STORMWATER MEMORANDUM

Élan Design Lab, Inc.
Flour Exchange Building
310 4th Ave S
Suite 1006
Mpls, MN 55415

DATE: September 1, 2022

TO: Town of Florida Planning Board

FROM: Stephen M. Johnston, PE

RE: Dollar General Fresh Conceptual Stormwater Management Plan, Town of Florida, NY

Dollar General (DG) Fresh Distribution Center will include the construction of a 167,500 square foot cold storage warehouse with dispatch and administrative offices, along with associated employee, truck, and trailer parking, loading docks, a 420 square foot guard house, a pumphouse with water tank, and an above ground fuel station.

The 21.47-acre site is currently entirely pervious and is used for agricultural purposes. The existing topography slopes from the southeast corner of the site at an elevation of 544 feet to the northwest corner at an elevation of 470 feet. Similar to the larger distribution center located across Highway 5S from the new cold storage warehouse, the site will be used for a large-scale warehousing and distribution facility. By their nature these facilities need to be relatively flat to readily enable truck movement and parking. As a result, large flat sites with significant impervious areas generate significant runoff that must be collected and disposed of quickly to minimize disruption of the facility.

The site includes an existing wetland that totals 0.49 acres. This wetland stretches along a narrow ditch that drains from the south where it picks up the drainage ditch and existing 24-inch culvert along Highway 5S. The drainage continues north through the center of the site to the northern, widened portion of this wetland that is intended to be preserved. A wetland mitigation area is proposed to the west side of the site, however, the site will likely require in-lieu wetland mitigation credits to achieve the total required wetland replacement. Wetland impacts amount to ~0.25 acres due to the construction of the warehouse. The wetland mitigation shown equals ~0.22 acres and is proposed to be located partially within the Town of Florida right of way.

The geotechnical investigation indicated large amounts of dense clayey silts (ML) not ideal for infiltration. Infiltration was then discarded from the realm of stormwater treatment possibilities on this site. The geotechnical report was also consistent with the USDA Soil Survey which indicated largely Hydrologic Soil Group C/D and trace amounts of B soils, see Figure 1 below. The Geotechnical Report is included in this memorandum.

The significant grade differential across the site along with the existing wetlands and poor draining soils start to limit stormwater options on the site. Given the nature of the site and proposed project it appears the best solution for managing stormwater on the site is to maintain as close as possible to existing, predevelopment drainage subcatchments and to provide rate control where needed through the use of a wet pond. Pretreatment will be managed through forebays. The conceptual stormwater management plan for this site is intended to meet the Criteria in the New York Stormwater Management Design Manual dated January 2015.

Figure 1: USDA Web Soil Survey Map

Figure 2: USDA Web Soil Survey Key and Soil Types

Map Unit Symbol	Map Unit Name	Percent of AOI	Hydrologic Soil Group
DaB	Darien silt loam 3-8% slopes	71.2%	C/D
DaC	Darien silt loam 8-15% slopes	3.8%	C/D
LaB	Lansing silt loam 3-8% slopes	18.4%	B
LaC	Lansing silt loam 8-15% slopes	6.5%	B

The site is to have a proposed impervious surface area of approximately 12.58 acres. This is 58% impervious cover. The water quality volume (WQv) to be treated as a result of this new impervious cover is approximately 53,460 cubic feet. The proposed stormwater management solution will be a combination of a wet pond and three forebays for pretreatment. This pond will be the destination for all impervious runoff on site except small portions of driveway that will be infeasible to route that direction due to the steep grades required to tie into the existing street. These small impervious areas will be routed to a swale prior to discharging to the wetland mitigation area.

Due to the nature of the drainage on site three separate forebays will be provided as pretreatment before the wet pond. Doing so will also mimic existing drainage patterns. Currently runoff drains northwest to the wetland and ultimately offsite to the northwest. The forebays and wet pond combined have a permanent ponding volume that exceeds that of the required WQv. The proposed system shall manage the runoff rate of the following larger events: the Channel Protection Volume (CPv: 1-year storm), Overbank Flood (Qp: 10-year storm), and the Extreme Storm (Qfh: 100-year storm). The existing and proposed drainage maps are included in this memorandum for reference.

The water quality volume requirements are broken down by subcatchment below. Each forebay is required to pretreat a minimum of 10% the provided volume of the wet pond and is calculated as such. Two of the forebays will be managed by an outlet control device routed to the wet pond and the third will be controlled by an overflow spillway directly connected to the pond. Subcatchment P1, which consists of the perimeter of the site and is 98% pervious routes directly offsite, the 0.102 acres of impervious in subcatchment P1 will route northwest to the wetland remediation area. Although the WQv required by P1's impervious runoff will be provided in the total volume of the pond and forebays. The formula used to determine WQv (ac-ft) is calculated as follows:

$$WQv\ (ac\text{-}ft) = 1.1" * (0.05 + 0.009*I) * A/12$$

Figure 3: WQv Summary

BMP/Subcatchment	Impervious Area (Acres)	A (Total Area, Acres)	I (% Impervious)	Required WQv (cu ft)	Provided WQv (cu ft)
Forebay 1 (3P)	N/A	N/A	N/A	2,180	9,290
Forebay 2 (2P)	N/A	N/A	N/A	2,180	16,300
Forebay 3 (4P)	N/A	N/A	N/A	2,180	14,085
Wet Pond (2P, 3P & 4P)	12.474	17.102	73%	47,920	21,790
Offsite (1P)	0.102	4.414	2%	1,180	0
Total:	12.576	21.516	58%	53,460	61,465

The total required WQv in the table above is 53,460 cubic feet. This volume is the sum of the required volume for each forebay and the wet pond combined as calculated from each BMP's respective drainage area. This could be calculated from the total area of 21.516 and the overall 58% impervious on site, which would include P1, but the 98% pervious P1 subcatchment drains directly offsite. This calculation would give a less stringent total required WQv of 49,220 cubic feet, thus the more stringent calculation method was used as the required WQv for this site.

The post-construction runoff rates shall not exceed existing conditions in the CPv, Qp, and Qfh events. Ultimately in both the proposed and existing conditions on site, the runoff will flow offsite in the northwest direction. In the proposed condition, the only difference is that the impervious runoff will be routed through the stormwater management forebays and wet pond prior to discharge offsite. Attached to this memorandum is the HydroCAD analysis prepared to ensure the sizing of the stormwater facilities. This breakdown is summarized in Figure 4 below.

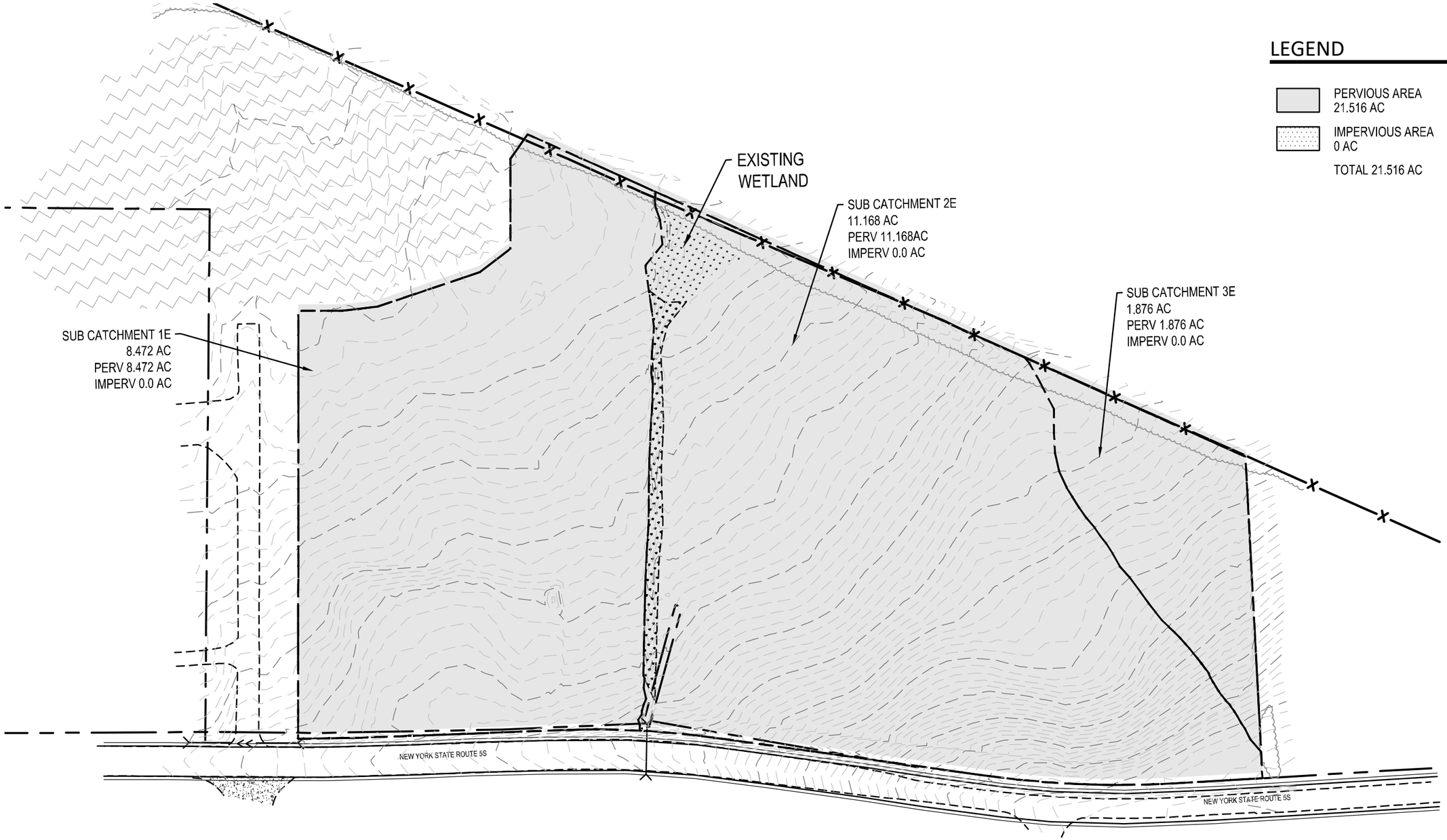
Figure 4: Rate Control Summary

Sub-Catchment	CPv (1 year: CFS)	Qp (10 year: CFS)	Qfh (100 year: CFS)
Existing Conditions	18.0	50.4	115.2
Proposed Conditions	11.7	24.5	46.7
Difference	-6.3	-25.9	-68.5

We believe that our design meets the intent of the New York State SPDES Permit for stormwater retention, rate control, and water quality treatment. A more detailed stormwater management plan and stormwater pollution prevention plan will be provided in a subsequent design phase. Please direct any questions regarding this report and the design of the project to Marcie Weslock, PE, mweslock@elanlab.com.

Encl: Proposed and Existing Drainage Maps
HydroCAD Model
Geotechnical Report

cc: Élan File No.: DGC22025



1 EXISTING DRAINAGE MAP
1" = 150'

DOLLAR GENERAL FRESH
AMSTERDAM, NEW YORK
DGC22025

EXISTING DRAINAGE AREA MAP
08/30/2022

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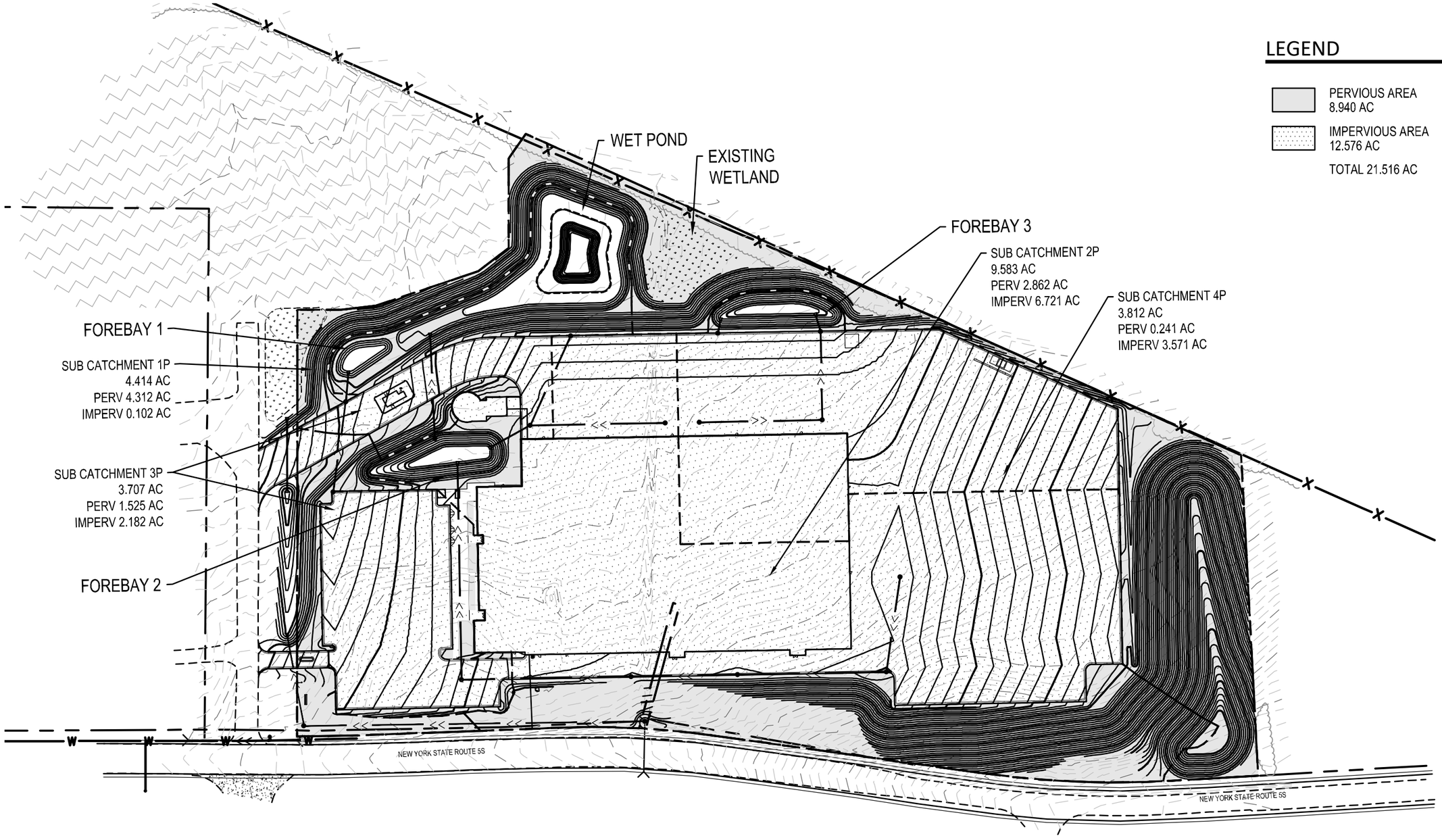

