

Stormwater Management Plan and Drainage Study

**Pine Crossing Residential Subdivision
Spruce St., Florence, Oregon**
Branch Engineering Project #22-312

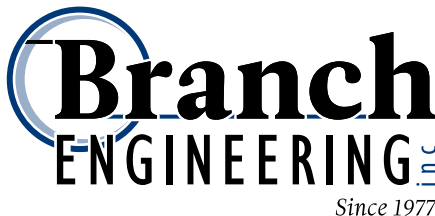
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1.0 INTRODUCTION

This Stormwater Management Plan (SWMP) report has been prepared for the tentative residential subdivision located on Spruce Street, north of 52nd Street, also identified as Tax Lot 0203, Tax Map 18121420. The subject property is 7.61 acres and the tentative subdivision proposes to create 46 duet and single-family housing lots.

Stormwater from the proposed 53rd Street will flow into roadside raingardens and subsurface rock storage facilities before being released into the Spruce Street drainage ditch. Stormwater from the residential properties will flow into rock storage trenches before also being released into the Spruce Street drainage ditch. The purpose of this report is to summarize the stormwater treatment and detention design to show feasibility of the development to meet the City of Florence stormwater design requirements.

2.0 EXISTING CONDITIONS

2.1 TOPOGRAPHY

The site is currently vacant with gently undulating topography and vegetated primarily with younger trees and shrubs, as the site was last cleared sometime between 2008 and 2010. Vacant, forested land borders the site to the north and east, and a residential development occupies the land to the south.

2.2 SOILS

The Natural Resources Conservation Service (NRCS) Web Soil Survey maps the site area as consisting of approximately 80% Yaquina Loamy Fine Sand (140) and 20% Waldport Fine Sand, 12-30% slopes (131E). Yaquina Loamy Fine Sand belongs to dual Hydrologic Soil Group (HSG) A/D and is described as somewhat poorly drained with a high groundwater table, indicating a high runoff potential during the wet season. Waldport Fine Sand belongs to HSG A and is described as an excessively drained soil. A soils map and individual soil information is provided in Appendix B.

2.3 WETLANDS

A wetland delineation was completed for the property by Branch Engineering in March 2023. Eight jurisdictional wetlands were delineated, none of which are within Phase 1 of the proposed development. Phases 2 through 4 will need to accommodate wetland mitigation, as needed.

2.4 EXISTING STORM SYSTEM

The general drainage patterns on the site are to the south and southwest, with the existing stormwater destination being the drainage ditch along Spruce Street. The Spruce St. drainage ditch flows south to a channel along Munsel Lake Rd. and into the Florentine Estates drainage system before ultimately discharging into Munsel Creek as described in the City of Florence Stormwater Management Plan. The new development will continue to convey stormwater runoff to the public storm conveyance system along Spruce Street. The existing basin areas are given in the Table 1 below.

Table 1: Existing Basin Characteristics

Existing Basins	Impervious (sf)	Pervious (sf)	
Basin E1 (Phase 1 area)	-	66,929	66,929
Basin E2 (Phase 2 - 4 area)	-	242,661	242,661
		Total (sf)	309,590
		Total (acres)	7.11
Basin E3 (Off-site run-on)	-	14,181	14,181

3.0 PROPOSED DEVELOPMENT

The proposed development will consist of 44 lots developed for duet homes and two community lots, ones of which will retain existing wetlands and act as a retention facility for stormwater from three lots. 53rd street will extend down the center of the lots, connecting to Versant Dr.

3.1 PROPOSED DEVELOPMENT STORMWATER DESCRIPTION

The proposed development was delineated into drainage basins that shed runoff into treatment and storage facilities, shown in Appendix A. Stormwater runoff from impervious surfaces in the 53rd Street right-of-way for Phase 1 will be treated to the City of Florence water quality standards by four rain gardens, two on the north side of the street and two on the south side. Similarly, stormwater from roadway surfaces in Phases 2 through 4 will be treated by a series of rain gardens to meet the Oregon DEQ water quality requirements applicable during wetland permitting. According to the City of Florence Stormwater Design Manual, rain gardens “*are landscaped reservoirs used to collect, filter, and/or infiltrate stormwater runoff, allowing pollutants to settle and filter out as the water percolates through the planter soil before infiltrating into the ground below or being piped to its downstream destination.*”

Subsurface rock storage detention facilities stretch from the east edge of the development, beneath rain gardens and driveways to the west edge of the west-most rain gardens. Embedded in the rock storage facilities are 12-inch underdrain pipes connecting rain gardens on each side of the roadway to flow control outlets.

Runoff from proposed duet properties will drain to rock storage trenches inside the front and back property lines. All adjacent lots share a combined storage trench spanning the length of the lots along the back of the lots and a similar trench along the front of the lots. A single underdrain spans the length of the storage facilities to a single flow control structure at the downstream (West) end of the trenches.

Phase 1 storm drain facilities are designed to convey and release upstream flows from Phases 2 through 4. Underground rock storage facility configurations may be modified for future phases and additional flow control structures may be added at development phase boundaries for building permit submittals to meet applicable code requirements and allow for rock storage elevation adjustments, as needed. At building permit submittal, alternative storage materials or products may be used in order to meet flow control requirements of permitting through City of Florence, Oregon DEQ, Army Corps of Engineers, and Oregon DSL. Water quality treatment for future phases of development will occur within the boundaries of these phases to meet DEQ

requirements. The size of water quality treatment facilities may also be optimized for building permit submittals, potentially reducing the total rain garden area.

The proposed basin areas are given in Table 2. The Basin Map can be found in Appendix A.

Table 2: Proposed Basin Characteristics

Proposed Basins	Impervious (sf)	Pervious (sf)	Summary	Destination
P1	20,007	33,560	Back ½ of Lots 1, 2, 5, 6, 9, 10, 13, 14, 17, 18, 21, 24, 25, 28, 29, 32, 33, 36, 37, 41, and 42	RS1
P2	39,950	18,700	Front ½ of Lots 1, 2, 5, 6, 9, 10, 13, 14, 17, 18, 21, 24, 25, 28, 29, 32, 33, 36, 37, 41, and 42 Lot 40	RS2
P3	36,040	17,373	Front ½ of Lots 3, 4, 7, 8, 11, 12, 15, 16, 19, 20, 22, 23, 26, 27, 30, 31, 34, 35, and 38 Lot 39	RS3
P4	20,346	24,868	Back ½ of Lots 3, 4, 7, 8, 11, 12, 15, 16, 19, 20, 22, 23, 26, 27, 30, 31, 34, 35, and 38	RS4
P5	6,839	3,683	Front ½ of Lots 43-45	Lot 46
P6	6,552	3,528	Back ½ of Lots 43-45	Lot 46
P7	4,232	-	Part of Phase 1	Spruce Street Ditch
P8	2,411	465	Part of Phase 1	R1, RS7
P9	4,739	961	Phase 1/2 Boundary	R2, RS7
P10	3,217	706	Part of Phase 2	R3, RS7
P11	2,809	752	Part of Phase 2	R4, RS7
P12	2,246	465	Phase 2/3 Boundary	R5, RS7
P13	2,245	465	Part of Phase 3	R6, RS7
P14	2,506	465	Part of Phase 3	R7, RS7
P15	2,663	900	Phase 3/4 Boundary	R8, RS7
P16	2,670	360	Part of Phase 4	R9, RS7
P17	6,885	608	Part of Phase 4	R10, RS7
P18	2,665	307	Part of Phase 4	R11, RS7
P19	2,353	456	Part of Phase 1	R12, RS8
P20	4,698	926	Phase 1/2 Boundary	R13, RS8
P21	2,251	456	Part of Phase 2	R14, RS8
P22	2,344	456	Part of Phase 2	R15, RS8
P23	4,674	921	Phase 2/3 Boundary	R16, RS8
P24	3,581	695	Phase 3/4 Boundary	R17, RS8
P25	1,985	975	Phase 3/4 Boundary	R18, RS8
P26	2,674	257	Phase 3/4 Boundary	R19, RS8
P27	2,700	-	Phase 3/4 Boundary	Versant Dr.
Area Totals	196,708	112,882	-	-

4.0 HYDROLOGIC AND HYDRAULIC METHODS

4.1 COMPUTER MODEL

In preparing this Stormwater Management Plan for the project site, Branch Engineering utilized the HydroCAD 10.00 software. This is a computer program used to model, analyze and design hydro systems of drainage basins.

HydroCAD computes Santa Barbara Urban Hydrographs (SBUH) using rainfall data supplied by the designer. The SBUH method is an analysis method recognized by the city of Florence and is appropriate for a project site of this size. Once the necessary data is input to HydroCAD, each drainage basin has a hydrograph and runoff flow for the desired storm event.

4.2 COMPUTER MODEL DATA

HydroCAD needs data supplied from the designer describing the drainage basin to create the hydrograph. Below is the data needed to describe each drainage basin.

- o **Storm Event**

Due to the nature of this design, a combination of the City of Florence's Stormwater Design Manual as well as the NOAA Atlas was used to determine the following design storm events.

Phase 1 contains no wetlands and does not require removal-fill permitting. Phase 1 storm events meet the requirements of the City of Florence Stormwater Design Manual.

Phase 1 Storm Events

Water Quality Event	0.83 inches/24 hours
2-year Storm Event	3.46 inches/24 hours
10-year Storm Event	4.48 inches/24 hours
25-year Storm Event	5.06 inches/24 hours

Phases 2 through 4 contain wetlands and removal-fill permitting is expected to be a requirement for the development of these phases. Phase 2-4 storm events are based in part on NOAA Atlas precipitation estimates and partly on the City of Florence Stormwater Design Manual.

Phase 2-4 Storm Events

Water Quality Event	1.72 inches/24 hours
2-year Storm Event	3.43 inches/24 hours
10-year Storm Event	4.48 inches/24 hours
25-year Storm Event	5.06 inches/24 hours

The 2-Year storm event for Phases 2 through 4 was obtained from the NOAA Atlas 2 Precipitation Frequency Estimates. The water quality event design storm was computed as 50% of the 2-yr storm. The storm drainage system is analyzed for all phases of development using these standards to account for future permitting requirements.

- **Impervious Area**

Pavement, hardscapes and rooftops are all impervious surfaces. Each drainage basin's impervious area is presented in section 3.1 of this report.

- **Pervious Area**

Lawns and open space are pervious areas. Each drainage basin's pervious area is presented in section 3.1 of this report.

- **Runoff Curve Numbers**

Each drainage basin is assigned Runoff Curve Numbers for impervious and pervious areas. The Runoff Curve Number is based on the surface cover type and the HSG for each soil type present in the basin area. As stated earlier in the report, the soils on the site are primarily in dual HSG A/D with a small area designated as HSG A. The high groundwater table indicates that dual HSG A/D soils on the site exist in an undrained condition. As a result, soils in drainage basin areas with dual HSG A/D are assumed to behave as HSG D soils.

Curve numbers for the existing site conditions in areas of woods/grass in poor condition are 86 for HSG D soils and 57 for HSG A soils. A curve number of 92 is applied to wetland areas, which are expected to contain expanses of standing water with some vegetation.

The proposed development contains approximately 65% impervious surface, which is assigned a Curve Number of 98. The yard areas around proposed houses are assumed to be grassy areas in good condition, assigned a Curve Number of 80 in HSG D areas and 39 in HSG A areas. Vegetated rain garden areas are assigned a Curve Number of 39.

- **Time of Concentration**

The time of concentration for the existing drainage basins was based on the longest flow path. The time of concentration for each drainage basin under developed conditions was assumed to be 5 minutes, since each basin is small and longest flow paths are short.

5.0 STORMWATER ANALYSIS

5.1 PRE-DEVELOPMENT RUNOFF RATES

The existing site is 7.61 acres, approximately 1.54 acres of which is being developed during the first phase of development, with the remaining 5.57 being developed during Phases 2 through 4. The runoff from the existing site drainage basins is given in the Table 3 below.

Table 3: Pre-Development Runoff Rates

Drainage Basin	Storm event	Pre-development Runoff	Allowable Runoff Rates
E1 (Phase 1)	2-year	0.71 cfs	0.71 cfs
	10-year	1.05 cfs	1.05 cfs
	25-year	1.25 cfs	1.25 cfs
E2 (Phases 2-4)	2-year	1.87 cfs	0.94 cfs (50% of 2-year runoff)
	10-year	3.06 cfs	3.06 cfs
	25-year	3.75 cfs	3.75 cfs

The Allowable Runoff Rates shown in the table above are the maximum runoff rates that the developed site may release. It is assumed that the allowable runoff to be released from the overall post-developed site is a combination of the E1 and E2 runoff rates.

See Appendix C for Pre-Development Runoff HydroCAD results.

5.2 POST-DEVELOPMENT RUNOFF RATES

The drainage system is connected across all four phases of development with runoff being conveyed through Phase 1, as the most downstream of the development phases. All phases are analyzed for compliance with potential future permitting requirements.

The Post-Developed Runoff rates are shown in Table 4 below.

Table 4 Post-Development Runoff Rates

Storm event	Allowable Runoff Rates	Post-development Runoff Rates
2-year	1.65 cfs	1.51 cfs (NOAA storm) 1.49 cfs (City of Florence storm)
10-year	4.11 cfs	2.39 cfs
25-year	5.00 cfs	3.55 cfs

These post-development runoff rates are overly conservative and therefore the storm system may be modified as part of the Building Permit process to refine the design while still meeting applicable requirements for City of Florence, Oregon DEQ, Army Corps of Engineers, and Oregon DSL permits.

See Appendix D for Post-Development Runoff HydroCAD results.

5.3 RAIN GARDEN PERFORMANCE

Rain gardens are designed to filter stormwater through grow media to a rock storage layer beneath the rain gardens. Phase 1 Rain Garden facility properties and performance characteristics are given in Table 5 below.

Table 5: Phase 1 Rain Garden Performance

Rain Garden ID	Invert Elevation (ft)	Top Elevation (ft)	Overflow Elevation (ft)	Water Surface Elevations (ft)			
				Water Quality Storm*	2-year Storm*	10-year Storm	25-year Storm
R1	94.40	95.40	95.20	94.57	95.19	95.23	95.24
R2	94.71	95.71	95.50	95.08	95.55	95.56	95.57
R12	94.40	95.40	95.20	94.57	95.19	95.23	95.24
R13	94.73	95.73	95.50	95.07	95.55	95.56	95.57

* Based on the City of Florence storm event.

A full analysis of water quality treatment for Phase 2 through 4 rain gardens can be found in Appendix D.

5.4 ROCK STORAGE PERFORMANCE

Rock storage facilities for soakage trenches and rain gardens are combined for all phases. The properties and performance characteristics are given below. Rock storage underdrains are all 12” perforated pipes wrapped in filter fabric and embedded in the rock volume. At the downstream end of the storage facilities (the west end of Phase 1), prior to release into the Spruce Street ditch, each rock storage facility has a flow control outlet.

Table 6: Rock Storage Facility Performance

Rock Storage ID	Invert Elevation (ft)	Top Elevation (ft)	Overflow Elevation (ft)	Water Surface Elevations (ft)		
				2-year Storm*	10-year Storm	25-year Storm
RS1	92.50	95.20	94.80	93.93	94.87	94.97
RS2	92.50	95.20	94.80	94.28	95.03	95.23
RS3	92.50	95.20	94.80	94.26	94.91	95.02
RS4	92.50	95.20	94.80	93.58	94.44	94.86
RS5	95.80	98.50	Primary 12” Outlet Only	95.99	96.03	96.04
RS6	95.80	98.50	Primary 12” Outlet Only	95.99	96.02	96.04
RS7	91.80	92.90	95.30	92.24	92.45	92.67
RS8	91.80	92.90	95.10	92.29	92.58	92.81

* Based on the City of Florence storm event.

See Appendix D for the HydroCAD results for Rock Storage facilities.

6.0 STORMWATER COMPLIANCE

6.1 WATER QUALITY TREATMENT

From the hydraulic analysis given in Appendix D, the primary indicator for water quality compliance for the rain gardens is related to water surface elevation. If the water surface elevation is below the overflow elevation during the water quality design storm, then the entire water quality storm event volume is allowed to filter through the rain garden media into the underground rock storage.

The rain gardens in Phase 1 were designed to meet City of Florence Stormwater Management requirements per section 5.5 of the Stormwater Design Manual. The rain gardens in Phases 2-4 were designed to meet Oregon DEQ water quality requirements for future wetland permitting. From Table 5 provided above, the peak water surface elevation within Phase 1 rain gardens during the water quality design storms allows for full treatment of stormwater runoff. A similar approach was used to size rain gardens in Phases 2 through 4.

6.2 FLOW CONTROL

To meet City of Florence flow control requirements, the Phase 1 area of the developed site needs to release runoff at or below pre-developed rates for the 2-year, 10-year, and 25-year City of Florence design storms. Additionally, the Phase 2 through 4 area of the developed site will need to detain the NOAA 2-year, 24-hour design storm, controlling the release rate to 50% of the pre-development 2-year design storm to meet SLOPES V and Army Corps of Engineers requirements

during the wetland mitigation process. The various rock storage facilities are equipped with flow control outlets designed to release runoff from all four phases of development. Per the analysis in Appendix D, the post developed runoff rates for all phases of development and all design storms fall below the required rates.

7.0 MAINTENANCE

The proposed stormwater facilities on the private properties will be maintained by the developer/owner for the project. Maintenance will be per the City of Florence's Stormwater Management Manual. Repairs to storm facilities shall be made in accordance with City of Florence Public Works Department. Detailed operations and maintenance information is included in Appendix E.

The proposed stormwater facilities located in the 53rd Street right-of-way will be maintained by the City of Florence, as they are public improvements.

8.0 CONCLUSION

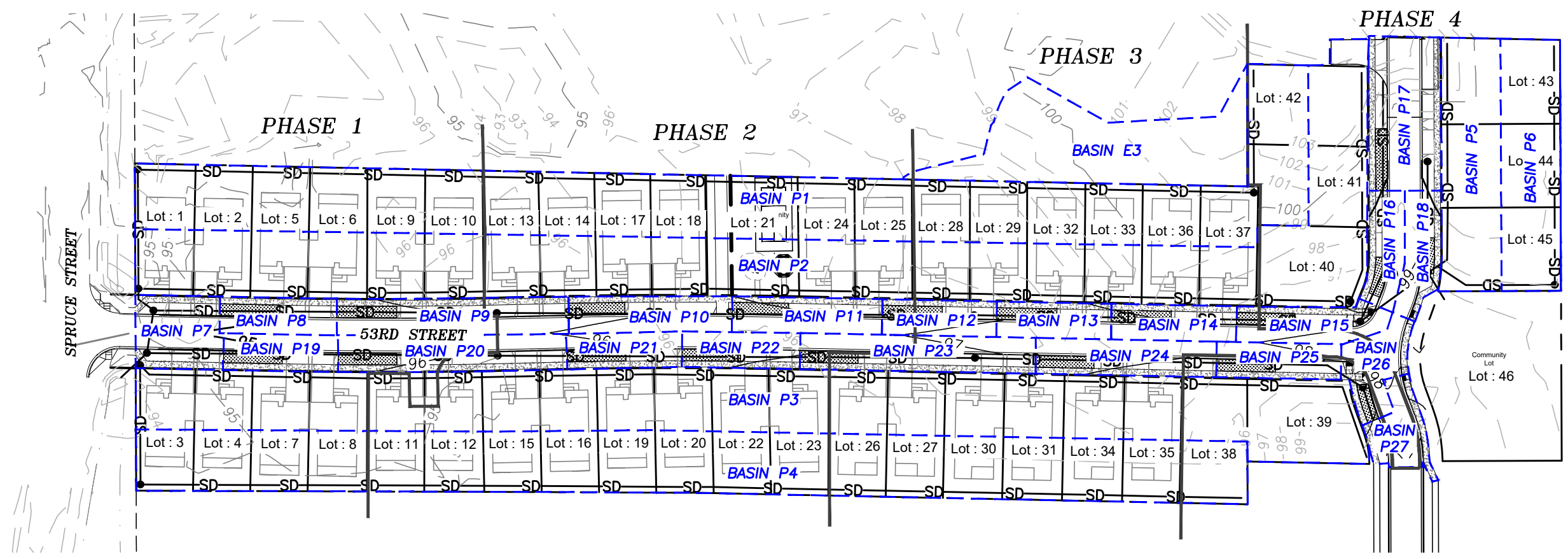
The proposed stormwater system for Phase 1 of the Pine Crossing project has been designed in accordance with the City of Florence Stormwater Design Manual. The proposed system meets the flow control, water quality, and detention requirements of the City of Florence and analysis demonstrated the ability of the proposed system to meet future permitting requirements for Phases 2 through 4.

APPENDIX A

Stormwater Management Drainage Basin Map



DRAINAGE BASIN OVERVIEW MAP
PINE CROSSING SUBDIVISION
FLORENCE, LANE COUNTY, OREGON
MAY 19, 2023
SCALE: 1" = 100'



PINE CROSSING SUBDIVISION

SPRUCE STREET
FLORENCE, OREGON

revisions:

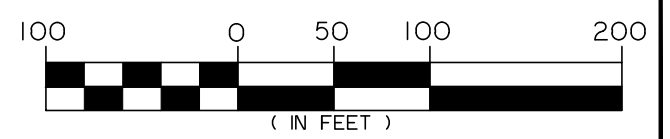
date: MAY 19, 2023
drawn by:
designer:
project no: 21-244

BASIN OVERVIEW MAP

sheet: **B1**



GRAPHIC SCALE



NOT FOR CONSTRUCTION
LAND USE SUBMITTAL

C:\Users\KeryP\Documents\Temporary Project Work\22-312\Pine Crossing Tentative Subdivision-Basin Maps.dwg 5/22/2023 2:18 PM KERYP
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APPENDIX B

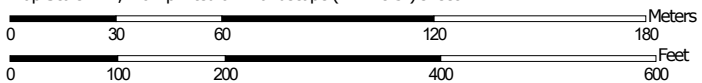
NRCS Soils Data



Custom Soil Resource Report Soil Map



Map Scale: 1:2,140 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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:
 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: Lane County Area, Oregon
 Survey Area Data: Version 21, Mar 13, 2023

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

Date(s) aerial images were photographed: May 23, 2020—May 28, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
131E	Waldport fine sand, 12 to 30 percent slopes	2.3	18.4%
140	Yaquina loamy fine sand	10.0	81.6%
Totals for Area of Interest		12.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

Custom Soil Resource Report

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lane County Area, Oregon

131E—Waldport fine sand, 12 to 30 percent slopes

Map Unit Setting

National map unit symbol: 234s
Elevation: 0 to 150 feet
Mean annual precipitation: 60 to 100 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 165 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Waldport and similar soils: 85 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waldport

Setting

Landform: Dunes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sand of mixed origin

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 3 inches: moderately decomposed plant material
H1 - 3 to 8 inches: fine sand
H2 - 8 to 60 inches: fine sand

Properties and qualities

Slope: 12 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F004AB202OR - Dune Forest
Hydric soil rating: No

Minor Components

Yaquina

Percent of map unit: 3 percent
Landform: Marine terraces
Hydric soil rating: Yes

Heceta

Percent of map unit: 3 percent
Landform: Interdunes
Hydric soil rating: Yes

140—Yaquina loamy fine sand

Map Unit Setting

National map unit symbol: 2359
Elevation: 20 to 130 feet
Mean annual precipitation: 70 to 80 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 180 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Yaquina and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yaquina

Setting

Landform: Dune slacks
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sand of mixed origin

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 9 inches: loamy fine sand
H2 - 9 to 30 inches: fine sand
H3 - 30 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F004AB202OR - Dune Forest
Forage suitability group: Somewhat Poorly Drained (G004AY017OR)

Custom Soil Resource Report

Other vegetative classification: Somewhat Poorly Drained (G004AY017OR)
Hydric soil rating: Yes

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Custom Soil Resource Report

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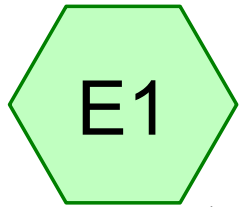
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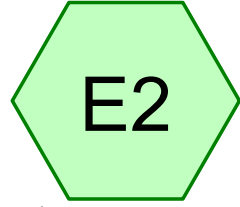
APPENDIX C

Pre-development Hydrologic and Hydraulic Modeling Results

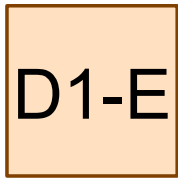




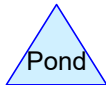
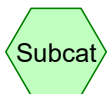
Existing Phase 1



Existing Phase 2-4



Spruce St Ditch (S
Flowing)



22-312 All Phases HCAD model

Type IA 24-hr 2 yr Florence Rainfall=3.46"

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Summary for Subcatchment E1: Existing Phase 1

Runoff = 0.71 cfs @ 8.00 hrs, Volume= 11,506 cf, Depth= 2.06"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

Area (sf)	CN	Description
66,929	86	Woods/grass comb., Poor, HSG D
66,929		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0100	0.14		Sheet Flow, Sheet Range n= 0.130 P2= 3.12"
1.8	172	0.0100	1.61		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
13.5	272	Total			

Summary for Reach D1-E: Spruce St Ditch (S Flowing)

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

Inflow Area = 309,590 sf, 0.00% Impervious, Inflow Depth = 1.76" for 2 yr Florence event
 Inflow = 2.61 cfs @ 8.00 hrs, Volume= 45,402 cf
 Outflow = 2.61 cfs @ 8.00 hrs, Volume= 45,402 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

22-312 All Phases HCAD model

Type IA 24-hr 10 yr Rainfall=4.48"

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Summary for Subcatchment E1: Existing Phase 1

Runoff = 1.05 cfs @ 8.00 hrs, Volume= 16,648 cf, Depth= 2.98"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
66,929	86	Woods/grass comb., Poor, HSG D
66,929		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0100	0.14		Sheet Flow, Sheet Range n= 0.130 P2= 3.12"
1.8	172	0.0100	1.61		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
13.5	272	Total			

22-312 All Phases HCAD model

Type IA 24-hr 25 yr Rainfall=5.06"

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Summary for Subcatchment E1: Existing Phase 1

Runoff = 1.25 cfs @ 8.00 hrs, Volume= 19,649 cf, Depth= 3.52"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
66,929	86	Woods/grass comb., Poor, HSG D
66,929		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0100	0.14		Sheet Flow, Sheet
					Range n= 0.130 P2= 3.12"
1.8	172	0.0100	1.61		Shallow Concentrated Flow, SCF
					Unpaved Kv= 16.1 fps
13.5	272	Total			

22-312 All Phases HCAD model

Type IA 24-hr 2-yr NOAA Rainfall=3.43"

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Summary for Subcatchment E2: Existing Phase 2-4

Runoff = 1.87 cfs @ 8.00 hrs, Volume= 33,408 cf, Depth= 1.65"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
169,296	86	Woods/grass comb., Poor, HSG D
* 25,592	92	Wetlands
47,773	57	Woods/grass comb., Poor, HSG A
242,661	81	Weighted Average
242,661		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0100	0.14		Sheet Flow, Sheet
					Range n= 0.130 P2= 3.12"
2.3	224	0.0100	1.61		Shallow Concentrated Flow, SCF
					Unpaved Kv= 16.1 fps
14.0	324	Total			

Summary for Reach D1-E: Spruce St Ditch (S Flowing)

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

Inflow Area = 309,590 sf, 0.00% Impervious, Inflow Depth = 1.74" for 2-yr NOAA event
 Inflow = 2.57 cfs @ 8.00 hrs, Volume= 44,766 cf
 Outflow = 2.57 cfs @ 8.00 hrs, Volume= 44,766 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

22-312 All Phases HCAD model

Type IA 24-hr 10 yr Rainfall=4.48"

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Summary for Subcatchment E2: Existing Phase 2-4

Runoff = 3.06 cfs @ 8.00 hrs, Volume= 51,177 cf, Depth= 2.53"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
169,296	86	Woods/grass comb., Poor, HSG D
* 25,592	92	Wetlands
47,773	57	Woods/grass comb., Poor, HSG A
242,661	81	Weighted Average
242,661		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0100	0.14		Sheet Flow, Sheet Range n= 0.130 P2= 3.12"
2.3	224	0.0100	1.61		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
14.0	324	Total			

Summary for Reach D1-E: Spruce St Ditch (S Flowing)

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

Inflow Area = 309,590 sf, 0.00% Impervious, Inflow Depth = 2.63" for 10 yr event
Inflow = 4.11 cfs @ 8.00 hrs, Volume= 67,824 cf
Outflow = 4.11 cfs @ 8.00 hrs, Volume= 67,824 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

22-312 All Phases HCAD model

Type IA 24-hr 25 yr Rainfall=5.06"

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Summary for Subcatchment E2: Existing Phase 2-4

Runoff = 3.75 cfs @ 8.00 hrs, Volume= 61,442 cf, Depth= 3.04"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
169,296	86	Woods/grass comb., Poor, HSG D
* 25,592	92	Wetlands
47,773	57	Woods/grass comb., Poor, HSG A
242,661	81	Weighted Average
242,661		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0100	0.14		Sheet Flow, Sheet
					Range n= 0.130 P2= 3.12"
2.3	224	0.0100	1.61		Shallow Concentrated Flow, SCF
					Unpaved Kv= 16.1 fps
14.0	324	Total			

Summary for Reach D1-E: Spruce St Ditch (S Flowing)

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

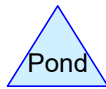
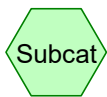
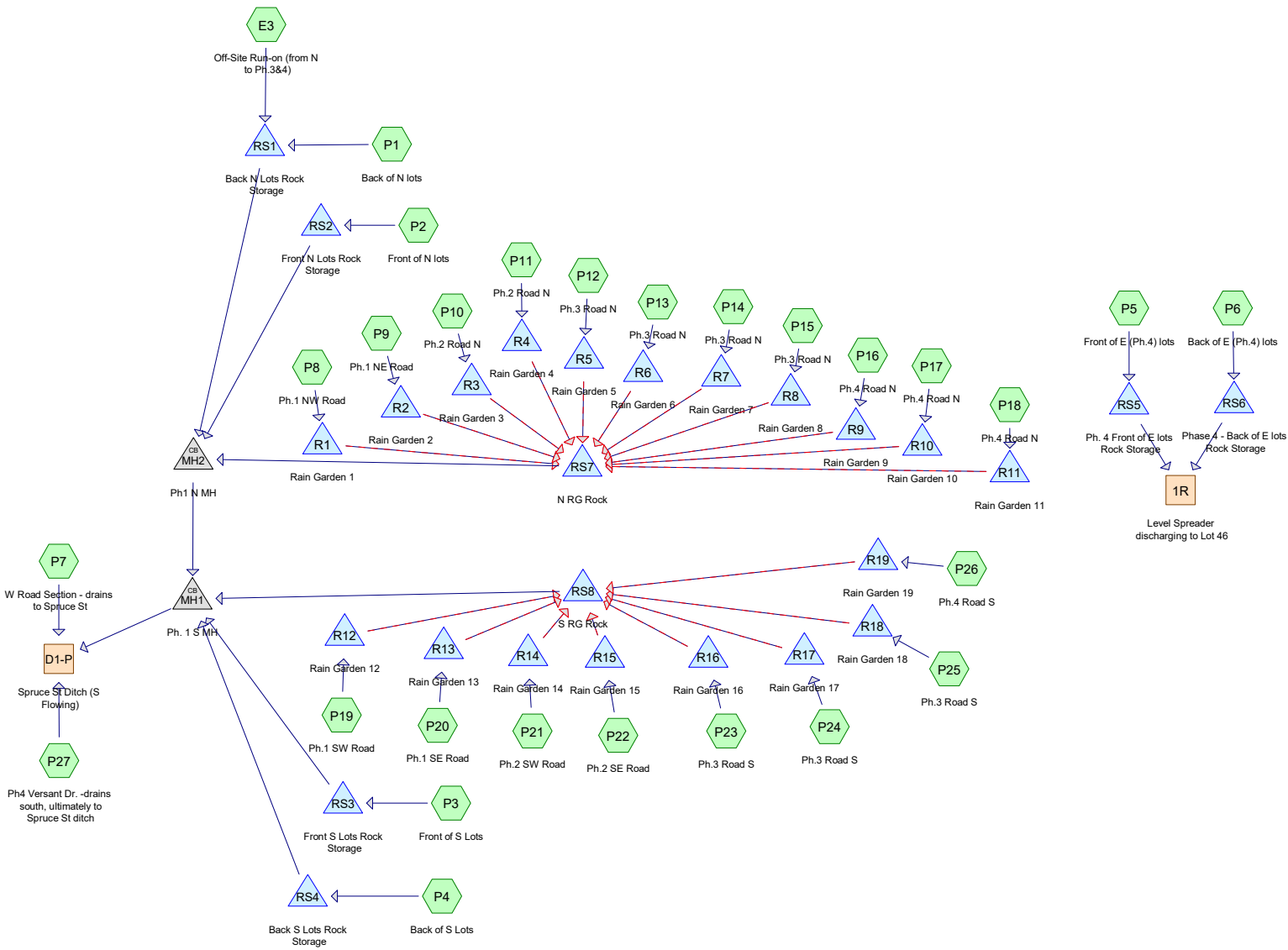
Inflow Area = 309,590 sf, 0.00% Impervious, Inflow Depth = 3.14" for 25 yr event
 Inflow = 5.00 cfs @ 8.00 hrs, Volume= 81,091 cf
 Outflow = 5.00 cfs @ 8.00 hrs, Volume= 81,091 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

APPENDIX D

Post-development Hydrologic and Hydraulic Modeling Results





Routing Diagram for 22-312 All Phases HCAD model_05222023
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22-312 All Phases HCAD model

Type IA 24-hr 2 yr Florence Rainfall=3.46"

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Summary for Subcatchment P1: Back of N lots

Runoff = 0.56 cfs @ 7.94 hrs, Volume= 8,941 cf, Depth= 2.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

	Area (sf)	CN	Description
*	3,707	84	Ph. 2 lot 21 - 50-75% Grass cover, Fair, HSG D
*	15,884	98	Ph. 1-3 - Impervious area
*	4,369	39	Ph. 3 - >75% Grass cover, Good, HSG A
*	23,264	80	Ph. 1-3 - >75% Grass cover, Good, HSG D
*	6,343	92	Ph. 4 - 1/8 acre lots, 65% imp, HSG D
	53,567	84	Weighted Average
	33,560		62.65% Pervious Area
	20,007		37.35% Impervious Area

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

Summary for Subcatchment P19: Ph.1 SW Road

Runoff = 0.04 cfs @ 7.88 hrs, Volume= 633 cf, Depth= 2.70"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

	Area (sf)	CN	Description
*	2,353	98	IMPERVIOUS AREA
*	456	39	Rain Garden - >75% Grass cover, Good, HSG A
	2,809	88	Weighted Average
	456		16.23% Pervious Area
	2,353		83.77% Impervious Area

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

Summary for Subcatchment P2: Front of N lots

Runoff = 0.87 cfs @ 7.90 hrs, Volume= 12,925 cf, Depth= 2.64"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

22-312 All Phases HCAD model

Type IA 24-hr 2 yr Florence Rainfall=3.46"

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Area (sf)	CN	Description
* 31,785	98	Ph 1 - 3 - IMPERVIOUS AREA
* 8,875	80	Ph 1 - 3 - >75% Grass cover, Good, HSG D
* 3,707	84	Ph. 2 lot 21 - 50-75% Grass cover, Fair, HSG D
* 1,720	39	Ph. 3 - >75% Grass cover, Good, HSG A
12,563	92	1/8 acre lots, 65% imp, HSG D
58,650	91	Weighted Average
18,699		31.88% Pervious Area
39,951		68.12% Impervious Area

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

Summary for Subcatchment P20: Ph.1 SE Road

Runoff = 0.09 cfs @ 7.88 hrs, Volume= 1,300 cf, Depth= 2.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

Area (sf)	CN	Description
* 4,698	98	IMPERVIOUS AREA
* 475	39	Rain Garden - >75% Grass cover, Good, HSG A
451	80	>75% Grass cover, Good, HSG D
5,624	92	Weighted Average
926		16.47% Pervious Area
4,698		83.53% Impervious Area

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

Summary for Subcatchment P3: Front of S Lots

Runoff = 0.81 cfs @ 7.90 hrs, Volume= 12,014 cf, Depth= 2.70"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

Area (sf)	CN	Description
* 32,002	98	Ph 1 - 3 - IMPERVIOUS AREA
* 15,198	80	Ph 1-3 - >75% Grass cover, Good, HSG D
6,213	92	1/8 acre lots, 65% imp, HSG D
53,413	92	Weighted Average
17,373		32.52% Pervious Area
36,040		67.48% Impervious Area

22-312 All Phases HCAD model

Type IA 24-hr 2 yr Florence Rainfall=3.46"

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

Summary for Subcatchment P4: Back of S Lots

Runoff = 0.58 cfs @ 7.92 hrs, Volume= 8,796 cf, Depth= 2.33"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

Area (sf)	CN	Description
* 20,346	98	Ph. 1-3 - IMPERVIOUS AREA
* 24,868	80	Ph. 1-3 - >75% Grass cover, Good, HSG D
45,214	88	Weighted Average
24,868		55.00% Pervious Area
20,346		45.00% Impervious Area

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

Summary for Subcatchment P8: Ph.1 NW Road

Runoff = 0.04 cfs @ 7.88 hrs, Volume= 649 cf, Depth= 2.71"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

Area (sf)	CN	Description
* 2,411	98	IMPERVIOUS AREA
* 465	39	Rain Garden - >75% Grass cover, Good, HSG A
2,876	88	Weighted Average
465		16.17% Pervious Area
2,411		83.83% Impervious Area

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

Summary for Subcatchment P9: Ph.1 NE Road

Runoff = 0.09 cfs @ 7.88 hrs, Volume= 1,312 cf, Depth= 2.76"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

22-312 All Phases HCAD model

Type IA 24-hr 2 yr Florence Rainfall=3.46"

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	Area (sf)	CN	Description
*	4,739	98	IMPERVIOUS AREA
*	494	39	Rain garden - >75% Grass cover, Good, HSG A
	467	80	>75% Grass cover, Good, HSG D
	5,700	91	Weighted Average
	961		16.86% Pervious Area
	4,739		83.14% Impervious Area

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

Summary for Pond R1: Rain Garden 1

Inflow Area = 2,876 sf, 83.83% Impervious, Inflow Depth = 2.71" for 2 yr Florence event
 Inflow = 0.04 cfs @ 7.88 hrs, Volume= 649 cf
 Outflow = 0.02 cfs @ 8.81 hrs, Volume= 649 cf, Atten= 66%, Lag= 56.1 min
 Primary = 0.02 cfs @ 8.81 hrs, Volume= 649 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.19' @ 8.81 hrs Surf.Area= 266 sf Storage= 117 cf

Plug-Flow detention time= 76.4 min calculated for 648 cf (100% of inflow)
 Center-of-Mass det. time= 76.4 min (739.8 - 663.4)

Volume	Invert	Avail.Storage	Storage Description
#1	94.40'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.20'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.81 hrs HW=95.19' TW=92.41' (Dynamic Tailwater)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=94.40' TW=91.80' (Dynamic Tailwater)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond R12: Rain Garden 12

Inflow Area = 2,809 sf, 83.77% Impervious, Inflow Depth = 2.70" for 2 yr Florence event
 Inflow = 0.04 cfs @ 7.88 hrs, Volume= 633 cf
 Outflow = 0.02 cfs @ 8.81 hrs, Volume= 633 cf, Atten= 66%, Lag= 55.9 min
 Primary = 0.02 cfs @ 8.81 hrs, Volume= 633 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.19' @ 8.81 hrs Surf.Area= 260 sf Storage= 114 cf

Plug-Flow detention time= 76.2 min calculated for 633 cf (100% of inflow)

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Type IA 24-hr 2 yr Florence Rainfall=3.46"

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Center-of-Mass det. time= 76.2 min (739.6 - 663.4)

Volume	Invert	Avail.Storage	Storage Description
#1	94.40'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.20'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.81 hrs HW=95.19' TW=92.26' (Dynamic Tailwater)↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=94.40' TW=91.80' (Dynamic Tailwater)↑**2=Orifice/Grate** (Controls 0.00 cfs)**Summary for Pond R13: Rain Garden 13**

Inflow Area = 5,624 sf, 83.53% Impervious, Inflow Depth = 2.77" for 2 yr Florence event
 Inflow = 0.09 cfs @ 7.88 hrs, Volume= 1,300 cf
 Outflow = 0.09 cfs @ 7.91 hrs, Volume= 1,300 cf, Atten= 0%, Lag= 2.2 min
 Primary = 0.02 cfs @ 7.91 hrs, Volume= 1,055 cf
 Secondary = 0.07 cfs @ 7.91 hrs, Volume= 245 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 95.55' @ 7.91 hrs Surf.Area= 282 sf Storage= 127 cf

Plug-Flow detention time= 84.2 min calculated for 1,300 cf (100% of inflow)

Center-of-Mass det. time= 84.2 min (756.2 - 672.0)

Volume	Invert	Avail.Storage	Storage Description
#1	94.73'	184 cf	0.86'W x 44.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.73'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.50'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.91 hrs HW=95.55' TW=92.08' (Dynamic Tailwater)↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)**Secondary OutFlow** Max=0.07 cfs @ 7.91 hrs HW=95.55' TW=92.08' (Dynamic Tailwater)↑**2=Orifice/Grate** (Weir Controls 0.07 cfs @ 0.71 fps)**Summary for Pond R2: Rain Garden 2**

Inflow Area = 5,700 sf, 83.14% Impervious, Inflow Depth = 2.76" for 2 yr Florence event
 Inflow = 0.09 cfs @ 7.88 hrs, Volume= 1,312 cf
 Outflow = 0.09 cfs @ 7.91 hrs, Volume= 1,312 cf, Atten= 0%, Lag= 2.0 min
 Primary = 0.02 cfs @ 7.91 hrs, Volume= 1,037 cf
 Secondary = 0.07 cfs @ 7.91 hrs, Volume= 275 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

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Peak Elev= 95.55' @ 7.91 hrs Surf.Area= 265 sf Storage= 122 cf

Plug-Flow detention time= 86.0 min calculated for 1,312 cf (100% of inflow)
Center-of-Mass det. time= 86.0 min (758.2 - 672.2)

Volume	Invert	Avail.Storage	Storage Description
#1	94.71'	169 cf	0.86'W x 40.00'L x 1.00'H Prismatoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.71'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.50'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.91 hrs HW=95.55' TW=92.29' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.07 cfs @ 7.91 hrs HW=95.55' TW=92.29' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.07 cfs @ 0.72 fps)

Summary for Pond RS1: Back N Lots Rock Storage

Inflow Area = 67,748 sf, 29.53% Impervious, Inflow Depth = 2.02" for 2 yr Florence event
 Inflow = 0.73 cfs @ 7.94 hrs, Volume= 11,379 cf
 Outflow = 0.20 cfs @ 9.97 hrs, Volume= 11,364 cf, Atten= 73%, Lag= 121.8 min
 Primary = 0.20 cfs @ 9.97 hrs, Volume= 11,364 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 93.93' @ 9.97 hrs Surf.Area= 4,056 sf Storage= 2,299 cf

Plug-Flow detention time= 157.5 min calculated for 11,364 cf (100% of inflow)
 Center-of-Mass det. time= 156.6 min (900.3 - 743.7)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,046 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 10,951 cf Overall - 796 cf Embedded = 10,155 cf x 30.0% Voids
#2	92.50'	796 cf	12.0" Round Pipe Storage Inside #1 L= 1,014.0'
		3,843 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,056	0	0
95.20	4,056	10,951	10,951

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 122.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.80' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.20 cfs @ 9.97 hrs HW=93.93' TW=92.19' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 0.20 cfs of 3.45 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.20 cfs @ 5.76 fps)
- ↑ 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond RS2: Front N Lots Rock Storage

Inflow Area = 58,650 sf, 68.12% Impervious, Inflow Depth = 2.64" for 2 yr Florence event
 Inflow = 0.87 cfs @ 7.90 hrs, Volume= 12,925 cf
 Outflow = 0.22 cfs @ 9.71 hrs, Volume= 12,910 cf, Atten= 75%, Lag= 108.5 min
 Primary = 0.22 cfs @ 9.71 hrs, Volume= 12,910 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.28' @ 9.71 hrs Surf.Area= 4,680 sf Storage= 3,138 cf

Plug-Flow detention time= 189.1 min calculated for 12,906 cf (100% of inflow)
 Center-of-Mass det. time= 188.3 min (880.0 - 691.7)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,515 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 12,636 cf Overall - 919 cf Embedded = 11,717 cf x 30.0% Voids
#2	92.50'	919 cf	12.0" Round Pipe Storage Inside #1 L= 1,170.0'
		4,434 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,680	0	0
95.20	4,680	12,636	12,636

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 20.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.80' S= 0.0341 ' S= 0.0341 ' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.22 cfs @ 9.71 hrs HW=94.28' TW=92.20' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 0.22 cfs of 4.27 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.22 cfs @ 6.42 fps)
- ↑ 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond RS3: Front S Lots Rock Storage

Inflow Area = 53,413 sf, 67.48% Impervious, Inflow Depth = 2.70" for 2 yr Florence event
 Inflow = 0.81 cfs @ 7.90 hrs, Volume= 12,014 cf
 Outflow = 0.22 cfs @ 9.35 hrs, Volume= 12,003 cf, Atten= 73%, Lag= 87.0 min
 Primary = 0.22 cfs @ 9.35 hrs, Volume= 12,003 cf

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Type IA 24-hr 2 yr Florence Rainfall=3.46"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.26' @ 9.35 hrs Surf.Area= 4,152 sf Storage= 2,757 cf

Plug-Flow detention time= 163.3 min calculated for 11,999 cf (100% of inflow)
 Center-of-Mass det. time= 162.7 min (854.7 - 692.0)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,119 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 11,210 cf Overall - 815 cf Embedded = 10,395 cf x 30.0% Voids
#2	92.50'	815 cf	12.0" Round Pipe Storage Inside #1 L= 1,038.0'
		3,934 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,152	0	0
95.20	4,152	11,210	11,210

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 16.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.70' S= 0.0500 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.22 cfs @ 9.35 hrs HW=94.26' TW=92.02' (Dynamic Tailwater)

- 1=Culvert (Passes 0.22 cfs of 4.24 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.22 cfs @ 6.38 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond RS4: Back S Lots Rock Storage

Inflow Area = 45,214 sf, 45.00% Impervious, Inflow Depth = 2.33" for 2 yr Florence event
 Inflow = 0.58 cfs @ 7.92 hrs, Volume= 8,796 cf
 Outflow = 0.17 cfs @ 9.26 hrs, Volume= 8,786 cf, Atten= 71%, Lag= 80.4 min
 Primary = 0.17 cfs @ 9.26 hrs, Volume= 8,786 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 93.58' @ 9.26 hrs Surf.Area= 3,624 sf Storage= 1,673 cf

Plug-Flow detention time= 118.3 min calculated for 8,786 cf (100% of inflow)
 Center-of-Mass det. time= 117.4 min (837.0 - 719.5)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	2,722 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 9,785 cf Overall - 712 cf Embedded = 9,073 cf x 30.0% Voids
#2	92.50'	712 cf	12.0" Round Pipe Storage Inside #1 L= 906.0'
		3,434 cf	Total Available Storage

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	3,624	0	0
95.20	3,624	9,785	9,785

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 105.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.75' S= 0.0071 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.17 cfs @ 9.26 hrs HW=93.58' TW=92.02' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 0.17 cfs of 2.88 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 5.01 fps)
- ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

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Type IA 24-hr 10 yr Rainfall=4.48"

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Summary for Subcatchment P1: Back of N lots

Runoff = 0.83 cfs @ 7.93 hrs, Volume= 12,766 cf, Depth= 2.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
*	3,707	84	Ph. 2 lot 21 - 50-75% Grass cover, Fair, HSG D
*	15,884	98	Ph. 1-3 - Impervious area
*	4,369	39	Ph. 3 - >75% Grass cover, Good, HSG A
*	23,264	80	Ph. 1-3 - >75% Grass cover, Good, HSG D
*	6,343	92	Ph. 4 - 1/8 acre lots, 65% imp, HSG D
	53,567	84	Weighted Average
	33,560		62.65% Pervious Area
	20,007		37.35% Impervious Area

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

Summary for Subcatchment P19: Ph.1 SW Road

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 836 cf, Depth= 3.57"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
*	2,353	98	IMPERVIOUS AREA
*	456	39	Rain Garden - >75% Grass cover, Good, HSG A
	2,809	88	Weighted Average
	456		16.23% Pervious Area
	2,353		83.77% Impervious Area

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

Summary for Subcatchment P2: Front of N lots

Runoff = 1.18 cfs @ 7.90 hrs, Volume= 17,549 cf, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

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Type IA 24-hr 10 yr Rainfall=4.48"

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	Area (sf)	CN	Description
*	31,785	98	Ph 1 - 3 - IMPERVIOUS AREA
*	8,875	80	Ph 1 - 3 - >75% Grass cover, Good, HSG D
*	3,707	84	Ph. 2 lot 21 - 50-75% Grass cover, Fair, HSG D
*	1,720	39	Ph. 3 - >75% Grass cover, Good, HSG A
	12,563	92	1/8 acre lots, 65% imp, HSG D
	58,650	91	Weighted Average
	18,699		31.88% Pervious Area
	39,951		68.12% Impervious Area

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

Summary for Subcatchment P20: Ph.1 SE Road

Runoff = 0.12 cfs @ 7.89 hrs, Volume= 1,735 cf, Depth= 3.70"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
*	4,698	98	IMPERVIOUS AREA
*	475	39	Rain Garden - >75% Grass cover, Good, HSG A
	451	80	>75% Grass cover, Good, HSG D
	5,624	92	Weighted Average
	926		16.47% Pervious Area
	4,698		83.53% Impervious Area

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

Summary for Subcatchment P3: Front of S Lots

Runoff = 1.11 cfs @ 7.89 hrs, Volume= 16,285 cf, Depth= 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
*	32,002	98	Ph 1 - 3 - IMPERVIOUS AREA
*	15,198	80	Ph 1-3 - >75% Grass cover, Good, HSG D
	6,213	92	1/8 acre lots, 65% imp, HSG D
	53,413	92	Weighted Average
	17,373		32.52% Pervious Area
	36,040		67.48% Impervious Area

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Type IA 24-hr 10 yr Rainfall=4.48"

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

Summary for Subcatchment P4: Back of S Lots

Runoff = 0.83 cfs @ 7.91 hrs, Volume= 12,262 cf, Depth= 3.25"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 20,346	98	Ph. 1-3 - IMPERVIOUS AREA
* 24,868	80	Ph. 1-3 - >75% Grass cover, Good, HSG D
45,214	88	Weighted Average
24,868		55.00% Pervious Area
20,346		45.00% Impervious Area

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

Summary for Subcatchment P8: Ph.1 NW Road

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 857 cf, Depth= 3.58"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 2,411	98	IMPERVIOUS AREA
* 465	39	Rain Garden - >75% Grass cover, Good, HSG A
2,876	88	Weighted Average
465		16.17% Pervious Area
2,411		83.83% Impervious Area

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

Summary for Subcatchment P9: Ph.1 NE Road

Runoff = 0.12 cfs @ 7.89 hrs, Volume= 1,752 cf, Depth= 3.69"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

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Type IA 24-hr 10 yr Rainfall=4.48"

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	Area (sf)	CN	Description
*	4,739	98	IMPERVIOUS AREA
*	494	39	Rain garden - >75% Grass cover, Good, HSG A
	467	80	>75% Grass cover, Good, HSG D
	5,700	91	Weighted Average
	961		16.86% Pervious Area
	4,739		83.14% Impervious Area

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

Summary for Pond R1: Rain Garden 1

Inflow Area = 2,876 sf, 83.83% Impervious, Inflow Depth = 3.58" for 10 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 857 cf
 Outflow = 0.05 cfs @ 8.02 hrs, Volume= 857 cf, Atten= 8%, Lag= 8.5 min
 Primary = 0.02 cfs @ 8.02 hrs, Volume= 799 cf
 Secondary = 0.04 cfs @ 8.02 hrs, Volume= 58 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.23' @ 8.02 hrs Surf.Area= 281 sf Storage= 128 cf

Plug-Flow detention time= 81.7 min calculated for 857 cf (100% of inflow)
 Center-of-Mass det. time= 81.7 min (741.2 - 659.5)

Volume	Invert	Avail.Storage	Storage Description
#1	94.40'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.20'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.02 hrs HW=95.23' TW=92.60' (Dynamic Tailwater)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.04 cfs @ 8.02 hrs HW=95.23' TW=92.60' (Dynamic Tailwater)
 ↑2=Orifice/Grate (Weir Controls 0.04 cfs @ 0.58 fps)

Summary for Pond R12: Rain Garden 12

Inflow Area = 2,809 sf, 83.77% Impervious, Inflow Depth = 3.57" for 10 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 836 cf
 Outflow = 0.05 cfs @ 8.02 hrs, Volume= 836 cf, Atten= 8%, Lag= 8.6 min
 Primary = 0.02 cfs @ 8.02 hrs, Volume= 780 cf
 Secondary = 0.04 cfs @ 8.02 hrs, Volume= 56 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.23' @ 8.02 hrs Surf.Area= 275 sf Storage= 126 cf

Plug-Flow detention time= 81.6 min calculated for 836 cf (100% of inflow)

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Type IA 24-hr 10 yr Rainfall=4.48"

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Center-of-Mass det. time= 81.6 min (741.2 - 659.6)

Volume	Invert	Avail.Storage	Storage Description
#1	94.40'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.20'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.02 hrs HW=95.23' TW=92.32' (Dynamic Tailwater)↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)**Secondary OutFlow** Max=0.04 cfs @ 8.02 hrs HW=95.23' TW=92.32' (Dynamic Tailwater)↑**2=Orifice/Grate** (Weir Controls 0.04 cfs @ 0.57 fps)**Summary for Pond R13: Rain Garden 13**

Inflow Area = 5,624 sf, 83.53% Impervious, Inflow Depth = 3.70" for 10 yr event
 Inflow = 0.12 cfs @ 7.89 hrs, Volume= 1,735 cf
 Outflow = 0.12 cfs @ 7.92 hrs, Volume= 1,735 cf, Atten= 0%, Lag= 1.9 min
 Primary = 0.02 cfs @ 7.92 hrs, Volume= 1,227 cf
 Secondary = 0.10 cfs @ 7.92 hrs, Volume= 508 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 95.56' @ 7.92 hrs Surf.Area= 286 sf Storage= 131 cf

Plug-Flow detention time= 80.1 min calculated for 1,734 cf (100% of inflow)

Center-of-Mass det. time= 80.2 min (748.2 - 668.1)

Volume	Invert	Avail.Storage	Storage Description
#1	94.73'	184 cf	0.86'W x 44.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.73'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.50'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.92 hrs HW=95.56' TW=92.25' (Dynamic Tailwater)↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)**Secondary OutFlow** Max=0.10 cfs @ 7.92 hrs HW=95.56' TW=92.25' (Dynamic Tailwater)↑**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.80 fps)**Summary for Pond R2: Rain Garden 2**

Inflow Area = 5,700 sf, 83.14% Impervious, Inflow Depth = 3.69" for 10 yr event
 Inflow = 0.12 cfs @ 7.89 hrs, Volume= 1,752 cf
 Outflow = 0.12 cfs @ 7.92 hrs, Volume= 1,752 cf, Atten= 0%, Lag= 1.8 min
 Primary = 0.02 cfs @ 7.92 hrs, Volume= 1,184 cf
 Secondary = 0.10 cfs @ 7.92 hrs, Volume= 568 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

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Type IA 24-hr 10 yr Rainfall=4.48"

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Peak Elev= 95.56' @ 7.92 hrs Surf.Area= 269 sf Storage= 125 cf

Plug-Flow detention time= 78.9 min calculated for 1,752 cf (100% of inflow)
Center-of-Mass det. time= 78.9 min (747.3 - 668.4)

Volume	Invert	Avail.Storage	Storage Description
#1	94.71'	169 cf	0.86'W x 40.00'L x 1.00'H Prismatoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.71'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.50'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.92 hrs HW=95.56' TW=92.49' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.10 cfs @ 7.92 hrs HW=95.56' TW=92.49' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.80 fps)

Summary for Pond RS1: Back N Lots Rock Storage

Inflow Area = 67,748 sf, 29.53% Impervious, Inflow Depth = 2.89" for 10 yr event
 Inflow = 1.07 cfs @ 7.93 hrs, Volume= 16,294 cf
 Outflow = 0.39 cfs @ 8.90 hrs, Volume= 16,276 cf, Atten= 63%, Lag= 58.0 min
 Primary = 0.39 cfs @ 8.90 hrs, Volume= 16,276 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.87' @ 8.90 hrs Surf.Area= 4,056 sf Storage= 3,447 cf

Plug-Flow detention time= 182.1 min calculated for 16,276 cf (100% of inflow)
 Center-of-Mass det. time= 181.3 min (914.1 - 732.8)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,046 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 10,951 cf Overall - 796 cf Embedded = 10,155 cf x 30.0% Voids
#2	92.50'	796 cf	12.0" Round Pipe Storage Inside #1 L= 1,014.0'
		3,843 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,056	0	0
95.20	4,056	10,951	10,951

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 122.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.80' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.39 cfs @ 8.90 hrs HW=94.87' TW=92.40' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 0.39 cfs of 4.68 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.25 cfs @ 7.42 fps)
- ↑ 3=Orifice/Grate (Weir Controls 0.14 cfs @ 0.89 fps)

Summary for Pond RS2: Front N Lots Rock Storage

Inflow Area = 58,650 sf, 68.12% Impervious, Inflow Depth = 3.59" for 10 yr event
 Inflow = 1.18 cfs @ 7.90 hrs, Volume= 17,549 cf
 Outflow = 0.43 cfs @ 8.77 hrs, Volume= 17,531 cf, Atten= 63%, Lag= 52.2 min
 Primary = 0.43 cfs @ 8.77 hrs, Volume= 17,531 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.03' @ 8.77 hrs Surf.Area= 4,680 sf Storage= 4,194 cf

Plug-Flow detention time= 205.8 min calculated for 17,531 cf (100% of inflow)
 Center-of-Mass det. time= 205.0 min (890.6 - 685.6)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,515 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 12,636 cf Overall - 919 cf Embedded = 11,717 cf x 30.0% Voids
#2	92.50'	919 cf	12.0" Round Pipe Storage Inside #1 L= 1,170.0'
		4,434 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,680	0	0
95.20	4,680	12,636	12,636

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 20.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.80' S= 0.0341 ' / Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.43 cfs @ 8.77 hrs HW=95.03' TW=92.40' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 0.43 cfs of 5.39 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.26 cfs @ 7.66 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 0.17 cfs @ 1.63 fps)

Summary for Pond RS3: Front S Lots Rock Storage

Inflow Area = 53,413 sf, 67.48% Impervious, Inflow Depth = 3.66" for 10 yr event
 Inflow = 1.11 cfs @ 7.89 hrs, Volume= 16,285 cf
 Outflow = 0.51 cfs @ 8.36 hrs, Volume= 16,273 cf, Atten= 54%, Lag= 28.0 min
 Primary = 0.51 cfs @ 8.36 hrs, Volume= 16,273 cf

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Type IA 24-hr 10 yr Rainfall=4.48"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.91' @ 8.36 hrs Surf.Area= 4,152 sf Storage= 3,573 cf

Plug-Flow detention time= 178.7 min calculated for 16,273 cf (100% of inflow)
 Center-of-Mass det. time= 178.1 min (863.2 - 685.1)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,119 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 11,210 cf Overall - 815 cf Embedded = 10,395 cf x 30.0% Voids
#2	92.50'	815 cf	12.0" Round Pipe Storage Inside #1 L= 1,038.0'
		3,934 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,152	0	0
95.20	4,152	11,210	11,210

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 16.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.70' S= 0.0500 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.51 cfs @ 8.36 hrs HW=94.91' TW=92.18' (Dynamic Tailwater)

- 1=Culvert (Passes 0.51 cfs of 5.23 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.25 cfs @ 7.48 fps)
- 3=Orifice/Grate (Weir Controls 0.25 cfs @ 1.09 fps)

Summary for Pond RS4: Back S Lots Rock Storage

Inflow Area = 45,214 sf, 45.00% Impervious, Inflow Depth = 3.25" for 10 yr event
 Inflow = 0.83 cfs @ 7.91 hrs, Volume= 12,262 cf
 Outflow = 0.23 cfs @ 9.34 hrs, Volume= 12,251 cf, Atten= 72%, Lag= 85.8 min
 Primary = 0.23 cfs @ 9.34 hrs, Volume= 12,251 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.44' @ 9.34 hrs Surf.Area= 3,624 sf Storage= 2,612 cf

Plug-Flow detention time= 147.3 min calculated for 12,251 cf (100% of inflow)
 Center-of-Mass det. time= 146.7 min (857.2 - 710.5)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	2,722 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 9,785 cf Overall - 712 cf Embedded = 9,073 cf x 30.0% Voids
#2	92.50'	712 cf	12.0" Round Pipe Storage Inside #1 L= 906.0'
		3,434 cf	Total Available Storage

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	3,624	0	0
95.20	3,624	9,785	9,785

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 105.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.75' S= 0.0071 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.23 cfs @ 9.34 hrs HW=94.44' TW=92.15' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 0.23 cfs of 4.42 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.23 cfs @ 6.71 fps)
- ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

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Type IA 24-hr 25 yr Rainfall=5.06"

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Summary for Subcatchment P1: Back of N lots

Runoff = 0.99 cfs @ 7.92 hrs, Volume= 15,027 cf, Depth= 3.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 3,707	84	Ph. 2 lot 21 - 50-75% Grass cover, Fair, HSG D
* 15,884	98	Ph. 1-3 - Impervious area
* 4,369	39	Ph. 3 - >75% Grass cover, Good, HSG A
* 23,264	80	Ph. 1-3 - >75% Grass cover, Good, HSG D
* 6,343	92	Ph. 4 - 1/8 acre lots, 65% imp, HSG D
53,567	84	Weighted Average
33,560		62.65% Pervious Area
20,007		37.35% Impervious Area

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

Summary for Subcatchment P19: Ph.1 SW Road

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 954 cf, Depth= 4.07"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 2,353	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
2,809	88	Weighted Average
456		16.23% Pervious Area
2,353		83.77% Impervious Area

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

Summary for Subcatchment P2: Front of N lots

Runoff = 1.37 cfs @ 7.89 hrs, Volume= 20,223 cf, Depth= 4.14"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

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Type IA 24-hr 25 yr Rainfall=5.06"

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	Area (sf)	CN	Description
*	31,785	98	Ph 1 - 3 - IMPERVIOUS AREA
*	8,875	80	Ph 1 - 3 - >75% Grass cover, Good, HSG D
*	3,707	84	Ph. 2 lot 21 - 50-75% Grass cover, Fair, HSG D
*	1,720	39	Ph. 3 - >75% Grass cover, Good, HSG A
	12,563	92	1/8 acre lots, 65% imp, HSG D
	58,650	91	Weighted Average
	18,699		31.88% Pervious Area
	39,951		68.12% Impervious Area

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

Summary for Subcatchment P20: Ph.1 SE Road

Runoff = 0.13 cfs @ 7.89 hrs, Volume= 1,986 cf, Depth= 4.24"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

	Area (sf)	CN	Description
*	4,698	98	IMPERVIOUS AREA
*	475	39	Rain Garden - >75% Grass cover, Good, HSG A
	451	80	>75% Grass cover, Good, HSG D
	5,624	92	Weighted Average
	926		16.47% Pervious Area
	4,698		83.53% Impervious Area

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

Summary for Subcatchment P3: Front of S Lots

Runoff = 1.27 cfs @ 7.89 hrs, Volume= 18,749 cf, Depth= 4.21"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

	Area (sf)	CN	Description
*	32,002	98	Ph 1 - 3 - IMPERVIOUS AREA
*	15,198	80	Ph 1-3 - >75% Grass cover, Good, HSG D
	6,213	92	1/8 acre lots, 65% imp, HSG D
	53,413	92	Weighted Average
	17,373		32.52% Pervious Area
	36,040		67.48% Impervious Area

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Type IA 24-hr 25 yr Rainfall=5.06"

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

Summary for Subcatchment P4: Back of S Lots

Runoff = 0.97 cfs @ 7.91 hrs, Volume= 14,281 cf, Depth= 3.79"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 20,346	98	Ph. 1-3 - IMPERVIOUS AREA
* 24,868	80	Ph. 1-3 - >75% Grass cover, Good, HSG D
45,214	88	Weighted Average
24,868		55.00% Pervious Area
20,346		45.00% Impervious Area

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

Summary for Subcatchment P8: Ph.1 NW Road

Runoff = 0.07 cfs @ 7.88 hrs, Volume= 977 cf, Depth= 4.08"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 2,411	98	IMPERVIOUS AREA
* 465	39	Rain Garden - >75% Grass cover, Good, HSG A
2,876	88	Weighted Average
465		16.17% Pervious Area
2,411		83.83% Impervious Area

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

Summary for Subcatchment P9: Ph.1 NE Road

Runoff = 0.13 cfs @ 7.89 hrs, Volume= 2,006 cf, Depth= 4.22"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

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Type IA 24-hr 25 yr Rainfall=5.06"

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Area (sf)	CN	Description
* 4,739	98	IMPERVIOUS AREA
* 494	39	Rain garden - >75% Grass cover, Good, HSG A
467	80	>75% Grass cover, Good, HSG D
5,700	91	Weighted Average
961		16.86% Pervious Area
4,739		83.14% Impervious Area

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

Summary for Pond R1: Rain Garden 1

Inflow Area = 2,876 sf, 83.83% Impervious, Inflow Depth = 4.08" for 25 yr event
 Inflow = 0.07 cfs @ 7.88 hrs, Volume= 977 cf
 Outflow = 0.07 cfs @ 7.96 hrs, Volume= 977 cf, Atten= 2%, Lag= 4.8 min
 Primary = 0.02 cfs @ 7.96 hrs, Volume= 878 cf
 Secondary = 0.05 cfs @ 7.96 hrs, Volume= 99 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.24' @ 7.96 hrs Surf.Area= 282 sf Storage= 130 cf

Plug-Flow detention time= 83.6 min calculated for 977 cf (100% of inflow)
 Center-of-Mass det. time= 83.6 min (742.1 - 658.4)

Volume	Invert	Avail.Storage	Storage Description
#1	94.40'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.20'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.96 hrs HW=95.24' TW=92.70' (Dynamic Tailwater)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.05 cfs @ 7.96 hrs HW=95.24' TW=92.70' (Dynamic Tailwater)
 ↑2=Orifice/Grate (Weir Controls 0.05 cfs @ 0.63 fps)

Summary for Pond R12: Rain Garden 12

Inflow Area = 2,809 sf, 83.77% Impervious, Inflow Depth = 4.07" for 25 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 954 cf
 Outflow = 0.06 cfs @ 7.96 hrs, Volume= 954 cf, Atten= 2%, Lag= 4.8 min
 Primary = 0.02 cfs @ 7.96 hrs, Volume= 858 cf
 Secondary = 0.05 cfs @ 7.96 hrs, Volume= 96 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.24' @ 7.96 hrs Surf.Area= 276 sf Storage= 127 cf

Plug-Flow detention time= 83.5 min calculated for 954 cf (100% of inflow)

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Type IA 24-hr 25 yr Rainfall=5.06"

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Center-of-Mass det. time= 83.6 min (742.0 - 658.4)

Volume	Invert	Avail.Storage	Storage Description
#1	94.40'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.20'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.96 hrs HW=95.24' TW=92.40' (Dynamic Tailwater)↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)**Secondary OutFlow** Max=0.05 cfs @ 7.96 hrs HW=95.24' TW=92.40' (Dynamic Tailwater)↑**2=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.62 fps)**Summary for Pond R13: Rain Garden 13**

Inflow Area = 5,624 sf, 83.53% Impervious, Inflow Depth = 4.24" for 25 yr event
 Inflow = 0.13 cfs @ 7.89 hrs, Volume= 1,986 cf
 Outflow = 0.13 cfs @ 7.92 hrs, Volume= 1,986 cf, Atten= 0%, Lag= 1.9 min
 Primary = 0.02 cfs @ 7.92 hrs, Volume= 1,285 cf
 Secondary = 0.12 cfs @ 7.92 hrs, Volume= 701 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 95.57' @ 7.92 hrs Surf.Area= 288 sf Storage= 133 cf

Plug-Flow detention time= 74.9 min calculated for 1,986 cf (100% of inflow)

Center-of-Mass det. time= 74.9 min (741.4 - 666.4)

Volume	Invert	Avail.Storage	Storage Description
#1	94.73'	184 cf	0.86'W x 44.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.73'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.50'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.92 hrs HW=95.57' TW=92.37' (Dynamic Tailwater)↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)**Secondary OutFlow** Max=0.12 cfs @ 7.92 hrs HW=95.57' TW=92.37' (Dynamic Tailwater)↑**2=Orifice/Grate** (Weir Controls 0.12 cfs @ 0.84 fps)**Summary for Pond R2: Rain Garden 2**

Inflow Area = 5,700 sf, 83.14% Impervious, Inflow Depth = 4.22" for 25 yr event
 Inflow = 0.13 cfs @ 7.89 hrs, Volume= 2,006 cf
 Outflow = 0.13 cfs @ 7.91 hrs, Volume= 2,006 cf, Atten= 0%, Lag= 1.7 min
 Primary = 0.02 cfs @ 7.91 hrs, Volume= 1,231 cf
 Secondary = 0.12 cfs @ 7.91 hrs, Volume= 776 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

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Type IA 24-hr 25 yr Rainfall=5.06"

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Peak Elev= 95.57' @ 7.91 hrs Surf.Area= 271 sf Storage= 127 cf

Plug-Flow detention time= 72.9 min calculated for 2,006 cf (100% of inflow)
Center-of-Mass det. time= 72.9 min (739.7 - 666.8)

Volume	Invert	Avail.Storage	Storage Description
#1	94.71'	169 cf	0.86"W x 40.00"L x 1.00"H Prismatoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.71'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.50'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.91 hrs HW=95.57' TW=92.64' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.12 cfs @ 7.91 hrs HW=95.57' TW=92.64' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.12 cfs @ 0.84 fps)

Summary for Pond RS1: Back N Lots Rock Storage

Inflow Area = 67,748 sf, 29.53% Impervious, Inflow Depth = 3.40" for 25 yr event
 Inflow = 1.28 cfs @ 7.93 hrs, Volume= 19,191 cf
 Outflow = 0.73 cfs @ 8.24 hrs, Volume= 19,172 cf, Atten= 43%, Lag= 19.1 min
 Primary = 0.73 cfs @ 8.24 hrs, Volume= 19,172 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.97' @ 8.24 hrs Surf.Area= 4,056 sf Storage= 3,565 cf

Plug-Flow detention time= 176.0 min calculated for 19,172 cf (100% of inflow)
 Center-of-Mass det. time= 175.2 min (902.8 - 727.6)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,046 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 10,951 cf Overall - 796 cf Embedded = 10,155 cf x 30.0% Voids
#2	92.50'	796 cf	12.0" Round Pipe Storage Inside #1 L= 1,014.0'
		3,843 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,056	0	0
95.20	4,056	10,951	10,951

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 122.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.80' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.73 cfs @ 8.24 hrs HW=94.97' TW=92.67' (Dynamic Tailwater)

- 1=Culvert (Passes 0.73 cfs of 4.79 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.25 cfs @ 7.30 fps)
- 3=Orifice/Grate (Weir Controls 0.49 cfs @ 1.35 fps)

Summary for Pond RS2: Front N Lots Rock Storage

[93] Warning: Storage range exceeded by 0.04'

Inflow Area = 58,650 sf, 68.12% Impervious, Inflow Depth = 4.14" for 25 yr event
 Inflow = 1.37 cfs @ 7.89 hrs, Volume= 20,223 cf
 Outflow = 0.81 cfs @ 8.22 hrs, Volume= 20,203 cf, Atten= 40%, Lag= 19.5 min
 Primary = 0.81 cfs @ 8.22 hrs, Volume= 20,203 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.24' @ 8.22 hrs Surf.Area= 4,680 sf Storage= 4,434 cf

Plug-Flow detention time= 200.1 min calculated for 20,203 cf (100% of inflow)
 Center-of-Mass det. time= 199.3 min (882.1 - 682.8)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,515 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 12,636 cf Overall - 919 cf Embedded = 11,717 cf x 30.0% Voids
#2	92.50'	919 cf	12.0" Round Pipe Storage Inside #1 L= 1,170.0'
		4,434 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,680	0	0
95.20	4,680	12,636	12,636

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 20.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.80' S= 0.0341 ' / Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.81 cfs @ 8.22 hrs HW=95.24' TW=92.69' (Dynamic Tailwater)

- 1=Culvert (Passes 0.81 cfs of 5.66 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.26 cfs @ 7.68 fps)
- 3=Orifice/Grate (Orifice Controls 0.54 cfs @ 2.25 fps)

22-312 All Phases HCAD model

Type IA 24-hr 25 yr Rainfall=5.06"

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Summary for Pond RS3: Front S Lots Rock Storage

Inflow Area = 53,413 sf, 67.48% Impervious, Inflow Depth = 4.21" for 25 yr event
 Inflow = 1.27 cfs @ 7.89 hrs, Volume= 18,749 cf
 Outflow = 0.96 cfs @ 8.09 hrs, Volume= 18,736 cf, Atten= 25%, Lag= 11.6 min
 Primary = 0.96 cfs @ 8.09 hrs, Volume= 18,736 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.02' @ 8.09 hrs Surf.Area= 4,152 sf Storage= 3,708 cf

Plug-Flow detention time= 174.3 min calculated for 18,736 cf (100% of inflow)
 Center-of-Mass det. time= 173.8 min (855.8 - 682.0)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,119 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 11,210 cf Overall - 815 cf Embedded = 10,395 cf x 30.0% Voids
#2	92.50'	815 cf	12.0" Round Pipe Storage Inside #1 L= 1,038.0'
		3,934 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,152	0	0
95.20	4,152	11,210	11,210

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 16.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.70' S= 0.0500 ' / Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.96 cfs @ 8.09 hrs HW=95.02' TW=92.33' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 0.96 cfs of 5.37 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.26 cfs @ 7.64 fps)
- ↑ 3=Orifice/Grate (Weir Controls 0.70 cfs @ 1.53 fps)

Summary for Pond RS4: Back S Lots Rock Storage

Inflow Area = 45,214 sf, 45.00% Impervious, Inflow Depth = 3.79" for 25 yr event
 Inflow = 0.97 cfs @ 7.91 hrs, Volume= 14,281 cf
 Outflow = 0.35 cfs @ 8.85 hrs, Volume= 14,270 cf, Atten= 64%, Lag= 56.4 min
 Primary = 0.35 cfs @ 8.85 hrs, Volume= 14,270 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.86' @ 8.85 hrs Surf.Area= 3,624 sf Storage= 3,062 cf

Plug-Flow detention time= 156.8 min calculated for 14,270 cf (100% of inflow)
 Center-of-Mass det. time= 156.2 min (862.4 - 706.2)

22-312 All Phases HCAD model

Type IA 24-hr 25 yr Rainfall=5.06"

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Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	2,722 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 9,785 cf Overall - 712 cf Embedded = 9,073 cf x 30.0% Voids
#2	92.50'	712 cf	12.0" Round Pipe Storage Inside #1 L= 906.0'
		3,434 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	3,624	0	0
95.20	3,624	9,785	9,785

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 105.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.75' S= 0.0071 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.35 cfs @ 8.85 hrs HW=94.86' TW=92.28' (Dynamic Tailwater)

- 1=Culvert (Passes 0.35 cfs of 4.93 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.25 cfs @ 7.39 fps)
- 3=Orifice/Grate (Weir Controls 0.10 cfs @ 0.79 fps)

Summary for Subcatchment P1: Back of N lots

Runoff = 0.07 cfs @ 7.91 hrs, Volume= 1,067 cf, Depth= 0.24"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ Florence Rainfall=0.83"

Area (sf)	CN	Description
* 3,707	84	Ph. 2 lot 21 - 50-75% Grass cover, Fair, HSG D
* 15,884	98	Ph. 1-3 - Impervious area
* 4,369	39	Ph. 3 - >75% Grass cover, Good, HSG A
* 23,264	80	Ph. 1-3 - >75% Grass cover, Good, HSG D
* 6,343	92	Ph. 4 - 1/8 acre lots, 65% imp, HSG D
53,567	84	Weighted Average
33,560		62.65% Pervious Area
20,007		37.35% Impervious Area

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

Summary for Subcatchment P19: Ph.1 SW Road

Runoff = 0.01 cfs @ 7.91 hrs, Volume= 123 cf, Depth= 0.53"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ Florence Rainfall=0.83"

Area (sf)	CN	Description
* 2,353	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
2,809	88	Weighted Average
456		16.23% Pervious Area
2,353		83.77% Impervious Area

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

Summary for Subcatchment P2: Front of N lots

Runoff = 0.15 cfs @ 7.91 hrs, Volume= 2,114 cf, Depth= 0.43"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ Florence Rainfall=0.83"

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Type IA 24-hr WQ Florence Rainfall=0.83"

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	Area (sf)	CN	Description
*	31,785	98	Ph 1 - 3 - IMPERVIOUS AREA
*	8,875	80	Ph 1 - 3 - >75% Grass cover, Good, HSG D
*	3,707	84	Ph. 2 lot 21 - 50-75% Grass cover, Fair, HSG D
*	1,720	39	Ph. 3 - >75% Grass cover, Good, HSG A
	12,563	92	1/8 acre lots, 65% imp, HSG D
	58,650	91	Weighted Average
	18,699		31.88% Pervious Area
	39,951		68.12% Impervious Area

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

Summary for Subcatchment P20: Ph.1 SE Road

Runoff = 0.02 cfs @ 7.91 hrs, Volume= 245 cf, Depth= 0.52"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ Florence Rainfall=0.83"

	Area (sf)	CN	Description
*	4,698	98	IMPERVIOUS AREA
*	475	39	Rain Garden - >75% Grass cover, Good, HSG A
	451	80	>75% Grass cover, Good, HSG D
	5,624	92	Weighted Average
	926		16.47% Pervious Area
	4,698		83.53% Impervious Area

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

Summary for Subcatchment P3: Front of S Lots

Runoff = 0.13 cfs @ 7.91 hrs, Volume= 1,939 cf, Depth= 0.44"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ Florence Rainfall=0.83"

	Area (sf)	CN	Description
*	32,002	98	Ph 1 - 3 - IMPERVIOUS AREA
*	15,198	80	Ph 1-3 - >75% Grass cover, Good, HSG D
	6,213	92	1/8 acre lots, 65% imp, HSG D
	53,413	92	Weighted Average
	17,373		32.52% Pervious Area
	36,040		67.48% Impervious Area

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Type IA 24-hr WQ Florence Rainfall=0.83"

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

Summary for Subcatchment P4: Back of S Lots

Runoff = 0.08 cfs @ 7.91 hrs, Volume= 1,143 cf, Depth= 0.30"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ Florence Rainfall=0.83"

Area (sf)	CN	Description
* 20,346	98	Ph. 1-3 - IMPERVIOUS AREA
* 24,868	80	Ph. 1-3 - >75% Grass cover, Good, HSG D
45,214	88	Weighted Average
24,868		55.00% Pervious Area
20,346		45.00% Impervious Area

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

Summary for Subcatchment P8: Ph.1 NW Road

Runoff = 0.01 cfs @ 7.91 hrs, Volume= 126 cf, Depth= 0.53"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ Florence Rainfall=0.83"

Area (sf)	CN	Description
* 2,411	98	IMPERVIOUS AREA
* 465	39	Rain Garden - >75% Grass cover, Good, HSG A
2,876	88	Weighted Average
465		16.17% Pervious Area
2,411		83.83% Impervious Area

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

Summary for Subcatchment P9: Ph.1 NE Road

Runoff = 0.02 cfs @ 7.91 hrs, Volume= 248 cf, Depth= 0.52"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ Florence Rainfall=0.83"

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Type IA 24-hr WQ Florence Rainfall=0.83"

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	Area (sf)	CN	Description
*	4,739	98	IMPERVIOUS AREA
*	494	39	Rain garden - >75% Grass cover, Good, HSG A
	467	80	>75% Grass cover, Good, HSG D
	5,700	91	Weighted Average
	961		16.86% Pervious Area
	4,739		83.14% Impervious Area

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

Summary for Pond R1: Rain Garden 1

Inflow Area = 2,876 sf, 83.83% Impervious, Inflow Depth = 0.53" for WQ Florence event
 Inflow = 0.01 cfs @ 7.91 hrs, Volume= 126 cf
 Outflow = 0.00 cfs @ 8.27 hrs, Volume= 126 cf, Atten= 47%, Lag= 21.7 min
 Primary = 0.00 cfs @ 8.27 hrs, Volume= 126 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.57' @ 8.27 hrs Surf.Area= 83 sf Storage= 10 cf

Plug-Flow detention time= 10.4 min calculated for 126 cf (100% of inflow)
 Center-of-Mass det. time= 10.4 min (734.1 - 723.7)

Volume	Invert	Avail.Storage	Storage Description
#1	94.40'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.20'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 8.27 hrs HW=94.57' TW=91.96' (Dynamic Tailwater)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=94.40' TW=91.80' (Dynamic Tailwater)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond R12: Rain Garden 12

Inflow Area = 2,809 sf, 83.77% Impervious, Inflow Depth = 0.53" for WQ Florence event
 Inflow = 0.01 cfs @ 7.91 hrs, Volume= 123 cf
 Outflow = 0.00 cfs @ 8.27 hrs, Volume= 123 cf, Atten= 47%, Lag= 21.6 min
 Primary = 0.00 cfs @ 8.27 hrs, Volume= 123 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.57' @ 8.27 hrs Surf.Area= 81 sf Storage= 10 cf

Plug-Flow detention time= 10.4 min calculated for 123 cf (100% of inflow)

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Type IA 24-hr WQ Florence Rainfall=0.83"

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Center-of-Mass det. time= 10.4 min (734.0 - 723.7)

Volume	Invert	Avail.Storage	Storage Description
#1	94.40'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.40'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.20'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 8.27 hrs HW=94.57' TW=91.88' (Dynamic Tailwater)↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=94.40' TW=91.80' (Dynamic Tailwater)↑**2=Orifice/Grate** (Controls 0.00 cfs)**Summary for Pond R13: Rain Garden 13**

Inflow Area = 5,624 sf, 83.53% Impervious, Inflow Depth = 0.52" for WQ Florence event
 Inflow = 0.02 cfs @ 7.91 hrs, Volume= 245 cf
 Outflow = 0.01 cfs @ 8.40 hrs, Volume= 245 cf, Atten= 56%, Lag= 29.8 min
 Primary = 0.01 cfs @ 8.40 hrs, Volume= 245 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 95.07' @ 8.40 hrs Surf.Area= 133 sf Storage= 29 cf

Plug-Flow detention time= 25.7 min calculated for 245 cf (100% of inflow)

Center-of-Mass det. time= 25.7 min (749.4 - 723.7)

Volume	Invert	Avail.Storage	Storage Description
#1	94.73'	184 cf	0.86'W x 44.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.73'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.50'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.40 hrs HW=95.07' TW=91.89' (Dynamic Tailwater)↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=94.73' TW=91.80' (Dynamic Tailwater)↑**2=Orifice/Grate** (Controls 0.00 cfs)**Summary for Pond R2: Rain Garden 2**

Inflow Area = 5,700 sf, 83.14% Impervious, Inflow Depth = 0.52" for WQ Florence event
 Inflow = 0.02 cfs @ 7.91 hrs, Volume= 248 cf
 Outflow = 0.01 cfs @ 8.43 hrs, Volume= 248 cf, Atten= 57%, Lag= 31.1 min
 Primary = 0.01 cfs @ 8.43 hrs, Volume= 248 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

22-312 All Phases HCAD model

Type IA 24-hr WQ Florence Rainfall=0.83"

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Peak Elev= 95.08' @ 8.43 hrs Surf.Area= 130 sf Storage= 30 cf

Plug-Flow detention time= 29.7 min calculated for 248 cf (100% of inflow)
Center-of-Mass det. time= 29.7 min (753.4 - 723.7)

Volume	Invert	Avail.Storage	Storage Description
#1	94.71'	169 cf	0.86'W x 40.00'L x 1.00'H Prismatoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	94.71'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	95.50'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.43 hrs HW=95.08' TW=91.96' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=94.71' TW=91.80' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RS1: Back N Lots Rock Storage

Inflow Area = 67,748 sf, 29.53% Impervious, Inflow Depth = 0.21" for WQ Florence event
 Inflow = 0.07 cfs @ 7.92 hrs, Volume= 1,208 cf
 Outflow = 0.05 cfs @ 8.17 hrs, Volume= 1,196 cf, Atten= 36%, Lag= 15.0 min
 Primary = 0.05 cfs @ 8.17 hrs, Volume= 1,196 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.61' @ 8.18 hrs Surf.Area= 4,056 sf Storage= 169 cf

Plug-Flow detention time= 100.3 min calculated for 1,196 cf (99% of inflow)
 Center-of-Mass det. time= 93.8 min (856.0 - 762.2)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,046 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 10,951 cf Overall - 796 cf Embedded = 10,155 cf x 30.0% Voids
#2	92.50'	796 cf	12.0" Round Pipe Storage Inside #1 L= 1,014.0'
		3,843 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,056	0	0
95.20	4,056	10,951	10,951

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 122.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.80' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 8.17 hrs HW=92.61' TW=91.92' (Dynamic Tailwater)

- ↑ 1=Culvert (Outlet Controls 0.05 cfs @ 1.52 fps)
 - ↑ 2=Orifice/Grate (Passes 0.05 cfs of 0.05 cfs potential flow)
 - ↑ 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond RS2: Front N Lots Rock Storage

Inflow Area = 58,650 sf, 68.12% Impervious, Inflow Depth = 0.43" for WQ Florence event
 Inflow = 0.15 cfs @ 7.91 hrs, Volume= 2,114 cf
 Outflow = 0.07 cfs @ 8.36 hrs, Volume= 2,103 cf, Atten= 53%, Lag= 27.2 min
 Primary = 0.07 cfs @ 8.36 hrs, Volume= 2,103 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.68' @ 8.36 hrs Surf.Area= 4,680 sf Storage= 326 cf

Plug-Flow detention time= 85.4 min calculated for 2,102 cf (99% of inflow)
 Center-of-Mass det. time= 81.9 min (811.4 - 729.5)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,515 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 12,636 cf Overall - 919 cf Embedded = 11,717 cf x 30.0% Voids
#2	92.50'	919 cf	12.0" Round Pipe Storage Inside #1 L= 1,170.0'
		4,434 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,680	0	0
95.20	4,680	12,636	12,636

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 20.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.80' S= 0.0341 ' / Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.07 cfs @ 8.36 hrs HW=92.68' TW=91.92' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 0.07 cfs of 0.14 cfs potential flow)
 - ↑ 2=Orifice/Grate (Orifice Controls 0.07 cfs @ 2.03 fps)
 - ↑ 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond RS3: Front S Lots Rock Storage

Inflow Area = 53,413 sf, 67.48% Impervious, Inflow Depth = 0.44" for WQ Florence event
 Inflow = 0.13 cfs @ 7.91 hrs, Volume= 1,939 cf
 Outflow = 0.07 cfs @ 8.31 hrs, Volume= 1,930 cf, Atten= 50%, Lag= 23.9 min
 Primary = 0.07 cfs @ 8.31 hrs, Volume= 1,930 cf

22-312 All Phases HCAD model

Type IA 24-hr WQ Florence Rainfall=0.83"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.67' @ 8.31 hrs Surf.Area= 4,152 sf Storage= 274 cf

Plug-Flow detention time= 77.8 min calculated for 1,930 cf (100% of inflow)
 Center-of-Mass det. time= 74.7 min (809.5 - 734.8)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	3,119 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 11,210 cf Overall - 815 cf Embedded = 10,395 cf x 30.0% Voids
#2	92.50'	815 cf	12.0" Round Pipe Storage Inside #1 L= 1,038.0'
		3,934 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	4,152	0	0
95.20	4,152	11,210	11,210

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 16.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.70' S= 0.0500 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 8.31 hrs HW=92.67' TW=91.75' (Dynamic Tailwater)

- 1=Culvert (Passes 0.07 cfs of 0.12 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.07 cfs @ 1.98 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond RS4: Back S Lots Rock Storage

Inflow Area = 45,214 sf, 45.00% Impervious, Inflow Depth = 0.30" for WQ Florence event
 Inflow = 0.08 cfs @ 7.91 hrs, Volume= 1,143 cf
 Outflow = 0.05 cfs @ 8.12 hrs, Volume= 1,134 cf, Atten= 30%, Lag= 13.0 min
 Primary = 0.05 cfs @ 8.12 hrs, Volume= 1,134 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.61' @ 8.12 hrs Surf.Area= 3,624 sf Storage= 149 cf

Plug-Flow detention time= 86.7 min calculated for 1,134 cf (99% of inflow)
 Center-of-Mass det. time= 81.7 min (832.5 - 750.8)

Volume	Invert	Avail.Storage	Storage Description
#1	92.50'	2,722 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 9,785 cf Overall - 712 cf Embedded = 9,073 cf x 30.0% Voids
#2	92.50'	712 cf	12.0" Round Pipe Storage Inside #1 L= 906.0'
		3,434 cf	Total Available Storage

22-312 All Phases HCAD model

Type IA 24-hr WQ Florence Rainfall=0.83"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.50	3,624	0	0
95.20	3,624	9,785	9,785

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	12.0" Round Culvert L= 105.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 91.75' S= 0.0071 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	92.50'	2.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 8.12 hrs HW=92.61' TW=91.74' (Dynamic Tailwater)

- ↑ **1=Culvert** (Barrel Controls 0.05 cfs @ 1.72 fps)
- ↑ **2=Orifice/Grate** (Passes 0.05 cfs of 0.05 cfs potential flow)
- ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Subcatchment P27: Ph4 Versant Dr. -drains south, ultimately to Spruce St ditch

Runoff = 0.05 cfs @ 7.88 hrs, Volume= 726 cf, Depth= 3.23"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

Area (sf)	CN	Description
* 2,700	98	IMPERVIOUS AREA
2,700		100.00% Impervious Area

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

Summary for Subcatchment P7: W Road Section - drains to Spruce St

Runoff = 0.08 cfs @ 7.88 hrs, Volume= 1,138 cf, Depth= 3.23"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Florence Rainfall=3.46"

Area (sf)	CN	Description
* 4,232	98	IMPERVIOUS AREA
4,232		100.00% Impervious Area

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

Summary for Reach D1-P: Spruce St Ditch (S Flowing)

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

Inflow Area = 323,771 sf, 60.64% Impervious, Inflow Depth > 2.51" for 2 yr Florence event
Inflow = 1.35 cfs @ 8.71 hrs, Volume= 67,792 cf
Outflow = 1.35 cfs @ 8.71 hrs, Volume= 67,792 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond MH1: Ph. 1 S MH

[57] Hint: Peaked at 92.03' (Flood elevation advised)

Inflow Area = 316,839 sf, 59.78% Impervious, Inflow Depth > 2.50" for 2 yr Florence event
Inflow = 1.31 cfs @ 8.82 hrs, Volume= 65,928 cf
Outflow = 1.31 cfs @ 8.82 hrs, Volume= 65,928 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.31 cfs @ 8.82 hrs, Volume= 65,928 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

22-312 All Phases HCAD model

Type IA 24-hr 2 yr Florence Rainfall=3.46"

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Peak Elev= 92.03' @ 8.82 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.50'	24.0" Round Culvert L= 30.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.50' / 91.32' S= 0.0060 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.31 cfs @ 8.82 hrs HW=92.03' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 1.31 cfs @ 2.96 fps)

Summary for Pond MH2: Ph1 N MH

[57] Hint: Peaked at 92.22' (Flood elevation advised)

Inflow Area =	188,510 sf, 57.56% Impervious, Inflow Depth > 2.45"	for 2 yr Florence event
Inflow =	0.82 cfs @ 8.47 hrs, Volume=	38,429 cf
Outflow =	0.82 cfs @ 8.47 hrs, Volume=	38,429 cf, Atten= 0%, Lag= 0.0 min
Primary =	0.82 cfs @ 8.47 hrs, Volume=	38,429 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 92.22' @ 8.53 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.70'	18.0" Round Culvert L= 35.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.70' / 91.60' S= 0.0029 '/ Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Primary OutFlow Max=0.82 cfs @ 8.47 hrs HW=92.22' TW=92.03' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 0.82 cfs @ 2.26 fps)

Summary for Subcatchment E3: Off-Site Run-on (from N to Ph.3&4)

Runoff = 0.16 cfs @ 7.97 hrs, Volume= 2,407 cf, Depth= 2.04"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
14,181	86	Woods/grass comb., Poor, HSG D
14,181		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	85	0.0350	0.23		Sheet Flow, Sheet Range n= 0.130 P2= 3.12"
0.1	25	0.0950	4.96		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
6.3	110	Total			

Summary for Subcatchment P10: Ph.2 Road N

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 872 cf, Depth= 2.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 3,217	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
241	80	>75% Grass cover, Good, HSG D
3,923	90	Weighted Average
706		18.00% Pervious Area
3,217		82.00% Impervious Area

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

Summary for Subcatchment P11: Ph.2 Road N

Runoff = 0.05 cfs @ 7.88 hrs, Volume= 769 cf, Depth= 2.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2-yr NOAA Rainfall=3.43"

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	Area (sf)	CN	Description
*	2,809	98	IMPERVIOUS AREA
*	465	39	Rain garden - >75% Grass cover, Good, HSG A
	287	80	>75% Grass cover, Good, HSG D
	3,561	89	Weighted Average
	752		21.12% Pervious Area
	2,809		78.88% Impervious Area

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

Summary for Subcatchment P12: Ph.3 Road N

Runoff = 0.04 cfs @ 7.88 hrs, Volume= 613 cf, Depth= 2.71"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

	Area (sf)	CN	Description
*	2,301	98	IMPERVIOUS AREA
*	410	39	Rain garden - >75% Grass cover, Good, HSG A
	2,711	89	Weighted Average
	410		15.12% Pervious Area
	2,301		84.88% Impervious Area

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

Summary for Subcatchment P13: Ph.3 Road N

Runoff = 0.04 cfs @ 7.88 hrs, Volume= 613 cf, Depth= 2.71"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

	Area (sf)	CN	Description
*	2,300	98	IMPERVIOUS AREA
*	410	39	Rain garden - >75% Grass cover, Good, HSG A
	2,710	89	Weighted Average
	410		15.13% Pervious Area
	2,300		84.87% Impervious Area

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

Summary for Subcatchment P14: Ph.3 Road N

Runoff = 0.05 cfs @ 7.88 hrs, Volume= 668 cf, Depth= 2.70"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 2,506	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
2,971	89	Weighted Average
465		15.65% Pervious Area
2,506		84.35% Impervious Area

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

Summary for Subcatchment P15: Ph.3 Road N

Runoff = 0.05 cfs @ 7.88 hrs, Volume= 744 cf, Depth= 2.51"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 2,663	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
435	80	>75% Grass cover, Good, HSG D
3,563	88	Weighted Average
900		25.26% Pervious Area
2,663		74.74% Impervious Area

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

Summary for Subcatchment P16: Ph.4 Road N

Runoff = 0.05 cfs @ 7.88 hrs, Volume= 716 cf, Depth= 2.84"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2-yr NOAA Rainfall=3.43"

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Area (sf)	CN	Description
* 2,670	98	IMPERVIOUS AREA
* 275	39	Rain garden - >75% Grass cover, Good, HSG A
85	80	>75% Grass cover, Good, HSG D
3,030	92	Weighted Average
360		11.88% Pervious Area
2,670		88.12% Impervious Area

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

Summary for Subcatchment P17: Ph.4 Road N

Runoff = 0.13 cfs @ 7.88 hrs, Volume= 1,834 cf, Depth= 2.94"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 6,885	98	IMPERVIOUS AREA
* 608	39	Rain garden - >75% Grass cover, Good, HSG A
7,493	93	Weighted Average
608		8.11% Pervious Area
6,885		91.89% Impervious Area

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

Summary for Subcatchment P18: Ph.4 Road N

Runoff = 0.05 cfs @ 7.88 hrs, Volume= 713 cf, Depth= 2.88"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 2,665	98	IMPERVIOUS AREA
* 247	39	Rain garden - >75% Grass cover, Good, HSG A
60	80	>75% Grass cover, Good, HSG D
2,972	93	Weighted Average
307		10.33% Pervious Area
2,665		89.67% Impervious Area

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

Summary for Subcatchment P21: Ph.2 SW Road

Runoff = 0.04 cfs @ 7.88 hrs, Volume= 600 cf, Depth= 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 2,251	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
2,707	88	Weighted Average
456		16.85% Pervious Area
2,251		83.15% Impervious Area

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

Summary for Subcatchment P22: Ph.2 SE Road

Runoff = 0.04 cfs @ 7.88 hrs, Volume= 625 cf, Depth= 2.68"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 2,344	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
2,800	88	Weighted Average
456		16.29% Pervious Area
2,344		83.71% Impervious Area

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

Summary for Subcatchment P23: Ph.3 Road S

Runoff = 0.09 cfs @ 7.88 hrs, Volume= 1,284 cf, Depth= 2.75"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 4,674	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
465	80	>75% Grass cover, Good, HSG D
5,595	92	Weighted Average
921		16.46% Pervious Area
4,674		83.54% Impervious Area

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

Summary for Subcatchment P24: Ph.3 Road S

Runoff = 0.07 cfs @ 7.88 hrs, Volume= 969 cf, Depth= 2.72"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 3,581	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
239	80	>75% Grass cover, Good, HSG D
4,276	91	Weighted Average
695		16.25% Pervious Area
3,581		83.75% Impervious Area

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

Summary for Subcatchment P25: Ph.3 Road S

Runoff = 0.04 cfs @ 7.90 hrs, Volume= 573 cf, Depth= 2.32"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 1,985	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
519	80	>75% Grass cover, Good, HSG D
2,960	86	Weighted Average
975		32.94% Pervious Area
1,985		67.06% Impervious Area

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

Summary for Subcatchment P26: Ph.4 Road S

Runoff = 0.05 cfs @ 7.88 hrs, Volume= 698 cf, Depth= 2.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

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	Area (sf)	CN	Description
*	2,618	98	IMPERVIOUS AREA
*	313	39	Rain Garden - >75% Grass cover, Good, HSG A
	2,931	92	Weighted Average
	313		10.68% Pervious Area
	2,618		89.32% Impervious Area

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

Summary for Subcatchment P27: Ph4 Versant Dr. -drains south, ultimately to Spruce St ditch

Runoff = 0.05 cfs @ 7.88 hrs, Volume= 719 cf, Depth= 3.20"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

	Area (sf)	CN	Description
*	2,700	98	IMPERVIOUS AREA
	2,700		100.00% Impervious Area

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

Summary for Subcatchment P5: Front of E (Ph.4) lots

Runoff = 0.16 cfs @ 7.90 hrs, Volume= 2,329 cf, Depth= 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

	Area (sf)	CN	Description
	10,522	92	1/8 acre lots, 65% imp, HSG D
	3,683		35.00% Pervious Area
	6,839		65.00% Impervious Area

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

Summary for Subcatchment P6: Back of E (Ph.4) lots

Runoff = 0.15 cfs @ 7.90 hrs, Volume= 2,231 cf, Depth= 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
10,080	92	1/8 acre lots, 65% imp, HSG D
3,528		35.00% Pervious Area
6,552		65.00% Impervious Area

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

Summary for Subcatchment P7: W Road Section - drains to Spruce St

Runoff = 0.08 cfs @ 7.88 hrs, Volume= 1,127 cf, Depth= 3.20"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-yr NOAA Rainfall=3.43"

Area (sf)	CN	Description
* 4,232	98	IMPERVIOUS AREA
4,232		100.00% Impervious Area

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

Summary for Reach D1-P: Spruce St Ditch (S Flowing)

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

Inflow Area = 303,169 sf, 60.34% Impervious, Inflow Depth > 2.47" for 2-yr NOAA event
Inflow = 1.19 cfs @ 8.84 hrs, Volume= 62,514 cf
Outflow = 1.19 cfs @ 8.84 hrs, Volume= 62,514 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach LS1: Level Spreader discharging to Lot 46

Inflow Area = 20,602 sf, 65.00% Impervious, Inflow Depth = 2.66" for 2-yr NOAA event
Inflow = 0.30 cfs @ 7.97 hrs, Volume= 4,559 cf
Outflow = 0.30 cfs @ 7.97 hrs, Volume= 4,559 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.49 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.36 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 7.97 hrs

Average Depth at Peak Storage= 0.01'

Bank-Full Depth= 0.50' Flow Area= 44.3 sf, Capacity= 342.84 cfs

88.00' x 0.50' deep channel, n= 0.012 Wood, planed
 Side Slope Z-value= 1.0 '/' Top Width= 89.00'
 Length= 1.0' Slope= 0.0100 '/'
 Inlet Invert= 94.80', Outlet Invert= 94.79'



Summary for Pond MH1: Ph. 1 S MH

[57] Hint: Peaked at 91.99' (Flood elevation advised)

Inflow Area = 296,237 sf, 59.42% Impervious, Inflow Depth > 2.46" for 2-yr NOAA event
 Inflow = 1.15 cfs @ 8.98 hrs, Volume= 60,668 cf
 Outflow = 1.15 cfs @ 8.98 hrs, Volume= 60,668 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.15 cfs @ 8.98 hrs, Volume= 60,668 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 91.99' @ 8.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.50'	24.0" Round Culvert L= 30.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.50' / 91.32' S= 0.0060 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.15 cfs @ 8.98 hrs HW=91.99' TW=0.00' (Dynamic Tailwater)
 ↖**1=Culvert** (Barrel Controls 1.15 cfs @ 2.88 fps)

Summary for Pond MH2: Ph1 N MH

[57] Hint: Peaked at 92.16' (Flood elevation advised)

Inflow Area = 167,908 sf, 56.65% Impervious, Inflow Depth > 2.39" for 2-yr NOAA event
 Inflow = 0.65 cfs @ 8.68 hrs, Volume= 33,457 cf
 Outflow = 0.65 cfs @ 8.68 hrs, Volume= 33,457 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.65 cfs @ 8.68 hrs, Volume= 33,457 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.16' @ 8.83 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.70'	18.0" Round Culvert L= 35.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.70' / 91.60' S= 0.0029 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Primary OutFlow Max=0.65 cfs @ 8.68 hrs HW=92.16' TW=91.99' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 0.65 cfs @ 2.09 fps)

Summary for Pond R10: Rain Garden 10

Inflow Area = 7,493 sf, 91.89% Impervious, Inflow Depth = 2.94" for 2-yr NOAA event
 Inflow = 0.13 cfs @ 7.88 hrs, Volume= 1,834 cf
 Outflow = 0.13 cfs @ 7.92 hrs, Volume= 1,834 cf, Atten= 0%, Lag= 2.6 min
 Primary = 0.02 cfs @ 7.92 hrs, Volume= 1,446 cf
 Secondary = 0.10 cfs @ 7.92 hrs, Volume= 388 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.06' @ 7.92 hrs Surf.Area= 381 sf Storage= 182 cf

Plug-Flow detention time= 86.5 min calculated for 1,834 cf (100% of inflow)
 Center-of-Mass det. time= 86.6 min (750.0 - 663.5)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	238 cf	0.86'W x 58.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.92 hrs HW=97.06' TW=92.16' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.10 cfs @ 7.92 hrs HW=97.06' TW=92.16' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.10 cfs @ 0.81 fps)

Summary for Pond R11: Rain Garden 11

Inflow Area = 2,972 sf, 89.67% Impervious, Inflow Depth = 2.88" for 2-yr NOAA event
 Inflow = 0.05 cfs @ 7.88 hrs, Volume= 713 cf
 Outflow = 0.05 cfs @ 7.90 hrs, Volume= 713 cf, Atten= 0%, Lag= 1.3 min
 Primary = 0.01 cfs @ 7.90 hrs, Volume= 563 cf
 Secondary = 0.04 cfs @ 7.90 hrs, Volume= 150 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.03' @ 7.90 hrs Surf.Area= 146 sf Storage= 65 cf

Plug-Flow detention time= 83.4 min calculated for 713 cf (100% of inflow)
 Center-of-Mass det. time= 83.4 min (748.7 - 665.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	92 cf	0.86'W x 20.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 7.90 hrs HW=97.03' TW=92.15' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.04 cfs @ 7.90 hrs HW=97.03' TW=92.15' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Weir Controls 0.04 cfs @ 0.59 fps)

Summary for Pond R14: Rain Garden 14

Inflow Area = 2,707 sf, 83.15% Impervious, Inflow Depth = 2.66" for 2-yr NOAA event
 Inflow = 0.04 cfs @ 7.88 hrs, Volume= 600 cf
 Outflow = 0.01 cfs @ 8.78 hrs, Volume= 600 cf, Atten= 65%, Lag= 54.5 min
 Primary = 0.01 cfs @ 8.78 hrs, Volume= 600 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.00' @ 8.78 hrs Surf.Area= 250 sf Storage= 105 cf

Plug-Flow detention time= 72.4 min calculated for 600 cf (100% of inflow)

Center-of-Mass det. time= 72.4 min (736.0 - 663.6)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	177 cf	0.86'W x 42.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.78 hrs HW=96.00' TW=92.23' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=95.25' TW=91.80' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R15: Rain Garden 15

Inflow Area = 2,800 sf, 83.71% Impervious, Inflow Depth = 2.68" for 2-yr NOAA event
 Inflow = 0.04 cfs @ 7.88 hrs, Volume= 625 cf
 Outflow = 0.01 cfs @ 8.80 hrs, Volume= 625 cf, Atten= 65%, Lag= 55.6 min
 Primary = 0.01 cfs @ 8.80 hrs, Volume= 625 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.38' @ 8.80 hrs Surf.Area= 258 sf Storage= 112 cf

Plug-Flow detention time= 75.2 min calculated for 625 cf (100% of inflow)

Center-of-Mass det. time= 75.2 min (738.8 - 663.6)

Volume	Invert	Avail.Storage	Storage Description
#1	95.60'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.60'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.40'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.80 hrs HW=96.38' TW=92.23' (Dynamic Tailwater)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=95.60' TW=91.80' (Dynamic Tailwater)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond R16: Rain Garden 16

Inflow Area = 5,595 sf, 83.54% Impervious, Inflow Depth = 2.75" for 2-yr NOAA event
 Inflow = 0.09 cfs @ 7.88 hrs, Volume= 1,284 cf
 Outflow = 0.09 cfs @ 7.92 hrs, Volume= 1,284 cf, Atten= 0%, Lag= 2.2 min
 Primary = 0.02 cfs @ 7.92 hrs, Volume= 1,047 cf
 Secondary = 0.07 cfs @ 7.92 hrs, Volume= 237 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.75' @ 7.92 hrs Surf.Area= 280 sf Storage= 130 cf

Plug-Flow detention time= 87.1 min calculated for 1,284 cf (100% of inflow)
 Center-of-Mass det. time= 87.1 min (759.6 - 672.5)

Volume	Invert	Avail.Storage	Storage Description
#1	95.90'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.90'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.70'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.92 hrs HW=96.75' TW=92.07' (Dynamic Tailwater)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.07 cfs @ 7.92 hrs HW=96.75' TW=92.07' (Dynamic Tailwater)
 ↑2=Orifice/Grate (Weir Controls 0.07 cfs @ 0.71 fps)

Summary for Pond R17: Rain Garden 17

Inflow Area = 4,276 sf, 83.75% Impervious, Inflow Depth = 2.72" for 2-yr NOAA event
 Inflow = 0.07 cfs @ 7.88 hrs, Volume= 969 cf
 Outflow = 0.07 cfs @ 7.95 hrs, Volume= 969 cf, Atten= 1%, Lag= 4.6 min
 Primary = 0.02 cfs @ 7.95 hrs, Volume= 867 cf
 Secondary = 0.05 cfs @ 7.95 hrs, Volume= 102 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

22-312 All Phases HCAD model_Phase 4 alternative Type IA 24-hr 2-yr NOAA Rainfall=3.43"

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Peak Elev= 97.39' @ 7.95 hrs Surf.Area= 277 sf Storage= 127 cf

Plug-Flow detention time= 84.5 min calculated for 969 cf (100% of inflow)

Center-of-Mass det. time= 84.5 min (753.9 - 669.4)

Volume	Invert	Avail.Storage	Storage Description
#1	96.55'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.55'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.35'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.95 hrs HW=97.39' TW=92.09' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.05 cfs @ 7.95 hrs HW=97.39' TW=92.09' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.63 fps)

Summary for Pond R18: Rain Garden 18

Inflow Area = 2,960 sf, 67.06% Impervious, Inflow Depth = 2.32" for 2-yr NOAA event
 Inflow = 0.04 cfs @ 7.90 hrs, Volume= 573 cf
 Outflow = 0.01 cfs @ 8.81 hrs, Volume= 573 cf, Atten= 64%, Lag= 54.8 min
 Primary = 0.01 cfs @ 8.81 hrs, Volume= 573 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 97.64' @ 8.81 hrs Surf.Area= 231 sf Storage= 90 cf

Plug-Flow detention time= 67.4 min calculated for 573 cf (100% of inflow)

Center-of-Mass det. time= 67.4 min (753.4 - 686.0)

Volume	Invert	Avail.Storage	Storage Description
#1	96.95'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.95'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.75'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.81 hrs HW=97.64' TW=92.23' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.95' TW=91.80' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R19: Rain Garden 19

Inflow Area = 2,931 sf, 89.32% Impervious, Inflow Depth = 2.86" for 2-yr NOAA event
 Inflow = 0.05 cfs @ 7.88 hrs, Volume= 698 cf
 Outflow = 0.05 cfs @ 7.90 hrs, Volume= 698 cf, Atten= 0%, Lag= 1.5 min
 Primary = 0.01 cfs @ 7.90 hrs, Volume= 571 cf
 Secondary = 0.04 cfs @ 7.90 hrs, Volume= 126 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.03' @ 7.90 hrs Surf.Area= 158 sf Storage= 70 cf

Plug-Flow detention time= 83.6 min calculated for 697 cf (100% of inflow)
 Center-of-Mass det. time= 83.6 min (747.1 - 663.5)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	100 cf	0.86'W x 22.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 7.90 hrs HW=97.03' TW=92.06' (Dynamic Tailwater)
 ↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.04 cfs @ 7.90 hrs HW=97.03' TW=92.06' (Dynamic Tailwater)
 ↳2=Orifice/Grate (Weir Controls 0.04 cfs @ 0.58 fps)

Summary for Pond R3: Rain Garden 3

Inflow Area = 3,923 sf, 82.00% Impervious, Inflow Depth = 2.67" for 2-yr NOAA event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 872 cf
 Outflow = 0.05 cfs @ 8.02 hrs, Volume= 872 cf, Atten= 8%, Lag= 8.4 min
 Primary = 0.02 cfs @ 8.02 hrs, Volume= 812 cf
 Secondary = 0.04 cfs @ 8.02 hrs, Volume= 61 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.08' @ 8.02 hrs Surf.Area= 281 sf Storage= 129 cf

Plug-Flow detention time= 82.8 min calculated for 872 cf (100% of inflow)
 Center-of-Mass det. time= 82.8 min (753.0 - 670.2)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.02 hrs HW=96.08' TW=92.19' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.04 cfs @ 8.02 hrs HW=96.08' TW=92.19' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Weir Controls 0.04 cfs @ 0.58 fps)

Summary for Pond R4: Rain Garden 4

Inflow Area = 3,561 sf, 78.88% Impervious, Inflow Depth = 2.59" for 2-yr NOAA event
 Inflow = 0.05 cfs @ 7.88 hrs, Volume= 769 cf
 Outflow = 0.03 cfs @ 8.16 hrs, Volume= 769 cf, Atten= 37%, Lag= 16.8 min
 Primary = 0.02 cfs @ 8.16 hrs, Volume= 744 cf
 Secondary = 0.02 cfs @ 8.16 hrs, Volume= 25 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.07' @ 8.16 hrs Surf.Area= 276 sf Storage= 125 cf

Plug-Flow detention time= 81.1 min calculated for 768 cf (100% of inflow)

Center-of-Mass det. time= 81.1 min (754.0 - 672.9)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.16 hrs HW=96.07' TW=92.22' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.02 cfs @ 8.16 hrs HW=96.07' TW=92.22' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Weir Controls 0.02 cfs @ 0.44 fps)

Summary for Pond R5: Rain Garden 5

Inflow Area = 2,711 sf, 84.88% Impervious, Inflow Depth = 2.71" for 2-yr NOAA event
 Inflow = 0.04 cfs @ 7.88 hrs, Volume= 613 cf
 Outflow = 0.01 cfs @ 8.79 hrs, Volume= 613 cf, Atten= 65%, Lag= 54.5 min
 Primary = 0.01 cfs @ 8.79 hrs, Volume= 613 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.90' @ 8.79 hrs Surf.Area= 256 sf Storage= 108 cf

Plug-Flow detention time= 72.5 min calculated for 613 cf (100% of inflow)

Center-of-Mass det. time= 72.5 min (736.0 - 663.6)

22-312 All Phases HCAD model_Phase 4 alternative Type IA 24-hr 2-yr NOAA Rainfall=3.43"

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Volume	Invert	Avail.Storage	Storage Description
#1	96.15'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.15'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.95'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.79 hrs HW=96.90' TW=92.23' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.15' TW=91.80' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R6: Rain Garden 6

Inflow Area = 2,710 sf, 84.87% Impervious, Inflow Depth = 2.71" for 2-yr NOAA event
 Inflow = 0.04 cfs @ 7.88 hrs, Volume= 613 cf
 Outflow = 0.01 cfs @ 8.79 hrs, Volume= 613 cf, Atten= 65%, Lag= 54.5 min
 Primary = 0.01 cfs @ 8.79 hrs, Volume= 613 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.25' @ 8.79 hrs Surf.Area= 256 sf Storage= 108 cf

Plug-Flow detention time= 72.4 min calculated for 613 cf (100% of inflow)
 Center-of-Mass det. time= 72.4 min (736.0 - 663.6)

Volume	Invert	Avail.Storage	Storage Description
#1	96.50'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.50'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.30'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.79 hrs HW=97.25' TW=92.23' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.50' TW=91.80' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R7: Rain Garden 7

Inflow Area = 2,971 sf, 84.35% Impervious, Inflow Depth = 2.70" for 2-yr NOAA event
 Inflow = 0.05 cfs @ 7.88 hrs, Volume= 668 cf
 Outflow = 0.02 cfs @ 8.72 hrs, Volume= 668 cf, Atten= 64%, Lag= 50.3 min
 Primary = 0.02 cfs @ 8.72 hrs, Volume= 667 cf
 Secondary = 0.00 cfs @ 8.72 hrs, Volume= 1 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

22-312 All Phases HCAD model_Phase 4 alternative Type IA 24-hr 2-yr NOAA Rainfall=3.43"

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Peak Elev= 97.60' @ 8.72 hrs Surf.Area= 271 sf Storage= 121 cf

Plug-Flow detention time= 78.2 min calculated for 668 cf (100% of inflow)

Center-of-Mass det. time= 78.2 min (741.8 - 663.6)

Volume	Invert	Avail.Storage	Storage Description
#1	96.80'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.80'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.60'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.72 hrs HW=97.60' TW=92.23' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.00 cfs @ 8.72 hrs HW=97.60' TW=92.23' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.17 fps)

Summary for Pond R8: Rain Garden 8

Inflow Area = 3,563 sf, 74.74% Impervious, Inflow Depth = 2.51" for 2-yr NOAA event
 Inflow = 0.05 cfs @ 7.88 hrs, Volume= 744 cf
 Outflow = 0.03 cfs @ 8.28 hrs, Volume= 744 cf, Atten= 49%, Lag= 24.0 min
 Primary = 0.02 cfs @ 8.28 hrs, Volume= 730 cf
 Secondary = 0.01 cfs @ 8.28 hrs, Volume= 14 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 97.96' @ 8.28 hrs Surf.Area= 274 sf Storage= 123 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 81.1 min (759.2 - 678.1)

Volume	Invert	Avail.Storage	Storage Description
#1	97.15'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	97.15'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.95'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.28 hrs HW=97.96' TW=92.23' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.01 cfs @ 8.28 hrs HW=97.96' TW=92.23' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Weir Controls 0.01 cfs @ 0.36 fps)

Summary for Pond R9: Rain Garden 9

Inflow Area = 3,030 sf, 88.12% Impervious, Inflow Depth = 2.84" for 2-yr NOAA event
 Inflow = 0.05 cfs @ 7.88 hrs, Volume= 716 cf
 Outflow = 0.05 cfs @ 7.90 hrs, Volume= 716 cf, Atten= 0%, Lag= 1.3 min
 Primary = 0.01 cfs @ 7.90 hrs, Volume= 565 cf
 Secondary = 0.04 cfs @ 7.90 hrs, Volume= 150 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.83' @ 7.90 hrs Surf.Area= 146 sf Storage= 65 cf

Plug-Flow detention time= 83.6 min calculated for 716 cf (100% of inflow)
 Center-of-Mass det. time= 83.6 min (749.9 - 666.3)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	92 cf	0.86"W x 20.00"L x 1.00"H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	98.00'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	98.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 7.90 hrs HW=98.83' TW=92.15' (Dynamic Tailwater)
 ↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.04 cfs @ 7.90 hrs HW=98.83' TW=92.15' (Dynamic Tailwater)
 ↳2=Orifice/Grate (Weir Controls 0.04 cfs @ 0.59 fps)

Summary for Pond RS5: Ph. 4 Front of E lots Rock Storage

Inflow Area = 10,522 sf, 65.00% Impervious, Inflow Depth = 2.66" for 2-yr NOAA event
 Inflow = 0.16 cfs @ 7.90 hrs, Volume= 2,329 cf
 Outflow = 0.16 cfs @ 7.97 hrs, Volume= 2,329 cf, Atten= 1%, Lag= 4.2 min
 Primary = 0.16 cfs @ 7.97 hrs, Volume= 2,329 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.99' @ 7.97 hrs Surf.Area= 885 sf Storage= 64 cf

Plug-Flow detention time= 14.2 min calculated for 2,328 cf (100% of inflow)
 Center-of-Mass det. time= 14.2 min (708.7 - 694.5)

Volume	Invert	Avail.Storage	Storage Description
#1	95.80'	675 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,390 cf Overall - 139 cf Embedded = 2,250 cf x 30.0% Voids
#2	95.80'	139 cf	12.0" Round Pipe Storage Inside #1 L= 177.0'

814 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.80	885	0	0
98.50	885	2,390	2,390

Device	Routing	Invert	Outlet Devices
#1	Primary	95.80'	12.0" Round Culvert L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.80' / 95.00' S= 0.0400 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.16 cfs @ 7.97 hrs HW=95.99' TW=94.81' (Dynamic Tailwater)
 ↳1=Culvert (Inlet Controls 0.16 cfs @ 1.49 fps)

Summary for Pond RS6: Phase 4 - Back of E lots Rock Storage

Inflow Area = 10,080 sf, 65.00% Impervious, Inflow Depth = 2.66" for 2-yr NOAA event
 Inflow = 0.15 cfs @ 7.90 hrs, Volume= 2,231 cf
 Outflow = 0.15 cfs @ 7.98 hrs, Volume= 2,231 cf, Atten= 2%, Lag= 4.7 min
 Primary = 0.15 cfs @ 7.98 hrs, Volume= 2,231 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.99' @ 7.98 hrs Surf.Area= 965 sf Storage= 68 cf

Plug-Flow detention time= 15.8 min calculated for 2,230 cf (100% of inflow)
 Center-of-Mass det. time= 15.8 min (710.3 - 694.5)

Volume	Invert	Avail.Storage	Storage Description
#1	95.80'	736 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,606 cf Overall - 152 cf Embedded = 2,454 cf x 30.0% Voids
#2	95.80'	152 cf	12.0" Round Pipe Storage Inside #1 L= 193.0'
		888 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.80	965	0	0
98.50	965	2,606	2,606

Device	Routing	Invert	Outlet Devices
#1	Primary	95.80'	12.0" Round Culvert L= 45.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.80' / 94.80' S= 0.0222 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.15 cfs @ 7.98 hrs HW=95.99' TW=94.81' (Dynamic Tailwater)
 ↳1=Culvert (Inlet Controls 0.15 cfs @ 1.47 fps)

Summary for Pond RS7: N RG Rock

Inflow Area = 41,510 sf, 84.72% Impervious, Inflow Depth = 2.74" for 2-yr NOAA event
 Inflow = 0.44 cfs @ 8.00 hrs, Volume= 9,484 cf
 Outflow = 0.27 cfs @ 8.33 hrs, Volume= 9,457 cf, Atten= 40%, Lag= 19.8 min
 Primary = 0.27 cfs @ 8.33 hrs, Volume= 9,457 cf

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.24' @ 8.44 hrs Surf.Area= 5,668 sf Storage= 1,022 cf

Plug-Flow detention time= 92.2 min calculated for 9,457 cf (100% of inflow)
 Center-of-Mass det. time= 90.0 min (839.2 - 749.3)

Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	1,591 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 6,232 cf Overall - 929 cf Embedded = 5,302 cf x 30.0% Voids
#2	91.80'	929 cf	12.0" Round Pipe Storage Inside #1 L= 1,183.0'
#3	91.80'	13 cf	2.00'D x 4.00'H Vertical Cone/Cylinder
		2,532 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	5,665	0	0
92.90	5,665	6,232	6,232

Device	Routing	Invert	Outlet Devices
#1	Primary	91.80'	12.0" Round Culvert L= 2.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.80' / 91.78' S= 0.0100 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	91.80'	6.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	95.30'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.27 cfs @ 8.33 hrs HW=92.24' TW=92.16' (Dynamic Tailwater)

- 1=Culvert (Passes 0.27 cfs of 0.38 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.27 cfs @ 1.36 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond RS8: S RG Rock

Inflow Area = 29,702 sf, 82.50% Impervious, Inflow Depth = 2.69" for 2-yr NOAA event
 Inflow = 0.34 cfs @ 7.95 hrs, Volume= 6,662 cf
 Outflow = 0.12 cfs @ 10.15 hrs, Volume= 6,645 cf, Atten= 63%, Lag= 132.4 min
 Primary = 0.12 cfs @ 10.15 hrs, Volume= 6,645 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.26' @ 9.77 hrs Surf.Area= 5,023 sf Storage= 956 cf

Plug-Flow detention time= 96.8 min calculated for 6,645 cf (100% of inflow)
 Center-of-Mass det. time= 94.8 min (845.1 - 750.3)

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Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	1,406 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 5,522 cf Overall - 835 cf Embedded = 4,687 cf x 30.0% Voids
#2	91.80'	835 cf	12.0" Round Pipe Storage Inside #1 L= 1,063.0'
#3	91.90'	13 cf	2.00'D x 4.00'H Vertical Cone/Cylinder
		2,254 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	5,020	0	0
92.90	5,020	5,522	5,522

Device	Routing	Invert	Outlet Devices
#1	Primary	91.80'	12.0" Round Culvert L= 5.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.80' / 91.60' S= 0.0400 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	91.80'	3.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	95.10'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.12 cfs @ 10.15 hrs HW=92.26' TW=91.98' (Dynamic Tailwater)

- 1=Culvert (Passes 0.12 cfs of 0.71 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.12 cfs @ 2.54 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Subcatchment E3: Off-Site Run-on (from N to Ph.3&4)

Runoff = 0.24 cfs @ 7.95 hrs, Volume= 3,527 cf, Depth= 2.98"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
14,181	86	Woods/grass comb., Poor, HSG D
14,181		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	85	0.0350	0.23		Sheet Flow, Sheet Range n= 0.130 P2= 3.12"
0.1	25	0.0950	4.96		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
6.3	110	Total			

Summary for Subcatchment P10: Ph.2 Road N

Runoff = 0.08 cfs @ 7.88 hrs, Volume= 1,175 cf, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 3,217	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
241	80	>75% Grass cover, Good, HSG D
3,923	90	Weighted Average
706		18.00% Pervious Area
3,217		82.00% Impervious Area

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

Summary for Subcatchment P11: Ph.2 Road N

Runoff = 0.07 cfs @ 7.89 hrs, Volume= 1,039 cf, Depth= 3.50"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
*	2,809	98	IMPERVIOUS AREA
*	465	39	Rain garden - >75% Grass cover, Good, HSG A
	287	80	>75% Grass cover, Good, HSG D
	3,561	89	Weighted Average
	752		21.12% Pervious Area
	2,809		78.88% Impervious Area

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

Summary for Subcatchment P12: Ph.3 Road N

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 817 cf, Depth= 3.62"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
*	2,301	98	IMPERVIOUS AREA
*	410	39	Rain garden - >75% Grass cover, Good, HSG A
	2,711	89	Weighted Average
	410		15.12% Pervious Area
	2,301		84.88% Impervious Area

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

Summary for Subcatchment P13: Ph.3 Road N

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 817 cf, Depth= 3.62"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
*	2,300	98	IMPERVIOUS AREA
*	410	39	Rain garden - >75% Grass cover, Good, HSG A
	2,710	89	Weighted Average
	410		15.13% Pervious Area
	2,300		84.87% Impervious Area

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

Summary for Subcatchment P14: Ph.3 Road N

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 890 cf, Depth= 3.60"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 2,506	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
2,971	89	Weighted Average
465		15.65% Pervious Area
2,506		84.35% Impervious Area

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

Summary for Subcatchment P15: Ph.3 Road N

Runoff = 0.07 cfs @ 7.89 hrs, Volume= 1,013 cf, Depth= 3.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 2,663	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
435	80	>75% Grass cover, Good, HSG D
3,563	88	Weighted Average
900		25.26% Pervious Area
2,663		74.74% Impervious Area

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

Summary for Subcatchment P16: Ph.4 Road N

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 958 cf, Depth= 3.79"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

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Type IA 24-hr 10 yr Rainfall=4.48"

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	Area (sf)	CN	Description
*	2,670	98	IMPERVIOUS AREA
*	275	39	Rain garden - >75% Grass cover, Good, HSG A
	85	80	>75% Grass cover, Good, HSG D
	3,030	92	Weighted Average
	360		11.88% Pervious Area
	2,670		88.12% Impervious Area

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

Summary for Subcatchment P17: Ph.4 Road N

Runoff = 0.17 cfs @ 7.88 hrs, Volume= 2,440 cf, Depth= 3.91"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
*	6,885	98	IMPERVIOUS AREA
*	608	39	Rain garden - >75% Grass cover, Good, HSG A
	7,493	93	Weighted Average
	608		8.11% Pervious Area
	6,885		91.89% Impervious Area

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

Summary for Subcatchment P18: Ph.4 Road N

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 952 cf, Depth= 3.84"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
*	2,665	98	IMPERVIOUS AREA
*	247	39	Rain garden - >75% Grass cover, Good, HSG A
	60	80	>75% Grass cover, Good, HSG D
	2,972	93	Weighted Average
	307		10.33% Pervious Area
	2,665		89.67% Impervious Area

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

Summary for Subcatchment P21: Ph.2 SW Road

Runoff = 0.05 cfs @ 7.88 hrs, Volume= 800 cf, Depth= 3.55"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 2,251	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
2,707	88	Weighted Average
456		16.85% Pervious Area
2,251		83.15% Impervious Area

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

Summary for Subcatchment P22: Ph.2 SE Road

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 833 cf, Depth= 3.57"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 2,344	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
2,800	88	Weighted Average
456		16.29% Pervious Area
2,344		83.71% Impervious Area

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

Summary for Subcatchment P23: Ph.3 Road S

Runoff = 0.12 cfs @ 7.89 hrs, Volume= 1,731 cf, Depth= 3.71"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 4,674	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
465	80	>75% Grass cover, Good, HSG D
5,595	92	Weighted Average
921		16.46% Pervious Area
4,674		83.54% Impervious Area

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

Summary for Subcatchment P24: Ph.3 Road S

Runoff = 0.09 cfs @ 7.88 hrs, Volume= 1,303 cf, Depth= 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 3,581	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
239	80	>75% Grass cover, Good, HSG D
4,276	91	Weighted Average
695		16.25% Pervious Area
3,581		83.75% Impervious Area

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

Summary for Subcatchment P25: Ph.3 Road S

Runoff = 0.05 cfs @ 7.90 hrs, Volume= 789 cf, Depth= 3.20"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 1,985	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
519	80	>75% Grass cover, Good, HSG D
2,960	86	Weighted Average
975		32.94% Pervious Area
1,985		67.06% Impervious Area

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

Summary for Subcatchment P26: Ph.4 Road S

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 929 cf, Depth= 3.80"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

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	Area (sf)	CN	Description
*	2,618	98	IMPERVIOUS AREA
*	313	39	Rain Garden - >75% Grass cover, Good, HSG A
	2,931	92	Weighted Average
	313		10.68% Pervious Area
	2,618		89.32% Impervious Area

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

Summary for Subcatchment P27: Ph4 Versant Dr. -drains south, ultimately to Spruce St ditch

Runoff = 0.07 cfs @ 7.88 hrs, Volume= 955 cf, Depth= 4.24"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
*	2,700	98	IMPERVIOUS AREA
	2,700		100.00% Impervious Area

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

Summary for Subcatchment P5: Front of E (Ph.4) lots

Runoff = 0.22 cfs @ 7.90 hrs, Volume= 3,196 cf, Depth= 3.64"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

	Area (sf)	CN	Description
	10,522	92	1/8 acre lots, 65% imp, HSG D
	3,683		35.00% Pervious Area
	6,839		65.00% Impervious Area

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

Summary for Subcatchment P6: Back of E (Ph.4) lots

Runoff = 0.21 cfs @ 7.90 hrs, Volume= 3,061 cf, Depth= 3.64"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

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Type IA 24-hr 10 yr Rainfall=4.48"

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Area (sf)	CN	Description
10,080	92	1/8 acre lots, 65% imp, HSG D
3,528		35.00% Pervious Area
6,552		65.00% Impervious Area

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

Summary for Subcatchment P7: W Road Section - drains to Spruce St

Runoff = 0.10 cfs @ 7.88 hrs, Volume= 1,497 cf, Depth= 4.24"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=4.48"

Area (sf)	CN	Description
* 4,232	98	IMPERVIOUS AREA
4,232		100.00% Impervious Area

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

Summary for Reach D1-P: Spruce St Ditch (S Flowing)

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

Inflow Area = 303,169 sf, 60.34% Impervious, Inflow Depth > 3.42" for 10 yr event
Inflow = 1.97 cfs @ 8.80 hrs, Volume= 86,400 cf
Outflow = 1.97 cfs @ 8.80 hrs, Volume= 86,400 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach LS1: Level Spreader discharging to Lot 46Inflow Area = 20,602 sf, 65.00% Impervious, Inflow Depth = 3.64" for 10 yr event
Inflow = 0.42 cfs @ 7.96 hrs, Volume= 6,256 cf
Outflow = 0.42 cfs @ 7.96 hrs, Volume= 6,256 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.55 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 0.37 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 7.96 hrs

Average Depth at Peak Storage= 0.01'

Bank-Full Depth= 0.50' Flow Area= 44.3 sf, Capacity= 342.84 cfs

88.00' x 0.50' deep channel, n= 0.012 Wood, planed
 Side Slope Z-value= 1.0 '/' Top Width= 89.00'
 Length= 1.0' Slope= 0.0100 '/'
 Inlet Invert= 94.80', Outlet Invert= 94.79'



Summary for Pond MH1: Ph. 1 S MH

[57] Hint: Peaked at 92.15' (Flood elevation advised)

Inflow Area = 296,237 sf, 59.42% Impervious, Inflow Depth > 3.40" for 10 yr event
 Inflow = 1.91 cfs @ 8.81 hrs, Volume= 83,949 cf
 Outflow = 1.91 cfs @ 8.81 hrs, Volume= 83,949 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.91 cfs @ 8.81 hrs, Volume= 83,949 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.15' @ 8.81 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.50'	24.0" Round Culvert L= 30.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.50' / 91.32' S= 0.0060 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.91 cfs @ 8.81 hrs HW=92.15' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Barrel Controls 1.91 cfs @ 3.20 fps)

Summary for Pond MH2: Ph1 N MH

[57] Hint: Peaked at 92.34' (Flood elevation advised)

Inflow Area = 167,908 sf, 56.65% Impervious, Inflow Depth > 3.32" for 10 yr event
 Inflow = 1.13 cfs @ 8.86 hrs, Volume= 46,487 cf
 Outflow = 1.13 cfs @ 8.86 hrs, Volume= 46,487 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.13 cfs @ 8.86 hrs, Volume= 46,487 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.34' @ 8.84 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.70'	18.0" Round Culvert L= 35.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.70' / 91.60' S= 0.0029 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Primary OutFlow Max=1.13 cfs @ 8.86 hrs HW=92.34' TW=92.15' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 1.13 cfs @ 2.31 fps)

Summary for Pond R10: Rain Garden 10

Inflow Area = 7,493 sf, 91.89% Impervious, Inflow Depth = 3.91" for 10 yr event
 Inflow = 0.17 cfs @ 7.88 hrs, Volume= 2,440 cf
 Outflow = 0.17 cfs @ 7.91 hrs, Volume= 2,440 cf, Atten= 0%, Lag= 2.4 min
 Primary = 0.02 cfs @ 7.91 hrs, Volume= 1,665 cf
 Secondary = 0.14 cfs @ 7.91 hrs, Volume= 775 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.08' @ 7.91 hrs Surf.Area= 387 sf Storage= 187 cf

Plug-Flow detention time= 81.1 min calculated for 2,440 cf (100% of inflow)
 Center-of-Mass det. time= 81.1 min (739.3 - 658.2)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	238 cf	0.86'W x 58.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.91 hrs HW=97.08' TW=92.29' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.14 cfs @ 7.91 hrs HW=97.08' TW=92.29' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.14 cfs @ 0.90 fps)

Summary for Pond R11: Rain Garden 11

Inflow Area = 2,972 sf, 89.67% Impervious, Inflow Depth = 3.84" for 10 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 952 cf
 Outflow = 0.06 cfs @ 7.90 hrs, Volume= 952 cf, Atten= 0%, Lag= 1.2 min
 Primary = 0.01 cfs @ 7.90 hrs, Volume= 651 cf
 Secondary = 0.06 cfs @ 7.90 hrs, Volume= 301 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.04' @ 7.90 hrs Surf.Area= 148 sf Storage= 66 cf

Plug-Flow detention time= 77.8 min calculated for 952 cf (100% of inflow)
 Center-of-Mass det. time= 77.8 min (738.6 - 660.8)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	92 cf	0.86'W x 20.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 7.90 hrs HW=97.04' TW=92.27' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.06 cfs @ 7.90 hrs HW=97.04' TW=92.27' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.06 cfs @ 0.66 fps)

Summary for Pond R14: Rain Garden 14

Inflow Area = 2,707 sf, 83.15% Impervious, Inflow Depth = 3.55" for 10 yr event
 Inflow = 0.05 cfs @ 7.88 hrs, Volume= 800 cf
 Outflow = 0.05 cfs @ 8.05 hrs, Volume= 800 cf, Atten= 16%, Lag= 10.2 min
 Primary = 0.02 cfs @ 8.05 hrs, Volume= 756 cf
 Secondary = 0.03 cfs @ 8.05 hrs, Volume= 44 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.08' @ 8.05 hrs Surf.Area= 273 sf Storage= 125 cf

Plug-Flow detention time= 81.0 min calculated for 800 cf (100% of inflow)

Center-of-Mass det. time= 81.0 min (740.6 - 659.7)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	177 cf	0.86'W x 42.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.05 hrs HW=96.08' TW=92.32' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.03 cfs @ 8.05 hrs HW=96.08' TW=92.32' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.03 cfs @ 0.53 fps)

Summary for Pond R15: Rain Garden 15

Inflow Area = 2,800 sf, 83.71% Impervious, Inflow Depth = 3.57" for 10 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 833 cf
 Outflow = 0.05 cfs @ 8.02 hrs, Volume= 833 cf, Atten= 9%, Lag= 8.7 min
 Primary = 0.02 cfs @ 8.02 hrs, Volume= 778 cf
 Secondary = 0.04 cfs @ 8.02 hrs, Volume= 55 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.43' @ 8.02 hrs Surf.Area= 274 sf Storage= 125 cf

Plug-Flow detention time= 81.6 min calculated for 833 cf (100% of inflow)

Center-of-Mass det. time= 81.6 min (741.1 - 659.6)

Volume	Invert	Avail.Storage	Storage Description
#1	95.60'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.60'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.40'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.02 hrs HW=96.43' TW=92.30' (Dynamic Tailwater)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.04 cfs @ 8.02 hrs HW=96.43' TW=92.30' (Dynamic Tailwater)
 ↑2=Orifice/Grate (Weir Controls 0.04 cfs @ 0.57 fps)

Summary for Pond R16: Rain Garden 16

Inflow Area = 5,595 sf, 83.54% Impervious, Inflow Depth = 3.71" for 10 yr event
 Inflow = 0.12 cfs @ 7.89 hrs, Volume= 1,731 cf
 Outflow = 0.12 cfs @ 7.92 hrs, Volume= 1,731 cf, Atten= 0%, Lag= 1.9 min
 Primary = 0.02 cfs @ 7.92 hrs, Volume= 1,223 cf
 Secondary = 0.10 cfs @ 7.92 hrs, Volume= 507 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.76' @ 7.92 hrs Surf.Area= 284 sf Storage= 134 cf

Plug-Flow detention time= 82.6 min calculated for 1,731 cf (100% of inflow)
 Center-of-Mass det. time= 82.6 min (751.0 - 668.4)

Volume	Invert	Avail.Storage	Storage Description
#1	95.90'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.90'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.70'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.92 hrs HW=96.76' TW=92.24' (Dynamic Tailwater)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.10 cfs @ 7.92 hrs HW=96.76' TW=92.24' (Dynamic Tailwater)
 ↑2=Orifice/Grate (Weir Controls 0.10 cfs @ 0.80 fps)

Summary for Pond R17: Rain Garden 17

Inflow Area = 4,276 sf, 83.75% Impervious, Inflow Depth = 3.66" for 10 yr event
 Inflow = 0.09 cfs @ 7.88 hrs, Volume= 1,303 cf
 Outflow = 0.09 cfs @ 7.91 hrs, Volume= 1,303 cf, Atten= 0%, Lag= 2.2 min
 Primary = 0.02 cfs @ 7.91 hrs, Volume= 1,059 cf
 Secondary = 0.07 cfs @ 7.91 hrs, Volume= 244 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

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Type IA 24-hr 10 yr Rainfall=4.48"

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Peak Elev= 97.40' @ 7.91 hrs Surf.Area= 280 sf Storage= 130 cf

Plug-Flow detention time= 87.0 min calculated for 1,303 cf (100% of inflow)
 Center-of-Mass det. time= 87.0 min (752.9 - 665.9)

Volume	Invert	Avail.Storage	Storage Description
#1	96.55'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.55'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.35'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.91 hrs HW=97.40' TW=92.24' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.07 cfs @ 7.91 hrs HW=97.40' TW=92.24' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.07 cfs @ 0.71 fps)

Summary for Pond R18: Rain Garden 18

Inflow Area = 2,960 sf, 67.06% Impervious, Inflow Depth = 3.20" for 10 yr event
 Inflow = 0.05 cfs @ 7.90 hrs, Volume= 789 cf
 Outflow = 0.03 cfs @ 8.19 hrs, Volume= 789 cf, Atten= 39%, Lag= 17.4 min
 Primary = 0.02 cfs @ 8.19 hrs, Volume= 764 cf
 Secondary = 0.02 cfs @ 8.19 hrs, Volume= 25 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.77' @ 8.19 hrs Surf.Area= 270 sf Storage= 122 cf

Plug-Flow detention time= 83.2 min calculated for 789 cf (100% of inflow)
 Center-of-Mass det. time= 83.2 min (767.4 - 684.2)

Volume	Invert	Avail.Storage	Storage Description
#1	96.95'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.95'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.75'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.19 hrs HW=97.77' TW=92.39' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.02 cfs @ 8.19 hrs HW=97.77' TW=92.39' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.02 cfs @ 0.43 fps)

Summary for Pond R19: Rain Garden 19

Inflow Area = 2,931 sf, 89.32% Impervious, Inflow Depth = 3.80" for 10 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 929 cf
 Outflow = 0.06 cfs @ 7.90 hrs, Volume= 929 cf, Atten= 0%, Lag= 1.3 min
 Primary = 0.01 cfs @ 7.90 hrs, Volume= 675 cf
 Secondary = 0.05 cfs @ 7.90 hrs, Volume= 254 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.04' @ 7.90 hrs Surf.Area= 159 sf Storage= 71 cf

Plug-Flow detention time= 81.3 min calculated for 929 cf (100% of inflow)
 Center-of-Mass det. time= 81.3 min (739.9 - 658.6)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	100 cf	0.86'W x 22.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 7.90 hrs HW=97.04' TW=92.23' (Dynamic Tailwater)
 ↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.05 cfs @ 7.90 hrs HW=97.04' TW=92.23' (Dynamic Tailwater)
 ↳2=Orifice/Grate (Weir Controls 0.05 cfs @ 0.65 fps)

Summary for Pond R3: Rain Garden 3

Inflow Area = 3,923 sf, 82.00% Impervious, Inflow Depth = 3.59" for 10 yr event
 Inflow = 0.08 cfs @ 7.88 hrs, Volume= 1,175 cf
 Outflow = 0.08 cfs @ 7.92 hrs, Volume= 1,175 cf, Atten= 0%, Lag= 2.5 min
 Primary = 0.02 cfs @ 7.92 hrs, Volume= 1,001 cf
 Secondary = 0.06 cfs @ 7.92 hrs, Volume= 174 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.09' @ 7.92 hrs Surf.Area= 284 sf Storage= 132 cf

Plug-Flow detention time= 86.7 min calculated for 1,175 cf (100% of inflow)
 Center-of-Mass det. time= 86.7 min (753.7 - 667.0)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.92 hrs HW=96.09' TW=92.29' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.06 cfs @ 7.92 hrs HW=96.09' TW=92.29' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.06 cfs @ 0.68 fps)

Summary for Pond R4: Rain Garden 4

Inflow Area = 3,561 sf, 78.88% Impervious, Inflow Depth = 3.50" for 10 yr event
 Inflow = 0.07 cfs @ 7.89 hrs, Volume= 1,039 cf
 Outflow = 0.07 cfs @ 7.95 hrs, Volume= 1,039 cf, Atten= 1%, Lag= 3.9 min
 Primary = 0.02 cfs @ 7.95 hrs, Volume= 924 cf
 Secondary = 0.05 cfs @ 7.95 hrs, Volume= 115 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.09' @ 7.95 hrs Surf.Area= 283 sf Storage= 131 cf

Plug-Flow detention time= 85.9 min calculated for 1,039 cf (100% of inflow)

Center-of-Mass det. time= 85.9 min (756.0 - 670.1)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.95 hrs HW=96.09' TW=92.31' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.05 cfs @ 7.95 hrs HW=96.09' TW=92.31' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.05 cfs @ 0.64 fps)

Summary for Pond R5: Rain Garden 5

Inflow Area = 2,711 sf, 84.88% Impervious, Inflow Depth = 3.62" for 10 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 817 cf
 Outflow = 0.05 cfs @ 8.05 hrs, Volume= 817 cf, Atten= 17%, Lag= 10.2 min
 Primary = 0.02 cfs @ 8.05 hrs, Volume= 773 cf
 Secondary = 0.03 cfs @ 8.05 hrs, Volume= 45 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.98' @ 8.05 hrs Surf.Area= 279 sf Storage= 127 cf

Plug-Flow detention time= 81.0 min calculated for 817 cf (100% of inflow)

Center-of-Mass det. time= 81.0 min (740.4 - 659.4)

Volume	Invert	Avail.Storage	Storage Description
#1	96.15'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.15'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.95'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.05 hrs HW=96.98' TW=92.37' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.03 cfs @ 8.05 hrs HW=96.98' TW=92.37' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.03 cfs @ 0.54 fps)

Summary for Pond R6: Rain Garden 6

Inflow Area = 2,710 sf, 84.87% Impervious, Inflow Depth = 3.62" for 10 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 817 cf
 Outflow = 0.05 cfs @ 8.05 hrs, Volume= 817 cf, Atten= 17%, Lag= 10.3 min
 Primary = 0.02 cfs @ 8.05 hrs, Volume= 772 cf
 Secondary = 0.03 cfs @ 8.05 hrs, Volume= 45 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.33' @ 8.05 hrs Surf.Area= 279 sf Storage= 127 cf

Plug-Flow detention time= 81.0 min calculated for 817 cf (100% of inflow)
 Center-of-Mass det. time= 81.0 min (740.3 - 659.4)

Volume	Invert	Avail.Storage	Storage Description
#1	96.50'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.50'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.30'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.05 hrs HW=97.33' TW=92.37' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.03 cfs @ 8.05 hrs HW=97.33' TW=92.37' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.03 cfs @ 0.54 fps)

Summary for Pond R7: Rain Garden 7

Inflow Area = 2,971 sf, 84.35% Impervious, Inflow Depth = 3.60" for 10 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 890 cf
 Outflow = 0.06 cfs @ 8.01 hrs, Volume= 890 cf, Atten= 5%, Lag= 7.8 min
 Primary = 0.02 cfs @ 8.01 hrs, Volume= 821 cf
 Secondary = 0.04 cfs @ 8.01 hrs, Volume= 70 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

22-312 All Phases HCAD model_Phase 4 alternative

Type IA 24-hr 10 yr Rainfall=4.48"

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Peak Elev= 97.63' @ 8.01 hrs Surf.Area= 281 sf Storage= 129 cf

Plug-Flow detention time= 82.3 min calculated for 890 cf (100% of inflow)

Center-of-Mass det. time= 82.3 min (741.7 - 659.5)

Volume	Invert	Avail.Storage	Storage Description
#1	96.80'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.80'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.60'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.01 hrs HW=97.63' TW=92.34' (Dynamic Tailwater)↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)**Secondary OutFlow** Max=0.04 cfs @ 8.01 hrs HW=97.63' TW=92.34' (Dynamic Tailwater)↑**2=Orifice/Grate** (Weir Controls 0.04 cfs @ 0.60 fps)**Summary for Pond R8: Rain Garden 8**

Inflow Area = 3,563 sf, 74.74% Impervious, Inflow Depth = 3.41" for 10 yr event
 Inflow = 0.07 cfs @ 7.89 hrs, Volume= 1,013 cf
 Outflow = 0.07 cfs @ 7.98 hrs, Volume= 1,013 cf, Atten= 2%, Lag= 5.1 min
 Primary = 0.02 cfs @ 7.98 hrs, Volume= 912 cf
 Secondary = 0.05 cfs @ 7.98 hrs, Volume= 101 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 97.99' @ 7.98 hrs Surf.Area= 282 sf Storage= 130 cf

Plug-Flow detention time= 86.1 min calculated for 1,013 cf (100% of inflow)

Center-of-Mass det. time= 86.1 min (761.6 - 675.5)

Volume	Invert	Avail.Storage	Storage Description
#1	97.15'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	97.15'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.95'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.98 hrs HW=97.99' TW=92.33' (Dynamic Tailwater)↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)**Secondary OutFlow** Max=0.05 cfs @ 7.98 hrs HW=97.99' TW=92.33' (Dynamic Tailwater)↑**2=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.63 fps)

Summary for Pond R9: Rain Garden 9

Inflow Area = 3,030 sf, 88.12% Impervious, Inflow Depth = 3.79" for 10 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 958 cf
 Outflow = 0.06 cfs @ 7.90 hrs, Volume= 958 cf, Atten= 0%, Lag= 1.2 min
 Primary = 0.01 cfs @ 7.90 hrs, Volume= 653 cf
 Secondary = 0.06 cfs @ 7.90 hrs, Volume= 305 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.84' @ 7.90 hrs Surf.Area= 148 sf Storage= 66 cf

Plug-Flow detention time= 77.7 min calculated for 958 cf (100% of inflow)
 Center-of-Mass det. time= 77.7 min (739.8 - 662.1)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	92 cf	0.86"W x 20.00"L x 1.00"H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	98.00'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	98.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 7.90 hrs HW=98.84' TW=92.27' (Dynamic Tailwater)
 ↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.06 cfs @ 7.90 hrs HW=98.84' TW=92.27' (Dynamic Tailwater)
 ↳2=Orifice/Grate (Weir Controls 0.06 cfs @ 0.66 fps)

Summary for Pond RS5: Ph. 4 Front of E lots Rock Storage

Inflow Area = 10,522 sf, 65.00% Impervious, Inflow Depth = 3.64" for 10 yr event
 Inflow = 0.22 cfs @ 7.90 hrs, Volume= 3,196 cf
 Outflow = 0.22 cfs @ 7.96 hrs, Volume= 3,195 cf, Atten= 1%, Lag= 3.6 min
 Primary = 0.22 cfs @ 7.96 hrs, Volume= 3,195 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.03' @ 7.96 hrs Surf.Area= 885 sf Storage= 76 cf

Plug-Flow detention time= 12.3 min calculated for 3,194 cf (100% of inflow)
 Center-of-Mass det. time= 12.3 min (699.4 - 687.0)

Volume	Invert	Avail.Storage	Storage Description
#1	95.80'	675 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,390 cf Overall - 139 cf Embedded = 2,250 cf x 30.0% Voids
#2	95.80'	139 cf	12.0" Round Pipe Storage Inside #1 L= 177.0'

814 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.80	885	0	0
98.50	885	2,390	2,390

Device	Routing	Invert	Outlet Devices
#1	Primary	95.80'	12.0" Round Culvert L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.80' / 95.00' S= 0.0400 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.22 cfs @ 7.96 hrs HW=96.03' TW=94.81' (Dynamic Tailwater)
 ↳1=Culvert (Inlet Controls 0.22 cfs @ 1.62 fps)

Summary for Pond RS6: Phase 4 - Back of E lots Rock Storage

Inflow Area = 10,080 sf, 65.00% Impervious, Inflow Depth = 3.64" for 10 yr event
 Inflow = 0.21 cfs @ 7.90 hrs, Volume= 3,061 cf
 Outflow = 0.21 cfs @ 7.96 hrs, Volume= 3,061 cf, Atten= 1%, Lag= 4.1 min
 Primary = 0.21 cfs @ 7.96 hrs, Volume= 3,061 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.02' @ 7.96 hrs Surf.Area= 965 sf Storage= 81 cf

Plug-Flow detention time= 13.8 min calculated for 3,061 cf (100% of inflow)
 Center-of-Mass det. time= 13.7 min (700.7 - 687.0)

Volume	Invert	Avail.Storage	Storage Description
#1	95.80'	736 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,606 cf Overall - 152 cf Embedded = 2,454 cf x 30.0% Voids 12.0" Round Pipe Storage Inside #1 L= 193.0'
#2	95.80'	152 cf	
		888 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.80	965	0	0
98.50	965	2,606	2,606

Device	Routing	Invert	Outlet Devices
#1	Primary	95.80'	12.0" Round Culvert L= 45.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.80' / 94.80' S= 0.0222 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.21 cfs @ 7.96 hrs HW=96.02' TW=94.81' (Dynamic Tailwater)
 ↳1=Culvert (Inlet Controls 0.21 cfs @ 1.60 fps)

Summary for Pond RS7: N RG Rock

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

22-312 All Phases HCAD model_Phase 4 alternative

Type IA 24-hr 10 yr Rainfall=4.48"

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Inflow Area = 41,510 sf, 84.72% Impervious, Inflow Depth = 3.67" for 10 yr event
 Inflow = 0.81 cfs @ 8.01 hrs, Volume= 12,712 cf
 Outflow = 0.40 cfs @ 8.18 hrs, Volume= 12,681 cf, Atten= 51%, Lag= 10.3 min
 Primary = 0.40 cfs @ 8.18 hrs, Volume= 12,681 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.45' @ 8.47 hrs Surf.Area= 5,668 sf Storage= 1,560 cf

Plug-Flow detention time= 91.5 min calculated for 12,681 cf (100% of inflow)
 Center-of-Mass det. time= 89.3 min (834.6 - 745.3)

Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	1,591 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 6,232 cf Overall - 929 cf Embedded = 5,302 cf x 30.0% Voids
#2	91.80'	929 cf	12.0" Round Pipe Storage Inside #1 L= 1,183.0'
#3	91.80'	13 cf	2.00'D x 4.00'H Vertical Cone/Cylinder
		2,532 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	5,665	0	0
92.90	5,665	6,232	6,232

Device	Routing	Invert	Outlet Devices
#1	Primary	91.80'	12.0" Round Culvert L= 2.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.80' / 91.78' S= 0.0100 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	91.80'	6.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	95.30'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.39 cfs @ 8.18 hrs HW=92.42' TW=92.25' (Dynamic Tailwater)

- 1=Culvert (Passes 0.39 cfs of 0.91 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.39 cfs @ 2.00 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond RS8: S RG Rock

Inflow Area = 29,702 sf, 82.50% Impervious, Inflow Depth = 3.62" for 10 yr event
 Inflow = 0.53 cfs @ 8.01 hrs, Volume= 8,956 cf
 Outflow = 0.16 cfs @ 10.40 hrs, Volume= 8,938 cf, Atten= 69%, Lag= 143.4 min
 Primary = 0.16 cfs @ 10.40 hrs, Volume= 8,938 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.56' @ 9.44 hrs Surf.Area= 5,023 sf Storage= 1,614 cf

Plug-Flow detention time= 120.9 min calculated for 8,935 cf (100% of inflow)
 Center-of-Mass det. time= 119.3 min (867.6 - 748.3)

22-312 All Phases HCAD model_Phase 4 alternative

Type IA 24-hr 10 yr Rainfall=4.48"

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Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	1,406 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 5,522 cf Overall - 835 cf Embedded = 4,687 cf x 30.0% Voids
#2	91.80'	835 cf	12.0" Round Pipe Storage Inside #1 L= 1,063.0'
#3	91.90'	13 cf	2.00'D x 4.00'H Vertical Cone/Cylinder
		2,254 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	5,020	0	0
92.90	5,020	5,522	5,522

Device	Routing	Invert	Outlet Devices
#1	Primary	91.80'	12.0" Round Culvert L= 5.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.80' / 91.60' S= 0.0400 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	91.80'	3.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	95.10'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.16 cfs @ 10.40 hrs HW=92.54' TW=92.06' (Dynamic Tailwater)

- 1=Culvert (Passes 0.16 cfs of 1.59 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.16 cfs @ 3.33 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Subcatchment E3: Off-Site Run-on (from N to Ph.3&4)

Runoff = 0.29 cfs @ 7.94 hrs, Volume= 4,163 cf, Depth= 3.52"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
14,181	86	Woods/grass comb., Poor, HSG D
14,181		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	85	0.0350	0.23		Sheet Flow, Sheet Range n= 0.130 P2= 3.12"
0.1	25	0.0950	4.96		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
6.3	110	Total			

Summary for Subcatchment P10: Ph.2 Road N

Runoff = 0.09 cfs @ 7.89 hrs, Volume= 1,345 cf, Depth= 4.12"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 3,217	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
241	80	>75% Grass cover, Good, HSG D
3,923	90	Weighted Average
706		18.00% Pervious Area
3,217		82.00% Impervious Area

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

Summary for Subcatchment P11: Ph.2 Road N

Runoff = 0.08 cfs @ 7.89 hrs, Volume= 1,192 cf, Depth= 4.02"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

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Type IA 24-hr 25 yr Rainfall=5.06"

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	Area (sf)	CN	Description
*	2,809	98	IMPERVIOUS AREA
*	465	39	Rain garden - >75% Grass cover, Good, HSG A
	287	80	>75% Grass cover, Good, HSG D
	3,561	89	Weighted Average
	752		21.12% Pervious Area
	2,809		78.88% Impervious Area

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

Summary for Subcatchment P12: Ph.3 Road N

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 932 cf, Depth= 4.13"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

	Area (sf)	CN	Description
*	2,301	98	IMPERVIOUS AREA
*	410	39	Rain garden - >75% Grass cover, Good, HSG A
	2,711	89	Weighted Average
	410		15.12% Pervious Area
	2,301		84.88% Impervious Area

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

Summary for Subcatchment P13: Ph.3 Road N

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 932 cf, Depth= 4.13"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

	Area (sf)	CN	Description
*	2,300	98	IMPERVIOUS AREA
*	410	39	Rain garden - >75% Grass cover, Good, HSG A
	2,710	89	Weighted Average
	410		15.13% Pervious Area
	2,300		84.87% Impervious Area

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

Summary for Subcatchment P14: Ph.3 Road N

Runoff = 0.07 cfs @ 7.88 hrs, Volume= 1,015 cf, Depth= 4.10"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 2,506	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
2,971	89	Weighted Average
465		15.65% Pervious Area
2,506		84.35% Impervious Area

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

Summary for Subcatchment P15: Ph.3 Road N

Runoff = 0.08 cfs @ 7.89 hrs, Volume= 1,165 cf, Depth= 3.93"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 2,663	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
435	80	>75% Grass cover, Good, HSG D
3,563	88	Weighted Average
900		25.26% Pervious Area
2,663		74.74% Impervious Area

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

Summary for Subcatchment P16: Ph.4 Road N

Runoff = 0.07 cfs @ 7.88 hrs, Volume= 1,093 cf, Depth= 4.33"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

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Type IA 24-hr 25 yr Rainfall=5.06"

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	Area (sf)	CN	Description
*	2,670	98	IMPERVIOUS AREA
*	275	39	Rain garden - >75% Grass cover, Good, HSG A
	85	80	>75% Grass cover, Good, HSG D
	3,030	92	Weighted Average
	360		11.88% Pervious Area
	2,670		88.12% Impervious Area

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

Summary for Subcatchment P17: Ph.4 Road N

Runoff = 0.19 cfs @ 7.88 hrs, Volume= 2,778 cf, Depth= 4.45"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

	Area (sf)	CN	Description
*	6,885	98	IMPERVIOUS AREA
*	608	39	Rain garden - >75% Grass cover, Good, HSG A
	7,493	93	Weighted Average
	608		8.11% Pervious Area
	6,885		91.89% Impervious Area

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

Summary for Subcatchment P18: Ph.4 Road N

Runoff = 0.07 cfs @ 7.88 hrs, Volume= 1,085 cf, Depth= 4.38"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

	Area (sf)	CN	Description
*	2,665	98	IMPERVIOUS AREA
*	247	39	Rain garden - >75% Grass cover, Good, HSG A
	60	80	>75% Grass cover, Good, HSG D
	2,972	93	Weighted Average
	307		10.33% Pervious Area
	2,665		89.67% Impervious Area

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

Summary for Subcatchment P21: Ph.2 SW Road

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 913 cf, Depth= 4.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 2,251	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
2,707	88	Weighted Average
456		16.85% Pervious Area
2,251		83.15% Impervious Area

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

Summary for Subcatchment P22: Ph.2 SE Road

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 950 cf, Depth= 4.07"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 2,344	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
2,800	88	Weighted Average
456		16.29% Pervious Area
2,344		83.71% Impervious Area

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

Summary for Subcatchment P23: Ph.3 Road S

Runoff = 0.13 cfs @ 7.89 hrs, Volume= 1,981 cf, Depth= 4.25"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 4,674	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
465	80	>75% Grass cover, Good, HSG D
5,595	92	Weighted Average
921		16.46% Pervious Area
4,674		83.54% Impervious Area

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

Summary for Subcatchment P24: Ph.3 Road S

Runoff = 0.10 cfs @ 7.88 hrs, Volume= 1,491 cf, Depth= 4.18"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 3,581	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
239	80	>75% Grass cover, Good, HSG D
4,276	91	Weighted Average
695		16.25% Pervious Area
3,581		83.75% Impervious Area

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

Summary for Subcatchment P25: Ph.3 Road S

Runoff = 0.06 cfs @ 7.90 hrs, Volume= 912 cf, Depth= 3.70"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 1,985	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
519	80	>75% Grass cover, Good, HSG D
2,960	86	Weighted Average
975		32.94% Pervious Area
1,985		67.06% Impervious Area

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

Summary for Subcatchment P26: Ph.4 Road S

Runoff = 0.07 cfs @ 7.88 hrs, Volume= 1,058 cf, Depth= 4.33"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

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Type IA 24-hr 25 yr Rainfall=5.06"

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	Area (sf)	CN	Description
*	2,618	98	IMPERVIOUS AREA
*	313	39	Rain Garden - >75% Grass cover, Good, HSG A
	2,931	92	Weighted Average
	313		10.68% Pervious Area
	2,618		89.32% Impervious Area

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

Summary for Subcatchment P27: Ph4 Versant Dr. -drains south, ultimately to Spruce St ditch

Runoff = 0.07 cfs @ 7.88 hrs, Volume= 1,085 cf, Depth= 4.82"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

	Area (sf)	CN	Description
*	2,700	98	IMPERVIOUS AREA
	2,700		100.00% Impervious Area

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

Summary for Subcatchment P5: Front of E (Ph.4) lots

Runoff = 0.25 cfs @ 7.89 hrs, Volume= 3,681 cf, Depth= 4.20"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

	Area (sf)	CN	Description
	10,522	92	1/8 acre lots, 65% imp, HSG D
	3,683		35.00% Pervious Area
	6,839		65.00% Impervious Area

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

Summary for Subcatchment P6: Back of E (Ph.4) lots

Runoff = 0.24 cfs @ 7.89 hrs, Volume= 3,527 cf, Depth= 4.20"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
10,080	92	1/8 acre lots, 65% imp, HSG D
3,528		35.00% Pervious Area
6,552		65.00% Impervious Area

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

Summary for Subcatchment P7: W Road Section - drains to Spruce St

Runoff = 0.12 cfs @ 7.88 hrs, Volume= 1,701 cf, Depth= 4.82"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=5.06"

Area (sf)	CN	Description
* 4,232	98	IMPERVIOUS AREA
4,232		100.00% Impervious Area

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

Summary for Reach D1-P: Spruce St Ditch (S Flowing)

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

Inflow Area = 303,169 sf, 60.34% Impervious, Inflow Depth > 3.95" for 25 yr event
 Inflow = 3.06 cfs @ 8.23 hrs, Volume= 99,880 cf
 Outflow = 3.06 cfs @ 8.23 hrs, Volume= 99,880 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach LS1: Level Spreader discharging to Lot 46

Inflow Area = 20,602 sf, 65.00% Impervious, Inflow Depth = 4.20" for 25 yr event
 Inflow = 0.49 cfs @ 7.95 hrs, Volume= 7,207 cf
 Outflow = 0.49 cfs @ 7.95 hrs, Volume= 7,207 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 0.57 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.37 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 7.95 hrs
 Average Depth at Peak Storage= 0.01'
 Bank-Full Depth= 0.50' Flow Area= 44.3 sf, Capacity= 342.84 cfs

88.00' x 0.50' deep channel, n= 0.012 Wood, planed
 Side Slope Z-value= 1.0 '/' Top Width= 89.00'
 Length= 1.0' Slope= 0.0100 '/'
 Inlet Invert= 94.80', Outlet Invert= 94.79'



Summary for Pond MH1: Ph. 1 S MH

[57] Hint: Peaked at 92.34' (Flood elevation advised)

Inflow Area = 296,237 sf, 59.42% Impervious, Inflow Depth > 3.93" for 25 yr event
 Inflow = 2.95 cfs @ 8.23 hrs, Volume= 97,094 cf
 Outflow = 2.95 cfs @ 8.23 hrs, Volume= 97,094 cf, Atten= 0%, Lag= 0.0 min
 Primary = 2.95 cfs @ 8.23 hrs, Volume= 97,094 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.34' @ 8.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.50'	24.0" Round Culvert L= 30.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.50' / 91.32' S= 0.0060 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.95 cfs @ 8.23 hrs HW=92.34' TW=0.00' (Dynamic Tailwater)
 ←**1=Culvert** (Barrel Controls 2.95 cfs @ 3.50 fps)

Summary for Pond MH2: Ph1 N MH

[57] Hint: Peaked at 92.54' (Flood elevation advised)

Inflow Area = 167,908 sf, 56.65% Impervious, Inflow Depth > 3.85" for 25 yr event
 Inflow = 1.79 cfs @ 8.23 hrs, Volume= 53,863 cf
 Outflow = 1.79 cfs @ 8.23 hrs, Volume= 53,863 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.79 cfs @ 8.23 hrs, Volume= 53,863 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.54' @ 8.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.70'	18.0" Round Culvert L= 35.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.70' / 91.60' S= 0.0029 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Primary OutFlow Max=1.76 cfs @ 8.23 hrs HW=92.54' TW=92.34' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 1.76 cfs @ 2.48 fps)

Summary for Pond R10: Rain Garden 10

Inflow Area = 7,493 sf, 91.89% Impervious, Inflow Depth = 4.45" for 25 yr event
 Inflow = 0.19 cfs @ 7.88 hrs, Volume= 2,778 cf
 Outflow = 0.19 cfs @ 7.91 hrs, Volume= 2,778 cf, Atten= 0%, Lag= 2.3 min
 Primary = 0.02 cfs @ 7.91 hrs, Volume= 1,739 cf
 Secondary = 0.17 cfs @ 7.91 hrs, Volume= 1,039 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.08' @ 7.91 hrs Surf.Area= 390 sf Storage= 190 cf

Plug-Flow detention time= 75.9 min calculated for 2,777 cf (100% of inflow)
 Center-of-Mass det. time= 75.9 min (732.2 - 656.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	238 cf	0.86'W x 58.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.91 hrs HW=97.08' TW=92.38' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.17 cfs @ 7.91 hrs HW=97.08' TW=92.38' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.17 cfs @ 0.95 fps)

Summary for Pond R11: Rain Garden 11

Inflow Area = 2,972 sf, 89.67% Impervious, Inflow Depth = 4.38" for 25 yr event
 Inflow = 0.07 cfs @ 7.88 hrs, Volume= 1,085 cf
 Outflow = 0.07 cfs @ 7.89 hrs, Volume= 1,085 cf, Atten= 0%, Lag= 1.2 min
 Primary = 0.01 cfs @ 7.89 hrs, Volume= 680 cf
 Secondary = 0.06 cfs @ 7.89 hrs, Volume= 406 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.04' @ 7.89 hrs Surf.Area= 149 sf Storage= 66 cf

Plug-Flow detention time= 72.5 min calculated for 1,085 cf (100% of inflow)
 Center-of-Mass det. time= 72.5 min (731.6 - 659.1)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	92 cf	0.86'W x 20.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 7.89 hrs HW=97.04' TW=92.37' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.06 cfs @ 7.89 hrs HW=97.04' TW=92.37' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.06 cfs @ 0.69 fps)

Summary for Pond R14: Rain Garden 14

Inflow Area = 2,707 sf, 83.15% Impervious, Inflow Depth = 4.05" for 25 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 913 cf
 Outflow = 0.06 cfs @ 7.98 hrs, Volume= 913 cf, Atten= 3%, Lag= 6.5 min
 Primary = 0.02 cfs @ 7.98 hrs, Volume= 832 cf
 Secondary = 0.04 cfs @ 7.98 hrs, Volume= 81 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.08' @ 7.98 hrs Surf.Area= 276 sf Storage= 127 cf

Plug-Flow detention time= 82.9 min calculated for 913 cf (100% of inflow)

Center-of-Mass det. time= 82.9 min (741.6 - 658.6)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	177 cf	0.86'W x 42.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.98 hrs HW=96.08' TW=92.41' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.04 cfs @ 7.98 hrs HW=96.08' TW=92.41' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.04 cfs @ 0.61 fps)

Summary for Pond R15: Rain Garden 15

Inflow Area = 2,800 sf, 83.71% Impervious, Inflow Depth = 4.07" for 25 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 950 cf
 Outflow = 0.06 cfs @ 7.96 hrs, Volume= 950 cf, Atten= 2%, Lag= 5.0 min
 Primary = 0.02 cfs @ 7.96 hrs, Volume= 855 cf
 Secondary = 0.05 cfs @ 7.96 hrs, Volume= 95 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.44' @ 7.96 hrs Surf.Area= 276 sf Storage= 127 cf

Plug-Flow detention time= 83.5 min calculated for 950 cf (100% of inflow)

Center-of-Mass det. time= 83.5 min (742.0 - 658.5)

Volume	Invert	Avail.Storage	Storage Description
#1	95.60'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.60'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.40'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.96 hrs HW=96.44' TW=92.39' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.05 cfs @ 7.96 hrs HW=96.44' TW=92.39' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.62 fps)

Summary for Pond R16: Rain Garden 16

Inflow Area = 5,595 sf, 83.54% Impervious, Inflow Depth = 4.25" for 25 yr event
 Inflow = 0.13 cfs @ 7.89 hrs, Volume= 1,981 cf
 Outflow = 0.13 cfs @ 7.92 hrs, Volume= 1,981 cf, Atten= 0%, Lag= 1.8 min
 Primary = 0.02 cfs @ 7.92 hrs, Volume= 1,280 cf
 Secondary = 0.12 cfs @ 7.92 hrs, Volume= 701 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.77' @ 7.92 hrs Surf.Area= 286 sf Storage= 135 cf

Plug-Flow detention time= 77.1 min calculated for 1,981 cf (100% of inflow)
 Center-of-Mass det. time= 77.1 min (743.8 - 666.7)

Volume	Invert	Avail.Storage	Storage Description
#1	95.90'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.90'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.70'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.92 hrs HW=96.77' TW=92.35' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.12 cfs @ 7.92 hrs HW=96.77' TW=92.35' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.12 cfs @ 0.84 fps)

Summary for Pond R17: Rain Garden 17

Inflow Area = 4,276 sf, 83.75% Impervious, Inflow Depth = 4.18" for 25 yr event
 Inflow = 0.10 cfs @ 7.88 hrs, Volume= 1,491 cf
 Outflow = 0.10 cfs @ 7.92 hrs, Volume= 1,491 cf, Atten= 0%, Lag= 2.0 min
 Primary = 0.02 cfs @ 7.92 hrs, Volume= 1,147 cf
 Secondary = 0.08 cfs @ 7.92 hrs, Volume= 344 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

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Type IA 24-hr 25 yr Rainfall=5.06"

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Peak Elev= 97.40' @ 7.92 hrs Surf.Area= 282 sf Storage= 132 cf

Plug-Flow detention time= 86.5 min calculated for 1,491 cf (100% of inflow)
 Center-of-Mass det. time= 86.5 min (751.0 - 664.5)

Volume	Invert	Avail.Storage	Storage Description
#1	96.55'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.55'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.35'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.92 hrs HW=97.40' TW=92.35' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.08 cfs @ 7.92 hrs HW=97.40' TW=92.35' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.08 cfs @ 0.75 fps)

Summary for Pond R18: Rain Garden 18

Inflow Area = 2,960 sf, 67.06% Impervious, Inflow Depth = 3.70" for 25 yr event
 Inflow = 0.06 cfs @ 7.90 hrs, Volume= 912 cf
 Outflow = 0.05 cfs @ 8.02 hrs, Volume= 912 cf, Atten= 9%, Lag= 7.5 min
 Primary = 0.02 cfs @ 8.02 hrs, Volume= 848 cf
 Secondary = 0.04 cfs @ 8.02 hrs, Volume= 64 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.78' @ 8.02 hrs Surf.Area= 275 sf Storage= 126 cf

Plug-Flow detention time= 85.7 min calculated for 912 cf (100% of inflow)
 Center-of-Mass det. time= 85.7 min (768.9 - 683.2)

Volume	Invert	Avail.Storage	Storage Description
#1	96.95'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.95'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.75'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.02 hrs HW=97.78' TW=92.44' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.04 cfs @ 8.02 hrs HW=97.78' TW=92.44' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.04 cfs @ 0.58 fps)

Summary for Pond R19: Rain Garden 19

Inflow Area = 2,931 sf, 89.32% Impervious, Inflow Depth = 4.33" for 25 yr event
 Inflow = 0.07 cfs @ 7.88 hrs, Volume= 1,058 cf
 Outflow = 0.07 cfs @ 7.90 hrs, Volume= 1,058 cf, Atten= 0%, Lag= 1.3 min
 Primary = 0.01 cfs @ 7.90 hrs, Volume= 712 cf
 Secondary = 0.06 cfs @ 7.90 hrs, Volume= 346 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.04' @ 7.90 hrs Surf.Area= 160 sf Storage= 72 cf

Plug-Flow detention time= 77.3 min calculated for 1,057 cf (100% of inflow)
 Center-of-Mass det. time= 77.3 min (734.2 - 656.9)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	100 cf	0.86'W x 22.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 7.90 hrs HW=97.04' TW=92.34' (Dynamic Tailwater)
 ↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.06 cfs @ 7.90 hrs HW=97.04' TW=92.34' (Dynamic Tailwater)
 ↳2=Orifice/Grate (Weir Controls 0.06 cfs @ 0.68 fps)

Summary for Pond R3: Rain Garden 3

Inflow Area = 3,923 sf, 82.00% Impervious, Inflow Depth = 4.12" for 25 yr event
 Inflow = 0.09 cfs @ 7.89 hrs, Volume= 1,345 cf
 Outflow = 0.09 cfs @ 7.92 hrs, Volume= 1,345 cf, Atten= 0%, Lag= 2.2 min
 Primary = 0.02 cfs @ 7.92 hrs, Volume= 1,092 cf
 Secondary = 0.07 cfs @ 7.92 hrs, Volume= 253 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.10' @ 7.92 hrs Surf.Area= 286 sf Storage= 133 cf

Plug-Flow detention time= 87.4 min calculated for 1,345 cf (100% of inflow)
 Center-of-Mass det. time= 87.4 min (753.1 - 665.7)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.92 hrs HW=96.10' TW=92.39' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.07 cfs @ 7.92 hrs HW=96.10' TW=92.39' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.07 cfs @ 0.72 fps)

Summary for Pond R4: Rain Garden 4

Inflow Area = 3,561 sf, 78.88% Impervious, Inflow Depth = 4.02" for 25 yr event
 Inflow = 0.08 cfs @ 7.89 hrs, Volume= 1,192 cf
 Outflow = 0.08 cfs @ 7.93 hrs, Volume= 1,192 cf, Atten= 0%, Lag= 2.3 min
 Primary = 0.02 cfs @ 7.93 hrs, Volume= 1,015 cf
 Secondary = 0.06 cfs @ 7.93 hrs, Volume= 178 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.09' @ 7.93 hrs Surf.Area= 285 sf Storage= 132 cf

Plug-Flow detention time= 87.2 min calculated for 1,192 cf (100% of inflow)

Center-of-Mass det. time= 87.2 min (756.2 - 669.0)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.93 hrs HW=96.09' TW=92.40' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.06 cfs @ 7.93 hrs HW=96.09' TW=92.40' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.06 cfs @ 0.68 fps)

Summary for Pond R5: Rain Garden 5

Inflow Area = 2,711 sf, 84.88% Impervious, Inflow Depth = 4.13" for 25 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 932 cf
 Outflow = 0.06 cfs @ 7.98 hrs, Volume= 932 cf, Atten= 3%, Lag= 6.5 min
 Primary = 0.02 cfs @ 7.98 hrs, Volume= 849 cf
 Secondary = 0.05 cfs @ 7.98 hrs, Volume= 83 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.99' @ 7.98 hrs Surf.Area= 282 sf Storage= 130 cf

Plug-Flow detention time= 82.9 min calculated for 932 cf (100% of inflow)

Center-of-Mass det. time= 82.9 min (741.1 - 658.1)

Volume	Invert	Avail.Storage	Storage Description
#1	96.15'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.15'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.95'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.98 hrs HW=96.99' TW=92.44' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.05 cfs @ 7.98 hrs HW=96.99' TW=92.44' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.61 fps)

Summary for Pond R6: Rain Garden 6

Inflow Area = 2,710 sf, 84.87% Impervious, Inflow Depth = 4.13" for 25 yr event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 932 cf
 Outflow = 0.06 cfs @ 7.98 hrs, Volume= 932 cf, Atten= 3%, Lag= 6.5 min
 Primary = 0.02 cfs @ 7.98 hrs, Volume= 849 cf
 Secondary = 0.05 cfs @ 7.98 hrs, Volume= 83 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.34' @ 7.98 hrs Surf.Area= 282 sf Storage= 130 cf

Plug-Flow detention time= 82.9 min calculated for 932 cf (100% of inflow)
 Center-of-Mass det. time= 82.9 min (741.1 - 658.1)

Volume	Invert	Avail.Storage	Storage Description
#1	96.50'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.50'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.30'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.98 hrs HW=97.34' TW=92.44' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.05 cfs @ 7.98 hrs HW=97.34' TW=92.44' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.61 fps)

Summary for Pond R7: Rain Garden 7

Inflow Area = 2,971 sf, 84.35% Impervious, Inflow Depth = 4.10" for 25 yr event
 Inflow = 0.07 cfs @ 7.88 hrs, Volume= 1,015 cf
 Outflow = 0.07 cfs @ 7.94 hrs, Volume= 1,015 cf, Atten= 1%, Lag= 3.8 min
 Primary = 0.02 cfs @ 7.94 hrs, Volume= 901 cf
 Secondary = 0.05 cfs @ 7.94 hrs, Volume= 114 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

22-312 All Phases HCAD model_Phase 4 alternative

Type IA 24-hr 25 yr Rainfall=5.06"

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Peak Elev= 97.64' @ 7.94 hrs Surf.Area= 283 sf Storage= 131 cf

Plug-Flow detention time= 84.1 min calculated for 1,015 cf (100% of inflow)
 Center-of-Mass det. time= 84.1 min (742.4 - 658.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.80'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.80'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.60'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.94 hrs HW=97.64' TW=92.41' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.05 cfs @ 7.94 hrs HW=97.64' TW=92.41' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.64 fps)

Summary for Pond R8: Rain Garden 8

Inflow Area = 3,563 sf, 74.74% Impervious, Inflow Depth = 3.93" for 25 yr event
 Inflow = 0.08 cfs @ 7.89 hrs, Volume= 1,165 cf
 Outflow = 0.08 cfs @ 7.93 hrs, Volume= 1,165 cf, Atten= 0%, Lag= 2.5 min
 Primary = 0.02 cfs @ 7.93 hrs, Volume= 1,003 cf
 Secondary = 0.06 cfs @ 7.93 hrs, Volume= 162 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.99' @ 7.93 hrs Surf.Area= 284 sf Storage= 132 cf

Plug-Flow detention time= 87.6 min calculated for 1,165 cf (100% of inflow)
 Center-of-Mass det. time= 87.6 min (761.9 - 674.3)

Volume	Invert	Avail.Storage	Storage Description
#1	97.15'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	97.15'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.95'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 7.93 hrs HW=97.99' TW=92.40' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.06 cfs @ 7.93 hrs HW=97.99' TW=92.40' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Weir Controls 0.06 cfs @ 0.67 fps)

Summary for Pond R9: Rain Garden 9

Inflow Area = 3,030 sf, 88.12% Impervious, Inflow Depth = 4.33" for 25 yr event
 Inflow = 0.07 cfs @ 7.88 hrs, Volume= 1,093 cf
 Outflow = 0.07 cfs @ 7.89 hrs, Volume= 1,093 cf, Atten= 0%, Lag= 1.2 min
 Primary = 0.01 cfs @ 7.89 hrs, Volume= 681 cf
 Secondary = 0.06 cfs @ 7.89 hrs, Volume= 412 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.84' @ 7.89 hrs Surf.Area= 149 sf Storage= 66 cf

Plug-Flow detention time= 72.2 min calculated for 1,093 cf (100% of inflow)
 Center-of-Mass det. time= 72.2 min (732.7 - 660.4)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	92 cf	0.86"W x 20.00"L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	98.00'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	98.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 7.89 hrs HW=98.84' TW=92.37' (Dynamic Tailwater)
 ↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.06 cfs @ 7.89 hrs HW=98.84' TW=92.37' (Dynamic Tailwater)
 ↳2=Orifice/Grate (Weir Controls 0.06 cfs @ 0.69 fps)

Summary for Pond RS5: Ph. 4 Front of E lots Rock Storage

Inflow Area = 10,522 sf, 65.00% Impervious, Inflow Depth = 4.20" for 25 yr event
 Inflow = 0.25 cfs @ 7.89 hrs, Volume= 3,681 cf
 Outflow = 0.25 cfs @ 7.95 hrs, Volume= 3,681 cf, Atten= 1%, Lag= 3.4 min
 Primary = 0.25 cfs @ 7.95 hrs, Volume= 3,681 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.04' @ 7.95 hrs Surf.Area= 885 sf Storage= 83 cf

Plug-Flow detention time= 11.6 min calculated for 3,680 cf (100% of inflow)
 Center-of-Mass det. time= 11.6 min (695.3 - 683.7)

Volume	Invert	Avail.Storage	Storage Description
#1	95.80'	675 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,390 cf Overall - 139 cf Embedded = 2,250 cf x 30.0% Voids
#2	95.80'	139 cf	12.0" Round Pipe Storage Inside #1 L= 177.0'

814 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.80	885	0	0
98.50	885	2,390	2,390

Device	Routing	Invert	Outlet Devices
#1	Primary	95.80'	12.0" Round Culvert L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.80' / 95.00' S= 0.0400 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.25 cfs @ 7.95 hrs HW=96.04' TW=94.81' (Dynamic Tailwater)
 ↳1=Culvert (Inlet Controls 0.25 cfs @ 1.68 fps)

Summary for Pond RS6: Phase 4 - Back of E lots Rock Storage

Inflow Area =	10,080 sf, 65.00% Impervious, Inflow Depth = 4.20" for 25 yr event
Inflow =	0.24 cfs @ 7.89 hrs, Volume= 3,527 cf
Outflow =	0.24 cfs @ 7.96 hrs, Volume= 3,526 cf, Atten= 1%, Lag= 3.8 min
Primary =	0.24 cfs @ 7.96 hrs, Volume= 3,526 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.04' @ 7.96 hrs Surf.Area= 965 sf Storage= 88 cf

Plug-Flow detention time= 12.9 min calculated for 3,525 cf (100% of inflow)
 Center-of-Mass det. time= 12.9 min (696.6 - 683.7)

Volume	Invert	Avail.Storage	Storage Description
#1	95.80'	736 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,606 cf Overall - 152 cf Embedded = 2,454 cf x 30.0% Voids 12.0" Round Pipe Storage Inside #1 L= 193.0'
#2	95.80'	152 cf	
		888 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.80	965	0	0
98.50	965	2,606	2,606

Device	Routing	Invert	Outlet Devices
#1	Primary	95.80'	12.0" Round Culvert L= 45.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.80' / 94.80' S= 0.0222 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.24 cfs @ 7.96 hrs HW=96.04' TW=94.81' (Dynamic Tailwater)
 ↳1=Culvert (Inlet Controls 0.24 cfs @ 1.66 fps)

Summary for Pond RS7: N RG Rock

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=5)

22-312 All Phases HCAD model_Phase 4 alternative

Type IA 24-hr 25 yr Rainfall=5.06"

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Inflow Area = 41,510 sf, 84.72% Impervious, Inflow Depth = 4.20" for 25 yr event
 Inflow = 0.96 cfs @ 7.94 hrs, Volume= 14,522 cf
 Outflow = 0.42 cfs @ 8.98 hrs, Volume= 14,489 cf, Atten= 57%, Lag= 62.1 min
 Primary = 0.42 cfs @ 8.98 hrs, Volume= 14,489 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.67' @ 8.49 hrs Surf.Area= 5,668 sf Storage= 2,082 cf

Plug-Flow detention time= 91.0 min calculated for 14,489 cf (100% of inflow)
 Center-of-Mass det. time= 88.9 min (830.9 - 742.0)

Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	1,591 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 6,232 cf Overall - 929 cf Embedded = 5,302 cf x 30.0% Voids
#2	91.80'	929 cf	12.0" Round Pipe Storage Inside #1 L= 1,183.0'
#3	91.80'	13 cf	2.00'D x 4.00'H Vertical Cone/Cylinder
		2,532 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	5,665	0	0
92.90	5,665	6,232	6,232

Device	Routing	Invert	Outlet Devices
#1	Primary	91.80'	12.0" Round Culvert L= 2.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.80' / 91.78' S= 0.0100 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	91.80'	6.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	95.30'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.42 cfs @ 8.98 hrs HW=92.63' TW=92.43' (Dynamic Tailwater)

- 1=Culvert (Passes 0.42 cfs of 1.31 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.42 cfs @ 2.14 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond RS8: S RG Rock

Inflow Area = 29,702 sf, 82.50% Impervious, Inflow Depth = 4.14" for 25 yr event
 Inflow = 0.67 cfs @ 7.99 hrs, Volume= 10,245 cf
 Outflow = 0.19 cfs @ 10.20 hrs, Volume= 10,226 cf, Atten= 72%, Lag= 132.6 min
 Primary = 0.19 cfs @ 10.20 hrs, Volume= 10,226 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.77' @ 9.35 hrs Surf.Area= 5,023 sf Storage= 2,050 cf

Plug-Flow detention time= 133.2 min calculated for 10,226 cf (100% of inflow)
 Center-of-Mass det. time= 131.6 min (876.7 - 745.1)

22-312 All Phases HCAD model_Phase 4 alternative

Type IA 24-hr 25 yr Rainfall=5.06"

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Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	1,406 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 5,522 cf Overall - 835 cf Embedded = 4,687 cf x 30.0% Voids
#2	91.80'	835 cf	12.0" Round Pipe Storage Inside #1 L= 1,063.0'
#3	91.90'	13 cf	2.00'D x 4.00'H Vertical Cone/Cylinder
		2,254 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	5,020	0	0
92.90	5,020	5,522	5,522

Device	Routing	Invert	Outlet Devices
#1	Primary	91.80'	12.0" Round Culvert L= 5.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.80' / 91.60' S= 0.0400 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	91.80'	3.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	95.10'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.19 cfs @ 10.20 hrs HW=92.74' TW=92.11' (Dynamic Tailwater)

- 1=Culvert (Passes 0.19 cfs of 2.24 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.19 cfs @ 3.82 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Subcatchment E3: Off-Site Run-on (from N to Ph.3&4)

Runoff = 0.04 cfs @ 8.00 hrs, Volume= 760 cf, Depth= 0.64"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
14,181	86	Woods/grass comb., Poor, HSG D
14,181		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	85	0.0350	0.23		Sheet Flow, Sheet Range n= 0.130 P2= 3.12"
0.1	25	0.0950	4.96		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
6.3	110	Total			

Summary for Subcatchment P10: Ph.2 Road N

Runoff = 0.03 cfs @ 7.89 hrs, Volume= 401 cf, Depth= 1.23"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 3,217	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
241	80	>75% Grass cover, Good, HSG D
3,923	90	Weighted Average
706		18.00% Pervious Area
3,217		82.00% Impervious Area

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

Summary for Subcatchment P11: Ph.2 Road N

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 351 cf, Depth= 1.18"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr WQ-DEQ Rainfall=1.72"

	Area (sf)	CN	Description
*	2,809	98	IMPERVIOUS AREA
*	465	39	Rain garden - >75% Grass cover, Good, HSG A
	287	80	>75% Grass cover, Good, HSG D
	3,561	89	Weighted Average
	752		21.12% Pervious Area
	2,809		78.88% Impervious Area

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

Summary for Subcatchment P12: Ph.3 Road N

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 287 cf, Depth= 1.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

	Area (sf)	CN	Description
*	2,301	98	IMPERVIOUS AREA
*	410	39	Rain garden - >75% Grass cover, Good, HSG A
	2,711	89	Weighted Average
	410		15.12% Pervious Area
	2,301		84.88% Impervious Area

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

Summary for Subcatchment P13: Ph.3 Road N

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 287 cf, Depth= 1.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

	Area (sf)	CN	Description
*	2,300	98	IMPERVIOUS AREA
*	410	39	Rain garden - >75% Grass cover, Good, HSG A
	2,710	89	Weighted Average
	410		15.13% Pervious Area
	2,300		84.87% Impervious Area

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

Summary for Subcatchment P14: Ph.3 Road N

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 313 cf, Depth= 1.26"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 2,506	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
2,971	89	Weighted Average
465		15.65% Pervious Area
2,506		84.35% Impervious Area

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

Summary for Subcatchment P15: Ph.3 Road N

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 333 cf, Depth= 1.12"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 2,663	98	IMPERVIOUS AREA
* 465	39	Rain garden - >75% Grass cover, Good, HSG A
435	80	>75% Grass cover, Good, HSG D
3,563	88	Weighted Average
900		25.26% Pervious Area
2,663		74.74% Impervious Area

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

Summary for Subcatchment P16: Ph.4 Road N

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 333 cf, Depth= 1.32"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr WQ-DEQ Rainfall=1.72"

22-312 All Phases HCAD model_Phase 4 alternative Type IA 24-hr WQ-DEQ Rainfall=1.72"

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Area (sf)	CN	Description
* 2,670	98	IMPERVIOUS AREA
* 275	39	Rain garden - >75% Grass cover, Good, HSG A
85	80	>75% Grass cover, Good, HSG D
3,030	92	Weighted Average
360		11.88% Pervious Area
2,670		88.12% Impervious Area

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

Summary for Subcatchment P17: Ph.4 Road N

Runoff = 0.06 cfs @ 7.89 hrs, Volume= 859 cf, Depth= 1.38"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 6,885	98	IMPERVIOUS AREA
* 608	39	Rain garden - >75% Grass cover, Good, HSG A
7,493	93	Weighted Average
608		8.11% Pervious Area
6,885		91.89% Impervious Area

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

Summary for Subcatchment P18: Ph.4 Road N

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 333 cf, Depth= 1.34"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 2,665	98	IMPERVIOUS AREA
* 247	39	Rain garden - >75% Grass cover, Good, HSG A
60	80	>75% Grass cover, Good, HSG D
2,972	93	Weighted Average
307		10.33% Pervious Area
2,665		89.67% Impervious Area

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

Summary for Subcatchment P21: Ph.2 SW Road

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 281 cf, Depth= 1.25"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 2,251	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
2,707	88	Weighted Average
456		16.85% Pervious Area
2,251		83.15% Impervious Area

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

Summary for Subcatchment P22: Ph.2 SE Road

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 292 cf, Depth= 1.25"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 2,344	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
2,800	88	Weighted Average
456		16.29% Pervious Area
2,344		83.71% Impervious Area

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

Summary for Subcatchment P23: Ph.3 Road S

Runoff = 0.04 cfs @ 7.89 hrs, Volume= 585 cf, Depth= 1.25"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 4,674	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
465	80	>75% Grass cover, Good, HSG D
5,595	92	Weighted Average
921		16.46% Pervious Area
4,674		83.54% Impervious Area

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

Summary for Subcatchment P24: Ph.3 Road S

Runoff = 0.03 cfs @ 7.89 hrs, Volume= 447 cf, Depth= 1.25"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 3,581	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
239	80	>75% Grass cover, Good, HSG D
4,276	91	Weighted Average
695		16.25% Pervious Area
3,581		83.75% Impervious Area

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

Summary for Subcatchment P25: Ph.3 Road S

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 250 cf, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 1,985	98	IMPERVIOUS AREA
* 456	39	Rain Garden - >75% Grass cover, Good, HSG A
519	80	>75% Grass cover, Good, HSG D
2,960	86	Weighted Average
975		32.94% Pervious Area
1,985		67.06% Impervious Area

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

Summary for Subcatchment P26: Ph.4 Road S

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 327 cf, Depth= 1.34"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

	Area (sf)	CN	Description
*	2,618	98	IMPERVIOUS AREA
*	313	39	Rain Garden - >75% Grass cover, Good, HSG A
	2,931	92	Weighted Average
	313		10.68% Pervious Area
	2,618		89.32% Impervious Area

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

Summary for Subcatchment P27: Ph4 Versant Dr. -drains south, ultimately to Spruce St ditch

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 337 cf, Depth= 1.50"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

	Area (sf)	CN	Description
*	2,700	98	IMPERVIOUS AREA
	2,700		100.00% Impervious Area

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

Summary for Subcatchment P5: Front of E (Ph.4) lots

Runoff = 0.07 cfs @ 7.91 hrs, Volume= 987 cf, Depth= 1.13"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

	Area (sf)	CN	Description
	10,522	92	1/8 acre lots, 65% imp, HSG D
	3,683		35.00% Pervious Area
	6,839		65.00% Impervious Area

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

Summary for Subcatchment P6: Back of E (Ph.4) lots

Runoff = 0.06 cfs @ 7.91 hrs, Volume= 945 cf, Depth= 1.13"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
10,080	92	1/8 acre lots, 65% imp, HSG D
3,528		35.00% Pervious Area
6,552		65.00% Impervious Area

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

Summary for Subcatchment P7: W Road Section - drains to Spruce St

Runoff = 0.04 cfs @ 7.89 hrs, Volume= 528 cf, Depth= 1.50"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type IA 24-hr WQ-DEQ Rainfall=1.72"

Area (sf)	CN	Description
* 4,232	98	IMPERVIOUS AREA
4,232		100.00% Impervious Area

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

Summary for Reach D1-P: Spruce St Ditch (S Flowing)

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

Inflow Area = 303,169 sf, 60.34% Impervious, Inflow Depth > 1.03" for WQ-DEQ event
 Inflow = 0.60 cfs @ 9.14 hrs, Volume= 26,110 cf
 Outflow = 0.60 cfs @ 9.14 hrs, Volume= 26,110 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach LS1: Level Spreader discharging to Lot 46

Inflow Area = 20,602 sf, 65.00% Impervious, Inflow Depth > 1.12" for WQ-DEQ event
 Inflow = 0.12 cfs @ 8.01 hrs, Volume= 1,931 cf
 Outflow = 0.12 cfs @ 8.01 hrs, Volume= 1,931 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.36 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.36 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 8.01 hrs

Average Depth at Peak Storage= 0.00'

Bank-Full Depth= 0.50' Flow Area= 44.3 sf, Capacity= 342.84 cfs

88.00' x 0.50' deep channel, n= 0.012 Wood, planed
 Side Slope Z-value= 1.0 '/ Top Width= 89.00'
 Length= 1.0' Slope= 0.0100 '/
 Inlet Invert= 94.80', Outlet Invert= 94.79'



Summary for Pond MH1: Ph. 1 S MH

[57] Hint: Peaked at 91.84' (Flood elevation advised)

Inflow Area = 296,237 sf, 59.42% Impervious, Inflow Depth > 1.02" for WQ-DEQ event
 Inflow = 0.58 cfs @ 9.27 hrs, Volume= 25,245 cf
 Outflow = 0.58 cfs @ 9.27 hrs, Volume= 25,245 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.58 cfs @ 9.27 hrs, Volume= 25,245 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 91.84' @ 9.27 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.50'	24.0" Round Culvert L= 30.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.50' / 91.32' S= 0.0060 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.58 cfs @ 9.27 hrs HW=91.84' TW=0.00' (Dynamic Tailwater)
 ←**1=Culvert** (Barrel Controls 0.58 cfs @ 2.51 fps)

Summary for Pond MH2: Ph1 N MH

[57] Hint: Peaked at 92.00' (Flood elevation advised)

Inflow Area = 167,908 sf, 56.65% Impervious, Inflow Depth > 0.98" for WQ-DEQ event
 Inflow = 0.31 cfs @ 9.45 hrs, Volume= 13,771 cf
 Outflow = 0.31 cfs @ 9.45 hrs, Volume= 13,771 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.31 cfs @ 9.45 hrs, Volume= 13,771 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.00' @ 9.40 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	91.70'	18.0" Round Culvert L= 35.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.70' / 91.60' S= 0.0029 '/ Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Primary OutFlow Max=0.31 cfs @ 9.45 hrs HW=92.00' TW=91.84' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 0.31 cfs @ 1.84 fps)

Summary for Pond R10: Rain Garden 10

Inflow Area = 7,493 sf, 91.89% Impervious, Inflow Depth = 1.38" for WQ-DEQ event
 Inflow = 0.06 cfs @ 7.89 hrs, Volume= 859 cf
 Outflow = 0.02 cfs @ 8.88 hrs, Volume= 859 cf, Atten= 66%, Lag= 59.9 min
 Primary = 0.02 cfs @ 8.88 hrs, Volume= 859 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.99' @ 8.88 hrs Surf.Area= 352 sf Storage= 156 cf

Plug-Flow detention time= 78.6 min calculated for 859 cf (100% of inflow)
 Center-of-Mass det. time= 78.7 min (765.0 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	238 cf	0.86'W x 58.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 8.88 hrs HW=96.99' TW=92.03' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.20' TW=91.80' (Dynamic Tailwater)

↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond R11: Rain Garden 11

Inflow Area = 2,972 sf, 89.67% Impervious, Inflow Depth = 1.34" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 333 cf
 Outflow = 0.01 cfs @ 8.83 hrs, Volume= 333 cf, Atten= 65%, Lag= 56.9 min
 Primary = 0.01 cfs @ 8.83 hrs, Volume= 333 cf
 Secondary = 0.00 cfs @ 8.83 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.00' @ 8.83 hrs Surf.Area= 140 sf Storage= 60 cf

Plug-Flow detention time= 78.1 min calculated for 332 cf (100% of inflow)
 Center-of-Mass det. time= 78.1 min (764.5 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	92 cf	0.86'W x 20.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.83 hrs HW=97.00' TW=92.03' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 8.83 hrs HW=97.00' TW=92.03' (Dynamic Tailwater)

↑2=Orifice/Grate (Weir Controls 0.00 cfs @ 0.02 fps)

Summary for Pond R14: Rain Garden 14

Inflow Area = 2,707 sf, 83.15% Impervious, Inflow Depth = 1.25" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 281 cf
 Outflow = 0.01 cfs @ 8.41 hrs, Volume= 281 cf, Atten= 58%, Lag= 31.2 min
 Primary = 0.01 cfs @ 8.41 hrs, Volume= 281 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 95.65' @ 8.41 hrs Surf.Area= 146 sf Storage= 36 cf

Plug-Flow detention time= 31.7 min calculated for 281 cf (100% of inflow)

Center-of-Mass det. time= 31.7 min (718.1 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	177 cf	0.86'W x 42.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.41 hrs HW=95.65' TW=91.93' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=95.25' TW=91.80' (Dynamic Tailwater)

↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond R15: Rain Garden 15

Inflow Area = 2,800 sf, 83.71% Impervious, Inflow Depth = 1.25" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 292 cf
 Outflow = 0.01 cfs @ 8.41 hrs, Volume= 292 cf, Atten= 58%, Lag= 31.7 min
 Primary = 0.01 cfs @ 8.41 hrs, Volume= 292 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.02' @ 8.41 hrs Surf.Area= 150 sf Storage= 39 cf

Plug-Flow detention time= 33.5 min calculated for 292 cf (100% of inflow)

Center-of-Mass det. time= 33.5 min (719.8 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	95.60'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.60'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.40'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.41 hrs HW=96.02' TW=91.93' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=95.60' TW=91.80' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R16: Rain Garden 16

Inflow Area = 5,595 sf, 83.54% Impervious, Inflow Depth = 1.25" for WQ-DEQ event
 Inflow = 0.04 cfs @ 7.89 hrs, Volume= 585 cf
 Outflow = 0.01 cfs @ 8.83 hrs, Volume= 585 cf, Atten= 65%, Lag= 56.7 min
 Primary = 0.01 cfs @ 8.83 hrs, Volume= 585 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.64' @ 8.83 hrs Surf.Area= 247 sf Storage= 102 cf

Plug-Flow detention time= 72.4 min calculated for 585 cf (100% of inflow)
 Center-of-Mass det. time= 72.3 min (760.2 - 687.9)

Volume	Invert	Avail.Storage	Storage Description
#1	95.90'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.90'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.70'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.83 hrs HW=96.64' TW=91.94' (Dynamic Tailwater)
 ↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=95.90' TW=91.80' (Dynamic Tailwater)
 ↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R17: Rain Garden 17

Inflow Area = 4,276 sf, 83.75% Impervious, Inflow Depth = 1.25" for WQ-DEQ event
 Inflow = 0.03 cfs @ 7.89 hrs, Volume= 447 cf
 Outflow = 0.01 cfs @ 8.70 hrs, Volume= 447 cf, Atten= 63%, Lag= 48.7 min
 Primary = 0.01 cfs @ 8.70 hrs, Volume= 447 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

22-312 All Phases HCAD model_Phase 4 alternative Type IA 24-hr WQ-DEQ Rainfall=1.72"

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Peak Elev= 97.15' @ 8.70 hrs Surf.Area= 203 sf Storage= 71 cf

Plug-Flow detention time= 55.4 min calculated for 447 cf (100% of inflow)

Center-of-Mass det. time= 55.4 min (741.8 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.55'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.55'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.35'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.70 hrs HW=97.15' TW=91.94' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.55' TW=91.80' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R18: Rain Garden 18

Inflow Area = 2,960 sf, 67.06% Impervious, Inflow Depth = 1.01" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 250 cf
 Outflow = 0.01 cfs @ 8.38 hrs, Volume= 250 cf, Atten= 56%, Lag= 29.6 min
 Primary = 0.01 cfs @ 8.38 hrs, Volume= 250 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 97.31' @ 8.38 hrs Surf.Area= 133 sf Storage= 30 cf

Plug-Flow detention time= 26.6 min calculated for 250 cf (100% of inflow)

Center-of-Mass det. time= 26.6 min (717.8 - 691.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.95'	177 cf	0.86'W x 42.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.95'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.75'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.38 hrs HW=97.31' TW=91.93' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.95' TW=91.80' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R19: Rain Garden 19

Inflow Area = 2,931 sf, 89.32% Impervious, Inflow Depth = 1.34" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 327 cf
 Outflow = 0.01 cfs @ 8.80 hrs, Volume= 327 cf, Atten= 65%, Lag= 54.7 min
 Primary = 0.01 cfs @ 8.80 hrs, Volume= 327 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.94' @ 8.80 hrs Surf.Area= 141 sf Storage= 57 cf

Plug-Flow detention time= 71.8 min calculated for 327 cf (100% of inflow)
 Center-of-Mass det. time= 71.8 min (758.2 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.20'	100 cf	0.86'W x 22.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.20'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.00'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.80 hrs HW=96.94' TW=91.94' (Dynamic Tailwater)
 ↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.20' TW=91.80' (Dynamic Tailwater)
 ↳2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond R3: Rain Garden 3

Inflow Area = 3,923 sf, 82.00% Impervious, Inflow Depth = 1.23" for WQ-DEQ event
 Inflow = 0.03 cfs @ 7.89 hrs, Volume= 401 cf
 Outflow = 0.01 cfs @ 8.49 hrs, Volume= 401 cf, Atten= 61%, Lag= 36.0 min
 Primary = 0.01 cfs @ 8.49 hrs, Volume= 401 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.79' @ 8.49 hrs Surf.Area= 189 sf Storage= 60 cf

Plug-Flow detention time= 48.1 min calculated for 401 cf (100% of inflow)
 Center-of-Mass det. time= 48.1 min (734.4 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.49 hrs HW=95.79' TW=92.02' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=95.25' TW=91.80' (Dynamic Tailwater)

↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond R4: Rain Garden 4

Inflow Area = 3,561 sf, 78.88% Impervious, Inflow Depth = 1.18" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 351 cf
 Outflow = 0.01 cfs @ 8.45 hrs, Volume= 351 cf, Atten= 60%, Lag= 33.9 min
 Primary = 0.01 cfs @ 8.45 hrs, Volume= 351 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 95.73' @ 8.45 hrs Surf.Area= 172 sf Storage= 50 cf

Plug-Flow detention time= 41.0 min calculated for 350 cf (100% of inflow)

Center-of-Mass det. time= 41.0 min (727.4 - 686.5)

Volume	Invert	Avail.Storage	Storage Description
#1	95.25'	181 cf	0.86'W x 43.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	95.25'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.05'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.45 hrs HW=95.73' TW=92.01' (Dynamic Tailwater)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=95.25' TW=91.80' (Dynamic Tailwater)

↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond R5: Rain Garden 5

Inflow Area = 2,711 sf, 84.88% Impervious, Inflow Depth = 1.27" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 287 cf
 Outflow = 0.01 cfs @ 8.41 hrs, Volume= 287 cf, Atten= 58%, Lag= 31.2 min
 Primary = 0.01 cfs @ 8.41 hrs, Volume= 287 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 96.55' @ 8.41 hrs Surf.Area= 149 sf Storage= 37 cf

Plug-Flow detention time= 31.7 min calculated for 287 cf (100% of inflow)

Center-of-Mass det. time= 31.7 min (718.0 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.15'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.15'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	96.95'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.41 hrs HW=96.55' TW=92.01' (Dynamic Tailwater)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.15' TW=91.80' (Dynamic Tailwater)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond R6: Rain Garden 6

Inflow Area = 2,710 sf, 84.87% Impervious, Inflow Depth = 1.27" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 287 cf
 Outflow = 0.01 cfs @ 8.41 hrs, Volume= 287 cf, Atten= 58%, Lag= 31.2 min
 Primary = 0.01 cfs @ 8.41 hrs, Volume= 287 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.90' @ 8.41 hrs Surf.Area= 149 sf Storage= 37 cf

Plug-Flow detention time= 31.7 min calculated for 287 cf (100% of inflow)
 Center-of-Mass det. time= 31.7 min (718.0 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.50'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.50'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.30'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.41 hrs HW=96.90' TW=92.01' (Dynamic Tailwater)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.50' TW=91.80' (Dynamic Tailwater)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond R7: Rain Garden 7

Inflow Area = 2,971 sf, 84.35% Impervious, Inflow Depth = 1.26" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 313 cf
 Outflow = 0.01 cfs @ 8.42 hrs, Volume= 313 cf, Atten= 59%, Lag= 32.3 min
 Primary = 0.01 cfs @ 8.42 hrs, Volume= 313 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 97.24' @ 8.42 hrs Surf.Area= 158 sf Storage= 42 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 35.5 min (721.8 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.80'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	96.80'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.60'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.42 hrs HW=97.24' TW=92.01' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.80' TW=91.80' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R8: Rain Garden 8

Inflow Area = 3,563 sf, 74.74% Impervious, Inflow Depth = 1.12" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 333 cf
 Outflow = 0.01 cfs @ 8.44 hrs, Volume= 333 cf, Atten= 59%, Lag= 33.2 min
 Primary = 0.01 cfs @ 8.44 hrs, Volume= 333 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 97.61' @ 8.44 hrs Surf.Area= 165 sf Storage= 46 cf

Plug-Flow detention time= 38.3 min calculated for 333 cf (100% of inflow)
Center-of-Mass det. time= 38.3 min (726.6 - 688.3)

Volume	Invert	Avail.Storage	Storage Description
#1	97.15'	181 cf	0.86'W x 43.00'L x 1.00'H Prismaoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	97.15'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	97.95'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.44 hrs HW=97.61' TW=92.01' (Dynamic Tailwater)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=97.15' TW=91.80' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R9: Rain Garden 9

Inflow Area = 3,030 sf, 88.12% Impervious, Inflow Depth = 1.32" for WQ-DEQ event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 333 cf
 Outflow = 0.01 cfs @ 8.80 hrs, Volume= 333 cf, Atten= 65%, Lag= 55.0 min
 Primary = 0.01 cfs @ 8.80 hrs, Volume= 333 cf
 Secondary = 0.00 cfs @ 8.80 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.80' @ 8.80 hrs Surf.Area= 141 sf Storage= 60 cf

Plug-Flow detention time= 78.2 min calculated for 333 cf (100% of inflow)
 Center-of-Mass det. time= 78.2 min (764.5 - 686.3)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	92 cf	0.86'W x 20.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	98.00'	2.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Secondary	98.80'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.80 hrs HW=98.80' TW=92.03' (Dynamic Tailwater)
 ←1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 8.80 hrs HW=98.80' TW=92.03' (Dynamic Tailwater)
 ←2=Orifice/Grate (Weir Controls 0.00 cfs @ 0.09 fps)

Summary for Pond RS5: Ph. 4 Front of E lots Rock Storage

Inflow Area = 10,522 sf, 65.00% Impervious, Inflow Depth = 1.13" for WQ-DEQ event
 Inflow = 0.07 cfs @ 7.91 hrs, Volume= 987 cf
 Outflow = 0.06 cfs @ 8.00 hrs, Volume= 986 cf, Atten= 3%, Lag= 5.5 min
 Primary = 0.06 cfs @ 8.00 hrs, Volume= 986 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.92' @ 8.00 hrs Surf.Area= 885 sf Storage= 39 cf

Plug-Flow detention time= 21.1 min calculated for 986 cf (100% of inflow)
 Center-of-Mass det. time= 20.9 min (735.7 - 714.7)

Volume	Invert	Avail.Storage	Storage Description
#1	95.80'	675 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,390 cf Overall - 139 cf Embedded = 2,250 cf x 30.0% Voids
#2	95.80'	139 cf	12.0" Round Pipe Storage Inside #1 L= 177.0'

814 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.80	885	0	0
98.50	885	2,390	2,390

Device	Routing	Invert	Outlet Devices
#1	Primary	95.80'	12.0" Round Culvert L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.80' / 95.00' S= 0.0400 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.06 cfs @ 8.00 hrs HW=95.92' TW=94.80' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.06 cfs @ 1.18 fps)

Summary for Pond RS6: Phase 4 - Back of E lots Rock Storage

Inflow Area = 10,080 sf, 65.00% Impervious, Inflow Depth = 1.13" for WQ-DEQ event
 Inflow = 0.06 cfs @ 7.91 hrs, Volume= 945 cf
 Outflow = 0.06 cfs @ 8.01 hrs, Volume= 945 cf, Atten= 4%, Lag= 5.7 min
 Primary = 0.06 cfs @ 8.01 hrs, Volume= 945 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.92' @ 8.01 hrs Surf.Area= 965 sf Storage= 41 cf

Plug-Flow detention time= 23.5 min calculated for 945 cf (100% of inflow)
 Center-of-Mass det. time= 23.3 min (738.0 - 714.7)

Volume	Invert	Avail.Storage	Storage Description
#1	95.80'	736 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,606 cf Overall - 152 cf Embedded = 2,454 cf x 30.0% Voids 12.0" Round Pipe Storage Inside #1 L= 193.0'
#2	95.80'	152 cf	
		888 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.80	965	0	0
98.50	965	2,606	2,606

Device	Routing	Invert	Outlet Devices
#1	Primary	95.80'	12.0" Round Culvert L= 45.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.80' / 94.80' S= 0.0222 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.06 cfs @ 8.01 hrs HW=95.92' TW=94.80' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.06 cfs @ 1.17 fps)

Summary for Pond RS7: N RG Rock

Inflow Area = 41,510 sf, 84.72% Impervious, Inflow Depth = 1.27" for WQ-DEQ event
 Inflow = 0.12 cfs @ 8.75 hrs, Volume= 4,390 cf
 Outflow = 0.11 cfs @ 9.75 hrs, Volume= 4,369 cf, Atten= 6%, Lag= 60.2 min
 Primary = 0.11 cfs @ 9.75 hrs, Volume= 4,369 cf

22-312 All Phases HCAD model_Phase 4 alternative Type IA 24-hr WQ-DEQ Rainfall=1.72"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 92.04' @ 9.57 hrs Surf.Area= 5,668 sf Storage= 527 cf

Plug-Flow detention time= 100.6 min calculated for 4,369 cf (100% of inflow)
 Center-of-Mass det. time= 97.0 min (840.8 - 743.8)

Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	1,591 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 6,232 cf Overall - 929 cf Embedded = 5,302 cf x 30.0% Voids
#2	91.80'	929 cf	12.0" Round Pipe Storage Inside #1 L= 1,183.0'
#3	91.80'	13 cf	2.00'D x 4.00'H Vertical Cone/Cylinder
		2,532 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	5,665	0	0
92.90	5,665	6,232	6,232

Device	Routing	Invert	Outlet Devices
#1	Primary	91.80'	12.0" Round Culvert L= 2.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.80' / 91.78' S= 0.0100 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	91.80'	6.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	95.30'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.11 cfs @ 9.75 hrs HW=92.04' TW=92.00' (Dynamic Tailwater)

- 1=Culvert (Outlet Controls 0.11 cfs @ 1.15 fps)
- 2=Orifice/Grate (Passes 0.11 cfs of 0.18 cfs potential flow)
- 3=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond RS8: S RG Rock

Inflow Area = 29,702 sf, 82.50% Impervious, Inflow Depth = 1.24" for WQ-DEQ event
 Inflow = 0.08 cfs @ 8.49 hrs, Volume= 3,062 cf
 Outflow = 0.08 cfs @ 10.03 hrs, Volume= 3,048 cf, Atten= 6%, Lag= 92.5 min
 Primary = 0.08 cfs @ 10.03 hrs, Volume= 3,048 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 91.94' @ 9.57 hrs Surf.Area= 5,023 sf Storage= 269 cf

Plug-Flow detention time= 78.7 min calculated for 3,047 cf (100% of inflow)
 Center-of-Mass det. time= 75.5 min (817.2 - 741.7)

22-312 All Phases HCAD model_Phase 4 alternative Type IA 24-hr WQ-DEQ Rainfall=1.72"

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Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	1,406 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 5,522 cf Overall - 835 cf Embedded = 4,687 cf x 30.0% Voids
#2	91.80'	835 cf	12.0" Round Pipe Storage Inside #1 L= 1,063.0'
#3	91.90'	13 cf	2.00'D x 4.00'H Vertical Cone/Cylinder
		2,254 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	5,020	0	0
92.90	5,020	5,522	5,522

Device	Routing	Invert	Outlet Devices
#1	Primary	91.80'	12.0" Round Culvert L= 5.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 91.80' / 91.60' S= 0.0400 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	91.80'	3.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	95.10'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.08 cfs @ 10.03 hrs HW=91.94' TW=91.84' (Dynamic Tailwater)

- 1=Culvert (Passes 0.08 cfs of 0.08 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.08 cfs @ 1.57 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

APPENDIX E

Operations and Maintenance Plan



Rain Gardens

Operations & Maintenance Plan

Training and/or written guidance information for operating and maintaining vegetated infiltration basins shall be provided to all property owners and tenants. A copy of the O&M Plan shall be provided to all property owners and tenants.

Access to the infiltration basin shall be safe and efficient. Egress and ingress routes shall be maintained to design standards. Roadways shall be maintained to accommodate size and weight of vehicles, if applicable.

- Obstacles preventing maintenance personnel and/or equipment access to the infiltration basin shall be removed.
- Gravel or ground cover shall be added if erosion occurs, e.g., due to vehicular or pedestrian traffic.

Insects & Rodents shall not be harbored in the infiltration basin. Pest control measures shall be taken when insects/rodents are found to be present.

- If a complaint is received or an inspection reveals that a stormwater facility is significantly infested with mosquitoes or other vectors, the property owner/owners or their designee may be required to eliminate the infestation at the City inspector's discretion. Control of the infestation shall be attempted by using first non-chemical methods and secondly, only those chemical methods specifically approved by the City's inspector. Acceptable methods include but are not limited to the following:
 - i) Installation of predacious bird or bat nesting boxes.
 - ii) Alterations of pond water levels approximately every four days in order to disrupt mosquito larval development cycles.
 - iii) Stocking ponds and other permanent water facilities with fish or other predatory species.
 - iv) If non-chemical methods have proved unsuccessful, contact the City inspector prior to use of chemical methods such as the mosquito larvicides *Bacillus thurengensis* var. *israeliensis* or other approved larvacides. These materials may only be used with City inspector approval if evidence can be provided that these materials will not migrate off-site or enter the public stormwater system. Chemical larvicides shall be applied by a licensed individual or contractor.
- Holes in the ground located in and around the infiltration basin shall be filled.

If used at this site, the following will be applicable:

Fences shall be maintained to preserve their functionality and appearance.

- Collapsed fences shall be restored to an upright position.
- Jagged edges and damaged fences shall be repaired or replaced.

Rain Gardens

Operations & Maintenance Plan

A **vegetated Infiltration Basin** is a vegetated depression created by excavation, berms, or small dams to provide for short-term ponding of surface water until it percolates into the soil. The basin shall infiltrate stormwater within 24 hours. All facility components and vegetation shall be inspected for proper operations and structural stability, at a minimum, quarterly for the first 2 years from the date of installation, 2 times per year thereafter, and within 48 hours after each major storm event. The facility owner must keep a log, recording all inspection dates, observations, and maintenance activities. The following items shall be inspected and maintained as stated:

Basin Inlet shall assure unrestricted stormwater flow to the vegetated basin.

- Sources of erosion shall be identified and controlled when native soil is exposed or erosion channels are present.
- Inlet shall be cleared when conveyance capacity is plugged.
- Rock splash pads shall be replenished to prevent erosion.

Embankment, Dikes, Berms & Side Slopes retain water in the infiltration basin.

- Structural deficiencies shall be corrected upon discovery:
- Slopes shall be stabilized using appropriate erosion control measures when soil is exposed/ flow channels are forming.
- Sources of erosion damage shall be identified and controlled.

Overflow or Emergency Spillway conveys flow exceeding reservoir capacity to an approved stormwater receiving system.

- Overflow shall be cleared when 25% of the conveyance capacity is plugged.
- Sources of erosion damage shall be identified and controlled when soil is exposed.
- Rocks or other armament shall be replaced when only one layer of rock exists.

Filter Media shall allow stormwater to percolate uniformly through the infiltration basin. If water remains 36-48 hours after storm, sources of possible clogging shall be identified and corrected.

- Basin shall be raked and, if necessary, soil shall be excavated, and cleaned or replaced.

Sediment/ Basin Debris Management shall prevent loss of infiltration basin volume caused by sedimentation. Gauges located at the opposite ends of the basin shall be maintained to monitor sedimentation.

- Sediment and debris exceeding 4" in depth shall be removed every 2-5 years or sooner if performance is affected.

Debris and Litter shall be removed to ensure stormwater infiltration and to prevent clogging of overflow drains and interference with plant growth.

- Restricted sources of sediment and debris, such as discarded lawn clippings, shall be identified and prevented.

Vegetation shall be healthy and dense enough to provide filtering while protecting underlying soils from erosion.

- Mulch shall be replenished as needed to ensure healthy plant growth.
- Vegetation, large shrubs or trees that limit access or interfere with basin operation shall be pruned or removed.
- Grass shall be mowed to 4"-9" high and grass clippings shall be removed no less than 2 times per year.
- Fallen leaves and debris from deciduous plant foliage shall be raked and removed.
- Nuisance or prohibited vegetation from the Eugene Plant List (such as blackberries or English Ivy) shall be removed when discovered. Invasive vegetation contributing up to 25% of vegetation of all species shall be removed.
- Dead vegetation shall be removed to maintain less than 10% of area coverage or when infiltration basin function is impaired. Vegetation shall be replaced within 3 months, or immediately if required to control erosion.

Spill Prevention measures shall be exercised when handling substances that contaminate stormwater. Releases of pollutants shall be corrected as soon as identified.

**STORMWATER MANAGEMENT FACILITY
INSPECTION & MAINTENANCE LOG (SAMPLE)**

Property Address:

Inspection Date:

Inspection Time:

Inspected By:

Approximate Date/Time of Last Rainfall:

Type of Stormwater Management Facility:

Location of Facility on Site (In relation to buildings or other permanent structures):

Water levels and observations (Oil sheen, smell, turbidity, etc.):

Sediment accumulation & record of sediment removal:

Condition of vegetation (Height, survival rates, invasive species present, etc.) & record of replacement and management (mowing, weeding, etc.):

Condition of physical properties such as inlets, outlets, piping, fences, irrigation facilities, and side slopes. Record damaged items and replacement activities:

Presence of insects or vectors. Record control activities:

Identify safety hazards present. Record resolution activities: