Stormwater Report

Sexton Mountain Pump Station Upgrade

Beaverton, OR

October 27, 2021

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OREGON
JULY 11, 2017
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EXPIRES: 6/30/2022

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Acronyms and Abbreviations

cfs	cubic feet per second
City	City of Beaverton
CWS	Clean Water Services
LIDA	low impact development approaches
R&O	Resolution and Order
SF	square feet

1 Introduction

The City of Beaverton (City) is upgrading the Sexton Mountain Pump Station to optimize operation and improve service. The project includes two phases of improvements. Phase 1 has been completed and included pump replacement, new retaining wall, new electrical equipment, and the addition of an emergency generator. Phase 2 will include new pump station building, additional pumps, hydropower turbine equipment, seismic upgrades, and site/hardscape improvements. This report documents the stormwater design for Phase 2 of the project.

2 Design Standards

The following standards were used to design the stormwater facilities:

- City Engineering Design Manual (2019)
- Clean Water Services (CWS) Design and Construction (D&C) Standards (Resolution and Order [R&O] 19-5, amended by R&O 19-22; 2019)

These guidelines set requirements for water quality, detention, and hydromodification that new development or redevelopment owners must fulfill. Guideline specifics and how they apply to the project site are outlined below.

2.1 Clean Water Services Design Guidelines

Water Quantity Control - Per CWS D&C Standards section 4.02, each new development or redevelopment must mitigate its impacts on the public stormwater system for conveyance capacity and downstream impacts. Mitigation is required when there is an identified downstream deficiency. Downstream deficiencies are restrictions that create backwater during the 25-year storm. Techniques available to satisfy the mitigation requirement include on-site detention facilities, enlargement of the downstream conveyance system, or payment of a fee.

Hydromodification Requirement - Per R&O 19-5 section 4.03, owners of new developments and redevelopments exceeding 1,000 square feet (SF) of impervious surface, or increasing the amount or rate of surface water leaving a site, are required to implement or fund techniques to reduce impacts to the downstream receiving water body. Techniques available to satisfy this requirement include construction of low impact development approaches (LIDA), construction of a detention facility, or payment of a fee-in-lieu. If the project area exceeds 12,000 SF and is not in a CWS-approved subbasin strategy area with an identified regional stormwater management approach for hydromodification, an assessment is necessary to determine the reach-specific risk level, development class, and project size category for the project. These parameters are used to determine the hydromodification approach requirements for a project.

Water Quality Control - Per R&O 19-5 section 4.04, owners of new developments and redevelopments exceeding 1,000 SF of impervious surface or increasing the amount of stormwater runoff or pollution leaving the site, are required to implement or fund

permanent water quality approaches to reduce contaminants entering the storm and surface water system. Available mitigation includes LIDAs and proprietary treatment technologies.

CWS D&C Standards were used as a basis for the analysis and design of the stormwater system for this project. The CWS storm precipitation depths used for runoff calculations are presented in Table 1.

Table 1. Design Storm Events

Recurrence Interval	Total 24-Hour Precipitation Depth (inches)
2-year	2.50
10-year	3.45
25-year	3.90

2.2 Project-Specific Regulatory Guidelines

The project redevelopment area exceeds 12,000 SF, requiring water quality and hydromodification mitigation. Simplified LIDA sizing may be used to meet the water quality and hydromodification requirements.

Simplified LIDA sizing uses a 6 percent factor to calculate facility area for the water quality requirement. However, a 12 percent factor may be used to simultaneously fulfill the water quality and hydromodification requirement (R&O 19-5 section 4.08.4).

3 Existing Conditions

The Sexton Mountain Pump Station is located at 14600 SW Sexton Mountain Drive. The existing pump station is housed in a small concrete structure (940 SF) on a small parking pad. Total existing impervious area for the project site is 4,740 SF.

Existing site drainage consists of several catch basins near the pump station and piped conveyance flowing east toward SW Murray Boulevard. The site conveyance system connects to the stormwater system in SW Murray Boulevard which flows north. This system continues north until the outfall at a tributary of Johnson Creek near SW Cherryhill Drive. There are no existing water quality treatment or detention facilities on-site.

According to the U.S. Department of Agriculture Natural Resources Conservation Service, soils within the project area consist of Pits, with no hydrologic soil group rating. Off-site soils in the vicinity consist mostly of Cascade and Cornelius/Kinton silt loams with hydrologic soil group ratings of C. CWS classifies the infiltration rates of these silt loam soils as 0.5 inches per hour (R&O 19-5 Table 4-5 showing hydrologic properties of common soils in urban Washington County). A soil report for the project site is provided in Appendix A.

3.1 Downstream Capacity Analysis

Per the requirements of R&O 19-5 section 2.04.2, a downstream capacity analysis was performed. The downstream analysis was evaluated until the site runoff comprised less than 10 percent of the total piped flow, then an additional quarter mile downstream. The result of the analysis showed no downstream capacity restrictions for the 25-year, 24-hour storm event. The Santa Barbara Urban Hydrograph runoff methodology was used to calculate flows and HydroCAD software was used to perform the runoff and routing analysis (Appendix B). The site and off-site basin maps supporting the downstream analysis are presented in Appendix C and Appendix D respectively.

3.2 Hydromodification Assessment

A hydromodification assessment was performed to determine the reach-specific risk level, development class, and project size category. These parameters determine the hydromodification approach requirements.

- Risk Level – Using the CWS Hydromod Planning Tool, the receiving reach for the project has a moderate risk level.
- Development Class – Using the CWS Hydromod Planning Tool, the project is located in a developed area.
- Project Size Category – The area of proposed or new impervious area is less than 12,000 square feet. Project size category is small.

Per R&O 19-5 Table 4-2, the project hydromodification approach is a Category 1. Category 1 projects may use simplified LIDA sizing. A map of the CWS Hydromodification Planning Tool is included in Appendix A.

4 Proposed Stormwater Management

Stormwater improvements, satisfying the requirements outlined in Section 2.2, include a LIDA rain garden (non-structural planter). The rain garden, located east of the new pump house, is approximately 13 feet wide by 59 feet long. A gravel trench and check dams will serve to evenly distribute sheet flow along the width of the facility. The proposed cross section of the rain garden includes 30 inches of growing medium above 3 inches of choker course aggregate above 9 inches of drain rock aggregate. A 30-inch-deep section of growing medium is proposed to reduce the required vegetated surface of the filter strip area by 25 percent (R&O 19-5 section 4.08.4.d.1).

Runoff from the new pump house and surrounding impervious area will be collected and conveyed to the LIDA rain garden. An area drain at the downstream end of the facility will provide an outlet for stormwater that is not infiltrated. Ultimately, the site runoff will be conveyed to the existing stormwater system along SW Murray Boulevard.

The proposed hardscape and structures result in an increase in overall impervious surface area. The total impervious surface area will increase by 3,718 SF. Total existing and proposed impervious areas are summarized in Table 2. A site map with impervious areas is provided in Appendix C.

Table 2. Site Impervious Areas

	Impervious Area (SF)	Pervious Area (SF)	Total Area (SF)
Existing Conditions	4,740	17,660	22,429
Proposed Conditions	8,458	13,942	22,429

4.1 Water Quality and Hydromodification

A LIDA rain garden is proposed to satisfy water quality and hydromodification requirements. The minimum LIDA vegetated area is determined by a 12 percent factor, where the LIDA vegetated area is equal to 12 percent of the contributing impervious area. The LIDA rain garden is designed using the following CWS criteria:

- Longitudinal slope less than 0.5 percent
- Minimum bottom width 30 inches
- Maximum treatment depth 6 inches
- Minimum freeboard 6 inches
- Rain garden minimum area: 8,458 SF x 0.12 = 1,015 x 75% = 761 SF (Incorporating 25% reduction factor for 30-inch depth of growing medium)

Appendix B includes the HydroCAD modeling calculations for existing and proposed site conditions. Peak flows are summarized in Table 3. An Operations and Maintenance manual for the rain garden is provided in Appendix E.

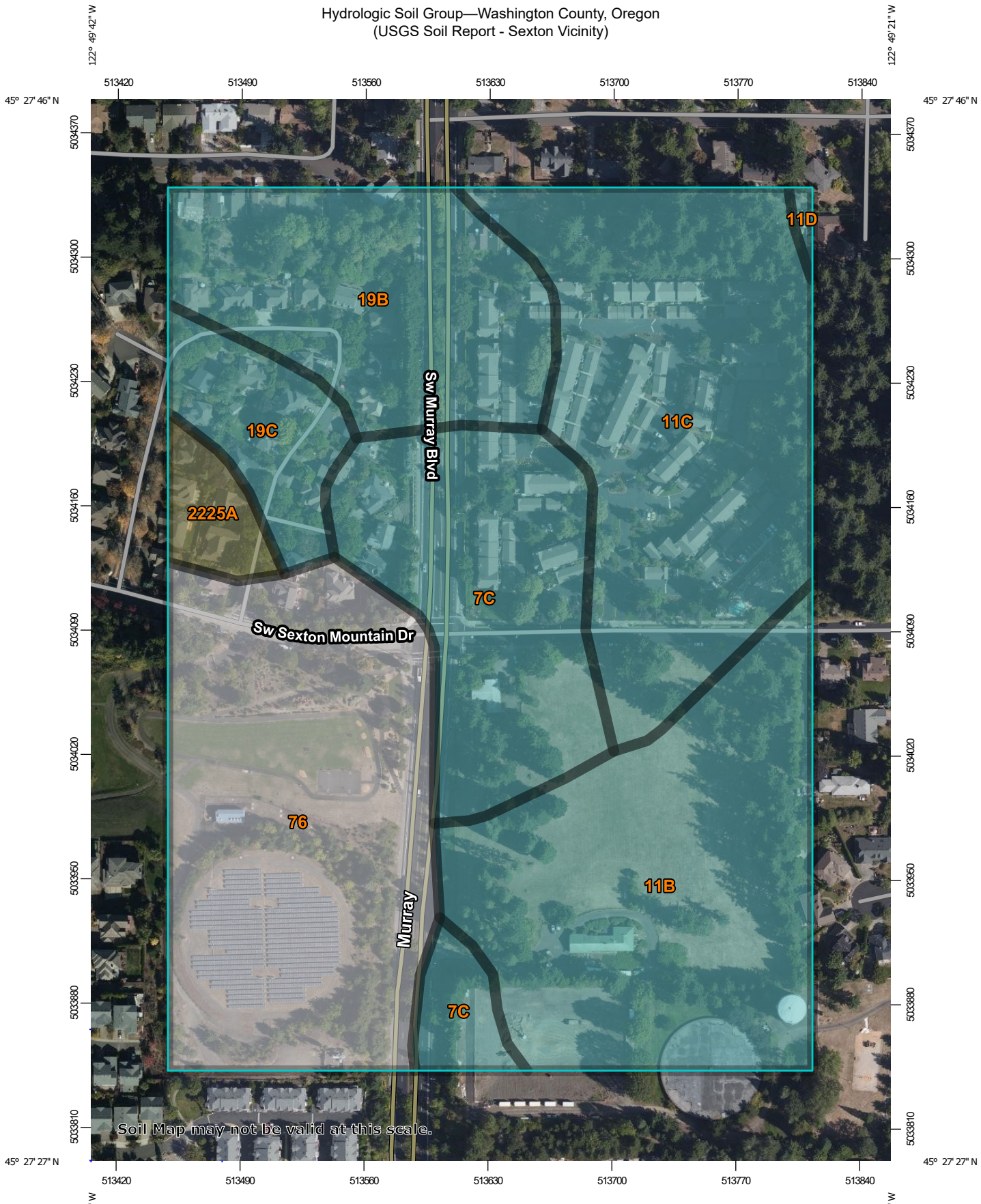
Table 3. Existing and Proposed Runoff Summary

