Received
Town of Eagle
2/5/2025

Long Meadow

Town of Eagle
Waukesha County, Wisconsin

Storm Water Management Plan

Prepared by:

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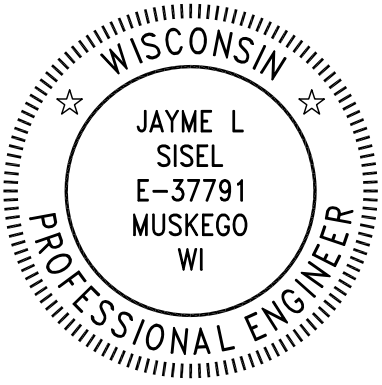

January 31, 2025

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Introduction

"Long Meadow" is a proposed 19-lot residential subdivision on a 79-acre parcel located east of Sprague Road and south of Whitetail Drive, in the Town of Eagle, Waukesha County, Wisconsin.

This report documents the design computations for existing and proposed conditions and presents a plan for stormwater management that meets the requirements of the Town of Eagle and the Wisconsin Department of Natural Resources (WDNR).

Owner/ Developer

The owner, developer, and responsible entity for installation and maintenance of the stormwater management practices is:

Bielinski Homes, Inc.
1830 Meadow Lane, Suite A
Pewaukee, Wisconsin 53072
Contact: John Donovan
Phone: (262) 548-5570

Design Requirements

The following design standards have been used to develop the stormwater management plan for the "Long Meadow" project:

- Town of Eagle: Ordinance No. 07-08, Stormwater Management Ordinance
- Wisconsin Department of Natural Resources (WDNR) Technical Standards, NR151, and NR216
- Summary of design requirements:
  - Peak Discharge:
    - The peak flow discharge rates of stormwater runoff from the site under the post-development site conditions shall not exceed the rates under the pre-development conditions for the 1, 2, 10, and 100-yr, 24-hr design storms.
  - Water Quality (Total Suspended Solids): Reduce to the maximum extent practicable the total suspended solids load by 80% for new development sites, based on an average annual rainfall, as compared to no runoff management controls.
  - Infiltration: For residential developments one of the following shall be met:
    - Infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 90% of the pre-development infiltration volume, based on an average annual rainfall.
    - No more than 1% of the project site is required as an effective infiltration area.

Analysis Overview

The Stormwater Management Plan for the "Long Meadow" subdivision has been designed in accordance with the Town of Eagle's requirements and all applicable state requirements. Existing and proposed stormwater runoff conditions for the site were analyzed for**:** runoff volume, peak volume, discharge, detention basin storage capacity required, outlet structure and storm sewer system requirements. The software package used for modeling and analysis was HydroCAD Version 10.10 software by HydroCAD Software Solutions. HydroCAD uses NRCS methods to generate runoff and pond routing hydrographs. The model's capabilities include modeling simple drainage basins, combining hydrographs to determine runoff and storage requirements, and detention basin and outlet structure sizing.

MSE3 rainfall distributions were used for modeling the 1, 2, 10 and 100-year, 24-hour storm events. The corresponding rainfall data used for modeling was taken from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency Tables for Wisconsin Counties and is shown in the following table.

TABLE 1
Design Rainfall Values

Storm Recurrence Interval	24-hour Rainfall Depths
1-year	2.40 inches
2-year	2.70 inches
10-year	3.81 inches
100-year	6.18 inches

Soil types for the site were determined from the NRCS Soil Survey Maps for Waukesha County. The Soil Survey identifies the soils at the site as mostly Type B soils (Warsaw loam, Lorenzo loam, and Casco-Rodman complex) with limited areas of Type B/D soils (Adrian muck) and Type C soils (Kane silt loam and Fox sandy loam). Based on this, a hydrologic soil group Type B was used to determine the runoff curve numbers for the site.

Pre-Development Watershed Description

The existing site encompasses a 79-acre parcel located east of Sprague Road and south of Whitetail Drive, in the Town of Eagle. The existing site is comprised of vacant cultivated fields with some areas of intermittent trees and a wetland. Surface drainage is generally towards the existing wetland located at the southeast corner of the property. The entire site is tributary to Jericho Creek which discharges to the Mukwonago River.

Figure 1, Pre-Development Conditions Plan, shows the location of the project site, land cover types, drainage subareas and flow paths. The following table summarizes the results of the stormwater model for pre-development conditions. Detailed hydrological computations are included in Appendix A.

TABLE 2
Pre-Development Site Conditions

Subarea or Junction	Description	Total Area (acres)	Impervious Area (acres)	Time of Conc. (min.)	Peak Flow Rate (cfs)			
					1-year	2-year	10-year	100-year
1	Subarea	4.80	0.00	19	1.35	2.09	5.58	15.10
1D	Existing Depression	-	-	-	0.00	0.00	0.00	2.96
2	Subarea	0.99	0.00	14	0.32	0.50	1.33	3.56
2D	Existing Depression	-	-	-	0.00	0.00	0.00	0.00
3	Subarea	21.39	0.00	29	4.84	7.38	19.61	53.53
3D	Existing Depression	-	-	-	0.66	2.19	12.29	41.65
4	Subarea	4.63	0.00	18	1.34	2.08	5.52	14.94
4D	Existing Depression	-	-	-	0.00	0.00	0.00	1.13
5	Subarea	44.32	0.00	25	7.03	11.70	35.97	107.57
6	Subarea	3.60	0.00	13	1.25	1.93	5.15	13.83
1L	Link – Drains South	-	-	-	0.66	2.19	12.29	43.63
2L	Link – Drains East	-	-	-	7.03	11.70	35.97	107.57
3L	Link – Drains West to Sprague	-	-	-	1.25	1.93	5.15	13.83
99	**Total Outflow**	**79.73**	**0.00**	**-**	**7.75**	**12.77**	**42.42**	**144.32**

Post-Development Site Drainage Description

The proposed development is a single-family residential subdivision comprised of nineteen (19) lots and new public roads. Calculations for the subdivision are based on a 5,200 square-foot impervious footprint per lot. General assumptions were made for the types of impervious development per lot and are as follows: 20% drive, 20% sidewalk/patio, and 60% roof.

Stormwater management for the development will be provided by three (3) bioretention basins. The proposed development plan will disturb approximately 68.35 acres of area and will result in a net increase in impervious area of approximately 4.57 acres.

Figure 2, Post-Development Conditions Plan, shows the proposed land cover, grading, drainage boundaries, flow paths, and proposed site and stormwater management improvements. The following table summarizes the results of the hydrologic analysis for post-development conditions. Detailed hydrological computations are included in Appendix B.

TABLE 3
Post-Development Site Conditions

Subarea, Junction or Pond	Description	Total Area (acres)	Impervious Area (acres)	Time of Conc. (min.)	Peak Flow Rate (cfs)			
					1-year	2-year	10-year	100-year
1	Subarea	30.11	1.72	27	3.85	6.59	21.45	66.59
1B	Bioretention Basin	-	-	-	0.00	0.00	0.70	5.26
2	Subarea	6.21	0.84	17	1.86	2.86	7.60	20.65
2B	Bioretention Basin	-	-	-	0.00	0.00	0.45	1.28
3	Subarea	20.42	1.17	25	2.26	4.02	14.03	45.18
3B	Bioretention Basin	-	-	-	0.00	0.00	0.38	12.16
4	Subarea	1.56	0.30	23	0.40	0.62	1.65	4.48
5	Subarea	18.74	0.24	26	1.10	2.22	9.60	35.26
6	Subarea	2.69	0.30	15	0.53	0.91	2.87	8.48
1L	Link – Drains East	-	-	-	1.40	2.73	11.10	40.81
2L	Link – Drains West to Sprague	-	-	-	0.53	0.91	2.87	8.48
99	**Total Outflow**	**79.73**	**4.57**	**-**	**1.75**	**3.31**	**12.96**	**46.07**

Stormwater Detention Basin Design & Summary

The Stormwater Management Plan proposes three (3) bioretention basins as the primary means of stormwater management for the site. The basins have been designed with 4:1 side slopes, an 10-foot top of berm width, and overflow spillways set above the 100-year high water level.

Figure 2, Post-Development Conditions Plan, shows the location of the project site, land cover types, drainage subareas, flow paths, and proposed stormwater management improvements. The following table summarizes the results of the stormwater model for post-development conditions. Detailed hydrological computations are included in Appendix B.

TABLE 4
Post-Development Site Conditions

Bioretention Basin 1B

Basin Details:
Bottom elevation = 929.5
Top of engineered soil elevation = 930.5
Top of berm elevation = 935.2

Outlet Control:
0.50 in/hr native infiltration rate, WDNR Tech Stand 1002
6-inch diameter orifice at I.E. 931.0
36-inch horizontal grate at elevation 933.5
12-inch outlet pipe at I.E. 931.0
10-foot spillway = 934.0

	1-year Storm	2-year Storm	10-year Storm	100-year Storm
Peak Inflow (cfs)	3.85	6.59	21.45	66.59
Peak Outflow (cfs)	0.00	0.00	0.70	5.26
Max Water Surface Elev.	930.58	930.84	931.80	933.83
Max Storage Volume (ac-ft)	0.28	0.49	1.37	3.76

Bioretention Basin 2B

Basin Details:
Bottom elevation = 926.0
Top of engineered soil elevation = 927.0
Top of berm elevation = 934.0

Outlet Control:
0.50 in/hr native infiltration rate, WDNR Tech Stand 1002
6-inch diameter orifice at I.E. 927.5
36-inch horizontal grate at elevation 930.0
12-inch outlet pipe at I.E. 927.5
10-foot spillway = 932.0

	1-year Storm	2-year Storm	10-year Storm	100-year Storm
Peak Inflow (cfs)	1.86	2.86	7.60	20.65
Peak Outflow (cfs)	0.00	0.00	0.45	1.28
Max Water Surface Elev.	927.10	927.31	927.97	929.59
Max Storage Volume (ac-ft)	0.09	0.14	0.32	0.86

Bioretention Basin 3B

System Details:
Bottom elevation = 909.0
Top of engineered soil elevation = 910.0
Top of berm elevation = 913.4

Outlet Control:
0.50 in/hr native infiltration rate, WDNR Tech Stand 1002
12-inch outlet pipe at I.E. 910.9
4-foot sharp-crested weir at elevation 911.50
10-foot spillway = 912.4

	1-year Storm	2-year Storm	10-year Storm	100-year Storm
Peak Inflow (cfs)	2.26	4.02	14.03	46.06
Peak Outflow (cfs)	0.00	0.00	0.38	12.16
Max Water Surface Elev.	910.17	910.43	911.35	912.37
Max Storage Volume (ac-ft)	0.15	0.26	0.89	1.80

Peak Discharge Summaries

The stormwater management system will maintain post-development peak discharge rates to be no greater than pre-development discharge rates for the 1, 2, 10, and 100-year, 24-hour design storms. This is in accordance with the Town of Eagle's stormwater discharge criteria. The following table compares the results of the analysis from a peak discharge standpoint.

TABLE 5
Comparison of Peak Discharge

Area Draining South			
	Pre-Development (Link 1L)		Post-Development (none)
1-year	0.66 cfs	>	0.00 cfs
2-year	2.19 cfs	>	0.00 cfs
10-year	12.29 cfs	>	0.00 cfs
100-year	43.63 cfs	>	0.00 cfs
Area Draining East			
	Pre-Development (Link 2L)		Post-Development (Link 1L)
1-year	7.03 cfs	>	1.40 cfs
2-year	11.70 cfs	>	2.73 cfs
10-year	35.97 cfs	>	11.10 cfs
100-year	107.57 cfs	>	40.81 cfs
Area Draining West			
	Pre-Development (Link 3L)		Post-Development (Link 2L)
1-year	1.25 cfs	>	0.53 cfs
2-year	1.93 cfs	>	0.91 cfs
10-year	5.15 cfs	>	2.87 cfs
100-year	13.83 cfs	>	8.48 cfs

Water Quality

The Town of Eagle requires new development sites to be designed to remove 80 percent of TSS, based on an average annual rainfall as compared to no runoff management controls. Stormwater quality was analyzed using winSLAMM Version 10.5.0 software, developed by Robert Pitt and John Voorhees. The results of the winSLAMM analysis indicate that approximately 82.4 percent of TSS will be removed from stormwater as a result of the proposed bioretention basins. In addition, approximately 79.6 percent of TSS will be removed. Detailed computations are included in Appendix C.

Infiltration

The Town of Eagle requires low imperviousness developments to infiltrate sufficient runoff volume so that the post-development infiltration volume is at least 90% of the pre-development infiltration

volume, based on an average annual rainfall. However, no more than 1% of the project site is required as an effective infiltration area.

The development plan will disturb approximately 68.35 acres of area. In accordance with the Town's ordinance, the maximum effective infiltration area required is approximately 0.68 acres (1% of the project site). The three proposed bioretention basins will provide a total effective infiltration area of approximately 1.42 acres which exceeds the 1% requirement. Based on this, the site meets the requirements for infiltration.

Conclusion

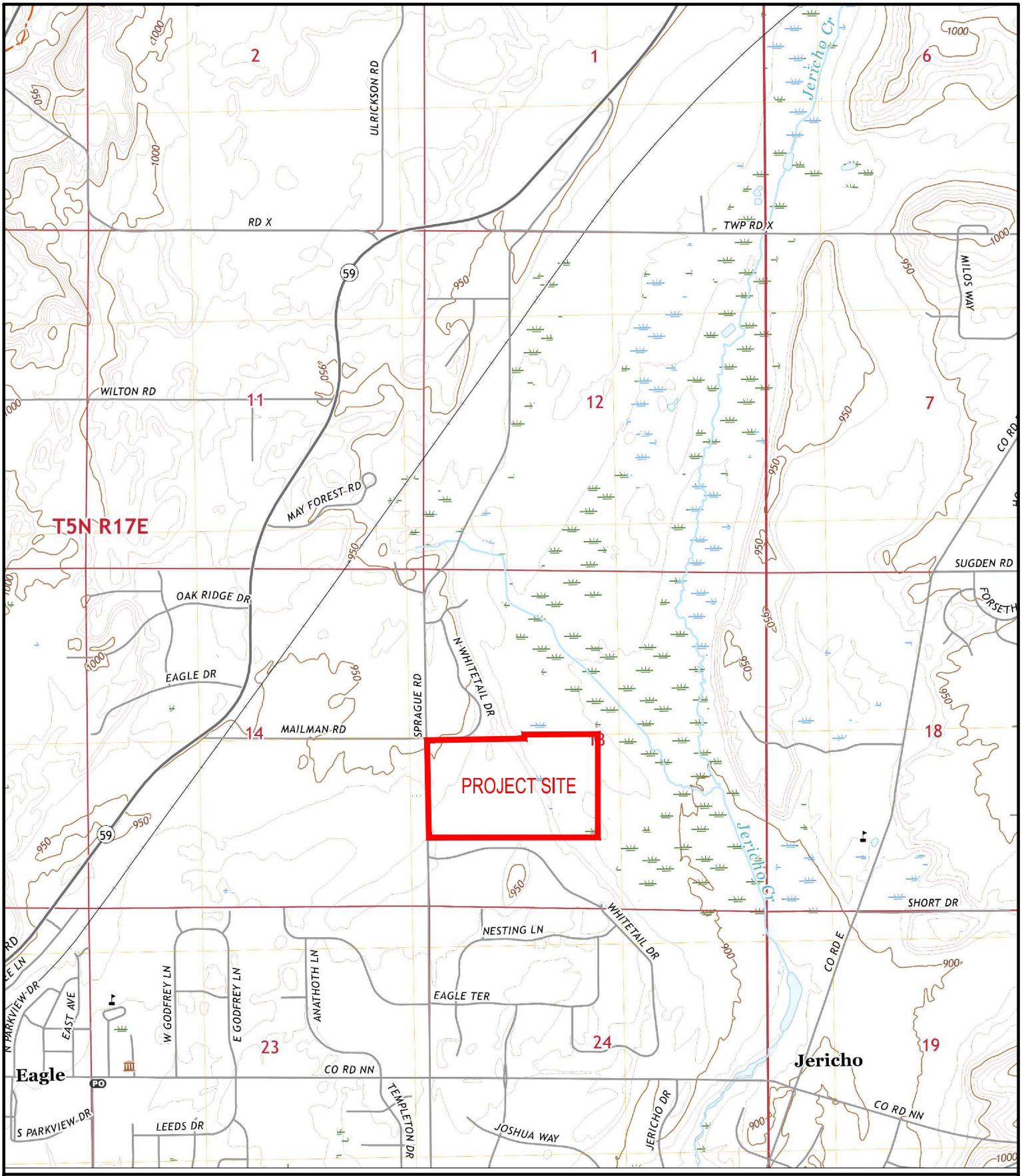
The proposed development will maintain compliance with the Town of Eagle and the WDNR's requirements for control of stormwater quantity, quality, and infiltration. We request, on behalf of Bielinski Homes, approval of this Stormwater Management Plan to allow for construction of the Eagle Pointe subdivision development.

Prepared by:

SOUND STORMWATER DESIGN LLC

Jayme Sisel, P.E.

FIGURES



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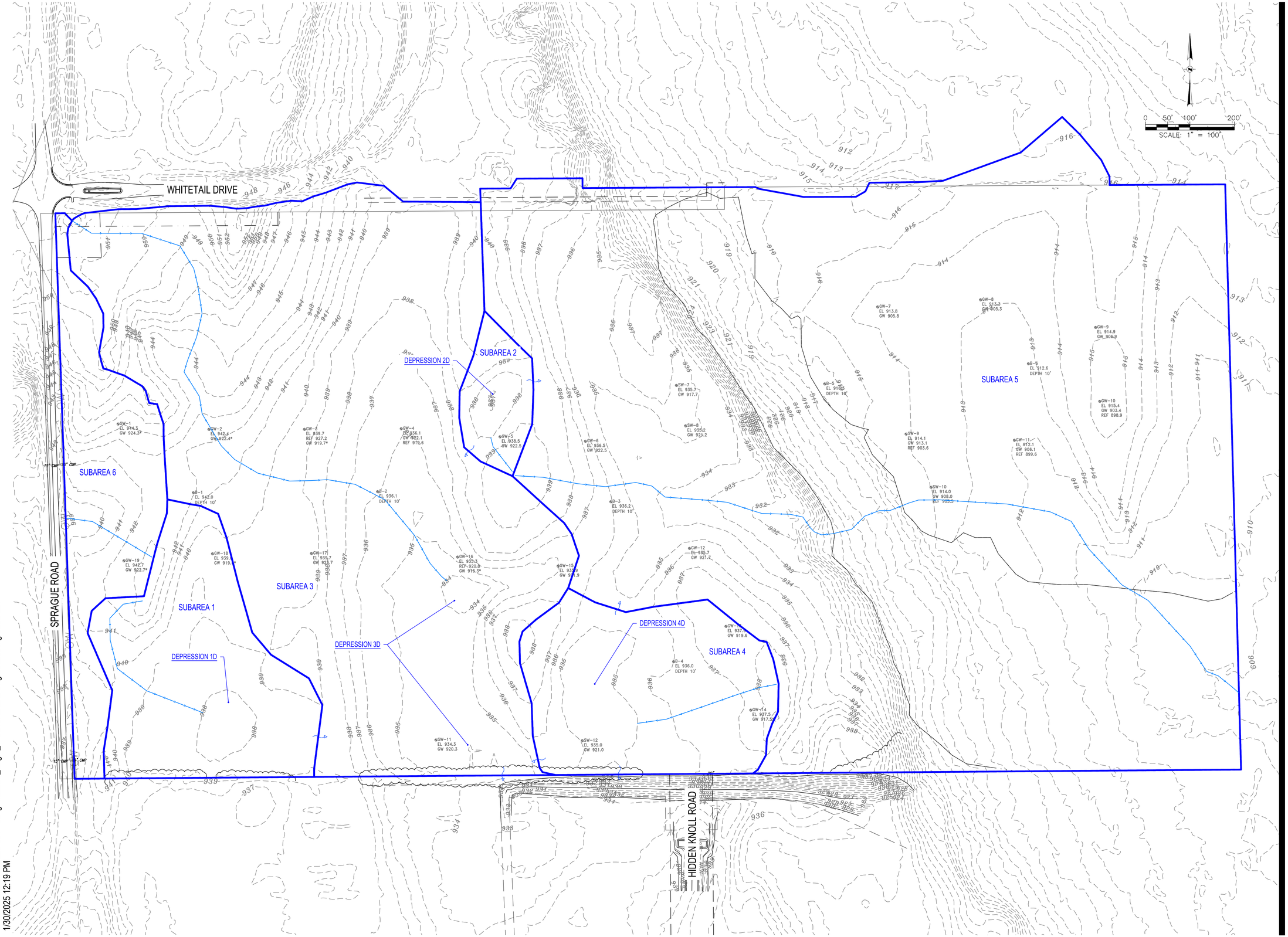
FEET

FIGURE 1

SITE LOCATION MAP

LONG MEADOW
TOWN OF EAGLE, WI

SOUND STORMWATER DESIGN



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SOUND STORMWATER DESIGN

Copper Oaks Ct.
Muskego, WI 53150
414.286.4739
jayme.sisel@soundstormwater.com

CLIENT:
BIELINSKI HOMES, INC.
1830 MEADOW LANE, SUITE A
PEWAUKEE, WISCONSIN 53072

PROJECT TITLE:
LONG MEADOW SUBDIVISION
TOWN OF EAGLE, WISCONSIN

DATE: 01-31-25

JOB NO: 2025-001

SHEET TITLE:
PRE-DEVELOPMENT CONDITIONS PLAN

FIGURE:
3

WHITETAIL DRIVE

SPRAGUE ROAD

HIDDEN KNOLL ROAD

SUBAREA 1

SUBAREA 2

SUBAREA 3

SUBAREA 4

SUBAREA 5

SUBAREA 6

BASIN 1B
TOP=935.2
SPILLWAY=934.0
TOP OF SOIL=930.5
BOTTOM=929.5

BASIN 2B
TOP=934.0
SPILLWAY=932.0
TOP OF SOIL=927.0
BOTTOM=926.0

BASIN 3B
TOP=913.4
SPILLWAY=912.4
TOP OF SOIL=910.0
BOTTOM=909.0

1 130693 SF
2 130702 SF
3 130691 SF
4 130694 SF
5 130911 SF
6 130823 SF
7 145638 SF
8 132496 SF
9 135738 SF
10 132462 SF
11 126822 SF
12 132581 SF
13 135703 SF
14 153185 SF
15 130763 SF
16 131813 SF
17 130792 SF
18 130859 SF
19 130857 SF
O.L. #1 159849 SF
O.L. #2 379912 SF
O.L. #3 117729 SF
O.L. #4 9303 SF

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SOUND STORMWATER DESIGN

Copper Oaks Ct.
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CLIENT:
BIELINSKI HOMES, INC.
1830 MEADOW LANE, SUITE A
PEWAUKEE, WISCONSIN 53072

PROJECT TITLE:
LONG MEADOW SUBDIVISION
TOWN OF EAGLE, WISCONSIN

DATE: 01-31-25

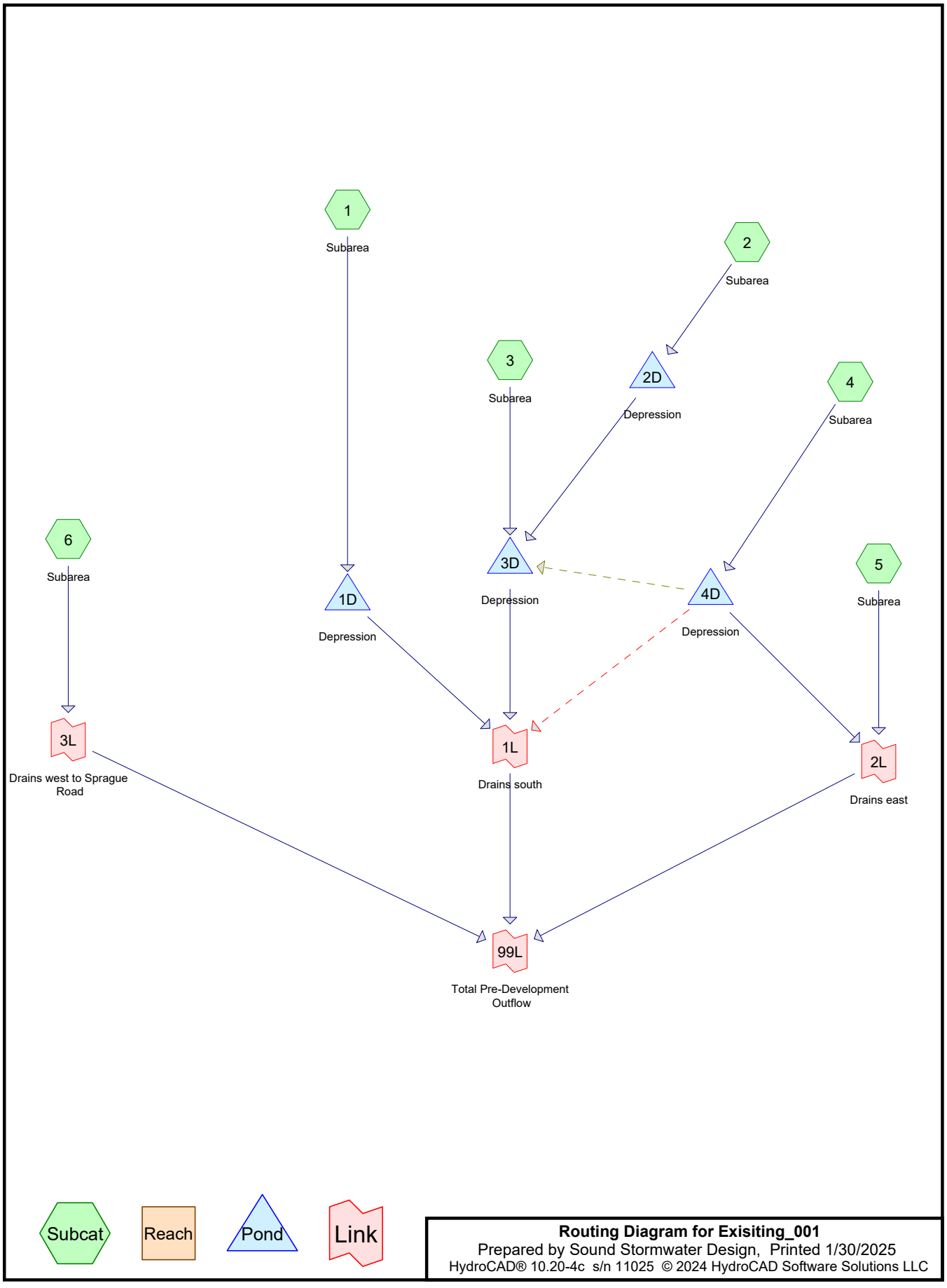
JOB NO: 2025-001

SHEET TITLE:
POST-DEVELOPMENT CONDITIONS PLAN

FIGURE:
3

APPENDIX A

Pre-Development Hydrologic Analysis



Routing Diagram for Exisiting_001
Prepared by Sound Stormwater Design, Printed 1/30/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 yr	MSE 24-hr	3	Default	24.00	1	2.40	2
2	2 yr	MSE 24-hr	3	Default	24.00	1	2.70	2
3	10 yr	MSE 24-hr	3	Default	24.00	1	3.81	2
4	100 yr	MSE 24-hr	3	Default	24.00	1	6.18	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
11.480	58	meadow (5)
68.250	68	predevelopment (1, 2, 3, 4, 5, 6)
79.730	**67**	**TOTAL AREA**

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subarea Runoff Area=4.800 ac 0.00% Impervious Runoff Depth>0.32"
Flow Length=420' Slope=0.0100 '/' Tc=18.9 min CN=68 Runoff=1.35 cfs 0.127 af

Subcatchment2: Subarea Runoff Area=0.990 ac 0.00% Impervious Runoff Depth>0.32"
Flow Length=90' Slope=0.0100 '/' Tc=14.3 min CN=68 Runoff=0.32 cfs 0.026 af

Subcatchment3: Subarea Runoff Area=21.390 ac 0.00% Impervious Runoff Depth>0.31"
Flow Length=1,375' Slope=0.0100 '/' Tc=28.8 min CN=68 Runoff=4.84 cfs 0.561 af

Subcatchment4: Subarea Runoff Area=4.630 ac 0.00% Impervious Runoff Depth>0.32"
Flow Length=325' Slope=0.0100 '/' Tc=17.9 min CN=68 Runoff=1.34 cfs 0.122 af

Subcatchment5: Subarea Runoff Area=44.320 ac 0.00% Impervious Runoff Depth>0.24"
Flow Length=1,860' Slope=0.0200 '/' Tc=24.7 min CN=65 Runoff=7.03 cfs 0.871 af

Subcatchment6: Subarea Runoff Area=3.600 ac 0.00% Impervious Runoff Depth>0.32"
Flow Length=215' Slope=0.0200 '/' Tc=12.6 min CN=68 Runoff=1.25 cfs 0.095 af

Pond 1D: Depression Peak Elev=937.92' Storage=0.066 af Inflow=1.35 cfs 0.127 af
Discarded=0.15 cfs 0.085 af Primary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.085 af

Pond 2D: Depression Peak Elev=937.39' Storage=0.013 af Inflow=0.32 cfs 0.026 af
Discarded=0.03 cfs 0.019 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.019 af

Pond 3D: Depression Peak Elev=934.53' Storage=0.271 af Inflow=4.84 cfs 0.561 af
Discarded=0.51 cfs 0.293 af Primary=0.66 cfs 0.073 af Outflow=1.17 cfs 0.365 af

Pond 4D: Depression Peak Elev=934.58' Storage=0.061 af Inflow=1.34 cfs 0.122 af
s 0.088 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.088 af

Link 1L: Drains south Inflow=0.66 cfs 0.073 af
Primary=0.66 cfs 0.073 af

Link 2L: Drains east Inflow=7.03 cfs 0.871 af
Primary=7.03 cfs 0.871 af

Link 3L: Drains west to Sprague Road Inflow=1.25 cfs 0.095 af
Primary=1.25 cfs 0.095 af

Link 99L: Total Pre-DevelopmentOutflow Inflow=7.75 cfs 1.039 af
Primary=7.75 cfs 1.039 af

Total Runoff Area = 79.730 ac Runoff Volume = 1.803 af Average Runoff Depth = 0.27"
100.00% Pervious = 79.730 ac 0.00% Impervious = 0.000 ac

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subarea Runoff Area=4.800 ac 0.00% Impervious Runoff Depth>0.44"
Flow Length=420' Slope=0.0100 '/' Tc=18.9 min CN=68 Runoff=2.09 cfs 0.177 af

Subcatchment2: Subarea Runoff Area=0.990 ac 0.00% Impervious Runoff Depth>0.44"
Flow Length=90' Slope=0.0100 '/' Tc=14.3 min CN=68 Runoff=0.50 cfs 0.037 af

Subcatchment3: Subarea Runoff Area=21.390 ac 0.00% Impervious Runoff Depth>0.44"
Flow Length=1,375' Slope=0.0100 '/' Tc=28.8 min CN=68 Runoff=7.38 cfs 0.785 af

Subcatchment4: Subarea Runoff Area=4.630 ac 0.00% Impervious Runoff Depth>0.44"
Flow Length=325' Slope=0.0100 '/' Tc=17.9 min CN=68 Runoff=2.08 cfs 0.171 af

Subcatchment5: Subarea Runoff Area=44.320 ac 0.00% Impervious Runoff Depth>0.34"
Flow Length=1,860' Slope=0.0200 '/' Tc=24.7 min CN=65 Runoff=11.70 cfs 1.268 af

Subcatchment6: Subarea Runoff Area=3.600 ac 0.00% Impervious Runoff Depth>0.44"
Flow Length=215' Slope=0.0200 '/' Tc=12.6 min CN=68 Runoff=1.93 cfs 0.133 af

Pond 1D: Depression Peak Elev=938.02' Storage=0.097 af Inflow=2.09 cfs 0.177 af
Discarded=0.20 cfs 0.112 af Primary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.112 af

Pond 2D: Depression Peak Elev=937.48' Storage=0.020 af Inflow=0.50 cfs 0.037 af
Discarded=0.04 cfs 0.025 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.025 af

Pond 3D: Depression Peak Elev=934.57' Storage=0.310 af Inflow=7.38 cfs 0.785 af
Discarded=0.56 cfs 0.311 af Primary=2.19 cfs 0.254 af Outflow=2.75 cfs 0.565 af

Pond 4D: Depression Peak Elev=934.67' Storage=0.091 af Inflow=2.08 cfs 0.171 af
s 0.117 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.117 af

Link 1L: Drains south Inflow=2.19 cfs 0.254 af
Primary=2.19 cfs 0.254 af

Link 2L: Drains east Inflow=11.70 cfs 1.268 af
Primary=11.70 cfs 1.268 af

Link 3L: Drains west to Sprague Road Inflow=1.93 cfs 0.133 af
Primary=1.93 cfs 0.133 af

Link 99L: Total Pre-DevelopmentOutflow Inflow=12.77 cfs 1.655 af
Primary=12.77 cfs 1.655 af

Total Runoff Area = 79.730 ac Runoff Volume = 2.570 af Average Runoff Depth = 0.39"
100.00% Pervious = 79.730 ac 0.00% Impervious = 0.000 ac

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subarea Runoff Area=4.800 ac 0.00% Impervious Runoff Depth>1.02"
Flow Length=420' Slope=0.0100 '/' Tc=18.9 min CN=68 Runoff=5.58 cfs 0.408 af

Subcatchment2: Subarea Runoff Area=0.990 ac 0.00% Impervious Runoff Depth>1.02"
Flow Length=90' Slope=0.0100 '/' Tc=14.3 min CN=68 Runoff=1.33 cfs 0.084 af

Subcatchment3: Subarea Runoff Area=21.390 ac 0.00% Impervious Runoff Depth>1.02"
Flow Length=1,375' Slope=0.0100 '/' Tc=28.8 min CN=68 Runoff=19.61 cfs 1.810 af

Subcatchment4: Subarea Runoff Area=4.630 ac 0.00% Impervious Runoff Depth>1.02"
Flow Length=325' Slope=0.0100 '/' Tc=17.9 min CN=68 Runoff=5.52 cfs 0.393 af

Subcatchment5: Subarea Runoff Area=44.320 ac 0.00% Impervious Runoff Depth>0.86"
Flow Length=1,860' Slope=0.0200 '/' Tc=24.7 min CN=65 Runoff=35.97 cfs 3.165 af

Subcatchment6: Subarea Runoff Area=3.600 ac 0.00% Impervious Runoff Depth>1.02"
Flow Length=215' Slope=0.0200 '/' Tc=12.6 min CN=68 Runoff=5.15 cfs 0.307 af

Pond 1D: Depression Peak Elev=938.29' Storage=0.251 af Inflow=5.58 cfs 0.408 af
Discarded=0.39 cfs 0.231 af Primary=0.00 cfs 0.000 af Outflow=0.39 cfs 0.231 af

Pond 2D: Depression Peak Elev=937.74' Storage=0.052 af Inflow=1.33 cfs 0.084 af
Discarded=0.08 cfs 0.048 af Primary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.048 af

Pond 3D: Depression Peak Elev=934.71' Storage=0.495 af Inflow=19.61 cfs 1.810 af
Discarded=0.75 cfs 0.349 af Primary=12.29 cfs 1.210 af Outflow=13.05 cfs 1.559 af

Pond 4D: Depression Peak Elev=934.92' Storage=0.239 af Inflow=5.52 cfs 0.393 af
s 0.234 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.40 cfs 0.234 af

Link 1L: Drains south Inflow=12.29 cfs 1.210 af
Primary=12.29 cfs 1.210 af

Link 2L: Drains east Inflow=35.97 cfs 3.165 af
Primary=35.97 cfs 3.165 af

Link 3L: Drains west to Sprague Road Inflow=5.15 cfs 0.307 af
Primary=5.15 cfs 0.307 af

Link 99L: Total Pre-DevelopmentOutflow Inflow=42.42 cfs 4.681 af
Primary=42.42 cfs 4.681 af

Total Runoff Area = 79.730 ac Runoff Volume = 6.167 af Average Runoff Depth = 0.93"
100.00% Pervious = 79.730 ac 0.00% Impervious = 0.000 ac

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subarea Runoff Area=4.800 ac 0.00% Impervious Runoff Depth>2.62"
Flow Length=420' Slope=0.0100 '/' Tc=18.9 min CN=68 Runoff=15.10 cfs 1.049 af

Subcatchment2: Subarea Runoff Area=0.990 ac 0.00% Impervious Runoff Depth>2.63"
Flow Length=90' Slope=0.0100 '/' Tc=14.3 min CN=68 Runoff=3.56 cfs 0.217 af