1 PROPOSED DRAINAGE MAP
1" = 150'

DOLLAR GENERAL FRESH
AMSTERDAM, NEW YORK
DGC22025

PROPOSED DRAINAGE AREA MAP
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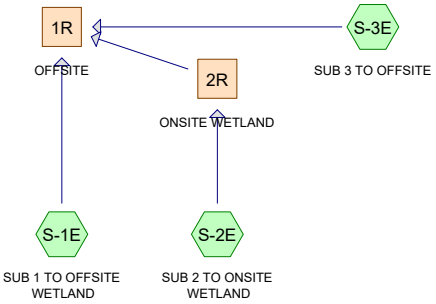
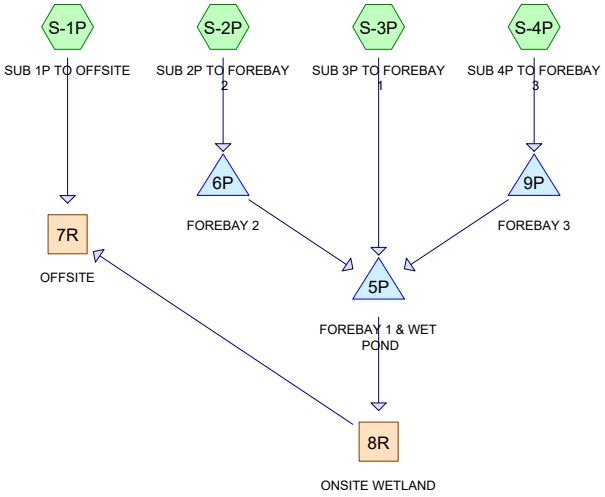
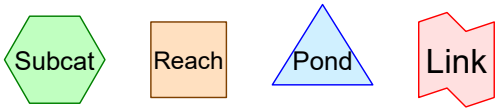
EXISTING DRAINAGE



PROPOSED DRAINAGE





Routing Diagram for DGC025_HydroCAD
Prepared by Elan Design Lab, Inc, Printed 8/30/2022

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 yr (Cpv)	Type II 24-hr		Default	24.00	1	2.20	2
2	10 yr (Qp)	Type II 24-hr		Default	24.00	1	3.75	2
3	100 yr (Qf)	Type II 24-hr		Default	24.00	1	6.50	2
4	Water Quality (WQv)	Type II 24-hr		Default	24.00	1	1.10	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
30.456	80	>75% Grass cover, Good, HSG D (S-1E, S-1P, S-2E, S-2P, S-3E, S-3P, S-4P)
11.740	98	Paved parking, HSG D (S-1P, S-2P, S-3P, S-4P)
0.836	98	Roofs, HSG D (S-2P)
43.032	**85**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
43.032	HSG D	S-1E, S-1P, S-2E, S-2P, S-3E, S-3P, S-4P
0.000	Other	
43.032		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	30.456	0.000	30.456	>75% Grass cover, Good	S-1E, S-1P, S-2E, S-2P, S-3E, S-3P, S-4P
0.000	0.000	0.000	11.740	0.000	11.740	Paved parking	S-1P, S-2P, S-3P, S-4P
0.000	0.000	0.000	0.836	0.000	0.836	Roofs	S-2P
0.000	**0.000**	**0.000**	**43.032**	**0.000**	**43.032**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	5P	471.00	475.00	38.0	-0.1053	0.010	0.0	18.0	0.0
2	5P	475.00	474.00	38.0	0.0263	0.010	0.0	24.0	0.0
3	6P	480.00	479.00	156.0	0.0064	0.010	0.0	18.0	0.0
4	9P	482.00	477.00	169.0	0.0296	0.010	0.0	18.0	0.0

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S-1E: SUB 1 TO OFFSITE Runoff Area=8.472 ac 0.00% Impervious Runoff Depth=0.69"
Flow Length=764' Slope=0.0430 '/' Tc=12.4 min CN=80 Runoff=7.88 cfs 0.486 af

Subcatchment S-1P: SUB 1P TO OFFSITE Runoff Area=4.414 ac 2.31% Impervious Runoff Depth=0.69"
Flow Length=104' Slope=0.1540 '/' Tc=1.3 min CN=80 Runoff=5.92 cfs 0.253 af

Subcatchment S-2E: SUB 2 TO ONSITE Runoff Area=11.168 ac 0.00% Impervious Runoff Depth=0.69"
Flow Length=1,273' Slope=0.0540 '/' Tc=16.6 min CN=80 Runoff=8.94 cfs 0.640 af

Subcatchment S-2P: SUB 2P TO FOREBAY Runoff Area=9.583 ac 70.13% Impervious Runoff Depth=1.50"
Flow Length=1,620' Slope=0.0360 '/' Tc=15.2 min CN=93 Runoff=18.06 cfs 1.197 af

Subcatchment S-3E: SUB 3 TO OFFSITE Runoff Area=1.876 ac 0.00% Impervious Runoff Depth=0.69"
Flow Length=633' Slope=0.0660 '/' Tc=8.6 min CN=80 Runoff=2.01 cfs 0.108 af

Subcatchment S-3P: SUB 3P TO FOREBAY Runoff Area=3.707 ac 58.86% Impervious Runoff Depth=1.34"
Flow Length=1,531' Slope=0.0350 '/' Tc=16.1 min CN=91 Runoff=6.14 cfs 0.414 af

Subcatchment S-4P: SUB 4P TO FOREBAY Runoff Area=3.812 ac 93.68% Impervious Runoff Depth=1.87"
Flow Length=520' Slope=0.0560 '/' Tc=4.0 min CN=97 Runoff=11.95 cfs 0.593 af

Reach 1R: OFFSITE Inflow=17.99 cfs 1.234 af
Outflow=17.99 cfs 1.234 af

Reach 2R: ONSITE WETLAND Inflow=8.94 cfs 0.640 af
Outflow=8.94 cfs 0.640 af

Reach 7R: OFFSITE Inflow=11.74 cfs 2.894 af
Outflow=11.74 cfs 2.894 af

Reach 8R: ONSITE WETLAND Inflow=10.32 cfs 2.641 af
Outflow=10.32 cfs 2.641 af

Pond 5P: FOREBAY 1 & WET POND Peak Elev=477.22' Storage=53,498 cf Inflow=29.83 cfs 2.642 af
Outflow=10.32 cfs 2.641 af

Pond 6P: FOREBAY 2 Peak Elev=488.00' Storage=16,298 cf Inflow=18.06 cfs 1.197 af
Discarded=0.00 cfs 0.000 af Primary=21.75 cfs 1.635 af Outflow=21.75 cfs 1.635 af

Pond 9P: FOREBAY 3 Peak Elev=488.60' Storage=17,717 cf Inflow=11.95 cfs 0.593 af
Outflow=9.59 cfs 0.593 af

Total Runoff Area = 43.032 ac Runoff Volume = 3.691 af Average Runoff Depth = 1.03"
70.78% Pervious = 30.456 ac 29.22% Impervious = 12.576 ac

Summary for Subcatchment S-1E: SUB 1 TO OFFSITE WETLAND

Runoff = 7.88 cfs @ 12.05 hrs, Volume= 0.486 af, Depth= 0.69"
Routed to Reach 1R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr (Cpv) Rainfall=2.20"

Area (ac)	CN	Description
8.472	80	>75% Grass cover, Good, HSG D
8.472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	764	0.0430	1.03		**Lag/CN Method,**

Summary for Subcatchment S-1P: SUB 1P TO OFFSITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.92 cfs @ 11.92 hrs, Volume= 0.253 af, Depth= 0.69"
Routed to Reach 7R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr (Cpv) Rainfall=2.20"

Area (ac)	CN	Description
4.312	80	>75% Grass cover, Good, HSG D
0.102	98	Paved parking, HSG D
4.414	80	Weighted Average
4.312		97.69% Pervious Area
0.102		2.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	104	0.1540	1.31		**Lag/CN Method,**

Summary for Subcatchment S-2E: SUB 2 TO ONSITE WETLAND

Runoff = 8.94 cfs @ 12.10 hrs, Volume= 0.640 af, Depth= 0.69"
Routed to Reach 2R : ONSITE WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr (Cpv) Rainfall=2.20"

Area (ac)	CN	Description
11.168	80	>75% Grass cover, Good, HSG D
11.168		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	1,273	0.0540	1.28		**Lag/CN Method,**

Summary for Subcatchment S-2P: SUB 2P TO FOREBAY 2

Runoff = 18.06 cfs @ 12.07 hrs, Volume= 1.197 af, Depth= 1.50"
Routed to Pond 6P : FOREBAY 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr (Cpv) Rainfall=2.20"

Area (ac)	CN	Description
2.862	80	>75% Grass cover, Good, HSG D
5.252	98	Paved parking, HSG D
0.836	98	Roofs, HSG D
0.633	98	Paved parking, HSG D
9.583	93	Weighted Average
2.862		29.87% Pervious Area
6.721		70.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	1,620	0.0360	1.78		**Lag/CN Method,**

Summary for Subcatchment S-3E: SUB 3 TO OFFSITE

Runoff = 2.01 cfs @ 12.01 hrs, Volume= 0.108 af, Depth= 0.69"
Routed to Reach 1R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr (Cpv) Rainfall=2.20"

Area (ac)	CN	Description
1.876	80	>75% Grass cover, Good, HSG D
1.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	633	0.0660	1.23		**Lag/CN Method,**

Summary for Subcatchment S-3P: SUB 3P TO FOREBAY 1

Runoff = 6.14 cfs @ 12.08 hrs, Volume= 0.414 af, Depth= 1.34"
Routed to Pond 5P : FOREBAY 1 & WET POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr (Cpv) Rainfall=2.20"

Area (ac)	CN	Description
1.525	80	>75% Grass cover, Good, HSG D
2.182	98	Paved parking, HSG D
3.707	91	Weighted Average
1.525		41.14% Pervious Area
2.182		58.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	1,531	0.0350	1.59		**Lag/CN Method,**

Summary for Subcatchment S-4P: SUB 4P TO FOREBAY 3

[49] Hint: Tc<2dt may require smaller dt

Runoff = 11.95 cfs @ 11.94 hrs, Volume= 0.593 af, Depth= 1.87"
Routed to Pond 9P : FOREBAY 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr (Cpv) Rainfall=2.20"

Area (ac)	CN	Description
0.241	80	>75% Grass cover, Good, HSG D
3.571	98	Paved parking, HSG D
3.812	97	Weighted Average
0.241		6.32% Pervious Area
3.571		93.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	520	0.0560	2.17		**Lag/CN Method,**

Summary for Reach 1R: OFFSITE

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

Inflow Area = 21.516 ac, 0.00% Impervious, Inflow Depth = 0.69" for 1 yr (Cpv) event
Inflow = 17.99 cfs @ 12.07 hrs, Volume= 1.234 af
Outflow = 17.99 cfs @ 12.07 hrs, Volume= 1.234 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 2R: ONSITE WETLAND

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

Inflow Area = 11.168 ac, 0.00% Impervious, Inflow Depth = 0.69" for 1 yr (Cpv) event
Inflow = 8.94 cfs @ 12.10 hrs, Volume= 0.640 af
Outflow = 8.94 cfs @ 12.10 hrs, Volume= 0.640 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 1R : OFFSITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 7R: OFFSITE

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

Inflow Area = 21.516 ac, 58.45% Impervious, Inflow Depth = 1.61" for 1 yr (Cpv) event
Inflow = 11.74 cfs @ 11.94 hrs, Volume= 2.894 af
Outflow = 11.74 cfs @ 11.94 hrs, Volume= 2.894 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 8R: ONSITE WETLAND

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

Inflow Area = 17.102 ac, 72.94% Impervious, Inflow Depth = 1.85" for 1 yr (Cpv) event
Inflow = 10.32 cfs @ 12.31 hrs, Volume= 2.641 af
Outflow = 10.32 cfs @ 12.31 hrs, Volume= 2.641 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 7R : OFFSITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 5P: FOREBAY 1 & WET POND

Inflow Area = 17.102 ac, 72.94% Impervious, Inflow Depth = 1.85" for 1 yr (Cpv) event
Inflow = 29.83 cfs @ 12.02 hrs, Volume= 2.642 af
Outflow = 10.32 cfs @ 12.31 hrs, Volume= 2.641 af, Atten= 65%, Lag= 17.3 min
Primary = 10.32 cfs @ 12.31 hrs, Volume= 2.641 af
Routed to Reach 8R : ONSITE WETLAND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 475.00' Surf.Area= 6,000 sf Storage= 22,390 cf
Peak Elev= 477.22' @ 12.31 hrs Surf.Area= 23,524 sf Storage= 53,498 cf (31,108 cf above start)

Plug-Flow detention time= 305.8 min calculated for 2.080 af (79% of inflow)
Center-of-Mass det. time= 49.9 min (724.7 - 674.8)

Volume	Invert	Avail.Storage	Storage Description
#1	468.00'	171,728 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
468.00	1,610	0	0
469.00	2,000	1,805	1,805
470.00	2,410	2,205	4,010
471.00	2,840	2,625	6,635
472.00	3,290	3,065	9,700
473.00	3,770	3,530	13,230
474.00	4,275	4,023	17,253
475.00	6,000	5,138	22,390
476.00	11,675	8,838	31,228
477.00	22,610	17,143	48,370
478.00	26,720	24,665	73,035
479.00	30,590	28,655	101,690
480.00	35,215	32,903	134,593
481.00	39,055	37,135	171,728

Device	Routing	Invert	Outlet Devices
#1	Device 4	480.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 4	478.00'	**3.0' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 4	475.00'	**18.0" Round Culvert** L= 38.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 471.00' / 475.00' S= -0.1053 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#4	Primary	475.00'	**24.0" Round Culvert** L= 38.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 475.00' / 474.00' S= 0.0263 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.32 cfs @ 12.31 hrs HW=477.22' TW=0.00' (Dynamic Tailwater)
└─**4=Culvert** (Passes 10.32 cfs of 16.71 cfs potential flow)
  ├─**1=Orifice/Grate** (Controls 0.00 cfs)
  ├─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Culvert** (Inlet Controls 10.32 cfs @ 5.84 fps)

Summary for Pond 6P: FOREBAY 2

[44] Hint: Outlet device #2 is below defined storage
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=117)

Inflow Area = 9.583 ac, 70.13% Impervious, Inflow Depth = 1.50" for 1 yr (Cpv) event
Inflow = 18.06 cfs @ 12.07 hrs, Volume= 1.197 af
Outflow = 21.75 cfs @ 0.00 hrs, Volume= 1.635 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 21.75 cfs @ 0.00 hrs, Volume= 1.635 af
Routed to Pond 5P : FOREBAY 1 & WET POND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 488.00' Surf.Area= 6,200 sf Storage= 16,298 cf
Peak Elev= 488.00' @ 0.00 hrs Surf.Area= 6,200 sf Storage= 16,298 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	484.00'	40,673 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
484.00	2,205	0	0
485.00	3,040	2,623	2,623
486.00	4,000	3,520	6,143
487.00	5,055	4,528	10,670
488.00	6,200	5,628	16,298
489.00	7,445	6,823	23,120
490.00	8,770	8,108	31,228
491.00	10,120	9,445	40,673

Device	Routing	Invert	Outlet Devices
#1	Discarded	488.00'	**32.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	480.00'	**18.0" Round Culvert** L= 156.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 480.00' / 479.00' S= 0.0064 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=488.00' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Primary OutFlow Max=21.75 cfs @ 0.00 hrs HW=488.00' TW=475.28' (Dynamic Tailwater)
↑—**2=Culvert** (Barrel Controls 21.75 cfs @ 12.31 fps)

Summary for Pond 9P: FOREBAY 3

Inflow Area = 3.812 ac, 93.68% Impervious, Inflow Depth = 1.87" for 1 yr (Cpv) event
Inflow = 11.95 cfs @ 11.94 hrs, Volume= 0.593 af
Outflow = 9.59 cfs @ 11.99 hrs, Volume= 0.593 af, Atten= 20%, Lag= 2.9 min
Primary = 9.59 cfs @ 11.99 hrs, Volume= 0.593 af
Routed to Pond 5P : FOREBAY 1 & WET POND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 488.00' Surf.Area= 5,680 sf Storage= 14,085 cf
Peak Elev= 488.60' @ 11.99 hrs Surf.Area= 6,390 sf Storage= 17,717 cf (3,632 cf above start)

Plug-Flow detention time= 273.8 min calculated for 0.270 af (45% of inflow)
Center-of-Mass det. time= 14.8 min (785.7 - 770.9)

Volume	Invert	Avail.Storage	Storage Description
#1	484.00'	27,833 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
484.00	1,510	0	0
485.00	2,445	1,978	1,978
486.00	3,490	2,968	4,945
487.00	4,555	4,023	8,968
488.00	5,680	5,118	14,085
489.00	6,860	6,270	20,355
490.00	8,095	7,478	27,833

Device	Routing	Invert	Outlet Devices
#1	Device 2	488.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	482.00'	**18.0" Round Culvert** L= 169.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 482.00' / 477.00' S= 0.0296 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=9.40 cfs @ 11.99 hrs HW=488.59' TW=476.49' (Dynamic Tailwater)
↑—**2=Culvert** (Passes 9.40 cfs of 20.57 cfs potential flow)
↑—**1=Orifice/Grate** (Weir Controls 9.40 cfs @ 2.52 fps)

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S-1E: SUB 1 TO OFFSITE Runoff Area=8.472 ac 0.00% Impervious Runoff Depth=1.84"
Flow Length=764' Slope=0.0430 '/' Tc=12.4 min CN=80 Runoff=21.82 cfs 1.297 af

Subcatchment S-1P: SUB 1P TO OFFSITE Runoff Area=4.414 ac 2.31% Impervious Runoff Depth=1.84"
Flow Length=104' Slope=0.1540 '/' Tc=1.3 min CN=80 Runoff=15.92 cfs 0.676 af

Subcatchment S-2E: SUB 2 TO ONSITE Runoff Area=11.168 ac 0.00% Impervious Runoff Depth=1.84"
Flow Length=1,273' Slope=0.0540 '/' Tc=16.6 min CN=80 Runoff=25.06 cfs 1.710 af

Subcatchment S-2P: SUB 2P TO FOREBAY Runoff Area=9.583 ac 70.13% Impervious Runoff Depth=2.98"
Flow Length=1,620' Slope=0.0360 '/' Tc=15.2 min CN=93 Runoff=34.75 cfs 2.377 af

Subcatchment S-3E: SUB 3 TO OFFSITE Runoff Area=1.876 ac 0.00% Impervious Runoff Depth=1.84"
Flow Length=633' Slope=0.0660 '/' Tc=8.6 min CN=80 Runoff=5.52 cfs 0.287 af

Subcatchment S-3P: SUB 3P TO FOREBAY Runoff Area=3.707 ac 58.86% Impervious Runoff Depth=2.78"
Flow Length=1,531' Slope=0.0350 '/' Tc=16.1 min CN=91 Runoff=12.42 cfs 0.858 af

Subcatchment S-4P: SUB 4P TO FOREBAY Runoff Area=3.812 ac 93.68% Impervious Runoff Depth=3.40"
Flow Length=520' Slope=0.0560 '/' Tc=4.0 min CN=97 Runoff=20.97 cfs 1.081 af

Reach 1R: OFFSITE Inflow=50.38 cfs 3.294 af
Outflow=50.38 cfs 3.294 af

Reach 2R: ONSITE WETLAND Inflow=25.06 cfs 1.710 af
Outflow=25.06 cfs 1.710 af

Reach 7R: OFFSITE Inflow=24.47 cfs 5.445 af
Outflow=24.47 cfs 5.445 af

Reach 8R: ONSITE WETLAND Inflow=17.11 cfs 4.769 af
Outflow=17.11 cfs 4.769 af

Pond 5P: FOREBAY 1 & WET POND Peak Elev=478.47' Storage=86,052 cf Inflow=44.78 cfs 4.771 af
Outflow=17.11 cfs 4.769 af

Pond 6P: FOREBAY 2 Peak Elev=488.00' Storage=16,298 cf Inflow=34.75 cfs 2.377 af
Discarded=0.00 cfs 0.000 af Primary=21.75 cfs 2.832 af Outflow=21.75 cfs 2.832 af

Pond 9P: FOREBAY 3 Peak Elev=488.98' Storage=20,207 cf Inflow=20.97 cfs 1.081 af
Outflow=14.96 cfs 1.081 af

Total Runoff Area = 43.032 ac Runoff Volume = 8.286 af Average Runoff Depth = 2.31"
70.78% Pervious = 30.456 ac 29.22% Impervious = 12.576 ac

Summary for Subcatchment S-1E: SUB 1 TO OFFSITE WETLAND

Runoff = 21.82 cfs @ 12.05 hrs, Volume= 1.297 af, Depth= 1.84"
Routed to Reach 1R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr (Qp) Rainfall=3.75"

Area (ac)	CN	Description
8.472	80	>75% Grass cover, Good, HSG D
8.472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	764	0.0430	1.03		**Lag/CN Method,**

Summary for Subcatchment S-1P: SUB 1P TO OFFSITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 15.92 cfs @ 11.91 hrs, Volume= 0.676 af, Depth= 1.84"
Routed to Reach 7R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr (Qp) Rainfall=3.75"

Area (ac)	CN	Description
4.312	80	>75% Grass cover, Good, HSG D
0.102	98	Paved parking, HSG D
4.414	80	Weighted Average
4.312		97.69% Pervious Area
0.102		2.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	104	0.1540	1.31		**Lag/CN Method,**

Summary for Subcatchment S-2E: SUB 2 TO ONSITE WETLAND

Runoff = 25.06 cfs @ 12.09 hrs, Volume= 1.710 af, Depth= 1.84"
Routed to Reach 2R : ONSITE WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr (Qp) Rainfall=3.75"

Area (ac)	CN	Description
11.168	80	>75% Grass cover, Good, HSG D
11.168		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	1,273	0.0540	1.28		**Lag/CN Method,**

Summary for Subcatchment S-2P: SUB 2P TO FOREBAY 2

Runoff = 34.75 cfs @ 12.07 hrs, Volume= 2.377 af, Depth= 2.98"
Routed to Pond 6P : FOREBAY 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr (Qp) Rainfall=3.75"

Area (ac)	CN	Description
2.862	80	>75% Grass cover, Good, HSG D
5.252	98	Paved parking, HSG D
0.836	98	Roofs, HSG D
0.633	98	Paved parking, HSG D
9.583	93	Weighted Average
2.862		29.87% Pervious Area
6.721		70.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	1,620	0.0360	1.78		**Lag/CN Method,**

Summary for Subcatchment S-3E: SUB 3 TO OFFSITE

Runoff = 5.52 cfs @ 12.00 hrs, Volume= 0.287 af, Depth= 1.84"
Routed to Reach 1R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr (Qp) Rainfall=3.75"

Area (ac)	CN	Description
1.876	80	>75% Grass cover, Good, HSG D
1.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	633	0.0660	1.23		**Lag/CN Method,**

Summary for Subcatchment S-3P: SUB 3P TO FOREBAY 1

Runoff = 12.42 cfs @ 12.08 hrs, Volume= 0.858 af, Depth= 2.78"
Routed to Pond 5P : FOREBAY 1 & WET POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr (Qp) Rainfall=3.75"

Area (ac)	CN	Description
1.525	80	>75% Grass cover, Good, HSG D
2.182	98	Paved parking, HSG D
3.707	91	Weighted Average
1.525		41.14% Pervious Area
2.182		58.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	1,531	0.0350	1.59		**Lag/CN Method,**

Summary for Subcatchment S-4P: SUB 4P TO FOREBAY 3

[49] Hint: Tc<2dt may require smaller dt

Runoff = 20.97 cfs @ 11.94 hrs, Volume= 1.081 af, Depth= 3.40"
Routed to Pond 9P : FOREBAY 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr (Qp) Rainfall=3.75"

Area (ac)	CN	Description
0.241	80	>75% Grass cover, Good, HSG D
3.571	98	Paved parking, HSG D
3.812	97	Weighted Average
0.241		6.32% Pervious Area
3.571		93.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	520	0.0560	2.17		**Lag/CN Method,**

Summary for Reach 1R: OFFSITE

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

Inflow Area = 21.516 ac, 0.00% Impervious, Inflow Depth = 1.84" for 10 yr (Qp) event
Inflow = 50.38 cfs @ 12.06 hrs, Volume= 3.294 af
Outflow = 50.38 cfs @ 12.06 hrs, Volume= 3.294 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 2R: ONSITE WETLAND

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

Inflow Area = 11.168 ac, 0.00% Impervious, Inflow Depth = 1.84" for 10 yr (Qp) event
Inflow = 25.06 cfs @ 12.09 hrs, Volume= 1.710 af
Outflow = 25.06 cfs @ 12.09 hrs, Volume= 1.710 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 1R : OFFSITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 7R: OFFSITE

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

Inflow Area = 21.516 ac, 58.45% Impervious, Inflow Depth = 3.04" for 10 yr (Qp) event
Inflow = 24.47 cfs @ 11.92 hrs, Volume= 5.445 af
Outflow = 24.47 cfs @ 11.92 hrs, Volume= 5.445 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 8R: ONSITE WETLAND

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

Inflow Area = 17.102 ac, 72.94% Impervious, Inflow Depth = 3.35" for 10 yr (Qp) event
Inflow = 17.11 cfs @ 12.54 hrs, Volume= 4.769 af
Outflow = 17.11 cfs @ 12.54 hrs, Volume= 4.769 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 7R : OFFSITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 5P: FOREBAY 1 & WET POND

Inflow Area = 17.102 ac, 72.94% Impervious, Inflow Depth = 3.35" for 10 yr (Qp) event
Inflow = 44.78 cfs @ 12.05 hrs, Volume= 4.771 af
Outflow = 17.11 cfs @ 12.54 hrs, Volume= 4.769 af, Atten= 62%, Lag= 29.2 min
Primary = 17.11 cfs @ 12.54 hrs, Volume= 4.769 af
Routed to Reach 8R : ONSITE WETLAND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 475.00' Surf.Area= 6,000 sf Storage= 22,390 cf
Peak Elev= 478.47' @ 12.54 hrs Surf.Area= 28,543 sf Storage= 86,052 cf (63,662 cf above start)

Plug-Flow detention time= 202.2 min calculated for 4.211 af (88% of inflow)
Center-of-Mass det. time= 52.8 min (771.2 - 718.4)

Volume	Invert	Avail.Storage	Storage Description
#1	468.00'	171,728 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
468.00	1,610	0	0
469.00	2,000	1,805	1,805
470.00	2,410	2,205	4,010
471.00	2,840	2,625	6,635
472.00	3,290	3,065	9,700
473.00	3,770	3,530	13,230
474.00	4,275	4,023	17,253
475.00	6,000	5,138	22,390
476.00	11,675	8,838	31,228
477.00	22,610	17,143	48,370
478.00	26,720	24,665	73,035
479.00	30,590	28,655	101,690
480.00	35,215	32,903	134,593
481.00	39,055	37,135	171,728

Device	Routing	Invert	Outlet Devices
#1	Device 4	480.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 4	478.00'	**3.0' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 4	475.00'	**18.0" Round Culvert** L= 38.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 471.00' / 475.00' S= -0.1053 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#4	Primary	475.00'	**24.0" Round Culvert** L= 38.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 475.00' / 474.00' S= 0.0263 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=17.06 cfs @ 12.54 hrs HW=478.47' TW=0.00' (Dynamic Tailwater)
└─**4=Culvert** (Passes 17.06 cfs of 23.76 cfs potential flow)
  ├─**1=Orifice/Grate** (Controls 0.00 cfs)
  ├─**2=Sharp-Crested Rectangular Weir** (Weir Controls 3.03 cfs @ 2.23 fps)
  └─**3=Culvert** (Inlet Controls 14.03 cfs @ 7.94 fps)

Summary for Pond 6P: FOREBAY 2

[44] Hint: Outlet device #2 is below defined storage
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=116)

Inflow Area = 9.583 ac, 70.13% Impervious, Inflow Depth = 2.98" for 10 yr (Qp) event
Inflow = 34.75 cfs @ 12.07 hrs, Volume= 2.377 af
Outflow = 21.75 cfs @ 0.00 hrs, Volume= 2.832 af, Atten= 37%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 21.75 cfs @ 0.00 hrs, Volume= 2.832 af
Routed to Pond 5P : FOREBAY 1 & WET POND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 488.00' Surf.Area= 6,200 sf Storage= 16,298 cf
Peak Elev= 488.00' @ 0.00 hrs Surf.Area= 6,200 sf Storage= 16,298 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	484.00'	40,673 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
484.00	2,205	0	0
485.00	3,040	2,623	2,623
486.00	4,000	3,520	6,143
487.00	5,055	4,528	10,670
488.00	6,200	5,628	16,298
489.00	7,445	6,823	23,120
490.00	8,770	8,108	31,228
491.00	10,120	9,445	40,673

Device	Routing	Invert	Outlet Devices
#1	Discarded	488.00'	**32.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	480.00'	**18.0" Round Culvert** L= 156.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 480.00' / 479.00' S= 0.0064 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=488.00' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Primary OutFlow Max=21.75 cfs @ 0.00 hrs HW=488.00' TW=475.28' (Dynamic Tailwater)
↑—**2=Culvert** (Barrel Controls 21.75 cfs @ 12.31 fps)

Summary for Pond 9P: FOREBAY 3

Inflow Area = 3.812 ac, 93.68% Impervious, Inflow Depth = 3.40" for 10 yr (Qp) event
Inflow = 20.97 cfs @ 11.94 hrs, Volume= 1.081 af
Outflow = 14.96 cfs @ 12.00 hrs, Volume= 1.081 af, Atten= 29%, Lag= 3.5 min
Primary = 14.96 cfs @ 12.00 hrs, Volume= 1.081 af
Routed to Pond 5P : FOREBAY 1 & WET POND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 488.00' Surf.Area= 5,680 sf Storage= 14,085 cf
Peak Elev= 488.98' @ 12.00 hrs Surf.Area= 6,834 sf Storage= 20,207 cf (6,122 cf above start)

Plug-Flow detention time= 181.2 min calculated for 0.757 af (70% of inflow)
Center-of-Mass det. time= 12.6 min (769.1 - 756.5)

Volume	Invert	Avail.Storage	Storage Description
#1	484.00'	27,833 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
484.00	1,510	0	0
485.00	2,445	1,978	1,978
486.00	3,490	2,968	4,945
487.00	4,555	4,023	8,968
488.00	5,680	5,118	14,085
489.00	6,860	6,270	20,355
490.00	8,095	7,478	27,833

Device	Routing	Invert	Outlet Devices
#1	Device 2	488.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	482.00'	**18.0" Round Culvert** L= 169.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 482.00' / 477.00' S= 0.0296 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=14.95 cfs @ 12.00 hrs HW=488.98' TW=477.18' (Dynamic Tailwater)
↑**2=Culvert** (Passes 14.95 cfs of 21.23 cfs potential flow)
↑**1=Orifice/Grate** (Orifice Controls 14.95 cfs @ 4.76 fps)

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S-1E: SUB 1 TO OFFSITE Runoff Area=8.472 ac 0.00% Impervious Runoff Depth=4.24"
Flow Length=764' Slope=0.0430 '/' Tc=12.4 min CN=80 Runoff=49.58 cfs 2.990 af

Subcatchment S-1P: SUB 1P TO OFFSITE Runoff Area=4.414 ac 2.31% Impervious Runoff Depth=4.24"
Flow Length=104' Slope=0.1540 '/' Tc=1.3 min CN=80 Runoff=35.61 cfs 1.558 af