	Peak Flow (cfs)		
	2-year	10-year	25-year
Site Pre-development (existing)	0.05	0.13	0.17
Site Post-development	0.08	0.16	0.20

cfs: cubic feet per second

Appendix A. U.S. Department of Agriculture Soil Report and CWS Hydromodification Planning Map

Hydrologic Soil Group—Washington County, Oregon
(USGS Soil Report - Sexton Vicinity)



Map Scale: 1:2,910 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

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 Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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: Washington County, Oregon
Survey Area Data: Version 18, Jun 11, 2020

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

Date(s) aerial images were photographed: Aug 1, 2019—Sep 12, 2019

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
7C	Cascade silt loam, 7 to 12 percent slopes	C	6.7	14.9%
11B	Cornelius and Kinton silt loams, 2 to 7 percent slopes	C	9.4	20.9%
11C	Cornelius and Kinton silt loams, 7 to 12 percent slopes	C	9.7	21.6%
11D	Cornelius and Kinton silt loams, 12 to 20 percent slopes	C	0.1	0.2%
19B	Helvetia silt loam, 2 to 7 percent slopes	C	5.8	13.0%
19C	Helvetia silt loam, 7 to 12 percent slopes	C	2.1	4.6%
76	Pits		10.2	22.7%
2225A	Huberly silt loam, 0 to 3 percent slopes	C/D	0.9	2.1%
Totals for Area of Interest			**44.9**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

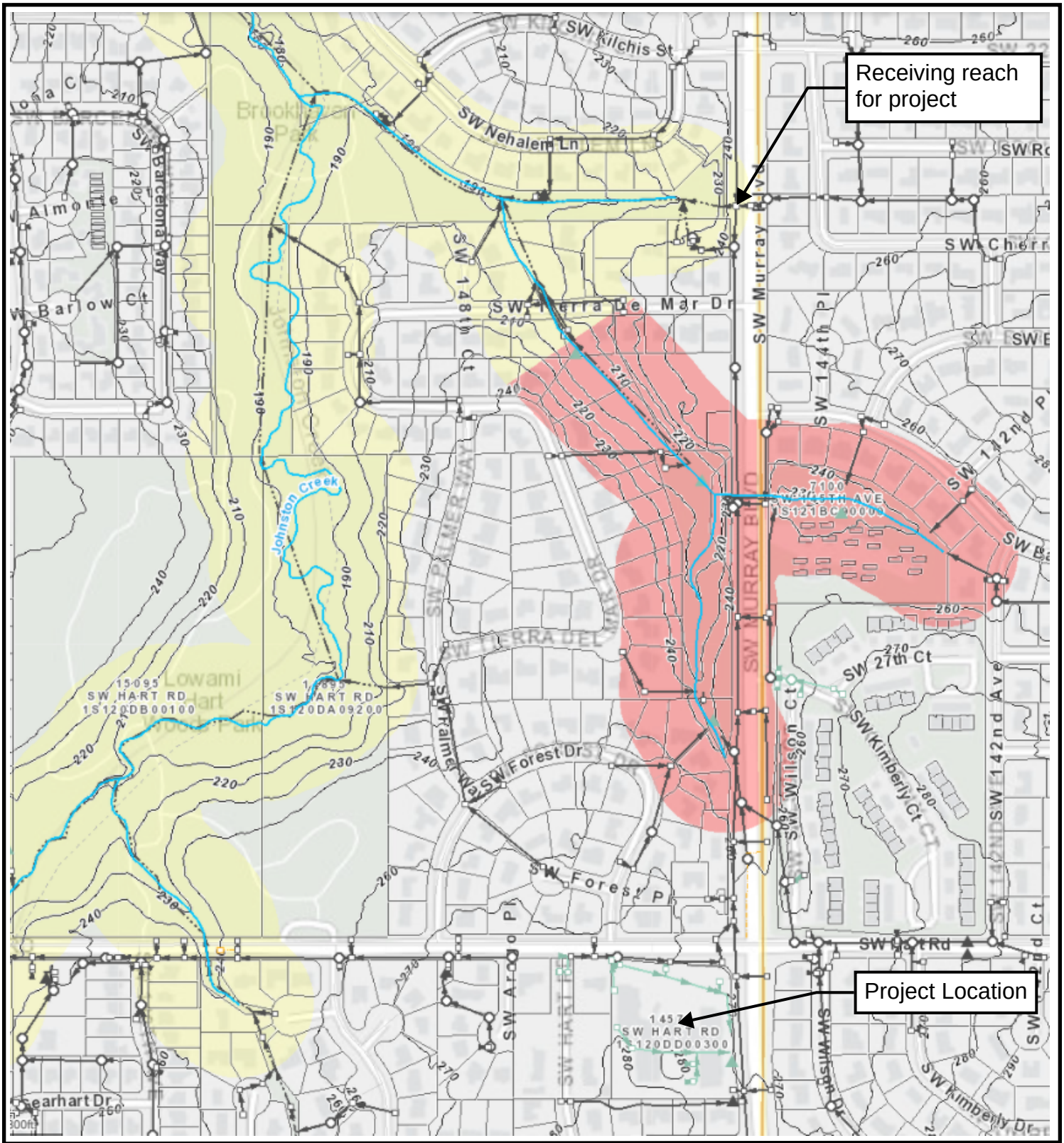
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

TABLE 4-5
HYDROLOGIC PROPERTIES OF COMMON SOILS IN URBAN WASHINGTON COUNTY

Soil Series	Hydrologic Soil Group	Drainage Class	Depth to Restrictive Layer (inches)	Depth to Ground-water (inches)	Infiltration Rates For Simplified Sizing (inches/ hour)
Aloha silt loam	C/D	somewhat poorly drained	>80	18-24	0.2
Amity silt loam	C/D	somewhat poorly drained	>80	6-18	0.2
Briedwell stony silt loam	B	well drained	25	>80	2
Cascade silt loam	C	somewhat poorly drained	20-30*	18-30	0.5
Cascade-Urban complex	C	somewhat poorly drained	20-30	18-30	0.5
Chehalis silty clay loam	B	well drained	>80	48-80	2
Cornelius & Kinton silt loams	C	moderately well drained	30-40*	27-37	0.5
Cornelius variant silt loam	C	moderately well drained	30-40*	27-37	0.5
Cove clay	D	poorly drained	>80	0-12	0.1
Cove silty clay loam	D	poorly drained	>80	0-12	0.1
Dayton silt loam	D	poorly drained	0-24	0-24	0.1
Delena silt loam	D	poorly drained	20-30*	0-18	0.1
Helvetia silt loam	C	moderately well drained	>80	36-72	0.5
Hillsboro loam	B	well drained	>80	>80	2
Huberly silt loam	C/D	poorly drained	38*	0-8	0.2
Laurelwood silt loam	B	well drained	>80	>80	2
McBee silty clay loam	C	moderately well drained	>80	24-36	0.5
Quatama loam	C	moderately well drained	>80	24-36	0.5
Saum silt loam	C	well drained	20-30*	18-30	0.5
Urban land	Not specified; site-specific infiltration testing required				
Verboort silty clay loam	D	poorly drained	12-26	0-8	0.1
Wapato silty clay loam	C/D	poorly drained	>80	0-12	0.2
Willamette silt loam	B	well drained	>80	>80	2
Woodburn silt loam	C	moderately well drained	>80	25-32	0.5
Xerocrepts & Haploxerolls	B	well drained	>80	>80	2
Xerocrepts-rock outcrop	B	well drained	>80	>80	2

* indicates presence of fragipan below which infiltration increases
Source: USDA/NRCS National engineering Handbook, Chapter 7, “Hydrologic Soil Groups” (2009), City of Gresham Stormwater Manual Appendix D (2018), and Web Soil Survey
Note: data for soil series not listed in this table are available from Web Soil Survey, except for Assumed Infiltration Rate, which can be determined from Hydrologic Soil Group.



Hydromod Risk Levels

Risk Levels

- Low
- Moderate
- High

Hydromodification Planning Map

Source: Clean Water Services Hydromod Planning Tool

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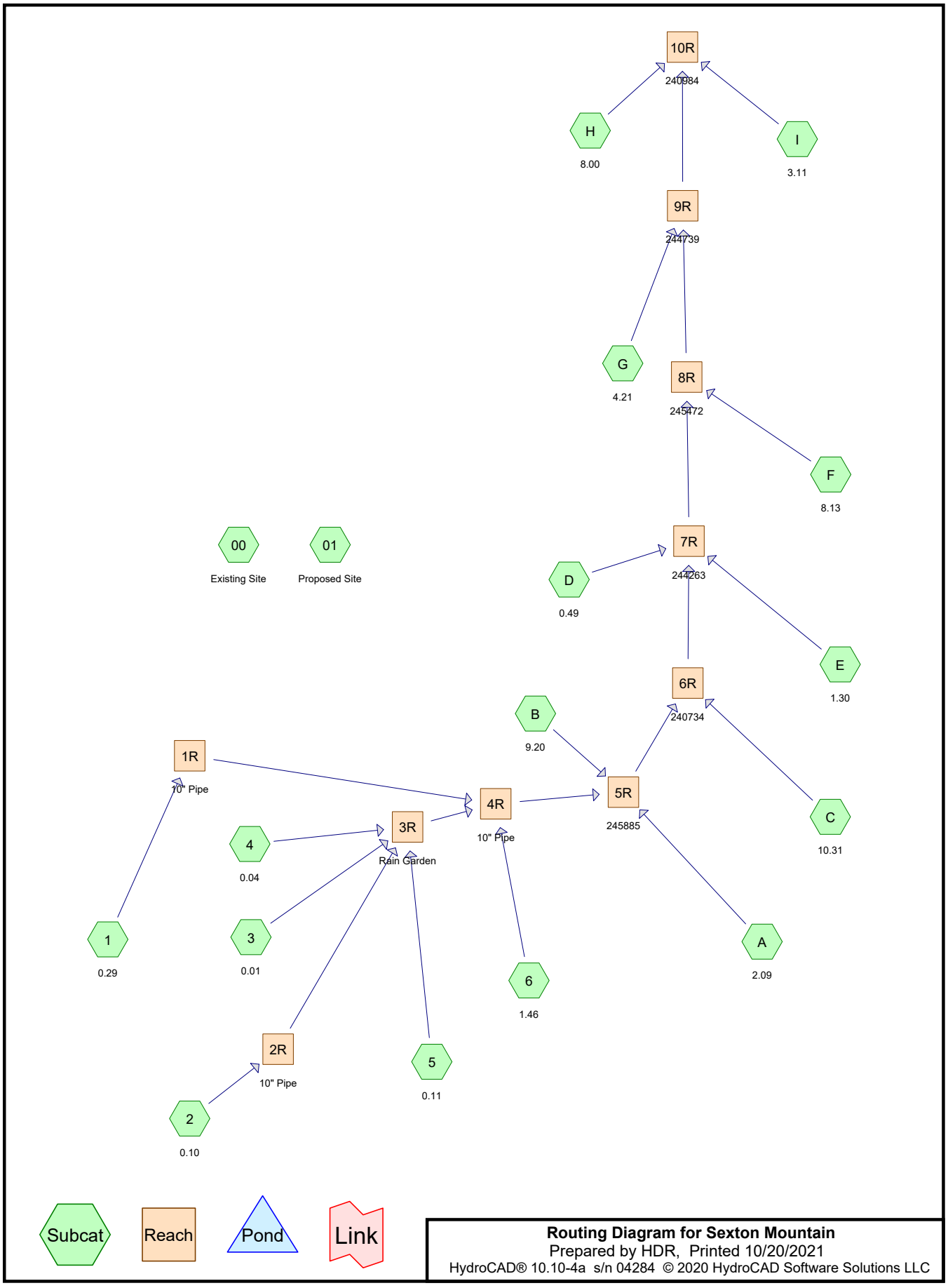
Appendix B. HydroCAD Runoff and Conveyance Calculations



Routing Diagram for Sexton Mountain
Prepared by HDR, Printed 10/20/2021

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 yr	Type IA 24-hr		Default	24.00	1	2.50	2
2	10 yr	Type IA 24-hr		Default	24.00	1	3.45	2
3	25 yr	Type IA 24-hr		Default	24.00	1	3.90	2

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SBUH method, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment00: Existing Site Runoff Area=22,429 sf Runoff Depth=0.74"
Tc=15.0 min CN=77 Runoff=0.05 cfs 1,384 cf

Subcatchment01: Proposed Site Runoff Area=22,429 sf Runoff Depth=0.89"
Tc=15.0 min CN=80 Runoff=0.08 cfs 1,661 cf

Subcatchment1: 0.29 Runoff Area=11,364 sf Runoff Depth=1.06"
Tc=20.0 min CN=83 Runoff=0.05 cfs 1,000 cf

Subcatchment2: 0.10 Runoff Area=4,473 sf Runoff Depth=0.94"
Tc=10.0 min CN=81 Runoff=0.02 cfs 351 cf

Subcatchment3: 0.01 Runoff Area=371 sf Runoff Depth=2.27"
Tc=5.0 min CN=98 Runoff=0.00 cfs 70 cf

Subcatchment4: 0.04 Runoff Area=1,742 sf Runoff Depth=2.27"
Tc=5.0 min CN=98 Runoff=0.02 cfs 330 cf

Subcatchment5: 0.11 Runoff Area=4,883 sf Runoff Depth=0.61"
Tc=10.0 min CN=74 Runoff=0.01 cfs 248 cf

Subcatchment6: 1.46 Runoff Area=93,482 sf Runoff Depth=0.61"
Tc=40.0 min CN=74 Runoff=0.10 cfs 4,738 cf

SubcatchmentA: 2.09 Runoff Area=2.090 ac Runoff Depth=0.61"
Tc=10.0 min CN=74 Runoff=0.16 cfs 4,615 cf

SubcatchmentB: 9.20 Runoff Area=9.200 ac Runoff Depth=0.84"
Tc=12.0 min CN=79 Runoff=1.30 cfs 27,967 cf

SubcatchmentC: 10.31 Runoff Area=10.310 ac Runoff Depth=0.61"
Tc=10.0 min CN=74 Runoff=0.80 cfs 22,764 cf

SubcatchmentD: 0.49 Runoff Area=0.490 ac Runoff Depth=2.27"
Tc=5.0 min CN=98 Runoff=0.28 cfs 4,039 cf

SubcatchmentE: 1.30 Runoff Area=1.300 ac Runoff Depth=1.06"
Tc=5.0 min CN=83 Runoff=0.30 cfs 4,982 cf

SubcatchmentF: 8.13 Runoff Area=8.130 ac Runoff Depth=1.06"
Tc=10.0 min CN=83 Runoff=1.75 cfs 31,160 cf

SubcatchmentG: 4.21 Runoff Area=4.210 ac Runoff Depth=1.24"
Tc=10.0 min CN=86 Runoff=1.15 cfs 19,003 cf

SubcatchmentH: 8.00 Runoff Area=8.000 ac Runoff Depth=1.06"
Tc=10.0 min CN=83 Runoff=1.72 cfs 30,661 cf

SubcatchmentI: 3.11 Runoff Area=3.110 ac Runoff Depth=1.06"
Tc=8.0 min CN=83 Runoff=0.69 cfs 11,920 cf

Reach 1R: 10" Pipe Avg. Flow Depth=0.08' Max Vel=1.62 fps Inflow=0.05 cfs 1,000 cf
10.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=2.19 cfs Outflow=0.05 cfs 1,000 cf

Reach 2R: 10" Pipe Avg. Flow Depth=0.05' Max Vel=1.23 fps Inflow=0.02 cfs 351 cf
10.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=2.19 cfs Outflow=0.02 cfs 351 cf

Reach 3R: Rain Garden Avg. Flow Depth=0.02' Max Vel=0.22 fps Inflow=0.04 cfs 300 cf
n=0.030 L=59.0' S=0.0051 '/' Capacity=4.59 cfs Outflow=0.04 cfs 300 cf

Reach 4R: 10" Pipe Avg. Flow Depth=0.16' Max Vel=2.42 fps Inflow=0.18 cfs 6,038 cf
10.0" Round Pipe n=0.013 L=200.0' S=0.0100 '/' Capacity=2.19 cfs Outflow=0.18 cfs 6,038 cf

Reach 5R: 245885 Avg. Flow Depth=0.51' Max Vel=3.08 fps Inflow=1.62 cfs 38,619 cf
18.0" Round Pipe n=0.013 L=254.0' S=0.0039 '/' Capacity=6.59 cfs Outflow=1.61 cfs 38,619 cf

Reach 6R: 240734 Avg. Flow Depth=0.33' Max Vel=8.42 fps Inflow=2.39 cfs 61,383 cf
18.0" Round Pipe n=0.013 L=259.0' S=0.0480 '/' Capacity=23.01 cfs Outflow=2.39 cfs 61,383 cf

Reach 7R: 244263 Avg. Flow Depth=0.38' Max Vel=8.34 fps Inflow=2.90 cfs 70,404 cf
18.0" Round Pipe n=0.013 L=387.0' S=0.0400 '/' Capacity=21.01 cfs Outflow=2.89 cfs 70,404 cf

Reach 8R: 245472 Avg. Flow Depth=0.48' Max Vel=9.51 fps Inflow=4.58 cfs 101,564 cf
18.0" Round Pipe n=0.013 L=238.0' S=0.0400 '/' Capacity=21.01 cfs Outflow=4.57 cfs 101,564 cf

Reach 9R: 244739 Avg. Flow Depth=0.50' Max Vel=10.95 fps Inflow=5.69 cfs 120,567 cf
18.0" Round Pipe n=0.013 L=224.0' S=0.0500 '/' Capacity=23.49 cfs Outflow=5.68 cfs 120,567 cf

Reach 10R: 240984 Avg. Flow Depth=0.65' Max Vel=8.39 fps Inflow=8.04 cfs 163,148 cf
27.0" Round Pipe n=0.013 L=174.0' S=0.0200 '/' Capacity=43.80 cfs Outflow=8.03 cfs 163,148 cf

Total Runoff Area = 2,201,523 sf Runoff Volume = 166,892 cf Average Runoff Depth = 0.91"

Summary for Subcatchment 00: Existing Site

Runoff = 0.05 cfs @ 8.02 hrs, Volume= 1,384 cf, Depth= 0.74"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
4,740	89	Gravel roads, HSG C
17,689	74	>75% Grass cover, Good, HSG C
22,429	77	Weighted Average

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

Summary for Subcatchment 01: Proposed Site

Runoff = 0.08 cfs @ 8.02 hrs, Volume= 1,661 cf, Depth= 0.89"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
8,458	89	Gravel roads, HSG C
13,971	74	>75% Grass cover, Good, HSG C
22,429	80	Weighted Average

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

Summary for Subcatchment 1: 0.29

Runoff = 0.05 cfs @ 8.02 hrs, Volume= 1,000 cf, Depth= 1.06"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
6,905	89	Gravel roads, HSG C
4,459	74	>75% Grass cover, Good, HSG C
11,364	83	Weighted Average

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

Summary for Subcatchment 2: 0.10

Runoff = 0.02 cfs @ 8.00 hrs, Volume= 351 cf, Depth= 0.94"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
1,980	89	Gravel roads, HSG C
2,493	74	>75% Grass cover, Good, HSG C
4,473	81	Weighted Average

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

Summary for Subcatchment 3: 0.01

Runoff = 0.00 cfs @ 7.89 hrs, Volume= 70 cf, Depth= 2.27"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
371	98	Roofs, HSG C

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

Summary for Subcatchment 4: 0.04

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 330 cf, Depth= 2.27"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
1,742	98	Roofs, HSG C

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

Summary for Subcatchment 5: 0.11

Runoff = 0.01 cfs @ 8.02 hrs, Volume= 248 cf, Depth= 0.61"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
4,883	74	>75% Grass cover, Good, HSG C

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

Summary for Subcatchment 6: 1.46

Runoff = 0.10 cfs @ 8.86 hrs, Volume= 4,738 cf, Depth= 0.61"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
93,482	74	>75% Grass cover, Good, HSG C

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

Summary for Subcatchment A: 2.09

Runoff = 0.16 cfs @ 8.02 hrs, Volume= 4,615 cf, Depth= 0.61"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (ac)	CN	Description
*	2.090	74	

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

Summary for Subcatchment B: 9.20

Runoff = 1.30 cfs @ 8.01 hrs, Volume= 27,967 cf, Depth= 0.84"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (ac)	CN	Description
*	9.200	79	

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

Summary for Subcatchment C: 10.31

Runoff = 0.80 cfs @ 8.02 hrs, Volume= 22,764 cf, Depth= 0.61"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (ac)	CN	Description
*	10.310	74	

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

Summary for Subcatchment D: 0.49

Runoff = 0.28 cfs @ 7.89 hrs, Volume= 4,039 cf, Depth= 2.27"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (ac)	CN	Description
*	0.490	98	

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

Summary for Subcatchment E: 1.30

Runoff = 0.30 cfs @ 7.99 hrs, Volume= 4,982 cf, Depth= 1.06"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (ac)	CN	Description
*	1.300	83	

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

Summary for Subcatchment F: 8.13

Runoff = 1.75 cfs @ 8.00 hrs, Volume= 31,160 cf, Depth= 1.06"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (ac)	CN	Description
*	8.130	83	

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

Summary for Subcatchment G: 4.21

Runoff = 1.15 cfs @ 8.00 hrs, Volume= 19,003 cf, Depth= 1.24"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (ac)	CN	Description
*	4.210	86	

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

Summary for Subcatchment H: 8.00

Runoff = 1.72 cfs @ 8.00 hrs, Volume= 30,661 cf, Depth= 1.06"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (ac)	CN	Description
*	8.000	83	

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

Summary for Subcatchment I: 3.11

Runoff = 0.69 cfs @ 8.00 hrs, Volume= 11,920 cf, Depth= 1.06"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (ac)	CN	Description
*	3.110	83	

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

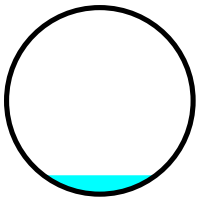
Summary for Reach 1R: 10" Pipe

Inflow Area = 11,364 sf, Inflow Depth = 1.06" for 2 yr event
Inflow = 0.05 cfs @ 8.02 hrs, Volume= 1,000 cf
Outflow = 0.05 cfs @ 8.05 hrs, Volume= 1,000 cf, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.62 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.05 fps, Avg. Travel Time= 1.6 min

Peak Storage= 3 cf @ 8.03 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 0.50'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.19 cfs

10.0" Round Pipe
n= 0.013
Length= 100.0' Slope= 0.0100 '/'
Inlet Invert= 345.40', Outlet Invert= 344.40'



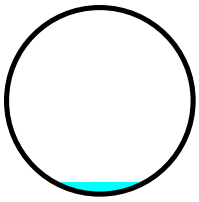
Summary for Reach 2R: 10" Pipe

Inflow Area = 4,473 sf, Inflow Depth = 0.94" for 2 yr event
Inflow = 0.02 cfs @ 8.00 hrs, Volume= 351 cf
Outflow = 0.02 cfs @ 8.04 hrs, Volume= 351 cf, Atten= 1%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.23 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.81 fps, Avg. Travel Time= 2.1 min

Peak Storage= 2 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.05' , Surface Width= 0.41'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.19 cfs

10.0" Round Pipe
n= 0.013
Length= 100.0' Slope= 0.0100 '/'
Inlet Invert= 345.00', Outlet Invert= 344.00'



Summary for Reach 3R: Rain Garden

Inflow Area = 11,469 sf, Inflow Depth = 0.31" for 2 yr event
Inflow = 0.04 cfs @ 8.00 hrs, Volume= 300 cf, Incl. 0.01 cfs Inflow Loss
Outflow = 0.04 cfs @ 8.10 hrs, Volume= 300 cf, Atten= 2%, Lag= 6.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 0.22 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 11.1 min

Peak Storage= 12 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.02' , Surface Width= 13.06'
Bank-Full Depth= 0.25' Flow Area= 3.4 sf, Capacity= 4.59 cfs

13.00' x 0.25' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 59.0' Slope= 0.0051 '/'
Inlet Invert= 100.00', Outlet Invert= 99.70'

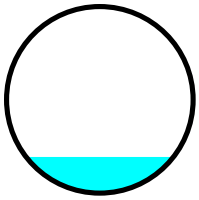
Summary for Reach 4R: 10" Pipe

Inflow Area = 116,315 sf, Inflow Depth = 0.62" for 2 yr event
Inflow = 0.18 cfs @ 8.13 hrs, Volume= 6,038 cf
Outflow = 0.18 cfs @ 8.18 hrs, Volume= 6,038 cf, Atten= 0%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 2.42 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.63 fps, Avg. Travel Time= 2.0 min

Peak Storage= 15 cf @ 8.15 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 0.66'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.19 cfs

10.0" Round Pipe
n= 0.013
Length= 200.0' Slope= 0.0100 '/'
Inlet Invert= 100.00', Outlet Invert= 98.00'



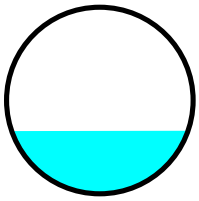
Summary for Reach 5R: 245885

Inflow Area = 608,107 sf, Inflow Depth = 0.76" for 2 yr event
Inflow = 1.62 cfs @ 8.02 hrs, Volume= 38,619 cf
Outflow = 1.61 cfs @ 8.06 hrs, Volume= 38,619 cf, Atten= 1%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 3.08 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.83 fps, Avg. Travel Time= 2.3 min

Peak Storage= 133 cf @ 8.03 hrs
Average Depth at Peak Storage= 0.51' , Surface Width= 1.42'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 6.59 cfs

18.0" Round Pipe
n= 0.013
Length= 254.0' Slope= 0.0039 '/'
Inlet Invert= 1.00', Outlet Invert= 0.00'



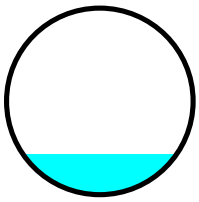
Summary for Reach 6R: 240734

Inflow Area = 1,057,211 sf, Inflow Depth = 0.70" for 2 yr event
Inflow = 2.39 cfs @ 8.05 hrs, Volume= 61,383 cf
Outflow = 2.39 cfs @ 8.06 hrs, Volume= 61,383 cf, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 8.42 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 5.21 fps, Avg. Travel Time= 0.8 min

Peak Storage= 74 cf @ 8.05 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 1.24'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 23.01 cfs

18.0" Round Pipe
n= 0.013
Length= 259.0' Slope= 0.0480 '/'
Inlet Invert= 0.00', Outlet Invert= -12.43'



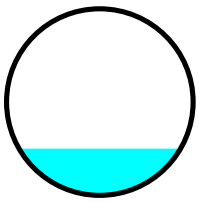
Summary for Reach 7R: 244263

Inflow Area = 1,135,183 sf, Inflow Depth = 0.74" for 2 yr event
Inflow = 2.90 cfs @ 8.03 hrs, Volume= 70,404 cf
Outflow = 2.89 cfs @ 8.06 hrs, Volume= 70,404 cf, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 8.34 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 4.58 fps, Avg. Travel Time= 1.4 min

Peak Storage= 134 cf @ 8.04 hrs
Average Depth at Peak Storage= 0.38' , Surface Width= 1.30'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 21.01 cfs

18.0" Round Pipe
n= 0.013
Length= 387.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -15.48'



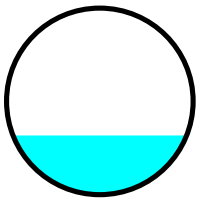
Summary for Reach 8R: 245472

Inflow Area = 1,489,326 sf, Inflow Depth = 0.82" for 2 yr event
Inflow = 4.58 cfs @ 8.03 hrs, Volume= 101,564 cf
Outflow = 4.57 cfs @ 8.04 hrs, Volume= 101,564 cf, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 9.51 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 5.06 fps, Avg. Travel Time= 0.8 min

Peak Storage= 115 cf @ 8.03 hrs
Average Depth at Peak Storage= 0.48' , Surface Width= 1.40'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 21.01 cfs

18.0" Round Pipe
n= 0.013
Length= 238.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -9.52'



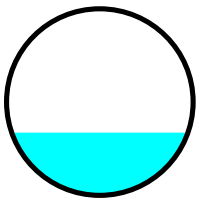
Summary for Reach 9R: 244739

Inflow Area = 1,672,714 sf, Inflow Depth = 0.86" for 2 yr event
Inflow = 5.69 cfs @ 8.03 hrs, Volume= 120,567 cf
Outflow = 5.68 cfs @ 8.04 hrs, Volume= 120,567 cf, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 10.95 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.77 fps, Avg. Travel Time= 0.6 min

Peak Storage= 116 cf @ 8.03 hrs
Average Depth at Peak Storage= 0.50' , Surface Width= 1.42'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 23.49 cfs

18.0" Round Pipe
n= 0.013
Length= 224.0' Slope= 0.0500 '/'
Inlet Invert= 0.00', Outlet Invert= -11.20'



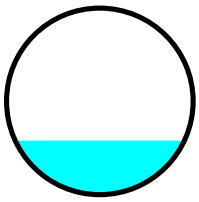
Summary for Reach 10R: 240984

Inflow Area = 2,156,665 sf, Inflow Depth = 0.91" for 2 yr event
Inflow = 8.04 cfs @ 8.02 hrs, Volume= 163,148 cf
Outflow = 8.03 cfs @ 8.03 hrs, Volume= 163,148 cf, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 8.39 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 4.31 fps, Avg. Travel Time= 0.7 min

Peak Storage= 167 cf @ 8.03 hrs
Average Depth at Peak Storage= 0.65' , Surface Width= 2.04'
Bank-Full Depth= 2.25' Flow Area= 4.0 sf, Capacity= 43.80 cfs

27.0" Round Pipe
n= 0.013
Length= 174.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -3.48'



Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SBUH method, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment00: Existing Site Runoff Area=22,429 sf Runoff Depth=1.39"
Tc=15.0 min CN=77 Runoff=0.13 cfs 2,605 cf

Subcatchment01: Proposed Site Runoff Area=22,429 sf Runoff Depth=1.60"
Tc=15.0 min CN=80 Runoff=0.16 cfs 2,985 cf

Subcatchment1: 0.29 Runoff Area=11,364 sf Runoff Depth=1.82"
Tc=20.0 min CN=83 Runoff=0.09 cfs 1,720 cf

Subcatchment2: 0.10 Runoff Area=4,473 sf Runoff Depth=1.67"
Tc=10.0 min CN=81 Runoff=0.04 cfs 622 cf

Subcatchment3: 0.01 Runoff Area=371 sf Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=0.01 cfs 99 cf

Subcatchment4: 0.04 Runoff Area=1,742 sf Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=0.03 cfs 467 cf

Subcatchment5: 0.11 Runoff Area=4,883 sf Runoff Depth=1.21"
Tc=10.0 min CN=74 Runoff=0.02 cfs 491 cf

Subcatchment6: 1.46 Runoff Area=93,482 sf Runoff Depth=1.21"
Tc=40.0 min CN=74 Runoff=0.29 cfs 9,391 cf

SubcatchmentA: 2.09 Runoff Area=2.090 ac Runoff Depth=1.21"
Tc=10.0 min CN=74 Runoff=0.46 cfs 9,146 cf

SubcatchmentB: 9.20 Runoff Area=9.200 ac Runoff Depth=1.53"
Tc=12.0 min CN=79 Runoff=2.84 cfs 51,004 cf

SubcatchmentC: 10.31 Runoff Area=10.310 ac Runoff Depth=1.21"
Tc=10.0 min CN=74 Runoff=2.26 cfs 45,118 cf

SubcatchmentD: 0.49 Runoff Area=0.490 ac Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=0.40 cfs 5,721 cf

SubcatchmentE: 1.30 Runoff Area=1.300 ac Runoff Depth=1.82"
Tc=5.0 min CN=83 Runoff=0.56 cfs 8,572 cf

SubcatchmentF: 8.13 Runoff Area=8.130 ac Runoff Depth=1.82"
Tc=10.0 min CN=83 Runoff=3.32 cfs 53,611 cf

SubcatchmentG: 4.21 Runoff Area=4.210 ac Runoff Depth=2.05"
Tc=10.0 min CN=86 Runoff=2.03 cfs 31,392 cf

SubcatchmentH: 8.00 Runoff Area=8.000 ac Runoff Depth=1.82"
Tc=10.0 min CN=83 Runoff=3.27 cfs 52,754 cf

SubcatchmentI: 3.11 Runoff Area=3.110 ac Runoff Depth=1.82"
Tc=8.0 min CN=83 Runoff=1.31 cfs 20,508 cf

Reach 1R: 10" Pipe Avg. Flow Depth=0.12' Max Vel=1.98 fps Inflow=0.09 cfs 1,720 cf
10.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=2.19 cfs Outflow=0.09 cfs 1,720 cf

Reach 2R: 10" Pipe Avg. Flow Depth=0.08' Max Vel=1.51 fps Inflow=0.04 cfs 622 cf
10.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=2.19 cfs Outflow=0.04 cfs 622 cf

Reach 3R: Rain Garden Avg. Flow Depth=0.02' Max Vel=0.29 fps Inflow=0.09 cfs 930 cf
n=0.030 L=59.0' S=0.0051 '/' Capacity=4.59 cfs Outflow=0.09 cfs 930 cf

Reach 4R: 10" Pipe Avg. Flow Depth=0.26' Max Vel=3.17 fps Inflow=0.46 cfs 12,041 cf
10.0" Round Pipe n=0.013 L=200.0' S=0.0100 '/' Capacity=2.19 cfs Outflow=0.46 cfs 12,041 cf

Reach 5R: 245885 Avg. Flow Depth=0.80' Max Vel=3.84 fps Inflow=3.72 cfs 72,191 cf
18.0" Round Pipe n=0.013 L=254.0' S=0.0039 '/' Capacity=6.59 cfs Outflow=3.71 cfs 72,191 cf

Reach 6R: 240734 Avg. Flow Depth=0.52' Max Vel=10.92 fps Inflow=5.93 cfs 117,309 cf
18.0" Round Pipe n=0.013 L=259.0' S=0.0480 '/' Capacity=23.01 cfs Outflow=5.92 cfs 117,309 cf

Reach 7R: 244263 Avg. Flow Depth=0.59' Max Vel=10.61 fps Inflow=6.82 cfs 131,603 cf
18.0" Round Pipe n=0.013 L=387.0' S=0.0400 '/' Capacity=21.01 cfs Outflow=6.80 cfs 131,603 cf

Reach 8R: 245472 Avg. Flow Depth=0.73' Max Vel=11.76 fps Inflow=10.06 cfs 185,214 cf
18.0" Round Pipe n=0.013 L=238.0' S=0.0400 '/' Capacity=21.01 cfs Outflow=10.04 cfs 185,214 cf

Reach 9R: 244739 Avg. Flow Depth=0.76' Max Vel=13.37 fps Inflow=12.03 cfs 216,606 cf
18.0" Round Pipe n=0.013 L=224.0' S=0.0500 '/' Capacity=23.49 cfs Outflow=12.02 cfs 216,606 cf

Reach 10R: 240984 Avg. Flow Depth=0.96' Max Vel=10.24 fps Inflow=16.53 cfs 289,868 cf
27.0" Round Pipe n=0.013 L=174.0' S=0.0200 '/' Capacity=43.80 cfs Outflow=16.51 cfs 289,868 cf

Total Runoff Area = 2,201,523 sf Runoff Volume = 296,205 cf Average Runoff Depth = 1.61"

Summary for Subcatchment 00: Existing Site

Runoff = 0.13 cfs @ 8.01 hrs, Volume= 2,605 cf, Depth= 1.39"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
4,740	89	Gravel roads, HSG C
17,689	74	>75% Grass cover, Good, HSG C
22,429	77	Weighted Average

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

Summary for Subcatchment 01: Proposed Site

Runoff = 0.16 cfs @ 8.01 hrs, Volume= 2,985 cf, Depth= 1.60"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
8,458	89	Gravel roads, HSG C
13,971	74	>75% Grass cover, Good, HSG C
22,429	80	Weighted Average

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

Summary for Subcatchment 1: 0.29

Runoff = 0.09 cfs @ 8.02 hrs, Volume= 1,720 cf, Depth= 1.82"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
6,905	89	Gravel roads, HSG C
4,459	74	>75% Grass cover, Good, HSG C
11,364	83	Weighted Average

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

Summary for Subcatchment 2: 0.10

Runoff = 0.04 cfs @ 8.00 hrs, Volume= 622 cf, Depth= 1.67"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
1,980	89	Gravel roads, HSG C
2,493	74	>75% Grass cover, Good, HSG C
4,473	81	Weighted Average

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

Summary for Subcatchment 3: 0.01

Runoff = 0.01 cfs @ 7.88 hrs, Volume= 99 cf, Depth= 3.22"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
371	98	Roofs, HSG C

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

Summary for Subcatchment 4: 0.04

Runoff = 0.03 cfs @ 7.88 hrs, Volume= 467 cf, Depth= 3.22"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
1,742	98	Roofs, HSG C

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

Summary for Subcatchment 5: 0.11

Runoff = 0.02 cfs @ 8.00 hrs, Volume= 491 cf, Depth= 1.21"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
4,883	74	>75% Grass cover, Good, HSG C

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

Summary for Subcatchment 6: 1.46

Runoff = 0.29 cfs @ 8.25 hrs, Volume= 9,391 cf, Depth= 1.21"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
93,482	74	>75% Grass cover, Good, HSG C

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

Summary for Subcatchment A: 2.09

Runoff = 0.46 cfs @ 8.00 hrs, Volume= 9,146 cf, Depth= 1.21"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

	Area (ac)	CN	Description
*	2.090	74	

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

Summary for Subcatchment B: 9.20

Runoff = 2.84 cfs @ 8.00 hrs, Volume= 51,004 cf, Depth= 1.53"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

	Area (ac)	CN	Description
*	9.200	79	

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

Summary for Subcatchment C: 10.31

Runoff = 2.26 cfs @ 8.00 hrs, Volume= 45,118 cf, Depth= 1.21"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

	Area (ac)	CN	Description
*	10.310	74	

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

Summary for Subcatchment D: 0.49

Runoff = 0.40 cfs @ 7.88 hrs, Volume= 5,721 cf, Depth= 3.22"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

	Area (ac)	CN	Description
*	0.490	98	

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

Summary for Subcatchment E: 1.30

Runoff = 0.56 cfs @ 7.97 hrs, Volume= 8,572 cf, Depth= 1.82"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

	Area (ac)	CN	Description
*	1.300	83	

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

Summary for Subcatchment F: 8.13

Runoff = 3.32 cfs @ 8.00 hrs, Volume= 53,611 cf, Depth= 1.82"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

	Area (ac)	CN	Description
*	8.130	83	

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

Summary for Subcatchment G: 4.21

Runoff = 2.03 cfs @ 7.99 hrs, Volume= 31,392 cf, Depth= 2.05"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

	Area (ac)	CN	Description
*	4.210	86	

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

Summary for Subcatchment H: 8.00

Runoff = 3.27 cfs @ 8.00 hrs, Volume= 52,754 cf, Depth= 1.82"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

	Area (ac)	CN	Description
*	8.000	83	

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

Summary for Subcatchment I: 3.11

Runoff = 1.31 cfs @ 7.99 hrs, Volume= 20,508 cf, Depth= 1.82"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

	Area (ac)	CN	Description
*	3.110	83	

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

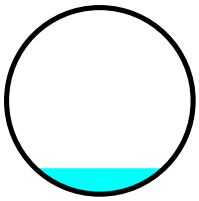
Summary for Reach 1R: 10" Pipe

Inflow Area = 11,364 sf, Inflow Depth = 1.82" for 10 yr event
Inflow = 0.09 cfs @ 8.02 hrs, Volume= 1,720 cf
Outflow = 0.09 cfs @ 8.04 hrs, Volume= 1,720 cf, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.98 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.21 fps, Avg. Travel Time= 1.4 min

Peak Storage= 5 cf @ 8.03 hrs
Average Depth at Peak Storage= 0.12' , Surface Width= 0.58'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.19 cfs

10.0" Round Pipe
n= 0.013
Length= 100.0' Slope= 0.0100 '/'
Inlet Invert= 345.40', Outlet Invert= 344.40'



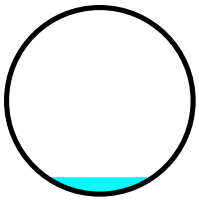
Summary for Reach 2R: 10" Pipe

Inflow Area = 4,473 sf, Inflow Depth = 1.67" for 10 yr event
Inflow = 0.04 cfs @ 8.00 hrs, Volume= 622 cf
Outflow = 0.04 cfs @ 8.03 hrs, Volume= 622 cf, Atten= 0%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.51 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 1.8 min

Peak Storage= 2 cf @ 8.01 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 0.48'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.19 cfs

10.0" Round Pipe
n= 0.013
Length= 100.0' Slope= 0.0100 '/'
Inlet Invert= 345.00', Outlet Invert= 344.00'



Summary for Reach 3R: Rain Garden

Inflow Area = 11,469 sf, Inflow Depth = 0.97" for 10 yr event
Inflow = 0.09 cfs @ 7.99 hrs, Volume= 930 cf, Incl. 0.01 cfs Inflow Loss
Outflow = 0.09 cfs @ 8.07 hrs, Volume= 930 cf, Atten= 1%, Lag= 4.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 0.29 fps, Min. Travel Time= 3.4 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 7.8 min

Peak Storage= 18 cf @ 8.01 hrs
Average Depth at Peak Storage= 0.02' , Surface Width= 13.09'
Bank-Full Depth= 0.25' Flow Area= 3.4 sf, Capacity= 4.59 cfs

13.00' x 0.25' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 59.0' Slope= 0.0051 '/'
Inlet Invert= 100.00', Outlet Invert= 99.70'

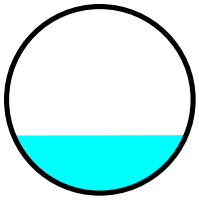
Summary for Reach 4R: 10" Pipe

Inflow Area = 116,315 sf, Inflow Depth = 1.24" for 10 yr event
Inflow = 0.46 cfs @ 8.09 hrs, Volume= 12,041 cf
Outflow = 0.46 cfs @ 8.12 hrs, Volume= 12,041 cf, Atten= 0%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 3.17 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.92 fps, Avg. Travel Time= 1.7 min

Peak Storage= 29 cf @ 8.10 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 0.77'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.19 cfs

10.0" Round Pipe
n= 0.013
Length= 200.0' Slope= 0.0100 '/'
Inlet Invert= 100.00', Outlet Invert= 98.00'



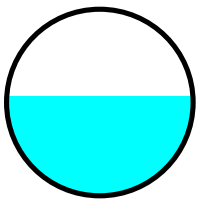
Summary for Reach 5R: 245885

Inflow Area = 608,107 sf, Inflow Depth = 1.42" for 10 yr event
Inflow = 3.72 cfs @ 8.01 hrs, Volume= 72,191 cf
Outflow = 3.71 cfs @ 8.04 hrs, Volume= 72,191 cf, Atten= 0%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 3.84 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 2.12 fps, Avg. Travel Time= 2.0 min

Peak Storage= 245 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.80' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 6.59 cfs

18.0" Round Pipe
n= 0.013
Length= 254.0' Slope= 0.0039 '/'
Inlet Invert= 1.00', Outlet Invert= 0.00'



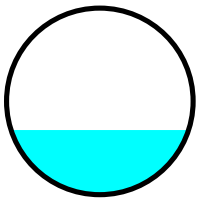
Summary for Reach 6R: 240734

Inflow Area = 1,057,211 sf, Inflow Depth = 1.33" for 10 yr event
Inflow = 5.93 cfs @ 8.02 hrs, Volume= 117,309 cf
Outflow = 5.92 cfs @ 8.03 hrs, Volume= 117,309 cf, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 10.92 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 6.09 fps, Avg. Travel Time= 0.7 min

Peak Storage= 141 cf @ 8.03 hrs
Average Depth at Peak Storage= 0.52' , Surface Width= 1.43'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 23.01 cfs

18.0" Round Pipe
n= 0.013
Length= 259.0' Slope= 0.0480 '/'
Inlet Invert= 0.00', Outlet Invert= -12.43'



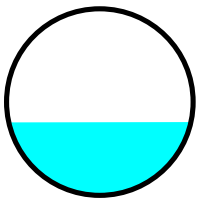
Summary for Reach 7R: 244263

Inflow Area = 1,135,183 sf, Inflow Depth = 1.39" for 10 yr event
Inflow = 6.82 cfs @ 8.02 hrs, Volume= 131,603 cf
Outflow = 6.80 cfs @ 8.04 hrs, Volume= 131,603 cf, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 10.61 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 5.41 fps, Avg. Travel Time= 1.2 min

Peak Storage= 248 cf @ 8.03 hrs
Average Depth at Peak Storage= 0.59' , Surface Width= 1.46'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 21.01 cfs

18.0" Round Pipe
n= 0.013
Length= 387.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -15.48'



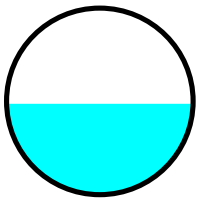
Summary for Reach 8R: 245472

Inflow Area = 1,489,326 sf, Inflow Depth = 1.49" for 10 yr event
Inflow = 10.06 cfs @ 8.02 hrs, Volume= 185,214 cf
Outflow = 10.04 cfs @ 8.03 hrs, Volume= 185,214 cf, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 11.76 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.94 fps, Avg. Travel Time= 0.7 min

Peak Storage= 203 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.73' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 21.01 cfs

18.0" Round Pipe
n= 0.013
Length= 238.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -9.52'



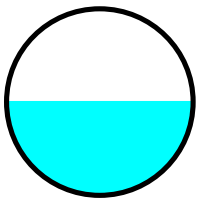
Summary for Reach 9R: 244739

Inflow Area = 1,672,714 sf, Inflow Depth = 1.55" for 10 yr event
Inflow = 12.03 cfs @ 8.02 hrs, Volume= 216,606 cf
Outflow = 12.02 cfs @ 8.03 hrs, Volume= 216,606 cf, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 13.37 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 6.75 fps, Avg. Travel Time= 0.6 min

Peak Storage= 202 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.76' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 23.49 cfs

18.0" Round Pipe
n= 0.013
Length= 224.0' Slope= 0.0500 '/'
Inlet Invert= 0.00', Outlet Invert= -11.20'



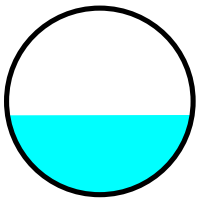
Summary for Reach 10R: 240984

Inflow Area = 2,156,665 sf, Inflow Depth = 1.61" for 10 yr event
Inflow = 16.53 cfs @ 8.01 hrs, Volume= 289,868 cf
Outflow = 16.51 cfs @ 8.02 hrs, Volume= 289,868 cf, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 10.24 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.05 fps, Avg. Travel Time= 0.6 min

Peak Storage= 281 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.96' , Surface Width= 2.23'
Bank-Full Depth= 2.25' Flow Area= 4.0 sf, Capacity= 43.80 cfs

27.0" Round Pipe
n= 0.013
Length= 174.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -3.48'



Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SBUH method, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment00: Existing Site Runoff Area=22,429 sf Runoff Depth=1.73"
Tc=15.0 min CN=77 Runoff=0.17 cfs 3,241 cf

Subcatchment01: Proposed Site Runoff Area=22,429 sf Runoff Depth=1.96"
Tc=15.0 min CN=80 Runoff=0.20 cfs 3,662 cf

Subcatchment1: 0.29 Runoff Area=11,364 sf Runoff Depth=2.20"
Tc=20.0 min CN=83 Runoff=0.11 cfs 2,083 cf

Subcatchment2: 0.10 Runoff Area=4,473 sf Runoff Depth=2.04"
Tc=10.0 min CN=81 Runoff=0.05 cfs 760 cf

Subcatchment3: 0.01 Runoff Area=371 sf Runoff Depth=3.67"
Tc=5.0 min CN=98 Runoff=0.01 cfs 113 cf

Subcatchment4: 0.04 Runoff Area=1,742 sf Runoff Depth=3.67"
Tc=5.0 min CN=98 Runoff=0.04 cfs 532 cf

Subcatchment5: 0.11 Runoff Area=4,883 sf Runoff Depth=1.52"
Tc=10.0 min CN=74 Runoff=0.03 cfs 620 cf

Subcatchment6: 1.46 Runoff Area=93,482 sf Runoff Depth=1.52"
Tc=40.0 min CN=74 Runoff=0.40 cfs 11,867 cf

SubcatchmentA: 2.09 Runoff Area=2.090 ac Runoff Depth=1.52"
Tc=10.0 min CN=74 Runoff=0.62 cfs 11,557 cf

SubcatchmentB: 9.20 Runoff Area=9.200 ac Runoff Depth=1.88"
Tc=12.0 min CN=79 Runoff=3.64 cfs 62,872 cf

SubcatchmentC: 10.31 Runoff Area=10.310 ac Runoff Depth=1.52"
Tc=10.0 min CN=74 Runoff=3.07 cfs 57,011 cf

SubcatchmentD: 0.49 Runoff Area=0.490 ac Runoff Depth=3.67"
Tc=5.0 min CN=98 Runoff=0.45 cfs 6,520 cf

SubcatchmentE: 1.30 Runoff Area=1.300 ac Runoff Depth=2.20"
Tc=5.0 min CN=83 Runoff=0.69 cfs 10,380 cf

SubcatchmentF: 8.13 Runoff Area=8.130 ac Runoff Depth=2.20"
Tc=10.0 min CN=83 Runoff=4.12 cfs 64,914 cf

SubcatchmentG: 4.21 Runoff Area=4.210 ac Runoff Depth=2.46"
Tc=10.0 min CN=86 Runoff=2.46 cfs 37,532 cf

SubcatchmentH: 8.00 Runoff Area=8.000 ac Runoff Depth=2.20"
Tc=10.0 min CN=83 Runoff=4.06 cfs 63,876 cf

SubcatchmentI: 3.11 Runoff Area=3.110 ac Runoff Depth=2.20"
Tc=8.0 min CN=83 Runoff=1.62 cfs 24,832 cf

Reach 1R: 10" Pipe Avg. Flow Depth=0.13' Max Vel=2.11 fps Inflow=0.11 cfs 2,083 cf
10.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=2.19 cfs Outflow=0.11 cfs 2,083 cf

Reach 2R: 10" Pipe Avg. Flow Depth=0.08' Max Vel=1.62 fps Inflow=0.05 cfs 760 cf
10.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=2.19 cfs Outflow=0.05 cfs 760 cf

Reach 3R: Rain Garden Avg. Flow Depth=0.03' Max Vel=0.32 fps Inflow=0.11 cfs 1,259 cf
n=0.030 L=59.0' S=0.0051 '/' Capacity=4.59 cfs Outflow=0.11 cfs 1,259 cf

Reach 4R: 10" Pipe Avg. Flow Depth=0.30' Max Vel=3.44 fps Inflow=0.61 cfs 15,209 cf
10.0" Round Pipe n=0.013 L=200.0' S=0.0100 '/' Capacity=2.19 cfs Outflow=0.61 cfs 15,209 cf

Reach 5R: 245885 Avg. Flow Depth=0.95' Max Vel=4.07 fps Inflow=4.84 cfs 89,639 cf
18.0" Round Pipe n=0.013 L=254.0' S=0.0039 '/' Capacity=6.59 cfs Outflow=4.82 cfs 89,639 cf

Reach 6R: 240734 Avg. Flow Depth=0.60' Max Vel=11.79 fps Inflow=7.85 cfs 146,649 cf
18.0" Round Pipe n=0.013 L=259.0' S=0.0480 '/' Capacity=23.01 cfs Outflow=7.83 cfs 146,649 cf

Reach 7R: 244263 Avg. Flow Depth=0.68' Max Vel=11.40 fps Inflow=8.92 cfs 163,549 cf
18.0" Round Pipe n=0.013 L=387.0' S=0.0400 '/' Capacity=21.01 cfs Outflow=8.89 cfs 163,549 cf

Reach 8R: 245472 Avg. Flow Depth=0.85' Max Vel=12.50 fps Inflow=12.95 cfs 228,463 cf
18.0" Round Pipe n=0.013 L=238.0' S=0.0400 '/' Capacity=21.01 cfs Outflow=12.93 cfs 228,463 cf

Reach 9R: 244739 Avg. Flow Depth=0.88' Max Vel=14.17 fps Inflow=15.35 cfs 265,995 cf
18.0" Round Pipe n=0.013 L=224.0' S=0.0500 '/' Capacity=23.49 cfs Outflow=15.33 cfs 265,995 cf

Reach 10R: 240984 Avg. Flow Depth=1.10' Max Vel=10.89 fps Inflow=20.94 cfs 354,704 cf
27.0" Round Pipe n=0.013 L=174.0' S=0.0200 '/' Capacity=43.80 cfs Outflow=20.92 cfs 354,704 cf

Total Runoff Area = 2,201,523 sf Runoff Volume = 362,373 cf Average Runoff Depth = 1.98"

Summary for Subcatchment 00: Existing Site

Runoff = 0.17 cfs @ 8.01 hrs, Volume= 3,241 cf, Depth= 1.73"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
4,740	89	Gravel roads, HSG C
17,689	74	>75% Grass cover, Good, HSG C
22,429	77	Weighted Average

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

Summary for Subcatchment 01: Proposed Site

Runoff = 0.20 cfs @ 8.01 hrs, Volume= 3,662 cf, Depth= 1.96"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
8,458	89	Gravel roads, HSG C
13,971	74	>75% Grass cover, Good, HSG C
22,429	80	Weighted Average

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

Summary for Subcatchment 1: 0.29

Runoff = 0.11 cfs @ 8.01 hrs, Volume= 2,083 cf, Depth= 2.20"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
6,905	89	Gravel roads, HSG C
4,459	74	>75% Grass cover, Good, HSG C
11,364	83	Weighted Average

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

Summary for Subcatchment 2: 0.10

Runoff = 0.05 cfs @ 8.00 hrs, Volume= 760 cf, Depth= 2.04"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
1,980	89	Gravel roads, HSG C
2,493	74	>75% Grass cover, Good, HSG C
4,473	81	Weighted Average

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

Summary for Subcatchment 3: 0.01

Runoff = 0.01 cfs @ 7.88 hrs, Volume= 113 cf, Depth= 3.67"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
371	98	Roofs, HSG C

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

Summary for Subcatchment 4: 0.04

Runoff = 0.04 cfs @ 7.88 hrs, Volume= 532 cf, Depth= 3.67"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
1,742	98	Roofs, HSG C

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

Summary for Subcatchment 5: 0.11

Runoff = 0.03 cfs @ 8.00 hrs, Volume= 620 cf, Depth= 1.52"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
4,883	74	>75% Grass cover, Good, HSG C

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

Summary for Subcatchment 6: 1.46

Runoff = 0.40 cfs @ 8.21 hrs, Volume= 11,867 cf, Depth= 1.52"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
93,482	74	>75% Grass cover, Good, HSG C

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

Summary for Subcatchment A: 2.09

Runoff = 0.62 cfs @ 8.00 hrs, Volume= 11,557 cf, Depth= 1.52"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

	Area (ac)	CN	Description
*	2.090	74	

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

Summary for Subcatchment B: 9.20

Runoff = 3.64 cfs @ 8.00 hrs, Volume= 62,872 cf, Depth= 1.88"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

	Area (ac)	CN	Description
*	9.200	79	

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

Summary for Subcatchment C: 10.31

Runoff = 3.07 cfs @ 8.00 hrs, Volume= 57,011 cf, Depth= 1.52"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

	Area (ac)	CN	Description
*	10.310	74	

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

Summary for Subcatchment D: 0.49

Runoff = 0.45 cfs @ 7.88 hrs, Volume= 6,520 cf, Depth= 3.67"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

	Area (ac)	CN	Description
*	0.490	98	

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

Summary for Subcatchment E: 1.30

Runoff = 0.69 cfs @ 7.96 hrs, Volume= 10,380 cf, Depth= 2.20"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

	Area (ac)	CN	Description
*	1.300	83	

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

Summary for Subcatchment F: 8.13

Runoff = 4.12 cfs @ 8.00 hrs, Volume= 64,914 cf, Depth= 2.20"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

	Area (ac)	CN	Description
*	8.130	83	

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

Summary for Subcatchment G: 4.21

Runoff = 2.46 cfs @ 7.99 hrs, Volume= 37,532 cf, Depth= 2.46"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

	Area (ac)	CN	Description
*	4.210	86	

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

Summary for Subcatchment H: 8.00

Runoff = 4.06 cfs @ 8.00 hrs, Volume= 63,876 cf, Depth= 2.20"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

	Area (ac)	CN	Description
*	8.000	83	

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

Summary for Subcatchment I: 3.11

Runoff = 1.62 cfs @ 7.99 hrs, Volume= 24,832 cf, Depth= 2.20"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

	Area (ac)	CN	Description
*	3.110	83	

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

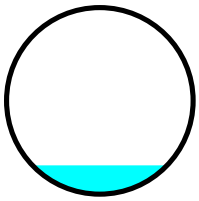
Summary for Reach 1R: 10" Pipe

Inflow Area = 11,364 sf, Inflow Depth = 2.20" for 25 yr event
Inflow = 0.11 cfs @ 8.01 hrs, Volume= 2,083 cf
Outflow = 0.11 cfs @ 8.04 hrs, Volume= 2,083 cf, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 2.11 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 1.3 min

Peak Storage= 5 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 0.60'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.19 cfs

10.0" Round Pipe
n= 0.013
Length= 100.0' Slope= 0.0100 '/'
Inlet Invert= 345.40', Outlet Invert= 344.40'



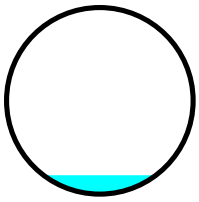
Summary for Reach 2R: 10" Pipe

Inflow Area = 4,473 sf, Inflow Depth = 2.04" for 25 yr event
Inflow = 0.05 cfs @ 8.00 hrs, Volume= 760 cf
Outflow = 0.05 cfs @ 8.02 hrs, Volume= 760 cf, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.62 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 1.7 min

Peak Storage= 3 cf @ 8.00 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 0.50'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.19 cfs

10.0" Round Pipe
n= 0.013
Length= 100.0' Slope= 0.0100 '/'
Inlet Invert= 345.00', Outlet Invert= 344.00'



Summary for Reach 3R: Rain Garden

Inflow Area = 11,469 sf, Inflow Depth = 1.32" for 25 yr event
Inflow = 0.11 cfs @ 7.99 hrs, Volume= 1,259 cf, Incl. 0.01 cfs Inflow Loss
Outflow = 0.11 cfs @ 8.06 hrs, Volume= 1,259 cf, Atten= 1%, Lag= 4.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 0.32 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 7.0 min

Peak Storage= 21 cf @ 8.01 hrs
Average Depth at Peak Storage= 0.03' , Surface Width= 13.11'
Bank-Full Depth= 0.25' Flow Area= 3.4 sf, Capacity= 4.59 cfs

13.00' x 0.25' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 59.0' Slope= 0.0051 '/'
Inlet Invert= 100.00', Outlet Invert= 99.70'

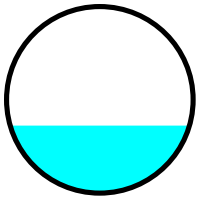
Summary for Reach 4R: 10" Pipe

Inflow Area = 116,315 sf, Inflow Depth = 1.57" for 25 yr event
Inflow = 0.61 cfs @ 8.08 hrs, Volume= 15,209 cf
Outflow = 0.61 cfs @ 8.11 hrs, Volume= 15,209 cf, Atten= 0%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 3.44 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.03 fps, Avg. Travel Time= 1.6 min

Peak Storage= 36 cf @ 8.09 hrs
Average Depth at Peak Storage= 0.30' , Surface Width= 0.80'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.19 cfs

10.0" Round Pipe
n= 0.013
Length= 200.0' Slope= 0.0100 '/'
Inlet Invert= 100.00', Outlet Invert= 98.00'



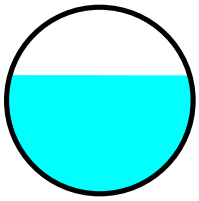
Summary for Reach 5R: 245885

Inflow Area = 608,107 sf, Inflow Depth = 1.77" for 25 yr event
Inflow = 4.84 cfs @ 8.01 hrs, Volume= 89,639 cf
Outflow = 4.82 cfs @ 8.04 hrs, Volume= 89,639 cf, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 4.07 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.23 fps, Avg. Travel Time= 1.9 min

Peak Storage= 301 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.95' , Surface Width= 1.44'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 6.59 cfs

18.0" Round Pipe
n= 0.013
Length= 254.0' Slope= 0.0039 '/'
Inlet Invert= 1.00', Outlet Invert= 0.00'



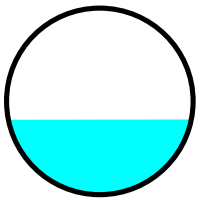
Summary for Reach 6R: 240734

Inflow Area = 1,057,211 sf, Inflow Depth = 1.66" for 25 yr event
Inflow = 7.85 cfs @ 8.02 hrs, Volume= 146,649 cf
Outflow = 7.83 cfs @ 8.03 hrs, Volume= 146,649 cf, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 11.79 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 6.43 fps, Avg. Travel Time= 0.7 min

Peak Storage= 172 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.60' , Surface Width= 1.47'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 23.01 cfs

18.0" Round Pipe
n= 0.013
Length= 259.0' Slope= 0.0480 '/'
Inlet Invert= 0.00', Outlet Invert= -12.43'



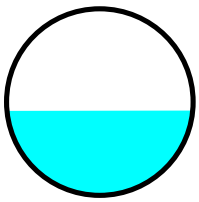
Summary for Reach 7R: 244263

Inflow Area = 1,135,183 sf, Inflow Depth = 1.73" for 25 yr event
Inflow = 8.92 cfs @ 8.02 hrs, Volume= 163,549 cf
Outflow = 8.89 cfs @ 8.03 hrs, Volume= 163,549 cf, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 11.40 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 5.74 fps, Avg. Travel Time= 1.1 min

Peak Storage= 302 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.68' , Surface Width= 1.49'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 21.01 cfs

18.0" Round Pipe
n= 0.013
Length= 387.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -15.48'



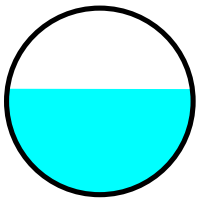
Summary for Reach 8R: 245472

Inflow Area = 1,489,326 sf, Inflow Depth = 1.84" for 25 yr event
Inflow = 12.95 cfs @ 8.01 hrs, Volume= 228,463 cf
Outflow = 12.93 cfs @ 8.02 hrs, Volume= 228,463 cf, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 12.50 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 6.29 fps, Avg. Travel Time= 0.6 min

Peak Storage= 246 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.85' , Surface Width= 1.49'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 21.01 cfs

18.0" Round Pipe
n= 0.013
Length= 238.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -9.52'



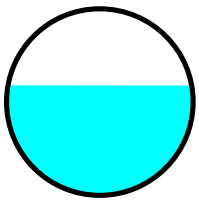
Summary for Reach 9R: 244739

Inflow Area = 1,672,714 sf, Inflow Depth = 1.91" for 25 yr event
Inflow = 15.35 cfs @ 8.02 hrs, Volume= 265,995 cf
Outflow = 15.33 cfs @ 8.02 hrs, Volume= 265,995 cf, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 14.17 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 7.13 fps, Avg. Travel Time= 0.5 min

Peak Storage= 243 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.88' , Surface Width= 1.48'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 23.49 cfs

18.0" Round Pipe
n= 0.013
Length= 224.0' Slope= 0.0500 '/'
Inlet Invert= 0.00', Outlet Invert= -11.20'



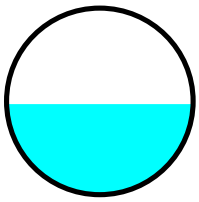
Summary for Reach 10R: 240984

Inflow Area = 2,156,665 sf, Inflow Depth = 1.97" for 25 yr event
Inflow = 20.94 cfs @ 8.01 hrs, Volume= 354,704 cf
Outflow = 20.92 cfs @ 8.02 hrs, Volume= 354,704 cf, Atten= 0%, Lag= 0.4 min

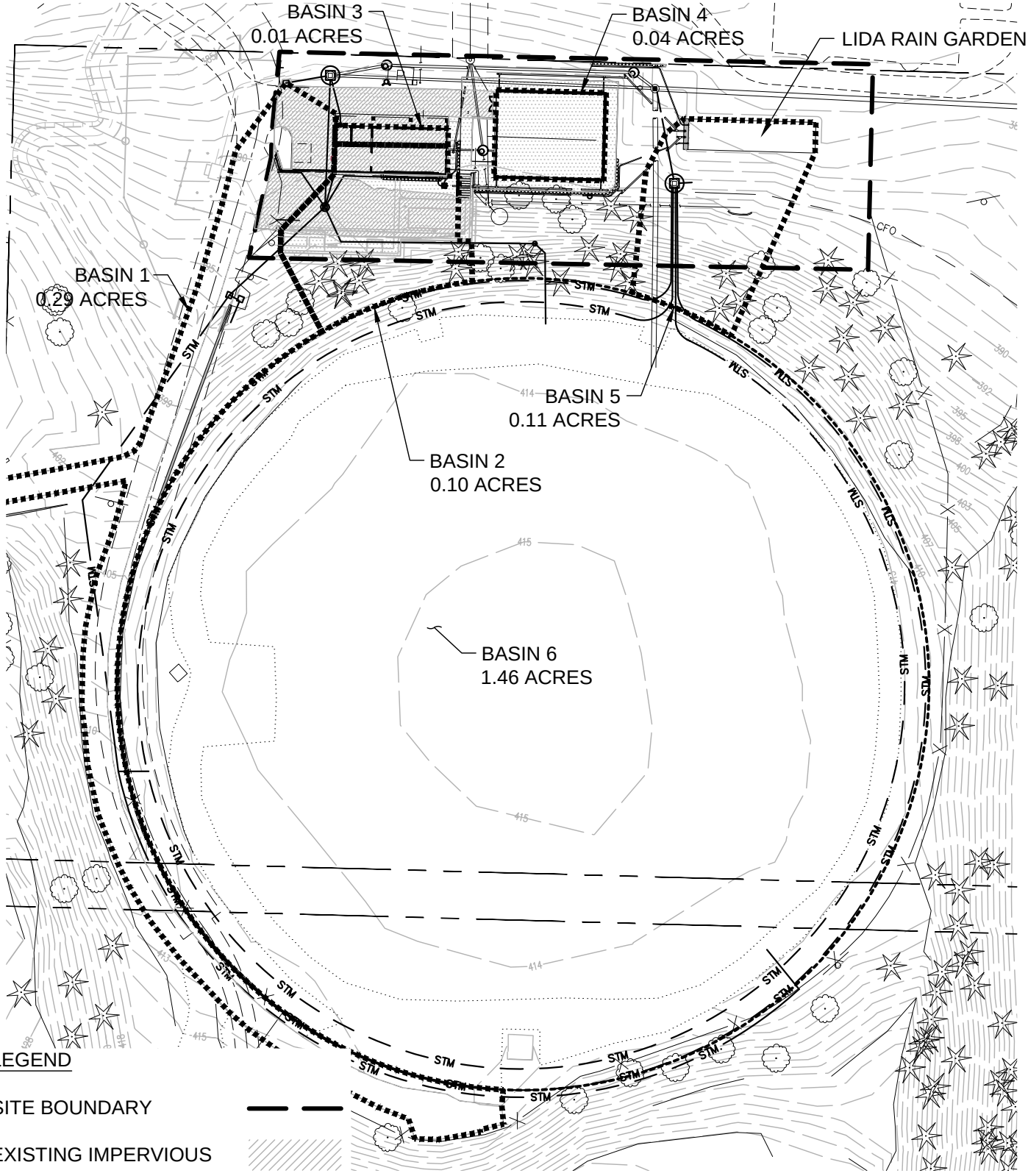
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 10.89 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.33 fps, Avg. Travel Time= 0.5 min

Peak Storage= 334 cf @ 8.01 hrs
Average Depth at Peak Storage= 1.10' , Surface Width= 2.25'
Bank-Full Depth= 2.25' Flow Area= 4.0 sf, Capacity= 43.80 cfs

27.0" Round Pipe
n= 0.013
Length= 174.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -3.48'



Appendix C. Site Basin Map

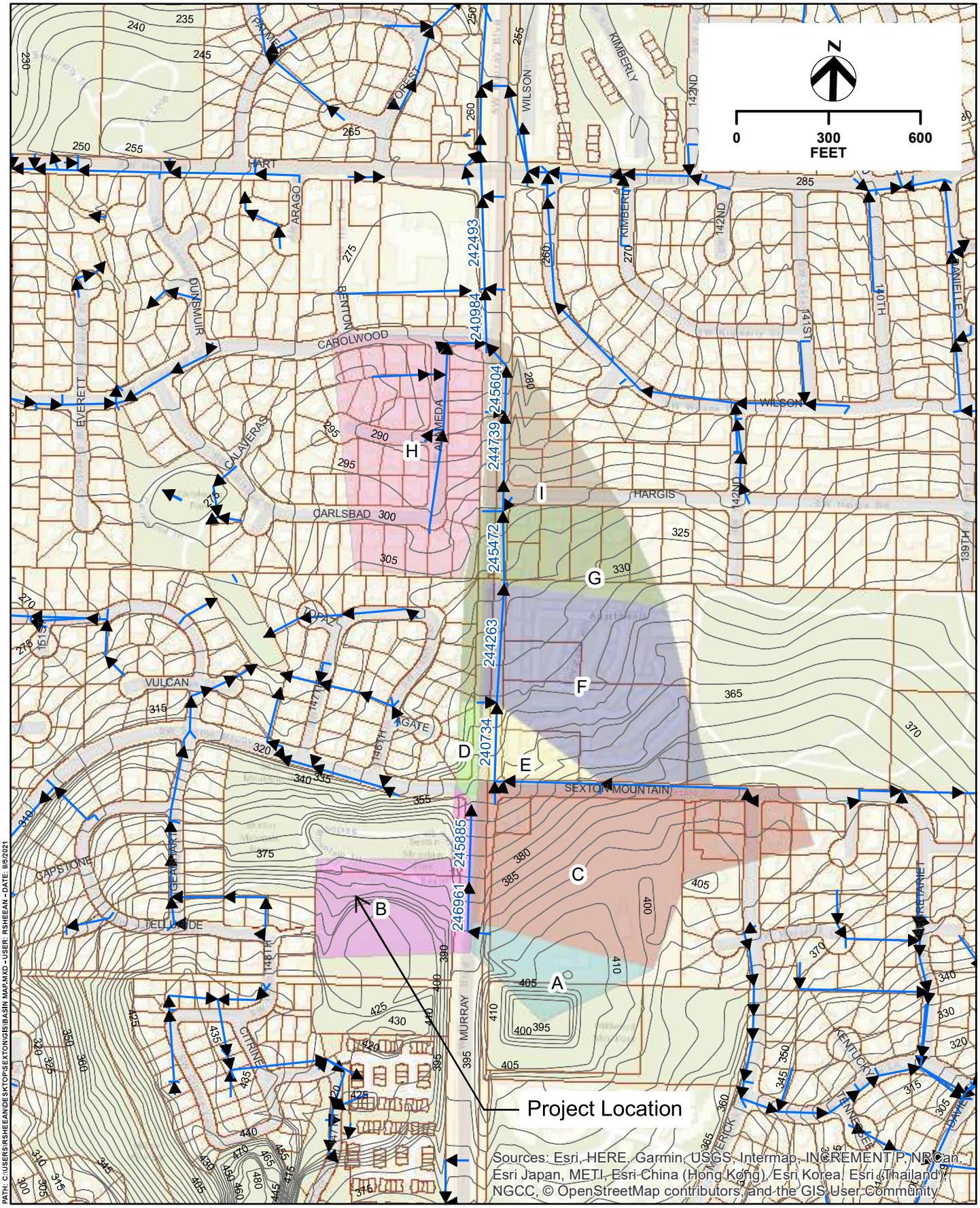


SEXTON MOUNTAIN PUMP STATION IMPROVEMENTS

SITE MAP

DATE:
SEPTEMBER 2021

Appendix D. Off-Site Basin Map



Off-Site Basin Map

SEXTON PUMP STATION IMPROVEMENTS

DATE

SEPTEMBER 2021

FIGURE

FIGURE 1

Appendix E. Rain Garden Operations and Maintenance Manual

Infiltration Planter / Rain Garden Operation and Maintenance Plan

Annual inspections are required. It is recommended that the facility is inspected on a monthly basis to ensure proper function. The plan below describes inspection and maintenance activities, and may be used as an inspection log. Contact the design engineer, Clean Water Services or City representative for more information.

Identified Problem	Condition to Check for	Maintenance Activity	Maintenance Timing	✔ Task Complete Comments
Invasive Vegetation as outlined in Appendix A	Invasive vegetation found in facility. Examples include: Himalayan Blackberry; Reed Canary Grass; Teasel; English Ivy; Nightshade; Clematis; Cattail; Thistle; Scotch Broom	Remove excessive weeds and all invasive plants. Attempt to control even if complete eradication is not feasible. Refer to Clean Water Services Integrated Pest Management Plan for appropriate control methods, including proper use of chemical treatment.		
Obstructed Inlet/Outlet	Material such as vegetation, trash, sediment is blocking more than 10% of the inlet pipe or basin opening	Remove blockages from facility	 Inspect after major storm (1-inch in 24 hours)	
Excessive Vegetation	Vegetation grows so tall it competes with or shades approved emergent wetland grass/shrubs; interferes with access or becomes a fire danger	Cut tall grass 4" to 6" and remove clippings. Prune emergent wetland grass/shrubs that have become overgrown.	 Ideal time to prune emergent wetland grass is spring. Cut grass during dry months	
Tree/Shrub Growth	Tree/shrub growth shades out wetland/emergent grass in treatment area. Interferes with access for maintenance/inspection	Prune trees and shrubs that block sun from reaching treatment area. Remove trees that block access points. Do not remove trees that are not interfering with access or maintenance without first contacting Clean Water Services or local City.	 Ideal timing for pruning trees is winter	

Infiltration Planter / Rain Garden Operation and Maintenance Plan (continued)

Annual inspections are required. It is recommended that the facility is inspected on a monthly basis to ensure proper function. The plan below describes inspection and maintenance activities, and may be used as an inspection log. Contact the design engineer, Clean Water Services or City representative for more information.

Identified Problem	Condition to Check for	Maintenance Activity	Maintenance Timing	✔ Task Complete Comments
Hazard Trees	Observe dead, dying or diseased trees	Remove hazard trees. A certified arborist may need to determine health of tree or removal requirements	As Needed	
Poor Vegetation Coverage	80% survival of approved vegetation and no bare areas large enough to affect function of facility.	Determine cause of poor growth and correct the condition. Replant per the approved planting plan and applicable standards at the time of construction. Remove excessive weeds and all invasive plants.	 Ideal time to plant is spring and fall seasons	
Trash and Debris	Visual evidence of trash, debris or dumping	Remove trash and debris from facility. Dispose of properly		
Contaminants and Pollution	Evidence of oil, gasoline, contaminants or other pollutants. Look for sheens, odor or signs of contamination.	If contaminants or pollutants are present, coordinate removal/cleanup with local jurisdiction		
Erosion	Erosion or channelization that impacts or effects the function of the facility or creates a safety concern	Repair eroded areas and stabilize using proper erosion control measures. Establish appropriate vegetation as needed.		
Flow Not Distributed Evenly	Flows unevenly distributed through planter width due to uneven or clogged flow spreader	Level the spreader and clean so that flows spread evenly over entire planter width