Subcatchment3: Subarea Runoff Area=21.390 ac 0.00% Impervious Runoff Depth>2.61"
Flow Length=1,375' Slope=0.0100 '/' Tc=28.8 min CN=68 Runoff=53.53 cfs 4.658 af

Subcatchment4: Subarea Runoff Area=4.630 ac 0.00% Impervious Runoff Depth>2.62"
Flow Length=325' Slope=0.0100 '/' Tc=17.9 min CN=68 Runoff=14.94 cfs 1.012 af

Subcatchment5: Subarea Runoff Area=44.320 ac 0.00% Impervious Runoff Depth>2.35"
Flow Length=1,860' Slope=0.0200 '/' Tc=24.7 min CN=65 Runoff=107.57 cfs 8.670 af

Subcatchment6: Subarea Runoff Area=3.600 ac 0.00% Impervious Runoff Depth>2.63"
Flow Length=215' Slope=0.0200 '/' Tc=12.6 min CN=68 Runoff=13.83 cfs 0.788 af

Pond 1D: Depression Peak Elev=938.58' Storage=0.552 af Inflow=15.10 cfs 1.049 af
Discarded=0.69 cfs 0.390 af Primary=2.96 cfs 0.282 af Outflow=3.64 cfs 0.672 af

Pond 2D: Depression Peak Elev=938.16' Storage=0.148 af Inflow=3.56 cfs 0.217 af
Discarded=0.16 cfs 0.098 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.098 af

Pond 3D: Depression Peak Elev=934.97' Storage=0.963 af Inflow=53.53 cfs 4.658 af
Discarded=1.17 cfs 0.424 af Primary=41.65 cfs 3.962 af Outflow=42.82 cfs 4.386 af

Pond 4D: Depression Peak Elev=935.29' Storage=0.626 af Inflow=14.94 cfs 1.012 af
s 0.410 af Primary=1.13 cfs 0.125 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=1.79 cfs 0.535 af

Link 1L: Drains south Inflow=43.63 cfs 4.244 af
Primary=43.63 cfs 4.244 af

Link 2L: Drains east Inflow=107.57 cfs 8.795 af
Primary=107.57 cfs 8.795 af

Link 3L: Drains west to Sprague Road Inflow=13.83 cfs 0.788 af
Primary=13.83 cfs 0.788 af

Link 99L: Total Pre-DevelopmentOutflow Inflow=144.32 cfs 13.827 af
Primary=144.32 cfs 13.827 af

Total Runoff Area = 79.730 ac Runoff Volume = 16.394 af Average Runoff Depth = 2.47"
100.00% Pervious = 79.730 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1: Subarea

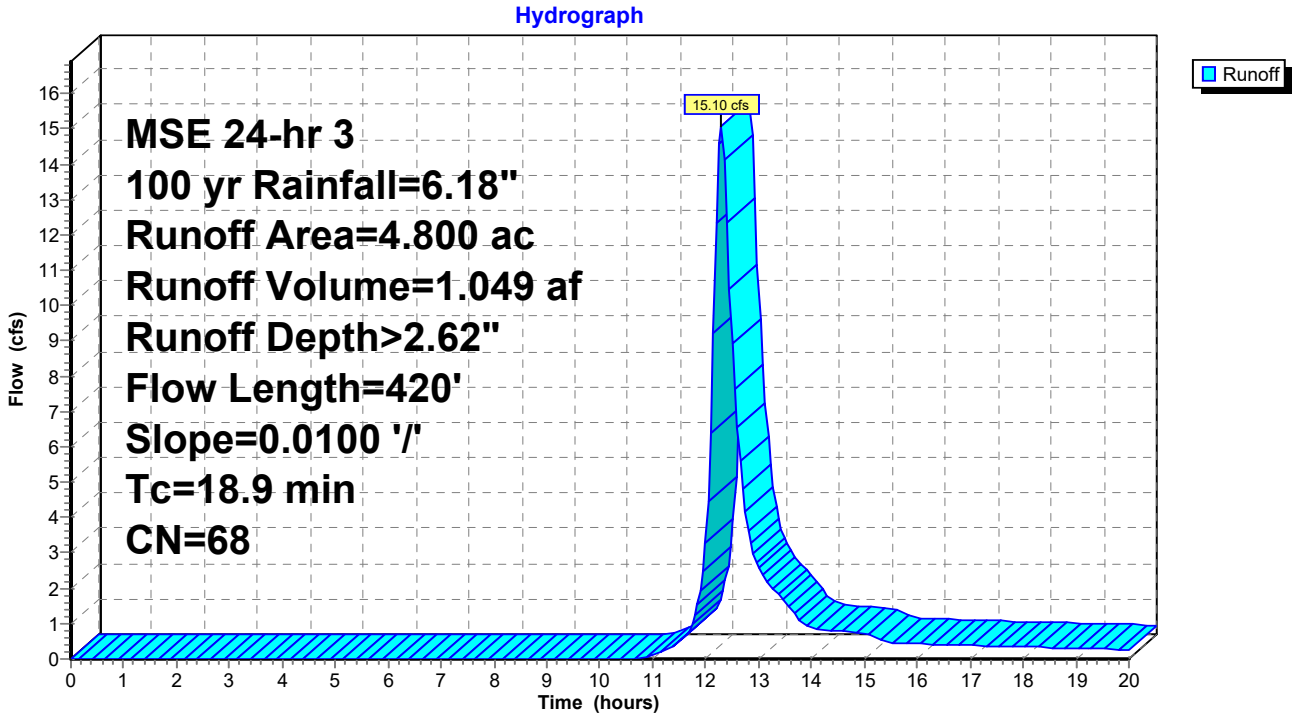
Runoff = 15.10 cfs @ 12.29 hrs, Volume= 1.049 af, Depth> 2.62"
Routed to Pond 1D : Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	4.800	68	predevelopment
	4.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
3.3	320	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
18.9	420	Total			

Subcatchment 1: Subarea



Summary for Subcatchment 2: Subarea

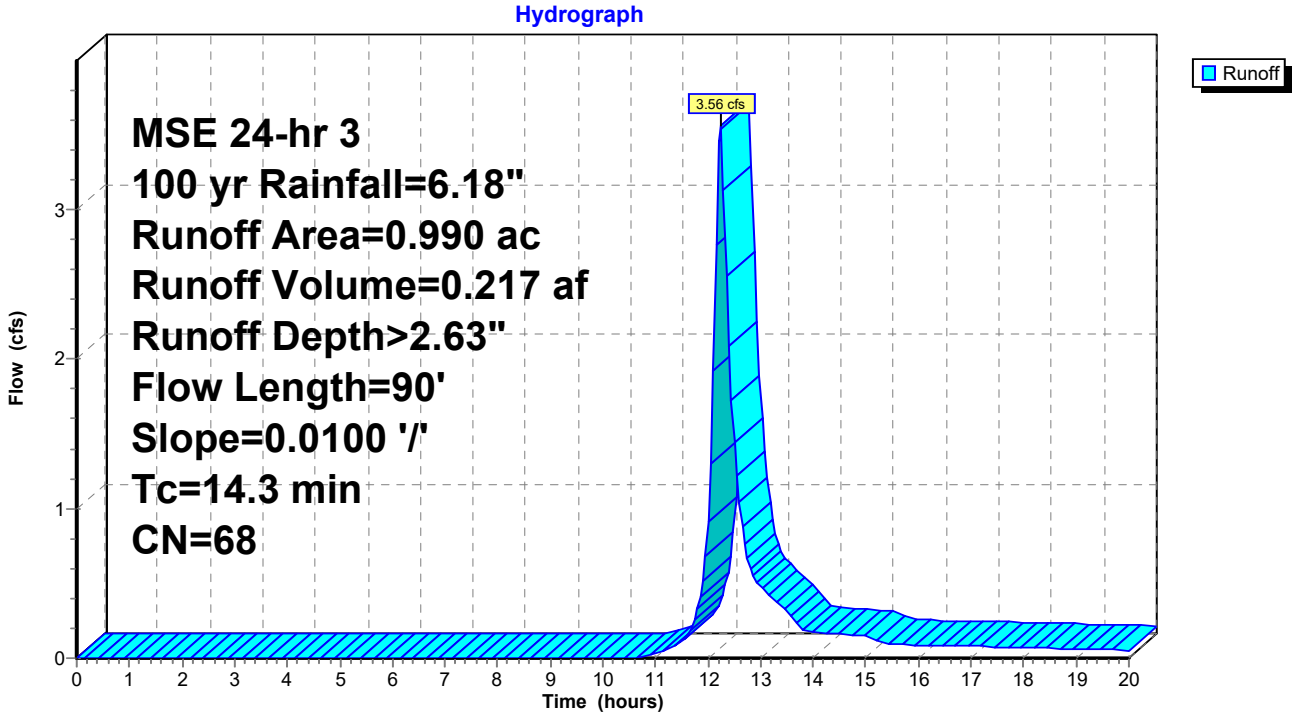
Runoff = 3.56 cfs @ 12.23 hrs, Volume= 0.217 af, Depth> 2.63"
Routed to Pond 2D : Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.990	68	predevelopment
	0.990		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	90	0.0100	0.10		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"

Subcatchment 2: Subarea



Summary for Subcatchment 3: Subarea

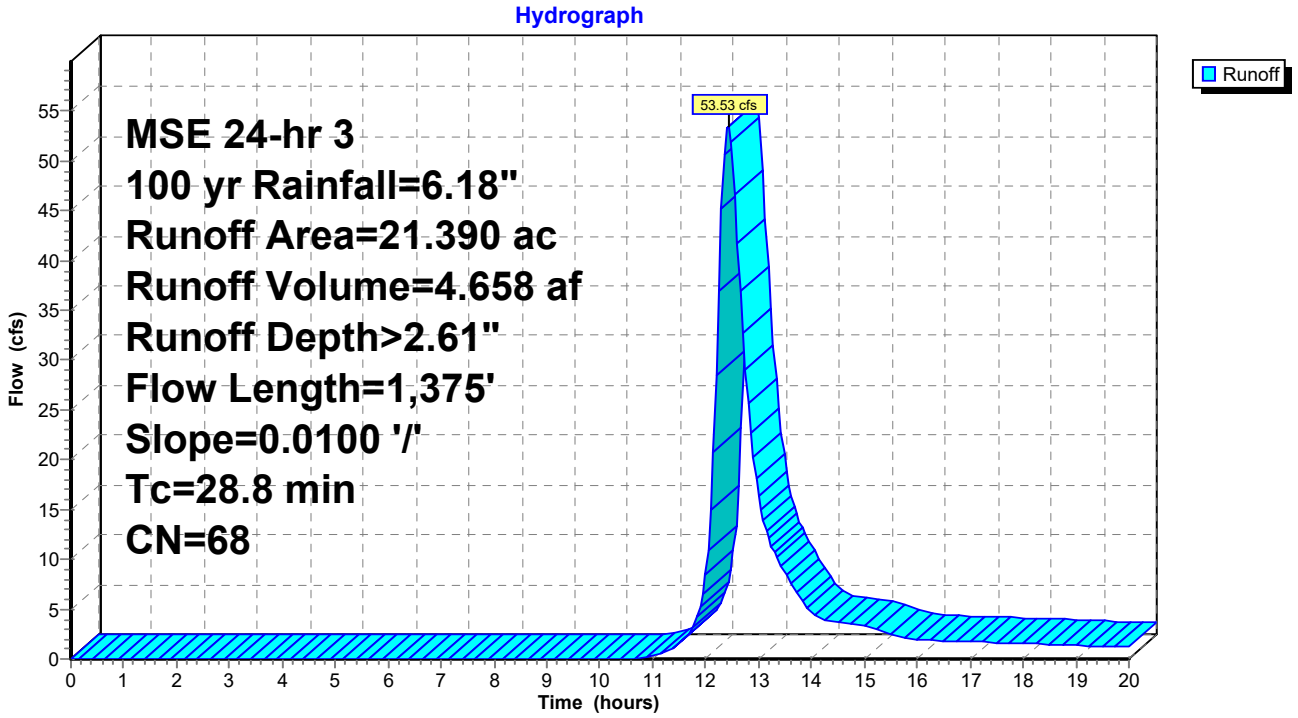
Runoff = 53.53 cfs @ 12.42 hrs, Volume= 4.658 af, Depth> 2.61"
Routed to Pond 3D : Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	21.390	68	predevelopment
	21.390		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
13.2	1,275	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
28.8	1,375	Total			

Subcatchment 3: Subarea



Summary for Subcatchment 4: Subarea

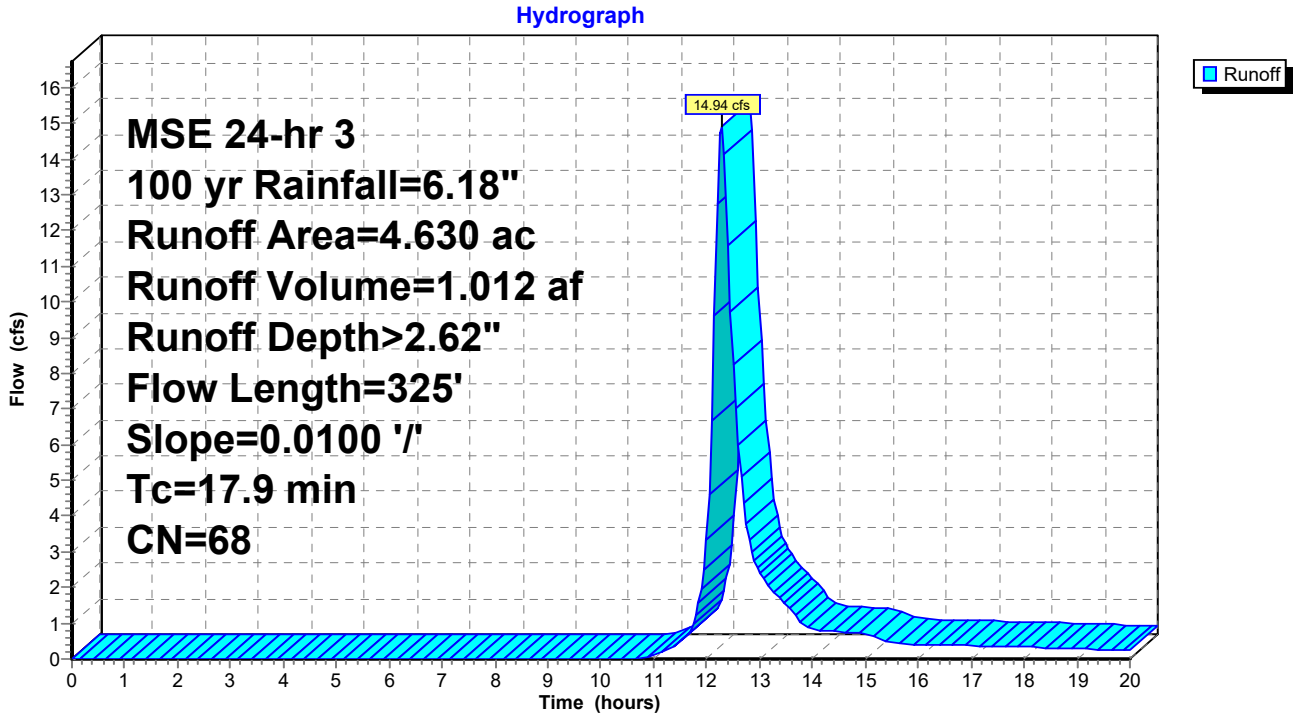
Runoff = 14.94 cfs @ 12.28 hrs, Volume= 1.012 af, Depth> 2.62"
Routed to Pond 4D : Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	4.630	68	predevelopment
	4.630		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
2.3	225	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.9	325	Total			

Subcatchment 4: Subarea



Summary for Subcatchment 5: Subarea

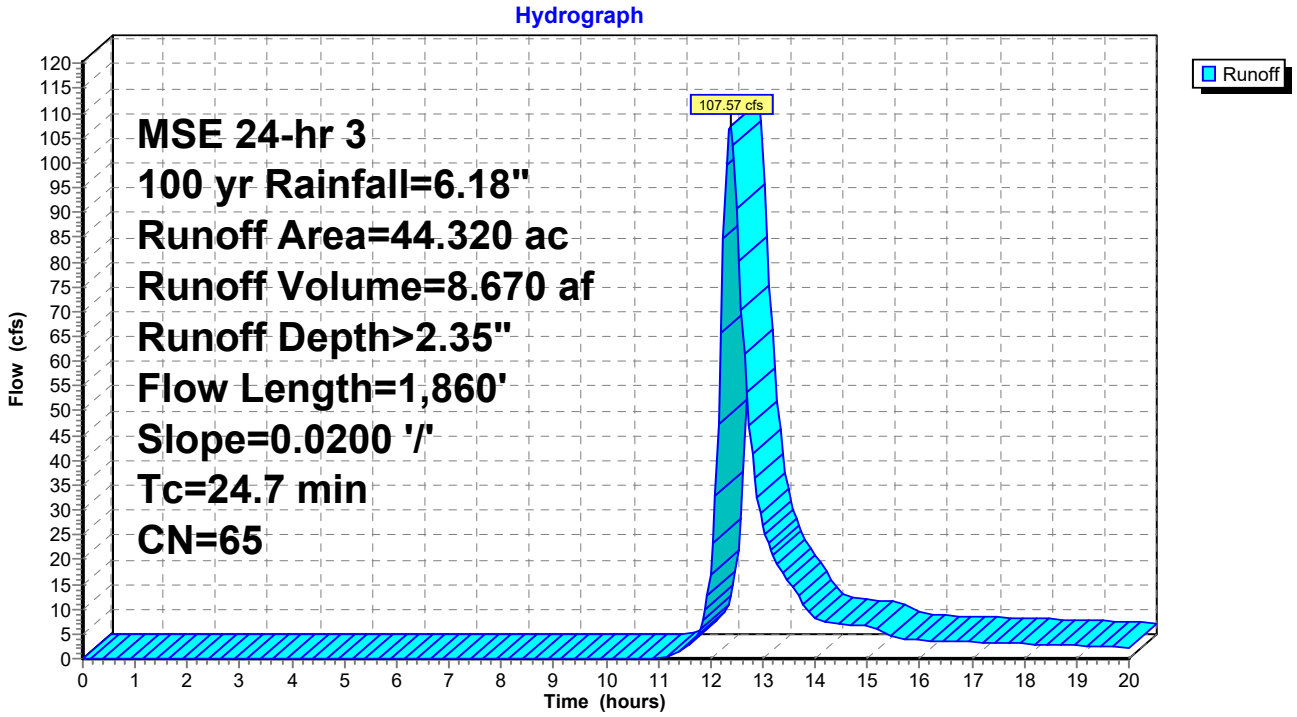
Runoff = 107.57 cfs @ 12.37 hrs, Volume= 8.670 af, Depth> 2.35"
Routed to Link 2L : Drains east

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	32.840	68	predevelopment
*	11.480	58	meadow
	44.320	65	Weighted Average
	44.320		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0200	0.14		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
12.9	1,760	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
24.7	1,860	Total			

Subcatchment 5: Subarea



Summary for Subcatchment 6: Subarea

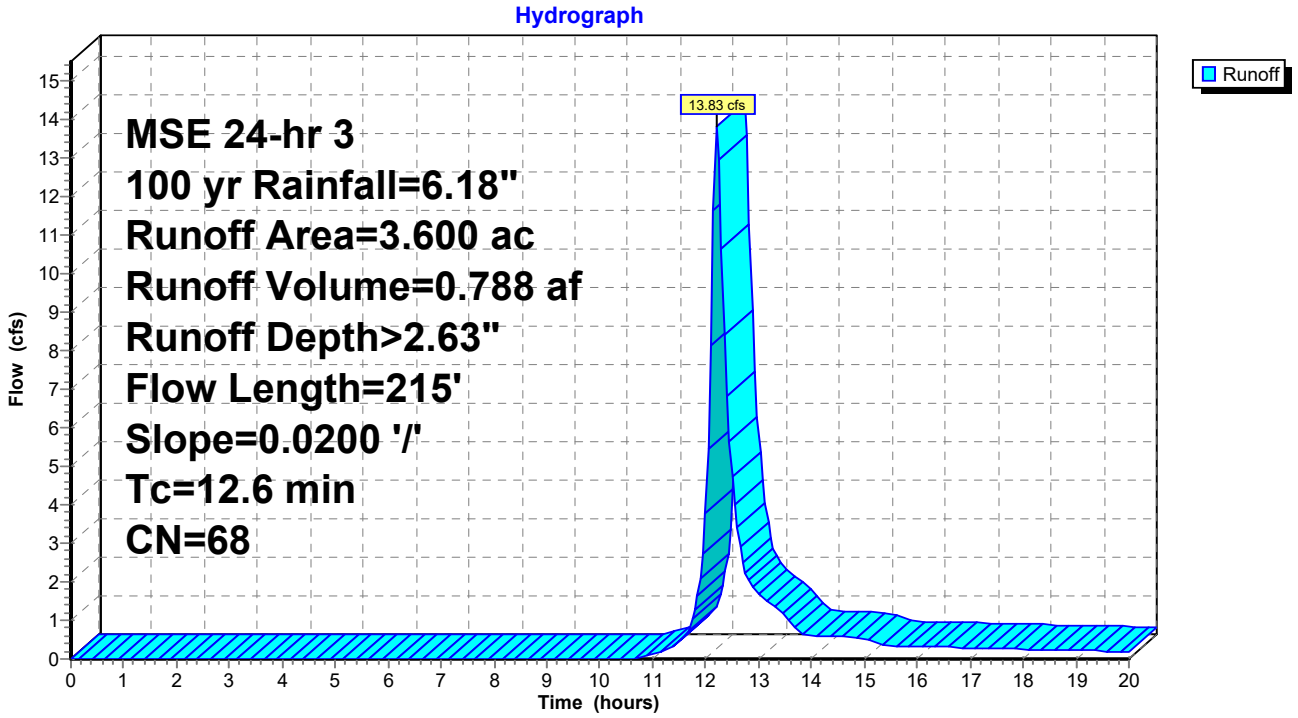
Runoff = 13.83 cfs @ 12.21 hrs, Volume= 0.788 af, Depth> 2.63"
Routed to Link 3L : Drains west to Sprague Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	3.600	68	predevelopment
	3.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0200	0.14		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.8	115	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.6	215	Total			

Subcatchment 6: Subarea



Summary for Pond 1D: Depression

Inflow Area = 4.800 ac, 0.00% Impervious, Inflow Depth > 2.62" for 100 yr event
Inflow = 15.10 cfs @ 12.29 hrs, Volume= 1.049 af
Outflow = 3.64 cfs @ 12.81 hrs, Volume= 0.672 af, Atten= 76%, Lag= 30.8 min
Discarded = 0.69 cfs @ 12.81 hrs, Volume= 0.390 af
Primary = 2.96 cfs @ 12.81 hrs, Volume= 0.282 af
Routed to Link 1L : Drains south

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 938.58' @ 12.81 hrs Surf.Area= 1.329 ac Storage= 0.552 af

Plug-Flow detention time= 151.3 min calculated for 0.672 af (64% of inflow)
Center-of-Mass det. time= 90.8 min (890.9 - 800.1)

Volume	Invert	Avail.Storage	Storage Description
#1	937.25'	1.320 af	**Custom Stage Data (Conic)** Listed below (Recalc)

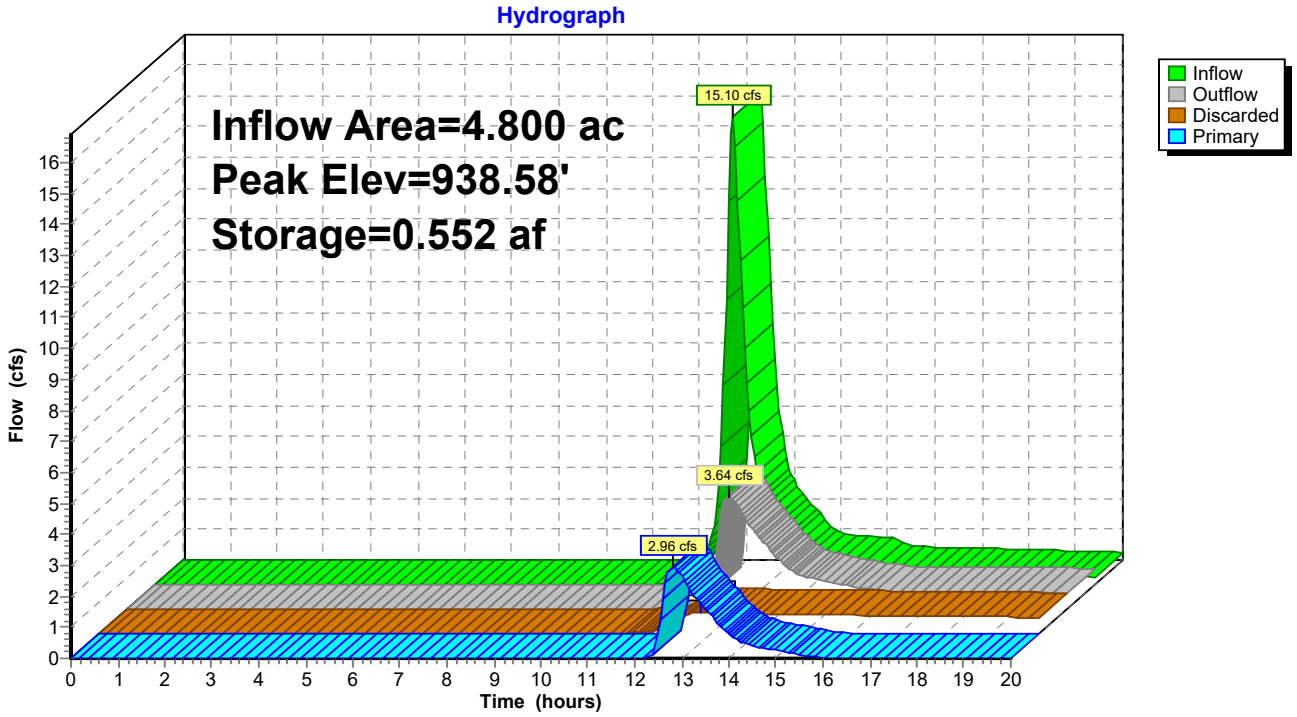
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
937.25	0.000	0.000	0.000	0.000
938.00	0.360	0.090	0.090	0.360
939.00	2.400	1.230	1.320	2.400

Device	Routing	Invert	Outlet Devices
#1	Discarded	937.25'	**0.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 920.30' Phase-In= 0.01'
#2	Primary	938.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.69 cfs @ 12.81 hrs HW=938.58' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.69 cfs)

Primary OutFlow Max=2.95 cfs @ 12.81 hrs HW=938.58' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 2.95 cfs @ 0.71 fps)

Pond 1D: Depression



Summary for Pond 2D: Depression

Inflow Area = 0.990 ac, 0.00% Impervious, Inflow Depth > 2.63" for 100 yr event
Inflow = 3.56 cfs @ 12.23 hrs, Volume= 0.217 af
Outflow = 0.16 cfs @ 14.73 hrs, Volume= 0.098 af, Atten= 96%, Lag= 150.0 min
Discarded = 0.16 cfs @ 14.73 hrs, Volume= 0.098 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 3D : Depression

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 938.16' @ 14.73 hrs Surf.Area= 0.301 ac Storage= 0.148 af

Plug-Flow detention time= 232.0 min calculated for 0.098 af (45% of inflow)
Center-of-Mass det. time= 163.7 min (960.2 - 796.4)

Volume	Invert	Avail.Storage	Storage Description
#1	937.00'	0.529 af	**Custom Stage Data (Conic)** Listed below (Recalc)

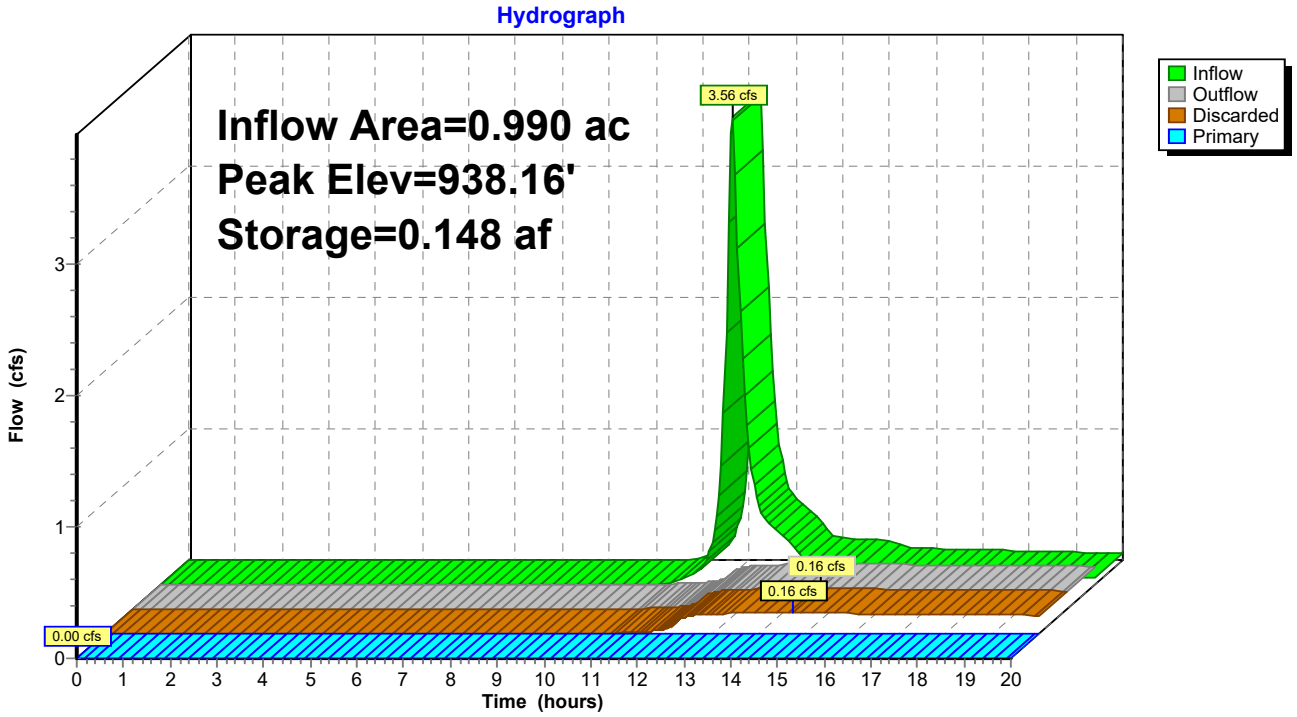
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
937.00	0.010	0.000	0.000	0.010
938.00	0.250	0.103	0.103	0.250
939.00	0.630	0.426	0.529	0.630

Device	Routing	Invert	Outlet Devices
#1	Discarded	937.00'	**0.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 922.50' Phase-In= 0.01'
#2	Primary	938.40'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.16 cfs @ 14.73 hrs HW=938.16' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=937.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2D: Depression



Summary for Pond 3D: Depression

Inflow Area = 22.380 ac, 0.00% Impervious, Inflow Depth > 2.50" for 100 yr event
Inflow = 53.53 cfs @ 12.42 hrs, Volume= 4.658 af
Outflow = 42.82 cfs @ 12.59 hrs, Volume= 4.386 af, Atten= 20%, Lag= 10.2 min
Discarded = 1.17 cfs @ 12.59 hrs, Volume= 0.424 af
Primary = 41.65 cfs @ 12.59 hrs, Volume= 3.962 af
Routed to Link 1L : Drains south

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 934.97' @ 12.59 hrs Surf.Area= 2.256 ac Storage= 0.963 af

Plug-Flow detention time= 36.4 min calculated for 4.375 af (94% of inflow)
Center-of-Mass det. time= 16.9 min (824.9 - 808.0)

Volume	Invert	Avail.Storage	Storage Description
#1	934.00'	1.039 af	**Custom Stage Data (Conic)** Listed below (Recalc)

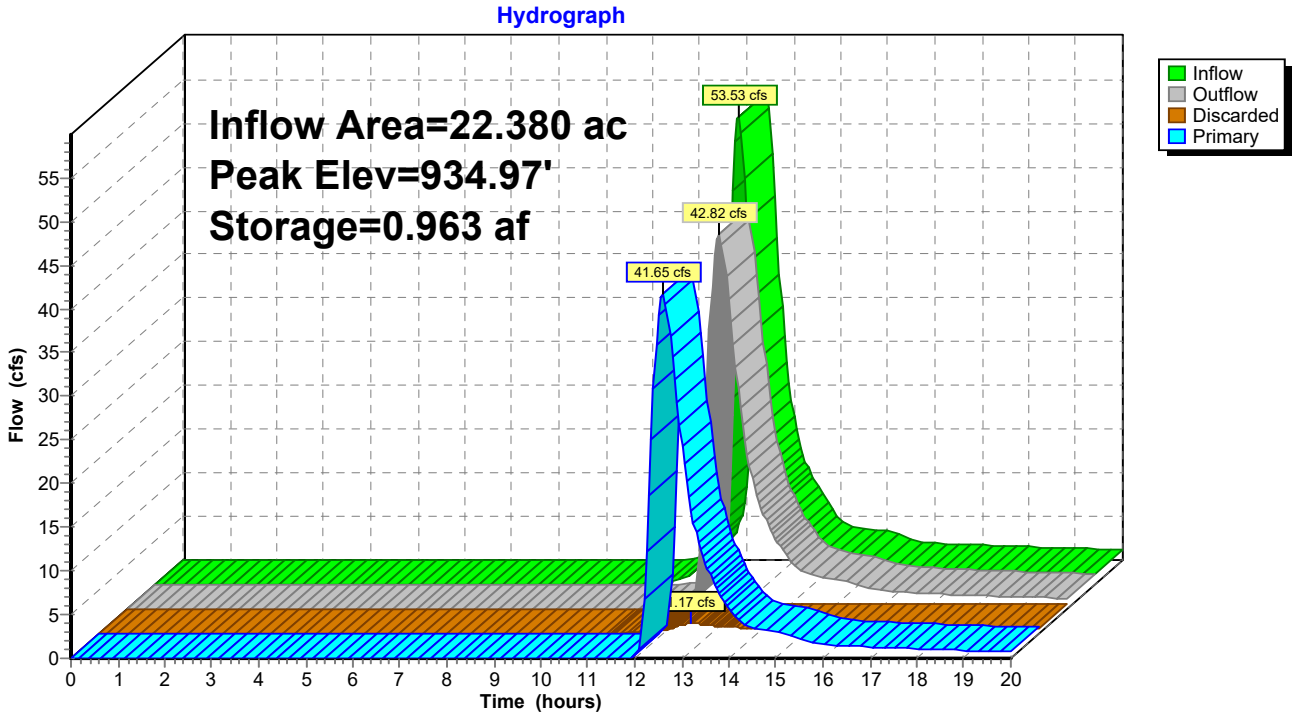
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
934.00	0.150	0.000	0.000	0.150
935.00	2.370	1.039	1.039	2.370

Device	Routing	Invert	Outlet Devices
#1	Discarded	934.00'	**0.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 920.30' Phase-In= 0.01'
#2	Primary	934.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=1.17 cfs @ 12.59 hrs HW=934.97' (Free Discharge)
↑—**1=Exfiltration** (Controls 1.17 cfs)

Primary OutFlow Max=41.56 cfs @ 12.59 hrs HW=934.97' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 41.56 cfs @ 1.78 fps)

Pond 3D: Depression



Summary for Pond 4D: Depression

Inflow Area = 4.630 ac, 0.00% Impervious, Inflow Depth > 2.62" for 100 yr event
Inflow = 14.94 cfs @ 12.28 hrs, Volume= 1.012 af
Outflow = 1.79 cfs @ 13.34 hrs, Volume= 0.535 af, Atten= 88%, Lag= 63.7 min
Discarded = 0.66 cfs @ 13.34 hrs, Volume= 0.410 af
Primary = 1.13 cfs @ 13.34 hrs, Volume= 0.125 af
Routed to Link 2L : Drains east
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 1L : Drains south
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 3D : Depression

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 935.29' @ 13.34 hrs Surf.Area= 1.273 ac Storage= 0.626 af

Plug-Flow detention time= 193.7 min calculated for 0.535 af (53% of inflow)
Center-of-Mass det. time= 128.2 min (927.5 - 799.3)

Volume	Invert	Avail.Storage	Storage Description
#1	934.00'	1.891 af	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
934.00	0.000	0.000	0.000	0.000
935.00	0.920	0.307	0.307	0.920
936.00	2.360	1.584	1.891	2.360

