DRAINAGE ANALYSIS

180 WELLS AVENUE
NEWTON, MASSACHUSETTS

October 10, 2019

Prepared for

INTRUM REAL ESTATE MANAGEMENT & DEVELOPMENT

Prepared by:

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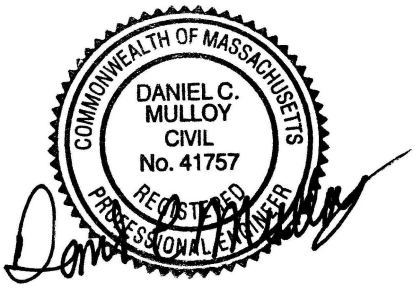
JOB NUMBER 14225



INTRODUCTION

This drainage report is prepared for a proposed building expansion located at 180 Wells Avenue in the City of Newton, Massachusetts. The drainage design was previously reviewed and approved in 2015 however the project site design has changed necessitating in a new stormwater management system design. The new design removes grass swales and open detention basins and replaces them with a typical curb and gutter drainage collection system followed by an underground treatment and detention system. The overall project stormwater design conditions/requirements remain the same as those previous approved including storm event and discharge location criteria.

The project site is approximately 5.05± acres, 3.5 of which is currently developed. The site is surrounded by developed properties and roadways, Wells Ave, on all sides. Wells Ave abuts the site to the east and west and commercially developed properties abut the site to the north and south. The site contains an existing 18,600± sf building, 2± acres of paved parking, and 1± acre of landscape area. The remainder of the site is wooded. The site does not contain any significant existing drainage facilities.

The proposed project includes construction of a 19,000± square foot building addition footprint, new parking areas and a parking garage, and stormwater management facilities. Stormwater runoff will be treated through the use of stormwater management Best Management Practices (BMP's). The BMP's used within the proposed drainage system include deep sump hooded catch basins, oil/water separator, undertreatment system and an underground storage chamber system. The proposed stormwater facilities will provide water quality treatment and reduce the rate of discharge to the existing drainage system in Wells Ave. The proposed drainage system will also remove two existing headwalls adjacent to Wells Ave and construct a new culvert system.

METHODOLOGY

The drainage system was designed according to the recommendations of the Department of Environmental Protection Stormwater Management Policy. The drainage system for this project was designed using the following methods: the HydroCad® Stormwater Modeling System and the Manning's Equation.

The HydroCad® Stormwater Modeling System was used to quantify stormwater runoff conditions. The HydroCad® program utilizes Natural Resource Conservation Service (NRCS) techniques (TR-20) to predict stormwater runoff for given design storms. The calculations performed by HydroCad® are based on the NRCS model return frequency Type III distribution and 2, 10 and 100-year design storms. The analysis is performed by modeling the drainage areas as subcatchments. A subcatchment is an area that produces runoff that drains into a pond. A pond can be a natural depression, wetland, or manmade structure that detains or retains stormwater runoff.

SUMMARY

This drainage analysis was performed to determine and analyze the stormwater runoff characteristics resulting from the proposed project. The project will provide a drainage system and stormwater treatment where none currently exists. The proposed system will improve, treat and mitigate stormwater runoff to the municipal drainage system by providing treatment, recharge, and reduction of stormwater flow rates.

DRAINAGE SYSTEM DESIGN

Stormwater Storage System

HydroCad® was utilized to analyze the stormwater storage system. The system is designed to reduce the discharge rate and recharge a portion of the stormwater volume occurring from 2, 10, and 100-year 24-hour storm events. HydroCad® pond models simulate the system's function during a storm and provide data to accurately evaluate the design. The system model consists of the following information: the volume available for storage and a stage discharge curve. The stone void ratio is accounted to be 40 percent. A stage discharge curve is created for the system based on the infiltration rate taken from local soil information and percolation rates. Based on a long term projection of the system's function, a conservative *Rawls* infiltration rate of 0.17 in/hour (0.34 ft/day) class "C" sandy clay loam soil is assumed. After entering the required data, the model is complete, and the program is executed to determine if the size of the system to attenuate the storm runoff is adequate. The HydroCad® pond models provide the maximum water elevation, volume stored, and recharge rate attained.

The proposed system is constructed with heavy duty H20 parabolic plastic chambers model SC-740 as manufactured by Stormtech®. The chambers are surrounded by stone. The system will reduce the site stormwater runoff rate to the existing municipal drainage system. The system will also address the required recharged volume as stipulated by the stormwater management policy.

Drainage Network

The HydroCad® model consists of subcatchments and ponds. The subcatchments are the drainage area to each respective structure; the structures are modeled as ponds. Generally surface runoff flows uniformly from east to west towards the rear of the site at Wells Avenue. Presently the site is roughly split into three major subcatchment areas, northerly which is existing subcatchment eS3, intermediate which is existing subcatchment eS1, and southerly which is existing subcatchment eS2. These three subcatchments flow toward an existing depression or correlating HydroCad® pond models, which are pond eP3, pond eW1, and pond eP1 respectively.

Eventually when these existing ponds are overtopped the excess runoff discharges toward a naturally occurring vegetated depression, which is the lowest point on site just adjacent to Wells Avenue, with an existing municipal 30-inch RCP drainage culvert outlet. This discharge point is designated in the drainage analysis as pre-development HydroCad® analysis point pond model eA1.

The northwesterly abutting property appears to also contribute stormwater runoff at this point. The abutting drainage area is designated in HydroCad® as subcatchment eS4. Existing runoff in general collects and traverses through naturally occurring vegetated channels along the property boundaries along the wooded perimeter and eventually amassing at the existing depressions.

In the post-development the existing municipal 30-inch RCP drainage culvert outlet adjacent to Wells Avenue is also the ultimate discharge point for the site's contributing runoff. This discharge point is designated in the drainage analysis as post-development HydroCad® analysis point pond model A1. HydroCad® analysis point pond model A1 is comparable to pre-development HydroCad® analysis point pond model eA1.

In the post-development, drainage areas of proposed catch basin structures and proposed building roof covers are modeled in HydroCad® as subcatchments. Building roof drain networks are proposed, and just like the catch basins, roof drains are routed to proposed drain manholes. Proposed structures such as catch basins, drain manholes, and storage ponds are modeled in HydroCad® as ponds. Proposed catch basin structures (CBs) and drain manhole structures (DMHs) are modeled in HydroCad® as ponds with culvert

outlet. Culvert (pipe) sizes, invert elevations and the structure rim elevations are assigned; utilizing HydroCad® stormwater modeling system and the Manning's Equation for the analysis.

Post-development stormwater surface runoff flows uniformly from east to west, across the proposed expanded parking lot, and towards the rear of the site at Wells Avenue. The post-development site is split into multiple subcatchment areas to correspond with inlet locations or buildings. The majority of these subcatchments are all directed into the stormwater conveyance system. There are several small subcatchments around the perimeter of the site which encompass areas flowing off of the property. The correlating proposed ponds are modeled in HydroCad® as post-development pond models.

The main stormwater component is the underground treatment and detention system. This system consists of two flow splitting/diversion manholes to direct low flows to treatment systems while larger flows are directed to the detention system. The treatment system consists of deep sump hooded catch basins, oil/water separators, a Stormtech underground isolator row and an underground detention system. Flows from the underground detention system are then routed through a flow control structure before entering the existing piping system within Wells Ave

Roof runoff from the proposed building and parking garage is routed into the same collection and treatment system as the parking lot. The existing building roof drain network will also be connected to the new system at its current discharge location along the southerly property line.

Discharge from the underground storage chamber system is routed to the existing municipal 30-inch RCP drain line. A new manhole will be constructed over the existing line to accommodate this new pipe connection. As previously highlighted flow rate values at any given rainstorm of post-development pond model A1 do not exceed that of pre-development pond model eA1.

Stormwater Treatment

Stormwater runoff will be treated through the use of a series of stormwater management Best Management Practices (BMP's). Runoff enters and is treated by the BMP's generally in the following sequence: deep sump hooded catch basins, oil/water separator, Stormtech underground isolator row and finally the underground chamber detention system.

The first three treatment systems will remove the majority of oils and sediments while also providing required water quality treatment. The underground system provides additional settlement of fine particles as well as groundwater recharge. All of the system components function together to provide stormwater quality treatment in excess of the 80% TSS removal requirement.

SUMMARY OF RESULTS

Post-development HydroCad® pond model A1 is the analytical comparison to pre-development HydroCad® pond model eA1. The peak flow rate values of Post-development pond model A1 do not exceed the peak flow rate values of Pre-Development pond model eA1 for the prescribed design storm events. Refer to the HydroCad® drainage analysis report for additional information.

FLOW RATES & VOLUME SUMMARY				
	Pre-Development *Analysis Pt.* ***eA1***		**Post-Development** Analysis Pt. **A1**	
Storm Event	*Flow Rate (cfs)*		Flow Rate (cfs)	
2 - Year	*8.08*		6.43	
10 - Year	*15.34*		11.47	
100 - Year	*22.76*		21.21	

STORMWATER

INSPECTION
&
MANAGEMENT PLAN

Stormwater Best Management Practices
Inspection and Maintenance Plan

I. Stormwater Management System Owner

The stormwater system will be owned and managed by the facility owner. The system will be located on private property and serviced by the facility owner.

II. Compliance with Stormwater Best Management Practice Maintenance Requirements

The system owner is responsible for ensuring that stormwater best management practices (BMPs) for facilities installed on their property are properly maintained and that they function as designed.

III. Inspection & Maintenance – Reporting

Requirements for the inspection and maintenance of stormwater facilities, as well as reporting requirements are included in this Stormwater Best Management Practices Operation and Maintenance Plan. The owner shall maintain a log file of all maintenance activities performed on the stormwater systems including date and services performed.

IV. Preventative Measures to Reduce Maintenance Costs

The most effective way to maintain your water quality facility is to prevent the pollutants from entering the facility. Common pollutants include sediment, trash & debris, chemicals, pet wastes, runoff from stored materials, illicit discharges into the storm drainage system and many others. A thoughtful maintenance program will include measures to address these potential contaminants. Key points to consider in your maintenance program include:

- Educate employees to be aware of how their actions affect water quality and how they can help reduce maintenance costs.
- Keep streets, gutters and parking lots free of trash, debris, and lawn clippings.
- Ensure the proper use, storage, and disposal of hazardous wastes and chemicals. Promptly clean up and spilled materials and dispose of properly.
- Plan lawn care to minimize and properly use chemicals and pesticides.
- Be aware of automobiles leaking fluids. Use absorbents such as cat litter to soak up drippings – dispose of properly.
- Encourage pet owners to clean up pet wastes.
- Re-vegetate disturbed and bare areas to maintain vegetative stabilization.
- Clean any private storm drainage system components, including inlets, storm sewers, and outfalls.
- Do not store materials outdoors (including landscaping materials) unless properly protected from runoff.

V. Safety

Keep safety considerations at the forefront of inspection procedures at all times. Likely hazards should be anticipated and avoided. Never enter a confined space (outlet structure, manhole, etc) without proper training, number of personal, and equipment.

VI. Field Inspection Equipment

It is imperative that the appropriate equipment is taken to the field with the inspector(s). This is to ensure the safety of the inspector and allow the inspections to be performed as efficiently as possible. Below is a list of the equipment that may be necessary to perform the inspections of all Stormwater BMPs:

- Protective clothing and boots.
- Safety equipment (vest, hard hat, confined space entry equipment [if certified to perform confined space entry]).
- Communication equipment.
- Clipboard.
- Stormwater BMP Inspection Forms.
- Manhole Lid Remover
- Shovel.

Some of the items identified above need not be carried by the inspector (manhole lid remover, shovel, and confined space entry equipment), but should be available in the vehicle driven to the site. Specialized equipment may require specific training related to that equipment and should only be used by trained individuals.

VII. Inspecting Stormwater BMPs

The quality of stormwater entering the waters of the state relies heavily on the proper operation and maintenance of permanent BMPs. Stormwater BMPs must be periodically inspected to ensure that they function as designed. The inspection will determine the appropriate maintenance that is required for the facility.

A. Inspection Procedures

Inspections should follow the inspection guidance for the specific type of facility.

B. Inspection Report

The person(s) conducting the inspection activities shall complete the appropriate inspection report for the specific facility.

VIII. Maintaining Stormwater BMPs

Stormwater BMPs must be properly maintained to ensure that they operate correctly and provide the water quality treatment for which they were designed.

A. Maintenance Categories

Stormwater BMP maintenance programs are separated into three broad categories of work. The categories are separated based upon the magnitude and type of the maintenance activities performed. A description of each category follows:

Routine Work

The majority of this work consists of scheduled mowings and trash and debris pickups for stormwater management facilities during the growing season. This includes items such as the removal of debris/material that may be clogging the outlet structure well screens and trash racks. It also includes activities such as weed control, mosquito treatment, and algae treatment. These activities normally will be performed numerous times during the year. Inspection and maintenance logs shall be completed for all maintenance.

Restoration Work

This work consists of a variety of isolated or small-scale maintenance and work needed to address operational problems. Most of this work can be completed by a small crew, with minor tools, and small equipment. Inspection and maintenance logs shall be completed for all work.

Rehabilitation Work

This work consists of large-scale maintenance and major improvements needed to address failures within the stormwater BMP. This work requires consultation with Town and may require an engineering design with construction plans to be prepared for review and approval. This work may also require more specialized maintenance equipment, surveying, construction permits or assistance through private contractors and consultants. Inspection and maintenance logs shall be completed for all work.

B. Maintenance Personnel

Maintenance personnel should be qualified to properly maintain stormwater BMPs, especially for restoration or rehabilitation work.

STORMWATER MANAGEMENT SYSTEM
BEST MANAGEMENT PRACTICES (BMP) RECOMMENDED MAINTENANCE

180 WELLS REALTY, LLC
180 WELLS AVENUE
NEWTON, MA

DEEP SUMP & HOODED CATCH BASINS

Maintenance:

- Inspections shall be performed a minimum of 2 times per year (spring/fall). Units shall be cleaned whenever the depth of sediment is greater than or equal to half the sump depth.
- The inlet grate shall not be welded closed so the sump can be inspected and maintained.
- Maintenance of structure shall be performed by qualified personnel and in accordance with OSHA regulations.
- All sediment, debris, floatables, contaminants shall be disposed of to a landfill or other permitted facility.

OIL & WATER SEPARATORS

Maintenance:

- Inspections shall be performed a minimum of 2 times per year (spring/fall). Units shall be cleaned whenever the depth of sediment is greater than 1 foot.
- The inlet grate shall not be welded closed so the sump can be inspected and maintained.
- Maintenance of structure shall be performed by qualified personnel and in accordance with OSHA regulations.
- All sediment, debris, floatables, contaminants shall be disposed of to a landfill or other permitted facility.

SUBSURFACE STORAGE CHAMBERS

General Chamber Maintenance:

- The system shall be inspected 24 hours after major rainfall events (greater than 3 inches) for retention of liquid following the first 6 months of full operation. The inspection shall be by means of the inspection manhole and/or inspection ports. If liquid is found, the depth shall be recorded and a follow up inspection within twenty-four (24) hours shall be conducted and the depth of liquid shall be re-measured. If liquid is found during the second inspection, then notify the design engineer. Inspections shall extend to once annually following initial 6-months of inspections with no reporting issues.

Isolator Row Chamber Maintenance:

- The isolator row shall be inspected and reported on the same schedule as the overall underground chamber system. Maintenance cleaning of the system shall be completed annually by use of a JetVac cleaning process.

STORMWATER CALCULATIONS

ANALYSIS DATA

The following information was used in performing the calculations for the drainage system.

NRCS Soils Information

The NRCS Soil Survey for Middlesex County lists the site as Udorthents-Urban (656). On site soil evaluations indicate that the prevalent material has the characteristics of a NRCS drainage class type C. Copies of the NRCS soil survey map and soil evaluations are attached.

1. Existing & Proposed Ground Cover:

   The existing ground cover of the site is predominantly developed, consisting of landscaping and buildings. The Curve Numbers listed below, hydrologic soil type C, were used in all the calculations performed with HydroCad®.

RUNOFF CURVE NUMBERS		
Cover Description		
Cover Type	Hydrologic condition	Curve Number
Dense Grass, Woods	Poor	82
Landscaping, Lawns	Poor	86
Rooftops, Pavements	-	98
Walkways, Sidewalks	-	98

2. Rainfall Data (24 Hour Storm Duration*)

Storm Event	Rainfall
2 - Year	3.5 inches
10 - Year	4.8 inches
100 - Year	6.5 inches

* From U.S. Department of Commerce Weather Bureau T.P. 40, May 1961, see attached.

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STORMWATER MANAGEMENT

STORMWATER RUNOFF FLOW RATES SUMMARY

SDE Job No.: 14225 Date: 6/01/2015 , *Revised: [2] 10/10/2019*

Prepared by: RPBT Checked by: DCM

PRE-DEVELOPMENT

Analysis Points	Storm Event									
			2-yr		10-yr		100-yr			
(Subcatchment/Pond)			Q (cfs)		Q (cfs)		Q (cfs)			
eA1			**8.08**		**15.34**		**22.76**			
Totals			**8.08**		**15.34**		**22.76**			

POST-DEVELOPMENT

Analysis Points	Storm Event									
			2-yr		10-yr		100-yr			
(Subcatchment/Pond)			Q (cfs)		Q (cfs)		Q (cfs)			
A1			**6.43**		**11.47**		**21.21**			
Totals			**6.43**		**11.47**		**21.21**			

Totals *are the summations of the Analysis points values (Combine values leaving the site and contributing to the existing drainage network)*
Analysis points ***eA1*** *&* ***A1*** *are pre-development and post-development comparisons. (Site's runoff overflow to Wells Ave existing drainage network)*

Refer to Hydrocad® calculations for additional information.

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STORMWATER MANAGEMENT

WATER QUALITY TREATMENT VOLUME CALCULATION WORKSHEET

SDE Job No.: 14225 Date: 6/01/2015 , *Revised: [2] 10/10/2019*

Prepared by: RPBT Checked by: DCM

Impervious Area	**Area sf**	**X in. of runoff 0.5 cf**		
Total Impervious Area Excluding Roof	113,158	4,715		
Total Roof Area to be Treated	42,085	1,754		
	0	0		
Total Volume =		6,468		

Drainage Storage Structure		Treatment Storage Capacity **(cf)**		
		Primary	Secondary	**Subtotal**
Depressed Landscaping (near Lot M)		2,861		**2,861**
Depressed Landscaping (near Lot P)		956		**956**
Two(2) 2,000 Gal. O/W & Sediment Separator		534		**534**
Underground Storage - Isolator Row		655		**655**
Underground Storage - Extended			7,208	**7,208**
Total WQv Provided , (cf) =		**5,006**		**12,214**

Note:

1. Depressed landscaping storage volume is the volume below overflow flow outlet elevation.
2. Underground storage chambers system storage volume is the volume below low flow outlet invert.

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STORMWATER MANAGEMENT

STORMWATER RECHARGE CALCULATION WORKSHEET

SDE Job No.: 14225 Date: 6/01/2015 , *Revised: [2] 10/10/2019*

Prepared by: RPBT Checked by: DCM

Hydrologic Group	A	B	C	D	Total ReV
Target Runoff Depth Factor (Inches of Runoff)	0.60	0.35	0.25	0.10	
Total Impervious Area, (sf)	0	0	155,243	0	
X inches of runoff, (cf)	0	0	3,234	0	3,234
Total Recharge Volume Required, (cf) = 3,234					

Soil Texture Class			Sandy Clay Loam		
Infiltration Rate (inches / hour)				0.17	
					Structure Available
Structure Recharged Volume, (cf)					Storage, (cf)
Depressed Landscaping (near Lot M)				2,359	2,861
Depressed Landscaping (near Lot P)				1,223	956
Underground Storage Chambers System				4,529	7,863
Total Recharge Volume Provided, (cf) = 11,680					

Note:

1. Infiltration rates are derived from the 1982 Rawls rates based on soil texture.
2. Recharged volume are calculated utilizing Simple Dynamic Method : Automated
3. Calculations are based on 2-Yr , 24-Hr storm event.
4. Depressed landscaping storage volume is the volume below overflow flow outlet elevation.
5. Underground storage chambers system storage volume is the volume below low flow outlet invert.

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STORMWATER MANAGEMENT

TSS REMOVAL CALCULATION WORKSHEET

SDE Job No.: 14225 Date: 6/01/2015 , *Revised: [2] 10/10/2019*

Prepared by: RPBT Checked by: DCM

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	25.0%	1.000	0.250	0.750
O/W Sediment Separator	10.0%	0.750	0.075	0.675
Underground Storage - Isolator Row	25.0%	0.675	0.169	0.506
Underground Storage - Extended	80.0%	0.506	0.405	0.101
		Total TSS Removal =	**89.9%**	

* Equals remaining load from previous BMP (E) which enters the BMP

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STORMWATER MANAGEMENT

REQUIRED RECHARGE VOLUME DRAWDOWN TIME CALCULATION WORKSHEET

SDE Job No.: 14225 Date: 6/01/2015 , *Revised: [2] 10/10/2019*
Prepared by: RPBT Checked by: DCM

Underground Storage Chambers System

Parameters			
Required Recharge Volume , ***ReV (cf)***		7,863	*Vol. below 16" orifice outlet*
Infiltration BMP Bottom Area , ***BA (sf)***		12,638	
Sat. Hydraulic Conductivity , ***K (in./hr)***		0.17	
6"dia. Pipes @ s=0.01% min., ***Q (cfs)***		0.06	*Underdrain low flow outlet*
Drawdown Time , *T (hrs.)* =		19.90	< 72 hours

T = ***ReV / [(K*** x ***BA)+Q]***

Note:

1. Infiltration rates are derived from the 1982 Rawls rates based on soil texture.
2. Recharged volume are calculated utilizing Simple Dynamic Method : Automated
3. Calculations are based on 2-Yr , 24-Hr storm event.
4. Underground storage chambers system required recharge or drawdown volume is the volume below primary outlet.
5. Surface storage required recharge or drawdown volume is the volume difference between low flow and high flow outle

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STORMWATER MANAGEMENT

REQUIRED RECHARGE VOLUME DRAWDOWN TIME CALCULATION WORKSHEET

SDE Job No.: 14225 Date: 6/01/2015 , *Revised:*
Prepared by: RPBT Checked by: DCM

Depressed Landscaping (near Lot M)

Parameters			
Required Recharge Volume , ***ReV (cf)***		2,861	
Infiltration BMP Bottom Area , ***BA (sf)***		3,709	*weighted surface area at peak el.*
Sat. Hydraulic Conductivity , ***K (in./hr)***		0.17	
Drawdown Time , *T (hrs.)* =		54.45	< 72 hours

Depressed Landscaping (near Lot P)

Parameters			
Required Recharge Volume , ***ReV (cf)***		921	
Infiltration BMP Bottom Area , ***BA (sf)***		1,788	*weighted surface area at peak el.*
Sat. Hydraulic Conductivity , ***K (in./hr)***		0.17	
Drawdown Time , *T (hrs.)* =		36.36	< 72 hours

$T = ReV / [(K \times BA)+Q]$

Note:

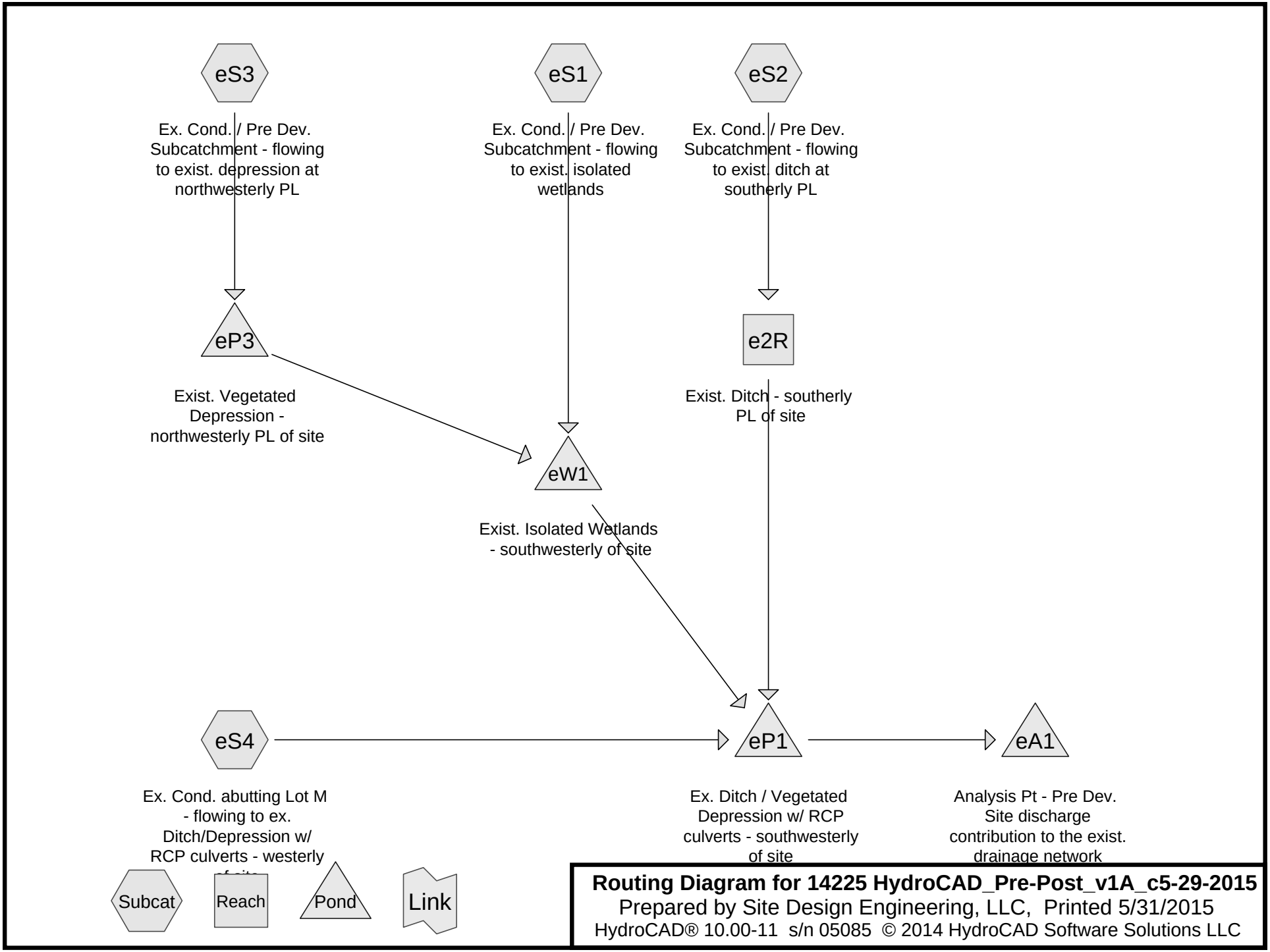
1. Infiltration rates are derived from the 1982 Rawls rates based on soil texture.
2. Recharged volume are calculated utilizing Simple Dynamic Method : Automated
3. Calculations are based on 2-Yr , 24-Hr storm event.

PRE-DEVELOPMENT

STORMWATER

CALCULATIONS

2, 10, 100 YEAR EVENTS



Routing Diagram for 14225 HydroCAD_Pre-Post_v1A_c5-29-2015

Prepared by Site Design Engineering, LLC, Printed 5/31/2015

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
76,380	86	<50% Grass cover, Poor, HSG C (eS1, eS2, eS3, eS4)
18,600	98	Buildings - existing (eS1, eS2)
114,930	98	Driveways, parkings, walkways - existing (eS1, eS3, eS4)
95,035	82	Woods/grass comb., Poor, HSG C (eS1, eS2, eS3)
304,945	**90**	**TOTAL AREA**

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	eP1	99.90	99.30	60.0	0.0100	0.013	30.0	0.0	0.0

Summary for Subcatchment eS1: Ex. Cond. / Pre Dev. Subcatchment - flowing to exist. isolated wetlands

Runoff = 4.07 cfs @ 12.35 hrs, Volume= 22,220 cf, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	9,300	98	Buildings - existing
*	37,735	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	19,460	86	<50% Grass cover, Poor, HSG C
	40,600	82	Woods/grass comb., Poor, HSG C
	107,095	90	Weighted Average
	60,060	83	56.08% Pervious Area
	47,035	98	43.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0100	0.05		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
10.5	325	0.0107	0.52		**Shallow Concentrated Flow, SEGMENT BC** Woodland Kv= 5.0 fps
26.0	375	Total			

Summary for Subcatchment eS2: Ex. Cond. / Pre Dev. Subcatchment - flowing to exist. ditch at southerly PL

Runoff = 2.75 cfs @ 12.17 hrs, Volume= 10,668 cf, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	9,300	98	Buildings - existing
*	0	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	16,200	86	<50% Grass cover, Poor, HSG C
	35,800	82	Woods/grass comb., Poor, HSG C
	61,300	85	Weighted Average
	52,000	83	84.83% Pervious Area
	9,300	98	15.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	50	0.0300	0.08		**Sheet Flow, SEGMENT AB**
					Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	75	0.0200	0.99		**Shallow Concentrated Flow, SEGMENT BC**
					Short Grass Pasture Kv= 7.0 fps
0.7	65	0.0450	1.48		**Shallow Concentrated Flow, SEGMENT CD**
					Short Grass Pasture Kv= 7.0 fps
12.0	190	Total			

Summary for Subcatchment eS3: Ex. Cond. / Pre Dev. Subcatchment - flowing to exist. depression at northwesterly PL

Runoff = 4.07 cfs @ 12.18 hrs, Volume= 17,383 cf, Depth= 2.70"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	0	98	Buildings - existing
*	44,935	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	13,690	86	<50% Grass cover, Poor, HSG C
	18,635	82	Woods/grass comb., Poor, HSG C
	77,260	92	Weighted Average
	32,325	84	41.84% Pervious Area
	44,935	98	58.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0250	0.08		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
2.7	135	0.0280	0.84		**Shallow Concentrated Flow, SEGMENT BC** Woodland Kv= 5.0 fps
13.5	185	Total			

Summary for Subcatchment eS4: Ex. Cond. abutting Lot M - flowing to ex. Ditch/Depression w/ RCP culverts - westerly of site

Runoff = 3.72 cfs @ 12.11 hrs, Volume= 13,508 cf, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	0	98	Buildings - existing
*	32,260	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	27,030	86	<50% Grass cover, Poor, HSG C
	59,290	93	Weighted Average
	27,030	86	45.59% Pervious Area
	32,260	98	54.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0200	0.11		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 3.50"
0.3	60	0.0200	2.87		**Shallow Concentrated Flow, SEGMENT BC** Paved Kv= 20.3 fps
8.2	110	Total			

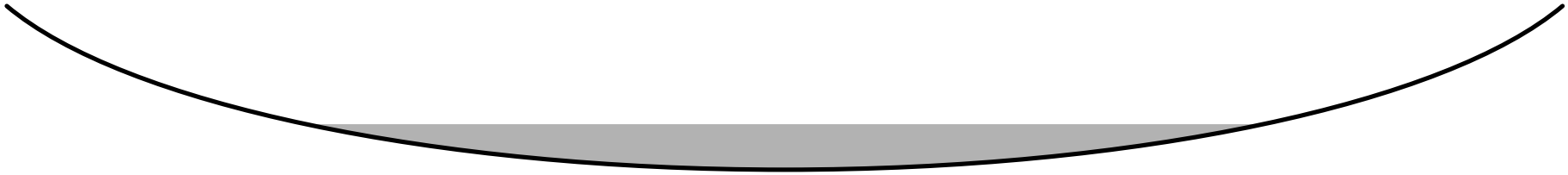
Summary for Reach e2R: Exist. Ditch - southerly PL of site

Inflow Area = 61,300 sf, 15.17% Impervious, Inflow Depth = 2.09" for 2-year event
Inflow = 2.75 cfs @ 12.17 hrs, Volume= 10,668 cf
Outflow = 2.62 cfs @ 12.21 hrs, Volume= 10,668 cf, Atten= 5%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Max. Velocity= 1.69 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.49 fps, Avg. Travel Time= 11.4 min

Peak Storage= 520 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 10.7 sf, Capacity= 42.19 cfs

16.00' x 1.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 335.0' Slope= 0.0060 '/'
Inlet Invert= 107.00', Outlet Invert= 105.00'



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Summary for Pond eA1: Analysis Pt - Pre Dev. Site discharge contribution to the exist. drainage network

Inflow Area = 304,945 sf, 43.79% Impervious, Inflow Depth = 1.87" for 2-year event
Inflow = 8.08 cfs @ 12.46 hrs, Volume= 47,476 cf
Primary = 8.08 cfs @ 12.46 hrs, Volume= 47,476 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Summary for Pond eP1: Ex. Ditch / Vegetated Depression w/ RCP culverts - southwesterly of site

Inflow Area = 304,945 sf, 43.79% Impervious, Inflow Depth = 1.87" for 2-year event
Inflow = 8.08 cfs @ 12.46 hrs, Volume= 47,477 cf
Outflow = 8.08 cfs @ 12.46 hrs, Volume= 47,477 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.46 hrs, Volume= 0 cf
Primary = 8.08 cfs @ 12.46 hrs, Volume= 47,476 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 102.00' @ 12.46 hrs Surf.Area= 20 sf Storage= 0 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	102.00'	5,257 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.00	20	0	0
103.00	200	110	110
104.00	630	415	525
105.00	2,330	1,480	2,005
105.80	5,800	3,252	5,257

Device	Routing	Invert	Outlet Devices
#1	Primary	99.90'	**30.0" Round Culvert - exist. 30" RCP** L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 99.90' / 99.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Discarded	102.00'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 12.46 hrs HW=102.00' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=19.77 cfs @ 12.46 hrs HW=102.00' TW=0.00' (Dynamic Tailwater)
1=Culvert - exist. 30" RCP (Barrel Controls 19.77 cfs @ 6.07 fps)

Summary for Pond eP3: Exist. Vegetated Depression - northwesterly PL of site

Inflow Area = 77,260 sf, 58.16% Impervious, Inflow Depth = 2.70" for 2-year event
Inflow = 4.07 cfs @ 12.18 hrs, Volume= 17,383 cf
Outflow = 3.63 cfs @ 12.25 hrs, Volume= 15,371 cf, Atten= 11%, Lag= 4.4 min
Discarded = 0.02 cfs @ 12.25 hrs, Volume= 1,949 cf
Primary = 3.61 cfs @ 12.25 hrs, Volume= 13,422 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.28' @ 12.25 hrs Surf.Area= 5,794 sf Storage= 4,374 cf

Plug-Flow detention time= 201.5 min calculated for 15,359 cf (88% of inflow)
Center-of-Mass det. time= 147.7 min (930.5 - 782.8)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	28,830 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
106.00	100	0	0
107.00	1,230	665	665
108.00	3,550	2,390	3,055
109.00	11,500	7,525	10,580
110.00	25,000	18,250	28,830

Device	Routing	Invert	Outlet Devices
#1	Primary	108.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	106.00'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 12.25 hrs HW=108.28' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=3.58 cfs @ 12.25 hrs HW=108.28' TW=106.29' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 3.58 cfs @ 1.27 fps)

Summary for Pond eW1: Exist. Isolated Wetlands - southwesterly of site

Inflow Area = 184,355 sf, 49.89% Impervious, Inflow Depth = 2.32" for 2-year event
Inflow = 7.46 cfs @ 12.30 hrs, Volume= 35,642 cf
Outflow = 5.67 cfs @ 12.50 hrs, Volume= 28,709 cf, Atten= 24%, Lag= 12.5 min
Discarded = 0.05 cfs @ 12.50 hrs, Volume= 5,408 cf
Primary = 5.62 cfs @ 12.50 hrs, Volume= 23,301 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.54' @ 12.50 hrs Surf.Area= 12,559 sf Storage= 12,849 cf

Plug-Flow detention time= 281.4 min calculated for 28,709 cf (81% of inflow)
Center-of-Mass det. time= 207.4 min (1,022.4 - 815.0)

Volume	Invert	Avail.Storage	Storage Description
#1	104.00'	19,400 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.00	500	0	0
104.50	1,500	500	500
105.00	2,700	1,050	1,550
106.00	8,500	5,600	7,150
107.00	16,000	12,250	19,400

Device	Routing	Invert	Outlet Devices
#1	Primary	106.30'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.00'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.05 cfs @ 12.50 hrs HW=106.54' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=5.60 cfs @ 12.50 hrs HW=106.54' TW=102.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 5.60 cfs @ 1.16 fps)

Summary for Subcatchment eS1: Ex. Cond. / Pre Dev. Subcatchment - flowing to exist. isolated wetlands

Runoff = 6.02 cfs @ 12.35 hrs, Volume= 33,010 cf, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	9,300	98	Buildings - existing
*	37,735	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	19,460	86	<50% Grass cover, Poor, HSG C
	40,600	82	Woods/grass comb., Poor, HSG C
	107,095	90	Weighted Average
	60,060	83	56.08% Pervious Area
	47,035	98	43.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0100	0.05		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
10.5	325	0.0107	0.52		**Shallow Concentrated Flow, SEGMENT BC** Woodland Kv= 5.0 fps
26.0	375	Total			

Summary for Subcatchment eS2: Ex. Cond. / Pre Dev. Subcatchment - flowing to exist. ditch at southerly PL

Runoff = 4.27 cfs @ 12.17 hrs, Volume= 16,610 cf, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	9,300	98	Buildings - existing
*	0	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	16,200	86	<50% Grass cover, Poor, HSG C
	35,800	82	Woods/grass comb., Poor, HSG C
	61,300	85	Weighted Average
	52,000	83	84.83% Pervious Area
	9,300	98	15.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	50	0.0300	0.08		**Sheet Flow, SEGMENT AB**
					Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	75	0.0200	0.99		**Shallow Concentrated Flow, SEGMENT BC**
					Short Grass Pasture Kv= 7.0 fps
0.7	65	0.0450	1.48		**Shallow Concentrated Flow, SEGMENT CD**
					Short Grass Pasture Kv= 7.0 fps
12.0	190	Total			

Summary for Subcatchment eS3: Ex. Cond. / Pre Dev. Subcatchment - flowing to exist. depression at northwesterly PL

Runoff = 5.92 cfs @ 12.18 hrs, Volume= 25,329 cf, Depth= 3.93"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	0	98	Buildings - existing
*	44,935	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	13,690	86	<50% Grass cover, Poor, HSG C
	18,635	82	Woods/grass comb., Poor, HSG C
	77,260	92	Weighted Average
	32,325	84	41.84% Pervious Area
	44,935	98	58.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0250	0.08		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
2.7	135	0.0280	0.84		**Shallow Concentrated Flow, SEGMENT BC** Woodland Kv= 5.0 fps
13.5	185	Total			

Summary for Subcatchment eS4: Ex. Cond. abutting Lot M - flowing to ex. Ditch/Depression w/ RCP culverts - westerly of site

Runoff = 5.37 cfs @ 12.11 hrs, Volume= 19,658 cf, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	0	98	Buildings - existing
*	32,260	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	27,030	86	<50% Grass cover, Poor, HSG C
	59,290	93	Weighted Average
	27,030	86	45.59% Pervious Area
	32,260	98	54.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0200	0.11		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 3.50"
0.3	60	0.0200	2.87		**Shallow Concentrated Flow, SEGMENT BC** Paved Kv= 20.3 fps
8.2	110	Total			

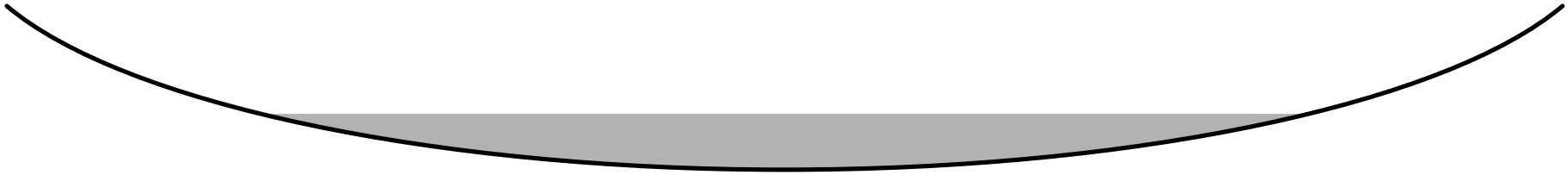
Summary for Reach e2R: Exist. Ditch - southerly PL of site

Inflow Area = 61,300 sf, 15.17% Impervious, Inflow Depth = 3.25" for 10-year event
Inflow = 4.27 cfs @ 12.17 hrs, Volume= 16,610 cf
Outflow = 4.11 cfs @ 12.20 hrs, Volume= 16,610 cf, Atten= 4%, Lag= 2.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Max. Velocity= 1.94 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 10.0 min

Peak Storage= 711 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 1.00' Flow Area= 10.7 sf, Capacity= 42.19 cfs

16.00' x 1.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 335.0' Slope= 0.0060 '/'
Inlet Invert= 107.00', Outlet Invert= 105.00'



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Summary for Pond eA1: Analysis Pt - Pre Dev. Site discharge contribution to the exist. drainage network

Inflow Area = 304,945 sf, 43.79% Impervious, Inflow Depth = 3.07" for 10-year event
Inflow = 15.34 cfs @ 12.31 hrs, Volume= 78,038 cf
Primary = 15.34 cfs @ 12.31 hrs, Volume= 78,038 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Summary for Pond eP1: Ex. Ditch / Vegetated Depression w/ RCP culverts - southwesterly of site

Inflow Area = 304,945 sf, 43.79% Impervious, Inflow Depth = 3.07" for 10-year event
Inflow = 15.34 cfs @ 12.31 hrs, Volume= 78,039 cf
Outflow = 15.34 cfs @ 12.31 hrs, Volume= 78,039 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.31 hrs, Volume= 0 cf
Primary = 15.34 cfs @ 12.31 hrs, Volume= 78,038 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 102.00' @ 12.31 hrs Surf.Area= 20 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (822.1 - 822.1)

Volume	Invert	Avail.Storage	Storage Description
#1	102.00'	5,257 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.00	20	0	0
103.00	200	110	110
104.00	630	415	525
105.00	2,330	1,480	2,005
105.80	5,800	3,252	5,257

Device	Routing	Invert	Outlet Devices
#1	Primary	99.90'	**30.0" Round Culvert - exist. 30" RCP** L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 99.90' / 99.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Discarded	102.00'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 12.31 hrs HW=102.00' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=19.77 cfs @ 12.31 hrs HW=102.00' TW=0.00' (Dynamic Tailwater)
└**1=Culvert - exist. 30" RCP** (Barrel Controls 19.77 cfs @ 6.07 fps)

Summary for Pond eP3: Exist. Vegetated Depression - northwesterly PL of site

Inflow Area = 77,260 sf, 58.16% Impervious, Inflow Depth = 3.93" for 10-year event
Inflow = 5.92 cfs @ 12.18 hrs, Volume= 25,329 cf
Outflow = 5.31 cfs @ 12.25 hrs, Volume= 23,314 cf, Atten= 10%, Lag= 4.1 min
Discarded = 0.03 cfs @ 12.25 hrs, Volume= 2,034 cf
Primary = 5.29 cfs @ 12.25 hrs, Volume= 21,279 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.36' @ 12.25 hrs Surf.Area= 6,398 sf Storage= 4,837 cf

Plug-Flow detention time= 150.9 min calculated for 23,314 cf (92% of inflow)
Center-of-Mass det. time= 108.9 min (885.4 - 776.6)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	28,830 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
106.00	100	0	0
107.00	1,230	665	665
108.00	3,550	2,390	3,055
109.00	11,500	7,525	10,580
110.00	25,000	18,250	28,830

Device	Routing	Invert	Outlet Devices
#1	Primary	108.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	106.00'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 12.25 hrs HW=108.36' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=5.26 cfs @ 12.25 hrs HW=108.36' TW=106.60' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 5.26 cfs @ 1.47 fps)

Summary for Pond eW1: Exist. Isolated Wetlands - southwesterly of site

Inflow Area = 184,355 sf, 49.89% Impervious, Inflow Depth = 3.53" for 10-year event
Inflow = 10.97 cfs @ 12.29 hrs, Volume= 54,289 cf
Outflow = 10.17 cfs @ 12.39 hrs, Volume= 47,339 cf, Atten= 7%, Lag= 5.8 min
Discarded = 0.05 cfs @ 12.39 hrs, Volume= 5,568 cf
Primary = 10.12 cfs @ 12.39 hrs, Volume= 41,771 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.65' @ 12.39 hrs Surf.Area= 13,364 sf Storage= 14,240 cf

Plug-Flow detention time= 194.9 min calculated for 47,339 cf (87% of inflow)
Center-of-Mass det. time= 137.8 min (944.3 - 806.6)

Volume	Invert	Avail.Storage	Storage Description
#1	104.00'	19,400 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.00	500	0	0
104.50	1,500	500	500
105.00	2,700	1,050	1,550
106.00	8,500	5,600	7,150
107.00	16,000	12,250	19,400

Device	Routing	Invert	Outlet Devices
#1	Primary	106.30'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.00'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.05 cfs @ 12.39 hrs HW=106.65' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=10.09 cfs @ 12.39 hrs HW=106.65' TW=102.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 10.09 cfs @ 1.45 fps)

Summary for Subcatchment eS1: Ex. Cond. / Pre Dev. Subcatchment - flowing to exist. isolated wetlands

Runoff = 8.61 cfs @ 12.35 hrs, Volume= 47,514 cf, Depth= 5.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	9,300	98	Buildings - existing
*	37,735	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	19,460	86	<50% Grass cover, Poor, HSG C
	40,600	82	Woods/grass comb., Poor, HSG C
	107,095	90	Weighted Average
	60,060	83	56.08% Pervious Area
	47,035	98	43.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0100	0.05		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
10.5	325	0.0107	0.52		**Shallow Concentrated Flow, SEGMENT BC** Woodland Kv= 5.0 fps
26.0	375	Total			

Summary for Subcatchment eS2: Ex. Cond. / Pre Dev. Subcatchment - flowing to exist. ditch at southerly PL

Runoff = 6.30 cfs @ 12.16 hrs, Volume= 24,718 cf, Depth= 4.84"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	9,300	98	Buildings - existing
*	0	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	16,200	86	<50% Grass cover, Poor, HSG C
	35,800	82	Woods/grass comb., Poor, HSG C
	61,300	85	Weighted Average
	52,000	83	84.83% Pervious Area
	9,300	98	15.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	50	0.0300	0.08		**Sheet Flow, SEGMENT AB**
					Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	75	0.0200	0.99		**Shallow Concentrated Flow, SEGMENT BC**
					Short Grass Pasture Kv= 7.0 fps
0.7	65	0.0450	1.48		**Shallow Concentrated Flow, SEGMENT CD**
					Short Grass Pasture Kv= 7.0 fps
12.0	190	Total			