Subcatchment S-2E: SUB 2 TO ONSITE Runoff Area=11.168 ac 0.00% Impervious Runoff Depth=4.24"
Flow Length=1,273' Slope=0.0540 '/' Tc=16.6 min CN=80 Runoff=57.36 cfs 3.942 af

Subcatchment S-2P: SUB 2P TO FOREBAY Runoff Area=9.583 ac 70.13% Impervious Runoff Depth=5.68"
Flow Length=1,620' Slope=0.0360 '/' Tc=15.2 min CN=93 Runoff=63.91 cfs 4.533 af

Subcatchment S-3E: SUB 3 TO OFFSITE Runoff Area=1.876 ac 0.00% Impervious Runoff Depth=4.24"
Flow Length=633' Slope=0.0660 '/' Tc=8.6 min CN=80 Runoff=12.46 cfs 0.662 af

Subcatchment S-3P: SUB 3P TO FOREBAY Runoff Area=3.707 ac 58.86% Impervious Runoff Depth=5.45"
Flow Length=1,531' Slope=0.0350 '/' Tc=16.1 min CN=91 Runoff=23.51 cfs 1.683 af

Subcatchment S-4P: SUB 4P TO FOREBAY Runoff Area=3.812 ac 93.68% Impervious Runoff Depth=6.14"
Flow Length=520' Slope=0.0560 '/' Tc=4.0 min CN=97 Runoff=36.80 cfs 1.951 af

Reach 1R: OFFSITE Inflow=115.17 cfs 7.594 af
Outflow=115.17 cfs 7.594 af

Reach 2R: ONSITE WETLAND Inflow=57.36 cfs 3.942 af
Outflow=57.36 cfs 3.942 af

Reach 7R: OFFSITE Inflow=46.66 cfs 9.690 af
Outflow=46.66 cfs 9.690 af

Reach 8R: ONSITE WETLAND Inflow=27.27 cfs 8.132 af
Outflow=27.27 cfs 8.132 af

Pond 5P: FOREBAY 1 & WET POND Peak Elev=479.46' Storage=116,322 cf Inflow=66.45 cfs 8.134 af
Outflow=27.27 cfs 8.132 af

Pond 6P: FOREBAY 2 Peak Elev=489.12' Storage=24,032 cf Inflow=63.91 cfs 4.533 af
Discarded=28.48 cfs 0.479 af Primary=23.32 cfs 4.499 af Outflow=51.80 cfs 4.979 af

Pond 9P: FOREBAY 3 Peak Elev=489.92' Storage=27,192 cf Inflow=36.80 cfs 1.951 af
Outflow=20.97 cfs 1.951 af

Total Runoff Area = 43.032 ac Runoff Volume = 17.319 af Average Runoff Depth = 4.83"
70.78% Pervious = 30.456 ac 29.22% Impervious = 12.576 ac

Summary for Subcatchment S-1E: SUB 1 TO OFFSITE WETLAND

Runoff = 49.58 cfs @ 12.04 hrs, Volume= 2.990 af, Depth= 4.24"
Routed to Reach 1R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 yr (Qf) Rainfall=6.50"

Area (ac)	CN	Description
8.472	80	>75% Grass cover, Good, HSG D
8.472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	764	0.0430	1.03		**Lag/CN Method,**

Summary for Subcatchment S-1P: SUB 1P TO OFFSITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 35.61 cfs @ 11.90 hrs, Volume= 1.558 af, Depth= 4.24"
Routed to Reach 7R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 yr (Qf) Rainfall=6.50"

Area (ac)	CN	Description
4.312	80	>75% Grass cover, Good, HSG D
0.102	98	Paved parking, HSG D
4.414	80	Weighted Average
4.312		97.69% Pervious Area
0.102		2.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	104	0.1540	1.31		**Lag/CN Method,**

Summary for Subcatchment S-2E: SUB 2 TO ONSITE WETLAND

Runoff = 57.36 cfs @ 12.09 hrs, Volume= 3.942 af, Depth= 4.24"
Routed to Reach 2R : ONSITE WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 yr (Qf) Rainfall=6.50"

Area (ac)	CN	Description
11.168	80	>75% Grass cover, Good, HSG D
11.168		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	1,273	0.0540	1.28		**Lag/CN Method,**

Summary for Subcatchment S-2P: SUB 2P TO FOREBAY 2

Runoff = 63.91 cfs @ 12.06 hrs, Volume= 4.533 af, Depth= 5.68"
Routed to Pond 6P : FOREBAY 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 yr (Qf) Rainfall=6.50"

Area (ac)	CN	Description
2.862	80	>75% Grass cover, Good, HSG D
5.252	98	Paved parking, HSG D
0.836	98	Roofs, HSG D
0.633	98	Paved parking, HSG D
9.583	93	Weighted Average
2.862		29.87% Pervious Area
6.721		70.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	1,620	0.0360	1.78		**Lag/CN Method,**

Summary for Subcatchment S-3E: SUB 3 TO OFFSITE

Runoff = 12.46 cfs @ 12.00 hrs, Volume= 0.662 af, Depth= 4.24"
Routed to Reach 1R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 yr (Qf) Rainfall=6.50"

Area (ac)	CN	Description
1.876	80	>75% Grass cover, Good, HSG D
1.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	633	0.0660	1.23		**Lag/CN Method,**

Summary for Subcatchment S-3P: SUB 3P TO FOREBAY 1

Runoff = 23.51 cfs @ 12.07 hrs, Volume= 1.683 af, Depth= 5.45"
Routed to Pond 5P : FOREBAY 1 & WET POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 yr (Qf) Rainfall=6.50"

Area (ac)	CN	Description
1.525	80	>75% Grass cover, Good, HSG D
2.182	98	Paved parking, HSG D
3.707	91	Weighted Average
1.525		41.14% Pervious Area
2.182		58.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	1,531	0.0350	1.59		**Lag/CN Method,**

Summary for Subcatchment S-4P: SUB 4P TO FOREBAY 3

[49] Hint: Tc<2dt may require smaller dt

Runoff = 36.80 cfs @ 11.94 hrs, Volume= 1.951 af, Depth= 6.14"
Routed to Pond 9P : FOREBAY 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 yr (Qf) Rainfall=6.50"

Area (ac)	CN	Description
0.241	80	>75% Grass cover, Good, HSG D
3.571	98	Paved parking, HSG D
3.812	97	Weighted Average
0.241		6.32% Pervious Area
3.571		93.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	520	0.0560	2.17		**Lag/CN Method,**

Summary for Reach 1R: OFFSITE

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

Inflow Area = 21.516 ac, 0.00% Impervious, Inflow Depth = 4.24" for 100 yr (Qf) event
Inflow = 115.17 cfs @ 12.05 hrs, Volume= 7.594 af
Outflow = 115.17 cfs @ 12.05 hrs, Volume= 7.594 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 2R: ONSITE WETLAND

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

Inflow Area = 11.168 ac, 0.00% Impervious, Inflow Depth = 4.24" for 100 yr (Qf) event
Inflow = 57.36 cfs @ 12.09 hrs, Volume= 3.942 af
Outflow = 57.36 cfs @ 12.09 hrs, Volume= 3.942 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 1R : OFFSITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 7R: OFFSITE

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

Inflow Area = 21.516 ac, 58.45% Impervious, Inflow Depth = 5.40" for 100 yr (Qf) event
Inflow = 46.66 cfs @ 11.91 hrs, Volume= 9.690 af
Outflow = 46.66 cfs @ 11.91 hrs, Volume= 9.690 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 8R: ONSITE WETLAND

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

Inflow Area = 17.102 ac, 72.94% Impervious, Inflow Depth = 5.71" for 100 yr (Qf) event
Inflow = 27.27 cfs @ 12.54 hrs, Volume= 8.132 af
Outflow = 27.27 cfs @ 12.54 hrs, Volume= 8.132 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 7R : OFFSITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 5P: FOREBAY 1 & WET POND

[95] Warning: Outlet Device #2 rise exceeded

Inflow Area = 17.102 ac, 72.94% Impervious, Inflow Depth = 5.71" for 100 yr (Qf) event
Inflow = 66.45 cfs @ 12.07 hrs, Volume= 8.134 af
Outflow = 27.27 cfs @ 12.54 hrs, Volume= 8.132 af, Atten= 59%, Lag= 28.1 min
Primary = 27.27 cfs @ 12.54 hrs, Volume= 8.132 af
Routed to Reach 8R : ONSITE WETLAND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 475.00' Surf.Area= 6,000 sf Storage= 22,390 cf
Peak Elev= 479.46' @ 12.54 hrs Surf.Area= 32,728 sf Storage= 116,322 cf (93,932 cf above start)

Plug-Flow detention time= 143.1 min calculated for 7.574 af (93% of inflow)
Center-of-Mass det. time= 50.6 min (787.2 - 736.6)

Volume	Invert	Avail.Storage	Storage Description
#1	468.00'	171,728 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
468.00	1,610	0	0
469.00	2,000	1,805	1,805
470.00	2,410	2,205	4,010
471.00	2,840	2,625	6,635
472.00	3,290	3,065	9,700
473.00	3,770	3,530	13,230
474.00	4,275	4,023	17,253
475.00	6,000	5,138	22,390
476.00	11,675	8,838	31,228
477.00	22,610	17,143	48,370
478.00	26,720	24,665	73,035
479.00	30,590	28,655	101,690
480.00	35,215	32,903	134,593
481.00	39,055	37,135	171,728

Device	Routing	Invert	Outlet Devices
#1	Device 4	480.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 4	478.00'	**3.0' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 4	475.00'	**18.0" Round Culvert** L= 38.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 471.00' / 475.00' S= -0.1053 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#4	Primary	475.00'	**24.0" Round Culvert** L= 38.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 475.00' / 474.00' S= 0.0263 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=27.26 cfs @ 12.54 hrs HW=479.46' TW=0.00' (Dynamic Tailwater)
└─**4=Culvert** (Passes 27.26 cfs of 28.14 cfs potential flow)
  ├─**1=Orifice/Grate** (Controls 0.00 cfs)
  ├─**2=Sharp-Crested Rectangular Weir** (Orifice Controls 10.87 cfs @ 5.09 fps)
  └─**3=Culvert** (Inlet Controls 16.39 cfs @ 9.28 fps)

Summary for Pond 6P: FOREBAY 2

[44] Hint: Outlet device #2 is below defined storage
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=113)

Inflow Area = 9.583 ac, 70.13% Impervious, Inflow Depth = 5.68" for 100 yr (Qf) event
Inflow = 63.91 cfs @ 12.06 hrs, Volume= 4.533 af
Outflow = 51.80 cfs @ 12.15 hrs, Volume= 4.979 af, Atten= 19%, Lag= 5.0 min
Discarded = 28.48 cfs @ 12.15 hrs, Volume= 0.479 af
Primary = 23.32 cfs @ 12.15 hrs, Volume= 4.499 af
Routed to Pond 5P : FOREBAY 1 & WET POND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 488.00' Surf.Area= 6,200 sf Storage= 16,298 cf
Peak Elev= 489.12' @ 12.15 hrs Surf.Area= 7,606 sf Storage= 24,032 cf (7,734 cf above start)

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	484.00'	40,673 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
484.00	2,205	0	0
485.00	3,040	2,623	2,623
486.00	4,000	3,520	6,143
487.00	5,055	4,528	10,670
488.00	6,200	5,628	16,298
489.00	7,445	6,823	23,120
490.00	8,770	8,108	31,228
491.00	10,120	9,445	40,673

Device	Routing	Invert	Outlet Devices
#1	Discarded	488.00'	**32.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	480.00'	**18.0" Round Culvert** L= 156.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 480.00' / 479.00' S= 0.0064 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=28.40 cfs @ 12.15 hrs HW=489.11' (Free Discharge)
1=Orifice/Grate (Orifice Controls 28.40 cfs @ 5.08 fps)

Primary OutFlow Max=23.31 cfs @ 12.15 hrs HW=489.12' TW=478.88' (Dynamic Tailwater)
2=Culvert (Barrel Controls 23.31 cfs @ 13.19 fps)

Summary for Pond 9P: FOREBAY 3

Inflow Area = 3.812 ac, 93.68% Impervious, Inflow Depth = 6.14" for 100 yr (Qf) event
Inflow = 36.80 cfs @ 11.94 hrs, Volume= 1.951 af
Outflow = 20.97 cfs @ 12.02 hrs, Volume= 1.951 af, Atten= 43%, Lag= 4.7 min
Primary = 20.97 cfs @ 12.02 hrs, Volume= 1.951 af
Routed to Pond 5P : FOREBAY 1 & WET POND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 488.00' Surf.Area= 5,680 sf Storage= 14,085 cf
Peak Elev= 489.92' @ 12.02 hrs Surf.Area= 7,997 sf Storage= 27,192 cf (13,107 cf above start)

Plug-Flow detention time= 141.3 min calculated for 1.626 af (83% of inflow)
Center-of-Mass det. time= 11.6 min (756.3 - 744.8)

Volume	Invert	Avail.Storage	Storage Description
#1	484.00'	27,833 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
484.00	1,510	0	0
485.00	2,445	1,978	1,978
486.00	3,490	2,968	4,945
487.00	4,555	4,023	8,968
488.00	5,680	5,118	14,085
489.00	6,860	6,270	20,355
490.00	8,095	7,478	27,833

Device	Routing	Invert	Outlet Devices
#1	Device 2	488.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	482.00'	**18.0" Round Culvert** L= 169.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 482.00' / 477.00' S= 0.0296 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=20.77 cfs @ 12.02 hrs HW=489.89' TW=478.12' (Dynamic Tailwater)
↑**2=Culvert** (Passes 20.77 cfs of 22.73 cfs potential flow)
↑**1=Orifice/Grate** (Orifice Controls 20.77 cfs @ 6.61 fps)

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S-1E: SUB 1 TO OFFSITE Runoff Area=8.472 ac 0.00% Impervious Runoff Depth=0.12"
Flow Length=764' Slope=0.0430 '/' Tc=12.4 min CN=80 Runoff=0.78 cfs 0.082 af

Subcatchment S-1P: SUB 1P TO OFFSITE Runoff Area=4.414 ac 2.31% Impervious Runoff Depth=0.12"
Flow Length=104' Slope=0.1540 '/' Tc=1.3 min CN=80 Runoff=0.74 cfs 0.043 af

Subcatchment S-2E: SUB 2 TO ONSITE Runoff Area=11.168 ac 0.00% Impervious Runoff Depth=0.12"
Flow Length=1,273' Slope=0.0540 '/' Tc=16.6 min CN=80 Runoff=0.86 cfs 0.108 af

Subcatchment S-2P: SUB 2P TO FOREBAY Runoff Area=9.583 ac 70.13% Impervious Runoff Depth=0.53"
Flow Length=1,620' Slope=0.0360 '/' Tc=15.2 min CN=93 Runoff=6.46 cfs 0.423 af

Subcatchment S-3E: SUB 3 TO OFFSITE Runoff Area=1.876 ac 0.00% Impervious Runoff Depth=0.12"
Flow Length=633' Slope=0.0660 '/' Tc=8.6 min CN=80 Runoff=0.21 cfs 0.018 af

Subcatchment S-3P: SUB 3P TO FOREBAY Runoff Area=3.707 ac 58.86% Impervious Runoff Depth=0.43"
Flow Length=1,531' Slope=0.0350 '/' Tc=16.1 min CN=91 Runoff=1.95 cfs 0.133 af

Subcatchment S-4P: SUB 4P TO FOREBAY Runoff Area=3.812 ac 93.68% Impervious Runoff Depth=0.80"
Flow Length=520' Slope=0.0560 '/' Tc=4.0 min CN=97 Runoff=5.42 cfs 0.254 af

Reach 1R: OFFSITE Inflow=1.73 cfs 0.208 af
Outflow=1.73 cfs 0.208 af

Reach 2R: ONSITE WETLAND Inflow=0.86 cfs 0.108 af
Outflow=0.86 cfs 0.108 af

Reach 7R: OFFSITE Inflow=6.89 cfs 1.288 af
Outflow=6.89 cfs 1.288 af

Reach 8R: ONSITE WETLAND Inflow=6.89 cfs 1.245 af
Outflow=6.89 cfs 1.245 af

Pond 5P: FOREBAY 1 & WET POND Peak Elev=476.39' Storage=36,683 cf Inflow=21.75 cfs 1.247 af
Outflow=6.89 cfs 1.245 af

Pond 6P: FOREBAY 2 Peak Elev=488.00' Storage=16,298 cf Inflow=6.46 cfs 0.423 af
Discarded=0.00 cfs 0.000 af Primary=21.75 cfs 0.860 af Outflow=21.75 cfs 0.860 af

Pond 9P: FOREBAY 3 Peak Elev=488.34' Storage=16,062 cf Inflow=5.42 cfs 0.254 af
Outflow=4.01 cfs 0.254 af

Total Runoff Area = 43.032 ac Runoff Volume = 1.061 af Average Runoff Depth = 0.30"
70.78% Pervious = 30.456 ac 29.22% Impervious = 12.576 ac

Summary for Subcatchment S-1E: SUB 1 TO OFFSITE WETLAND

Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.082 af, Depth= 0.12"
Routed to Reach 1R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Water Quality (WQv) Rainfall=1.10"

Area (ac)	CN	Description
8.472	80	>75% Grass cover, Good, HSG D
8.472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	764	0.0430	1.03		**Lag/CN Method,**

Summary for Subcatchment S-1P: SUB 1P TO OFFSITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.74 cfs @ 11.94 hrs, Volume= 0.043 af, Depth= 0.12"
Routed to Reach 7R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Water Quality (WQv) Rainfall=1.10"

Area (ac)	CN	Description
4.312	80	>75% Grass cover, Good, HSG D
0.102	98	Paved parking, HSG D
4.414	80	Weighted Average
4.312		97.69% Pervious Area
0.102		2.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	104	0.1540	1.31		**Lag/CN Method,**

Summary for Subcatchment S-2E: SUB 2 TO ONSITE WETLAND

Runoff = 0.86 cfs @ 12.15 hrs, Volume= 0.108 af, Depth= 0.12"
Routed to Reach 2R : ONSITE WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Water Quality (WQv) Rainfall=1.10"

Area (ac)	CN	Description
11.168	80	>75% Grass cover, Good, HSG D
11.168		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	1,273	0.0540	1.28		**Lag/CN Method,**

Summary for Subcatchment S-2P: SUB 2P TO FOREBAY 2

Runoff = 6.46 cfs @ 12.08 hrs, Volume= 0.423 af, Depth= 0.53"
Routed to Pond 6P : FOREBAY 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Water Quality (WQv) Rainfall=1.10"

Area (ac)	CN	Description
2.862	80	>75% Grass cover, Good, HSG D
5.252	98	Paved parking, HSG D
0.836	98	Roofs, HSG D
0.633	98	Paved parking, HSG D
9.583	93	Weighted Average
2.862		29.87% Pervious Area
6.721		70.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	1,620	0.0360	1.78		**Lag/CN Method,**

Summary for Subcatchment S-3E: SUB 3 TO OFFSITE

Runoff = 0.21 cfs @ 12.04 hrs, Volume= 0.018 af, Depth= 0.12"
Routed to Reach 1R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Water Quality (WQv) Rainfall=1.10"

Area (ac)	CN	Description
1.876	80	>75% Grass cover, Good, HSG D
1.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	633	0.0660	1.23		**Lag/CN Method,**

Summary for Subcatchment S-3P: SUB 3P TO FOREBAY 1

Runoff = 1.95 cfs @ 12.09 hrs, Volume= 0.133 af, Depth= 0.43"
Routed to Pond 5P : FOREBAY 1 & WET POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Water Quality (WQv) Rainfall=1.10"

Area (ac)	CN	Description
1.525	80	>75% Grass cover, Good, HSG D
2.182	98	Paved parking, HSG D
3.707	91	Weighted Average
1.525		41.14% Pervious Area
2.182		58.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	1,531	0.0350	1.59		**Lag/CN Method,**

Summary for Subcatchment S-4P: SUB 4P TO FOREBAY 3

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.42 cfs @ 11.94 hrs, Volume= 0.254 af, Depth= 0.80"
Routed to Pond 9P : FOREBAY 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Water Quality (WQv) Rainfall=1.10"

Area (ac)	CN	Description
0.241	80	>75% Grass cover, Good, HSG D
3.571	98	Paved parking, HSG D
3.812	97	Weighted Average
0.241		6.32% Pervious Area
3.571		93.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	520	0.0560	2.17		**Lag/CN Method,**

Summary for Reach 1R: OFFSITE

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

Inflow Area = 21.516 ac, 0.00% Impervious, Inflow Depth = 0.12" for Water Quality (WQv) event
Inflow = 1.73 cfs @ 12.11 hrs, Volume= 0.208 af
Outflow = 1.73 cfs @ 12.11 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 2R: ONSITE WETLAND

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

Inflow Area = 11.168 ac, 0.00% Impervious, Inflow Depth = 0.12" for Water Quality (WQv) event
Inflow = 0.86 cfs @ 12.15 hrs, Volume= 0.108 af
Outflow = 0.86 cfs @ 12.15 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 1R : OFFSITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 7R: OFFSITE

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

Inflow Area = 21.516 ac, 58.45% Impervious, Inflow Depth > 0.72" for Water Quality (WQv) event
Inflow = 6.89 cfs @ 0.26 hrs, Volume= 1.288 af
Outflow = 6.89 cfs @ 0.26 hrs, Volume= 1.288 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Reach 8R: ONSITE WETLAND

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

Inflow Area = 17.102 ac, 72.94% Impervious, Inflow Depth > 0.87" for Water Quality (WQv) event
Inflow = 6.89 cfs @ 0.26 hrs, Volume= 1.245 af
Outflow = 6.89 cfs @ 0.26 hrs, Volume= 1.245 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 7R : OFFSITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 5P: FOREBAY 1 & WET POND

Inflow Area = 17.102 ac, 72.94% Impervious, Inflow Depth = 0.87" for Water Quality (WQv) event
Inflow = 21.75 cfs @ 0.00 hrs, Volume= 1.247 af
Outflow = 6.89 cfs @ 0.26 hrs, Volume= 1.245 af, Atten= 68%, Lag= 15.6 min
Primary = 6.89 cfs @ 0.26 hrs, Volume= 1.245 af
Routed to Reach 8R : ONSITE WETLAND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 475.00' Surf.Area= 6,000 sf Storage= 22,390 cf
Peak Elev= 476.39' @ 0.26 hrs Surf.Area= 15,988 sf Storage= 36,683 cf (14,293 cf above start)

Plug-Flow detention time= 667.6 min calculated for 0.686 af (55% of inflow)
Center-of-Mass det. time= 56.2 min (600.8 - 544.6)

Volume	Invert	Avail.Storage	Storage Description
#1	468.00'	171,728 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
468.00	1,610	0	0
469.00	2,000	1,805	1,805
470.00	2,410	2,205	4,010
471.00	2,840	2,625	6,635
472.00	3,290	3,065	9,700
473.00	3,770	3,530	13,230
474.00	4,275	4,023	17,253
475.00	6,000	5,138	22,390
476.00	11,675	8,838	31,228
477.00	22,610	17,143	48,370
478.00	26,720	24,665	73,035
479.00	30,590	28,655	101,690
480.00	35,215	32,903	134,593
481.00	39,055	37,135	171,728

Device	Routing	Invert	Outlet Devices
#1	Device 4	480.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 4	478.00'	**3.0' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 4	475.00'	**18.0" Round Culvert** L= 38.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 471.00' / 475.00' S= -0.1053 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#4	Primary	475.00'	**24.0" Round Culvert** L= 38.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 475.00' / 474.00' S= 0.0263 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.84 cfs @ 0.26 hrs HW=476.39' TW=0.00' (Dynamic Tailwater)
└─**4=Culvert** (Passes 6.84 cfs of 9.31 cfs potential flow)
  ├─**1=Orifice/Grate** (Controls 0.00 cfs)
  ├─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Culvert** (Inlet Controls 6.84 cfs @ 4.01 fps)

Summary for Pond 6P: FOREBAY 2

[44] Hint: Outlet device #2 is below defined storage

Inflow Area = 9.583 ac, 70.13% Impervious, Inflow Depth = 0.53" for Water Quality (WQv) event
Inflow = 6.46 cfs @ 12.08 hrs, Volume= 0.423 af
Outflow = 21.75 cfs @ 0.00 hrs, Volume= 0.860 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 21.75 cfs @ 0.00 hrs, Volume= 0.860 af
Routed to Pond 5P : FOREBAY 1 & WET POND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 488.00' Surf.Area= 6,200 sf Storage= 16,298 cf
Peak Elev= 488.00' @ 0.00 hrs Surf.Area= 6,200 sf Storage= 16,298 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	484.00'	40,673 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
484.00	2,205	0	0
485.00	3,040	2,623	2,623
486.00	4,000	3,520	6,143
487.00	5,055	4,528	10,670
488.00	6,200	5,628	16,298
489.00	7,445	6,823	23,120
490.00	8,770	8,108	31,228
491.00	10,120	9,445	40,673

Device	Routing	Invert	Outlet Devices
#1	Discarded	488.00'	**32.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	480.00'	**18.0" Round Culvert** L= 156.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 480.00' / 479.00' S= 0.0064 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=488.00' (Free Discharge)
↑**1=Orifice/Grate** (Controls 0.00 cfs)

Primary OutFlow Max=21.75 cfs @ 0.00 hrs HW=488.00' TW=475.28' (Dynamic Tailwater)
↑**2=Culvert** (Barrel Controls 21.75 cfs @ 12.31 fps)

Summary for Pond 9P: FOREBAY 3

Inflow Area = 3.812 ac, 93.68% Impervious, Inflow Depth = 0.80" for Water Quality (WQv) event
Inflow = 5.42 cfs @ 11.94 hrs, Volume= 0.254 af
Outflow = 4.01 cfs @ 12.00 hrs, Volume= 0.254 af, Atten= 26%, Lag= 3.4 min
Primary = 4.01 cfs @ 12.00 hrs, Volume= 0.254 af
Routed to Pond 5P : FOREBAY 1 & WET POND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Starting Elev= 488.00' Surf.Area= 5,680 sf Storage= 14,085 cf
Peak Elev= 488.34' @ 12.00 hrs Surf.Area= 6,077 sf Storage= 16,062 cf (1,977 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 18.9 min (812.9 - 794.0)

Volume	Invert	Avail.Storage	Storage Description
#1	484.00'	27,833 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
484.00	1,510	0	0
485.00	2,445	1,978	1,978
486.00	3,490	2,968	4,945
487.00	4,555	4,023	8,968
488.00	5,680	5,118	14,085
489.00	6,860	6,270	20,355
490.00	8,095	7,478	27,833

Device	Routing	Invert	Outlet Devices
#1	Device 2	488.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	482.00'	**18.0" Round Culvert** L= 169.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 482.00' / 477.00' S= 0.0296 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.00 cfs @ 12.00 hrs HW=488.34' TW=475.74' (Dynamic Tailwater)
↑—**2=Culvert** (Passes 4.00 cfs of 20.11 cfs potential flow)
↑—**1=Orifice/Grate** (Weir Controls 4.00 cfs @ 1.90 fps)

DANIEL G. LOUCKS, P.E.
GEOTECHNICAL ENGINEERING

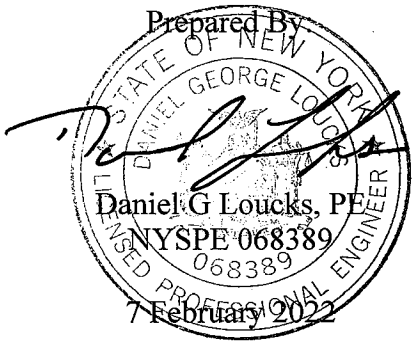
Geotechnical Report
For
MCIDA Warehouse Site
Rt 5S, Town of Florida, New York

File No. 3960

Prepared For:

Prime AE Group of NY

Prepared By:



Daniel G Loucks, PE
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7 February 2022

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INTRODUCTION:

The subsurface investigation for the proposed MCIDA Warehouse Facility, Town of Florida, New York has been completed. Aztech Environmental Technologies Inc. of Ballston Spa, New York has completed ten (10) soil borings at the site. Soil boring B-1 was not performed. The logs of these borings, along with a location diagram, have been included in the appendix of this report.

It is my understanding that the final design for the site hasn't been completed, but the estimated construction may include one to two single-story warehouse building(s) located approximately as indicated on the boring location diagram. The building(s) will have a steel frame design.

The maximum column loadings could range from 150 to 200 kips. The settlement tolerances are normal. Settlement tolerances are considered to include up to 1 inch of total settlement and 3/4 inch of differential settlement between column locations.

The current preliminary plan has an estimated first floor slab will be established at between elevations 490 and 495. This would require up to approximately 25 feet of cut and fill over the site.

The purpose of this report is to describe the investigation conducted and the results obtained; to analyze and interpret the data obtained; and to make preliminary recommendations for the design and construction of the feasible foundation types and earthworks for the project. The preliminary recommendations contained in this report are based on the information that was provided up to the date the report was completed. Any changes in the design of the project or changes to the recommendations provided in this report should be brought to my attention to determine if there needs to be any revision of the geotechnical recommendations. I am not responsible for any changes made to the recommendations provided in this report unless I have provided written approval of the changes.

The scope of my services has been limited to coordinating the boring and laboratory investigation, analyzing the soils information, and providing a geotechnical report with preliminary foundation recommendations and seismic site classifications as per NYS Building Code. Environmental aspects of the project as well as grading and site design should be performed by qualified others. Additional soil borings may be required depending on the final building placement and grading.

FIELD INVESTIGATION PROCEDURES:

The borings were extended by means of 3.75 inch ID, hollow-stem augers, by using various cutting bits using circulating drilling fluid to remove the cuttings from the casing and by continuous sampling with a split-spoon sampler.

Representative samples were obtained from the boring holes by means of the split-spoon sampling procedure performed in accordance with ASTM D 1586. The standard penetration values obtained from this procedure have been indicated on the soil boring logs.

Soil samples obtained from these procedures were examined in the field, sealed in containers, and shipped to the laboratory for further examination, classification, and testing, as applicable.

During the investigation, water level readings were obtained at various times where water accumulated in the boring hole. The water level readings, along with an indication of the time of the reading relative to the boring procedure, have been indicated on the soil boring logs.

LABORATORY INVESTIGATION:

All samples were examined in the laboratory by the soil engineer and classified according to the Unified Soil Classification System. In this system, the soils are visually classified according to texture and plasticity. The appropriate group symbol is indicated on the soil boring logs.

Atterberg limit tests were performed on representative samples in accordance with ASTM D 4318. The results of these tests are included in the appendix of this report.

Sieve Analyses were performed on representative samples in accordance with ASTM Specification D 422. These tests were performed to verify the visual soil classifications. Results of the tests can be found in the appendix of the report.

SITE CONDITIONS:

The site is currently a farm field. The ground surface at the site slopes down from approximately elevation 520 down to 470.

Geologic mapping of the area indicates upper silt/clay soils with bedrock consisting of sales and some siltstone.

SUBSURFACE CONDITIONS:

The specific subsurface conditions encountered at each boring location are indicated on the individual soil boring logs. However, to aid in the evaluation of this data, I have prepared a generalized description of the soil conditions based on the boring data. Ground surface elevations as shown on the boring logs, when available, have be estimated from the existing topographic mapping as shown on the site plan provided to this office.

The borings generally encountered an upper layer of clayey silt topsoil that extends to between approximately 1 and 2 feet below the existing ground surface.

Beneath the topsoil is clayey silt soils with varying amounts of sand and gravel. These soils extended to the bottom of the borings at between 10 and 42 feet below the existing ground surface and they are loose to very dense. Borings B-10 and B-11 encountered split spoon/auger refusal at 20.2 and 12.6 feet below the existing ground surface respectively. No rock core was able to be taken due to site limitations. I recommend that when available, the borings be extended and rock core be taken at these locations to determine if refusal was on bedrock of very dense glacial till soils with possible cobbles/boulders.

GROUNDWATER CONDITIONS:

Accurate groundwater levels are difficult to determine in clayey silt soils with only short term readings or observations. Clayey silt soils typically do not allow an adequate amount of water to flow through the soil to produce a water level reading during the drilling operation. I have indicated where water was observed on the boring logs.

Based on the groundwater levels observed during the boring investigation, the moisture condition of the samples recovered from the boring holes and coloration of the soil samples, I judge that the groundwater level was located below depth of 6 feet.

Perched groundwater tables may occur at higher elevations in the soil profile due to groundwater being retained by layers or lenses of silt or clay soils.

Some fluctuation in hydrostatic groundwater levels and perched water conditions should be anticipated with variations in the seasonal rainfall and surface runoff.

It should be noted that the groundwater levels were obtained during the drilling procedure. Actual water levels may vary at the time of construction. Some groundwater could be encountered in soil layers labeled moist to wet on the boring logs.

ANALYSIS AND RECOMMENDATIONS:

The purpose of this investigation and report was to perform soil borings spaced across the potential building areas at the site to provide a better understanding of the subsurface conditions and look at possible foundation types for proposed building(s). It also was performed to identify possible geotechnical issues that may occur at the site.

I understand that the current preliminary plan includes on long warehouse building with a possible finished floor elevation of between 490 and 495. Depending on the size of the building this could require up to approximately 25 feet of cut and fill at the site. Borings B-8, B-9, B-10 and B-11 were all performed where the ground surface is currently higher than elevation 500. The other borings were performed at elevations of 489 or lower. Boring B-8 extended to approximately elevation 483, boring B-9 extended to approximately elevation 465, boring B-10 extended to approximately elevation 487 all of which are below the estimated proposed finished floor elevation of 490. Boring B-11 extended to approximately elevation 502 where power auger refusal was encountered. Depending on the final grading plan, I recommend at this boring be extended and possibly additional borings performed to more accurately determine the subsurface conditions in this area and if bedrock may be encountered.

Depending on the proposed grading, the lower portion of the site may require up to 25 feet of fill. The borings in this area indicate the soils are loose to dense clayey silt soils with varying amounts of sand and gravel. In my experience these soils

generally consolidate fairly quickly (within 30 to 45 days of loading). I would recommend monitoring this area with settlement plates during the placement of the fill to determine the rate of consolidation of the virgin soils. This will help determine when the rate has slowed to within allowable tolerances to allow the construction of the proposed building.

The other potential issue would be using on site soils as controlled fill in the proposed fill locations. These soils are predominantly clayey silt soils and will therefore be very sensitive to moisture content when placing them. If these soils become wet, they can be very difficult to place and achieve proper compaction. They also can become easily disturbed by construction traffic. Proper placement of these soils as controlled fill in the fall, winter and spring will be difficult. A summer placement of these soils as controlled fill would offer the best opportunity for success.

Site Work:

The proposed construction areas should be cleared and grubbed and all organic topsoil and vegetation along with any uncontrolled fill and debris. The subgrade should be proof-rolled with a 10-ton roller and the proof rolling should be observed by the soil engineer. This proof rolling will compact the subgrade and reveal the presence of soft spots. If saturated subgrade conditions exist, I recommend that the subgrade be observed and probed by the soil engineer in place of proof rolling. Any soft spots should be excavated and backfilled with controlled fill material.

A way to stabilize a spongy, but suitable, footing subgrade would be to spread a reinforcement or separation type of geotextile (Mirafi 600X or approved equal) on the subgrade and follow with a lift of clean, granular fill or uniform crushed stone. The thickness of the controlled fill can range from 0.5 to 1.5 feet, as necessary, to achieve a working mat upon which to place footings. If uniform crushed stone is used as controlled fill a layer of geotextile should be placed between the crushed stone and any sand/gravel controlled fill or virgin soil.

Building Foundations:

Based on the estimated loading, it is my preliminary opinion that the proposed structure(s) may be supported by spread footing foundations resting on firm virgin, inorganic, soils or on controlled fill which, in turn, rests on these virgin materials. Footings can be preliminarily designed for a maximum, net, allowable soil bearing pressure of 2000 psf. When a final plan has been developed and additional soil borings performed, a final recommendation can be provided.

A minimum footing width of 2.0 feet is recommended for load bearing strip footings. Isolated footings should be at least 3.0 feet wide.

Exterior footings or footings in unheated areas should have a minimum of 4.0 feet of embedment for protection from frost action. Interior footings should have a minimum embedment of 2.0 feet below finished grade to develop the bearing value of the soils.

All walls that retain soil on only one side should have a drain tile placed along the base of the wall. The drain tile should be a minimum of 4 inches in diameter, surrounded by a minimum of 6 inches of properly graded washed sand or crushed stone wrapped with a non-woven filter fabric with a maximum apparent opening size of 70 and a minimum trapezoid tearing strength of 100 lbs. The drain tile should drain to a stormwater sewer, daylight, or a sump equipped with a pump.

The wall should then be backfilled with a controlled, well graded, free-draining granular material. The material should extend away from the wall a horizontal distance of two-thirds the height of the fill being placed. The upper 1 foot of material should be a fairly impermeable material to shed surface water and should be pitched away from the building to provide proper drainage.

If these procedures are used, a static lateral soil pressure of 40 psf per foot of retained soil can be used for preliminary design of the wall. This static, active lateral soil pressure is based on a moist unit weight of 125 pcf and an angle of internal friction of 32 degrees. A wall soil friction angle of 18 degrees and a coefficient of base sliding of 0.35 can also be used for preliminary design.

If the retaining wall is braced or if the deflection is limited prior to backfilling so the active soil pressure is not achieved, a static, at-rest lateral soil pressure of 63 psf per foot of retained soil can be used for preliminary design.

To resist overturning and sliding a static lateral passive pressure of 250 psf per foot of embedment can be used for preliminary design, provided foundations are backfilled with controlled fill. This static, passive pressure resistance value has been reduced from the calculated full passive pressure because of stress/strain characteristics of the soil. To develop the full, calculated resistance a certain amount of movement or deflection in the structure is required. The amount of movement required to generate this resistance generally greater than is acceptable for structures. I therefore recommend that the full passive pressure not be used.

The passive resistance of the upper two feet of soil, not in floor slab areas, should be ignored due to surface effects of frost and moisture.

Any surcharge loading of existing adjacent building foundations or other adjacent structures/utilities should be addressed by the structural engineer using Boussinesq charts.

Floor Slabs:

Concrete floor slabs can be preliminarily designed to rest on controlled fills resting on virgin materials. A layer of well-graded, free-draining, granular material should be placed beneath the floor slab to provide drainage, act as a capillary break, and to provide better and more uniform support. The thickness of this layer will depend on the loading and differential settlement tolerances. I would preliminarily estimate that a minimum of 6 inches would be required in office floor areas and up to 18 inches in warehouse slab locations.

Seismic Conditions:

The potential seismic conditions at the proposed site have been investigated using the information provided in the NYS Building Code, ASCE-7 and the boring information obtained during my investigation and past experience with soils in the area.

Based on the soil boring information, estimated proposed finished floor elevations and my experience it is my opinion that the Site Soil Classification (ASCE-7 Table 20.3-1) could be assumed to be D. Using data from Reference Document ASCE7-16, Risk Category I, I estimate that the MCE spectral acceleration (S_{MS}) at short periods is 34.7 and the MCE spectral acceleration (S_{M1}) at 1 s period is 15.0. I have included a copy of the spectral accelerations for other Hazard Levels in the appendix of this report.

The probabilistic ground motion values are expressed in %g for rock site class B. Peak ground accelerations in the upper soil profile may vary. If specific peak ground accelerations or shear wave velocities are required for the upper soil profile additional testing would be required. If it is determined by the structural engineer that the Seismic Design Category is D, E or F additional geotechnical recommendations can be provided.

The soil borings and my analysis do not indicate any significant potential seismic hazards such as liquefaction, sensitive clays, weakly cemented soil, or surface rupture.

CONSTRUCTION PROCEDURES AND PROBLEMS:

The NYS Building Code Section 17 requires special inspections and follow up reports. These inspections should be performed to verify compliance with the recommendations contained in this report.

All excavations of more than a few feet should be sheeted and braced or laid back to prevent sloughing in of the sides.

Excavations should not extend below adjacent footings or structures unless properly designed sheeting and bracing or underpinning is installed.

Sump-pit and sump-pump-type dewatering may be required in excavations or low areas during wet weather or if groundwater is encountered. If large quantities of groundwater are encountered vacuum wells maybe required to stabilize the subgrade soils. All excavations should be dewatered to a minimum of 1 foot below the bottom of the excavation. All dewatering programs should be designed to prevent bottom heave. Any dewatering program should

be performed with properly designed filtration protection on all pumps to prevent loss of ground.

As previously noted, the on-site soils contain clayey silt which will make the soils sensitive to moisture content. If the material becomes wet or saturated, it will become spongy and easily disturbed. It will also be difficult to place as controlled fill if it becomes too wet. Imported well draining sand and gravel or possibly crushed stone may be required to prevent disturbance of the subgrade soils during construction and in roadway areas. Additional subbase, up to 24 inches of total thickness, may be required to support traffic loadings. Any areas of the pavement subgrades that become disturbed during construction should be removed and replaced with subbase materials.

Temporary paving using coarse fill material or separation/ reinforcement geotextile and coarse fill material will be required for moving about the site during wet or thaw weather.

MCIDA Warehouse Site
Rt 5S, Town of Florida, New York
File No. 3960

CONTENTS OF APPENDIX:

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS

SS : Split-Spoon — 1¾ " I.D., 2" O.D., except where noted
S : Shelby Tube — 2" O.D., except where noted
PA : Power Auger Sample
DB : Diamond Bit — NX: BX: AX:
CB : Carboloy Bit — NX: BX: AX:
OS : Osterberg Sampler — 3" Shelby Tube
HS : Housel Sampler
WS : Wash Sample
FT : Fish Tail
RB : Rock Bit
WO : Wash Out

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch OD split spoon, except where noted

WATER LEVEL MEASUREMENT SYMBOLS

WL : Water Level
WCI : Wet Cave In
DCI : Dry Cave In
WS : While Sampling
WD : While Drilling
BCR : Before Casing Removal
ACR : After Casing Removal
AB : After Boring

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils the accurate determination of ground water elevations is not possible in even several day's observation, and additional evidence on ground water elevations must be sought.

CLASSIFICATION

COHESIONLESS SOILS

"Trace"	:	1% to 10%
"Trace to some"	:	10% to 20%
"Some"	:	20% to 35%
"And"	:	35% to 50%
Loose	:	0 to 9 Blows
Medium Dense	:	10 to 29 Blows
Dense	:	30 to 59 Blows
Very Dense	:	≥60 Blows

} or equivalent

COHESIVE SOILS

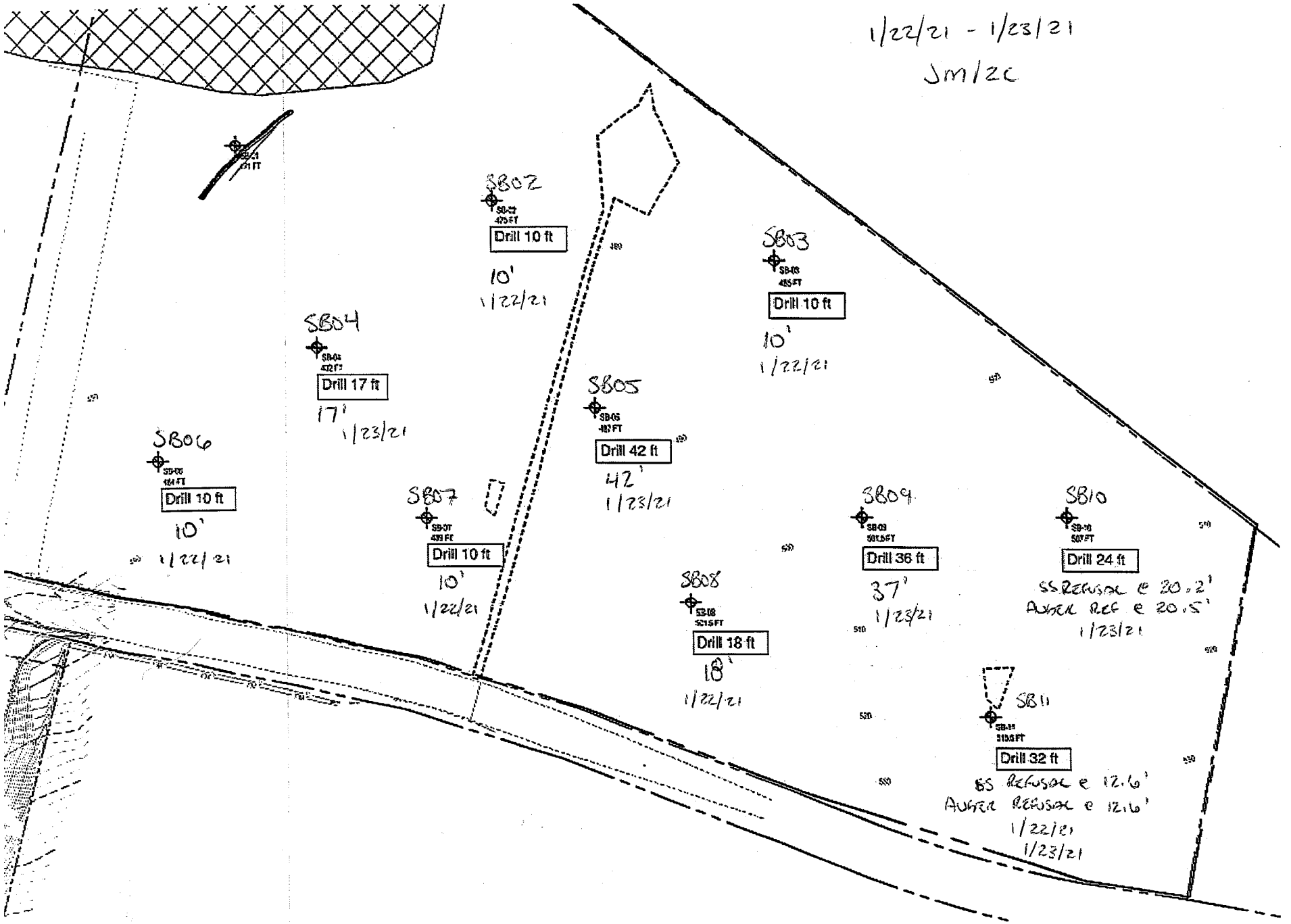
If clay content is sufficient so that clay dominates soil properties, then clay becomes the principle noun with the other major soil constituent as modifiers: i.e., silty clay. Other minor soil constituents may be added according to classification breakdown for cohesionless soils; i.e., silty clay, trace to some sand, trace gravel.

Soft	:	0.00 — 0.59 tons/ft²
Medium	:	0.60 — 0.99 tons/ft²
Stiff	:	1.00 — 1.99 tons/ft²
Very Stiff	:	2.00 — 3.99 tons/ft²
Hard	:	≥ 4.00 tons/ft²

2018 RT 5S AMSTERDAM NY

1/22/21 - 1/23/21

JM/ZC



BORING LOG

BORING NO: 2

SHEET 1 of 1

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 475 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: None Observed **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
1	1	SS	8-12-10-11	22		Topsoil
2						Clayey Silt, trace Sand, Brown, Moist, Medium Dense (ML)
3	2	SS	7-5-7-6	12		Clayey Silt, some Sand, trace Gravel, Brown, Moist, Medium Dense to Dense (ML)
4						
5	3	SS	11-16-14-19	30		
6						
7	4	SS	16-22-26-18	48		
8						
9	5	SS	16-16-20-27	36		Clayey Silt, some Sand, trace to some Gravel, Dark Brown, Moist, Dense (ML)
10						End of Boring at 10.0 Feet
11						
12						
13						
14						
15						
16						
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18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

BORING LOG

BORING NO: 3

SHEET 1 of 1

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 485 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: None Observed **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
1						Topsoil
1	1	SS	4-7-6-12	13		Clayey Silt, trace to some Sand, trace Gravel, Brown, Moist, Medium Dense (ML)
2						
3	2	SS	7-7-7-7	14		
4						
5	3	SS	10-12-17-19	29		
6						
7	4	SS	6-8-19-15	27		
8						
9	5	SS	18-18-21-20	39		Clayey Silt, some Sand, trace to some Gravel, Dark Brown, Moist, Dense (ML)
10						End of Boring at 10.0 Feet
11						
12						
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23						
24						
25						
26						
27						

BORING LOG

BORING NO: 4

SHEET 1 of 1

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 482 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: None Observed **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
1	1	SS	14-14-8-2	22		Clayey Silt, trace to some Sand, trace Gravel, Dark Brown, Moist, Medium Dense (ML) Topsoil
3	2	SS	4-4-4-4	8		Clayey Silt, trace to some Sand, trace Gravel, Brown, Moist, Loose to Medium Dense (ML)
5	3	SS	7-7-12-13	19		
7	4	SS	11-11-11-13	22		Clayey Silt, some Sand, trace Gravel, Brown, Moist, Medium Dense to Dense (ML)
9	5	SS	12-12-21-16	33		
11	6	SS	8-11-7-14	18		Clayey Silt, some Sand, trace to some Gravel, Dark Gray, Moist, Medium Dense (ML)
13		PA				Clayey Silt, some Gravel, trace to some Sand, Dark Gray, Moist, Medium Dense (ML)
16	7	SS	12-12-13-12	25		
17						End of Boring at 17.0 Feet

BORING LOG

BORING NO: 5

SHEET 1 of 2

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 487 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: None Observed **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
1	1	SS	16-13-4-4	17		Clayey Silt, trace Sand, Dark Brown, Moist to Wet, Medium Dense (ML) Topsoil
3	2	SS	3-3-2-6	5		Clayey Silt, trace Sand, Brown, Moist to Wet, Loose (ML)
5	3	SS	8-3-3-5	6		Clayey Silt, trace to some Sand, Gravel, Brown, Moist, Loose (ML)
7	4	SS	8-16-10-10	26		Clayey Silt, some Sand, trace Gravel, Brown, Moist, Medium Dense to Dense (ML)
9	5	SS	10-10-20-31	30		
11	6	SS	6-6-11-9	17		Clayey Silt, trace to some Sand, trace Gravel, Brown, Moist, Medium Dense (ML)
13		PA				Clayey Silt, some Sand, trace to some Gravel, Dark Brown, Moist, Dense (ML)
16	7	SS	14-26-27-20	53		
18		PA				
21	8	SS	11-5-7-8	12		
23		PA				Clayey Silt, trace to some Sand, trace Gravel, Dark Gray, Moist to Wet, Medium Dense (ML)
26	9	SS	5-8-7-9	15		

BORING LOG

BORING NO: 5

SHEET 2 of 2

PROJECT NAME: MCIDA Project

LOCATION: Town of Florida, New York

DATE STARTED/COMPLETED: January 2022

ENGINEER/ARCHITECT:

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: None Observed **TIME:** WS

FILE NUMBER: 3960

OFFSET: None

SURFACE ELEV.: 487 +/- ft

DRILL CONTRACTOR: Aztech Environmental Technology

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
28		PA				Clayey Silt, trace to some Sand, trace Gravel, Dark Gray, Moist to Wet, Medium Dense (ML)
29						
30						
31	10	SS	5-5-8-9	13		
32						
33		PA				
34						
35						
36	11	SS	5-7-8-8	15		
37						
38		PA				Clayey Silt, some Sand, trace Gravel, Dark Gray, Moist to Wet, Medium Dense (ML)
39						
40						
41	12	SS	5-8-8-11	16		
42						Clayey Silt, trace to some Sand, trace Gravel, Dark Gray, Moist to Wet, Medium Dense (ML)
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						
54						

BORING LOG

BORING NO: 6

SHEET 1 of 1

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 484 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: None Observed **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
1	1	SS	6-6-13-17	19		Topsoil
2						Clayey Silt and Sand, trace to some Gravel, Brown, Moist to Wet, Loose to Medium Dense (ML-SM)
3	2	SS	3-2-2-2	4		
4						
5	3	SS	2-2-5-4	7		Clayey Silt, some Sand, trace Gravel, Brown, Moist, Loose (ML)
6						
7	4	SS	6-5-5-5	10		
8						
9	5	SS	7-11-13-15	24		Clayey Silt, trace to some Sand, trace Gravel, Brown, Moist, Medium Dense (ML)
10						
11						End of Boring at 10.0 Feet
12						
13						
14						
15						
16						
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18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

BORING LOG

BORING NO: 7

SHEET 1 of 1

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 489 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: None Observed **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
1	1	SS	16-6-4-4	10		Topsoil Clayey Silt, some Sand, trace Gravel, Moist, Medium Dense (ML)
3	2	SS	4-4-4-4	8		Clayey Silt, trace to some Sand, trace Gravel, Brown, Moist, Loose (ML)
5	3	SS	12-15-17-36	32		Clayey Silt, some Sand, trace Gravel, Brown, Moist, Dense (ML)
7	4	SS	12-16-27-21	43		Clayey Silt, some Sand, trace to some Gravel, Dark Brown, Moist, Very Dense (ML)
9	5	SS	27-33-40-46	73		
10						End of Boring at 10.0 Feet

BORING LOG

BORING NO: 8

SHEET 1 of 1

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 501 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: 5 ft **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
1	1	SS	10-4-4-4	8		Clayey Silt, trace Sand, Dark Brown, Moist to Wet, Loose (ML) Topsoil
3	2	SS	4-4-4-4	8		Clayey Silt, trace to some Sand, Brown, Moist, Loose (ML)
5	3	SS	12-16-17-17	33		Clayey Silt, trace to some Sand, Gravel, Brown, Moist, Dense (ML)
7	4	SS	17-22-21-32	43		
9	5	SS	22-22-27-43	49		Clayey Silt, some Sand, trace to some Gravel, Dark Brown, Moist, Dense (ML)
11	6	SS	29-28-23-27	51		Clayey Silt, some Sand, trace to some Gravel, Dark Gray, Moist, Dense (ML)
13		PA				
16	7	SS	19-20-19-20	39		
17						End of Boring at 17.0 Feet

BORING LOG

BORING NO: 9

SHEET 1 of 2

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 502 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: 18 ft **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
1						Topsoil
2	1	SS	14-3-4-3	7		Clayey Silt, trace to some Sand, trace Gravel, Brown, Moist, Loose to Medium Dense (ML)
3						
4	2	SS	6-4-4-3	8		
5						
6	3	SS	8-8-7-6	15		
7						Clayey Silt, some Sand, trace Gravel, Brown, Moist, Dense to Very Dense (ML)
8	4	SS	27-27-33-46	60		
9						
10	5	SS	18-21-21-27	42		
11						Clayey Silt and Sand, some Gravel, Brown, Moist, Dense (ML-SM)
12	6	SS	18-23-20-38	43		
13						
14		PA				Clayey Silt, some Sand, trace Gravel, Dark Gray, Moist, Dense (ML)
15						
16	7	SS	32-26-27-22	53		
17						
18		PA				Clayey Silt, trace to some Sand, trace Gravel, Dark Gray, Moist to Wet, Medium Dense (ML)
19						
20						
21	8	SS	5-7-8-7	15		
22						
23		PA				
24						
25						
26	9	SS	4-6-5-8	11		
27						

BORING LOG

BORING NO: 9

SHEET 2 of 2

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 502 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: 18 ft **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
28		PA				Clayey Silt, trace to some Sand, trace Gravel, Dark Gray, Moist to Wet, Medium Dense (ML)
29						
30						
31	10	SS	6-6-11-13	17		
32						
33		PA				
34						
35						
36	11	SS	6-5-5-9	10		
37						End of Boring at 37.0 Feet
38						
39						
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52						
53						
54						

BORING LOG

BORING NO: 11

SHEET 1 of 1

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 515 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: 6 ft **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
1						Topsoil
2	1	SS	4-3-3-2	6		Clayey Silt, trace to some Sand, trace Gravel, Brown, Moist, Loose (ML)
3	2	SS	5-4-3-3	7		Clayey Silt and Sand, trace Gravel, Brown, Moist to Wet, Loose (ML-SM)
4						
5	3	SS	2-4-6-8	10		
6						
7	4	SS	12-27-19-23	46		Clayey Silt, some Sand, trace Gravel, Brown, Moist to Wet, Medium Dense to Dense (ML)
8						
9	5	SS	11-11-13-10	23		
10						
11	6	SS	7-9-9-11	18		Clayey Silt, some Sand, trace to some Gravel. Dark Brown, Moist to Wet, Medium Dense (ML)
12	7			100+		No Recovery
13						End of Boring at 12.6 Feet Power Auger Refusal
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

BORING LOG

BORING NO: 10

SHEET 1 of 1

PROJECT NAME: MCIDA Project

FILE NUMBER: 3960

LOCATION: Town of Florida, New York

OFFSET: None

DATE STARTED/COMPLETED: January 2022

SURFACE ELEV.: 507 +/- ft

ENGINEER/ARCHITECT:

DRILL CONTRACTOR: Aztech Environmental Technology

DRILLING METHOD: Hollow Stem Auger

DRILL RIG TYPE: ATV

HAMMER WEIGHT: 140 Lbs

DROP: 30 Inches

CASING DIAMETER: OD/ID: 3.75 inch ID

WATER LEVEL DEPTH: None Observed **TIME:** WS

Daniel G Loucks PE
PO Box 163
Ballston Spa, New York 12020
Phone: 518-371-7622
Fax: 518-383-2069

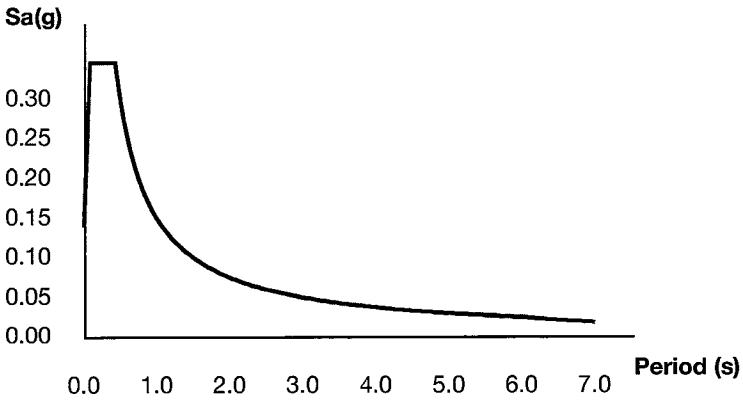
DEPTH	Sample Number	Sample Type	BLOW COUNTS per 6 inches	"N" Value	Recovery	DESCRIPTION
0						Topsoil
1	1	SS	9-5-3-4	8		Clayey Silt, trace to some Sand, trace Gravel, Brown, Moist, Loose (ML)
2						
3	2	SS	6-5-6-12	11		Clayey Silt, some Sand, trace Gravel, Brown, Moist, Medium Dense (ML)
4						
5	3	SS	11-12-13-15	25		
6						
7	4	SS	15-17-24-23	41		Clayey Silt, some Sand, trace to some Gravel, Brown, Moist, Dense (ML)
8						
9	5	SS	15-18-30-30	48		Clayey Silt, some Sand, trace Gravel, Dark Brown, Moist, Dense (ML)
10						
11	6	SS	14-14-43-31	57		Clayey Silt, some Sand, trace Gravel, Dark Gray, Moist, Dense to Very Dense (ML)
12						
13		PA				
14						
15						
16	7	SS	20-23-27-17	50		
17						
18		PA				
19						
20						
21	8	SS	30-50	80+		Clayey Silt and Gravel, trace to some Sand, Dark Gray, Moist, Very Dense (ML-GM)
22						End of Boring at 21.0 Feet Split Spoon Refusal
23						
24						
25						
26						
27						

Hazards by Location

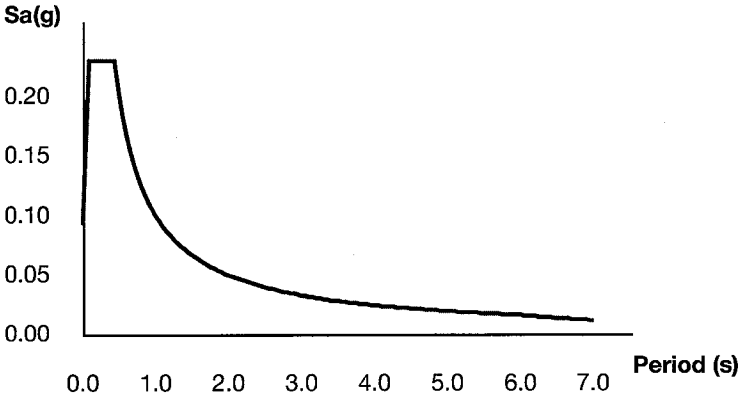
Search Information

Address:	2018 NY-5S, Amsterdam, NY 12010, USA
Coordinates:	42.93706189999999, -74.26052969999999
Elevation:	489 ft
Timestamp:	2022-02-04T16:02:29.891Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	I
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.217	MCE_R ground motion (period=0.2s)
S_1	0.063	MCE_R ground motion (period=1.0s)
S_{MS}	0.347	Site-modified spectral acceleration value
S_{M1}	0.15	Site-modified spectral acceleration value
S_{DS}	0.231	Numeric seismic design value at 0.2s SA
S_{D1}	0.1	Numeric seismic design value at 1.0s SA

▾Additional Information

Name	Value	Description
SDC	B	Seismic design category
F_a	1.6	Site amplification factor at 0.2s

F_V	2.4	Site amplification factor at 1.0s
CR_S	0.945	Coefficient of risk (0.2s)
CR_1	0.922	Coefficient of risk (1.0s)
PGA	0.12	MCE_G peak ground acceleration
F_{PGA}	1.56	Site amplification factor at PGA
PGA_M	0.187	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
SsRT	0.217	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.23	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.063	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.068	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	Factored deterministic acceleration value (PGA)

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

CONSTRUCTION TECHNOLOGY

INSPECTION & TESTING DIVISION, P.D.& T.S., INC.
4 William Street, Ballston Lake, New York 12019
Phone: (518) 399-1848 Email: constructiontech@live.com

CLIENT: **DANIEL LOUCKS, P.E.**
POST OFFICE BOX 163
BALLSTON SPA, NEW YORK 12020

REPORT DATE: 02/02/22
SAMPLE NUMBER: 21648
OUR FILE NO: 750.001

Robert Behan

ATTN: MR. DANIEL LOUCKS, P.E.
REVIEWED BY: ROBERT BEHAN, NICET

PROJECT: **MCIDA: AMSTERDAM, NEW YORK**

ASTM C136 / C117 / D422: SIZE DISTRIBUTION OF SOIL & AGGREGATES: SIEVE ANALYSIS

MATERIAL SOURCE: **CLIENT ID: SB-8, 2'-4'**
MATERIAL DESCRIPTION: SILT/CLAY; and fine Sand; trace fine Gravel
MATERIAL PROJECT USE: PER CLIENT:
EVALUATION SPECIFICATION: PER CLIENT:

COARSE SIEVE SERIES: US STANDARD			
SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFICATION ALLOWANCE
4"			
3"			
2 1/2"			
2"			
1 1/2"			
1"			
3/4"			
1/2"		100.0	
3/8"	2.3	97.7	

MEDIUM SIEVE SERIES: US STANDARD			
SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFICATION ALLOWANCE
1/4"	3.6	96.4	
#4	5.6	94.4	
1/8"			
#8	9.2	90.8	
#10			
#16	12.0	88.0	
#20			
#30	16.0	84.0	
#40	18.9	81.1	

FINE SIEVE SERIES: US STANDARD			
SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFICATION ALLOWANCE
#50	22.7	77.3	
#60			
#80			
#100	33.7	66.3	
#140			
#200	42.7	57.3	
SILT			
CLAY			
COLLOID			

CONSTRUCTION TECHNOLOGY

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CLIENT: **DANIEL LOUCKS, P.E.**
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BALLSTON SPA, NEW YORK 12020

REPORT DATE: 02/02/22
SAMPLE NUMBER: 21649
OUR FILE NO: 750.001

Robert Behan

ATT'N: MR. DANIEL LOUCKS, P.E.
REVIEWED BY: ROBERT BEHAN, NICET

PROJECT: **MCIDA: AMSTERDAM, NEW YORK**

ASTM C136 / C117 / D422: SIZE DISTRIBUTION OF SOIL & AGGREGATES: SIEVE ANALYSIS

MATERIAL SOURCE: **CLIENT ID: SB-9, 4'-6'**
MATERIAL DESCRIPTION: SILT/CLAY; and fine Sand; trace fine Gravel
MATERIAL PROJECT USE: PER CLIENT:
EVALUATION SPECIFICATION: PER CLIENT:

COARSE SIEVE SERIES: US STANDARD				MEDIUM SIEVE SERIES: US STANDARD				FINE SIEVE SERIES: US STANDARD			
SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFICATION ALLOWANCE	SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFICATION ALLOWANCE	SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFICATION ALLOWANCE
4"				1/4"	6.0	94.0		#50	28.2	71.8	
3"				#4	7.6	92.4		#60			
2 1/2"				1/8"				#80			
2"				#8	12.0	88.0		#100	38.7	61.3	
1 1/2"				#10				#140			
1"				#16	16.1	83.9		#200	46.8	53.2	
3/4"		100.0		#20				SILT			
1/2"	1.9	98.1		#30	21.0	79.0		CLAY			
3/8"	4.1	95.9		#40	24.1	75.9		COLLOID			

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REPORT DATE: 02/02/22
SAMPLE NUMBER: 21650
OUR FILE NO: 750.001

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ATT'N: MR. DANIEL LOUCKS, P.E.
REVIEWED BY: ROBERT BEHAN, NICET

PROJECT: **MCIDA: AMSTERDAM, NEW YORK**

ASTM C136 / C117 / D422: SIZE DISTRIBUTION OF SOIL & AGGREGATES: SIEVE ANALYSIS

MATERIAL SOURCE: **CLIENT ID: SB-10, 4'-6'**
MATERIAL DESCRIPTION: SILT/CLAY; and fine Sand; little fine Gravel
MATERIAL PROJECT USE: PER CLIENT:
EVALUATION SPECIFICATION: PER CLIENT:

COARSE SIEVE SERIES: US STANDARD			
SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFICATION ALLOWANCE
4"			
3"			
2 1/2"			
2"			
1 1/2"			
1"		100.0	
3/4"	9.5	90.5	
1/2"			
3/8"	10.5	89.5	

MEDIUM SIEVE SERIES: US STANDARD			
SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFICATION ALLOWANCE
1/4"	12.0	88.0	
#4	13.4	86.6	
1/8"			
#8	18.7	81.3	
#10			
#16	22.3	77.7	
#20			
#30	26.7	73.3	
#40	29.3	70.7	

FINE SIEVE SERIES: US STANDARD			
SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFICATION ALLOWANCE
#50	32.6	67.4	
#60			
#80			
#100	42.3	57.7	
#140			
#200	50.7	49.3	
SILT			
CLAY			
COLLOID			

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REPORT NUMBER: 1 : PAGE: 1
REPORT DATE: 02/02/22
OUR FILE NUMBER: 750.001
LAB CONTROL NUMBER: 21651

ATT'N: MR. DANIEL LOUCKS, P.E.

PROJECT: **MCIDA: AMSTERDAM, NEW YORK**

DETERMINATION OF PLASTICITY INDEX & WATER (MOISTURE) CONTENT IN SOILS

SAMPLE ID: **CLIENT ID: SB-5, 35'-37'**

ASTM D-4318 LIQUID LIMIT	ASTM D-4318 PLASTIC LIMIT	ASTM D-4318 PLASTICITY INDEX
23.1%	**14.3%**	**9**

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RESPECTFULLY SUBMITTED,
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Robert Behan
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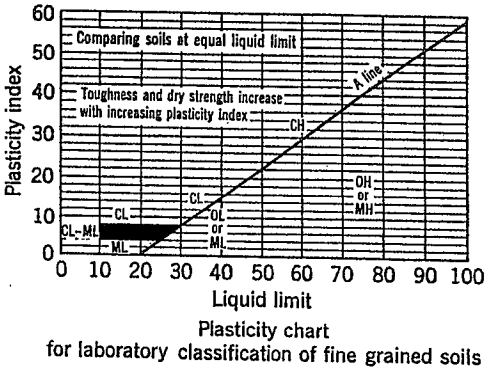
MANAGER TECHNICAL SERVICES

Table 3.5 Unified Soil Classification

Field Identification Procedures (Excluding particles larger than 3 in. and basing fractions on estimated weights)						Group Symbols [a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria
Coarse-grained soils More than half of material is *larger* than No. 200 sieve size[b] (The No. 200 sieve size is about the smallest particle visible to naked eye)	Gravels More than half of coarse fraction is larger than No. 4 sieve size	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes			*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles ½-in. maximum size; rounded and subangular sand grains coarse to fine, about 15% nonplastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	Use grain size curve in identifying the fractions as given under field identification Determine percentages of gravel and sand from grain size curve Depending on percentage of fines (fraction smaller than No. 200 sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP* More than 12% *GM, GC, SM, SC* 5% to 12% *Borderline* cases requiring use of dual symbols
			Predominantly one size or a range of sizes with some intermediate sizes missing			*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines		
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)			*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)			*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures		
	Sands More than half of coarse fraction is smaller than No. 4 sieve size (For visual classification, the ¼ in. size may be used as equivalent to the No. 4 sieve size)	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes			*SW*	Well graded sands, gravelly sands, little or no fines		$C_U = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *GW* Atterberg limits below "A" line, or *PI* less than 4 Atterberg limits above "A" line, with *PI* greater than 7 Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols
			Predominantly one size or a range of sizes with some intermediate sizes missing			*SP*	Poorly graded sands, gravelly sands, little or no fines		
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)			*SM*	Silty sands, poorly graded sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)			*SC*	Clayey sands, poorly graded sand-clay mixtures		$C_U = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *SW* Atterberg limits below "A" line or *PI* less than 5 Atterberg limits below "A" line with *PI* greater than 7 Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols
	Identification Procedures on Fraction Smaller than No. 40 Sieve Size		Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)				
Fine-grained soils More than half of material is *smaller* than No. 200 sieve size	Silts and clays liquid limit less than 50		None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions Example: *Clayey silt*, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)	
			Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
			Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity		
	Silts and clays liquid limit greater than 50		Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
			High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays		
			Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity		
Highly Organic Soils			Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils		



Plasticity chart
for laboratory classification of fine grained soils

From Wagner, 1957.

[a] *Boundary classifications*. Soils possessing characteristics of two groups are designated by combinations of group symbols. For example *GW–GC*, well graded gravel-sand mixture with clay binder.

[b] All sieve sizes on this chart are U.S. standard.

Field Identification Procedure for Fine Grained Soils or Fractions

These procedures are to be performed on the minus No. 40 sieve size particles, approximately ½₆₄ in. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

Dilatancy (Reaction to shaking):

After removing particles larger than No. 40 sieve size, prepare a pat of moist soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky.

Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens and finally it cracks or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil.

Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

Dry Strength (Crushing characteristics):

After removing particles larger than No. 40 sieve size, mould a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

Toughness (Consistency near plastic limit):

After removing particles larger than the No. 40 sieve size, a specimen of soil about one-half inch cube in size, is moulded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about one-eight inch in diameter. The thread is then folded and re-rolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.

After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line.

Highly organic clays have a very weak and spongy feel at the plastic limit.

Soil Characteristics Pertinent to Roads and Airfields

Major Divisions		Letter (1)	Name	Value as Subgrade When Not Subject to Frost Action	Value as Subbase When Not Subject to Frost Action	Value as Base When Not Subject to Frost Action	Potential Frost Action	Compressibility and Expansion	Drainage Characteristics	Compaction Equipment	Unit Dry Weight lb. per cu. ft.	Typical Design Values	
												CBR (2)	Subgrade Modulus k lb. per cu. in.
Coarse-Grained Soils	Gravel and Gravelly soils	GW	Well-graded gravels or gravel-sand mixtures, little or no fines	Excellent	Excellent	Good	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller, steel-wheeled roller	125-140	40-80	300-500
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines	Good to excellent	Good	Fair to good	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller, steel-wheeled roller	110-140	30-60	300-500
		GM d	Silty gravels, gravel-sand-silt mixtures	Good to excellent	Good	Fair to good	Slight to medium	Very slight	Fair to poor	Rubber-tired roller, sheepsfoot roller; close control of moisture	125-145	40-60	300-500
		GM u		Good	Fair	Poor to not suitable	Slight to medium	Slight	Poor to practically impervious	Rubber-tired roller, sheepsfoot roller	115-135	20-30	200-500
		OC	Clayey gravels, gravel-sand-clay mixtures	Good	Fair	Poor to not suitable	Slight to medium	Slight	Poor to practically impervious	Rubber-tired roller, sheepsfoot roller	130-145	20-40	200-500
	Sand and Sandy soils	SW	Well-graded sands or gravelly sands, little or no fines	Good	Fair to good	Poor	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller	110-130	20-40	200-400
		SP	Poorly graded sands or gravelly sands, little or no fines	Fair to good	Fair	Poor to not suitable	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller	105-135	10-40	150-400
		SM d	Silty sands, sand-silt mixtures	Fair to good	Fair to good	Poor	Slight to high	Very slight	Fair to poor	Rubber-tired roller, sheepsfoot roller; close control of moisture	120-135	15-40	150-400
		SM u		Fair	Poor to fair	Not suitable	Slight to high	Slight to medium	Poor to practically impervious	Rubber-tired roller, sheepsfoot roller	100-130	10-20	100-300
		SC	Clayey sands, sand-clay mixtures	Poor to fair	Poor	Not suitable	Slight to high	Slight to medium	Poor to practically impervious	Rubber-tired roller, sheepsfoot roller	100-135	5-20	100-300
Fine-Grained Soils	Silts and Clays LL is less than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Poor to fair	Not suitable	Not suitable	Medium to very high	Slight to medium	Fair to poor	Rubber-tired roller, sheepsfoot roller; close control of moisture	90-130	15 or less	100-200
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Poor to fair	Not suitable	Not suitable	Medium to high	Medium	Practically impervious	Rubber-tired roller, sheepsfoot roller	90-130	15 or less	50-150
		OL	Organic silts and organic silt-clays of low plasticity	Poor	Not suitable	Not suitable	Medium to high	Medium to high	Poor	Rubber-tired roller, sheepsfoot roller	90-105	5 or less	50-100
	Silts and Clays LL is Greater than 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Poor	Not suitable	Not suitable	Medium to very high	High	Fair to poor	Sheepsfoot roller, rubber-tired roller	80-105	10 or less	50-100
		CH	Inorganic clays of medium to high plasticity, organic silts	Poor to fair	Not suitable	Not suitable	Medium	High	Practically impervious	Sheepsfoot roller, rubber-tired roller	90-115	15 or less	50-150
		OH	Organic clays of high plasticity, fat clays	Poor to very poor	Not suitable	Not suitable	Medium	High	Practically impervious	Sheepsfoot roller, rubber-tired roller	80-110	5 or less	25-100
Highly Organic Soils		Pt	Peat and other highly organic soils	Not suitable	Not suitable	Not suitable	Slight	Very high	Fair to poor	Compaction not practical	—	—	—

Note:

(1) Unit Dry Weights are for compacted soil at optimum moisture content for modified AASHO compaction effort. Division of GM and SM groups into subdivision of d and u are for roads and airfields only. Subdivision is basis of Atterberg limits; suffix d (e.g., GMd) will be used when the liquid limit (LL) is 25 or less and the plasticity index is 6 or less; the suffix u will be used otherwise.

(2) The maximum value that can be used in design of airfields is, in some cases, limited by gradation and plasticity requirements.

GENERAL QUALIFICATIONS

This report has been prepared in order to aid in the evaluation of this property and to assist the architect and/or engineer in the design of this project. The scope of the project and location described herein, and my description of the project represents my understanding of the significant aspects relevant to soil and foundation characteristics. In the event that any changes in the design or location of the proposed facilities, as outlined in this report, are planned, I should be informed so the changes can be reviewed and the conclusions of this report modified or approved in writing by myself.

It is recommended that all construction operations dealing with earthwork and foundations be inspected by an experienced soil engineer to assure that the design requirements are fulfilled in the actual construction. If you wish, I would welcome the opportunity to review the plans and specifications when they have been prepared so that I may have the opportunity of commenting on the effect of soil conditions on the design and specifications.

The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings and/or test pits performed at the locations indicated on the location diagram and from any other information discussed in the report. This report does not reflect any variations which may occur between these boring and/or test pits. In the performance of subsurface investigations, specific information is obtained at specific locations at specific times. However, it is a well-known fact that variations in soil and rock conditions exist on most sites between boring locations and also such situations as groundwater conditions vary from time to time. The nature and extent of variations may may not become evident until the course of construction. If variations then appear evident, it will be necessary for a reevaluation of the recommendations of this report after performing on-site observations during the construction period and noting the characteristics of any variations.