Device	Routing	Invert	Outlet Devices
#1	Discarded	934.00'	**0.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 921.00' Phase-In= 0.01'
#2	Primary	935.25'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Secondary	935.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#4	Tertiary	935.60'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

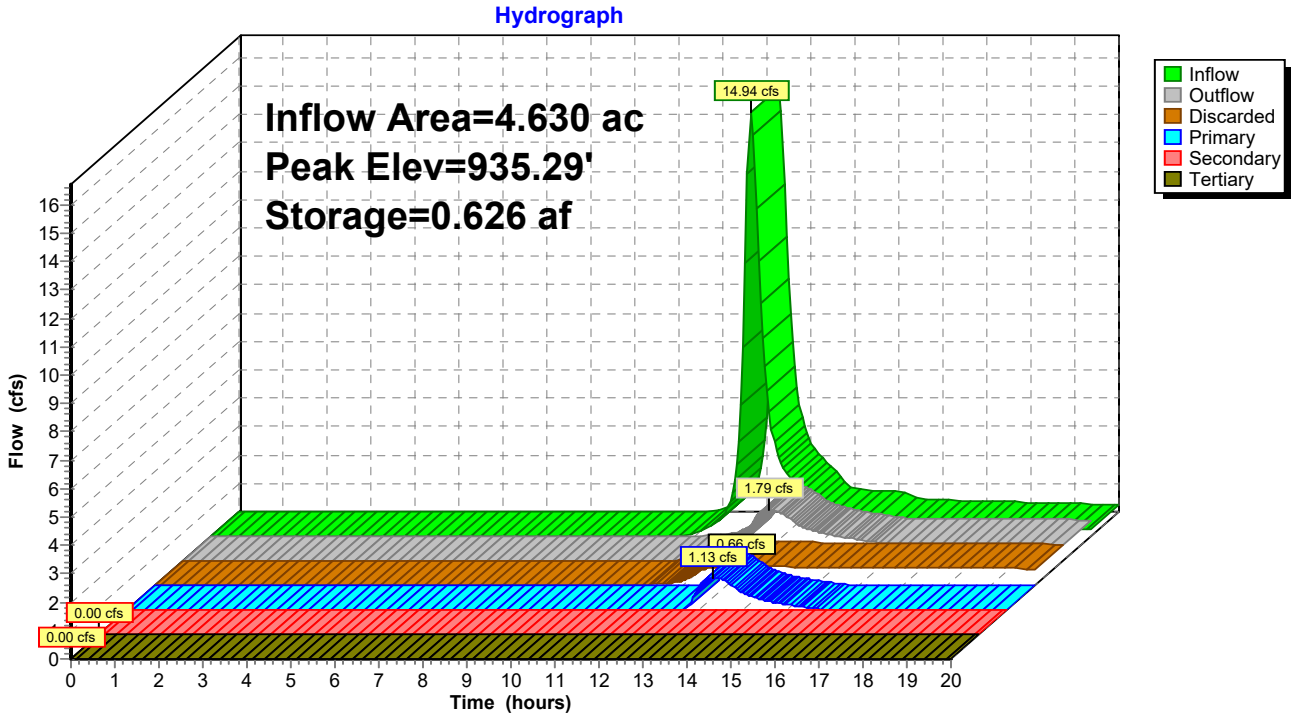
Discarded OutFlow Max=0.66 cfs @ 13.34 hrs HW=935.29' (Free Discharge)
└**1=Exfiltration** (Controls 0.66 cfs)

Primary OutFlow Max=1.10 cfs @ 13.34 hrs HW=935.29' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.10 cfs @ 0.52 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=934.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=934.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Depression

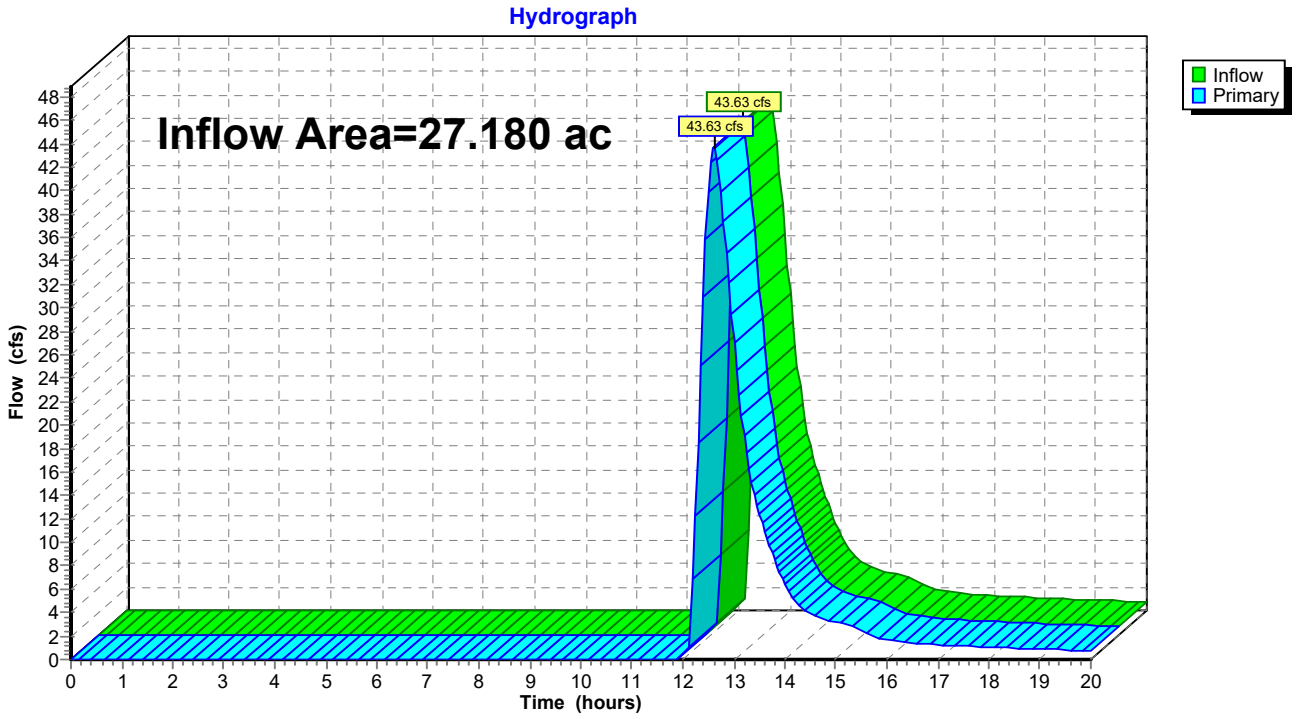


Summary for Link 1L: Drains south

Inflow Area = 27.180 ac, 0.00% Impervious, Inflow Depth > 1.87" for 100 yr event
Inflow = 43.63 cfs @ 12.61 hrs, Volume= 4.244 af
Primary = 43.63 cfs @ 12.61 hrs, Volume= 4.244 af, Atten= 0%, Lag= 0.0 min
Routed to Link 99L : Total Pre-Development Outflow

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 1L: Drains south

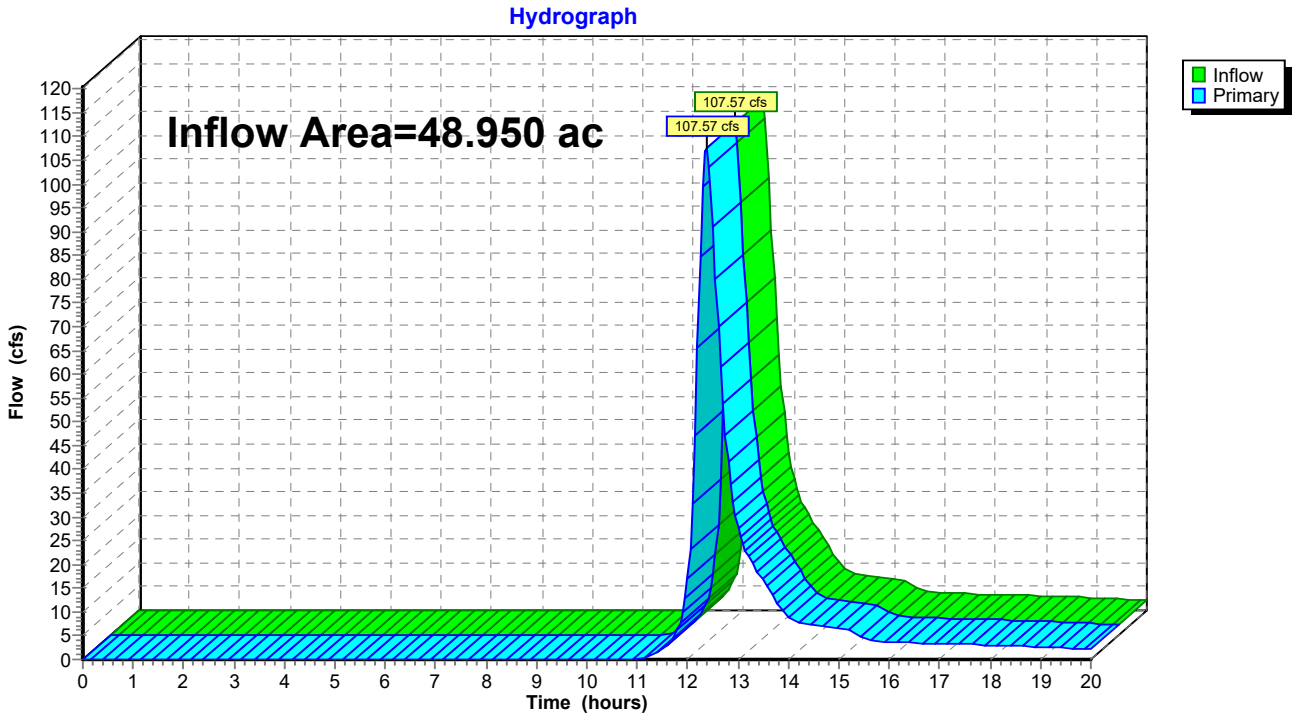


Summary for Link 2L: Drains east

Inflow Area = 48.950 ac, 0.00% Impervious, Inflow Depth > 2.16" for 100 yr event
Inflow = 107.57 cfs @ 12.37 hrs, Volume= 8.795 af
Primary = 107.57 cfs @ 12.37 hrs, Volume= 8.795 af, Atten= 0%, Lag= 0.0 min
Routed to Link 99L : Total Pre-Development Outflow

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Drains east

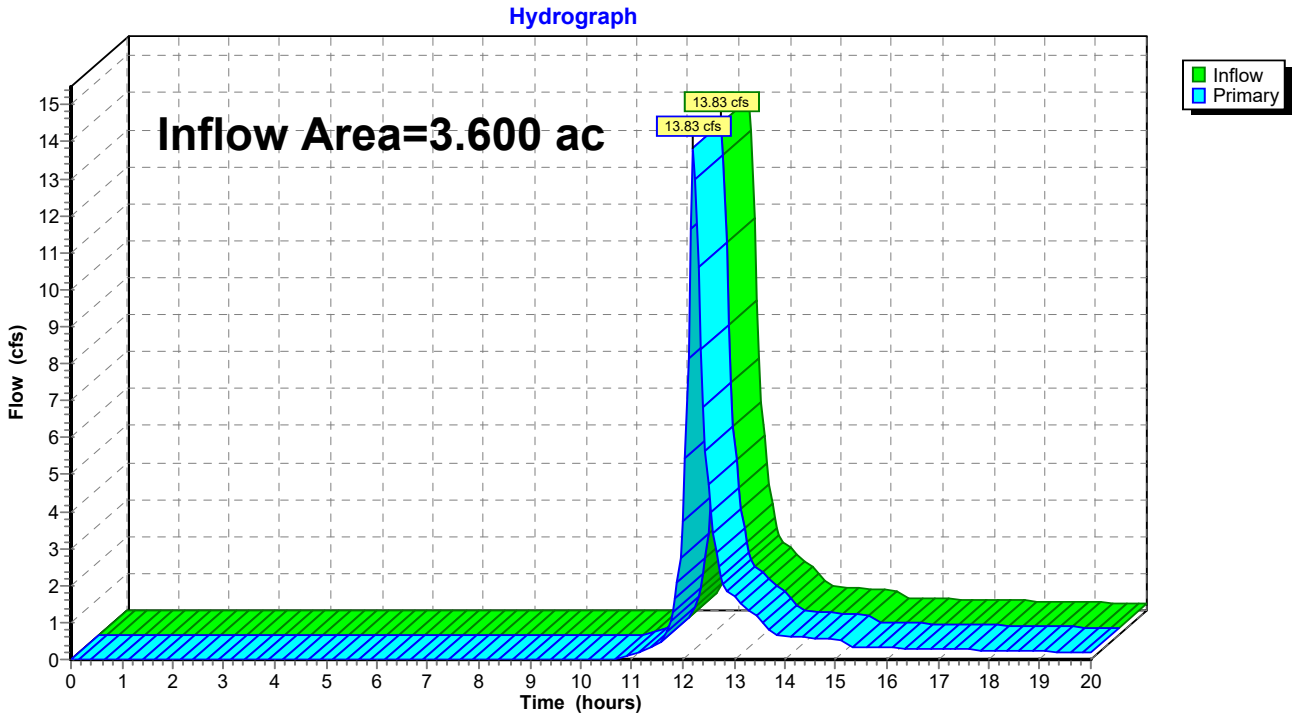


Summary for Link 3L: Drains west to Sprague Road

Inflow Area = 3.600 ac, 0.00% Impervious, Inflow Depth > 2.63" for 100 yr event
Inflow = 13.83 cfs @ 12.21 hrs, Volume= 0.788 af
Primary = 13.83 cfs @ 12.21 hrs, Volume= 0.788 af, Atten= 0%, Lag= 0.0 min
Routed to Link 99L : Total Pre-Development Outflow

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 3L: Drains west to Sprague Road

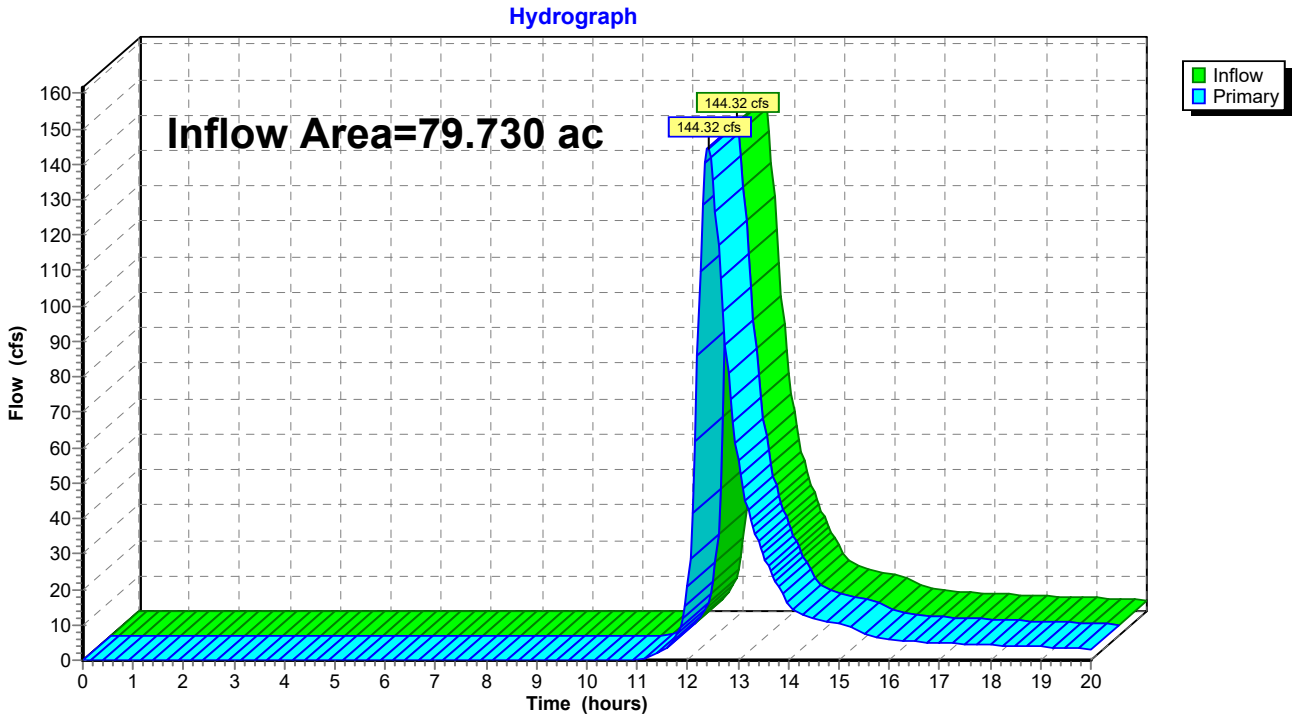


Summary for Link 99L: Total Pre-Development Outflow

Inflow Area = 79.730 ac, 0.00% Impervious, Inflow Depth > 2.08" for 100 yr event
Inflow = 144.32 cfs @ 12.41 hrs, Volume= 13.827 af
Primary = 144.32 cfs @ 12.41 hrs, Volume= 13.827 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 99L: Total Pre-Development Outflow



Events for Subcatchment 1: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.35	0.127	0.32
2 yr	2.70	2.09	0.177	0.44
10 yr	3.81	5.58	0.408	1.02
100 yr	**6.18**	**15.10**	**1.049**	**2.62**

Events for Subcatchment 2: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.32	0.026	0.32
2 yr	2.70	0.50	0.037	0.44
10 yr	3.81	1.33	0.084	1.02
100 yr	**6.18**	**3.56**	**0.217**	**2.63**

Events for Subcatchment 3: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	4.84	0.561	0.31
2 yr	2.70	7.38	0.785	0.44
10 yr	3.81	19.61	1.810	1.02
100 yr	**6.18**	**53.53**	**4.658**	**2.61**

Events for Subcatchment 4: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.34	0.122	0.32
2 yr	2.70	2.08	0.171	0.44
10 yr	3.81	5.52	0.393	1.02
100 yr	**6.18**	**14.94**	**1.012**	**2.62**

Events for Subcatchment 5: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	7.03	0.871	0.24
2 yr	2.70	11.70	1.268	0.34
10 yr	3.81	35.97	3.165	0.86
100 yr	**6.18**	**107.57**	**8.670**	**2.35**

Events for Subcatchment 6: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.25	0.095	0.32
2 yr	2.70	1.93	0.133	0.44
10 yr	3.81	5.15	0.307	1.02
100 yr	**6.18**	**13.83**	**0.788**	**2.63**

Events for Pond 1D: Depression

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	1.35	0.15	0.15	0.00	937.92	0.066
2 yr	2.09	0.20	0.20	0.00	938.02	0.097
10 yr	5.58	0.39	0.39	0.00	938.29	0.251
100 yr	**15.10**	**3.64**	**0.69**	**2.96**	**938.58**	**0.552**

Events for Pond 2D: Depression

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	0.32	0.03	0.03	**0.00**	937.39	0.013
2 yr	0.50	0.04	0.04	0.00	937.48	0.020
10 yr	1.33	0.08	0.08	0.00	937.74	0.052
100 yr	**3.56**	**0.16**	**0.16**	0.00	**938.16**	**0.148**

Events for Pond 3D: Depression

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	4.84	1.17	0.51	0.66	934.53	0.271
2 yr	7.38	2.75	0.56	2.19	934.57	0.310
10 yr	19.61	13.05	0.75	12.29	934.71	0.495
100 yr	**53.53**	**42.82**	**1.17**	**41.65**	**934.97**	**0.963**

Events for Pond 4D: Depression

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	1.34	0.16	0.16	0.00	**0.00**	**0.00**	934.58	0.061
2 yr	2.08	0.21	0.21	0.00	0.00	0.00	934.67	0.091
10 yr	5.52	0.40	0.40	0.00	0.00	0.00	934.92	0.239
100 yr	**14.94**	**1.79**	**0.66**	**1.13**	0.00	0.00	**935.29**	**0.626**

Events for Link 1L: Drains south

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	0.66	0.66	**0.00**
2 yr	2.19	2.19	0.00
10 yr	12.29	12.29	0.00
100 yr	**43.63**	**43.63**	0.00

Events for Link 2L: Drains east

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	7.03	7.03	**0.00**
2 yr	11.70	11.70	0.00
10 yr	35.97	35.97	0.00
100 yr	**107.57**	**107.57**	0.00

Events for Link 3L: Drains west to Sprague Road

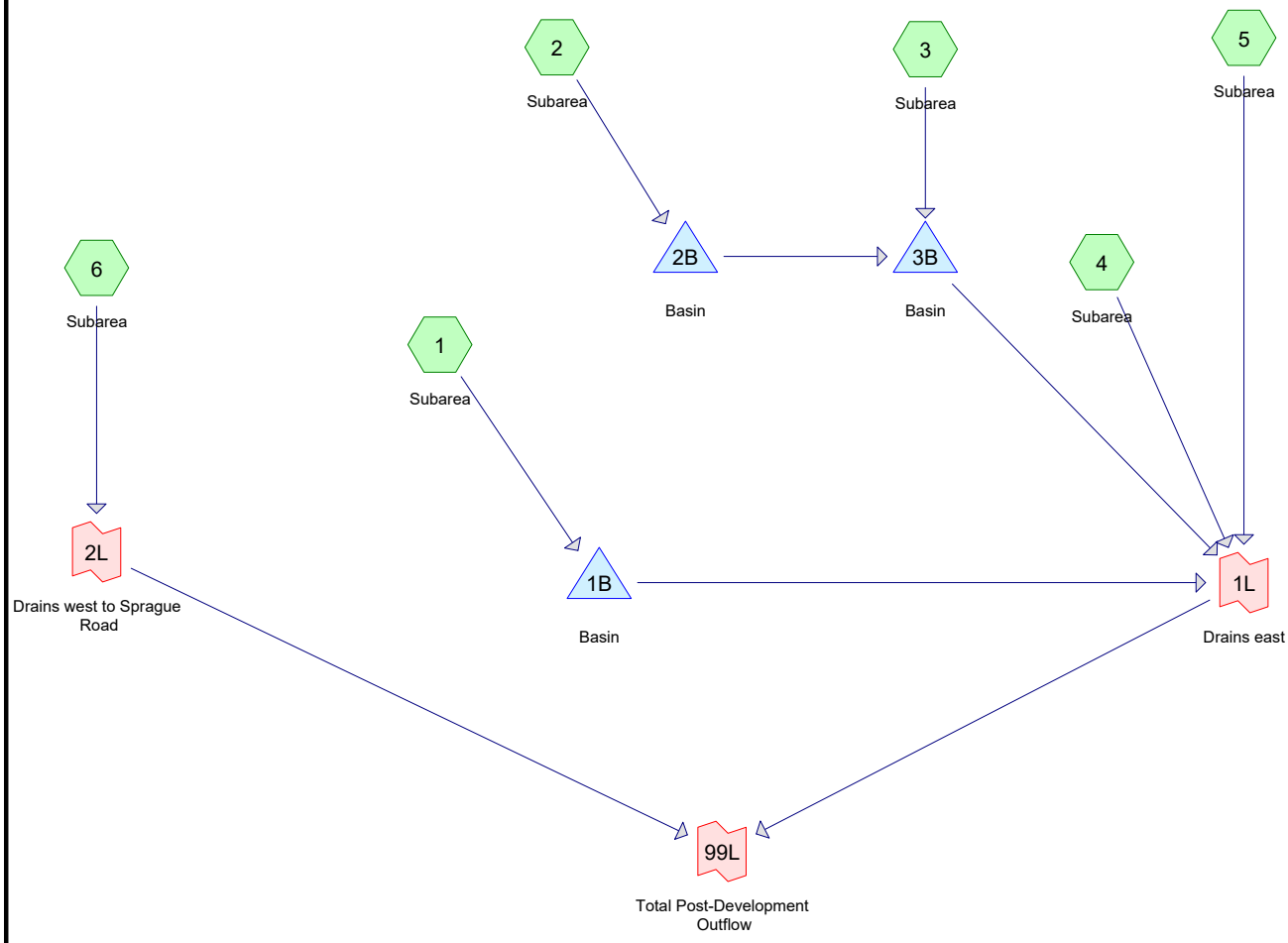
Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	1.25	1.25	**0.00**
2 yr	1.93	1.93	0.00
10 yr	5.15	5.15	0.00
100 yr	**13.83**	**13.83**	0.00

Events for Link 99L: Total Pre-Development Outflow

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	7.75	7.75	**0.00**
2 yr	12.77	12.77	0.00
10 yr	42.42	42.42	0.00
100 yr	**144.32**	**144.32**	0.00

APPENDIX B

Post-Development Hydrologic Analysis



Subcat Reach Pond Link

Routing Diagram for Proposed_001
Prepared by Sound Stormwater Design, Printed 1/31/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 yr	MSE 24-hr	3	Default	24.00	1	2.40	2
2	2 yr	MSE 24-hr	3	Default	24.00	1	2.70	2
3	10 yr	MSE 24-hr	3	Default	24.00	1	3.81	2
4	100 yr	MSE 24-hr	3	Default	24.00	1	6.18	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.420	100	effective infiltration area (1, 2, 3)
4.570	98	impervious (1, 2, 3, 4, 5, 6)
62.360	61	lawn (1, 2, 3, 4, 5, 6)
11.380	58	meadow (3, 5)
79.730	**63**	**TOTAL AREA**

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subarea Runoff Area=30.110 ac 8.57% Impervious Runoff Depth>0.21"
Flow Length=735' Slope=0.0100 '/' Tc=27.1 min CN=64 Runoff=3.85 cfs 0.531 af

Subcatchment2: Subarea Runoff Area=6.210 ac 17.39% Impervious Runoff Depth>0.32"
Flow Length=300' Slope=0.0200 '/' Tc=17.0 min CN=68 Runoff=1.86 cfs 0.164 af

Subcatchment3: Subarea Runoff Area=20.420 ac 7.30% Impervious Runoff Depth>0.19"
Flow Length=1,325' Tc=25.1 min CN=63 Runoff=2.26 cfs 0.322 af

Subcatchment4: Subarea Runoff Area=1.560 ac 19.23% Impervious Runoff Depth>0.32"
Flow Length=345' Tc=22.6 min CN=68 Runoff=0.40 cfs 0.041 af

Subcatchment5: Subarea Runoff Area=18.740 ac 1.28% Impervious Runoff Depth>0.13"
Flow Length=645' Slope=0.0100 '/' Tc=26.1 min CN=60 Runoff=1.10 cfs 0.201 af

Subcatchment6: Subarea Runoff Area=2.690 ac 11.15% Impervious Runoff Depth>0.24"
Flow Length=95' Slope=0.0200 '/' Tc=14.9 min CN=65 Runoff=0.53 cfs 0.053 af

Pond 1B: Basin Peak Elev=930.58' Storage=0.280 af Inflow=3.85 cfs 0.531 af
Discarded=0.46 cfs 0.291 af Primary=0.00 cfs 0.000 af Outflow=0.46 cfs 0.291 af

Pond 2B: Basin Peak Elev=927.10' Storage=0.090 af Inflow=1.86 cfs 0.164 af
Discarded=0.15 cfs 0.097 af Primary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.097 af

Pond 3B: Basin Peak Elev=910.17' Storage=0.147 af Inflow=2.26 cfs 0.322 af
Discarded=0.38 cfs 0.227 af Primary=0.00 cfs 0.000 af Outflow=0.38 cfs 0.227 af

Link 1L: Drains east Inflow=1.40 cfs 0.243 af
Primary=1.40 cfs 0.243 af

Link 2L: Drains west to Sprague Road Inflow=0.53 cfs 0.053 af
Primary=0.53 cfs 0.053 af

Link 99L: Total Post-DevelopmentOutflow Inflow=1.75 cfs 0.296 af
Primary=1.75 cfs 0.296 af

Total Runoff Area = 79.730 ac Runoff Volume = 1.313 af Average Runoff Depth = 0.20"
92.49% Pervious = 73.740 ac 7.51% Impervious = 5.990 ac

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subarea Runoff Area=30.110 ac 8.57% Impervious Runoff Depth>0.31"
Flow Length=735' Slope=0.0100 '/' Tc=27.1 min CN=64 Runoff=6.59 cfs 0.786 af

Subcatchment2: Subarea Runoff Area=6.210 ac 17.39% Impervious Runoff Depth>0.44"
Flow Length=300' Slope=0.0200 '/' Tc=17.0 min CN=68 Runoff=2.86 cfs 0.229 af

Subcatchment3: Subarea Runoff Area=20.420 ac 7.30% Impervious Runoff Depth>0.29"
Flow Length=1,325' Tc=25.1 min CN=63 Runoff=4.02 cfs 0.485 af

Subcatchment4: Subarea Runoff Area=1.560 ac 19.23% Impervious Runoff Depth>0.44"
Flow Length=345' Tc=22.6 min CN=68 Runoff=0.62 cfs 0.057 af

Subcatchment5: Subarea Runoff Area=18.740 ac 1.28% Impervious Runoff Depth>0.21"
Flow Length=645' Slope=0.0100 '/' Tc=26.1 min CN=60 Runoff=2.22 cfs 0.324 af

Subcatchment6: Subarea Runoff Area=2.690 ac 11.15% Impervious Runoff Depth>0.35"
Flow Length=95' Slope=0.0200 '/' Tc=14.9 min CN=65 Runoff=0.91 cfs 0.077 af

Pond 1B: Basin Peak Elev=930.84' Storage=0.491 af Inflow=6.59 cfs 0.786 af
Discarded=0.49 cfs 0.310 af Primary=0.00 cfs 0.000 af Outflow=0.49 cfs 0.310 af

Pond 2B: Basin Peak Elev=927.31' Storage=0.142 af Inflow=2.86 cfs 0.229 af
Discarded=0.16 cfs 0.104 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.104 af

Pond 3B: Basin Peak Elev=910.43' Storage=0.258 af Inflow=4.02 cfs 0.485 af
Discarded=0.48 cfs 0.289 af Primary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.289 af

Link 1L: Drains east Inflow=2.73 cfs 0.382 af
Primary=2.73 cfs 0.382 af

Link 2L: Drains west to Sprague Road Inflow=0.91 cfs 0.077 af
Primary=0.91 cfs 0.077 af

Link 99L: Total Post-DevelopmentOutflow Inflow=3.31 cfs 0.459 af
Primary=3.31 cfs 0.459 af

Total Runoff Area = 79.730 ac Runoff Volume = 1.959 af Average Runoff Depth = 0.29"
92.49% Pervious = 73.740 ac 7.51% Impervious = 5.990 ac

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subarea Runoff Area=30.110 ac 8.57% Impervious Runoff Depth>0.81"
Flow Length=735' Slope=0.0100 '/' Tc=27.1 min CN=64 Runoff=21.45 cfs 2.021 af

Subcatchment2: Subarea Runoff Area=6.210 ac 17.39% Impervious Runoff Depth>1.02"
Flow Length=300' Slope=0.0200 '/' Tc=17.0 min CN=68 Runoff=7.60 cfs 0.528 af

Subcatchment3: Subarea Runoff Area=20.420 ac 7.30% Impervious Runoff Depth>0.76"
Flow Length=1,325' Tc=25.1 min CN=63 Runoff=14.03 cfs 1.288 af

Subcatchment4: Subarea Runoff Area=1.560 ac 19.23% Impervious Runoff Depth>1.02"
Flow Length=345' Tc=22.6 min CN=68 Runoff=1.65 cfs 0.132 af

Subcatchment5: Subarea Runoff Area=18.740 ac 1.28% Impervious Runoff Depth>0.62"
Flow Length=645' Slope=0.0100 '/' Tc=26.1 min CN=60 Runoff=9.60 cfs 0.965 af

Subcatchment6: Subarea Runoff Area=2.690 ac 11.15% Impervious Runoff Depth>0.86"
Flow Length=95' Slope=0.0200 '/' Tc=14.9 min CN=65 Runoff=2.87 cfs 0.193 af

Pond 1B: Basin Peak Elev=931.80' Storage=1.372 af Inflow=21.45 cfs 2.021 af
Discarded=0.61 cfs 0.389 af Primary=0.70 cfs 0.386 af Outflow=1.32 cfs 0.775 af

Pond 2B: Basin Peak Elev=927.97' Storage=0.321 af Inflow=7.60 cfs 0.528 af
Discarded=0.20 cfs 0.125 af Primary=0.45 cfs 0.166 af Outflow=0.64 cfs 0.290 af

Pond 3B: Basin Peak Elev=911.35' Storage=0.885 af Inflow=14.03 cfs 1.454 af
Discarded=0.86 cfs 0.527 af Primary=0.38 cfs 0.162 af Outflow=1.24 cfs 0.690 af

Link 1L: Drains east Inflow=11.10 cfs 1.646 af
Primary=11.10 cfs 1.646 af

Link 2L: Drains west to Sprague Road Inflow=2.87 cfs 0.193 af
Primary=2.87 cfs 0.193 af

Link 99L: Total Post-DevelopmentOutflow Inflow=12.96 cfs 1.839 af
Primary=12.96 cfs 1.839 af

Total Runoff Area = 79.730 ac Runoff Volume = 5.127 af Average Runoff Depth = 0.77"
92.49% Pervious = 73.740 ac 7.51% Impervious = 5.990 ac

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subarea Runoff Area=30.110 ac 8.57% Impervious Runoff Depth>2.26"
Flow Length=735' Slope=0.0100 '/' Tc=27.1 min CN=64 Runoff=66.59 cfs 5.665 af

Subcatchment2: Subarea Runoff Area=6.210 ac 17.39% Impervious Runoff Depth>2.62"
Flow Length=300' Slope=0.0200 '/' Tc=17.0 min CN=68 Runoff=20.65 cfs 1.357 af

Subcatchment3: Subarea Runoff Area=20.420 ac 7.30% Impervious Runoff Depth>2.17"
Flow Length=1,325' Tc=25.1 min CN=63 Runoff=45.18 cfs 3.697 af

Subcatchment4: Subarea Runoff Area=1.560 ac 19.23% Impervious Runoff Depth>2.62"
Flow Length=345' Tc=22.6 min CN=68 Runoff=4.48 cfs 0.340 af

Subcatchment5: Subarea Runoff Area=18.740 ac 1.28% Impervious Runoff Depth>1.92"
Flow Length=645' Slope=0.0100 '/' Tc=26.1 min CN=60 Runoff=35.26 cfs 2.994 af

Subcatchment6: Subarea Runoff Area=2.690 ac 11.15% Impervious Runoff Depth>2.36"
Flow Length=95' Slope=0.0200 '/' Tc=14.9 min CN=65 Runoff=8.48 cfs 0.528 af

Pond 1B: Basin Peak Elev=933.83' Storage=3.758 af Inflow=66.59 cfs 5.665 af
Discarded=0.97 cfs 0.611 af Primary=5.26 cfs 1.803 af Outflow=6.23 cfs 2.414 af

Pond 2B: Basin Peak Elev=929.59' Storage=0.855 af Inflow=20.65 cfs 1.357 af
Discarded=0.29 cfs 0.183 af Primary=1.28 cfs 0.705 af Outflow=1.57 cfs 0.887 af

Pond 3B: Basin Peak Elev=912.37' Storage=1.804 af Inflow=46.06 cfs 4.401 af
Discarded=1.23 cfs 0.678 af Primary=12.16 cfs 2.641 af Outflow=13.39 cfs 3.319 af

Link 1L: Drains east Inflow=40.81 cfs 7.779 af
Primary=40.81 cfs 7.779 af

Link 2L: Drains west to Sprague Road Inflow=8.48 cfs 0.528 af
Primary=8.48 cfs 0.528 af

Link 99L: Total Post-DevelopmentOutflow Inflow=46.07 cfs 8.307 af
Primary=46.07 cfs 8.307 af

Total Runoff Area = 79.730 ac Runoff Volume = 14.582 af Average Runoff Depth = 2.19"
92.49% Pervious = 73.740 ac 7.51% Impervious = 5.990 ac

