Level I – Minor Residential
Development Review Application
Portland, Maine

Planning and Urban Development Department
Planning Division

Portland's Planning and Urban Development Department coordinates the development review process for site plan, subdivision and other applications under the City's Land Use Code. Attached is the application form for a Level I: Minor Residential site plan and building permit.

Level I: Minor Residential development includes:

- Development of a single-family or a two-family building, excluding building additions, decks, or accessory structures, such development shall be deemed minor residential development for purposes of this article regardless of its size.

- The addition of any additional dwelling unit to a building initially reviewed as a two-family dwelling or multifamily structure, if the additional dwelling unit does not require subdivision review under Maine State Statutes and Portland's Subdivision Ordinance.

As of September 16, 2010 all new construction of one and two family homes are required to be sprinkled in compliance with NFPA 13D. This is required by City Code. (NFPA 101 2009 ed.)

The Maine Home Construction Contracts Act requires that any home construction or repair work for more than $3000 in materials or labor must be based on a written contract unless the parties agree to exempt themselves. A sample contract is available on the City's website at www.portlandmaine.gov , or contact the Inspections Office to have one mailed to you.

The Land Use Code (including Article V), the Technical Manual, and the Design Manual are available on the City's web site at http://www.portlandmaine.gov/planning/default.asp or copies may be purchased at the Planning Division Office.

Inspection Division
Room 315, City Hall
389 Congress Street
(207) 874-8703

Office Hours
Monday, Tuesday, Wednesday and Friday
8:00 a.m. – 4:00 p.m.
Thursday
8:00 a.m. – 1:00 p.m.

Planning Division
Fourth Floor, City Hall
389 Congress Street
(207) 874-8721

Office Hours
Monday thru Friday
8:00 a.m. – 4:30 p.m.

Project Address:

Total Square Footage of Proposed Structure/Area: Main Bld'g: 6,587(sf) Studio: 1,046 (sf heated)	**Area of lot (total sq. ft.):** **Garage:** **Yes** X **No** ____ **Attached** X **Detached** _____ **Sq. Ft.:** 523 (sf)	main studio **Number of Stories:** 4 3 **Number of Bathrooms:** 4 1 **Number of Bedrooms:** 4 1 @ proposed area of new work

Tax Assessor's Chart, Block & Lot(s):

Chart#	Block #	Lot #
013	K062	001

Current legal use: Multi-family

Number of Residential Units (4)existing (1) proposed

If vacant, what was the previous use? _____

Is property part of a subdivision? no **If yes, please name** _____

Project Description: Main Building: Existing 4 story building with 3 residential units. The proposal includes a 4th floor dormer roof expansion, 3rd and 4th floor interior renovations and the addition of a 4th residential living unit. The proposal includes the installation of a fire suppression system per NFPA. No increase in stories & no change of use is proposed. Studio: Construct a free standing living unit per proposed drawings.

Applicant – **must be owner, Lessee or Buyer**	**Applicant Contact Information**
Name: Mark Smith and Stephanie Dunn	Work #
Business Name, if applicable:	Home#
Address: 41 Cumberland Avenue	Cell # 207-877-4965
City/State : Portland, ME Zip Code: 04101	e-mail: msmith@chaosunlimited.com
Owner – (if different from Applicant)	**Owner Contact Information**
Name:	Work #
Address:	Home#
City/State : Zip Code:	Cell #
	e-mail:
Billing Information	**Contact when Building Permit is Ready:**
Name: same as applicant	Name: Mark Mueller
Address:	Address: 100 Commercial Street #205
City/State : Zip Code:	City/State : Portland, ME Zip Code: 04101
Phone Number:	Phone Number: 207-774-9057

DEVELOPMENT REVIEW FEES:
Payment may be made in cash, credit card or check addressed to the City of Portland.

Level I Minor Residential Site Plan	**Fees Paid:**
1. Application Fee - $300.00	$ 300.00
2. Inspection Fee - $100.00 (for site plan inspection by the Planning Division)	$ 100.00
3. Certificate of Occupancy Fee - $75.00	$
4. Building Permit (Cost of Work)	$ 3,940.00
Total Due:	$ 4,340.00
Building Permit Fee - $30 for the first $1,000 construction cost - $10 every additional $1,000.	
Performance Guarantee - Exempt except for those projects that complete construction in the winter and the site work is incomplete.	

Please submit all of the information outlined on the applicable Checklist, shown on Page 4 and 5 of this Application. In addition, a CD or PDF (e-mailed to buildinginspections@portlandmaine.gov) of the entire Application, including all plans, must be submitted with the Application. Failure to do so may result in the automatic denial of your permit.

Portland's development review process and requirements are outlined in the Land Use Code (Chapter 14), which includes the Subdivision Ordinance (Section 14-491) and the Site Plan Ordinance (Section 14-521). Portland's Land Use Code is on the City's web site: www.portlandmaine.gov Copies of the ordinances may be purchased through the Planning Division. All of the information on the checklist must be submitted for review. The applicant must check off the items contained in the application package to ensure the application is complete.

Property Taxes:
If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before a permit of any kind is accepted.

Separate Permits:
Separate permits are required for internal and external plumbing, HVAC, and electrical installations.

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Planning Authority and Code Enforcement's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature of Applicant:	**Date:**

This is not a permit - you may not commence any work until the permit is issued.

(A CD or PDF (e-mailed to buildinginspections@portlandmaine.gov) of the entire application, including all plans, must be submitted with the application.)

General Submittal Requirements – Level I Minor Residential			
Applicant Checklist	***Planner Checklist (internal)***	***Number of Copies***	***Submittal Requirement***
X		*2*	*Completed application form and check list.*
X		*1*	*Application fees.*
X		*2*	*Evidence of right, title and interest.*
N/A		*2*	*Copies of required state and/or federal permits.*
NONE		*2*	*Written Description of existing and proposed easements or other burdens.*
X		*2*	*Written requests for waivers from individual site plan and/or technical standards.*
SEE ARCH PLANS		*2*	*Written summary of fire safety (referencing NFPA fire code and Section 3 of the City of Portland Technical Manual). Refer to Fire Department Checklist on page 6 of this application.*

Site Plans and Boundary Survey Requirements – Level I Minor Residential			
Applicant Checklist	**Planner Checklist (internal)**	**Number of Copies**	**Submittal Requirement**
X		3	Boundary survey meeting the requirements of section 13 of the City of Portland Technical Manual with the site plan information listed below shown on the plan, including a north arrow and a scale greater than or equal to 1"=20'. (Photocopies of the plat or hand drawn building footprints will not be accepted.)
X		▪ *Zoning district, setbacks and dimensional requirements. Show zone lines and overlay zones that apply to the property, including Shoreland Zone &/or Stream Protection Zone.*	
X		▪ *Existing and proposed structures (including location of proposed piers, docks or wharves if in Shoreland Zone).*	
X		▪ *Location and dimension of existing and proposed paved areas.*	
X		▪ *Proposed ground floor area of building.*	
X		▪ *Finish floor elevation (FEE) or sill elevation.*	
X		▪ *Exterior building elevations (show all 4 sides).*	
X		▪ *Existing and proposed utilities (or septic system, where applicable)*	
X		▪ *Existing and proposed grading and contours.*	
X		▪ *Proposed stormwater management and erosion controls.*	
X		▪ *Total area and limits of proposed land disturbance.*	
X		▪ *Proposed protections to or alterations of watercourses.*	
X		▪ *Proposed wetland protections or impacts.*	
X		▪ *Existing vegetation to be preserved and proposed site landscaping and street trees (2 trees per unit for a single or two-family house).*	

X		▪ *Existing and proposed curb and sidewalk, except for a single family home.*
X		▪ *Existing and proposed easements or public or private rights of way.*
X		▪ *Show foundation/perimeter drain and outlet.*
X		▪ *Additional requirements may apply for lots on unimproved streets.*

Building Permit Submittal Requirements –Level I: Minor Residential Development			
Applicant Checklist	**Planner Checklist (internal)**	**Number of Copies**	**Submittal Requirement**
X		**1**	**One (1) complete set of construction drawings must include:**
X			▪ *Cross section with framing details*
X			▪ *Floor plans and elevations to scale*
X			▪ *Stair details including dimensions of : rise/run, head room, guards/handrails, baluster space*
X			▪ *Window and door schedules*
X			▪ *Foundation plans w/required drainage and damp proofing , if applicable*
X			▪ *Detail egress requirements and fire separation, if applicable*
X			▪ *Insulation R-factors of walls, ceilings & floors & U-factors of windows per the IEEC 2003*
X			▪ *Deck construction including: pier layout, framing, fastenings, guards, stair dimensions*
X			▪ *As of September 16, 2010 all new construction of one and two family homes are required to be sprinkled in compliance with NFPA 13D. This is required by City Code. (NFPA 101 2009 ed.)*
X			▪ *Reduced plans or electronic files in pdf format are also required if original plans are larger than 11X17"*

** **Reminder:** **

1. **A CD or PDF of the entire application, including all plans, must be submitted with the application.**
2. Separate permits are required for internal and external plumbing, HVAC, and electrical installations.
3. Please submit all of the information outlined in this application checklist.
4. If the application is incomplete, the application may be refused.
5. The Planning and Urban Development Department may request additional information prior to the issuance of a permit.

Site Plan Standards for Review of Level I: Minor Residential

Level I: Minor Residential site plan applications are subject to the following site plan standards*, as contained in section 14-526 of Article V, Site Plan:

- 14-526 (a) **Transportation Standards**:
  - 2.a. Site Access and Circulation (i) and (ii);
  - 2.c Sidewalks: (*if the site plan is a two- family or multi-family building only*);
  - 4.a. Location and required number of vehicle parking spaces:(i) and (iv)

- 14-526 (b) **Environmental Quality Standards**:
  - 1. Preservation of significant natural features.
  - 2.a. Landscaping and landscape preservation
  - 2.b. Site landscaping (iii)
  - 3.a. Water quality, stormwater management and erosion control: a., d., e., and f.

- 14-526 (c) **Public Infrastructure and Community Safety Standards**:
  - 1. Consistency with Master Plan
  - 2. Public Safety and fire prevention
  - 3. Availability and adequate capacity of public utilities; a., c., d., and e.

- 14-526 (d) **Site Design Standards**:
  - 5. Historic Resources
  - 9. Zoning related design standards

- *Except as provided in Article III of the City Code, or to conditions imposed under Section 14-526(e) only, or to those submission requirements set forth in section 14-527 as relate solely thereto.*

PORTLAND FIRE DEPARTMENT
SITE REVIEW
FIRE DEPARTMENT CHECKLIST

A separate drawing[s] shall be provided to the Portland Fire Department for all site plan reviews.

1. Name, address, telephone number of applicant.
2. Name address, telephone number of architect
3. Proposed uses of any structures [NFPA and IBC classification]
4. Square footage of all structures [total and per story]
5. Elevation of all structures
6. Proposed fire protection of all structures
   - ***As of September 16, 2010 all new construction of one and two family homes are required to be sprinkled in compliance with NFPA 13D. This is required by City Code. (NFPA 101 2009 ed.)***
7. Hydrant locations

August 14th, 2012

To Whom it May Concern,

We authorize Mark Mueller of Mark Mueller Architects to act as our Agent to sign permitting applications on our behalf for the property we own at 43 and 45 Cumberland Avenue Apartments Project.

Sincerely,

Mark Smith and Stephanie Dunn

8/14/2012

8/14/2012

RIGHT, TITLE, AND INTEREST

The applicant has right, title and interest in the proposed project property. The following documents confirm the applicant's right, title and interests:

1. Deed, dated 3-30-2011 (CCRD book 28616, page 217)
2. Deed of Sale by Personal Representative (Interstate), dated 2-23-2009 (CCRD book 26709, page 303)
3. Warranty Deed, dated 2-24-2009 (CCRD book 26662, page 40)

STATE AND/OR FEDERAL PERMITS

The proposed project does not anticipate any state or federal permits.

EXISTING OR PROPOSED EASEMENTS OR OTHER BURDENS

The applicant is not aware of any existing easements on the project parcel. The proposed project does not anticipate the creation of any easements or other burdens.

REQUEST FOR WAIVERS

The applicant is requesting a waiver from ordinance Section-14-526(b)2.b.iii-Street Trees. The section states a waiver may be granted by the following:

> "Where the applicant can demonstrate that site constraints prevent the planting of required street trees in the City right of way, the Reviewing Authority may permit the planting of street trees in the front yard, within ten feet of the property line…"

The existing street frontage has an esplanade between the sidewalk and the street. The property line is approximately along the back side of the sidewalk. The esplanade currently has street trees planted per section 4 of the Technical Manual. Therefore, there are no places to place a street tree without conflicting with the requirements of section 4 of the Technical Manual. Therefore, a location has been provided on within 10 feet of the property line as a means to satisfy the requirements of this section.

WRITTEN ASSESSMENT OF PROPOSED PROJECT'S COMPLIANCE WITH APPLICABLE ZONING REQUIREMENTS

TRANSPORTATION STANDARDS:

1. Impact on surrounding street systems:
    i. *The provisions for vehicular loading and unloading and parking and for vehicular and pedestrian circulation on the site and onto adjacent public streets and ways;*

The project envisions exceeding the minimum required number of new parking spaces required by the ordinance. The existing site provided 1 non conforming parking space, and the proposed project provides 4 parking spaces. The proposed project does not anticipate having an adverse effect on the existing city sidewalk. The proposed project maintains internal pedestrian ways as well as vehicular access and circulation. The proposed project internal vehicular circulation was analyzed with AutoTURN software, a computer aided traffic design software intended for analyzing the movement of vehicular traffic. The internal circulation is consistent with similar sized developments in the Portland area.

ii. *And the incremental volume of traffic will not create or aggravate any significant hazard to safety at or to and including intersections in any direction where traffic could be expected to be impacted;*

The proposed project anticipates the overall creation of one additional unit. The project provides additional off-street parking reducing the congestion of on-street parking. Due to the relative insignificant increase in traffic when compared to the surrounding neighborhood, the proposed development does not anticipate creating or aggravating any significant hazard to safety at or to and including intersection in any direction where traffic could be expected to be impacted.

iii. *and will not cause traffic congestion on any street which reduces the level of service below Level "D" as described in the 1985 Highway Capacity manual published by the Transportation Research Board of the National Research Council, a copy of which manual is on file with the public works authority, or*

substantially increase congestion on any street which is already at a level of service below Level "D":

The proposed project does not anticipate generating enough additional traffic to noticeably affect the level of service on any street immediately surrounding the project.

2. Access and circulation
    i. *The development shall provide safe and reasonable access and internal circulation for the entire site for all users of the site and shall comply with the standards set forth in Sections 1 of the Technical Manual*

The proposed project provides safe and reasonable access and internal circulation for the entire site for all users of the site and complies with the standards set forth in sections 1 of the Technical Manual when applicable.

    ii. *Points of access and egress shall be located to avoid conflicts with existing turning movements and traffic flows.*

The proposed project envisions the continued use of the existing curb cut on Cumberland Avenue. The curb cut is consistent with other curb cuts within the general area. The curb cut is located approximately 220 feet from the nearest intersection (4-way Stop movement).

    iii. *Where drive up features such as gasoline pumps, vacuum cleaners and menu/order boards are permitted, they shall not extend nearer than twenty five (25) feet to the street line. The site must have stacking capacity for vehicles waiting to use these service features without impeding on-site vehicular circulation or creating hazards to vehicular circulation on adjoining streets.*

Not applicable to the proposed project.

3. Parking
    i. Location and Required Number of Vehicle Parking Spaces:

The proposed project envisions the creation of a 4 space parking lot. The existing site included one non-conforming space. The overall project envisions the creation of one new unit. Therefore, the proposed development is required to provide 1 space for the new unit. The proposed project envisions exceeding the required number of parking spaces by more than 10%, however, it does not anticipate exceeding the rate of parking spaces per units recommended by the ordinance. Therefore, by default the number of proposed parking spaces, in excess of the requirement, is appropriate. The parking spaces are anticipated to be no less than 9' wide by 18' long and are accessed by a 12' wide driveway which is greater than the minimum 10' wide driveway required by the Technical Manual.

ii. Location and Required Number of Bicycle Parking Spaces:

The proposed project envisions bicycle parking in the basement of the larger building. At a minimum 2 bicycle parking spaces are anticipated in the basement.

iii. Motorcycle and Scooter Parking:

Motorcycle and scooters shall have access to the proposed project. A motorcycle or scooter can utilize the parking spaces provided.

iv. Snow Storage:

The proposed project envisions the storage of snow to be on the rear of the parcel behind the parking area. The proposed snow storage is located in and around the stormwater depression. The stormwater depression is designed solely for the storage of stormwater. In the unlikely event a 100 year storm impacts the area while significant snow is being stored, the system is anticipated to be functional to the 25 year storm in the event the stormwater depression was to be at a reduced capacity, therefore, the overall proposed stormwater system would not be adversely affected by the storage of snow.

ENVIRONMENTAL QUALITY STANDARDS

4. Preservation of significant natural features:

The applicant is not aware of any significant natural features. The existing project site is fully developed.

5. Landscaping and landscape preservation:
   i. Landscape Preservation:

The proposed site is currently developed. Bushy vegetation is located along the rear of the property and is anticipated to remain. The proposed project envision re-utilizing many of the existing site features, such as the curb cut, existing building footprints, and vegetated areas. The parking area was limited in size to allow for functionality and preserve the remaining open space on the site. No sizable trees are anticipated to be removed as a result of this project.

ii. Site Landscaping:

The proposed project envisions the creation of one new residential unit within a multi-family residential property. Therefore, one street tree is required per the Technical Design Standards. One Street Tree has been provided on the Plan within ten feet of the front property line per the Street Tree Waiver requirements of Section-14-526(b)2.b.iii-Street Trees.

6. Water quality, stormwater management and erosion control

Please reference the stormwater plan and an erosion control plan included in this application. The proposed project envisions complying with applicable standards for water quality, stormwater management and erosion control.

PUBLIC INFRASTRUCTURE AND COMMUNITY SAFETY STANDARDS

7. Consistency with city master plans:

The proposed project appears to be consistent with the city master plans when applicable.

SITE DESIGN STANDARDS:

8. Historic Resources

The proposed project does not appear to be within a historic district. Regarding archaeological sites a letter was obtained from the Maine Historic Preservation Commission stating “there will be no historic properties affected by the proposed undertaking”.

9. Exterior Lighting

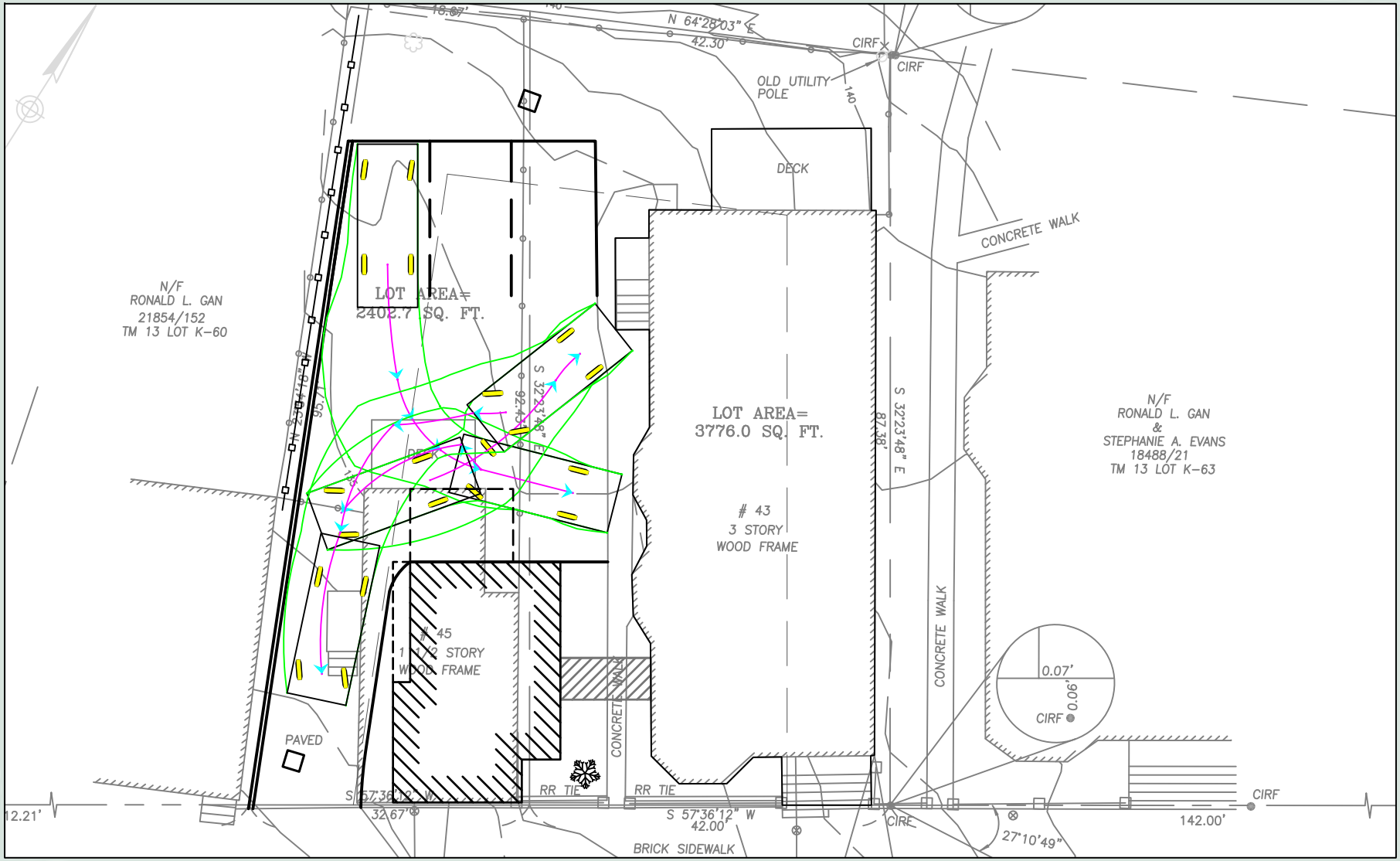
The proposed project’s exterior lighting appears to comply with the requirement of this section.

10. Signage and Wayfinding

There will be no signage or Wayfinding as part of this project, therefore, not applicable.

11. Zoning related design standards

The proposed project is within the R6 zone. The project envisions architectural improvements and the rehabilitation of a condemned home. The project does not envision any infill development as part of this project. The project design is consistent with surrounding development.



W. P. BROGAN & ASSOCIATES
ENGINEERING AND DESIGN CONSULTANTS

367 US ROUTE 1
FALMOUTH, ME 04105
P: (207) 221-5441
F: (207) 615-0464
www.wpbrogan.com

43 CUMBERLAND AVE

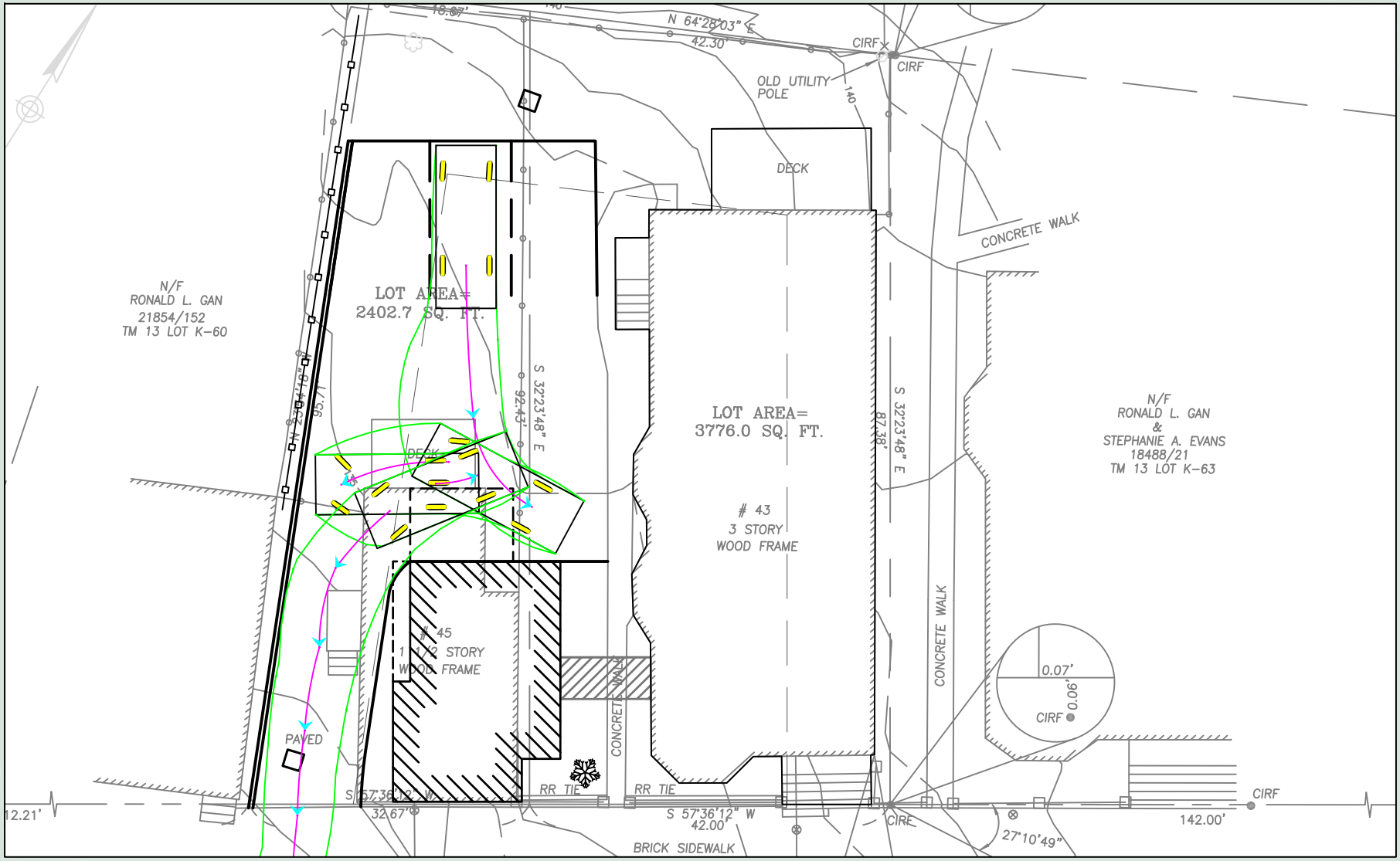
August 13, 2012

REVISIONS

NO.	BY	DATE	DESCRIPTION

Contact: William Brogan, P.E.
Phone: (207) 221-5441
Email: bill@wpbrogan.com

SKETCH



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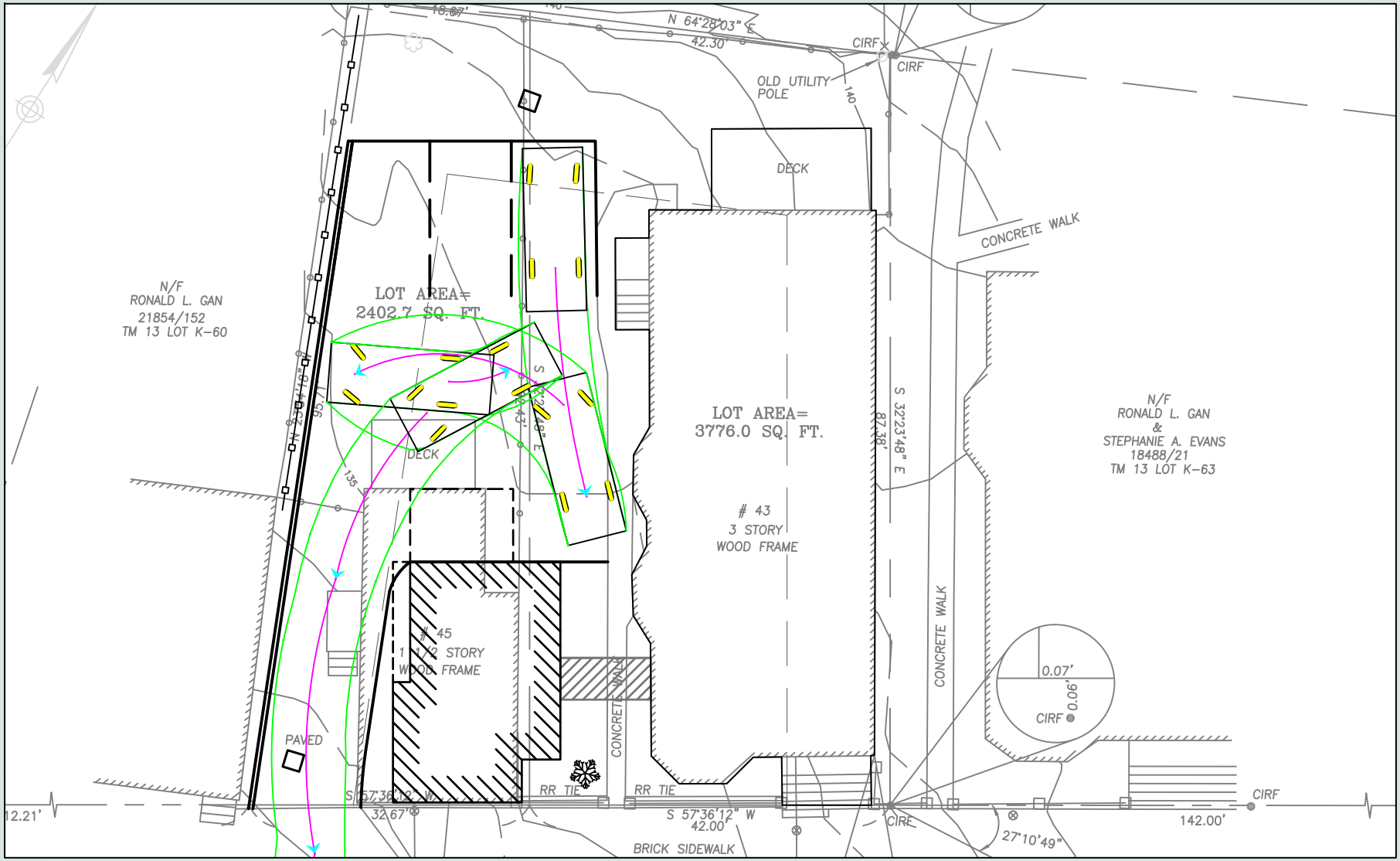

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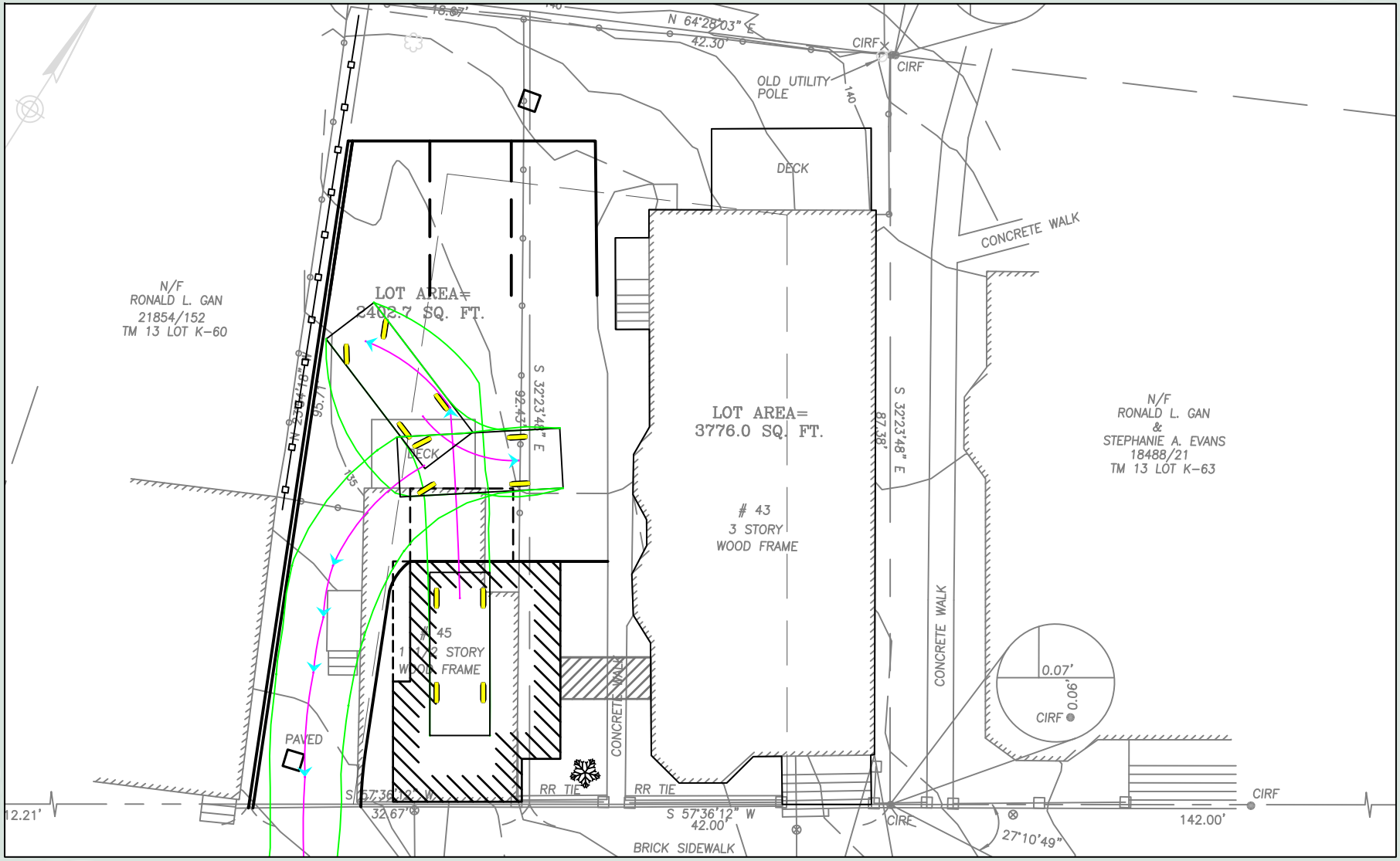

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Contact: William Brogan, P.E.
Phone: (207) 221-5441
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SKETCH

STORMWATER REPORT

Prepared For:

Mark Smith & Stephanie Dunn
PO Box 608
New Portland, Maine 04954

Prepared By:

W.P. Brogan & Associates
149 Hurricane Road
Falmouth, ME 04105

August 2012

TABLE OF CONTENTS

INTRODUCTION

W.P. Brogan & Associates in cooperation with Mark Mueller Architects and Anthony Muench Landscape Architects, have been retained by Mark Smith and Stephanie Dunn (the Applicants) to provide design services for a project site located at 43 and 45 Cumberland Avenue in Portland, Maine.

The project site consists of two parcels shown on the Portland Tax Map 13, Block K, as Lots 61 and 62. The lots are currently developed as a single family home (lot 61) and a 3 unit apartment building (lot 62). The single family home is currently uninhabitable and condemned by the City. The project envisions the rehabilitation of the single family structure, the creation of a 5th dwelling unit on the fourth floor of the existing 3 unit apartment building, and the creation of a 4 total space parking area. The 5th unit is anticipated to be constructed in existing unused attic space with appropriate architectural improvements (dormers, stair access, etc.) to make the space livable.

PRE-DEVELOPMENT CONDITIONS

The existing property consists of primarily residential development. The site includes 1 single family structure with a footprint of approximately 630 square feet and a 3 unit structure with a footprint of approximately 1,700 square feet. In addition to the single family structure are a driveway, a deck, and entry steps. In addition to the multi family structure is a walkway, a deck, and two entry steps. The existing coverage is described in table 1 below:

Table 1 - Pre-Development Coverage

Lot #	Impervious Area (sf)	Pervious Area (sf)	Total Area (sf)
61	1,080	1,323	2,403
62	2,245	1,531	3,776
Total:	3,325	2,854	6,179

The stormwater collection system in the area consists of a combined storm-sewer main in Cumberland Avenue. The combined system includes a 12 inch vitrified clay main at the project site frontage. A catch basin is located down grade at the intersection of Cumberland Avenue and Sheridan Street. A site visit concluded that stormwater on site is ultimately tributary to the combined system in Cumberland Avenue. A portion of stormwater is

infiltrated into the ground due to favorable soil conditions for infiltration. Roof drains where noticed on the multi family structure which is assumed to be tributary to the combined storm-sewer system through the sanitary service lateral.

Offsite stormwater that flows onto the site consists of predominately developed area to the northwest of the site (behind the development). The area consists of residential development, access drives, and a parking lot. The access drive and parking lot consists of gravel surfaces. A site visit indicated areas of limited pooling at the lowest point of the parking area directly before stormwater drains on to the project site.

POST-DEVELOPMENT CONDITIONS

The post-development conditions consists of the continued use of the multi family structure (with roof improvements, and no change in foot print), the rehabilitation of the single family structure to include 1 internal parking space, and the construction of a 3 space parking lot with access drive. The project envisions the installation of a subsurface detention/infiltration pipe and trench located in the parking and drive area. The detention/infiltration pipe and trench consists of a 15 inch diameter perforated pipe and a crushed stone matrix to form a detention area and utilizes existing onsite soils to promote infiltration.

An infiltration depression is proposed to the northwest side of the parking area, where stormwater from off site is proposed to enter. The depression is designed to help slow stormwater flow to settle out particulates and promote infiltration. For larger storm events, stormwater volumes that exceed the infiltration depression volume shall continue into the stone parking surface and will infiltrate and/or trickle down to the lower catch basin located at the entrance of the proposed parking area.

On site coverage includes the multi family structure, the proposed rehabilitated single family structure, and parking and walkways totaling approximately 4,688 square feet. The parking and walkway areas are anticipated to be 4" depth of ¾" crushed stone. The stone area is considered impervious for the purposed of this permit application. Table 2 below provides the anticipated post-development coverage for the proposed development.

Table 2 - Post-Development Coverage			
Lot #	Impervious Area (sf)	Pervious Area (sf)	Total Area (sf)
61 & 62	4,688	1,491	6,179

The proposed development anticipates infiltrating stormwater for the 2, 10, 25 and 100 year storms. Included in the infiltration process is offsite stormwater entering the site from the rear property line. The proposed infiltration system anticipates a greater volume of stormwater generated from offsite areas than onsite areas. It is anticipated storms intensities that exceed the 100 year storm event may overflow the parking area and ultimately enter the combined storm-sewer system similarly to the existing conditions.

The Proposed development anticipates an increase in impervious area of approximately 1,363 square feet as shown in table 3. The increase in impervious surface is anticipated to be mitigated by the use of infiltration, a technique approved by the Maine Department of Environmental Protection, Best Management Practice for stormwater quantity and quality control.

Table 3 - Change in Development Coverage			
Lot #	Impervious Area (sf)	Pervious Area (sf)	Total Area (sf)
61 & 62	1,363	-1,363	0

SOILS

Soils on the site are based upon the Soil Conservation Service Medium Intensity Soil Survey for Cumberland County. The area of the development is mapped with soils as shown in the table below. The SCS mapping for this project is shown in the plan set on sheet C1 – Site, Grading and Utility plan. The project site and offsite areas consists of Hinckley soils (Hydrologic Soil Group - A).

BEST MANAGEMENT PRACTICES

The selection of BMP's to meet water quality objectives are focused on achieving four major goals: effective pollutant removal, cooling, channel protection, and flood control. The Maine Department of Environmental Protection (MDEP) has simplified the process of selecting BMP's for a project

by providing four BMP's intended for pollutant removal, cooling, and channel protection. The four BMP's are:

- Wet Ponds
- Buffers
- Infiltration BMP's
- Filtration BMP's

To better clarify each BMP, a description for each BMP has been included below:

WET PONDS: Wet ponds are stormwater detention impoundments that have a permanent pool of water and have the capacity to temporarily store stormwater runoff while it is released at a controlled rate. They can be designed to provide flood control as well as water quality treatment. Properly sized and maintained wet ponds can achieve high rates of removal for a number of urban pollutants, including sediment and the pollutants associated with sediment, such as trace metals, hydrocarbons, BOD, nutrients, and pesticides. They also provide some treatment of dissolved nutrients, through biological processes within the pond. The addition of an underdrained gravel trench in the bench area around the permanent pool allows for slow, extended release of stormwater without risk of blockage and effective cooling avoiding thermal impacts. The underdrained gravel trench outlet is required when used to meet the BMP standards discharging to a stream, river of brook. The designer should refer to the referenced material for a more extensive discussion of removal efficiencies and how they compare with other BMP's.

VEGETATED BUFFERS: Buffer strips are natural, undisturbed strips of natural vegetation or planted strips of close-growing vegetation adjacent to and down slope of developed areas. As stormwater runoff travels over the buffer area, vegetation slows the runoff and traps particulate pollutants. They are also effective for phosphorus removal when designed in accordance with the manual. The effectiveness of buffers for pollutant removal depends on the flow path length and slope of the buffer berm length, the soil permeability, the size of drainage area, and the type and density of vegetation. Also critical to the performance of the buffer strips is the distribution of water flowing over it. If water is allowed to concentrate because of poor grading or uneven runoff distribution, the buffer will be short-circuited and have only minimal benefit. The irregular micro topography of undisturbed buffers provides small areas within which runoff can pool, encouraging infiltration and reducing the amount of runoff. Buffers are used to treat runoff from relatively small amounts of impervious area, as typically found in residential developments and small commercial and

industrial sites. This type of BMP requires minimal maintenance and provides an aesthetically pleasing area.

INFILTRATION BMP'S: Infiltration measures control stormwater quantity and quality, by retaining all or part of runoff onsite and discharging it into the ground. Infiltration is designed to occur at the surface, or in subsurface systems. The basic function of an infiltration system is to remove a portion of runoff from the total runoff volume of the site and treatment comes about through absorption, straining, microbial decomposition in the soil and trapping of particulate matter within pretreatment areas. Pretreatment to remove sediments grease and oils is required prior to discharge to the infiltration measure. Possible pretreatment measures include filter strips, swales with check dams, sand filters, sediment traps, grease and oil traps, and sediment basins.

FILTRATION BMP'S: Filtration BMP's, particularly organic soil filter medias, have shown to be very effective at removing a wide range of pollutants from stormwater runoff. They can be constructed in combination with infiltration practices, or with an underdrain filter, where infiltrations not feasible. Soil filters can be designed and constructed using common materials.

STORMWATER MODELING

Stormwater Modeling has been performed utilizing HydroCAD 8.50 computer based stormwater modeling software. The model assumed a type III – 24 hour storm event. Due to the small size of the development, and the intended use of infiltration, the site was modeled for post-development conditions only. Furthermore, the model indicates no discharge into the city storm-sewer system for the 2, 10, 25 and 100 year storm events. By inspection, this is anticipated to be a reduction in stormwater quantity entering the city's combined system. A HydroCAD report modeling the anticipated stormwater system can be found in Attachment 1.

INFILTRATION SIZING

INFILTRATION RATE

Infiltration rates are based upon the Maine Department of Environmental Protection's publication "Maine Erosion and Sediment Control BMP's", Appendix B – Maine Hdrogeologic Soil Groups. The publication indicates the inflow rate for Hinckley soils is 1.00 cubic feet per second per 1,000 square feet of infiltration area. To be conservative, the infiltration area assumes that only the bottom of basins and depressions infiltrate (does not include vertical sides and side slopes).

INFILTRATION DEPRESSION

The project envisions the construction of 1 infiltration depression at the northwest corner of the parking lot. The infiltration depression primarily infiltrates stormwater flow generated from offsite areas. The infiltration depression performs as a preliminary area for stormwater infiltration prior to entering the subsurface system. The intention of the infiltration depression is to reduce stormwater quantity prior to entering the subsurface detention/infiltration trench. Therefore, the infiltration depression reduces the required size of the subsurface infiltration basin while utilizing onsite topography and features to responsibly mitigate offsite stormwater impacts on the site and city infrastructure. The capacity of the infiltration depression is shown in the HydroCAD report in attachment 1 and is summarized in Table 5.

Table 5 - Infiltration Depression Performance

BMP	Infiltration Area (SF)	Storage Volume (CF)	Discharge Rate (CFS)
Infiltration Depression	315	417	0.24

SUBSURFACE DETENTION/INFILTRATION BASIN

The project envision the construction of a subsurface detention/infiltration pipe and trench located below the proposed parking area. The subsurface detention/infiltration pipe and trench includes a matrix of crushed stone (assumed 40% porosity) to provide storage and conveyance to maximize infiltration footprint.

The subsurface detention/infiltration system is a dynamic system when determining the size. The infiltration system infiltrates at a rate of 0.36 cubic feet per second when stormwater exists in the system. Based on a type III – 24 hour storm event for Cumberland County, the system was sized to store and infiltrate stormwater for the 2, 10, 25, and 100 year storm events using HydroCAD modeling software. Unreasonable designed storm events (500+ year) or uncommon intensities (multiple inches of rainfall in a short time span) are anticipated to spill over the driveway entrance and into the Cumberland Avenue cutter line.

The capacity of the subsurface detention/infiltration basin is shown in the HyrdoCAD report found in Attachment 1 of this report. Table 6 below summarizes the anticipated capacity of the subsurface infiltration basin.

Table 6 - Subsurface Infiltration Pipe Performance

BMP	Infiltration Area (SF)	Storage Volume (CF)	Discharge Rate (CFS)
Subsurface Infiltration Pipe	400	637	0.40

STORMWATER SYSTEM PERFORMANCE

SUBCATCHMENTS

The proposed stormwater system has been modeled in HydroCAD for the post-development conditions. The proposed development has

been evaluated in two subcatchments as shown on sheet C3 of the plan set. Below is a description of each subcatchment:

Subcatchment 1S: Subcatchment 1S includes predominately offsite areas tributary to the project site. Included in this area are an offsite parking lot, offsite buildings, offsite driveways, and a portion of onsite landscaped area. The time of concentration paths, assumptions, and times are indicated on Sheet C3 of the plan set.

Subcatchment 3S: Subcatchment 3S includes the onsite parking area, the tributary portions of the onsite structure roofs, and remaining tributary landscaped area. Please note portions of the roof have not been included in this model. These areas are anticipated to have no change between pre development and post development and are not tributary to the proposed stormwater system. The time of concentration paths, assumptions, and times are indicated on Sheet C3 of the plan set.

"POND" PERFORMANCE

HydroCAD models and/or refers to BMP devices as "ponds". W.P. Brogan & Associates refers to the proposed BMP's as basins or depressions. The HydroCAD report prepared for this application models the proposed infiltration depression as pond 2P, and models the subsurface detention/infiltration basin as pond 4P. The results of the HydroCAD model can be found in Attachment 1. A summary of the infiltration depression (Pond 2P) performance for the 2, 10, 25, and 100 year storm events is shown in Table 7 below.

Table 7 - Pond 2P (Infiltration Depression) Performance 2, 10, 25, 100 Year Storms

	Max Elevation (ft)	Storage (CF)	Inflow (CFS)	Infiltration Flow (CFS)	Non Infiltration Flow (CFS)
2 Year	136.48	58	0.42	0.24	0.00
10 Year	136.70	123	0.96	0.24	0.71
25 Year	136.72	130	1.24	0.24	0.98
100 Year	136.75	139	1.66	0.24	1.41

A summary of the subsurface detention/infiltration basin (Pond 4P) performance for the 2, 10, 25, and 100 year storm event is shown in Table 8 below.

Table 8 - Pond 4P (Subsurface Infiltration Pipe) Performance 2, 10, 25, 100 Year Storms					
	Max Elevation (ft)	Storage (CF)	Inflow (CFS)	Infiltration Flow (CFS)	Non Infiltration Flow (CFS)
2 Year	127.50	0	0.01	0.01	0
10 Year	128.19	110	0.81	0.40	0
25 Year	129.07	279	1.14	0.40	0
100 Year	130.95	621	1.65	0.40	0

Please note the non-infiltration flow for the infiltration depression in Table 7 are tributary to the subsurface detention/infiltration pipe and trench in Table 8. Table 8 indicates the subsurface detention/infiltration basin has a non-infiltration flow rate of 0.0 cfs for the 2, 10, 25 and 100 year storm events. Therefore, the overall system is anticipated to have 0.0 cfs of discharge into the city combined system for the 2, 10, 25 and 100 year storm events for the areas of the project identified in this model.

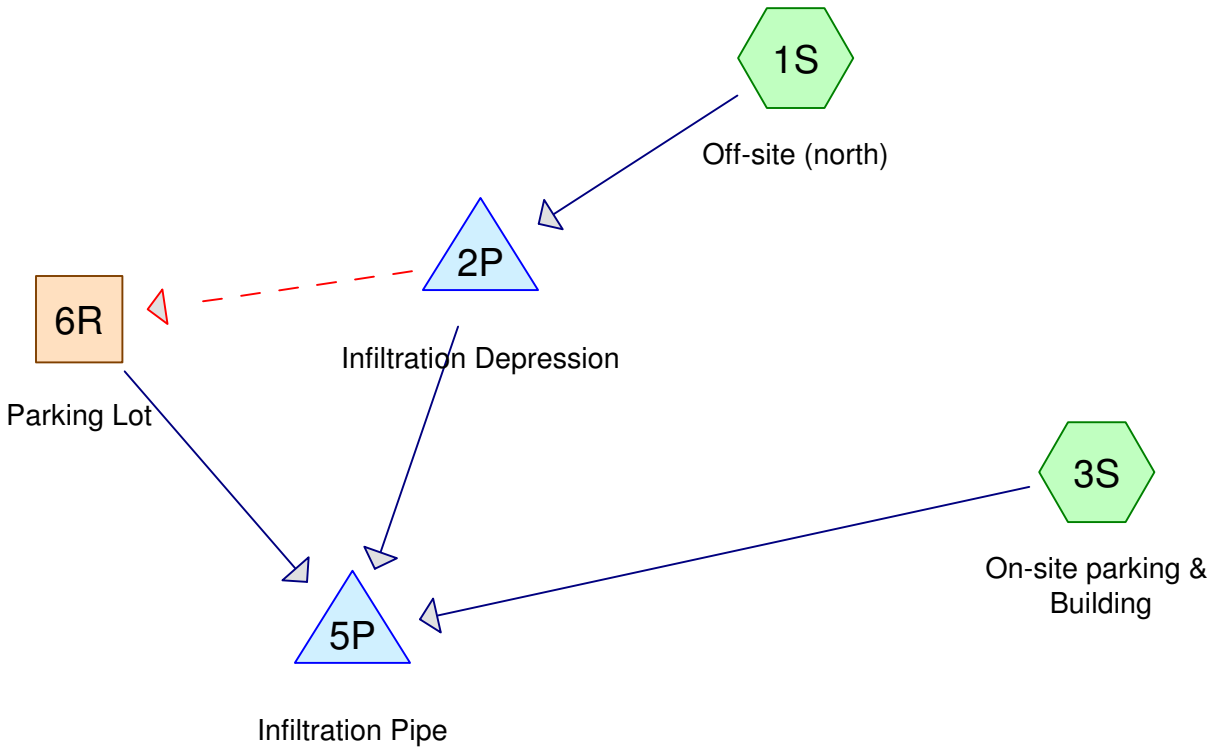
CONCLUSION

The proposed stormwater system is anticipated to provide infiltration to reduce stormwater quantity and provide stormwater quality. W.P. Brogan & Associates does not anticipate the proposed system to have an adverse impact on the surrounding development or the city infrastructure.

Reference Material: Project plan set sheets: C1, C2, C3

Attachments:

Attachment 1 – HydroCAD Report
Attachment 2 – Stormwater Maintenance Plan



Subcat Reach Pond Link

Drainage Diagram for 43 Cumberland Ave_may11
Prepared by W.P. Brogan & Associates, Printed 8/12/2012

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.106	39	>75% Grass cover, Good, HSG A (1S)
0.058	39	Stone Surface with Hinkley Soil plus Vegetated Area (3S)
0.190	98	Paved parking & roofs (1S)
0.028	98	Sidewalk and Roofs (3S)
0.382		**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
0.106	HSG A	1S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.276	Other	1S, 3S
0.382		**TOTAL AREA**

Time span=0.00-37.00 hrs, dt=0.01 hrs, 3701 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Off-site (north) Runoff Area=12,898 sf 64.07% Impervious Runoff Depth=1.07"
Flow Length=213' Tc=1.6 min CN=77 Runoff=0.42 cfs 0.026 af

Subcatchment 3S: On-site parking & Runoff Area=3,756 sf 32.29% Impervious Runoff Depth=0.27"
Flow Length=76' Slope=0.0600 '/' Tc=0.6 min CN=58 Runoff=0.01 cfs 0.002 af

Reach 6R: Parking Lot Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.050 L=20.0' S=0.1250 '/' Capacity=6.57 cfs Outflow=0.00 cfs 0.000 af

Pond 2P: Infiltration Depression Peak Elev=136.48' Storage=58 cf Inflow=0.42 cfs 0.026 af
Discarded=0.24 cfs 0.026 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.24 cfs 0.026 af

Pond 5P: Infiltration Pipe Peak Elev=127.50' Storage=0 cf Inflow=0.01 cfs 0.002 af
Discarded=0.01 cfs 0.002 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.002 af

Total Runoff Area = 0.382 ac Runoff Volume = 0.028 af Average Runoff Depth = 0.89"
43.09% Pervious = 0.165 ac 56.91% Impervious = 0.218 ac

Summary for Subcatchment 1S: Off-site (north)

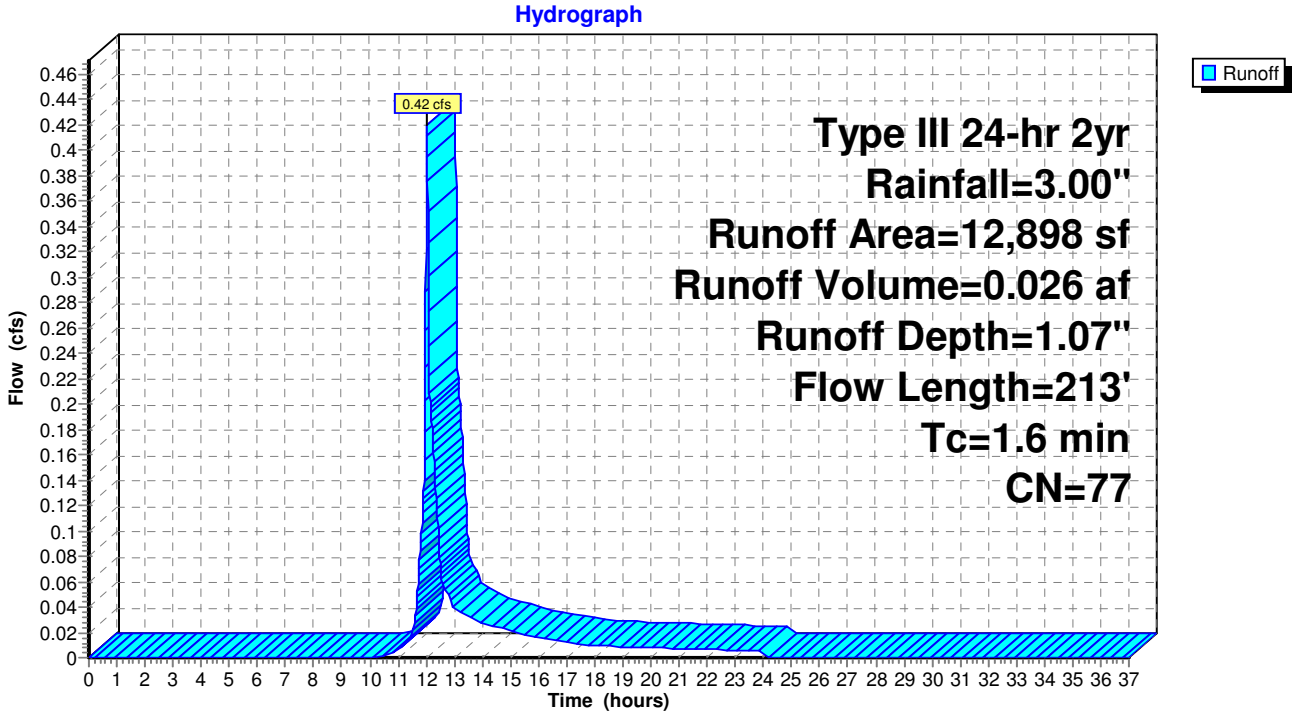
Runoff = 0.42 cfs @ 12.03 hrs, Volume= 0.026 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Type III 24-hr 2yr Rainfall=3.00"

Area (sf)	CN	Description
4,634	39	>75% Grass cover, Good, HSG A
8,264	98	Paved parking & roofs
12,898	77	Weighted Average
4,634		Pervious Area
8,264		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.36		**Sheet Flow, sheet flow** Smooth surfaces n= 0.011 P2= 3.00"
0.9	143	0.0300	2.79		**Shallow Concentrated Flow, shallow concentrated flow** Unpaved Kv= 16.1 fps
0.1	20	0.1400	2.62		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.6	213	Total			

Subcatchment 1S: Off-site (north)



Summary for Subcatchment 3S: On-site parking & Building

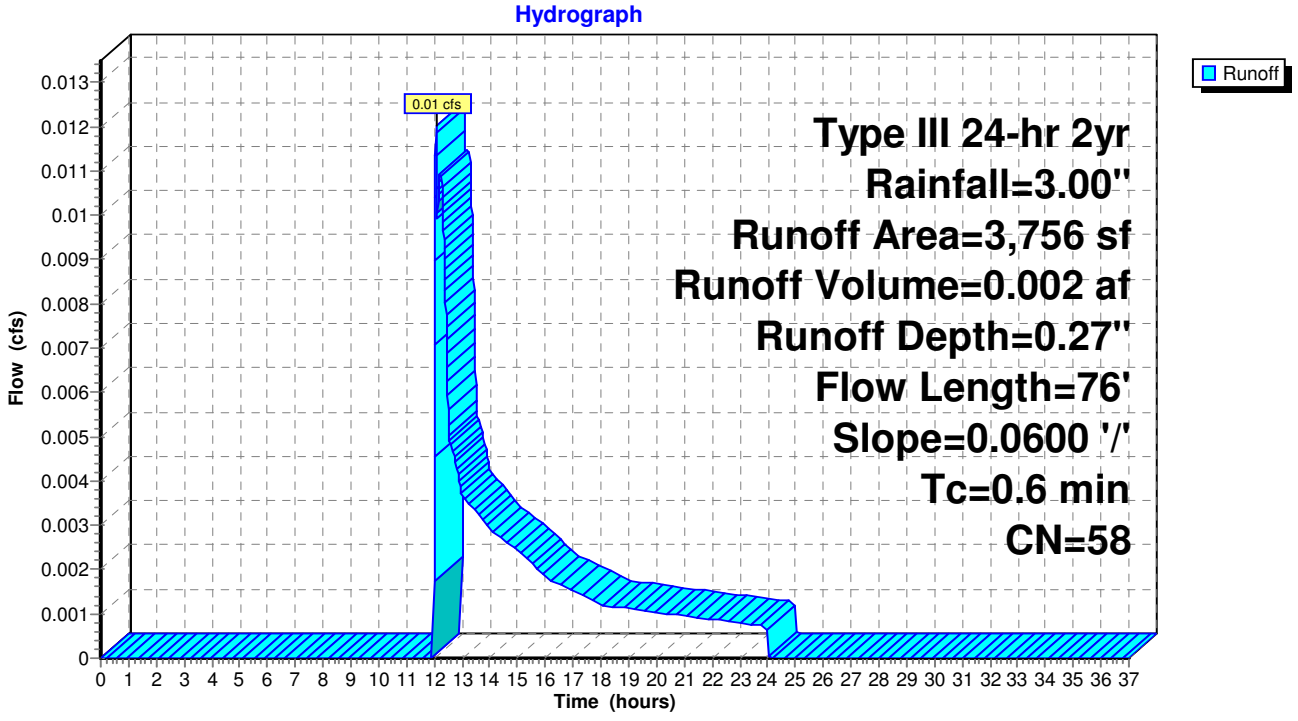
Runoff = 0.01 cfs @ 12.07 hrs, Volume= 0.002 af, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Type III 24-hr 2yr Rainfall=3.00"

	Area (sf)	CN	Description
*	2,543	39	Stone Surface with Hinkley Soil plus Vegetated Area
*	1,213	98	Sidewalk and Roofs
	3,756	58	Weighted Average
	2,543		Pervious Area
	1,213		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	76	0.0600	1.96		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 3.00"

Subcatchment 3S: On-site parking & Building



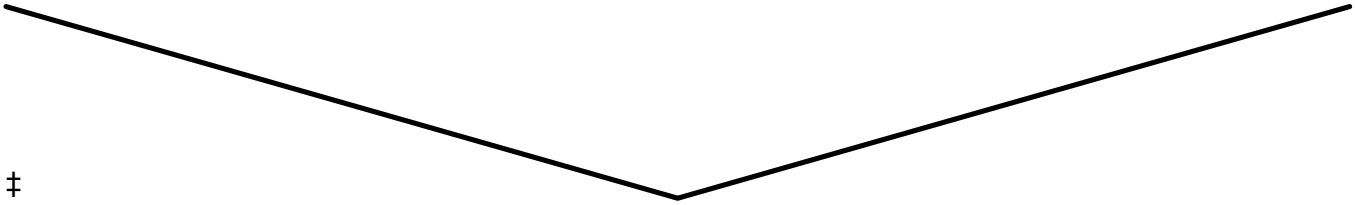
Summary for Reach 6R: Parking Lot

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.25', Capacity at Bank-Full= 6.57 cfs

Custom cross-section, Length= 20.0' Slope= 0.1250 '/'
Constant n= 0.050 Stone, clean & dense
Inlet Invert= 135.00', Outlet Invert= 132.50'

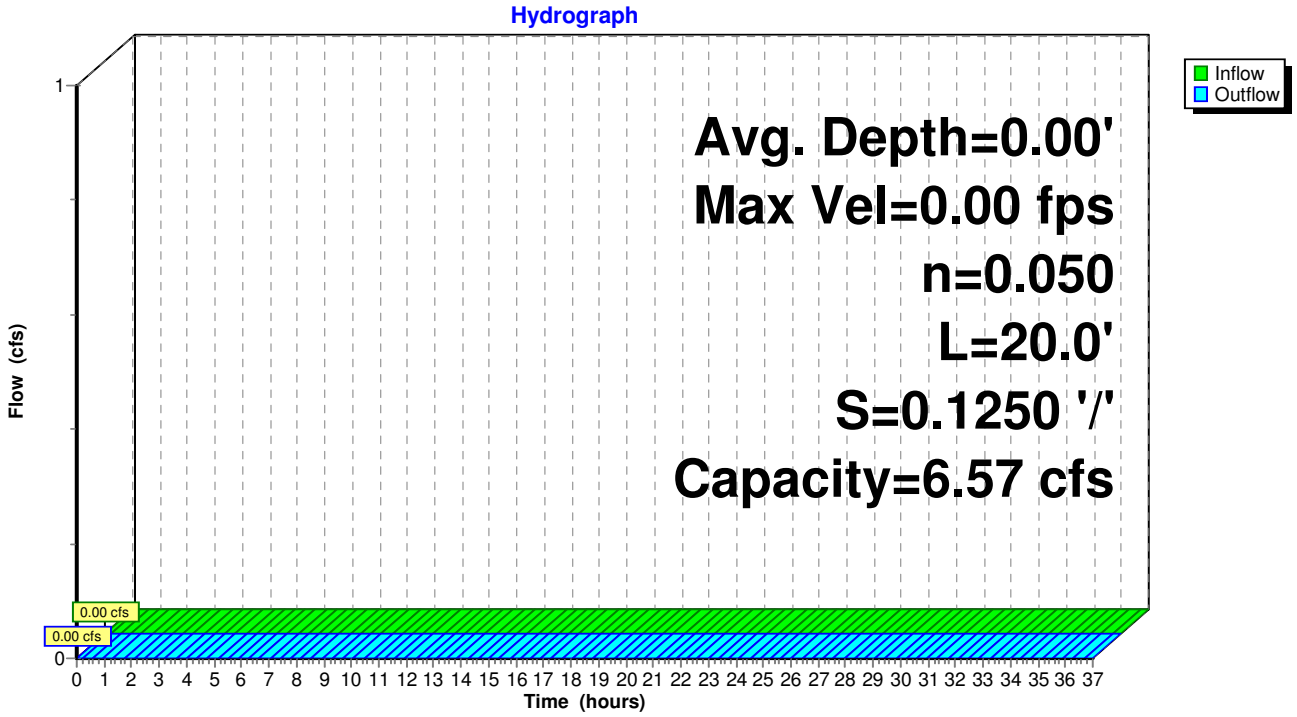


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	135.25	0.00
10.00	135.00	0.25
20.00	135.25	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.25	2.5	20.0	50	6.57

Reach 6R: Parking Lot



Summary for Pond 2P: Infiltration Depression

Inflow Area = 0.296 ac, 64.07% Impervious, Inflow Depth = 1.07" for 2yr event
Inflow = 0.42 cfs @ 12.03 hrs, Volume= 0.026 af
Outflow = 0.24 cfs @ 11.97 hrs, Volume= 0.026 af, Atten= 43%, Lag= 0.0 min
Discarded = 0.24 cfs @ 11.97 hrs, Volume= 0.026 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 136.48' @ 12.11 hrs Surf.Area= 273 sf Storage= 58 cf

Plug-Flow detention time= 0.8 min calculated for 0.026 af (100% of inflow)
Center-of-Mass det. time= 0.8 min (852.9 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	136.25'	417 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
136.25	239	0	0
136.75	315	139	139
137.53	400	279	417

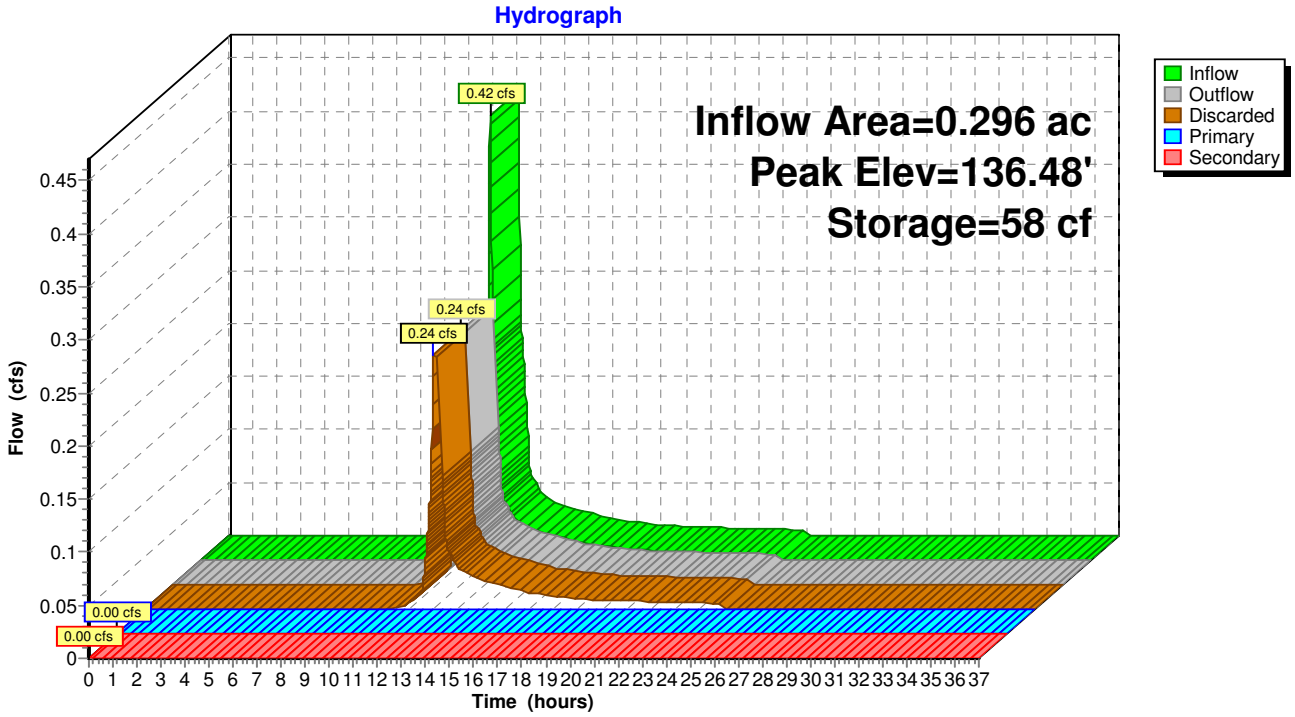
Device	Routing	Invert	Outlet Devices
#1	Discarded	136.25'	**0.24 cfs Exfiltration at all elevations**
#2	Secondary	136.75'	**3.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	136.61'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.24 cfs @ 11.97 hrs HW=136.26' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=136.25' (Free Discharge)
↑—**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=136.25' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Infiltration Depression



Summary for Pond 5P: Infiltration Pipe

Inflow Area = 0.382 ac, 56.91% Impervious, Inflow Depth = 0.06" for 2yr event
Inflow = 0.01 cfs @ 12.07 hrs, Volume= 0.002 af
Outflow = 0.01 cfs @ 12.08 hrs, Volume= 0.002 af, Atten= 1%, Lag= 0.4 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.002 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 127.50' @ 12.08 hrs Surf.Area= 400 sf Storage= 0 cf

Plug-Flow detention time= 0.4 min calculated for 0.002 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (939.4 - 939.0)

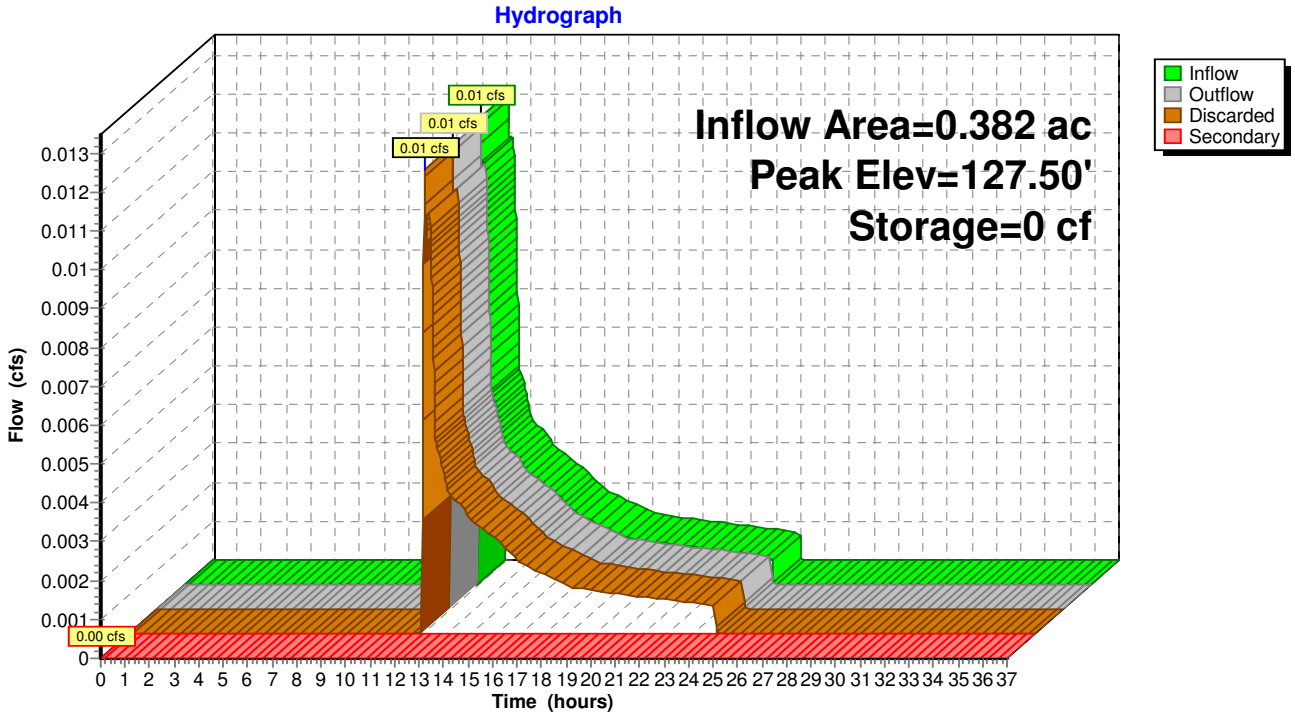
Volume	Invert	Avail.Storage	Storage Description
#1	127.50'	521 cf	**5.00'W x 80.00'L x 3.50'H Stone Trench** 1,400 cf Overall - 98 cf Embedded = 1,302 cf x 40.0% Voids
#2	128.50'	98 cf	**15.0"D x 80.00'L 15" Pipe** Inside #1
#3	128.50'	18 cf	**2.00'W x 2.00'L x 4.50'H Catch Basin**
		637 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	**0.40 cfs Exfiltration at all elevations**
#2	Secondary	132.50'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.40 cfs @ 12.08 hrs HW=127.50' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.40 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=127.50' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Infiltration Pipe



Time span=0.00-37.00 hrs, dt=0.01 hrs, 3701 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Off-site (north) Runoff Area=12,898 sf 64.07% Impervious Runoff Depth=2.37"
Flow Length=213' Tc=1.6 min CN=77 Runoff=0.96 cfs 0.059 af

Subcatchment 3S: On-site parking & Runoff Area=3,756 sf 32.29% Impervious Runoff Depth=1.01"
Flow Length=76' Slope=0.0600 '/' Tc=0.6 min CN=58 Runoff=0.10 cfs 0.007 af

Reach 6R: Parking Lot Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.050 L=20.0' S=0.1250 '/' Capacity=6.57 cfs Outflow=0.00 cfs 0.000 af

Pond 2P: Infiltration Depression Peak Elev=136.70' Storage=123 cf Inflow=0.96 cfs 0.059 af
Discarded=0.24 cfs 0.050 af Primary=0.71 cfs 0.008 af Secondary=0.00 cfs 0.000 af Outflow=0.95 cfs 0.059 af

Pond 5P: Infiltration Pipe Peak Elev=128.19' Storage=110 cf Inflow=0.81 cfs 0.016 af
Discarded=0.40 cfs 0.016 af Secondary=0.00 cfs 0.000 af Outflow=0.40 cfs 0.016 af

Total Runoff Area = 0.382 ac Runoff Volume = 0.066 af Average Runoff Depth = 2.07"
43.09% Pervious = 0.165 ac 56.91% Impervious = 0.218 ac

Summary for Subcatchment 1S: Off-site (north)

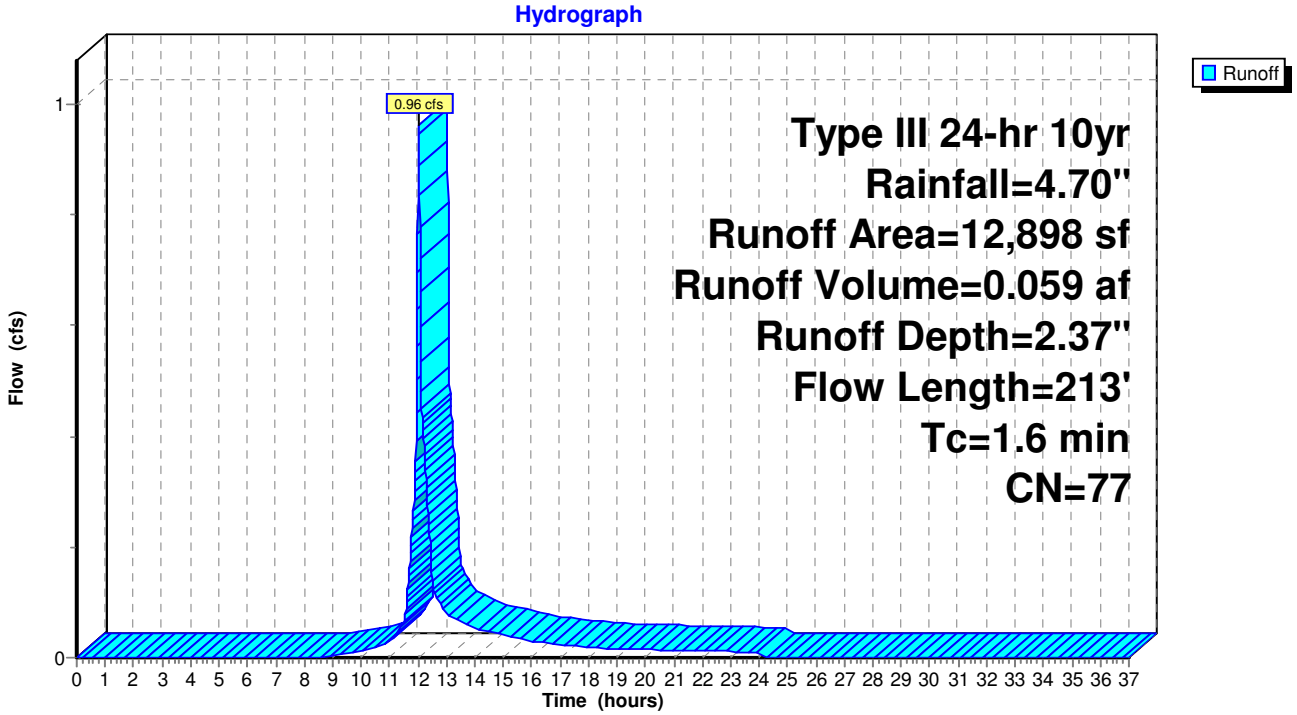
Runoff = 0.96 cfs @ 12.03 hrs, Volume= 0.059 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Type III 24-hr 10yr Rainfall=4.70"

Area (sf)	CN	Description
4,634	39	>75% Grass cover, Good, HSG A
8,264	98	Paved parking & roofs
12,898	77	Weighted Average
4,634		Pervious Area
8,264		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.36		**Sheet Flow, sheet flow** Smooth surfaces n= 0.011 P2= 3.00"
0.9	143	0.0300	2.79		**Shallow Concentrated Flow, shallow concentrated flow** Unpaved Kv= 16.1 fps
0.1	20	0.1400	2.62		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.6	213	Total			

Subcatchment 1S: Off-site (north)



Summary for Subcatchment 3S: On-site parking & Building

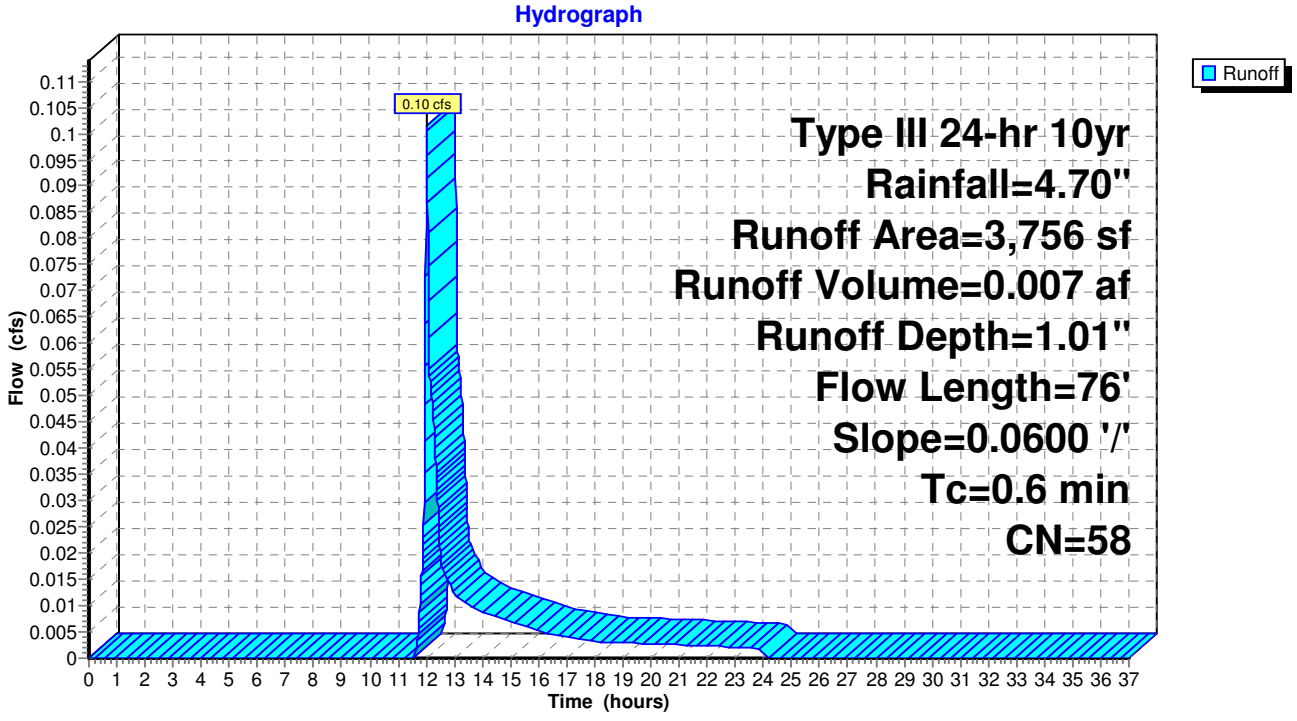
Runoff = 0.10 cfs @ 12.02 hrs, Volume= 0.007 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Type III 24-hr 10yr Rainfall=4.70"

	Area (sf)	CN	Description
*	2,543	39	Stone Surface with Hinkley Soil plus Vegetated Area
*	1,213	98	Sidewalk and Roofs
	3,756	58	Weighted Average
	2,543		Pervious Area
	1,213		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	76	0.0600	1.96		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 3.00"

Subcatchment 3S: On-site parking & Building



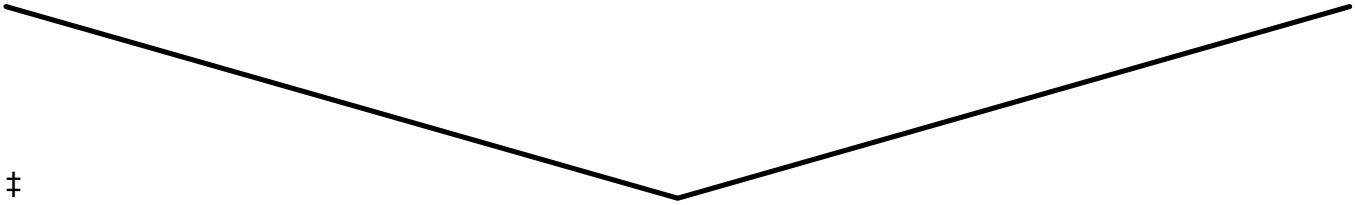
Summary for Reach 6R: Parking Lot

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.25', Capacity at Bank-Full= 6.57 cfs

Custom cross-section, Length= 20.0' Slope= 0.1250 '/'
Constant n= 0.050 Stone, clean & dense
Inlet Invert= 135.00', Outlet Invert= 132.50'

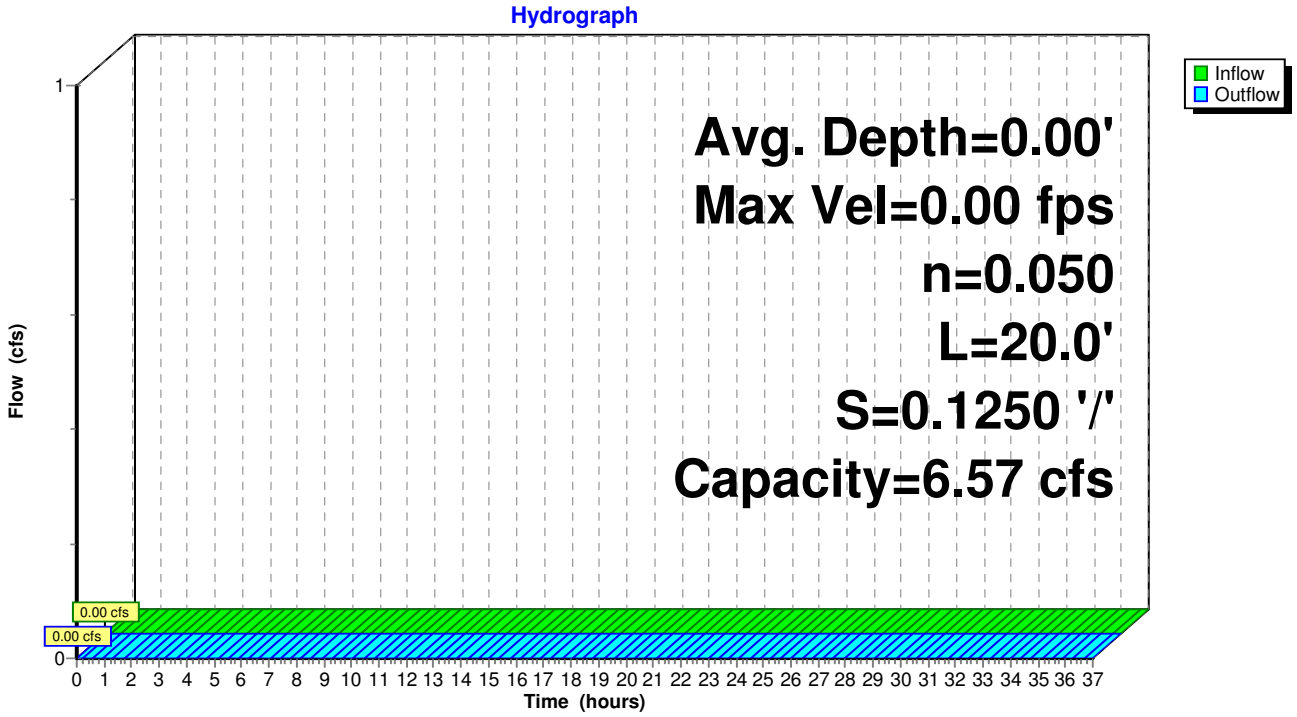


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	135.25	0.00
10.00	135.00	0.25
20.00	135.25	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.25	2.5	20.0	50	6.57

Reach 6R: Parking Lot



Summary for Pond 2P: Infiltration Depression

Inflow Area = 0.296 ac, 64.07% Impervious, Inflow Depth = 2.37" for 10yr event
Inflow = 0.96 cfs @ 12.03 hrs, Volume= 0.059 af
Outflow = 0.95 cfs @ 12.03 hrs, Volume= 0.059 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.24 cfs @ 11.81 hrs, Volume= 0.050 af
Primary = 0.71 cfs @ 12.03 hrs, Volume= 0.008 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 136.70' @ 12.03 hrs Surf.Area= 307 sf Storage= 123 cf

Plug-Flow detention time= 1.7 min calculated for 0.059 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (830.2 - 828.5)

Volume	Invert	Avail.Storage	Storage Description
#1	136.25'	417 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
136.25	239	0	0
136.75	315	139	139
137.53	400	279	417

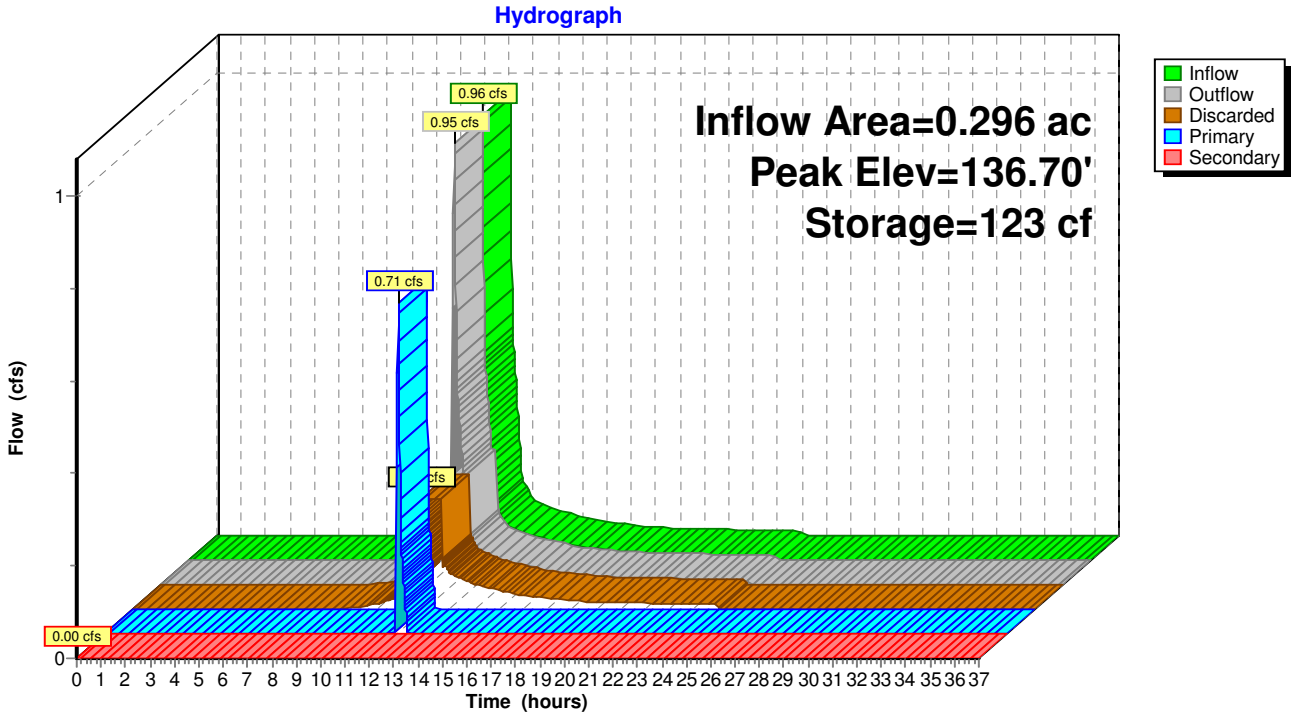
Device	Routing	Invert	Outlet Devices
#1	Discarded	136.25'	**0.24 cfs Exfiltration at all elevations**
#2	Secondary	136.75'	**3.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	136.61'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.24 cfs @ 11.81 hrs HW=136.26' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.71 cfs @ 12.03 hrs HW=136.70' (Free Discharge)
↑—**3=Orifice/Grate** (Weir Controls 0.71 cfs @ 0.98 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=136.25' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Infiltration Depression



Summary for Pond 5P: Infiltration Pipe

Inflow Area = 0.382 ac, 56.91% Impervious, Inflow Depth = 0.49" for 10yr event
Inflow = 0.81 cfs @ 12.03 hrs, Volume= 0.016 af
Outflow = 0.40 cfs @ 12.01 hrs, Volume= 0.016 af, Atten= 51%, Lag= 0.0 min
Discarded = 0.40 cfs @ 12.01 hrs, Volume= 0.016 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 128.19' @ 12.11 hrs Surf.Area= 400 sf Storage= 110 cf

Plug-Flow detention time= 1.8 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 1.8 min (800.5 - 798.7)

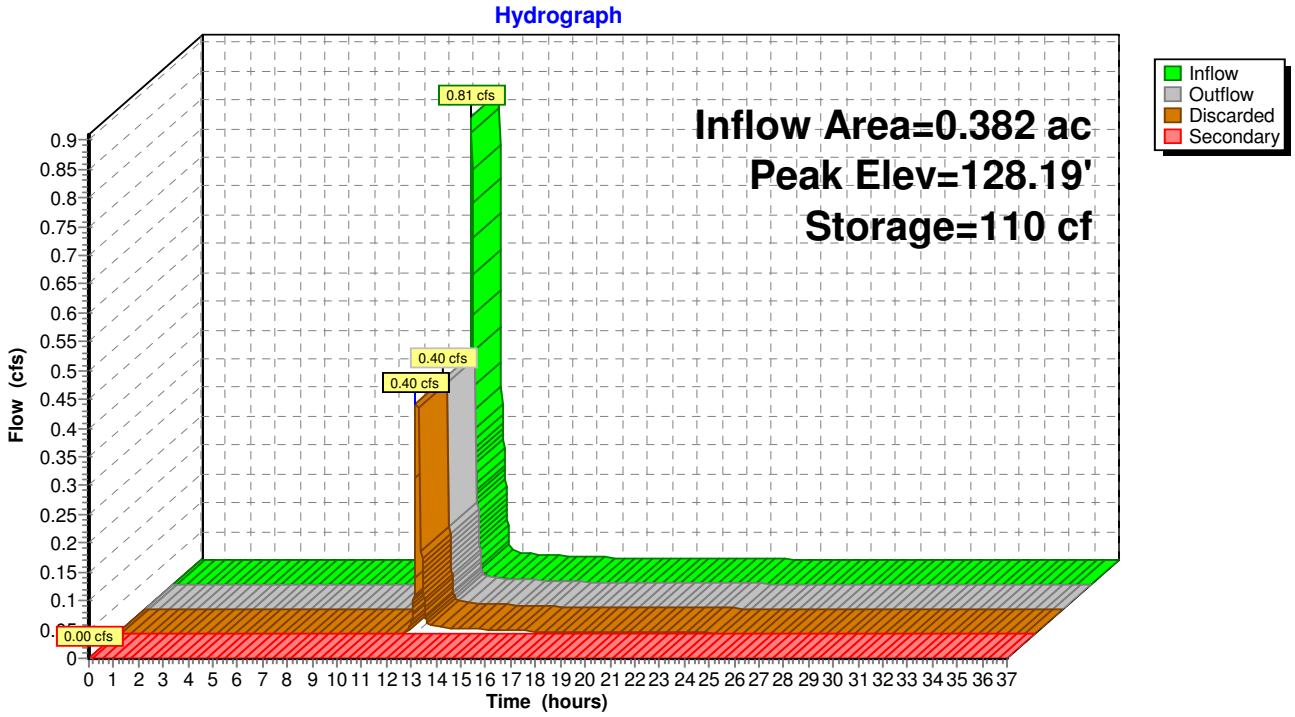
Volume	Invert	Avail.Storage	Storage Description
#1	127.50'	521 cf	**5.00'W x 80.00'L x 3.50'H Stone Trench** 1,400 cf Overall - 98 cf Embedded = 1,302 cf x 40.0% Voids
#2	128.50'	98 cf	**15.0"D x 80.00'L 15" Pipe** Inside #1
#3	128.50'	18 cf	**2.00'W x 2.00'L x 4.50'H Catch Basin**
		637 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	**0.40 cfs Exfiltration at all elevations**
#2	Secondary	132.50'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.40 cfs @ 12.01 hrs HW=127.59' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.40 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=127.50' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: Infiltration Pipe



Time span=0.00-37.00 hrs, dt=0.01 hrs, 3701 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Off-site (north) Runoff Area=12,898 sf 64.07% Impervious Runoff Depth=3.05"
Flow Length=213' Tc=1.6 min CN=77 Runoff=1.24 cfs 0.075 af

Subcatchment 3S: On-site parking & Runoff Area=3,756 sf 32.29% Impervious Runoff Depth=1.45"
Flow Length=76' Slope=0.0600 '/' Tc=0.6 min CN=58 Runoff=0.16 cfs 0.010 af

Reach 6R: Parking Lot Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.050 L=20.0' S=0.1250 '/' Capacity=6.57 cfs Outflow=0.00 cfs 0.000 af

Pond 2P: Infiltration Depression Peak Elev=136.72' Storage=130 cf Inflow=1.24 cfs 0.075 af
Discarded=0.24 cfs 0.060 af Primary=0.99 cfs 0.015 af Secondary=0.00 cfs 0.000 af Outflow=1.23 cfs 0.075 af

Pond 5P: Infiltration Pipe Peak Elev=129.07' Storage=279 cf Inflow=1.14 cfs 0.025 af
Discarded=0.40 cfs 0.025 af Secondary=0.00 cfs 0.000 af Outflow=0.40 cfs 0.025 af

Total Runoff Area = 0.382 ac Runoff Volume = 0.086 af Average Runoff Depth = 2.69"
43.09% Pervious = 0.165 ac 56.91% Impervious = 0.218 ac

Summary for Subcatchment 1S: Off-site (north)

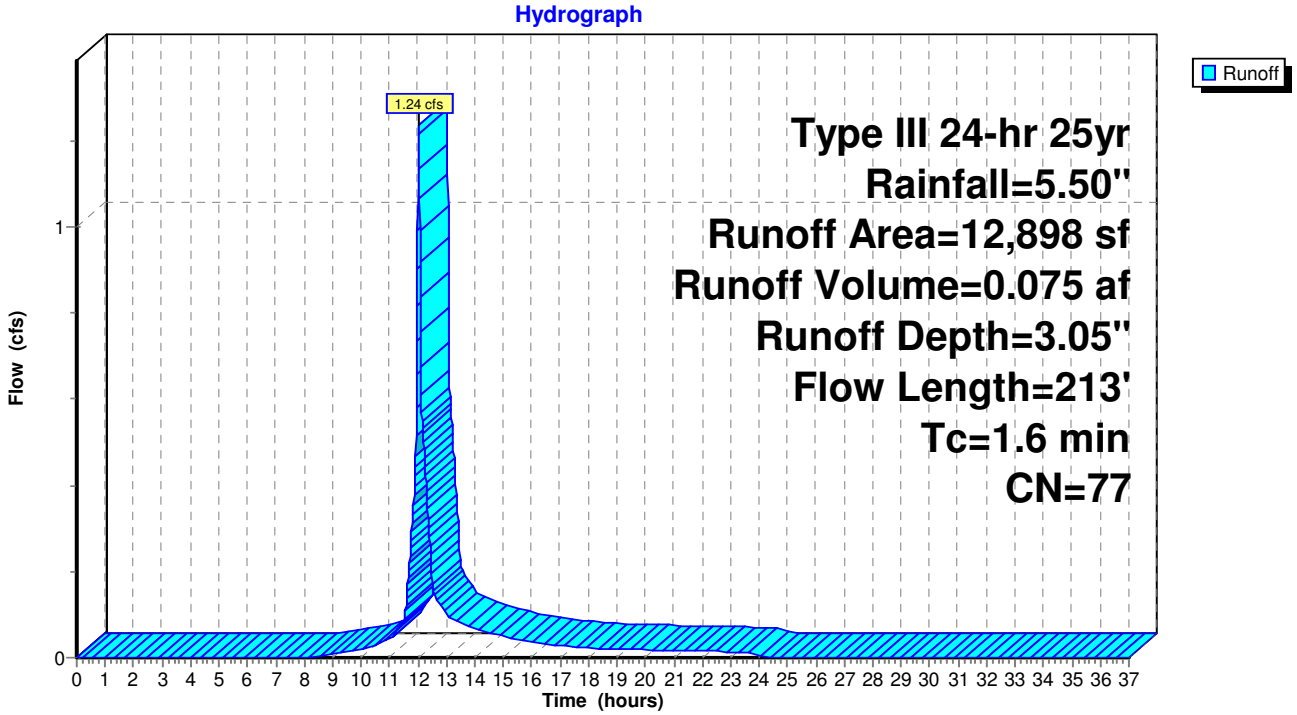
Runoff = 1.24 cfs @ 12.03 hrs, Volume= 0.075 af, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Type III 24-hr 25yr Rainfall=5.50"

Area (sf)	CN	Description
4,634	39	>75% Grass cover, Good, HSG A
8,264	98	Paved parking & roofs
12,898	77	Weighted Average
4,634		Pervious Area
8,264		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.36		**Sheet Flow, sheet flow** Smooth surfaces n= 0.011 P2= 3.00"
0.9	143	0.0300	2.79		**Shallow Concentrated Flow, shallow concentrated flow** Unpaved Kv= 16.1 fps
0.1	20	0.1400	2.62		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.6	213	Total			

Subcatchment 1S: Off-site (north)



Summary for Subcatchment 3S: On-site parking & Building

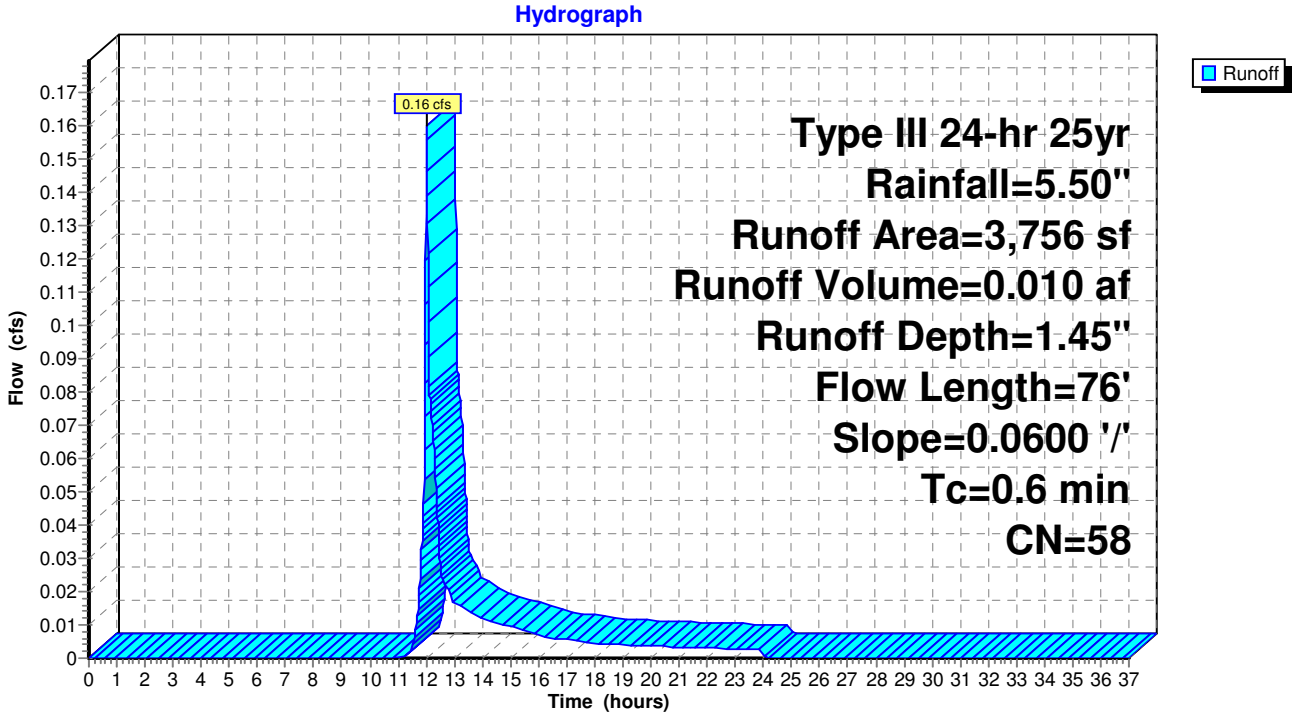
Runoff = 0.16 cfs @ 12.01 hrs, Volume= 0.010 af, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Type III 24-hr 25yr Rainfall=5.50"

	Area (sf)	CN	Description
*	2,543	39	Stone Surface with Hinkley Soil plus Vegetated Area
*	1,213	98	Sidewalk and Roofs
	3,756	58	Weighted Average
	2,543		Pervious Area
	1,213		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	76	0.0600	1.96		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 3.00"

Subcatchment 3S: On-site parking & Building



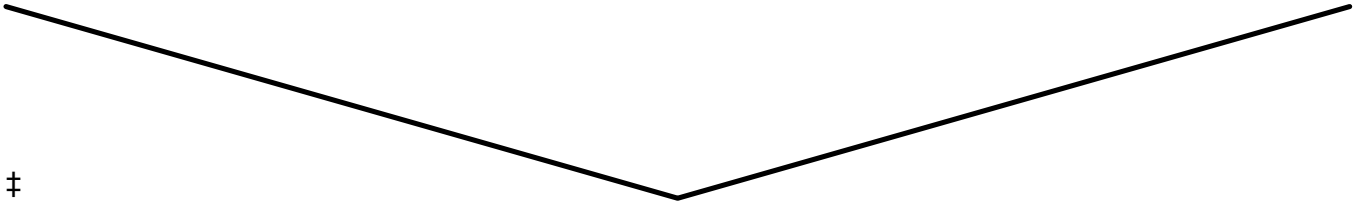
Summary for Reach 6R: Parking Lot

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.25', Capacity at Bank-Full= 6.57 cfs

Custom cross-section, Length= 20.0' Slope= 0.1250 '/'
Constant n= 0.050 Stone, clean & dense
Inlet Invert= 135.00', Outlet Invert= 132.50'

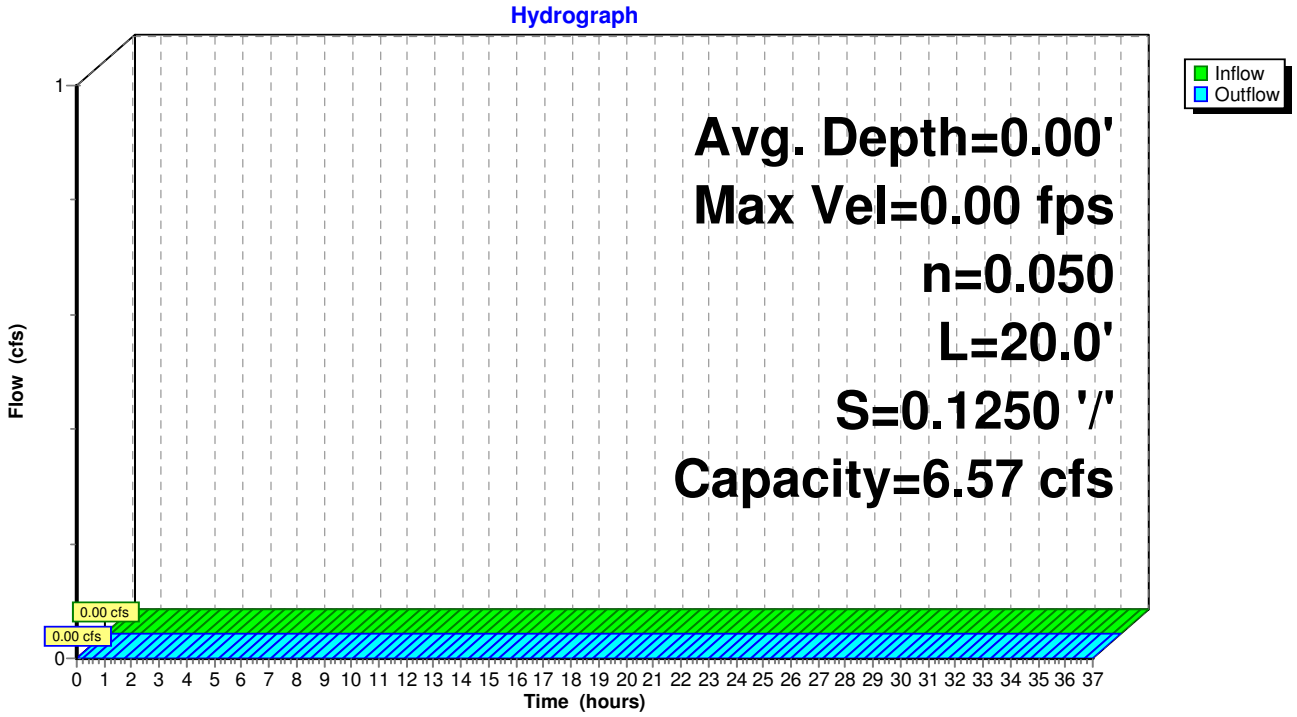


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	135.25	0.00
10.00	135.00	0.25
20.00	135.25	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.25	2.5	20.0	50	6.57

Reach 6R: Parking Lot



Summary for Pond 2P: Infiltration Depression

Inflow Area = 0.296 ac, 64.07% Impervious, Inflow Depth = 3.05" for 25yr event
Inflow = 1.24 cfs @ 12.03 hrs, Volume= 0.075 af
Outflow = 1.23 cfs @ 12.03 hrs, Volume= 0.075 af, Atten= 1%, Lag= 0.4 min
Discarded = 0.24 cfs @ 11.73 hrs, Volume= 0.060 af
Primary = 0.99 cfs @ 12.03 hrs, Volume= 0.015 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 136.72' @ 12.03 hrs Surf.Area= 311 sf Storage= 130 cf

Plug-Flow detention time= 1.6 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time= 1.6 min (822.9 - 821.3)

Volume	Invert	Avail.Storage	Storage Description
#1	136.25'	417 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
136.25	239	0	0
136.75	315	139	139
137.53	400	279	417

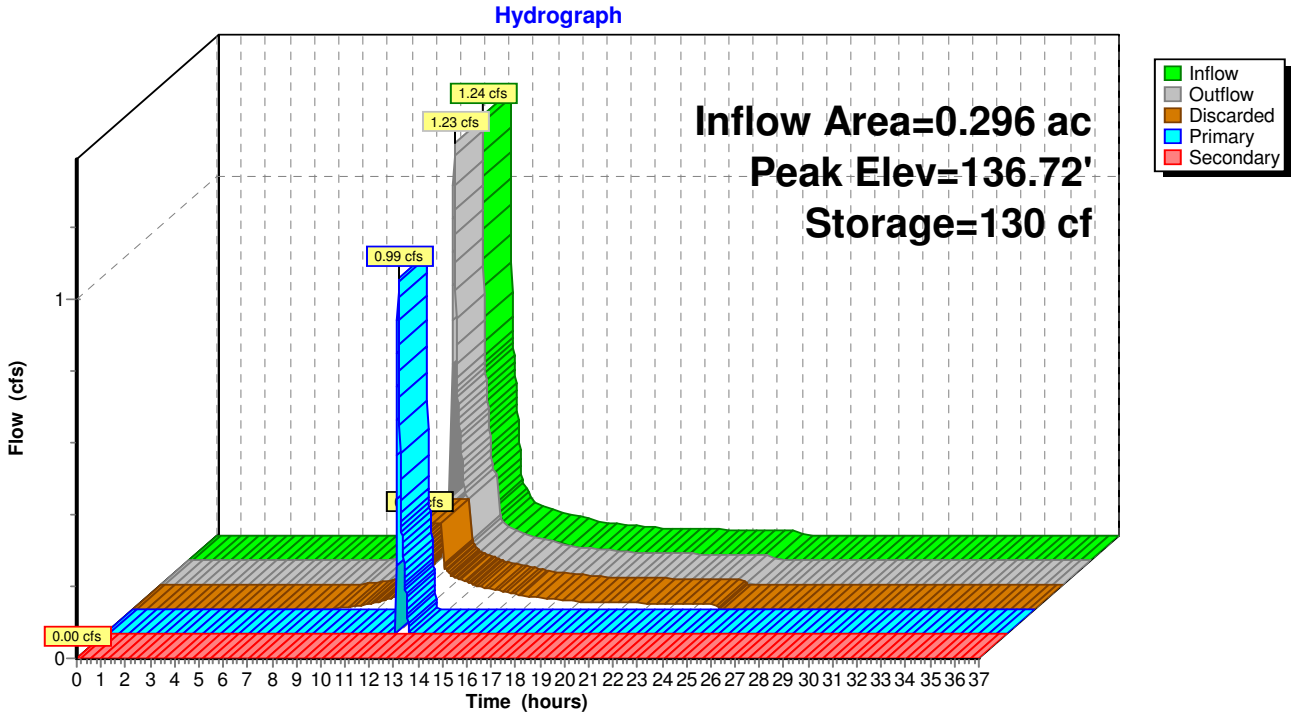
Device	Routing	Invert	Outlet Devices
#1	Discarded	136.25'	**0.24 cfs Exfiltration at all elevations**
#2	Secondary	136.75'	**3.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	136.61'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.24 cfs @ 11.73 hrs HW=136.26' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.98 cfs @ 12.03 hrs HW=136.72' (Free Discharge)
↑—**3=Orifice/Grate** (Weir Controls 0.98 cfs @ 1.10 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=136.25' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Infiltration Depression



Summary for Pond 5P: Infiltration Pipe

Inflow Area = 0.382 ac, 56.91% Impervious, Inflow Depth = 0.80" for 25yr event
Inflow = 1.14 cfs @ 12.03 hrs, Volume= 0.025 af
Outflow = 0.40 cfs @ 11.97 hrs, Volume= 0.025 af, Atten= 65%, Lag= 0.0 min
Discarded = 0.40 cfs @ 11.97 hrs, Volume= 0.025 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 129.07' @ 12.14 hrs Surf.Area= 404 sf Storage= 279 cf

Plug-Flow detention time= 5.4 min calculated for 0.025 af (100% of inflow)
Center-of-Mass det. time= 5.4 min (790.4 - 785.0)

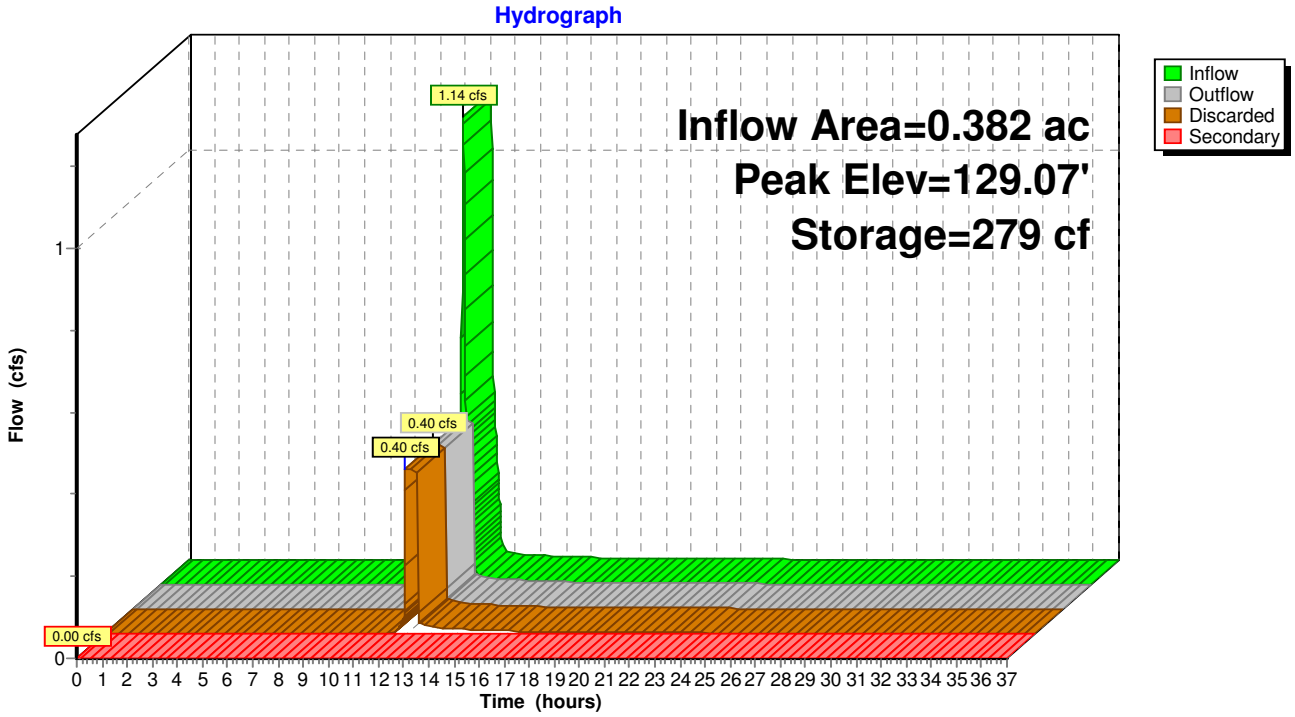
Volume	Invert	Avail.Storage	Storage Description
#1	127.50'	521 cf	**5.00'W x 80.00'L x 3.50'H Stone Trench** 1,400 cf Overall - 98 cf Embedded = 1,302 cf x 40.0% Voids
#2	128.50'	98 cf	**15.0"D x 80.00'L 15" Pipe** Inside #1
#3	128.50'	18 cf	**2.00'W x 2.00'L x 4.50'H Catch Basin**
		637 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	**0.40 cfs Exfiltration at all elevations**
#2	Secondary	132.50'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.40 cfs @ 11.97 hrs HW=127.58' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.40 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=127.50' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Infiltration Pipe



Time span=0.00-37.00 hrs, dt=0.01 hrs, 3701 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Off-site (north) Runoff Area=12,898 sf 64.07% Impervious Runoff Depth=4.10"
Flow Length=213' Tc=1.6 min CN=77 Runoff=1.66 cfs 0.101 af

Subcatchment 3S: On-site parking & Runoff Area=3,756 sf 32.29% Impervious Runoff Depth=2.21"
Flow Length=76' Slope=0.0600 '/' Tc=0.6 min CN=58 Runoff=0.26 cfs 0.016 af

Reach 6R: Parking Lot Avg. Depth=0.01' Max Vel=0.29 fps Inflow=0.00 cfs 0.000 af
n=0.050 L=20.0' S=0.1250 '/' Capacity=6.57 cfs Outflow=0.00 cfs 0.000 af

Pond 2P: Infiltration Depression Peak Elev=136.75' Storage=139 cf Inflow=1.66 cfs 0.101 af
Discarded=0.24 cfs 0.075 af Primary=1.41 cfs 0.026 af Secondary=0.00 cfs 0.000 af Outflow=1.65 cfs 0.101 af

Pond 5P: Infiltration Pipe Peak Elev=130.95' Storage=621 cf Inflow=1.65 cfs 0.042 af
Discarded=0.40 cfs 0.042 af Secondary=0.00 cfs 0.000 af Outflow=0.40 cfs 0.042 af

Total Runoff Area = 0.382 ac Runoff Volume = 0.117 af Average Runoff Depth = 3.67"
43.09% Pervious = 0.165 ac 56.91% Impervious = 0.218 ac

Summary for Subcatchment 1S: Off-site (north)

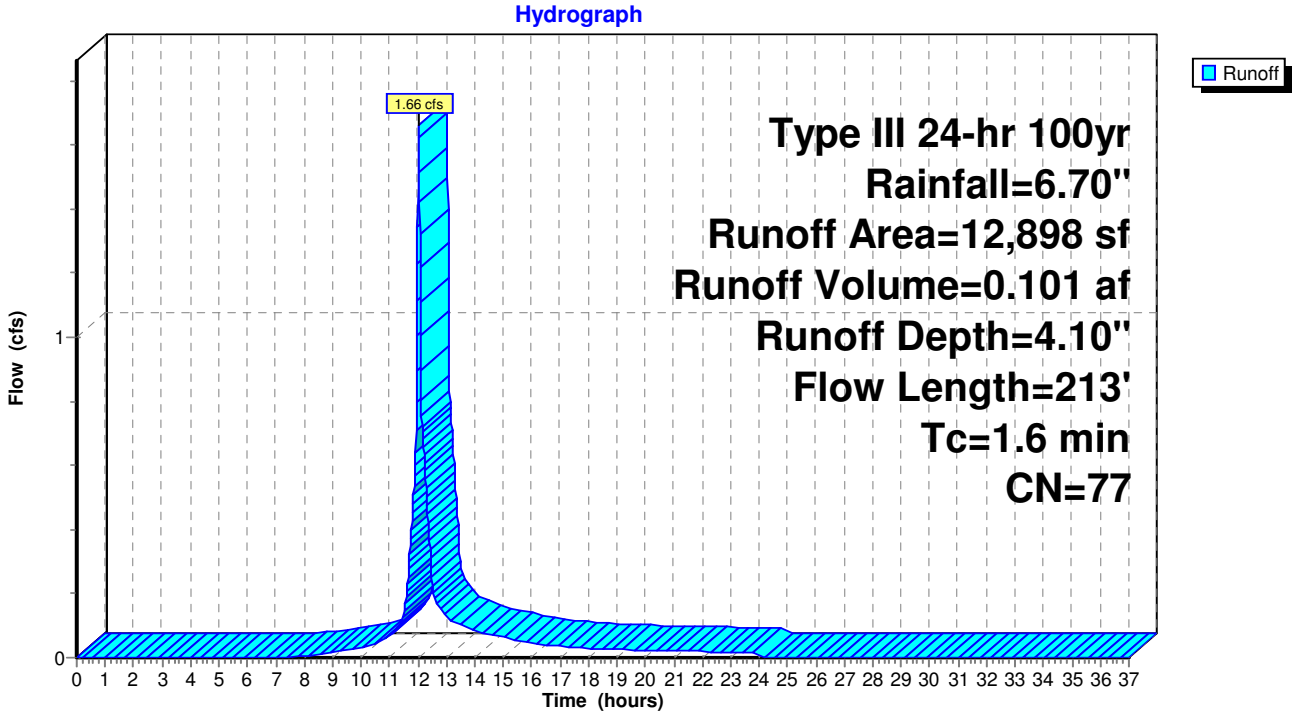
Runoff = 1.66 cfs @ 12.02 hrs, Volume= 0.101 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Type III 24-hr 100yr Rainfall=6.70"

Area (sf)	CN	Description
4,634	39	>75% Grass cover, Good, HSG A
8,264	98	Paved parking & roofs
12,898	77	Weighted Average
4,634		Pervious Area
8,264		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.36		**Sheet Flow, sheet flow** Smooth surfaces n= 0.011 P2= 3.00"
0.9	143	0.0300	2.79		**Shallow Concentrated Flow, shallow concentrated flow** Unpaved Kv= 16.1 fps
0.1	20	0.1400	2.62		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
1.6	213	Total			

Subcatchment 1S: Off-site (north)



Summary for Subcatchment 3S: On-site parking & Building

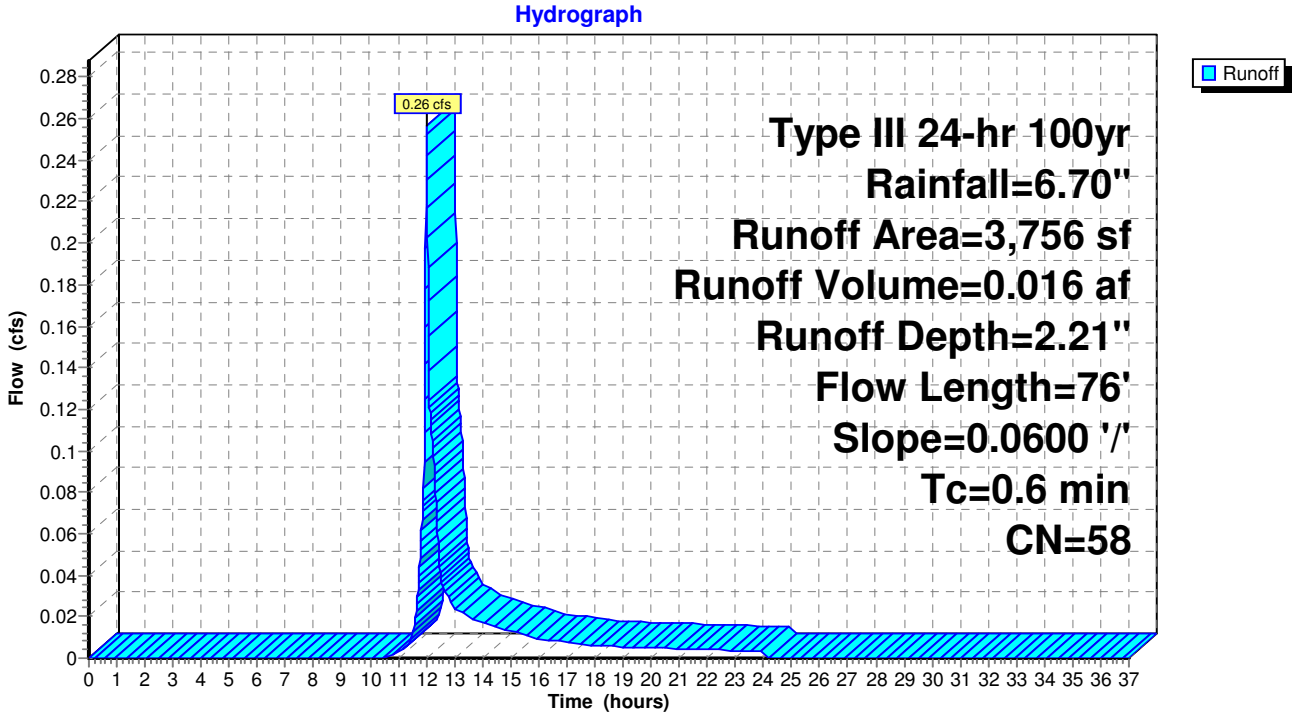
Runoff = 0.26 cfs @ 12.01 hrs, Volume= 0.016 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Type III 24-hr 100yr Rainfall=6.70"

	Area (sf)	CN	Description
*	2,543	39	Stone Surface with Hinkley Soil plus Vegetated Area
*	1,213	98	Sidewalk and Roofs
	3,756	58	Weighted Average
	2,543		Pervious Area
	1,213		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	76	0.0600	1.96		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 3.00"

Subcatchment 3S: On-site parking & Building



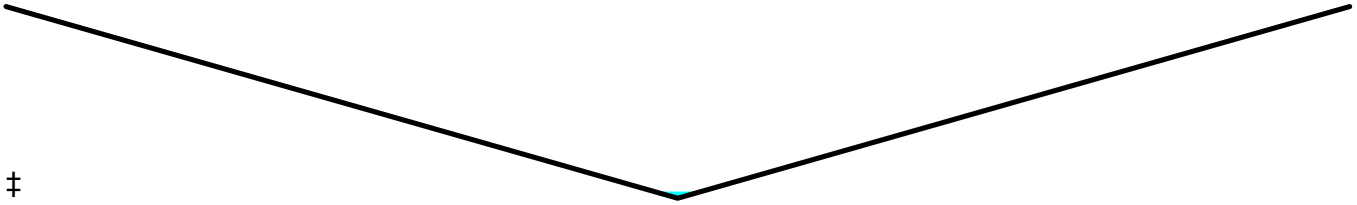
Summary for Reach 6R: Parking Lot

Inflow = 0.00 cfs @ 12.03 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 12.06 hrs, Volume= 0.000 af, Atten= 59%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.29 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.18 fps, Avg. Travel Time= 1.8 min

Peak Storage= 0 cf @ 12.04 hrs, Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 0.25', Capacity at Bank-Full= 6.57 cfs

Custom cross-section, Length= 20.0' Slope= 0.1250 '/'
Constant n= 0.050 Stone, clean & dense
Inlet Invert= 135.00', Outlet Invert= 132.50'

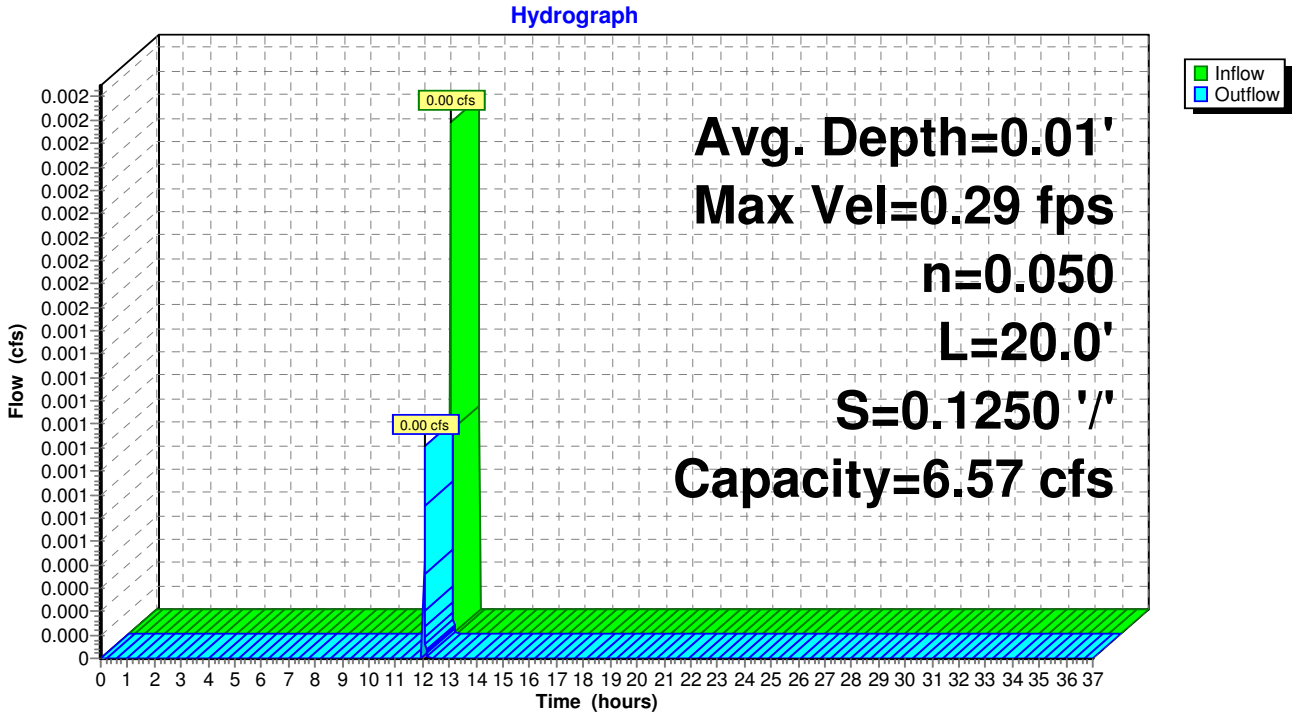


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	135.25	0.00
10.00	135.00	0.25
20.00	135.25	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.25	2.5	20.0	50	6.57

Reach 6R: Parking Lot



Summary for Pond 2P: Infiltration Depression

Inflow Area = 0.296 ac, 64.07% Impervious, Inflow Depth = 4.10" for 100yr event
Inflow = 1.66 cfs @ 12.02 hrs, Volume= 0.101 af
Outflow = 1.65 cfs @ 12.03 hrs, Volume= 0.101 af, Atten= 1%, Lag= 0.4 min
Discarded = 0.24 cfs @ 11.64 hrs, Volume= 0.075 af
Primary = 1.41 cfs @ 12.03 hrs, Volume= 0.026 af
Secondary = 0.00 cfs @ 12.03 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 136.75' @ 12.03 hrs Surf.Area= 315 sf Storage= 139 cf

Plug-Flow detention time= 1.5 min calculated for 0.101 af (100% of inflow)
Center-of-Mass det. time= 1.5 min (814.4 - 812.8)

Volume	Invert	Avail.Storage	Storage Description
#1	136.25'	417 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
136.25	239	0	0
136.75	315	139	139
137.53	400	279	417

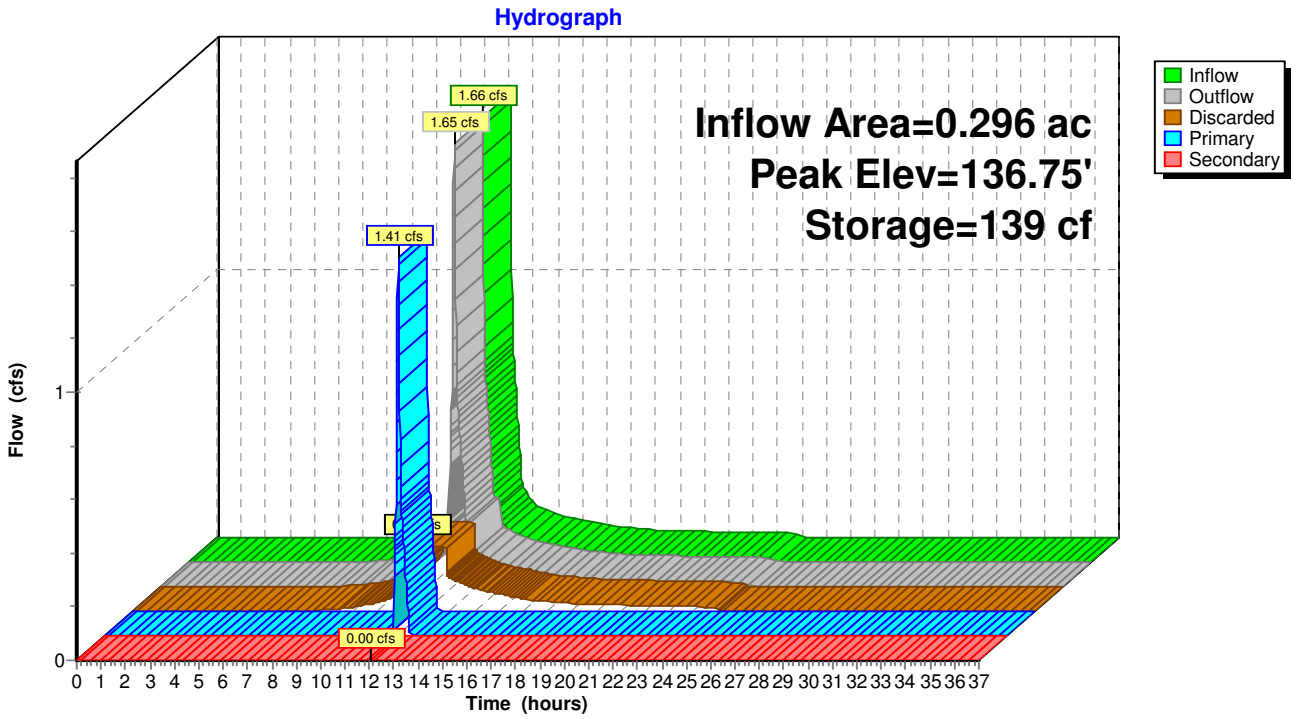
Device	Routing	Invert	Outlet Devices
#1	Discarded	136.25'	**0.24 cfs Exfiltration at all elevations**
#2	Secondary	136.75'	**3.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	136.61'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.24 cfs @ 11.64 hrs HW=136.26' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=1.41 cfs @ 12.03 hrs HW=136.75' (Free Discharge)
↑—**3=Orifice/Grate** (Weir Controls 1.41 cfs @ 1.23 fps)

Secondary OutFlow Max=0.00 cfs @ 12.03 hrs HW=136.75' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.12 fps)

Pond 2P: Infiltration Depression



Summary for Pond 5P: Infiltration Pipe

Inflow Area = 0.382 ac, 56.91% Impervious, Inflow Depth = 1.32" for 100yr event
Inflow = 1.65 cfs @ 12.03 hrs, Volume= 0.042 af
Outflow = 0.40 cfs @ 11.90 hrs, Volume= 0.042 af, Atten= 76%, Lag= 0.0 min
Discarded = 0.40 cfs @ 11.90 hrs, Volume= 0.042 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 130.95' @ 12.28 hrs Surf.Area= 404 sf Storage= 621 cf

Plug-Flow detention time= 12.0 min calculated for 0.042 af (100% of inflow)
Center-of-Mass det. time= 12.0 min (786.7 - 774.7)

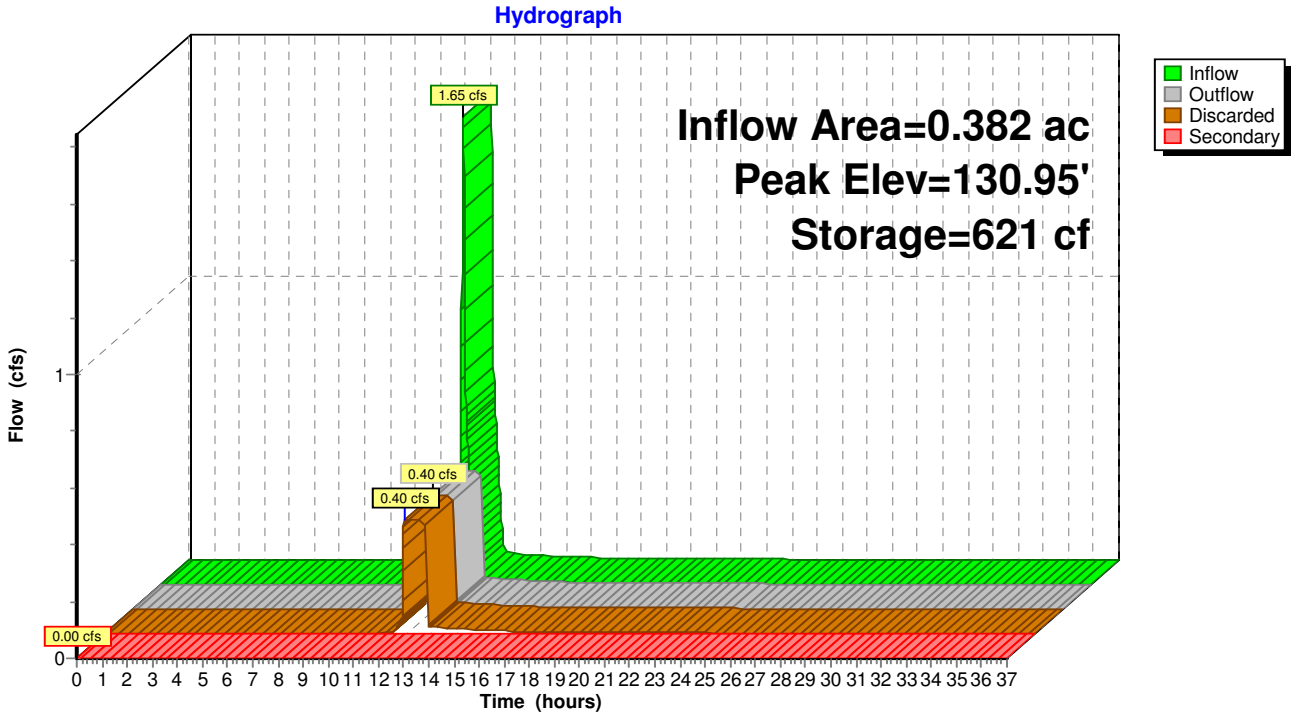
Volume	Invert	Avail.Storage	Storage Description
#1	127.50'	521 cf	**5.00'W x 80.00'L x 3.50'H Stone Trench** 1,400 cf Overall - 98 cf Embedded = 1,302 cf x 40.0% Voids
#2	128.50'	98 cf	**15.0"D x 80.00'L 15" Pipe** Inside #1
#3	128.50'	18 cf	**2.00'W x 2.00'L x 4.50'H Catch Basin**
		637 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	**0.40 cfs Exfiltration at all elevations**
#2	Secondary	132.50'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.40 cfs @ 11.90 hrs HW=127.56' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.40 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=127.50' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: Infiltration Pipe



STORMWATER MAINTENANCE PLAN

FOR: #45 CUMBERLAND AVENUE, PORTLAND, MAINE

This plan is intended to provide long term maintenance requirements for stormwater infrastructure located at #43 Cumberland Avenue in Portland, Maine. Stormwater infrastructure shall include the site's infiltration depression, the subsurface detention/infiltration Pipe, and the paved/grassed surfaces. Periodic inspection and maintenance of the stormwater infrastructure is necessary for system performance and longevity. Deviations or changes to this plan shall be done under the supervision of a Licensed Professional Engineer.

Infiltration Depression:

The designed stormwater infiltration depression is located at the northwest corner of the parking area. The depression is approximately 6" deep and 150 square feet in area. The infiltration depression shall be vegetated with routinely mowed grass. Snow storage is allowable in in this area.

INSPECTION FREQUENCY: The infiltration depression shall be inspected on annual basis in the spring. The infiltration depression shall be inspected between 24 and 72 hours after a major storm event (greater than 2" of rain in a 24 hour period) on an annual basis to ensure the depression is infiltrating. Inspections shall be recorded and kept in the owner's records.

MAINTENANCE: The infiltration depression shall be cleaned of sand and debris by hand on an annual basis (spring) when present. If the infiltration basin is not draining within 48 hours, replace the top 6" of loam and reestablish vegetation.

Subsurface Detention/Infiltration Pipe:

The designed stormwater subsurface detention/infiltration Pipe is located under the proposed parking lot. Due to the location and material fill of the infiltration pipe, no access is feasible to the base of the basin. Inspection shall include visual inspection at the two catch basins located at each end of the stormwater infiltration pipe. Seepage from the crushed stone surface at the lowest point of the parking area or water flowing out of the lower catch basin frame may indicate problems with infiltration and further investigation should be taken by a Licensed Professional Engineer.

INSPECTION FREQUENCY: The subsurface detention/infiltration pipe shall be inspected on an annual basis in the spring. The basin shall be inspected between 24 and 72 hours after a major storm event (greater than 2" of rain in a 24 hour period) on an annual basis to ensure the basin is infiltrating properly. Inspections shall be recorded and kept in the owner's records.

MAINTENANCE: When significant sediment is evident within the infiltration pipe (over 1/4 full), a vacuum truck shall clean the catch basins and pipe of all sediment. If significant seepage is monitored from the lowest point of the parking area, the owner shall contact a licensed Professional Engineer to evaluate the system.

Paved/Grassed Areas:

The project site includes a 4 space parking area located to the southwesterly side of #43 Cumberland Avenue building. The parking area includes crushed stone surfaces and a paved/brick drive entrance. The project site includes grassed areas to the rear of the site as well as various other locations.

INSPECTION FREQUENCY: Paved areas shall be inspected on an annual basis (spring) to ensure the surface is clean of sediment and debris. Grassed areas shall be inspected on an annual basis (spring) to ensure the surfaces are stabilized and are clean of sediment and debris.

MAINTENANCE: Paved areas shall be swept and cleaned of sediment annually in the spring. Grassed areas shall be kept clear of debris and mowed on a regular basis.

ATTACHMENTS:

- Inspection and Maintenance Form

INSPECTION AND MAINTENANCE FORM

Date:

☐ Check this box if all BMP's are in compliance with the Inspection and Maintenance Plan (only for inspection)

Work Completed

☐ Inspection
☐ Maintenance

BMP's Checked/Maintained

☐ Infiltration Depression
☐ Subsurface Pipe
☐ Paved/Grassed Area

Description of Work Completed:

Date:

☐ Check this box if all BMP's are in compliance with the Inspection and Maintenance Plan (only for inspection)

Work Completed

☐ Inspection
☐ Maintenance

BMP's Checked/Maintained

☐ Infiltration Depression
☐ Subsurface Pipe
☐ Paved/Grassed Area

Description of Work Completed:

Date:

☐ Check this box if all BMP's are in compliance with the Inspection and Maintenance Plan (only for inspection)

Work Completed

☐ Inspection
☐ Maintenance

BMP's Checked/Maintained

☐ Infiltration Depression
☐ Subsurface Pipe
☐ Paved/Grassed Area

Description of Work Completed:

EROSION AND SEDIMENTATION CONTROL PLAN

1.0 Introduction

W.P. Brogan & Associates in cooperation with Mark Mueller Architects and Anthony Muench Landscape Architects, have been retained by Mark Smith and Stephanie Dunn (the Applicants) to provide design services for a project site located at 43 and 45 Cumberland Avenue in Portland, Maine.

The project site consists of two parcels shown on the Portland Tax Map 13, Block K, as Lots 61 and 62. The lots are currently developed as a single family home (lot 61) and a 3 unit apartment building (lot 62). The single family home is currently uninhabitable and condemned by the City. The project envisions the rehabilitation of the single family structure, the creation of a 5th dwelling unit on the fourth floor of the existing 3 unit apartment building, and the creation of a 4 total space parking area. The 5th unit is anticipated to be constructed in existing unused attic space with appropriate architectural improvements (dormers, stair access, etc.) to make the space livable.

2.0 Existing Conditions

The existing property consists of primarily residential development. The site includes 1 single family structure with a footprint of approximately 630 square feet and a 3 unit structure with a footprint of approximately 1,700 square feet. In addition to the single family structure are a driveway, a deck, and entry steps. In addition to the multi family structure is a walkway, a deck, and two entry steps.

Offsite stormwater that flows onto the site consists of predominately developed area to the northwest of the site (behind the development). The area consists of residential development, access drives, and a parking lot. The access drive and parking lot consists of gravel surfaces. A site visit indicated areas of limited pooling at the lowest point of the parking area directly before stormwater drains on to the project site.

Soils onsite are Hinckley Soils based on the Soil conservation Service Medium Intensity Soil Survey for Cumberland County. These soils are hydrologic soil group A.

2.1 Existing Erosion Problems

W.P. Brogan & Associates. is not aware of any erosion problems on site.

2.2 Critical Areas

Critical areas that would require special attention during construction would be the areas of construction abutting the south westerly property line. These areas are on the down slope of the project development.

2.3 Protected Natural Resource

The project site does not appear to have any protected natural resources.

2.4 Previous Construction Activity (5 years)

It does not appear any construction has occurred in the last 5 years.

2.5 Timber Harvesting

It does not appear any timber harvesting has occurred on the project site.

3.0 Erosion Control Measures and Site Stabilization

As part of the site development, the following temporary and permanent erosion and sedimentation control devices shall be implemented. Devices shall be installed as described in this report or within the plan set. See the Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices for further reference.

3.1 Temporary Erosion Control Measures

The following temporary erosion and sedimentation control measures are planned for the project's construction period.

3.1.1 Crushed stone stabilized construction entrances shall be placed at all access points to the project site where there are disturbed areas. The following specifications shall be followed at a minimum:

- Stone size shall be 3/4 inches, or reclaimed or recycled concrete equivalent.
- The thickness of the entrance shall be no less than 6 inches.
- The entrance shall not be less than 10 feet wide, however not less than the full width of points where ingress or egress occurs. The length shall not be less than 50 feet in length.
- Geotextile fabric (woven or non woven) shall be placed over the entire entrance area. Piping for surface water drainage shall be provided under the entrance; however a mountable berm with 5:1 slopes shall be permitted.
- The entrance/exit shall be maintained to the extent that it will prevent the tracking of sediment onto public road ways.

3.1.2 Siltation fence shall be installed downstream of any disturbed areas to trap runoff borne sediments until permanent stabilization is achieved. The silt fence shall be installed per the details provided in the plan set and inspected before and immediately after each rainfall and at least daily during prolonged rainfall. Repairs shall be made if there are any signs of erosion or sedimentation below the fence line. If there are signs of undercutting at the center or the edges, or

impounding of large volumes of water behind the fence, the barrier shall be replaced with a stone check dam.

3.1.3 Hay mulch including hydro seeding is intended to provide cover for denuded or seeded areas until revegetation is established. Mulch placed between April 15th and November 1st on slopes of less than 15 percent shall be covered by fabric netting and anchored with staples in accordance with the manufacturer's recommendation. Erosion control blankets and mats shall be used on disturbed areas within 100' of lakes, streams, and wetlands, regardless of the upstream slope. Mulch placed between November 1st and April 15th on slopes equal to or steeper than 8 percent and equal to or flatter than 2:1 shall use mats or fabric netting and anchored with staples in accordance with the manufacturer's recommendation.

3.1.4 All disturbed areas within 100 feet of a wetland and are not a proposed impervious area such as a parking lot, driveway, building footprint, shall receive mulch or erosion control blankets / mats within 7 days of disturbance of soil. Regardless of the 7 day time period to stabilize a disturbed area after initial disturbance; all areas within 100 feet of an undisturbed wetland shall be mulched. In other areas, the time period may be extended to 21 days.

3.1.5 All slopes greater than 2:1 shall be stabilized with Double Net Erosion Control Blanket Bionet SC150BN by North American Green or Approved Equal.

3.1.6 All surrounding roads shall be swept to control mud and dust as necessary. Add additional stone to the stabilized construction entrance to minimize the tracking of material off the site and onto the surrounding roadways.

3.1.7 During clearing and grubbing operations stone check dams shall be installed at any areas of concentrated flow. The tributary area to a ditch or swale shall not exceed 10 acres in size. The maximum height of the check dam shall not exceed 2 feet. The center of the check dam shall be 6 inches below the outer edges of the dam.

3.1.8 Silt fence stake spacing shall not exceed 6 feet unless the fence is supported with 14 gauge wire in which case the maximum spacing shall not exceed 10 feet. The silt fence shall be "toed" into the ground.

3.1.9 Stormdrain inlet protection shall be provided through the use of any of the following: hay bale drop inlet structures, silt fence drop inlet sediment filter, gravel and wire mesh drop inlet sediment filter, or curb inlet sediment filter. Barriers shall be inspected after every rainfall event and repaired as necessary. Sediments shall be removed when accumulation has reached ½ the design height.

3.1.10 Dust control shall be accomplished by the use of any of the following: water, calcium chloride, stone, or an approved MDEP product. Dust control shall be applied as needed to accomplish dust control.

3.1.11 Temporary loam, seed, and mulching shall be used in areas where no other erosion control measure is used. Application rates for seeding are provided at the end of this report.

3.1.12 Stockpiles shall be stabilized within 7 days of formation unless a scheduled rain event occurs prior to the 7 day window, in which case the stockpile shall be stabilized. Methods of stabilization shall be mulch, erosion control mix, or erosion control blankets/mats.

3.1.13 For disturbance between November 1 and April 15, please refer to winter stabilization plan in this report and the Maine Erosion and Sediment Control BMP manual for further information.

3.2 Permanent Erosion Control Measures

The following permanent erosion control measures are intended for post disturbance areas of the project.

3.2.1 All disturbed areas during construction, not subject to other proposed conditions, shall be loamed, limed, fertilized, seeded, and mulched. Erosion control blankets or mats shall be placed over the mulch in areas noted in paragraph 4.1 of this report.

3.2.2 All culvert inlet and outlets shall have riprap aprons. Riprap aprons shall be installed prior to receiving stormwater.

3.2.3 All stormdrain outlets shall have riprap aprons or stabilized swales as depicted on the plans.

3.2.4 All stormwater devices shall be installed and stabilized prior receiving stormwater.

3.2.5 Catch Basins shall be constructed with sediment sumps as well as inlet hoods for all outlet pipes that are 18” in diameter or less. Inlet hoods shall be installed prior to the removal of any temporary erosion control devices implemented for catch basin inlet protection.

3.2.6 Refer to the Maine Erosion and Sediment Control BMP manual for additional information.

4.0 Erosion and Sedimentation Control Plan

4.1 Erosion and Sedimentation Control Plans are included in the plan set.

5.0 Details and Specifications

5.1 Erosion Control Details and Specification are included in the plan set.

6.0 Stabilization Plan for Winter Construction

Winter Construction consists of earthwork disturbance between the dates of November 1 and April 15. If a construction site is not stabilized with pavement, a road gravel base, 75% mature vegetation cover or riprap by November 15 then the site shall be protected with over-winter stabilization. Any area not stabilized with pavement, vegetation, mulching, erosion control mix, erosion control mats, riprap or gravel base on a road shall be considered open.

A project shall not open more than 1 acre of the site without stabilization at any one time. The contractor shall limit the work area to areas that work will occur in the following 15 days and so that it can be mulched one day prior to a snow event. The contractor shall stabilize work areas prior to opening additional work areas to minimize areas without erosion control measures.

The following measures shall be implemented during winter construction periods:

6.1 Natural Resource Protection

Any areas within 100 feet from any natural resources, if not stabilized with a minimum of 75% mature vegetation catch, shall be mulched by December 1 and anchored with plastic netting or protected with an erosion control cover. During winter construction, a double row of sediment barriers, (i.e. silt fence backed with hay bales or erosion control mix) will be placed between any natural resource and the disturbed area. Projects crossing the natural resource shall be protected a minimum distance of 100 feet on either side from the resource. Existing projects not stabilized by December 1 shall be protected with the second line of sediment barrier to ensure functionality during the spring thaw and rains.

6.2 Sediment Barriers

During frozen conditions, sediment barriers may consist of erosion control mix berms or any other recognized sediment barriers as frozen soil prevents the proper installation of hay bales or silt fences.

6.3 Mulching

All areas shall be considered to be denuded until seeded and mulched. Hay and straw mulch shall be applied at a rate of 150 lb. per 1,000 square feet or 3 tons/acre (twice the normal accepted rate of 75-lbs./1,000 s.f. or 1.5 tons/acre) and shall be properly anchored. Erosion control mix must be applied with a minimum 4 inch thickness. Mulch shall not be spread on top of snow. The snow will be removed down to a one-inch depth or less prior to application. After each day of final grading, the area will be properly stabilized with anchored hay or straw or erosion control matting. An area shall be considered to have been stabilized when exposed surfaces have been either mulched or adequately anchored so that ground surface is not visible through the mulch. Between the dates of November 1 and April 15, all mulch shall be anchored by either mulch netting, asphalt emulsion chemical, tracking or wood cellulose fiber. The cover will be considered sufficient when the ground surface is not visible through the mulch. After November 1st, mulch and anchoring of all exposed soil shall occur at the end of each final grading workday.

6.4 Soil Stockpiling

Stockpiles of soil or subsoil shall be mulched for over winter protection with hay or straw at twice the normal rate or with a four-inch layer of erosion control mix. This shall be done within 24 hours of stocking and re-established prior to any rainfall or snowfall. Any soil stockpile will not be placed (even covered with mulched) within 100 feet from any natural resource.

6.5 Seeding

Between the dates of October 15th and April 1st, loam or seed shall not be required. During periods of above freezing temperatures finished areas shall be fine graded and either protected with mulch or temporarily seeded and mulched until such time as the final treatment can be applied. If the date is after November 1st and if the exposed area has not been loamed, final grading with a uniform surface, then the area may be dormant seeded at a rate of 3 times higher than specified for permanent seed and then mulched.

Dormant seeding may be placed prior to the placement of mulch or erosion control blankets. If dormant seeding is used for the site, all disturbed areas shall receive 4' of loam and seed at an application rate of 5lbs/1,000 s.f. All areas seeded during the winter shall be inspected in the spring for adequate catch. All areas insufficiently vegetated (less than 75% catch) shall be revegetated by replacing loam, seed and mulch. If dormant seeding is not used for the site, all disturbed areas shall be revegetated in the spring.

6.6 Overwinter stabilization of ditches and channels

All stone-lined ditches and channels shall be constructed and stabilized by November 15th. All grass-lined ditches and channels shall be constructed and stabilized by September 1st. If a ditch or channel is not grass-lined by September 1st, then one of the following actions shall be taken to stabilize the ditch for late fall and winter.

- Install a sod lining in the ditch – A ditch shall be lined with properly installed sod by October 1st. Proper installation includes: pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and the underlying soil, watering the sod to promote root growth into the disturbed soil, and anchoring sod at the base of the ditch with jute or plastic mesh to prevent the sod from sloughing during flow conditions.
- Install a stone lining in the ditch – A ditch shall be lined with stone riprap by November 15th. A registered professional engineer shall be hired to determine the stone size and lining thickness needed to withstand the anticipated flow velocities and flow depths within the ditch. If necessary, the contractor will regrade the ditch prior to placing

the stone lining so to prevent the stone lining from reducing the ditch's cross-sectional area.

6.7 Over winter stabilization of disturbed soils

By September 15th, all disturbed soils on areas having a slope less than 15% shall be seeded and mulched. If the disturbed areas are not stabilized by this date, then one of the following actions shall be taken to stabilize the soil for late fall and winter:

- Stabilize the soil with temporary vegetation – By October 1st, seed the disturbed soil with winter rye at a seeding rate of 3lbs per 1,000 s.f., lightly mulch the seeded soil with hay or straw at 75 lbs per 1,000 s.f., and anchor the mulch with plastic netting. Monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or fails to cover at least 75% of the disturbed soil before November 1st, then mulch the area for over-winter protection.

- Stabilize the soil with sod – Stabilize the disturbed soil with properly installed sod by October 1st. Proper installation includes pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil.

- Stabilize the soil with mulch – By November 15th, mulch the disturbed soil by spreading hay or straw at a rate of at least 150 lbs per 1,000 s.f. on the area so that no soil is visible through the mulch. Immediately after applying the mulch, anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

6.8 Over winter stabilization of disturbed slopes

All stone-covered slopes shall be constructed and stabilized by November 15th. All slopes to be vegetated shall be seeded and mulched by September 1st. A slope is considered a grade greater than 15%. If a slope to be vegetated is not stabilized by September 1st, then one of the following action shall be taken to stabilize the slope for late fall and winter:

- Stabilize the soil with temporary vegetation and erosion control mats – By October 1st the disturbed slope shall be seeded with winter rye at a seeding rate of 3 lbs per 1,000 s.f. and then install erosion control mats or anchored mulch over the seeding. If the rye fails to grow at least three inches or fails to cover at least 75% f the slope by November 1st, then the contractor shall cover the slope with a layer of erosion control mix or with stone riprap.

- Stabilize the soil with sod – The disturbed slope shall be stabilized with properly installed sod by October 1st. Proper installation includes the contractor pinning the sod onto the slope with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil. The contractor shall not use late-season sod installation to stabilize slopes having a grade greater than 3H:1V or having groundwater seeps on the slope face.
- Stabilize the soil with erosion control mix – Erosion control mix shall be properly installed by November 15th. The contractor shall not use erosion control mix to stabilize slopes having grades greater than 2H:1V or having groundwater seeps on the slope face.

- Stabilize the soil with stone riprap – Place a layer of stone riprap on the slope by November 15th. A registered professional engineer shall be hired to determine the stone size needed for stability on the slope and to design a filter layer for underneath the riprap.

6.9 Inspection and Maintenance

After each rainfall, snow storm or period of thawing and runoff, the site contractor shall perform a visual inspection of all installed erosion control measures and perform repairs as needed to insure their continuous function. Following the temporary and/or final seeding and mulching, the contractor shall, in the spring, inspect and repair any damages and/or bare spots. An established vegetative cover means a minimum of 85 to 90% of areas vegetated with vigorous growth.

7.0 Implementation Schedule

The following implementation schedule is intended to maximize the effectiveness of the above described erosion control measures. Contractors should be cautious of over exposing disturbed areas to limit the amount of stabilization area.

1. Install a stabilized construction entrance in all locations where construction traffic will enter and exit the site. Particularly, at intersections with public rights of way.
2. Install perimeter silt fence or wood waste berm.
3. Install all other erosion control devices as necessary throughout the remainder of this schedule
4. Commence clearing and grubbing operations
5. Commence earthwork operations
6. Commence installation of drainage infrastructure
7. Commence installation of utility infrastructure
8. Continue earthwork and grading to subgrade as necessary for construction
9. Complete installation of drainage and utility infrastructure

10. Complete remaining earthwork operations.
11. Install stone surface in parking lot.
12. Loam, lime, fertilize, seed and mulch disturbed areas and complete all landscaping.
13. Once the site is stabilized and 90% catch of vegetation has been obtained, remove all temporary erosion control measures.
14. Touch up loam and seed.

The above implementation schedule should be generally followed by the site contractor. However, the contractor may construct several items simultaneously. A contractor shall submit to the owner a schedule of the completion of the work. If the contractor is to commence the construction of more than one item above, they shall limit the amount of exposed are to those areas in which work is expected to be undertaken during the preceding 30 days.

The contractor shall revegeteate disturbed areas as rapidly as possible. All areas shall be permanently stabilized within 7 days of final grading or before a storm event. The contractor shall incorporate planned inlets and drainage systems as early as possible into the construction phase. Ditches shall be lined or vegetated as soon as their installation is complete.

8.0 Conclusion

The above erosion control narrative is intended to minimize the development impact by implementing temporary and permanent erosion control measures. The contractor shall also refer to the Maine Erosion and Sediment Control BMP manual for additional information.

9.0 Attachments

- Temporary Seeding Plan
- Permanent Seeding Plan

PERMANENT SEEDING PLAN

Site Preparation

The seeded areas shall be feasibly graded out to provide the use of equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. If necessary, the site may require additional temporary erosion control measures outlined in the Erosion Control report.

Seedbed Preparation

Fertilizer shall be applied to the site at a rate of 13.8 pounds per 1,000 square feet. The composition of the fertilizer shall be 10-10-10 (N-P2O5-K2O) or equivalent.

Limestone shall be applied to the site at a rate of 138 pounds per 1,000 square feet.

Seeding

The composition and amount of permanent seed applied to a site shall be determined by the following table:

Seed	Pounds / 1,000 S.F.
Kentucky Bluegrass	0.46
Creeping Red Fescue	0.46
Perennial Ryegrass	0.11
Total	1.03

Mulching

Mulch shall be applied at a rate of 70 lbs – 90 lbs per 1,000 square feet. The mulch shall be installed at a depth of 4 inches. The seeded area shall be mulched immediately after seed is applied. Mulching during the winter season shall be double the normal amount.

Recommendations

Permanent seeding is recommended to be completed in the spring. Later summer seeding is allowed if completed prior to September 1st. If seeding cannot be accomplished during the periods recommended for permanent seeding, then the contractor shall perform temporary seeding per the temporary seeding plan.

Conclusion

Please refer to the Maine Erosion and Sediment Control BMP manual for additional information pertaining to permanent seeding and mulching.

TEMPORARY SEEDING PLAN

Site Preparation

The seeded areas shall be feasibly graded out to provide the use of equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. If necessary, the site may require additional temporary erosion control measures outlined in the Erosion Control report.

Seedbed Preparation

Fertilizer shall be applied to the site at a rate of 13.8 pounds per 1,000 square feet. The composition of the fertilizer shall be 10-10-10 (N-P2O5-K2O) or equivalent.

Limestone shall be applied to the site at a rate of 138 pounds per 1,000 square feet.

Seeding

The composition and amount of temporary seed applied to a site shall be determined by the following table:

Seed	Pounds / 1,000 S.F.	Recommended Seeding Dates
Winter Rye	2.57	Aug-15 to Oct-1
Oats	1.84	Apr-1 to Jul-1 Aug-15 to Sep-15
Annual Ryegrass	0.92	Apr-1 to Jul-1
Sudangrass	0.92	May-15 to Aug-15
Perennial	0.92	Aug-15 to Sep-15

Mulching

Mulch shall be applied at a rate of 70 lbs – 90 lbs per 1,000 square feet. The mulch shall be installed at a depth of 4 inches. The seeded area shall be mulched immediately after seed is applied. Mulching during the winter season shall be double the normal amount.

Conclusion

Please refer to the Maine Erosion and Sediment Control BMP manual for additional information pertaining to temporary seeding and mulching.