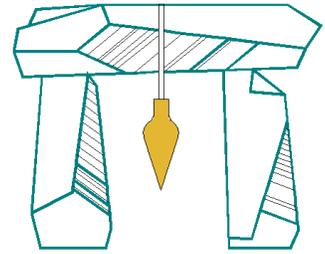


June 28, 2021

Mr. Nicholas Iannuzzi, Chair  
Belmont Zoning Board of Appeals  
455 Concord Avenue  
Belmont, MA 02478

**Re: Peer Review Response  
91 Beatrice Circle  
Belmont, MA**

DeCelle-Burke-Sala



& Associates, Inc.

Dear Mr. Chair & Board of Appeals Members:

DeCelle-Burke-Sala & Associates, Inc. (DBS) has prepared the attached information to respond to outstanding concerns raised by your peer review professional, Jesse Johnson, PE of Weston & Sampson Engineers, Inc. (W&S) during recent work sessions and as outlined in an email dated June 16, 2021. The outstanding concerns itemized in the email and corresponding responses are as follows:

- Provide documentation/calculations that the proposed tie-in at Frontage Road.

The current stormwater management design proposes to connect to the existing 15" drain pipe with a 10" HDPE drain pipe. The proposed 10" drain pipe allows treated and detained stormwater runoff generated from the project site to enter the existing Town of Belmont drainage infrastructure. WSE requested this office to prepare calculations that determine how this connection impacts the existing infrastructure's capacity.

DBS generated a watershed map that delineates the up-gradient watershed for the existing 15" drain pipe that runs along Frontage Road at the project locus, 91 Beatrice Circle. The watershed area is 618,294 square feet (s.f.) and we provided an existing coverage number (CN) of 61 for existing conditions and calculated a time of concentration of 9.9 minutes. The existing drain pipe is a 15" reinforced concrete pipe with a slope of 7.7%.

DBS used HydroCAD to calculate the existing stormwater flow for this 15" pipe using the data above. In addition, DBS generated a proposed condition HydroCAD model for the proposed condition. The proposed condition model includes the redeveloped project site along with the up-gradient neighborhood flow. The project site watershed contributing to the pipe is 25,100 s.f. and is routed through a subsurface recharge structure and a detention tank. DBS removed 25,100 s.f. of area from the existing watershed area and added the proposed site's HydroCAD model to form the proposed conditions HydroCAD model.

The results show a reduction of flow into the 15" pipe for each calculated storm event. The calculations also show that the pipe under current conditions is slightly surcharged for the 10-year storm event. The proposed conditions model shows that the on-site detention allows the pipe to operate under open-channel conditions for the 10-year event. The pipe is not surcharged. The proposed stormwater management structures not only reduces the flow off-site to the abutters but allows the existing drainage infrastructure to operate at an improved efficiency.

DeCelle-Burke-Sala & Associates, Inc.  
1266 Furnace Brook Pkwy., #401 Quincy, MA 02169  
PH: 617-405-5100 FX: 617-405-5101

DBS has attached the watershed map, the HydroCAD calculations for the existing condition off-site drainage analysis, the HydroCAD calculations for the proposed condition off-site drainage analysis and comparison summary sheets showing peak flows and flow depth for the 15" pipe.

- Provide more detail on how the apparent ledge will be dealt with at the site.

DBS has generated a plan showing estimated ledge contours calculated by interpolating between the ledge elevations found in each test pit. A copy of this plan is attached to this letter. In addition DBS estimated the underground excavation required for this site and created a surface using Civil 3D AutoCAD software. A ledge removal volume of 726 cubic yards was calculated with a maximum depth of 3.5 feet for the installation of the detention tank. The applicant proposes to remove the ledge by hydraulic hammer. No blasting is proposed for this site.

- The system is proposed 2' closer to foundations than DEP suggests

DBS replaced the Cultec chambers and stone with twenty-nine (29) concrete 4'x4'x3' subsurface recharge galleys backfilled with native soil. DBS revised the plans and the HydroCAD calculations in support of this revision and the plans and supporting calculations are attached to this letter. The data is in a document titled Supplemental Engineering Report revised June 28, 2021 while a flow comparison flow summary sheet is attached to this letter. This revision allows the subsurface recharge structure to meet the ten foot MADEP setback guideline of infiltration structure to foundation.

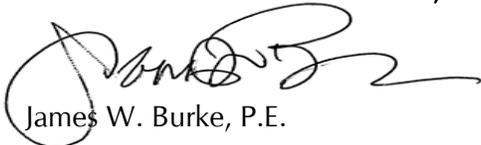
- The mounding analysis needs to be done with correct input parameters. We ran the correct numbers informally and they appeared to work but the Applicant should confirm.

DBS has attached a revised mounding analysis that shows the calculated groundwater mound does not have a negative impact upon the subsurface recharge structure and that it drains within 72 hours. The mounding analysis can be found in the Supplemental Engineering Report.

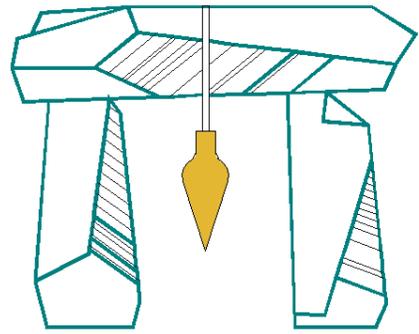
We realize that WSE may have other items requiring attention with the attached design but we look forward to continuing to work with WSE and the Town of Belmont to address these concerns. We look forward to presenting these revisions to the Board at the next scheduled hearing.

Sincerely,

DeCelle-Burke-Sala & Associates, Inc.



James W. Burke, P.E.



June 28, 2021

**Peak Flow Comparison for Frontage Road  
91 Beatrice Circle  
Belmont, MA**

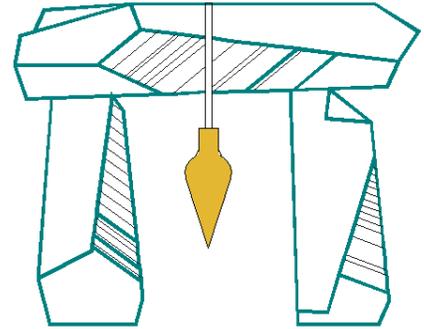
2-Year Storm (3.41")			
Existing Conditions		Proposed Conditions	
Area Description	Flow	Area Description	Flow
Flow off-site	4.41 cfs; (12.18)	Flow off-site	4.25 cfs; (12.18)

10-Year Storm (5.33")			
Existing Conditions		Proposed Conditions	
Area Description	Flow	Area Description	Flow
Flow off-site	19.52 cfs; (12.15)	Flow off-site	18.90 cfs; (12.15)

25-Year Storm (6.52")			
Existing Conditions		Proposed Conditions	
Area Description	Flow	Area Description	Flow
Flow off-site	31.25 cfs; (12.15)	Flow off-site	30.42 cfs; (12.15)

100-Year Storm (8.37")			
Existing Conditions		Proposed Conditions	
Area Description	Flow	Area Description	Flow
Flow off-site	51.22 cfs; (12.14)	Flow off-site	49.97 cfs; (12.14)

(Number in parentheses is peak inflow time in decimal hours)



June 28, 2021

**Peak Flow Depth Comparison for  
15” Drain Pipe on Frontage Road  
91 Beatrice Circle  
Belmont, MA**

2-Year Storm (3.41”)			
Existing Conditions		Proposed Conditions	
Area Description	Flow Depth	Area Description	Flow Depth
15” Drain Pipe	0.42 feet; (12.19)	15” Drain Pipe	0.41 feet; (12.19)

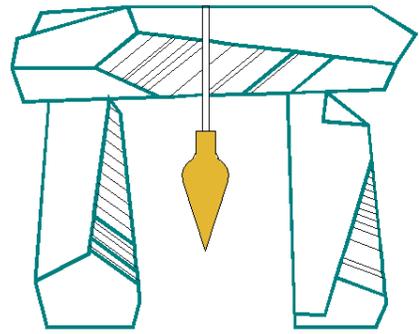
10-Year Storm (5.33”)			
Existing Conditions		Proposed Conditions	
Area Description	Flow Depth (Feet)	Area Description	Flow Depth
15” Drain Pipe	1.25 feet; (12.16)	15” Drain Pipe	1.10 feet; (12.16)

25-Year Storm (6.52”)			
Existing Conditions		Proposed Conditions	
Area Description	Flow Depth (Feet)	Area Description	Flow Depth
15” Drain Pipe	1.25 feet; (12.06)	15” Drain Pipe	1.25 feet; (12.07)

100-Year Storm (8.37”)			
Existing Conditions		Proposed Conditions	
Area Description	Flow Depth	Area Description	Flow Depth
15” Drain Pipe	1.25 feet; (11.99)	15” Drain Pipe	1.25 feet; (11.99)

(Parentheses number is peak storage time in decimal hours)

**\*\* Pipe surcharged when depth is 1.25 feet**



June 28, 2021

**Peak Flow Comparison for Frontage Road  
91 Beatrice Circle  
Belmont, MA**

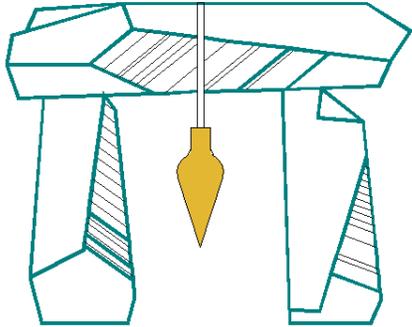
2-Year Storm (3.41")			
Existing Conditions		Proposed Conditions	
Area Description	Flow	Area Description	Flow
Flow off-site	0.03 cfs; (12.33)	Flow off-site	0.03 cfs; (12.45)

10-Year Storm (5.33")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow
Flow off-site	0.30 (12.11)	Flow off-site	0.26 cfs; (12.43)

25-Year Storm (6.52")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow
Flow off-site	0.54 cfs; (12.10)	Flow off-site	0.44 cfs; (12.32)

100-Year Storm (8.37")			
Existing Conditions		Proposed Conditions	
Area Description	Flow	Area Description	Flow
Flow off-site	0.98 cfs; (12.09)	Flow off-site	0.84 cfs; (12.11)

(Number in parentheses is peak inflow time in decimal hours)



June 28, 2021

**Peak Flow Comparison for Abutters  
91 Beatrice Circle  
Belmont, MA**

2-Year Storm (3.41")			
Existing Conditions		Proposed Conditions	
Area Description	Flow	Area Description	Flow
Stream Channel	0.04 cfs; (12.15)	Stream Channel	0.00 cfs; (23.34)

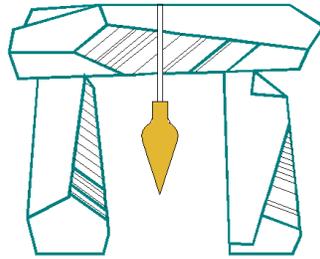
10-Year Storm (5.33")			
Existing Conditions		Proposed Conditions	
Area Description	Flow	Area Description	Flow
Stream Channel	0.31 cfs; (12.11)	Stream Channel	0.01 cfs; (12.42)

25-Year Storm (6.52")			
Existing Conditions		Proposed Conditions	
Area Description	Flow	Area Description	Flow
Stream Channel	0.59 (12.10)	Stream Channel	0.05cfs; (12.28)

100-Year Storm (8.37")			
Existing Conditions		Proposed Conditions	
Area Description	Flow	Area Description	Flow
Stream Channel	1.15 cfs; (12.10)	Stream Channel	0.18cfs; (12.11)

(Number in parentheses is peak inflow time in decimal hours)

DeCelle-Burke-Sala



& Associates, Inc.

Supplemental Engineering Report  
for a  
Multi-Unit Residential Development  
91 Beatrice Circle  
Belmont, Massachusetts

Prepared by:

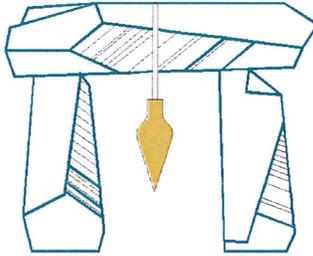
DeCelle-Burke-Sala & Associates, Inc.  
1266 Furnace Brook Parkway  
Suite 401  
Quincy, MA 02169

Prepared for:

91 Beatrice Circle LLC  
c/o Regnante Sterio  
401 Edgewater Pl., #603  
Wakefield, MA 01880

Revised: June 1, 2021

DeCelle-Burke-Sala



& Associates, Inc.

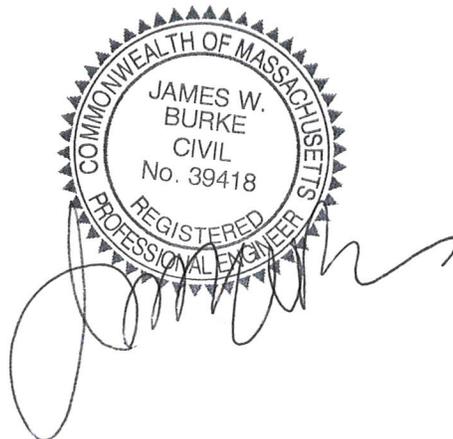
**Supplemental Engineering Report**  
**for a**  
**Multi-Unit Residential Development**  
**91 Beatrice Circle**  
**Belmont, Massachusetts**

Prepared by:

DeCelle-Burke-Sala & Associates, Inc.  
1266 Furnace Brook Parkway  
Suite 401  
Quincy, MA 02169

Prepared for:

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Wakefield, MA 01880



Revised: June 28, 2021

## Table of Contents

<u>Section 1</u>	–	<u>Stormwater Management Data</u>	
		Checklist for Stormwater Report	2-10
		Standard 3 Compliance	11-19
		Groundwater Mounding	20-21
		HydroCAD Calculations	
		Existing Conditions	22-34
		2-Year	
		10-Year	
		25-Year	
		100-Year	
		Proposed Conditions	35-61
		2-Year	
		10-Year	
		25-Year	
		100-Year	
		Offsite Watershed Analysis	
		Existing Conditions	62-68
		2-Year	
		10-Year	
		25-Year	
		100-Year	
		Proposed Conditions	69-93
		2-Year	
		10-Year	
		25-Year	
		100-Year	
		Watershed Maps	94-95

## **SECTION 1 - STORMWATER MANAGEMENT DATA**

Checklist for Stormwater Report



# Checklist for Stormwater Report

## A. Introduction

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

<sup>1</sup> The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

<sup>2</sup> For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

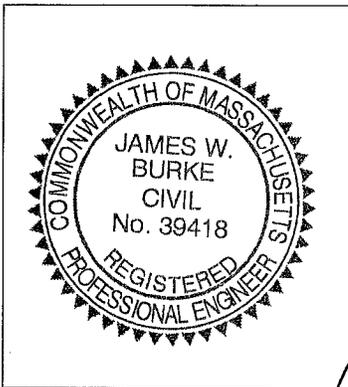
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

### Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date

### Checklist

**Project Type:** Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment



# Checklist for Stormwater Report

---

## Checklist (continued)

**LID Measures:** Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
  - Credit 1
  - Credit 2
  - Credit 3
- Use of "country drainage" versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): \_\_\_\_\_

### Standard 1: No New Untreated Discharges

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

### Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - Static
  - Simple Dynamic
  - Dynamic Field<sup>1</sup>
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - Site is comprised solely of C and D soils and/or bedrock at the land surface
  - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - Solid Waste Landfill pursuant to 310 CMR 19.000
  - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

---

<sup>1</sup> 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



# Checklist for Stormwater Report

---

## Checklist (continued)

### Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

### Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
  - Provisions for storing materials and waste products inside or under cover;
  - Vehicle washing controls;
  - Requirements for routine inspections and maintenance of stormwater BMPs;
  - Spill prevention and response plans;
  - Provisions for maintenance of lawns, gardens, and other landscaped areas;
  - Requirements for storage and use of fertilizers, herbicides, and pesticides;
  - Pet waste management provisions;
  - Provisions for operation and management of septic systems;
  - Provisions for solid waste management;
  - Snow disposal and plowing plans relative to Wetland Resource Areas;
  - Winter Road Salt and/or Sand Use and Storage restrictions;
  - Street sweeping schedules;
  - Provisions for prevention of illicit discharges to the stormwater management system;
  - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
  - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
  - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
  - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
    - is within the Zone II or Interim Wellhead Protection Area
    - is near or to other critical areas
    - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
    - involves runoff from land uses with higher potential pollutant loads.
  - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
  - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
  - The ½" or 1" Water Quality Volume or
  - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

### Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

### Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



# Checklist for Stormwater Report

---

## Checklist (continued)

### Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
  - Limited Project
  - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
  - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
  - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
  - Bike Path and/or Foot Path
  - Redevelopment Project
  - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
  - Construction Period Operation and Maintenance Plan;
  - Names of Persons or Entity Responsible for Plan Compliance;
  - Construction Period Pollution Prevention Measures;
  - Erosion and Sedimentation Control Plan Drawings;
  - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
  - Vegetation Planning;
  - Site Development Plan;
  - Construction Sequencing Plan;
  - Sequencing of Erosion and Sedimentation Controls;
  - Operation and Maintenance of Erosion and Sedimentation Controls;
  - Inspection Schedule;
  - Maintenance Schedule;
  - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



# Checklist for Stormwater Report

---

## Checklist (continued)

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

### Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
  - Name of the stormwater management system owners;
  - Party responsible for operation and maintenance;
  - Schedule for implementation of routine and non-routine maintenance tasks;
  - Plan showing the location of all stormwater BMPs maintenance access areas;
  - Description and delineation of public safety features;
  - Estimated operation and maintenance budget; and
  - Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
  - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
  - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

### Standard 10: Prohibition of Illicit Discharges

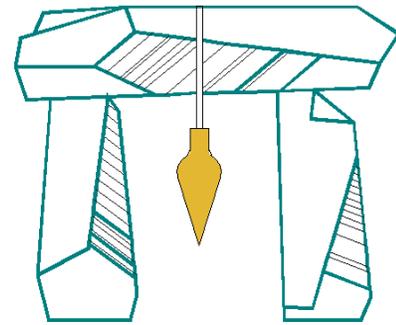
- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

## Standard 3 Compliance

# Calculation Sheet

DeCelle-Burke-Sala

Project: Proposed Site Plan  
91 Beatrice Circle  
Belmont, MA  
 Client: 91 Beatrice Circle LLC  
401 Edgewater Pl., Suite 630, Wakefield, MA  
 Date: June 28, 2021



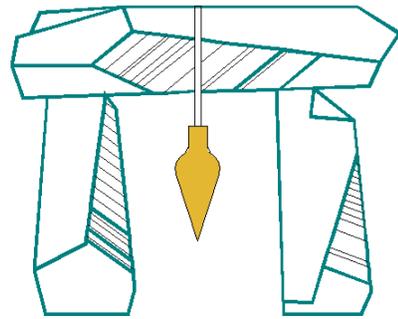
& Associates, Inc.

Standard 3 Compliance Infiltration System									
Step 1.									
Find: Recharge Volume Requirement									
Given: $R_v = (F \times \text{impervious area})$									
$A = 12,350$ s.f. impervious area $F = 0.6$ " for A-soils									
Solve: $R_v = 12,350$ s.f. x $0.6$ "/12' = $617.50$ c.f.									
Total Impervious Area = $16,138$ s.f.									
Collected Impervious Area = $12,350$ s.f.									
Adjustment Factor = $1.31$									
Adjusted $R_v = 806.90$ c.f.									
Step 2.									
Select a 24-hour rainfall event that generates the $R_v$ during the peak 2 hours. Use only the Site's impervious drainage area and the default NRCS Initial Abstraction of 0.25 and Type III storm. Set storm duration for 24 hours, but use a start time of 11 hours and an end time of 13 hours.									
Rainfall Depth Generating $R_v$ $806.90$ c.f. is $1.71$ in.									
Step 3.									
Bottom area of infiltration system = length x width									
= $116$ ft x $4.00$ ft									
= $464.00$ s.f.									

# Calculation Sheet

DeCelle-Burke-Sala

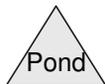
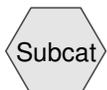
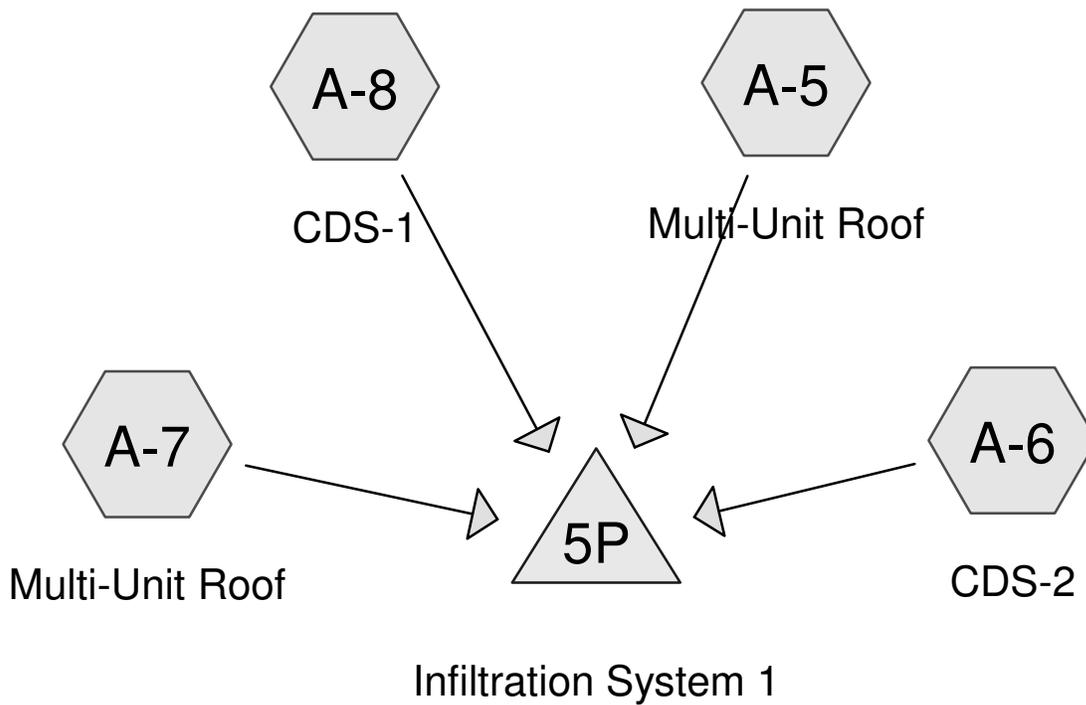
Project: Proposed Site Plan  
91 Beatrice Circle  
Belmont, MA  
 Client: 91 Beatrice Circle LLC  
401 Edgewater Pl., Suite 630, Wakefield, MA  
 Date: June 28, 2021



& Associates, Inc.

Step 4.	
Set exfiltration in HydroCAD to exfiltrate through the bottom only. Exfiltration rate to be the Rawls Rate based on the soil analysis.	
Step 5.	
Determine if recharge system can handle required recharge volume.	
Solve: See Attached HydroCAD	
Depth of Infiltration System below outlet=	3.17 ft.
Find: Depth of Rv within Infiltration System	
Peak Elevation - Bottom of Field = Corresponding Field Depth	
221.27 ft. -	219.00 ft. = 2.27 ft.
<b>CHECKS OK</b>	





**Routing Diagram for Standard 3-6-28-21**  
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**Standard 3-6-28-21**

**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
173	39	>75% Grass cover, Good, HSG A (A-8)
4,875	98	Paved parking (A-6, A-8)
7,475	98	Roofs (A-5, A-7)
<b>12,523</b>	<b>97</b>	<b>TOTAL AREA</b>

**Standard 3-6-28-21**

Type III 24-hr Custom Rainfall=1.71"

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Page 3

**Summary for Subcatchment A-5: Multi-Unit Roof**

Runoff = 0.13 cfs @ 12.08 hrs, Volume= 241 cf, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr Custom Rainfall=1.71"

Area (sf)	CN	Description
* 3,557	98	Roofs
3,557		100.00% Impervious Area

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

**Summary for Subcatchment A-6: CDS-2**

Runoff = 0.04 cfs @ 12.08 hrs, Volume= 76 cf, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr Custom Rainfall=1.71"

Area (sf)	CN	Description
* 1,122	98	Paved parking
1,122		100.00% Impervious Area

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

**Summary for Subcatchment A-7: Multi-Unit Roof**

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 265 cf, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr Custom Rainfall=1.71"

Area (sf)	CN	Description
* 3,918	98	Roofs
3,918		100.00% Impervious Area

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

**Standard 3-6-28-21**

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Type III 24-hr Custom Rainfall=1.71"

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Page 4

**Summary for Subcatchment A-8: CDS-1**

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 225 cf, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
Type III 24-hr Custom Rainfall=1.71"

Area (sf)	CN	Description
* 3,753	98	Paved parking
173	39	>75% Grass cover, Good, HSG A
3,926	95	Weighted Average
173		4.41% Pervious Area
3,753		95.59% Impervious Area

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

**Summary for Pond 5P: Infiltration System 1**

Inflow Area = 12,523 sf, 98.62% Impervious, Inflow Depth > 0.77" for Custom event  
 Inflow = 0.44 cfs @ 12.08 hrs, Volume= 806 cf  
 Outflow = 0.03 cfs @ 11.03 hrs, Volume= 186 cf, Atten= 94%, Lag= 0.0 min  
 Discarded = 0.03 cfs @ 11.03 hrs, Volume= 186 cf  
 Primary = 0.00 cfs @ 11.00 hrs, Volume= 0 cf

Routing by Sim-Route method, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs  
 Peak Elev= 221.27' @ 13.00 hrs Surf.Area= 464 sf Storage= 620 cf

Plug-Flow detention time= 25.9 min calculated for 185 cf (23% of inflow)  
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	389 cf	<b>4.00'W x 116.00'L x 5.50'H Field A</b> 2,552 cf Overall - 1,254 cf Embedded = 1,298 cf x 30.0% Voids
#2A	220.00'	905 cf	<b>Concrete Galley 4x4x3</b> x 29 Inside #1 Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf
		1,294 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	222.17'	<b>10.0" Round Culvert</b> L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 222.17' / 220.57' S= 0.0800 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf

**Standard 3-6-28-21**

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*Type III 24-hr Custom Rainfall=1.71"*

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Page 5

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**Discarded OutFlow** Max=0.03 cfs @ 11.03 hrs HW=219.01' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.00 cfs @ 11.00 hrs HW=219.00' (Free Discharge)

↑2=Culvert ( Controls 0.00 cfs)

## Groundwater Mounding

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0)), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.

Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. **The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed** otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)	Conversion Table		
			inch/hour	feet/day	
4.8200	R	Recharge (infiltration) rate (feet/day)	0.67	1.33	
0.210	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
48.20	K	Horizontal hydraulic conductivity, Kh (feet/day)*	2.00	4.00	In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).
58.000	x	1/2 length of basin (x direction, in feet)			
2.000	y	1/2 width of basin (y direction, in feet)	hours	days	
1.460	t	duration of infiltration period (days)	36	1.50	
0.000	hi(0)	initial thickness of saturated zone (feet)			

3.135	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
3.135	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)

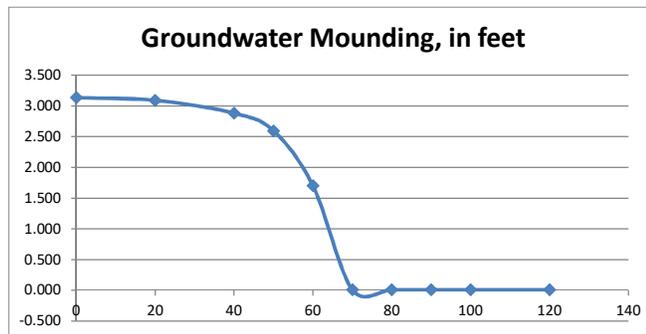
Ground-water Mounding, in feet

Distance from center of basin in x direction, in feet

3.135	0
3.092	20
2.882	40
2.595	50
1.701	60
0.011	70
0.010	80
0.011	90
0.010	100
0.012	120



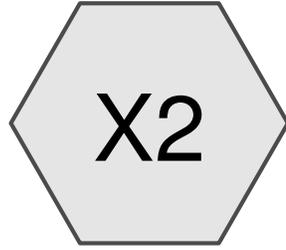
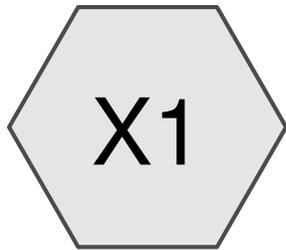
Re-Calculate Now



**Disclaimer**

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

HydroCAD Calculations  
Existing Conditions  
2-Year  
10-Year  
25-Year  
100-Year

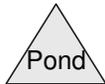
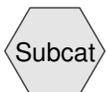


South Abutter

East Abutter



Flow to Abutters



**Routing Diagram for Off-site Analysis**  
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## Off-site Analysis

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Page 2

### Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
13,094	39	>75% Grass cover, Good, HSG A (X1, X2)
1,494	98	Pavement (X2)
2,612	98	Roof (X1, X2)
1,663	30	Woods, Good, HSG A (X2)
<b>18,863</b>	<b>51</b>	<b>TOTAL AREA</b>

**Off-site Analysis**

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 3

**Summary for Subcatchment X1: South Abutter**

Runoff = 0.00 cfs @ 20.94 hrs, Volume= 12 cf, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

	Area (sf)	CN	Description
*	414	98	Roof
	7,367	39	>75% Grass cover, Good, HSG A
	7,781	42	Weighted Average
	7,367		94.68% Pervious Area
	414		5.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment X2: East Abutter**

Runoff = 0.04 cfs @ 12.15 hrs, Volume= 308 cf, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

	Area (sf)	CN	Description
*	1,494	98	Pavement
*	2,198	98	Roof
	5,727	39	>75% Grass cover, Good, HSG A
	1,663	30	Woods, Good, HSG A
	11,082	57	Weighted Average
	7,390		66.68% Pervious Area
	3,692		33.32% Impervious Area

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

**Summary for Reach 2R: Flow to Abutters**

Inflow Area = 18,863 sf, 21.77% Impervious, Inflow Depth = 0.20" for 2-yr event

Inflow = 0.04 cfs @ 12.15 hrs, Volume= 320 cf

Outflow = 0.04 cfs @ 12.16 hrs, Volume= 320 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

**Off-site Analysis**

Type III 24-hr 10-yr Rainfall=5.16"

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Page 4

**Summary for Subcatchment X1: South Abutter**

Runoff = 0.02 cfs @ 12.36 hrs, Volume= 230 cf, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

	Area (sf)	CN	Description
*	414	98	Roof
	7,367	39	>75% Grass cover, Good, HSG A
	7,781	42	Weighted Average
	7,367		94.68% Pervious Area
	414		5.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment X2: East Abutter**

Runoff = 0.31 cfs @ 12.10 hrs, Volume= 1,100 cf, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

	Area (sf)	CN	Description
*	1,494	98	Pavement
*	2,198	98	Roof
	5,727	39	>75% Grass cover, Good, HSG A
	1,663	30	Woods, Good, HSG A
	11,082	57	Weighted Average
	7,390		66.68% Pervious Area
	3,692		33.32% Impervious Area

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

**Summary for Reach 2R: Flow to Abutters**

Inflow Area = 18,863 sf, 21.77% Impervious, Inflow Depth = 0.85" for 10-yr event

Inflow = 0.31 cfs @ 12.11 hrs, Volume= 1,330 cf

Outflow = 0.31 cfs @ 12.12 hrs, Volume= 1,330 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

**Off-site Analysis**

Type III 24-hr 25-yr Rainfall=6.34"

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Page 5

**Summary for Subcatchment X1: South Abutter**

Runoff = 0.08 cfs @ 12.14 hrs, Volume= 477 cf, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 414	98	Roof
7,367	39	>75% Grass cover, Good, HSG A
7,781	42	Weighted Average
7,367		94.68% Pervious Area
414		5.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment X2: East Abutter**

Runoff = 0.52 cfs @ 12.10 hrs, Volume= 1,742 cf, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 1,494	98	Pavement
* 2,198	98	Roof
5,727	39	>75% Grass cover, Good, HSG A
1,663	30	Woods, Good, HSG A
11,082	57	Weighted Average
7,390		66.68% Pervious Area
3,692		33.32% Impervious Area

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

**Summary for Reach 2R: Flow to Abutters**

Inflow Area = 18,863 sf, 21.77% Impervious, Inflow Depth = 1.41" for 25-yr event

Inflow = 0.59 cfs @ 12.10 hrs, Volume= 2,219 cf

Outflow = 0.59 cfs @ 12.11 hrs, Volume= 2,219 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

**Off-site Analysis**

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Type III 24-hr 100-yr Rainfall=8.15"

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Page 6

**Summary for Subcatchment X1: South Abutter**

Runoff = 0.25 cfs @ 12.11 hrs, Volume= 981 cf, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 414	98	Roof
7,367	39	>75% Grass cover, Good, HSG A
7,781	42	Weighted Average
7,367		94.68% Pervious Area
414		5.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment X2: East Abutter**

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 2,871 cf, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 1,494	98	Pavement
* 2,198	98	Roof
5,727	39	>75% Grass cover, Good, HSG A
1,663	30	Woods, Good, HSG A
11,082	57	Weighted Average
7,390		66.68% Pervious Area
3,692		33.32% Impervious Area

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

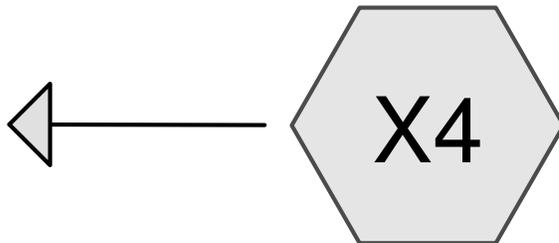
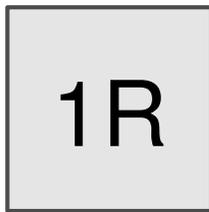
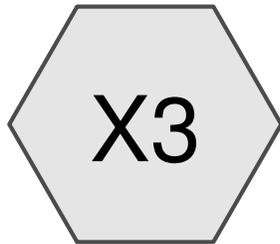
**Summary for Reach 2R: Flow to Abutters**

Inflow Area = 18,863 sf, 21.77% Impervious, Inflow Depth = 2.45" for 100-yr event

Inflow = 1.15 cfs @ 12.10 hrs, Volume= 3,852 cf

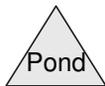
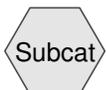
Outflow = 1.15 cfs @ 12.11 hrs, Volume= 3,852 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs



Runoff to Frontage Rd

Off Locus



**Routing Diagram for Off-site Analysis**  
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## Off-site Analysis

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Page 2

### Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
5,858	39	>75% Grass cover, Good, HSG A (X3, X4)
3,071	98	Pavement (X3, X4)
941	98	Roof (X3)
3,346	30	Woods, Good, HSG A (X4)
<b>13,216</b>	<b>55</b>	<b>TOTAL AREA</b>

## Off-site Analysis

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 3

### Summary for Subcatchment X3: To Frontage Road

Runoff = 0.01 cfs @ 12.30 hrs, Volume= 117 cf, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 370	98	Pavement
* 941	98	Roof
3,323	39	>75% Grass cover, Good, HSG A
4,634	56	Weighted Average
3,323		71.71% Pervious Area
1,311		28.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

### Summary for Subcatchment X4: Off Locus

Runoff = 0.02 cfs @ 12.34 hrs, Volume= 174 cf, Depth= 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 2,701	98	Pavement
2,535	39	>75% Grass cover, Good, HSG A
3,346	30	Woods, Good, HSG A
8,582	54	Weighted Average
5,881		68.53% Pervious Area
2,701		31.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

### Summary for Reach 1R: Runoff to Frontage Rd

Inflow Area = 13,216 sf, 30.36% Impervious, Inflow Depth = 0.26" for 2-yr event  
Inflow = 0.03 cfs @ 12.33 hrs, Volume= 291 cf  
Outflow = 0.03 cfs @ 12.34 hrs, Volume= 291 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

**Off-site Analysis**

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Type III 24-hr 10-yr Rainfall=5.16"

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Page 4

**Summary for Subcatchment X3: To Frontage Road**

Runoff = 0.12 cfs @ 12.10 hrs, Volume= 434 cf, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 370	98	Pavement
* 941	98	Roof
3,323	39	>75% Grass cover, Good, HSG A
4,634	56	Weighted Average
3,323		71.71% Pervious Area
1,311		28.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment X4: Off Locus**

Runoff = 0.18 cfs @ 12.11 hrs, Volume= 713 cf, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 2,701	98	Pavement
2,535	39	>75% Grass cover, Good, HSG A
3,346	30	Woods, Good, HSG A
8,582	54	Weighted Average
5,881		68.53% Pervious Area
2,701		31.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Reach 1R: Runoff to Frontage Rd**

Inflow Area = 13,216 sf, 30.36% Impervious, Inflow Depth = 1.04" for 10-yr event  
 Inflow = 0.30 cfs @ 12.11 hrs, Volume= 1,148 cf  
 Outflow = 0.30 cfs @ 12.12 hrs, Volume= 1,148 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

## Off-site Analysis

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Type III 24-hr 25-yr Rainfall=6.34"

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Page 5

### Summary for Subcatchment X3: To Frontage Road

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 695 cf, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 370	98	Pavement
* 941	98	Roof
3,323	39	>75% Grass cover, Good, HSG A
4,634	56	Weighted Average
3,323		71.71% Pervious Area
1,311		28.29% Impervious Area

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

### Summary for Subcatchment X4: Off Locus

Runoff = 0.34 cfs @ 12.10 hrs, Volume= 1,169 cf, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 2,701	98	Pavement
2,535	39	>75% Grass cover, Good, HSG A
3,346	30	Woods, Good, HSG A
8,582	54	Weighted Average
5,881		68.53% Pervious Area
2,701		31.47% Impervious Area

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

### Summary for Reach 1R: Runoff to Frontage Rd

Inflow Area = 13,216 sf, 30.36% Impervious, Inflow Depth = 1.69" for 25-yr event

Inflow = 0.54 cfs @ 12.10 hrs, Volume= 1,864 cf

Outflow = 0.54 cfs @ 12.11 hrs, Volume= 1,864 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

**Off-site Analysis**

Type III 24-hr 100-yr Rainfall=8.15"

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Page 6

**Summary for Subcatchment X3: To Frontage Road**

Runoff = 0.36 cfs @ 12.09 hrs, Volume= 1,158 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 370	98	Pavement
* 941	98	Roof
3,323	39	>75% Grass cover, Good, HSG A
4,634	56	Weighted Average
3,323		71.71% Pervious Area
1,311		28.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment X4: Off Locus**

Runoff = 0.61 cfs @ 12.09 hrs, Volume= 1,986 cf, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 2,701	98	Pavement
2,535	39	>75% Grass cover, Good, HSG A
3,346	30	Woods, Good, HSG A
8,582	54	Weighted Average
5,881		68.53% Pervious Area
2,701		31.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Reach 1R: Runoff to Frontage Rd**

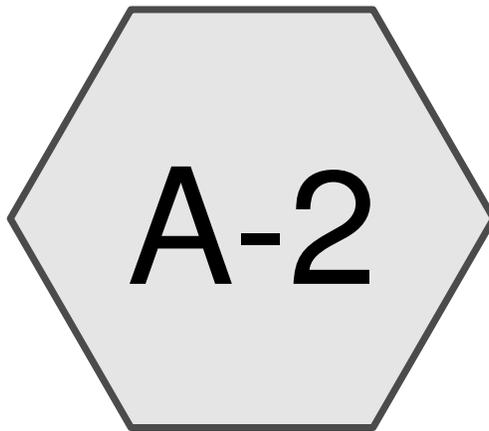
Inflow Area = 13,216 sf, 30.36% Impervious, Inflow Depth = 2.85" for 100-yr event

Inflow = 0.98 cfs @ 12.09 hrs, Volume= 3,144 cf

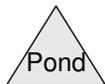
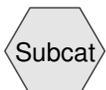
Outflow = 0.98 cfs @ 12.10 hrs, Volume= 3,144 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

HydroCAD Calculations  
Proposed Conditions  
2-Year  
10-Year  
25-Year  
100-Year



# Uncaptured to Abutters



**Routing Diagram for Off-site Analysis**  
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## Off-site Analysis

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### Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
6,697	39	>75% Grass cover, Good, HSG A (A-2)
282	98	Unconnected pavement, HSG A (A-2)
<b>6,979</b>	<b>41</b>	<b>TOTAL AREA</b>

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 3

**Summary for Subcatchment A-2: Uncaptured to Abutters**

Runoff = 0.00 cfs @ 23.34 hrs, Volume= 3 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Adj	Description
282	98		Unconnected pavement, HSG A
6,697	39		>75% Grass cover, Good, HSG A
6,979	41	40	Weighted Average, UI Adjusted
6,697			95.96% Pervious Area
282			4.04% Impervious Area
282			100.00% Unconnected

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

**Off-site Analysis**

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Type III 24-hr 10-yr Rainfall=5.16"

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Page 4

**Summary for Subcatchment A-2: Uncaptured to Abutters**

Runoff = 0.01 cfs @ 12.42 hrs, Volume= 158 cf, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Adj	Description
282	98		Unconnected pavement, HSG A
6,697	39		>75% Grass cover, Good, HSG A
6,979	41	40	Weighted Average, UI Adjusted
6,697			95.96% Pervious Area
282			4.04% Impervious Area
282			100.00% Unconnected

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

**Off-site Analysis**

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Type III 24-hr 25-yr Rainfall=6.34"

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Page 5

**Summary for Subcatchment A-2: Uncaptured to Abutters**

Runoff = 0.05 cfs @ 12.28 hrs, Volume= 354 cf, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Adj	Description
282	98		Unconnected pavement, HSG A
6,697	39		>75% Grass cover, Good, HSG A
6,979	41	40	Weighted Average, UI Adjusted
6,697			95.96% Pervious Area
282			4.04% Impervious Area
282			100.00% Unconnected

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

**Off-site Analysis**

Type III 24-hr 100-yr Rainfall=8.15"

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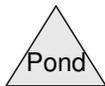
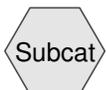
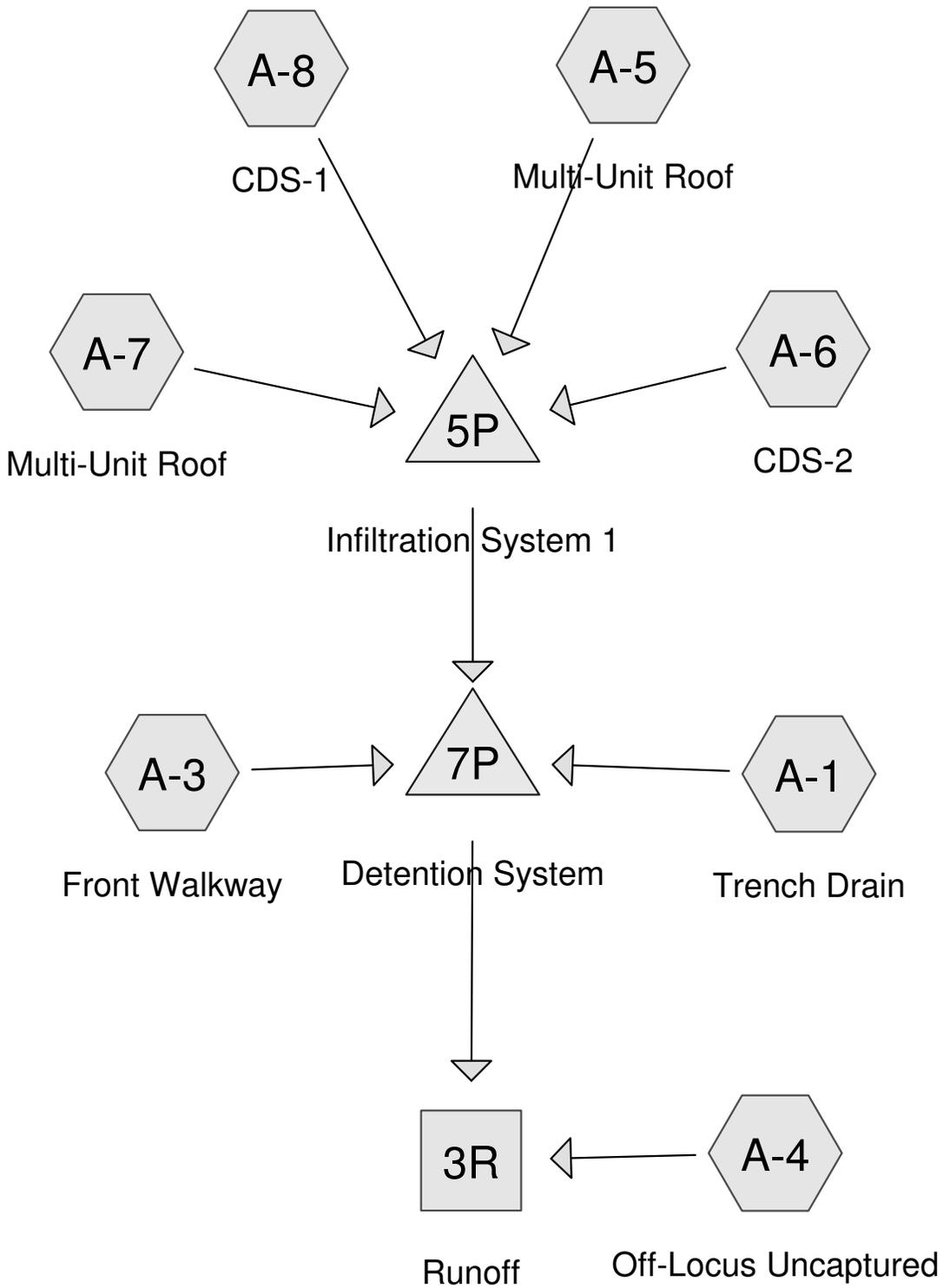
**Summary for Subcatchment A-2: Uncaptured to Abutters**

Runoff = 0.18 cfs @ 12.11 hrs, Volume= 766 cf, Depth= 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Adj	Description
282	98		Unconnected pavement, HSG A
6,697	39		>75% Grass cover, Good, HSG A
6,979	41	40	Weighted Average, UI Adjusted
6,697			95.96% Pervious Area
282			4.04% Impervious Area
282			100.00% Unconnected

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



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Page 2

### Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
2,247	39	>75% Grass cover, Good, HSG A (A-1, A-3, A-4, A-8)
8,377	98	Paved parking (A-3, A-4, A-6, A-8)
2,626	98	Paved parking, HSG A (A-1)
7,475	98	Roofs (A-5, A-7)
4,375	30	Woods, Good, HSG A (A-4)
<b>25,100</b>	<b>81</b>	<b>TOTAL AREA</b>

**Off-site Analysis**

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 3

**Summary for Subcatchment A-1: Trench Drain**

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 596 cf, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
2,626	98	Paved parking, HSG A
218	39	>75% Grass cover, Good, HSG A
2,844	93	Weighted Average
218		7.67% Pervious Area
2,626		92.33% Impervious Area

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

**Summary for Subcatchment A-3: Front Walkway**

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 167 cf, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 880	98	Paved parking
271	39	>75% Grass cover, Good, HSG A
1,151	84	Weighted Average
271		23.54% Pervious Area
880		76.46% Impervious Area

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

**Summary for Subcatchment A-4: Off-Locus Uncaptured**

Runoff = 0.01 cfs @ 12.39 hrs, Volume= 136 cf, Depth= 0.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 2,622	98	Paved parking
1,585	39	>75% Grass cover, Good, HSG A
4,375	30	Woods, Good, HSG A
8,582	52	Weighted Average
5,960		69.45% Pervious Area
2,622		30.55% Impervious Area

**Off-site Analysis**

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 4

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment A-5: Multi-Unit Roof**

Runoff = 0.26 cfs @ 12.08 hrs, Volume= 900 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 3,557	98	Roofs
3,557		100.00% Impervious Area

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

**Summary for Subcatchment A-6: CDS-2**

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 284 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 1,122	98	Paved parking
1,122		100.00% Impervious Area

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

**Summary for Subcatchment A-7: Multi-Unit Roof**

Runoff = 0.29 cfs @ 12.08 hrs, Volume= 992 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 3,918	98	Roofs
3,918		100.00% Impervious Area

**Off-site Analysis**

Type III 24-hr 2-yr Rainfall=3.27"

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

**Summary for Subcatchment A-8: CDS-1**

Runoff = 0.27 cfs @ 12.08 hrs, Volume= 888 cf, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 3,753	98	Paved parking
173	39	>75% Grass cover, Good, HSG A
3,926	95	Weighted Average
173		4.41% Pervious Area
3,753		95.59% Impervious Area

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

**Summary for Reach 3R: Runoff**

Inflow Area = 25,100 sf, 73.62% Impervious, Inflow Depth > 0.61" for 2-yr event  
 Inflow = 0.03 cfs @ 12.45 hrs, Volume= 1,267 cf  
 Outflow = 0.03 cfs @ 12.46 hrs, Volume= 1,267 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

**Summary for Pond 5P: Infiltration System 1**

Inflow Area = 12,523 sf, 98.62% Impervious, Inflow Depth = 2.94" for 2-yr event  
 Inflow = 0.90 cfs @ 12.08 hrs, Volume= 3,064 cf  
 Outflow = 0.97 cfs @ 12.21 hrs, Volume= 2,546 cf, Atten= 0%, Lag= 7.6 min  
 Discarded = 0.03 cfs @ 8.80 hrs, Volume= 1,742 cf  
 Primary = 0.94 cfs @ 12.21 hrs, Volume= 803 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Peak Elev= 222.80' @ 12.21 hrs Surf.Area= 464 sf Storage= 1,082 cf

Plug-Flow detention time= 188.3 min calculated for 2,545 cf (83% of inflow)  
 Center-of-Mass det. time= 119.3 min ( 882.3 - 763.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	389 cf	<b>4.00'W x 116.00'L x 5.50'H Field A</b> 2,552 cf Overall - 1,254 cf Embedded = 1,298 cf x 30.0% Voids
#2A	220.00'	905 cf	<b>Concrete Galley 4x4x3</b> x 29 Inside #1 Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf

**Off-site Analysis**

Type III 24-hr 2-yr Rainfall=3.27"

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Page 6

1,294 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	222.17'	<b>10.0" Round Culvert</b> L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 222.17' / 220.57' S= 0.0800 '/ Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf

**Discarded OutFlow** Max=0.03 cfs @ 8.80 hrs HW=219.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.93 cfs @ 12.21 hrs HW=222.79' TW=213.80' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 0.93 cfs @ 2.12 fps)

**Summary for Pond 7P: Detention System**

Inflow Area =	16,518 sf, 95.99% Impervious, Inflow Depth = 1.14" for 2-yr event
Inflow =	1.07 cfs @ 12.21 hrs, Volume= 1,566 cf
Outflow =	0.03 cfs @ 14.69 hrs, Volume= 1,131 cf, Atten= 97%, Lag= 148.6 min
Primary =	0.03 cfs @ 14.69 hrs, Volume= 1,131 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Peak Elev= 214.57' @ 14.69 hrs Surf.Area= 936 sf Storage= 1,078 cf

Plug-Flow detention time= 343.9 min calculated for 1,131 cf (72% of inflow)  
Center-of-Mass det. time= 286.0 min ( 1,072.7 - 786.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.42'	5,616 cf	<b>12.00'W x 78.00'L x 6.00'H Prismatic</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	213.42'	<b>8.0" Round Culvert</b> L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 213.42' / 208.90' S= 0.0675 '/ Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	213.42'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	215.08'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	218.67'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=0.03 cfs @ 14.69 hrs HW=214.57' TW=0.00' (Dynamic Tailwater)

- ↑**1=Culvert** (Passes 0.03 cfs of 1.20 cfs potential flow)
- ↑**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 5.07 fps)
- ↑**3=Orifice/Grate** ( Controls 0.00 cfs)
- ↑**4=Orifice/Grate** ( Controls 0.00 cfs)

**Off-site Analysis**

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Type III 24-hr 10-yr Rainfall=5.16"

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Page 7

**Summary for Subcatchment A-1: Trench Drain**

Runoff = 0.31 cfs @ 12.08 hrs, Volume= 1,032 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
2,626	98	Paved parking, HSG A
218	39	>75% Grass cover, Good, HSG A
2,844	93	Weighted Average
218		7.67% Pervious Area
2,626		92.33% Impervious Area

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

**Summary for Subcatchment A-3: Front Walkway**

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 328 cf, Depth= 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 880	98	Paved parking
271	39	>75% Grass cover, Good, HSG A
1,151	84	Weighted Average
271		23.54% Pervious Area
880		76.46% Impervious Area

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

**Summary for Subcatchment A-4: Off-Locus Uncaptured**

Runoff = 0.15 cfs @ 12.11 hrs, Volume= 626 cf, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 2,622	98	Paved parking
1,585	39	>75% Grass cover, Good, HSG A
4,375	30	Woods, Good, HSG A
8,582	52	Weighted Average
5,960		69.45% Pervious Area
2,622		30.55% Impervious Area

**Off-site Analysis**

Type III 24-hr 10-yr Rainfall=5.16"

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Page 8

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment A-5: Multi-Unit Roof**

Runoff = 0.41 cfs @ 12.08 hrs, Volume= 1,459 cf, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 3,557	98	Roofs
3,557		100.00% Impervious Area

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

**Summary for Subcatchment A-6: CDS-2**

Runoff = 0.13 cfs @ 12.08 hrs, Volume= 460 cf, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 1,122	98	Paved parking
1,122		100.00% Impervious Area

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

**Summary for Subcatchment A-7: Multi-Unit Roof**

Runoff = 0.45 cfs @ 12.08 hrs, Volume= 1,607 cf, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 3,918	98	Roofs
3,918		100.00% Impervious Area

**Off-site Analysis**

Type III 24-hr 10-yr Rainfall=5.16"

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Page 9

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

**Summary for Subcatchment A-8: CDS-1**

Runoff = 0.44 cfs @ 12.08 hrs, Volume= 1,498 cf, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 3,753	98	Paved parking
173	39	>75% Grass cover, Good, HSG A
3,926	95	Weighted Average
173		4.41% Pervious Area
3,753		95.59% Impervious Area

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

**Summary for Reach 3R: Runoff**

Inflow Area = 25,100 sf, 73.62% Impervious, Inflow Depth > 1.67" for 10-yr event  
 Inflow = 0.26 cfs @ 12.43 hrs, Volume= 3,494 cf  
 Outflow = 0.26 cfs @ 12.44 hrs, Volume= 3,494 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

**Summary for Pond 5P: Infiltration System 1**

Inflow Area = 12,523 sf, 98.62% Impervious, Inflow Depth = 4.81" for 10-yr event  
 Inflow = 1.44 cfs @ 12.08 hrs, Volume= 5,025 cf  
 Outflow = 1.53 cfs @ 12.02 hrs, Volume= 4,321 cf, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.03 cfs @ 7.14 hrs, Volume= 1,922 cf  
 Primary = 1.50 cfs @ 12.02 hrs, Volume= 2,398 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Peak Elev= 223.10' @ 12.02 hrs Surf.Area= 464 sf Storage= 1,099 cf

Plug-Flow detention time= 123.8 min calculated for 4,319 cf (86% of inflow)  
 Center-of-Mass det. time= 61.8 min ( 815.2 - 753.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	389 cf	<b>4.00'W x 116.00'L x 5.50'H Field A</b> 2,552 cf Overall - 1,254 cf Embedded = 1,298 cf x 30.0% Voids
#2A	220.00'	905 cf	<b>Concrete Galley 4x4x3</b> x 29 Inside #1 Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf

**Off-site Analysis**

Type III 24-hr 10-yr Rainfall=5.16"

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Page 10

1,294 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	222.17'	<b>10.0" Round Culvert</b> L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 222.17' / 220.57' S= 0.0800 '/ Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf

**Discarded OutFlow** Max=0.03 cfs @ 7.14 hrs HW=219.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=1.38 cfs @ 12.02 hrs HW=223.03' TW=214.02' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 1.38 cfs @ 2.53 fps)

**Summary for Pond 7P: Detention System**

Inflow Area =	16,518 sf, 95.99% Impervious, Inflow Depth = 2.73" for 10-yr event
Inflow =	1.82 cfs @ 12.09 hrs, Volume= 3,758 cf
Outflow =	0.21 cfs @ 12.71 hrs, Volume= 2,869 cf, Atten= 88%, Lag= 37.3 min
Primary =	0.21 cfs @ 12.71 hrs, Volume= 2,869 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Peak Elev= 215.72' @ 12.71 hrs Surf.Area= 936 sf Storage= 2,156 cf

Plug-Flow detention time= 226.7 min calculated for 2,869 cf (76% of inflow)  
Center-of-Mass det. time= 176.4 min ( 949.6 - 773.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.42'	5,616 cf	<b>12.00'W x 78.00'L x 6.00'H Prismatic</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	213.42'	<b>8.0" Round Culvert</b> L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 213.42' / 208.90' S= 0.0675 '/ Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	213.42'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	215.08'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	218.67'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=0.21 cfs @ 12.71 hrs HW=215.72' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.21 cfs of 1.86 cfs potential flow)  
 ↑**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.24 fps)  
 ↑**3=Orifice/Grate** (Orifice Controls 0.17 cfs @ 3.47 fps)  
 ↑**4=Orifice/Grate** ( Controls 0.00 cfs)

**Off-site Analysis**

Type III 24-hr 25-yr Rainfall=6.34"

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Page 11

**Summary for Subcatchment A-1: Trench Drain**

Runoff = 0.39 cfs @ 12.08 hrs, Volume= 1,308 cf, Depth= 5.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
2,626	98	Paved parking, HSG A
218	39	>75% Grass cover, Good, HSG A
2,844	93	Weighted Average
218		7.67% Pervious Area
2,626		92.33% Impervious Area

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

**Summary for Subcatchment A-3: Front Walkway**

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 433 cf, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 880	98	Paved parking
271	39	>75% Grass cover, Good, HSG A
1,151	84	Weighted Average
271		23.54% Pervious Area
880		76.46% Impervious Area

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

**Summary for Subcatchment A-4: Off-Locus Uncaptured**

Runoff = 0.29 cfs @ 12.10 hrs, Volume= 1,052 cf, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 2,622	98	Paved parking
1,585	39	>75% Grass cover, Good, HSG A
4,375	30	Woods, Good, HSG A
8,582	52	Weighted Average
5,960		69.45% Pervious Area
2,622		30.55% Impervious Area

**Off-site Analysis**

Type III 24-hr 25-yr Rainfall=6.34"

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Page 12

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment A-5: Multi-Unit Roof**

Runoff = 0.51 cfs @ 12.08 hrs, Volume= 1,809 cf, Depth= 6.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 3,557	98	Roofs
3,557		100.00% Impervious Area

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

**Summary for Subcatchment A-6: CDS-2**

Runoff = 0.16 cfs @ 12.08 hrs, Volume= 570 cf, Depth= 6.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 1,122	98	Paved parking
1,122		100.00% Impervious Area

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

**Summary for Subcatchment A-7: Multi-Unit Roof**

Runoff = 0.56 cfs @ 12.08 hrs, Volume= 1,992 cf, Depth= 6.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 3,918	98	Roofs
3,918		100.00% Impervious Area

**Off-site Analysis**

Type III 24-hr 25-yr Rainfall=6.34"

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Page 13

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

**Summary for Subcatchment A-8: CDS-1**

Runoff = 0.55 cfs @ 12.08 hrs, Volume= 1,881 cf, Depth= 5.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 3,753	98	Paved parking
173	39	>75% Grass cover, Good, HSG A
3,926	95	Weighted Average
173		4.41% Pervious Area
3,753		95.59% Impervious Area

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

**Summary for Reach 3R: Runoff**

Inflow Area = 25,100 sf, 73.62% Impervious, Inflow Depth > 2.53" for 25-yr event  
 Inflow = 0.44 cfs @ 12.32 hrs, Volume= 5,283 cf  
 Outflow = 0.44 cfs @ 12.33 hrs, Volume= 5,283 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

**Summary for Pond 5P: Infiltration System 1**

Inflow Area = 12,523 sf, 98.62% Impervious, Inflow Depth = 5.99" for 25-yr event  
 Inflow = 1.78 cfs @ 12.08 hrs, Volume= 6,252 cf  
 Outflow = 1.72 cfs @ 12.11 hrs, Volume= 5,468 cf, Atten= 3%, Lag= 1.5 min  
 Discarded = 0.03 cfs @ 6.33 hrs, Volume= 2,006 cf  
 Primary = 1.70 cfs @ 12.11 hrs, Volume= 3,462 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Peak Elev= 223.26' @ 12.11 hrs Surf.Area= 464 sf Storage= 1,121 cf

Plug-Flow detention time= 105.8 min calculated for 5,468 cf (87% of inflow)  
 Center-of-Mass det. time= 47.6 min ( 797.4 - 749.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	389 cf	<b>4.00'W x 116.00'L x 5.50'H Field A</b> 2,552 cf Overall - 1,254 cf Embedded = 1,298 cf x 30.0% Voids
#2A	220.00'	905 cf	<b>Concrete Galley 4x4x3</b> x 29 Inside #1 Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf

**Off-site Analysis**

Type III 24-hr 25-yr Rainfall=6.34"

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Page 14

1,294 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	222.17'	<b>10.0" Round Culvert</b> L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 222.17' / 220.57' S= 0.0800 '/ Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf

**Discarded OutFlow** Max=0.03 cfs @ 6.33 hrs HW=219.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=1.70 cfs @ 12.11 hrs HW=223.26' TW=215.27' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 1.70 cfs @ 3.11 fps)

**Summary for Pond 7P: Detention System**

Inflow Area =	16,518 sf, 95.99% Impervious, Inflow Depth = 3.78" for 25-yr event
Inflow =	2.21 cfs @ 12.10 hrs, Volume= 5,203 cf
Outflow =	0.32 cfs @ 12.63 hrs, Volume= 4,231 cf, Atten= 86%, Lag= 31.4 min
Primary =	0.32 cfs @ 12.63 hrs, Volume= 4,231 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Peak Elev= 216.50' @ 12.63 hrs Surf.Area= 936 sf Storage= 2,887 cf

Plug-Flow detention time= 187.5 min calculated for 4,230 cf (81% of inflow)  
Center-of-Mass det. time= 141.9 min ( 912.6 - 770.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.42'	5,616 cf	<b>12.00'W x 78.00'L x 6.00'H Prismatic</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	213.42'	<b>8.0" Round Culvert</b> L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 213.42' / 208.90' S= 0.0675 '/ Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	213.42'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	215.08'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	218.67'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=0.32 cfs @ 12.63 hrs HW=216.50' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.32 cfs of 2.20 cfs potential flow)  
 ↑**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 8.40 fps)  
 ↑**3=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.49 fps)  
 ↑**4=Orifice/Grate** ( Controls 0.00 cfs)

**Off-site Analysis**

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Type III 24-hr 100-yr Rainfall=8.15"

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Page 15

**Summary for Subcatchment A-1: Trench Drain**

Runoff = 0.51 cfs @ 12.08 hrs, Volume= 1,733 cf, Depth= 7.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
2,626	98	Paved parking, HSG A
218	39	>75% Grass cover, Good, HSG A
2,844	93	Weighted Average
218		7.67% Pervious Area
2,626		92.33% Impervious Area

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

**Summary for Subcatchment A-3: Front Walkway**

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 598 cf, Depth= 6.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 880	98	Paved parking
271	39	>75% Grass cover, Good, HSG A
1,151	84	Weighted Average
271		23.54% Pervious Area
880		76.46% Impervious Area

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

**Summary for Subcatchment A-4: Off-Locus Uncaptured**

Runoff = 0.56 cfs @ 12.10 hrs, Volume= 1,829 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 2,622	98	Paved parking
1,585	39	>75% Grass cover, Good, HSG A
4,375	30	Woods, Good, HSG A
8,582	52	Weighted Average
5,960		69.45% Pervious Area
2,622		30.55% Impervious Area

**Off-site Analysis**

Type III 24-hr 100-yr Rainfall=8.15"

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Page 16

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment A-5: Multi-Unit Roof**

Runoff = 0.65 cfs @ 12.08 hrs, Volume= 2,345 cf, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 3,557	98	Roofs
3,557		100.00% Impervious Area

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

**Summary for Subcatchment A-6: CDS-2**

Runoff = 0.21 cfs @ 12.08 hrs, Volume= 740 cf, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 1,122	98	Paved parking
1,122		100.00% Impervious Area

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

**Summary for Subcatchment A-7: Multi-Unit Roof**

Runoff = 0.72 cfs @ 12.08 hrs, Volume= 2,583 cf, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 3,918	98	Roofs
3,918		100.00% Impervious Area

**Off-site Analysis**

Type III 24-hr 100-yr Rainfall=8.15"

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Page 17

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

**Summary for Subcatchment A-8: CDS-1**

Runoff = 0.71 cfs @ 12.08 hrs, Volume= 2,470 cf, Depth= 7.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 3,753	98	Paved parking
173	39	>75% Grass cover, Good, HSG A
3,926	95	Weighted Average
173		4.41% Pervious Area
3,753		95.59% Impervious Area

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

**Summary for Reach 3R: Runoff**

Inflow Area = 25,100 sf, 73.62% Impervious, Inflow Depth > 3.94" for 100-yr event  
 Inflow = 0.84 cfs @ 12.11 hrs, Volume= 8,236 cf  
 Outflow = 0.84 cfs @ 12.12 hrs, Volume= 8,236 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

**Summary for Pond 5P: Infiltration System 1**

Inflow Area = 12,523 sf, 98.62% Impervious, Inflow Depth = 7.80" for 100-yr event  
 Inflow = 2.29 cfs @ 12.08 hrs, Volume= 8,137 cf  
 Outflow = 2.18 cfs @ 12.11 hrs, Volume= 7,285 cf, Atten= 5%, Lag= 1.9 min  
 Discarded = 0.03 cfs @ 4.70 hrs, Volume= 2,103 cf  
 Primary = 2.16 cfs @ 12.11 hrs, Volume= 5,181 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Peak Elev= 223.67' @ 12.11 hrs Surf.Area= 464 sf Storage= 1,178 cf

Plug-Flow detention time= 89.8 min calculated for 7,282 cf (89% of inflow)  
 Center-of-Mass det. time= 38.1 min ( 783.9 - 745.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	389 cf	<b>4.00'W x 116.00'L x 5.50'H Field A</b> 2,552 cf Overall - 1,254 cf Embedded = 1,298 cf x 30.0% Voids
#2A	220.00'	905 cf	<b>Concrete Galley 4x4x3</b> x 29 Inside #1 Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf

**Off-site Analysis**

Type III 24-hr 100-yr Rainfall=8.15"

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Page 18

1,294 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	222.17'	<b>10.0" Round Culvert</b> L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 222.17' / 220.57' S= 0.0800 '/ Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf

**Discarded OutFlow** Max=0.03 cfs @ 4.70 hrs HW=219.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=2.15 cfs @ 12.11 hrs HW=223.67' TW=216.35' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 2.15 cfs @ 3.95 fps)

**Summary for Pond 7P: Detention System**

Inflow Area =	16,518 sf, 95.99% Impervious, Inflow Depth = 5.46" for 100-yr event
Inflow =	2.82 cfs @ 12.11 hrs, Volume= 7,512 cf
Outflow =	0.44 cfs @ 12.56 hrs, Volume= 6,408 cf, Atten= 84%, Lag= 27.5 min
Primary =	0.44 cfs @ 12.56 hrs, Volume= 6,408 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Peak Elev= 217.84' @ 12.56 hrs Surf.Area= 936 sf Storage= 4,133 cf

Plug-Flow detention time= 168.8 min calculated for 6,408 cf (85% of inflow)  
Center-of-Mass det. time= 125.6 min ( 895.4 - 769.7 )

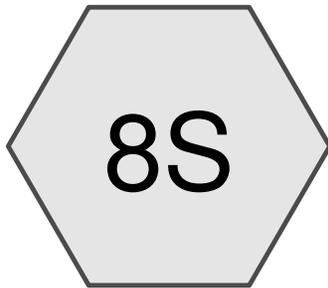
Volume	Invert	Avail.Storage	Storage Description
#1	213.42'	5,616 cf	<b>12.00'W x 78.00'L x 6.00'H Prismatic</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	213.42'	<b>8.0" Round Culvert</b> L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 213.42' / 208.90' S= 0.0675 '/ Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	213.42'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	215.08'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	218.67'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

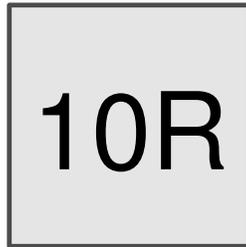
**Primary OutFlow** Max=0.44 cfs @ 12.56 hrs HW=217.83' TW=0.00' (Dynamic Tailwater)

- ↑**1=Culvert** (Passes 0.44 cfs of 2.68 cfs potential flow)
- ↑**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 10.07 fps)
- ↑**3=Orifice/Grate** (Orifice Controls 0.38 cfs @ 7.81 fps)
- ↑**4=Orifice/Grate** ( Controls 0.00 cfs)

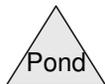
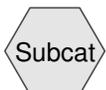
Offsite Watershed Analysis  
HydroCAD Calculations  
Existing Conditions  
2-Year  
10-Year  
25-Year  
100-Year



XC-GIS



15" RCP



**Routing Diagram for Off-site Analysis**  
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## Off-site Analysis

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Page 2

### Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
618,294	61	1/4 acre lots, 38% imp, HSG A (8S)
<b>618,294</b>	<b>61</b>	<b>TOTAL AREA</b>

**Off-site Analysis**

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 3

**Summary for Subcatchment 8S: XC-GIS**

Runoff = 4.41 cfs @ 12.18 hrs, Volume= 24,367 cf, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
618,294	61	1/4 acre lots, 38% imp, HSG A
383,342		62.00% Pervious Area
234,952		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.40"
0.7	150	0.0500	3.60		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
5.4	1,865	0.0800	5.74		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
9.9	2,065	Total			

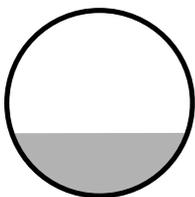
**Summary for Reach 10R: 15" RCP**

Inflow Area = 618,294 sf, 38.00% Impervious, Inflow Depth = 0.47" for 2-yr event  
 Inflow = 4.41 cfs @ 12.18 hrs, Volume= 24,367 cf  
 Outflow = 4.42 cfs @ 12.19 hrs, Volume= 24,367 cf, Atten= 0%, Lag= 0.3 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 12.08 fps, Min. Travel Time= 0.4 min  
 Avg. Velocity = 5.73 fps, Avg. Travel Time= 0.9 min

Peak Storage= 118 cf @ 12.19 hrs  
 Average Depth at Peak Storage= 0.42'  
 Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 17.90 cfs

15.0" Round Pipe  
 n= 0.013  
 Length= 324.0' Slope= 0.0768 '/'  
 Inlet Invert= 213.02', Outlet Invert= 188.13'



**Off-site Analysis**

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Type III 24-hr 10-yr Rainfall=5.16"

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Page 4

**Summary for Subcatchment 8S: XC-GIS**

Runoff = 19.52 cfs @ 12.15 hrs, Volume= 75,544 cf, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
618,294	61	1/4 acre lots, 38% imp, HSG A
383,342		62.00% Pervious Area
234,952		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.40"
0.7	150	0.0500	3.60		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
5.4	1,865	0.0800	5.74		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
9.9	2,065	Total			

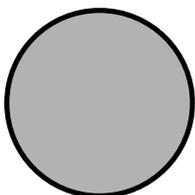
**Summary for Reach 10R: 15" RCP**

Inflow Area = 618,294 sf, 38.00% Impervious, Inflow Depth = 1.47" for 10-yr event  
 Inflow = 19.52 cfs @ 12.15 hrs, Volume= 75,544 cf  
 Outflow = 19.39 cfs @ 12.15 hrs, Volume= 75,544 cf, Atten= 1%, Lag= 0.0 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 16.63 fps, Min. Travel Time= 0.3 min  
 Avg. Velocity = 7.46 fps, Avg. Travel Time= 0.7 min

Peak Storage= 398 cf @ 12.16 hrs  
 Average Depth at Peak Storage= 1.25'  
 Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 17.90 cfs

15.0" Round Pipe  
 n= 0.013  
 Length= 324.0' Slope= 0.0768 '/'  
 Inlet Invert= 213.02', Outlet Invert= 188.13'



## Off-site Analysis

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Type III 24-hr 25-yr Rainfall=6.34"

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Page 5

### Summary for Subcatchment 8S: XC-GIS

Runoff = 31.25 cfs @ 12.15 hrs, Volume= 115,227 cf, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
618,294	61	1/4 acre lots, 38% imp, HSG A
383,342		62.00% Pervious Area
234,952		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.40"
0.7	150	0.0500	3.60		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
5.4	1,865	0.0800	5.74		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
9.9	2,065	Total			

### Summary for Reach 10R: 15" RCP

Inflow Area = 618,294 sf, 38.00% Impervious, Inflow Depth = 2.24" for 25-yr event

Inflow = 31.25 cfs @ 12.15 hrs, Volume= 115,227 cf

Outflow = 18.48 cfs @ 12.05 hrs, Volume= 115,227 cf, Atten= 41%, Lag= 0.0 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Max. Velocity= 16.61 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 8.16 fps, Avg. Travel Time= 0.7 min

Peak Storage= 398 cf @ 12.06 hrs

Average Depth at Peak Storage= 1.25'

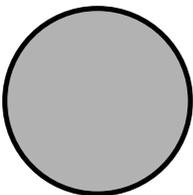
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 17.90 cfs

15.0" Round Pipe

n= 0.013

Length= 324.0' Slope= 0.0768 '/'

Inlet Invert= 213.02', Outlet Invert= 188.13'



**Off-site Analysis**

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Type III 24-hr 100-yr Rainfall=8.15"

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Page 6

**Summary for Subcatchment 8S: XC-GIS**

Runoff = 51.22 cfs @ 12.14 hrs, Volume= 183,398 cf, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
618,294	61	1/4 acre lots, 38% imp, HSG A
383,342		62.00% Pervious Area
234,952		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.40"
0.7	150	0.0500	3.60		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
5.4	1,865	0.0800	5.74		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
9.9	2,065	Total			

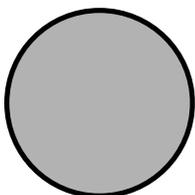
**Summary for Reach 10R: 15" RCP**

Inflow Area = 618,294 sf, 38.00% Impervious, Inflow Depth = 3.56" for 100-yr event  
 Inflow = 51.22 cfs @ 12.14 hrs, Volume= 183,398 cf  
 Outflow = 19.20 cfs @ 11.98 hrs, Volume= 183,398 cf, Atten= 63%, Lag= 0.0 min

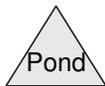
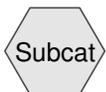
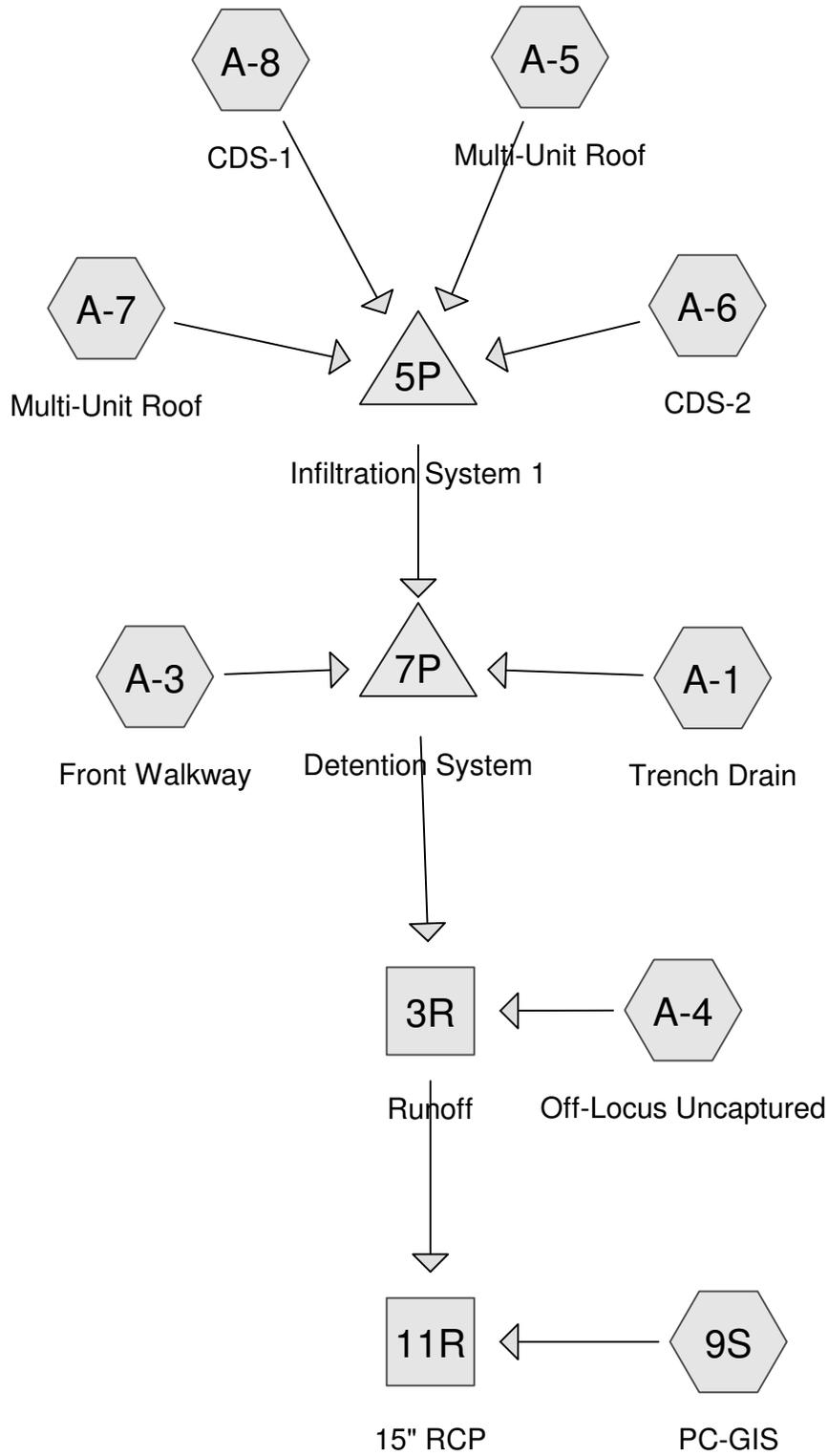
Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 16.63 fps, Min. Travel Time= 0.3 min  
 Avg. Velocity = 9.01 fps, Avg. Travel Time= 0.6 min

Peak Storage= 398 cf @ 11.99 hrs  
 Average Depth at Peak Storage= 1.25'  
 Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 17.90 cfs

15.0" Round Pipe  
 n= 0.013  
 Length= 324.0' Slope= 0.0768 '/'  
 Inlet Invert= 213.02', Outlet Invert= 188.13'



Offsite Watershed Analysis  
HydroCAD Calculations  
Proposed Conditions  
2-Year  
10-Year  
25-Year  
100-Year



**Routing Diagram for Off-site Analysis**  
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## Off-site Analysis

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Page 2

### Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
593,184	61	1/4 acre lots, 38% imp, HSG A (9S)
2,247	39	>75% Grass cover, Good, HSG A (A-1, A-3, A-4, A-8)
8,377	98	Paved parking (A-3, A-4, A-6, A-8)
2,626	98	Paved parking, HSG A (A-1)
7,475	98	Roofs (A-5, A-7)
4,375	30	Woods, Good, HSG A (A-4)
<b>618,284</b>	<b>62</b>	<b>TOTAL AREA</b>

**Off-site Analysis**

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 3

**Summary for Subcatchment 9S: PC-GIS**

Runoff = 4.23 cfs @ 12.18 hrs, Volume= 23,377 cf, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
593,184	61	1/4 acre lots, 38% imp, HSG A
367,774		62.00% Pervious Area
225,410		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.40"
0.7	150	0.0500	3.60		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
5.4	1,865	0.0800	5.74		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
9.9	2,065	Total			

**Summary for Subcatchment A-1: Trench Drain**

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 596 cf, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
2,626	98	Paved parking, HSG A
218	39	>75% Grass cover, Good, HSG A
2,844	93	Weighted Average
218		7.67% Pervious Area
2,626		92.33% Impervious Area

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

**Summary for Subcatchment A-3: Front Walkway**

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 167 cf, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

**Off-site Analysis**

Type III 24-hr 2-yr Rainfall=3.27"

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Page 4

Area (sf)	CN	Description
* 880	98	Paved parking
271	39	>75% Grass cover, Good, HSG A
1,151	84	Weighted Average
271		23.54% Pervious Area
880		76.46% Impervious Area

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

**Summary for Subcatchment A-4: Off-Locus Uncaptured**

Runoff = 0.01 cfs @ 12.39 hrs, Volume= 136 cf, Depth= 0.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 2,622	98	Paved parking
1,585	39	>75% Grass cover, Good, HSG A
4,375	30	Woods, Good, HSG A
8,582	52	Weighted Average
5,960		69.45% Pervious Area
2,622		30.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment A-5: Multi-Unit Roof**

Runoff = 0.26 cfs @ 12.08 hrs, Volume= 900 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 3,557	98	Roofs
3,557		100.00% Impervious Area

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

**Off-site Analysis**

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 5

**Summary for Subcatchment A-6: CDS-2**

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 284 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 1,122	98	Paved parking
1,122		100.00% Impervious Area

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

**Summary for Subcatchment A-7: Multi-Unit Roof**

Runoff = 0.29 cfs @ 12.08 hrs, Volume= 992 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 3,918	98	Roofs
3,918		100.00% Impervious Area

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

**Summary for Subcatchment A-8: CDS-1**

Runoff = 0.27 cfs @ 12.08 hrs, Volume= 888 cf, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
* 3,753	98	Paved parking
173	39	>75% Grass cover, Good, HSG A
3,926	95	Weighted Average
173		4.41% Pervious Area
3,753		95.59% Impervious Area

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

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 6

### Summary for Reach 3R: Runoff

Inflow Area = 25,100 sf, 73.62% Impervious, Inflow Depth > 0.61" for 2-yr event  
Inflow = 0.03 cfs @ 12.45 hrs, Volume= 1,267 cf  
Outflow = 0.03 cfs @ 12.46 hrs, Volume= 1,267 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

### Summary for Reach 11R: 15" RCP

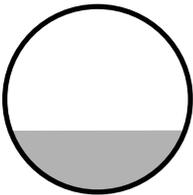
Inflow Area = 618,284 sf, 39.45% Impervious, Inflow Depth > 0.48" for 2-yr event  
Inflow = 4.25 cfs @ 12.18 hrs, Volume= 24,643 cf  
Outflow = 4.25 cfs @ 12.19 hrs, Volume= 24,641 cf, Atten= 0%, Lag= 0.3 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Max. Velocity= 11.96 fps, Min. Travel Time= 0.5 min  
Avg. Velocity= 4.62 fps, Avg. Travel Time= 1.2 min

Peak Storage= 115 cf @ 12.19 hrs  
Average Depth at Peak Storage= 0.41'  
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 17.90 cfs

15.0" Round Pipe  
n= 0.013  
Length= 324.0' Slope= 0.0768 '/'  
Inlet Invert= 213.02', Outlet Invert= 188.13'



### Summary for Pond 5P: Infiltration System 1

Inflow Area = 12,523 sf, 98.62% Impervious, Inflow Depth = 2.94" for 2-yr event  
Inflow = 0.90 cfs @ 12.08 hrs, Volume= 3,064 cf  
Outflow = 0.97 cfs @ 12.21 hrs, Volume= 2,546 cf, Atten= 0%, Lag= 7.6 min  
Discarded = 0.03 cfs @ 8.80 hrs, Volume= 1,742 cf  
Primary = 0.94 cfs @ 12.21 hrs, Volume= 803 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Peak Elev= 222.80' @ 12.21 hrs Surf.Area= 464 sf Storage= 1,082 cf

Plug-Flow detention time= 188.3 min calculated for 2,545 cf (83% of inflow)  
Center-of-Mass det. time= 119.3 min ( 882.3 - 763.0 )

## Off-site Analysis

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 7

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	389 cf	<b>4.00'W x 116.00'L x 5.50'H Field A</b> 2,552 cf Overall - 1,254 cf Embedded = 1,298 cf x 30.0% Voids
#2A	220.00'	905 cf	<b>Concrete Galley 4x4x3</b> x 29 Inside #1 Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf
		1,294 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	222.17'	<b>10.0" Round Culvert</b> L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 222.17' / 220.57' S= 0.0800 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf

**Discarded OutFlow** Max=0.03 cfs @ 8.80 hrs HW=219.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.93 cfs @ 12.21 hrs HW=222.79' TW=213.80' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 0.93 cfs @ 2.12 fps)

### Summary for Pond 7P: Detention System

Inflow Area = 16,518 sf, 95.99% Impervious, Inflow Depth = 1.14" for 2-yr event  
 Inflow = 1.07 cfs @ 12.21 hrs, Volume= 1,566 cf  
 Outflow = 0.03 cfs @ 14.69 hrs, Volume= 1,131 cf, Atten= 97%, Lag= 148.6 min  
 Primary = 0.03 cfs @ 14.69 hrs, Volume= 1,131 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Peak Elev= 214.57' @ 14.69 hrs Surf.Area= 936 sf Storage= 1,078 cf

Plug-Flow detention time= 343.9 min calculated for 1,131 cf (72% of inflow)

Center-of-Mass det. time= 286.0 min ( 1,072.7 - 786.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.42'	5,616 cf	<b>12.00'W x 78.00'L x 6.00'H Prismaoid</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	213.42'	<b>8.0" Round Culvert</b> L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 213.42' / 208.90' S= 0.0675 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	213.42'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	215.08'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	218.67'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

## Off-site Analysis

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Type III 24-hr 2-yr Rainfall=3.27"

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Page 8

**Primary OutFlow** Max=0.03 cfs @ 14.69 hrs HW=214.57' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.03 cfs of 1.20 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.03 cfs @ 5.07 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)
- 4=Orifice/Grate ( Controls 0.00 cfs)

**Off-site Analysis**

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Type III 24-hr 10-yr Rainfall=5.16"

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Page 9

**Summary for Subcatchment 9S: PC-GIS**

Runoff = 18.73 cfs @ 12.15 hrs, Volume= 72,476 cf, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
593,184	61	1/4 acre lots, 38% imp, HSG A
367,774		62.00% Pervious Area
225,410		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.40"
0.7	150	0.0500	3.60		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
5.4	1,865	0.0800	5.74		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
9.9	2,065	Total			

**Summary for Subcatchment A-1: Trench Drain**

Runoff = 0.31 cfs @ 12.08 hrs, Volume= 1,032 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
2,626	98	Paved parking, HSG A
218	39	>75% Grass cover, Good, HSG A
2,844	93	Weighted Average
218		7.67% Pervious Area
2,626		92.33% Impervious Area

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

**Summary for Subcatchment A-3: Front Walkway**

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 328 cf, Depth= 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-yr Rainfall=5.16"

**Off-site Analysis**

Type III 24-hr 10-yr Rainfall=5.16"

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Page 10

Area (sf)	CN	Description
* 880	98	Paved parking
271	39	>75% Grass cover, Good, HSG A
1,151	84	Weighted Average
271		23.54% Pervious Area
880		76.46% Impervious Area

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

**Summary for Subcatchment A-4: Off-Locus Uncaptured**

Runoff = 0.15 cfs @ 12.11 hrs, Volume= 626 cf, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 2,622	98	Paved parking
1,585	39	>75% Grass cover, Good, HSG A
4,375	30	Woods, Good, HSG A
8,582	52	Weighted Average
5,960		69.45% Pervious Area
2,622		30.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment A-5: Multi-Unit Roof**

Runoff = 0.41 cfs @ 12.08 hrs, Volume= 1,459 cf, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 3,557	98	Roofs
3,557		100.00% Impervious Area

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

**Off-site Analysis**

Type III 24-hr 10-yr Rainfall=5.16"

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Page 11

**Summary for Subcatchment A-6: CDS-2**

Runoff = 0.13 cfs @ 12.08 hrs, Volume= 460 cf, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 1,122	98	Paved parking
1,122		100.00% Impervious Area

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

**Summary for Subcatchment A-7: Multi-Unit Roof**

Runoff = 0.45 cfs @ 12.08 hrs, Volume= 1,607 cf, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 3,918	98	Roofs
3,918		100.00% Impervious Area

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

**Summary for Subcatchment A-8: CDS-1**

Runoff = 0.44 cfs @ 12.08 hrs, Volume= 1,498 cf, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
* 3,753	98	Paved parking
173	39	>75% Grass cover, Good, HSG A
3,926	95	Weighted Average
173		4.41% Pervious Area
3,753		95.59% Impervious Area

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

## Off-site Analysis

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Type III 24-hr 10-yr Rainfall=5.16"

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Page 12

### Summary for Reach 3R: Runoff

Inflow Area = 25,100 sf, 73.62% Impervious, Inflow Depth > 1.67" for 10-yr event  
Inflow = 0.26 cfs @ 12.43 hrs, Volume= 3,494 cf  
Outflow = 0.26 cfs @ 12.44 hrs, Volume= 3,494 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

### Summary for Reach 11R: 15" RCP

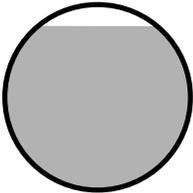
Inflow Area = 618,284 sf, 39.45% Impervious, Inflow Depth > 1.47" for 10-yr event  
Inflow = 18.90 cfs @ 12.15 hrs, Volume= 75,969 cf  
Outflow = 18.91 cfs @ 12.16 hrs, Volume= 75,967 cf, Atten= 0%, Lag= 0.4 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Max. Velocity= 16.63 fps, Min. Travel Time= 0.3 min  
Avg. Velocity = 5.76 fps, Avg. Travel Time= 0.9 min

Peak Storage= 372 cf @ 12.16 hrs  
Average Depth at Peak Storage= 1.10'  
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 17.90 cfs

15.0" Round Pipe  
n= 0.013  
Length= 324.0' Slope= 0.0768 '/'  
Inlet Invert= 213.02', Outlet Invert= 188.13'



### Summary for Pond 5P: Infiltration System 1

Inflow Area = 12,523 sf, 98.62% Impervious, Inflow Depth = 4.81" for 10-yr event  
Inflow = 1.44 cfs @ 12.08 hrs, Volume= 5,025 cf  
Outflow = 1.53 cfs @ 12.02 hrs, Volume= 4,321 cf, Atten= 0%, Lag= 0.0 min  
Discarded = 0.03 cfs @ 7.14 hrs, Volume= 1,922 cf  
Primary = 1.50 cfs @ 12.02 hrs, Volume= 2,398 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Peak Elev= 223.10' @ 12.02 hrs Surf.Area= 464 sf Storage= 1,099 cf

Plug-Flow detention time= 123.8 min calculated for 4,319 cf (86% of inflow)  
Center-of-Mass det. time= 61.8 min ( 815.2 - 753.4 )

## Off-site Analysis

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Type III 24-hr 10-yr Rainfall=5.16"

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Page 13

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	389 cf	<b>4.00'W x 116.00'L x 5.50'H Field A</b> 2,552 cf Overall - 1,254 cf Embedded = 1,298 cf x 30.0% Voids
#2A	220.00'	905 cf	<b>Concrete Galley 4x4x3</b> x 29 Inside #1 Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf
		1,294 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	222.17'	<b>10.0" Round Culvert</b> L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 222.17' / 220.57' S= 0.0800 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf

**Discarded OutFlow** Max=0.03 cfs @ 7.14 hrs HW=219.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=1.38 cfs @ 12.02 hrs HW=223.03' TW=214.02' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 1.38 cfs @ 2.53 fps)

### Summary for Pond 7P: Detention System

Inflow Area = 16,518 sf, 95.99% Impervious, Inflow Depth = 2.73" for 10-yr event  
 Inflow = 1.82 cfs @ 12.09 hrs, Volume= 3,758 cf  
 Outflow = 0.21 cfs @ 12.71 hrs, Volume= 2,869 cf, Atten= 88%, Lag= 37.3 min  
 Primary = 0.21 cfs @ 12.71 hrs, Volume= 2,869 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Peak Elev= 215.72' @ 12.71 hrs Surf.Area= 936 sf Storage= 2,156 cf

Plug-Flow detention time= 226.7 min calculated for 2,869 cf (76% of inflow)

Center-of-Mass det. time= 176.4 min ( 949.6 - 773.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.42'	5,616 cf	<b>12.00'W x 78.00'L x 6.00'H Prismaoid</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	213.42'	<b>8.0" Round Culvert</b> L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 213.42' / 208.90' S= 0.0675 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	213.42'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	215.08'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	218.67'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

## Off-site Analysis

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Type III 24-hr 10-yr Rainfall=5.16"

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Page 14

**Primary OutFlow** Max=0.21 cfs @ 12.71 hrs HW=215.72' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.21 cfs of 1.86 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.04 cfs @ 7.24 fps)
- 3=Orifice/Grate (Orifice Controls 0.17 cfs @ 3.47 fps)
- 4=Orifice/Grate ( Controls 0.00 cfs)

**Off-site Analysis**

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Type III 24-hr 25-yr Rainfall=6.34"

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Page 15

**Summary for Subcatchment 9S: PC-GIS**

Runoff = 29.98 cfs @ 12.15 hrs, Volume= 110,547 cf, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
593,184	61	1/4 acre lots, 38% imp, HSG A
367,774		62.00% Pervious Area
225,410		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.40"
0.7	150	0.0500	3.60		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
5.4	1,865	0.0800	5.74		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
9.9	2,065	Total			

**Summary for Subcatchment A-1: Trench Drain**

Runoff = 0.39 cfs @ 12.08 hrs, Volume= 1,308 cf, Depth= 5.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
2,626	98	Paved parking, HSG A
218	39	>75% Grass cover, Good, HSG A
2,844	93	Weighted Average
218		7.67% Pervious Area
2,626		92.33% Impervious Area

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

**Summary for Subcatchment A-3: Front Walkway**

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 433 cf, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

**Off-site Analysis**

Type III 24-hr 25-yr Rainfall=6.34"

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Page 16

Area (sf)	CN	Description
* 880	98	Paved parking
271	39	>75% Grass cover, Good, HSG A
1,151	84	Weighted Average
271		23.54% Pervious Area
880		76.46% Impervious Area

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

**Summary for Subcatchment A-4: Off-Locus Uncaptured**

Runoff = 0.29 cfs @ 12.10 hrs, Volume= 1,052 cf, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 2,622	98	Paved parking
1,585	39	>75% Grass cover, Good, HSG A
4,375	30	Woods, Good, HSG A
8,582	52	Weighted Average
5,960		69.45% Pervious Area
2,622		30.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment A-5: Multi-Unit Roof**

Runoff = 0.51 cfs @ 12.08 hrs, Volume= 1,809 cf, Depth= 6.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 3,557	98	Roofs
3,557		100.00% Impervious Area

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

**Off-site Analysis**

Type III 24-hr 25-yr Rainfall=6.34"

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Page 17

**Summary for Subcatchment A-6: CDS-2**

Runoff = 0.16 cfs @ 12.08 hrs, Volume= 570 cf, Depth= 6.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 1,122	98	Paved parking
1,122		100.00% Impervious Area

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

**Summary for Subcatchment A-7: Multi-Unit Roof**

Runoff = 0.56 cfs @ 12.08 hrs, Volume= 1,992 cf, Depth= 6.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 3,918	98	Roofs
3,918		100.00% Impervious Area

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

**Summary for Subcatchment A-8: CDS-1**

Runoff = 0.55 cfs @ 12.08 hrs, Volume= 1,881 cf, Depth= 5.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
* 3,753	98	Paved parking
173	39	>75% Grass cover, Good, HSG A
3,926	95	Weighted Average
173		4.41% Pervious Area
3,753		95.59% Impervious Area

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

## Off-site Analysis

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Type III 24-hr 25-yr Rainfall=6.34"

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Page 18

### Summary for Reach 3R: Runoff

Inflow Area = 25,100 sf, 73.62% Impervious, Inflow Depth > 2.53" for 25-yr event  
Inflow = 0.44 cfs @ 12.32 hrs, Volume= 5,283 cf  
Outflow = 0.44 cfs @ 12.33 hrs, Volume= 5,283 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

### Summary for Reach 11R: 15" RCP

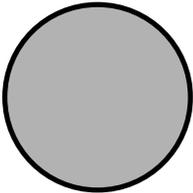
Inflow Area = 618,284 sf, 39.45% Impervious, Inflow Depth > 2.25" for 25-yr event  
Inflow = 30.42 cfs @ 12.15 hrs, Volume= 115,829 cf  
Outflow = 19.26 cfs @ 12.06 hrs, Volume= 115,827 cf, Atten= 37%, Lag= 0.0 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Max. Velocity= 16.63 fps, Min. Travel Time= 0.3 min  
Avg. Velocity= 6.29 fps, Avg. Travel Time= 0.9 min

Peak Storage= 398 cf @ 12.07 hrs  
Average Depth at Peak Storage= 1.25'  
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 17.90 cfs

15.0" Round Pipe  
n= 0.013  
Length= 324.0' Slope= 0.0768 '/'  
Inlet Invert= 213.02', Outlet Invert= 188.13'



### Summary for Pond 5P: Infiltration System 1

Inflow Area = 12,523 sf, 98.62% Impervious, Inflow Depth = 5.99" for 25-yr event  
Inflow = 1.78 cfs @ 12.08 hrs, Volume= 6,252 cf  
Outflow = 1.72 cfs @ 12.11 hrs, Volume= 5,468 cf, Atten= 3%, Lag= 1.5 min  
Discarded = 0.03 cfs @ 6.33 hrs, Volume= 2,006 cf  
Primary = 1.70 cfs @ 12.11 hrs, Volume= 3,462 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Peak Elev= 223.26' @ 12.11 hrs Surf.Area= 464 sf Storage= 1,121 cf

Plug-Flow detention time= 105.8 min calculated for 5,468 cf (87% of inflow)  
Center-of-Mass det. time= 47.6 min ( 797.4 - 749.7 )

**Off-site Analysis**

Type III 24-hr 25-yr Rainfall=6.34"

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Page 19

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	389 cf	<b>4.00'W x 116.00'L x 5.50'H Field A</b> 2,552 cf Overall - 1,254 cf Embedded = 1,298 cf x 30.0% Voids
#2A	220.00'	905 cf	<b>Concrete Galley 4x4x3</b> x 29 Inside #1 Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf
		1,294 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	222.17'	<b>10.0" Round Culvert</b> L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 222.17' / 220.57' S= 0.0800 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf

**Discarded OutFlow** Max=0.03 cfs @ 6.33 hrs HW=219.01' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=1.70 cfs @ 12.11 hrs HW=223.26' TW=215.27' (Dynamic Tailwater)

↳ **2=Culvert** (Inlet Controls 1.70 cfs @ 3.11 fps)

**Summary for Pond 7P: Detention System**

Inflow Area = 16,518 sf, 95.99% Impervious, Inflow Depth = 3.78" for 25-yr event  
 Inflow = 2.21 cfs @ 12.10 hrs, Volume= 5,203 cf  
 Outflow = 0.32 cfs @ 12.63 hrs, Volume= 4,231 cf, Atten= 86%, Lag= 31.4 min  
 Primary = 0.32 cfs @ 12.63 hrs, Volume= 4,231 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
 Peak Elev= 216.50' @ 12.63 hrs Surf.Area= 936 sf Storage= 2,887 cf

Plug-Flow detention time= 187.5 min calculated for 4,230 cf (81% of inflow)  
 Center-of-Mass det. time= 141.9 min ( 912.6 - 770.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.42'	5,616 cf	<b>12.00'W x 78.00'L x 6.00'H Prismatoid</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	213.42'	<b>8.0" Round Culvert</b> L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 213.42' / 208.90' S= 0.0675 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	213.42'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	215.08'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	218.67'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

## Off-site Analysis

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Type III 24-hr 25-yr Rainfall=6.34"

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Page 20

**Primary OutFlow** Max=0.32 cfs @ 12.63 hrs HW=216.50' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.32 cfs of 2.20 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.05 cfs @ 8.40 fps)
- 3=Orifice/Grate (Orifice Controls 0.27 cfs @ 5.49 fps)
- 4=Orifice/Grate ( Controls 0.00 cfs)

**Off-site Analysis**

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Type III 24-hr 100-yr Rainfall=8.15"

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Page 21

**Summary for Subcatchment 9S: PC-GIS**

Runoff = 49.14 cfs @ 12.14 hrs, Volume= 175,950 cf, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
593,184	61	1/4 acre lots, 38% imp, HSG A
367,774		62.00% Pervious Area
225,410		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.40"
0.7	150	0.0500	3.60		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
5.4	1,865	0.0800	5.74		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
9.9	2,065	Total			

**Summary for Subcatchment A-1: Trench Drain**

Runoff = 0.51 cfs @ 12.08 hrs, Volume= 1,733 cf, Depth= 7.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
2,626	98	Paved parking, HSG A
218	39	>75% Grass cover, Good, HSG A
2,844	93	Weighted Average
218		7.67% Pervious Area
2,626		92.33% Impervious Area

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

**Summary for Subcatchment A-3: Front Walkway**

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 598 cf, Depth= 6.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

**Off-site Analysis**

Type III 24-hr 100-yr Rainfall=8.15"

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Page 22

Area (sf)	CN	Description
* 880	98	Paved parking
271	39	>75% Grass cover, Good, HSG A
1,151	84	Weighted Average
271		23.54% Pervious Area
880		76.46% Impervious Area

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

**Summary for Subcatchment A-4: Off-Locus Uncaptured**

Runoff = 0.56 cfs @ 12.10 hrs, Volume= 1,829 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 2,622	98	Paved parking
1,585	39	>75% Grass cover, Good, HSG A
4,375	30	Woods, Good, HSG A
8,582	52	Weighted Average
5,960		69.45% Pervious Area
2,622		30.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry,</b>

**Summary for Subcatchment A-5: Multi-Unit Roof**

Runoff = 0.65 cfs @ 12.08 hrs, Volume= 2,345 cf, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 3,557	98	Roofs
3,557		100.00% Impervious Area

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

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Type III 24-hr 100-yr Rainfall=8.15"

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Page 23

**Summary for Subcatchment A-6: CDS-2**

Runoff = 0.21 cfs @ 12.08 hrs, Volume= 740 cf, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 1,122	98	Paved parking
1,122		100.00% Impervious Area

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

**Summary for Subcatchment A-7: Multi-Unit Roof**

Runoff = 0.72 cfs @ 12.08 hrs, Volume= 2,583 cf, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 3,918	98	Roofs
3,918		100.00% Impervious Area

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

**Summary for Subcatchment A-8: CDS-1**

Runoff = 0.71 cfs @ 12.08 hrs, Volume= 2,470 cf, Depth= 7.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
* 3,753	98	Paved parking
173	39	>75% Grass cover, Good, HSG A
3,926	95	Weighted Average
173		4.41% Pervious Area
3,753		95.59% Impervious Area

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

## Off-site Analysis

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Type III 24-hr 100-yr Rainfall=8.15"

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Page 24

### Summary for Reach 3R: Runoff

Inflow Area = 25,100 sf, 73.62% Impervious, Inflow Depth > 3.94" for 100-yr event  
Inflow = 0.84 cfs @ 12.11 hrs, Volume= 8,236 cf  
Outflow = 0.84 cfs @ 12.12 hrs, Volume= 8,236 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

### Summary for Reach 11R: 15" RCP

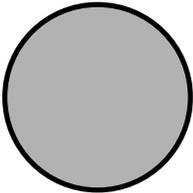
Inflow Area = 618,284 sf, 39.45% Impervious, Inflow Depth > 3.57" for 100-yr event  
Inflow = 49.97 cfs @ 12.14 hrs, Volume= 184,185 cf  
Outflow = 18.99 cfs @ 11.99 hrs, Volume= 184,182 cf, Atten= 62%, Lag= 0.0 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Max. Velocity= 16.62 fps, Min. Travel Time= 0.3 min  
Avg. Velocity = 7.05 fps, Avg. Travel Time= 0.8 min

Peak Storage= 398 cf @ 12.00 hrs  
Average Depth at Peak Storage= 1.25'  
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 17.90 cfs

15.0" Round Pipe  
n= 0.013  
Length= 324.0' Slope= 0.0768 '/'  
Inlet Invert= 213.02', Outlet Invert= 188.13'



### Summary for Pond 5P: Infiltration System 1

Inflow Area = 12,523 sf, 98.62% Impervious, Inflow Depth = 7.80" for 100-yr event  
Inflow = 2.29 cfs @ 12.08 hrs, Volume= 8,137 cf  
Outflow = 2.18 cfs @ 12.11 hrs, Volume= 7,285 cf, Atten= 5%, Lag= 1.9 min  
Discarded = 0.03 cfs @ 4.70 hrs, Volume= 2,103 cf  
Primary = 2.16 cfs @ 12.11 hrs, Volume= 5,181 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs  
Peak Elev= 223.67' @ 12.11 hrs Surf.Area= 464 sf Storage= 1,178 cf

Plug-Flow detention time= 89.8 min calculated for 7,282 cf (89% of inflow)  
Center-of-Mass det. time= 38.1 min ( 783.9 - 745.7 )

## Off-site Analysis

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Type III 24-hr 100-yr Rainfall=8.15"

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Page 25

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	389 cf	<b>4.00'W x 116.00'L x 5.50'H Field A</b> 2,552 cf Overall - 1,254 cf Embedded = 1,298 cf x 30.0% Voids
#2A	220.00'	905 cf	<b>Concrete Galley 4x4x3</b> x 29 Inside #1 Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf
		1,294 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	222.17'	<b>10.0" Round Culvert</b> L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 222.17' / 220.57' S= 0.0800 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf

**Discarded OutFlow** Max=0.03 cfs @ 4.70 hrs HW=219.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=2.15 cfs @ 12.11 hrs HW=223.67' TW=216.35' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 2.15 cfs @ 3.95 fps)

### Summary for Pond 7P: Detention System

Inflow Area = 16,518 sf, 95.99% Impervious, Inflow Depth = 5.46" for 100-yr event  
 Inflow = 2.82 cfs @ 12.11 hrs, Volume= 7,512 cf  
 Outflow = 0.44 cfs @ 12.56 hrs, Volume= 6,408 cf, Atten= 84%, Lag= 27.5 min  
 Primary = 0.44 cfs @ 12.56 hrs, Volume= 6,408 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Peak Elev= 217.84' @ 12.56 hrs Surf.Area= 936 sf Storage= 4,133 cf

Plug-Flow detention time= 168.8 min calculated for 6,408 cf (85% of inflow)

Center-of-Mass det. time= 125.6 min ( 895.4 - 769.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.42'	5,616 cf	<b>12.00'W x 78.00'L x 6.00'H Prismaoid</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	213.42'	<b>8.0" Round Culvert</b> L= 67.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 213.42' / 208.90' S= 0.0675 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	213.42'	<b>1.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	215.08'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	218.67'	<b>6.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

## Off-site Analysis

Prepared by DeCelle-Burke-Sala & Associates, Inc.

HydroCAD® 10.00-25 s/n 07920 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 100-yr Rainfall=8.15"

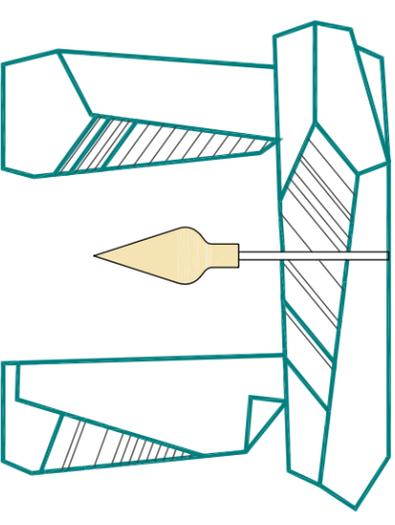
Printed 6/28/2021

Page 26

**Primary OutFlow** Max=0.44 cfs @ 12.56 hrs HW=217.83' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.44 cfs of 2.68 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.05 cfs @ 10.07 fps)
- 3=Orifice/Grate (Orifice Controls 0.38 cfs @ 7.81 fps)
- 4=Orifice/Grate ( Controls 0.00 cfs)

## Watershed Maps



**& Associates, Inc.**

1266 Furnace Brook Parkway #401  
 Quincy, MA 02169  
 617-405-5100(o) 617-405-5101(f)  
[www.decelle-burke-sala.com](http://www.decelle-burke-sala.com)

**GENERAL NOTES:**

1. THE IMAGE IS PREPARED FROM THE TOWN OF BELMONT GIS WEBSITE. IT WAS PREPARED BY THIS OFFICE FOR OFF-SITE STORMWATER INFRASTRUCTURE REVIEW.
2. SCALE OF THE PLAN IS APPROXIMATE.

**PROJECT TITLE:**

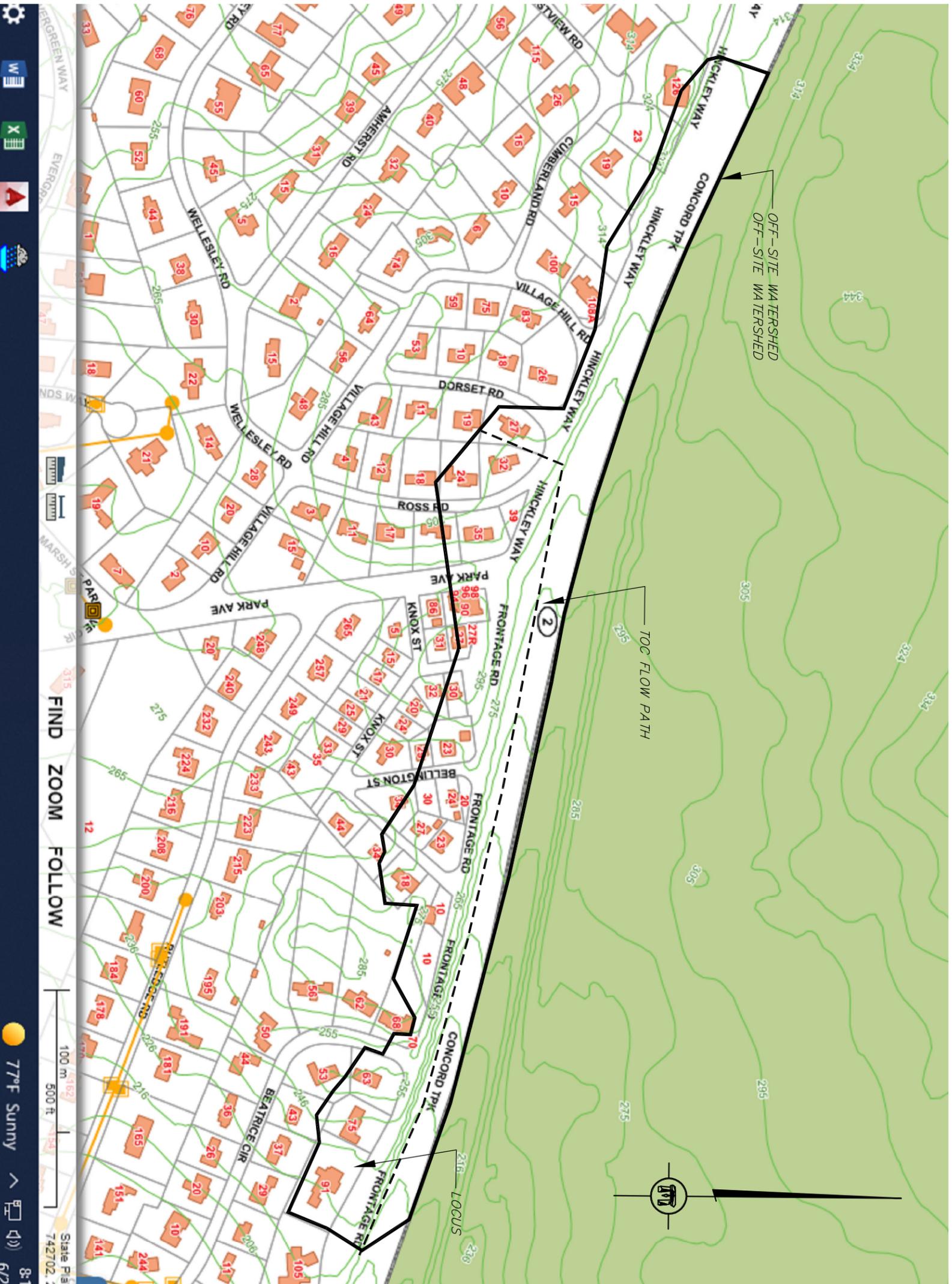
**PROPOSED OFF-SITE  
 WATERSHED MAP  
 91 BEATRICE CIRCLE  
 BELMONT, MASS.**

**PREPARED FOR:**

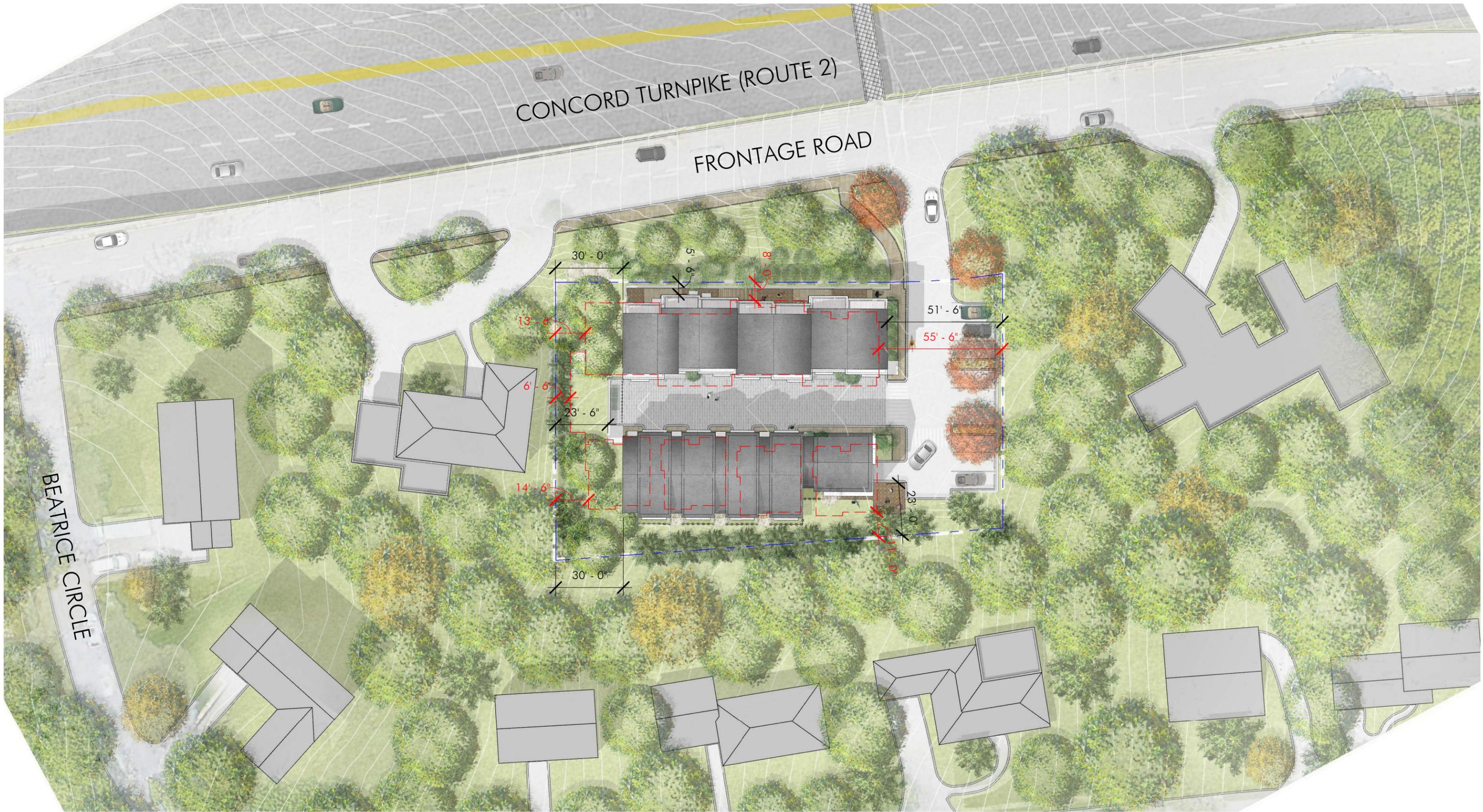
91 BEATRICE CIRCLE LLC  
 c/o REGNANTE STERIO  
 401 EDGEWATER PL, SUITE 630  
 WAKEFIELD, MA 01880

DATE: JUNE 28, 2021

REVISION:



JOB NUMBER: 2019.085 SCALE: 1" = 250' SHEET 1 OF 1



- ▲ SITE ENTRY
- ▲ GARAGE ENTRY
- ▲ UNIT ENTRY



- ▲ SITE ENTRY
- ▲ GARAGE ENTRY
- ▲ UNIT ENTRY





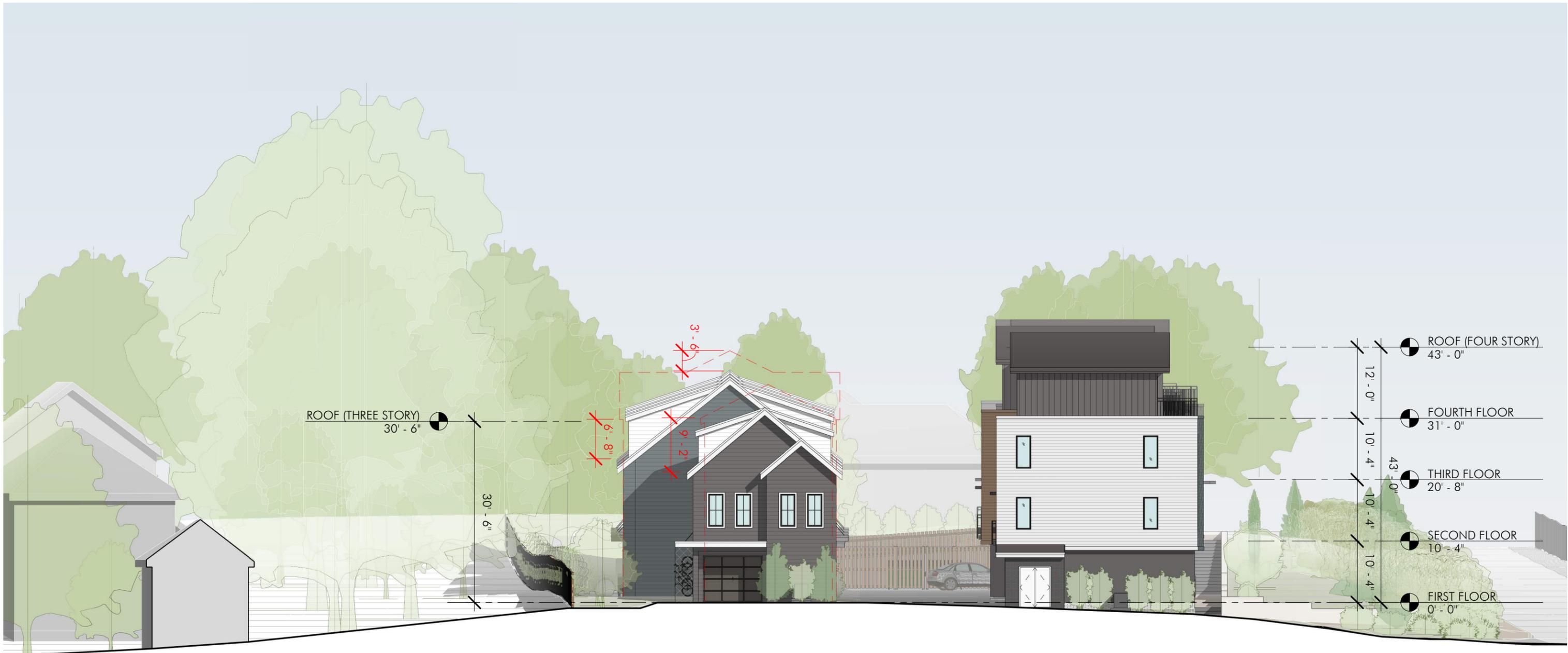












**EMBARC**

**EAST SIDE ELEVATION**



91 BEATRICE CIRCLE  
BELMONT, MA 02478

JULY 2, 2021

**A10**







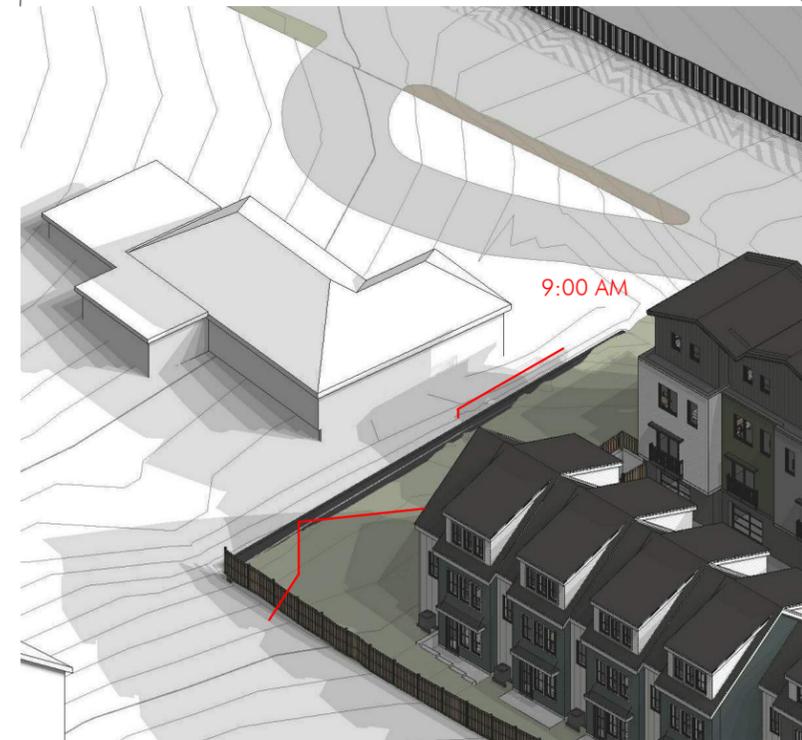
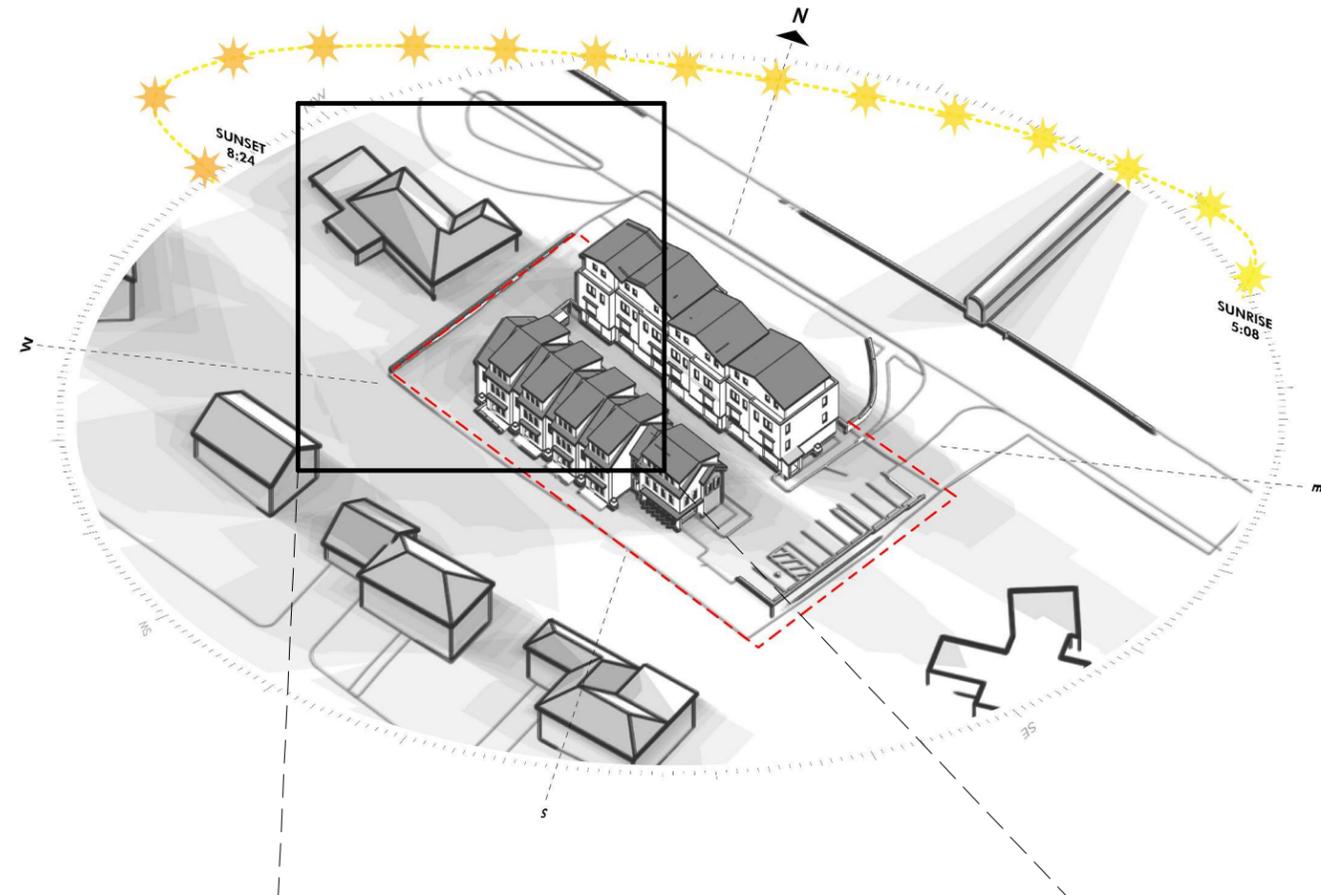
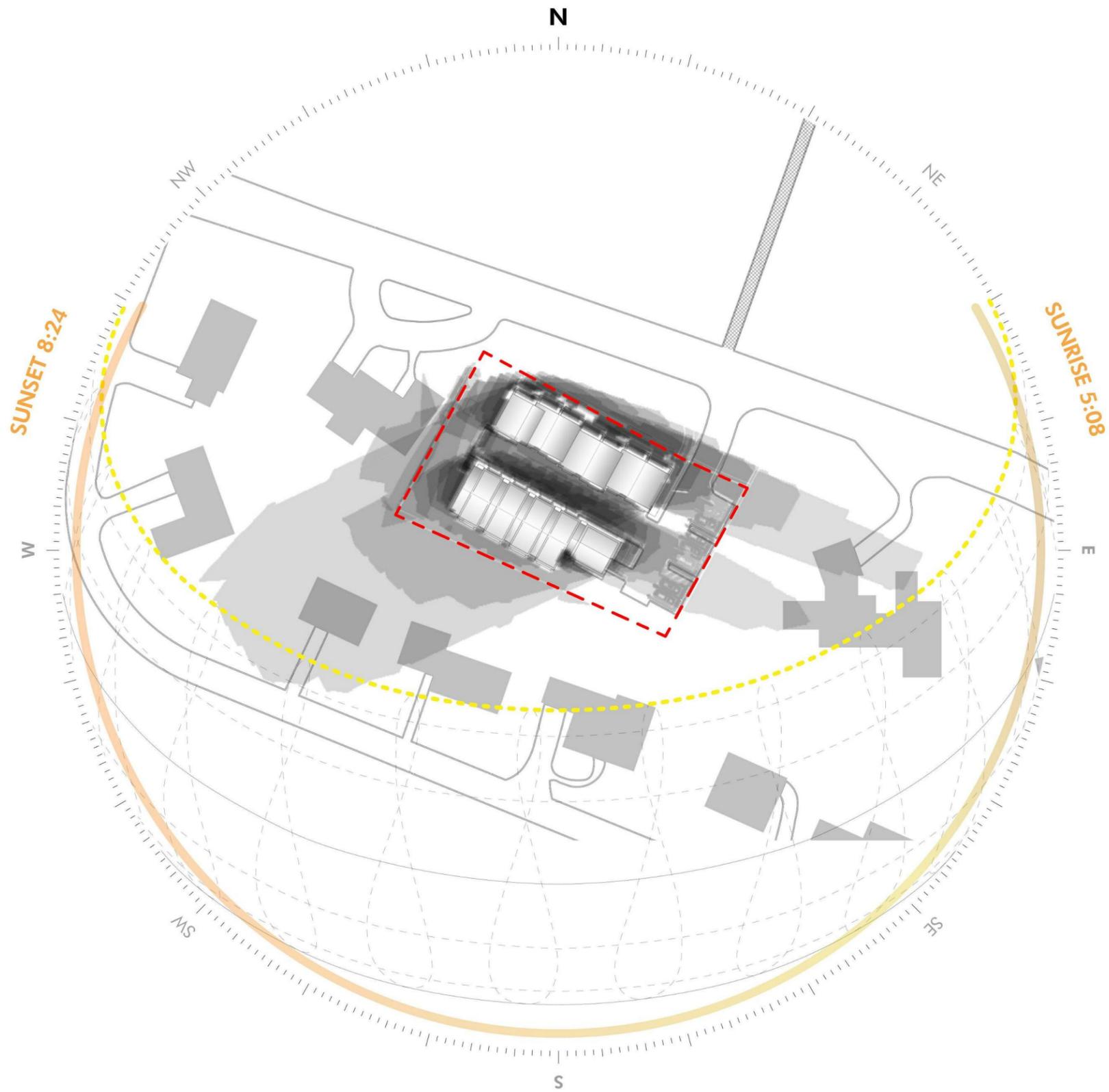
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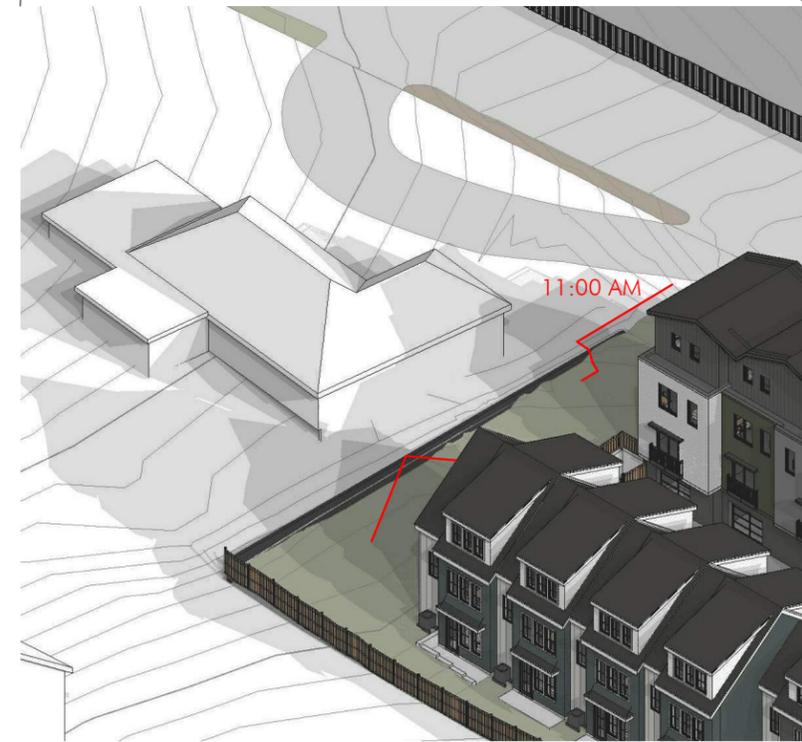
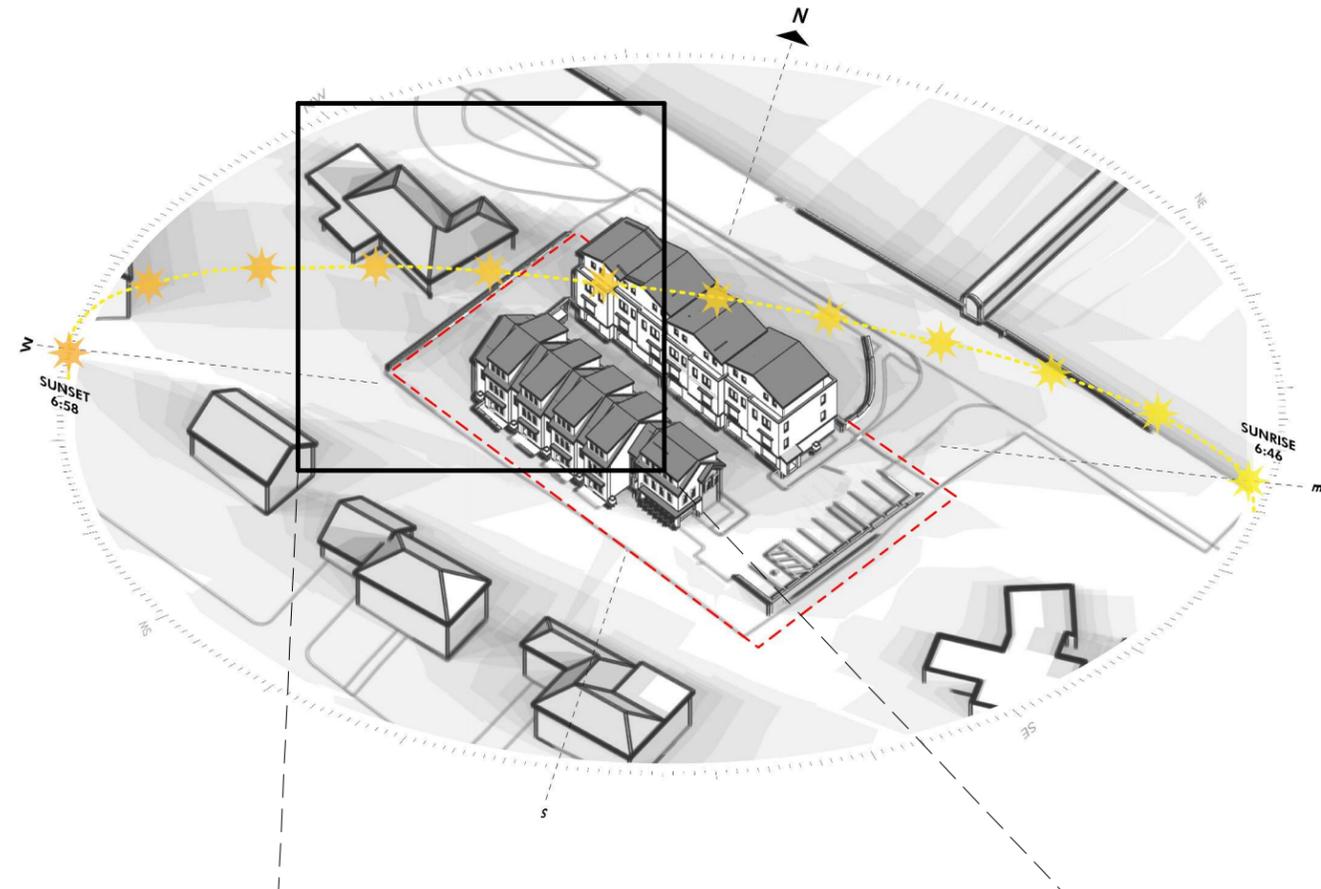
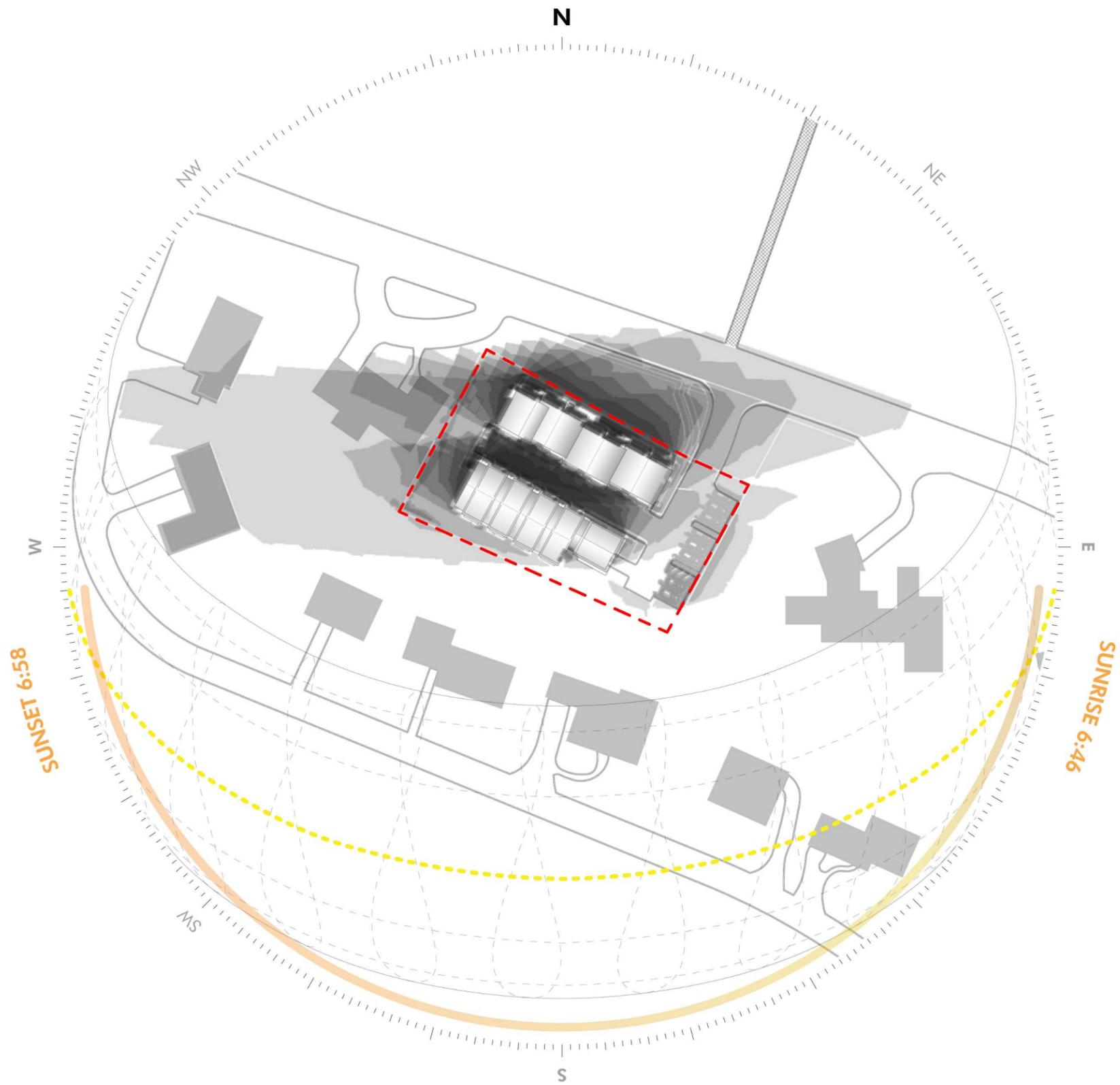
**REVISED SITE AXON**

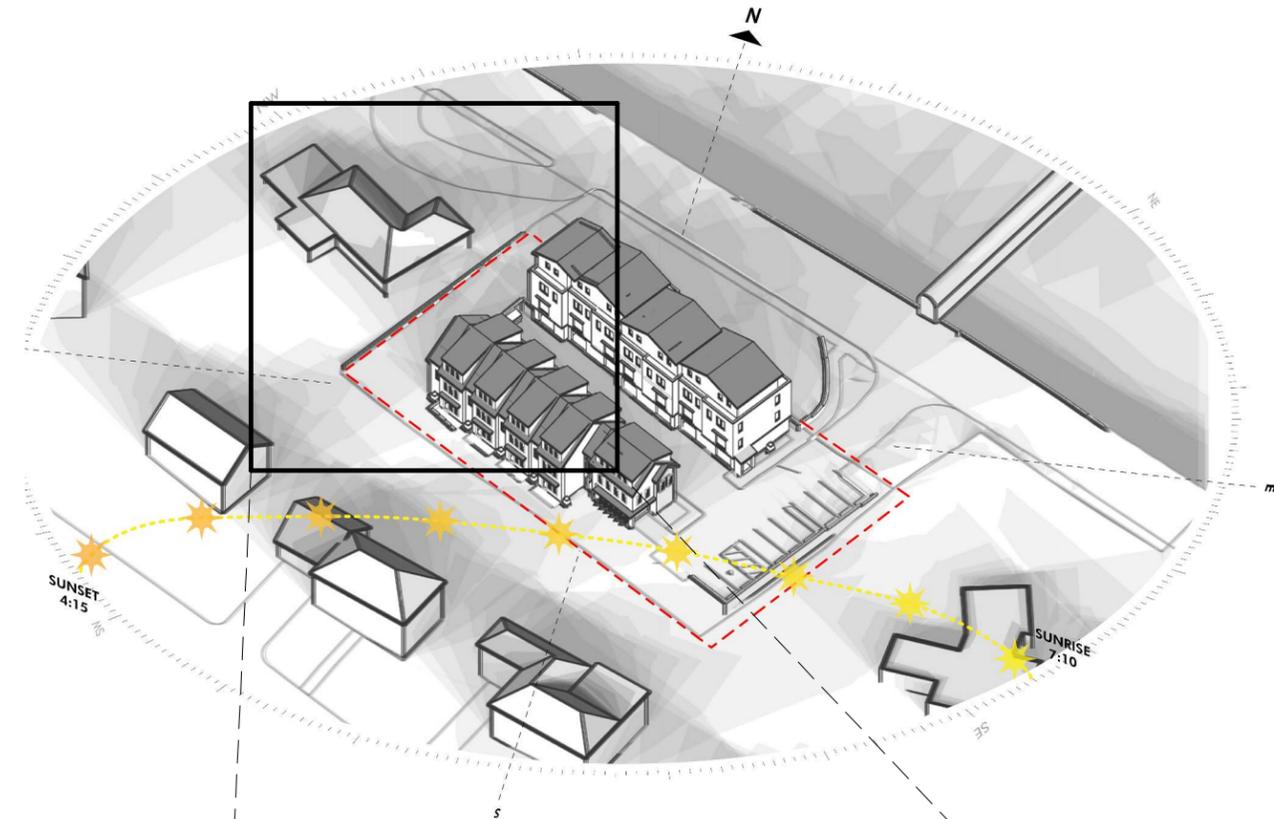
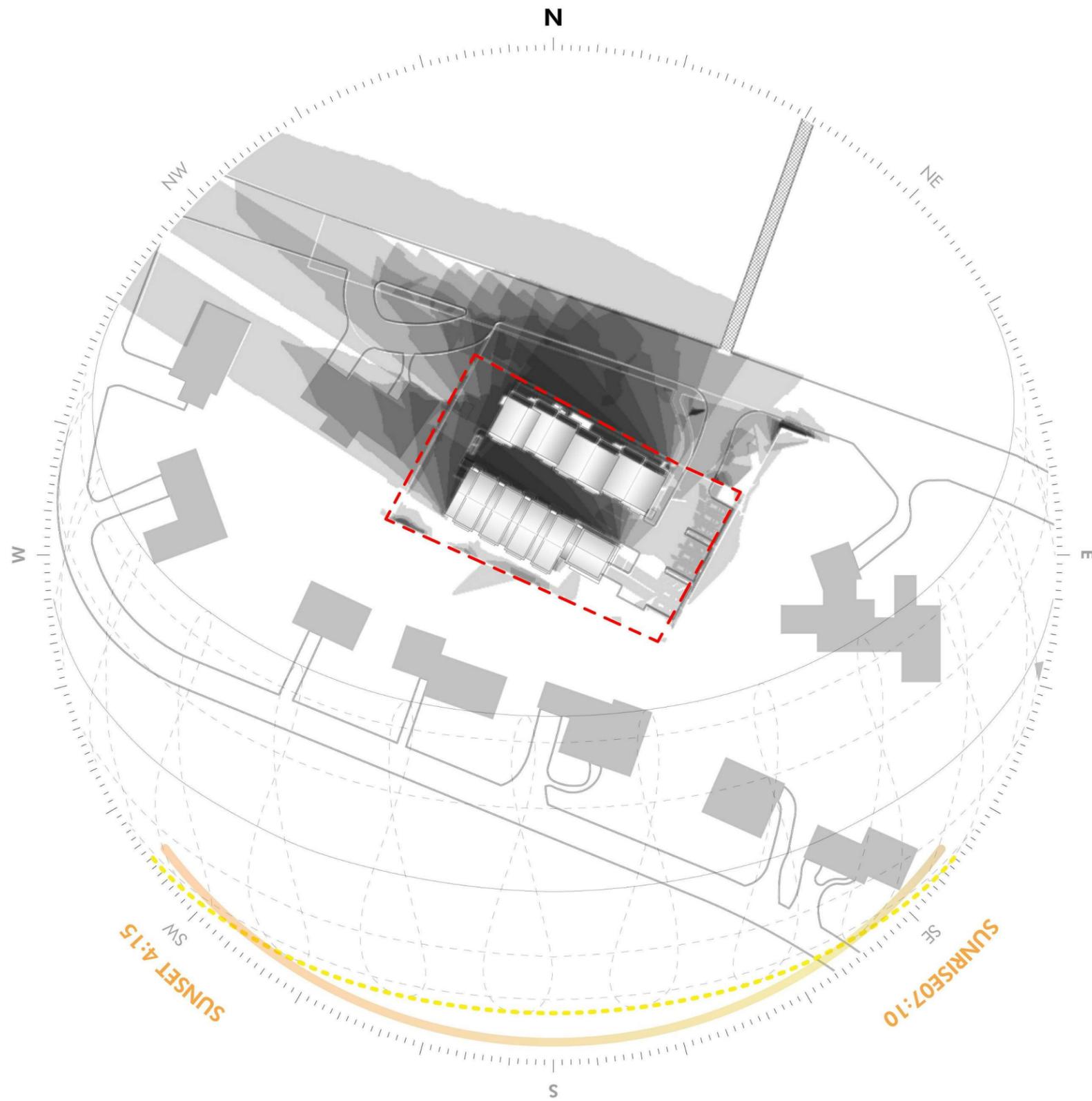
91 BEATRICE CIRCLE  
BELMONT, MA 02478

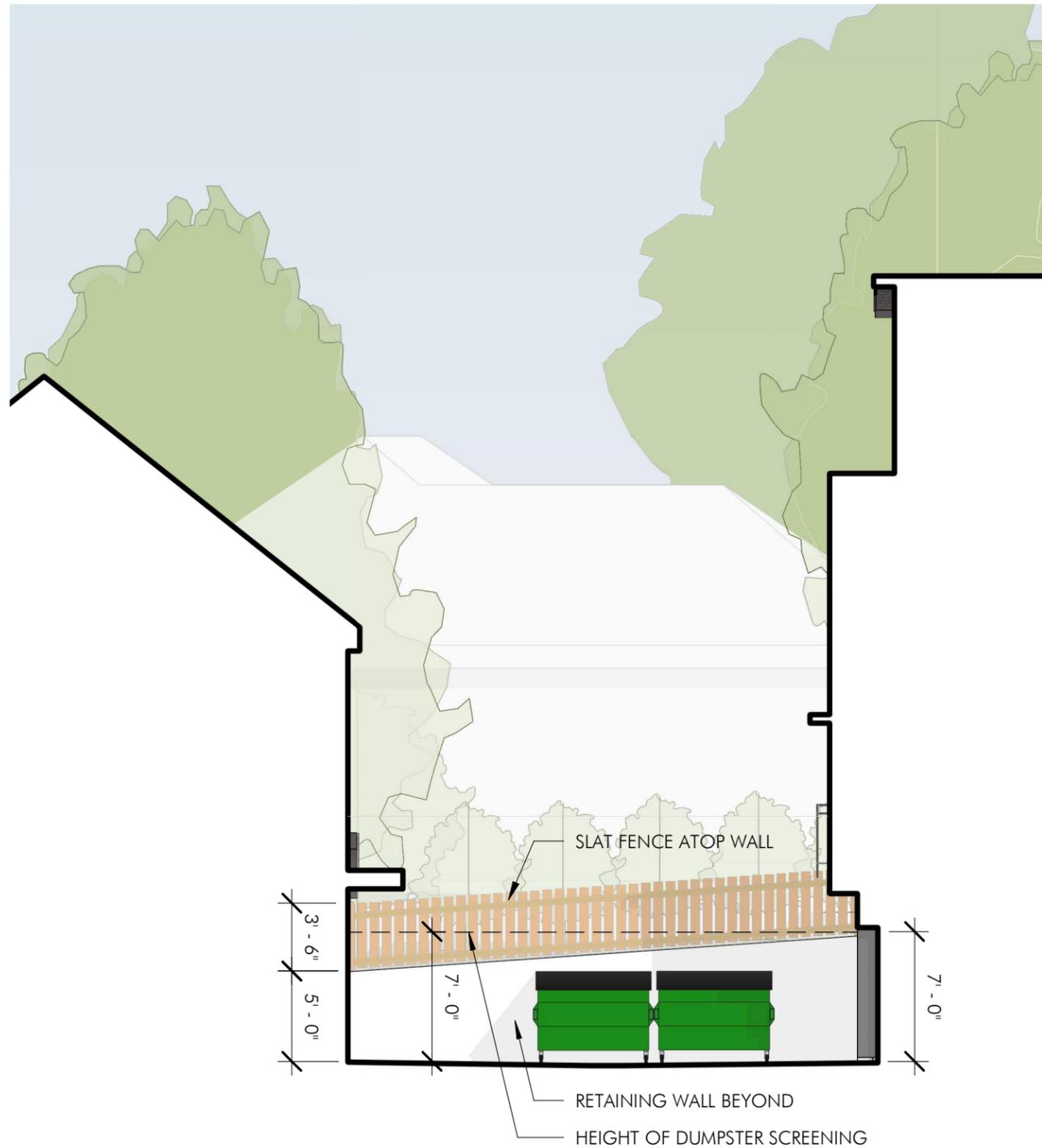
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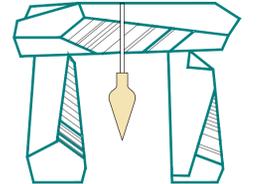












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 617-405-5100 (o) 617-405-5101 (f)  
 www.decelle-burke-sala.com

CLAUDIO SALA, PLS

- GENERAL NOTES:**
- LOCUS: ASSESSORS MAP 51 BLOCK LOT 36  
 RECORD OWNER: COMPREHENSIVE LAND HOLDINGS  
 DEED REFERENCE: CERTIFICATE #271959  
 PLAN REFERENCE: LC PLAN 2367-12
  - ELEVATIONS REFER TO NAVD-88.
  - EXISTING UTILITIES WHERE SHOWN IN THE DRAWINGS ARE FROM SURFACE OBSERVATION AND RECORD INFORMATION AND SHOULD BE CONSIDERED APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY LOCATING AND COORDINATING THE PROPOSED CONSTRUCTION ACTIVITY WITH DIG-SAFE AND THE APPLICABLE UTILITY COMPANIES AND MAINTAINING THE EXISTING UTILITY SYSTEM IN SERVICE. DIG-SAFE SHALL BE NOTIFIED PER THE STATE OF MASSACHUSETTS STATUTE CHAPTER 82, SECTION 409 AT TEL. 1-888-344-7233. THE ENGINEER DOES NOT GUARANTEE THEIR ACCURACY OR THAT ALL UTILITIES AND SUBSURFACE STRUCTURES ARE SHOWN. LOCATIONS AND ELEVATIONS OF UNDERGROUND UTILITIES WERE TAKEN FROM RECORD PLANS. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION, AND INVERTS OF UTILITIES AND STRUCTURES AS REQUIRED PRIOR TO THE START OF CONSTRUCTION.
  - THE LOT SHOWN DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD ZONE AS DELINEATED ON FIRM 25017C-00416E, DATED JUNE 4, 2010.
  - PARCEL IS ZONED SR-A.

PROJECT TITLE & LOCATION:

**PROPOSED SITE PLAN**  
 91 BEATRICE CIRCLE  
 BELMONT, MASS.

PLAN TITLE:  
**EXISTING CONDITIONS - LEDGE ELEVATIONS**

PREPARED FOR:  
 91 BEATRICE CIRCLE LLC  
 c/o REGNANTE STERIO  
 401 EDGEWATER PL, SUITE 630  
 WAKEFIELD, MA 01880

DATE: JUNE 28, 2021

JOB NUMBER: 19.085 SHEET 1 OF 1  
 SCALE: 1"=20'

**SOIL TEST PIT DATA:**

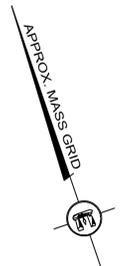
DATE: 12/5/2019  
 TEST BY: KAMERON CAMPBELL, SE #14227

TEST PIT	GRD. EL.	NGWO
1	225.0	
2	224.7	
3	229.8	
4	223.5	
5	230.3	
6	229.8	
7	234.2	
8	231.0	
9	220.8	

DATE: 05/12/2021  
 TEST BY: KAMERON CAMPBELL, SE #14227

TEST PIT	GRD. EL.	NGWO
1	225.0	
2	224.7	
3	229.8	
4	223.5	
5	230.3	
6	229.8	
7	234.2	
8	231.0	
9	220.8	

\*No groundwater or any signs of groundwater observed in any of the test pits performed.



**CONCORD TURNPIKE**



**LEGEND:**

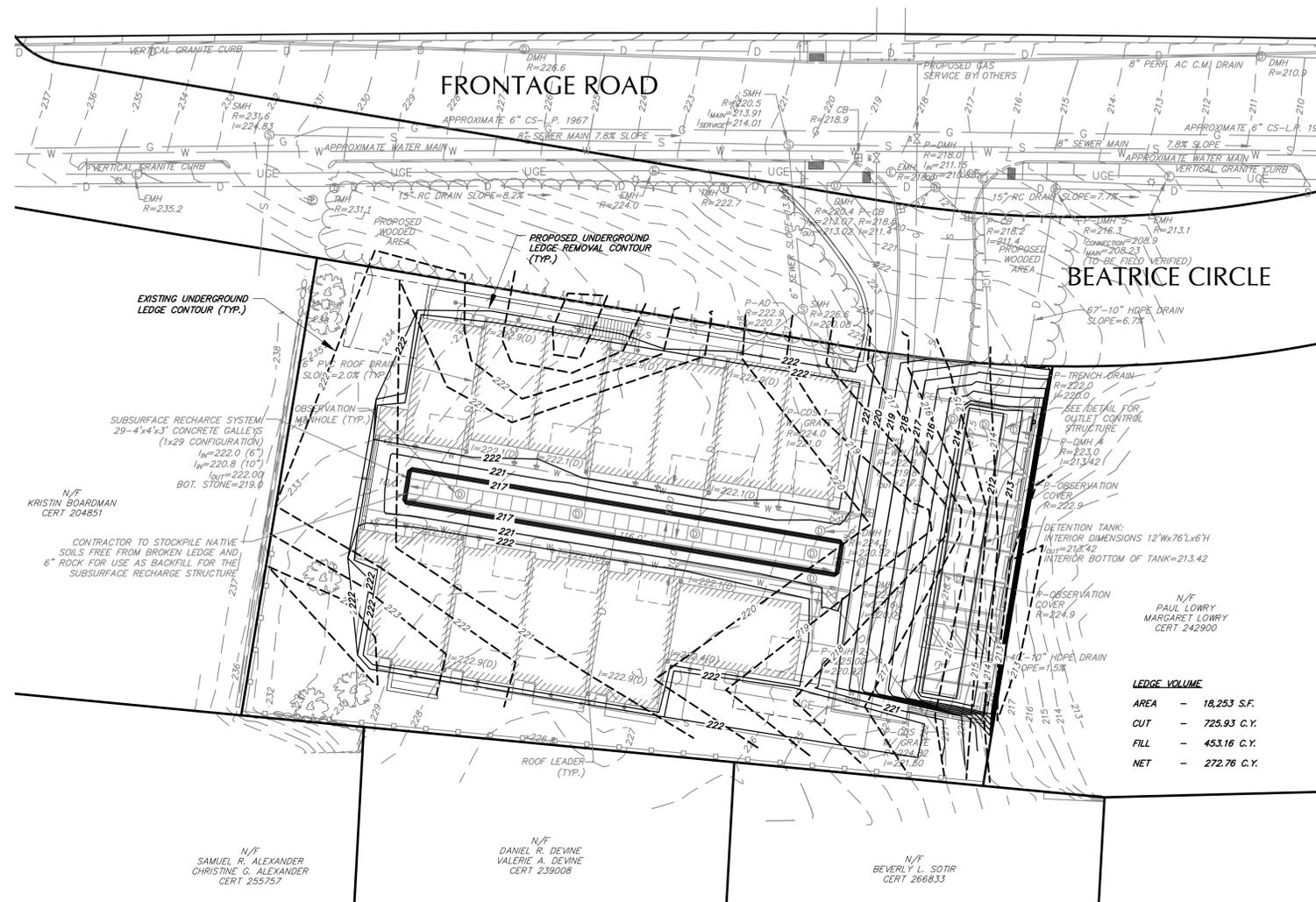
- EXISTING:**
- LOCUS PROPERTY LINE
  - TREE LINE
  - SEWER MANHOLE (SMH)
  - DRAIN MANHOLE (DMH)
  - CATCH BASIN (CB)
  - STONEWALL
  - GAS VALVE
  - WATER VALVE
  - WATER SERVICE
  - HYDRANT
  - UTILITY POLE
  - N/F OR FORMERLY
  - DRAIN PIPE
  - WATER MAIN
  - GAS SERVICE
  - UNDERGROUND POWER
  - OVERHEAD WIRES
  - SEWER MAIN
  - LANDSCAPED AREA
  - SPOT GRADE
  - CHAIN LINK FENCE
  - STOCKADE FENCE
  - TEST PIT
  - HAND HOLES FOR UTILITIES
  - LIGHT POLE
  - FIRST FLOOR



CONCORD TURNPIKE

FRONTAGE ROAD

BEATRICE CIRCLE



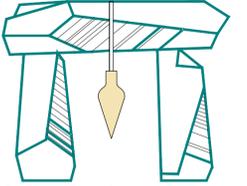
LEGEND:

<b>EXISTING:</b>		<b>PROPOSED:</b>
	- LOCUS PROPERTY LINE	
	- TREE LINE	
	- CATCH BASIN (CB)	
	- GAS VALVE	
	- WATER VALVE	
	- WATER SERVICE	
	- HYDRANT	
	- UTILITY POLE	
N/F	- NOW OR FORMERLY	
	- DRAIN PIPE	
	- WATER MAIN	
	- GAS SERVICE	
	- UNDERGROUND POWER	
	- OVERHEAD WIRES	
	- SEWER MAIN	
LSA	- LANDSCAPED AREA	
-25	- GRADE	
x25.7	- SPOT GRADE	
x	- CHAIN LINK FENCE	
	- CHAIN LINK FENCE	
	- TEST PIT	
	- HAND HOLES FOR UTILITIES	
	- LIGHT POLE	
	- FIRST FLOOR	
	- TOP OF FOUNDATION	
	- GARAGE FLOOR	
	- SECOND FLOOR	
	- SEWER INVERT	
	- DRAIN INVERT	

**LEDGE VOLUME**

AREA	-	18,253 S.F.
CUT	-	725.93 C.Y.
FILL	-	453.16 C.Y.
NET	-	272.76 C.Y.

DeCelle-Burke-Sala



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 www.decelle-burke-sala.com



JAMES W. BURKE, P.E.

GENERAL NOTES:

- LOCUS: ASSESSORS MAP 51 BLOCK LOT 36
- RECORD OWNER: COMPREHENSIVE LAND HOLDINGS  
 DEED REFERENCE: CERTIFICATE #21959  
 PLAN REFERENCE: LC PLAN 2367-12
- ELEVATIONS REFER TO NAVD-88.
- EXISTING UTILITIES WHERE SHOWN IN THE DRAWINGS ARE FROM SURFACE OBSERVATION AND RECORD INFORMATION AND SHOULD BE CONSIDERED APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY LOCATING AND COORDINATING THE PROPOSED CONSTRUCTION ACTIVITY WITH DIG-SAFE AND THE APPLICABLE UTILITY COMPANIES AND MAINTAINING THE EXISTING UTILITY SYSTEM IN SERVICE.
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- PARCEL IS ZONED SR-A.

PROJECT TITLE & LOCATION:

PROPOSED SITE PLAN  
 91 BEATRICE CIRCLE  
 BELMONT, MASS.

PLAN TITLE:

LEDGE REMOVAL VOLUME PLAN

PREPARED FOR:

91 BEATRICE CIRCLE LLC  
 c/o REGNANTE STERIO  
 401 EDGEWATER PL, SUITE 630  
 WAKEFIELD, MA 01880

DATE: JUNE 28, 2021

JOB NUMBER: 19.085 SHEET 1 OF 1