Summary for Subcatchment 1: Subarea

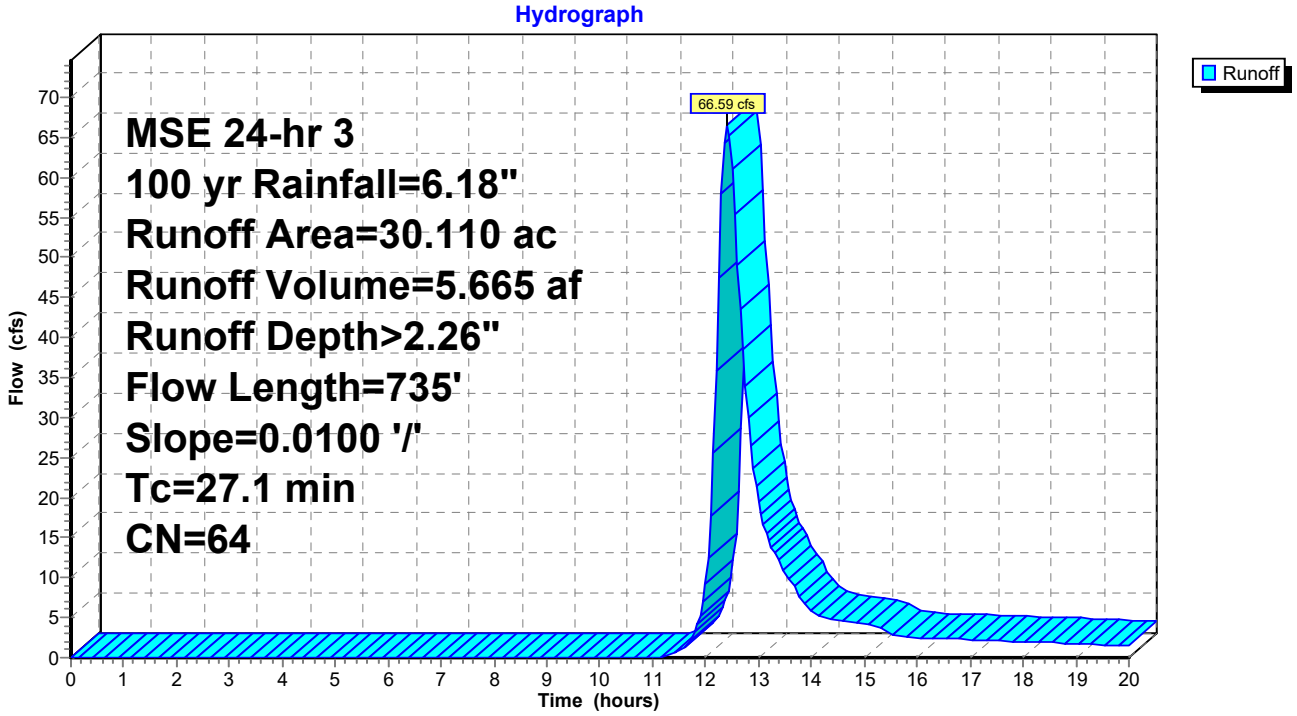
Runoff = 66.59 cfs @ 12.41 hrs, Volume= 5.665 af, Depth> 2.26"
Routed to Pond 1B : Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	27.530	61	lawn
*	1.720	98	impervious
*	0.860	100	effective infiltration area
	30.110	64	Weighted Average
	27.530		91.43% Pervious Area
	2.580		8.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
6.6	635	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
27.1	735	Total			

Subcatchment 1: Subarea



Summary for Subcatchment 2: Subarea

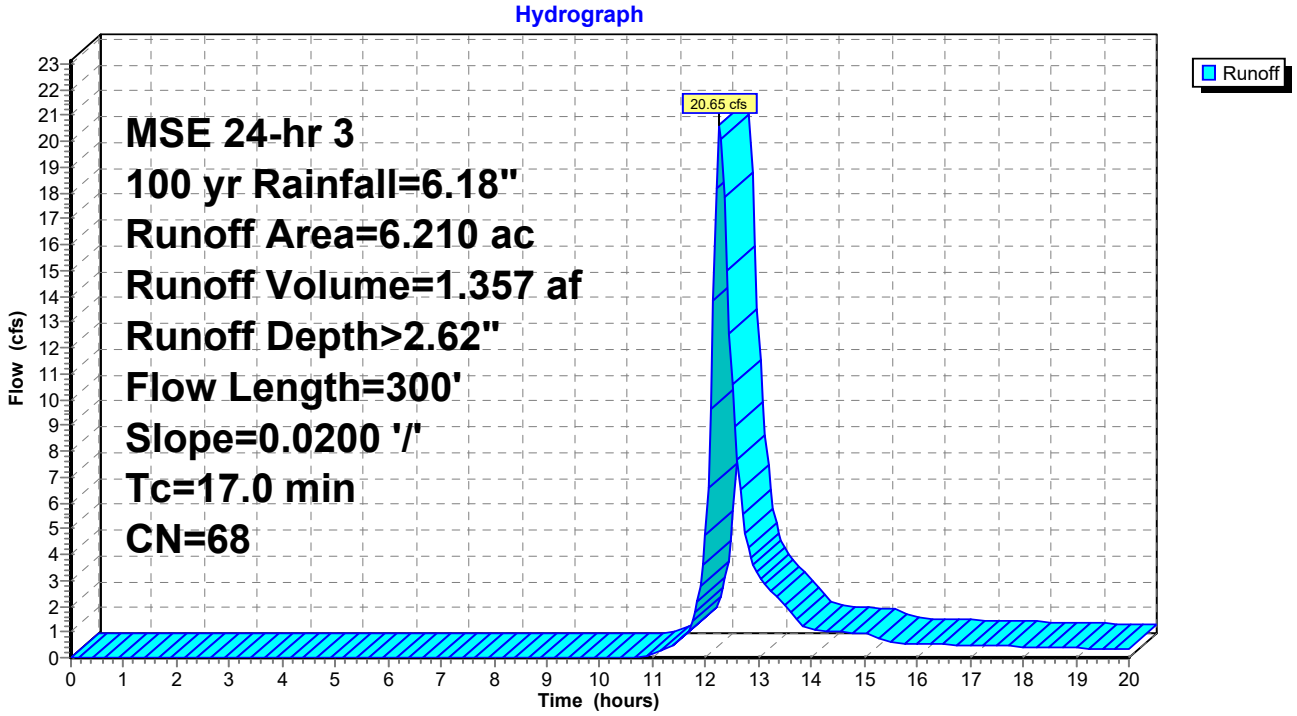
Runoff = 20.65 cfs @ 12.27 hrs, Volume= 1.357 af, Depth> 2.62"
Routed to Pond 2B : Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	5.130	61	lawn
*	0.840	98	impervious
*	0.240	100	effective infiltration area
	6.210	68	Weighted Average
	5.130		82.61% Pervious Area
	1.080		17.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0200	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
17.0	300	Total			

Subcatchment 2: Subarea



Summary for Subcatchment 3: Subarea

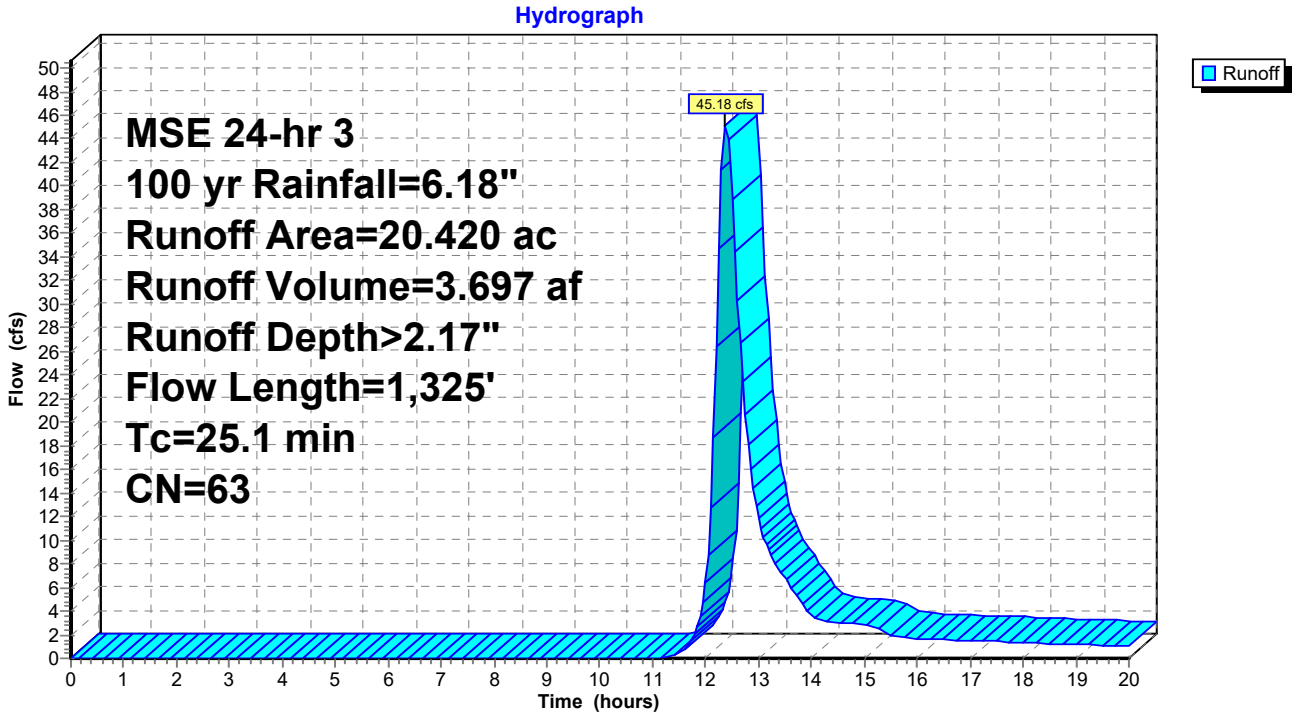
Runoff = 45.18 cfs @ 12.38 hrs, Volume= 3.697 af, Depth> 2.17"
Routed to Pond 3B : Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	15.240	61	lawn
*	3.690	58	meadow
*	1.170	98	impervious
*	0.320	100	effective infiltration area
	20.420	63	Weighted Average
	18.930		92.70% Pervious Area
	1.490		7.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0200	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.4	185	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	370	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.3	605	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	65		5.00		**Direct Entry, pipe**
25.1	1,325	Total			

Subcatchment 3: Subarea



Summary for Subcatchment 4: Subarea

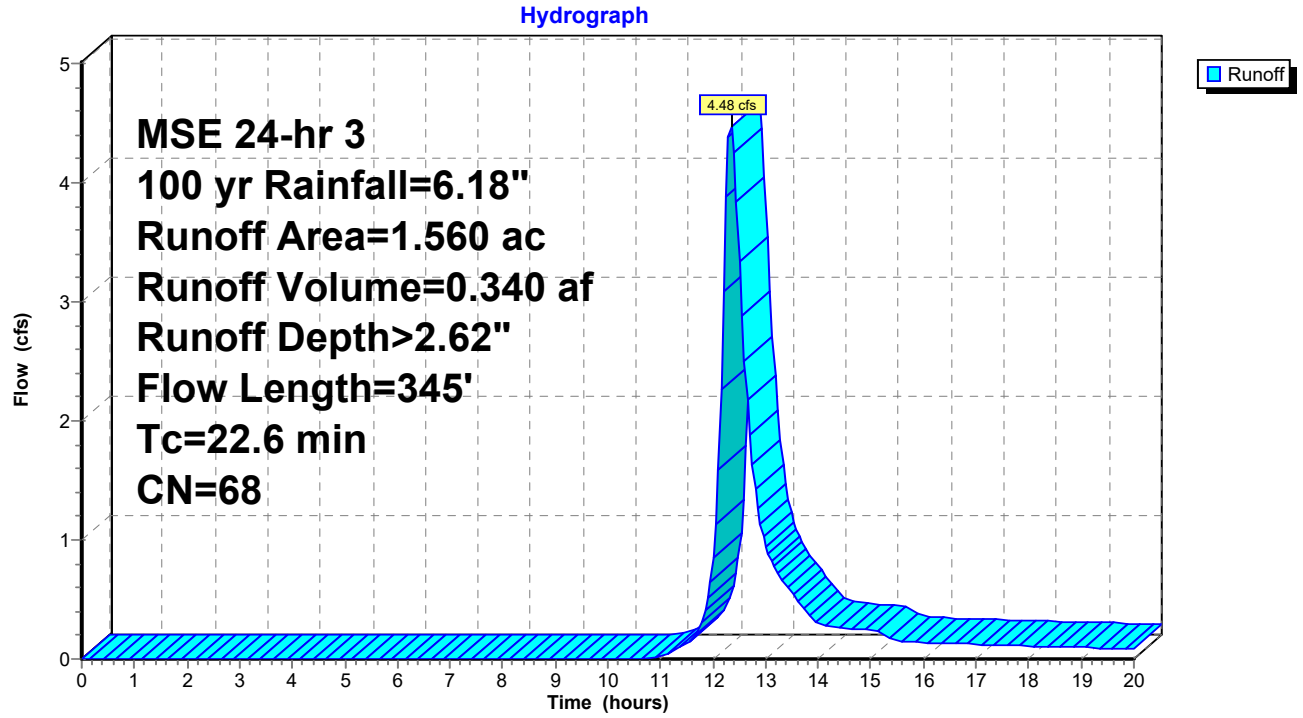
Runoff = 4.48 cfs @ 12.34 hrs, Volume= 0.340 af, Depth> 2.62"
Routed to Link 1L : Drains east

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	1.260	61	lawn
*	0.300	98	impervious
	1.560	68	Weighted Average
	1.260		80.77% Pervious Area
	0.300		19.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	95	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	5	0.2000	7.20		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.1	145	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
22.6	345	Total			

Subcatchment 4: Subarea



Summary for Subcatchment 5: Subarea

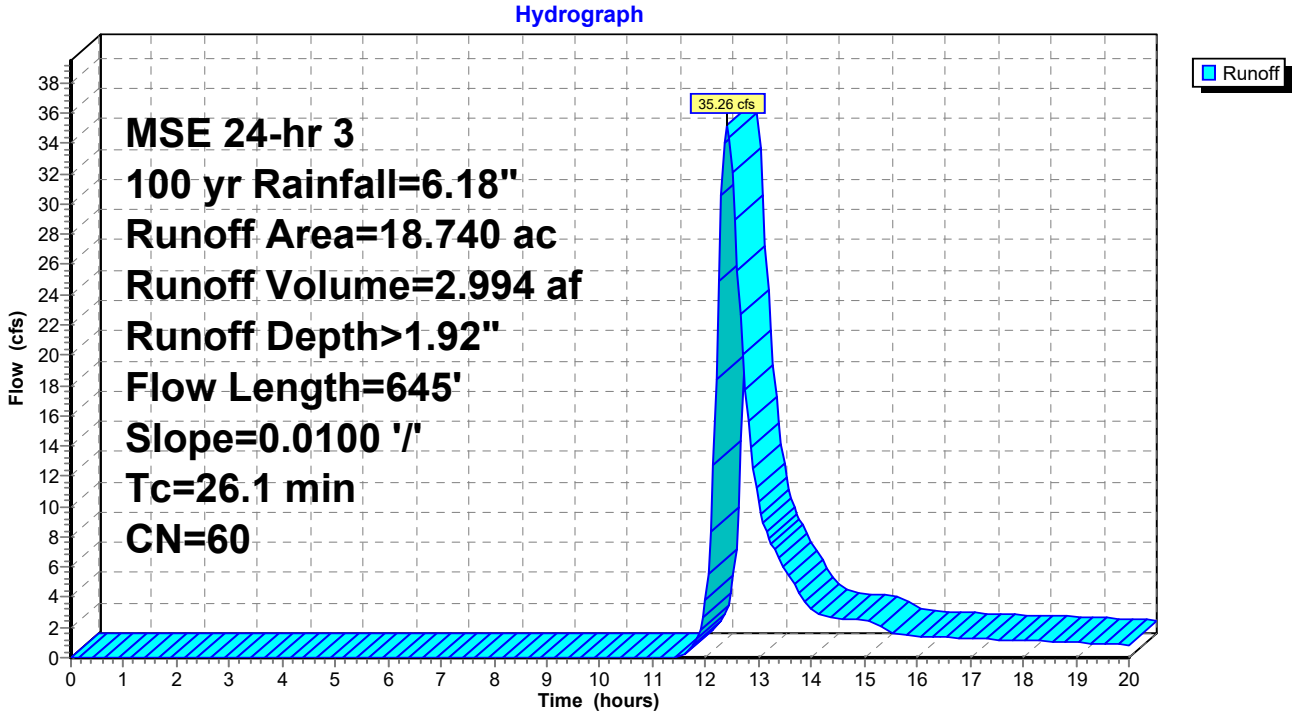
Runoff = 35.26 cfs @ 12.40 hrs, Volume= 2.994 af, Depth> 1.92"
Routed to Link 1L : Drains east

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	10.810	61	lawn
*	0.240	98	impervious
*	7.690	58	meadow
	18.740	60	Weighted Average
	18.500		98.72% Pervious Area
	0.240		1.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
5.6	545	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
26.1	645	Total			

Subcatchment 5: Subarea



Summary for Subcatchment 6: Subarea

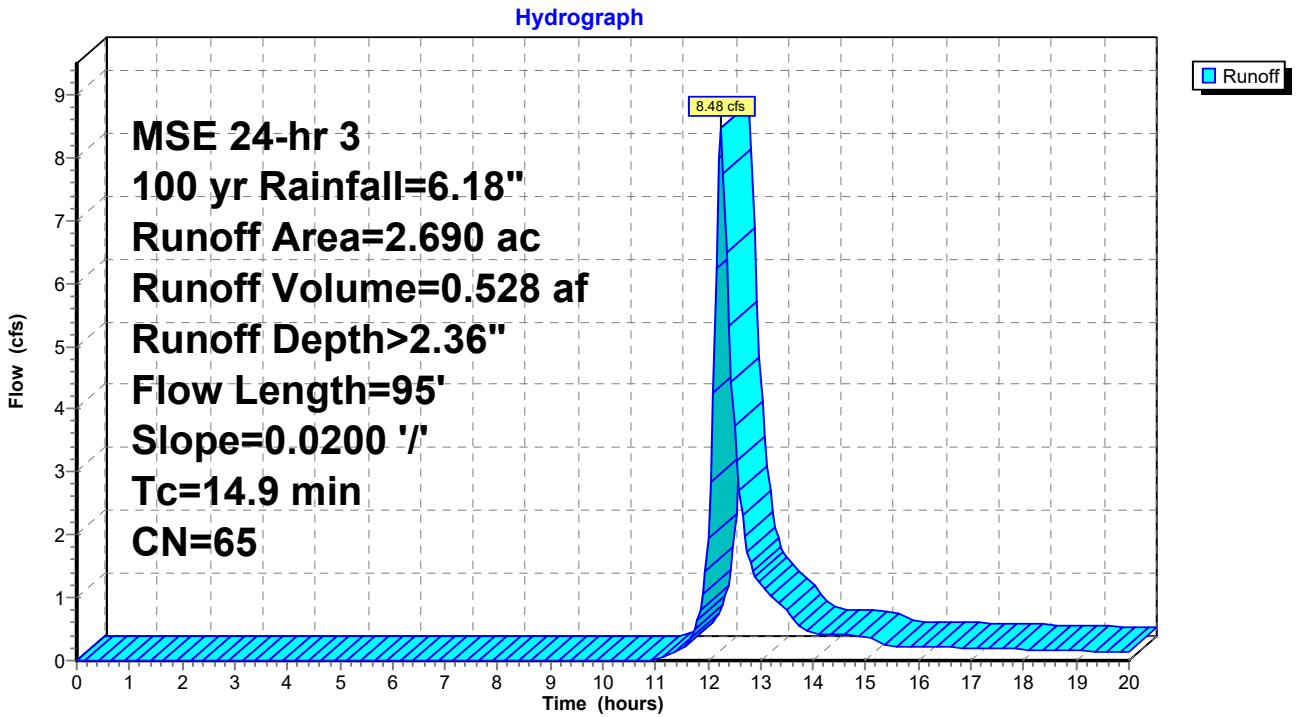
Runoff = 8.48 cfs @ 12.25 hrs, Volume= 0.528 af, Depth> 2.36"
Routed to Link 2L : Drains west to Sprague Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	2.390	61	lawn
*	0.300	98	impervious
	2.690	65	Weighted Average
	2.390		88.85% Pervious Area
	0.300		11.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	95	0.0200	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 6: Subarea



Summary for Pond 1B: Basin

Inflow Area = 30.110 ac, 8.57% Impervious, Inflow Depth > 2.26" for 100 yr event
Inflow = 66.59 cfs @ 12.41 hrs, Volume= 5.665 af
Outflow = 6.23 cfs @ 13.93 hrs, Volume= 2.414 af, Atten= 91%, Lag= 91.4 min
Discarded = 0.97 cfs @ 13.93 hrs, Volume= 0.611 af
Primary = 5.26 cfs @ 13.93 hrs, Volume= 1.803 af
Routed to Link 1L : Drains east

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 933.83' @ 13.93 hrs Surf.Area= 1.436 ac Storage= 3.758 af

Plug-Flow detention time= 197.9 min calculated for 2.414 af (43% of inflow)
Center-of-Mass det. time= 126.1 min (938.0 - 811.9)

Volume	Invert	Avail.Storage	Storage Description
#1	929.50'	5.854 af	**Custom Stage Data (Conic)** Listed below (Recalc)

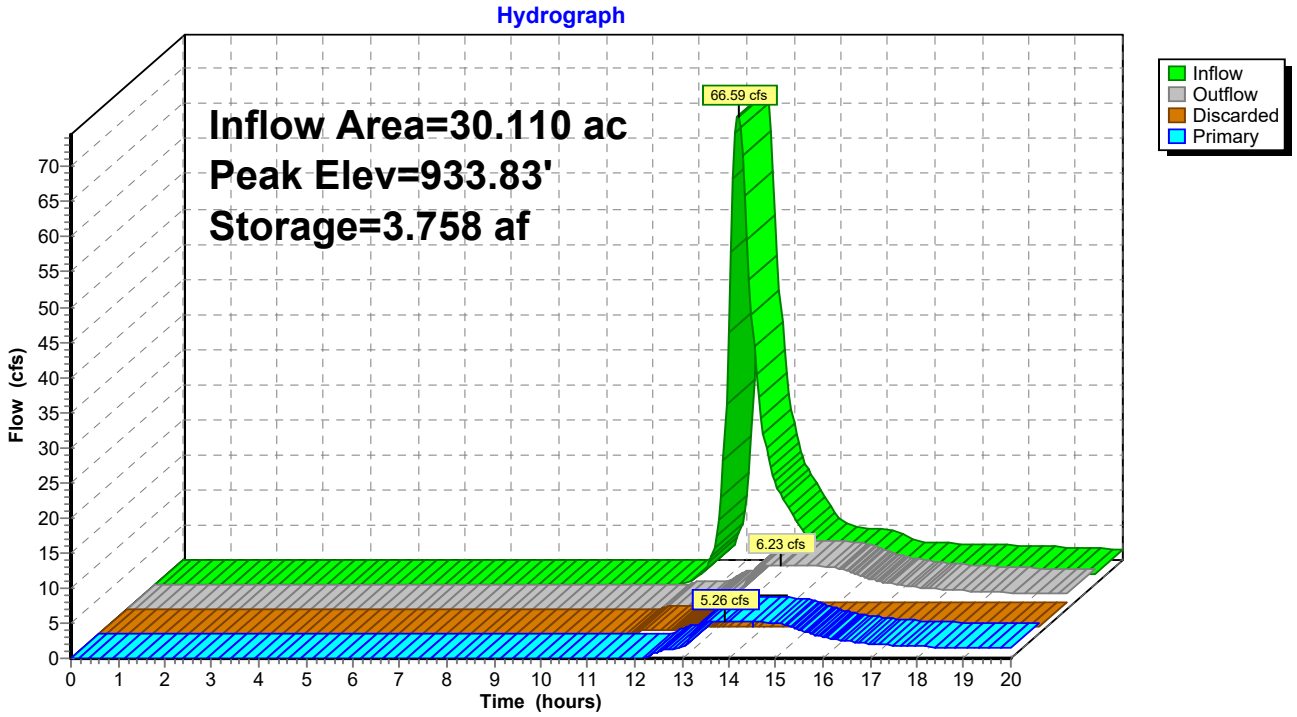
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
929.50	0.800	0.0	0.000	0.000	0.800
930.50	0.800	27.0	0.216	0.216	0.815
931.00	0.860	100.0	0.415	0.631	0.876
932.00	1.020	100.0	0.939	1.570	1.037
933.00	1.190	100.0	1.104	2.674	1.207
934.00	1.490	100.0	1.337	4.011	1.508
935.00	2.220	100.0	1.843	5.854	2.238

Device	Routing	Invert	Outlet Devices
#1	Discarded	929.50'	**0.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 921.00' Phase-In= 0.01'
#2	Primary	931.00'	**12.0" Round Culvert** L= 67.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 931.00' / 930.30' S= 0.0104 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	931.00'	**6.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 2	933.50'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	934.00'	**10.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.97 cfs @ 13.93 hrs HW=933.83' (Free Discharge)
└**1=Exfiltration** (Controls 0.97 cfs)

Primary OutFlow Max=5.26 cfs @ 13.93 hrs HW=933.83' (Free Discharge)
└**2=Culvert** (Barrel Controls 5.26 cfs @ 6.70 fps)
└**3=Orifice** (Passes < 1.52 cfs potential flow)
└**4=Grate** (Passes < 5.76 cfs potential flow)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1B: Basin



Summary for Pond 2B: Basin

Inflow Area = 6.210 ac, 17.39% Impervious, Inflow Depth > 2.62" for 100 yr event
Inflow = 20.65 cfs @ 12.27 hrs, Volume= 1.357 af
Outflow = 1.57 cfs @ 13.69 hrs, Volume= 0.887 af, Atten= 92%, Lag= 85.3 min
Discarded = 0.29 cfs @ 13.69 hrs, Volume= 0.183 af
Primary = 1.28 cfs @ 13.69 hrs, Volume= 0.705 af
Routed to Pond 3B : Basin

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 929.59' @ 13.69 hrs Surf.Area= 0.376 ac Storage= 0.855 af

Plug-Flow detention time= 212.0 min calculated for 0.885 af (65% of inflow)
Center-of-Mass det. time= 152.6 min (951.2 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1	926.00'	2.551 af	**Custom Stage Data (Conic)** Listed below (Recalc)

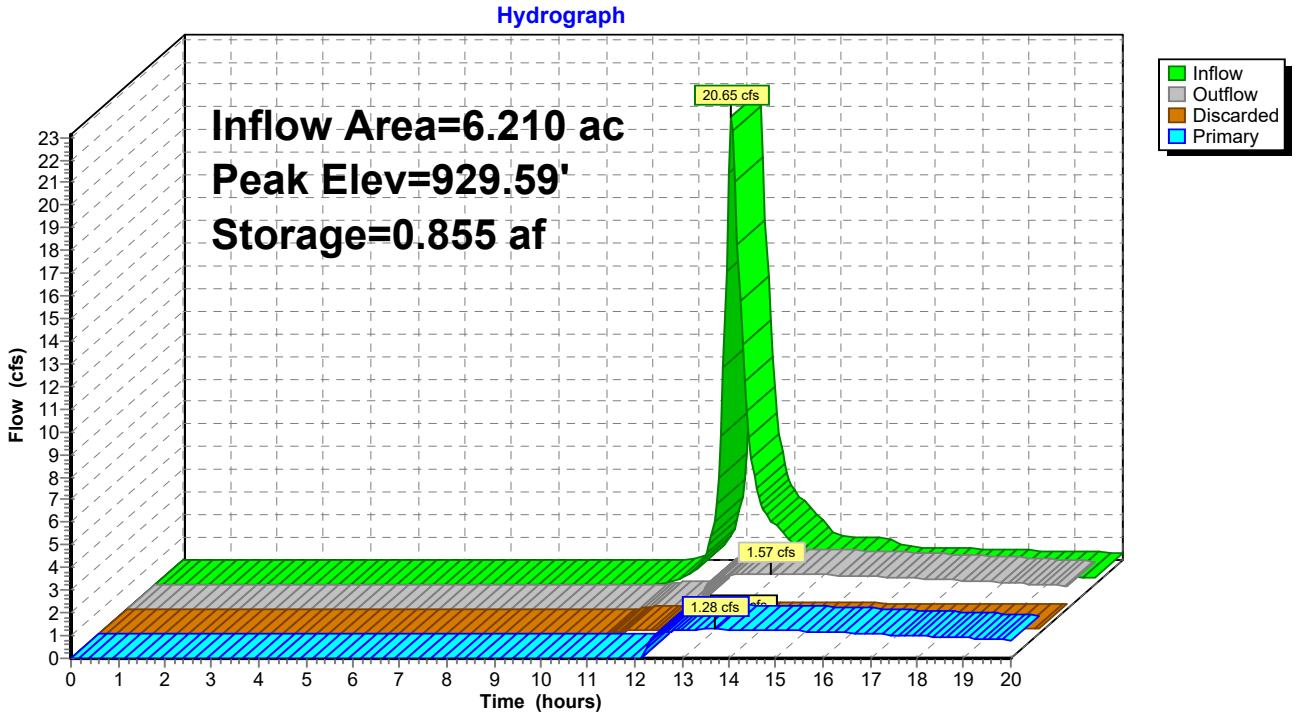
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
926.00	0.240	0.0	0.000	0.000	0.240
927.00	0.240	27.0	0.065	0.065	0.248
932.00	0.530	100.0	1.878	1.943	0.543
933.00	0.690	100.0	0.608	2.551	0.703

Device	Routing	Invert	Outlet Devices
#1	Discarded	926.00'	**0.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 921.20' Phase-In= 0.01'
#2	Primary	927.50'	**12.0" Round Culvert** L= 113.6' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 927.50' / 924.00' S= 0.0308 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	927.50'	**6.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 2	930.00'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	932.00'	**10.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.29 cfs @ 13.69 hrs HW=929.59' (Free Discharge)
└**1=Exfiltration** (Controls 0.29 cfs)

Primary OutFlow Max=1.28 cfs @ 13.69 hrs HW=929.59' (Free Discharge)
└**2=Culvert** (Passes 1.28 cfs of 5.95 cfs potential flow)
  └**3=Orifice** (Orifice Controls 1.28 cfs @ 6.53 fps)
  └**4=Grate** (Controls 0.00 cfs)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2B: Basin



Summary for Pond 3B: Basin

Inflow Area = 26.630 ac, 9.65% Impervious, Inflow Depth > 1.98" for 100 yr event
Inflow = 46.06 cfs @ 12.38 hrs, Volume= 4.401 af
Outflow = 13.39 cfs @ 12.99 hrs, Volume= 3.319 af, Atten= 71%, Lag= 36.5 min
Discarded = 1.23 cfs @ 12.99 hrs, Volume= 0.678 af
Primary = 12.16 cfs @ 12.99 hrs, Volume= 2.641 af
Routed to Link 1L : Drains east

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 912.37' @ 12.99 hrs Surf.Area= 0.989 ac Storage= 1.804 af

Plug-Flow detention time= 126.0 min calculated for 3.311 af (75% of inflow)
Center-of-Mass det. time= 62.9 min (897.4 - 834.4)

Volume	Invert	Avail.Storage	Storage Description
#1	909.00'	3.725 af	**Custom Stage Data (Conic)** Listed below (Recalc)

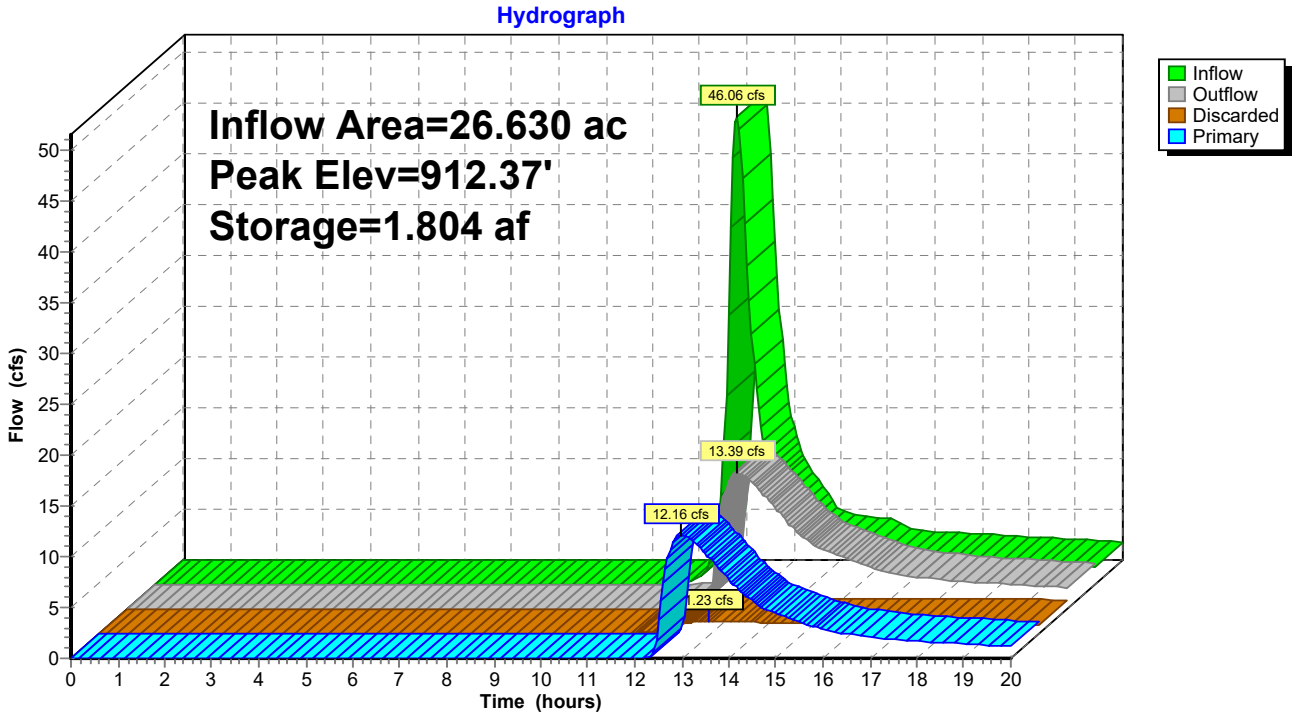
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
909.00	0.320	0.0	0.000	0.000	0.320
910.00	0.320	27.0	0.086	0.086	0.330
911.00	0.760	100.0	0.524	0.611	0.770
912.00	0.920	100.0	0.839	1.450	0.931
913.00	1.110	100.0	1.014	2.463	1.121
914.00	1.420	100.0	1.262	3.725	1.432

Device	Routing	Invert	Outlet Devices
#1	Discarded	909.00'	**0.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 908.00' Phase-In= 0.01'
#2	Primary	910.90'	**12.0" Round Culvert** L= 235.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 910.90' / 910.50' S= 0.0017 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	911.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Primary	912.40'	**10.0' long + 5.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=1.23 cfs @ 12.99 hrs HW=912.37' (Free Discharge)
└**1=Exfiltration** (Controls 1.23 cfs)

Primary OutFlow Max=12.15 cfs @ 12.99 hrs HW=912.37' (Free Discharge)
├**2=Culvert** (Barrel Controls 1.97 cfs @ 2.51 fps)
├**3=Sharp-Crested Rectangular Weir** (Weir Controls 10.18 cfs @ 3.05 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3B: Basin