Summary for Subcatchment eS3: Ex. Cond. / Pre Dev. Subcatchment - flowing to exist. depression at northwesterly PL

Runoff = 8.33 cfs @ 12.18 hrs, Volume= 35,927 cf, Depth= 5.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	0	98	Buildings - existing
*	44,935	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	13,690	86	<50% Grass cover, Poor, HSG C
	18,635	82	Woods/grass comb., Poor, HSG C
	77,260	92	Weighted Average
	32,325	84	41.84% Pervious Area
	44,935	98	58.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0250	0.08		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
2.7	135	0.0280	0.84		**Shallow Concentrated Flow, SEGMENT BC** Woodland Kv= 5.0 fps
13.5	185	Total			

Summary for Subcatchment eS4: Ex. Cond. abutting Lot M - flowing to ex. Ditch/Depression w/ RCP culverts - westerly of site

Runoff = 7.53 cfs @ 12.11 hrs, Volume= 27,839 cf, Depth= 5.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	0	98	Buildings - existing
*	32,260	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	27,030	86	<50% Grass cover, Poor, HSG C
	59,290	93	Weighted Average
	27,030	86	45.59% Pervious Area
	32,260	98	54.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0200	0.11		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 3.50"
0.3	60	0.0200	2.87		**Shallow Concentrated Flow, SEGMENT BC** Paved Kv= 20.3 fps
8.2	110	Total			

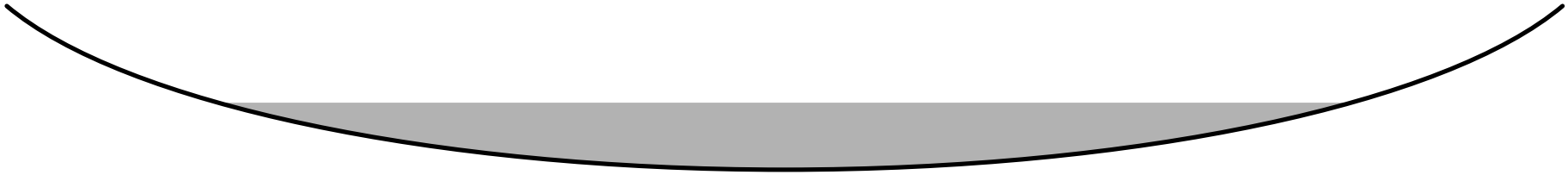
Summary for Reach e2R: Exist. Ditch - southerly PL of site

Inflow Area = 61,300 sf, 15.17% Impervious, Inflow Depth = 4.84" for 100-year, Newton event
Inflow = 6.30 cfs @ 12.16 hrs, Volume= 24,718 cf
Outflow = 6.10 cfs @ 12.20 hrs, Volume= 24,718 cf, Atten= 3%, Lag= 1.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Max. Velocity= 2.19 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 8.9 min

Peak Storage= 934 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 1.00' Flow Area= 10.7 sf, Capacity= 42.19 cfs

16.00' x 1.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 335.0' Slope= 0.0060 '/'
Inlet Invert= 107.00', Outlet Invert= 105.00'



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Summary for Pond eA1: Analysis Pt - Pre Dev. Site discharge contribution to the exist. drainage network

Inflow Area = 304,945 sf, 43.79% Impervious, Inflow Depth = 4.69" for 100-year, Newton event
Inflow = 22.76 cfs @ 12.27 hrs, Volume= 119,131 cf
Primary = 22.76 cfs @ 12.27 hrs, Volume= 119,131 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Summary for Pond eP1: Ex. Ditch / Vegetated Depression w/ RCP culverts - southwesterly of site

Inflow Area = 304,945 sf, 43.79% Impervious, Inflow Depth = 4.69" for 100-year, Newton event
Inflow = 22.75 cfs @ 12.27 hrs, Volume= 119,132 cf
Outflow = 22.76 cfs @ 12.27 hrs, Volume= 119,132 cf, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.27 hrs, Volume= 1 cf
Primary = 22.76 cfs @ 12.27 hrs, Volume= 119,131 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 102.22' @ 12.27 hrs Surf.Area= 59 sf Storage= 9 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (813.1 - 813.1)

Volume	Invert	Avail.Storage	Storage Description
#1	102.00'	5,257 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.00	20	0	0
103.00	200	110	110
104.00	630	415	525
105.00	2,330	1,480	2,005
105.80	5,800	3,252	5,257

Device	Routing	Invert	Outlet Devices
#1	Primary	99.90'	**30.0" Round Culvert - exist. 30" RCP** L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 99.90' / 99.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Discarded	102.00'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 12.27 hrs HW=102.21' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=22.72 cfs @ 12.27 hrs HW=102.21' TW=0.00' (Dynamic Tailwater)
└**1=Culvert - exist. 30" RCP** (Barrel Controls 22.72 cfs @ 6.25 fps)

Summary for Pond eP3: Exist. Vegetated Depression - northwesterly PL of site

Inflow Area = 77,260 sf, 58.16% Impervious, Inflow Depth = 5.58" for 100-year, Newton event
Inflow = 8.33 cfs @ 12.18 hrs, Volume= 35,927 cf
Outflow = 7.55 cfs @ 12.24 hrs, Volume= 33,909 cf, Atten= 9%, Lag= 3.9 min
Discarded = 0.03 cfs @ 12.24 hrs, Volume= 2,122 cf
Primary = 7.52 cfs @ 12.24 hrs, Volume= 31,787 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.44' @ 12.24 hrs Surf.Area= 7,078 sf Storage= 5,413 cf

Plug-Flow detention time= 113.7 min calculated for 33,881 cf (94% of inflow)
Center-of-Mass det. time= 83.1 min (853.9 - 770.8)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	28,830 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
106.00	100	0	0
107.00	1,230	665	665
108.00	3,550	2,390	3,055
109.00	11,500	7,525	10,580
110.00	25,000	18,250	28,830

Device	Routing	Invert	Outlet Devices
#1	Primary	108.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	106.00'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 12.24 hrs HW=108.44' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=7.50 cfs @ 12.24 hrs HW=108.44' TW=106.70' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 7.50 cfs @ 1.69 fps)

Summary for Pond eW1: Exist. Isolated Wetlands - southwesterly of site

Inflow Area = 184,355 sf, 49.89% Impervious, Inflow Depth = 5.16" for 100-year, Newton event
Inflow = 15.61 cfs @ 12.29 hrs, Volume= 79,301 cf
Outflow = 14.79 cfs @ 12.37 hrs, Volume= 72,337 cf, Atten= 5%, Lag= 4.8 min
Discarded = 0.06 cfs @ 12.37 hrs, Volume= 5,762 cf
Primary = 14.74 cfs @ 12.37 hrs, Volume= 66,575 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.74' @ 12.37 hrs Surf.Area= 14,038 sf Storage= 15,472 cf

Plug-Flow detention time= 143.7 min calculated for 72,277 cf (91% of inflow)
Center-of-Mass det. time= 101.0 min (899.3 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	104.00'	19,400 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.00	500	0	0
104.50	1,500	500	500
105.00	2,700	1,050	1,550
106.00	8,500	5,600	7,150
107.00	16,000	12,250	19,400

Device	Routing	Invert	Outlet Devices
#1	Primary	106.30'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.00'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.06 cfs @ 12.37 hrs HW=106.74' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

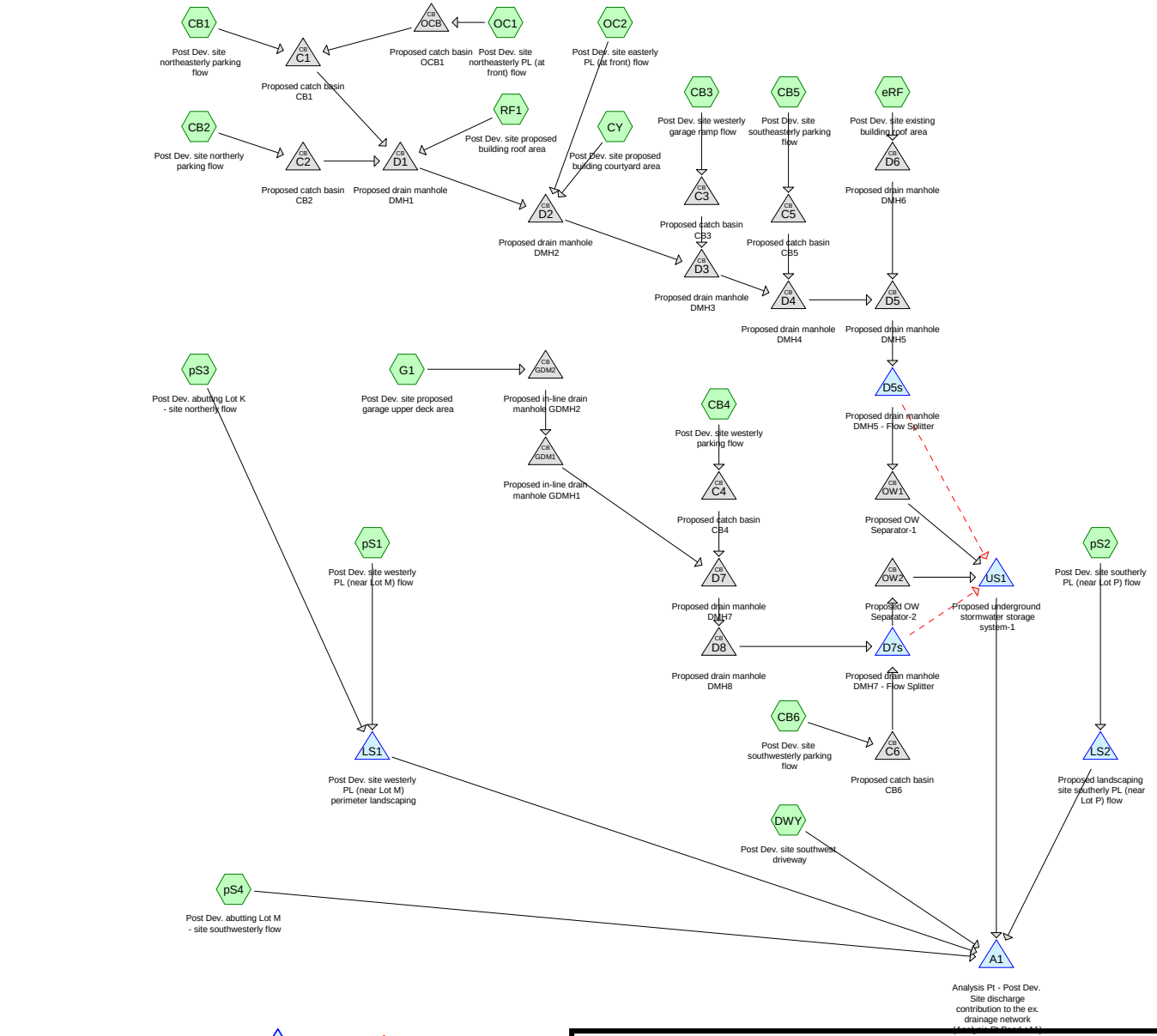
Primary OutFlow Max=14.71 cfs @ 12.37 hrs HW=106.74' TW=102.14' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 14.71 cfs @ 1.68 fps)

POST-DEVELOPMENT

STORMWATER

CALCULATIONS

2 YEAR EVENT



Routing Diagram for 14225 HydroCAD_Pre-Post_rev2_c10-10-2019

Prepared by {enter your company name here}, Printed 12/3/2019

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Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
2,890	79	50-75% Grass cover, Fair, HSG C (CY)
27,030	86	<50% Grass cover, Poor, HSG C (pS4)
62,859	74	>75% Grass cover, Good, HSG C (CB1, CB2, CB3, CB5, CB6, OC1, OC2, pS1, pS2, pS3)
18,560	98	Buildings - existing (eRF)
43,705	98	Buildings - proposed (G1, RF1)
92,978	98	Driveways, parkings, walkways (CB1, CB2, CB3, CB4, CB5, CB6, DWY, OC1, OC2)
32,260	98	Driveways, parkings, walkways - existing (pS4)
3,620	98	Other impervious - existing (pS2)
20,960	82	Woods/grass comb., Poor, HSG C (CB5, pS1, pS3)
304,862	**91**	**TOTAL AREA**

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	C1	106.20	105.25	140.5	0.0068	0.013	12.0	0.0	0.0
2	C2	105.38	105.15	45.5	0.0051	0.013	18.0	0.0	0.0
3	C3	104.55	104.36	37.8	0.0050	0.013	18.0	0.0	0.0
4	C4	104.50	104.40	6.0	0.0167	0.013	18.0	0.0	0.0
5	C5	104.39	104.17	21.8	0.0101	0.013	18.0	0.0	0.0
6	C6	103.60	103.40	4.0	0.0500	0.013	12.0	0.0	0.0
7	D1	105.05	104.25	157.3	0.0051	0.013	24.0	0.0	0.0
8	D2	104.25	103.86	75.8	0.0051	0.013	24.0	0.0	0.0
9	D3	103.86	103.67	37.3	0.0051	0.013	24.0	0.0	0.0
10	D4	103.67	103.50	16.2	0.0105	0.013	24.0	0.0	0.0
11	D5	103.50	103.40	5.6	0.0179	0.013	24.0	0.0	0.0
12	D5s	103.37	103.27	18.2	0.0055	0.013	12.0	0.0	0.0
13	D6	105.00	104.00	95.0	0.0105	0.013	18.0	0.0	0.0
14	D7	104.40	103.71	136.7	0.0050	0.013	18.0	0.0	0.0
15	D7s	103.37	103.27	6.0	0.0167	0.013	12.0	0.0	0.0
16	D8	103.71	103.40	30.4	0.0102	0.013	18.0	0.0	0.0
17	GDM1	104.78	104.50	55.4	0.0051	0.013	12.0	0.0	0.0
18	GDM2	105.00	104.78	42.7	0.0052	0.013	12.0	0.0	0.0
19	OCB	107.50	106.45	95.6	0.0110	0.013	12.0	0.0	0.0
20	OW1	103.10	103.00	15.0	0.0067	0.013	12.0	0.0	0.0
21	OW2	103.10	103.00	15.0	0.0067	0.013	12.0	0.0	0.0
22	US1	102.50	102.20	30.0	0.0100	0.013	24.0	0.0	0.0

Summary for Subcatchment CB1: Post Dev. site northeasterly parking flow

Runoff = 0.55 cfs @ 12.07 hrs, Volume= 1,866 cf, Depth= 2.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	6,390	98	Driveways, parkings, walkways
	1,230	74	>75% Grass cover, Good, HSG C
	7,620	94	Weighted Average
	1,230	74	16.14% Pervious Area
	6,390	98	83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB2: Post Dev. site northerly parking flow

Runoff = 1.20 cfs @ 12.07 hrs, Volume= 4,103 cf, Depth= 3.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	14,835	98	Driveways, parkings, walkways
	630	74	>75% Grass cover, Good, HSG C
	15,465	97	Weighted Average
	630	74	4.07% Pervious Area
	14,835	98	95.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB3: Post Dev. site westerly garage ramp flow

Runoff = 2.74 cfs @ 12.07 hrs, Volume= 9,348 cf, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	34,200	98	Driveways, parkings, walkways
	372	74	>75% Grass cover, Good, HSG C
	34,572	98	Weighted Average
	372	74	1.08% Pervious Area
	34,200	98	98.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB4: Post Dev. site westerly parking flow

Runoff = 1.34 cfs @ 12.07 hrs, Volume= 4,583 cf, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	16,835	98	Driveways, parkings, walkways
	0	74	>75% Grass cover, Good, HSG C
	16,835	98	Weighted Average
	16,835	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB5: Post Dev. site southeasterly parking flow

Runoff = 0.97 cfs @ 12.18 hrs, Volume= 4,075 cf, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	7,133	98	Driveways, parkings, walkways
*	0	98	Other impervious
	13,817	74	>75% Grass cover, Good, HSG C
	4,860	82	Woods/grass comb., Poor, HSG C
	25,810	82	Weighted Average
	18,677	76	72.36% Pervious Area
	7,133	98	27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	50	0.0300	0.08		**Sheet Flow, SEGMENT AB**
					Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	140	0.0200	0.99		**Shallow Concentrated Flow, SEGMENT BC**
					Short Grass Pasture Kv= 7.0 fps
0.7	80	0.0100	2.03		**Shallow Concentrated Flow, SEGMENT CD**
					Paved Kv= 20.3 fps
13.0	270	Total			

Summary for Subcatchment CB6: Post Dev. site southwesterly parking flow

Runoff = 0.88 cfs @ 12.07 hrs, Volume= 3,012 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	10,935	98	Driveways, parkings, walkways
	340	74	>75% Grass cover, Good, HSG C
	11,275	97	Weighted Average
	340	74	3.02% Pervious Area
	10,935	98	96.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CY: Post Dev. site proposed building courtyard area

Runoff = 0.12 cfs @ 12.08 hrs, Volume= 377 cf, Depth= 1.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
2,890	79	50-75% Grass cover, Fair, HSG C
2,890	79	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment DWY: Post Dev. site southwest driveway

Runoff = 0.04 cfs @ 12.07 hrs, Volume= 136 cf, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	500	98	Driveways, parkings, walkways
	0	74	>75% Grass cover, Good, HSG C
	500	98	Weighted Average
	500	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment eRF: Post Dev. site existing building roof area

Runoff = 1.64 cfs @ 12.01 hrs, Volume= 5,052 cf, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	18,560	98	Buildings - existing
	18,560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment G1: Post Dev. site proposed garage upper deck area

Runoff = 1.61 cfs @ 12.07 hrs, Volume= 5,493 cf, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	20,180	98	Buildings - proposed
	20,180	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment OC1: Post Dev. site northeasterly PL (at front) flow

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 582 cf, Depth= 1.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	700	98	Driveways, parkings, walkways
*	0	98	Other impervious
	3,790	74	>75% Grass cover, Good, HSG C
	4,490	78	Weighted Average
	3,790	74	84.41% Pervious Area
	700	98	15.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment OC2: Post Dev. site easterly PL (at front) flow

Runoff = 0.43 cfs @ 12.08 hrs, Volume= 1,366 cf, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	1,450	98	Driveways, parkings, walkways
*	0	98	Other impervious
	9,400	74	>75% Grass cover, Good, HSG C
	10,850	77	Weighted Average
	9,400	74	86.64% Pervious Area
	1,450	98	13.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment pS1: Post Dev. site westerly PL (near Lot M) flow

Runoff = 0.62 cfs @ 12.42 hrs, Volume= 3,405 cf, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	0	98	Driveways, parkings, walkways
*	0	98	Other impervious
	16,580	74	>75% Grass cover, Good, HSG C
	11,600	82	Woods/grass comb., Poor, HSG C
	28,180	77	Weighted Average
	28,180	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0100	0.05		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
6.9	290	0.0100	0.70		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
6.4	270	0.0100	0.70		**Shallow Concentrated Flow, SEGMENT CD** Short Grass Pasture Kv= 7.0 fps
28.9	610	Total			

Summary for Subcatchment pS2: Post Dev. site southerly PL (near Lot P) flow

Runoff = 0.39 cfs @ 12.24 hrs, Volume= 1,829 cf, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	0	98	Buildings - existing
*	0	98	Driveways, parkings, walkways - existing
*	3,620	98	Other impervious - existing
	8,160	74	>75% Grass cover, Good, HSG C
	0	82	Woods/grass comb., Poor, HSG C
	11,780	81	Weighted Average
	8,160	74	69.27% Pervious Area
	3,620	98	30.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0100	0.08		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 3.50"
6.9	290	0.0100	0.70		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
17.2	340	Total			

Summary for Subcatchment pS3: Post Dev. abutting Lot K - site northerly flow

Runoff = 0.37 cfs @ 12.22 hrs, Volume= 1,537 cf, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	0	98	Driveways, parkings, walkways
*	0	98	Other impervious
	8,540	74	>75% Grass cover, Good, HSG C
	4,500	82	Woods/grass comb., Poor, HSG C
	13,040	77	Weighted Average
	13,040	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0250	0.08		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
4.3	300	0.0280	1.17		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
15.1	350	Total			

Summary for Subcatchment pS4: Post Dev. abutting Lot M - site southwesterly flow

Runoff = 3.72 cfs @ 12.11 hrs, Volume= 13,508 cf, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	32,260	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	27,030	86	<50% Grass cover, Poor, HSG C
	59,290	93	Weighted Average
	27,030	86	45.59% Pervious Area
	32,260	98	54.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0200	0.11		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 3.50"
0.3	60	0.0200	2.87		**Shallow Concentrated Flow, SEGMENT BC** Paved Kv= 20.3 fps
8.2	110	Total			

Summary for Subcatchment RF1: Post Dev. site proposed building roof area

Runoff = 1.88 cfs @ 12.07 hrs, Volume= 6,404 cf, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
*	23,525	98	Buildings - proposed
	23,525	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Pond A1: Analysis Pt - Post Dev. Site discharge contribution to the ex. drainage network (Analysis Pt Pond eA1)

Inflow Area = 304,862 sf, 62.69% Impervious, Inflow Depth = 2.24" for 2-year event
Inflow = 6.43 cfs @ 12.16 hrs, Volume= 56,803 cf
Primary = 6.43 cfs @ 12.16 hrs, Volume= 56,803 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Summary for Pond C1: Proposed catch basin CB1

Inflow Area = 12,110 sf, 58.55% Impervious, Inflow Depth = 2.43" for 2-year event
Inflow = 0.73 cfs @ 12.08 hrs, Volume= 2,449 cf
Outflow = 0.73 cfs @ 12.08 hrs, Volume= 2,449 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.73 cfs @ 12.08 hrs, Volume= 2,449 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.73' @ 12.09 hrs
Flood Elev= 109.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	106.20'	**12.0" Round Culvert** L= 140.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 106.20' / 105.25' S= 0.0068 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.67 cfs @ 12.08 hrs HW=106.72' TW=106.12' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.67 cfs @ 2.35 fps)

Summary for Pond C2: Proposed catch basin CB2

Inflow Area = 15,465 sf, 95.93% Impervious, Inflow Depth = 3.18" for 2-year event
Inflow = 1.20 cfs @ 12.07 hrs, Volume= 4,103 cf
Outflow = 1.20 cfs @ 12.07 hrs, Volume= 4,103 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.20 cfs @ 12.07 hrs, Volume= 4,103 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.21' @ 12.12 hrs
Flood Elev= 108.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.38'	**18.0" Round Culvert** L= 45.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.38' / 105.15' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.61 cfs @ 12.07 hrs HW=106.15' TW=106.11' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.61 cfs @ 0.97 fps)

Summary for Pond C3: Proposed catch basin CB3

Inflow Area = 34,572 sf, 98.92% Impervious, Inflow Depth = 3.24" for 2-year event
Inflow = 2.74 cfs @ 12.07 hrs, Volume= 9,348 cf
Outflow = 2.74 cfs @ 12.07 hrs, Volume= 9,348 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.74 cfs @ 12.07 hrs, Volume= 9,348 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.80' @ 12.14 hrs
Flood Elev= 108.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.55'	**18.0" Round Culvert** L= 37.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.55' / 104.36' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.15 cfs @ 12.07 hrs HW=105.66' TW=105.62' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.15 cfs @ 1.14 fps)

