SEBAGO TECHNICS

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STORMWATER MANAGEMENT PLAN

To:

City of Portland

Proposed Condominium Development

218 Washington Avenue
Portland, Maine

Prepared for:
218-220 Washington Avenue, LLC
199 Elderberry Road
South Portland, Maine 04106

Prepared by:
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06172

STORMWATER & EROSION CONTROL PLAN

218-220 WASHINGTON AVE. CONDOMINIUMS
218 WASHINGTON AVENUE
PORTLAND, MAINE

Executive Summary

On behalf of 218-220 Washington Avenue, LLC, we are pleased to submit this Stormwater Management Plan for the proposed 45-unit residential condominiums at 218 Washington Ave. The applicant intends to remove the existing home and develop the property into a 13,982 s.f. building with associated parking located at the basement level.

The project is subject to the City's Site/Stormwater Standards and is required to provide treatment for both stormwater quantity and quality. The chambers combined with the underdrained subsurface sand filter have been designed to have a treatment volume equal to one inch of runoff times the tributary impervious area and 0.4 inches of runoff times the tributary landscaped area. Additional storage provided above the treatment volume will be utilized for controlling the peak runoff from the site to meet the peak discharge requirement under the City of Portland's Site Plan review.

The project has been designed to provide treatment for 97% of the impervious area and 88% of the developed area. Treatment is achieved utilizing a wetpond located on the southerly side of the site to treat and detain the developed area. Best Management Practices (BMPs) have been designed and sized in accordance with criteria published in Chapter 500 BMP's Technical Design Manual.

06172

STORMWATER & EROSION CONTROL PLAN

218-220 WASHINGTON AVE. CONDOMINIUMS
218 WASHINGTON AVENUE
PORTLAND, MAINE

I. Introduction

This Stormwater Management Plan has been prepared to address the potential impacts associated with this project due to the proposed modification in stormwater runoff characteristics. The stormwater management controls that are outlined in this plan have been designed to best suit the proposed development and to comply with applicable regulatory requirements.

II. Existing Conditions

The property is identified as Lot 10 and 15 on the City of South Portland Tax Map 10 and is located in the Residential District. The proposed 13,982 s.f. building is to be constructed across the street from the intersection of Washington Avenue and Eastern Promenade. The existing single family structure located at 218 Washington Avenue would be demolished to clear the way for the proposed condominiums.

Land Cover: The site is currently developed with an existing 1,844 s.f. building, shed and deck. The vegetation of the property consists of minimal lawn areas and landscaping associated with the house with the majority of the site consisting mostly of mixed vegetated and wooded open space on a steep embankment.

Site Topography: The site significantly decreases in elevation from Washington Avenue down to Anderson Street. The elevation at Washington Ave is around 65 and the elevation at the back (western) property boundary is about 45 averaging a 30% slope across the property.

Surface Water Features: The project site contains multiple subareas where the majority of stormwater runoff from the site flows towards Anderson Street and is directed to existing catch basins and municipal infrastructure. The municipal infrastructure in Washington Ave discharges to Casco Bay. There are no existing wetlands delineated onsite. No other special natural features are known to exist within 500 feet of the project site.

Soils: Soil characteristics were obtained from the Soil Conservation Service (SCS) Medium Intensity Soil Survey of Cumberland County. Soils identified on the site (or within close proximity) are identified below in Table 1. These soil boundaries are identified on the attached watershed maps.

Table 1 – Proximity Soil Types and Characteristics			
Soil Type	Symbol	HSG	K Factor
Hinckley loamy sand (8% to 15% slopes)	HIC	A	0.28
Hinckley loamy sand (15% to 25% slopes)	HID	A	0.28

The K factor is an erodibility index that relates each soil family based on a slight erosion potential of 0.10 to a high erosion potential of 0.64. An index number, greater than 0.32, indicates that a high level of erosion control measures must be taken in order to control erosion of this soil. The Hydrologic Soil Group (HSG) designation is based on a rating of the relative permeability of a soil, with Group "A" being extremely permeable such as coarse sand, to Group "D" having low permeability such as clay.

III. Proposed Development

The proposed 13,982 s.f. building is situated over undeveloped woods and the existing single family home to be demolished. Access to the site is proposed to be located at the existing curb cut off from Washington Avenue where vehicles will proceed down a ramp to the parking deck located at the basement level of the building.

The majority of the stormwater runoff from the proposed development will be collected within the roof drainage leaders connected to catch basins and routed to underground storage chambers for treatment and detention prior to connecting into the City's storm infrastructure in Anderson Street. The development proposes to meet the Maine DEP Chapter 500 General Standards for treatment requirements by collecting stormwater runoff and routing it to a proposed underdrained chamber system which will provide both treatment and detention.

Alterations to Land Cover: Completion of the proposed project will result in required treatment of 17,460 square feet of impervious area. The total impervious area for pre-development conditions is 41.31% of the total area and post-development is increased to 67.37% of the total area.

IV. Downstream Ponds and Waterbodies

The site is tributary to Casco Bay.

V. Regulatory Requirements

A. City of Portland, Maine

The proposed development will require Site & Subdivision Plan approval from the City of Portland and must comply with the performance standards specified in the City's Site Plan Review Ordinance.

B. Maine Department of Environmental Protection (Maine DEP)

The City of Portland has delegated stormwater capacity over MDEP. Based on the amount of newly created non-vegetated area and the watershed which the project is located in, the proposed development shall comply with the Basic Standards and the General Standards as described below. The City also requires Flooding Standards to be met.

Basic Standards: These standards include various erosion and sedimentation controls, inspection and maintenance procedures, and general housekeeping requirements. These performance standards are addressed in the Erosion and Sedimentation Control Plan within the enclosed plan set and in the Inspection, Maintenance, and Housekeeping Plan attached. Please refer to these documents for more detailed information.

General Standards: These standards require that a minimum of 95% of all new non-vegetated areas and at least 80% of all new developed areas are designed to be treated by stormwater Best Management Practices (BMPs). The site is also listed as an impaired stream and is required to meet those standards.

General Standard BMPs have been defined by the MDEP and are described thoroughly in their publication "Stormwater Management for Maine: Best Management Practices Manual". Volume III of this manual contains additional information and sizing requirements for the treatment measures proposed for the proposed development.

Flooding Standards: These standards require detention of stormwater to meet pre-development conditions peak flow analysis.

VI. Stormwater Management BMPs

In order to meet the applicable regulations, the project will utilize a StormTech chamber system with an underdrain to treat and detain runoff from the majority of the developed area.

A. StormTech Chamber System & Underdrained Subsurface Sand Filter

The chambers combined with the underdrained subsurface sand filter have been designed to have a treatment volume equal to one inch of runoff times the tributary impervious area and 0.4 inches of runoff times the tributary landscaped area. Additional storage provided above the treatment volume will be utilized for controlling the peak runoff from the site to meet the peak discharge requirement under the City of Portland's Site Plan review.

The areas treated by this BMP are summarized in the stormwater treatment calculations attached in Attachment 1: *Stormwater Quality Calculations* and are shown on the Watershed/Treatment Plan attached to this application.

VII. Peak Flow Analysis

This section has been prepared to discuss the proposed modifications to peak flow rates as a result of the development.

A. Modeling Technique

In order to evaluate drainage characteristics in pre and post-development conditions, a quantitative analysis was performed to determine peak rates of runoff for the 2, 10, and 25-year storm events. Runoff calculations were performed following the methodology outlined in the USDA Soil Conservation Service's "Urban Hydrology for Small Watersheds, Technical Release #55" and HydroCAD Stormwater Modeling System Software. A 24-hour, SCS Type III storm distribution for the 2, 10, and 25-year storm frequencies were used for analysis.

The current 24-hour rainfall values utilized in the hydrologic model for Cumberland County are as follows.

Table 2 - Storm Frequency Precipitation (in./24 hr)	
2-year	3.10
10-year	4.60
25-year	5.80

B. Drainage Characteristics (Pre and Post-Development Watershed Delineation)

One watershed point of analysis (POA1) was established to evaluate the pre-development and post-development peak runoff conditions for compliance with the City Stormwater Compliance.

Point of analysis one (POA1) is located at the southern corner of the property where stormwater runoff collects and enters into an existing catch basin connected to the City's stormdrain infrastructure.

C. Pre-Development

Pre-development is defined by three (3) subareas (1S, 2S & 3S). Subarea 1S includes undeveloped wooded area; Subarea 2S includes the existing residence, driveway, outbuilding and wooded and lawn areas; Subarea 3S includes the offsite developed adjacent to Anderson Street.

D. Post-Development

Post-development is defined by eight (8) subareas (1S through 8S). Subarea 1S, 2S & 3S includes undeveloped wooded area and the offsite developed adjacent to Anderson Street as it did in pre-development but with reduced areas. Subareas 4S, 5S, 6S & 7S contain the impervious areas created from the development. Subarea 8S contains the landscape area between Washington Avenue and the proposed building.

E. Comparison

The watershed areas and times of concentration of the post-development watersheds vary from the existing conditions based on the proposed site development and grading. Table 3 summarizes the results of the hydrologic analysis of the project under pre-development and post-development conditions.

Table 3 – Stormwater Runoff Summary Table
Pre-Development vs. Post-Development

Study Point	Total Watershed Area (Ac)		Percent Impervious		Peak Rates of Runoff (cfs)					
					2-year		10-year		25-year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
POA1	1.59	1.59	41.31%	67.37%	1.88	1.99	3.37	3.23	4.74	4.31

As depicted in the above table, post-development peak runoff rates at the study point will be at or below pre-development levels for the 10-year and 25-year storm events with the exception of the 2-year event where the 5% increase is due to the subsurface underdrained sand filter which cannot be eliminated.

To achieve the required water quality treatment, an underdrained subsurface sand filter is proposed to treat a vast majority of the development. The proposed filter has been designed and sized in accordance with the current Maine DEP Stormwater Best Management Practices handbook.

The provided treatment percentages are indicated in the below table:

Table 4 – General Standards Treatment Level

Developed				Non-Vegetated			
Created Developed (ac)	Treated Developed (ac)	Required % Treated	Provided % Treatment	Created Impervious (ac)	Treated Impervious (ac)	Required % Treated	Provided % Treatment
0.457	0.401	80%	88%	0.457	0.441	95%	97%

From the table above, the proposed project has been designed to exceed the required treatment levels with the applied credit for existing impervious area. Water Quality Volumes and BMP sizing volume calculations are attached to this report.

IX. Conclusions

The proposed development has been designed to meet the requirements of the City of Portland's Site Plan Ordinance. The stormwater management system will treat 97% of the created impervious surface and 88% of the total developed area. Almost all the peak flow rates have been controlled to below or equal to the pre-development rates. Additionally, erosion and sedimentation controls have been outlined to prevent unreasonable impacts on the site and to the surrounding environment.

Prepared by,

SEBAGO TECHNICS, INC.

Keith D. Gray, P.E.
Project Engineer

KDG/WTC:

Attachment A

Inspection, Maintenance, and Housekeeping

Exhibit 1

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INSPECTION, MAINTENANCE, AND HOUSEKEEPING PLAN

Proposed Development at 218 Washington Ave.
Portland, ME

Introduction

Upon completion of the proposed development, the owner, 218-220 Washington Avenue, LLC will be the responsible party for maintaining the stormwater management system. The owner shall be responsible for maintaining the stormwater management system. The responsible party shall schedule maintenance of all stormwater management structures, the establishment of any contract services required to implement the program, and the keeping of records and maintenance logbook.

Records of all inspections and maintenance work accomplished must be kept on file and retained for a minimum 5-year time span. The maintenance logbook will be made available to the Maine Department of Environmental Protection (MDEP) and the City of Portland upon request. At a minimum, the appropriate and relevant activities for each of the stormwater management systems will be performed on the prescribed schedule.