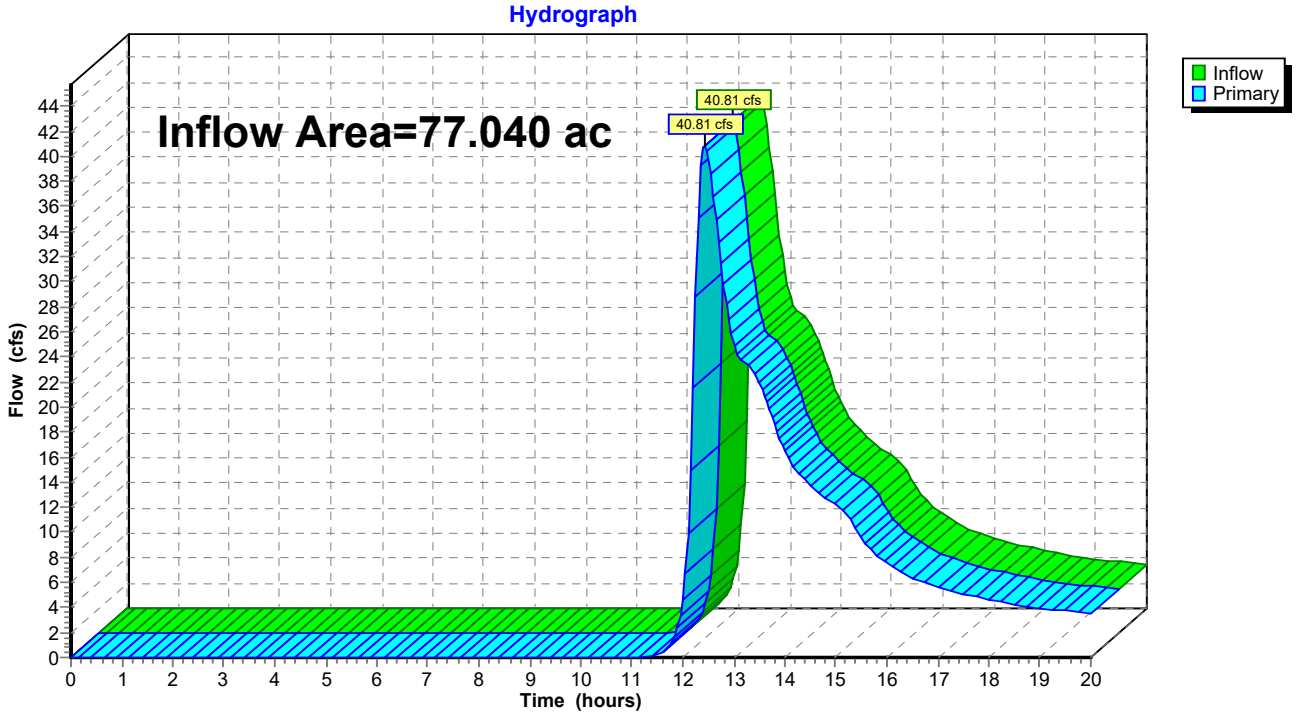


Summary for Link 1L: Drains east

Inflow Area = 77.040 ac, 7.39% Impervious, Inflow Depth > 1.21" for 100 yr event
Inflow = 40.81 cfs @ 12.43 hrs, Volume= 7.779 af
Primary = 40.81 cfs @ 12.43 hrs, Volume= 7.779 af, Atten= 0%, Lag= 0.0 min
Routed to Link 99L : Total Post-Development Outflow

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 1L: Drains east

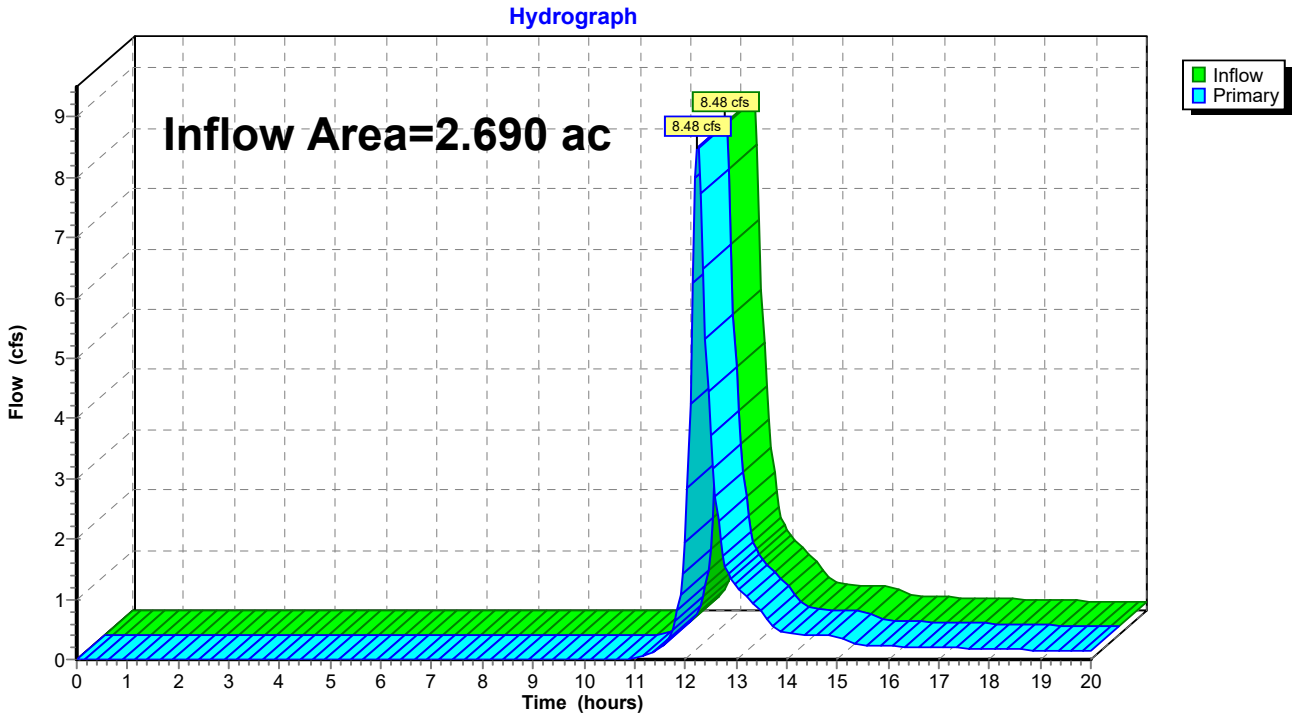


Summary for Link 2L: Drains west to Sprague Road

Inflow Area = 2.690 ac, 11.15% Impervious, Inflow Depth > 2.36" for 100 yr event
Inflow = 8.48 cfs @ 12.25 hrs, Volume= 0.528 af
Primary = 8.48 cfs @ 12.25 hrs, Volume= 0.528 af, Atten= 0%, Lag= 0.0 min
Routed to Link 99L : Total Post-Development Outflow

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Drains west to Sprague Road

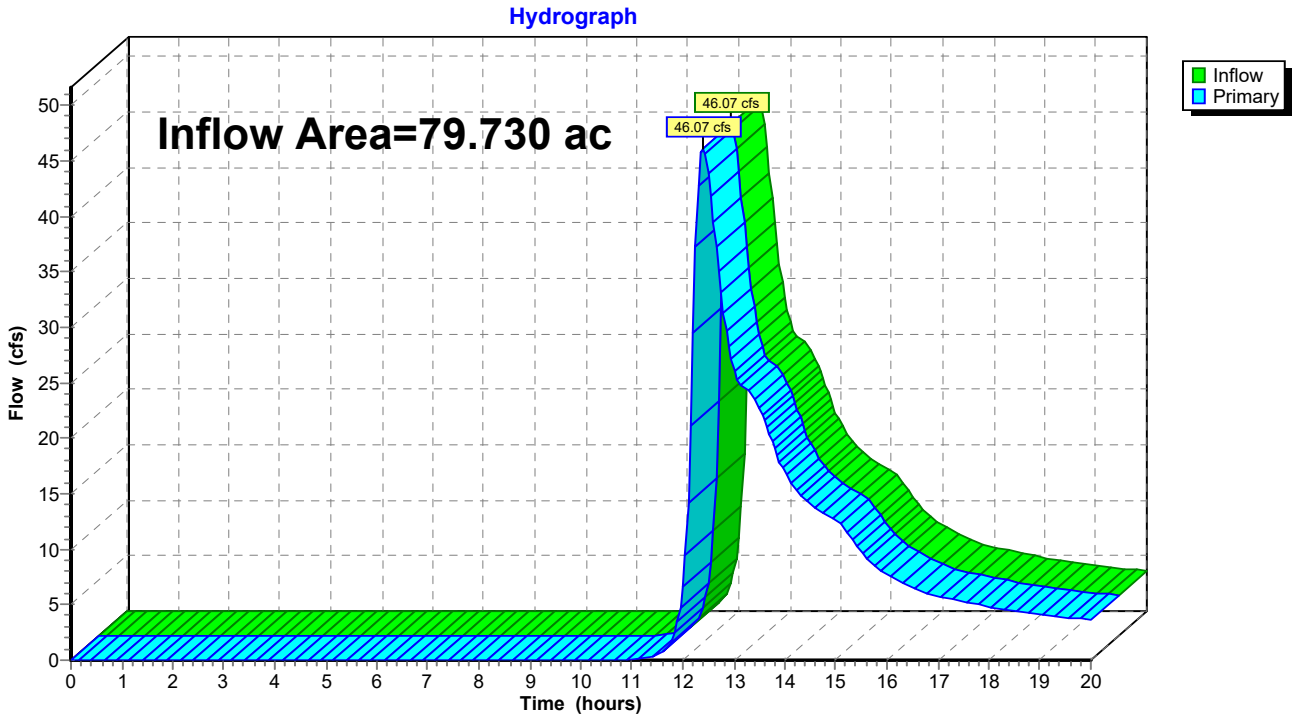


Summary for Link 99L: Total Post-Development Outflow

Inflow Area = 79.730 ac, 7.51% Impervious, Inflow Depth > 1.25" for 100 yr event
Inflow = 46.07 cfs @ 12.39 hrs, Volume= 8.307 af
Primary = 46.07 cfs @ 12.39 hrs, Volume= 8.307 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 99L: Total Post-Development Outflow



Events for Subcatchment 1: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	3.85	0.531	0.21
2 yr	2.70	6.59	0.786	0.31
10 yr	3.81	21.45	2.021	0.81
100 yr	**6.18**	**66.59**	**5.665**	**2.26**

Events for Subcatchment 2: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.86	0.164	0.32
2 yr	2.70	2.86	0.229	0.44
10 yr	3.81	7.60	0.528	1.02
100 yr	**6.18**	**20.65**	**1.357**	**2.62**

Events for Subcatchment 3: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	2.26	0.322	0.19
2 yr	2.70	4.02	0.485	0.29
10 yr	3.81	14.03	1.288	0.76
100 yr	**6.18**	**45.18**	**3.697**	**2.17**

Events for Subcatchment 4: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.40	0.041	0.32
2 yr	2.70	0.62	0.057	0.44
10 yr	3.81	1.65	0.132	1.02
100 yr	**6.18**	**4.48**	**0.340**	**2.62**

Events for Subcatchment 5: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.10	0.201	0.13
2 yr	2.70	2.22	0.324	0.21
10 yr	3.81	9.60	0.965	0.62
100 yr	**6.18**	**35.26**	**2.994**	**1.92**

Events for Subcatchment 6: Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.53	0.053	0.24
2 yr	2.70	0.91	0.077	0.35
10 yr	3.81	2.87	0.193	0.86
100 yr	**6.18**	**8.48**	**0.528**	**2.36**

Events for Pond 1B: Basin

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	3.85	0.46	0.46	0.00	930.58	0.280
2 yr	6.59	0.49	0.49	0.00	930.84	0.491
10 yr	21.45	1.32	0.61	0.70	931.80	1.372
100 yr	**66.59**	**6.23**	**0.97**	**5.26**	**933.83**	**3.758**

Events for Pond 2B: Basin

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	1.86	0.15	0.15	0.00	927.10	0.090
2 yr	2.86	0.16	0.16	0.00	927.31	0.142
10 yr	7.60	0.64	0.20	0.45	927.97	0.321
100 yr	**20.65**	**1.57**	**0.29**	**1.28**	**929.59**	**0.855**

Events for Pond 3B: Basin

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	2.26	0.38	0.38	0.00	910.17	0.147
2 yr	4.02	0.48	0.48	0.00	910.43	0.258
10 yr	14.03	1.24	0.86	0.38	911.35	0.885
100 yr	**46.06**	**13.39**	**1.23**	**12.16**	**912.37**	**1.804**

Events for Link 1L: Drains east

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	1.40	1.40	**0.00**
2 yr	2.73	2.73	0.00
10 yr	11.10	11.10	0.00
100 yr	**40.81**	**40.81**	0.00

Events for Link 2L: Drains west to Sprague Road

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	0.53	0.53	**0.00**
2 yr	0.91	0.91	0.00
10 yr	2.87	2.87	0.00
100 yr	**8.48**	**8.48**	0.00

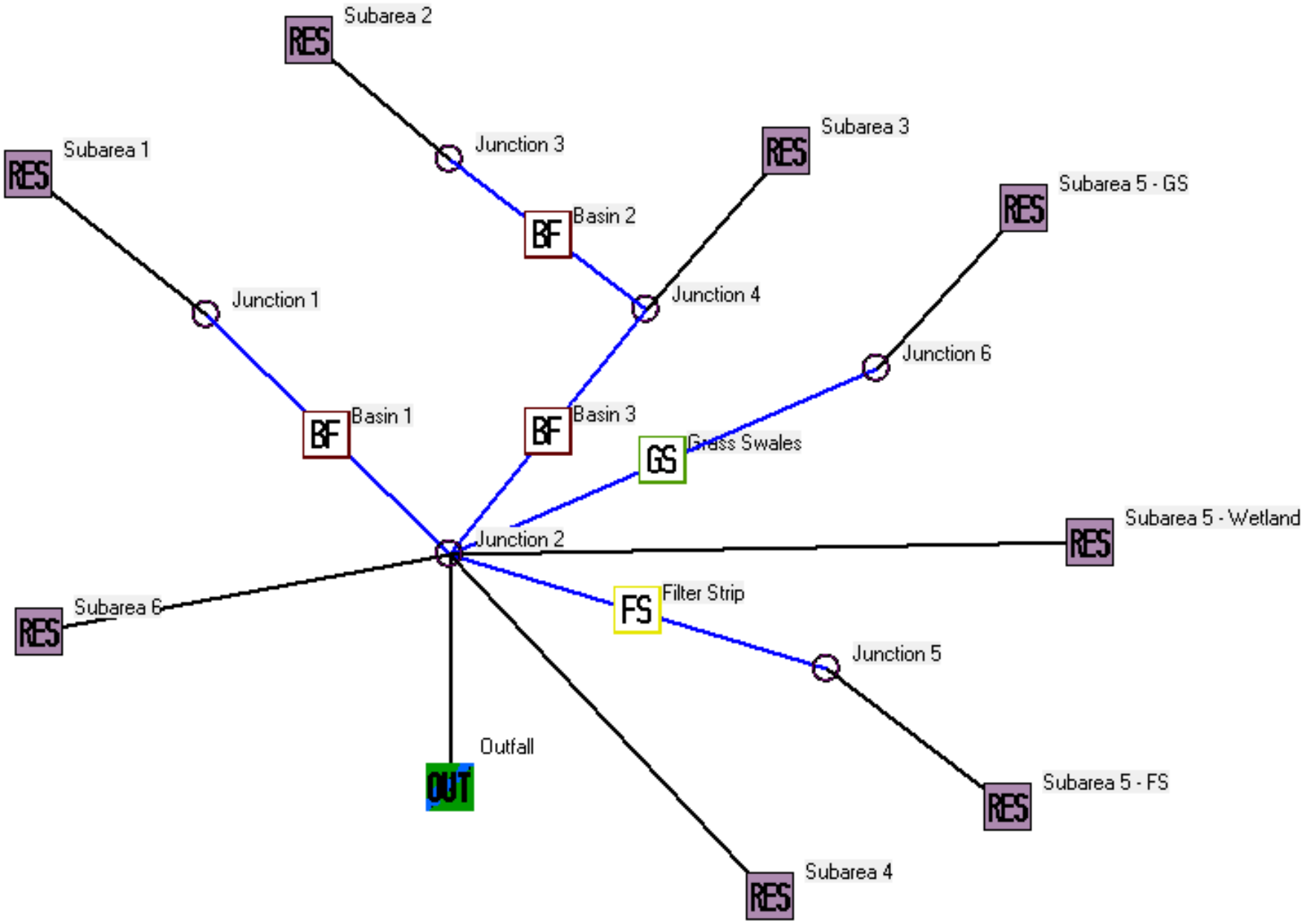
Events for Link 99L: Total Post-Development Outflow

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	1.75	1.75	**0.00**
2 yr	3.31	3.31	0.00
10 yr	12.96	12.96	0.00
100 yr	**46.07**	**46.07**	0.00

APPENDIX C

Treatment Analysis

Treatment Analysis



SLAMM for Windows Version 10.5.0

Data file name: C:\Data\Jobs\2025\2025-001 - Long Meadow_Eagle_TRIO\Project_Information\Calcs\SLAMM\Proposed.mdb
Data file description:
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Start of Winter Season: 12/06 End of Winter Season: 03/28
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 01-31-2025 Time of run: 12:22:28
Total Area Modeled (acres): 79.730
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	939618	-	135.3	7937	-
Outfall Total with Controls:	174479	81.43%	128.3	1398	82.39%
Annualized Total After Outfall Controls:	176902			1417	

Pollutant	Concentration - No Controls	Concentration - With Controls	Conc. Units	Pollutant Yield No Controls	Pollutant Yield With Controls	Pol. Yield Units	Percent Reduction
Particulate Solids	135.3	128.3	mg/L	7937	1398	lbs	82.39 %
Total Phosphorus	0.7819	0.8596	mg/L	45.87	9.364	lbs	79.59 %

Data file name: C:\Data\Jobs\2025\2025-001 - Long Meadow_Eagle_TRIO\Project_Information\Calcs\SLAMM\Proposed.mdb
WinSLAMM Version 10.5.0
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Study period starting date: 01/05/69 Study period ending date: 12/31/69
Start of Winter Season: 12/06 End of Winter Season: 03/28
Date: 01-31-2025 Time: 12:22:38
Site information:

LU# 1 - Residential: Subarea 1 Total area (ac): 30.110
  1 - Roofs 1: 0.600 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  25 - Driveways 1: 0.220 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  31 - Sidewalks 1: 0.230 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  37 - Streets 1: 0.670 ac. Smooth Street Length = 0.1843 mi Street Width = 29.99186 ft Street Edges = 2
    Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  45 - Large Landscaped Areas 1: 27.530 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  70 - Water Body Areas: 0.860 ac. Source Area PSD File:
LU# 2 - Residential: Subarea 2 Total area (ac): 6.210
  1 - Roofs 1: 0.160 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  25 - Driveways 1: 0.070 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  31 - Sidewalks 1: 0.040 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  37 - Streets 1: 0.570 ac. Smooth Street Length = 0.1568 mi Street Width = 29.99043 ft Street Edges = 2
    Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  45 - Large Landscaped Areas 1: 5.130 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  70 - Water Body Areas: 0.240 ac. Source Area PSD File:
LU# 3 - Residential: Subarea 3 Total area (ac): 20.420
  1 - Roofs 1: 0.280 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  25 - Driveways 1: 0.120 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  31 - Sidewalks 1: 0.100 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  37 - Streets 1: 0.670 ac. Smooth Street Length = 0.1843 mi Street Width = 29.99186 ft Street Edges = 2
    Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

```
     45 - Large Landscaped Areas 1:  15.240 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     57 - Undeveloped Areas 1:  3.690 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     70 - Water Body Areas:  0.320 ac.    Source Area PSD File:
LU# 4 - Residential:  Subarea 4     Total area (ac):  1.560
     1 - Roofs 1:  0.090 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1:  0.050 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  0.160 ac.    Smooth    Street Length = 0.044 mi    Street Width = 30 ft     Street Edges = 2
          Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1:  1.260 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 5 - Residential:  Subarea 5 - Wetland     Total area (ac):  7.690
     57 - Undeveloped Areas 1:  7.690 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 6 - Residential:  Subarea 6     Total area (ac):  2.690
     1 - Roofs 1:  0.070 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1:  0.230 ac.    Smooth    Street Length = 0.0633 mi    Street Width = 29.97631 ft     Street Edges = 2
          Default St. Dirt Accum.    Annual Winter Load = 2500 lbs    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1:  2.390 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 7 - Residential:  Subarea 5 - FS     Total area (ac):  2.690
     31 - Sidewalks 1:  0.020 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1:  2.670 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 8 - Residential:  Subarea 5 - GS     Total area (ac):  8.360
     1 - Roofs 1:  0.140 ac.    Pitched    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     31 - Sidewalks 1:  0.080 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     45 - Large Landscaped Areas 1:  8.140 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

      Control Practice 1:  Biofilter CP# 1 (DS) - Basin 1
         1.  Top area (square feet) =  96768
         2.  Bottom aea (square feet) =  34910
         3.  Depth (ft):   5.5
         4.  Biofilter width (ft) - for Cost Purposes Only:   10
         5.  Infiltration rate (in/hr) =  0.5
         6.  Random infiltration rate generation?  No
         7.  Infiltration rate fraction (side):   0.001
         8.  Infiltration rate fraction (bottom):   1
         9.  Depth of biofilter that is rock filled (ft) 0
         10.  Porosity of rock filled volume =  0
         11.  Engineered soil infiltration rate:   0.5
         12.  Engineered soil depth (ft) =  1
         13.  Engineered soil porosity =  0.27
         14. Percent solids reduction due to flow through engineered soil =  80
         15. Biofilter peak to average flow ratio =  3.8
         16. Number of biofiltration control devices =  1
         17. Particle size distribution file:  Not needed - calculated by program
         18. Initial water surface elevation (ft):   0
              Soil Data                      Soil Type Fraction in Eng. Soil
             User-Defined Media Type                1.000
```

```
         Saturation water content (Porosity) =   0
         Field capacity (fraction) =   0
         Permanent Wilting Point (fraction) =   0
         Infiltration rate (in/hr) =   0.5
         Biofilter Outlet/Discharge Characteristics:
        Outlet type:  Broad Crested Weir
                1.  Weir crest length (ft):   10
                2.  Weir crest width (ft):   10
                3.  Height of datum to bottom of weir opening:   4.5
        Outlet type:  Vertical Stand Pipe
                1.  Stand pipe diameter (ft):   3
                2.  Stand pipe height above datum (ft):   4
        Outlet type:  Surface Discharge Pipe
                1.  Surface discharge pipe outlet diameter (ft):   0.5
                2.  Pipe invert elevation above datum (ft):   1.5
                3.  Number of surface pipe outlets:   1

Control Practice 2:  Biofilter CP# 2 (DS) - Basin 2
   1.  Top area (square feet) =  29938
   2.  Bottom aea (square feet) =  10329
   3.  Depth (ft):   7
   4.  Biofilter width (ft) - for Cost Purposes Only:   10
   5.  Infiltration rate (in/hr) =  0.5
   6.  Random infiltration rate generation?  No
   7.  Infiltration rate fraction (side):   0.001
   8.  Infiltration rate fraction (bottom):   1
   9.  Depth of biofilter that is rock filled (ft) 0
   10.  Porosity of rock filled volume =  0
   11.  Engineered soil infiltration rate:   0.5
   12.  Engineered soil depth (ft) =  1
   13.  Engineered soil porosity =  0.27
   14. Percent solids reduction due to flow through engineered soil =  80
   15. Biofilter peak to average flow ratio =  3.8
   16. Number of biofiltration control devices =  1
   17. Particle size distribution file:  Not needed - calculated by program
   18. Initial water surface elevation (ft):   0
        Soil Data                        Soil Type Fraction in Eng. Soil
       User-Defined Media Type                    1.000
        Saturation water content (Porosity) =   0
        Field capacity (fraction) =   0
        Permanent Wilting Point (fraction) =   0
        Infiltration rate (in/hr) =   0.5
        Biofilter Outlet/Discharge Characteristics:
       Outlet type:  Broad Crested Weir
                1.  Weir crest length (ft):   10
```

```
               2.  Weir crest width (ft):   10
               3.  Height of datum to bottom of weir opening:   6
       Outlet type:  Vertical Stand Pipe
               1.  Stand pipe diameter (ft):   3
               2.  Stand pipe height above datum (ft):   4
       Outlet type:  Surface Discharge Pipe
               1.  Surface discharge pipe outlet diameter (ft):   0.5
               2.  Pipe invert elevation above datum (ft):   1.5
               3.  Number of surface pipe outlets:   1

Control Practice 3:  Biofilter CP# 3 (DS) - Basin 3
   1.  Top area (square feet) =  62019
   2.  Bottom aea (square feet) =  13791
   3.  Depth (ft):   5
   4.  Biofilter width (ft) - for Cost Purposes Only:   10
   5.  Infiltration rate (in/hr) =  0.5
   6.  Random infiltration rate generation?  No
   7.  Infiltration rate fraction (side):   1
   8.  Infiltration rate fraction (bottom):   1
   9.  Depth of biofilter that is rock filled (ft) 0
   10.  Porosity of rock filled volume =  0
   11.  Engineered soil infiltration rate:   0.5
   12.  Engineered soil depth (ft) =  1
   13.  Engineered soil porosity =  0.27
   14. Percent solids reduction due to flow through engineered soil =  80
   15. Biofilter peak to average flow ratio =  3.8
   16. Number of biofiltration control devices =  1
   17. Particle size distribution file:  Not needed - calculated by program
   18. Initial water surface elevation (ft):   0
        Soil Data                        Soil Type Fraction in Eng. Soil
       User-Defined Media Type                  1.000
        Saturation water content (Porosity) =   0
        Field capacity (fraction) =   0
        Permanent Wilting Point (fraction) =   0
        Infiltration rate (in/hr) =   0.5
        Biofilter Outlet/Discharge Characteristics:
       Outlet type:  Sharp Crested Weir
               1.  Weir length (ft):   4
               2.  Invert elevation above datum (ft):   2.5
       Outlet type:  Broad Crested Weir
               1.  Weir crest length (ft):   10
               2.  Weir crest width (ft):   10
               3.  Height of datum to bottom of weir opening:   3.4
       Outlet type:  Surface Discharge Pipe
               1.  Surface discharge pipe outlet diameter (ft):   1
```

2. Pipe invert elevation above datum (ft): 1.9
3. Number of surface pipe outlets: 1

Control Practice 4: Filter Strip CP# 1 (DS) - Filter Strip
Total drainage area (acres)= 2.690
Fraction of drainage area served by filter strips (ac) = 1.00
Total filter strip width (ft) = 450.0
Effective flow length (ft) = 20
Infiltration rate (in/hr)= 0.250
Typical longitudinal slope (ft.H/ft.V) = 0.150
Typical grass height (in) = 6.0
Swale retardance factor = C
Use stochastic analysis to determine infiltration rate: False
Infiltration rate coeficient of variation (COV) = 0.00
Particle size distribution file name: Not needed - calculated by program
Surface Clogging Load (lbs/sf) = 3.50

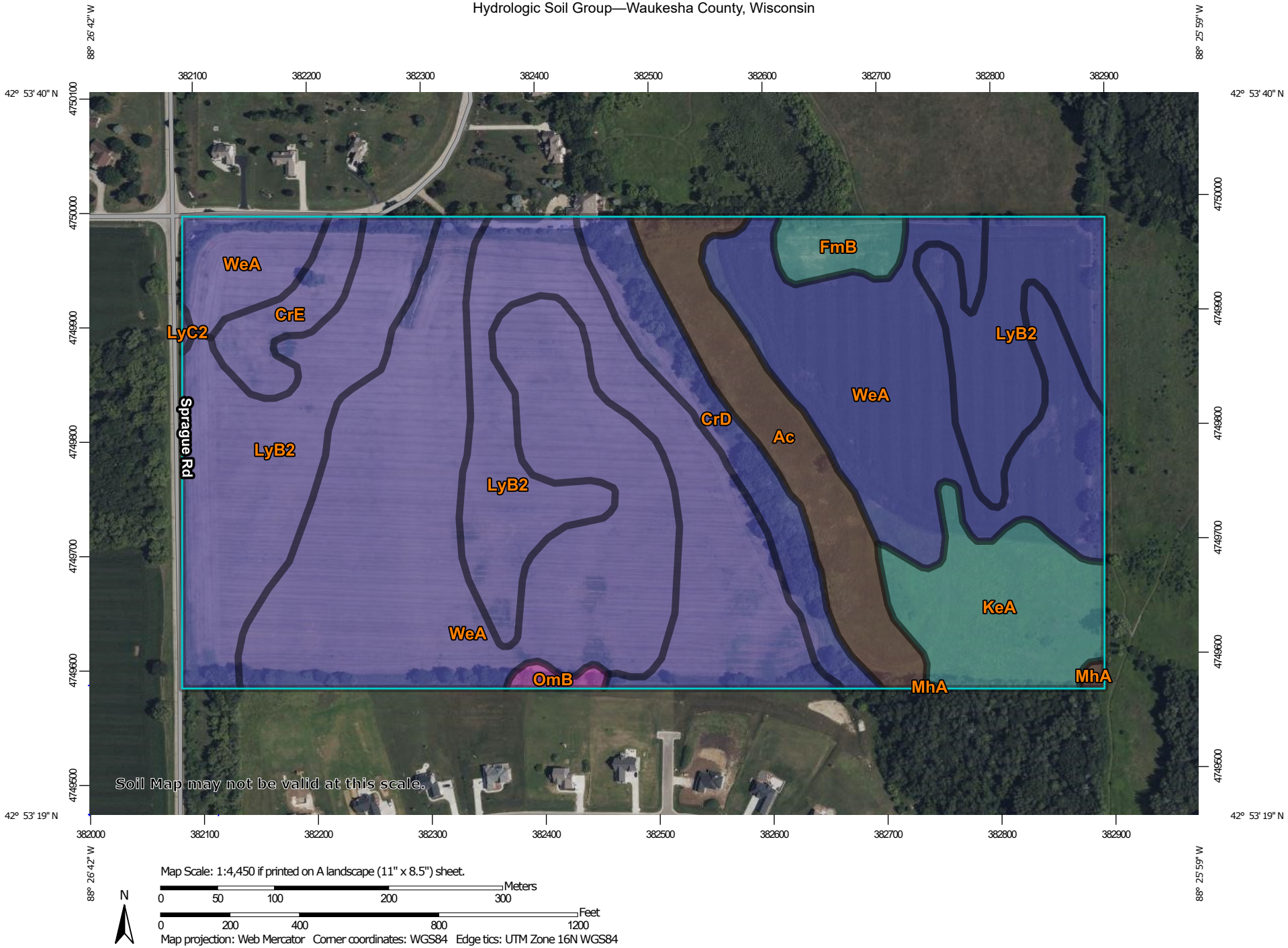
Control Practice 5: Grass Swale CP# 1 (DS) - Grass Swales
Total drainage area (acres)= 8.360
Fraction of drainage area served by swales (ac) = 1.00
Swale density (ft/ac) = 101.67
Total swale length (ft) = 850
Average swale length to outlet (ft)= 280
Typical bottom width (ft) = 10.0
Typical swale side slope (_H:1V) = 5.0
Typical longitudinal slope (ft.H/ft.V) = 0.005
Swale retardance factor: C
Typical grass height (in) = 6.0
Swale dynamic infiltration rate (in/hr)= 0.250
Typical swale depth (ft) for cost analysis (optional) = 0.0
Particle size distribution file name: Not needed - calculated by program
Use total swale length instead of swale density for infiltration calculations: True

APPENDIX D

Soil Survey

&

Preliminary Geotechnical and Site Feasibility Evaluation



Map Scale: 1:4,450 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 50, 100, 200, 300

Feet: 0, 200, 400, 800, 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Waukesha County, Wisconsin
Survey Area Data: Version 3, Dec 10, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 30, 2022—Aug 18, 2022

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ac	Adrian muck, 0 to 2 percent slopes	B/D	5.8	7.0%
CrD	Casco-Rodman complex, 12-20 percent slopes	B	4.2	5.0%
CrE	Casco-Rodman complex, 20 to 30 percent slopes	B	2.0	2.5%
FmB	Fox sandy loam, 2 to 6 percent slopes	C	1.5	1.8%
KeA	Kane silt loam, 1 to 3 percent slopes	C	5.7	6.9%
LyB2	Lorenzo loam, 2 to 6 percent slopes, eroded	B	27.0	32.5%
LyC2	Lorenzo loam, 6 to 12 percent slopes, eroded	B	0.1	0.1%
MhA	Matherton sandy loam, 1 to 3 percent slopes	B/D	0.1	0.2%
OmB	Oshtemo loamy sand, 1 to 6 percent slopes	A	0.4	0.4%
WeA	Warsaw loam, 0 to 2 percent slopes	B	36.1	43.6%
Totals for Area of Interest			**82.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Professional Service Industries, Inc.
821 Corporate Court, Waukesha, WI 53189
Phone: (262) 521-2125
Fax: (262) 521-2471

December 12, 2024

Bielinski Homes
1830 Meadow Lane, Suite A
Pewaukee, WI 53072

Attn: Mr. John Donovan
Acquisitions and Development Manager

Re: Preliminary Geotechnical Exploration and Site Feasibility Evaluation
Proposed Sprague Road Subdivision
Southeast Corner of Sprague Road and North Whitetail Drive
Eagle, Wisconsin
PSI Project No. 00523640

Dear Mr. Donovan:

The geotechnical exploration and evaluation for the referenced project has been completed. An electronic copy of the report is being provided via email. Paper copies can be issued upon request. After you have had the opportunity of reading the report, please call at any time with any questions or comments you may have. Professional Service Industries, Inc. (PSI), an Intertek Company, appreciates the opportunity to be of service on this project, and looks forward to continuing as your geotechnical consultant during the design and construction phases, as well as your upcoming projects.

Sincerely,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Patrick J. Patterson, P.G.
Senior Geologist

James M. Becco, P.E.
Principal Consultant

Ilyas Ahmed
Staff Engineer

The above Professional Engineering Seal and signature is an electronic production of the original seal and signature. Original hard copies can be provided upon request. This electronic reproduction shall not be construed as an original or certified document.

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APPENDIX (in order of appearance)

INTRODUCTION

General

This report presents the results of the preliminary geotechnical exploration and site feasibility evaluation for the proposed Sprague Road Subdivision project located in Eagle, Wisconsin. The work was performed for Bielinski Homes, at the request of Mr. John Donovan.

Purpose

The purpose of this preliminary study was to evaluate the subsurface conditions at specific boring locations on the site, and to provide subsurface information for general site feasibility and preliminary design planning. A comprehensive foundation evaluation and recommendations for specific structures were beyond the scope of this preliminary site evaluation but are recommended as part of design planning.

Scope

The scope of services included a site reconnaissance, the subsurface exploration, an evaluation of soil characteristics by field and laboratory testing, and an evaluation of the data obtained. The scope of the field work, including the number, location, and depth of the borings was determined by the client.

Authorization

The description of services and authorization to perform this geotechnical exploration and site feasibility evaluation were in the form of signed PSI Proposal No. 438528-R1, dated November 13, 2024. This report has been prepared on behalf of, and exclusively for the use of Bielinski Homes. The information contained in this report may not be relied upon by any other parties without the express written consent of PSI, and acceptance by such parties of PSI's General Conditions.

SITE AND PROJECT DESCRIPTION

Site Features

The project site is located at southeast corner of the intersection of North Whitetail Drive and Sprague Road in the Town of Eagle, Wisconsin. At the time of exploration, the site was a vacant agricultural field with trees and brush within an area situated in the central portion of the parcel, and a wetland in the southeast corner and central portion. There are residential properties and vacant land to the north and south, agricultural properties to the east, and Sprague Road to the west. Aerial photos of various years between 1985 to 2022 reviewed on Google Earth indicate that the parcel was predominantly vacant agricultural land. The subject site is depicted on the enclosed Boring Location Plans (Figure 1).

The topography of the project site is rolling and generally sloping down to the eastern portion of the parcel. The elevation difference at the borings was approximately 37 feet (EL. 948.7 to EL. 911.9).

Project Description

Based on the information provided by the client, it is understood that the proposed project consists of the development of 19 single-family home lots, associated roadways, and three (3) stormwater management areas. The structures are estimated to be up to two stories above grade, with below grade basements and attached garages. No other details were provided. Structural loads were not provided for the proposed buildings but are estimated to be light to moderate in magnitude. For this report, it is estimated that maximum column and wall loads will not exceed 100 kips and 5 kips per lineal foot, respectively. When structural loads are determined, PSI must be informed to determine if revisions to this report are necessary.

Planned floor and associated surface elevations are not known at the time of report preparation. Based on the elevations at the borings, it is estimated that cuts and fills of 5 to 10 feet or more may be necessary as part of the site development.

The new pavements are estimated to consist of asphalt or concrete. Traffic loading for pavements has not been provided. However, it is understood that traffic will generally consist of light passenger vehicle traffic, delivery trucks, garbage trucks, school buses, and snow removal vehicles.

Three (3) stormwater management areas are proposed in the southcentral and the northeastern portions of the development. The planned bottom elevation and other design details of the stormwater management area have not been provided.

It is anticipated that underground utilities will be installed throughout the development. The bearing depths and other details were not provided. It is presumed that the lines will be installed using open cut trenching.

This preliminary exploration has been commissioned to evaluate the subsurface conditions at widely spaced borings across areas of the subject site, and to provide subsurface information for general site feasibility and preliminary design planning for the proposed development. The number and spacing of the borings requested is not considered sufficient to serve as a conventional foundation evaluation for the proposed buildings, and for associated pavements and utilities. Additional borings are necessary and recommended to further evaluate more specific soil conditions and provide subsequent recommendations. In addition, when finished floor, yard, utility invert, and other elevations are determined; and when additional design details of the planned development become available, PSI must be provided an opportunity to review them and determine if a redirection of the evaluation and recommendations contained herein is warranted. PSI must also be informed if any of the information contained herein is incorrect or changes as plans progress.