Summary for Pond C4: Proposed catch basin CB4

Inflow Area = 16,835 sf,100.00% Impervious, Inflow Depth = 3.27" for 2-year event
Inflow = 1.34 cfs @ 12.07 hrs, Volume= 4,583 cf
Outflow = 1.34 cfs @ 12.07 hrs, Volume= 4,583 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.34 cfs @ 12.07 hrs, Volume= 4,583 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.44' @ 12.12 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.50'	**18.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.50' / 104.40' S= 0.0167 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=105.37' TW=105.37' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond C5: Proposed catch basin CB5

Inflow Area = 25,810 sf, 27.64% Impervious, Inflow Depth = 1.89" for 2-year event
Inflow = 0.97 cfs @ 12.18 hrs, Volume= 4,075 cf
Outflow = 0.97 cfs @ 12.18 hrs, Volume= 4,075 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.97 cfs @ 12.18 hrs, Volume= 4,075 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.58' @ 12.15 hrs
Flood Elev= 108.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.39'	**18.0" Round Culvert** L= 21.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.39' / 104.17' S= 0.0101 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=2.43 cfs @ 12.18 hrs HW=105.51' TW=105.35' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.43 cfs @ 2.38 fps)

Summary for Pond C6: Proposed catch basin CB6

Inflow Area = 11,275 sf, 96.98% Impervious, Inflow Depth = 3.21" for 2-year event
Inflow = 0.88 cfs @ 12.07 hrs, Volume= 3,012 cf
Outflow = 0.88 cfs @ 12.07 hrs, Volume= 3,012 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.88 cfs @ 12.07 hrs, Volume= 3,012 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.50' @ 12.10 hrs
Flood Elev= 108.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.60'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.60' / 103.40' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.56 cfs @ 12.07 hrs HW=104.48' TW=104.45' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.56 cfs @ 1.02 fps)

Summary for Pond D1: Proposed drain manhole DMH1

Inflow Area = 51,100 sf, 88.94% Impervious, Inflow Depth = 3.04" for 2-year event
Inflow = 3.81 cfs @ 12.07 hrs, Volume= 12,956 cf
Outflow = 3.81 cfs @ 12.07 hrs, Volume= 12,956 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.81 cfs @ 12.07 hrs, Volume= 12,956 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.14' @ 12.10 hrs
Flood Elev= 109.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.05'	**24.0" Round Culvert** L= 157.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.05' / 104.25' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=3.19 cfs @ 12.07 hrs HW=106.12' TW=105.66' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 3.19 cfs @ 2.72 fps)

Summary for Pond D2: Proposed drain manhole DMH2

Inflow Area = 64,840 sf, 72.33% Impervious, Inflow Depth = 2.72" for 2-year event
Inflow = 4.36 cfs @ 12.07 hrs, Volume= 14,699 cf
Outflow = 4.36 cfs @ 12.07 hrs, Volume= 14,699 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.36 cfs @ 12.07 hrs, Volume= 14,699 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.81' @ 12.14 hrs
Flood Elev= 109.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.25'	**24.0" Round Culvert** L= 75.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.25' / 103.86' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=1.86 cfs @ 12.07 hrs HW=105.67' TW=105.62' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.86 cfs @ 1.09 fps)

Summary for Pond D3: Proposed drain manhole DMH3

Inflow Area = 99,412 sf, 81.58% Impervious, Inflow Depth = 2.90" for 2-year event
Inflow = 7.10 cfs @ 12.07 hrs, Volume= 24,047 cf
Outflow = 7.10 cfs @ 12.07 hrs, Volume= 24,047 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.10 cfs @ 12.07 hrs, Volume= 24,047 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.72' @ 12.12 hrs
Flood Elev= 108.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.86'	**24.0" Round Culvert** L= 37.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.86' / 103.67' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=4.42 cfs @ 12.07 hrs HW=105.62' TW=105.50' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.42 cfs @ 2.01 fps)

Summary for Pond D4: Proposed drain manhole DMH4

Inflow Area = 125,222 sf, 70.46% Impervious, Inflow Depth = 2.69" for 2-year event
Inflow = 7.78 cfs @ 12.08 hrs, Volume= 28,121 cf
Outflow = 7.78 cfs @ 12.08 hrs, Volume= 28,121 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.78 cfs @ 12.08 hrs, Volume= 28,121 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.56' @ 12.11 hrs
Flood Elev= 108.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.67'	**24.0" Round Culvert** L= 16.2' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.67' / 103.50' S= 0.0105 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=6.31 cfs @ 12.08 hrs HW=105.52' TW=105.33' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 6.31 cfs @ 2.71 fps)

Summary for Pond D5: Proposed drain manhole DMH5

Inflow Area = 143,782 sf, 74.27% Impervious, Inflow Depth = 2.77" for 2-year event
Inflow = 8.95 cfs @ 12.07 hrs, Volume= 33,174 cf
Outflow = 8.95 cfs @ 12.07 hrs, Volume= 33,174 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.95 cfs @ 12.07 hrs, Volume= 33,174 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.34' @ 12.08 hrs
Flood Elev= 108.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**24.0" Round Culvert** L= 5.6' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.50' / 103.40' S= 0.0179 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=8.29 cfs @ 12.07 hrs HW=105.31' TW=104.98' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 8.29 cfs @ 2.78 fps)

Summary for Pond D5s: Proposed drain manhole DMH5 - Flow Splitter

Inflow Area = 143,782 sf, 74.27% Impervious, Inflow Depth = 2.77" for 2-year event
Inflow = 8.95 cfs @ 12.07 hrs, Volume= 33,174 cf
Outflow = 8.94 cfs @ 12.07 hrs, Volume= 33,138 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.93 cfs @ 12.05 hrs, Volume= 26,571 cf
Secondary = 6.01 cfs @ 12.07 hrs, Volume= 6,567 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.98' @ 12.07 hrs Surf.Area= 28 sf Storage= 82 cf
Flood Elev= 109.10' Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= 2.4 min calculated for 33,138 cf (100% of inflow)
Center-of-Mass det. time= 1.1 min (767.1 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	102.10'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	103.37'	**12.0" Round Culvert** L= 18.2' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.37' / 103.27' S= 0.0055 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Secondary	104.50'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.89 cfs @ 12.05 hrs HW=104.97' TW=104.38' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.89 cfs @ 3.68 fps)

Secondary OutFlow Max=5.87 cfs @ 12.07 hrs HW=104.98' TW=103.88' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 5.87 cfs @ 2.06 fps)

Summary for Pond D6: Proposed drain manhole DMH6

Inflow Area = 18,560 sf,100.00% Impervious, Inflow Depth = 3.27" for 2-year event
Inflow = 1.64 cfs @ 12.01 hrs, Volume= 5,052 cf
Outflow = 1.64 cfs @ 12.01 hrs, Volume= 5,052 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.64 cfs @ 12.01 hrs, Volume= 5,052 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.66' @ 12.03 hrs
Flood Elev= 110.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.00'	**18.0" Round Culvert** L= 95.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.00' / 104.00' S= 0.0105 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.38 cfs @ 12.01 hrs HW=105.64' TW=105.13' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.38 cfs @ 2.81 fps)

Summary for Pond D7: Proposed drain manhole DMH7

Inflow Area = 37,015 sf,100.00% Impervious, Inflow Depth = 3.27" for 2-year event
Inflow = 2.95 cfs @ 12.07 hrs, Volume= 10,076 cf
Outflow = 2.95 cfs @ 12.07 hrs, Volume= 10,076 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.95 cfs @ 12.07 hrs, Volume= 10,076 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.39' @ 12.08 hrs
Flood Elev= 108.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.40'	**18.0" Round Culvert** L= 136.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.40' / 103.71' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=2.72 cfs @ 12.07 hrs HW=105.37' TW=104.74' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.72 cfs @ 3.18 fps)

Summary for Pond D7s: Proposed drain manhole DMH7 - Flow Splitter

Inflow Area = 48,290 sf, 99.30% Impervious, Inflow Depth = 3.25" for 2-year event
Inflow = 3.84 cfs @ 12.07 hrs, Volume= 13,087 cf
Outflow = 3.84 cfs @ 12.07 hrs, Volume= 13,051 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.26 cfs @ 12.07 hrs, Volume= 11,473 cf
Secondary = 1.59 cfs @ 12.08 hrs, Volume= 1,578 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.46' @ 12.08 hrs Surf.Area= 28 sf Storage= 67 cf
Flood Elev= 108.35' Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= 4.2 min calculated for 13,041 cf (100% of inflow)
Center-of-Mass det. time= 2.3 min (756.2 - 753.9)

Volume	Invert	Avail.Storage	Storage Description
#1	102.10'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	103.37'	**12.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.37' / 103.27' S= 0.0167 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Secondary	104.25'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.17 cfs @ 12.07 hrs HW=104.45' TW=104.12' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.17 cfs @ 2.77 fps)

Secondary OutFlow Max=1.55 cfs @ 12.08 hrs HW=104.45' TW=103.91' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.55 cfs @ 1.27 fps)

Summary for Pond D8: Proposed drain manhole DMH8

Inflow Area = 37,015 sf,100.00% Impervious, Inflow Depth = 3.27" for 2-year event
Inflow = 2.95 cfs @ 12.07 hrs, Volume= 10,076 cf
Outflow = 2.95 cfs @ 12.07 hrs, Volume= 10,076 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.95 cfs @ 12.07 hrs, Volume= 10,076 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.75' @ 12.09 hrs
Flood Elev= 108.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.71'	**18.0" Round Culvert** L= 30.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.71' / 103.40' S= 0.0102 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=2.73 cfs @ 12.07 hrs HW=104.74' TW=104.45' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.73 cfs @ 2.99 fps)

Summary for Pond GDM1: Proposed in-line drain manhole GDMH1

Inflow Area = 20,180 sf,100.00% Impervious, Inflow Depth = 3.27" for 2-year event
Inflow = 1.61 cfs @ 12.07 hrs, Volume= 5,493 cf
Outflow = 1.61 cfs @ 12.07 hrs, Volume= 5,493 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.61 cfs @ 12.07 hrs, Volume= 5,493 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.69' @ 12.09 hrs
Flood Elev= 109.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.78'	**12.0" Round Culvert** L= 55.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.78' / 104.50' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.39 cfs @ 12.07 hrs HW=105.66' TW=105.37' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.39 cfs @ 2.52 fps)

Summary for Pond GDM2: Proposed in-line drain manhole GDMH2

Inflow Area = 20,180 sf,100.00% Impervious, Inflow Depth = 3.27" for 2-year event
Inflow = 1.61 cfs @ 12.07 hrs, Volume= 5,493 cf
Outflow = 1.61 cfs @ 12.07 hrs, Volume= 5,493 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.61 cfs @ 12.07 hrs, Volume= 5,493 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.92' @ 12.10 hrs
Flood Elev= 109.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.00'	**12.0" Round Culvert** L= 42.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.00' / 104.78' S= 0.0052 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.32 cfs @ 12.07 hrs HW=105.89' TW=105.66' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.32 cfs @ 2.37 fps)

Summary for Pond LS1: Post Dev. site westerly PL (near Lot M) perimeter landscaping

Inflow Area = 41,220 sf, 0.00% Impervious, Inflow Depth = 1.44" for 2-year event
Inflow = 0.89 cfs @ 12.35 hrs, Volume= 4,942 cf
Outflow = 0.12 cfs @ 14.15 hrs, Volume= 3,500 cf, Atten= 86%, Lag= 108.0 min
Discarded = 0.02 cfs @ 14.15 hrs, Volume= 2,359 cf
Primary = 0.10 cfs @ 14.15 hrs, Volume= 1,142 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.82' @ 14.15 hrs Surf.Area= 5,537 sf Storage= 2,949 cf
Flood Elev= 109.00' Surf.Area= 7,040 sf Storage= 4,102 cf

Plug-Flow detention time= 705.5 min calculated for 3,498 cf (71% of inflow)
Center-of-Mass det. time= 607.0 min (1,471.2 - 864.3)

Volume	Invert	Avail.Storage	Storage Description
#1	107.00'	4,102 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
107.00	310	0	0	310
108.00	810	540	540	817
108.25	2,040	345	885	2,047
109.00	7,040	3,217	4,102	7,050

Device	Routing	Invert	Outlet Devices
#1	Discarded	107.00'	**0.170 in/hr Exfiltration over Wetted area**
#2	Primary	108.80'	**20.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.02 cfs @ 14.15 hrs HW=108.82' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.10 cfs @ 14.15 hrs HW=108.82' TW=0.00' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.10 cfs @ 0.31 fps)

Summary for Pond LS2: Proposed landscaping site southerly PL (near Lot P) flow

Inflow Area = 11,780 sf, 30.73% Impervious, Inflow Depth = 1.86" for 2-year event
Inflow = 0.39 cfs @ 12.24 hrs, Volume= 1,829 cf
Outflow = 0.06 cfs @ 13.09 hrs, Volume= 1,580 cf, Atten= 84%, Lag= 51.2 min
Discarded = 0.01 cfs @ 13.09 hrs, Volume= 1,223 cf
Primary = 0.05 cfs @ 13.09 hrs, Volume= 357 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 107.81' @ 13.09 hrs Surf.Area= 2,670 sf Storage= 983 cf
Flood Elev= 108.00' Surf.Area= 3,440 sf Storage= 1,561 cf

Plug-Flow detention time= 686.2 min calculated for 1,580 cf (86% of inflow)
Center-of-Mass det. time= 623.0 min (1,435.1 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1	107.20'	1,561 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
107.20	640	0	0	640
107.25	750	35	35	750
107.50	1,620	289	324	1,621
108.00	3,440	1,237	1,561	3,443

Device	Routing	Invert	Outlet Devices
#1	Discarded	107.20'	**0.170 in/hr Exfiltration over Wetted area**
#2	Primary	107.80'	**20.0' long x 4.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.01 cfs @ 13.09 hrs HW=107.81' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.05 cfs @ 13.09 hrs HW=107.81' TW=0.00' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.05 cfs @ 0.24 fps)

Summary for Pond OCB: Proposed catch basin OCB1

Inflow Area = 4,490 sf, 15.59% Impervious, Inflow Depth = 1.56" for 2-year event
Inflow = 0.18 cfs @ 12.08 hrs, Volume= 582 cf
Outflow = 0.18 cfs @ 12.08 hrs, Volume= 582 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.18 cfs @ 12.08 hrs, Volume= 582 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 107.71' @ 12.08 hrs
Flood Elev= 111.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.50'	**12.0" Round Culvert** L= 95.6' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 107.50' / 106.45' S= 0.0110 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.18 cfs @ 12.08 hrs HW=107.71' TW=106.73' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.18 cfs @ 2.27 fps)

Summary for Pond OW1: Proposed OW Separator-1

Inflow Area = 143,782 sf, 74.27% Impervious, Inflow Depth = 2.22" for 2-year event
Inflow = 2.93 cfs @ 12.05 hrs, Volume= 26,571 cf
Outflow = 2.93 cfs @ 12.05 hrs, Volume= 26,571 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.93 cfs @ 12.05 hrs, Volume= 26,571 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.54' @ 12.28 hrs
Flood Elev= 108.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.10'	**12.0" Round Culvert** L= 15.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.10' / 103.00' S= 0.0067 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.90 cfs @ 12.05 hrs HW=104.38' TW=103.80' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.90 cfs @ 3.69 fps)

Summary for Pond OW2: Proposed OW Separator-2

Inflow Area = 48,290 sf, 99.30% Impervious, Inflow Depth = 2.85" for 2-year event
Inflow = 2.26 cfs @ 12.07 hrs, Volume= 11,473 cf
Outflow = 2.26 cfs @ 12.07 hrs, Volume= 11,473 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.26 cfs @ 12.07 hrs, Volume= 11,473 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.36' @ 12.38 hrs
Flood Elev= 108.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.10'	**12.0" Round Culvert** L= 15.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.10' / 103.00' S= 0.0067 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.87 cfs @ 12.07 hrs HW=104.12' TW=103.87' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.87 cfs @ 2.38 fps)

Summary for Pond US1: Proposed underground stormwater storage system-1

Inflow Area = 192,072 sf, 80.57% Impervious, Inflow Depth = 2.89" for 2-year event
Inflow = 12.78 cfs @ 12.07 hrs, Volume= 46,189 cf
Outflow = 4.14 cfs @ 12.39 hrs, Volume= 46,189 cf, Atten= 68%, Lag= 19.2 min
Discarded = 0.05 cfs @ 4.48 hrs, Volume= 4,529 cf
Primary = 4.09 cfs @ 12.39 hrs, Volume= 41,661 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.34' @ 12.39 hrs Surf.Area= 12,638 sf Storage= 16,274 cf
Flood Elev= 106.00' Surf.Area= 12,638 sf Storage= 27,637 cf

Plug-Flow detention time= 103.6 min calculated for 46,151 cf (100% of inflow)
Center-of-Mass det. time= 103.7 min (867.8 - 764.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	102.50'	11,065 cf	**58.50'W x 216.04'L x 3.50'H Field A** 44,234 cf Overall - 16,572 cf Embedded = 27,662 cf x 40.0% Voids
#2A	103.00'	16,572 cf	**ADS_StormTech SC-740** x 360 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 12 rows
		27,637 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	102.50'	**24.0" Round Culvert - Discharge Pipe** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 102.50' / 102.20' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	105.30'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	103.50'	**16.0" Vert. Orifice/Grate - Low flow outlet** C= 0.600
#4	Device 1	102.50'	**6.0" Vert. Orifice/Grate - Underdrain flow outlet** C= 0.600
#5	Discarded	102.50'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.05 cfs @ 4.48 hrs HW=102.54' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.05 cfs)

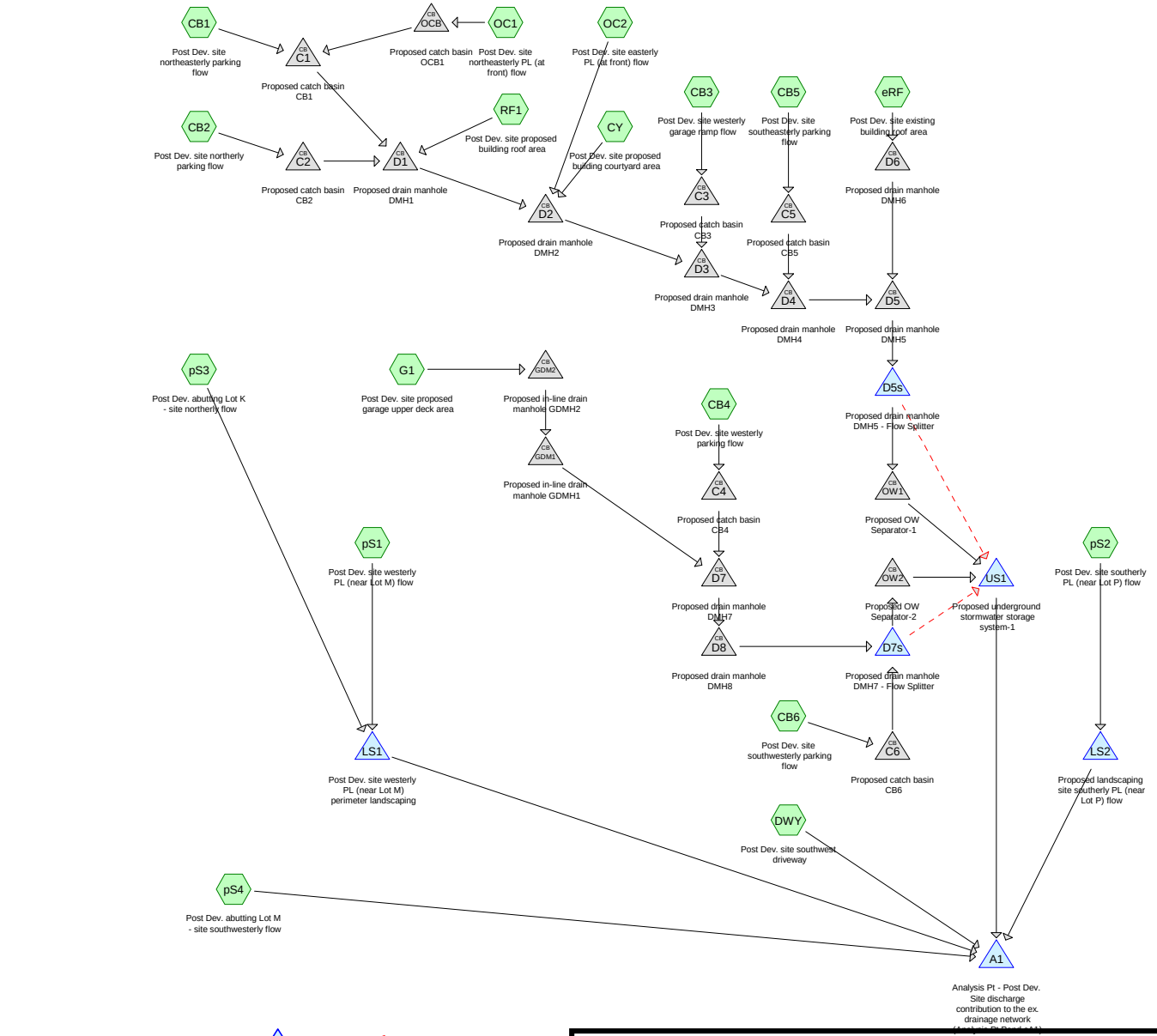
Primary OutFlow Max=4.09 cfs @ 12.39 hrs HW=104.34' TW=0.00' (Dynamic Tailwater)
└**1=Culvert - Discharge Pipe** (Passes 4.09 cfs of 12.07 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  ├**3=Orifice/Grate - Low flow outlet** (Orifice Controls 2.90 cfs @ 3.12 fps)
  └**4=Orifice/Grate - Underdrain flow outlet** (Orifice Controls 1.19 cfs @ 6.07 fps)

POST-DEVELOPMENT

STORMWATER

CALCULATIONS

10 YEAR EVENT



Routing Diagram for 14225 HydroCAD_Pre-Post_rev2_c10-10-2019

Prepared by {enter your company name here}, Printed 12/3/2019

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Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
2,890	79	50-75% Grass cover, Fair, HSG C (CY)
27,030	86	<50% Grass cover, Poor, HSG C (pS4)
62,859	74	>75% Grass cover, Good, HSG C (CB1, CB2, CB3, CB5, CB6, OC1, OC2, pS1, pS2, pS3)
18,560	98	Buildings - existing (eRF)
43,705	98	Buildings - proposed (G1, RF1)
92,978	98	Driveways, parkings, walkways (CB1, CB2, CB3, CB4, CB5, CB6, DWY, OC1, OC2)
32,260	98	Driveways, parkings, walkways - existing (pS4)
3,620	98	Other impervious - existing (pS2)
20,960	82	Woods/grass comb., Poor, HSG C (CB5, pS1, pS3)
304,862	**91**	**TOTAL AREA**

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	C1	106.20	105.25	140.5	0.0068	0.013	12.0	0.0	0.0
2	C2	105.38	105.15	45.5	0.0051	0.013	18.0	0.0	0.0
3	C3	104.55	104.36	37.8	0.0050	0.013	18.0	0.0	0.0
4	C4	104.50	104.40	6.0	0.0167	0.013	18.0	0.0	0.0
5	C5	104.39	104.17	21.8	0.0101	0.013	18.0	0.0	0.0
6	C6	103.60	103.40	4.0	0.0500	0.013	12.0	0.0	0.0
7	D1	105.05	104.25	157.3	0.0051	0.013	24.0	0.0	0.0
8	D2	104.25	103.86	75.8	0.0051	0.013	24.0	0.0	0.0
9	D3	103.86	103.67	37.3	0.0051	0.013	24.0	0.0	0.0
10	D4	103.67	103.50	16.2	0.0105	0.013	24.0	0.0	0.0
11	D5	103.50	103.40	5.6	0.0179	0.013	24.0	0.0	0.0
12	D5s	103.37	103.27	18.2	0.0055	0.013	12.0	0.0	0.0
13	D6	105.00	104.00	95.0	0.0105	0.013	18.0	0.0	0.0
14	D7	104.40	103.71	136.7	0.0050	0.013	18.0	0.0	0.0
15	D7s	103.37	103.27	6.0	0.0167	0.013	12.0	0.0	0.0
16	D8	103.71	103.40	30.4	0.0102	0.013	18.0	0.0	0.0
17	GDM1	104.78	104.50	55.4	0.0051	0.013	12.0	0.0	0.0
18	GDM2	105.00	104.78	42.7	0.0052	0.013	12.0	0.0	0.0
19	OCB	107.50	106.45	95.6	0.0110	0.013	12.0	0.0	0.0
20	OW1	103.10	103.00	15.0	0.0067	0.013	12.0	0.0	0.0
21	OW2	103.10	103.00	15.0	0.0067	0.013	12.0	0.0	0.0
22	US1	102.50	102.20	30.0	0.0100	0.013	24.0	0.0	0.0

Summary for Subcatchment CB1: Post Dev. site northeasterly parking flow

Runoff = 0.78 cfs @ 12.07 hrs, Volume= 2,656 cf, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	6,390	98	Driveways, parkings, walkways
	1,230	74	>75% Grass cover, Good, HSG C
	7,620	94	Weighted Average
	1,230	74	16.14% Pervious Area
	6,390	98	83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB2: Post Dev. site northerly parking flow

Runoff = 1.67 cfs @ 12.07 hrs, Volume= 5,757 cf, Depth= 4.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	14,835	98	Driveways, parkings, walkways
	630	74	>75% Grass cover, Good, HSG C
	15,465	97	Weighted Average
	630	74	4.07% Pervious Area
	14,835	98	95.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB3: Post Dev. site westerly garage ramp flow

Runoff = 3.78 cfs @ 12.07 hrs, Volume= 13,074 cf, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	34,200	98	Driveways, parkings, walkways
	372	74	>75% Grass cover, Good, HSG C
	34,572	98	Weighted Average
	372	74	1.08% Pervious Area
	34,200	98	98.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB4: Post Dev. site westerly parking flow

Runoff = 1.85 cfs @ 12.07 hrs, Volume= 6,402 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	16,835	98	Driveways, parkings, walkways
	0	74	>75% Grass cover, Good, HSG C
	16,835	98	Weighted Average
	16,835	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB5: Post Dev. site southeasterly parking flow

Runoff = 1.56 cfs @ 12.18 hrs, Volume= 6,415 cf, Depth= 2.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	0	98	Buildings
*	7,133	98	Driveways, parkings, walkways
*	0	98	Other impervious
	13,817	74	>75% Grass cover, Good, HSG C
	4,860	82	Woods/grass comb., Poor, HSG C
	25,810	82	Weighted Average
	18,677	76	72.36% Pervious Area
	7,133	98	27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	50	0.0300	0.08		**Sheet Flow, SEGMENT AB**
					Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	140	0.0200	0.99		**Shallow Concentrated Flow, SEGMENT BC**
					Short Grass Pasture Kv= 7.0 fps
0.7	80	0.0100	2.03		**Shallow Concentrated Flow, SEGMENT CD**
					Paved Kv= 20.3 fps
13.0	270	Total			

Summary for Subcatchment CB6: Post Dev. site southwesterly parking flow

Runoff = 1.22 cfs @ 12.07 hrs, Volume= 4,221 cf, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	10,935	98	Driveways, parkings, walkways
	340	74	>75% Grass cover, Good, HSG C
	11,275	97	Weighted Average
	340	74	3.02% Pervious Area
	10,935	98	96.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CY: Post Dev. site proposed building courtyard area

Runoff = 0.21 cfs @ 12.08 hrs, Volume= 633 cf, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
2,890	79	50-75% Grass cover, Fair, HSG C
2,890	79	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment DWY: Post Dev. site southwest driveway

Runoff = 0.05 cfs @ 12.07 hrs, Volume= 190 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	500	98	Driveways, parkings, walkways
	0	74	>75% Grass cover, Good, HSG C
	500	98	Weighted Average
	500	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment eRF: Post Dev. site existing building roof area

Runoff = 2.26 cfs @ 12.01 hrs, Volume= 7,058 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	18,560	98	Buildings - existing
	18,560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment G1: Post Dev. site proposed garage upper deck area

Runoff = 2.22 cfs @ 12.07 hrs, Volume= 7,674 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	20,180	98	Buildings - proposed
	20,180	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment OC1: Post Dev. site northeasterly PL (at front) flow

Runoff = 0.31 cfs @ 12.08 hrs, Volume= 963 cf, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	0	98	Buildings
*	700	98	Driveways, parkings, walkways
*	0	98	Other impervious
	3,790	74	>75% Grass cover, Good, HSG C
	4,490	78	Weighted Average
	3,790	74	84.41% Pervious Area
	700	98	15.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment OC2: Post Dev. site easterly PL (at front) flow

Runoff = 0.73 cfs @ 12.08 hrs, Volume= 2,279 cf, Depth= 2.52"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	0	98	Buildings
*	1,450	98	Driveways, parkings, walkways
*	0	98	Other impervious
	9,400	74	>75% Grass cover, Good, HSG C
	10,850	77	Weighted Average
	9,400	74	86.64% Pervious Area
	1,450	98	13.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment pS1: Post Dev. site westerly PL (near Lot M) flow

Runoff = 1.08 cfs @ 12.41 hrs, Volume= 5,828 cf, Depth= 2.48"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	0	98	Buildings
*	0	98	Driveways, parkings, walkways
*	0	98	Other impervious
	16,580	74	>75% Grass cover, Good, HSG C
	11,600	82	Woods/grass comb., Poor, HSG C
	28,180	77	Weighted Average
	28,180	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0100	0.05		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
6.9	290	0.0100	0.70		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
6.4	270	0.0100	0.70		**Shallow Concentrated Flow, SEGMENT CD** Short Grass Pasture Kv= 7.0 fps
28.9	610	Total			

Summary for Subcatchment pS2: Post Dev. site southerly PL (near Lot P) flow

Runoff = 0.62 cfs @ 12.24 hrs, Volume= 2,877 cf, Depth= 2.93"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	0	98	Buildings - existing
*	0	98	Driveways, parkings, walkways - existing
*	3,620	98	Other impervious - existing
	8,160	74	>75% Grass cover, Good, HSG C
	0	82	Woods/grass comb., Poor, HSG C
	11,780	81	Weighted Average
	8,160	74	69.27% Pervious Area
	3,620	98	30.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0100	0.08		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 3.50"
6.9	290	0.0100	0.70		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
17.2	340	Total			

Summary for Subcatchment pS3: Post Dev. abutting Lot K - site northerly flow

Runoff = 0.64 cfs @ 12.21 hrs, Volume= 2,647 cf, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	0	98	Buildings
*	0	98	Driveways, parkings, walkways
*	0	98	Other impervious
	8,540	74	>75% Grass cover, Good, HSG C
	4,500	82	Woods/grass comb., Poor, HSG C
	13,040	77	Weighted Average
	13,040	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0250	0.08		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
4.3	300	0.0280	1.17		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
15.1	350	Total			

Summary for Subcatchment pS4: Post Dev. abutting Lot M - site southwesterly flow

Runoff = 5.37 cfs @ 12.11 hrs, Volume= 19,658 cf, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	0	98	Buildings
*	32,260	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	27,030	86	<50% Grass cover, Poor, HSG C
	59,290	93	Weighted Average
	27,030	86	45.59% Pervious Area
	32,260	98	54.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0200	0.11		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 3.50"
0.3	60	0.0200	2.87		**Shallow Concentrated Flow, SEGMENT BC** Paved Kv= 20.3 fps
8.2	110	Total			

Summary for Subcatchment RF1: Post Dev. site proposed building roof area

Runoff = 2.59 cfs @ 12.07 hrs, Volume= 8,946 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	23,525	98	Buildings - proposed
	23,525	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Pond A1: Analysis Pt - Post Dev. Site discharge contribution to the ex. drainage network (Analysis Pt Pond eA1)

Inflow Area = 304,862 sf, 62.69% Impervious, Inflow Depth = 3.43" for 10-year event
Inflow = 11.47 cfs @ 12.15 hrs, Volume= 87,082 cf
Primary = 11.47 cfs @ 12.15 hrs, Volume= 87,082 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Summary for Pond C1: Proposed catch basin CB1

Inflow Area = 12,110 sf, 58.55% Impervious, Inflow Depth = 3.59" for 10-year event
Inflow = 1.08 cfs @ 12.07 hrs, Volume= 3,619 cf
Outflow = 1.08 cfs @ 12.07 hrs, Volume= 3,619 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.08 cfs @ 12.07 hrs, Volume= 3,619 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.90' @ 12.10 hrs
Flood Elev= 109.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	106.20'	**12.0" Round Culvert** L= 140.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 106.20' / 105.25' S= 0.0068 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.94 cfs @ 12.07 hrs HW=106.88' TW=106.40' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.94 cfs @ 2.31 fps)

Summary for Pond C2: Proposed catch basin CB2

Inflow Area = 15,465 sf, 95.93% Impervious, Inflow Depth = 4.47" for 10-year event
Inflow = 1.67 cfs @ 12.07 hrs, Volume= 5,757 cf
Outflow = 1.67 cfs @ 12.07 hrs, Volume= 5,757 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.67 cfs @ 12.07 hrs, Volume= 5,757 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.70' @ 12.24 hrs
Flood Elev= 108.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.38'	**18.0" Round Culvert** L= 45.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.38' / 105.15' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=106.38' TW=106.40' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Summary for Pond C3: Proposed catch basin CB3

Inflow Area = 34,572 sf, 98.92% Impervious, Inflow Depth = 4.54" for 10-year event
Inflow = 3.78 cfs @ 12.07 hrs, Volume= 13,074 cf
Outflow = 3.78 cfs @ 12.07 hrs, Volume= 13,074 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.78 cfs @ 12.07 hrs, Volume= 13,074 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.62' @ 12.17 hrs
Flood Elev= 108.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.55'	**18.0" Round Culvert** L= 37.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.55' / 104.36' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=106.01' TW=106.16' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond C4: Proposed catch basin CB4

Inflow Area = 16,835 sf,100.00% Impervious, Inflow Depth = 4.56" for 10-year event
Inflow = 1.85 cfs @ 12.07 hrs, Volume= 6,402 cf
Outflow = 1.85 cfs @ 12.07 hrs, Volume= 6,402 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.85 cfs @ 12.07 hrs, Volume= 6,402 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.66' @ 12.12 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.50'	**18.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.50' / 104.40' S= 0.0167 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=105.57' TW=105.59' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond C5: Proposed catch basin CB5

Inflow Area = 25,810 sf, 27.64% Impervious, Inflow Depth = 2.98" for 10-year event
Inflow = 1.56 cfs @ 12.18 hrs, Volume= 6,415 cf
Outflow = 1.56 cfs @ 12.18 hrs, Volume= 6,415 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.18 hrs, Volume= 6,415 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.32' @ 12.14 hrs
Flood Elev= 108.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.39'	**18.0" Round Culvert** L= 21.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.39' / 104.17' S= 0.0101 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=4.97 cfs @ 12.18 hrs HW=106.14' TW=105.80' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 4.97 cfs @ 2.82 fps)

Summary for Pond C6: Proposed catch basin CB6

Inflow Area = 11,275 sf, 96.98% Impervious, Inflow Depth = 4.49" for 10-year event
Inflow = 1.22 cfs @ 12.07 hrs, Volume= 4,221 cf
Outflow = 1.22 cfs @ 12.07 hrs, Volume= 4,221 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 12.07 hrs, Volume= 4,221 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.92' @ 12.39 hrs
Flood Elev= 108.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.60'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.60' / 103.40' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.83 cfs @ 12.07 hrs HW=104.63' TW=104.59' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.83 cfs @ 1.06 fps)

Summary for Pond D1: Proposed drain manhole DMH1

Inflow Area = 51,100 sf, 88.94% Impervious, Inflow Depth = 4.30" for 10-year event
Inflow = 5.34 cfs @ 12.07 hrs, Volume= 18,323 cf
Outflow = 5.34 cfs @ 12.07 hrs, Volume= 18,323 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.34 cfs @ 12.07 hrs, Volume= 18,323 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.69' @ 12.20 hrs
Flood Elev= 109.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.05'	**24.0" Round Culvert** L= 157.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.05' / 104.25' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=4.07 cfs @ 12.07 hrs HW=106.40' TW=106.05' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.07 cfs @ 2.56 fps)

Summary for Pond D2: Proposed drain manhole DMH2

Inflow Area = 64,840 sf, 72.33% Impervious, Inflow Depth = 3.93" for 10-year event
Inflow = 6.27 cfs @ 12.07 hrs, Volume= 21,236 cf
Outflow = 6.27 cfs @ 12.07 hrs, Volume= 21,236 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.27 cfs @ 12.07 hrs, Volume= 21,236 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.61' @ 12.17 hrs
Flood Elev= 109.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.25'	**24.0" Round Culvert** L= 75.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.25' / 103.86' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=106.05' TW=106.17' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond D3: Proposed drain manhole DMH3

Inflow Area = 99,412 sf, 81.58% Impervious, Inflow Depth = 4.14" for 10-year event
Inflow = 10.06 cfs @ 12.07 hrs, Volume= 34,310 cf
Outflow = 10.06 cfs @ 12.07 hrs, Volume= 34,310 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.06 cfs @ 12.07 hrs, Volume= 34,310 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.55' @ 12.13 hrs
Flood Elev= 108.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.86'	**24.0" Round Culvert** L= 37.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.86' / 103.67' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=1.79 cfs @ 12.07 hrs HW=106.16' TW=106.15' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.79 cfs @ 0.57 fps)

Summary for Pond D4: Proposed drain manhole DMH4

Inflow Area = 125,222 sf, 70.46% Impervious, Inflow Depth = 3.90" for 10-year event
Inflow = 11.16 cfs @ 12.08 hrs, Volume= 40,725 cf
Outflow = 11.16 cfs @ 12.08 hrs, Volume= 40,725 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.16 cfs @ 12.08 hrs, Volume= 40,725 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.28' @ 12.10 hrs
Flood Elev= 108.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.67'	**24.0" Round Culvert** L= 16.2' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.67' / 103.50' S= 0.0105 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=9.27 cfs @ 12.08 hrs HW=106.20' TW=105.82' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 9.27 cfs @ 2.95 fps)

Summary for Pond D5: Proposed drain manhole DMH5

Inflow Area = 143,782 sf, 74.27% Impervious, Inflow Depth = 3.99" for 10-year event
Inflow = 12.77 cfs @ 12.07 hrs, Volume= 47,783 cf
Outflow = 12.77 cfs @ 12.07 hrs, Volume= 47,783 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.77 cfs @ 12.07 hrs, Volume= 47,783 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.83' @ 12.08 hrs
Flood Elev= 108.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**24.0" Round Culvert** L= 5.6' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.50' / 103.40' S= 0.0179 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=12.05 cfs @ 12.07 hrs HW=105.78' TW=105.15' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 12.05 cfs @ 3.84 fps)

Summary for Pond D5s: Proposed drain manhole DMH5 - Flow Splitter

Inflow Area = 143,782 sf, 74.27% Impervious, Inflow Depth = 3.99" for 10-year event
Inflow = 12.77 cfs @ 12.07 hrs, Volume= 47,783 cf
Outflow = 12.76 cfs @ 12.07 hrs, Volume= 47,747 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.92 cfs @ 12.04 hrs, Volume= 32,980 cf
Secondary = 10.05 cfs @ 12.07 hrs, Volume= 14,767 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.16' @ 12.07 hrs Surf.Area= 28 sf Storage= 86 cf
Flood Elev= 109.10' Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= 1.9 min calculated for 47,747 cf (100% of inflow)
Center-of-Mass det. time= 0.8 min (762.1 - 761.3)

Volume	Invert	Avail.Storage	Storage Description
#1	102.10'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	103.37'	**12.0" Round Culvert** L= 18.2' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.37' / 103.27' S= 0.0055 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Secondary	104.50'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.56 cfs @ 12.04 hrs HW=105.13' TW=104.67' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.56 cfs @ 3.26 fps)

Secondary OutFlow Max=9.91 cfs @ 12.07 hrs HW=105.15' TW=104.43' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 9.91 cfs @ 2.53 fps)

Summary for Pond D6: Proposed drain manhole DMH6

Inflow Area = 18,560 sf,100.00% Impervious, Inflow Depth = 4.56" for 10-year event
Inflow = 2.26 cfs @ 12.01 hrs, Volume= 7,058 cf
Outflow = 2.26 cfs @ 12.01 hrs, Volume= 7,058 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.26 cfs @ 12.01 hrs, Volume= 7,058 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.92' @ 12.11 hrs
Flood Elev= 110.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.00'	**18.0" Round Culvert** L= 95.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.00' / 104.00' S= 0.0105 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.67 cfs @ 12.01 hrs HW=105.81' TW=105.45' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.67 cfs @ 2.50 fps)

Summary for Pond D7: Proposed drain manhole DMH7

Inflow Area = 37,015 sf,100.00% Impervious, Inflow Depth = 4.56" for 10-year event
Inflow = 4.07 cfs @ 12.07 hrs, Volume= 14,076 cf
Outflow = 4.07 cfs @ 12.07 hrs, Volume= 14,076 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.07 cfs @ 12.07 hrs, Volume= 14,076 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.61' @ 12.09 hrs
Flood Elev= 108.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.40'	**18.0" Round Culvert** L= 136.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.40' / 103.71' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.73 cfs @ 12.07 hrs HW=105.59' TW=104.92' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 3.73 cfs @ 3.41 fps)

Summary for Pond D7s: Proposed drain manhole DMH7 - Flow Splitter

Inflow Area = 48,290 sf, 99.30% Impervious, Inflow Depth = 4.55" for 10-year event
Inflow = 5.29 cfs @ 12.07 hrs, Volume= 18,297 cf
Outflow = 5.29 cfs @ 12.07 hrs, Volume= 18,261 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.13 cfs @ 12.00 hrs, Volume= 13,823 cf
Secondary = 3.49 cfs @ 12.08 hrs, Volume= 4,438 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.91' @ 12.36 hrs Surf.Area= 28 sf Storage= 80 cf
Flood Elev= 108.35' Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= 3.8 min calculated for 18,261 cf (100% of inflow)
Center-of-Mass det. time= 1.8 min (749.9 - 748.1)

Volume	Invert	Avail.Storage	Storage Description
#1	102.10'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	103.37'	**12.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.37' / 103.27' S= 0.0167 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Secondary	104.25'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.65 cfs @ 12.00 hrs HW=104.45' TW=104.26' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.65 cfs @ 2.10 fps)

Secondary OutFlow Max=2.61 cfs @ 12.08 hrs HW=104.60' TW=104.48' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 2.61 cfs @ 1.26 fps)

Summary for Pond D8: Proposed drain manhole DMH8

Inflow Area = 37,015 sf,100.00% Impervious, Inflow Depth = 4.56" for 10-year event
Inflow = 4.07 cfs @ 12.07 hrs, Volume= 14,076 cf
Outflow = 4.07 cfs @ 12.07 hrs, Volume= 14,076 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.07 cfs @ 12.07 hrs, Volume= 14,076 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.95' @ 12.37 hrs
Flood Elev= 108.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.71'	**18.0" Round Culvert** L= 30.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.71' / 103.40' S= 0.0102 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.72 cfs @ 12.07 hrs HW=104.92' TW=104.59' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.72 cfs @ 3.31 fps)

Summary for Pond GDM1: Proposed in-line drain manhole GDMH1

Inflow Area = 20,180 sf,100.00% Impervious, Inflow Depth = 4.56" for 10-year event
Inflow = 2.22 cfs @ 12.07 hrs, Volume= 7,674 cf
Outflow = 2.22 cfs @ 12.07 hrs, Volume= 7,674 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.22 cfs @ 12.07 hrs, Volume= 7,674 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.94' @ 12.10 hrs
Flood Elev= 109.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.78'	**12.0" Round Culvert** L= 55.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.78' / 104.50' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.89 cfs @ 12.07 hrs HW=105.90' TW=105.59' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.89 cfs @ 2.67 fps)

Summary for Pond GDM2: Proposed in-line drain manhole GDMH2

Inflow Area = 20,180 sf,100.00% Impervious, Inflow Depth = 4.56" for 10-year event
Inflow = 2.22 cfs @ 12.07 hrs, Volume= 7,674 cf
Outflow = 2.22 cfs @ 12.07 hrs, Volume= 7,674 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.22 cfs @ 12.07 hrs, Volume= 7,674 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.19' @ 12.11 hrs
Flood Elev= 109.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.00'	**12.0" Round Culvert** L= 42.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.00' / 104.78' S= 0.0052 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.71 cfs @ 12.07 hrs HW=106.13' TW=105.90' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.71 cfs @ 2.41 fps)

Summary for Pond LS1: Post Dev. site westerly PL (near Lot M) perimeter landscaping

Inflow Area = 41,220 sf, 0.00% Impervious, Inflow Depth = 2.47" for 10-year event
Inflow = 1.55 cfs @ 12.33 hrs, Volume= 8,475 cf
Outflow = 1.00 cfs @ 12.65 hrs, Volume= 7,024 cf, Atten= 35%, Lag= 19.3 min
Discarded = 0.02 cfs @ 12.65 hrs, Volume= 2,414 cf
Primary = 0.98 cfs @ 12.65 hrs, Volume= 4,610 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.87' @ 12.65 hrs Surf.Area= 5,990 sf Storage= 3,282 cf
Flood Elev= 109.00' Surf.Area= 7,040 sf Storage= 4,102 cf

Plug-Flow detention time= 387.4 min calculated for 7,024 cf (83% of inflow)
Center-of-Mass det. time= 316.1 min (1,164.6 - 848.5)

Volume	Invert	Avail.Storage	Storage Description
#1	107.00'	4,102 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
107.00	310	0	0	310
108.00	810	540	540	817
108.25	2,040	345	885	2,047
109.00	7,040	3,217	4,102	7,050

Device	Routing	Invert	Outlet Devices
#1	Discarded	107.00'	**0.170 in/hr Exfiltration over Wetted area**
#2	Primary	108.80'	**20.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.02 cfs @ 12.65 hrs HW=108.87' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.98 cfs @ 12.65 hrs HW=108.87' TW=0.00' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.98 cfs @ 0.66 fps)

Summary for Pond LS2: Proposed landscaping site southerly PL (near Lot P) flow

Inflow Area = 11,780 sf, 30.73% Impervious, Inflow Depth = 2.93" for 10-year event
Inflow = 0.62 cfs @ 12.24 hrs, Volume= 2,877 cf
Outflow = 0.44 cfs @ 12.42 hrs, Volume= 2,609 cf, Atten= 29%, Lag= 11.2 min
Discarded = 0.01 cfs @ 12.42 hrs, Volume= 1,268 cf
Primary = 0.43 cfs @ 12.42 hrs, Volume= 1,342 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 107.84' @ 12.42 hrs Surf.Area= 2,798 sf Storage= 1,074 cf
Flood Elev= 108.00' Surf.Area= 3,440 sf Storage= 1,561 cf

Plug-Flow detention time= 437.6 min calculated for 2,607 cf (91% of inflow)
Center-of-Mass det. time= 391.3 min (1,197.8 - 806.5)

Volume	Invert	Avail.Storage	Storage Description
#1	107.20'	1,561 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
107.20	640	0	0	640
107.25	750	35	35	750
107.50	1,620	289	324	1,621
108.00	3,440	1,237	1,561	3,443

Device	Routing	Invert	Outlet Devices
#1	Discarded	107.20'	**0.170 in/hr Exfiltration over Wetted area**
#2	Primary	107.80'	**20.0' long x 4.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.01 cfs @ 12.42 hrs HW=107.84' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.43 cfs @ 12.42 hrs HW=107.84' TW=0.00' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.43 cfs @ 0.50 fps)

Summary for Pond OCB: Proposed catch basin OCB1

Inflow Area = 4,490 sf, 15.59% Impervious, Inflow Depth = 2.57" for 10-year event
Inflow = 0.31 cfs @ 12.08 hrs, Volume= 963 cf
Outflow = 0.31 cfs @ 12.08 hrs, Volume= 963 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.08 hrs, Volume= 963 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 107.78' @ 12.08 hrs
Flood Elev= 111.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.50'	**12.0" Round Culvert** L= 95.6' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 107.50' / 106.45' S= 0.0110 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.29 cfs @ 12.08 hrs HW=107.78' TW=106.89' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.29 cfs @ 2.50 fps)

Summary for Pond OW1: Proposed OW Separator-1

Inflow Area = 143,782 sf, 74.27% Impervious, Inflow Depth = 2.75" for 10-year event
Inflow = 2.92 cfs @ 12.04 hrs, Volume= 32,980 cf
Outflow = 2.92 cfs @ 12.04 hrs, Volume= 32,980 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.92 cfs @ 12.04 hrs, Volume= 32,980 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.97' @ 12.29 hrs
Flood Elev= 108.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.10'	**12.0" Round Culvert** L= 15.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.10' / 103.00' S= 0.0067 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.43 cfs @ 12.04 hrs HW=104.67' TW=104.26' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.43 cfs @ 3.10 fps)

Summary for Pond OW2: Proposed OW Separator-2

Inflow Area = 48,290 sf, 99.30% Impervious, Inflow Depth = 3.44" for 10-year event
Inflow = 2.13 cfs @ 12.00 hrs, Volume= 13,823 cf
Outflow = 2.13 cfs @ 12.00 hrs, Volume= 13,823 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.13 cfs @ 12.00 hrs, Volume= 13,823 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.16' @ 12.50 hrs
Flood Elev= 108.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.10'	**12.0" Round Culvert** L= 15.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.10' / 103.00' S= 0.0067 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.62 cfs @ 12.00 hrs HW=104.26' TW=104.08' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.62 cfs @ 2.06 fps)

Summary for Pond US1: Proposed underground stormwater storage system-1

Inflow Area = 192,072 sf, 80.57% Impervious, Inflow Depth = 4.12" for 10-year event
Inflow = 18.04 cfs @ 12.07 hrs, Volume= 66,008 cf
Outflow = 7.23 cfs @ 12.32 hrs, Volume= 66,010 cf, Atten= 60%, Lag= 14.8 min
Discarded = 0.05 cfs @ 3.24 hrs, Volume= 4,728 cf
Primary = 7.18 cfs @ 12.32 hrs, Volume= 61,281 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 104.91' @ 12.32 hrs Surf.Area= 12,638 sf Storage= 21,251 cf
Flood Elev= 106.00' Surf.Area= 12,638 sf Storage= 27,637 cf

Plug-Flow detention time= 93.4 min calculated for 65,955 cf (100% of inflow)
Center-of-Mass det. time= 93.6 min (852.3 - 758.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	102.50'	11,065 cf	**58.50'W x 216.04'L x 3.50'H Field A** 44,234 cf Overall - 16,572 cf Embedded = 27,662 cf x 40.0% Voids
#2A	103.00'	16,572 cf	**ADS_StormTech SC-740** x 360 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 12 rows
		27,637 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	102.50'	**24.0" Round Culvert - Discharge Pipe** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 102.50' / 102.20' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	105.30'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	103.50'	**16.0" Vert. Orifice/Grate - Low flow outlet** C= 0.600
#4	Device 1	102.50'	**6.0" Vert. Orifice/Grate - Underdrain flow outlet** C= 0.600
#5	Discarded	102.50'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.05 cfs @ 3.24 hrs HW=102.54' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.05 cfs)

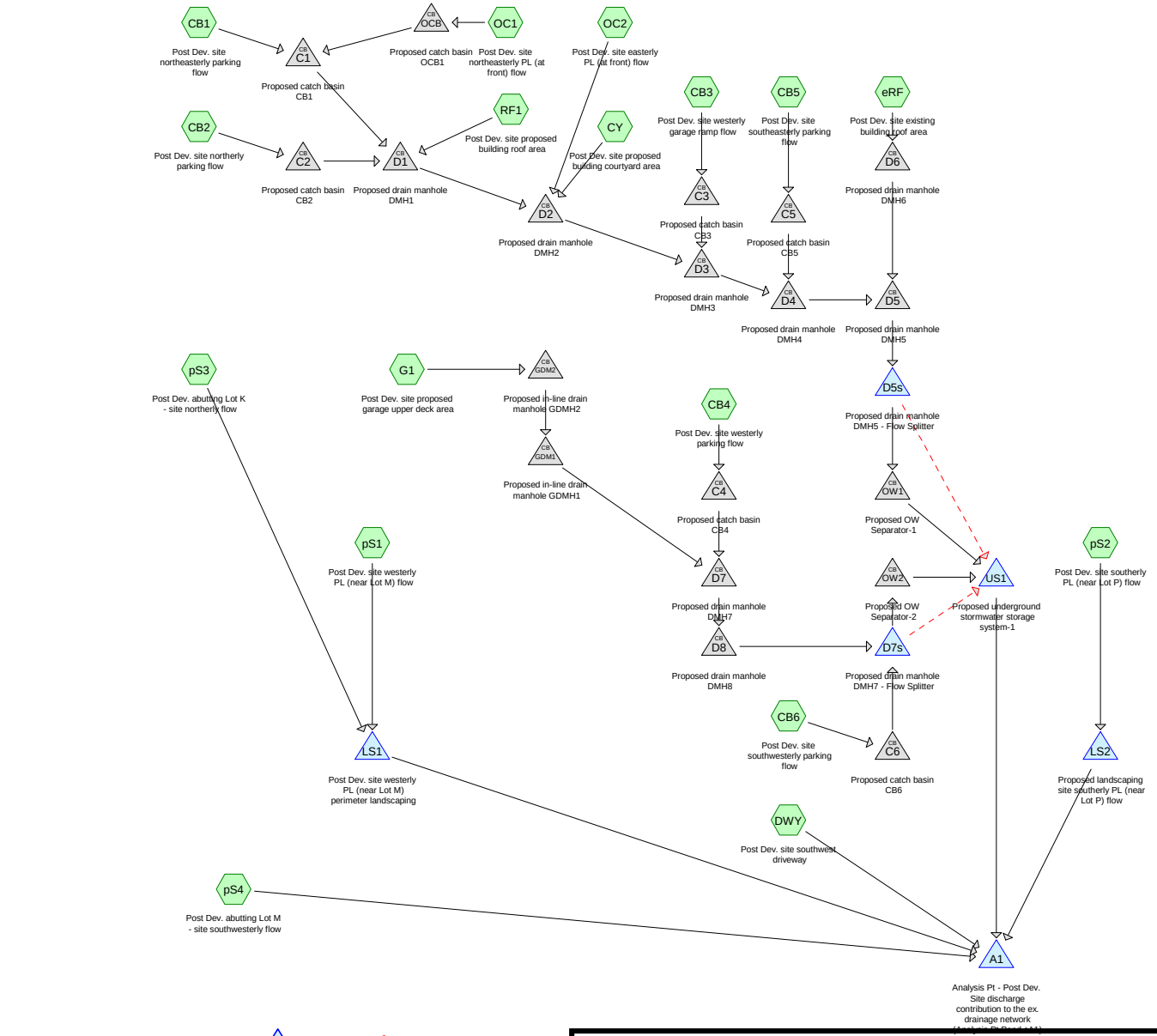
Primary OutFlow Max=7.18 cfs @ 12.32 hrs HW=104.91' TW=0.00' (Dynamic Tailwater)
└**1=Culvert - Discharge Pipe** (Passes 7.18 cfs of 16.98 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  ├**3=Orifice/Grate - Low flow outlet** (Orifice Controls 5.79 cfs @ 4.15 fps)
  └**4=Orifice/Grate - Underdrain flow outlet** (Orifice Controls 1.39 cfs @ 7.08 fps)

POST-DEVELOPMENT

STORMWATER

CALCULATIONS

100 YEAR EVENT



Routing Diagram for 14225 HydroCAD_Pre-Post_rev2_c10-10-2019

Prepared by {enter your company name here}, Printed 12/3/2019

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Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
2,890	79	50-75% Grass cover, Fair, HSG C (CY)
27,030	86	<50% Grass cover, Poor, HSG C (pS4)
62,859	74	>75% Grass cover, Good, HSG C (CB1, CB2, CB3, CB5, CB6, OC1, OC2, pS1, pS2, pS3)
18,560	98	Buildings - existing (eRF)
43,705	98	Buildings - proposed (G1, RF1)
92,978	98	Driveways, parkings, walkways (CB1, CB2, CB3, CB4, CB5, CB6, DWY, OC1, OC2)
32,260	98	Driveways, parkings, walkways - existing (pS4)
3,620	98	Other impervious - existing (pS2)
20,960	82	Woods/grass comb., Poor, HSG C (CB5, pS1, pS3)
304,862	**91**	**TOTAL AREA**

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	C1	106.20	105.25	140.5	0.0068	0.013	12.0	0.0	0.0
2	C2	105.38	105.15	45.5	0.0051	0.013	18.0	0.0	0.0
3	C3	104.55	104.36	37.8	0.0050	0.013	18.0	0.0	0.0
4	C4	104.50	104.40	6.0	0.0167	0.013	18.0	0.0	0.0
5	C5	104.39	104.17	21.8	0.0101	0.013	18.0	0.0	0.0
6	C6	103.60	103.40	4.0	0.0500	0.013	12.0	0.0	0.0
7	D1	105.05	104.25	157.3	0.0051	0.013	24.0	0.0	0.0
8	D2	104.25	103.86	75.8	0.0051	0.013	24.0	0.0	0.0
9	D3	103.86	103.67	37.3	0.0051	0.013	24.0	0.0	0.0
10	D4	103.67	103.50	16.2	0.0105	0.013	24.0	0.0	0.0
11	D5	103.50	103.40	5.6	0.0179	0.013	24.0	0.0	0.0
12	D5s	103.37	103.27	18.2	0.0055	0.013	12.0	0.0	0.0
13	D6	105.00	104.00	95.0	0.0105	0.013	18.0	0.0	0.0
14	D7	104.40	103.71	136.7	0.0050	0.013	18.0	0.0	0.0
15	D7s	103.37	103.27	6.0	0.0167	0.013	12.0	0.0	0.0
16	D8	103.71	103.40	30.4	0.0102	0.013	18.0	0.0	0.0
17	GDM1	104.78	104.50	55.4	0.0051	0.013	12.0	0.0	0.0
18	GDM2	105.00	104.78	42.7	0.0052	0.013	12.0	0.0	0.0
19	OCB	107.50	106.45	95.6	0.0110	0.013	12.0	0.0	0.0
20	OW1	103.10	103.00	15.0	0.0067	0.013	12.0	0.0	0.0
21	OW2	103.10	103.00	15.0	0.0067	0.013	12.0	0.0	0.0
22	US1	102.50	102.20	30.0	0.0100	0.013	24.0	0.0	0.0

Summary for Subcatchment CB1: Post Dev. site northeasterly parking flow

Runoff = 1.08 cfs @ 12.07 hrs, Volume= 3,704 cf, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	6,390	98	Driveways, parkings, walkways
	1,230	74	>75% Grass cover, Good, HSG C
	7,620	94	Weighted Average
	1,230	74	16.14% Pervious Area
	6,390	98	83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB2: Post Dev. site northerly parking flow

Runoff = 2.28 cfs @ 12.07 hrs, Volume= 7,930 cf, Depth= 6.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	14,835	98	Driveways, parkings, walkways
	630	74	>75% Grass cover, Good, HSG C
	15,465	97	Weighted Average
	630	74	4.07% Pervious Area
	14,835	98	95.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB3: Post Dev. site westerly garage ramp flow

Runoff = 5.14 cfs @ 12.07 hrs, Volume= 17,957 cf, Depth= 6.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	34,200	98	Driveways, parkings, walkways
	372	74	>75% Grass cover, Good, HSG C
	34,572	98	Weighted Average
	372	74	1.08% Pervious Area
	34,200	98	98.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB4: Post Dev. site westerly parking flow

Runoff = 2.51 cfs @ 12.07 hrs, Volume= 8,784 cf, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	16,835	98	Driveways, parkings, walkways
	0	74	>75% Grass cover, Good, HSG C
	16,835	98	Weighted Average
	16,835	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CB5: Post Dev. site southeasterly parking flow

Runoff = 2.36 cfs @ 12.18 hrs, Volume= 9,673 cf, Depth= 4.50"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	7,133	98	Driveways, parkings, walkways
*	0	98	Other impervious
	13,817	74	>75% Grass cover, Good, HSG C
	4,860	82	Woods/grass comb., Poor, HSG C
	25,810	82	Weighted Average
	18,677	76	72.36% Pervious Area
	7,133	98	27.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	50	0.0300	0.08		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	140	0.0200	0.99		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
0.7	80	0.0100	2.03		**Shallow Concentrated Flow, SEGMENT CD** Paved Kv= 20.3 fps
13.0	270	Total			

Summary for Subcatchment CB6: Post Dev. site southwesterly parking flow

Runoff = 1.67 cfs @ 12.07 hrs, Volume= 5,808 cf, Depth= 6.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	10,935	98	Driveways, parkings, walkways
	340	74	>75% Grass cover, Good, HSG C
	11,275	97	Weighted Average
	340	74	3.02% Pervious Area
	10,935	98	96.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment CY: Post Dev. site proposed building courtyard area

Runoff = 0.33 cfs @ 12.08 hrs, Volume= 994 cf, Depth= 4.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

Area (sf)	CN	Description
2,890	79	50-75% Grass cover, Fair, HSG C
2,890	79	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment DWY: Post Dev. site southwest driveway

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 261 cf, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	500	98	Driveways, parkings, walkways
	0	74	>75% Grass cover, Good, HSG C
	500	98	Weighted Average
	500	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment eRF: Post Dev. site existing building roof area

Runoff = 3.07 cfs @ 12.01 hrs, Volume= 9,684 cf, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	18,560	98	Buildings - existing
	18,560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment G1: Post Dev. site proposed garage upper deck area

Runoff = 3.01 cfs @ 12.07 hrs, Volume= 10,530 cf, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	20,180	98	Buildings - proposed
	20,180	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment OC1: Post Dev. site northeasterly PL (at front) flow

Runoff = 0.48 cfs @ 12.08 hrs, Volume= 1,505 cf, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	700	98	Driveways, parkings, walkways
*	0	98	Other impervious
	3,790	74	>75% Grass cover, Good, HSG C
	4,490	78	Weighted Average
	3,790	74	84.41% Pervious Area
	700	98	15.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment OC2: Post Dev. site easterly PL (at front) flow

Runoff = 1.15 cfs @ 12.08 hrs, Volume= 3,584 cf, Depth= 3.96"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	1,450	98	Driveways, parkings, walkways
*	0	98	Other impervious
	9,400	74	>75% Grass cover, Good, HSG C
	10,850	77	Weighted Average
	9,400	74	86.64% Pervious Area
	1,450	98	13.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Subcatchment pS1: Post Dev. site westerly PL (near Lot M) flow

Runoff = 1.72 cfs @ 12.40 hrs, Volume= 9,276 cf, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	0	98	Driveways, parkings, walkways
*	0	98	Other impervious
	16,580	74	>75% Grass cover, Good, HSG C
	11,600	82	Woods/grass comb., Poor, HSG C
	28,180	77	Weighted Average
	28,180	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0100	0.05		**Sheet Flow, SEGMENT AB**
					Woods: Light underbrush n= 0.400 P2= 3.50"
6.9	290	0.0100	0.70		**Shallow Concentrated Flow, SEGMENT BC**
					Short Grass Pasture Kv= 7.0 fps
6.4	270	0.0100	0.70		**Shallow Concentrated Flow, SEGMENT CD**
					Short Grass Pasture Kv= 7.0 fps
28.9	610	Total			

Summary for Subcatchment pS2: Post Dev. site southerly PL (near Lot P) flow

Runoff = 0.95 cfs @ 12.23 hrs, Volume= 4,343 cf, Depth= 4.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	0	98	Buildings - existing
*	0	98	Driveways, parkings, walkways - existing
*	3,620	98	Other impervious - existing
	8,160	74	>75% Grass cover, Good, HSG C
	0	82	Woods/grass comb., Poor, HSG C
	11,780	81	Weighted Average
	8,160	74	69.27% Pervious Area
	3,620	98	30.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0100	0.08		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 3.50"
6.9	290	0.0100	0.70		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
17.2	340	Total			

Summary for Subcatchment pS3: Post Dev. abutting Lot K - site northerly flow

Runoff = 1.03 cfs @ 12.21 hrs, Volume= 4,232 cf, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	0	98	Driveways, parkings, walkways
*	0	98	Other impervious
	8,540	74	>75% Grass cover, Good, HSG C
	4,500	82	Woods/grass comb., Poor, HSG C
	13,040	77	Weighted Average
	13,040	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0250	0.08		**Sheet Flow, SEGMENT AB** Woods: Light underbrush n= 0.400 P2= 3.50"
4.3	300	0.0280	1.17		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
15.1	350	Total			

Summary for Subcatchment pS4: Post Dev. abutting Lot M - site southwesterly flow

Runoff = 7.53 cfs @ 12.11 hrs, Volume= 27,839 cf, Depth= 5.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	0	98	Buildings
*	32,260	98	Driveways, parkings, walkways - existing
*	0	98	Other impervious - existing
	27,030	86	<50% Grass cover, Poor, HSG C
	59,290	93	Weighted Average
	27,030	86	45.59% Pervious Area
	32,260	98	54.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0200	0.11		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 3.50"
0.3	60	0.0200	2.87		**Shallow Concentrated Flow, SEGMENT BC** Paved Kv= 20.3 fps
8.2	110	Total			

Summary for Subcatchment RF1: Post Dev. site proposed building roof area

Runoff = 3.51 cfs @ 12.07 hrs, Volume= 12,275 cf, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-year, Newton Rainfall=6.50"

	Area (sf)	CN	Description
*	23,525	98	Buildings - proposed
	23,525	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SEGMENT AB**

Summary for Pond A1: Analysis Pt - Post Dev. Site discharge contribution to the ex. drainage network (Analysis Pt Pond eA1)

Inflow Area = 304,862 sf, 62.69% Impervious, Inflow Depth = 5.04" for 100-year, Newton event
Inflow = 21.21 cfs @ 12.18 hrs, Volume= 127,916 cf
Primary = 21.21 cfs @ 12.18 hrs, Volume= 127,916 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Summary for Pond C1: Proposed catch basin CB1

Inflow Area = 12,110 sf, 58.55% Impervious, Inflow Depth = 5.16" for 100-year, Newton event
Inflow = 1.56 cfs @ 12.07 hrs, Volume= 5,209 cf
Outflow = 1.56 cfs @ 12.07 hrs, Volume= 5,209 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.07 hrs, Volume= 5,209 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.43' @ 12.24 hrs
Flood Elev= 109.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	106.20'	**12.0" Round Culvert** L= 140.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 106.20' / 105.25' S= 0.0068 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.20 cfs @ 12.07 hrs HW=107.12' TW=106.78' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.20 cfs @ 2.08 fps)

Summary for Pond C2: Proposed catch basin CB2

Inflow Area = 15,465 sf, 95.93% Impervious, Inflow Depth = 6.15" for 100-year, Newton event
Inflow = 2.28 cfs @ 12.07 hrs, Volume= 7,930 cf
Outflow = 2.28 cfs @ 12.07 hrs, Volume= 7,930 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.28 cfs @ 12.07 hrs, Volume= 7,930 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.38' @ 12.24 hrs
Flood Elev= 108.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.38'	**18.0" Round Culvert** L= 45.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.38' / 105.15' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=106.67' TW=106.77' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond C3: Proposed catch basin CB3

Inflow Area = 34,572 sf, 98.92% Impervious, Inflow Depth = 6.23" for 100-year, Newton event
Inflow = 5.14 cfs @ 12.07 hrs, Volume= 17,957 cf
Outflow = 5.14 cfs @ 12.07 hrs, Volume= 17,957 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.14 cfs @ 12.07 hrs, Volume= 17,957 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.30' @ 12.16 hrs
Flood Elev= 108.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.55'	**18.0" Round Culvert** L= 37.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.55' / 104.36' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=106.86' TW=107.42' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond C4: Proposed catch basin CB4

Inflow Area = 16,835 sf,100.00% Impervious, Inflow Depth = 6.26" for 100-year, Newton event
Inflow = 2.51 cfs @ 12.07 hrs, Volume= 8,784 cf
Outflow = 2.51 cfs @ 12.07 hrs, Volume= 8,784 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.51 cfs @ 12.07 hrs, Volume= 8,784 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.96' @ 12.12 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.50'	**18.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.50' / 104.40' S= 0.0167 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=105.82' TW=105.87' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond C5: Proposed catch basin CB5

Inflow Area = 25,810 sf, 27.64% Impervious, Inflow Depth = 4.50" for 100-year, Newton event
Inflow = 2.36 cfs @ 12.18 hrs, Volume= 9,673 cf
Outflow = 2.36 cfs @ 12.18 hrs, Volume= 9,673 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.36 cfs @ 12.18 hrs, Volume= 9,673 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 107.68' @ 12.14 hrs
Flood Elev= 108.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.39'	**18.0" Round Culvert** L= 21.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.39' / 104.17' S= 0.0101 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=6.57 cfs @ 12.18 hrs HW=107.37' TW=106.78' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 6.57 cfs @ 3.72 fps)

Summary for Pond C6: Proposed catch basin CB6

Inflow Area = 11,275 sf, 96.98% Impervious, Inflow Depth = 6.18" for 100-year, Newton event
Inflow = 1.67 cfs @ 12.07 hrs, Volume= 5,808 cf
Outflow = 1.67 cfs @ 12.07 hrs, Volume= 5,808 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.67 cfs @ 12.07 hrs, Volume= 5,808 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.77' @ 12.28 hrs
Flood Elev= 108.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.60'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.60' / 103.40' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.61 cfs @ 12.07 hrs HW=104.93' TW=104.91' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.61 cfs @ 0.78 fps)

Summary for Pond D1: Proposed drain manhole DMH1

Inflow Area = 51,100 sf, 88.94% Impervious, Inflow Depth = 5.97" for 100-year, Newton event
Inflow = 7.35 cfs @ 12.07 hrs, Volume= 25,414 cf
Outflow = 7.35 cfs @ 12.07 hrs, Volume= 25,414 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.35 cfs @ 12.07 hrs, Volume= 25,414 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.36' @ 12.20 hrs
Flood Elev= 109.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.05'	**24.0" Round Culvert** L= 157.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.05' / 104.25' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=106.78' TW=106.85' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond D2: Proposed drain manhole DMH2

Inflow Area = 64,840 sf, 72.33% Impervious, Inflow Depth = 5.55" for 100-year, Newton event
Inflow = 8.83 cfs @ 12.07 hrs, Volume= 29,993 cf
Outflow = 8.83 cfs @ 12.07 hrs, Volume= 29,993 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.83 cfs @ 12.07 hrs, Volume= 29,993 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.29' @ 12.16 hrs
Flood Elev= 109.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.25'	**24.0" Round Culvert** L= 75.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.25' / 103.86' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=106.87' TW=107.45' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond D3: Proposed drain manhole DMH3

Inflow Area = 99,412 sf, 81.58% Impervious, Inflow Depth = 5.79" for 100-year, Newton event
Inflow = 13.97 cfs @ 12.07 hrs, Volume= 47,950 cf
Outflow = 13.97 cfs @ 12.07 hrs, Volume= 47,950 cf, Atten= 0%, Lag= 0.0 min
Primary = 13.97 cfs @ 12.07 hrs, Volume= 47,950 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.16' @ 12.13 hrs
Flood Elev= 108.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.86'	**24.0" Round Culvert** L= 37.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.86' / 103.67' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=2.60 cfs @ 12.07 hrs HW=107.44' TW=107.41' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.60 cfs @ 0.83 fps)

Summary for Pond D4: Proposed drain manhole DMH4

Inflow Area = 125,222 sf, 70.46% Impervious, Inflow Depth = 5.52" for 100-year, Newton event
Inflow = 15.67 cfs @ 12.08 hrs, Volume= 57,623 cf
Outflow = 15.67 cfs @ 12.08 hrs, Volume= 57,623 cf, Atten= 0%, Lag= 0.0 min
Primary = 15.67 cfs @ 12.08 hrs, Volume= 57,623 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 107.64' @ 12.10 hrs
Flood Elev= 108.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.67'	**24.0" Round Culvert** L= 16.2' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.67' / 103.50' S= 0.0105 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=13.70 cfs @ 12.08 hrs HW=107.50' TW=106.68' (Dynamic Tailwater)
1=Culvert (Inlet Controls 13.70 cfs @ 4.36 fps)

Summary for Pond D5: Proposed drain manhole DMH5

Inflow Area = 143,782 sf, 74.27% Impervious, Inflow Depth = 5.62" for 100-year, Newton event
Inflow = 17.84 cfs @ 12.07 hrs, Volume= 67,307 cf
Outflow = 17.84 cfs @ 12.07 hrs, Volume= 67,307 cf, Atten= 0%, Lag= 0.0 min
Primary = 17.84 cfs @ 12.07 hrs, Volume= 67,307 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.69' @ 12.08 hrs
Flood Elev= 108.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.50'	**24.0" Round Culvert** L= 5.6' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.50' / 103.40' S= 0.0179 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=16.88 cfs @ 12.07 hrs HW=106.63' TW=105.38' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 16.88 cfs @ 5.37 fps)

Summary for Pond D5s: Proposed drain manhole DMH5 - Flow Splitter

Inflow Area = 143,782 sf, 74.27% Impervious, Inflow Depth = 5.62" for 100-year, Newton event
Inflow = 17.84 cfs @ 12.07 hrs, Volume= 67,307 cf
Outflow = 17.82 cfs @ 12.07 hrs, Volume= 67,271 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.79 cfs @ 12.44 hrs, Volume= 41,680 cf
Secondary = 15.47 cfs @ 12.07 hrs, Volume= 25,592 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.78' @ 12.24 hrs Surf.Area= 28 sf Storage= 104 cf
Flood Elev= 109.10' Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= 1.0 min calculated for 67,215 cf (100% of inflow)
Center-of-Mass det. time= 0.7 min (757.6 - 757.0)

Volume	Invert	Avail.Storage	Storage Description
#1	102.10'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	103.37'	**12.0" Round Culvert** L= 18.2' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.37' / 103.27' S= 0.0055 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Secondary	104.50'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.00 cfs @ 12.44 hrs HW=105.47' TW=107.07' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=12.16 cfs @ 12.07 hrs HW=105.39' TW=105.10' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 12.16 cfs @ 2.28 fps)

Summary for Pond D6: Proposed drain manhole DMH6

Inflow Area = 18,560 sf,100.00% Impervious, Inflow Depth = 6.26" for 100-year, Newton event
Inflow = 3.07 cfs @ 12.01 hrs, Volume= 9,684 cf
Outflow = 3.07 cfs @ 12.01 hrs, Volume= 9,684 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.07 cfs @ 12.01 hrs, Volume= 9,684 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.73' @ 12.12 hrs
Flood Elev= 110.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.00'	**18.0" Round Culvert** L= 95.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.00' / 104.00' S= 0.0105 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.01 hrs HW=106.06' TW=106.07' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond D7: Proposed drain manhole DMH7

Inflow Area = 37,015 sf,100.00% Impervious, Inflow Depth = 6.26" for 100-year, Newton event
Inflow = 5.53 cfs @ 12.07 hrs, Volume= 19,314 cf
Outflow = 5.53 cfs @ 12.07 hrs, Volume= 19,314 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.53 cfs @ 12.07 hrs, Volume= 19,314 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.92' @ 12.30 hrs
Flood Elev= 108.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.40'	**18.0" Round Culvert** L= 136.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.40' / 103.71' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=4.94 cfs @ 12.07 hrs HW=105.87' TW=105.19' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.94 cfs @ 3.55 fps)

Summary for Pond D7s: Proposed drain manhole DMH7 - Flow Splitter

Inflow Area = 48,290 sf, 99.30% Impervious, Inflow Depth = 6.24" for 100-year, Newton event
Inflow = 7.19 cfs @ 12.07 hrs, Volume= 25,122 cf
Outflow = 7.16 cfs @ 12.07 hrs, Volume= 25,086 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.94 cfs @ 12.32 hrs, Volume= 17,264 cf
Secondary = 5.65 cfs @ 12.07 hrs, Volume= 7,822 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.74' @ 12.24 hrs Surf.Area= 28 sf Storage= 103 cf
Flood Elev= 108.35' Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.5 min (744.8 - 743.4)

Volume	Invert	Avail.Storage	Storage Description
#1	102.10'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	103.37'	**12.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.37' / 103.27' S= 0.0167 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Secondary	104.25'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.00 cfs @ 12.32 hrs HW=104.57' TW=106.27' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.07 hrs HW=104.91' TW=105.11' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond D8: Proposed drain manhole DMH8

Inflow Area = 37,015 sf,100.00% Impervious, Inflow Depth = 6.26" for 100-year, Newton event
Inflow = 5.53 cfs @ 12.07 hrs, Volume= 19,314 cf
Outflow = 5.53 cfs @ 12.07 hrs, Volume= 19,314 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.53 cfs @ 12.07 hrs, Volume= 19,314 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.80' @ 12.27 hrs
Flood Elev= 108.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.71'	**18.0" Round Culvert** L= 30.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.71' / 103.40' S= 0.0102 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=4.35 cfs @ 12.07 hrs HW=105.19' TW=104.91' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 4.35 cfs @ 3.09 fps)

Summary for Pond GDM1: Proposed in-line drain manhole GDMH1

Inflow Area = 20,180 sf,100.00% Impervious, Inflow Depth = 6.26" for 100-year, Newton event
Inflow = 3.01 cfs @ 12.07 hrs, Volume= 10,530 cf
Outflow = 3.01 cfs @ 12.07 hrs, Volume= 10,530 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.01 cfs @ 12.07 hrs, Volume= 10,530 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.52' @ 12.09 hrs
Flood Elev= 109.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.78'	**12.0" Round Culvert** L= 55.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.78' / 104.50' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.63 cfs @ 12.07 hrs HW=106.43' TW=105.87' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.63 cfs @ 3.34 fps)

Summary for Pond GDM2: Proposed in-line drain manhole GDMH2

Inflow Area = 20,180 sf,100.00% Impervious, Inflow Depth = 6.26" for 100-year, Newton event
Inflow = 3.01 cfs @ 12.07 hrs, Volume= 10,530 cf
Outflow = 3.01 cfs @ 12.07 hrs, Volume= 10,530 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.01 cfs @ 12.07 hrs, Volume= 10,530 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.96' @ 12.11 hrs
Flood Elev= 109.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	105.00'	**12.0" Round Culvert** L= 42.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 105.00' / 104.78' S= 0.0052 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.03 cfs @ 12.07 hrs HW=106.73' TW=106.43' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.03 cfs @ 2.58 fps)

Summary for Pond LS1: Post Dev. site westerly PL (near Lot M) perimeter landscaping

Inflow Area = 41,220 sf, 0.00% Impervious, Inflow Depth = 3.93" for 100-year, Newton event
Inflow = 2.47 cfs @ 12.32 hrs, Volume= 13,507 cf
Outflow = 2.31 cfs @ 12.45 hrs, Volume= 12,051 cf, Atten= 7%, Lag= 7.7 min
Discarded = 0.03 cfs @ 12.45 hrs, Volume= 2,472 cf
Primary = 2.28 cfs @ 12.45 hrs, Volume= 9,578 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.93' @ 12.45 hrs Surf.Area= 6,444 sf Storage= 3,629 cf
Flood Elev= 109.00' Surf.Area= 7,040 sf Storage= 4,102 cf

Plug-Flow detention time= 244.3 min calculated for 12,051 cf (89% of inflow)
Center-of-Mass det. time= 192.9 min (1,028.0 - 835.1)

Volume	Invert	Avail.Storage	Storage Description
#1	107.00'	4,102 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
107.00	310	0	0	310
108.00	810	540	540	817
108.25	2,040	345	885	2,047
109.00	7,040	3,217	4,102	7,050

Device	Routing	Invert	Outlet Devices
#1	Discarded	107.00'	**0.170 in/hr Exfiltration over Wetted area**
#2	Primary	108.80'	**20.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.03 cfs @ 12.45 hrs HW=108.93' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=2.28 cfs @ 12.45 hrs HW=108.93' TW=0.00' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 2.28 cfs @ 0.88 fps)

Summary for Pond LS2: Proposed landscaping site southerly PL (near Lot P) flow

Inflow Area = 11,780 sf, 30.73% Impervious, Inflow Depth = 4.42" for 100-year, Newton event
Inflow = 0.95 cfs @ 12.23 hrs, Volume= 4,343 cf
Outflow = 0.91 cfs @ 12.29 hrs, Volume= 4,073 cf, Atten= 4%, Lag= 3.2 min
Discarded = 0.01 cfs @ 12.29 hrs, Volume= 1,302 cf
Primary = 0.90 cfs @ 12.29 hrs, Volume= 2,771 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 107.87' @ 12.29 hrs Surf.Area= 2,905 sf Storage= 1,152 cf
Flood Elev= 108.00' Surf.Area= 3,440 sf Storage= 1,561 cf

Plug-Flow detention time= 295.9 min calculated for 4,073 cf (94% of inflow)
Center-of-Mass det. time= 261.6 min (1,061.9 - 800.3)

Volume	Invert	Avail.Storage	Storage Description
#1	107.20'	1,561 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
107.20	640	0	0	640
107.25	750	35	35	750
107.50	1,620	289	324	1,621
108.00	3,440	1,237	1,561	3,443

Device	Routing	Invert	Outlet Devices
#1	Discarded	107.20'	**0.170 in/hr Exfiltration over Wetted area**
#2	Primary	107.80'	**20.0' long x 4.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.01 cfs @ 12.29 hrs HW=107.87' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.89 cfs @ 12.29 hrs HW=107.87' TW=0.00' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.89 cfs @ 0.63 fps)

Summary for Pond OCB: Proposed catch basin OCB1

Inflow Area = 4,490 sf, 15.59% Impervious, Inflow Depth = 4.02" for 100-year, Newton event
Inflow = 0.48 cfs @ 12.08 hrs, Volume= 1,505 cf
Outflow = 0.48 cfs @ 12.08 hrs, Volume= 1,505 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.48 cfs @ 12.08 hrs, Volume= 1,505 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 108.44' @ 12.28 hrs
Flood Elev= 111.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.50'	**12.0" Round Culvert** L= 95.6' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 107.50' / 106.45' S= 0.0110 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.44 cfs @ 12.08 hrs HW=107.86' TW=107.13' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.44 cfs @ 2.57 fps)

Summary for Pond OW1: Proposed OW Separator-1

Inflow Area = 143,782 sf, 74.27% Impervious, Inflow Depth = 3.48" for 100-year, Newton event
Inflow = 4.79 cfs @ 12.44 hrs, Volume= 41,680 cf
Outflow = 4.79 cfs @ 12.44 hrs, Volume= 41,680 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.79 cfs @ 12.44 hrs, Volume= 41,680 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 107.19' @ 12.45 hrs
Flood Elev= 108.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.10'	**12.0" Round Culvert** L= 15.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.10' / 103.00' S= 0.0067 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=4.89 cfs @ 12.44 hrs HW=107.07' TW=105.40' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.89 cfs @ 6.22 fps)

Summary for Pond OW2: Proposed OW Separator-2

Inflow Area = 48,290 sf, 99.30% Impervious, Inflow Depth = 4.29" for 100-year, Newton event
Inflow = 2.94 cfs @ 12.32 hrs, Volume= 17,264 cf
Outflow = 2.94 cfs @ 12.32 hrs, Volume= 17,264 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.94 cfs @ 12.32 hrs, Volume= 17,264 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 106.46' @ 12.33 hrs
Flood Elev= 108.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.10'	**12.0" Round Culvert** L= 15.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 103.10' / 103.00' S= 0.0067 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.07 cfs @ 12.32 hrs HW=106.27' TW=105.61' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.07 cfs @ 3.91 fps)

Summary for Pond US1: Proposed underground stormwater storage system-1

Inflow Area = 192,072 sf, 80.57% Impervious, Inflow Depth = 5.77" for 100-year, Newton event
Inflow = 24.97 cfs @ 12.07 hrs, Volume= 92,357 cf
Outflow = 14.42 cfs @ 12.20 hrs, Volume= 92,360 cf, Atten= 42%, Lag= 8.0 min
Discarded = 0.05 cfs @ 2.32 hrs, Volume= 4,893 cf
Primary = 14.37 cfs @ 12.20 hrs, Volume= 87,467 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 105.74' @ 12.20 hrs Surf.Area= 12,638 sf Storage= 26,321 cf
Flood Elev= 106.00' Surf.Area= 12,638 sf Storage= 27,637 cf

Plug-Flow detention time= 84.8 min calculated for 92,283 cf (100% of inflow)
Center-of-Mass det. time= 85.0 min (839.2 - 754.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	102.50'	11,065 cf	**58.50'W x 216.04'L x 3.50'H Field A** 44,234 cf Overall - 16,572 cf Embedded = 27,662 cf x 40.0% Voids
#2A	103.00'	16,572 cf	**ADS_StormTech SC-740** x 360 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 12 rows
		27,637 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	102.50'	**24.0" Round Culvert - Discharge Pipe** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 102.50' / 102.20' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	105.30'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	103.50'	**16.0" Vert. Orifice/Grate - Low flow outlet** C= 0.600
#4	Device 1	102.50'	**6.0" Vert. Orifice/Grate - Underdrain flow outlet** C= 0.600
#5	Discarded	102.50'	**0.170 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.05 cfs @ 2.32 hrs HW=102.54' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=14.33 cfs @ 12.20 hrs HW=105.74' TW=0.00' (Dynamic Tailwater)
└**1=Culvert - Discharge Pipe** (Passes 14.33 cfs of 22.63 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Weir Controls 4.27 cfs @ 1.95 fps)
  ├**3=Orifice/Grate - Low flow outlet** (Orifice Controls 8.43 cfs @ 6.03 fps)
  └**4=Orifice/Grate - Underdrain flow outlet** (Orifice Controls 1.63 cfs @ 8.32 fps)

Pond US1: Proposed underground stormwater storage system-1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 12 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

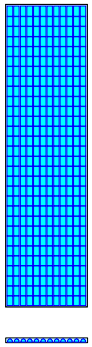
30 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 214.04' Row Length +12.0" End Stone x 2 = 216.04' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

360 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 12 Rows = 16,572.5 cf Chamber Storage

44,234.2 cf Field - 16,572.5 cf Chambers = 27,661.7 cf Stone x 40.0% Voids = 11,064.7 cf Stone Storage

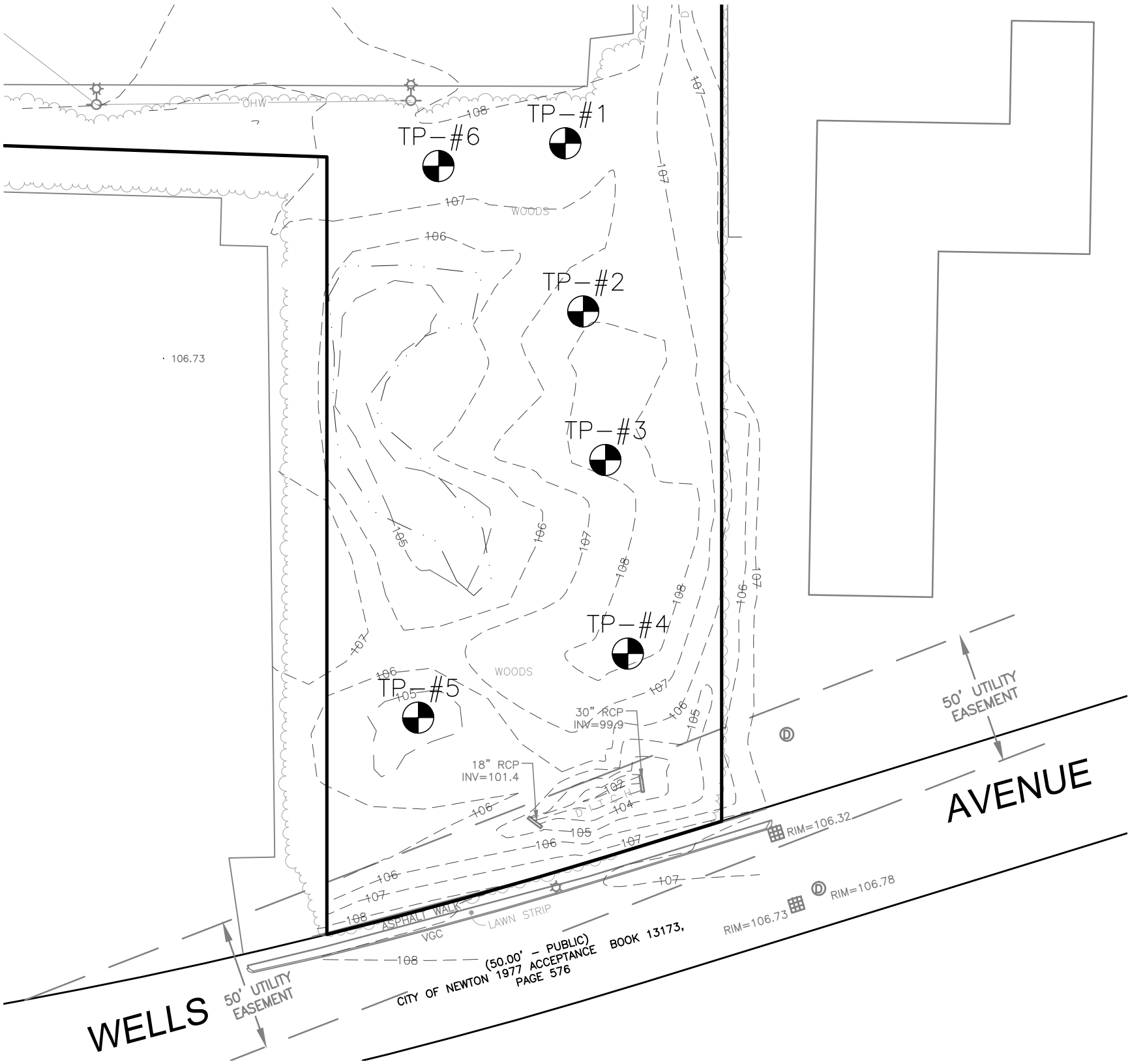
Chamber Storage + Stone Storage = 27,637.2 cf = 0.634 af
Overall Storage Efficiency = 62.5%
Overall System Size = 216.04' x 58.50' x 3.50'

360 Chambers
1,638.3 cy Field
1,024.5 cy Stone



SITE SOILS

INFORMATION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OHW
WOODS
WOODS
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18" RCP
INV=101.4
RIM=106.32
RIM=106.73
RIM=106.78
ASPHALT WALK
LAWN STRIP
VGC
50' UTILITY EASEMENT
50' UTILITY EASEMENT
(50.00' – PUBLIC)
CITY OF NEWTON 1977 ACCEPTANCE BOOK 13173, PAGE 576
WELLS AVENUE

Commonwealth of Massachusetts
City/Town of Newton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Intrum
Owner Name

180 Wells Ave
Street Address

Map/Lot #

Newton
City

MA
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☒ Yes ☐ No If yes: NRCS (Source) 656 (Soil Map Unit)

Urban Land
Soil Name

loamy fine sands
Soil Limitations

Geologic/Parent Material

Landform

3. Surficial Geological Report Available? ☐ Yes ☐ No If yes:

Year Published/Source | Publication | Map Unit

4. Flood Rate Insurance Map

Above the 500-year flood boundary? ☒ Yes ☐ No
If Yes, continue to #5.

Within the 500-year flood boundary? ☐ Yes ☒ No

Within the 100-year flood boundary? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No

MassGIS Wetland Data Layer:

Wetland Type

7. Current Water Resource Conditions (USGS): April (Month/Year) Range: ☐ Above Normal ☒ Normal ☐ Below Normal

8. Other references reviewed:

Commonwealth of Massachusetts
City/Town of Newton
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: 1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10	A		-	-	0	Sandy Loam					
10-14	B		-	-	0	Loamy Sand					
14-108	C1		-	-	0	Coarse Sand & Gravel			Loose		

Additional Notes:

Weeping at 72", no mottling observed, percolation test performed at 36" depth, rate < 2 mpi

Commonwealth of Massachusetts
City/Town of Newton
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: 2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10	A		-	-	0	Sandy Loam					
10-36	B		-	-	0	Loamy Sand					
36-58	C1		-	-	0	Loamy Sand					silty
58-61	C2					Sandy Loam / Organic					
61-84	C3					Loamy Coarse Sand					silty

Additional Notes:

Weeping at 58", no mottling observed, possible fill area or historical river flood plain

C. On-Site Review (continued)

Deep Observation Hole Number: 3

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-108	Fill		80	-	0	Fill / Organics					

Additional Notes:

Weeping at 96", mottling observed at 80", possible fill area or historical river flood plain

Commonwealth of Massachusetts
City/Town of Newton
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: 4

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-54	Fill		-	-	0	Fill / Organics					
54-60	O/A					Organics / Sandy Loam					
60-112	C		68			Fine Sand / Loamy Sand					silty

Additional Notes:

Weeping at 110", mottling observed at 68", possible fill area or historical river flood plain

C. On-Site Review (continued)

Deep Observation Hole Number: 5

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-72	Fill		-	-	0	Fill / Organics					
72-108	C					Fine Sand			Firm		Silty

Additional Notes:

Weeping at 72", no mottling observed, possible fill area or historical river flood plain

Commonwealth of Massachusetts
City/Town of Newton
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C. On-Site Review (continued)

Deep Observation Hole Number: 6

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6	O/A		-	-	0	Organics					
6-70	Fill					Fill					
70-80	A					Sandy Loam					
80-100	C					Fine Sand			Firm		

Additional Notes:

Weeping at 70", no mottling observed, possible fill area or historical river flood plain

Commonwealth of Massachusetts
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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

6-2-15
Date

Daniel C Mulloy, PE. / SE #1702
Typed or Printed Name of Soil Evaluator / License #

6/30/2016
Expiration Date of License

Name of Board of Health Witness

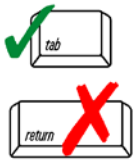
Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of Newton
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Site Information

Intrum
Owner Name

180 Wells Ave
Street Address or Lot #

Newton	MA	
City/Town	State	Zip Code

Dan Mulloy, PE, Site Design Engineering LLC	508-503-3500
Contact Person (if different from Owner)	Telephone Number

B. Test Results

	Date	Time	Date	Time
	5/19/15	am		
Observation Hole #	1			
Depth of Perc	36"			
Start Pre-Soak	9:15			
End Pre-Soak	25 gallons in less than			
Time at 12”	15 minutes			
Time at 9”				
Time at 6”				
Time (9”-6”)				
Rate (Min./Inch)	< 2			
	Test Passed: ☒ Test Failed: ☐		Test Passed: ☐ Test Failed: ☐	

Dan Mulloy, PE, Site Design Engineering LLC
Test Performed By:

Witnessed By:

Comments:

Percolation rate determined to be less than 2 minutes per inch by use of 25 gallons in perc hole in less than 15 minutes

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Middlesex County, Massachusetts

January 26, 2015

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

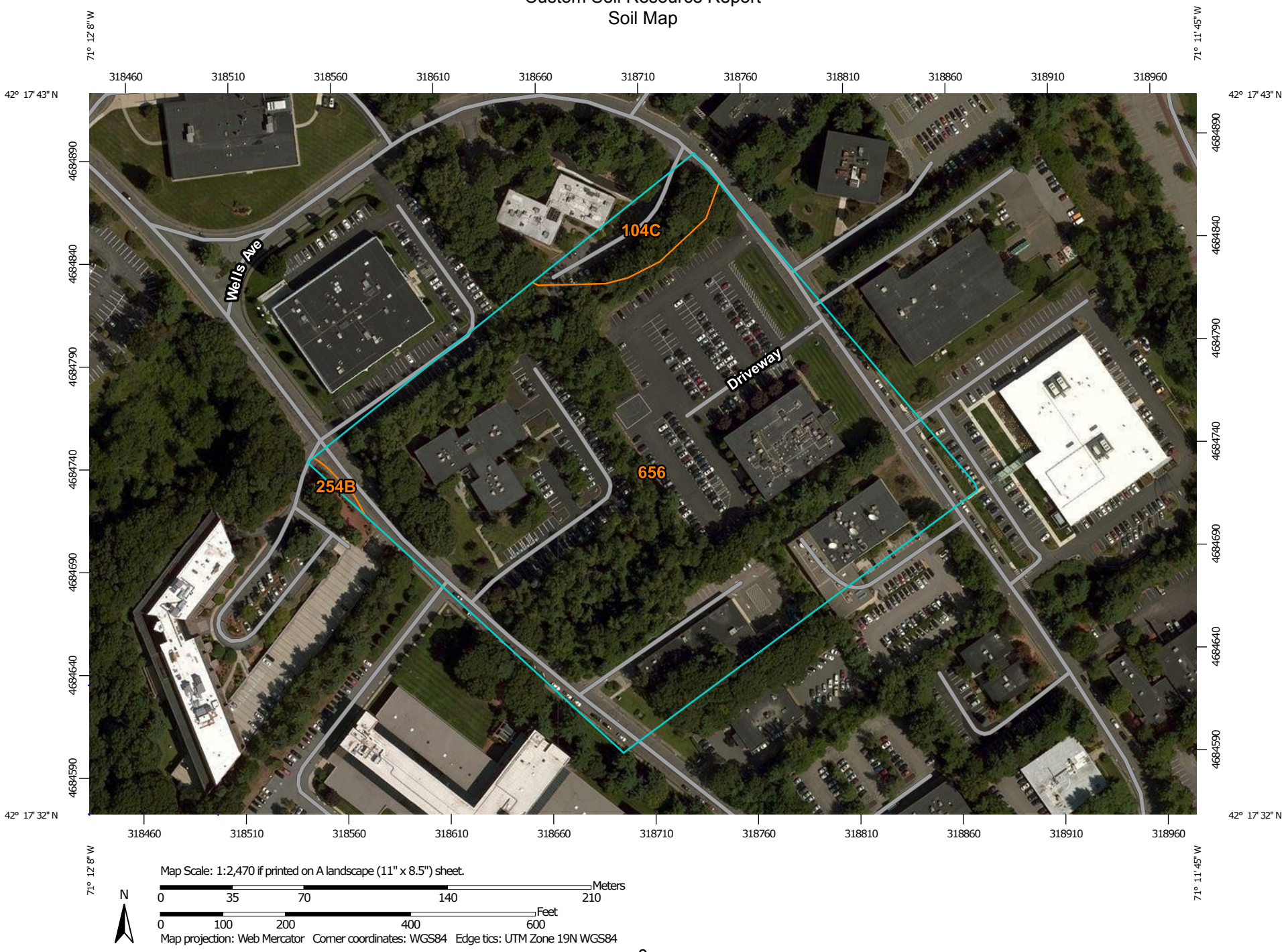
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 14, Sep 19, 2014

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

Date(s) aerial images were photographed: Aug 10, 2014—Aug 25, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Middlesex County, Massachusetts (MA017)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
104C	Hollis-Rock outcrop-Charlton complex, 3 to 15 percent slopes	0.6	4.9%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	0.0	0.3%
656	Udorthents-Urban land complex	11.3	94.8%
Totals for Area of Interest		**11.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments

on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Middlesex County, Massachusetts

104C—Hollis-Rock outcrop-Charlton complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: vqp2
Elevation: 0 to 1,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 110 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 30 percent
Hollis and similar soils: 30 percent
Charlton and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Toeslope, backslope
Landform position (three-dimensional): Crest, head slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable, shallow loamy basal till over granite and gneiss

Typical profile

H1 - 0 to 2 inches: fine sandy loam
H2 - 2 to 14 inches: fine sandy loam
H3 - 14 to 18 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D

Description of Rock Outcrop

Setting

Landform: Ledges
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Granite and gneiss

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s

Description of Charlton

Setting

Landform: Hills, swales
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable loamy eolian deposits over friable loamy basal till derived from granite and gneiss

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 22 inches: sandy loam
H3 - 22 to 65 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A

Minor Components

Canton

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Head slope
Down-slope shape: Convex
Across-slope shape: Convex

Scituate

Percent of map unit: 3 percent

Landform: Depressions, hillslopes
Landform position (two-dimensional): Toeslope, summit
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Linear
Across-slope shape: Concave

Montauk

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Nose slope, head slope
Down-slope shape: Convex
Across-slope shape: Convex

Unnamed

Percent of map unit: 1 percent

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash terraces, eskers, moraines, outwash plains, kames
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand

2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Eskers, deltas, outwash plains, kames
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear

Windsor

Percent of map unit: 3 percent
Landform: Outwash terraces, deltas, outwash plains, dunes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex

Agawam

Percent of map unit: 2 percent
Landform: Outwash terraces, eskers, moraines, outwash plains, stream terraces, kames
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex

656—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 995k
Elevation: 0 to 3,000 feet
Mean annual precipitation: 32 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 110 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 40 percent
Udorthents and similar soils: 40 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Excavated and filled land

Minor Components

Canton

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Convex

Merrimac

Percent of map unit: 5 percent
Landform: Terraces, plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Convex

Paxton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex

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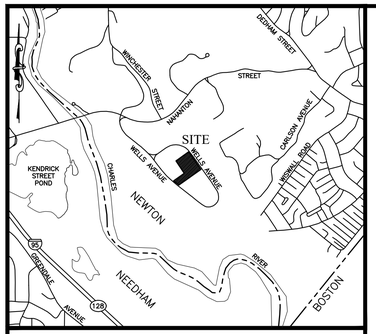
WATERSHED

PLANS



LOCUS NOT TO SCALE

LEGEND

- SUBCATCHMENT AREA
- POND / STRUCTURE
- REACH / CHANNEL
- Tc–FLOWPATH POST–DEVELOPMENT (A START – B END)
- Tc–FLOWPATH PRE–DEVELOPMENT (A START – B END)
- POST–DEVELOPMENT SUBCATCHMENT BOUNDARY
- PRE–DEVELOPMENT SUBCATCHMENT BOUNDARY

GENERAL NOTES:

1. EXISTING CONDITIONS INFORMATION WAS COMPILED FROM AN ON THE GROUND SURVEY PERFORMED BY R. E. CAMERON AND ASSOCIATES, INC. AND SUPPLEMENTED WITH RECORD PLAN INFORMATION.
2. ELEVATIONS ARE REFERENCED TO AN ASSUMED DATUM.
3. THIS PLAN AND ANY ACCOMPANYING CERTIFICATIONS DO NOT CONSTITUTE A CERTIFICATION OF TITLE TO THE PROPERTY DISPLAYED HEREON. THE OWNER OF LOCUS AND ABUTTING PROPERTIES ARE SHOWN ACCORDING TO CURRENT TOWN ASSESSORS RECORDS.
4. EXISTING UTILITY LINES SHOWN ON THIS PLAN ARE FROM AVAILABLE INFORMATION AND ARE APPROXIMATE LOCATIONS. THERE MAY BE EXISTING LINES OTHER THAN THOSE INDICATED. SITE DESIGN ENGINEERING, LLC. ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER PUBLIC UTILITY ENGINEERING DEPARTMENT SHOULD BE CONSULTED.

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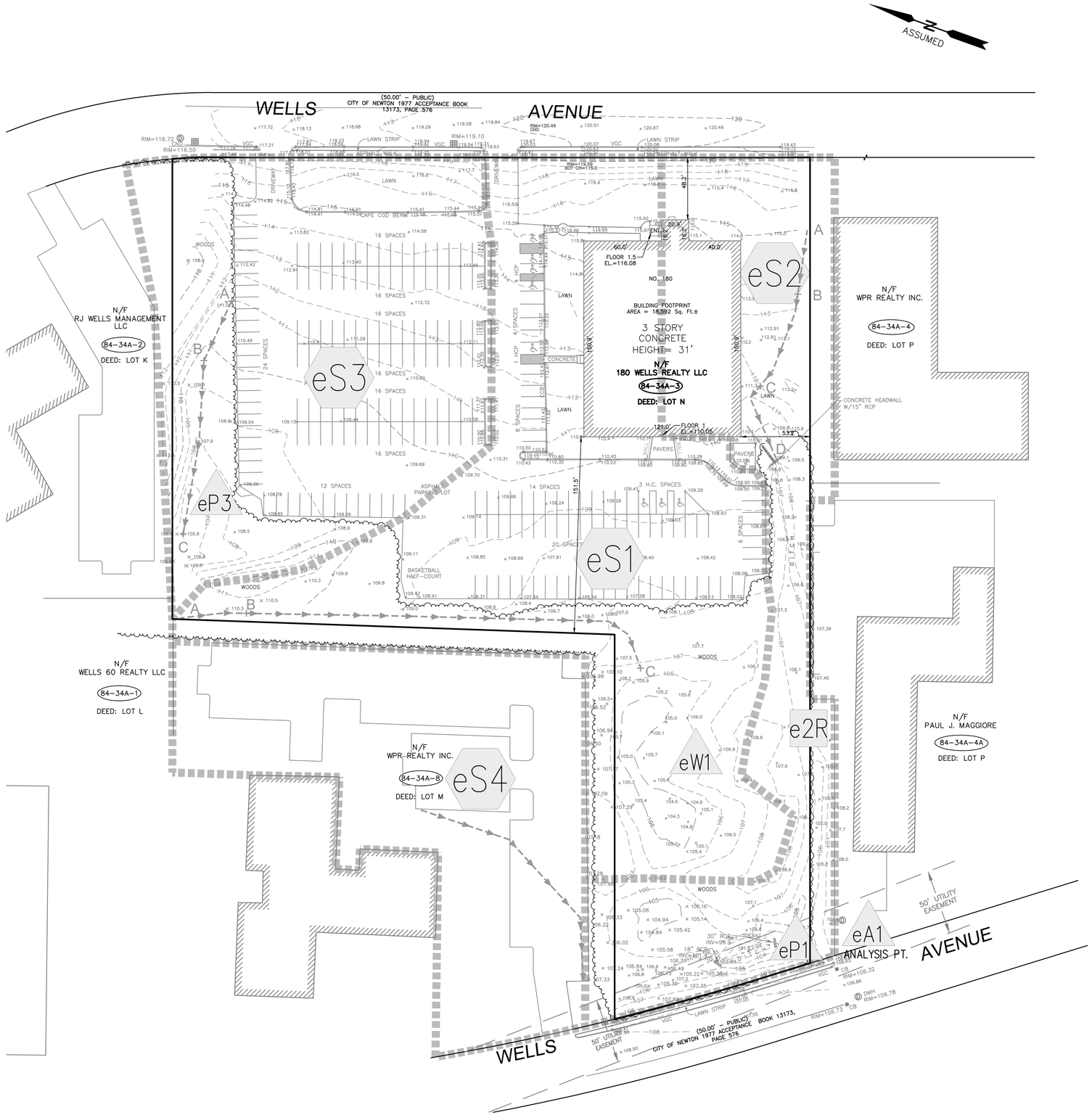
SCALE: 1 INCH = 40 FEET



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NO.	DATE	DESCRIPTION	APPROVED

PLAN REVISIONS

DATE: JUNE 3, 2015

DRAWN BY:	DESIGN BY:	CHECK BY:
SKD	DCM	DCM

PROJECT NO. 14225

ISSUED FOR: REVIEW

COMMONWEALTH OF MASSACHUSETTS
DANIEL C. MULLOY
CIVIL
No. 41757
REGISTERED PROFESSIONAL ENGINEER

WATERSHED PLAN

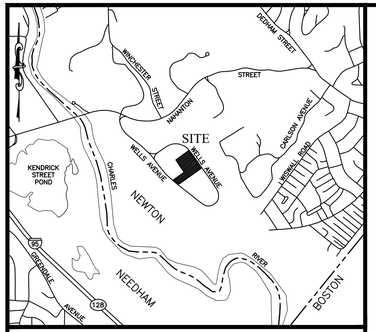
180 WELLS AVENUE
ASSESSOR'S MAP 160NW, PARCEL 84034A0003
NEWTON, MASSACHUSETTS

PREPARED FOR INTRUM REAL ESTATE MANAGEMENT & DEVELOPMENT

DRAWING TITLE: PRE-DEVELOPMENT PLAN

SCALE: 1"=40'

SHEET NO. 1 OF 1



LOCUS NOT TO SCALE

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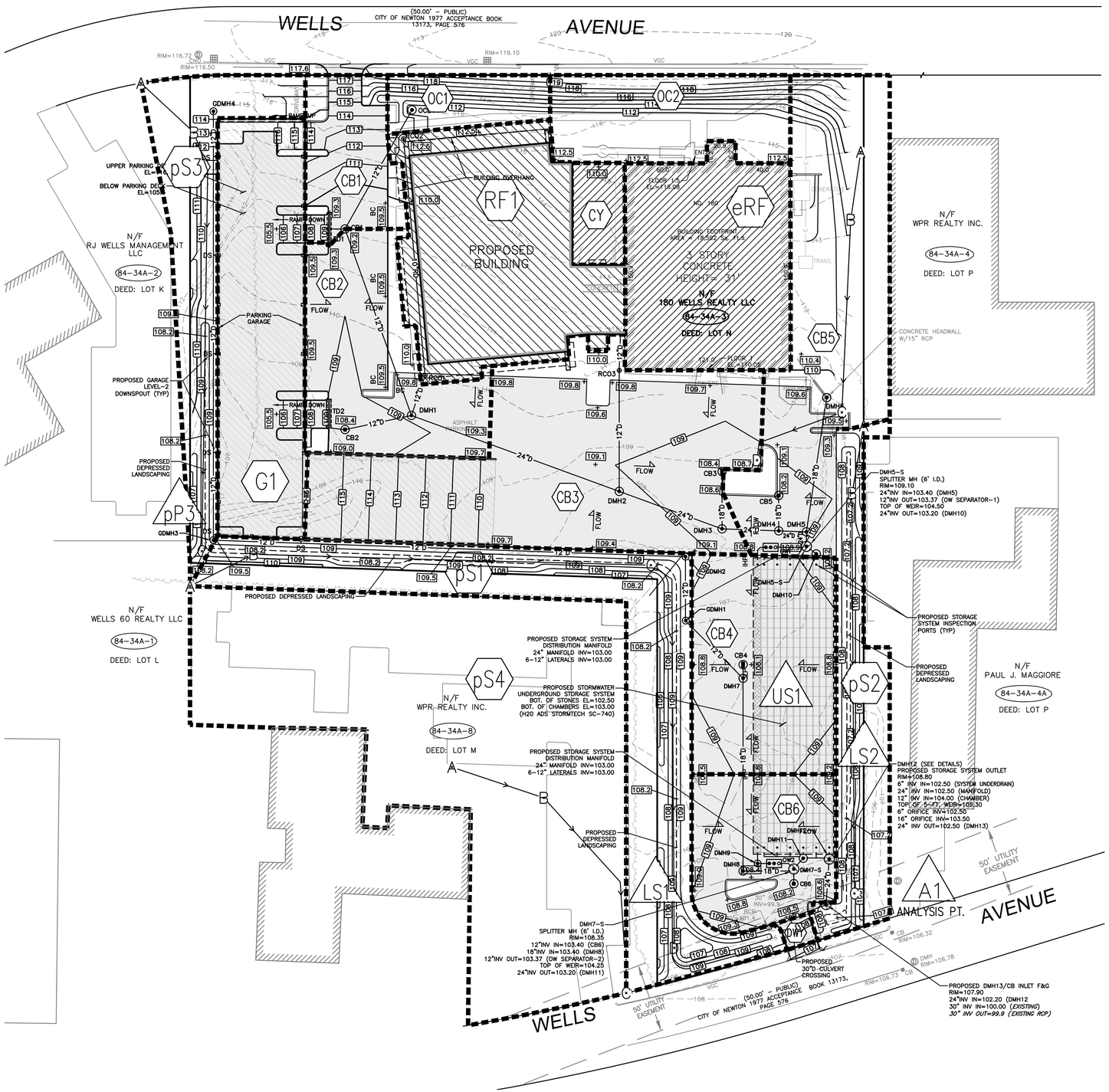
LEGEND

- pS8 — SUBCATCHMENT AREA
- pP8 — POND / STRUCTURE
- pR8 — REACH
- A → Tc–FLOWPATH → B (START / END)
- SUBCATCHMENT BOUNDARY

ASSUMED N



PROPOSED DRAINAGE STRUCTURES PIPE & ELEVATION SCHEDULE

FROM STRUCTURE	RIM ELEV.	INVERT OUT	INVERT IN	TO STRUCTURE	PIPE SIZE IN & OUT (INCH.)	LENGTH (FT.)	SLOPE (FT./FT.)	CLASS
OCB1	111.50	107.50	106.45	CB1	12	95.6	0.0110	HDPE
TD1	109.30	106.65	106.55	CB1	8	9.0	0.0111	HDPE
CB1	109.20	106.20	105.25	DMH1	12	140.5	0.0068	HDPE
TD2	109.00	106.00	105.88	CB2	12	9.0	0.0133	HDPE
CB2	108.40	105.38	105.15	DMH1	18	45.5	0.0051	HDPE
CB3	108.40	104.55	104.36	DMH3	18	78.3	0.0050	HDPE
CB4	108.00	104.50	104.40	DMH7	18	6.0	0.0167	HDPE
CB5	108.20	104.39	104.17	DMH4	18	21.8	0.0101	HDPE
CB6	108.20	103.60	103.40	DMH7–S	12	4.0	0.0500	HDPE
RC02	112.50	108.75	106.10	RC01	10	172.0	0.0154	HDPE
RC01	109.75	106.00	105.25	DMH1	12	28.8	0.0260	HDPE
DMH1	109.10	105.05	104.25	DMH2	24	157.3	0.0051	HDPE
BUILDING	–	106.00	105.60	RCO3	12	26.0	0.0154	HDPE
RCO3	109.75	105.60	104.50	DMH2	12	108.8	0.0100	HDPE
DMH2	109.00	104.25	103.86	DMH3	24	75.8	0.0051	HDPE
DMH3	108.80	103.86	103.67	DMH4	24	37.3	0.0051	HDPE
DMH4	108.55	103.67	103.50	DMH5	24	16.2	0.0105	HDPE
DMH5	108.90	103.50	103.40	DMH5–S	24	5.6	0.0179	HDPE
DMH6	110.00	105.00	104.00	DMH5	18	95.0	0.0105	HDPE
DMH8	108.50	103.71	103.40	DMH7–S	18	30.4	0.0102	HDPE
DMH9	108.10	104.40	103.71	DMH8	18	136.7	0.0050	HDPE
GDMH–4	115.00	108.60	107.00	GDMH–3	12	315.0	0.0051	HDPE
GDMH–3	109.50	106.95	105.00	GDMH–2	12	340.5	0.0057	HDPE
GDMH–2	109.00	105.00	104.78	GDMH–1	12	42.7	0.0052	HDPE
GDMH–1	109.00	104.78	104.50	DMH7	12	22.0	0.0051	HDPE
DMH5–S	109.10	103.37	103.27	OW1	12	18.2	0.0055	HDPE
		103.20	103.10	DMH10	24	4.0	0.0250	HDPE
OW1	108.85	103.10	103.00	CHAMBERS	12	13.0	0.0067	HDPE
DMH7–S	108.35	103.37	103.27	OW2	12	10.0	0.0050	HDPE
		103.20	103.10	DMH11	18	6.0	0.0167	HDPE
OW2	108.35	103.10	103.00	DMH9	12	5.0	0.0200	HDPE
DMH9	108.45	103.00	103.00	CHAMBERS	12	6.0	0.0000	HDPE
DMH10	109.10	103.00	103.00	MANIFOLD	(2)24	VAR	0.0000	HDPE
		103.00	103.00	CHAMBERS	12	3.0	0.0000	HDPE
DMH11	108.45	103.00	103.00	MANIFOLD	24	27.0	0.0000	HDPE
		103.00	103.00	CHAMBERS	12	3.0	0.0000	HDPE
		103.00	102.50	DMH12	24	14.0	0.0357	HDPE
DMH12	108.80	102.50	102.50	SYSTEM UNDERDRAIN	6	3.0	0.0000	HDPE
		102.50	102.20	DMH13	24	30.0	0.0100	HDPE
DMH13	107.90	*99.90*	–	*EXISTING*	*30*	–	–	*RCP*

DRAINAGE NOTES:

ALL DRAIN PIPING 10" DIA. AND GREATER TO BE HDPE SMOOTH WALL INTERIOR. ALL DRAIN PIPING UNDER 10" DIA. TO BE SDR–35.

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NO.	DATE	DESCRIPTION	APPROVED
2	10/10/2019	REVISED PER PARKING & DRAINAGE LAYOUT CHANGE	DCM
1	2/15/2019	REVISED PER PARKING & DRAINAGE LAYOUT CHANGE	DCM

PLAN REVISIONS

DATE: JUNE 3, 2015

DRAWN BY:	DESIGN BY:	CHECK BY:
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POST-DEVELOPMENT PLAN

SCALE: 1"=40'

SHEET NO.
2 OF 2