The following plan outlines the anticipated inspection, maintenance, and housekeeping procedures for the erosion and sedimentation controls as well as stormwater management devices for the project site. Also, this plan outlines several housekeeping requirements that shall be followed during and after construction. These procedures should be followed in order to ensure the intended function of the designed measures and to prevent unreasonable adverse impacts to the surrounding environment.

The procedures outlined in the Inspection, Maintenance, and Housekeeping Plan is provided as an overview of the anticipated practices to be used on this site. In some instances, additional measures may be required due to unexpected conditions. For additional details on any of the erosion and sedimentation control measures or stormwater management devices to be utilized on this project, refer to the most recently revised edition of the "Maine Erosion and Sedimentation Control BMP" manual and/or the "Stormwater Management for Maine: Best Management Practices" manual as published by the MDEP.

During Construction

1. **Inspection:** During the construction process, it is the Contractor's responsibility to comply with the inspection and maintenance procedures outlined in this section. These responsibilities include inspecting disturbed and impervious areas, erosion control measures, materials storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. These areas shall be inspected at least once a week as well as before and after a storm event, and prior to completing permanent stabilization measures. A person with knowledge of erosion and stormwater control,

including the standards and conditions in any applicable permits, shall conduct the inspections.

2. **Maintenance:** All measures shall be maintained in an effective operating condition until areas are permanently stabilized. If Best Management Practices (BMPs) need to be maintained or modified, additional BMPs are necessary, or other corrective action is needed, implementation must be completed within seven (7) calendar days and prior to any storm event (rainfall).

3. **Documentation:** A log summarizing the inspections and any corrective action taken must be maintained on-site. The log must include the name(s) and qualifications of the person making the inspections, the date(s) of the inspections, and major observations about the operation and maintenance of erosion and sedimentation controls, material storage areas, and vehicle access points to the site. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and locations where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken.

   The log must be made accessible to the appropriate regulatory agency upon request. The permittee shall retain a copy of the log for a period of at least three (3) years from the completion of permanent stabilization.

4. **Specific Inspection and Maintenance Tasks:** The following is a list of erosion control and stormwater management measures and the specific inspection and maintenance tasks to be performed during construction.

   A. <u>Sediment Barriers:</u>

   - Hay bale barriers, silt fences, and filter berms shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.
   - If the fabric on silt fence or filter barrier should decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, it shall be replaced.
   - Sediment deposits should be removed after each storm event. They must be removed before deposits reach approximately one-half the height of the barrier.
   - Filter berms shall be reshaped as needed.
   - Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required should be dressed to conform to the existing grade, prepared, and seeded.

   B. <u>Riprap Materials:</u>

   - Once a riprap installation has been completed, it should require very little maintenance. It shall, however, be inspected periodically to determine if high flows have caused scour beneath the riprap or dislodged any of the stone.

C. Erosion Control Blankets:

- Inspect these reinforced areas semi-annually and after significant rainfall events for slumping, sliding, seepage, and scour. Pay close attention to unreinforced areas adjacent to the erosion control blankets, which may experience accelerated erosion.
- Review all applicable inspection and maintenance procedures recommended by the specific blanket manufacturer. These tasks shall be included in addition to this plan.

D. Temporary Storm Drain Inlet Protection:

- The inlet protection structure shall be inspected before each rain event and repaired as necessary.
- Sediment shall be removed and the storm drain sediment barrier restored to its original dimensions when the sediment has accumulated to half of the design depth of the trap.
- Structures shall be removed upon permanent stabilization of the tributary area.
- Upon removal of the structure, all accumulated sediments downstream of the structure shall be cleaned from the storm drain system.

E. Stabilized Construction Entrances/Exits:

- The exit shall be maintained in a condition that will prevent tracking of sediment onto public rights-of-way.
- When the control pad becomes ineffective, the stone shall be removed along with the collected soil material. The entrance should then be reconstructed.
- Areas that have received mud-tracking or sediment deposits shall be swept or washed. Washing shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device (not into storm drains, ditches, or waterways).

F. Temporary Seed and Mulch:

- Mulched areas should be inspected after rain events to check for rill erosion.
- If less than 90% of the soil surface is covered by mulch, additional mulch shall be applied in bare areas.
- In applications where seeding and mulch have been applied in conjunction with erosion control blankets, the blankets must be inspected after rain events for dislocation or undercutting.
- Mulch shall continue to be reapplied until 95% of the soil surface has established temporary vegetative cover.

G. Stabilized Drainage Swales:

- Sediment accumulation in the swale shall be removed once the cross section of the swale is reduced by 25%.
- The swales shall be inspected after rainfall events. Any evidence of sloughing of the side slopes or channel erosion shall be repaired and corrective action should be taken to prevent reoccurrence of the problem.
- In addition to the stabilized lining of the channel (i.e. erosion control blankets), stone check dams may be needed to further reduce channel velocity.

5. **Housekeeping:** The following general performance standards apply to the proposed project.

A. Spill Prevention: Controls must be used to prevent pollutants from being discharged from materials on-site, including storage practices to minimize exposure of the materials to stormwater, and appropriate spill prevention, containment, and response planning and implementation.

B. Groundwater Protection: During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors, accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials.

C. Fugitive Sediment and Dust: Actions must be taken to insure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control.

D. Debris and Other Materials: Litter, construction debris, and chemicals exposed to stormwater must be prevented from becoming a pollutant source.

E. Trench or Foundation Dewatering: Trench dewatering is the removal of water from trenches, foundations, cofferdams, ponds, and other areas within the construction area that retain water after excavation. In most cases, the collected water is heavily silted and hinders correct and safe construction practices. The collected water must be removed from the ponded area, either through gravity or pumping, and must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved.

After Construction

1. **Inspection:** After construction, the owner or operator shall hire a qualified post-construction stormwater inspector to at least annually, inspect the BMPs, in accordance with all municipal and state inspection, cleaning and maintenance requirements of the approved post-construction stormwater management plan.

2. **Maintenance, and repair:** If a BMP requires maintenance, repair or replacement to function as intended by the approved post-construction stormwater management plan, the owner or operator shall take corrective actions to address the deficiency or deficiencies as soon as possible after the deficiency is discovered and shall provide a record of the deficiency and corrective actions to the Department of Public Services (DPS). The following is a list of permanent erosion control and stormwater management measures and the inspection, maintenance, and housekeeping tasks to be performed after construction.

   A. Vegetated Areas:
      - Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems.
      - Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows.

   B. Ditches, Swales and Other Open Channels:
      - Inspect ditches, swales, and other open stormwater channels in the spring, in the late fall, and after heavy rains to remove any obstructions to the flow. Remove accumulated sediments and debris, remove woody vegetative growth that could obstruct flow and repair any erosion of the ditch lining.
      - Vegetated ditches must be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity.
      - Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable.
      - Replace riprap in areas where any underlying filter fabric or underlying gravel is showing through the stone or where stones have dislodged.

   C. Winter Sanding:
      - Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring.
      - Accumulations on pavement may be removed by pavement sweeping.
      - Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader or other acceptable method.

D. Bioretention Cell:
   - Inspect the site monthly for the first few months after construction. Then inspections can occur on an Semi-annual basis, preferably after rain events when clogging will be obvious.
   - Make any repairs necessary to ensure the measure is operating properly.
   - Regular maintenance is necessary to remove surface sediment, trash, debris, and leaf litter.
   - Outlets and chambers need to be cleaned/repaired when drawdown times in the filter exceed 36 hours.
   - In certain cases, layers of sand may need to be replaced every 3 to 5 years.
   - The soil filter should be inspected after every major storm in the first year to be sure it is functioning properly and that the plants are established. Thereafter, the filter should be inspected at least once every six months to ensure that it is draining within 48 hours following a one inch storm or greater.

E. Stormtech Chambers/Isolator Row:
   - Stormtech Chambers shall be inspected and maintained according to manufacturer's recommendations.
   - Recommended maintenance includes, but not limited to, visual inspection of accumulated sediment within isolator row and jet-vac flushing when required.

F. Catch Basins:
   - Inspect and, if required, clean-out catch basins at least once a year, preferably in early spring.
   - Clean out must include the removal and legal disposal of accumulated sediments and debris at the bottom of the basin, at any inlet grates, at any inflow channels to the basin, and at any pipes between basins.

G. Culverts:
   - Inspect culverts in the spring, in the late fall, and after heavy rains to remove any obstructions to flow.
   - Remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit.
   - Inspect and repair any erosion damage at the culvert's inlet and outlet.
   - Inspect embankment for erosion, settling, and structural failure.

3. **Annual Report:** The owner or operator or a qualified post-construction stormwater inspector hired by that person, shall, on or by June 30 of each year, provide a completed and signed certification that the person has inspected the BMPs and that they are adequately maintained and functioning as intended by the approved post-construction stormwater management plan, or that they require maintenance or repair, including the record of the deficiency and corrective actions taken. Annual reporting shall be submitted to the City of South Portland Director of Water Resource Protection.

4. **Duration of Maintenance:** Perform maintenance as described and required for any associated permits unless and until the system is formally accepted by a municipality or quasi-municipal district, or is placed under the jurisdiction of a legally created association that will be responsible for the maintenance of the system. If a municipality or quasi-municipal district chooses to accept a stormwater management system, or a component of a stormwater system, it must provide a letter to the MDEP stating that it assumes responsibility for the system. The letter must specify the components of the system for which the municipality or district will assume responsibility, and that the municipality or district agrees to maintain those components of the system in compliance with MDEP standards. Upon such assumption of responsibility, and approval by the MDEP, the municipality, quasi-municipal district, or association becomes a co-permittee for this purpose only and must comply with all terms and conditions of the permit.

Attachments

Attachment 1 – Sample Stormwater Inspection and Maintenance Form

06172

Sample Stormwater Inspection and Maintenance Form

Proposed Development; 218 Washington Ave. Portland, ME
Attachment 1

This log is intended to accompany the stormwater Inspection, Maintenance and Housekeeping Plan for the Proposed Development. The following items shall be checked, cleaned and maintained on a regular basis as specified in the Maintenance Plan and as described in the table below. This log shall be kept on file for a minimum of five (5) years and shall be available for review. Qualified personnel familiar with drainage systems and soils shall perform all inspections. Attached is a copy of the construction and post-construction maintenance logs.