EXPLORATION AND LABORATORY PROCEDURES

Scope Summary

The field and laboratory data utilized in the evaluation of the subsurface materials was obtained by drilling exploratory test borings, securing soil samples by the split-spoon sampling method, and subjecting the samples to standard laboratory testing.

With respect to the stormwater management areas, the field and laboratory work for classification of the subgrade soils was performed to provide information for use by the basin design personnel when considering requirements of Chapter NR151 of the Wisconsin Administrative Code, and of WDNR Technical Standard 1002, “Site Evaluation for Stormwater Infiltration” guidelines. The design of the proposed stormwater management areas was beyond the scope of services for this project.

Field Exploration

Thirty-one (31) soil borings were drilled for this project. B-1 through B-6 were drilled within the proposed roadways to a planned depth of about 10 feet below the existing grade. GW-1 through GW-19 were planned to be drilled in the general areas of the proposed structures to a planned depth of 20 feet below the existing grade. SW-7 through SW-12 were planned to be drilled within the proposed stormwater management areas to a planned depth of about 20 feet below the existing grade. However, auger refusal on possible cobbles and/or boulders was encountered within borings GW-3, GW-4, GW-10, GW-11, GW-16, SW-9, and SW-10 at depths of about 10.5 to 16.5 feet (EL. 927.2 to EL. 898.9) below the existing grade. The soil borings were staked in the field by a client representative prior to the boring activities. The approximate locations of the borings performed are shown on the Boring Location Plan (Figure 1), which is provided in the Appendix of this report.

The soil test borings were performed with an all-terrain vehicle (ATV) mounted rotary drilling rig utilizing continuous flight hollow stem augers to advance the holes. Representative samples were obtained by the Standard Penetration Test (SPT) method using split-spoon sampling procedures in general accordance with ASTM D-1586 procedures. Samples were collected at 2.5-foot intervals to 10 feet to the end of the roadway borings. As an exception, samples were obtained at 2-foot intervals at the borings performed within the proposed structures footprint and stormwater management areas. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer, falling thirty (30) inches, required to advance the split-spoon sampler one (1) foot into the soil. The sampler is lowered to the bottom of the drill hole and the number of blows recorded for each of the three (3) successive increments of six (6) inches penetration. The “N” value is obtained by adding the second and third incremental numbers. The SPT provides a means of estimating the relative density of granular soils and comparative consistency of cohesive soils, thereby providing a method of evaluating the relative strength and compressibility characteristics of the subsoils.

The SPT soil samples were transferred into clean glass jars immediately after retrieval and returned to the laboratory upon completion of the field operations. Samples will be discarded unless other instructions are received. The soil samples were visually classified in general accordance with the Unified Soil Classification System (ASTM D-2488-75). As an exception, the soil samples from SW-7 through SW-12 were visually classified by a geologist in general accordance with USDA National Resources Conservation Service textural soil classification procedures. In addition, the soil samples from GW-1 through GW-19 were also visually classified by a geologist in general accordance with USDA National Resources Conservation Service textural soil classification procedures and Unified Soil Classification System (ASTM D-2488-75). A description of the subsurface conditions encountered at each boring location is shown on the enclosed Soil Boring Logs. After completion of the borings, the auger holes were backfilled to the ground surface with bentonite.

A copy of the Soil Boring Logs, Boring Location Plan (Figure 1), Soil Evaluation – Storm Forms (Basins/Lots), and Waukesha County–Form A (Seasonal High Groundwater Determination) are enclosed in the Appendix. The soil stratification shown on the logs represents the approximate soil conditions in the actual boring locations at the time of the exploration. The terms and symbols used on the logs are described in the General Notes found in the Appendix.

Laboratory Physical Testing

Soil samples obtained from the exploration were visually classified in the laboratory, and subjected to testing, which included moisture content determinations.

Selected cohesive soil samples were tested in unconfined compression with a controlled strain loading rate and/or with a calibrated hand penetrometer to aid in evaluating the soil strength characteristics. The values of strength tests performed on soil samples obtained by the Standard Penetration Test Method (SPT) are considered approximate, recognizing that the SPT method provides a representative but somewhat disturbed soil sample.

The laboratory testing was performed in general accordance with the respective ASTM methods, as applicable, and the results are shown on the boring logs in the Appendix.

DESCRIPTION OF SUBSURFACE CONDITIONS

General

A description of the subsurface conditions encountered at the test boring locations is shown on the Soil Boring Logs. The lines of demarcation shown on the logs represent an approximate boundary between the various soil classifications. It must be recognized that the soil descriptions are considered representative estimates for the specific test hole location, but those variations may occur between and beyond the sampling intervals and boring locations. Soil depths, topsoil, and layer thicknesses, and demarcation lines utilized for preconstruction

planning should not be expected to yield exact and final quantities. A summary of the major soil profile components is described in the following paragraphs.

Soil Conditions

General Development Area and Utility Trench Borings (B-1 to B-6 and GW-1 to GW-19) - USCS Classification

The surface materials at these borings consisted of about 6 to 24 inches of topsoil comprised of dark brown silty clay to lean clay and silty sand to sandy silt. Underlying the surface topsoil in B-2, B-4, GW-1 through GW-4, GW-7, GW-8, GW-11, GW-14, GW-15, GW-16, GW-18 and GW-19 were natural soils generally consisting of intermixed layers of lean clay to silty clay to depths ranging from about 2 to 8 feet (EL. 910 to EL. 942) below existing grade. The underlying deeper soils in these borings, and underlying the surface topsoil in the remaining borings consisted of natural clayey sand, and silty sand to sand with gravel to the termination depths (EL. 932 to EL. 885). Portions of the underlying soils contained possible cobbles and/or boulders. The natural cohesive soils were soft to hard in consistency with N-values ranging from 4 blows per foot (bpf) to 50 blows for 5 inches of penetration and unconfined compressive strength readings of 1.7 tons per square foot (tsf) and 0.6 tsf in samples from B-2 and GW-7, respectively. The natural granular soils were loose to extremely dense conditions with N-values ranging from 6 blows per foot (bpf) to 50 blows for 4 inches of penetration.

Auger refusal was experienced on possible cobbles and/or boulders within borings GW-3, GW-4, GW-10, GW-11, GW-16, SW-9, and SW-10 at depths of about 10.5 to 16.5 feet (EL. 927.2 to EL. 898.9) below the existing grade. Refusal depths are outlined below:

Boring No.	Approximate Refusal Elevation	Approximate Refusal Depth (Feet)
GW-3	927.2	12.5
GW-4	919.6	16.5
GW-10	898.9	16.5
GW-11	899.6	12.5
GW-16	920.8	14.5
SW-9	903.6	10.5
SW-10	903.5	10.5

Stormwater Management Area and Seasonal High Water Table Borings (SW-7 to SW-12 and GW-1 to GW-19) - USDA Classification

The surficial materials at these borings consisted of about 12 to 24 inches of very dark brown silt loam to silty clay loam topsoil. Underlying the topsoil were natural soils consisting of dark brown, brown, yellowish brown, and pale brown gravelly, very gravelly to extremely gravelly sandy loam, silty sand, and fine sand to fine to medium sand to the boring termination depth of 20 feet (EL. 924 to EL. 892) below existing grade. As an exception, dark brown clay loam to gravelly clay loam soils were observed below the topsoil and in the upper 3 to 6 feet below existing grade (EL. 942 to EL. 909.5) in GW-1 through GW-4, GW-7, GW-8, GW-11, GW-14,

GW-16, and GW-18 and SW-7 through SW-12. The natural cohesive soils were soft to hard in consistency with N-values ranging from 4 blows per foot (bpf) to 50 blows for 5 inches of penetration, and an unconfined compressive strength reading of 0.6 tons per square foot (tsf) in the sample from GW-7. The natural granular soils were loose to extremely dense conditions with N-values ranging from 6 blows per foot (bpf) to 50 blows for 2 inches of penetration.

The foregoing discussion of soil conditions on this site represents a generalized soil profile as determined at the test boring locations. A more detailed description and supporting data for each test location can be found on the individual Soil Boring Logs.

Groundwater Observations

Groundwater observations were made during the drilling operations and in the open boreholes upon completion of drilling and removal of the augers. Groundwater was encountered within SW-7 through SW-12, GW-4 through GW-13, GW-15, and GW-17 during auger advancement at depths ranging from about 6 to 18 feet (EL. 923.2 to EL. 903.4) below the existing grade. No groundwater was observed within these borings upon completion of drilling and removal of the augers. Additionally, no groundwater was observed within the remaining borings during auger advancement or upon completion of drilling and removal of the augers.

The groundwater observations reported herein are considered approximate. It must be recognized that groundwater levels fluctuate with time due to variations in seasonal precipitation, lateral drainage conditions, and soil permeability characteristics. Longer-term monitoring would be required to further evaluate groundwater levels on this site and may be necessary dependent upon final first and basement floor elevations.

EVALUATION AND RECOMMENDATIONS

General Development Considerations

In view of the subsurface conditions encountered in the test borings, together with the structural loading criteria and development grades anticipated, conventional spread footings, along with conventional slab-on-grade construction, can be used for support of the proposed structure. Some difficulty with subgrade and excavation sidewall stability may be experienced.

Relatively shallow groundwater was encountered in a several of the borings. As such, substantial difficulty with groundwater, and with excavation subgrade and sidewall stability may be experienced in at least some areas. An adequate dewatering effort will be necessary. The over-excavation of unstable zones along the use of a crushed stone working mat may also be required. It is recommended that basement slabs be placed at least 2 feet above the groundwater level to help reduce the potential for moisture problems and constantly running sump pumps. Detailed and careful design planning will be required. Dependent upon planned/required surface grades, further evaluation of groundwater levels in at least some areas of the site using backhoe test pits may be necessary to assist in establishing appropriate

basement floor and corresponding surface elevations.

Auger refusal on possible cobbles, boulders, or bedrock was encountered at depths ranging from 12.5 to 16.5 feet (EL. 927.2 to EL. 898.9) below existing grade at several of the test boring locations, and generally very dense to extremely dense granular soils were encountered with increasing depth. Substantial difficulty digging and longer excavation times for conventional excavating, and substantial difficulty with the installation of bracing systems may be experienced. Refusal or near refusal conditions may also occur. Careful planning must be performed, and dependent upon planned/desired surface grades and basement floor elevations, backhoe test pits may be necessary to further evaluate the depth, type, and excavatability of the refusal materials.

The floor slabs and pavements can be supported by the existing soils following proper preparation, which will include the removal of the existing topsoil and soft, unstable or unsuitable zones. Some instability and the need for undercutting may occur.

A discussion of the foundation design parameters, as well as the support conditions for the floor slab and pavement areas, is included in the following sections.

Site Preparation

The presence of organic topsoil and vegetation in the subgrade can adversely affect the serviceability of structural fills, foundations, floor slabs, pavements, and other structures placed upon them. Approximately 6 to 24 inches of topsoil were present on the surface of the site at the boring locations. However, some variation should be anticipated, especially within agricultural fields, where tilling and other related operations can result in thicker pockets of topsoil, or topsoil having become intermixed within underlying soils. Thicker topsoil layers and organic soils may also be encountered within and encroaching upon wetland areas. All topsoil, vegetation, trees, roots and other organic matter must be stripped from the areas of footings, floor slabs, pavements, sidewalks, and other structures. Additionally, if the pond is planned to be filled in as part of the development, all organic, soft, wet, unstable, and other bottom type sediments must be completely removed and a suitable and stable subgrade established prior to filling. Adequate dewatering must be performed throughout the removal and filling activities.

The majority of the property was a farm field at the time of the field exploration. If any remnant drain tiles are encountered during construction, it is generally recommended that they be tied into new drainage structures or otherwise be properly drained to a suitable area (in accordance with any applicable regulatory requirements or restrictions), since they may still actively drain areas of the subject site or adjacent properties.

Topsoil depths and/or the presence of organic soils may increase substantially within and encroaching upon wetland areas. It is generally recommended that development within wetland areas not be performed due to the typical presence of highly organic soils and shallow

groundwater. If such development is contemplated, special permits may be required from the Army Corps of Engineers, the WDNR, or other government agencies.

After stripping the topsoil and cutting any high areas of the site to the planned finished grade, and prior to the placement of new fill which may be placed to raise grades, the subgrade must be thoroughly proofrolled to detect unstable, yielding soils. This should consist of overlapping passes in a perpendicular grid pattern, with a fully loaded tandem-axle dump truck, or other equipment of similar size and weight suitable for the surface conditions. Proofrolling should be performed in consultation with the geotechnical engineer at the time of construction. Some difficulty with subgrade preparation may be experienced, especially in wet or cold weather, or during thawing conditions. Additionally, instability can become more severe and widespread in silty and clayey materials (such as were encountered in the near surface profile in several of the borings), which are considered to be moderately to highly moisture sensitive. It is generally recommended that earthwork be carried out during relatively warm, dry weather. Any soft, wet, or otherwise unstable zones which cannot be improved by scarification and aeration, must be removed and replaced with compacted structural fill, such as clean crushed stone, possibly in conjunction with the use of a geotextile fabric. Construction delays and difficulty with subgrade stabilization may be experienced if moisture contents within the soils are high during construction, and during periods of wet and/or cool weather. It is recommended that construction roads be installed to reduce potential disturbance to the subgrade soils.

Every effort must be made to keep excavations dry. If construction proceeds during wet weather, some additional overexcavation may be necessary. If weather permits, the soil could be dried and recompacted. A crushed stone working mat, possibly in conjunction with a geotextile fabric may also be feasible to help stabilize subgrades. Site grading runoff should be directed to catch basins, so that the potential for the softening of the foundation and pavement subgrade soils is reduced.

If site grades are raised in excess of 2 feet, the first lift of new fill must be placed so as to extend a minimum lateral distance of 5 feet beyond the planned top building pad dimension (for fills less than 5 feet in thickness), or for a distance equal to at least 1 foot laterally beyond the top pad dimension for every foot of fill thickness (for fills greater than 5 feet in depth). Subsequent lifts can then be placed on an approximate 1H:1V slope back up to the planned top perimeter dimension of the pad. Similarly, where undercutting of unsuitable soils is performed beneath foundations, floor slabs, or other structural areas, it is recommended that the removal extend laterally beyond the perimeter of the structure at least 1 foot for every foot of removal below the planned bearing depth. Proper moisture control is essential to reduce the amount of compactive effort necessary to achieve the desired densities.

When a firm and stable subgrade is established, low areas may be raised to planned grades with properly compacted structural fill. Any new fill should be a clean granular soil, such as those materials meeting the gradations outlined in Section 209 or 305 of the State of Wisconsin Standard Specification for Highway and Structure Construction. If fine-grained soils, such as those with high silt or clay content are used, they should generally be placed over large open

areas, where conditions are more favorable for the proper placement and compaction of such materials. It must be recognized that high silt or clay content materials are extremely difficult to compact when placed at moisture contents beyond a few percent of the optimum moisture content**.** Fill must be placed in layers of not more than nine (9) inches in thickness, at moisture contents at or near optimum, and be compacted to a minimum density of 95 percent of the maximum dry density as determined by ASTM designation D-698. Where fill thicknesses exceed 15 feet (including new fills used to raise grades), the compaction percentage must be increased to 98 percent. If the fine-grained soils encountered in the borings are used to raise grades on the site, substantial sorting and moisture conditioning is likely to be necessary. Silt, clay, and wet granular soils are not suitable for reuse as compacted fill in trenches, or adjacent to foundation stem walls or retaining walls.

Proper moisture control is essential to reduce the amount of compactive effort necessary to achieve the desired densities. This is especially true of clayey soils, where scarification and aeration may be required to achieve near - optimum moisture levels prior to compaction. A sheepsfoot roller is generally required for compaction of clayey soils, whereas a vibratory smooth drum roller is preferred for granular material. Small hand-operated compactors should be used in confined areas; granular fills are generally more readily compacted to the required densities in such applications.

It is recommended that well-graded granular soils be utilized as backfill in new utility trenches and alongside below grade walls to reduce the potential for consolidation and settlement of the fill. All fill soils must be placed and compacted under engineering-controlled conditions, to provide suitable support for overlaying structures and roadways. Additional guidance can be provided at the time of construction in the selection process for grade-raising fill and trench backfill.

The selection of fill materials for various applications should be done in consultation with the soils engineer. Similarly, the evaluation of the subgrade and placement and compaction of fill for structural applications should be monitored and tested by a qualified representative of the soils engineer.

Foundation Evaluation

The following is a general overview of the subsurface conditions for the site, as it relates to foundation analysis, and can be used in preliminary site planning.

The proposed structures may be supported by a conventional spread foundation system, bearing on suitable naturally occurring soils or within structural fill, prepared as discussed in a previous section. For preliminary planning, conventional spread footings bearing upon suitable natural soils, or compacted structural fill (or lean concrete mix) used to replace unsuitable materials, can be designed to exert net allowable soil bearing pressures of 1,500 to 4,000 psf, dependent upon location and bearing elevation. However, some undercutting of soft, loose,

wet, or otherwise unsuitable natural soils may be required, especially where excavations extend below the groundwater or perched zones.

The suitability of the existing soils for support of the proposed foundation must be determined by testing by a qualified geotechnical engineer during construction, utilizing static cone penetrometer tests or dynamic cone penetrometer tests for cohesive and granular soils, respectively. Soft, loose, or otherwise unsuitable materials not disclosed by the borings, may be encountered in the foundation excavations at the bearing elevation. If unsuitable existing soil is present, it must be removed throughout a zone extending one foot laterally for each two feet removed below the foundation, on either side of the planned footing. The over-excavated area must be backfilled with structural compacted fill.

In lieu of the use of compacted structural fill, lean concrete mix can be used to replace the unsuitable soils. The foundation excavations should be about 4 inches wider than the proposed footing width and must extend to suitable natural bearing soils. The concrete must be placed immediately after excavation to avoid intrusion of soil into the excavation. The concrete should contain sufficient aggregate and cement to attain a 28-day compressive strength of at least 1000 psi. Some sloughing or caving of the overlying soils may be experienced. Should this occur during concrete placement, the area must be removed and recast. Additionally, should caving become extensive (such as can more typically occur within granular or soft clay soil), it may be necessary to substantially widen excavations to avoid soil intrusion into the concrete. This may result in the use of additional concrete quantities significantly in excess of preconstruction budget estimates.

Wet soils may be encountered within foundation excavations in at least isolated areas (this will also depend on final grades), and a substantial loss in strength along with a soft or loose subgrade may develop when the confining effect of the overburden is removed. This may require undercutting and the use of a crushed stone working mat or a “mud mat” to achieve a stable bearing grade. Substantial sloughing and caving may also occur, and dewatering may be required.

All perimeter footings and all footings in unheated areas must be placed at a depth of at least 4 feet (or deeper if required by local code or in accordance with customary practice) below the finished grade for frost protection. Due to periodic severity of winters in this area, it is recommended that footings in poorly heated or unheated areas of the building also be placed at least 4 feet below the adjacent exterior grade. Interior footings not subject to frost action may be placed at a shallow depth of at least 18 inches below the floor slab, provided they bear on suitable natural soils or engineered fills. All footings must be protected from the effects of frost if construction is carried out during winter months.

It is recommended that the footings supporting individual columns have a minimum dimension of 24 inches, and continuous footings have a minimum width of 18 inches, even if the maximum recommended allowable bearing pressure is not fully utilized. In order to minimize the effects of any slight differential movement that may occur due to variations in the character of the

supporting soils and any variations in seasonal moisture contents, it is recommended that all foundations be suitably reinforced to make them as rigid as needed.

In general, the performance of the foundation system on this site is dependent on the various factors discussed herein. The excavation, preparation, and concreting of foundations should be monitored and tested by a representative of the soils engineer.

Floor Slab and Pavement Subgrades

Prior to constructing the floor slabs or pavements, and prior to the placement of any fill used to raise grades, the exposed subgrade must be prepared utilizing the proofrolling procedures described previously. In areas that exhibit soft, yielding or unstable soil conditions, the following remedial measures are recommended to provide a stable subgrade. It must be recognized that the high silt and clay content soils present across this site are highly sensitive to increases in moisture and construction disturbance. It will therefore be necessary to maintain these materials in a relatively dry condition to allow for proper subgrade preparation. It is recommended that the proofrolling operations be monitored by a representative of the geotechnical engineer to ensure that a firm, suitable subgrade is present prior to placement of new fills, or to construction of floor slabs and pavements.

Localized wet, soft or unstable areas can be undercut to such depths determined necessary in the field to reach stable material, and the area backfilled with imported crushed stone, such as the 1¼-inch gradation specified in Section 305 of the WisDOT Standard Specifications, placed and compacted as recommended in the Site Preparation section of this report. If relatively thick zones or areas of extensive yielding are observed, and they cannot be stabilized by normal discing, aeration and recompaction procedures, undercutting and replacement with crushed stone and geotextile fabric (if needed) may also be required in these areas.

The floor slab(s) may be designed utilizing an estimated modulus of subgrade reaction of 125 pci based on the presence of suitable and stable soils, prepared as discussed in this report. However, this is based on common range values obtained from 1 ft. x 1 ft. plate load tests on specific soil types. Depending on how the slab load is applied, the value may need to be modified for larger areas using the following:

Modulus of Subgrade Reaction $k_s = (\frac{k}{B})$ for cohesive soil

$k_s = k\,(\frac{B+1}{2B})^2$ for cohesionless soil

where: k_s = coefficient of vertical subgrade reaction for loaded area
k = coefficient of vertical subgrade reaction for a 1x1 foot square area
B = width of area loaded, in feet

The final design and detailing should be performed by a qualified structural engineer based on the intended slab use, loading conditions and anticipated subgrade conditions.

A granular mat, which can be designed as a drainage layer, should be provided below the floor slab. This must be a minimum of six (6) inches in thickness and properly compacted**.** In moisture sensitive areas, a vapor retarder may be placed beneath the floor slab or base course, however, it is recommended that the architect be consulted in this regard. The proper use of a vapor retarder may not completely prevent moisture beneath or on top of slabs. If the base course contains sharp particles, a cushion layer of sand approximately 2 inches in thickness may be required to provide protection from puncture.

The floor slabs should be suitably reinforced to make them as rigid as necessary and proper joints provided at the junction of slabs and the foundation system so that a small amount of independent movement can occur without causing damage. Large floor areas must be provided with joints at frequent intervals (maximum spacing of 30 times the slab thickness, per ACI) to compensate for concrete volume changes (shrinkage). Where the slab will be supporting live loads, such as from moving vehicles, joints must be keyed or dowelled to permit proper load transfer. It is recommended that appropriate construction methods and curing procedures be used to minimize shrinkage and curling of the floor slabs.

Below Grade Walls

It is recommended that basement slab elevations be placed at least 2 feet above the groundwater level. Dependent upon final first and basement floor slabs, additional evaluation of groundwater levels across the site may be necessary.

It is recommended that a drainage course be placed beneath the floor slab and alongside below grade walls, and that a drain tile system be placed alongside the basement foundation to alleviate excessive lateral pressure on the walls. The drainage system should be connected to adequate sumps for drainage and be properly discharged in accordance with all state and local discharge requirements. Drain tile should have a minimum diameter of four (4) inches and should be wrapped with an appropriate filter fabric. Drainage pipes should be surrounded by clean gravel and extend up to the near ground surface in window well areas. At least six (6) inches of clean ¾ inch stone should be utilized for the free draining layer beneath the floor areas.

The below grade walls must be backfilled for a lateral distance of 3 to 4 feet with a well-graded, free draining granular material. This should be placed in lifts not exceeding 12 inches in thickness and be compacted to at least 95 percent of the Standard Proctor density. Based upon the use of a clean, crushed stone fill (ϕ=31; γ_m =130 pcf), and a drained condition, an equivalent fluid pressure of 65 psf may be used as the horizontal component of earth pressure at rest. However, when a proposed fill material has been selected, a representative sample must be submitted to PSI for testing to verify the above values and associated recommendations. Silt and clay soils, organic soils, and wet granular materials are not suitable for use as backfill alongside basement walls. It must be recognized that the above value is based upon a drained condition and is exclusive of traffic and other surcharge loads near the walls, which must be factored into the design.

Seasonal High Groundwater Level Determination

The soil samples in GW-1 through GW-19 drilled in the proposed building footprint were also classified in accordance with the USDA Textural Soil Classification system. These soil classifications were previously mentioned in *Soil Conditions* section. Observations of groundwater, apparent soil moisture condition, soil coloration and redoximorphic features, which can be indicative of seasonal high groundwater table, were utilized in estimating the seasonal high groundwater level at each location. No redoximorphic features were observed in the samples from the completed soil borings.

The following Table indicates the general locations, elevations, estimated depth beneath existing grade of the seasonal high groundwater level based on the visual assessment and estimated seasonal high groundwater level.

Soil Boring No.	Lot No.	Boring Ground Surface Elevation (Feet MSL)(a)	Depth Beneath Existing Grade to Seasonal High Groundwater (Feet)	Approximate Seasonal High Groundwater Elevation (Feet MSL)
GW-1	1	944.3	>20	≤ 924.3
GW-2	2	942.4	>20	≤ 922.4
GW-3	3	939.7	>20	≤ 919.7
GW-4	4	936.1	14	922.1
GW-5	5	938.5	16	922.5
GW-6	6	936.5	14	922.5
GW-7	7	913.8	8	905.8
GW-8	8	913.3	8	905.3
GW-9	9	914.9	8	906.9
GW-10	10	915.4	12	903.4
GW-11	11	912.1	6	906.1

Soil Boring No.	Lot No.	Boring Ground Surface Elevation (Feet MSL)(a)	Depth Beneath Existing Grade to Seasonal High Groundwater (Feet)	Approximate Seasonal High Groundwater Elevation (Feet MSL)
GW-12	12	935.7	14	921.7
GW-13	13	937.6	18	919.6
GW-14	14	937.5	>20	≤ 917.5
GW-15	15	935.9	14	921.9
GW-16	16	935.3	>20	≤ 915.3
GW-17	17	939.7	16	923.7
GW-18	18	939.6	>20	≤ 919.6
GW-19	19	942.7	>20	≤ 922.7

a. Ground surface elevations furnished by client's surveyor

The requested Waukesha County Land Resources Division's Form A has been prepared and is attached along with the DSPS Soil Evaluation Form (SBD-10793). PSI recommends that basement slabs be placed at least 2 feet above the groundwater level to help reduce the potential for moisture problems and constantly running sump pumps. Detailed and careful design planning will be required. Dependent upon planned/required surface grades, further evaluation of groundwater levels in at least some areas of the site using backhoe test pits may be necessary to assist in establishing appropriate basement floor and corresponding surface elevations.

Exterior/Unheated Area Slabs

Based on the borings, entry slabs, sidewalks, aprons, and other slabs in exterior or unheated areas may bear upon silty or clayey soils in at least some areas. Such materials are highly frost susceptible and poorly drained. Slabs placed directly upon such soils are subject to heaving and subsequent settlement due to freeze/thaw cycles. This can result in cracking, misalignment, and other related effects (especially at joints). It is recommended that consideration be given to limited undercutting of the frost susceptible materials to a depth of 1 to 2 feet below the slab, and replacement with well graded, properly placed and compacted granular soils. A properly designed underdrain system connected to the municipal sewer (if

permissible) or directed to on-site stormwater management areas should also be incorporated to reduce the potential effects of freeze/thaw cycles.

Utility Construction

The on-site soils can generally be used for support of utility lines. However, some undercutting of soft, wet, or otherwise unsuitable soils, in conjunction with the placement of crushed stone or other suitable granular backfill may be necessary. Some difficulty with the stability of utility trenches may be experienced, especially in the presence of water. The use of sloping, shoring, bracing, or trench boxes will likely be required. Utility construction should be performed in accordance with “The Standard Specifications for Sewer and Water Line Construction” for the State of Wisconsin.

It is recommended that well graded granular soils such as those specified in Tables 37 and 39 of the Standard Specification for Sewer and Water Construction be utilized as backfill in utility trenches to reduce the potential for consolidation and settlement of the backfill. All fill soils must be properly placed and compacted under engineering-controlled conditions to provide suitable support for overlaying structures and roadways. Silty and clayey soils, organic soils, and wet materials are not recommended for use as backfill within utility trenches due to the substantial difficulty of obtaining proper compaction in confined areas. Substantial importing of suitable fill may be required.

As with all excavation work, all open cut trenches must be properly shored and braced as required by applicable federal and state OSHA codes, and as necessary to protect life and property.

CONSTRUCTION CONSIDERATIONS

Groundwater Control

Groundwater observations were made during the drilling operations and in the open boreholes upon completion of drilling and removal of the augers. Groundwater was encountered within SW-7 through SW-12, GW-4 through GW-13, GW-15, and GW-17 during auger advancement at depths ranging from about 6 to 18 feet (EL. 903.4 to EL. 923.7) below the existing grade. No groundwater was observed within these borings upon completion of drilling and removal of the augers. Additionally, no groundwater was observed within the remaining borings during auger advancement or upon completion of drilling and removal of the augers.

On the basis of the observations, some difficulty with groundwater may be experienced during excavation work in at least some areas on this site. For low volume perched zones, a filtered sump pump or other conventional means may suffice to control the groundwater. However, for excavations encroaching upon or extending below the groundwater, or for larger volume perched zones; and when encroaching upon or extending into wetland areas, more severe

difficulty may be experienced and prolonged dewatering with a series of sumps and high-capacity pumps (with sufficient lifting capacity) may be necessary to facilitate construction.

Since portions of the anticipated subgrade soils are subject to softening when exposed to free moisture, every effort should be made to keep excavations dry. Site grading should be performed to direct runoff away from the construction area, so that the potential for the softening of the subgrade soils is reduced.

It must be recognized that groundwater levels fluctuate with time due to variations in seasonal precipitation, lateral drainage conditions, and soil permeability characteristics. Dependent upon planned/desired basement floor elevations, additional evaluation of groundwater levels is recommended.

Excavations and Site Drainage

Sloping, shoring or bracing of excavation sidewalls will be necessary to facilitate construction and to protect life and property. Sloughing and caving may occur within unprotected excavations. The degree of excavation instability problems is dependent upon the depth and length of time that excavations remain open, excavation bank slopes, water levels and the effectiveness of any dewatering systems. All excavation work must be performed in accordance with OSHA and local building code requirements.

Where excavations encroach upon or extend below the groundwater or perched zones and into granular, soft clay, or organic soils, a substantially unstable subgrade may develop when the confining effect of the overburden is removed. Significant sloughing or caving of sidewalls may also occur. Some over-excavation of softened or loosened soils, in conjunction with the use of a crushed stone working mat, may be necessary to establish a stable bearing subgrade. Additionally, significantly widened excavations may result, or be required to maintain or achieve sidewall stability. Dependent upon final grades, extreme difficulty with excavations and in achieving a stable subgrade may be experienced in at least isolated areas on this site, especially when encroaching upon or extending below the groundwater.

All excavations must be performed with caution and utilize methods which will prevent undermining or destabilization of slopes, buildings, utilities, pavements, sidewalks or other structures. The use of a properly designed shoring and bracing, sheet piling, or underpinning system must be utilized as necessary to adequately protect buildings, utilities, pavements, and other structures. This must be performed by an experienced specialty contractor. Additionally, extreme care must be used during the installation of any bracing system, especially those using driven or vibratory methods, in order to avoid damaging existing buildings, utilities, and other structures. Consideration should be given to the performance of video and/or photographic documentation of the condition of nearby buildings, utilities, and other structures prior to installation. In addition, monitoring of such structures must be performed from the time of commencement and extending through completion of the installation activities.

Auger refusal on cobbles, boulders, or possible bedrock was encountered at depths ranging from about 10.5 to about 16.5 feet (EL. 927.2 to EL. 898.9) below existing grade at the test boring locations GW-3, GW-4, GW-10, GW-10, GW-16, SW-9 and SW-10, and very dense to extremely dense granular soils, with cobbles and/or boulders are present on the site. Substantial difficulty digging and longer excavation times for conventional excavating, and substantial difficulty with the installation of bracing systems may be experienced. Refusal or near refusal conditions may also occur. Careful design planning will be required, and dependent upon planned/desired basement floor and associated utility elevations, additional subsurface exploration with backhoe test pits may be necessary as part of design planning to further evaluate refusal depths, and the type and excavatability of the materials.

It is mandated that excavations, whether they be for utility trenches, or footing excavations, be constructed in accordance with current Occupational Safety and Health Administration (OSHA) guidelines to protect workers and others during construction. PSI recommends that these regulations be strictly enforced; otherwise, workers could be in danger and the owner(s) and the contractor(s) could be liable for substantial penalties. The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. PSI is providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

Since the subgrade soils are generally sensitive to moisture, every effort should be made to provide adequate drainage across the site during construction, and to prevent ponding of runoff on the subgrade. These soils are also subject to erosion caused by runoff, and erosion control measures should be implemented where needed or required by local ordinances.

Seismic Design Considerations

The soils encountered in the borings are estimated to meet the criteria for Site Class D in accordance with 1613.2.5.2 of the International Building Code-2018 (which directs to the simplified design procedure outlined in ASCE 7 – Minimum Design Loads and Associated Criteria for Buildings and Other Structures).

PAVEMENT DESIGN RECOMMENDATIONS

Pavements for this project are understood to consist of residential roads, which are estimated to be primarily subjected to light passenger vehicle traffic, and occasional delivery trucks, garbage trucks, and school buses.

The near surface pavement subgrade soils encountered at the borings consisted predominantly of sand with an estimated visual classification of A-2-4 by the AASHTO soil classification method. These soils are generally rated as fair for pavement subgrade support, based on their low to moderate shrink/swell potential and frost susceptibility, and fair drainage characteristics. Provided that the subgrade soils are prepared as outlined in the Site Preparation section of this report, the in-place subgrade soils and any new structural fill can be used for standard flexible or rigid pavement construction.

Evaluation of the visual soil classification has been made in estimating pertinent subgrade design coefficients as described in the Wisconsin Soils Manual for Pavement Design. Based on the soils encountered, and with proper subgrade preparation and drainage, the following pavement subgrade design parameters are recommended for the pavement section design. However, if soils with support characteristics different from the lean clay materials are encountered or are used to raise grades in new pavement areas, revised coefficients will need to be provided.

PAVEMENT SUBGRADE DESIGN COEFFICIENTS

AASHTO Soil Classification	A-2-4
Design Frost Index	F-3
Design Group Index	10
Soil Support Value	4.5
Estimated Subgrade Modulus (k)	200 pci

During construction, the surficial subgrade soils can become wet, softened and disturbed from rainfall and construction equipment. Therefore, prior to placing the pavement base materials, the subgrade must be proofrolled as outlined previously. Particular attention should be given to high traffic areas that have become rutted and areas of backfilled trenches. Localized wet, soft, or unstable areas can be undercut to such depths determined necessary in the field to reach stable materials. The granular base course should consist of well-graded crushed stone meeting the requirements from the State of Wisconsin DOT Standard Specifications for construction for dense graded base. If relatively large or thick zones of extensive yielding are observed, and normal discing and recompaction procedures cannot stabilize them, undercutting and replacement with crushed stone and geotextile fabric (if needed) may be required in these areas. Preparation and evaluation of the pavement subgrade must be performed as outlined in the Site Preparation section of this report.

It should be recognized that all pavements require regular maintenance and occasional repairs to keep the pavements in a serviceable condition. Maintenance is necessary to reduce the

effects of pavement stress caused by changes in temperature and moisture, repetitive traffic loadings, and movement of the subgrade soils. As pavement distress is observed, it should be repaired as quickly as possible. Timely sealing of joints and cracks is essential to help reduce the potential for water to enter the pavement section and cause rapid deterioration of the pavement during freeze-thaw cycles. Unrepaired areas will generally lead to more severe and widespread distress, and eventually, pavement disintegration. Therefore, annual maintenance should include sealing of cracks and joints, and maintenance of proper surface drainage to avoid ponding water on or near the pavements. Periodic pavement condition surveys of the pavement can also be implemented to evaluate the need for other surface maintenance, and treatments or repairs that may be needed to obtain the design service life.

The subject site is located in an area that experiences annual freezing cycles. The predominantly granular subgrade soils encountered at the borings are not generally considered to be highly susceptible to frost action. However, near surface layers of finer grained soils may be encountered. In addition, it is generally good customary practice to control surface runoff in order to reduce the potential for frost action. It is recommended that underdrains be placed within the subgrade, just below the granular base, to help reduce the potential for trapping water within the aggregate base layer. Sufficient drain tiles extending radially outward an adequate distance from each interior catch basin must be installed. In addition, drain tiles should extend along curb lines, up the slope from curb inlets. The drain tile should be directly connected to the storm sewer manholes or catch basins (if permissible by local municipal or other applicable code). The drain tile should consist of perforated PVC pipe of adequate diameter placed beneath the base layer, extending a sufficient distance into the subgrade. The pipe should be surrounded by appropriately sized clean stone, with the pipe and stone being wrapped with a geotextile filter fabric to reduce the potential for soils to migrating into and obstruct the pipe.

STORMWATER MANAGEMENT AREA CONSIDERATIONS

As requested by the client, borings SW-7 through SW-12 were completed within the areas of the proposed stormwater management basins. The subgrade soils encountered in the borings have been visually classified in general accordance with the USDA textural soil classification system. They consisted of clay loam, silt loam, gravelly sandy loam, very gravelly fine sand, gravelly loamy fine to medium sand and gravelly fine to medium sand. Groundwater was encountered within SW-7 through SW-12 during auger advancement at depths ranging from about 6 to 18 feet (EL. 904.1 to EL. 921.2) below the existing grade. No groundwater was observed within these borings upon completion of drilling and removal of the augers. Groundwater was not encountered in the borings.

With regard to the above soil and groundwater conditions encountered at the borings, NR 151.124(4)(c)1 and 2 – *Infiltration rate exemptions* indicates that infiltration practices located in an area where the infiltration rate of the soil measured at the proposed bottom of the infiltration system is less than 0.6 inches per hour using a scientifically credible field test method; or an area where the least permeable soil horizon to 5 feet below the proposed bottom of the infiltration system using the USDA method of soils analysis consists of sandy clay loam, clay

loam, silty clay loam, sandy clay, silty clay or clay may be credited toward meeting the requirements, but the decision to infiltrate under these conditions is optional. In addition, NR 151.124(4)(b)1 – *Separation distances* indicates that infiltration practices shall be located so that the characteristics of the soil and the separation distance between the bottom of the infiltration system and the elevation of seasonal high groundwater or the top of bedrock are in accordance with the following Table (reproduced from NR 151.124):

Table 3. Separation Distances and Soil Characteristics

Source Area	Separation Distance	Soil Characteristics
Industrial, Commercial, Institutional Parking Lots and Roads	5 feet or more	Filtering Layer*
Residential Arterial Roads	5 feet or more	Filtering Layer*
Roofs Draining to Surface Infiltration Practices	1 foot or more	Native or Engineered Soil with Particles Finer than Coarse Sand
Roofs Draining to Surface Infiltration Practices	Not Applicable	
All Other Impervious Source Areas	3 feet or more	Filtering Layer*

*Defined in NR 151.002(14r) as a "soil that has at least a 3-foot deep layer with at least 20 percent fines; or at least a 5-foot deep layer with at least 10 percent fines; or an engineered soil with an equivalent level of protection as determined by the regulatory authority for the site."

The information shown above is a selected excerpt from NR151 that is intended only as general guidance for considering stormwater management in conjunction with the encountered subsurface conditions at the borings. Basin design must be performed by a qualified and experienced firm. In addition, the entirety of Chapter NR151 of the Wisconsin Administrative Code, the Site Evaluation for Stormwater Infiltration (1002) document, and other applicable references; along with appropriate state, local or other municipal requirements must be consulted as part of site-specific stormwater design.

It is recommended that stormwater management basins not be placed in close proximity to basements or other below grade structures. Proper and careful consideration of soils and subsurface conditions must be given during site and design planning, and extreme care must be exercised during construction. Lateral migration of water may result in substantially increased sump pump activity and can quickly overcome the ability of such pumps to maintain a desirable water level, resulting in significant flooding. The potential for such conditions to occur can greatly increase when below grade floor elevations encroach upon or are below the elevation of basin bottoms and/or when basins are placed in close proximity to structures (strongly not recommended). In addition, the presence of granular or other generally permeable soils, which is typically necessary in the areas of structures for utility backfill, alongside basement walls, or within other development excavations/trenches can act as extensive migration channels to rapidly carry large volumes of water from basins and into nearby below grade structures. Building codes or municipal regulations may require that floor elevations of below grade structures be a specified distance above the water level of nearby basins or other

stormwater features. It is therefore recommended that the design engineer (or other appropriate representative) review applicable municipal or other regulatory requirements and verify the design normal and design high water elevations of stormwater basins/features with respect to planned or existing below grade slab elevations.

GENERAL COMMENTS

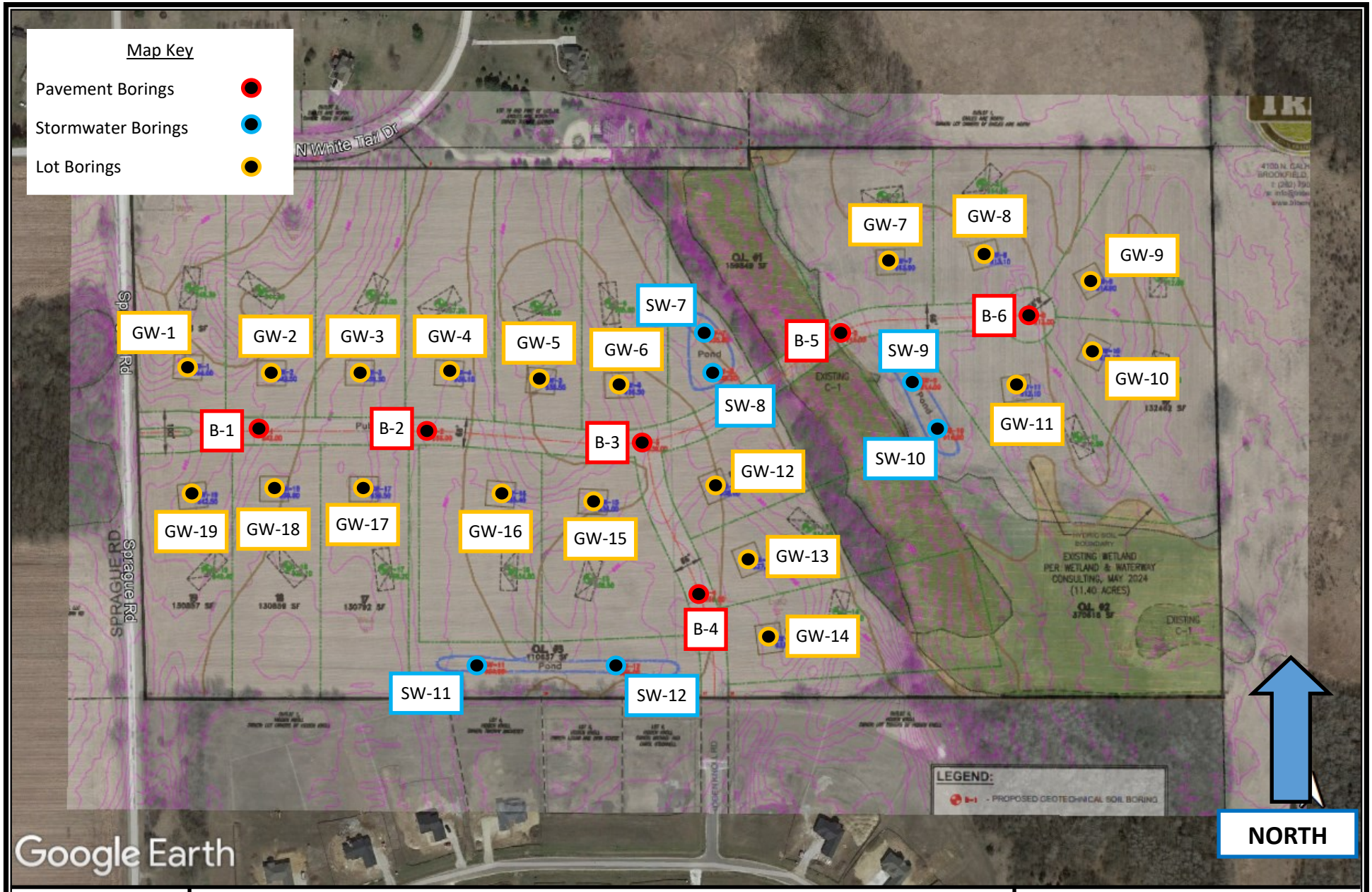
This geotechnical exploration and evaluation have been prepared to aid in the evaluation of the subsurface conditions on this site. The recommendations presented herein are based on the available soil information and the preliminary project information provided. Any changes in the planned project activities should be brought to the attention of the soil engineer to determine if modifications in the recommendations are required. The final design plans and specifications should also be reviewed by the soil engineer to determine that the recommendations presented herein have been interpreted and implemented as intended.

This geotechnical study has been conducted in a manner consistent with that level of care ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. The findings, recommendations and opinions contained herein have been promulgated in accordance with generally accepted practice in the fields of foundation engineering, soils mechanics, and engineering geology. No other representations expressed or implied, and no warranty or guarantee is included or intended in this report.

It is recommended that the earthwork and foundation operations be monitored by the soil engineer, to test and evaluate the subgrade stability, bearing capacities, and the selection, placement and compaction of controlled fills. WisDOT Standard Specifications for Highway and Structure Construction can also serve as a guide in implementing the subgrade preparation and other earthwork operations.

Appendix

Figure 1 – Boring Location Plan
Soil Boring Logs
General Notes
Soil Evaluation–Storm Form-Basins
USDA Classification Chart
Waukesha County–Form A
Soil Evaluation–Storm Form-Lots



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Proposed Sprague Road Subdivision
Eagle, WI

SCALE: 1 inch = 330 feet (approx.)

DATE: 12/11/2024

FIGURE 1: BORING LOCATION PLAN

PROJECT NUMBER: 00523460

BORING B-1

DATE STARTED:	11/20/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/20/24	**DRILLER:** DT	**LOGGED BY:** IK
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Marooka D-50 ATV - Rig #395
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	942 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Dark Brown Silty Sand With Gravel, Moist (6.5"± Thick)	TPSL		16		
						Light Brown Silty Sand With Gravel, Possible Cobbles, Damp					
940				1	12		SM	14-41-34 N=75	3	>>◎	
						Brown Fine to Medium Sand With Silt and Gravel, Possible Cobbles, Damp					
				2	6			24-50/2"	3		
	5						SP				
935				3	14			18-24-16 N=40	5		
						Possible Cobbles and/or Boulders					
				4	1		POSS CBBLS	50/2"	1	>>◎	No Recovery
	10					End of Boring at 10'					
						Cave-In at 3.5'					

Professional Service Industries, Inc.
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Telephone: (262) 521-2125

PROJECT NO.: 00523460
PROJECT: Proposed Sprauge Rd Subdivision
LOCATION: SEC of Sprauge Rd & N Whitetail Dr
Eagle, WI
Tax Key EGLT 1779999001

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-2

DATE STARTED:	11/20/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/20/24	**DRILLER:** DT	**LOGGED BY:** IK
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Marooka D-50 ATV - Rig #395
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	936.1 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Dark Brown Silty Sand, Moist (6"± Thick)	TPSL		19		
935				1	8	Brown Lean Clay With Sand, Moist	CL	2-2-3 N=5	17		
	5			2	8	Light Brown Silty Sand With Gravel, Moist	SM	4-13-22 N=35	11		
930				3	4	Dark Brown Lean Clay With Sand, Possible Cobbles, Moist	CL	16-50/6"	16	>>◎ Q_r = 1.7 tsf	
	10			4	12	Light Brown Silty Sand With Gravel, Possible Cobbles, Moist	SM	7-19-22 N=41	2		
						End of Boring at 10' Cave-In at 4'					

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Eagle, WI
Tax Key EGLT 1779999001

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BORING B-3

DATE STARTED:	11/20/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/20/24	**DRILLER:** DT	**LOGGED BY:** IK
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Marooka D-50 ATV - Rig #395
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	936.2 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed	
Upon Completion	Not Observed	
Delay	N/A	

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Dark Brown Silty Sand With Gravel, Moist (6"± Thick)	TPSL		23		
935						Light Brown Sand With Silt and Gravel, Moist					
				1	10			7-11-19 N=30	8		
							SP				
				2	8			11-23-28 N=51	3		
	5										
						Light Brown Sand With Gravel and Silt Seams, Moist					
930											
				3	8			9-23-29 N=52	9		
							SP				
				4	8			4-12-20 N=32	4		
	10					End of Boring at 10'					
						Cave-In at 2'					

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The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-4

DATE STARTED:	11/20/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/20/24	**DRILLER:** DT	**LOGGED BY:** IK
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Marooka D-50 ATV - Rig #395
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	936 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Dark Brown Silty Sand With Gravel, Moist (7"± Thick)	TPSL		23		
935				1	10	Light Brown Sand With Silt and Gravel, Moist	SP	13-13-20 N=33	5		
	5			2	6	Dark Brown Lean Clay With Sand and Gravel, Very Moist	CL	7-25-50/4"	18		
930				3	8	Dark Brown Lean Clay With Sand and Gravel, Moist	CL	12-14-27 N=41	6		
				4	2	Possible Cobbles and/or Boulders	POSS CBBLS	50/2"		>>◎	
	10					End of Boring at 10'					
						Cave-In at 3'					

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BORING B-5

DATE STARTED:	11/20/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/20/24	**DRILLER:** DT	**LOGGED BY:** IK
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Marooka D-50 ATV - Rig #395
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	916.3 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Dark Brown Silty Sand, Moist (10"± Thick)	TPSL		23		
915				1	8	Very Dark Brown Silty Sand, Very Moist	SM	2-3-3 N=6	19		
				2	10	Light Brown Silty Sand, Moist	SM	2-2-4 N=6	11		
	5										
910				3	8	Brown Silty Sand With Gravel, Moist	SM	9-8-8 N=16	20		
				4	2			5-5-5 N=10	16		
	10					End of Boring at 10' Cave-In at 6'					

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BORING B-6

DATE STARTED:	11/20/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/20/24	**DRILLER:** DT	**LOGGED BY:** IK
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Marooka D-50 ATV - Rig #395
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	912.6 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed	
Upon Completion	Not Observed	
Delay	N/A	

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Dark Brown Silty Sand, Moist (10"± Thick)	TPSL		21		
				1	8	Light Brown Silty Sand With Gravel, Moist	SM	8-16-29 N=45	17		
910											
				2	10	Light Brown Sand With Gravel and Silt Seams, Moist	SP	8-17-20 N=37	6		
	5										
				3	11	Light Brown Silty Sand With Gravel, Possible Cobbles, Moist	SM	10-28-24 N=52	5	>>◎	
905											
				4	8			21-49-21 N=70	9	>>◎	
	10					End of Boring at 10' Cave-In at 7'					

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Tax Key EGLT 1779999001

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING GW-1

DATE STARTED:	11/18/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/18/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	944.3 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	

REMARKS:

Water		
	While Drilling	Not Observed
	Upon Completion	Not Observed
	Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
	0	1	8	Topsoil, Dark Brown Silty Sand, Moist (13"± Thick)	TPSL	2-4-5-6 N=9	15
				Brown Clayey Sand With Gravel, Moist	CL		12
		2	12	Light Brown Fine to Medium Sand With Silt and Gravel, Moist	SP	6-7-8-8 N=15	5
940	5	3	10	Light Brown Fine Sand With Silt and Gravel, Damp	SP	11-11-15-13 N=26	2
		4	10			15-9-9-6 N=18	1
935	10	5	6	Light Brown Silty Sand With Gravel, Possible Cobbles, Damp	SM	30-13-8-19 N=21	2
		6	5			38-47-14-18 N=61	0
		7	12	Light Brown Fine to Medium Sand With Gravel and Silt Seams, Possible Cobbles, Damp	SP	19-15-21-17 N=36	2
930	15	8	3			21-50/4"	3
		9	20			19-16-15-18 N=31	2
925		10	3			13-11-16-19 N=27	2
	20			End of Boring at 20' Cave-In at 3'			

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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Tax Key EGLT 1779999001

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING GW-2

DATE STARTED:	11/18/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/18/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	942.4 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
	0	1	8	Topsoil, Very Dark Brown Silty Sand, Moist (15"± Thick)	TPSL	2-1-2-3 N=3	12
				Brown Clayey to Silty Sand, Moist	SM		12
940		2	10	Brown Lean Clay With Sand and Gravel, Very Moist	CL	2-3-3-3 N=6	27
	5	3	6			3-2-1-2 N=3	13
		4	8	Brown Fine Sand With Clay Seams, Moist	SP	2-2-2-2 N=4	8
935		5	10	Brown Lean Clay With Sand and Gravel, Very Moist	CL	2-1-2-2 N=3	18
	10	6	8	Brown Sandy Lean Clay With Gravel, Very Moist	CL	2-2-1-6 N=3	23
930		7	6	Light Brown Silty Sand With Gravel, Possible Cobbles, Moist		10-6-11-16 N=17	9
	15	8	14		SM	7-10-13-14 N=23	7
925		9	15			23-34-48-50/3" N=82	3
		10	13	Light Brown Fine to Medium Sand With Silt and Gravel, Damp	SP	26-24-27-25 N=51	4
	20			End of Boring at 20'			
				Cave-In at 13.5'			

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

intertek psi

Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00523460
PROJECT: Proposed Sprauge Rd Subdivision
LOCATION: SEC of Sprauge Rd & N Whitetail Dr
Eagle, WI
Tax Key EGLT 1779999001

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING GW-3

DATE STARTED:	11/18/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/18/24	**DRILLER:**	PR **LOGGED BY:** AW
COMPLETION DEPTH	12.5 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	939.7 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION:	N/A **OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water		
	While Drilling	Not Observed
	Upon Completion	Not Observed
	Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0			1	12	Topsoil, Very Dark Brown Sandy Lean Clay, Moist (17"± Thick)	TPSL	3-3-6-5 N=9	19 19		
						Dark Brown Silty Sand, Moist	SM				
				2	8	Brown Fine to Medium Sand With Silt and Gravel, Possible Cobbles, Damp		15-14-13-13 N=27	4		
935	5			3	14			22-35-37-50/4" N=72	2		
				4	12		SP	23-30-39-50/5" N=69	2		
				5	0			50/2"	3		
930	10			6	14			29-36-50/5"-0			
						Auger Refusal at 12.5' Due to Possible Cobbles and/or Boulders					

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PROJECT NO.: 00523460
PROJECT: Proposed Sprauge Rd Subdivision
LOCATION: SEC of Sprauge Rd & N Whitetail Dr
Eagle, WI
Tax Key EGLT 1779999001

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING GW-4

DATE STARTED:	11/19/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/19/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	16.5 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	936.1 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	

REMARKS:

Water		
	While Drilling	14 feet
	Upon Completion	Not Observed
	Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Very Dark Brown Lean Clay With Sand, Moist (24"± Thick)	TPSL		21		
935				1	12			2-2-12-9 N=14	18		
						Brown Lean Clay With Sand, Moist	CL				
				2	12	Brown Fine to Medium Sand With Silt Seams, Moist	SP	4-5-5-5 N=10	19		
	5			3	3	Light Brown Fine to Medium Sand With Silt and Gravel, Possible Cobbles, Wet		4-8-11-12 N=19	4		
930				4	16			18-16-17-19 N=33	3		
				5	16		SP	18-26-25-25 N=51	2	>>	
	10										
925				6	20			26-22-21-21 N=43	17		
				7	14			25-22-50/3"	3		
	15			8	8	Light Brown Silty Clay With Sand and Gravel, Possible Cobbles, Wet	CL-ML	42-18-50/5"	9		
920				9	0	Auger Refusal at 16.5' Due to Possible Cobbles and/or Boulders		50/1"		>>	

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PROJECT NO.: 00523460
PROJECT: Proposed Sprauge Rd Subdivision
LOCATION: SEC of Sprauge Rd & N Whitetail Dr
Eagle, WI
Tax Key EGLT 1779999001

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING GW-5

DATE STARTED:	11/19/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/19/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	938.5 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	16 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
	0	1	8	Topsoil, Very Dark Brown Silty Sand, Moist (11"± Thick)	TPSL		26
				Light Brown Fine to Medium Sand With Silt and Gravel, Moist to Damp		2-7-11-12 N=18	7
935		2	10			15-13-12-12 N=25	5
	5	3	16		SP	19-29-21-19 N=50	4
		4	20			16-20-20-13 N=40	2
930				Light Brown Fine Sand, Damp			
		5	12		SP	13-9-8-9 N=17	3
	10			Light Brown Fine Sand With Gravel and Silt Seams, Damp			
		6	6			29-21-11-7 N=32	4
					SP		
925		7	12			9-10-10-7 N=20	3
	15			Light Brown Fine to Medium Silt and Gravel, Damp to Moist			
		8	14			9-13-10-7 N=23	3
		9	12		SP	11-13-45-41 N=58	6
920		10	6			23-50/6"	
	20			End of Boring at 20'			
				Cave-In at 2.5'			

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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Eagle, WI
Tax Key EGLT 1779999001

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BORING GW-6

DATE STARTED:	11/19/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/19/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	936.5 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	

REMARKS:

Water

While Drilling	14 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
935	0	1	8	Topsoil, Very Dark Brown Sandy Silty Clay, Moist (13"± Thick)	TPSL	4-11-14-8 N=25	15 4
				Brown Fine to Medium Sand With Gravel and Silt Seams, Moist			
		2	5		SP	7-6-8-8 N=14	6
	5	3	10			36-21-50/3"	3
930		4	16	Light Brown Fine Sand With Silt and Gravel, Possible Cobbles, Moist		29-41-41-43 N=82	3
		5	8			21-38-50/3"	2
	10	6	6		SP	18-50/6"	3
925		7	16			33-26-23-16 N=49	2
	15	8	8	Brown Gravel With Sand and Silt, Wet		19-15-16-25 N=31	7
920		9	16		GP	6-5-10-19 N=15	15
		10	14			10-8-9-8 N=17	
	20			End of Boring at 20'			
				Cave-In at 2.5'			

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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PROJECT NO.: 00523460
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BORING GW-7

DATE STARTED:	12/2/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	12/2/24	**DRILLER:** DT	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	913.8 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	8 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Very Dark Brown Sandy Silt, Moist (13"± Thick)	TPSL		15		
				1	12	Brown Sandy Lean Clay With Gravel, Moist		5-4-3-2 N=7	18		Q_r = 0.6 tsf
910				2	16		CL	2-2-3-3 N=5	19		
	5			3	12	Light Brown Fine to Medium Sand With Silt and Gravel, Moist to Wet		3-7-11-11 N=18	8		
				4	12			6-11-10-11 N=21	6		
905				5	10			8-10-5-6 N=15	16		
	10			6	16			7-7-10-11 N=17	16		
				7	14		SP	6-8-11-10 N=19	15		
900											
	15			8	3			8-9-8-11 N=17	14		
				9	20			8-9-9-11 N=18	21		
895				10	12			8-25-50/4"	16		
	20					End of Boring at 20'					
						Cave-In at 7'					

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BORING GW-8

DATE STARTED:	12/2/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	12/2/24	**DRILLER:** DT	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	913.3 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	8 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0			1	12	Topsoil, Very Dark Brown Sandy Silt, Moist (14"± Thick)	TPSL	6-4-6-10 N=10	14 17		
						Dark Brown Sandy Lean Clay With Gravel, Moist	CL				
910				2	14	Light Brown Fine Sand With Silt and Gravel, Moist	SP	14-19-24-13 N=43	4		
	5			3	10			12-16-21-27 N=37	3		
				4	12	Light Brown Silty Sand With Gravel, Moist to Wet		26-28-30-27 N=58	6	>>	
905				5	8			14-20-37-34 N=57	8	>>	
	10			6	14			10-21-21-26 N=42	7		
900				7	12		SM	22-49-18-18 N=67	10	>>	
	15			8	10			24-26-30-30 N=56	12	>>	
				9	4			24-19-50/6"	8		
895				10	4			29-34-50/4"	15		
	20					End of Boring at 20'					
						Cave-In at 3'					

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BORING GW-9

DATE STARTED:	12/2/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	12/2/24	**DRILLER:** DT	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	914.9 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	8 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
	0	1	4	Topsoil, Very Dark Brown Sandy Lean Clay, Moist (14"± Thick)	TPSL	8-10-10-17 N=20	17 10
				Light Brown Fine Sand With Silt and Gravel, Damp			
		2	12			6-14-29-28 N=43	4
910	5	3	10		SP	8-8-12-8 N=20	3
		4	12			15-28-23-19 N=51	5
				Light Brown Gravel With Silt and Sand, Wet			
		5	6			25-21-12-9 N=33	8
905	10				GP		
		6	14			8-16-17-13 N=33	7
				Light Brown Fine to Medium Sand With Silt and Gravel, Wet			
		7	10			10-15-19-16 N=34	16
900	15	8	8			36-26-23-22 N=49	9
					SP		
		9	12			17-24-12-12 N=36	8
		10	10			16-20-13-15 N=33	20
895	20			End of Boring at 20'			
				Cave-In at 7'			

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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BORING GW-10

DATE STARTED:	11/25/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/25/24	**DRILLER:** PR	**LOGGED BY:** PR / AL
COMPLETION DEPTH	16.5 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	915.4 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	12 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
915	0					Topsoil, Very Dark Brown Sandy Silt, Moist (11"± Thick)	TPSL		18		
				1	1	Light Brown Fine to Medium Sand With Silt and Gravel, Possible Cobbles, Damp to Moist		4-6-26-33 N=32	2		
				2	14			17-18-23-25 N=41	3		
910	5			3	12			26-19-24-12 N=43	4		
				4	5			18-19-21-18 N=40	3		
				5	13		SP	22-15-28-50/6" N=43	4		
905	10			6	2			50/6"	5	>>	
				7	13			12-11-12-18 N=23			
900	15			8	8			17-50/6"	9	>>	
						Auger Refusal at 16.5' Due to Possible Cobbles Cave-In at 5'					

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BORING GW-11

DATE STARTED:	11/25/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/25/24	**DRILLER:** PR	**LOGGED BY:** PR / AL
COMPLETION DEPTH	12.5 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	912.1 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	6 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
	0					Topsoil, Very Dark Brown Sandy Silt, Moist (14"± Thick)	TPSL		26
				1	14	Brown Clayey Sand, Moist	SC	3-2-3-2 N=5	17
910				2	12	Light Brown Fine to Medium Sand With Gravel and Silt Seams, Moist	SP	5-7-10-8 N=17	7
	5			3	10			12-13-11-12 N=24	5
905				4	15	Light Brown Silty Sand With Gravel, Possible Cobbles, Moist	SM	11-17-17-18 N=34	8
				5	16			10-15-17-17 N=32	12
	10			6	13			16-13-18-50/5" N=31	
900				7	0	Auger Refusal at 12.5' Due to Possible Cobbles Cave-In at 8'		50/2"	

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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BORING GW-12

DATE STARTED:	11/20/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/20/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	935.7 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	

REMARKS:

Water

While Drilling	14 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ / STRENGTH, tsf	Additional Remarks
935	0					Topsoil, Very Dark Brown Sandy Lean Clay With Gravel, Moist (15"± Thick)	TPSL		12		
				1	8	Light Brown Fine to Medium Sand With Gravel and Silt Seams, Damp		3-10-11-8 N=21	5		
				2	6			10-9-8-9 N=17	6		
930	5			3	16			35-34-41-34 N=75	3		
				4	6		SP	36-50/5"	3		
				5	8			34-50/6"	3		
925	10			6	14			17-22-21-18 N=43	5		
				7	16			20-19-21-23 N=40	4		
920	15			8	16	Light Brown Gravel With Sand and Silt Seams, Moist		16-14-16-19 N=30	12		
				9	20		GP	14-16-15-20 N=31	11		
				10	22			13-16-16-19 N=32	6		
	20					End of Boring at 20'					
						Cave-In at 4.5'					

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Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00523460
PROJECT: Proposed Sprauge Rd Subdivision
LOCATION: SEC of Sprauge Rd & N Whitetail Dr
Eagle, WI
Tax Key EGLT 1779999001

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING GW-13

DATE STARTED:	11/23/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/23/24	**DRILLER:** DT	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	937.6 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	18 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Very Dark Brown Sandy Lean Clay, Moist (12"± Thick)	TPSL		21		
				1	6	Light Brown Fine to Medium Sand With Silt and Gravel, Possible Cobbles, Damp		3-4-9-15 N=13	6		
935				2	14			20-29-33-37 N=62	4		
	5			3	12		SP	12-34-50/6"	2		
				4	14			19-30-31-34 N=61	4		
930						Light Brown Silty Sand With Gravel, Possible Cobbles, Damp					
				5	5			50/6"	3		
	10			6	16			12-23-22-28 N=45	2		
							SM				
925				7	10			20-21-20-21 N=41	1		
	15			8	12			15-22-24-20 N=46	2		
						Light Brown Fine to Medium Sand With Silt and Gravel, Moist					
				9	16		SP	13-21-28-40 N=49	7		
920						Light Brown Silty Sand With Gravel, Moist					
				10	12		SM	35-25-12-32 N=37	7		
	20					End of Boring at 20'					
						Cave-In at 5'					

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Eagle, WI
Tax Key EGLT 1779999001

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BORING GW-14

DATE STARTED:	11/23/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/23/24	**DRILLER:** DT	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	937.5 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Very Dark Brown Sandy Lean Clay, Moist (13"± Thick)	TPSL		15		
				1	6	Brown Lean Clay With Sand and Gravel, Moist	SP	4-3-7-11 N=10	9		
935				2	16	Light Brown Fine Sand With Silt and Gravel, Possible Cobbles, Damp		11-13-14-36 N=27	3		
	5			3	18		SP	24-41-43-33 N=84	4		
930				4	20			23-42-40-34 N=82	3		
				5	6			16-18-24-25 N=42	4		
	10			6	12	Light Brown Silty Sand With Gravel, Possible Cobbles, Damp		11-18-19-21 N=37	2		
925				7	10		SM	19-39-50/6"	1		
	15			8	12			23-36-37-45 N=73	2		
				9	20	Light Brown Fine to Medium Sand With Silt and Gravel, Damp		12-33-46-47 N=79	4		
920				10	16		SP	14-34-43-45 N=77	2		
	20					End of Boring at 20'					
						Cave-In at 4'					

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BORING GW-15

DATE STARTED:	11/20/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/20/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	935.9 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	14 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
935	0	1	8	Topsoil, Very Dark Brown Sandy Lean Clay, Moist (16"± Thick)	TPSL	3-2-2-4 N=4	18 18
				Brown Lean Clay With Sand and Gravel, Moist	CL		
		2	6	Light Brown Fine to Medium Sand With Gravel and Silt Seams, Possible Cobbles, Damp		7-8-10-12 N=18	6
	5	3	3			34-31-29-35 N=60	4
930		4	5			32-29-33-31 N=62	2
		5	8		SP	24-21-27-29 N=48	3
	10	6	3			23-23-25-25 N=48	2
925		7	2			21-24-26-2 N=50	2
				Light Brown Gravel With Silt and Sand, Wet			
	15	8	6			8-5-4-8 N=9	24
920		9	10		GP	12-7-9-10 N=16	6
		10	14			10-6-10-7 N=16	7
	20			End of Boring at 20'			
				Cave-In at 5'			

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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BORING GW-16

DATE STARTED:	11/20/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/20/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	14.5 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	935.3 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
935	0			1	10	Topsoil, Dark Brown Sandy Silt, Moist (13"± Thick)	TPSL	2-2-7-13 N=9	16 10		
						Brown Lean Clay With Sand and Gravel, Moist	CL				
				2	6	Light Brown Fine to Medium Sand With Silt and Gravel, Possible Cobbles, Moist to Damp		8-6-7-6 N=13	7		
930	5			3	14			18-14-23-29 N=37	3		
				4	10			17-25-24-27 N=49	4		
				5	8		SP	16-28-50/4"	1		
925	10			6	0			50/1"		>>	
				7	14			23-26-17-25 N=43	3		
				8	0	Auger Refusal at 14.5' Due to Possible Cobbles Cave-In at 5'		50/1"		>>	

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BORING GW-17

DATE STARTED:	11/22/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/22/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	939.7 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	

REMARKS:

Water

While Drilling	16 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Very Dark Brown Sandy Lean Clay With Gravel, Moist (13"± Thick)	TPSL		22		
				1	8	Brown Fine to Medium Sand With Gravel and Silt Seams, Damp		3-10-10-16 N=20	5		
				2	8			20-20-19-21 N=39	4		
935	5			3	16		SP	30-24-27-41 N=51	3		
				4	14			32-29-31-34 N=60	3		
				5	20	Light Brown Fine to Medium Sand With Silt and Gravel, Possible Cobbles, Damp		16-30-41-35 N=71	2		
930	10			6	18			26-21-15-21 N=36	2		
				7	16		SM	22-23-19-20 N=42	2		
925	15			8	1			50/1"			
				9	6	Light Brown Silty Sand With Gravel, Moist to Wet		13-15-50/3"	7		
				10	2		SM	50/3"	24		
920	20					End of Boring at 20'					
						Cave-In at 4'					

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BORING GW-18

DATE STARTED:	11/22/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/22/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	939.6 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water		
	While Drilling	Not Observed
	Upon Completion	Not Observed
	Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Dark Brown Sandy Lean Clay, Moist (15"± Thick)	TPSL		19		
				1	10			2-2-2-2 N=4	17		
						Dark Brown to Brown Lean Clay With Sand, Moist	CL				
				2	10	Light Brown Silty Sand With Gravel, Possible Cobbles, Damp		2-2-9-12 N=11	17		
935	5			3	12			19-27-32-35 N=59	2		
				4	10			30-33-29-31 N=62	3		
				5	2			50/3"			
930	10			6	16		SM	30-31-35-32 N=66	4		
				7	14			29-32-37-31 N=69	2		
925	15			8	12			13-26-37-21 N=63	2		
				9	10			18-25-24-14 N=49	2		
				10	5			19-23-21-22 N=44	3		
920	20					End of Boring at 20'					
						Cave-In at 7'					

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BORING GW-19

DATE STARTED:	11/22/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/22/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	942.7 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0	1	3	Topsoil, Very Dark Brown Sandy Lean Clay, Moist (14"± Thick)	TPSL	2-5-6-4 N=11	17 9	
				Brown Fine Sand With Silt and Gravel, Moist	SP			
940		2	16	Brown Lean Clay With Sand and Gravel, Moist	CL	6-5-3-2 N=8	6	
	5	3	16	Light Brown Fine Sand With Silt and Gravel, Damp		17-29-25-21 N=54	3	
		4	14			18-23-24-22 N=47	4	
935		5	0		SP	42-39-38-33 N=77		>> No Recovery
	10	6	2			20-19-18-21 N=37	5	
930		7	0	Light Brown Fine Sand With Gravel, Damp		22-27-20-21 N=47		No Recovery
	15	8	16			13-14-18-13 N=32	1	
		9	14		SP	11-10-11-11 N=21	1	
925		10	16			10-9-10-11 N=19	1	
	20			End of Boring at 20'				
				Cave-In at 7.5'				

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
Moisture, PL, LL
0 25 50
STRENGTH, tsf
Qu, Qp
0 2.0 4.0

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BORING SW-7

DATE STARTED:	11/20/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/20/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	935.7 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	

REMARKS:

Water

While Drilling	18 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
935	0			1	12	Topsoil, Very Dark Brown Silt Loam, Moist (14"± Thick)		2-3-5-5 N=8	16 16		
						Dark Brown Clay Loam, Moist					
				2	5	Light Yellowish-Brown Very Gravelly Loamy Fine Sand, Moist		7-4-3-5 N=7	12		
930	5			3	0			50/2"		>> No Recovery	
				4	0			50/3"		>> No Recovery	
				5	0			50/3"		>> No Recovery	
925	10			6	4	Very Pale Brown Extremely Gravelly Fine Sand, Damp		50/6"	2	>>	
				7	16	Brown Extremely Gravelly Sandy Loam, Damp		23-35-50/6"	2		
920	15			8	0			50/1"		>> No Recovery	
				9	0			50/2"		>> No Recovery	
				10	12	Light Brownish-Gray Gravelly Fine Sand, Moist		38-48-50/6"	10		
	20					End of Boring at 20'					
						Cave-In at 9'					
						Comment: Wet soils at 18 feet; Cobbles between 7 feet to 18 feet					

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BORING SW-8

DATE STARTED:	11/19/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/19/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	935.2 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	

REMARKS:

Water

While Drilling	14 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎	Additional Remarks
935	0					Topsoil, Very Dark Brown Silt Loam, Moist (13"± Thick)			24		
				1	10	Dark Brown Clay Loam, Moist		2-6-3-3 N=9	13		
				2	2	Light Yellowish-Brown Very Gravelly Loamy Fine Sand, Moist		9-13-8-8 N=21			
930	5			3	16	Very Pale Brown Very Gravelly Loamy Fine to Medium Sand, Damp		20-26-31-31 N=57	3		
				4	20			33-33-43-43 N=76	2		
				5	12			25-38-50/6"-50/6"	2		
925	10			6	3			50/6"	1		
				7	8			15-27-19-19 N=46	3		
						Light Brownish-Gray Gravelly Fine Sand, Moist					
920	15			8	14			7-14-21-21 N=35	11		
				9	12			11-16-19-19 N=35	7		
				10	16			18-14-15-15 N=29	7		
	20					End of Boring at 20'					
						Cave-In at 3'					
						Comment: Wet soils at 14 feet; Cobbles between 4 feet to 14 feet					

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

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BORING SW-9

DATE STARTED:	11/25/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/25/24	**DRILLER:**	PR **LOGGED BY:** PR / AL
COMPLETION DEPTH	10.5 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	914.1 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION:	N/A **OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	10 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Very Dark Brown Silt Loam, Moist (12"± Thick)					
				1	15	Dark Brown Clay Loam, Moist		3-2-1-2 N=3	21 13		
				2	1			3-8-16-21 N=24			
910											
	5			3	10	Light Yellowish-Brown Very Gravelly Loamy Fine Sand, Moist		15-19-12-20 N=31	4		
						Brown Very Gravelly Sandy Loam, Moist					
				4	6			26-50/2"	6	>>	
905				5	0			50/1"		>>	No Recovery
	10					Light Brownish Gray Gravelly Fine Sand, Moist					
						Auger Refusal at 10.5' Due to Possible Cobbles					
						Cave-In at 8.4'					
						Comment: Wet soils at 10 feet; Cobbles from 6 feet to 10.5 feet					

Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00523460
PROJECT: Proposed Sprauge Rd Subdivision
LOCATION: SEC of Sprauge Rd & N Whitetail Dr
Eagle, WI
Tax Key EGLT 1779999001

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING SW-10

DATE STARTED:	11/25/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/25/24	**DRILLER:** PR	**LOGGED BY:** PR / AL
COMPLETION DEPTH	10.5 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	914 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	6 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Very Dark Brown Silt Loam, Moist (13"± Thick)			26		
				1	14	Dark Brown Clay Loam, Moist		2-2-3-2 N=5	17		
				2	12	Light Yellowish-Brown Very Gravelly Loamy Fine Sand, Moist		4-3-3-4 N=6	7		
910											
	5			3	14			4-8-10-12 N=18	5		
						Very Pale Brown Very Gravelly Fine Sand, Moist					
				4	10			13-13-33-44 N=46	8		
						Brown Gravelly Fine to Medium Sand, Moist					
905				5	13			8-15-50/2"	12		
	10										
						Auger Refusal at 10.5' Due to Possible Cobbles					
						Cave-In at 9.4'					
						Comment: Wet soils at 6 feet; Cobbles from 8 feet to 10.5 feet					

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BORING SW-11

DATE STARTED:	11/22/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/22/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	934.3 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	14 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil, Very Dark Brown Silt Loam, Moist (14"± Thick)			22		
				1	12	Dark Brown Clay Loam, Moist		2-1-1-1 N=2	14		
				2	8			2-3-7-8 N=10	9		
930	5			3	10	Light Yellowish Brown Very Gravelly Loamy Fine Sand, Moist		13-14-19-24 N=33	6		
				4	16	Very Pale Brown Extremely Gravelly Fine Sand, Damp		23-27-21-20 N=48	3		
925	10			5	14			21-25-23-22 N=48	3		
				6	8			31-25-12-10 N=37	4		
				7	10	Brown Extremely Gravelly Sandy Loam, Moist		12-19-21-13 N=40	5		
920	15			8	5	Pale Brown Gravelly Very Fine Sand, Moist		10-9-12-13 N=21	10		
				9	16			14-14-29-38 N=43	11		
915				10	20			15-17-19-20 N=36	9		
	20					End of Boring at 20'					
						Cave-In at 6'					
						Comment: Wet soils at 14 feet; Cobbles between 6 feet to 18 feet					

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Eagle, WI
Tax Key EGLT 1779999001

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BORING SW-12

DATE STARTED:	11/23/24	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	11/23/24	**DRILLER:** PR	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ASV D-50 ATV - Rig #420
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	935.0 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	

REMARKS:

Water

While Drilling	14 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0 25 50) STRENGTH, tsf ▲ Qu ✳ Qp (0 2.0 4.0)	Additional Remarks
	0					Topsoil, Very Dark Brown Silt Loam, Moist (14"± Thick)			15		
				1	24	Dark Brown Clay Loam, Moist		2-2-3-2 N=5	16		
				2	8	Light Yellowish Brown Very Gravelly Loamy Fine Sand, Moist		3-4-18-13 N=22	5		
930	5			3	20	Very Pale Brown Extremely Gravelly Fine Sand, Damp		23-26-25-27 N=51	2		
				4	18			25-24-24-28 N=48	2		
				5	12			14-39-50/5"	2		
925	10			6	16			15-30-28-29 N=58	2		
				7	14			14-32-29-31 N=61	3		
						Light Brownish Gray Gravelly Fine Sand, Wet					
920	15			8	12			9-7-10-11 N=17	18		
				9	0			14-13-8-9 N=21			No Recovery
				10	24	Light Brownish Gray Fine to Medium Sand, Moist		14-16-17-13 N=33	10		
915	20					End of Boring at 20'					
						Cave-In at 14'					
						Comment: Wet soils at 14 feet; Cobbles between 8 feet and 14 feet					

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The stratification lines represent approximate boundaries. The transition may be gradual.

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
R.C.: Diamond Bit Core Sampler
H.A.: Hand Auger
P.A.: Power Auger - Handheld motorized auger

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
RC: Rock Core
TC: Texas Cone
BS: Bulk Sample
PM: Pressuremeter
CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N_{60}: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q_u: Unconfined compressive strength, TSF
Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL),%
DD: Dry unit weight, pcf
▼,▽,▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

Q_U - TSF	N - Blows/foot	Consistency
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

Description	Criteria
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term	% Dry Weight
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

Description	Criteria
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided:	Fracture planes appear polished or glossy, sometimes striated
Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed:	Inclusion of small pockets of different soils
Layer:	Inclusion greater than 3 inches thick (75 mm)
Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

Q_U - TSF	Consistency
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

Description	Criteria
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

Voids	Void Diameter
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

Component	Size Range
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

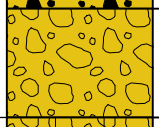
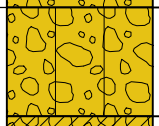
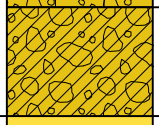
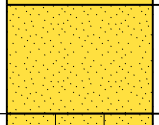
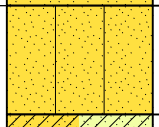
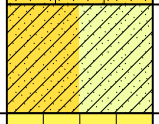
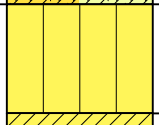
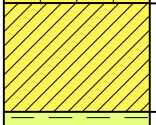
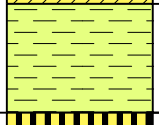
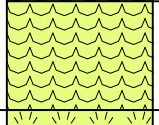
Rock Mass Description	RQD Value
Excellent	90 -100
Good	75 - 90
Fair	50 - 75
Poor	25 -50
Very Poor	Less than 25

DEGREE OF WEATHERING

Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS 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
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

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Wis. Dept. of Safety and Professional Services
Division of Industry Services

SOIL EVALUATION - STORM

In accordance with SPS 382.365 & 385, Wis. Adm. Code and WDNR Standard 1002

Attach complete site plan on paper not less that 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04 (1) (m)].

County: Waukesha

Parcel I.D.:

Reviewed by:

Date:

Property Owner	Property Location: Sprague Road, Eagle, WI
	Govt. Lot

Property Owner's Mailing Address	Lot #	Block #	Subd. Name or CSM#

City	State	Zip Code	Phone Number	☐ City ☐ Village ☒ Town	Nearest Road
				Eagle	Sprague Road

Drainage area _____ ☐ sq. ft. ☐ acres

Optional:

Test Site Suitable for (check all that apply)

☐ Irrigation ☐ Bioretention trench ☐ Trench(es)

☐ Rain Garden ☐ Grassed swale ☐ Reuse

☐ Infiltration trench ☐ SDS (> 15' wide) ☐ Other _____

Hydraulic Application Test Method:

☒ Morphological Evaluation

☐ Double Ring Infiltrometer

☐ Other (specify)

Soil Moisture

Date of Test Pits: November 20, 2024

USDA-NRCS WETS Value: 9

☒ **Dry =1;**

☐ **Normal = 2;**

☐ **Wet = 3.**

1 Obs. # ☒ Boring ☐ Pit SW-7

Ground surface elevation 935.66± Elevation of limiting factor: 917.7±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-14	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	14-24	10YR 3/3		cl	1 f sbk	mfi		<15		0.03
3	24-120	10YR 6/4		vgrlfs	0 m	mfr		>35		0.5
4	120-144	10YR 7/4		exgrfs	0 sg	ml		>65		0.5
5	144-216	10YR 4/3		exgrsl	1 f sbk	mfr		>65		0.5
6	216-240	10YR 6/2		grfs	0 m	mvfr		>15		0.5

Comment: wet soils at 18 feet; cobbles between 7 feet to 18 feet

2 Obs. # ☒ Boring ☐ Pit SW-8

Ground surface elevation 935.16± Elevation of limiting factor: 921.2±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-13	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	13-24	10YR 3/3		cl	1 f sbk	mfi		<15		0.03
3	24-48	10YR 6/4		vgrlfs	0 m	mfr		>35		0.5
4	48-168	10YR 7/3		vgrlf-ms	0 sg	ml		>35		3.6
5	168-240	10YR 6/2		grfs	0 m	mvfr		>15		0.5

Comment: wet soils at 14 feet; cobbles between 4 feet to 14 feet

CST/PSS Name (Please Print)	Signature	CST/PSS/Geologist Number
Patrick J. Patterson		G-229
Address	**Date Evaluation Conducted**	**Telephone Number**
821 Corporate Court, Waukesha, WI 53189	12/5/2024	262 521 2125

3 Obs. # ☒ Boring ☐ Pit SW-9 Ground surface elevation 914.05± Elevation of limiting factor: 904.1±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-12	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	12-54	10YR 3/3		cl	1 f sbk	mfi		<15		0.03
3	54-72	10YR 6/4		vgrlfs	0 m	mfr		>35		0.5
4	72-120	10YR 4/3		vgrsl	1 f sbk	mfr		>35		0.5
5	120-126	10YR 6/2		grfs	0 m	mvfr		>15		0.5

Comment: wet soils at 10 feet; cobbles from 6 feet to 10.5 feet; auger refusal at 10.5 feet

4 Obs. # ☒ Boring ☐ Pit SW-10 Ground surface elevation 914.00± Elevation of limiting factor: 908±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-13	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	13-30	10YR 3/3		cl	1 f sbk	mfi		<15		0.03
3	30-72	10YR 6/4		vgrlfs	0 m	mfr		>35		0.5
4	72-96	10YR 7/3		vgrfs	0 m	mvfr		>35		0.5
5	96-126	10YR 5/3		grf-ms	0 m	mvfr		>15		3.6

Comment: wet soils at 6 feet; cobbles from 8 feet to 10.5 feet; auger refusal at 10.5 feet

5 Obs. # ☒ Boring ☐ Pit SW-11 Ground surface elevation 934.27± Elevation of limiting factor: 920.3±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-14	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	14-48	10YR 3/3		cl	1 f sbk	mfi		<15		0.03
3	48-72	10YR 6/4		vgrlfs	0 m	mfr		>35		0.5
4	72-144	10YR 7/4		exgrfs	0 sg	ml		>65		0.5
5	144-168	10YR 4/3		exgrsl	1 f sbk	mfr		>65		0.5
6	168-240	10YR 6/3		grvfs	0 m	mvfr		>15		0.5

Comment: wet soils at 14 feet; cobbles between 6 feet to 18 feet

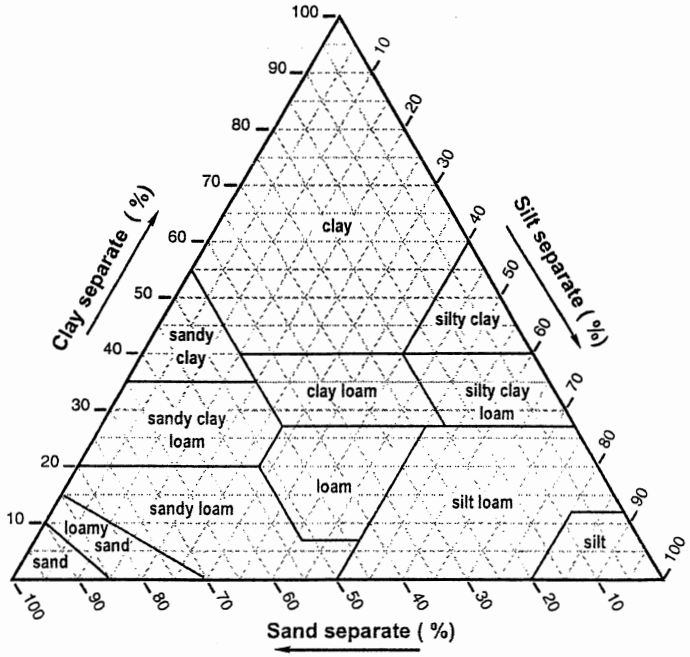
6 Obs. # ☒ Boring ☐ Pit SW-12 Ground surface elevation 934.99± Elevation of limiting factor: 921±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-14	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	14-24	10YR 3/3		cl	1 f sbk	mfi		<15		0.03
3	24-48	10YR 6/4		vgrlfs	0 m	mfr		>35		0.5
4	48-168	10YR 7/4		exgrfs	0 sg	ml		>65		0.5
5	168-216	10YR 6/2		grfs	0 m	mvfr		>15		0.5
6	216-240	10YR 6/2		f-ms	0 m	mvfr		<15		2.6

Comment: wet soils at 14 feet; cobbles between 8 feet to 14 feet

Texture Triangle:

Fine Earth Texture Classes (——)



TEXTURE MODIFIERS - Conventions for using "Rock Fragment Texture Modifiers" and for using textural adjectives that convey the "% volume" ranges for **Rock Fragments - Size and Quantity**.

Fragment Content % By Volume	Rock Fragment Modifier Usage
< 15	No texture adjective is used (noun only; e.g., *loam*).
15 to < 35	Use adjective for appropriate size; e.g., *gravelly*.
35 to < 60	Use "very" with the appropriate size adjective; e.g., *very gravelly*.
60 to < 90	Use "extremely" with the appropriate size adjective; e.g., *extremely gravelly*.
≥ 90	No adjective or modifier. If ≤ 10% fine earth, use the appropriate noun for the dominant size class; e.g., *gravel*. Use **Terms in Lieu of Texture**.

(SOIL) TEXTURE

This is the numerical proportion (percent by weight) of sand, silt, and clay in a soil. Sand, silt, and clay content is estimated in the field by hand (or quantitatively measured in the office/lab by hydrometer or pipette) and then placed within the texture triangle to determine **Texture Class**. Estimate the **Texture Class**; e.g., *sandy loam*; or **Subclass**; e.g., *fine sandy loam* of the fine earth (≤ 2 mm) fraction, or choose a **Term in Lieu of Texture**; e.g., *gravel.* If appropriate, use a **Textural Class Modifier**; e.g., *gravelly silt loam.*

NOTE: **Soil Texture** encompasses only the fine earth fraction (≤ 2 mm). **Particle Size Distribution** (PSD) encompasses the whole soil, including both the fine earth fraction (≤ 2 mm; weight %) and rock fragments (> 2 mm; volume %).

TEXTURE CLASS

Texture Class or Subclass	Code	
	Conv.	NASIS
Coarse Sand	cos	COS
Sand	s	S
Fine Sand	fs	FS
Very Fine Sand	vfs	VFS
Loamy Coarse Sand	lcos	LCOS
Loamy Sand	ls	LS
Loamy Fine Sand	lfs	LFS
Loamy Very Fine Sand	lvfs	LVFS
Coarse Sandy Loam	cosl	COSL
Sandy Loam	sl	SL
Fine Sandy Loam	fsl	FSL
Very Fine Sandy Loam	vfsl	VFSL
Loam	l	L
Silt Loam	sil	SIL
Silt	si	SI
Sandy Clay Loam	scl	SCL
Clay Loam	cl	CL
Silty Clay Loam	sicl	SICL
Sandy Clay	sc	SC
Silty Clay	sic	SIC
Clay	c	C

TEXTURE MODIFIERS - *(adjectives)*

ROCK FRAGMENTS: Size & Quantity [1]	Code		Criteria: Percent (By Volume) of Total Rock Fragments and Dominated By (*name size*): [1]
	Conv.	PDP/ NASIS	
ROCK FRAGMENTS (> 2 mm; ≥ Strongly Cemented)			
Gravelly	GR	GR	≥ 15% but < 35% gravel
Fine Gravelly	FGR	GRF	≥15% but < 35% fine gravel
Medium Gravelly	MGR	GRM	≥15% but < 35% med. gravel
Coarse Gravelly	CGR	GRC	≥ 15% but < 35% coarse gravel
Very Gravelly	VGR	GRV	≥ 35% but < 60% gravel
Extremely Gravelly	XGR	GRX	≥ 60% but < 90% gravel
Cobbly	CB	CB	≥ 15% but < 35% cobbles
Very Cobbly	VCB	CBV	≥ 35% but < 60% cobbles
Extremely Cobbly	XCB	CBX	≥ 60% but < 90% cobbles
Stony	ST	ST	≥ 15% but < 35% stones
Very Stony	VST	STV	≥ 35% but < 60% stones
Extremely Stony	XST	STX	≥ 60% but < 90% stones
Bouldery	BY	BY	≥ 15% but < 35% boulders
Very Bouldery	VBY	BYV	≥ 35% but < 60% boulders
Extremely Bouldery	XBY	BYX	≥ 60% but < 90% boulders
Channery	CN	CN	≥ 15% but < 35% channers
Very Channery	VCN	CNV	≥ 35% but < 60% channers
Extremely Channery	XCN	CNX	≥ 60% but < 90% channers
Flaggy	FL	FL	≥ 15% but < 35% flagstones
Very Flaggy	VFL	FLV	≥ 35% but < 60% flagstones
Extremely Flaggy	XFL	FLX	≥ 60% but < 90% flagstones
PARAROCK FRAGMENTS (> 2 mm; < Strongly Cemented) [2, 3]			
Parabouldery	PBY	PBY	(same criteria as bouldery)
Very Parabouldery	VPBY	PBYV	(same criteria as very bouldery)
Extr. Parabouldery	XPBY	PBYX	(same criteria as ext. bouldery)
etc.	etc.	etc.	(same criteria as non-para)

[1] The "Quantity" modifier (e.g., *very*) is based on the total rock fragment content. The "Size" modifier (e.g., *cobbly*) is independently based on the largest, dominant fragment size. For a mixture of sizes (e.g., *gravel and stones*), a smaller size–class is named only if its quantity (%) sufficiently exceeds that of a larger size–class. For field texture determination, a smaller size-class must exceed 2 times the quantity (vol. %) of a larger size class before it is named (e.g., 30% gravel and 14% stones = *very gravelly*, but 20% gravel and 14% stones = *stony*). For more explicit naming criteria see NSSH-Part 618, Exhibit 618.11(Soil Survey Staff, 2001b).

Form A - Seasonal High Groundwater Determination Report *(with sample language)*

Project/Plat Name: Sprague Road Parcel Date: December 10, 2024

Project Location (PLS/ID#): Sprague Road and N. Whitetail Drive, Town of Eagle, Wisconsin (ID EGLT1779999001)

The following table summarizes my interpretation of the soil profile evaluations conducted on the above noted site. The purpose of this report is to demonstrate compliance with a Waukesha County ordinance requirement to maintain basement floor elevations at least 1 foot above the seasonal high-water table. I understand that the definition for seasonal high-water table means the upper limit of the zone of soil saturation caused by underlying groundwater at its highest level. I certify that the information presented in this report represents my best professional judgment in estimating seasonal high-water table based on soil and site evaluations in accordance with the procedures contained in Chapter SPS 85 Wisconsin Administrative Code.

(Stamp/sign here)

Interpreters Signature: _____

Interpreters Printed Name/Credentials/Lic. #: 45678-6

Interpreters Company Name/Address: PSI, Inc./821 Corporate Court, Waukesha, WI 53189

Site Benchmark/Elevation (Co. Stds.): Provided by Client

References: The following references apply to the data presented herein: 1) Map 1 for soil boring locations; and 2) DSPS Soil Evaluation forms (6 sheets)

Lot #	Soil Observ. (#)	Surface Elev. (NGVD 29)	Bottom Elev. of Soil Profile	Soil Map Unit Symbol (NRCS)	Elevation of Seasonal High-Water Table	Depth to Seasonal High-Water Table (Feet)	Proposed Basement Floor Elevation(a)	**Notes: List information used to determine seasonal high-water table, including any soil color pattern exemptions under SPS 85.30(3) for a basement floor proposed less than 1-foot above redoximorphic features shown in the referenced soil evaluation reports.**
1	GW-1	944.3	924.3	LyB2	≤924.3	≥20	≥ 926.3	Soil saturation at 4.5’ below grade. No redoximorphic features encountered during excavation activities.
2	GW-2	942.43	922.4	LyB2	≤922.4	≥20	≥ 924.4	Soil saturation at 3.5’ below grade. No redoximorphic features encountered during excavation activities.
3	GW-3	939.71	927.2	WeA	≤927.2	≥12.5	≥ 929.2	No redoximorphic features or soil saturation encountered during excavation activities. Fill soils encountered from ground surface to a depth of 54”
4	GW-4	936.12	919.6	WeA	922.1	14	≥ 924.1	Soil saturation at 14’ below grade. No redoximorphic features encountered during drilling activities. Auger refusal at about 16.5’
5	GW-5	938.46	918.5	WeA	922.5	16	≥ 924.5	Soil saturation at 16’ below grade. No redoximorphic features encountered during drilling activities.
6	GW-6	936.51	916.5	WeA	922.5	14	≥ 924.5	Soil saturation at 14’ below grade. No redoximorphic features encountered during drilling activities.

a. PSI recommends the basement floor elevation at 2 feet above seasonal high-water table

Lot #	Soil Observ. (#)	Surface Elev. (NGVD 29)	Bottom Elev. of Soil Profile	Soil Map Unit Symbol (NRCS)	Elevation of Seasonal High-Water Table	Depth to Seasonal High-Water Table (Feet)	Proposed Basement Floor Elevation(a)	**Notes: List information used to determine seasonal high-water table, including any soil color pattern exemptions under SPS 85.30(3) for a basement floor proposed less than 1-foot above redoximorphic features shown in the referenced soil evaluation reports.**
7	GW-7	913.8	893.8	WeA	905.8	8	≥907.8	Soil saturation at 8' below grade. No redoximorphic features encountered during drilling activities.
8	GW-8	913.26	893.3	WeA	905.3	8	≥ 907.3	Soil saturation at 8' below grade. No redoximorphic features encountered during drilling activities.
9	GW-9	914.86	894.9	LyB2	906.9	8	≥ 908.9	Soil saturation at 8' below grade. No redoximorphic features encountered during drilling activities.
10	GW-10	915.36	898.9	LyB2	903.4	12	≥ 905.4	Soil saturation at 12' below grade. No redoximorphic features encountered during drilling activities. Auger refusal at about 16.5'
11	GW-11	912.12	899.6	WeA	906.1	6	≥ 908.1	Soil saturation at 6' below grade. No redoximorphic features encountered during drilling activities. Auger refusal at about 12.5'
12	GW-12	935.69	915.7	WeA	921.7	14	≥ 923.7	Soil saturation at 14' below grade. No redoximorphic features encountered during drilling activities.
13	GW-13	937.64	917.6	LyB2	919.6	17	≥ 922.6	Soil saturation at 17' below grade. No redoximorphic features encountered during drilling activities.
14	GW-14	937.51	917.5	LyB2	≤917.5	≥20	≥ 919.5	No redoximorphic features or soil saturation encountered during drilling activities.
15	GW-15	935.87	915.9	WeA	921.9	14	≥ 923.9	Soil saturation at 14' below grade. No redoximorphic features encountered during drilling activities.
16	GW-16	935.27	920.8	WeA	≤920.8	≥14.5	≥ 922.8	No redoximorphic features or soil saturation encountered during drilling activities. Auger refusal at about 14.5'
17	GW-17	939.71	919.7	WeA	923.7	16	≥ 925.7	Soil saturation at 16' below grade. No redoximorphic features encountered during drilling activities.
18	GW-18	939.58	919.6	LyB2	≤919.6	≥20	≥ 921.6	No redoximorphic features or soil saturation encountered during drilling activities.
19	GW-19	942.66	922.7	LyB2	≤922.7	≥20	≥ 924.7	No redoximorphic features or soil saturation encountered during drilling activities.

a. PSI recommends the basement floor elevation at 2 feet above seasonal high-water table

Wis. Dept. of Safety and Professional Services
Division of Industry Services

SOIL EVALUATION - STORM

In accordance with SPS 382.365 & 385, Wis. Adm. Code and WDNR Standard 1002

Attach complete site plan on paper not less that 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04 (1) (m)].

County: Waukesha

Parcel I.D.:

Reviewed by:

Date:

Property Owner	Property Location: Sprague Road, Eagle, WI
	Govt. Lot

Property Owner's Mailing Address	Lot #	Block #	Subd. Name or CSM#

City	State	Zip Code	Phone Number	☐ City ☐ Village ☒ Town	Nearest Road
				Eagle	Sprague Road

Drainage area _____ ☐ sq. ft. ☐ acres

Optional:

Test Site Suitable for (check all that apply)

☐ Irrigation ☐ Bioretention trench ☐ Trench(es)

☐ Rain Garden ☐ Grassed swale ☐ Reuse

☐ Infiltration trench ☐ SDS (> 15' wide) ☐ Other _____

Hydraulic Application Test Method:

☒ Morphological Evaluation

☐ Double Ring Infiltrometer

☐ Other (specify)

Soil Moisture

Date of Borings: 11/18/24 to 12/2/24

USDA-NRCS WETS Value: 9

☒ **Dry =1;**

☐ **Normal = 2;**

☐ **Wet = 3.**

1 Obs. # ☒ Boring ☐ Pit GW-1

Ground surface elevation 944.3± Elevation of limiting factor: ≤924.3±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-13	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	13-24	10YR 3/3		grcl	1 f sbk	mfr		>15		0.03
3	24-48	10YR 5/4		vgrfs	0 sg	ml		>35		0.5
4	48-144	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
5	144-240	10YR 5/3		vgrf-ms	0 sg	ml		>35		3.6

Comment: cobbles between 2 feet to 18 feet

2 Obs. # ☒ Boring ☐ Pit GW-2

Ground surface elevation 942.43± Elevation of limiting factor: ≤922.4±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-16	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	16-72	10YR 3/3		cl	1 f sbk	mfr		<15		0.03
3	72-96	10YR 3/4		fsl	1 f sbk	mfr		<15		0.5
4	96-144	10YR 3/4		grcl	1 f sbk	mfr		>15		0.03
5	144-192	10YR 5/3		vgrfsl	0 m	mvfr		>35		0.5
6	192-240	10YR 6/3		exgrfs	0 sg	ml		>65		0.5

Comment: cobbles between 12 feet to 18 feet

CST/PSS Name (Please Print)	Signature	CST/PSS/Geologist Number
Patrick J. Patterson		G-229
Address	**Date Evaluation Conducted**	**Telephone Number**
821 Corporate Court, Waukesha, WI 53189	12/5/2024	262 521 2125

3 Obs. # ☒ Boring ☐ Pit GW-3 Ground surface elevation 939.71± Elevation of limiting factor: ≤927.2±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-17	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	17-24	10YR 3/3		cl	1 f sbk	mfi		<15		0.03
3	24-150	10YR 5/3		exgrfs	0 sg	ml		>65		0.5

Comment: cobbles from 3 feet to 12.5 feet; auger refusal at 12.5 feet

4 Obs. # ☒ Boring ☐ Pit GW-4 Ground surface elevation 936.12± Elevation of limiting factor: 922.1±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-12	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	12-48	10YR 3/3		cl	1 f sbk	mfi		<15		0.03
3	48-198	10YR 5/3		exgrfs	0 sg	ml		>65		0.5

Comment: wet soils at 14 feet; cobbles from 3 feet to 16.5 feet; auger refusal at 16.5 feet

5 Obs. # ☒ Boring ☐ Pit GW-5 Ground surface elevation 938.46± Elevation of limiting factor: 922.5±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-11	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	11-48	10YR 3/3		exgrlfs	0 m	mvfr		>65		0.5
3	48-96	10YR 5/3		exgrlfs	0 m	mvfr		>65		0.5
4	96-120	10YR 5/3		fs	0 sg	ml		<15		0.5
5	120-168	10YR 5/3		exgrlfs	0 m	mvfr		>65		0.5
6	168-240	10YR 5/3		vgrf-ms	0 sg	ml		>35		3.6

Comment: wet soils at 16 feet; cobbles between 16 feet to 20 feet

6 Obs. # ☒ Boring ☐ Pit GW-6 Ground surface elevation 936.51± Elevation of limiting factor: 922.5±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-13	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	13-72	10YR 5/3		exgrlfs	0 m	mvfr		>65		0.5
3	72-120	10YR 5/3		fs	0 m	mvfr		<15		0.5
4	120-168	10YR 6/3		fs	0 m	ml		<15		0.5
5	168-240	10YR 6/2		exgrf-ms	0 sg	ml		>65		3.6

Comment: wet soils at 14 feet; dark yellowish brown silt loam inclusions between 10 feet to 14 feet; cobbles between 4 feet to 14 feet

7 Obs. # ☒ Boring ☐ Pit GW-7 Ground surface elevation 913.8± Elevation of limiting factor: 905.8±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-13	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	13-48	10YR 3/3		grcl	1 f sbk	mfr		>15		0.03
3	48-72	10YR 5/3		vgrsl	1 f sbk	mfr		>35		0.5
4	72-240	10YR 5/3		vgrf-ms	0 sg	ml		>35		3.6

Comment: wet soils at 8 feet

8 Obs. # ☒ Boring ☐ Pit GW-8 Ground surface elevation 913.26± Elevation of limiting factor: 905.3±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-14	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	14-24	10YR 3/3		grcl	1 f sbk	mfr		>15		0.03
3	24-72	10YR 5/3		vgrfs	0 sg	ml		>35		0.5
4	72-96	10YR 4/3		vgrsl	1 f sbk	mfr		>35		0.5
5	96-240	10YR 5/3		vgrfs	0 sg	ml		>35		0.5

Comment: wet soils at 8 feet

9 Obs. # ☒ Boring ☐ Pit GW-9 Ground surface elevation 914.86± Elevation of limiting factor: 906.9±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-14	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	14-24	10YR 4/3		grsl	0 m	mfr		>15		0.5
3	24-48	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
4	48-72	10YR 5/3		vgrf-ms	0 sg	ml		>35		3.6
5	72-96	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
6	96-240	10YR 5/3		vgrf-ms	0 sg	ml		>35		3.6

Comment: wet soils at 8 feet

10 Obs. # ☒ Boring ☐ Pit GW-10 Ground surface elevation 915.36± Elevation of limiting factor: 903.4±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-11	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	11-48	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
3	48-96	10YR 6/3		vgrf-ms	0 sg	ml		>35		3.6
4	96-144	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
5	144-198	10YR 5/3		vgrf-ms	0 sg	ml		>35		3.6

Comment: wet soils at 12 feet; cobbles from 2 feet to 16.5 feet; auger refusal at 16.5 feet

11 Obs. # ☒ Boring ☐ Pit GW-11 Ground surface elevation 912.12± Elevation of limiting factor: 906.1±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-14	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	14-24	10YR 3/3		grcl	1 f sbk	mfr		>15		0.03
3	24-48	10YR 5/3		vgrlfs	0 sg	ml		>35		0.5
4	48-72	10YR 6/3		f-ms	0 sg	ml		<15		3.6
5	72-150	10YR 6/3		vgrf-ms	0 sg	ml		>35		3.6

Comment: wet soils at 6 feet; cobbles from 3.5 feet to 12 feet; auger refusal at 12.5 feet

12 Obs. # ☒ Boring ☐ Pit GW-12 Ground surface elevation 935.69± Elevation of limiting factor: 921.7±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-15	10YR 2/2		sil	1 f sbk	mfr		<15		0.13
2	15-48	10YR 5/3		vgrfs	0 sg	ml		>35		0.5
3	48-120	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
4	120-144	10YR 6/3		fsl	0 m	mfr		<15		0.5
5	144-168	10YR 6/3		grfs	0 sg	ml		>15		0.5
6	168-240	10YR 4/3		vgrf-ms	0 sg	ml		>35		3.6

Comment: wet soils at 14 feet; cobbles from 2 feet to 18 feet

13 Obs. # ☒ Boring ☐ Pit GW-13 Ground surface elevation 937.64± Elevation of limiting factor: 920.6±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-12	10YR 3/3		sicl	1 f sbk	mfr		<15		0.04
2	12-120	10YR 5/3		vgrfs	0 sg	ml		>35		0.5
3	120-192	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
4	192-216	10YR 4/3		vgrf-ms	0 sg	ml		>35		3.6
5	216-240	10YR 5/3		grsl	1 f sbk	mfr		>15		0.5

Comment: wet soils at 17 feet

14 Obs. # ☒ Boring ☐ Pit GW-14 Ground surface elevation 937.51± Elevation of limiting factor: ≤917.5±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-13	10YR 3/3		sicl	1 f sbk	mfr		<15		0.04
2	13-24	10YR 3/3		grcl	1 f sbk	mfr		>15		0.03
3	24-72	10YR 5/3		grf-ms	0 sg	ml		>15		3.6
4	72-144	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
5	144-240	10YR 7/3		vgrfs	0 sg	ml		>35		0.5

Comment:

15 Obs. # ☒ Boring ☐ Pit GW-15 Ground surface elevation 935.87± Elevation of limiting factor: 921.9±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-16	10YR 3/3		sicl	1 f sbk	mfr		<15		0.04
2	16-48	10YR 5/3		vgrf-ms	0 sg	ml		>35		3.6
3	48-168	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
4	168-240	10YR 4/3		vgrf-ms	0 sg	ml		>35		3.6

Comment: wet soils at 14 feet; cobbles from 4 feet to 16 feet

16 Obs. # ☒ Boring ☐ Pit GW-16 Ground surface elevation 935.27± Elevation of limiting factor: ≤920.8±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-13	10YR 3/3		sicl	1 f sbk	mfr		<15		0.04
2	13-24	10YR 3/3		grcl	1 f sbk	mfr		>15		0.03
3	24-48	10YR 5/3		vgrfs	0 sg	ml		>35		0.5
4	48-174	10YR 6/3		exgrfs	0 sg	ml		>65		0.5

Comment: cobbles from 4 feet to 14.5 feet; auger refusal at 14.5 feet

17 Obs. # ☒ Boring ☐ Pit GW-17 Ground surface elevation 939.71± Elevation of limiting factor: 923.7±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-13	10YR 3/3		sicl	1 f sbk	mfr		<15		0.04
2	13-24	10YR 4/3		vgrlf-ms	0 m	mvfr		>35		3.6
3	24-96	10YR 6/3		exgrf-ms	0 sg	ml		>65		3.6
4	96-192	10YR 7/3		exgrfs	0 sg	ml		>65		0.5
5	192-240	10YR 5/3		exgrsl	0 m	mfr		>65		0.5

Comment: wet soils at 16 feet; cobbles from 2 feet to 18 feet

18 Obs. # ☒ Boring ☐ Pit GW-18 Ground surface elevation 939.58± Elevation of limiting factor: ≤919.6±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-15	10YR 3/3		sicl	1 f sbk	mfr		<15		0.04
2	15-36	10YR 3/3		grcl	1 f sbk	mfr		>15		0.03
3	36-144	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
4	144-240	10YR 6/3		vgrsl	0 m	mfr		>35		0.5

Comment: cobbles from 3 feet to 18 feet

19 Obs. # ☒ Boring ☐ Pit GW-19

Ground surface elevation 942.66± Elevation of limiting factor: ≤922.7±

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-14	10YR 3/3		sicl	1 f sbk	mfr		<15		0.04
2	14-36	10YR 3/6		grlfs	0 m	mfr		>15		0.5
3	36-48	10YR 3/6		fsl	1 f sbk	mfr		<15		0.5
4	48-168	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
5	168-240	10YR 7/3		fs	0 sg	ml		<15		0.5

Comment: cobbles from 2 feet to 10 feet