0	82.0	37.0	Poor
PB-2C	17.0	R2	22.0 - 23.0	100.0	100.0	Excellent
PB-4B	14.0	R1	14.0 - 19.0	56.0	53.0	Fair

Groundwater: Static groundwater was not encountered within the subsurface tests with the deepest depth explored of approximately 35 fbgs. However, perched groundwater was encountered within the soil borings at variable depths ranging between 7.8 fbgs and 26 fbgs. Seasonal variations, temperature effects, and recent rainfall conditions may influence the levels of the groundwater. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater level.

4.0 PRELIMINARY SWM AREA EVALUATION

General: A total of 14 soil profile pits (identified as SPP-1 through SPP-14), 10 stormwater borings (identified as SWB-1 through SWB-10, with associated offsets), and 24 field infiltration tests (identified as I-1 through I-24) were conducted as part of this investigation at locations designated by Bohler as areas of potential SWM facilities. The test locations are shown on the *Test Location Plan* included as Figure 1.

The field infiltration testing was conducted using double-ring infiltrometer and cased borehole methodologies in accordance with the Pennsylvania Department of Environmental Protection (PADEP) *Stormwater Best Management Practices Manual* (BMP Manual). Detailed infiltration test results are provided in Appendix D.

Estimated Seasonal High Groundwater Levels: The methods used in determining the seasonal high groundwater level include evaluating the soil morphology within a test excavation and identifying irregular spots or blotches of different colors or minerals unlike that of the surrounding soil (mottles). A summary of the estimated seasonal high groundwater observations, although not encountered, as well as permeability test results are included in the following table.

SUMMARY OF INFILTRATION TESTING					
Test Location	Approximate Surface Elevation (feet)	Approximate Test Depth / Elevation (fbgs / feet)	Soil Type Tested (USDA)	Weathered Rock Depth / Elevation (fbgs/feet)	Field Infiltration Rate (iph)*
SWB-1	350.0	2.5 / 347.5	Silty Clay	4.5 / 345.5	0.0
SWB-2	353.5	10.0 / 343.5	Clay Loam	12.0 / 341.5	0.0
SWB-3	350.8	7.0 / 343.08	Clay	11.0 / 339.8	0.0
SWB-4	359.0	3.0 / 356.0	Clay	5.5 / 353.5	0.0
SWB-5A	360.0	5.0 / 355.0	Clay	7.0 / 353.0	0.0
SWB-6	364.1	4.0 / 360.1	Clay	6.0 / 358.1	0.0
SWB-7A	365.0	17.0 / 348.0	Silt Loam	21.0 / 344.0	0.0
SWB-8A	361.0	12.0 / 349.0	Clay	14.5 / 346.5	0.0
SWB-9A	363.0	16.0 / 347.0	Clay	20.0 / 343.0	0.0
SWB-10	360.7	27.0 / 333.7	Silty Clay Loam	34.0 / 326.7	0.0
SPP-1	348.0	1.0 / 347.0	Silty Clay	3.0 / 345.0	0.0
SPP-2	341.0	1.0 / 340.0	Silty Clay Loam	3.0 / 338.0	0.0
SPP-3	331.0	1.0 / 330.0	Silty Clay Loam	5.0 / 326.0	0.0
SPP-4	331.0	1.0 / 330.0	Silty Clay Loam	5.0 / 326.0	1.0
SPP-5	333.0	1.0 / 332.0	Clay Loam	3.0 / 330.0	1.0
SPP-6	337.0	1.0 / 336.0	Clay Loam	3.0 / 334.0	0.0
SPP-7	335.0	1.0 / 334.0	Sandy Clay Loam	5.0 / 330.0	3.0
SPP-8	339.0	1.0 / 338.0	Sandy Clay Loam	1.5 / 337.5	3.0
SPP-9	341.00	1.0 / 340.0	Sandy clay Loam	5.0 / 336.0	2.0
SPP-10	341.0	1.0 / 340.0	Clay Loam	3.0 / 338.0	0.5
SPP-11	343.0	1.0 / 342.0	Sandy Clay Loam	4.0 / 339.0	0.5
SPP-12	344.0	2.0 / 342.0	Sandy Clay Loam	1.5 / 342.5	1.0
SPP-13	343.0	1.5 / 341.5	Silty Clay	NE	2.0
SPP-14	346.2	4.2 / 342.0*	Silty Clay	8.0 / 336.2	0.0

NE - Not Encountered; NS - Not Surveyed iph: inches per hour *Field test results do not include an applicable factor of safety

Conclusions and Recommendations: The results of the subsurface investigation indicated that site soils are predominantly impermeable with minor lenses of permeable soil. The subsurface investigation and document review also indicated that the site has an elevated risk of sinkhole development due to the presence of very loose/very soft soil conditions above bedrock (i.e., raveling), highly variable rock depths, documentation of sinkhole activity, and several faults (as shown on Figure 2). Because water infiltration into the substrata increases risk of sinkhole development, Whitestone recommends that the proposed SWM facilities be lined with an impermeable clay soil or geosynthetic membrane.

5.0 CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

The following discussion is based on the subsurface conditions encountered during Whitestone's subsurface investigation for the proposed development and is intended to provide general characteristics of the subsurface conditions for preliminary planning purposes. These preliminary considerations and development recommendations should be confirmed or revised based upon development of the final building architectural design.

Carbonate Rock Area Considerations: Due to the presence of carbonate bedrock and the potential for sinkhole formation, additional design measures should be incorporated into the site plan for the referenced property. Such measures should include using water-tight utility connections, avoiding the placement of subsurface irrigation or SWM infiltration design adjacent to buildings or other structures, and providing proper subgrade grading to avoid concentrations of surface runoff. Sound engineering design and construction practices can be followed to reduce, the inherent risk of sinkhole development.

Foundations: Whitestone preliminarily anticipates that the structure may be supported on conventional spread and continuous wall footings designed to bear either within the underlying natural soils or controlled structural fill, provided these materials are properly evaluated, placed, and prepared. Foundations bearing within approved materials may be preliminarily designed to impart a allowable net bearing pressure in the range of 3,000 pounds per square foot (psf) to potentially 5,000 psf, depending on final design column and wall loading, column spacing, settlement tolerances, final geotechnical investigation, and any required sinkhole mitigation.

Excavation Difficulties/Rock Removal: Split-spoon sampler and auger refusal was encountered on apparent bedrock and pinnacled rock at highly variable depths across the site and as shallow as 1.5 fbs. Based on proposed site grading, weathered rock/bedrock removal may be required during mass grading and for excavations of foundations and utilities, particularly within the central to northern portions of the site and within proposed SWM basins. The speed and ease of excavation will depend on the type of grading equipment, the equipment operator, and the geologic structure of the material, such as planes of weakness and spacing between discontinuities. Carbonate rock pinnacles and outcrops typically consist of very hard minerals and are expected to require the use of high energy pneumatic rock hammers. Blasting should be minimized, if possible, and over blasting should be avoided as blasting can increase fracturing and the potential for sinkhole development.

Floor Slabs and Pavements: Whitestone preliminarily anticipates that the properly prepared natural site subgrade soils will be suitable for support of the proposed floor slabs and pavements. Subgrade stabilization and protection may be necessary during wet conditions to obtain a stable surface. Subgrade stabilization may be achieved through the use of separation geotextiles, geogrids, and/or the addition of lime-cement to the subgrade. Isolated areas of overexcavation due to construction traffic or moisture degradation should be anticipated.

Preliminary Pavement Design Criteria: A California Bearing Ratio value of 6.4 has been assigned to the properly prepared subgrade soils for pavement design purposes. This value was correlated with pertinent soil support values and assumed traffic loads to prepare flexible and rigid pavement designs per the AASHTO *Guide for the Design of Pavement Structures*.

Design traffic loads were estimated and correlated with 18-kip equivalent single axle loads (ESAL) for a 20-year life. Detailed traffic data has not been provided. Based on a total of 216 loading bays, Whitestone assumes that heavy duty pavement will be subjected to up to 216 truck trips per day with each truck having a gross weight of 80,000 pounds, two trailer tandem axles and a single steering axle. Standard duty pavement is estimated to consist of light automobile traffic only. The actual traffic data should be provided to Whitestone to confirm these assumptions.

The following preliminary design criteria and traffic loads were considered:

Standard Duty Pavement - Design life of 20 years, based on 18-kip equivalent single axle loads (ESAL) with a maximum load of 35,000 ESALs.

Heavy Duty Pavement - Design life of 20 years, based on 18-kip ESAL with a maximum load of 4,000,000 ESALs.

Pavement Sections: The recommended flexible pavement sections are presented in the table below. Additional section thicknesses using stabilized subgrades with geosynthetics and lime or cement may also be considered:

FLEXIBLE PAVEMENT SECTIONS DESIGN			
Layer	Material	Standard Duty Thickness (Inches)	Heavy Duty Thickness (Inches)
Asphalt Surface	PennDOT SuperPave 12.5 mm PG 64-22 Surface Course	1.5	2.0
Asphalt Base	PennDOT SuperPave 19.0 mm PG 64-22 Base Course	2.5	6.0
Granular Subbase	PennDOT 2A Stone	6.0	13.0

A rigid concrete pavement should be used to provide suitable support at areas of high traffic or severe turns (such as loading areas, fueling positions, and garbage dumpster aprons). The recommended rigid pavement is presented below in tabular format:

RIGID PAVEMENT SECTIONS DESIGN			
Layer	Material	Standard Duty Thickness (Inches)	Heavy Duty Thickness (Inches)
Surface	4,000 psi Air-Entrained Concrete	5.0	11.0
Base	PennDOT 2A Stone	6.0	12.0

The pavement section thickness designs presented in this report are based on the design parameters detailed herein and are contingent on proper construction, inspection, and maintenance. Additional

pavement thickness may be required by local code. The designs are contingent on achieving the minimum soil support value in the field. To accomplish this requirement, all subgrade soil and supporting fill or backfill must be properly evaluated, placed, and prepared. Proper drainage must be provided for the pavement structure including appropriate grading and surface water control, as well as measures to drain water from the subgrade.

The performance of the pavement also will depend on the quality of materials and workmanship. Whitestone recommends that PennDOT standards for materials, workmanship, and maintenance be applied to this site. Project specifications should include verifying that the installed asphaltic concrete material composition is within tolerance for the specified materials and that the percentage of air voids of the installed pavement is within specified ranges for the respective materials. All rigid concrete pavements should be suitably air-entrained, jointed, and reinforced.

Supplemental Geophysical Survey & Sinkhole Evaluation: Several closed depressions and sinkholes were identified. In addition, loose soils were encountered above refusal material. Prior to any global sinkhole remedial efforts, Whitestone recommends conducting a geophysical survey, though electromagnetic or seismic refraction studies, to further delineate the subsurface conditions. Supplemental borings should be anticipated to validate and refine the geophysical data. The results of the supplemental study should be used to determine the optimum repair solution. Whitestone estimates that repair of the sinkholes will require either excavation and choked with aggregate where near-surface voids are present or proofdrilling and compaction grouting to address deeper concerns.

Overexcavation and replacement would include removing loose soils and debris from the sinkhole with a track-mounted excavator or similar equipment to expose the throat. Water may be introduced into the excavation to flush any remaining loose materials and observe infiltration rates. The exposed excavation should then be wrapped in a filter fabric and backfilled with granular materials that range in gradation from six inches to 12 inches at the base to dense graded aggregate near the surface and capped with impermeable material.

Alternatively, compaction grouting also may be considered for deeper anomalies or sinkholes. Compaction grouting is typically conducted on an initial grid spacing of approximately 10 feet at the area of concern. The drill hole is advanced into rock and then grout is pumped into the subsurface under pressures of 50 pounds per square inch (psi) to 300 psi. Grout takes are monitored. Where grout takes are in excess of the theoretical volume of the grid location, secondary grid locations are established at closer spacing than the initial grid.

Supplemental Borings: A supplemental subsurface investigation designed to address site-specific and project-specific conditions following development of the building plans is recommended. The final subsurface investigation and geotechnical evaluation should be conducted to obtain subsurface information across the site at more closely spaced intervals within the proposed building footprint and include a geophysical evaluation to assess a greater areal extent.

7.0 CLOSING

Whitestone appreciates the opportunity to be of service to Maiden Creek Associates, L.P. Please note that Whitestone has the capability to perform the additional geotechnical engineering services recommended herein.



Please contact us at (908) 668-7777 with any questions or comments regarding this report.

Sincerely,

WHITESTONE ASSOCIATES, INC.

James M. Morgan
Senior Associate

Laurence W. Keller, P.E.
Vice President

TDJ/az M:\Job Folders\2021\2118631GP\Reports and Submittals\18631 PreGI Final.doc
Enclosures
Copy: Christos N. Dinoulis, Bohler Engineering PA, LLC
Derek Maruca, Bohler Engineering PA, LLC

FIGURE 1
Test Location Plan



WHITESTONE
An Employee-Owned Company

1600 MANOR DRIVE, SUITE 220, CHALFONT, PA 18914
215.712.2700 WHITESTONEPA.COM

DATE	DESCRIPTION	BY	DATE
01/11/2017	CHANGING	CS	

NOT A PROJECT FOR CONSTRUCTION

OWNER: MAIDEN CREEK ASSOCIATES, L.P.

DESIGNER: L.W. KELLER

SCALE: AS SHOWN

PROJECT: PROPOSED WAREHOUSE

U.S. 302 PROJECT LOCATION: THIS & ADJACENT AREAS ARE PART OF THE MAIDEN CREEK ASSOCIATES, L.P. PROJECT. THE INFORMATION, DESIGN AND CONSTRUCTION SHALL BE COVERED AND USED FOR THE PROJECT ONLY. NO PART OF THIS DOCUMENT SHALL BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF L.W. KELLER.

L.W. KELLER

PROFESSIONAL ENGINEER

TEST LOCATION PLAN

SHEET NUMBER: 1

REVISIONS: 0

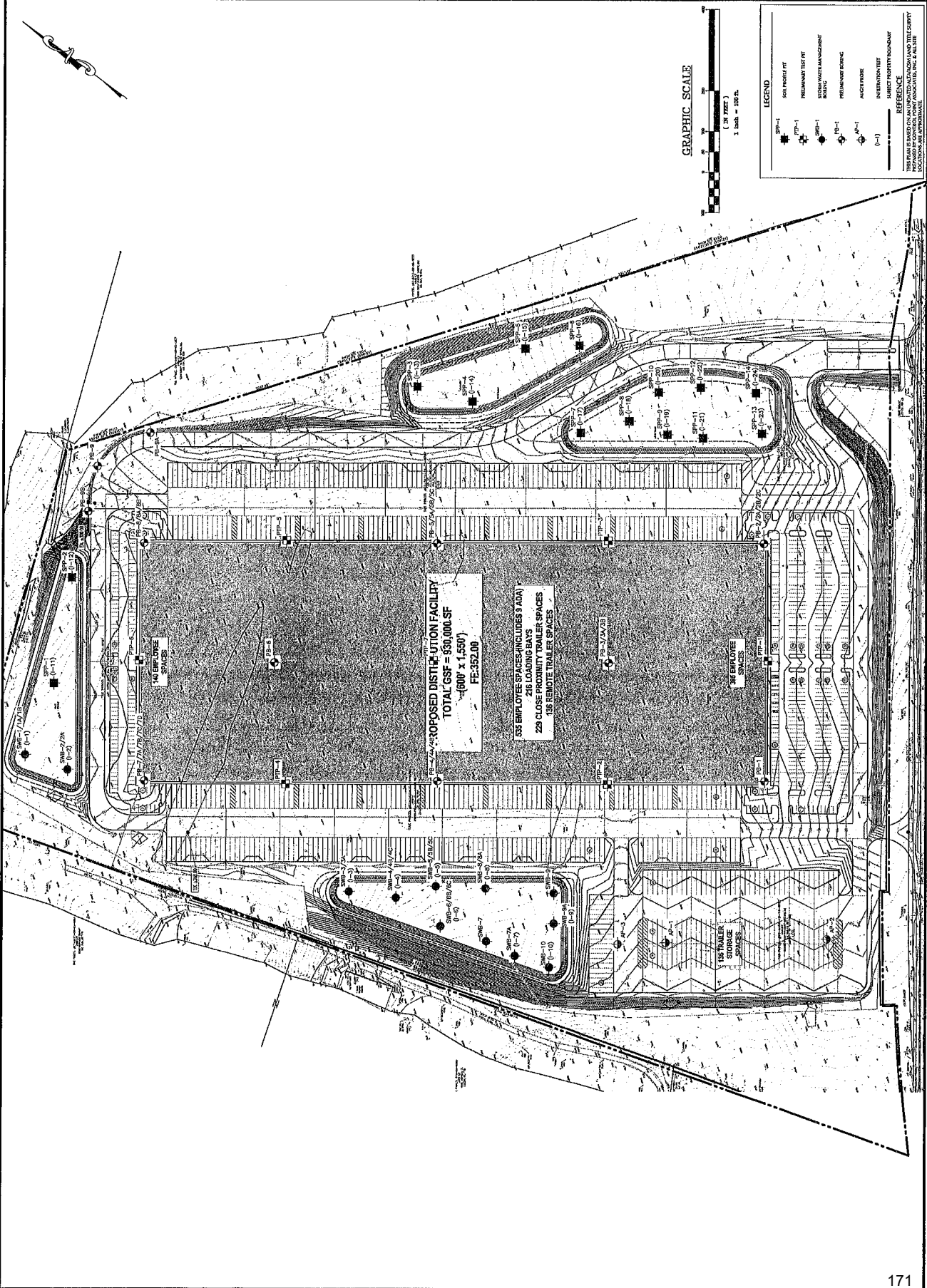
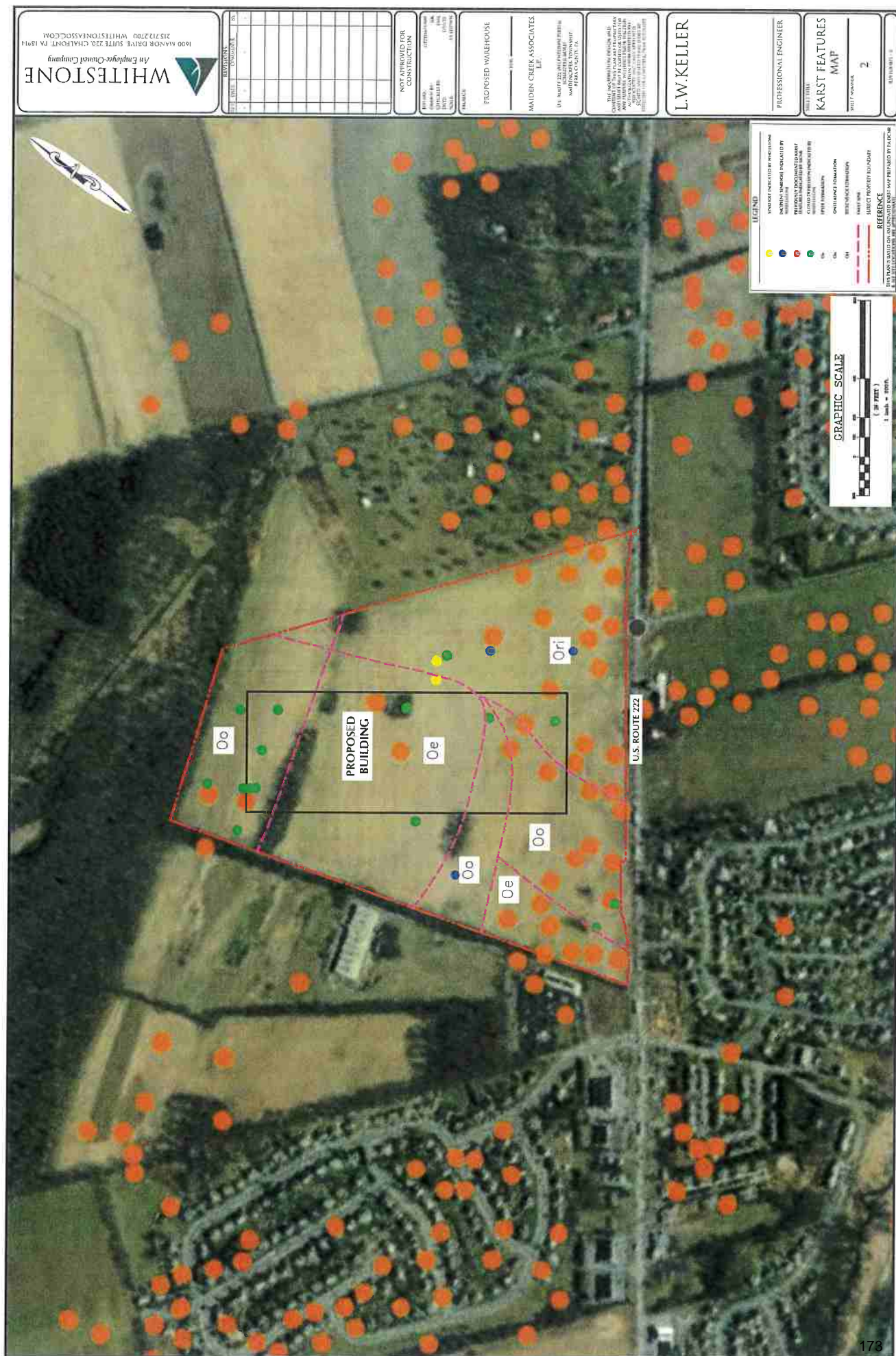


FIGURE 2
Karst Features Plan





APPENDIX A

Records of Subsurface Exploration



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-1

Page 1 of 2

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 346.0 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 29.8 feet bgs	Date Completed: 12/20/2021	During: 19.0 (P) 327.0	At Completion: 6.0 340.0
Proposed Location: Building	Logged By: TJ	At Completion: 19.0 (P) 327.0	24 Hours: -- --
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: -- --	
	Equipment: CME-55		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0.0						0.0	PLOUGHED HORIZON	8" Ploughed Horizon with Rock	
0.2	S-1	X	2 - 2 - 1 - 3	16	3	0.7	RESIDUAL	Brown Sandy Silt, Moist, Soft (ML)	Qu = 1.5 tsf
2.0						2.0			
2.4	S-2	X	3 - 4 - 4 - 8	24	8			Brown Sandy Lean Clay, Moist, Medium Stiff (CL)	Qu = 1.5 tsf Good Cutting Return
4.0						5.0			
4.6	S-3	X	6 - 7 - 6 - 6	22	13			As Above, Moist, Stiff (CL)	Qu = 3.5 tsf
6.0									
6.8	S-4	X	8 - 4 - 12 - 15	22	16			As Above, Trace Gravel, Moist, Very Stiff (CL)	Qu = 3.75 tsf
8.0									
8.10	S-5	X	9 - 10 - 12 - 16	19	22			As Above, Moist, Very Stiff (CL)	Qu = 3.75 tsf
10.0						10.0			
13.0									
13.15	S-6	X	3 - 5 - 5 - 5	24	10			As Above, Moist, Stiff (CL)	Qu = 2.5 tsf
15.0						15.0			
18.0									
18.20	S-7	X	5 - 5 - 3 - 5	24	8			As Above, Wet, Medium Stiff (CL)	Qu = 1.5 tsf Spoon Tip Wet Perched Water @ 19.0 fbgs
20.0						20.0			
23.0									
23.25	S-8	X	4 - 4 - 7 - 4	3	11			Low Recovery, As Above with Gravel (Rock Fragments), Wet, Stiff (CL)	Qu = 1.0 tsf
25.0						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18631_PBlgs 1/21/2022
175

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation:	± 346.0 feet	Date Started:	12/20/2021
Termination Depth:	29.8 feet bgs	Date Completed:	12/20/2021
Proposed Location:	Building	Logged By:	TJ
Drill / Test Method:	HSA / SPT	Contractor:	AD
		Equipment:	CME-55
		Water Depth Elevation	Cave-In Depth Elevation
		(feet bgs) (feet)	(feet bgs) (feet)
		During:	19.0 (P) 327.0 ▼
		At Completion:	19.0 (P) 327.0 ▼
		24 Hours:	-- -- ▼
		At Completion:	6.0 340.0 ⚠
		24 Hours:	-- -- ⚠

[illegible]



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-2**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 338.8 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 8.1 feet bgs	Date Completed: 12/20/2021	During: 7.8 P 331.0 ▼	At Completion: 4.0 334.8
Proposed Location: Building	Logged By: TJ	At Completion: 7.8 P 331.0 ▼	24 Hours: — —
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: — —	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1	X	2 - 3 - 3 - 3	18	6	0.0	PLOUGHED HORIZON	10" Ploughed Horizon with Rock	
						0.8	RESIDUAL	Dark Brown Sandy Lean Clay, Moist, Medium Stiff (CL)	Qu = 1.0 tsf
2 - 4	S-2	X	4 - 3 - 4 - 3	17	7			As Above, Brown, with Gravel, Moist, Medium Stiff (CL)	Qu = 1.5 tsf
4 - 6	S-3	X	4 - 6 - 7 - 7	24	13	5.0		As Above, Moist to Wet, Stiff (CL)	Qu = 4.0 tsf
6 - 7.9	S-4	X	4 - 4 - 5 - 50/5"	19	9			As Above, Moist to Wet, Stiff (CL)	Wet @ 7.8 fbgs (Perched Above Apparent Rock) Heavy Auger Grinding
8 - 8.1	S-5	X	50/0.5"	NR	50/0.5"	8.0	WR	No Recovery, Presumed Weathered Rock (Limestone)	7.9 fbgs to 8.1 fbgs
						8.1		Boring Log PB-2 Terminated at a Depth of 8.1 Feet Below Ground Surface Due to Auger Refusal; Offset to PB-2A	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-2APage 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 338.8 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 7.5 feet bgs	Date Completed: 12/20/2021	During: NE --- ▾	At Completion: 6.0 332.8 ▾
Proposed Location: Building	Logged By: TJ	At Completion: NE --- ▾	24 Hours: --- --- ▾
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: --- --- ▾	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	PLOUGHED HORIZON	10" Ploughed Horizon with Rock	Clay Cuttings (CL)
						0.8	RESIDUAL	Attempt to Auger to 8.0 fbg	
						5.0			
						7.5			
						10.0		Boring Log PB-2A Terminated at a Depth of 7.5 Feet Below Ground Surface Due to Auger Refusal on Apparent Weathered Rock; Offset to Boring PB-2B	Heavy Gravel and Auger Refusal @ 7.5 fbg
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

14928_PBIogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-2B**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 339.0 feet	Date Started: 1/3/2022	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 29.8 feet bgs	Date Completed: 1/3/2022	During: NE — ▽	At Completion: DRY — ▽
Proposed Location: Building	Logged By: CS	24 Hours: — — ▽	At Completion: — — ▽
Drill / Test Method: HSA / SPT	Contractor: Allied	24 Hours: — — ▽	At Completion: — — ▽
	Equipment: Geoprobe		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1	X	1 - 2 - 3 - 3	24	5	0.0 1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
2 - 4	S-2	X	3 - 4 - 5 - 7	24	9	4.0	RESIDUAL	Brown Silty Clay, Moist, Medium Stiff (CL)	Qu = 1.0 tsf
4 - 6	S-3	X	16 - 7 - 9 - 7	24	26	5.0		As Above, Moist, Stiff (CL)	Qu = 2.0 tsf
6 - 8	S-4	X	4 - 2 - 1 - 2	NR	3	8.0		Brown Clayey Sand with Gravel, Moist, Medium Dense (SC)	Sampled Wash @ 5.0 fbgs
8 - 10	S-5	X	1 - 1 - 7 - 6	12	8	10.0		As Above, Moist, Loose (SC)	Spoon Deflection, Auger Grinding 7.0 fbgs to 10.0 fbgs
								Brown Silty Clay with Gravel, Moist, Stiff (CL)	Qu = 0.25 tsf
						15.0 20.0 25.0		Boring Log PB-2B Terminated at a Depth of 10.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-2C	Casing Broke Due to Deflection of Weathered Rock

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-2C

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 334.0 feet	Date Started: 1/3/2022	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 29.8 feet bgs	Date Completed: 1/3/2022	During: NE --- ▽	At Completion: --- --- ▽
Proposed Location: Building	Logged By: CS	At Completion: NE --- ▽	24 Hours: --- --- ▽
Drill / Test Method: HSA / SPT / ROCK CORE	Contractor: Allied	24 Hours: --- --- ▽	
	Equipment: Geoprobe		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Brown Silty Clay, Moist (CL)	
						5.0			
						10.0			
						12.0	WEATHERED ROCK	Gray Weathered Limestone with Soil Seams (WR)	Weathered Limestone 12.0 fbgs to 17.0 fbgs
						15.0			
						17.0			Casing Set @ 17.0 fbgs
							ROCK		12.0 fbgs to 19.0 fbgs Highly Residual
						20.0		Gray Limestone, Highly Weathered to Fresh, Soft to Hard, Closely Spaced Fractures RD 40° to 45°, Intensely Bedded, RD 40° to 45°	No Water Return
									6" Void 20.0 fbgs to 20.5 fbgs
						23.0		Gray Limestone, Fresh, Hard, Extremely Closely Spaced Fractures RD 20° to 45°, Intensely Bedded, RD 20° to 45°	
						25.0		Boring Log PB-2C Terminated at a Depth of 23.0 Feet Below Ground Surface Due to Core Barrel Deflection	Core Barrel Deflection @ 20.0 fbgs; Could Not Advance

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-3**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 338.0 feet	Date Started: 12/22/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 7.1 feet bgs	Date Completed: 12/22/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: TJ	During: NE --- ▾	At Completion: 4.0 334.0
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE --- ▾	
	Equipment: CME-45	24 Hours: --- --- ▾	24 Hours: --- ---

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1		3 - 3 - 3 - 4	16	6	0.0 1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
2 - 4	S-2		5 - 5 - 5 - 5	15	10		RESIDUAL	Brown Lean Clay with Sand, Moist, Medium Stiff (CL)	Qu = 2.5 tsf
4 - 6	S-3		3 - 5 - 6 - 5	20	11	5.0		As Above, Moist, Stiff (CL)	Qu = 1.75 tsf
6 - 6.4	S-4		50/5"	5	50/5"	6.0 6.4	WR	As Above, Moist, Stiff (CL) Pale Gray Weathered Rock (Limestone), Moist, Very Dense (WR)	Qu = 2.25 tsf
								Boring Log PB-3 Terminated at a Depth of 7.1 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-3A	
						10.0			
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-3A**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 338.0 feet	Date Started: 12/22/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 8.2 feet bgs	Date Completed: 12/22/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: TJ	During: NE --- ▼	At Completion: 3.5 334.5
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE --- ▼	
	Equipment: CME-45	24 Hours: --- --- ▼	24 Hours: --- ---

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Brown Lean Clay with Sand, Moist, Medium Stiff to Stiff (CL)	Clay Cuttings
								Attempt to Continuously Auger to 8.0 fbgs	
4 - 5	S-1	X	Sampled Cuttings	---	---	5.0			
									Heavy Grinding from 6.0 fbgs to 8.0 fbgs
8 - 8.2	S-2	X	50/2"	2	50/2"	8.0	WR	Light Gray Weathered Rock (Limestone), Moist, Very Dense (WR)	Auger Refusal @ 8.0 fbgs
						8.2		Boring Log PB-3A Terminated at a Depth of 8.2 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-3B	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

1632_PBlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-3BPage 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: $\pm$ 338.0 feet	Date Started: 12/22/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 8.5 feet bgs	Date Completed: 12/22/2021	During: NE -- ☐	At Completion: 4.0 334.0 ☒
Proposed Location: Building	Logged By: TJ	At Completion: NE -- ☐	24 Hours: -- -- ☒
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: -- -- ☐	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Brown Lean Clay with Sand, Moist, Medium Stiff to Stiff (CL)	Clay Cuttings
						5.0			
						8.5		Attempt to Auger to 8.0 fbgs	
						10.0	WR	Boring Log PB-3B Terminated at a Depth of 8.5 Feet Below Ground Surface Due to Auger Refusal	Auger Refusal and Heavy Grinding @ 8.5 fbgs
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-4**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 350.0 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 8.5 feet bgs	Date Completed: 12/21/2021	During: NE — ▽	At Completion: 3.0 347.0 ▽
Proposed Location: Building	Logged By: TJ	At Completion: NE — ▽	24 Hours: — — ▽
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1	X	3 - 2 - 3 - 5	18	5	0.0	PLOUGHED HORIZON	13" Ploughed Horizon	
2 - 4	S-2	X	3 - 3 - 4 - 4	15	7	1.1	RESIDUAL	Brown Lean Clay with Sand, Moist, Medium Stiff (CL)	Qu = 2.0 tsf
4 - 6	S-3	X	4 - 5 - 7 - 8	24	12	5.0		As Above, Orange Brown, Moist, Medium Stiff (CL)	Qu = 1.75 tsf
6 - 7.25	S-4	X	5 - 5 - 50/3"	12	55/9"	7.0		As Above, Moist, Stiff (CL)	Qu = 3.25 tsf
						7.0		As Above, Moist, Stiff (CL)	Qu = 1.5 tsf
						8.5	WEATHERED ROCK	Gray Weathered Rock (Limestone), Moist, Very Dense (WR)	Limestone Fragments In Spoon
						10.0		Boring Log PB-4 Terminated at a Depth of 8.5 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-4A	
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-4A**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 350.0 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 6.8 feet bgs	Date Completed: 12/21/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: TJ	During: NE -- ▾	
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE -- ▾	
	Equipment: CME-45	24 Hours: -- -- ▾	
		At Completion: 2.0 348.0 ☒	
		24 Hours: -- -- ☒	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
							PLOUGHED HORIZON	13" Ploughed Horizon	
						1.1	RESIDUAL	Orange Brown Lean clay with Sand, Moist, Medium Stiff to Stiff (CL)	
								Attempt to Auger to 8.0 fbgs	
						5.0			
						6.5	WR	Pale Gray Weathered Rock (Limestone)	Auger Refusal on Apparent Weathered Rock @ 6.5 fbgs
6.5 - 6.8	S-1	☒	50/4"	0.75	50/4"	6.8		Boring Log PB-4A Terminated at a Depth of 6.8 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-4B	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-4B**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 350.0 feet	Date Started: 1/3/2022	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 19.0 feet bgs	Date Completed: 1/3/2022	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: CS	During: NE — ▽	At Completion: — — ▽ 24 Hours: — — ▽
Drill / Test Method: HSA / SPT / ROCK CORE	Contractor: Allied Equipment: Geoprobe	At Completion: — — ▽ 24 Hours: — — ▽	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1		1 - 3 - 3 - 3	20	6	0.0	PLOUGHED HORIZON	12" Ploughed Horizon	
2 - 4	S-2		3 - 3 - 4 - 5	21	7	1.0	RESIDUAL	Brown Silty Clay, Moist, Medium Stiff (CL)	Qu = 1.0 tsf
4 - 6	S-3		3 - 5 - 5 - 7	24	10	5.0		As Above, Moist, Stiff (CL)	Qu = 1.5 tsf to 2.0 tsf
6 - 8	S-4		6 - 5 - 4 - 4	24	9	6.0		As Above, Moist, Stiff (CL)	Qu = 1.5 tsf to 2.0 tsf
8 - 10	S-5		3 - 2 - 2 - 2	22	4	10.0		Brown Clayey Sand, Moist, Loose (SC)	
10 - 12	S-6		2 - 2 - 2 - 2	24	4			As Above, Moist, Loose (SC)	
						14.0		Brown Sandy Clay, Moist, Stiff (CL)	Qu = 1.5 tsf to 2.0 tsf
									Auger Grinding 12.0 fbgs to 13.0 fbgs Auger Refusal @ 13.0 fbgs
14 - 19	R-1	NQ	7:23 11:26 9:25 6:43 3:55	48" 80%	38" 63%	15.0	BEDROCK	Gray Limestone Bedrock, Fresh, Hard, Closely Spaced Fractures RD 30° to 45°, Intensely Bedded, RD 0° to 45°	Set Casing @ 14.0 fbgs Water Loss @ 15.0 fbgs
						19.0			
						20.0		Boring Log PB-4B Terminated at a Depth of 19.0 Feet Below Ground Surface	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-5**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 345.0 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 3.0 feet bgs	Date Completed: 12/20/2021	During: NE -- ▾	At Completion: 1.0 344.0 ▾
Proposed Location: Building	Logged By: TJ	24 Hours: -- -- ▾	24 Hours: -- -- ▾
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0.0						0.0			
0.2	S-1	X	4 - 4 - 6 - 7	20	10	0.8	PLOUGHED HORIZON RESIDUAL	10" Ploughed Horizon Dark Brown Sandy Lean Clay with Gravel, Moist, Medium Stiff (CL)	Qu = 3.5 tsf
2.2	S-2	X	17 - 50/1"	8	67/7"	2.5			
						3.0	WR	Light Gray Weathered Rock (Limestone), Moist, Very Dense (WR)	Auger Refusal @ 3.0 fbg
								Boring Log PB-5 Terminated at a Depth of 3.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-5A	Limestone Boulders Observed Nearby
						5.0			
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-5A**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 345.0 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 2.5 feet bgs	Date Completed: 12/20/2021	During: NE -- ▾	At Completion: 0.5 344.5 ▾
Proposed Location: Building	Logged By: TJ	At Completion: NE -- ▾	24 Hours: -- -- ▾
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.8	PLOUGHED HORIZON RESIDUAL	10" Ploughed Horizon Brown Lean Clay with Gravel, Moist, Medium Stiff to Stiff (CL) Attempt to Auger to 4.0 fbgs	Clay Cuttings with Rock Fragments Auger Refusal @ 2.5 fbgs
1 - 2.5	S-1	X	Sampled from Cuttings	---	---	2.5	WR		Boring Log PB-5A Terminated at a Depth of 2.5 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-5B Limestone Boulders Observed Nearby
						5.0			
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-5B**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 345.0 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 3.5 feet bgs	Date Completed: 12/20/2021	During: NE — ▽	At Completion: NE — ▽
Proposed Location: Building	Logged By: TJ	24 Hours: — — ▽	At Completion: 1.0 344.0
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.8	PLOUGHED HORIZON RESIDUAL	10" Ploughed Horizon Brown Sandy Lean Clay with Gravel, Moist, Medium Stiff to Stiff (CL)	Clay in Cuttings
1 - 3	S-1	X	Sampled from Cuttings	---	---	3.5		Attempt to Auger to 4.0 fbs ↓	Auger Refusal @ 3.5 fbs
						5.0		Boring Log PB-5B Terminated at a Depth of 3.5 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-5C	Limestone Boulders Observed Nearby
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-5C

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 345.0 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 16.0 feet bgs	Date Completed: 12/20/2021	During: 14.0 P 331.0	At Completion: 8.0 337.0
Proposed Location: Building	Logged By: TJ	At Completion: 14.0 P 331.0	24 Hours: -- --
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: -- --	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1	X	3 - 4 - 4 - 3	18	8	0.0	PLOUGHED HORIZON	10" Ploughed Horizon	
						0.8	RESIDUAL	Brown Sandy Silt, Moist, Medium Stiff (ML)	Qu = 1.0 tsf
2 - 4	S-2	X	3 - 3 - 3 - 3	15	6	2.0		Dark Brown Sandy Lean Clay, Moist, Medium Stiff (CL)	Qu = 0.75 tsf Trace Roots
4 - 6	S-3	X	1 - 1 - 2 - 1	20	3	5.0		As Above, Brown, Very Moist, Soft (CL)	Qu = 0.025 tsf
6 - 8	S-4	X	4 - 5 - 5 - 8	17	10			As Above, Moist, Stiff (CL)	Qu = 3.5 tsf
8 - 10	S-5	X	7 - 7 - 7 - 7	19	14	10.0		As Above, Moist, Stiff (CL)	Qu = 4.0 tsf
									Heavy Auger Grinding @ 12.0 fbgs
13 - 14.8	S-6	X	4 - 7 - 7 - 50/ 3"	9	14	14.5		As Above, Very Moist to Wet, Stiff (CL)	Perched Water @ 14.0 fbgs Above Rock
						15.0	WEATHERED ROCK	Light Pale Gray Weathered Rock (Limestone), Wet, Very Dense (WR)	
						16.0			
								Boring Log PB-5C Terminated at a Depth of 16.0 Feet Below Ground Surface Due to Auger Refusal	
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-6**Page **1** of **2**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Malden Creek Associates, L.P.	
Surface Elevation: ± 360.0 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 30.0 feet bgs	Date Completed: 12/21/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: TJ	During: 26.0 P 334.0	At Completion: 9.0 351.0
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: 26.0 P 334.0	24 Hours: — —
	Equipment: CME-45	24 Hours: — —	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1	X	2 - 2 - 3 - 4	16	5	0.0	PLOUGHED HORIZON	10" Ploughed Horizon	
						0.8	RESIDUAL	Orange Brown Lean Clay with Sand, Moist, Medium Stiff (CL)	Qu = 1.5 tsf
2 - 4	S-2	X	3 - 3 - 5 - 5	22	8			As Above, Moist, Medium Stiff (CL)	Qu = 2.25 tsf
4 - 6	S-3	X	3 - 3 - 5 - 5	19	8	5.0		As Above, Very Moist, Medium Stiff (CL)	Qu = 1.0 tsf
6 - 8	S-4	X	6 - 8 - 10 - 10	23	18			As Above, Very Moist, Medium Stiff (CL)	Qu = 1.75 tsf
8 - 10	S-5	X	7 - 7 - 10 - 8	20	17	10.0		As Above, Trace Gravel (Limestone Fragments), Moist, Very Stiff (CL)	Qu = 2.75 tsf
									Good Cutting Returns
13 - 15	S-6	X	4 - 4 - 5 - 7	24	9	15.0		Orange-Brown Fat Clay with Sand, Moist, Stiff (CH)	Qu = 2.5 tsf
18 - 20	S-7	X	4 - 4 - 5 - 5	16	9	20.0		As Above, Very Moist, Stiff (CH)	Qu = 1.0 tsf
23 - 25	S-8	X	5 - 5 - 6 - 5	8	11	25.0		As Above, Orange Brown/Pale Gray with Gravel, Very Moist, Stiff (CH)	Limestone Fragments

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
18631_PBIlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-6Page 2 of 2

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 360.0 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 30.0 feet bgs	Date Completed: 12/21/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: TJ	During: 26.0 P 334.0	At Completion: 9.0 351.0
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: 26.0 P 334.0	
	Equipment: CME-45	24 Hours: -- --	24 Hours: -- --

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0	RESIDUAL		Auger Grinding 23.0 fbgs to 28.0 fbgs Perched Water Above Rock @ 26.0 fbgs
28.5 - 28.8	S-9	X	12 - 50/4"	3	50/4"	28.5	WEATHERED ROCK	As Above, Orange Brown Fat Clay with Sand, Wet, Stiff (CH) Pale Gray Weathered Rock (Limestone), Moist to Wet, Very Dense (WR)	Deviated Augers Likely Pinnacled Limestone
						30.0			
								Boring Log PB-6 Terminated at a Depth of 30.0 Feet Below Ground Surface Due to Auger Refusal	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-7**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 356.3 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 9.0 feet bgs	Date Completed: 12/20/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: TJ	During: NE --- ▽	
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE --- ▽	
	Equipment: CME-45	24 Hours: --- --- ▽	
		At Completion: 3.0 353.3	
		24 Hours: --- ---	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0.0									
0 - 2	S-1		3 - 3 - 4 - 7	17	7	0.8	PLOUGHED HORIZON RESIDUAL	10" Ploughed Horizon Brown Sandy Lean Clay, Trace Gravel, Moist, Medium Stiff (CL)	Qu = 4.0 tsf
2 - 4	S-2		6 - 5 - 8 - 8	19	13			As Above, Moist, Stiff (CL)	Qu = 4.0 tsf
4 - 6	S-3		3 - 5 - 6 - 8	21	11	5.0		As Above, Moist, Stiff (CL)	Qu = 2.5 tsf
6 - 8	S-4		6 - 6 - 6 - 5	22	12			As Above, Moist, Stiff (CL)	Qu = 3.75 tsf
8 - 8.7	S-5		10 - 50/2"	6	60/2"	8.7	WR	As Above, Moist, Stiff (CL) Light Gray Weathered Rock (Limestone), Moist, Very Dense (WR)	
						9.0		Boring Log PB-7 Terminated at a Depth of 9.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-7A	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

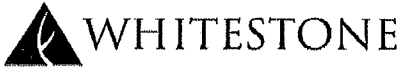
Boring No.: **PB-7A**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 356.3 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 6.0 feet bgs	Date Completed: 12/20/2021	During: NE --- ▾	At Completion: NE --- ▾
Proposed Location: Building	Logged By: TJ	24 Hours: --- --- ▾	At Completion: 4.0 352.3
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1	X	2 - 3 - 3 - 5	22	6	0.0 1.0	PLOUGHED HORIZON	12" Ploughed Horizon	Boulder/Outcrop @ Surface (Visible)
2 - 4	S-2	X	4 - 4 - 5 - 4	20	9		RESIDUAL	Brown Sandy Lean Clay, Moist, Medium Stiff (CL)	Qu = 4.0 tsf
4 - 5.7	S-3	X	10 - 10 - 8 - 50/ 2"	19	18	5.0		As Above, Moist, Medium Stiff (CL)	Qu = 4.25 tsf
						5.7	WR	As Above, Moist, Very Stiff (CL)	Heavy Auger Grinding @ 4.0 fbg
						6.0		Light Gray Weathered Rock (Limestone), Moist, Very Dense (WR)	Auer Refusal @ 5.0 fbg
								Boring Log PB-7A Terminated at a Depth of 6.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Borings PB-7B, PB-7C and PB-7D	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
1889_PBlgs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-7B

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 356.3 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 5.5 feet bgs	Date Completed: 12/20/2021	During: NE --- ▽	At Completion: 2.0 354.3 ▽
Proposed Location: Building	Logged By: TJ	24 Hours: --- --- ▽	24 Hours: --- --- ▽
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (In.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Brown Lean Clay with Gravel, Moist, Medium Stiff to Stiff (CL)	
						5.0		Attempt to Auger to 10.0 fbg	
						5.5			
								Boring Log PB-7B Terminated at a Depth of 5.5 Feet Below Ground Surface Due to Auger Refusal	
						10.0			
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-7C

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 356.3 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 6.0 feet bgs	Date Completed: 12/20/2021	During: NE -- ▽	At Completion: 2.0 354.3 ▽
Proposed Location: Building	Logged By: TJ	24 Hours: -- -- ▽	24 Hours: -- -- ▽
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Brown Lean Clay with Sand, Moist, Medium Stiff to Stiff (CL)	
								Attempt to Auger to 10.0 fbg	
						5.0			
						6.0			
								Boring Log PB-7C Terminated at a Depth of 6.0 Feet Below Ground Surface Due to Auger Refusal	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-7D

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 356.3 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 5.5 feet bgs	Date Completed: 12/20/2021	During: NE -- ▾	At Completion: 2.0 354.3 ▾
Proposed Location: Building	Logged By: TJ	24 Hours: -- -- ▾	24 Hours: -- -- ▾
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0.0						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Brown Lean Clay with Sand, Moist, Medium Stiff to Stiff (CL)	
						4.5		Attempt to Auger to 10.0 fbgs	
						5.0		Boring Log PB-7D Terminated at a Depth of 4.5 Feet Below Ground Surface Due to Auger Refusal	
						10.0			
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-8

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: $\pm$ 343.2 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 5.0 feet bgs	Date Completed: 12/20/2021	During: NE -- ▽	At Completion: 4.0 339.2 ▽
Proposed Location: Building	Logged By: TJ	24 Hours: -- -- ▽	24 Hours: -- -- ▽
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1	X	4 - 4 - 4 - 4	21	8	0.0 0.7	PLOUGHED HORIZON RESIDUAL	8" Ploughed Horizon Brown Sandy Fat Clay, Trace Gravel, Moist, Medium Stiff (CH)	Qu = 4.0 tsf
2 - 4	S-2	X	4 - 5 - 7 - 9	27	12			As Above, Moist, Stiff (CH)	Qu = 3.75 tsf
4 - 4.8	S-3	X	20 - 50/3"	8	50/3"	4.5 5.0	WR	As Above, Moist, Very Stiff (CH) Pale Gray Weathered Rock (Limestone), Moist, Very Dense (WR)	Heavy Auger Grinding @ 4.0 fbg
								Boring Log PB-8 Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-8A	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-8A**

Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 343.2 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 5.0 feet bgs	Date Completed: 12/20/2021	During: NE --- ▾	At Completion: 1.5 341.7 ▾
Proposed Location: Building	Logged By: TJ	24 Hours: --- --- ▾	24 Hours: --- --- ▾
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No.	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.8	PLOUGHED HORIZON RESIDUAL	10" Ploughed Horizon Brown Sandy Fat Clay with Gravel, Moist, Medium Stiff to Stiff (CH)	Clay Cuttings
								Attempt to Auger to 5.0 fbg	Good Cutting Return
3 - 5	S-1	X	Sampled Cuttings	---	---	5.0			
								Boring Log PB-8A Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-8A	
						10.0			
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-8B

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 343.2 feet	Date Started: 12/20/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 6.1 feet bgs	Date Completed: 12/20/2021	During: NE --- ▽	At Completion: 2.0 341.2 ▽
Proposed Location: Building	Logged By: TJ	24 Hours: --- --- ▽	24 Hours: --- --- ▽
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.8	PLOUGHED HORIZON RESIDUAL	10" Ploughed Horizon Brown Sandy Fat Clay with Gravel, Moist, Medium Stiff to Stiff (CH)	Clay Cuttings Limestone Boulders/ Outcrop Visible @ Surface in Adjacent Tree Line
						5.0		Attempt to Auger Continuously to 6.0 fbgs	
						6.0	WR	Light Gray Weathered Rock (Limestone), Moist, Very Hard (WR)	Auger Refusal @ 6.0 fbgs
6 - 6.1	S-1	✗	50/1"	0.5	50/1"	6.1		Boring Log PB-8B Terminated at a Depth of 6.1 Feet Below Ground Surface Due to Auger Refusal	
						10.0			
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-9

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 324.0 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 9.7 feet bgs	Date Completed: 12/21/2021	During: NE --- ▽	At Completion: 5.5 318.5 ▽
Proposed Location: Retaining Wall	Logged By: TJ	24 Hours: --- --- ▽	24 Hours: --- --- ▽
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1	X	2 - 3 - 3 - 3	20	6	0.0	PLOUGHED HORIZON	13" Ploughed Horizon	
2 - 4	S-2	X	2 - 3 - 3 - 5	23	6	1.1	RESIDUAL	Orange Brown Sandy Lean Clay, Moist, Medium Stiff (CL)	Qu = 2.5 tsf
4 - 6	S-3	X	3 - 2 - 1 - 1	2	3	5.0		As Above, Moist, Medium Stiff (CL)	Qu = 2.75 tsf
6 - 8	S-4	X	2 - 1 - 1 - 3	8	2	8.0		Low Recovery, As Above, Moist, Soft (CL)	Good Cutting Return
8 - 9.4	S-5	X	4 - 9 - 50/4"	10	59/10"	9.0		As Above, with Angular/Limestone Fragments (Gravel), Moist, Very Stiff (CL)	
						9.7	WEATHERED ROCK	Pale Gray/Brown Silt, Moist, Medium Stiff (ML)	
								Pale Gray Weathered Rock (Limestone), Moist, Very Dense (VWR)	
								Boring Log PB-9 Terminated at a Depth of 9.7 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-9A	
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Boring No.: PB-9A

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 324.0 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 8.5 feet bgs	Date Completed: 12/21/2021	During: NE --- ▾	At Completion: 4.0 320.0 ▾
Proposed Location: Retaining Wall	Logged By: TJ	At Completion: NE --- ▾	24 Hours: --- --- ▾
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: --- --- ▾	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Orange Brown Sandy Lean Clay, Moist, Soft to Stiff (CL)	Clay Cuttings
								Attempt to Continuously Auger to 10.0 fbg	
3 - 5	S-1	X	Sampled Cuttings	---	---	5.0			
						8.5			
						10.0			Boring Log PB-9A Terminated at a Depth of 8.5 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring PB-9B
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **PB-9B**

Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 324.0 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 5.0 feet bgs	Date Completed: 12/21/2021	During: NE -- ▽	At Completion: 4.0 320.0 ▣
Proposed Location: Retaining Wall	Logged By: TJ	At Completion: NE -- ▽	24 Hours: -- -- ▣
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: -- -- ▣	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Orange Brown Sandy Lean Clay, Moist, Soft to Stiff (CL)	Clay Cuttings
1 - 5	S-1		Sampled Cuttings	---	---			Attempt to Continuously Auger to 10.0 fbg	Good Cutting Return
						5.0			
								Boring Log PB-9B Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Auger Refusal	
						10.0			
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Auger Probe No.: AP-1

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 357.0 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 6.5 feet bgs	Date Completed: 12/21/2021	During: NE -- ▽	At Completion: 2.0 355.0 ▽
Proposed Location: Storage Spaces	Logged By: TJ	At Completion: NE -- ▽	24 Hours: -- -- ▽
Drill / Test Method: HSA	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	Auger Only
							RESIDUAL	Orange Brown Lean Clay with Sand, Moist (CL)	Clay Cuttings
								Attempt to Continuously Auger to 20.0 fbs	
						5.0			
						6.5			
								Auger Probe AP-1 Terminated at a Depth of 6.5 Feet Below Ground Surface Due to Auger Refusal	
						10.0			
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Auger Probe No.: AP-2

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 356.0 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 14.0 feet bgs	Date Completed: 12/21/2021	During: NE --- ▾	At Completion: 7.0 349.0 ▾
Proposed Location: Storage Spaces	Logged By: TJ	24 Hours: --- --- ▾	24 Hours: --- --- ▾
Drill / Test Method: HSA	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
							PLOUGHED HORIZON	13" Ploughed Horizon	
						1.1	RESIDUAL	Brown Lean Clay with Sand, Moist (CL)	Clay Cuttings
								Attempt to Continuously Auger to 20.0 fbg	
						5.0			
						10.0			
						14.0			
						15.0		Auger Probe AP-2 Terminated at a Depth of 14.0 Feet Below Ground Surface Due to Auger Refusal	
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Auger Probe No.: **AP-3**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 359.0 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 20.0 feet bgs	Date Completed: 12/21/2021	During: NE -- ▾	At Completion: 8.0 351.0 ▾
Proposed Location: Storage Spaces	Logged By: TJ	24 Hours: -- -- ▾	24 Hours: -- -- ▾
Drill / Test Method: HSA	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	Auger Only
							RESIDUAL	Orange Brown Lean Clay with Sand, Moist (CL)	Clay Cuttings
								Attempt to Continuously Auger to 20.0 fbg	Good Return
						5.0			
						10.0			
						15.0			Soft Zone Between 11.0 fbg to 13.0 fbg
						20.0			Soft Zone Between 17.0 fbg to 18.0 fbg
						25.0		Auger Probe AP-3 Terminated at a Depth of 20.0 Feet Below Ground Surface	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: PTP-1
Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 343.0 feet	Date Started: 12/30/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 3.0 feet bgs	Date Completed: 12/30/2021	During: NE —	At Completion: NE —
Proposed Location: Building	Logged By: CS	At Completion: DRY —	24 Hours: — —
Excavating Method: Test Pit Excavation	Contractor: BR		
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)			
			0.0	PLOUGHED HORIZON	14" Ploughed Horizon	
			1.2	RESIDUAL	Brown Silty Clay, Moist (CL)	
			3.0	WEATHERED ROCK	Gray Weathered Limestone Cobble and Boulder Sized Fragments, Dry, Dense (WR)	Bucket Refusal @ 3.0 fbgs
			4.0			
			5.0			
			10.0			
			15.0			



RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: **PTP-2**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 347.0 feet	Date Started: 12/30/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 6.0 to 12.0 feet bgs	Date Completed: 12/30/2021	During: NE — ▽	At Completion: NE — ▽
Proposed Location: Building	Logged By: CS	At Completion: DRY — ▽	24 Hours: — — ▽
Excavating Method: Test Pit Excavation	Contractor: BR		
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)			
			0.0	PLOUGHED HORIZON	14" Ploughed Horizon	
			1.4	RESIDUAL	Brown Silty Clay, Moist (CL)	
			5.0			
			6.0	BEDROCK / RESIDUAL	Limestone Bedrock @ 6.0 fbg on South Side of Test Pit Brown Silty Clay (CL) to 12.0 fbg on North Side of Test Pit	
			10.0			
			12.0			Test Pit Log PTP-2 Terminated at a Depth of 6.0 Feet Below Ground Surface on South Side Due to Bucket Refusal and at 12.0 Feet Below Ground Surface on North Side
			15.0			

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
18631_PTPlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: **PTP-3**
Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 343.0 feet	Date Started: 12/30/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 4.0 to 6.0 feet bgs	Date Completed: 12/30/2021	During: NE —	At Completion: NE —
Proposed Location: Building	Logged By: CS	At Completion: DRY —	24 Hours: — —
Excavating Method: Test Pit Excavation	Contractor: BR		
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)			
			0.0	PLOUGHED HORIZON	14" Ploughed Horizon	
			1.2	RESIDUAL	Brown Silty Clay, Moist (CL)	
			4.0	WEATHERED ROCK	Gray Limestone Bedrock (WR)	Bucket Refusal @ 4.0 fbg on South Side of Test Pit
			5.0			Bucket Refusal @ 5.0 fbg on North Side of Test Pit
			6.0		Test Pit Log PTP-3 Terminated at a Depth of 4.0 to 6.0 Feet Below Ground Surface Due to Bucket Refusal	Bucket Refusal @ 6.0 fbg in Center of Test Pit
			10.0			
			15.0			

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: **PTP-4**
Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 355.0 feet	Date Started: 12/30/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 6.0 to 7.0 feet bgs	Date Completed: 12/30/2021	During: NE —	At Completion: NE —
Proposed Location: Building	Logged By: CS	At Completion: DRY —	At Completion: NE —
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: — —	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)			
			0.0	PLOUGHED HORIZON	14" Ploughed Horizon	
			1.2	RESIDUAL	Brown Silty Clay, Molst (CL)	
			5.0			
			6.0	WR	Gray Limestone Bedrock (WR)	Bucket Refusal @ 6.0 fbg on West Side of Test Pit
			7.0		Test Pit Log PTP-4 Terminated at a Depth of 6.0 to 7.0 Feet Below Ground Surface Due to Bucket Refusal	Bucket Refusal @ 7.0 fbg on East Side of Test Pit
			10.0			
			15.0			



RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: **PTP-5**
Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 345.0 feet	Date Started: 12/29/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 3.0 to 6.0 feet bgs	Date Completed: 12/29/2021	During: NE — ▽	At Completion: NE — ▽
Proposed Location: Building	Logged By: CS	At Completion: DRY — ▽	24 Hours: — — ▽
Excavating Method: Test Pit Excavation	Contractor: BR		
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)			
			0.0			
			0.5	PLOUGHED HORIZON	6" Ploughed Horizon	
				RESIDUAL	Brown Silty Clay, Moist (CL)	
			3.0	WEATHERED ROCK	Gray Weathered Limestone, Dry (WR)	Bucket Refusal @ 3.0 fbg on North and South Sides of Test Pit
			6.0		Test Pit Log PTP-5 Terminated at a Depth of 3.0 to 6.0 Feet Below Ground Surface Due to Bucket Refusal	Bucket Refusal @ 6.0 fbg in Center of Test Pit
			10.0			
			15.0			



RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: **PTP-6**Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 354.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 3.0 to 5.0 feet bgs	Date Completed: 12/28/2021	During: NE — ▼	At Completion: NE — ▼
Proposed Location: Building	Logged By: CS	At Completion: DRY — ▼	At Completion: NE — ▼
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: — — ▼	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)			
			0.0			
				PLOUGHED HORIZON	8" Ploughed Horizon	
			0.7	RESIDUAL	Brown Silty Clay, Moist, Stiff (CL)	Qu = 1.5 tsf
			3.0	WEATHERED ROCK	Gray Weathered Limestone Boulder Sized Fragments, Dry, Very Dense (WR)	Bucket Refusal @ 3.0 fbg on East Side of Test Pit
			5.0		Test Pit Log PTP-6 Terminated at a Depth of 3.0 to 5.0 Feet Below Ground Surface Due to Bucket Refusal	Bucket Refusal @ 5.0 fbg on West Side of Test Pit
			10.0			
			15.0			

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
18631-PTPLogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: **PTP-7**
Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 343.0 feet	Date Started: 12/30/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 7.0 to 10.0 feet bgs	Date Completed: 12/30/2021	During: NE —	At Completion: NE —
Proposed Location: Building	Logged By: CS	At Completion: DRY —	At Completion: NE —
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: — —	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)			
			0.0	PLOUGHED HORIZON	14" Ploughed Horizon	
			1.2	RESIDUAL	Brown Silty Clay, Moist (CL)	
			5.0			
			7.0	WEATHERED ROCK	Gray Limestone Bedrock, Dense (WR)	Bucket Refusal @ 7.0 fbs on East Side of Test Pit
			10.0		Test Pit Log PTP-7 Terminated at a Depth of 7.0 to 10.0 Feet Below Ground Surface Due to Bucket Refusal	Bucket Refusal @ 10.0 fbs on West Side of Test Pit
			15.0			



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-1**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 348.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 3.0 feet bgs	Date Completed: 12/28/2021	During: NE ---	At Completion: NE ---
Proposed Location: SWM	Logged By: CS	At Completion: DRY ---	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- ---	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 0.7	PLOUGHED HORIZON	8" Ploughed Horizon	
			1.0	RESIDUAL	Dark Red (2.5YR 5/6) SILTY CLAY; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling; Abrupt Boundary	Infiltration Testing @ 1.0 fbs; 0.0 lph
			2.0			
			3.0			
			4.0		Soil Profile Pit SPP-1 Terminated at a Depth of 3.0 Feet Below Ground Surface Due to Bucket Refusal on Limestone	
			5.0			
			6.0			
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-2**

Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 341.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 3.0 feet bgs	Date Completed: 12/28/2021	During: NE ---	At Completion: NE ---
Proposed Location: SWM	Logged By: CS	At Completion: DRY ---	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- ---	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 0.7	PLOUGHED HORIZON	8" Ploughed Horizon	
			1.0	0.7 - 3	RESIDUAL	Dark Red (2.5YR 5/6) SILTY CLAY LOAM; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling; Abrupt Boundary
			2.0			
			3.0			
			4.0		Soil Profile Pit SPP-2 Terminated at a Depth of 3.0 Feet Below Ground Surface Due to Bucket Refusal on Limestone	
			5.0			
			6.0			
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-3**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 331.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 5.0 feet bgs	Date Completed: 12/28/2021	During: NE --- ▼	At Completion: NE --- ▼
Proposed Location: SWM	Logged By: CS	At Completion: DRY --- ▼	At Completion: NE --- ▼
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- --- ▼	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 5	RESIDUAL	Strong Brown (7.5YR 4/6) SILTY CLAY LOAM; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling	Infiltration Testing @ 1.0 fbs; 1.0 lph
			2.0			
			3.0			
			4.0			
			5.0			
			6.0		Soil Profile Pit SPP-3 Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Bucket Refusal on Limestone	
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
1863_SPPLogs 1/19/2022



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-4**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 331.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 5.0 feet bgs	Date Completed: 12/28/2021	During: NE --- ▼	At Completion: NE --- ▼
Proposed Location: SWM	Logged By: CS	At Completion: DRY --- ▼	At Completion: NE --- ▼
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- --- ▼	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 5	RESIDUAL	Dark Red (2.5YR 5/6) SILTY CLAY LOAM; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling	Infiltration Testing @ 1.0 fbs; 1.0 lph
			2.0			
			3.0			
			4.0			
			5.0			
			6.0		Soll Profile Pit SPP-4 Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Bucket Refusal on Limestone	
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
12/31/2022 SPP logs 1/10/2022



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-5**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 333.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 5.0 feet bgs	Date Completed: 12/28/2021	During: NE ---	At Completion: NE ---
Proposed Location: SWM	Logged By: CS	At Completion: DRY ---	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- ---	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 3	RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY LOAM; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling	Infiltration Testing @ 1.0 fbs; 1.0 lph
			2.0			
			3.0			
			3 - 5	WEATHERED ROCK	Gray (10YR 5/1) Weathered Rock; 15% Cobbles, 85% Boulders; Massive Structure; Dry; Very Hard; No Roots; No Mottling	
			4.0			
			5.0			
					Soil Profile Pit SPP-5 Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Bucket Refusal on Limestone	
			6.0			
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-6**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Malden Creek Associates, L.P.	
Surface Elevation: ± 337.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 3.0 to 5.0 feet bgs	Date Completed: 12/28/2021	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: CS	During: NE ---	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: BR	At Completion: DRY ---	
Test Method: Visual Observation	Rig Type: Wacker ET65	24 Hours: --- ---	

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 3 to 5	RESIDUAL	Dark Red (2.5YR 5/6) CLAY LOAM; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling	Infiltration Testing @ 1.0 fbs; 0.0 lph
			2.0			
			3.0			
			3 - 5	LIMESTONE BEDROCK	Gray (10YR 5/1) Weathered Rock; 100% Boulders; Massive Structure; Dry; Very Hard; No Roots; No Mottling	Bucket Refusal @ 3.0 fbs on West and East Sides
			4.0			
			5.0			
					Soil Profile Pit SPP-5 Terminated at a Depth of 3.0 to 5.0 Feet Below Ground Surface Due to Bucket Refusal on Limestone	Bucket Refusal @ 5.0 fbs in Middle
			6.0			
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-7**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 335.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 5.0 to 7.0 feet bgs	Date Completed: 12/28/2021	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: CS	During: NE ---	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: BR	At Completion: DRY ---	
Test Method: Visual Observation	Rig Type: Wacker ET65	24 Hours: --- ---	

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 5 to 7	RESIDUAL	Brownish-Yellow (10YR 6/6) SANDY CLAY LOAM; 5% Gravel; Subangular Blocky Structure; Moist; Friable to Sticky; No Roots; No Mottling	Infiltration Testing @ 1.0 fbs; 3.0 lph
			2.0			
			3.0			
			4.0			
			5.0			
			5 - 7	LIMESTONE BEDROCK	Gray (10YR 5/1) Weathered Rock; 100% Boulders; Massive Structure; Dry; Very Hard; No Roots; No Mottling	Bucket Refusal @ 5.0 fbs on North Side
			6.0			6" Void in Rock on North Side; Organic Staining Above Void Due to Sinkhole Activity
			7.0			
					Soil Profile Pit SPP-7 Terminated at a Depth of 5.0 Feet to 7.0 Below Ground Surface Due to Bucket Refusal on Limestone	Bucket Refusal @ 7.0 fbs on South Side
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
18631_SPPlogs 1/10/2022



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-8**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 339.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 1.5 to 5.0 feet bgs	Date Completed: 12/28/2021	During: NE ---	At Completion: NE ---
Proposed Location: SWM	Logged By: CS	At Completion: DRY ---	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- ---	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 1.5 to 5	RESIDUAL	Brownish-Yellow (10YR 6/6) SANDY CLAY LOAM; No Coarse Fragments; Subangular Blocky Structure; Moist; Friable to Sticky; No Roots; No Mottling; Irregular Boundary	Infiltration Testing @ 1.0 fbg; 3.0 lph
			1.5 - 5	LIMESTONE BEDROCK	Gray (10YR 5/1) Weathered Rock; 100% Boulders; Massive Structure; Dry; Very Hard; No Roots; No Mottling	Pinnacle in Center of Pit @ 1.5 fbg; Bucket Refusal @ 1.5 fbg on South Side
			2.0			
			3.0			
			4.0			
			5.0			
					Soil Profile Pit SPP-8 Terminated at a Depth of 1.5 to 5.0 Feet Below Ground Surface Due to Bucket Refusal in Limestone	Bucket Refusal @ 5.0 fbg on North Side
			6.0			
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
16221 SPPlogs 1/19/2022



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-9**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 341.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 5.0 to 8.0 feet bgs	Date Completed: 12/28/2021	During: NE ---	At Completion: NE ---
Proposed Location: SWM	Logged By: CS	At Completion: DRY ---	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- ---	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 5 to 8	RESIDUAL	Brownish-Yellow (10YR 6/6) SANDY CLAY LOAM; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling	Infiltration Testing @ 1.0 fbs; 2.0 lph
			2.0			
			3.0			
			4.0			
			5.0			
			5 - 8	LIMESTONE BEDROCK	Gray (10YR 5/1) Weathered Rock; 100% Boulders; Massive Structure; Dry; Very Hard; No Roots; No Mottling	Bucket Refusal @ 5.0 fbs on North Side
			6.0			
			7.0			
			8.0			
					Soil Profile Pit SPP-9 Terminated at a Depth of 5.0 Feet to 8.0 Below Ground Surface Due to Bucket Refusal on Limestone	Bucket Refusal @ 8.0 fbs on South Side
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
12/28/2022 SPPlogs 1/19/2022



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-10**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 341.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 3.0 feet bgs	Date Completed: 12/28/2021	During: NE --- ▾	At Completion: NE ---
Proposed Location: SWM	Logged By: CS	At Completion: DRY --- ▾	
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- --- ▾	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 3	RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY LOAM; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling	Infiltration Testing @ 1.0 fbs; 0.5 iph
			2.0			
			3.0			
			4.0		Soil Profile Pit SPP-10 Terminated at a Depth of 3.0 Feet Below Ground Surface Due to Bucket Refusal on Limestone	
			5.0			
			6.0			
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

1023 SPPlogs 1/19/2022



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-11**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 343.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 4.0 to 6.0 feet bgs	Date Completed: 12/28/2021	During: NE --- ▼	At Completion: NE --- ▼
Proposed Location: SWM	Logged By: CS	At Completion: DRY --- ▼	At Completion: NE --- ▼
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- --- ▼	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 4 to 6	RESIDUAL	Brownish-Yellow (10YR 6/6) SANDY CLAY LOAM; 10% Boulders; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling	Infiltration Testing @ 1.0 fbs; 0.5 iph
			2.0			
			3.0			
			4.0			
			4 - 6	LIMESTONE BEDROCK	Gray (10YR 5/1) Weathered Rock; 100% Boulders; Massive Structure; Dry; Very Hard; No Roots; No Mottling	Bucket Refusal @ 4.0 fbs on North Side
			5.0			
			6.0			
					Soil Profile Pit SPP-11 Terminated at a Depth of 4.0 to 6.0 Feet Below Ground Surface Due to Bucket Refusal on Limestone	Bucket Refusal @ 6.0 fbs on South Side
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
12/24/2021 SPP11 1/19/2022



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-12**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 344.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 1.5 to 5 feet bgs	Date Completed: 12/28/2021	During: NE --- ▼	At Completion: NE --- ▼
Proposed Location: SWM	Logged By: CS	At Completion: DRY --- ▼	At Completion: NE --- ▼
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- --- ▼	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 1.5 to 5	RESIDUAL	Yellowish-Brown (10YR 6/6) SANDY CLAY LOAM; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling	
			2.0	LIMESTONE BEDROCK	Gray (10YR 5/1) Weathered Rock; 100% Boulders; Massive Structure; Dry; Very Hard; No Roots; No Mottling	Bucket Refusal @ 1.5 fbg on West Side Infiltration Testing @ 2.0 fbg; 1.0 iph
			3.0			
			4.0			
			5.0			Bucket Refusal @ 4.0 fbg on East Site
			6.0		Soil Profile Pit SPP-12 Terminated at a Depth of 1.5 to 5.0 Feet Below Ground Surface Due to Bucket Refusal on Limestone	Bucket Refusal @ 5.0 fbg in Center of Pit
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
1025 SPPlogs 1/19/2022



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-13**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 343.0 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 12.0 feet bgs	Date Completed: 12/28/2021	During: NE ---	At Completion: NE ---
Proposed Location: SWM	Logged By: CS	At Completion: DRY ---	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- ---	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1.5	PLOUGHED HORIZON	18" Ploughed Horizon	
			1.0			
			1.5 - 12	RESIDUAL	Brownish-Yellow (10YR 6/6) SILTY CLAY; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling	Infiltration Testing @ 1.5 fbg; 2.0 lph
			2.0			
			3.0			
			4.0			
			5.0			
			6.0			
			7.0			
			8.0			
			9.0			Sinkhole Void on West Site (2' Diameter) from 8.0 fbg; 10.0 fbg
			10.0			Void Due to Sinkhole Activities
			11.0			
			12.0			
					Soil Profile Pit SPP-13 Terminated at a Depth of 12.0 Feet Below Ground Surface	
			13.0			
			14.0			
			15.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
12/28/2022 SPP-13 1/19/2022



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-14**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 346.2 feet	Date Started: 12/28/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 8.0 feet bgs	Date Completed: 12/28/2021	During: NE ---	At Completion: NE ---
Proposed Location: SWM	Logged By: CS	At Completion: DRY ---	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: BR	24 Hours: --- ---	
Test Method: Visual Observation	Rig Type: Wacker ET65		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 1	PLOUGHED HORIZON	12" Ploughed Horizon	
			1.0			
			1 - 8	RESIDUAL	Brownish-Yellow (10YR 6/6) SILTY CLAY; No Coarse Fragments; Subangular Blocky Structure; Moist; Plastic to Sticky; No Roots; No Mottling	
			2.0			
			3.0			
			4.0			
			5.0			
			6.0			
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			
					Soil Profile Pit SPP-14 Terminated at a Depth of 8.0 Feet Below Ground Surface Due to Bucket Refusal on Limestone	

Infiltration Testing @
4.2 fbg; 0.0 iph

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

12/27/2022 SPP logs 1/19/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: SWB-1Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 350.0 feet	Date Started: 12/27/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 5.1 feet bgs	Date Completed: 12/27/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: CS	During: NE — ▽	At Completion: — — ▽
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE — ▽	
	Equipment: CME-45	24 Hours: — — ▽	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
0 - 2	S-1	X	2 - 3 - 5 - 5	20	8	0.7	PLOUGHED HORIZON RESIDUAL	8" Ploughed Horizon Brownish-Yellow (10YR 6/6) SILTY CLAY; Moist; Stiff (CL)	Qu = 1.5 tsf
2 - 4	S-2	X	6 - 6 - 5 - 8	24	22			As Above, with Gravel, Moist, Stiff (CL)	Qu = 3.0 tsf Infiltration Test @ 2.5 fbg; 0.0 iph
4 - 5.1	S-3	X	7 - 20 - 50/1"	12	70/7"	4.5		As Above, Wet, Stiff (CL)	Qu = 3.0 tsf
						5.0	WEATHERED ROCK	Gray (10YR 5/1) Weathered Limestone; Dry; Very Dense (WR)	Auger Refusal @ 4.5 fbg
						5.1		Boring Log SWB-1 Terminated at a Depth of 5.1 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-1A	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18691 SWBlogs 1/21/2022

228



RECORD OF SUBSURFACE EXPLORATION

Boring No.: SWB-1A

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 350.0 feet	Date Started: 12/27/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 3.0 feet bgs	Date Completed: 12/27/2021	During: NE --- ▽	At Completion: NE --- ▽
Proposed Location: SWM	Logged By: CS	24 Hours: --- --- ▽	At Completion: --- --- ▽
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.7	PLOUGHED HORIZON RESIDUAL	8" Ploughed Horizon Brownish-Yellow (10YR 6/6) SILTY CLAY, Moist (CL)	
						3.0			
						5.0			
						10.0			
						15.0			
						20.0			
						25.0			
								Boring Log SWB-1A Terminated at a Depth of 3.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-1B	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18697 SWBlogs 1/21/2022

228



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-1B**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 350.0 feet	Date Started: 12/27/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 6.0 feet bgs	Date Completed: 12/27/2021	During: NE — ▾	At Completion: NE — ▾
Proposed Location: SWM	Logged By: CS	24 Hours: — — ▾	At Completion: — — ▾
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
							PLOUGHED HORIZON	8" Ploughed Horizon	
						0.7	RESIDUAL	Brownish-Yellow (10YR 6/6) SILTY CLAY, Moist (CL)	
						5.0			
						6.0			
						10.0			
						15.0			
						20.0			
						25.0			
								Boring Log SWB-1B Terminated at a Depth of 6.0 Feet Below Ground Surface Due to Auger Refusal	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

10930 SWBlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-2**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Malden Creek Associates, L.P.	
Surface Elevation: ± 353.47 feet	Date Started: 12/27/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 15.1 feet bgs	Date Completed: 12/27/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: CS	During: NE — ▽	At Completion: 14.0 339.5 ☒
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE — ▽	
	Equipment: CME-45	24 Hours: — — ▽	24 Hours: — — ☒

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
0 - 2	S-1	X	1 - 2 - 3 - 3	24	5	1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY LOAM; Moist; Medium Stiff (CL)	Qu = 1.5 tsf
2 - 4	S-2	X	6 - 4 - 6 - 7	24	10			As Above, Moist, Stiff (CL)	Qu = 2.5 tsf
4 - 6	S-3	X	4 - 4 - 5 - 6	24	9	5.0		As Above, Moist, Stiff (CL)	Qu = 1.5 tsf
6 - 8	S-4	X	5 - 5 - 6 - 7	24	12			As Above, Moist, Stiff (CL)	Qu = 1.5 tsf
8 - 10	S-5	X	4 - 4 - 6 - 7	24	10	10.0		As Above, Moist, Stiff (CL)	Qu = 1.75 tsf
									Infiltration Test @ 10.0 fbgs; 0.0 iph
									Auger Grinding 12.0 fbgs to 13.0 fbgs Pinnacle @ 12.0 fbgs
13 - 15	S-6	X	1/12 - 1/12	4	1	15.0	WR	As Above, Very Moist (CL)	Qu = 2.0 tsf
15 - 15.1	S-7	X	50/1"	1	50/1"	15.1		Gray (10YR 5/5) Weathered Limestone; Very Moist; Very Dense (WR)	
								Boring Log SWB-2 Terminated at a Depth of 15.1 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-2A	
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18631.000 SWBlogs 1/21/2022

20.1



RECORD OF SUBSURFACE EXPLORATION

Boring No.: SWB-2A

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 353.47 feet	Date Started: 12/27/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 12.0 feet bgs	Date Completed: 12/27/2021	During: NE -- ▾	At Completion: -- -- ▾
Proposed Location: SWM	Logged By: CS	24 Hours: -- -- ▾	At Completion: -- -- ▾
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY LOAM, Moist (CL)	
						5.0			
						10.0			
						12.0			
						15.0			Boring Log SWB-2A Terminated at a Depth of 12.0 Feet Below Ground Surface Due to Auger Refusal
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18232 SWBlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-3**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 350.8 feet	Date Started: 12/22/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 11.1 feet bgs	Date Completed: 12/22/2021	During: NE --- ▽	At Completion: 7.0 343.8
Proposed Location: SWM	Logged By: TJ	At Completion: NE --- ▽	24 Hours: --- ---
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: --- ---	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (In.)	N	(feet)			
						0.0			
0 - 2	S-1		2 - 3 - 3 - 4	18	6	1.1	PLOUGHED HORIZON	14" Ploughed Horizon	
2 - 4	S-2		4 - 5 - 5 - 7	20	10		RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; 5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling; Medium Stiff (CL)	Qu = 1.5 tsf
4 - 6	S-3		5 - 7 - 10 - 11	23	17	5.0		As Above, Moist, No Roots, No Mottling, Stiff (CL)	Qu = 3.75 tsf
6 - 8	S-4		10 - 13 - 14 - 16	21	27			As Above, Moist, Very Stiff (CL)	Qu = 4.0 tsf
8 - 10	S-5		10 - 8 - 2 - 4	15	10			As Above, Moist, Very Stiff (CL)	Qu = 4.0 tsf Infiltration Test @ 7.0 fbs (elev. 343.80)
						10.0			Perched Water Above Rock from 9.0 fbs
						11.0	WR	No Recovery, Presumed Weathered Rock (Limestone), Moist/Wet, Very Dense (WR)	Bent Spoon on S-6
11 - 11.2	S-6		50/1"	NR	50/1"	11.1		Boring Log SWB-3 Terminated at a Depth of 11.1 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-3A	Auger Refusal @ 11.0 fbs
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

180213 WBlog 1/21/2022

23



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-3A**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 350.8 feet	Date Started: 12/22/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 9.5 feet bgs	Date Completed: 12/22/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: TJ	During: NE — ▽	
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE — ▽	
	Equipment: CME-45	At Completion: 5.0 345.8 ☒	
		24 Hours: — — ▽	
		24 Hours: — — ☒	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	Offset from SWB-3
							RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; <5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling	
						5.0		Attempt to Continuously Auger to 13.0 fbgs	
5 - 9	S-1		Sampled Cuttings	---	---	9.5			
						10.0		Boring Log SWB-3A Terminated at a Depth of 9.5 Feet Below Ground Surface Due to Auger Refusal	Auger Refusal @ 9.5 fbgs
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

180214WBlogs 1/21/2022

204



Page 1 of 1

18683 LSWBlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: SWB-4A

Page 1 of 1

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 359.0 feet	Date Started: 12/22/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 3.0 feet bgs	Date Completed: 12/22/2021	During: NE --- ▼	At Completion: 1.0 358.0
Proposed Location: SWM	Logged By: TJ	At Completion: NE --- ▼	24 Hours: --- ---
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: --- ---	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.8	PLOUGHED HORIZON RESIDUAL	10" Ploughed Horizon Brownish-Yellow (10YR 6/6) CLAY; 5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling (CL)	
						3.0		Attempt to Auger Continuously to 6.0 fbg	
						5.0		Boring Log SWB-4A Terminated at a Depth of 3.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-4B	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18236 SWBlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-4B**

Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 359.0 feet	Date Started: 12/22/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 5.5 feet bgs	Date Completed: 12/22/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: TJ	During: NE — ▽	At Completion: 2.0 357.0
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE — ▽	
	Equipment: CME-45	24 Hours: — — ▽	24 Hours: — —

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.8	PLOUGHED HORIZON RESIDUAL	10" Ploughed Horizon Brownish-Yellow (10YR 6/6) CLAY; <5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling (CL) Attempt to Auger Continuously to 6.0 fbgs	
						5.0			
						5.5			
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18217WBlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-4C**

Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 359.0 feet	Date Started: 12/22/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 4.0 feet bgs	Date Completed: 12/22/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: TJ	During: NE — ▽	At Completion: 2.5 356.5
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE — ▽	
	Equipment: CME-45	24 Hours: — — ▽	24 Hours: — —

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; 5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling (CL)	
						4.0		Attempt to Auger Continuously to 6.0 fbgs	
						5.0		Boring Log SWB-4C Terminated at a Depth of 4.0 Feet Below Ground Surface Due to Auger Refusal	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18213 SWBlogs 1/21/2022

208



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-5**

Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 360.0 feet	Date Started: 12/23/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 4.0 feet bgs	Date Completed: 12/23/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: TJ	During: NE --- ▾	
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE --- ▾	
	Equipment: CME-45	At Completion: 2.0 358.0	
		24 Hours: --- --- ▾ 24 Hours: --- ---	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
0 - 2	S-1		3 - 3 - 4 - 6	18	7	0.0	PLOUGHED HORIZON	9" Ploughed Horizon	
						0.8	RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; <5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling (CL)	
2 - 3.2	S-2		7 - 11 - 50/3"	12	61/8"	3.0		As Above, Moist (CL)	
						4.0	WEATHERED ROCK	Gray (10YR 5/1) Weathered Rock (Limestone); Moist; Very Dense (WR)	Auger Refusal @ 4.0 fbgs
						5.0		Boring Log SWB-5 Terminated at a Depth of 4.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-5A	
						10.0			
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-5A**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 360.0 feet	Date Started: 12/23/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 7.0 feet bgs	Date Completed: 12/23/2021	During: NE --- ▼	At Completion: 4.0 356.0
Proposed Location: SWM	Logged By: TJ	At Completion: NE --- ▼	24 Hours: --- ---
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: --- ---	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	PLOUGHED HORIZON	9" Ploughed Horizon	
						0.8	RESIDUAL	Brownish-Orange (10YR 6/6) CLAY; <5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling	
								Attempt to Auger Continuously to 8.0 fbg (minimum)	
3 - 5	S-1	X	Sampled Cuttings	---	---	5.0			Infiltration Testing @ 5.0 fbg (elev. 355.0)
						7.0			
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
18631 SWBlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-5B**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 360.0 feet	Date Started: 12/23/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 6.0 feet bgs	Date Completed: 12/23/2021	During: NE — ▾	At Completion: 3.0 357.0 ▾
Proposed Location: SWM	Logged By: TJ	At Completion: NE — ▾	24 Hours: — — ▾
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: — — ▾	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	PLOUGHED HORIZON	9" Ploughed Horizon	
						0.8	RESIDUAL	Brownish-Orange (10YR 6/6) CLAY; <5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling	
								Attempt to Auger Continuously to 8.0 fbgs (minimum)	
4 - 6	S-1	X	Sampled Cuttings	—	—	5.0			
						6.0			
								Boring Log SWB-5B Terminated at a Depth of 6.0 Feet Below Ground Surface Due to Auger Refusal	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: fbgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
18534 SWBLogs 1/21/2022
241



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-6**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Malden Creek Associates, L.P.	
Surface Elevation: ± 364.12 feet	Date Started: 12/27/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 7.2 feet bgs	Date Completed: 12/27/2021	During: NE — ▽	At Completion: 6.0 358.1 ▽
Proposed Location: SWM	Logged By: CS	At Completion: NE — ▽	24 Hours: — — ▽
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: — — ▽	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	PLOUGHED HORIZON	8" Ploughed Horizon	
0 - 2	S-1	X	2 - 2 - 3 - 3	24	5	0.7	RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; Moist; Medium Stiff (CL)	Qu = 1.0 tsf
2 - 4	S-2	X	4 - 3 - 3 - 7	18	6			As Above, Moist, Medium Stiff (CL)	Qu = 1.5 tsf Infiltration Test @ 4.0 fbg; 0.0 lph (Elevation 360.10)
4 - 6	S-3	X	3 - 3 - 2 - 5	12	5	5.0		As Above, with Gravel, Moist, Medium Stiff (CL)	Qu = 1.5 tsf
6 - 7.2	S-4	X	23 - 40 - 50/2"	10	90/8"	6.0	WEATHERED ROCK	Gray (10YR 5/1) Weathered Limestone; Dry; Very Dense (WR)	
						7.2		Boring Log SWB-6 Terminated at a Depth of 7.2 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-6A	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
18531 SWBlogs 1/21/2022
242



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-6A**

Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 364.12 feet	Date Started: 12/27/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 4.0 feet bgs	Date Completed: 12/27/2021	During: NE --- ▼	At Completion: NE --- ▼
Proposed Location: SWM	Logged By: TJ	24 Hours: --- --- ▼	At Completion: --- --- ▼
Drill / Test Method: HSA / SPT	Contractor: AD		
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.7	PLOUGHED HORIZON	8" Ploughed Horizon	
							RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; Moist; Stiff (CL)	
						3.5			
						4.0	WR	Gray (10YR 5/1) Weathered Limestone; Dry; Very Dense (WR)	Auger Grinding 3.5 fbs to 4.0 fbs
						5.0		Boring Log SWB-6A Terminated at a Depth of 4.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-6B	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-6B**

Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 364.12 feet	Date Started: 12/27/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 4.5 feet bgs	Date Completed: 12/27/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: CS	During: NE --- ▽	
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE --- ▽	
	Equipment: CME-45	At Completion: --- --- ☒	
		24 Hours: --- --- ▽ 24 Hours: --- --- ☒	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
							PLOUGHED HORIZON	8" Ploughed Horizon	
						0.7	RESIDUAL	Brownish-yellow (10YR 6/6) CLAY, Moist, Stiff (CL)	
						3.5			
						4.5	WEATHERED ROCK	Gray (10YR 5/5) Weathered Limestone (WR)	Auger Grinding 3.5 fbs to 4.0 fbs
						5.0		Boring Log SWB-6B Terminated at a Depth of 4.5 Feet Below Ground Surface Due to Auger Refusal	
						10.0			
						15.0			
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-7**

Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 366.0 feet	Date Started: 12/23/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 5.5 feet bgs	Date Completed: 12/23/2021	During: NE — ▾	At Completion: 3.0 363.0 ▾
Proposed Location: SWM	Logged By: TJ	At Completion: NE — ▾	24 Hours: — — ▾
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: — — ▾	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (In.)	N	(feet)			
0 - 2	S-1	X	2 - 3 - 4 - 5	18	7	0.0	PLOUGHED HORIZON	10" Ploughed Horizon	
						0.8	RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; 5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling; Medium Stiff (CL)	
2 - 4	S-2	X	8 - 7 - 11 - 13	19	18			As Above, Moist, No Roots; Very Stiff (CL)	Qu = 3.75 tsf
4 - 5.1	S-3	X	6 - 7 - 50/1"	12	57/7"	5.0		As Above, Moist (CL)	
						5.5	WR	Gray (10YR 5/1) Weathered Rock (Limestone), Moist, Very Dense (WR)	
								Boring Log SWB-7 Terminated at a Depth of 5.5 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-7A	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-7A**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 365.0 feet	Date Started: 12/23/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 21.0 feet bgs	Date Completed: 12/23/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: TJ	During: 19.0 P 346.0 ▼	At Completion: 10.0 355.0 ☒
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: 19.0 P 346.0 ▼	
	Equipment: CME-45	24 Hours: — — ▼	24 Hours: — — ☒

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0			
						0.8	PLOUGHED HORIZON RESIDUAL	10" Ploughed Horizon	
0 - 2	S-1	X	2 - 2 - 3 - 3	16	5			Brownish-Yellow (10YR 6/6) CLAY; <5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling; Medium Stiff (CL)	Bottom of Proposed Basin ~340.0
2 - 4	S-2	X	7 - 11 - 10 - 18	18	21			As Above, Moist, No Roots, Very Stiff (CL)	
4 - 6	S-3	X	7 - 9 - 1 - 15	20	10	5.0		As Above, Moist, Stiff (CL)	
6 - 8	S-4	X	11 - 11 - 10 - 11	16	21			Brownish-Yellow (10YR 6/6) SILTY CLAY LOAM; <5% Gravel; Massive Structure; Moist; Plastic to Moderate Crumb; No Roots; No Mottling; Hard (CL)	
8 - 10	S-5	X	8 - 7 - 8 - 10	22	15			As Above, Moist, Very Stiff (CL)	
						10.0			
						13.0			
13 - 15	S-6	X	5 - 6 - 6 - 7	20	12			Brownish-Yellow (10YR 6/6) SILT LOAM; <5% Gravel; Massive Structure; Moist; Slightly Plastic to Moderate Crumb; No Roots; No Mottling (ML)	
						15.0			
									Infiltration Testing @ 17.0 fbgs (elev. 348.0)
18 - 19.75	S-7	X	4 - 4 - 4 - 50/3"	12	8			As Above, Moist, Medium Stiff (ML)	Wet from 19.0 fbgs to 19.5 fbgs (Perched Water)
						20.0			
						21.0			
								Boring Log SWB-7A Terminated at a Depth of 21.0 Feet Below Ground Surface Due to Auger Refusal	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
18991, SWBlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-8**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 361.0 feet	Date Started: 12/23/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 10.0 feet bgs	Date Completed: 12/23/2021	During: NE --- ▾	At Completion: 5.0 356.0
Proposed Location: SWM	Logged By: TJ	At Completion: NE --- ▾	24 Hours: --- ---
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: --- ---	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
0 - 2	S-1	X	3 - 3 - 3 - 4	15	6	0.8	PLOUGHED HORIZON	10" Ploughed Horizon	
							RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; <5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling (CL)	
2 - 4	S-2	X	3 - 4 - 5 - 5	30	9			As Above, Moist (CL)	
4 - 6	S-3	X	9 - 10 - 13 - 11	23	23	5.0		As Above, Moist (CL)	
6 - 8	S-4	X	5 - 6 - 9 - 10	21	15			As Above, Moist (CL)	
8 - 9.6	S-5	X	6 - 8 - 9 - 50/ 1"		17	9.5		As Above, 10% Gravel (CL)	Limestone Fragments
						10.0	WR	Gray (10YR 5/1) Weathered Rock (Limestone); Moist; Very Dense (WR)	
								Boring Log SWB-8 Terminated at a Depth of 10.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-8A	
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18934-SWBlogs 1/21/2022

247



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-8A**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 361.0 feet	Date Started: 12/23/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 15.5 feet bgs	Date Completed: 12/23/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: TJ	During: 14.0 P 347.0 ▼	
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: 14.0 P 347.0 ▼	
	Equipment: CME-45	At Completion: 6.0 355.0 ☒	
		24 Hours: — — ☒	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.8	PLOUGHED HORIZON RESIDUAL	10" Ploughed Horizon Brownish-Yellow (10YR 6/6) CLAY; <5% Gravel; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling (CL)	
						5.0			
						10.0			
						13 - 14.6			Infiltration Testing @ 12.0 fbgs (elev. 349.0)
	S-1	X	3 - 1 - 1 - 50/ 1"		2	14.5		As Above, Moist to Wet (CL)	Wet @ 14.0 fbgs (Perched Water Above Rock)
						15.0	WEATHERED ROCK	Gray (10YR 5/1) Weathered Rock (Limestone); Moist to Wet; Very Dense (WR)	
						15.5		Boring Log SWB-8A Terminated at a Depth of 15.5 Feet Below Ground Surface Due to Auger Refusal	Auger Refusal and Deviated @ 15.5 fbgs
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18948 SWBlogs 1/21/2022

248



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-9**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 363.0 feet	Date Started: 12/22/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 10.0 feet bgs	Date Completed: 12/22/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: TJ	During: NE --- ▾	
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: NE --- ▾	
	Equipment: CME-45	At Completion: 4.0 359.0 ☒	
		24 Hours: --- --- ▾	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (In.)	N	(feet)			
0 - 2	S-1		1 - 2 - 4 - 8	15	6	0.0	PLOUGHED HORIZON	13" Ploughed Horizon	
2 - 4	S-2		1 - 6 - 7 - 10	18	13	1.1	RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; 5% Gravel; Massive Structure; Moist; Plastic; Few Roots (5%); No Mottling; Medium Stiff (CL)	Qu = 2.0 tsf
4 - 6	S-3		3 - 5 - 7 - 11	24	12	5.0		As Above, Moist, No Roots, Stiff (CL)	Qu = 1.5 tsf
6 - 8	S-4		10 - 12 - 13 - 12	22	25			As Above, Moist, Stiff (CL)	Qu = 3.5 tsf
8 - 9.6	S-5		16 - 15 - 10 - 50/2"	18	25			As Above, Moist, Hard (CL)	Qu = 2.75 tsf
						9.5		As Above, Moist, Hard (CL)	
						10.0	WR	Gray (10YR 5/1) Weathered Rock (Limestone); Moist; Very Dense (WR)	
								Boring Log SWB-9 Terminated at a Depth of 10.0 Feet Below Ground Surface Due to Auger Refusal; Offset to Boring SWB-9A	Bent Spoon on Last Sample
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION
18631 SWBlogs 1/21/2022



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-9A**Page **1** of **1**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Malden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 363.0 feet	Date Started: 12/22/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 20.3 feet bgs	Date Completed: 12/22/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: SWM	Logged By: TJ	During: 18.0 P 345.0	At Completion: 10.0 353.0
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: 18.0 P 345.0	
	Equipment: CME-45	24 Hours: -- --	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						1.0	PLOUGHED HORIZON	12" Ploughed Horizon	Offset 10 feet from Boring SWB-9
							RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; 5% Gravel; Massive Structure; Moist; Plastic; Few Roots (5%); No Mottling (CL)	Clay Cuttings
								Attempt to Auger to 13.0 fbgs	Good Return
						5.0			
						10.0			Pinnacled Limestone Dipping West
13 - 15	S-1	X	5 - 6 - 5 - 5	21	11	15.0		As Above, Moist, Stiff (CL)	
									Infiltration Testing @ 16.0 fbgs (elev. 347.0)
18 - 20	S-2	X	W 1 - O - 1 - O H H	15	1	20.0		As Above, Wet (CL)	Perched Water Above Rock @ 18.0 fbgs
20 - 20.3	S-3	X	50/3"	2	50/2"	20.3	WR	Gray (10YR 5/1) Weathered Rock (Limestone); Moist; Very Dense (WR)	Likely Soft Zone Above Limestone
								Boring Log SWB-9A Terminated at a Depth of 20.3 Feet Below Ground Surface Due to Auger Refusal	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18631.000 SWBlogs 1/21/2022

250



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **SWB-10**Page **1** of **2**

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maidencreek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation: ± 360.75 feet	Date Started: 12/21/2021	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 35.0 feet bgs	Date Completed: 12/21/2021	During: NE --- ▾	At Completion: 9.0 351.8
Proposed Location: SWM	Logged By: TJ	At Completion: NE --- ▾	24 Hours: --- ---
Drill / Test Method: HSA / SPT	Contractor: AD	24 Hours: --- ---	
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
0 - 2	S-1	X	3 - 4 - 4 - 6	15	8	1.0	PLOUGHED HORIZON	12" Ploughed Horizon	
							RESIDUAL	Brownish-Yellow (10YR 6/6) CLAY; <5% Gravel, 0% Cobbles; Massive Structure; Moist; Plastic; Few Roots (<5%); No Mottling (CL)	Qu = 1.5 tsf
2 - 4	S-2	X	10 - 11 - 16 - 19	22	27			As Above, No Roots, Moist, Very Stiff (CL)	Qu = 4.0 tsf
4 - 6	S-3	X	7 - 13 - 14 - 19	24	27	5.0		As Above, Moist, Very Stiff (CL)	Qu = 3.75 tsf
6 - 8	S-4	X	13 - 15 - 16 - 20	24	31			As Above, Moist, Hard (CL)	Qu = 4.25 tsf
8 - 10	S-5	X	14 - 16 - 16 - 19	21	32	10.0		As Above, 5% Gravel, Moist, Hard (CL)	Qu = 3.25 tsf
									Slow Auger Advancement in Clay (10 minutes from 8.0 fbgs to 13.0 fbgs)
13 - 15	S-6	X	4 - 4 - 6 - 6	22	10	15.0		As Above, Moist, Stiff (CL)	Qu = 2.0 tsf
18 - 20	S-7	X	3 - 6 - 7 - 10	19	13	20.0		Brownish-Yellow (10YR 6/6) Silty Clay Loam; <5% Gravel, 0% Cobbles; Massive Structure; Crumb, No Roots, No Mottling, Very Stiff (ML)	Qu = 2.0 tsf
									Slow Auger Advancement
23 - 25	S-8	X	5 - 5 - 5 - 5	22	10	25.0		As Above, Moist to Very Moist, Stiff (ML)	Qu = 1.0 tsf

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

18011 SWBlogs 1/21/2022

284

Project: Proposed Warehouse		WAI Project No.: GP2118631.000	
Location: U.S. Route 222 (Allentown Pike) & Schaeffer Road; Maiden Creek Township, Berks County, PA		Client: Maiden Creek Associates, L.P.	
Surface Elevation:	± 360.75 feet	Date Started:	12/21/2021
Termination Depth:	35.0 feet bgs	Date Completed:	12/21/2021
Proposed Location:	SWM	Logged By:	TJ
Drill / Test Method:	HSA / SPT	Contractor:	AD
		Equipment:	CME-45
		Water Depth Elevation	Cave-In Depth Elevation
		(feet bgs) (feet)	(feet bgs) (feet)
		During:	NE — ▼
		At Completion:	NE — ▼
		24 Hours:	— — ▼
		At Completion:	9.0 351.8
		24 Hours:	— —

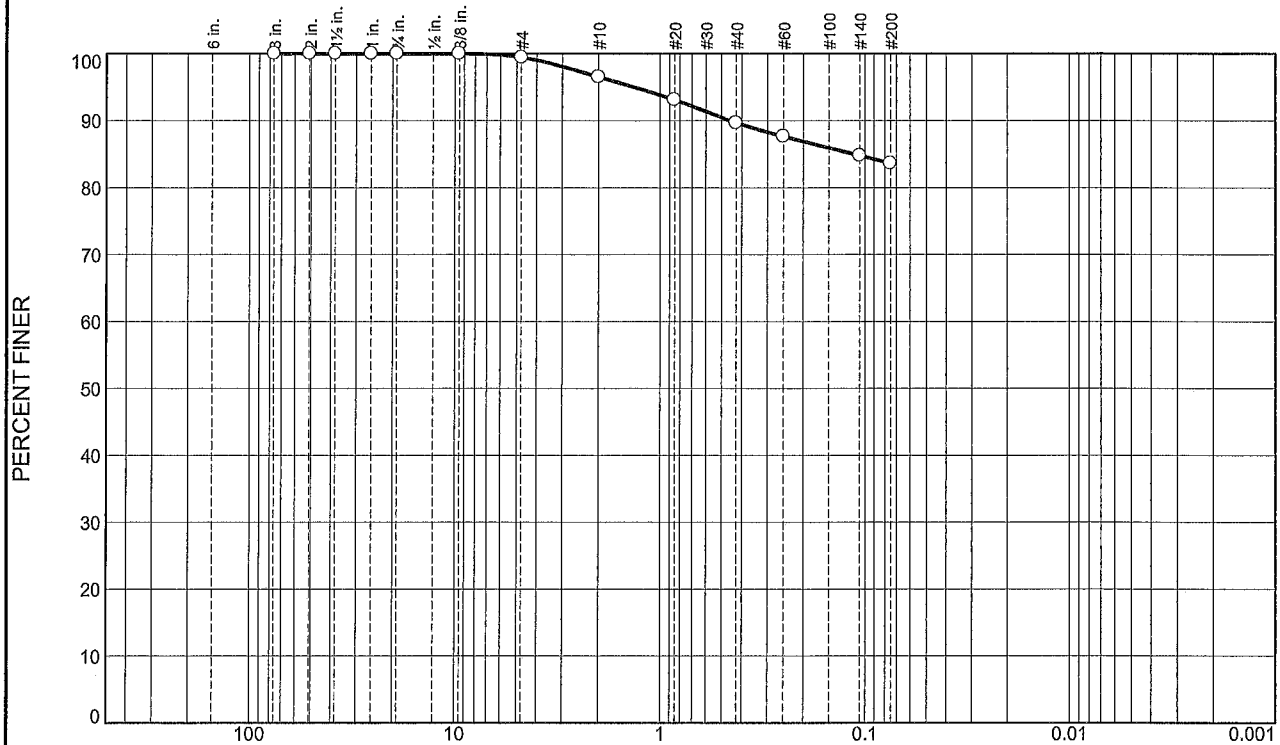
SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0	RESIDUAL 	As Above, Moist, Hard (ML)	Slower Auger Advancement Infiltration Testing @ 27.0 fbg (elev. 333.75)
28 - 30	S-9	X	10 - 9 - 8 - 14	19	17	30.0			
33 - 34.3	S-10	X	10 - 21 - 50/4"	14	71/9"	34.0			
						35.0	WEATHERED ROCK 	As Above, Moist, Hard (ML) Gray (10YR 5/1) Weathered Rock (Limestone); Moist; Very Dense (WR)	Qu = 2.0 tsf Limestone Rock Fragments
								Boring Log SWB-10 Terminated at a Depth of 35.0 Feet Below Ground Surface Due to Auger Refusal	



APPENDIX B

Laboratory Test Results

Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	2.9	6.8	6.1	83.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.4		
#10	96.5		
#20	93.1		
#40	89.7		
#60	87.6		
#140	84.8		
#200	83.6		

* (no specification provided)

Material Description

Lean Clay with Sand

PL= 18   Atterberg Limits   LL= 43   PI= 25

Coefficients
D₉₀= 0.4541   D₈₅= 0.1131   D₆₀=
D₅₀=   D₃₀=   D₁₅=
D₁₀=   C_u=   C_c=

Classification
USCS= CL   AASHTO= A-7-6(21)

Remarks
W_n = 22.6 %

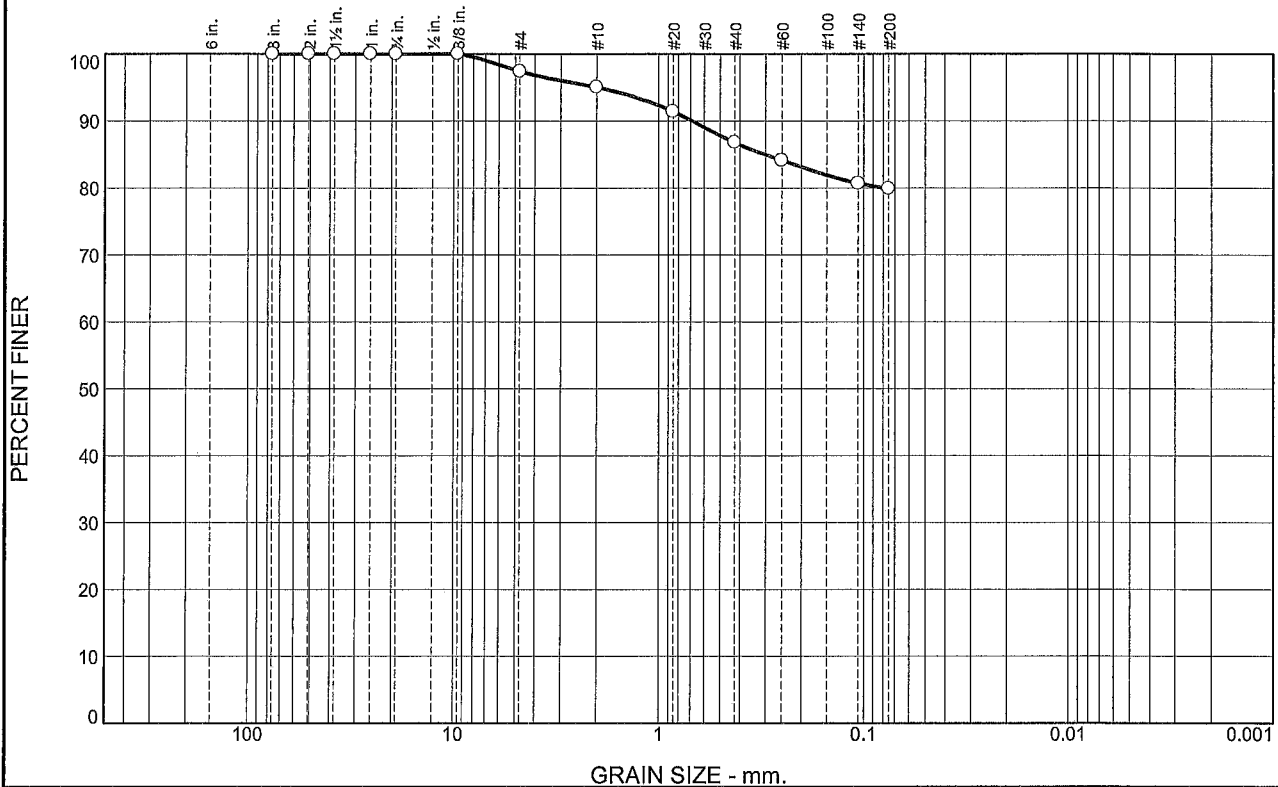
Source of Sample: PB-1   Depth: 4.0' - 6.0'
Sample Number: S-3

Date: 01/17/2022

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Maiden Creek Associates, L.P.
Project: Proposed Warehouse
US Route 222 & Schaeffer Rd, Maiden Creek Twp, Berks Co, PA
Project No: GP2118631.000   **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.6	2.4	8.2	6.9	79.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	97.4		
#10	95.0		
#20	91.4		
#40	86.8		
#60	84.1		
#140	80.7		
#200	79.9		

* (no specification provided)

Material Description

Fat Clay with Sand

PL= 22   Atterberg Limits   LL= 54   PI= 32

Coefficients
D₉₀= 0.6883   D₈₅= 0.3027   D₆₀=
D₅₀=   D₃₀=   D₁₅=
D₁₀=   C_u=   C_c=

USCS= CH   Classification   AASHTO= A-7-6(26)

Remarks
W_n = 30.3 %

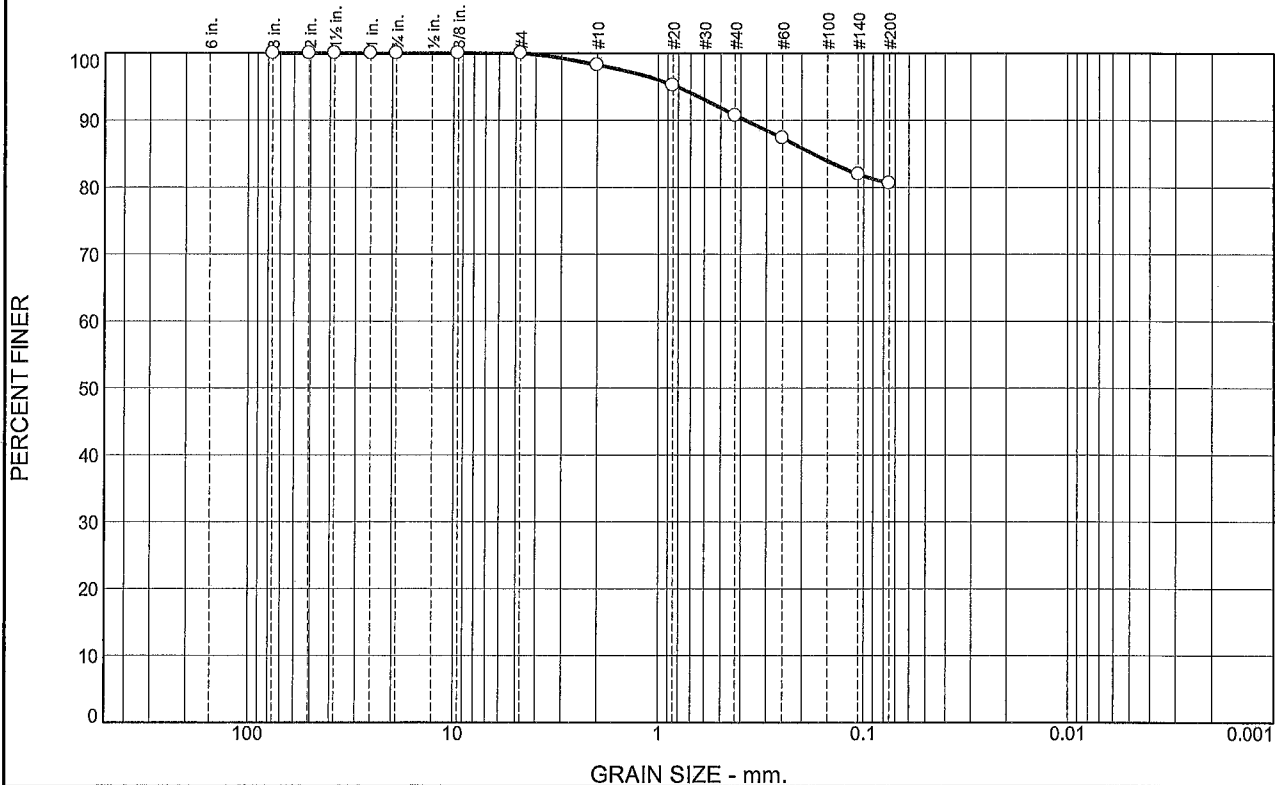
Source of Sample: PB-6   Depth: 13.0' - 15.0'
Sample Number: S-6

Date: 01/17/2022

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Maiden Creek Associates, L.P.
Project: Proposed Warehouse
US Route 222 & Schaeffer Rd, Maiden Creek Twp, Berks Co, PA
Project No: GP2118631.000   **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.8	7.5	10.1	80.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	98.2		
#20	95.2		
#40	90.7		
#60	87.3		
#140	81.9		
#200	80.6		

* (no specification provided)

Material Description

Fat Clay with Sand

PL= 25   Atterberg Limits   LL= 59   PI= 34

Coefficients
D₉₀= 0.3794   D₈₅= 0.1771   D₆₀=
D₅₀=   D₃₀=   D₁₅=
D₁₀=   C_u=   C_c=

Classification
USCS= CH   AASHTO= A-7-6(29)

Remarks
W_n = 29.9 %

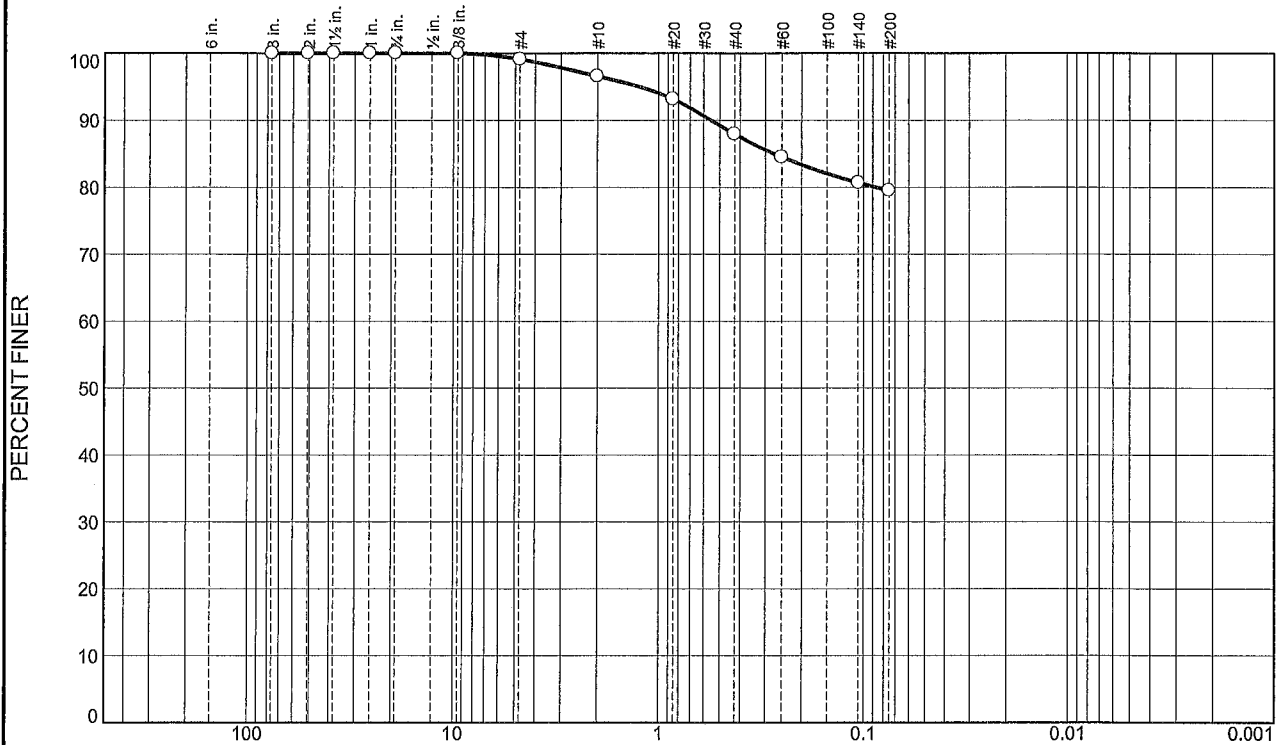
Source of Sample: PB-8   Depth: 2.0' - 4.0'
Sample Number: S-2

Date: 01/17/2022

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Maiden Creek Associates, L.P.
Project: Proposed Warehouse
US Route 222 & Schaeffer Rd, Maidencreek Twp, Berks Co, PA
Project No: GP2118631.000   **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.9	2.5	8.7	8.4	79.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.1		
#10	96.6		
#20	93.2		
#40	87.9		
#60	84.5		
#140	80.6		
#200	79.5		

* (no specification provided)

Material Description

Silt with Sand

PL= NP

Atterberg Limits

LL= NP

PI= NP

Coefficients

D₉₀= 0.5522

D₈₅= 0.2728

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= ML

AASHTO= A-4(0)

Remarks

W_n = 32.5 %

Source of Sample: SWB-10
Sample Number: S-7

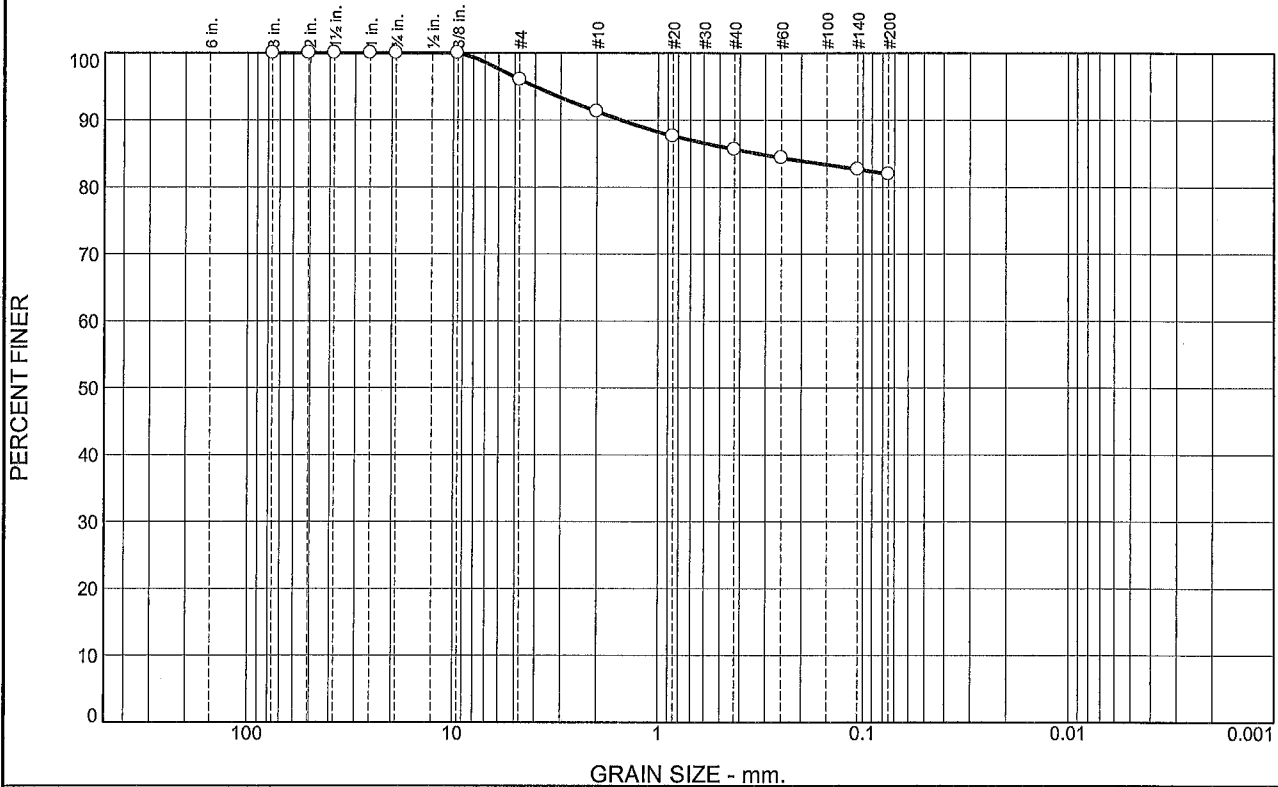
Depth: 18.0' - 20.0'

Date: 01/17/2022

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Maiden Creek Associates, L.P.
Project: Proposed Warehouse
US Route 222 & Schaeffer Rd, Maiden Creek Twp, Berks Co, PA
Project No: GP2118631.000
Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.9	4.8	5.6	3.8	81.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	96.1		
#10	91.3		
#20	87.6		
#40	85.7		
#60	84.4		
#140	82.7		
#200	81.9		

* (no specification provided)

<u>Material Description</u>		
Lean Clay with Sand		
<u>Atterberg Limits</u>		
PL= 17	LL= 41	PI= 24
<u>Coefficients</u>		
D ₉₀ = 1.5229	D ₈₅ = 0.3275	D ₆₀ =
D ₅₀ =	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-7-6(19)	
<u>Remarks</u>		
W _n = 20.9 %		

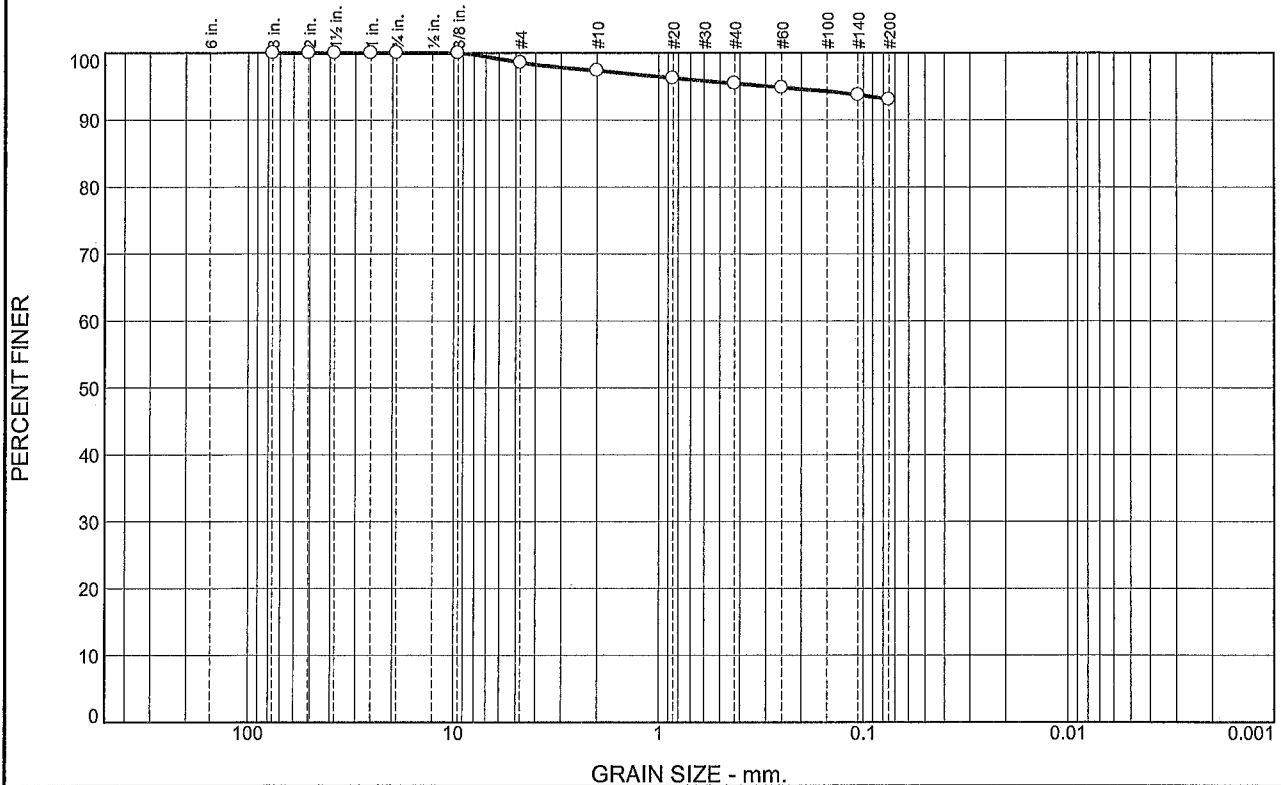
Source of Sample: SPP-5 Depth: 1.0' - 3.0'
Sample Number: S-1

Date: 01/19/2022

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Maiden Creek Associates, L.P.
Project: Proposed Warehouse
US Route 222 & Schaeffer Rd, Maidencreek Twp, Berks Co, PA
Project No: GP2118631.000 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.4	1.2	2.0	2.3	93.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	98.6		
#10	97.4		
#20	96.3		
#40	95.4		
#60	94.8		
#140	93.8		
#200	93.1		

* (no specification provided)

<u>Material Description</u>		
Lean Clay		
<u>Atterberg Limits</u>		
PL= 18	LL= 48	PI= 30
<u>Coefficients</u>		
D ₉₀ =	D ₈₅ =	D ₆₀ =
D ₅₀ =	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-7-6(30)	
<u>Remarks</u>		
W _n = 27.0 %		

Source of Sample: SPP-11 Depth: 1.0' - 4.0'
Sample Number: S-1

Date: 01/19/2022

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Maiden Creek Associates, L.P.
Project: Proposed Warehouse
US Route 222 & Schaeffer Rd, Maiden Creek Twp, Berks Co, PA
Project No: GP2118631.000 **Figure**

The graph illustrates the particle size distribution of a soil sample. The y-axis represents the percentage of soil finer than a given sieve size, ranging from 0 to 100. The x-axis represents the sieve size in inches and standard sieve numbers, ranging from 100 inches down to 0.001 inches. The curve shows that 100% of the soil is finer than a #40 sieve (0.425 mm). The percentage finer decreases as the sieve size decreases, reaching approximately 64% finer for the #200 sieve (0.075 mm).

Sieve Size (inches)	Sieve Number	Percent Finer (%)
6	-	100
3	-	100
2	-	100
1 1/2	-	100
1	-	100
3/4	-	100
3/8	-	95
1/2	-	90
1/4	-	85
1/10	-	80
1/20	-	78
1/40	-	74
1/60	-	70
1/100	-	66
1/140	-	64
1/200	-	64

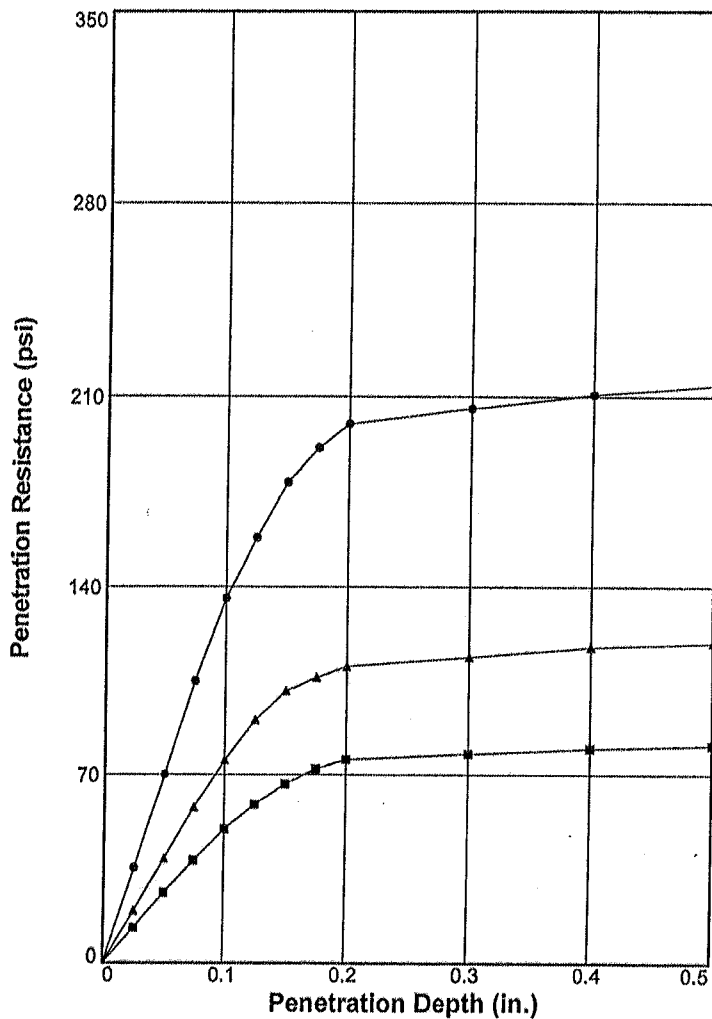
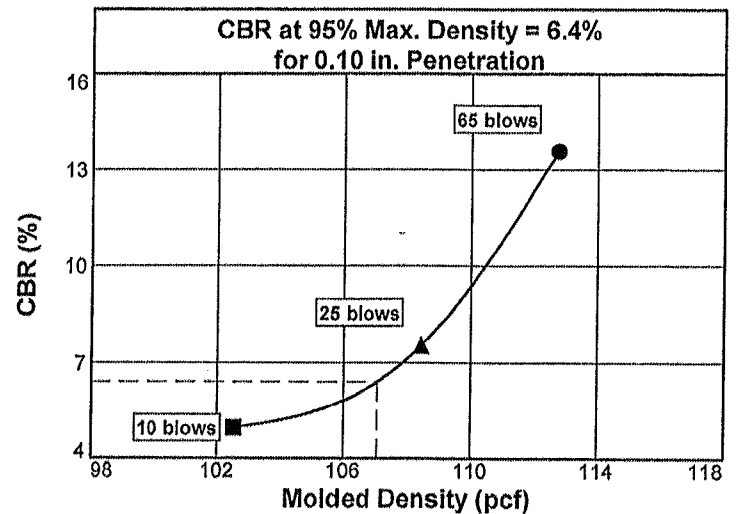
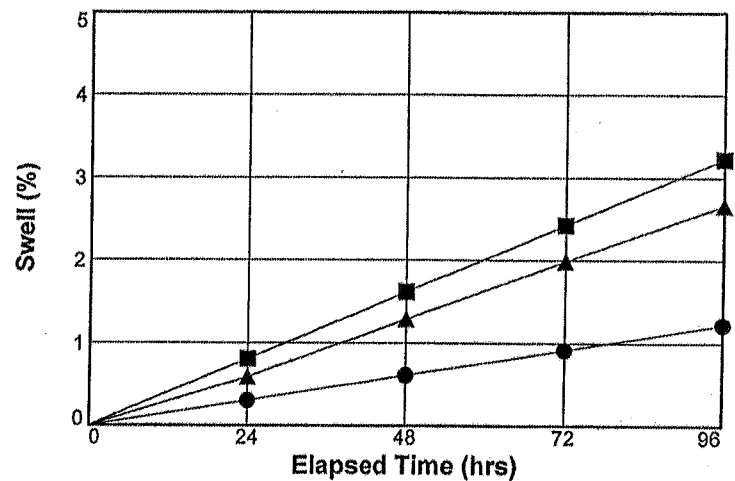
GRAIN SIZE - mm.							
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.6	4.9	11.1	9.5	63.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	94.5		
#4	89.4		
#10	84.5		
#20	78.3		
#40	73.4		
#60	69.8		
#140	65.5		
#200	63.9		

260

BEARING RATIO TEST REPORT

ASTM D 1883-07



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	112.7	100	17.0	111.4	98.8	19.3	13.6	13.3	0.000	10	1.2
2 △	108.5	96.3	17.0	105.7	93.7	21.5	7.5	7.4	0.000	10	2.7
3 □	102.5	90.9	17.0	99.3	88.1	24.1	5.0	5.0	0.000	10	3.2

Material Description							USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Brown in color, silt with sand							ML	112.7	17.1	NV	NP

Project No: CGZ-496

Project: Prop. Warehouse, GP2118631.000, US Rte 222 & Schaeffer Rd, Maidencreek Township Berks County, Pennsylvania

Source of Sample: On-Site material

Sample Number: S-1

Date:

Test Description/Remarks:

BEARING RATIO TEST REPORT
ANS CONSULTANTS, INC.

Figure 1 F 4

BEARING RATIO TESTING RESULTS (ASTM D 1883-07)

Date:
Project No.: CGZ-496
Project: Prop. Warehouse, GP2118631.000, US Rte 222 & Schaeffer Rd, Maidencreek Townshi
Location: On-Site material
Sample Number: S-1
Material Description: Brown in color. silt with sand
USCS Classification: ML
Liquid Limit: NV **Plasticity Index:** NP

Test Description:
Maximum Dry Density, pcf : 112.7 **Optimum Moisture Content, %:** 17.1
Testing Remarks:

Sample 1 (65 Blows; Surcharge: 10 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 672.1   Wt. Soil+Tare, gms. 594.2   Wt. Tare, gms. 135.0

Moisture, % 17.0

Unit Weight

Wt. Mold+Soil, lbs. 26.0145   Wt. Mold, lbs. 16.1215   Ht. Soil, in. 4.585

Density, pcf 112.7

Swell Data

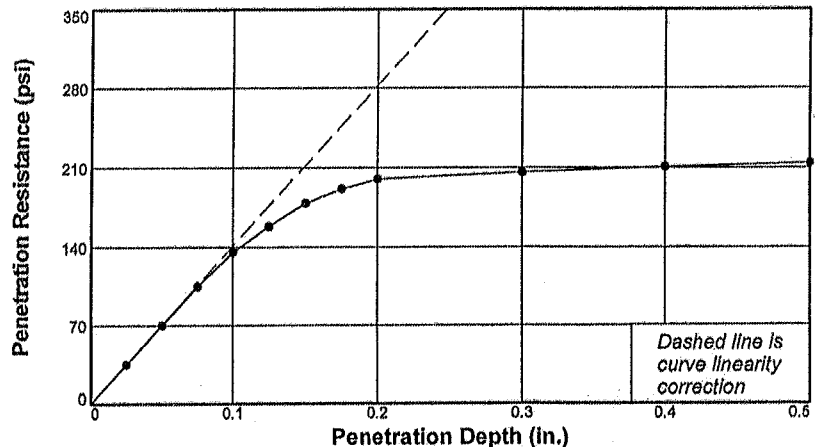
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	297	0.0
24	311	0.3
48	325	0.6
72	339	0.9
96	353	1.2

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	511.29	453.0	153.52	19.5
Middle	797.7	669.2	0.0	19.2
Bottom	797.7	669.2	0.0	19.2

Penetration Test Data

Pen. In.	Dial Reading	Stress psi	CBR %
0.0	0	0.0	
0.025	35.33	35.3	
0.05	70.00	70.0	
0.075	105.00	105.0	
0.1	135.67	135.7	19.6
0.125	158.33	158.3	
0.15	178.67	178.7	
0.175	191.33	191.3	
0.2	200.00	200.0	13.3
0.3	205.67	205.7	
0.4	210.67	210.7	
0.5	214.00	214.0	



Sample 2

(25 Blows; Surcharge: 10 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 672.1

Wt. Soil+Tare, gms. 594.2

Wt. Tare, gms. 135.0

Moisture, % 17.0

Unit Weight

Wt. Mold+Soil, lbs. 25.5060

Wt. Mold, lbs. 15.9805

Ht. Soil, in. 4.589

Density, pcf 108.5

Swell Data

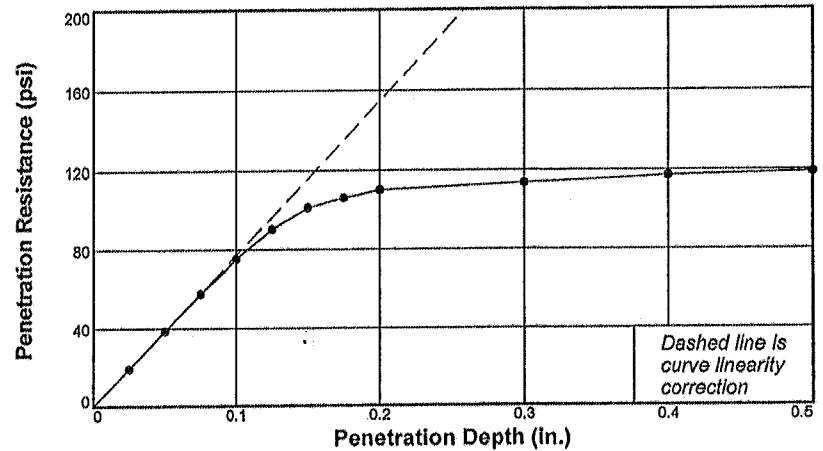
Elapsed Time, hrs.	Dial Reading In. x 1,000	Swell %
0	248	0.0
24	275	0.6
48	307	1.3
72	339	2.0
96	370	2.7

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	537.27	471.1	155.71	21.0
Middle	891.5	732.6	0.0	21.7
Bottom	961.3	789.3	0.0	21.8

Penetration Test Data

Pen. In.	Dial Reading	Stress psi	CBR %
0.0	0	0.0	
0.025	19.33	19.3	
0.05	38.67	38.7	
0.075	57.67	57.7	
0.1	75.33	75.3	7.5
0.125	90.33	90.3	
0.15	101.33	101.3	
0.175	106.33	106.3	
0.2	110.33	110.3	7.4
0.3	113.67	113.7	
0.4	117.33	117.3	
0.5	119.00	119.0	



Sample 3 (10 Blows; Surcharge: 10 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 672.1

Wt. Soil+Tare, gms. 594.2

Wt. Tare, gms. 135.0

Moisture, % 17.0

Unit Weight

Wt. Mold+Soil, lbs. 24.9685

Wt. Mold, lbs. 15.9725

Ht. Soil, in. 4.585

Density, pcf 102.5

Swell Data

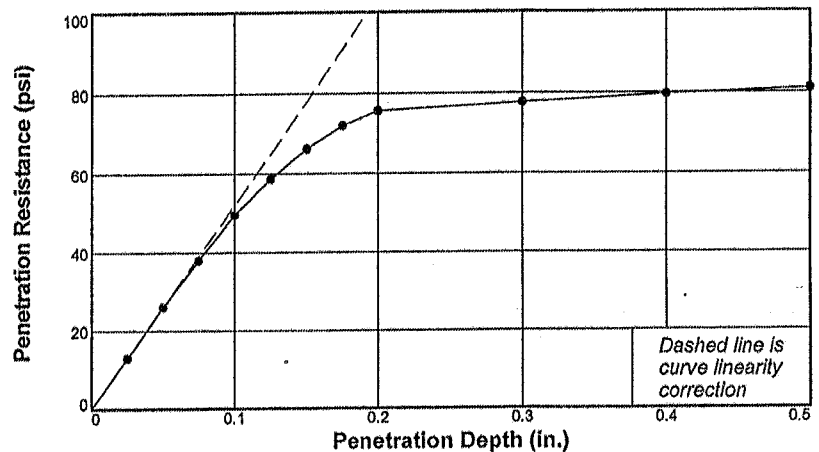
Elapsed Time, hrs.	Dial Reading In. x 1,000	Swell %
0	238	0.0
24	275	0.8
48	312	1.6
72	349	2.4
96	386	3.2

Final Water Content

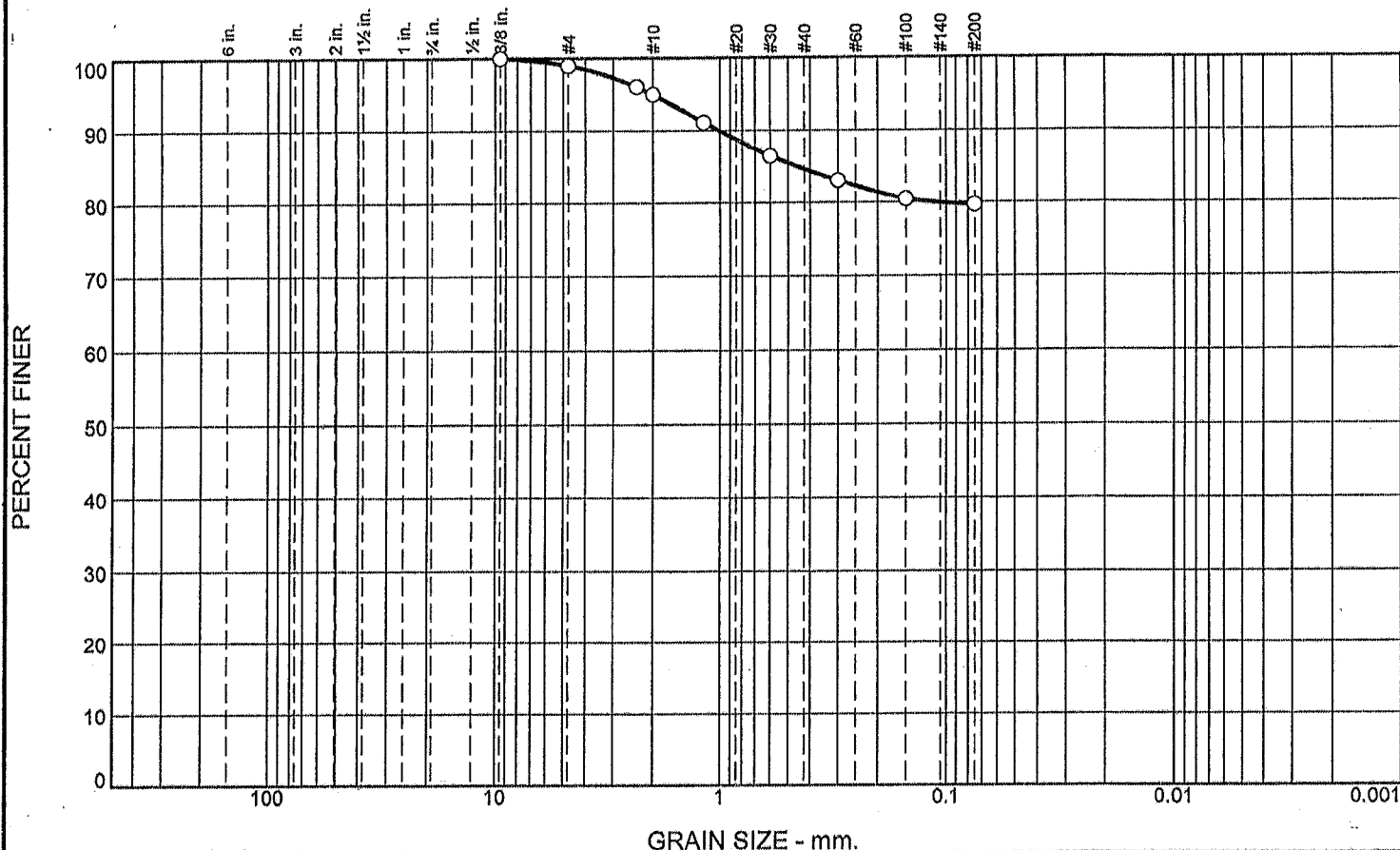
	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	716.37	606.5	154.89	24.3
Middle	858.9	692.7	0.0	24.0
Bottom	921.1	742.9	0.0	24.0

Penetration Test Data

Pen. in.	Dial Reading	Stress psi	CBR %
0.0	0	0.0	
0.025	13.00	13.0	
0.05	26.00	26.0	
0.075	38.00	38.0	
0.1	49.67	49.7	5.0
0.125	58.67	58.7	
0.15	66.33	66.3	
0.175	72.00	72.0	
0.2	75.66	75.7	5.0
0.3	77.67	77.7	
0.4	79.67	79.7	
0.5	81.00	81.0	



Particle Size Distribution Report As per ASTM D-422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.0	4.0	10.4	4.9	79.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	99.0		
#8	96.0		
#10	95.0		
#16	91.1		
#30	86.5		
#50	83.0		
#100	80.5		
#200	79.7		

* (no specification provided)

Material Description

Brown in color. silt with sand

Atterberg Limits

PL= NP

LL= NV

PI= NP

Coefficients

D₉₀= 1.0150

D₈₅= 0.4574

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= ML

AASHTO= A-4(0)

Remarks

Sample was dropped off by client on 01/10/22 and tested on 01/14/22. In-Situ %MC=26.2
F.M.=0.64

Source of Sample: On-Site material
Sample Number: S-1

Date:

ANS CONSULTANTS, INC.

South Plainfield, New Jersey

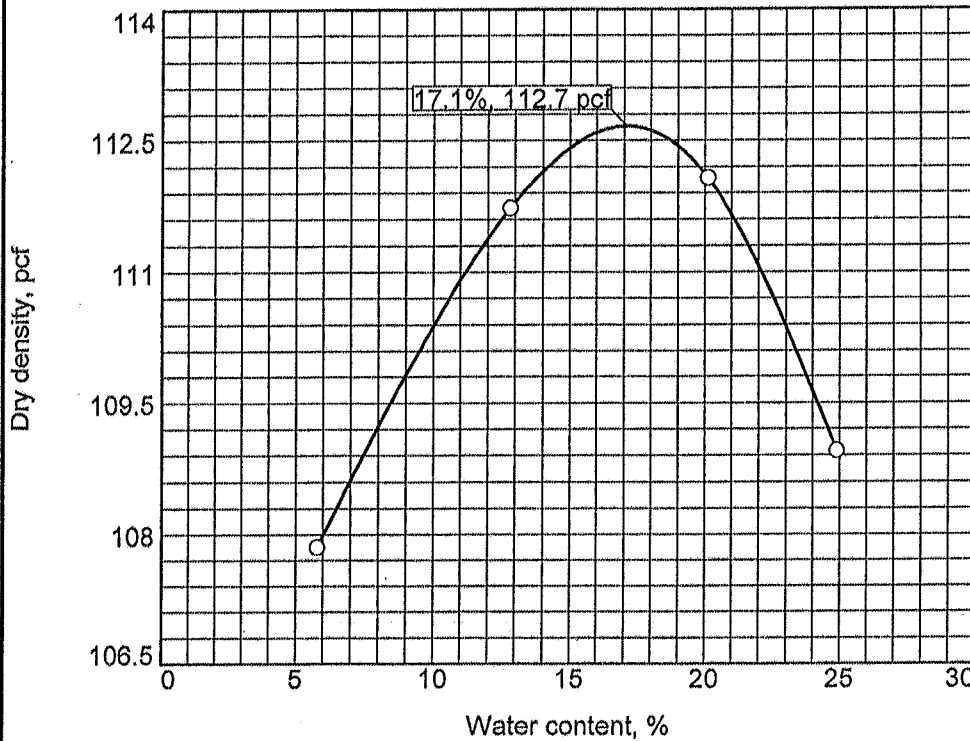
Client: Whitestone Associates, Inc.

Project: Prop. Warehouse, GP2118631.000, US Rte 222 & Schaeffer Rd, Maidencreek Township Berks County, Pennsylvania

Project No: CGZ-496

Figure 1 F 1

COMPACTION TEST REPORT



Curve No.
S-1

Test Specification:

ASTM D 1557-12 Method C Modified

Hammer Wt.: 10 lb.
 Hammer Drop: 18 in.
 Number of Layers: five
 Blows per Layer: 56
 Mold Size: 0.075 cu. ft.

Test Performed on Material

Passing 3/4 in. Sieve

Soil Data

NM _____ Sp.G. _____
 LL NV PI NP
 %>3/4 in. 0.0 %<#200 79.7
 USCS ML AASHTO A-4(0)

TESTING DATA

	1	2	3	4	5	6
WM + WS	22.30	23.20	23.84	23.95		
WM	13.75	13.75	13.75	13.75		
WW + T #1	819.9	781.1	769.3	736.4		
WD + T #1	775.1	692.3	640.5	589.7		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	5.8	12.8	20.1	24.9		
DRY DENSITY	107.9	111.7	112.1	109.0		

TEST RESULTS

Maximum dry density = 112.7 pcf

Optimum moisture = 17.1 %

Material Description

Brown in color. silt with sand

Project No. CGZ-496 **Client:** Whitestone Associates, Inc.
Project: Prop. Warehouse, GP2118631.000, US Rte 222 & Schaeffer Rd, Maidencreek Township Berks County, Pennsylvania
Source of Sample: On-Site material **Sample Number:** S-1

ANS CONSULTANTS, INC.

South Plainfield, New Jersey

Remarks:

Sample was dropped off by client on 01/10/22 and tested on 01/13/22.

Figure 1 F 2



APPENDIX C

Infiltration Test Results



Test Hole No.: I-1 @ SWB-1

Date: 12/22 - 12/27/2021

Weather: Sunny

Field Engineer: CS/TJ

Test Depth Ft. Elev.:	2.50	347.50

[illegible]Field $i = 0.0$ in/hr



Test Hole No.:	I-2 @ SWB-2	
Date:	12/22 - 12/27/2021	
Weather:	Sunny	
Field Engineer:	CS/TJ	
Depth Ft. Elev.:	10.00	343.47

[illegible]Field $i = 0.0$ in/hr



Client:	Maiden Creek Assoc., LLP
Project:	Proposed Warehouse
Location:	US Route 222 & Schaeffer Road, Maidencreek Township, PA
File No.	GP2118631.000
Surf. Elev.	350.80

Date: 12/22 - 12/27/2021

Weather: Sunny

Field Engineer: CS/TJ

Test Depth Ft. Elev.:	7.00	343.80

Field $i = 0.0$ in/hr



Test Hole No.:	I-4 @ SWB-4		
Date:	12/22 - 12/27/2021		
Weather:	Sunny		
Field Engineer:	CS/TJ		
Depth Ft. Elev.:	3.00	356.00	

Field $i = 0.0$ in/hr



Test Hole No.:	I-5 @ SWB-5A	
Date:	12/22 - 12/27/2021	
Weather:	Sunny	
Field Engineer:	CS/TJ	
Depth Ft. Elev.:	5.00	355.00

Field $i = 0.0$ in/hr



Test Hole No.:	I-6 @ SWB-6	
Date:	12/22 - 12/27/2021	
Weather:	Sunny	
Field Engineer:	CS/TJ	
Depth Ft. Elev.:	4.00	360.12

[illegible]Field $i = 0.0$ in/hr



INFILTRATION TEST

Test Hole No.: I-7 @ SWB-7A

Date: 12/22 - 12/27/2021

Weather: Sunny

Field Engineer: CS/TJ

Test Depth Ft. Elev.:	17.00	348.00

[illegible]Field $i = 0.0$ in/hr



Client:	Maiden Creek Assoc., LLP
Project:	Proposed Warehouse
Location:	US Route 222 & Schaeffer Road, Maidencreek Township, PA
File No.	GP2118631.000
Surf. Elev.	361.00

Date: 12/22 - 12/27/2021

Weather: Sunny

Field Engineer: CS/TJ

Test Depth Ft. Elev.:	12.00	349.00

Field $i = 0.0$ in/hr



Test Hole No.:	I-9 @ SWB-9A	
Date:	12/22 - 12/27/2021	
Weather:	Sunny	
Field Engineer:	CS/TJ	
Depth Ft. Elev.:	16.00	347.00

[illegible]Field $i = 0.0$ in/hr



Client:	Maiden Creek Assoc., LLP
Project:	Proposed Warehouse
Location:	US Route 222 & Schaeffer Road, Maidencreek Township, PA
File No.	GP2118631.000
Surf. Elev.	360.75

Date: 12/22 - 12/27/2021

Weather: Sunny

Field Engineer: CS/TJ

Test Depth Ft. Elev.:	27.00	333.75

Field $i = 0.0$ in/hr



Test Hole No.:	I-11 @ SPP-1	
Date:	12/22 - 12/27/2021	
Weather:	Sunny	
Field Engineer:	CS/TJ	
Depth Ft. Elev.:	1.00	347.00

Field $i = 0.0$ in/hr



Test Hole No.: I-12 @ SPP-2

Date: 12/22 - 12/27/2021

Weather: Sunny

Field Engineer: CS/TJ

Test Depth Ft. Elev.:	1.00	340.00

[illegible]Field $i = 0.0$ in/hr



INFILTRATION TEST

Client: Maiden Creek Assoc., LLP
Project: Proposed Warehouse
Location: US Route 222 & Schaeffer Road,
Maidencreek Township, PA
File No. GP2118631.000
Surf. Elev. 331.00

Test Hole No.: 1-13 @ SPP-3
Date: 12/22 - 12/27/2021
Weather: Sunny
Field Engineer: CS/TJ
Test Depth Ft. | Elev.: 1.00 | 330.00

Reading No.	Time		Water Level Reading (inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/Hour)
	Start	Finish	Start	Finish			
PS	9:40 AM	10:10 AM	6.0	4.75	1.25	0.5	2.5
PS	10:10 AM	10:40 AM	6.0	5.0	1.0	0.5	2.0
1	10:40 AM	11:10 AM	6.0	5.25	0.75	0.5	1.5
2	11:10 AM	11:40 AM	6.0	5.5	0.5	0.5	1.0
3	11:40 AM	12:10 PM	6.0	5.5	0.5	0.5	1.0
4	12:10 PM	1:40 PM	6.0	5.5	0.5	1.5	0.33
5	1:40 PM	2:10 PM	6.0	5.50	0.5	0.5	1.0

Field $i = 1.00$ in/hr



Client:	Maiden Creek Assoc., LLP
Project:	Proposed Warehouse
Location:	US Route 222 & Schaeffer Road, Maidencreek Township, PA
File No.	GP2118631.000
Surf. Elev.	331.00

Date: 12/22 - 12/27/2021

Weather: Sunny

Field Engineer: CS/TJ

Test Depth Ft. Elev.:	1.00	330.00

Field $i = 1.0$ in/hr



Test Hole No.:	I-16 @ SPP-6	
Date:	12/22 - 12/27/2021	
Weather:	Sunny	
Field Engineer:	CS/TJ	
Depth Ft. Elev.:	1.00	336.00

Field $i = 0.0$ in/hr



Client:	Maiden Creek Assoc., LLP
Project:	Proposed Warehouse
Location:	US Route 222 & Schaeffer Road, Maidencreek Township, PA
File No.	GP2118631.000
Surf. Elev.	335.00

Date: 12/22 - 12/27/2021

Weather: Sunny

Field Engineer: CS/TJ

Test Depth Ft. Elev.:	1.00	334.00

Field $i = 3.0$ in/hr



Test Hole No.:	I-18 @ SPP-8	
Date:	12/22 - 12/27/2021	
Weather:	Sunny	
Field Engineer:	CS/TJ	
Depth Ft. Elev.:	1.00	338.00

Field $i = 3.0$ in/hr



Test Hole No.:	I-19 @ SPP-9		
Date:	12/22 - 12/27/2021		
Weather:	Sunny		
Field Engineer:	CS/TJ		
Depth Ft. Elev.:	1.00	340.00	

Field $i = 2.0$ in/hr



Test Hole No.: I-20 @ SPP-10

Date: 12/22 - 12/27/2021

Weather: Sunny

Field Engineer: CS/TJ

Test Depth Ft. Elev.:	1.00	340.00

[illegible]Field $i = 0.5$ in/hr



INFILTRATION TEST

Client: Maiden Creek Assoc., LLP
Project: Proposed Warehouse
Location: US Route 222 & Schaeffer Road,
Maidencreek Township, PA
File No. GP2118631.000
Surf. Elev. 343.00

Test Hole No.: I-21 @ SPP-11
Date: 12/22 - 12/27/2021
Weather: Sunny
Field Engineer: CS/TJ
Test Depth Ft. | Elev.: 1.00 | 342.00

Reading No.	Time		Water Level Reading (inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/Hour)
	Start	Finish	Start	Finish			
PS	9:40 AM	10:10 AM	6.0	5.5	0.5	0.5	1.0
PS	10:10 AM	10:40 AM	6.0	5.625	0.375	0.5	0.75
1	10:40 AM	11:10 AM	6.0	5.625	0.375	0.5	0.75
2	11:10 AM	11:40 AM	6.0	5.625	0.375	0.5	0.75
3	11:40 AM	12:10 PM	6.0	5.75	0.25	0.5	0.5
4	12:10 PM	12:40 PM	6.0	5.75	0.25	0.5	0.5
5	12:40 PM	1:10 PM	6.0	5.75	0.25	0.5	0.5
6	1:10 PM	1:40 PM	6.0	5.75	0.25	0.5	0.5

Field i = 0.5 in/hr



Test Hole No.:	I-22 @ SPP-12	
Date:	12/22 - 12/27/2021	
Weather:	Sunny	
Field Engineer:	CS/TJ	
Depth Ft. Elev.:	2.00	342.00

[illegible]Field $i = 1.0$ in/hr



Test Hole No.: I-23 @ SPP-13

Date: 12/22 - 12/27/2021

Weather: Sunny

Field Engineer: CS/TJ

Test Depth Ft. Elev.:	1.50	341.50

[illegible]Field $i = 2.0$ in/hr

INFILTRATION TEST

Client: Maiden Creek Assoc., LLP

Test Hole No.: I-24 @ SPP-14

Project: Proposed Warehouse

Date: 12/22 - 12/27/2021

Location: US Route 222 & Schaeffer Road,
Maidencreek Township, PA

Weather: Sunny

File No. GP2118631.000

Field Engineer: CS/TJ

Surf. Elev. 346.20

Test Depth Ft. Elev.:	4.20	342.00

[illegible]Field $i = 0.0$ in/hr



APPENDIX D

Supplemental Information (USCS, Terms & Symbols)



UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION <u>RETAINED</u> ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		CLEAN SAND (LITTLE OR NO FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	SAND AND SANDY SOILS	MORE THAN 50% OF COARSE FRACTION <u>PASSING</u> NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GC
			SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS <u>LESS</u> THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
MORE THAN 50% OF MATERIAL IS <u>SMALLER</u> THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS <u>GREATER</u> THAN 50	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
HIGHLY ORGANIC SOILS			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS* Sand and/or Gravel

RELATIVE DENSITY

LOOSE..... 0% TO 40%
MEDIUM DENSE..... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY* Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

* VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE.
WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.

L:\Geotechnical Forms and References\Reports\USCSTRMSSYM PA.docx

Other Office Locations:

WARREN, NJ
908.668.7777

SOUTHBOROUGH, MA
508.485.0755

ROCKY HILL, CT
860.726.7889

WALL, NJ
732.592.2101

PHILADELPHIA, PA
215.848.2323

GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

- N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

- NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)

Standard Penetration Resistance

Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)

Qu (TSF)

Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

L:\Geotechnical Forms and References\Reports\USCSTRMSSYM PA.docx

Other Office Locations:

WARREN, NJ
908.668.7777

SOUTHBOROUGH, MA
508.485.0755

ROCKY HILL, CT
860.726.7889

WALL, NJ
732.592.2101

PHILADELPHIA, PA
215.848.2323

STORMWATER MANAGEMENT

182 Attachment 2

Township of Maidencreek

Appendix B Stormwater Management Design Criteria

TABLE B-1

REGION 4 – DESIGN STORM RAINFALL AMOUNT

Source: “Field Manual of Pennsylvania Department of Transportation”
STORM INTENSITY-DURATION-FREQUENCY CHARTS
PDT – IDF May 1986.

FIGURE B-1

NRCS TYPE II RAINFALL DISTRIBUTION – S CURVE

Source: NRCS, TR-55, June 1986

FIGURE B-2

PENNDOT DELINEATED REGIONS

Source: “Field Manual of Pennsylvania Department of Transportation”
STORM INTENSITY-DURATION-FREQUENCY CHARTS
PDT-IDF May 1986.

FIGURE B-3

PENNDOT REGION 4 STORM INTENSITY-DURATION-FREQUENCY CURVE

Source: “Field Manual of Pennsylvania Department of Transportation”
STORM INTENSITY-DURATION-FREQUENCY CHARTS
PDT-IDF May 1986.

TABLE B-2

RUNOFF CURVE NUMBERS

Source: NRCS (SCS) TR-55

TABLE B-3

RATIONAL RUNOFF COEFFICIENTS

TABLE B-4

MANNING ROUGHNESS COEFFICIENTS

TABLE B-5

INFILTRATION REQUIREMENTS IN CARBONATE AREAS

MAIDENCREEK CODE

TABLE B-1
DESIGN STORM RAINFALL AMOUNT (INCHES)

The design storm rainfall amount chosen for design should be obtained from the PennDOT region in which the site is located according to Figure B-2.

Source: "Field Manual of Pennsylvania Department of Transportation"
STORM INTENSITY-DURATION-FREQUENCY CHARTS
PDT-IDF May 1986.

Duration	Region 4 Precipitation Depth (inches)							
	1- Year	1.5- Year	2- Year	5- Year	10- Year	25- Year	50- Year	100- Year
5 minutes	0.30	0.33	0.35	0.41	0.45	0.50	0.55	0.61
15 minutes	0.58	0.63	0.68	0.80	0.93	1.03	1.13	1.25
1 hour	1.01	1.12	1.22	1.48	1.70	1.91	2.16	2.41
2 hours	1.24	1.37	1.50	1.84	2.14	2.46	2.80	3.18
3 hours	1.38	1.55	1.71	2.10	2.43	2.82	3.24	3.69
6 hours	1.68	1.86	2.04	2.52	3.06	3.60	4.14	4.74
12 hours	2.04	2.28	2.52	3.00	3.84	4.56	5.16	6.00
24 hours	2.40	2.64	2.88	3.60	4.56	5.76	6.48	7.44

STORMWATER MANAGEMENT

FIGURE B-1
NRCS (SCS) TYPE II RAINFALL DISTRIBUTION – S CURVE

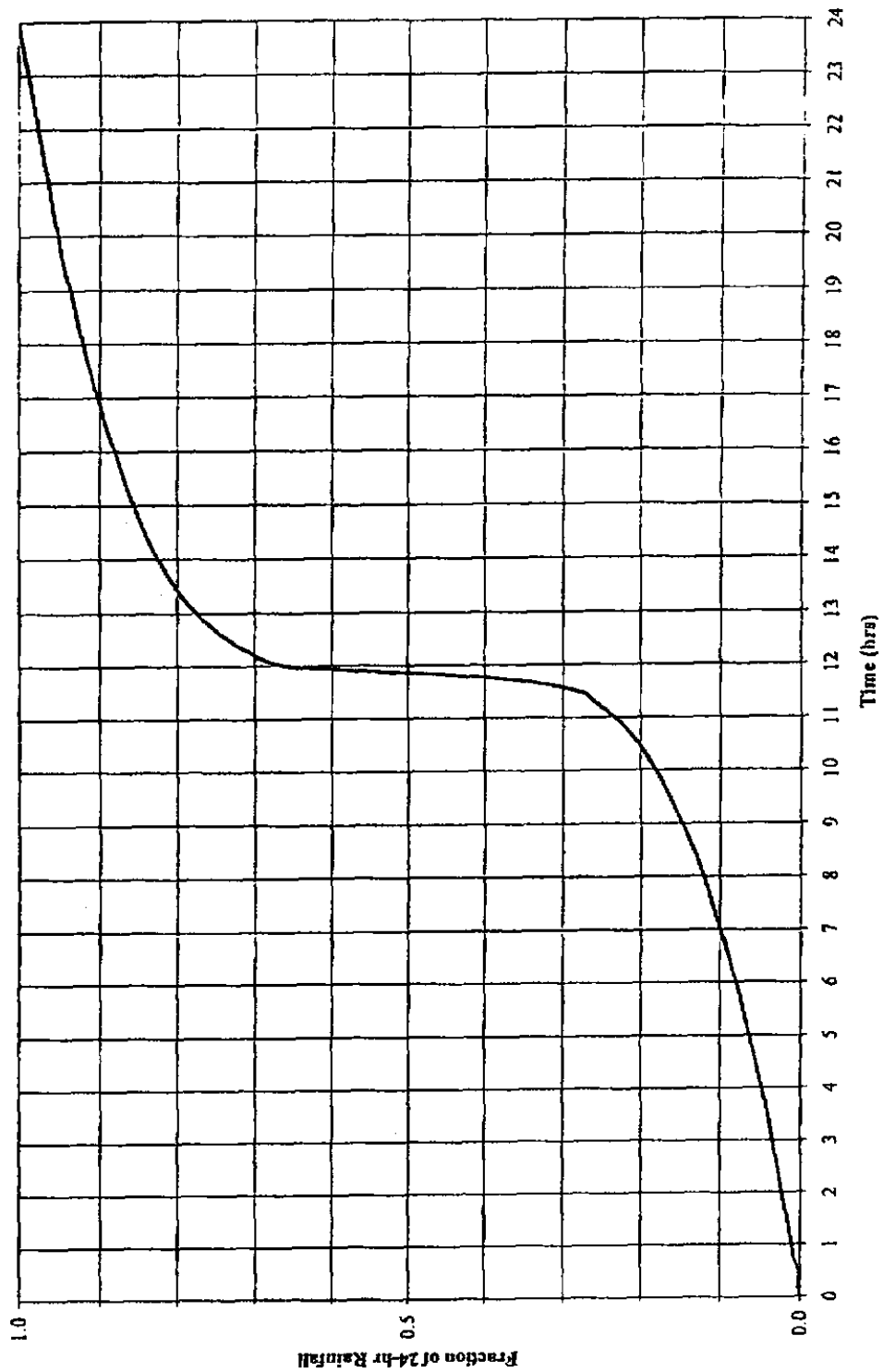
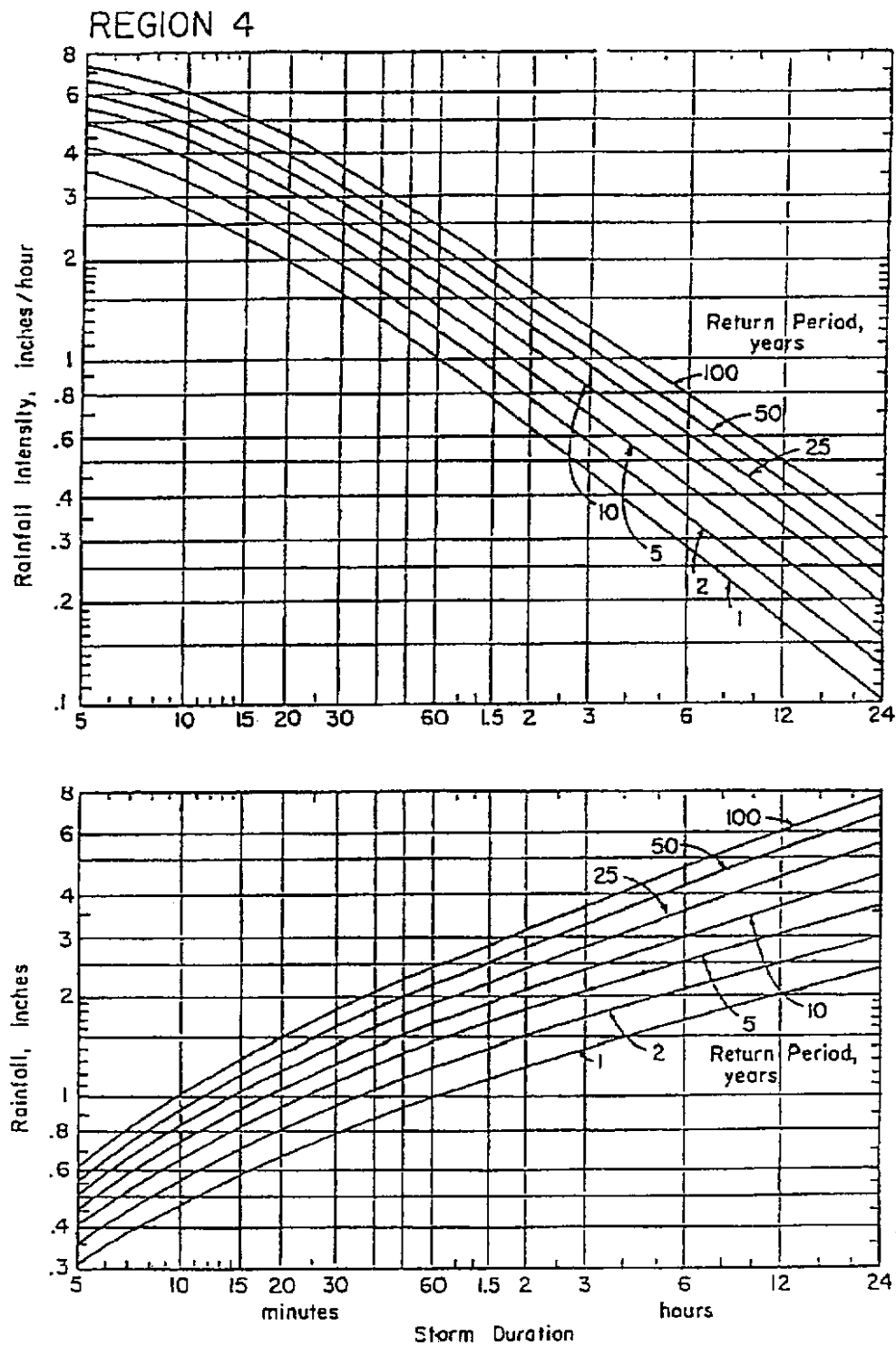


FIGURE B-2
PENNDOT DELINEATED REGIONS



STORMWATER MANAGEMENT

FIGURE B-3
PENNDOT REGION 4 STORM INTENSITY-DURATION-FREQUENCY CURVE



MAIDENCREEK CODE

TABLE B-2
Runoff Curve Numbers
 [From NRCS (SCS) TR-55]

Land Use Description		Hydrologic Soil Group			
		A	B	C	D
Open Space		44	65	77	82
Meadow/orchard		30	58	71	78
Agricultural		59	71	79	83
Forest		36	60	73	79
Commercial	(85% Impervious)	89	92	94	95
Industrial	(72% Impervious)	81	88	91	93
Institutional	(50% Impervious)	71	82	88	90
Residential					
Average Lot Size		% impervious			
1/8 acre or less*	65	77	85	90	92
1/8 to 1/3 acre	34	59	74	82	87
1/3 to 1 acre	23	53	69	80	85
1 to 4 acres	12	46	66	78	82
Farmstead		59	74	82	86
Smooth surfaces (concrete, asphalt, gravel or bare compacted soil)		98	98	98	98
Water		98	98	98	98
Mining/newly graded areas (pervious areas only)		77	86	91	94

* Includes multifamily housing unless justified lower density can be provided.

NOTE: Existing site conditions of bare earth or fallow ground shall be considered as meadow when choosing a CN value.

STORMWATER MANAGEMENT

TABLE B-3
RATIONAL RUNOFF COEFFICIENTS
 By Hydrologic Soils Group and Overland Slope (%)

Land Use	A			B			C			D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Cultivated Land	0.08 ^a	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
	0.14 ^b	0.18	0.22	0.16	0.21	0.28	0.20	0.25	0.34	0.24	0.29	0.41
Pasture	0.12	0.20	0.30	0.18	0.28	0.37	0.24	0.34	0.44	0.30	0.40	0.50
	0.15	0.25	0.37	0.23	0.34	0.45	0.30	0.42	0.52	0.37	0.50	0.61
Meadow	0.10	0.16	0.25	0.14	0.22	0.30	0.20	0.28	0.36	0.24	0.30	0.40
	0.14	0.22	0.30	0.20	0.28	0.37	0.26	0.35	0.44	0.30	0.40	0.50
Forest	0.05	0.08	0.11	0.08	0.11	0.14	0.10	0.13	0.16	0.12	0.16	0.20
	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25
Residential												
Lot size 1/8 Acre	0.25	0.28	0.31	0.27	0.30	0.25	0.30	0.33	0.38	0.33	0.36	0.42
	0.33	0.37	0.40	0.35	0.39	0.44	0.38	0.42	0.49	0.41	0.45	0.54
Lot size 1/4 Acre	0.22	0.26	0.29	0.24	0.29	0.33	0.27	0.31	0.36	0.30	0.34	0.40
	0.30	0.34	0.37	0.33	0.37	0.42	0.36	0.40	0.47	0.38	0.42	0.52
Lot size 1/3 Acre	0.19	0.23	0.26	0.22	0.26	0.30	0.25	0.29	0.34	0.28	0.32	0.39
	0.28	0.32	0.35	0.30	0.35	0.39	0.33	0.38	0.45	0.36	0.40	0.50
Lot size 1/2 Acre	0.16	0.20	0.24	0.19	0.23	0.28	0.22	0.27	0.32	0.26	0.30	0.37
	0.25	0.29	0.32	0.28	0.32	0.36	0.31	0.35	0.42	0.34	0.38	0.48
Lot size 1 Acre	0.14	0.19	0.22	0.17	0.21	0.26	0.20	0.25	0.31	0.24	0.29	0.35
	0.22	0.26	0.29	0.24	0.28	0.34	0.28	0.32	0.40	0.31	0.35	0.46
Industrial	0.67	0.68	0.68	0.68	0.68	0.69	0.68	0.69	0.69	0.69	0.69	0.70
	0.85	0.85	0.86	0.85	0.86	0.86	0.86	0.86	0.87	0.86	0.86	0.88
Commercial	0.71	0.71	0.72	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.90	0.89	0.89	0.90
Streets	0.70	0.71	0.71	0.71	0.72	0.74	0.72	0.73	0.76	0.73	0.75	0.78
	0.76	0.77	0.79	0.80	0.82	0.84	0.84	0.85	0.89	0.89	0.91	0.95
Open space	0.05	0.10	0.14	0.08	0.13	0.19	0.12	0.17	0.24	0.16	0.21	0.28
	0.11	0.16	0.20	0.14	0.19	0.26	0.18	0.23	0.32	0.22	0.27	0.39
Parking	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97

^a Runoff coefficients for storm recurrence intervals less than 25 years.

^b Runoff coefficients for storm recurrence intervals of 25 years or more.

Source: Rawls, W.J., S.L. Wong and R.H. McCuen, 1981, "Comparison of Urban Flood Frequency Procedures," Preliminary Draft, U.S. Department of Agriculture, Soil Conservation Service, Baltimore, MD.

MAIDENCREEK CODE

TABLE B-4
Roughness Coefficients (Manning's "n") for Overland Flow
 (U.S. Army Corps Of Engineers, HEC-1 Users Manual)

Surface Description	n		
		-	
Dense growth	0.4	-	0.5
Pasture	0.3	-	0.4
Lawns	0.2	-	0.3
Bluegrass sod	0.2	-	0.5
Short grass prairie	0.1	-	0.2
Sparse vegetation	0.05	-	0.13
Bare clay-loam soil (eroded)	0.01	-	0.03
Concrete/asphalt			
– very shallow depths (less than 1/4 inch)	0.10	-	0.15
– small depths (1/4 inch to several inches)	0.05	-	0.10

Roughness Coefficients (Manning's "n") for Channel Flow

Reach Description	n
Natural stream, clean, straight, no rifts or pools	0.03
Natural stream, clean, winding, some pools or shoals	0.04
Natural stream, winding, pools, shoals, stony with some weeds	0.05
Natural stream, sluggish deep pools and weeds	0.07
Natural stream or swale, very weedy or with timber underbrush	0.10
Concrete pipe, culvert or channel	0.012
Corrugated metal pipe	0.012 - 0.027 ⁽¹⁾
High density polyethylene (HDPE) pipe	
Corrugated	0.021 - 0.029 ⁽²⁾
Smooth lined	0.012 - 0.020 ⁽²⁾

⁽¹⁾ Depending upon type, coating and diameter.

⁽²⁾ Values recommended by the American Concrete Pipe Association; check manufacturer's recommended value.

STORMWATER MANAGEMENT

**TABLE B-5
INFILTRATION REQUIREMENTS IN CARBONATE AREAS**

Effective Soil Thickness (feet)	Test Pit Density (per acre of proposed infiltration area)*	Percolation Tests (per acre of proposed infiltration area)**	Auger Grid Spacing (feet on-center)
8	4	8	50
4 to 8	6	12	35
2 to 4	8	16	25

* No. of Test Pits required = Infiltration square feet/43,560 x test pit density from chart rounded up to the nearest whole number.

** No. of Percolation Tests required = Infiltration square feet/43,560 x percolation tests from chart rounded up to the nearest whole number.

SUBDIVISION AND LAND DEVELOPMENT

190 Attachment 1

Township of Maidencreek

Rainfall Intensity-Duration-Frequency Chart

Storm Event: Time of Concentration (minutes)	2 Years	10 Years	25 Years	50 Years	100 Years
	Rainfall Intensity (inches/hour)				
5.0	4.191	5.406	5.994	6.609	7.323
6.0	3.940	5.153	5.707	6.278	6.960
7.0	3.727	4.926	5.451	5.988	6.642
8.0	3.542	4.721	5.222	5.732	6.360
9.0	3.380	4.535	5.016	5.503	6.108
10.0	3.236	4.366	4.829	5.296	5.880
11.0	3.107	4.211	4.658	5.109	5.674
12.0	2.990	4.069	4.501	4.938	5.485
13.0	2.884	3.938	4.357	4.781	5.312
14.0	2.787	3.816	4.223	4.636	5.152
15.0	2.698	3.703	4.099	4.502	5.004
16.0	2.615	3.597	3.983	4.377	4.867
17.0	2.539	3.499	3.875	4.260	4.738
18.0	2.468	3.406	3.774	4.151	4.617
19.0	2.401	3.319	3.679	4.049	4.504
20.0	2.339	3.237	3.589	3.953	4.398
21.0	2.280	3.159	3.504	3.862	4.297
22.0	2.225	3.085	3.423	3.776	4.202
23.0	2.173	3.016	3.347	3.694	4.112
24.0	2.124	2.949	3.275	3.617	4.026
25.0	2.077	2.886	3.206	3.543	3.945
26.0	2.033	2.826	3.140	3.473	3.867
27.0	1.991	2.769	3.078	3.406	3.793
28.0	1.950	2.714	3.018	3.343	3.723
29.0	1.912	2.662	2.961	3.281	3.655
30.0	1.875	2.611	2.906	3.223	3.590
31.0	1.840	2.563	2.853	3.167	3.528
32.0	1.807	2.517	2.803	3.113	3.468
33.0	1.775	2.472	2.754	3.061	3.411
34.0	1.744	2.429	2.707	3.011	3.356
35.0	1.714	2.388	2.662	2.963	3.303
36.0	1.686	2.348	2.619	2.917	3.251
37.0	1.658	2.310	2.577	2.872	3.202
38.0	1.632	2.273	2.537	2.829	3.154
39.0	1.606	2.237	2.498	2.788	3.108
40.0	1.582	2.203	2.460	2.748	3.063
41.0	1.558	2.169	2.424	2.709	3.020
42.0	1.535	2.137	2.388	2.671	2.978
43.0	1.513	2.106	2.354	2.634	2.938
44.0	1.491	2.075	2.321	2.599	2.899
45.0	1.470	2.046	2.289	2.565	2.860
46.0	1.450	2.017	2.258	2.531	2.823
47.0	1.430	1.990	2.227	2.499	2.788

MAIDENCREEK CODE

Storm Event:	2 Years	10 Years	25 Years	50 Years	100 Years
Time of Concentration (minutes)	Rainfall Intensity (inches/hour)				
48.0	1.411	1.963	2.198	2.468	2.573
49.0	1.393	1.937	2.169	2.437	2.719
50.0	1.375	1.911	2.142	2.407	2.686
51.0	1.358	1.886	2.115	2.378	2.654
52.0	1.341	1.862	2.088	2.350	2.622
53.0	1.324	1.839	2.063	2.323	2.592
54.0	1.308	1.816	2.038	2.296	2.562
55.0	1.293	1.794	2.013	2.270	2.533
56.0	1.277	1.770	1.990	2.245	2.505
57.0	1.262	1.751	1.966	2.220	2.478
58.0	1.248	1.730	1.944	2.196	2.451
59.0	1.234	1.710	1.922	2.172	2.424
60.0	1.220	1.690	1.900	2.149	2.399

Source: Pennsylvania Department of Transportation, developed by the Department of Engineering of the Pennsylvania State University, October 1986.

Soil Map—Berks County, Pennsylvania



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Berks County, Pennsylvania
Survey Area Data: Version 19, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 19, 2011—Jul 1, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

MAP LEGEND

Area of Interest (AOI)		Soils		Special Point Features		Water Features		Transportation		Background	
	Area of Interest (AOI)		Soil Map Unit Polygons		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points		Streams and Canals		Rails		Aerial Photography
	Soil Map Unit Polygons		Soil Map Unit Lines		Soil Map Unit Points	<					

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BkC	Berks-Weikert complex, 8 to 15 percent slopes	0.1	0.0%
CmA	Clarksburg silt loam, 0 to 3 percent slopes	12.9	2.6%
DbA	Duffield silt loam, 0 to 3 percent slopes	6.0	1.2%
DbB	Duffield silt loam, 3 to 8 percent slopes	367.1	75.0%
DfC	Duffield-Ryder silt loams, 8 to 15 percent slopes	17.3	3.5%
Ho	Holly silt loam	3.3	0.7%
Me	Middlebury silt loam	17.5	3.6%
MuB	Murrill gravelly loam, 3 to 8 percent slopes	0.6	0.1%
UmB	Urban land-Duffield complex, 0 to 8 percent slopes	61.4	12.5%
W	Water	3.3	0.7%
Totals for Area of Interest		489.6	100.0%

PP213222-SWM-3

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 25 Year Rainfall=5.76"

Printed 9/27/2023

Stage-Area-Storage for Pond 1P: ABVG. MRC Basin 1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
335.50	0	338.15	52,561	340.80	258,026
335.55	525	338.20	56,106	340.85	262,248
335.60	1,050	338.25	59,664	340.90	266,482
335.65	1,575	338.30	63,234	340.95	270,728
335.70	2,100	338.35	66,817	341.00	274,988
335.75	2,625	338.40	70,413	341.05	279,260
335.80	3,150	338.45	74,022	341.10	283,545
335.85	3,675	338.50	77,644	341.15	287,843
335.90	4,200	338.55	81,278	341.20	292,154
335.95	4,725	338.60	84,925	341.25	296,477
336.00	5,250	338.65	88,585	341.30	300,813
336.05	5,775	338.70	92,257	341.35	305,162
336.10	6,300	338.75	95,942	341.40	309,524
336.15	6,825	338.80	99,640	341.45	313,898
336.20	7,351	338.85	103,351	341.50	318,285
336.25	7,876	338.90	107,075	341.55	322,685
336.30	8,401	338.95	110,811	341.60	327,098
336.35	8,926	339.00	114,560	341.65	331,523
336.40	9,451	339.05	118,322	341.70	335,961
336.45	9,976	339.10	122,097	341.75	340,412
336.50	10,501	339.15	125,884	341.80	344,876
336.55	11,551	339.20	129,684	341.85	349,353
336.60	12,601	339.25	133,497	341.90	353,842
336.65	13,651	339.30	137,323	341.95	358,344
336.70	14,701	339.35	141,161	342.00	362,859
336.75	15,751	339.40	145,012	342.05	367,386
336.80	16,801	339.45	148,876	342.10	371,926
336.85	17,851	339.50	152,753	342.15	376,479
336.90	18,901	339.55	156,642	342.20	381,045
336.95	19,951	339.60	160,545	342.25	385,624
337.00	21,002	339.65	164,460	342.30	390,215
337.05	22,052	339.70	168,387	342.35	394,819
337.10	23,102	339.75	172,328	342.40	399,436
337.15	24,152	339.80	176,281	342.45	404,066
337.20	25,202	339.85	180,247	342.50	408,708
337.25	26,252	339.90	184,226		
337.30	27,302	339.95	188,218		
337.35	28,352	340.00	192,222		
337.40	29,402	340.05	196,239		
337.45	30,452	340.10	200,269		
337.50	31,502	340.15	204,311		
337.55	32,552	340.20	208,367		
337.60	33,602	340.25	212,435		
337.65	34,652	340.30	216,516		
337.70	35,703	340.35	220,609		
337.75	36,753	340.40	224,716		
337.80	37,803	340.45	228,835		
337.85	38,853	340.50	232,967		
337.90	39,903	340.55	237,112		
337.95	40,953	340.60	241,269		
338.00	42,003	340.65	245,439		
338.05	45,510	340.70	249,622		
338.10	49,029	340.75	253,818		

Weir @ 338.50

PP213222-SWM-3

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 25 Year Rainfall=5.76"

Printed 9/27/2023

Stage-Area-Storage for Pond 2P: ABVG. MRC Basin 2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
327.50	0	332.80	242,030
327.60	978	332.90	250,030
327.70	1,956	333.00	258,082
327.80	2,934	333.10	266,186
327.90	3,912	333.20	274,342
328.00	4,890	333.30	282,550
328.10	5,868	333.40	290,810
328.20	6,845	333.50	299,122
328.30	7,823	333.60	307,486
328.40	8,801	333.70	315,902
328.50	9,779	333.80	324,370
328.60	11,735	333.90	332,890
328.70	13,691	334.00	341,461
328.80	15,647	334.10	350,085
328.90	17,603	334.20	358,761
329.00	19,559	334.30	367,488
329.10	21,514	334.40	376,268
329.20	23,470	334.50	385,099
329.30	25,426	334.60	393,983
329.40	27,382	334.70	402,918
329.50	29,338	334.80	411,906
329.60	31,294	334.90	420,945
329.70	33,249	335.00	430,036
329.80	35,205	335.10	439,179
329.90	37,161	335.20	448,375
330.00	39,117	335.30	457,622
330.10	45,662	335.40	466,921
330.20	52,260	335.50	476,272
330.30	58,909	335.60	485,675
330.40	65,611		
330.50	72,364		
330.60	79,169		
330.70	86,026		
330.80	92,936		
330.90	99,897		
331.00	106,910		
331.10	113,975		
331.20	121,092		
331.30	128,261		
331.40	135,482		
331.50	142,754		
331.60	150,079		
331.70	157,456		
331.80	164,885		
331.90	172,365		
332.00	179,898		
332.10	187,483		
332.20	195,119		
332.30	202,808		
332.40	210,548		
332.50	218,341		
332.60	226,185		
332.70	234,081		

Weir @ 330.50

PP213222-SWM-3

Prepared by Bohler Engineers
HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 25 Year Rainfall=5.76"

Printed 9/27/2023

Stage-Area-Storage for Pond 3P: ABVG. MRC Basin 3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
327.50	0	328.03	4,078	328.56	8,618
327.51	77	328.04	4,155	328.57	8,772
327.52	154	328.05	4,232	328.58	8,926
327.53	231	328.06	4,309	328.59	9,080
327.54	308	328.07	4,386	328.60	9,234
327.55	385	328.08	4,463	328.61	9,388
327.56	462	328.09	4,540	328.62	9,542
327.57	539	328.10	4,617	328.63	9,696
327.58	616	328.11	4,694	328.64	9,850
327.59	693	328.12	4,771	328.65	10,003
327.60	770	328.13	4,848	328.66	10,157
327.61	846	328.14	4,925	328.67	10,311
327.62	923	328.15	5,002	328.68	10,465
327.63	1,000	328.16	5,079	328.69	10,619
327.64	1,077	328.17	5,156	328.70	10,773
327.65	1,154	328.18	5,233	328.71	10,927
327.66	1,231	328.19	5,310	328.72	11,081
327.67	1,308	328.20	5,386	328.73	11,235
327.68	1,385	328.21	5,463	328.74	11,389
327.69	1,462	328.22	5,540	328.75	11,543
327.70	1,539	328.23	5,617	328.76	11,696
327.71	1,616	328.24	5,694	328.77	11,850
327.72	1,693	328.25	5,771	328.78	12,004
327.73	1,770	328.26	5,848	328.79	12,158
327.74	1,847	328.27	5,925	328.80	12,312
327.75	1,924	328.28	6,002	328.81	12,466
327.76	2,001	328.29	6,079	328.82	12,620
327.77	2,078	328.30	6,156	328.83	12,774
327.78	2,155	328.31	6,233	328.84	12,928
327.79	2,232	328.32	6,310	328.85	13,082
327.80	2,309	328.33	6,387	328.86	13,235
327.81	2,385	328.34	6,464	328.87	13,389
327.82	2,462	328.35	6,541	328.88	13,543
327.83	2,539	328.36	6,618	328.89	13,697
327.84	2,616	328.37	6,695	328.90	13,851
327.85	2,693	328.38	6,772	328.91	14,005
327.86	2,770	328.39	6,849	328.92	14,159
327.87	2,847	328.40	6,925	328.93	14,313
327.88	2,924	328.41	7,002	328.94	14,467
327.89	3,001	328.42	7,079	328.95	14,620
327.90	3,078	328.43	7,156	328.96	14,774
327.91	3,155	328.44	7,233	328.97	14,928
327.92	3,232	328.45	7,310	328.98	15,082
327.93	3,309	328.46	7,387	328.99	15,236
327.94	3,386	328.47	7,464	329.00	15,390
327.95	3,463	328.48	7,541	329.01	15,544
327.96	3,540	328.49	7,618	329.02	15,698
327.97	3,617	328.50	7,695	329.03	15,852
327.98	3,694	328.51	7,772	329.04	16,006
327.99	3,771	328.52	7,849	329.05	16,160
328.00	3,848	328.53	7,926	329.06	16,313
328.01	3,924	328.54	8,003	329.07	16,467
328.02	4,001	328.55	8,080	329.08	16,621

Stage-Area-Storage for Pond 3P: ABVG. MRC Basin 3 (continued)

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
329.09	16,775	329.62	24,932	330.15	38,523
329.10	16,929	329.63	25,086	330.16	38,677
329.11	17,083	329.64	25,240	330.17	38,831
329.12	17,237	329.65	25,393	330.18	40,083
329.13	17,391	329.66	25,547	330.19	40,604
329.14	17,545	329.67	25,701	330.20	41,126
329.15	17,698	329.68	25,855	330.21	41,647
329.16	17,852	329.69	26,009	330.22	42,170
329.17	18,006	329.70	26,163	330.23	42,692
329.18	18,160	329.71	26,317	330.24	43,215
329.19	18,314	329.72	26,471	330.25	43,738
329.20	18,468	329.73	26,625	330.26	44,261
329.21	18,622	329.74	26,779	330.27	44,784
329.22	18,776	329.75	26,933	330.28	45,307
329.23	18,930	329.76	27,086	330.29	45,830
329.24	19,084	329.77	27,240	330.30	46,353
329.25	19,238	329.78	27,394	330.31	46,876
329.26	19,391	329.79	27,548	330.32	47,400
329.27	19,545	329.80	27,702	330.33	47,923
329.28	19,699	329.81	27,856	330.34	48,446
329.29	19,853	329.82	28,010	330.35	48,969
329.30	20,007	329.83	28,164	330.36	49,492
329.31	20,161	329.84	28,318	330.37	50,015
329.32	20,315	329.85	28,472	330.38	50,538
329.33	20,469	329.86	28,626	330.39	51,061
329.34	20,623	329.87	28,779	330.40	51,584
329.35	20,777	329.88	28,933	330.41	52,107
329.36	20,930	329.89	29,087	330.42	52,630
329.37	21,084	329.90	29,241	330.43	53,153
329.38	21,238	329.91	29,395	330.44	53,676
329.39	21,392	329.92	29,549	330.45	54,199
329.40	21,546	329.93	29,703	330.46	54,722
329.41	21,700	329.94	29,857	330.47	55,245
329.42	21,854	329.95	30,011	330.48	55,768
329.43	22,008	329.96	30,165	330.49	56,291
329.44	22,162	329.97	30,319	330.50	56,814
329.45	22,315	329.98	30,473	330.51	57,337
329.46	22,469	329.99	30,627	330.52	57,860
329.47	22,623	330.00	30,781	330.53	58,383
329.48	22,777	330.01	30,935	330.54	58,906
329.49	22,931	330.02	31,089	330.55	59,429
329.50	23,085	330.03	31,243	330.56	59,952
329.51	23,239	330.04	31,397	330.57	60,475
329.52	23,393	330.05	31,551	330.58	60,998
329.53	23,547	330.06	31,705	330.59	61,521
329.54	23,701	330.07	31,859	330.60	62,044
329.55	23,855	330.08	32,013	330.61	62,567
329.56	24,009	330.09	32,167	330.62	63,090
329.57	24,163	330.10	32,321	330.63	63,613
329.58	24,317	330.11	32,475	330.64	64,136
329.59	24,471	330.12	32,629	330.65	64,659
329.60	24,625	330.13	32,783	330.66	65,182
329.61	24,779	330.14	32,937	330.67	65,705

Orifice @
330.25

PP213222-SWM-3

Prepared by Bohler Engineers
HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 25 Year Rainfall=5.76"

Printed 9/27/2023

Stage-Area-Storage for Pond 3P: ABVG. MRC Basin 3 (continued)

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
330.68	66,654	331.21	95,989	331.74	126,527
330.69	67,197	331.22	96,532	331.75	127,070
330.70	67,740	331.23	97,075	331.76	127,613
330.71	68,283	331.24	97,618	331.77	128,156
330.72	68,826	331.25	98,161	331.78	128,699
330.73	69,369	331.26	98,704	331.79	129,242
330.74	69,912	331.27	99,247	331.80	129,785
330.75	70,455	331.28	99,790	331.81	130,328
330.76	71,000	331.29	100,333	331.82	130,871
330.77	71,543	331.30	100,876	331.83	131,414
330.78	72,086	331.31	101,419	331.84	131,957
330.79	72,629	331.32	101,962	331.85	132,500
330.80	73,172	331.33	102,505	331.86	133,043
330.81	73,715	331.34	103,048	331.87	133,586
330.82	74,258	331.35	103,591	331.88	134,129
330.83	74,801	331.36	104,134	331.89	134,672
330.84	75,344	331.37	104,677	331.90	135,215
330.85	75,887	331.38	105,220	331.91	135,758
330.86	76,430	331.39	105,763	331.92	136,301
330.87	76,973	331.40	106,306	331.93	136,844
330.88	77,516	331.41	106,849	331.94	137,387
330.89	78,059	331.42	107,392	331.95	137,930
330.90	78,602	331.43	107,935	331.96	138,473
330.91	79,145	331.44	108,478	331.97	139,016
330.92	79,688	331.45	109,021	331.98	139,559
330.93	80,231	331.46	109,564	331.99	140,102
330.94	80,774	331.47	110,107	332.00	140,645
330.95	81,317	331.48	110,650	332.01	141,188
330.96	81,860	331.49	111,193	332.02	141,731
330.97	82,403	331.50	111,736	332.03	142,274
330.98	82,946	331.51	112,279	332.04	142,817
330.99	83,489	331.52	112,822	332.05	143,360
331.00	84,032	331.53	113,365	332.06	143,903
331.01	84,575	331.54	113,908	332.07	144,446
331.02	85,118	331.55	114,451	332.08	144,989
331.03	85,661	331.56	114,994	332.09	145,532
331.04	86,204	331.57	115,537	332.10	146,075
331.05	86,747	331.58	116,080	332.11	146,618
331.06	87,290	331.59	116,623	332.12	147,161
331.07	87,833	331.60	117,166	332.13	147,704
331.08	88,376	331.61	117,709	332.14	148,247
331.09	88,919	331.62	118,252	332.15	148,790
331.10	89,462	331.63	118,795	332.16	149,333
331.11	90,005	331.64	119,338	332.17	149,876
331.12	90,548	331.65	119,881	332.18	150,419
331.13	91,091	331.66	120,424	332.19	150,962
331.14	91,634	331.67	120,967	332.20	151,505
331.15	92,177	331.68	121,510	332.21	152,048
331.16	92,720	331.69	122,053	332.22	152,591
331.17	93,263	331.70	122,596	332.23	153,134
331.18	93,806	331.71	123,139	332.24	153,677
331.19	94,349	331.72	123,682	332.25	154,220
331.20	94,892	331.73	124,225	332.26	154,763

PP213222-SWM-3

Prepared by Bohler Engineers
HydroCAD® 10.20-2g s/n

PP213222-SWM-3

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 25 Year Rainfall=5.76"

Printed 9/27/2023

Stage-Area-Storage for Pond 3P: ABVG. MRC Basin 3 (continued)

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
333.86	260,714	334.39	297,269	334.92	335,028
333.87	261,393	334.40	297,971	334.93	335,752
333.88	262,072	334.41	298,672	334.94	336,477
333.89	262,751	334.42	299,375	334.95	337,201
333.90	263,431	334.43	300,077	334.96	337,927
333.91	264,111	334.44	300,780	334.97	338,652
333.92	264,792	334.45	301,484	334.98	339,379
333.93	265,473	334.46	302,187	334.99	340,105
333.94	266,155	334.47	302,892	335.00	340,832
333.95	266,837	334.48	303,596	335.01	341,560
333.96	267,519	334.49	304,302	335.02	342,287
333.97	268,202	334.50	305,007	335.03	343,016
333.98	268,885	334.51	305,713	335.04	343,744
333.99	269,569	334.52	306,420	335.05	344,473
334.00	270,253	334.53	307,126	335.06	345,203
334.01	270,938	334.54	307,834	335.07	345,933
334.02	271,623	334.55	308,541	335.08	346,663
334.03	272,308	334.56	309,250	335.09	347,394
334.04	272,994	334.57	309,958	335.10	348,126
334.05	273,681	334.58	310,667	335.11	348,857
334.06	274,367	334.59	311,377	335.12	349,589
334.07	275,054	334.60	312,086	335.13	350,322
334.08	275,742	334.61	312,797	335.14	351,055
334.09	276,430	334.62	313,507	335.15	351,788
334.10	277,118	334.63	314,219	335.16	352,522
334.11	277,807	334.64	314,930	335.17	353,257
334.12	278,497	334.65	315,642	335.18	353,991
334.13	279,186	334.66	316,355	335.19	354,726
334.14	279,876	334.67	317,067	335.20	355,462
334.15	280,567	334.68	317,781	335.21	356,198
334.16	281,258	334.69	318,494	335.22	356,934
334.17	281,949	334.70	319,209	335.23	357,671
334.18	282,641	334.71	319,923	335.24	358,408
334.19	283,334	334.72	320,638	335.25	359,146
334.20	284,026	334.73	321,354	335.26	359,884
334.21	284,719	334.74	322,069	335.27	360,623
334.22	285,413	334.75	322,786	335.28	361,362
334.23	286,107	334.76	323,502	335.29	362,101
334.24	286,802	334.77	324,220	335.30	362,841
334.25	287,496	334.78	324,937	335.31	363,581
334.26	288,192	334.79	325,655	335.32	364,322
334.27	288,887	334.80	326,374	335.33	365,063
334.28	289,584	334.81	327,092	335.34	365,805
334.29	290,280	334.82	327,812	335.35	366,547
334.30	290,977	334.83	328,531	335.36	367,289
334.31	291,675	334.84	329,252	335.37	368,032
334.32	292,372	334.85	329,972	335.38	368,775
334.33	293,071	334.86	330,693	335.39	369,519
334.34	293,769	334.87	331,415	335.40	370,263
334.35	294,469	334.88	332,136	335.41	371,008
334.36	295,168	334.89	332,859	335.42	371,753
334.37	295,868	334.90	333,581	335.43	372,498
334.38	296,569	334.91	334,305	335.44	373,244

PP213222-SWM-3

Prepared by Bohler Engineers

HydroCAD® 10.20-2g s/n 03478 © 2022 HydroCAD Software Solutions LLC

Type II 24-hr 25 Year Rainfall=5.76"

Printed 9/27/2023

Stage-Area-Storage for Pond 3P: ABVG. MRC Basin 3 (continued)

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
335.45	373,990	335.98	414,156
335.46	374,737	335.99	414,925
335.47	375,484	336.00	415,695
335.48	376,232		
335.49	376,980		
335.50	377,728		
335.51	378,477		
335.52	379,226		
335.53	379,976		
335.54	380,726		
335.55	381,477		
335.56	382,228		
335.57	382,979		
335.58	383,731		
335.59	384,483		
335.60	385,236		
335.61	385,989		
335.62	386,742		
335.63	387,496		
335.64	388,251		
335.65	389,006		
335.66	389,761		
335.67	390,517		
335.68	391,273		
335.69	392,029		
335.70	392,786		
335.71	393,544		
335.72	394,302		
335.73	395,060		
335.74	395,819		
335.75	396,578		
335.76	397,337		
335.77	398,097		
335.78	398,858		
335.79	399,618		
335.80	400,380		
335.81	401,141		
335.82	401,904		
335.83	402,666		
335.84	403,429		
335.85	404,192		
335.86	404,956		
335.87	405,721		
335.88	406,485		
335.89	407,250		
335.90	408,016		
335.91	408,782		
335.92	409,548		
335.93	410,315		
335.94	411,082		
335.95	411,850		
335.96	412,618		
335.97	413,387		