Item	Maintenance Required & Frequency	Date Completed	Maintenance Personnel	Comments
Ditches and Swales	Inspect after major rainfall event producing greater than 3" of rain in 2 hours.			
	Repair erosion or damage immediately.			
Catch Basins and Culverts	Remove accumulated sediment and debris			
	Sump depth			
Vegetated Areas	Inspect Slopes			
	Replant Bare Areas			
	Check after Major Storms			
Winter Sanding	Clean annually (Spring)			
	Remove sand and sediment from roadway shoulders			
Bioretention Cell	Inspect system thru inspection ports following major storm event			
	Remove sediment/debris from inlet structure annually			
Stormtech	Follow manufacturer's recommendations			

Attachment B

Stormwater Quality Calculations

TABLE 2: GENERAL STANDARD CALCULATIONS
218 Washington Avenue
JOB #06172

SUBAREA ID	TOTAL AREA	TOTAL IMPERVIOUS AREA	IMPERVIOUS AREA REQUIRING TREATMENT	IMPERVIOUS AREA RECEIVING TREATMENT	NEW LANDSCAPED AREA	TOTAL DEVELOPED AREA	DEVELOPED AREA REQUIRING TREATMENT	DEVELOPED AREA RECEIVING TREATMENT	TREATMENT METHOD
	(S.F.)	(S.F.)	(S.F.)	(S.F.)		(S.F.)	(S.F.)	(S.F.)	ID (PRIMARY)
1	5926	1458	1458	0	0	1458	1458	0	NONE
2	18465	985	985	0	0	985	985	0	NONE
3	25411	25411	0	0	0	25411	0	0	NONE
4	6785	6785	6785	6785	0	6785	6785	6785	SSF #1
5	7524	7524	7524	7524	0	7524	7524	7524	SSF #1
6	2604	2604	2604	2604	0	2604	2604	2604	SSF #1
7	547	547	547	547	0	547	547	547	SSF #1
8	2116	428	0	0	1688	2116	0	0	NONE
EXISTING HOUSE	2911	2911	0	1747	0	0	0	0	CREDIT
TOTAL (AC.)	1.660	1.117	0.457	0.441	0.039	1.089	0.457	0.401	

*IMPERVIOUS AND DEVELOPED AREAS TO BE TREATED ARE ASSOCIATED WITH THE DEVELOPMENT. OFFSITE AREAS NOT INCLUDED IN THE SITE TREATMENT CALCULATION
*THE EXISTING HOUSE TO BE DEMOLISHED IS NOT REQUIRED TO BE TREATED AS IT WAS CONSTRUCTED PRIOR TO STORMWATER LAW. THE EXISTING HOUSE AREA EQUALS A TOTAL OF 2,911 S.F. TIMES 60% ALLOWED FOR CREDIT EQUALS 1,747 S.F. CREDIT TOWARDS PROPOSED IMPERVIOUS

TOTAL IMPERVIOUS AREA REQUIRING TREATMENT (SF)	19,903
TOTAL IMPERVIOUS AREA RECEIVING TREATMENT (SF)	19,207
% OF IMPERVIOUS AREA RECEIVING TREATMENT (SF)	97%

TOTAL DEVELOPED AREA REQ. TREATMENT (SF)	19,903
TOTAL DEVELOPED AREA RECEIVING TREATMENT (SF)	17,460
% OF DEVELOPED AREA RECEIVING TREATMENT (SF)	88%

SEBAGO TECHNICS, INC.
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South Portland, Maine 04106
Tel. (207) 200-2100

JOB	06172 - 218 Washington Ave.		
SHEET NO.	1	OF	1
CALCULATED BY	KDG	DATE	11/29/2016
FILE NAME	06172_Subsurface Sand Filter BMP.xls	PRNT DATE	12/15/2016

UNDERDRAINED SUBSURFACE SAND FILTER

Task: Calculate water quality volume per MDEP chapter 500 regulations

References
1. Maine DEP Chapter 500, Section 4.B.(2)(b)
   a. "must detain a runoff volume equal to 1.0 inch times the subcatchment's impervious area plus 0.4 inch times the subcatchment's landscaped area"
2. Maine DEP Best Management Practices Stormwater Manual, Section 7.3.2
   a. "detain runoff volume equal to 1.0 inch times the subcatchment's impervious area plus 0.4 inch times the subcatchment's landscaped area"
   b. "surface area of the sand filter bed and chamber system must be at least equal to 5% of the impervious area draining to it and 2% of the landscaped area."
   c. "treatment flow rate for the Stormtech Isolcator Row is the projected one year peak flow rate for the drainage area feeding the Isolator Row"

Flow rates:

SC-310	0.10	cfs/chamber
SC-740	0.20	cfs/chamber
DC-780	0.20	cfs/chamber
MC-3500	0.30	cfs/chamber

Tributary to Subsurface Sand Filter #1

Landscaped Area	0	SF
Impervious Area	17,460	SF

Minimum Surface Area for sand filter and chamber system

Required (2% X Landscaped + 5%" X Impervious)

Total Landscaped Area	0	SF	Area	0	SF	
Total Impervious Area	17,460	SF	Area	873	SF	
Required Minimum Surface Area				873	SF	
Provided Surface Area				1,541	SF	

Channel Protection Volume (CPV)

Required (0.4" X Landscaped + 1.0" X Impervious)

Landscaped Area	0	SF	Volume	0		
Impervious Area	17,460	SF	Volume	1,455		
CPV Required				1,455	CF	0.033 AF
Provided CPV				1,489	CF	(Elevation 52.06)

Sediment Pre-Treatment

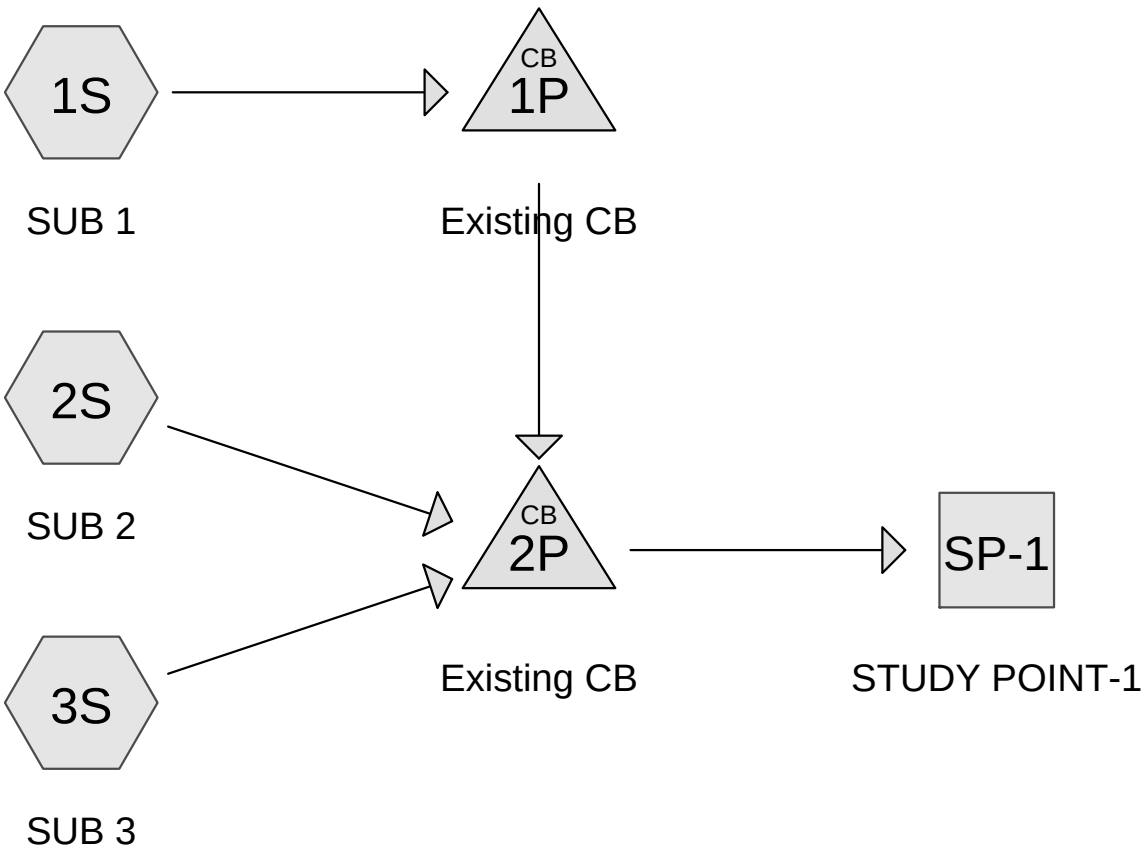
Per Reference 2.c above

One year flow rate output from HydroCAD:		1.04	cfs
Iso Row sizing for:	**MC-3500**	**0.3**	cfs
Total number of Isolator Row Chambers required:		4	

Attachment C

HydroCAD Output

Pre Development



Subcat Reach Pond Link

Routing Diagram for 06172 Pre Development
Prepared by Sebago Technics, Inc., Printed 12/15/2016

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB 1 Runoff Area=17,396 sf 0.00% Impervious Runoff Depth=0.28"
Flow Length=309' Tc=7.0 min CN=57 Runoff=0.05 cfs 402 cf

Subcatchment 2S: SUB 2 Runoff Area=26,571 sf 12.22% Impervious Runoff Depth=0.44"
Flow Length=338' Tc=12.0 min CN=62 Runoff=0.16 cfs 972 cf

Subcatchment 3S: SUB 3 Runoff Area=25,411 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=338' Tc=5.0 min CN=98 Runoff=1.82 cfs 6,073 cf

Reach SP-1: STUDY POINT-1 Inflow=1.88 cfs 7,447 cf
Outflow=1.88 cfs 7,447 cf

Pond 1P: Existing CB Peak Elev=12.78' Inflow=0.05 cfs 402 cf
12.0" Round Culvert n=0.013 L=93.0' S=0.0054 '/' Outflow=0.05 cfs 402 cf

Pond 2P: Existing CB Peak Elev=12.78' Inflow=1.88 cfs 7,447 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=1.88 cfs 7,447 cf

Total Runoff Area = 69,378 sf Runoff Volume = 7,447 cf Average Runoff Depth = 1.29"
58.69% Pervious = 40,721 sf 41.31% Impervious = 28,657 sf

Summary for Subcatchment 1S: SUB 1

Runoff = 0.05 cfs @ 12.31 hrs, Volume= 402 cf, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
17,396	57	Woods/grass comb., Poor, HSG A
17,396		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	95	0.4000	0.25		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.2	73	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.74	14.80	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 20.0 '/' Top.W=11.50' n= 0.013 Asphalt, smooth
7.0	309	Total			

Summary for Subcatchment 2S: SUB 2

Runoff = 0.16 cfs @ 12.23 hrs, Volume= 972 cf, Depth= 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
23,325	57	Woods/grass comb., Poor, HSG A
3,246	98	Paved parking, HSG A
26,571	62	Weighted Average
23,325		87.78% Pervious Area
3,246		12.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	150	0.2300	0.22		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
12.0	338	Total			

Summary for Subcatchment 3S: SUB 3

Runoff = 1.82 cfs @ 12.07 hrs, Volume= 6,073 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
25,411	98	Paved parking, HSG A
25,411		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	150	0.0400	1.94		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
3.1					**Direct Entry,**
5.0	338	Total			

Summary for Reach SP-1: STUDY POINT-1

Inflow Area = 69,378 sf, 41.31% Impervious, Inflow Depth = 1.29" for 2-YR event
Inflow = 1.88 cfs @ 12.07 hrs, Volume= 7,447 cf
Outflow = 1.88 cfs @ 12.07 hrs, Volume= 7,447 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Existing CB

Inflow Area = 17,396 sf, 0.00% Impervious, Inflow Depth = 0.28" for 2-YR event
Inflow = 0.05 cfs @ 12.31 hrs, Volume= 402 cf
Outflow = 0.05 cfs @ 12.31 hrs, Volume= 402 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.05 cfs @ 12.31 hrs, Volume= 402 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 12.78' @ 12.09 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.50'	**12.0" Round Culvert** L= 93.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.50' / 12.00' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.05 cfs @ 12.31 hrs HW=12.67' TW=12.48' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.05 cfs @ 0.89 fps)

Summary for Pond 2P: Existing CB

Inflow Area = 69,378 sf, 41.31% Impervious, Inflow Depth = 1.29" for 2-YR event
Inflow = 1.88 cfs @ 12.07 hrs, Volume= 7,447 cf
Outflow = 1.88 cfs @ 12.07 hrs, Volume= 7,447 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.88 cfs @ 12.07 hrs, Volume= 7,447 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 12.78' @ 12.07 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.00' / 11.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.87 cfs @ 12.07 hrs HW=12.78' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.87 cfs @ 3.93 fps)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB 1 Runoff Area=17,396 sf 0.00% Impervious Runoff Depth=0.90"
Flow Length=309' Tc=7.0 min CN=57 Runoff=0.32 cfs 1,303 cf

Subcatchment 2S: SUB 2 Runoff Area=26,571 sf 12.22% Impervious Runoff Depth=1.20"
Flow Length=338' Tc=12.0 min CN=62 Runoff=0.62 cfs 2,653 cf

Subcatchment 3S: SUB 3 Runoff Area=25,411 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=338' Tc=5.0 min CN=98 Runoff=2.72 cfs 9,241 cf

Reach SP-1: STUDY POINT-1 Inflow=3.37 cfs 13,196 cf
Outflow=3.37 cfs 13,196 cf

Pond 1P: Existing CB Peak Elev=13.40' Inflow=0.32 cfs 1,303 cf
12.0" Round Culvert n=0.013 L=93.0' S=0.0054 '/' Outflow=0.32 cfs 1,303 cf

Pond 2P: Existing CB Peak Elev=13.38' Inflow=3.37 cfs 13,196 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=3.37 cfs 13,196 cf

Total Runoff Area = 69,378 sf Runoff Volume = 13,196 cf Average Runoff Depth = 2.28"
58.69% Pervious = 40,721 sf 41.31% Impervious = 28,657 sf

Summary for Subcatchment 1S: SUB 1

Runoff = 0.32 cfs @ 12.12 hrs, Volume= 1,303 cf, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
17,396	57	Woods/grass comb., Poor, HSG A
17,396		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	95	0.4000	0.25		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.2	73	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.74	14.80	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 20.0 '/' Top.W=11.50' n= 0.013 Asphalt, smooth
7.0	309	Total			

Summary for Subcatchment 2S: SUB 2

Runoff = 0.62 cfs @ 12.18 hrs, Volume= 2,653 cf, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
23,325	57	Woods/grass comb., Poor, HSG A
3,246	98	Paved parking, HSG A
26,571	62	Weighted Average
23,325		87.78% Pervious Area
3,246		12.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	150	0.2300	0.22		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
12.0	338	Total			

Summary for Subcatchment 3S: SUB 3

Runoff = 2.72 cfs @ 12.07 hrs, Volume= 9,241 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
25,411	98	Paved parking, HSG A
25,411		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	150	0.0400	1.94		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
3.1					**Direct Entry,**
5.0	338	Total			

Summary for Reach SP-1: STUDY POINT-1

Inflow Area = 69,378 sf, 41.31% Impervious, Inflow Depth = 2.28" for 10-YR event
Inflow = 3.37 cfs @ 12.08 hrs, Volume= 13,196 cf
Outflow = 3.37 cfs @ 12.08 hrs, Volume= 13,196 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Existing CB

Inflow Area = 17,396 sf, 0.00% Impervious, Inflow Depth = 0.90" for 10-YR event
Inflow = 0.32 cfs @ 12.12 hrs, Volume= 1,303 cf
Outflow = 0.32 cfs @ 12.12 hrs, Volume= 1,303 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.12 hrs, Volume= 1,303 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 13.40' @ 12.09 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.50'	**12.0" Round Culvert** L= 93.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.50' / 12.00' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.51 cfs @ 12.12 hrs HW=13.25' TW=13.17' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.51 cfs @ 1.13 fps)

Summary for Pond 2P: Existing CB

Inflow Area = 69,378 sf, 41.31% Impervious, Inflow Depth = 2.28" for 10-YR event
Inflow = 3.37 cfs @ 12.08 hrs, Volume= 13,196 cf
Outflow = 3.37 cfs @ 12.08 hrs, Volume= 13,196 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.37 cfs @ 12.08 hrs, Volume= 13,196 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 13.38' @ 12.08 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.00' / 11.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.37 cfs @ 12.08 hrs HW=13.38' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.37 cfs @ 4.29 fps)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB 1 Runoff Area=17,396 sf 0.00% Impervious Runoff Depth=1.56"
Flow Length=309' Tc=7.0 min CN=57 Runoff=0.64 cfs 2,256 cf

Subcatchment 2S: SUB 2 Runoff Area=26,571 sf 12.22% Impervious Runoff Depth=1.95"
Flow Length=338' Tc=12.0 min CN=62 Runoff=1.09 cfs 4,329 cf

Subcatchment 3S: SUB 3 Runoff Area=25,411 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=338' Tc=5.0 min CN=98 Runoff=3.43 cfs 11,778 cf

Reach SP-1: STUDY POINT-1 Inflow=4.74 cfs 18,362 cf
Outflow=4.74 cfs 18,362 cf

Pond 1P: Existing CB Peak Elev=14.28' Inflow=0.64 cfs 2,256 cf
12.0" Round Culvert n=0.013 L=93.0' S=0.0054 '/' Outflow=0.64 cfs 2,256 cf

Pond 2P: Existing CB Peak Elev=14.24' Inflow=4.74 cfs 18,362 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=4.74 cfs 18,362 cf

Total Runoff Area = 69,378 sf Runoff Volume = 18,362 cf Average Runoff Depth = 3.18"
58.69% Pervious = 40,721 sf 41.31% Impervious = 28,657 sf

Summary for Subcatchment 1S: SUB 1

Runoff = 0.64 cfs @ 12.11 hrs, Volume= 2,256 cf, Depth= 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
17,396	57	Woods/grass comb., Poor, HSG A
17,396		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	95	0.4000	0.25		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.2	73	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.74	14.80	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 20.0 '/' Top.W=11.50' n= 0.013 Asphalt, smooth
7.0	309	Total			

Summary for Subcatchment 2S: SUB 2

Runoff = 1.09 cfs @ 12.18 hrs, Volume= 4,329 cf, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
23,325	57	Woods/grass comb., Poor, HSG A
3,246	98	Paved parking, HSG A
26,571	62	Weighted Average
23,325		87.78% Pervious Area
3,246		12.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	150	0.2300	0.22		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
12.0	338	Total			

Summary for Subcatchment 3S: SUB 3

Runoff = 3.43 cfs @ 12.07 hrs, Volume= 11,778 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
25,411	98	Paved parking, HSG A
25,411		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	150	0.0400	1.94		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
3.1					**Direct Entry,**
5.0	338	Total			

Summary for Reach SP-1: STUDY POINT-1

Inflow Area = 69,378 sf, 41.31% Impervious, Inflow Depth = 3.18" for 25-YR event
Inflow = 4.74 cfs @ 12.08 hrs, Volume= 18,362 cf
Outflow = 4.74 cfs @ 12.08 hrs, Volume= 18,362 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Existing CB

Inflow Area = 17,396 sf, 0.00% Impervious, Inflow Depth = 1.56" for 25-YR event
Inflow = 0.64 cfs @ 12.11 hrs, Volume= 2,256 cf
Outflow = 0.64 cfs @ 12.11 hrs, Volume= 2,256 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.64 cfs @ 12.11 hrs, Volume= 2,256 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 14.28' @ 12.09 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.50'	**12.0" Round Culvert** L= 93.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.50' / 12.00' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.05 cfs @ 12.11 hrs HW=14.22' TW=14.09' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.05 cfs @ 1.33 fps)

Summary for Pond 2P: Existing CB

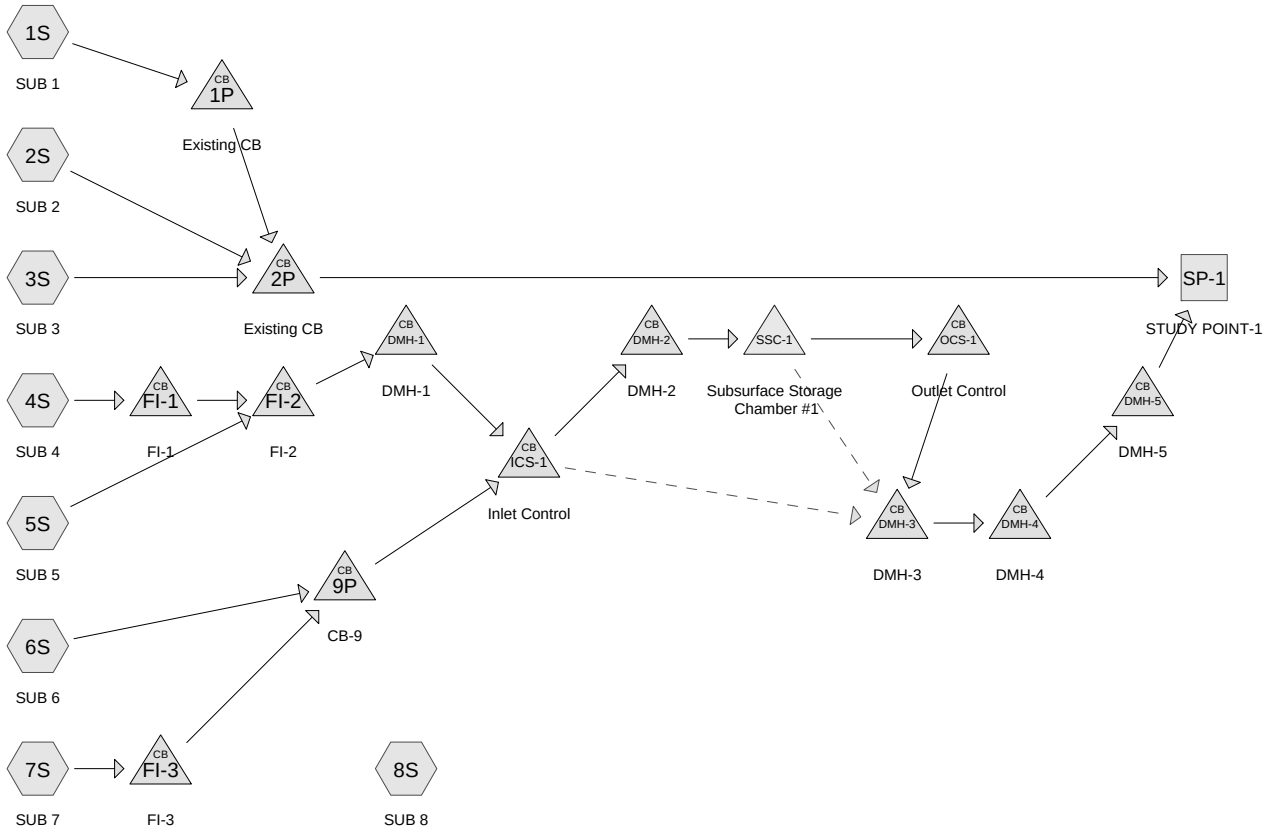
Inflow Area = 69,378 sf, 41.31% Impervious, Inflow Depth = 3.18" for 25-YR event
Inflow = 4.74 cfs @ 12.08 hrs, Volume= 18,362 cf
Outflow = 4.74 cfs @ 12.08 hrs, Volume= 18,362 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.74 cfs @ 12.08 hrs, Volume= 18,362 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 14.24' @ 12.08 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.00' / 11.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.74 cfs @ 12.08 hrs HW=14.23' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 4.74 cfs @ 6.03 fps)

Post Development



Routing Diagram for 06172 Post Development
Prepared by Sebago Technics, Inc., Printed 12/15/2016

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB 1 Runoff Area=5,926 sf 24.60% Impervious Runoff Depth=0.64"
Flow Length=333' Tc=5.0 min CN=67 Runoff=0.09 cfs 314 cf

Subcatchment 2S: SUB 2 Runoff Area=18,465 sf 5.33% Impervious Runoff Depth=0.34"
Flow Length=338' Tc=12.0 min CN=59 Runoff=0.07 cfs 520 cf

Subcatchment 3S: SUB 3 Runoff Area=25,411 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=338' Tc=5.0 min CN=98 Runoff=1.82 cfs 6,073 cf

Subcatchment 4S: SUB 4 Runoff Area=6,785 sf 100.00% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=98 Runoff=0.49 cfs 1,622 cf

Subcatchment 5S: SUB 5 Runoff Area=7,524 sf 100.00% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=98 Runoff=0.54 cfs 1,798 cf

Subcatchment 6S: SUB 6 Runoff Area=2,604 sf 100.00% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=98 Runoff=0.19 cfs 622 cf

Subcatchment 7S: SUB 7 Runoff Area=547 sf 100.00% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=98 Runoff=0.04 cfs 131 cf

Subcatchment 8S: SUB 8 Runoff Area=2,116 sf 20.23% Impervious Runoff Depth=1.26"
Tc=5.0 min CN=79 Runoff=0.07 cfs 223 cf

Reach SP-1: STUDY POINT-1 Inflow=1.99 cfs 11,080 cf
Outflow=1.99 cfs 11,080 cf

Pond 1P: Existing CB Peak Elev=12.77' Inflow=0.09 cfs 314 cf
12.0" Round Culvert n=0.013 L=93.0' S=0.0075 '/' Outflow=0.09 cfs 314 cf

Pond 2P: Existing CB Peak Elev=12.68' Inflow=1.91 cfs 6,907 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0060 '/' Outflow=1.91 cfs 6,907 cf

Pond 9P: CB-9 Peak Elev=53.23' Inflow=0.23 cfs 753 cf
12.0" Round Culvert n=0.012 L=44.0' S=0.0382 '/' Outflow=0.23 cfs 753 cf

Pond DMH-1: DMH-1 Peak Elev=53.02' Inflow=1.02 cfs 3,420 cf
12.0" Round Culvert n=0.012 L=16.0' S=0.0737 '/' Outflow=1.02 cfs 3,420 cf

Pond DMH-2: DMH-2 Peak Elev=52.15' Inflow=1.25 cfs 4,173 cf
15.0" Round Culvert n=0.012 L=6.0' S=0.0050 '/' Outflow=1.25 cfs 4,173 cf

Pond DMH-3: DMH-3 Peak Elev=47.13' Inflow=0.09 cfs 4,173 cf
15.0" Round Culvert n=0.012 L=30.0' S=0.1210 '/' Outflow=0.09 cfs 4,173 cf

Pond DMH-4: DMH-4 Peak Elev=24.11' Inflow=0.09 cfs 4,173 cf
15.0" Round Culvert n=0.012 L=83.0' S=0.1202 '/' Outflow=0.09 cfs 4,173 cf

Pond DMH-5: DMH-5 Peak Elev=14.13' Inflow=0.09 cfs 4,173 cf
15.0" Round Culvert n=0.012 L=56.0' S=0.1170 '/' Outflow=0.09 cfs 4,173 cf

Pond FI-1: FI-1 Peak Elev=55.74' Inflow=0.49 cfs 1,622 cf
10.0" Round Culvert n=0.013 L=97.0' S=0.0080 '/' Outflow=0.49 cfs 1,622 cf

Pond FI-2: FI-2 Peak Elev=55.19' Inflow=1.02 cfs 3,420 cf
10.0" Round Culvert n=0.013 L=14.0' S=0.0079 '/' Outflow=1.02 cfs 3,420 cf

Pond FI-3: FI-3 Peak Elev=53.89' Inflow=0.04 cfs 131 cf
12.0" Round Culvert n=0.012 L=40.0' S=0.0200 '/' Outflow=0.04 cfs 131 cf

Pond ICS-1: Inlet Control Peak Elev=52.15' Inflow=1.25 cfs 4,173 cf
Primary=1.25 cfs 4,173 cf Secondary=0.00 cfs 0 cf Outflow=1.25 cfs 4,173 cf

Pond OCS-1: Outlet Control Peak Elev=54.50' Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Pond SSC-1: Subsurface Storage Chamber #1 Peak Elev=52.15' Storage=1,597 cf Inflow=1.25 cfs 4,173 cf
Primary=0.00 cfs 0 cf Secondary=0.09 cfs 4,173 cf Outflow=0.09 cfs 4,173 cf

Total Runoff Area = 69,378 sf Runoff Volume = 11,302 cf Average Runoff Depth = 1.95"
34.07% Pervious = 23,636 sf 65.93% Impervious = 45,742 sf

Summary for Subcatchment 1S: SUB 1

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 314 cf, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
4,468	57	Woods/grass comb., Poor, HSG A
1,458	98	Paved parking, HSG C
5,926	67	Weighted Average
4,468		75.40% Pervious Area
1,458		24.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	35	0.5000	0.22		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	157	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.74	14.80	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 20.0 '/' Top.W=11.50' n= 0.013 Asphalt, smooth
1.4					**Direct Entry,**
5.0	333	Total			

Summary for Subcatchment 2S: SUB 2

Runoff = 0.07 cfs @ 12.33 hrs, Volume= 520 cf, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
17,480	57	Woods/grass comb., Poor, HSG A
985	98	Paved parking, HSG A
18,465	59	Weighted Average
17,480		94.67% Pervious Area
985		5.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	150	0.2300	0.22		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
12.0	338	Total			

Summary for Subcatchment 3S: SUB 3

Runoff = 1.82 cfs @ 12.07 hrs, Volume= 6,073 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
25,411	98	Paved parking, HSG A
25,411		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	150	0.0400	1.94		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
3.1					**Direct Entry,**
5.0	338	Total			

Summary for Subcatchment 4S: SUB 4

Runoff = 0.49 cfs @ 12.07 hrs, Volume= 1,622 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
6,785	98	Paved parking, HSG A
6,785		100.00% Impervious Area

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

Summary for Subcatchment 5S: SUB 5

Runoff = 0.54 cfs @ 12.07 hrs, Volume= 1,798 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
7,524	98	Paved parking, HSG A
7,524		100.00% Impervious Area

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

Summary for Subcatchment 6S: SUB 6

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 622 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
2,604	98	Paved parking, HSG A
2,604		100.00% Impervious Area

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

Summary for Subcatchment 7S: SUB 7

Runoff = 0.04 cfs @ 12.07 hrs, Volume= 131 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
547	98	Paved parking, HSG A
547		100.00% Impervious Area

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

Summary for Subcatchment 8S: SUB 8

Runoff = 0.07 cfs @ 12.08 hrs, Volume= 223 cf, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
428	98	Paved parking, HSG A
1,688	74	>75% Grass cover, Good, HSG C
2,116	79	Weighted Average
1,688		79.77% Pervious Area
428		20.23% Impervious Area

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

Summary for Reach SP-1: STUDY POINT-1

Inflow Area = 67,262 sf, 67.37% Impervious, Inflow Depth = 1.98" for 2-YR event
Inflow = 1.99 cfs @ 12.07 hrs, Volume= 11,080 cf
Outflow = 1.99 cfs @ 12.07 hrs, Volume= 11,080 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Existing CB

Inflow Area = 5,926 sf, 24.60% Impervious, Inflow Depth = 0.64" for 2-YR event
Inflow = 0.09 cfs @ 12.09 hrs, Volume= 314 cf
Outflow = 0.09 cfs @ 12.09 hrs, Volume= 314 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 12.09 hrs, Volume= 314 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 12.77' @ 12.08 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.50'	**12.0" Round Culvert** L= 93.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.50' / 11.80' S= 0.0075 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.09 cfs @ 12.09 hrs HW=12.76' TW=12.66' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.09 cfs @ 0.84 fps)

Summary for Pond 2P: Existing CB

Inflow Area = 49,802 sf, 55.93% Impervious, Inflow Depth = 1.66" for 2-YR event
Inflow = 1.91 cfs @ 12.07 hrs, Volume= 6,907 cf
Outflow = 1.91 cfs @ 12.07 hrs, Volume= 6,907 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.91 cfs @ 12.07 hrs, Volume= 6,907 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 12.68' @ 12.07 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.80'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.80' / 11.50' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.91 cfs @ 12.07 hrs HW=12.68' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.91 cfs @ 3.47 fps)

Summary for Pond 9P: CB-9

Inflow Area = 3,151 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 0.23 cfs @ 12.07 hrs, Volume= 753 cf
Outflow = 0.23 cfs @ 12.07 hrs, Volume= 753 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.23 cfs @ 12.07 hrs, Volume= 753 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.23' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**12.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.00' / 51.32' S= 0.0382 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.23 cfs @ 12.07 hrs HW=53.23' TW=52.07' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.23 cfs @ 1.64 fps)

Summary for Pond DMH-1: DMH-1

Inflow Area = 14,309 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 1.02 cfs @ 12.07 hrs, Volume= 3,420 cf
Outflow = 1.02 cfs @ 12.07 hrs, Volume= 3,420 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 12.07 hrs, Volume= 3,420 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.02' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	52.50'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 52.50' / 51.32' S= 0.0737 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.02 cfs @ 12.07 hrs HW=53.02' TW=52.07' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.02 cfs @ 2.46 fps)

Summary for Pond DMH-2: DMH-2

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 1.25 cfs @ 12.07 hrs, Volume= 4,173 cf
Outflow = 1.25 cfs @ 12.07 hrs, Volume= 4,173 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.25 cfs @ 12.07 hrs, Volume= 4,173 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.15' @ 13.25 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	51.28'	**15.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.28' / 51.25' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.25 cfs @ 12.07 hrs HW=51.94' TW=51.49' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.25 cfs @ 2.76 fps)

Summary for Pond DMH-3: DMH-3

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 0.09 cfs @ 11.62 hrs, Volume= 4,173 cf
Outflow = 0.09 cfs @ 11.63 hrs, Volume= 4,173 cf, Atten= 0%, Lag= 0.6 min
Primary = 0.09 cfs @ 11.63 hrs, Volume= 4,173 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 47.13' @ 11.63 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	47.00'	**15.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.00' / 43.37' S= 0.1210 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.09 cfs @ 11.63 hrs HW=47.13' TW=24.11' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.09 cfs @ 1.24 fps)

Summary for Pond DMH-4: DMH-4

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 0.09 cfs @ 11.63 hrs, Volume= 4,173 cf
Outflow = 0.09 cfs @ 11.63 hrs, Volume= 4,173 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 11.63 hrs, Volume= 4,173 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 24.11' @ 11.63 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	23.98'	**15.0" Round Culvert**

L= 83.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 23.98' / 14.00' S= 0.1202 '/' Cc= 0.900
n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.09 cfs @ 11.63 hrs HW=24.11' TW=14.13' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.09 cfs @ 1.24 fps)

Summary for Pond DMH-5: DMH-5

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 0.09 cfs @ 11.63 hrs, Volume= 4,173 cf
Outflow = 0.09 cfs @ 11.63 hrs, Volume= 4,173 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 11.63 hrs, Volume= 4,173 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 14.13' @ 11.63 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**15.0" Round Culvert**
			L= 56.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 14.00' / 7.45' S= 0.1170 '/' Cc= 0.900
			n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.09 cfs @ 11.63 hrs HW=14.13' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.09 cfs @ 1.24 fps)

Summary for Pond FI-1: FI-1

Inflow Area = 6,785 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 0.49 cfs @ 12.07 hrs, Volume= 1,622 cf
Outflow = 0.49 cfs @ 12.07 hrs, Volume= 1,622 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 12.07 hrs, Volume= 1,622 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 55.74' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	55.30'	**10.0" Round Culvert**
			L= 97.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 55.30' / 54.52' S= 0.0080 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=0.48 cfs @ 12.07 hrs HW=55.74' TW=55.19' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.48 cfs @ 2.39 fps)

Summary for Pond FI-2: FI-2

Inflow Area = 14,309 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 1.02 cfs @ 12.07 hrs, Volume= 3,420 cf
Outflow = 1.02 cfs @ 12.07 hrs, Volume= 3,420 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 12.07 hrs, Volume= 3,420 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 55.19' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	54.52'	**10.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 54.52' / 54.41' S= 0.0079 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=1.02 cfs @ 12.07 hrs HW=55.19' TW=53.02' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.02 cfs @ 2.99 fps)

Summary for Pond FI-3: FI-3

Inflow Area = 547 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 0.04 cfs @ 12.07 hrs, Volume= 131 cf
Outflow = 0.04 cfs @ 12.07 hrs, Volume= 131 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.04 cfs @ 12.07 hrs, Volume= 131 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.89' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	53.80'	**12.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.80' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.04 cfs @ 12.07 hrs HW=53.89' TW=53.23' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.04 cfs @ 1.04 fps)

Summary for Pond ICS-1: Inlet Control

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 1.25 cfs @ 12.07 hrs, Volume= 4,173 cf
Outflow = 1.25 cfs @ 12.07 hrs, Volume= 4,173 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.25 cfs @ 12.07 hrs, Volume= 4,173 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.15' @ 13.25 hrs
Flood Elev= 61.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	51.32'	**15.0" Round Culvert** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.32' / 51.28' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	51.32'	**12.0" Round By-pass Pipe** L= 129.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.32' / 47.00' S= 0.0335 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	54.50'	**6.0' long Overflow Weir** 2 End Contraction(s)

Primary OutFlow Max=1.23 cfs @ 12.07 hrs HW=52.07' TW=51.94' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.23 cfs @ 2.30 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.32' TW=47.00' (Dynamic Tailwater)
└**2=By-pass Pipe** (Controls 0.00 cfs)
└**3=Overflow Weir** (Controls 0.00 cfs)

Summary for Pond OCS-1: Outlet Control

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 54.50' @ 0.51 hrs
Flood Elev= 61.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.67'	**15.0" Round Outlet Pipe** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.67' / 47.00' S= 0.0744 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	54.50'	**6.0' long Overflow Weir** 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.67' TW=47.00' (Dynamic Tailwater)
└**1=Outlet Pipe** (Controls 0.00 cfs)
└**2=Overflow Weir** (Controls 0.00 cfs)

Summary for Pond SSC-1: Subsurface Storage Chamber #1

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 1.25 cfs @ 12.07 hrs, Volume= 4,173 cf
Outflow = 0.09 cfs @ 11.62 hrs, Volume= 4,173 cf, Atten= 93%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.09 cfs @ 11.62 hrs, Volume= 4,173 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Peak Elev= 52.15' @ 13.24 hrs Surf.Area= 1,541 sf Storage= 1,597 cf
Flood Elev= 61.25' Surf.Area= 1,541 sf Storage= 5,142 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 138.8 min (894.9 - 756.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.50'	2,224 cf	**15.58'W x 98.91'L x 5.50'H Field A** 8,477 cf Overall - 2,918 cf Embedded = 5,559 cf x 40.0% Voids
#2A	51.25'	2,918 cf	**ADS_StormTech MC-3500 d +Cap** x 26 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 2 Rows of 13 Chambers Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf
		5,142 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Secondary	47.67'	**6.0" Vert. 6" Underdrain** C= 0.600
#2	Device 1	50.50'	**2.410 in/hr Filtration to Underdrains over Surface area**
#3	Primary	51.25'	**15.0" Round Chamber Outlet Pipe** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.25' / 51.16' S= 0.0180 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=50.50' TW=47.67' (Dynamic Tailwater)
└─**3=Chamber Outlet Pipe** (Controls 0.00 cfs)

Secondary OutFlow Max=0.09 cfs @ 11.62 hrs HW=50.61' TW=47.13' (Dynamic Tailwater)
└─**1=6" Underdrain** (Passes 0.09 cfs of 1.55 cfs potential flow)
└─**2=Filtration to Underdrains** (Exfiltration Controls 0.09 cfs)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB 1 Runoff Area=5,926 sf 24.60% Impervious Runoff Depth=1.53"
Flow Length=333' Tc=5.0 min CN=67 Runoff=0.24 cfs 756 cf

Subcatchment 2S: SUB 2 Runoff Area=18,465 sf 5.33% Impervious Runoff Depth=1.01"
Flow Length=338' Tc=12.0 min CN=59 Runoff=0.34 cfs 1,561 cf

Subcatchment 3S: SUB 3 Runoff Area=25,411 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=338' Tc=5.0 min CN=98 Runoff=2.72 cfs 9,241 cf

Subcatchment 4S: SUB 4 Runoff Area=6,785 sf 100.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=98 Runoff=0.73 cfs 2,467 cf

Subcatchment 5S: SUB 5 Runoff Area=7,524 sf 100.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=98 Runoff=0.80 cfs 2,736 cf

Subcatchment 6S: SUB 6 Runoff Area=2,604 sf 100.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=98 Runoff=0.28 cfs 947 cf

Subcatchment 7S: SUB 7 Runoff Area=547 sf 100.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=98 Runoff=0.06 cfs 199 cf

Subcatchment 8S: SUB 8 Runoff Area=2,116 sf 20.23% Impervious Runoff Depth=2.46"
Tc=5.0 min CN=79 Runoff=0.15 cfs 434 cf

Reach SP-1: STUDY POINT-1 Inflow=3.23 cfs 17,907 cf
Outflow=3.23 cfs 17,907 cf

Pond 1P: Existing CB Peak Elev=13.28' Inflow=0.24 cfs 756 cf
12.0" Round Culvert n=0.013 L=93.0' S=0.0075 '/' Outflow=0.24 cfs 756 cf

Pond 2P: Existing CB Peak Elev=13.26' Inflow=3.15 cfs 11,558 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0060 '/' Outflow=3.15 cfs 11,558 cf

Pond 9P: CB-9 Peak Elev=53.29' Inflow=0.34 cfs 1,146 cf
12.0" Round Culvert n=0.012 L=44.0' S=0.0382 '/' Outflow=0.34 cfs 1,146 cf

Pond DMH-1: DMH-1 Peak Elev=53.23' Inflow=1.53 cfs 5,204 cf
12.0" Round Culvert n=0.012 L=16.0' S=0.0737 '/' Outflow=1.53 cfs 5,204 cf

Pond DMH-2: DMH-2 Peak Elev=53.23' Inflow=1.87 cfs 6,348 cf
15.0" Round Culvert n=0.012 L=6.0' S=0.0050 '/' Outflow=1.87 cfs 6,348 cf

Pond DMH-3: DMH-3 Peak Elev=47.13' Inflow=0.09 cfs 6,349 cf
15.0" Round Culvert n=0.012 L=30.0' S=0.1210 '/' Outflow=0.09 cfs 6,349 cf

Pond DMH-4: DMH-4 Peak Elev=24.11' Inflow=0.09 cfs 6,349 cf
15.0" Round Culvert n=0.012 L=83.0' S=0.1202 '/' Outflow=0.09 cfs 6,349 cf

Pond DMH-5: DMH-5 Peak Elev=14.13' Inflow=0.09 cfs 6,349 cf
15.0" Round Culvert n=0.012 L=56.0' S=0.1170 '/' Outflow=0.09 cfs 6,349 cf

Pond FI-1: FI-1 Peak Elev=55.89' Inflow=0.73 cfs 2,467 cf
10.0" Round Culvert n=0.013 L=97.0' S=0.0080 '/' Outflow=0.73 cfs 2,467 cf

Pond FI-2: FI-2 Peak Elev=55.40' Inflow=1.53 cfs 5,204 cf
10.0" Round Culvert n=0.013 L=14.0' S=0.0079 '/' Outflow=1.53 cfs 5,204 cf

Pond FI-3: FI-3 Peak Elev=53.92' Inflow=0.06 cfs 199 cf
12.0" Round Culvert n=0.012 L=40.0' S=0.0200 '/' Outflow=0.06 cfs 199 cf

Pond ICS-1: Inlet Control Peak Elev=53.23' Inflow=1.87 cfs 6,349 cf
Primary=1.87 cfs 6,348 cf Secondary=0.00 cfs 0 cf Outflow=1.87 cfs 6,348 cf

Pond OCS-1: Outlet Control Peak Elev=54.50' Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Pond SSC-1: Subsurface Storage Chamber #1 Peak Elev=53.23' Storage=2,884 cf Inflow=1.87 cfs 6,348 cf
Primary=0.00 cfs 0 cf Secondary=0.09 cfs 6,349 cf Outflow=0.09 cfs 6,349 cf

Total Runoff Area = 69,378 sf Runoff Volume = 18,341 cf Average Runoff Depth = 3.17"
34.07% Pervious = 23,636 sf 65.93% Impervious = 45,742 sf

Summary for Subcatchment 1S: SUB 1

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 756 cf, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
4,468	57	Woods/grass comb., Poor, HSG A
1,458	98	Paved parking, HSG C
5,926	67	Weighted Average
4,468		75.40% Pervious Area
1,458		24.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	35	0.5000	0.22		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	157	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.74	14.80	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 20.0 '/' Top.W=11.50' n= 0.013 Asphalt, smooth
1.4					**Direct Entry,**
5.0	333	Total			

Summary for Subcatchment 2S: SUB 2

Runoff = 0.34 cfs @ 12.19 hrs, Volume= 1,561 cf, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
17,480	57	Woods/grass comb., Poor, HSG A
985	98	Paved parking, HSG A
18,465	59	Weighted Average
17,480		94.67% Pervious Area
985		5.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	150	0.2300	0.22		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
12.0	338	Total			

Summary for Subcatchment 3S: SUB 3

Runoff = 2.72 cfs @ 12.07 hrs, Volume= 9,241 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
25,411	98	Paved parking, HSG A
25,411		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	150	0.0400	1.94		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
3.1					**Direct Entry,**
5.0	338	Total			

Summary for Subcatchment 4S: SUB 4

Runoff = 0.73 cfs @ 12.07 hrs, Volume= 2,467 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
6,785	98	Paved parking, HSG A
6,785		100.00% Impervious Area

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

Summary for Subcatchment 5S: SUB 5

Runoff = 0.80 cfs @ 12.07 hrs, Volume= 2,736 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
7,524	98	Paved parking, HSG A
7,524		100.00% Impervious Area

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

Summary for Subcatchment 6S: SUB 6

Runoff = 0.28 cfs @ 12.07 hrs, Volume= 947 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
2,604	98	Paved parking, HSG A
2,604		100.00% Impervious Area

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

Summary for Subcatchment 7S: SUB 7

Runoff = 0.06 cfs @ 12.07 hrs, Volume= 199 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
547	98	Paved parking, HSG A
547		100.00% Impervious Area

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

Summary for Subcatchment 8S: SUB 8

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 434 cf, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
428	98	Paved parking, HSG A
1,688	74	>75% Grass cover, Good, HSG C
2,116	79	Weighted Average
1,688		79.77% Pervious Area
428		20.23% Impervious Area

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

Summary for Reach SP-1: STUDY POINT-1

Inflow Area = 67,262 sf, 67.37% Impervious, Inflow Depth = 3.19" for 10-YR event
Inflow = 3.23 cfs @ 12.07 hrs, Volume= 17,907 cf
Outflow = 3.23 cfs @ 12.07 hrs, Volume= 17,907 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Existing CB

Inflow Area = 5,926 sf, 24.60% Impervious, Inflow Depth = 1.53" for 10-YR event
Inflow = 0.24 cfs @ 12.08 hrs, Volume= 756 cf
Outflow = 0.24 cfs @ 12.08 hrs, Volume= 756 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 12.08 hrs, Volume= 756 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 13.28' @ 12.08 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.50'	**12.0" Round Culvert** L= 93.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.50' / 11.80' S= 0.0075 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.27 cfs @ 12.08 hrs HW=13.28' TW=13.26' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.27 cfs @ 0.57 fps)

Summary for Pond 2P: Existing CB

Inflow Area = 49,802 sf, 55.93% Impervious, Inflow Depth = 2.78" for 10-YR event
Inflow = 3.15 cfs @ 12.07 hrs, Volume= 11,558 cf
Outflow = 3.15 cfs @ 12.07 hrs, Volume= 11,558 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.15 cfs @ 12.07 hrs, Volume= 11,558 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 13.26' @ 12.07 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.80'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.80' / 11.50' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.14 cfs @ 12.07 hrs HW=13.26' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 3.14 cfs @ 4.00 fps)

Summary for Pond 9P: CB-9

Inflow Area = 3,151 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 0.34 cfs @ 12.07 hrs, Volume= 1,146 cf
Outflow = 0.34 cfs @ 12.07 hrs, Volume= 1,146 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.34 cfs @ 12.07 hrs, Volume= 1,146 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.29' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**12.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.00' / 51.32' S= 0.0382 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.34 cfs @ 12.07 hrs HW=53.29' TW=52.27' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.34 cfs @ 1.82 fps)

Summary for Pond DMH-1: DMH-1

Inflow Area = 14,309 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 1.53 cfs @ 12.07 hrs, Volume= 5,204 cf
Outflow = 1.53 cfs @ 12.07 hrs, Volume= 5,204 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.53 cfs @ 12.07 hrs, Volume= 5,204 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.23' @ 14.33 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	52.50'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 52.50' / 51.32' S= 0.0737 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.53 cfs @ 12.07 hrs HW=53.16' TW=52.27' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.53 cfs @ 2.77 fps)

Summary for Pond DMH-2: DMH-2

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 1.87 cfs @ 12.07 hrs, Volume= 6,348 cf
Outflow = 1.87 cfs @ 12.07 hrs, Volume= 6,348 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.87 cfs @ 12.07 hrs, Volume= 6,348 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.23' @ 14.31 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	51.28'	**15.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.28' / 51.25' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.63 cfs @ 12.07 hrs HW=52.14' TW=51.98' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.63 cfs @ 2.53 fps)

Summary for Pond DMH-3: DMH-3

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 0.09 cfs @ 10.95 hrs, Volume= 6,349 cf
Outflow = 0.09 cfs @ 10.96 hrs, Volume= 6,349 cf, Atten= 0%, Lag= 0.6 min
Primary = 0.09 cfs @ 10.96 hrs, Volume= 6,349 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 47.13' @ 10.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	47.00'	**15.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.00' / 43.37' S= 0.1210 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.09 cfs @ 10.96 hrs HW=47.13' TW=24.11' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.09 cfs @ 1.24 fps)

Summary for Pond DMH-4: DMH-4

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 0.09 cfs @ 10.96 hrs, Volume= 6,349 cf
Outflow = 0.09 cfs @ 10.96 hrs, Volume= 6,349 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 10.96 hrs, Volume= 6,349 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 24.11' @ 10.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	23.98'	**15.0" Round Culvert**

L= 83.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 23.98' / 14.00' S= 0.1202 '/' Cc= 0.900
n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.09 cfs @ 10.96 hrs HW=24.11' TW=14.13' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.09 cfs @ 1.24 fps)

Summary for Pond DMH-5: DMH-5

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 0.09 cfs @ 10.96 hrs, Volume= 6,349 cf
Outflow = 0.09 cfs @ 10.96 hrs, Volume= 6,349 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 10.96 hrs, Volume= 6,349 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 14.13' @ 10.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**15.0" Round Culvert**
			L= 56.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 14.00' / 7.45' S= 0.1170 '/' Cc= 0.900
			n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.09 cfs @ 10.96 hrs HW=14.13' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.09 cfs @ 1.24 fps)

Summary for Pond FI-1: FI-1

Inflow Area = 6,785 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 0.73 cfs @ 12.07 hrs, Volume= 2,467 cf
Outflow = 0.73 cfs @ 12.07 hrs, Volume= 2,467 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.73 cfs @ 12.07 hrs, Volume= 2,467 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 55.89' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	55.30'	**10.0" Round Culvert**
			L= 97.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 55.30' / 54.52' S= 0.0080 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=0.72 cfs @ 12.07 hrs HW=55.89' TW=55.40' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.72 cfs @ 2.46 fps)

Summary for Pond FI-2: FI-2

Inflow Area = 14,309 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 1.53 cfs @ 12.07 hrs, Volume= 5,204 cf
Outflow = 1.53 cfs @ 12.07 hrs, Volume= 5,204 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.53 cfs @ 12.07 hrs, Volume= 5,204 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 55.40' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	54.52'	**10.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 54.52' / 54.41' S= 0.0079 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=1.53 cfs @ 12.07 hrs HW=55.40' TW=53.16' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.53 cfs @ 3.31 fps)

Summary for Pond FI-3: FI-3

Inflow Area = 547 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 0.06 cfs @ 12.07 hrs, Volume= 199 cf
Outflow = 0.06 cfs @ 12.07 hrs, Volume= 199 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.06 cfs @ 12.07 hrs, Volume= 199 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.92' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	53.80'	**12.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.80' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.06 cfs @ 12.07 hrs HW=53.92' TW=53.29' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.06 cfs @ 1.16 fps)

Summary for Pond ICS-1: Inlet Control

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 1.87 cfs @ 12.07 hrs, Volume= 6,349 cf
Outflow = 1.87 cfs @ 12.07 hrs, Volume= 6,348 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.87 cfs @ 12.07 hrs, Volume= 6,348 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.23' @ 14.32 hrs
Flood Elev= 61.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	51.32'	**15.0" Round Culvert** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.32' / 51.28' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	51.32'	**12.0" Round By-pass Pipe** L= 129.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.32' / 47.00' S= 0.0335 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	54.50'	**6.0' long Overflow Weir** 2 End Contraction(s)

Primary OutFlow Max=1.67 cfs @ 12.07 hrs HW=52.27' TW=52.14' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.67 cfs @ 2.30 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.32' TW=47.00' (Dynamic Tailwater)
└─**2=By-pass Pipe** (Controls 0.00 cfs)
└─**3=Overflow Weir** (Controls 0.00 cfs)

Summary for Pond OCS-1: Outlet Control

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 0.00" for 10-YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 54.50' @ 0.51 hrs
Flood Elev= 61.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.67'	**15.0" Round Outlet Pipe** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.67' / 47.00' S= 0.0744 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	54.50'	**6.0' long Overflow Weir** 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.67' TW=47.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Controls 0.00 cfs)
└─**2=Overflow Weir** (Controls 0.00 cfs)

Summary for Pond SSC-1: Subsurface Storage Chamber #1

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 1.87 cfs @ 12.07 hrs, Volume= 6,348 cf
Outflow = 0.09 cfs @ 10.95 hrs, Volume= 6,349 cf, Atten= 95%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.09 cfs @ 10.95 hrs, Volume= 6,349 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Peak Elev= 53.23' @ 14.31 hrs Surf.Area= 1,541 sf Storage= 2,884 cf
Flood Elev= 61.25' Surf.Area= 1,541 sf Storage= 5,142 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 274.0 min (1,022.5 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.50'	2,224 cf	**15.58'W x 98.91'L x 5.50'H Field A** 8,477 cf Overall - 2,918 cf Embedded = 5,559 cf x 40.0% Voids
#2A	51.25'	2,918 cf	**ADS_StormTech MC-3500 d +Cap** x 26 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 2 Rows of 13 Chambers Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf
		5,142 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Secondary	47.67'	**6.0" Vert. 6" Underdrain** C= 0.600
#2	Device 1	50.50'	**2.410 in/hr Filtration to Underdrains over Surface area**
#3	Primary	51.25'	**15.0" Round Chamber Outlet Pipe** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.25' / 51.16' S= 0.0180 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=50.50' TW=47.67' (Dynamic Tailwater)
└─**3=Chamber Outlet Pipe** (Controls 0.00 cfs)

Secondary OutFlow Max=0.09 cfs @ 10.95 hrs HW=50.61' TW=47.13' (Dynamic Tailwater)
└─**1=6" Underdrain** (Passes 0.09 cfs of 1.55 cfs potential flow)
└─**2=Filtration to Underdrains** (Exfiltration Controls 0.09 cfs)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB 1 Runoff Area=5,926 sf 24.60% Impervious Runoff Depth=2.38"
Flow Length=333' Tc=5.0 min CN=67 Runoff=0.39 cfs 1,175 cf

Subcatchment 2S: SUB 2 Runoff Area=18,465 sf 5.33% Impervious Runoff Depth=1.71"
Flow Length=338' Tc=12.0 min CN=59 Runoff=0.64 cfs 2,635 cf

Subcatchment 3S: SUB 3 Runoff Area=25,411 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=338' Tc=5.0 min CN=98 Runoff=3.43 cfs 11,778 cf

Subcatchment 4S: SUB 4 Runoff Area=6,785 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=98 Runoff=0.92 cfs 3,145 cf

Subcatchment 5S: SUB 5 Runoff Area=7,524 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=98 Runoff=1.02 cfs 3,487 cf

Subcatchment 6S: SUB 6 Runoff Area=2,604 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=98 Runoff=0.35 cfs 1,207 cf

Subcatchment 7S: SUB 7 Runoff Area=547 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=98 Runoff=0.07 cfs 254 cf

Subcatchment 8S: SUB 8 Runoff Area=2,116 sf 20.23% Impervious Runoff Depth=3.50"
Tc=5.0 min CN=79 Runoff=0.21 cfs 617 cf

Reach SP-1: STUDY POINT-1 Inflow=4.31 cfs 23,679 cf
Outflow=4.31 cfs 23,679 cf

Pond 1P: Existing CB Peak Elev=13.89' Inflow=0.39 cfs 1,175 cf
12.0" Round Culvert n=0.013 L=93.0' S=0.0075 '/' Outflow=0.39 cfs 1,176 cf

Pond 2P: Existing CB Peak Elev=13.88' Inflow=4.22 cfs 15,589 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0060 '/' Outflow=4.22 cfs 15,589 cf

Pond 9P: CB-9 Peak Elev=54.38' Inflow=0.43 cfs 1,460 cf
12.0" Round Culvert n=0.012 L=44.0' S=0.0382 '/' Outflow=0.43 cfs 1,460 cf

Pond DMH-1: DMH-1 Peak Elev=54.38' Inflow=1.93 cfs 6,632 cf
12.0" Round Culvert n=0.012 L=16.0' S=0.0737 '/' Outflow=1.93 cfs 6,632 cf

Pond DMH-2: DMH-2 Peak Elev=54.38' Inflow=2.36 cfs 8,090 cf
15.0" Round Culvert n=0.012 L=6.0' S=0.0050 '/' Outflow=2.36 cfs 8,090 cf

Pond DMH-3: DMH-3 Peak Elev=47.13' Inflow=0.09 cfs 8,091 cf
15.0" Round Culvert n=0.012 L=30.0' S=0.1210 '/' Outflow=0.09 cfs 8,091 cf

Pond DMH-4: DMH-4 Peak Elev=24.11' Inflow=0.09 cfs 8,091 cf
15.0" Round Culvert n=0.012 L=83.0' S=0.1202 '/' Outflow=0.09 cfs 8,091 cf

Pond DMH-5: DMH-5 Peak Elev=14.13' Inflow=0.09 cfs 8,091 cf
15.0" Round Culvert n=0.012 L=56.0' S=0.1170 '/' Outflow=0.09 cfs 8,091 cf

Pond FI-1: FI-1 Peak Elev=56.05' Inflow=0.92 cfs 3,145 cf
10.0" Round Culvert n=0.013 L=97.0' S=0.0080 '/' Outflow=0.92 cfs 3,145 cf

Pond FI-2: FI-2 Peak Elev=55.65' Inflow=1.93 cfs 6,632 cf
10.0" Round Culvert n=0.013 L=14.0' S=0.0079 '/' Outflow=1.93 cfs 6,632 cf

Pond FI-3: FI-3 Peak Elev=54.38' Inflow=0.07 cfs 254 cf
12.0" Round Culvert n=0.012 L=40.0' S=0.0200 '/' Outflow=0.07 cfs 254 cf

Pond ICS-1: Inlet Control Peak Elev=54.38' Inflow=2.36 cfs 8,093 cf
Primary=2.36 cfs 8,090 cf Secondary=0.00 cfs 0 cf Outflow=2.36 cfs 8,090 cf

Pond OCS-1: Outlet Control Peak Elev=54.50' Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Pond SSC-1: Subsurface Storage Chamber #1 Peak Elev=54.38' Storage=4,074 cf Inflow=2.36 cfs 8,090 cf
Primary=0.00 cfs 0 cf Secondary=0.09 cfs 8,091 cf Outflow=0.09 cfs 8,091 cf

Total Runoff Area = 69,378 sf Runoff Volume = 24,299 cf Average Runoff Depth = 4.20"
34.07% Pervious = 23,636 sf 65.93% Impervious = 45,742 sf

Summary for Subcatchment 1S: SUB 1

Runoff = 0.39 cfs @ 12.08 hrs, Volume= 1,175 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
4,468	57	Woods/grass comb., Poor, HSG A
1,458	98	Paved parking, HSG C
5,926	67	Weighted Average
4,468		75.40% Pervious Area
1,458		24.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	35	0.5000	0.22		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	157	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.74	14.80	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 20.0 '/' Top.W=11.50' n= 0.013 Asphalt, smooth
1.4					**Direct Entry,**
5.0	333	Total			

Summary for Subcatchment 2S: SUB 2

Runoff = 0.64 cfs @ 12.18 hrs, Volume= 2,635 cf, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
17,480	57	Woods/grass comb., Poor, HSG A
985	98	Paved parking, HSG A
18,465	59	Weighted Average
17,480		94.67% Pervious Area
985		5.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	150	0.2300	0.22		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
12.0	338	Total			

Summary for Subcatchment 3S: SUB 3

Runoff = 3.43 cfs @ 12.07 hrs, Volume= 11,778 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
25,411	98	Paved parking, HSG A
25,411		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	150	0.0400	1.94		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.1	47	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	141	0.0100	4.68	20.46	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=0.50' Z= 1.0 & 30.0 '/' Top.W=16.50' n= 0.013 Asphalt, smooth
3.1					**Direct Entry,**
5.0	338	Total			

Summary for Subcatchment 4S: SUB 4

Runoff = 0.92 cfs @ 12.07 hrs, Volume= 3,145 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
6,785	98	Paved parking, HSG A
6,785		100.00% Impervious Area

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

Summary for Subcatchment 5S: SUB 5

Runoff = 1.02 cfs @ 12.07 hrs, Volume= 3,487 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
7,524	98	Paved parking, HSG A
7,524		100.00% Impervious Area

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

Summary for Subcatchment 6S: SUB 6

Runoff = 0.35 cfs @ 12.07 hrs, Volume= 1,207 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
2,604	98	Paved parking, HSG A
2,604		100.00% Impervious Area

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

Summary for Subcatchment 7S: SUB 7

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 254 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
547	98	Paved parking, HSG A
547		100.00% Impervious Area

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

Summary for Subcatchment 8S: SUB 8

Runoff = 0.21 cfs @ 12.07 hrs, Volume= 617 cf, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
428	98	Paved parking, HSG A
1,688	74	>75% Grass cover, Good, HSG C
2,116	79	Weighted Average
1,688		79.77% Pervious Area
428		20.23% Impervious Area

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

Summary for Reach SP-1: STUDY POINT-1

Inflow Area = 67,262 sf, 67.37% Impervious, Inflow Depth = 4.22" for 25-YR event
Inflow = 4.31 cfs @ 12.08 hrs, Volume= 23,679 cf
Outflow = 4.31 cfs @ 12.08 hrs, Volume= 23,679 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Existing CB

Inflow Area = 5,926 sf, 24.60% Impervious, Inflow Depth = 2.38" for 25-YR event
Inflow = 0.39 cfs @ 12.08 hrs, Volume= 1,175 cf
Outflow = 0.39 cfs @ 12.08 hrs, Volume= 1,176 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.08 hrs, Volume= 1,176 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 13.89' @ 12.09 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.50'	**12.0" Round Culvert** L= 93.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.50' / 11.80' S= 0.0075 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.25 cfs @ 12.08 hrs HW=13.88' TW=13.87' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.25 cfs @ 0.31 fps)

Summary for Pond 2P: Existing CB

Inflow Area = 49,802 sf, 55.93% Impervious, Inflow Depth = 3.76" for 25-YR event
Inflow = 4.22 cfs @ 12.08 hrs, Volume= 15,589 cf
Outflow = 4.22 cfs @ 12.08 hrs, Volume= 15,589 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.22 cfs @ 12.08 hrs, Volume= 15,589 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 13.88' @ 12.08 hrs
Flood Elev= 59.66'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.80'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.80' / 11.50' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.21 cfs @ 12.08 hrs HW=13.87' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 4.21 cfs @ 5.37 fps)

Summary for Pond 9P: CB-9

Inflow Area = 3,151 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 0.43 cfs @ 12.07 hrs, Volume= 1,460 cf
Outflow = 0.43 cfs @ 12.07 hrs, Volume= 1,460 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.07 hrs, Volume= 1,460 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 54.38' @ 15.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**12.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.00' / 51.32' S= 0.0382 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.07 hrs HW=53.32' TW=52.64' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.43 cfs @ 1.94 fps)

Summary for Pond DMH-1: DMH-1

Inflow Area = 14,309 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 1.93 cfs @ 12.07 hrs, Volume= 6,632 cf
Outflow = 1.93 cfs @ 12.07 hrs, Volume= 6,632 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.93 cfs @ 12.07 hrs, Volume= 6,632 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 54.38' @ 15.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	52.50'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 52.50' / 51.32' S= 0.0737 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.93 cfs @ 12.07 hrs HW=53.27' TW=52.64' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.93 cfs @ 2.98 fps)

Summary for Pond DMH-2: DMH-2

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 2.36 cfs @ 12.07 hrs, Volume= 8,090 cf
Outflow = 2.36 cfs @ 12.07 hrs, Volume= 8,090 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.36 cfs @ 12.07 hrs, Volume= 8,090 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 54.38' @ 15.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	51.28'	**15.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.28' / 51.25' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.80 cfs @ 12.07 hrs HW=52.55' TW=52.45' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.80 cfs @ 1.47 fps)

Summary for Pond DMH-3: DMH-3

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 0.09 cfs @ 10.28 hrs, Volume= 8,091 cf
Outflow = 0.09 cfs @ 10.29 hrs, Volume= 8,091 cf, Atten= 0%, Lag= 0.6 min
Primary = 0.09 cfs @ 10.29 hrs, Volume= 8,091 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 47.13' @ 10.29 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	47.00'	**15.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.00' / 43.37' S= 0.1210 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.09 cfs @ 10.29 hrs HW=47.13' TW=24.11' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.09 cfs @ 1.24 fps)

Summary for Pond DMH-4: DMH-4

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 0.09 cfs @ 10.29 hrs, Volume= 8,091 cf
Outflow = 0.09 cfs @ 10.29 hrs, Volume= 8,091 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 10.29 hrs, Volume= 8,091 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 24.11' @ 10.29 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	23.98'	**15.0" Round Culvert**

L= 83.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 23.98' / 14.00' S= 0.1202 '/' Cc= 0.900
n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.09 cfs @ 10.29 hrs HW=24.11' TW=14.13' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.09 cfs @ 1.24 fps)

Summary for Pond DMH-5: DMH-5

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 0.09 cfs @ 10.29 hrs, Volume= 8,091 cf
Outflow = 0.09 cfs @ 10.29 hrs, Volume= 8,091 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 10.29 hrs, Volume= 8,091 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 14.13' @ 10.29 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**15.0" Round Culvert**
			L= 56.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 14.00' / 7.45' S= 0.1170 '/' Cc= 0.900
			n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.09 cfs @ 10.29 hrs HW=14.13' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.09 cfs @ 1.24 fps)

Summary for Pond FI-1: FI-1

Inflow Area = 6,785 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 0.92 cfs @ 12.07 hrs, Volume= 3,145 cf
Outflow = 0.92 cfs @ 12.07 hrs, Volume= 3,145 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.92 cfs @ 12.07 hrs, Volume= 3,145 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 56.05' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	55.30'	**10.0" Round Culvert**
			L= 97.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 55.30' / 54.52' S= 0.0080 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=0.91 cfs @ 12.07 hrs HW=56.04' TW=55.65' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.91 cfs @ 2.34 fps)

Summary for Pond FI-2: FI-2

Inflow Area = 14,309 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 1.93 cfs @ 12.07 hrs, Volume= 6,632 cf
Outflow = 1.93 cfs @ 12.07 hrs, Volume= 6,632 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.93 cfs @ 12.07 hrs, Volume= 6,632 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 55.65' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	54.52'	**10.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 54.52' / 54.41' S= 0.0079 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=1.93 cfs @ 12.07 hrs HW=55.65' TW=53.27' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.93 cfs @ 3.55 fps)

Summary for Pond FI-3: FI-3

Inflow Area = 547 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 0.07 cfs @ 12.07 hrs, Volume= 254 cf
Outflow = 0.07 cfs @ 12.07 hrs, Volume= 254 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.07 cfs @ 12.07 hrs, Volume= 254 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 54.38' @ 15.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	53.80'	**12.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.80' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.07 cfs @ 12.07 hrs HW=53.93' TW=53.32' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.07 cfs @ 1.23 fps)

Summary for Pond ICS-1: Inlet Control

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 2.36 cfs @ 12.07 hrs, Volume= 8,093 cf
Outflow = 2.36 cfs @ 12.07 hrs, Volume= 8,090 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.36 cfs @ 12.07 hrs, Volume= 8,090 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 54.38' @ 15.16 hrs
Flood Elev= 61.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	51.32'	**15.0" Round Culvert** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.32' / 51.28' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	51.32'	**12.0" Round By-pass Pipe** L= 129.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.32' / 47.00' S= 0.0335 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	54.50'	**6.0' long Overflow Weir** 2 End Contraction(s)

Primary OutFlow Max=1.82 cfs @ 12.07 hrs HW=52.64' TW=52.55' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.82 cfs @ 1.49 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.32' TW=47.00' (Dynamic Tailwater)
└─**2=By-pass Pipe** (Controls 0.00 cfs)
└─**3=Overflow Weir** (Controls 0.00 cfs)

Summary for Pond OCS-1: Outlet Control

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 0.00" for 25-YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 54.50' @ 0.51 hrs
Flood Elev= 61.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.67'	**15.0" Round Outlet Pipe** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.67' / 47.00' S= 0.0744 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	54.50'	**6.0' long Overflow Weir** 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.67' TW=47.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Controls 0.00 cfs)
└─**2=Overflow Weir** (Controls 0.00 cfs)

Summary for Pond SSC-1: Subsurface Storage Chamber #1

Inflow Area = 17,460 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 2.36 cfs @ 12.07 hrs, Volume= 8,090 cf
Outflow = 0.09 cfs @ 10.28 hrs, Volume= 8,091 cf, Atten= 96%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.09 cfs @ 10.28 hrs, Volume= 8,091 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Peak Elev= 54.38' @ 15.14 hrs Surf.Area= 1,541 sf Storage= 4,074 cf
Flood Elev= 61.25' Surf.Area= 1,541 sf Storage= 5,142 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 395.3 min (1,139.8 - 744.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.50'	2,224 cf	**15.58'W x 98.91'L x 5.50'H Field A** 8,477 cf Overall - 2,918 cf Embedded = 5,559 cf x 40.0% Voids
#2A	51.25'	2,918 cf	**ADS_StormTech MC-3500 d +Cap** x 26 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 2 Rows of 13 Chambers Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf
		5,142 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Secondary	47.67'	**6.0" Vert. 6" Underdrain** C= 0.600
#2	Device 1	50.50'	**2.410 in/hr Filtration to Underdrains over Surface area**
#3	Primary	51.25'	**15.0" Round Chamber Outlet Pipe** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.25' / 51.16' S= 0.0180 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=50.50' TW=47.67' (Dynamic Tailwater)
└─**3=Chamber Outlet Pipe** (Controls 0.00 cfs)

Secondary OutFlow Max=0.09 cfs @ 10.28 hrs HW=50.61' TW=47.13' (Dynamic Tailwater)
└─**1=6" Underdrain** (Passes 0.09 cfs of 1.55 cfs potential flow)
└─**2=Filtration to Underdrains** (Exfiltration Controls 0.09 cfs)

Attachment D

Soils Report

Hydrologic Soil Group—Cumberland County and Part of Oxford County, Maine
(218 Washington Ave)

Map Scale: 1:856 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: 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: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 11, Sep 17, 2015

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

Date(s) aerial images were photographed: Jul 31, 2013—Aug 11, 2013

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Cumberland County and Part of Oxford County, Maine (ME005)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
HIC	Hinckley loamy sand, 8 to 15 percent slopes	A	0.4	20.3%
HID	Hinckley loamy sand, 15 to 25 percent slopes	A	1.8	79.7%
Totals for Area of Interest			**2.2**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher