PROJECT NARRATIVE AND STORMWATER MANAGEMENT REPORT

for

THE INSTITUTION FOR SAVINGS
93 STATE STREET
NEWBURYPORT, MASSACHUSETTS

Prepared for:

The Institution for Savings
93 State Street
Newburyport, Massachusetts 01950

Prepared by:

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January 8, 2020
Revised: February 6, 2020
Revised: October 14, 2020

MERIDIAN ASSOCIATES
100% employee owned

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PROJECT NARRATIVE & STORMWATER MANAGEMENT STANDARDS

Project Narrative:

The project site is located at 93 State Street at the corner of Prospect Street in Newburyport, Massachusetts on a parcel totaling approximately 0.85 acres. The site has been home to the Institution for Savings since 1820 with the original building being constructed in 1872 and an additional building constructed in 1980. The site topography is predominantly flat with a slight pitch towards Prospect Street to allow for positive drainage in the parking areas. The existing site features consist of two connected parking areas, a central stone island, landscaped areas, brick walkways, as well as the iconic clock tower monument with associated seating areas.

The applicant is proposing the construction of an approximate 9,100 square foot, two story addition connecting to the 1980 building with ground level parking beneath. To minimize the increase in impervious area, the proposed addition is being located over the existing employee parking lot at the eastern portion of the site. As part of this improvement, the applicant is also proposing to redirect the majority of surface and roof runoff to a subsurface detention facility for storage and mitigation of peak flows. Existing parking area drains in the employee parking lot beneath the addition will be upgraded and redirected through an oil and grease separator before connecting into the existing sewer line in Prospect Street.

The proposed project results in a net increase in total impervious area by roughly 4,100 square feet. However, the proposed drainage system utilizes a series of vortechnic units and catch basins to pretreat surface runoff before directing flow into the subsurface storage facility that will provide an overall reduction of peak discharge rates. The subsurface storage facility is a sealed detention basin system and has been designed to provide a twenty+ percent reduction to the existing 100-year storm event peak discharge rate. Infiltration was considered as a potential BMP but given the densely developed urban environment and proximity to residential houses was deemed disadvantageous by the city's engineer. Additional areas of the site that are to be disturbed will be landscaped with shrubs, perennial plantings, and groundcovers to match the existing plant palette and character of the site.

Revisions from Previous Design:

The proposed building addition has been enlarged in size from 8,100 to 9,100 square feet. The hydrologic model has been updated per the new design. Twelve (12) additional subsurface storage chambers have been added to the system and incorporate outlet control within the detention facility to limit discharge within frequent smaller storm events. Additionally, a tailwater has been included within the existing pipe in the street.

Stormwater Management Standards

The following are the ten (10) DEP Stormwater Standards as outlined in the Wetlands Regulations:

Standard 1: No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

There are no new stormwater discharges to waters of the Commonwealth with the completion of this project. Stormwater will continue to be discharged into the existing conventional drainage system within Prospect Street. Runoff from paved surfaces will be treated through catch basins and vortechnic units prior to discharge from the property.

Standard 2: Peak Rate Attenuation - Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

The stormwater analysis utilizes compiled data from the Northeast Regional Climate Center in conjunction with US Natural Resource Conservation Service (NRCS) and Cornell University to calculate peak runoff rates. Full detail of peak rate attenuation along with supplemental stormwater calculation utilizing HydroCAD as well as existing and post development watershed plans can be found in this report.

The table below illustrates the predicted existing and post development stormwater peak rates of flow, in cubic feet per second (CFS) for the 2, 10, and 100-year storm events as required by the Newburyport Stormwater Management Standards (4/28/2014)

Peak Discharge Rates (cfs)	2-Year 24-Hour Storm Event	10-Year 24-Hour Storm Event	100-Year 24-Hour Storm Event
Existing	1.3	2.7	6.4
Proposed	0.8	2.6	5.1
Change	-0.5	-0.10	-1.1

Standard 3: Recharge - Loss of annual recharge to groundwater shall be eliminated or minimized…at a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This standard is met when the stormwater management system is designed to infiltrate the required recharge volume in accordance with the Mass Stormwater Handbook.

This project results in an overall increase in impervious area but after discussions with the City Engineer the preferred method of managing runoff in the urban environment is attenuation rather than infiltration. Loss of annual recharge to groundwater has been minimized to the maximum extent practical.

Standard 4: Water Quality – Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). The standard is met with pollution prevention plans, stormwater BMP's sized to capture required water quality volume, and pretreatment measures.

Treatment measures are provided to the maximum extent practical for this project. Stormwater runoff from paved surfaces is directed through catch basins and vortechnic units for treatment prior to discharge into the existing drain line in Prospect Street. The proposed drainage treatment train has been sized to capture surface runoff and provide the maximum removal percentage of the average annual post-construction load of Total Suspended Solids (TSS) as specified in the Massachusetts Stormwater Handbook.

The Stormwater Management Handbook assigns TSS removal percentages to some treatment BMPs. Catch basins are assigned a rate of 25%. The vortechnic units are not assigned a specific removal rate. DEP requires these proprietary units to be sized to capture the full water quality volume in order to claim treatment of 80% TSS. Sizing of the units are to follow the calculation method provided by DEP to convert water quality volume to discharge rate. Calculation of water quality treatment volume for each unit are in the Appendix of this report. For a conservative approach, the associated overall TSS calculation worksheet utilizes a removal rate of 50% based on New Jersey DEP documentation for the CDS unit.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs) – Source control and pollution prevention shall be implemented in accordance with the Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

Stormwater Standard 5 is not applicable to this project. The proposed project will not be subject the site to higher potential pollutant loads as defined in the Massachusetts Department of Environmental protection Wetlands and Water Quality Regulations.

LUHPPLs are identified in 310 CMR 22.20B(2) and C(2)(a)-(k) and (m) and CMR 22.21(2)(a)(1)-(8) and (b)(1)-(6), areas within a site that are the location of activities that are subject to an individual National Pollutant Discharge Elimination System (NPDES) permit or the NPDES Multi-sector General Permit; auto fueling facilities, exterior fleet storage areas, exterior vehicle service and equipment cleaning areas; marinas and boatyards; parking lots with high-intensity-use; confined disposal facilities and disposal sites.

Standard 6: Critical Areas – Stormwater discharges to critical areas require the use of specific source control and pollution prevention measures and specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas.

Stormwater Standard 6 is not applicable to this project given that proposed stormwater is not being discharged to a critical area. Critical areas being Outstanding Resource Waters and Special Resource Waters as designated in 314 CMR 4.0, recharge areas for public water supplies as defined in 310 CMR 22.02, bathing beaches as defined in 105 CMR 445.000, cold-water fisheries and shellfish growing areas as defined in 314 CMR 9.02 and 310 CMR 10.04.

Standard 7: Redevelopments – A redevelopment project is required to meet Standards 1-6 only to the maximum extent practicable. Remaining standards shall be met as well as the project shall improve the existing conditions.

This project does not qualify as a redevelopment project. Within the Stormwater Management Handbook (volume 1, chapter 1, page 20), the definition of a redevelopment project includes, "development, rehabilitation, expansion and phased projects on previously developed sites, provided the redevelopment results in no net increase in imperious area".

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan shall be implemented.

The permit site plans which accompany this report provide details for all the proposed construction erosion and sediment control devices. Refer to Appendix for the Construction Period Pollution Prevention Plan and Erosion and Sediment Control Plan. Notes regarding the sequence for erosion control activities during construction are also provided within the permit site plan.

Standard 9: A long term Operation and Maintenance Plan shall be implemented.

The stormwater management system consists of a series of catch basins, vortechnic units, and a Cultec R-280HD subsurface detention facility. The accompanying written plan includes information regarding the maintenance of the proposed BMPs. Refer to Appendix for the Long-Term Operation and Maintenance Plan. The site owner, The Institution for Savings, is the party responsible for maintenance.

Standard 10: Prohibition of Illicit Discharges – Illicit discharges to the stormwater management system are prohibited.

Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Discharges to the stormwater management system from the following activities or facilities are permissible: Firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents. All other illicit discharges are prohibited.

There are no known illicit discharges anticipated through the completion of this project. During construction and post construction procedures are provided to dissipate the potential for illicit discharges to the drainage system. Post construction preventions of illicit discharges are described in the Inspection and Maintenance Measures under the Good Housekeeping Practices section of the report (Appendix).

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PROPRIETARY STRUCTURE SIZING BASED ON DEP NOTICE – OCTOBER 15, 2013

Per Notice: Treatment requirement based on ½" rule [WQV] see following Vortex page for design flow rates.

PVMH#3

Impervious area directed to structure = 6,589± s.f.

Water Quality Flow:

WQF = (qu)(A)(WQV)

qu→unit peak discharge in cfs/mi^2/watershed inches
(qu based on Figure 3 & 4 la/P tables with a t_c value of 0.1 hrs.)
A→impervious surface drainage area (in. sq. mi*)
*conversation factor: 0.0015625 mi^2/acre

qu = 752 cfs/mi^2/in.
A = 6,589 s.f./43,560 s.f./acre = 0.15 acres
(0.15 acres)(0.0015625 mi^2/acre) = 0.00023 mi^2
WQF = (752 cfs/mi^2/in.)(0.00023 mi^2)(0.5 in.)
WQF = 0.09 cfs

Design flow rate for CDS 2015-4 = 1.4 cfs

PVMH#7

Impervious area directed to structure = 17,560± s.f.

Water Quality Flow:

WQF = (qu)(A)(WQV)

qu→unit peak discharge in cfs/mi^2/watershed inches
(qu based on Figure 3 & 4 la/P tables with a t_c value of 0.1 hrs.)
A→impervious surface drainage area (in. sq. mi*)
*conversation factor: 0.0015625 mi^2/acre

qu = 752 cfs/mi^2/in.
A = 17,560 s.f./43,560 s.f./acre = 0.40 acres
(0.40 acres)(0.0015625 mi^2/acre) = 0.0006 mi^2
WQF = (752 cfs/mi^2/in.)(0.0006 mi^2)(0.5 in.)
WQF = 0.22 cfs

Design flow rate for CDS 2015-4 = 1.4 cfs

CONTECH ENGINEERED SOLUTIONS

Hydrodynamic Separation Products Overview

Massachusetts

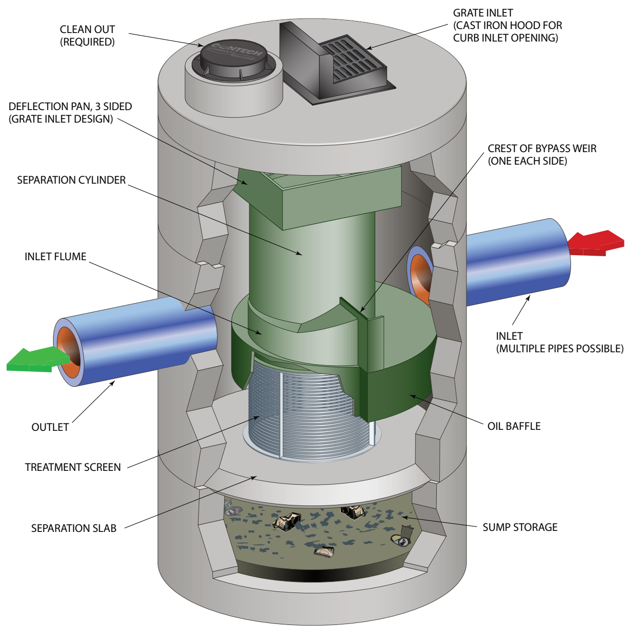
CDS

Vortechs

VortSentry® HS

Patented continuous deflection separation (CDS) technology

Using patented continuous deflective separation technology, the CDS system screens, separates and traps sediment, debris, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, and minimize the re-suspension and release of previously trapped pollutants. Available in precast or cast-in-place. Offline units can treat flows from 30 to 8500 L/s (1 to 300 cfs). Inline units can treat up to 170 L/s (7.5 cfs), and internally bypass larger flows in excess of 1420 L/s (50 cfs). The pollutant removal capability of the CDS system has been proven in the lab and field.



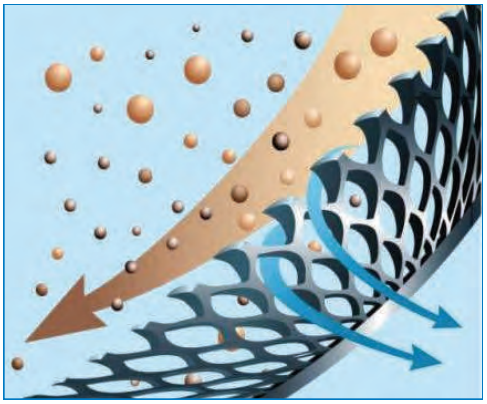
How does it work?

Stormwater enters the CDS unit's diversion chamber where the diversion weir guides the flow into the unit's separation chamber and pollutants are removed. All flows up to the system's treatment design capacity enter the separation chamber.

Swirl concentration and screen deflection forces floatables and solids to the center of the separation chamber where 100% of floatables and neutrally buoyant debris larger than the screen apertures are trapped.

Stormwater then moves through the separation screen, under the oil baffle and exits the system. The separation screen remains clog free due to continuous deflection.

During flow events exceeding the design capacity, the diversion weir bypasses excessive flows around the separation chamber, so captured pollutants will not wash out.



CDS

- Removes sediment, trash and free oil and grease
- Patented screening technology captures and retains 100% of floatables, including neutrally buoyant and all other material larger than the screen aperture
- Operation independent of flow
- Performance verified through lab and field testing
- Unobstructed maintenance access
- Customizable/flexible design and multiple configurations available
- Separates and confines pollutants from outlet flow
- Inline, offline, grate inlet and drop inlet configurations available
- Multiple screen aperture sizes available
- Allows for multiple inlet pipes

Available Models

CDS Model	Typical Internal MH Diameter or Equivalent ID[1] (ft)	Typical Depth[2] Below Pipe Invert (ft)	Treatment Capacity[3] (cfs)	Screen Diameter/ Height (ft)	Maximum Sediment Storage Capacity (CF)
2015_4	4	4.5	1.4	2.0/1.5	50
w/ 1' added sump	4	5.5	1.4	2.0/1.5	63
w/ 2' added sump	4	6.5	1.4	2.0/1.5	75
w/ 3' added sump	4	7.5	1.4	2.0/1.5	88
2015	5	4.7	1.4	2.0/1.5	79
w/ 1' added sump	5	5.7	1.4	2.0/1.5	98
w/ 2' added sump	5	6.7	1.4	2.0/1.5	118
2020	5	5.3	2.2	2.0/2.0	90
w/ 1' added sump	5	6.3	2.2	2.0/2.0	110
w/ 2' added sump	5	7.3	2.2	2.0/2.0	129
2025	5	5.6	3.2	2.0/2.5	97
w/ 1' added sump	5	6.6	3.2	2.0/2.5	117
w/ 2' added sump	5	7.6	3.2	2.0/2.5	136
3020	6	5.4	3.9	3.0/2.0	134
w/ 1' added sump	6	6.4	3.9	3.0/2.0	163
w/ 2' added sump	6	7.4	3.9	3.0/2.0	191
3030	6	6.2	6.1	3.0/3.0	157
w/ 1' added sump	6	7.2	6.1	3.0/3.0	185
w/ 2' added sump	6	8.2	6.1	3.0/3.0	213
4030	8	7.2	7.9	4.0/3.0	329
w/ 1' added sump	8	8.2	7.9	4.0/3.0	379
w/ 2' added sump	8	9.2	7.9	4.0/3.0	429
4040	8	8.3	12.4	4.0/4.0	381
w/ 1' added sump	8	9.3	12.4	4.0/4.0	431
w/ 2' added sump	8	10.3	12.4	4.0/4.0	482

1. Structure diameter represents the typical inside dimension of the concrete structure. Offline systems will require additional concrete diversion components
2. Depth below pipe can vary to accommodate site specific design. Depth below pipe invert represents the depth from the pipe invert to the inside bottom of concrete structure.
3. Treatment Capacity is based on laboratory testing using OK-110 (average d50 particle size of approximately 100 microns) and a 2400 micron screen.

Sediment Depths Indicating Required Servicing*

CDS Model	Sediment Depth (in.)
2015_4	18"
2015	18"
2020	18"
2025	18"
3020	18"
3030	18"
4030	27"
4040	27"
Every 1' of added sump depth	Add 9"

* Based on 75% capacity of isolated sump.

INSTRUCTIONS:

Non-automated: Mar.4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structureal BMP Table
2. The calcualtions must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

TSS Removal Calculation Worksheet

Location: 93 State Street, Newburyport, MA

Train: Full Treatment Train

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump Catchbasin	25%	1.00	0.25	0.75
Vortex Units	50%	0.75	0.38	0.37

Total TSS Removal = 63.0%

Separate Form Needs to be Completed for Each Outlet or BMP Train

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

Project: 6215
Prepared By: Meridian Associates, Inc.
Date: 10/12/2020

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

CONSTRUCTION PERIOD POLLUTION PREVENTION PLAN AND EROSION SEDIMENTATION CONTROL PLAN

located at

INSTITUTION FOR SAVINGS
93 STATE STREET
NEWBURYPORT, MASSACHUSETTS

Applicant:

Institution for Savings
93 State Street
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Project Name: Institution for Savings
93 State Street
Newburyport, Massachusetts 01950

Owner Name: Institution for Savings
93 State Street
Newburyport, Massachusetts 01950

Party Responsible for Maintenance: Institution for Savings
93 State Street
Newburyport, Massachusetts 01950

Project Description:

The project site is located at 93 State Street at the corner of Prospect Street in Newburyport, Massachusetts. The site has been home to the Institution for Savings since 1820 with the original building being constructed in 1872 and an additional building constructed in 1980. The site topography is predominantly flat with minor grading to allow for positive drainage in the parking areas. The existing ground cover consists of two connected parking areas, a central gravel island, landscaped areas, brick walkways, as well as the iconic clock tower monument with associated seating areas.

The client is proposing to add a 9,100 square foot, two story addition with ground level parking beneath, connecting to the 1980 building. Additional associated utility work will also be done as part of this project to upgrade the current site drainage systems.

The proposed drainage system utilizes a series of vortechnic units and catch basins to pretreat surface runoff before entering into the Cultec R-280HD subsurface storage facility. The subsurface storage facility is designed as a sealed detention basin and sized to provide a reduction of peak stormwater flow. Additional areas of the site that are to be disturbed will be landscaped with shrubs, perennial plantings, and groundcovers to match the existing plant palette and character of the site.

Erosion and Sedimentation Control Measures During Construction Activities

Erosion Control Sock

Compost Erosion Control Socks are proposed to be installed, as shown on the site plan, around all proposed improvement areas. The barriers are burlap fabric socks filled with compost blends and shall be installed prior to the commencement of any work on-site and in accordance with the design plans. An additional supply of socks shall be on-site to replace and/or repair socks that have been disturbed. The lines of socks shall be inspected and maintained on a weekly basis during construction. Deposited sediments shall be removed when the level of deposition reaches approximately one-half the height of the sock.

Storm Drain Inlet Protection

Temporary storm inlet protection filters will be placed around all catch basin units. The purpose of the filter is to prevent the inflow of sediments into the closed drainage system. The filters shall remain in place until a permanent vegetative cover is established and the transport of sediment is no longer visibly apparent. The filter shall be inspected and maintained on a weekly basis and after every storm of 0.25 inches or more of rainfall/precipitation.

Surface Stabilization

The surface of all disturbed areas shall be stabilized during and after construction. Temporary measures shall be taken during construction to prevent erosion and siltation. No construction sediment shall be allowed to enter any infiltration systems or the pocket wetland. All disturbed slopes will be stabilized with a permanent vegetative cover. Some or all of the following measures will be utilized on this project as conditions may warrant.

a. Temporary Seeding
b. Temporary Mulching
c. Permanent Seeding
d. Placement of Sod
e. Hydroseeding
f. Placement of Hay
g. Placement of Jute Netting

Street Sweeping

Any sediment tracked onto public right-of-ways or parking areas shall be swept at the end of each working day.

Subsurface Detention

The performance of the subsurface detention facility shall be checked weekly and after every major storm event during construction. No construction period runoff should be directed into the subsurface detention facilities. Excavation for the facility shall be performed from the edge of the facility location to avoid compaction of the parent material. Prior to the installation of the top surface, implement erosion and sediment controls around the perimeter of the open system to prevent sheet flow or windblown sediment from entering the system.

Catch Basins and Stormwater Water Quality Units (Contech CDS)

The performance of the catch basins and water quality units shall be checked weekly and after every major storm event during construction. Prevent construction period runoff from being discharged into the units until construction is complete and soil is stabilized.

Interim Erosion Control

Additional erosion control measures shall be implemented as conditions warrant during construction or as directed by the owner or owner’s representative.

Construction Entrance

Install the construction entrance as shown on the detail sheet. The entrance should be maintained in a condition that will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic topdressing with additional stone. Inspect entrance/exit pad and sediment disposal area weekly and after heavy rains or heavy use. Remove mud and sediment tracked or washed onto public roads immediately. Mud and soil particles will eventually clog the voids in the gravel and the effectiveness of the gravel pad will not be satisfactory. When this occurs, the pad should be top dressed with new stone. Complete replacement of the pad may be necessary when the pad becomes completely clogged. Reshape pad as needed for drainage and runoff control. Repair any broken road pavement immediately.

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STORMWATER MANAGEMENT
CONSTRUCTION PHASE

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

PROJECT LOCATION: 93 State Street, Newburyport, Massachusetts

Inspection Date	Inspector	Area Inspected	Best Management Practice (yes/no)	Required Inspection Frequency if BMP	Comments	Recommendation	Follow-up Inspection Required (yes/no)
		Erosion Control Sock	No	Weekly and After Major Storm Events			
		Storm Drain Inlet Protection	No	Weekly and After Major Storm Events			
		Construction Entrance	No	Weekly and After Major Storm Events			
		Catch Basin and Vortex	Yes	Weekly and After Major Storm Events			
		Subsurface Detention	Yes	Weekly and After Major Storm Events			

(1) Refer to the Massachusetts Stormwater Handbook, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP's.

(2) Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.
Other notes: (Include deviations from: Con. Comm. Order of Conditions, PB Approval, Construction Sequence and Approved Plan)
Stormwater Control Manager: ____

LONG TERM OPERATION AND MAINTENANCE PLAN

located at

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93 STATE STREET
NEWBURYPORT, MASSACHUSETTS

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Inspection and Maintenance Measures After Construction

Erosion Control

Eroded sediments can adversely affect the performance of the stormwater management system. Eroding or barren areas should be immediately re-vegetated.

Subsurface Detention Facility

The facility should be inspected after the first several rainfall events or first few months after construction, after all major storms (2-year), and on regular bi-annual scheduled dates. Open provided inspection ports and visually inspect for sediment and or ponded water. Ponded water inside the system after several days could indicate that the outlet of the system is clogged. A stadia rod may be used to measure the depth of sediment if any in the row. If the depth of sediment is in excess of 3" then the row should be cleaned with high pressure water through a culvert cleaning nozzle. Refer to maintenance guide from manufacturer for additional detail.

Debris and Litter Removal

Trash may collect in the BMP's, potentially causing clogging of the facilities. All debris and litter shall be removed when necessary, and after each storm event.

Catch Basins

The catch basins shall be inspected two (2) times per year, and if necessary, any maintenance shall be performed so that it functions as designed. The catch basins shall be cleaned once per year or when sediment in the bottom of the sump reaches 24 inches below the bottom of the outlet. Inlet and outlet pipes should be checked for clogging. Catch basin grates shall be kept free of snow and ice in the winter months and kept free of leaves, sand and debris during warmer months. At a minimum, inspection of the catch basin shall be performed during the last week of April and the first week of October each year.

Water Quality Vortex Treatment Unit (Contech CDS)

Inspection and maintenance of the CDS units shall follow documentation guidance as prepared by the manufacturer. At minimum, inspections should be performed twice per year once in the spring after snowmelt and once in late fall. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. Visual inspections should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. Additionally, the visual inspection shall include quantifying the accumulation of trash and sediment in the system. The CDS system should be cleaned when the level of sediment in the isolated sump storage chamber has reached 75% of capacity. Cleaning of the system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build up exists in this area. Oils and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from deep sump catch basins.

<u>Good Housekeeping Practices</u> (in accordance with Standard 10 of the Stormwater Management Handbook to prevent illicit discharges)

Provisions for storing paints, cleaners, automotive waste and other potentially hazardous household waste products inside or under cover

- All materials on site will be stored inside in a neat, orderly, manner in their appropriate containers with the original manufacturer's label.
- Only store enough material necessary. Whenever possible, all of a product shall be used up before disposing of container
- Manufacturer, local, and State recommendations for proper use and disposal shall be followed.

Vehicle washing controls
- A commercial car wash shall be used when possible. Car washes treat and/or recycle water.
- Cars shall be washed on gravel, grass, or other permeable surfaces to allow filtration to occur.
- Use biodegradable soaps.
- A water hose with a nozzle that automatically turns off when left unattended.

Requirements for routine inspection and maintenance of stormwater BMPs
- See Inspection and Maintenance Measures after Construction.

Spill prevention and response plans
- Spill Control Practices shall be in conformance with the guidelines set forth in the National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP)

Provisions for maintenance of lawns, gardens, and other landscaped areas
- Grass shall not be cut shorter than 2 to 3 inches.
- Use low volume water approaches such as drip-type or sprinkler systems. Water plants only when needed to enhance root growth and avoid runoff problems.
- The use of mulch shall be utilized where possible. Mulch helps retain water and prevents erosion.

Requirements for storage and use of fertilizers, herbicides and pesticides
- Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.
- Do not fertilize before a rainstorm.
- Consider using organic fertilizers. They release nutrients more slowly.
- Pesticides shall be applied on lawns and gardens only when necessary and applied only in the minimum amounts recommended by the manufacturer.

Pet waste management
- Scoop up and seal pet wastes in a plastic bag. Dispose of properly, in the garbage.

Provisions for operation and management of septic systems
- Not Applicable

Provisions for solid waste management
- All solid waste shall be disposed of or recycled in accordance with local city regulations.

Roadway and Parking Lot sweeping schedule
- Pavement sweeping shall be conducted at a frequency of not less than once per year
- Removal of any accumulated sand, grit, and debris from driveway after the snow melts shall be completed shortly after snow melts for the season.

Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL
- Not Applicable

Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan

- To be determined by the owner.

List of Emergency contacts for implementing Long-Term Pollution Prevention Plan

To be determined by the owner.

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STORMWATER MANAGEMENT
POST-CONSTRUCTION PHASE

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

PROJECT LOCATION: 93 State Street, Newburyport, Massachusetts

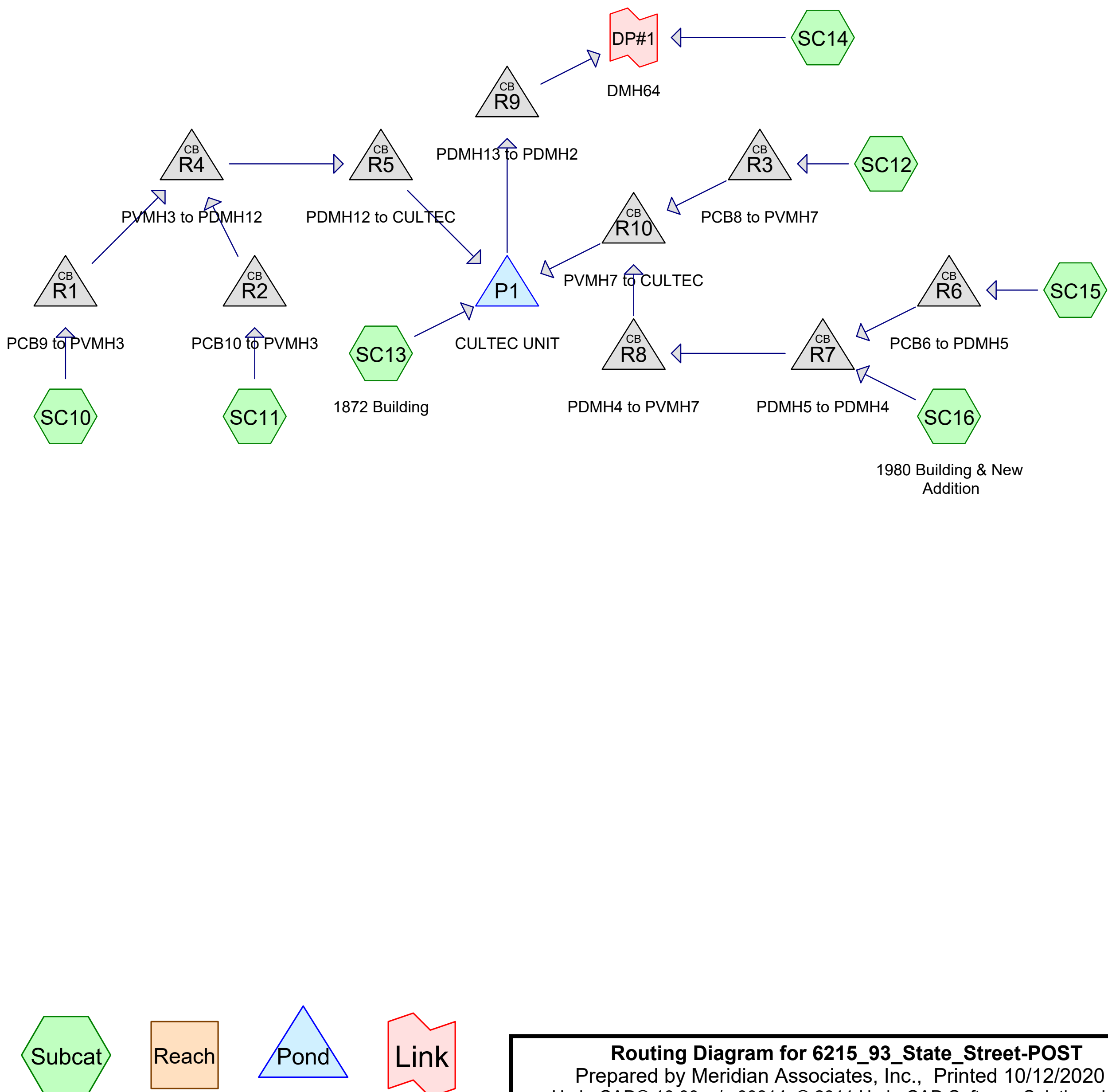
Inspection Date	Inspector	Area Inspected	Best Management Practice (yes/no)	Required Inspection Frequency if BMP	Comments	Recommendation	Follow-up Inspection Required (yes/no)
		Catch Basin	Yes	2 Times per year (clean as necessary)			
		Vortex Units	Yes	2 Times per year			
		Subsurface Detention Facility	Yes	2 Times per year			

(1) Refer to the Massachusetts Stormwater Handbook, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP's.

(2) Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.
Other notes: (Include deviations from: Con. Comm. Order of Conditions, PB Approval, Construction Sequence and Approved Plan)

Stormwater Control Manager: ____



Routing Diagram for 6215_93_State_Street-POST
Prepared by Meridian Associates, Inc., Printed 10/12/2020
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Summary for Subcatchment SC10:

Runoff = 0.12 cfs @ 12.10 hrs, Volume= 436 cf, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Description
3,560	98	Paved parking, HSG A
3,900	39	>75% Grass cover, Good, HSG A
7,460	67	Weighted Average
3,900		52.28% Pervious Area
3,560		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	36	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
0.2	17	0.0300	1.14		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.3	55	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.8					**Direct Entry, Minimum Tc**
6.0	108	Total			

Summary for Subcatchment SC11:

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 501 cf, Depth> 1.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Description
3,030	98	Paved parking, HSG A
1,400	39	>75% Grass cover, Good, HSG A
4,430	79	Weighted Average
1,400		31.60% Pervious Area
3,030		68.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	17	0.0500	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
0.4	34	0.0300	1.31		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.2	39	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.8					**Direct Entry, Minimum Tc**
6.0	90	Total			

Summary for Subcatchment SC12:

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 514 cf, Depth> 1.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Description
2,400	98	Paved parking, HSG A
325	98	Paved parking, HSG B
50	98	Roofs, HSG A
1,000	39	>75% Grass cover, Good, HSG A
555	61	>75% Grass cover, Good, HSG B
4,330	80	Weighted Average
1,555		35.91% Pervious Area
2,775		64.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	25	0.0500	0.45		**Sheet Flow,** Fallow n= 0.050 P2= 3.23"
0.3	25	0.0300	1.23		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.3	72	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5					**Direct Entry, Minimum Tc**
6.0	122	Total			

Summary for Subcatchment SC13: 1872 Building

Runoff = 0.26 cfs @ 12.08 hrs, Volume= 911 cf, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Description
3,650	98	Roofs, HSG A
3,650		100.00% Impervious Area

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

Summary for Subcatchment SC14:

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 120 cf, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.23"

	Area (sf)	CN	Description
*	815	98	Existing Asphalt Parking Areas
	550	39	>75% Grass cover, Good, HSG A
	1,365	74	Weighted Average
	550		40.29% Pervious Area
	815		59.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	23	0.0300	0.36		**Sheet Flow,** Fallow n= 0.050 P2= 3.23"
0.2	16	0.0300	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
4.7					**Direct Entry, Minimum Tc**
6.0	39	Total			

Summary for Subcatchment SC15:

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 494 cf, Depth> 2.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.23"

	Area (sf)	CN	Description
*	2,090	98	Existing Asphalt Parking Areas
	130	39	>75% Grass cover, Good, HSG A
	2,220	95	Weighted Average
	130		5.86% Pervious Area
	2,090		94.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	17	0.0300	0.34		**Sheet Flow,** Fallow n= 0.050 P2= 3.23"
0.1	9	0.0300	1.00		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
5.1					**Direct Entry, Minimum Tc**
6.0	26	Total			

Summary for Subcatchment SC16: 1980 Building & New Addition

Runoff = 0.90 cfs @ 12.08 hrs, Volume= 2,902 cf, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Description
550	98	Unconnected pavement, HSG A
12,150	98	Roofs, HSG A
845	39	>75% Grass cover, Good, HSG A
13,545	94	Weighted Average
845		6.24% Pervious Area
12,700		93.76% Impervious Area
550		4.33% Unconnected

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

Summary for Pond P1: CULTEC UNIT

Inflow Area = 35,635 sf, 78.03% Impervious, Inflow Depth > 1.94" for 2-yr event
Inflow = 1.75 cfs @ 12.09 hrs, Volume= 5,758 cf
Outflow = 0.79 cfs @ 12.28 hrs, Volume= 5,668 cf, Atten= 55%, Lag= 11.5 min
Primary = 0.79 cfs @ 12.28 hrs, Volume= 5,668 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 95.86' @ 12.28 hrs Surf.Area= 1,456 sf Storage= 1,177 cf

Plug-Flow detention time= 33.4 min calculated for 5,666 cf (98% of inflow)
Center-of-Mass det. time= 24.0 min (822.3 - 798.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	94.90'	849 cf	**28.00'W x 52.00'L x 2.71'H Field A** 3,943 cf Overall - 1,822 cf Embedded = 2,122 cf x 40.0% Voids
#2A	94.90'	1,822 cf	**Cultec R-280** x 42 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		2,670 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	94.90'	**12.0" Round pdmh 10 (ocs) to pdmh2** L= 32.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.90' / 94.50' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	94.90'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	95.80'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600

Primary OutFlow Max=0.79 cfs @ 12.28 hrs HW=95.86' TW=94.90' (Dynamic Tailwater)
└─**1=pdmh 10 (ocs) to pdmh2** (Passes 0.79 cfs of 2.57 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.75 cfs @ 4.29 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 0.83 fps)

Summary for Pond R1: PCB9 to PVMH3

Inflow Area = 7,460 sf, 47.72% Impervious, Inflow Depth > 0.70" for 2-yr event
Inflow = 0.12 cfs @ 12.10 hrs, Volume= 436 cf
Outflow = 0.12 cfs @ 12.10 hrs, Volume= 436 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.12 cfs @ 12.10 hrs, Volume= 436 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.79' @ 12.10 hrs
Flood Elev= 99.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.60'	**12.0" Round Culvert** L= 23.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.60' / 96.30' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.12 cfs @ 12.10 hrs HW=96.79' TW=96.58' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.12 cfs @ 1.76 fps)

Summary for Pond R10: PVMH7 to CULTEC

Inflow Area = 20,095 sf, 87.41% Impervious, Inflow Depth > 2.33" for 2-yr event
Inflow = 1.21 cfs @ 12.09 hrs, Volume= 3,909 cf
Outflow = 1.21 cfs @ 12.09 hrs, Volume= 3,909 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.21 cfs @ 12.09 hrs, Volume= 3,909 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.60' @ 12.09 hrs
Flood Elev= 100.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**12.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.70' S= 0.0120 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.21 cfs @ 12.09 hrs HW=96.60' TW=95.58' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 1.21 cfs @ 3.51 fps)

Summary for Pond R2: PCB10 to PVMH3

Inflow Area = 4,430 sf, 68.40% Impervious, Inflow Depth > 1.36" for 2-yr event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 501 cf
Outflow = 0.16 cfs @ 12.09 hrs, Volume= 501 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.09 hrs, Volume= 501 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.73' @ 12.10 hrs
Flood Elev= 99.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.50'	**12.0" Round Culvert** L= 16.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.50' / 96.30' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.16 cfs @ 12.09 hrs HW=96.73' TW=96.58' (Dynamic Tailwater)
└—**1=Culvert** (Outlet Controls 0.16 cfs @ 1.77 fps)

Summary for Pond R3: PCB8 to PVMH7

Inflow Area = 4,330 sf, 64.09% Impervious, Inflow Depth > 1.42" for 2-yr event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 514 cf
Outflow = 0.16 cfs @ 12.09 hrs, Volume= 514 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.09 hrs, Volume= 514 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.76' @ 12.09 hrs
Flood Elev= 99.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.50'	**12.0" Round Culvert** L= 35.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.50' / 96.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.16 cfs @ 12.09 hrs HW=96.76' TW=96.60' (Dynamic Tailwater)
└—**1=Culvert** (Outlet Controls 0.16 cfs @ 1.51 fps)

Summary for Pond R4: PVMH3 to PDMH12

Inflow Area = 11,890 sf, 55.42% Impervious, Inflow Depth > 0.95" for 2-yr event
Inflow = 0.28 cfs @ 12.10 hrs, Volume= 937 cf
Outflow = 0.28 cfs @ 12.10 hrs, Volume= 937 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.10 hrs, Volume= 937 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.58' @ 12.10 hrs
Flood Elev= 100.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.30'	**12.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.30' / 96.20' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.28 cfs @ 12.10 hrs HW=96.58' TW=96.37' (Dynamic Tailwater)
└—**1=Culvert** (Barrel Controls 0.28 cfs @ 2.35 fps)

Summary for Pond R5: PDMH12 to CULTEC

Inflow Area = 11,890 sf, 55.42% Impervious, Inflow Depth > 0.95" for 2-yr event
Inflow = 0.28 cfs @ 12.10 hrs, Volume= 937 cf
Outflow = 0.28 cfs @ 12.10 hrs, Volume= 937 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.10 hrs, Volume= 937 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.37' @ 12.10 hrs
Flood Elev= 100.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.10'	**12.0" Round Culvert** L= 3.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.10' / 96.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.28 cfs @ 12.10 hrs HW=96.37' TW=95.62' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.28 cfs @ 2.48 fps)

Summary for Pond R6: PCB6 to PDMH5

Inflow Area = 2,220 sf, 94.14% Impervious, Inflow Depth > 2.67" for 2-yr event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 494 cf
Outflow = 0.15 cfs @ 12.08 hrs, Volume= 494 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.15 cfs @ 12.08 hrs, Volume= 494 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.29' @ 12.10 hrs
Flood Elev= 99.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.90'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.90' / 96.80' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.12 cfs @ 12.08 hrs HW=97.29' TW=97.28' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.12 cfs @ 0.64 fps)

Summary for Pond R7: PDMH5 to PDMH4

Inflow Area = 15,765 sf, 93.82% Impervious, Inflow Depth > 2.58" for 2-yr event
Inflow = 1.05 cfs @ 12.08 hrs, Volume= 3,396 cf
Outflow = 1.05 cfs @ 12.08 hrs, Volume= 3,396 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.05 cfs @ 12.08 hrs, Volume= 3,396 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.28' @ 12.09 hrs
Flood Elev= 100.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.70'	**12.0" Round Culvert**

L= 32.0' RCP, sq.cut end projecting, Ke= 0.500
Inlet / Outlet Invert= 96.70' / 96.30' S= 0.0125 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.04 cfs @ 12.08 hrs HW=97.28' TW=96.85' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.04 cfs @ 3.20 fps)

Summary for Pond R8: PDMH4 to PVMH7

Inflow Area =	15,765 sf,	93.82% Impervious,	Inflow Depth > 2.58"	for 2-yr event
Inflow =	1.05 cfs @	12.08 hrs, Volume=	3,396 cf	
Outflow =	1.05 cfs @	12.08 hrs, Volume=	3,396 cf,	Atten= 0%, Lag= 0.0 min
Primary =	1.05 cfs @	12.08 hrs, Volume=	3,396 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.86' @ 12.09 hrs
Flood Elev= 100.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	**12.0" Round Culvert** L= 22.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.20' / 96.00' S= 0.0091 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.04 cfs @ 12.08 hrs HW=96.85' TW=96.60' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.04 cfs @ 2.71 fps)

Summary for Pond R9: PDMH13 to PDMH2

Inflow Area =	35,635 sf,	78.03% Impervious,	Inflow Depth > 1.91"	for 2-yr event
Inflow =	0.79 cfs @	12.28 hrs, Volume=	5,668 cf	
Outflow =	0.79 cfs @	12.28 hrs, Volume=	5,668 cf,	Atten= 0%, Lag= 0.0 min
Primary =	0.79 cfs @	12.28 hrs, Volume=	5,668 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 94.90' @ 12.27 hrs
Flood Elev= 99.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	**15.0" Round Culvert** L= 39.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.40' / 94.00' S= 0.0103 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.79 cfs @ 12.28 hrs HW=94.90' TW=94.61' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.79 cfs @ 2.52 fps)

Summary for Link DP#1: DMH64

Inflow Area = 37,000 sf, 77.35% Impervious, Inflow Depth > 1.88" for 2-yr event
Inflow = 0.81 cfs @ 12.28 hrs, Volume= 5,789 cf
Primary = 0.81 cfs @ 12.28 hrs, Volume= 5,789 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

25 Point manual elevation table, To= 0.00 hrs, dt= 1.00 hrs, feet =

94.00	94.05	94.10	94.16	94.21	94.26	94.31	94.36	94.41
94.47	94.52	94.57	94.62	94.57	94.52	94.47	94.41	94.36
94.31	94.26	94.21	94.16	94.10	94.05	94.00		

Summary for Subcatchment SC10:

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 1,102 cf, Depth> 1.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.96"

Area (sf)	CN	Description
3,560	98	Paved parking, HSG A
3,900	39	>75% Grass cover, Good, HSG A
7,460	67	Weighted Average
3,900		52.28% Pervious Area
3,560		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	36	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
0.2	17	0.0300	1.14		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.3	55	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.8					**Direct Entry, Minimum Tc**
6.0	108	Total			

Summary for Subcatchment SC11:

Runoff = 0.33 cfs @ 12.09 hrs, Volume= 1,020 cf, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.96"

Area (sf)	CN	Description
3,030	98	Paved parking, HSG A
1,400	39	>75% Grass cover, Good, HSG A
4,430	79	Weighted Average
1,400		31.60% Pervious Area
3,030		68.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	17	0.0500	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
0.4	34	0.0300	1.31		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.2	39	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.8					**Direct Entry, Minimum Tc**
6.0	90	Total			

Summary for Subcatchment SC12:

Runoff = 0.33 cfs @ 12.09 hrs, Volume= 1,030 cf, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.96"

Area (sf)	CN	Description
2,400	98	Paved parking, HSG A
325	98	Paved parking, HSG B
50	98	Roofs, HSG A
1,000	39	>75% Grass cover, Good, HSG A
555	61	>75% Grass cover, Good, HSG B
4,330	80	Weighted Average
1,555		35.91% Pervious Area
2,775		64.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	25	0.0500	0.45		**Sheet Flow,** Fallow n= 0.050 P2= 3.23"
0.3	25	0.0300	1.23		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.3	72	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5					**Direct Entry, Minimum Tc**
6.0	122	Total			

Summary for Subcatchment SC13: 1872 Building

Runoff = 0.41 cfs @ 12.08 hrs, Volume= 1,436 cf, Depth> 4.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.96"

Area (sf)	CN	Description
3,650	98	Roofs, HSG A
3,650		100.00% Impervious Area

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

Summary for Subcatchment SC14:

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 265 cf, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.96"

	Area (sf)	CN	Description
*	815	98	Existing Asphalt Parking Areas
	550	39	>75% Grass cover, Good, HSG A
	1,365	74	Weighted Average
	550		40.29% Pervious Area
	815		59.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	23	0.0300	0.36		**Sheet Flow,** Fallow n= 0.050 P2= 3.23"
0.2	16	0.0300	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
4.7					**Direct Entry, Minimum Tc**
6.0	39	Total			

Summary for Subcatchment SC15:

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 810 cf, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.96"

	Area (sf)	CN	Description
*	2,090	98	Existing Asphalt Parking Areas
	130	39	>75% Grass cover, Good, HSG A
	2,220	95	Weighted Average
	130		5.86% Pervious Area
	2,090		94.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	17	0.0300	0.34		**Sheet Flow,** Fallow n= 0.050 P2= 3.23"
0.1	9	0.0300	1.00		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
5.1					**Direct Entry, Minimum Tc**
6.0	26	Total			

Summary for Subcatchment SC16: 1980 Building & New Addition

Runoff = 1.45 cfs @ 12.08 hrs, Volume= 4,814 cf, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.96"

Area (sf)	CN	Description
550	98	Unconnected pavement, HSG A
12,150	98	Roofs, HSG A
845	39	>75% Grass cover, Good, HSG A
13,545	94	Weighted Average
845		6.24% Pervious Area
12,700		93.76% Impervious Area
550		4.33% Unconnected

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

Summary for Pond P1: CULTEC UNIT

Inflow Area = 35,635 sf, 78.03% Impervious, Inflow Depth > 3.44" for 10-yr event
Inflow = 3.10 cfs @ 12.09 hrs, Volume= 10,212 cf
Outflow = 2.49 cfs @ 12.14 hrs, Volume= 10,099 cf, Atten= 20%, Lag= 3.5 min
Primary = 2.49 cfs @ 12.14 hrs, Volume= 10,099 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.24' @ 12.15 hrs Surf.Area= 1,456 sf Storage= 1,607 cf

Plug-Flow detention time= 26.3 min calculated for 10,099 cf (99% of inflow)
Center-of-Mass det. time= 19.3 min (807.3 - 787.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	94.90'	849 cf	**28.00'W x 52.00'L x 2.71'H Field A** 3,943 cf Overall - 1,822 cf Embedded = 2,122 cf x 40.0% Voids
#2A	94.90'	1,822 cf	**Cultec R-280** x 42 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		2,670 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	94.90'	**12.0" Round pdmh 10 (ocs) to pdmh2** L= 32.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.90' / 94.50' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	94.90'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	95.80'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600

Primary OutFlow Max=2.48 cfs @ 12.14 hrs HW=96.24' TW=95.24' (Dynamic Tailwater)
└─**1=pdmh 10 (ocs) to pdmh2** (Passes 2.48 cfs of 3.42 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.84 cfs @ 4.82 fps)
  └─**3=Orifice/Grate** (Orifice Controls 1.64 cfs @ 2.25 fps)

Summary for Pond R1: PCB9 to PVMH3

Inflow Area = 7,460 sf, 47.72% Impervious, Inflow Depth > 1.77" for 10-yr event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 1,102 cf
Outflow = 0.34 cfs @ 12.09 hrs, Volume= 1,102 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.34 cfs @ 12.09 hrs, Volume= 1,102 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.95' @ 12.10 hrs
Flood Elev= 99.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.60'	**12.0" Round Culvert** L= 23.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.60' / 96.30' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.34 cfs @ 12.09 hrs HW=96.95' TW=96.76' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.34 cfs @ 2.06 fps)

Summary for Pond R10: PVMH7 to CULTEC

Inflow Area = 20,095 sf, 87.41% Impervious, Inflow Depth > 3.97" for 10-yr event
Inflow = 2.02 cfs @ 12.08 hrs, Volume= 6,654 cf
Outflow = 2.02 cfs @ 12.08 hrs, Volume= 6,654 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.02 cfs @ 12.08 hrs, Volume= 6,654 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.84' @ 12.08 hrs
Flood Elev= 100.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**12.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.70' S= 0.0120 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.02 cfs @ 12.08 hrs HW=96.84' TW=96.12' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 2.02 cfs @ 3.89 fps)

Summary for Pond R2: PCB10 to PVMH3

Inflow Area = 4,430 sf, 68.40% Impervious, Inflow Depth > 2.76" for 10-yr event
Inflow = 0.33 cfs @ 12.09 hrs, Volume= 1,020 cf
Outflow = 0.33 cfs @ 12.09 hrs, Volume= 1,020 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.33 cfs @ 12.09 hrs, Volume= 1,020 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.88' @ 12.10 hrs
Flood Elev= 99.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.50'	**12.0" Round Culvert** L= 16.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.50' / 96.30' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.32 cfs @ 12.09 hrs HW=96.88' TW=96.76' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.32 cfs @ 1.77 fps)

Summary for Pond R3: PCB8 to PVMH7

Inflow Area = 4,330 sf, 64.09% Impervious, Inflow Depth > 2.85" for 10-yr event
Inflow = 0.33 cfs @ 12.09 hrs, Volume= 1,030 cf
Outflow = 0.33 cfs @ 12.09 hrs, Volume= 1,030 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.33 cfs @ 12.09 hrs, Volume= 1,030 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.94' @ 12.09 hrs
Flood Elev= 99.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.50'	**12.0" Round Culvert** L= 35.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.50' / 96.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 12.09 hrs HW=96.94' TW=96.84' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.33 cfs @ 1.46 fps)

Summary for Pond R4: PVMH3 to PDMH12

Inflow Area = 11,890 sf, 55.42% Impervious, Inflow Depth > 2.14" for 10-yr event
Inflow = 0.67 cfs @ 12.09 hrs, Volume= 2,122 cf
Outflow = 0.67 cfs @ 12.09 hrs, Volume= 2,122 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.67 cfs @ 12.09 hrs, Volume= 2,122 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.76' @ 12.10 hrs
Flood Elev= 100.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.30'	**12.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.30' / 96.20' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.67 cfs @ 12.09 hrs HW=96.76' TW=96.55' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.67 cfs @ 2.78 fps)

Summary for Pond R5: PDMH12 to CULTEC

Inflow Area = 11,890 sf, 55.42% Impervious, Inflow Depth > 2.14" for 10-yr event
Inflow = 0.67 cfs @ 12.09 hrs, Volume= 2,122 cf
Outflow = 0.67 cfs @ 12.09 hrs, Volume= 2,122 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.67 cfs @ 12.09 hrs, Volume= 2,122 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 96.55' @ 12.09 hrs
Flood Elev= 100.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.10'	**12.0" Round Culvert** L= 3.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.10' / 96.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.67 cfs @ 12.09 hrs HW=96.55' TW=96.15' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.67 cfs @ 2.89 fps)

Summary for Pond R6: PCB6 to PDMH5

Inflow Area = 2,220 sf, 94.14% Impervious, Inflow Depth > 4.38" for 10-yr event
Inflow = 0.24 cfs @ 12.08 hrs, Volume= 810 cf
Outflow = 0.24 cfs @ 12.08 hrs, Volume= 810 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 12.08 hrs, Volume= 810 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.53' @ 12.10 hrs
Flood Elev= 99.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.90'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.90' / 96.80' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.05 cfs @ 12.08 hrs HW=97.51' TW=97.51' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.05 cfs @ 0.13 fps)

Summary for Pond R7: PDMH5 to PDMH4

Inflow Area = 15,765 sf, 93.82% Impervious, Inflow Depth > 4.28" for 10-yr event
Inflow = 1.69 cfs @ 12.08 hrs, Volume= 5,624 cf
Outflow = 1.69 cfs @ 12.08 hrs, Volume= 5,624 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.69 cfs @ 12.08 hrs, Volume= 5,624 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.52' @ 12.09 hrs
Flood Elev= 100.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.70'	**12.0" Round Culvert**

L= 32.0' RCP, sq.cut end projecting, Ke= 0.500
Inlet / Outlet Invert= 96.70' / 96.30' S= 0.0125 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.66 cfs @ 12.08 hrs HW=97.51' TW=97.11' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.66 cfs @ 3.32 fps)

Summary for Pond R8: PDMH4 to PVMH7

Inflow Area = 15,765 sf, 93.82% Impervious, Inflow Depth > 4.28" for 10-yr event
Inflow = 1.69 cfs @ 12.08 hrs, Volume= 5,624 cf
Outflow = 1.69 cfs @ 12.08 hrs, Volume= 5,624 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.69 cfs @ 12.08 hrs, Volume= 5,624 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.11' @ 12.09 hrs
Flood Elev= 100.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	**12.0" Round Culvert** L= 22.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.20' / 96.00' S= 0.0091 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.67 cfs @ 12.08 hrs HW=97.11' TW=96.84' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.67 cfs @ 2.93 fps)

Summary for Pond R9: PDMH13 to PDMH2

Inflow Area = 35,635 sf, 78.03% Impervious, Inflow Depth > 3.40" for 10-yr event
Inflow = 2.49 cfs @ 12.14 hrs, Volume= 10,099 cf
Outflow = 2.49 cfs @ 12.14 hrs, Volume= 10,099 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.49 cfs @ 12.14 hrs, Volume= 10,099 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 95.24' @ 12.14 hrs
Flood Elev= 99.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	**15.0" Round Culvert** L= 39.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.40' / 94.00' S= 0.0103 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.48 cfs @ 12.14 hrs HW=95.24' TW=94.61' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 2.48 cfs @ 4.04 fps)

Summary for Link DP#1: DMH64

Inflow Area = 37,000 sf, 77.35% Impervious, Inflow Depth > 3.36" for 10-yr event
Inflow = 2.56 cfs @ 12.14 hrs, Volume= 10,364 cf
Primary = 2.56 cfs @ 12.14 hrs, Volume= 10,364 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

25 Point manual elevation table, To= 0.00 hrs, dt= 1.00 hrs, feet =

94.00	94.05	94.10	94.16	94.21	94.26	94.31	94.36	94.41
94.47	94.52	94.57	94.62	94.57	94.52	94.47	94.41	94.36
94.31	94.26	94.21	94.16	94.10	94.05	94.00		

Summary for Subcatchment SC10:

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 3,184 cf, Depth> 5.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.19"

Area (sf)	CN	Description
3,560	98	Paved parking, HSG A
3,900	39	>75% Grass cover, Good, HSG A
7,460	67	Weighted Average
3,900		52.28% Pervious Area
3,560		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	36	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
0.2	17	0.0300	1.14		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.3	55	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.8					**Direct Entry, Minimum Tc**
6.0	108	Total			

Summary for Subcatchment SC11:

Runoff = 0.77 cfs @ 12.09 hrs, Volume= 2,443 cf, Depth> 6.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.19"

Area (sf)	CN	Description
3,030	98	Paved parking, HSG A
1,400	39	>75% Grass cover, Good, HSG A
4,430	79	Weighted Average
1,400		31.60% Pervious Area
3,030		68.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	17	0.0500	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
0.4	34	0.0300	1.31		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.2	39	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.8					**Direct Entry, Minimum Tc**
6.0	90	Total			

Summary for Subcatchment SC12:

Runoff = 0.77 cfs @ 12.09 hrs, Volume= 2,433 cf, Depth> 6.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.19"

Area (sf)	CN	Description
2,400	98	Paved parking, HSG A
325	98	Paved parking, HSG B
50	98	Roofs, HSG A
1,000	39	>75% Grass cover, Good, HSG A
555	61	>75% Grass cover, Good, HSG B
4,330	80	Weighted Average
1,555		35.91% Pervious Area
2,775		64.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	25	0.0500	0.45		**Sheet Flow,** Fallow n= 0.050 P2= 3.23"
0.3	25	0.0300	1.23		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.3	72	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5					**Direct Entry, Minimum Tc**
6.0	122	Total			

Summary for Subcatchment SC13: 1872 Building

Runoff = 0.76 cfs @ 12.08 hrs, Volume= 2,720 cf, Depth> 8.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.19"

Area (sf)	CN	Description
3,650	98	Roofs, HSG A
3,650		100.00% Impervious Area

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

Summary for Subcatchment SC14:

Runoff = 0.22 cfs @ 12.09 hrs, Volume= 682 cf, Depth> 6.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.19"

	Area (sf)	CN	Description
*	815	98	Existing Asphalt Parking Areas
	550	39	>75% Grass cover, Good, HSG A
	1,365	74	Weighted Average
	550		40.29% Pervious Area
	815		59.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	23	0.0300	0.36		**Sheet Flow,** Fallow n= 0.050 P2= 3.23"
0.2	16	0.0300	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
4.7					**Direct Entry, Minimum Tc**
6.0	39	Total			

Summary for Subcatchment SC15:

Runoff = 0.46 cfs @ 12.08 hrs, Volume= 1,587 cf, Depth> 8.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.19"

	Area (sf)	CN	Description
*	2,090	98	Existing Asphalt Parking Areas
	130	39	>75% Grass cover, Good, HSG A
	2,220	95	Weighted Average
	130		5.86% Pervious Area
	2,090		94.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	17	0.0300	0.34		**Sheet Flow,** Fallow n= 0.050 P2= 3.23"
0.1	9	0.0300	1.00		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
5.1					**Direct Entry, Minimum Tc**
6.0	26	Total			

Summary for Subcatchment SC16: 1980 Building & New Addition

Runoff = 2.77 cfs @ 12.08 hrs, Volume= 9,548 cf, Depth> 8.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.19"

Area (sf)	CN	Description
550	98	Unconnected pavement, HSG A
12,150	98	Roofs, HSG A
845	39	>75% Grass cover, Good, HSG A
13,545	94	Weighted Average
845		6.24% Pervious Area
12,700		93.76% Impervious Area
550		4.33% Unconnected

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

Summary for Pond P1: CULTEC UNIT

Inflow Area = 35,635 sf, 78.03% Impervious, Inflow Depth > 7.38" for 100-yr event
Inflow = 6.55 cfs @ 12.08 hrs, Volume= 21,915 cf
Outflow = 4.88 cfs @ 12.15 hrs, Volume= 21,760 cf, Atten= 26%, Lag= 4.1 min
Primary = 4.88 cfs @ 12.15 hrs, Volume= 21,760 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.40' @ 12.15 hrs Surf.Area= 1,456 sf Storage= 2,547 cf

Plug-Flow detention time= 19.7 min calculated for 21,751 cf (99% of inflow)
Center-of-Mass det. time= 15.1 min (788.8 - 773.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	94.90'	849 cf	**28.00'W x 52.00'L x 2.71'H Field A** 3,943 cf Overall - 1,822 cf Embedded = 2,122 cf x 40.0% Voids
#2A	94.90'	1,822 cf	**Cultec R-280** x 42 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		2,670 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	94.90'	**12.0" Round pdmh 10 (ocs) to pdmh2** L= 32.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.90' / 94.50' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	94.90'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	95.80'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600

Primary OutFlow Max=4.87 cfs @ 12.15 hrs HW=97.39' TW=95.73' (Dynamic Tailwater)
└─**1=pdmh 10 (ocs) to pdmh2** (Inlet Controls 4.87 cfs @ 6.21 fps)
  ├─**2=Orifice/Grate** (Passes < 1.08 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 5.66 cfs potential flow)

Summary for Pond R1: PCB9 to PVMH3

Inflow Area = 7,460 sf, 47.72% Impervious, Inflow Depth > 5.12" for 100-yr event
Inflow = 1.03 cfs @ 12.09 hrs, Volume= 3,184 cf
Outflow = 1.03 cfs @ 12.09 hrs, Volume= 3,184 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.03 cfs @ 12.09 hrs, Volume= 3,184 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.68' @ 12.17 hrs
Flood Elev= 99.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.60'	**12.0" Round Culvert** L= 23.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.60' / 96.30' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.90 cfs @ 12.09 hrs HW=97.36' TW=97.24' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.90 cfs @ 1.94 fps)

Summary for Pond R10: PVMH7 to CULTEC

Inflow Area = 20,095 sf, 87.41% Impervious, Inflow Depth > 8.10" for 100-yr event
Inflow = 3.99 cfs @ 12.08 hrs, Volume= 13,568 cf
Outflow = 3.99 cfs @ 12.08 hrs, Volume= 13,568 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.99 cfs @ 12.08 hrs, Volume= 13,568 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 98.11' @ 12.12 hrs
Flood Elev= 100.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**12.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.70' S= 0.0120 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.80 cfs @ 12.08 hrs HW=97.90' TW=96.89' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.80 cfs @ 4.84 fps)

Summary for Pond R2: PCB10 to PVMH3

Inflow Area = 4,430 sf, 68.40% Impervious, Inflow Depth > 6.62" for 100-yr event
Inflow = 0.77 cfs @ 12.09 hrs, Volume= 2,443 cf
Outflow = 0.77 cfs @ 12.09 hrs, Volume= 2,443 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.77 cfs @ 12.09 hrs, Volume= 2,443 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.66' @ 12.17 hrs
Flood Elev= 99.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.50'	**12.0" Round Culvert** L= 16.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.50' / 96.30' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.57 cfs @ 12.09 hrs HW=97.27' TW=97.22' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.57 cfs @ 1.22 fps)

Summary for Pond R3: PCB8 to PVMH7

Inflow Area = 4,330 sf, 64.09% Impervious, Inflow Depth > 6.74" for 100-yr event
Inflow = 0.77 cfs @ 12.09 hrs, Volume= 2,433 cf
Outflow = 0.77 cfs @ 12.09 hrs, Volume= 2,433 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.77 cfs @ 12.09 hrs, Volume= 2,433 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 98.14' @ 12.13 hrs
Flood Elev= 99.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.50'	**12.0" Round Culvert** L= 35.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.50' / 96.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=97.85' TW=97.92' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond R4: PVMH3 to PDMH12

Inflow Area = 11,890 sf, 55.42% Impervious, Inflow Depth > 5.68" for 100-yr event
Inflow = 1.80 cfs @ 12.09 hrs, Volume= 5,627 cf
Outflow = 1.80 cfs @ 12.09 hrs, Volume= 5,627 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.80 cfs @ 12.09 hrs, Volume= 5,627 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.64' @ 12.16 hrs
Flood Elev= 100.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.30'	**12.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.30' / 96.20' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.51 cfs @ 12.09 hrs HW=97.23' TW=97.06' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.51 cfs @ 2.59 fps)

Summary for Pond R5: PDMH12 to CULTEC

Inflow Area = 11,890 sf, 55.42% Impervious, Inflow Depth > 5.68" for 100-yr event
Inflow = 1.80 cfs @ 12.09 hrs, Volume= 5,627 cf
Outflow = 1.80 cfs @ 12.09 hrs, Volume= 5,627 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.80 cfs @ 12.09 hrs, Volume= 5,627 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.52' @ 12.16 hrs
Flood Elev= 100.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.10'	**12.0" Round Culvert** L= 3.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.10' / 96.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.35 cfs @ 12.09 hrs HW=97.06' TW=96.93' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.35 cfs @ 1.74 fps)

Summary for Pond R6: PCB6 to PDMH5

Inflow Area = 2,220 sf, 94.14% Impervious, Inflow Depth > 8.58" for 100-yr event
Inflow = 0.46 cfs @ 12.08 hrs, Volume= 1,587 cf
Outflow = 0.46 cfs @ 12.08 hrs, Volume= 1,587 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.46 cfs @ 12.08 hrs, Volume= 1,587 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 99.32' @ 12.12 hrs
Flood Elev= 99.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.90'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.90' / 96.80' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=98.92' TW=99.09' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Summary for Pond R7: PDMH5 to PDMH4

Inflow Area = 15,765 sf, 93.82% Impervious, Inflow Depth > 8.48" for 100-yr event
Inflow = 3.22 cfs @ 12.08 hrs, Volume= 11,136 cf
Outflow = 3.22 cfs @ 12.08 hrs, Volume= 11,136 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.22 cfs @ 12.08 hrs, Volume= 11,136 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 99.31' @ 12.11 hrs
Flood Elev= 100.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.70'	**12.0" Round Culvert**

L= 32.0' RCP, sq.cut end projecting, Ke= 0.500
Inlet / Outlet Invert= 96.70' / 96.30' S= 0.0125 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.88 cfs @ 12.08 hrs HW=99.09' TW=98.51' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.88 cfs @ 3.66 fps)

Summary for Pond R8: PDMH4 to PVMH7

Inflow Area =	15,765 sf, 93.82% Impervious,	Inflow Depth > 8.48"	for 100-yr event
Inflow =	3.22 cfs @ 12.08 hrs, Volume=	11,136 cf	
Outflow =	3.22 cfs @ 12.08 hrs, Volume=	11,136 cf, Atten= 0%, Lag= 0.0 min	
Primary =	3.22 cfs @ 12.08 hrs, Volume=	11,136 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 98.68' @ 12.11 hrs
Flood Elev= 100.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	**12.0" Round Culvert** L= 22.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.20' / 96.00' S= 0.0091 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.96 cfs @ 12.08 hrs HW=98.51' TW=97.89' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.96 cfs @ 3.77 fps)

Summary for Pond R9: PDMH13 to PDMH2

Inflow Area =	35,635 sf, 78.03% Impervious,	Inflow Depth > 7.33"	for 100-yr event
Inflow =	4.88 cfs @ 12.15 hrs, Volume=	21,760 cf	
Outflow =	4.88 cfs @ 12.15 hrs, Volume=	21,760 cf, Atten= 0%, Lag= 0.0 min	
Primary =	4.88 cfs @ 12.15 hrs, Volume=	21,760 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 95.73' @ 12.15 hrs
Flood Elev= 99.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	**15.0" Round Culvert** L= 39.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.40' / 94.00' S= 0.0103 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.88 cfs @ 12.15 hrs HW=95.73' TW=94.61' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 4.88 cfs @ 4.63 fps)

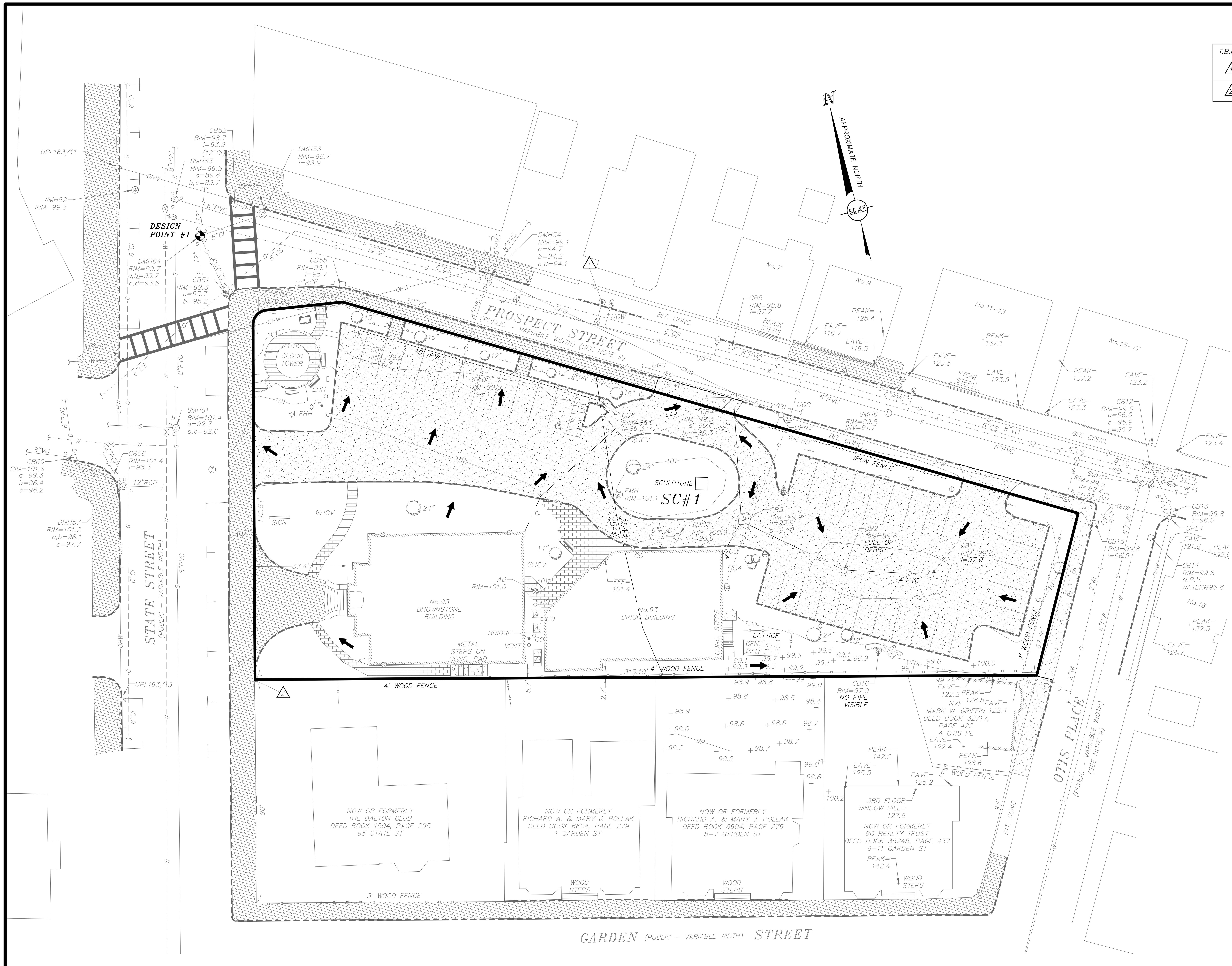
Summary for Link DP#1: DMH64

Inflow Area = 37,000 sf, 77.35% Impervious, Inflow Depth > 7.28" for 100-yr event
Inflow = 5.05 cfs @ 12.15 hrs, Volume= 22,442 cf
Primary = 5.05 cfs @ 12.15 hrs, Volume= 22,442 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

25 Point manual elevation table, To= 0.00 hrs, dt= 1.00 hrs, feet =

94.00	94.05	94.10	94.16	94.21	94.26	94.31	94.36	94.41
94.47	94.52	94.57	94.62	94.57	94.52	94.47	94.41	94.36
94.31	94.26	94.21	94.16	94.10	94.05	94.00		



GRAPHIC SCALE

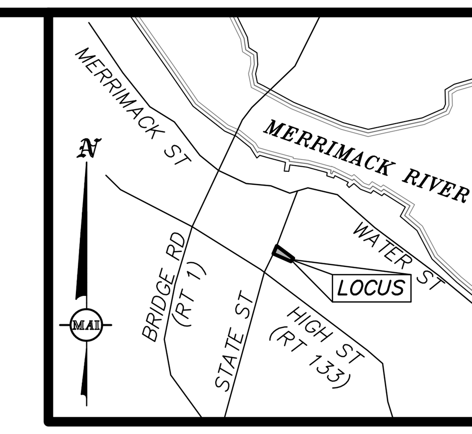
SCALE: 1"= 20'

10 0 10 20 40 80

TEMPORARY BENCHMARK CHART:

T.B.M.#	DESCRIPTION	ELEVATION
1	X-CUT RIGHT FRONT CAP BOLT HYDRANT, 2.8' A.G.	102.30
2	TOP OF GRANITE POST, 3.5' A.G.	107.26

(SEE NOTE 6)



LOCUS MAP:

(NOT TO SCALE)

LEGEND

- SUBCATCHMENT LIMIT
- SC#2 — SUBCATCHMENT LABEL
- STUDY POINT #1 (DESIGN POINT)
- OVERLAND FLOW DIRECTION
- 602 — SOIL TYPE
- SOIL TYPE DELINEATION LINE
- HSG — HYDROLOGIC SOIL GROUP
- HYDROLOGIC FLOW PATH

NOTES:

1. LOCATIONS AND TYPES OF SOIL DESIGNATIONS WITHIN THE LOCUS PROPERTY SUBCATCHMENT LIMITS HAVE BEEN DELINEATED BY USDA NATURAL RESOURCES CONSERVATION SERVICE (NRCS).
2. BASED ON NRCS, THE SOIL TYPES ARE ASSOCIATED WITH THE FOLLOWING HYDROLOGIC SOIL GROUPS (HSG):
   254A – MERRIMAC FINE SANDY LOAM (0–3% SLOPE) – HSG A
   254B – MERRIMAC FINE SANDY LOAM (3–8% SLOPE) – HSG A

REVISIONS		
DATE	DESCRIPTION	BY

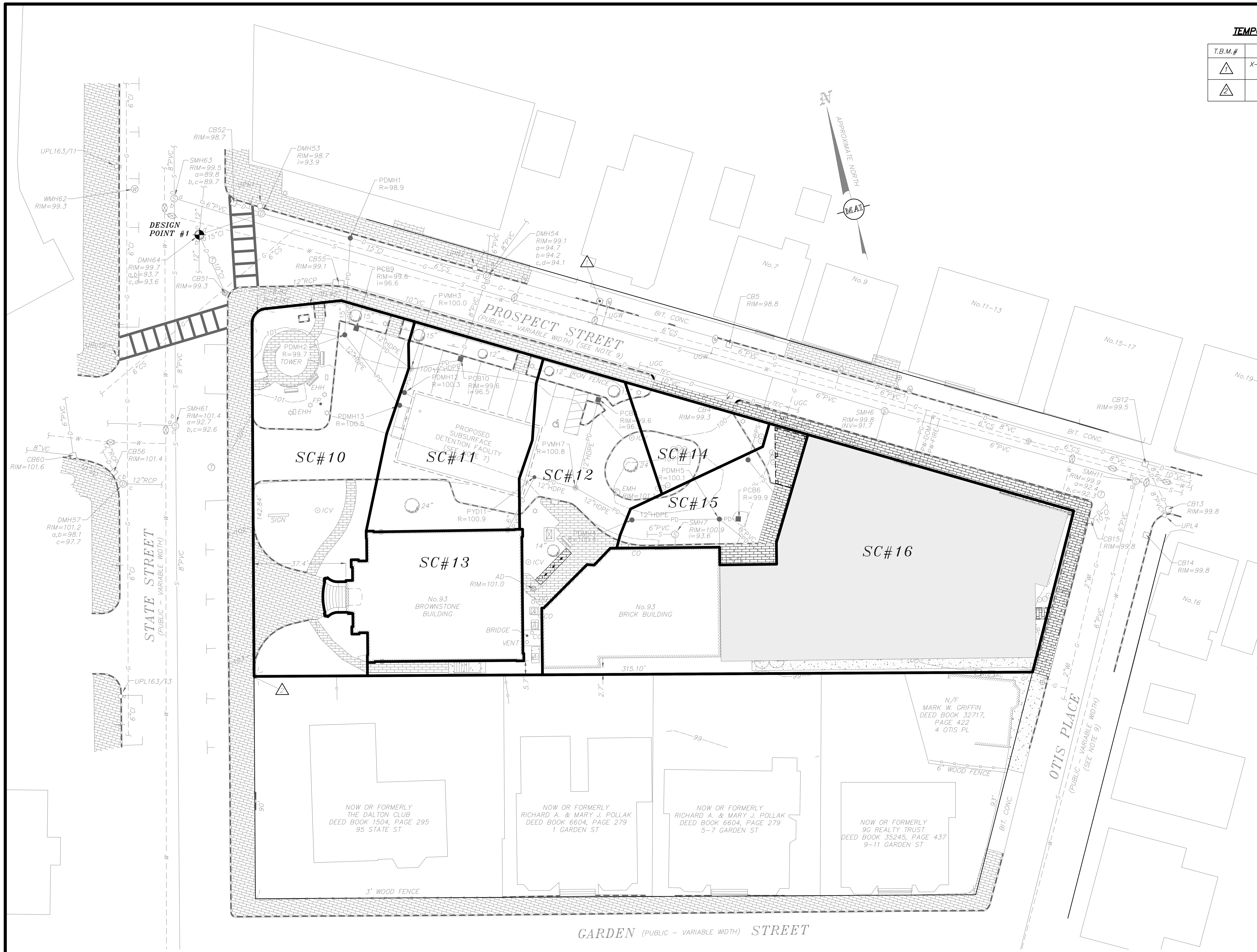
93 STATE STREET
EXISTING CONDITION WATERSHED
LOCATED IN
NEWBURYPORT, MASSACHUSETTS
(ESSEX COUNTY)
PREPARED FOR
INSTITUTION FOR SAVINGS

MERIDIAN ASSOCIATES
500 CUMMINGS CENTER, SUITE 5950 BEVERLY, MASSACHUSETTS 01915 TELEPHONE: (978) 299-0447
69 MILK STREET, SUITE 302 WESTBOROUGH, MASSACHUSETTS 01581 TELEPHONE: (508) 871-7030
WWW.MERIDIANASSOC.COM

DESIGNED BY: NAB
CHECKED BY: CEW

DATE: OCTOBER 14, 2020
SCALE: 1"=20'
SHEET No. 1 OF 2
PROJECT No. 6215

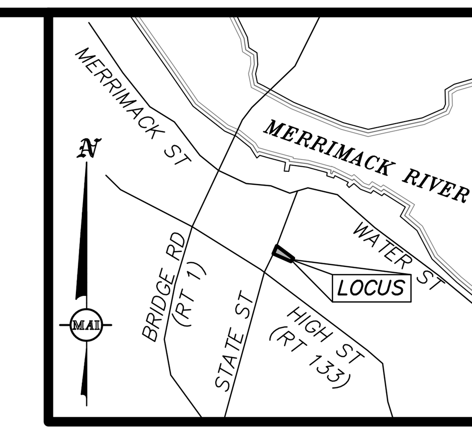
(XREF: 6215_REC)
DWG. No. 6215_PRE.DWG



TEMPORARY BENCHMARK CHART:

T.B.M.#	DESCRIPTION	ELEVATION
1	X-CUT RIGHT FRONT CAP BOLT HYDRANT, 2.8' A.G.	102.30
2	TOP OF GRANITE POST	107.26

(SEE NOTE 6 SHEET 2)



LOCUS MAP:
(NOT TO SCALE)

REVISIONS

DATE	DESCRIPTION	BY

LEGEND

———	SUBCATCHMENT LIMIT
SC#2	SUBCATCHMENT LABEL
⊕	STUDY POINT #1 (DESIGN POINT)
602	SOIL TYPE
— — —	SOIL TYPE DELINEATION LINE
HSG	HYDROLOGIC SOIL GROUP
—— · · ——	HYDROLOGIC FLOW PATH

NOTES:

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2. BASED ON NRCS, THE SOIL TYPES ARE ASSOCIATED WITH THE FOLLOWING HYDROLOGIC SOIL GROUPS (HSG):
   254A – MERRIMAC FINE SANDY LOAM (0–3% SLOPE) – HSG A
   254B – MERRIMAC FINE SANDY LOAM (3–8% SLOPE) – HSG A

GRAPHIC SCALE
SCALE: 1"= 20'
10 0 10 20 40 80

FOR PERMITTING ONLY
NOT FOR CONSTRUCTION

(XREF: 6215_REC/SITE)
DWG. No. 6215_POST.DWG

93 STATE STREET
POST CONSTRUCTION WATERSHED
LOCATED IN
NEWBURYPORT, MASSACHUSETTS
(ESSEX COUNTY)
PREPARED FOR
INSTITUTION FOR SAVINGS

MERIDIAN ASSOCIATES
500 CUMMINGS CENTER, SUITE 5950
BEVERLY, MASSACHUSETTS 01915
TELEPHONE: (978) 299-0447
69 MILK STREET, SUITE 302
WESTBOROUGH, MASSACHUSETTS 01581
TELEPHONE: (508) 871-7030
WWW.MERIDIANASSOC.COM
DESIGNED BY: NAB
CHECKED BY: CEW

DATE: OCTOBER 14, 2020
SCALE: 1"=20'
SHEET No. 2 OF 2
PROJECT No. 6215