

Gene Poveromo

From: Deborah Squires
Sent: Friday, October 28, 2016 11:01 AM
To: Jay Heikes
Subject: RE: Map Request: 111 Purefoy Rd
Attachments: 111Purefoy_rd_postcard.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Map attached.

Residents as follows:

Emma & Joel Blass

502 Oteys Rd

CH, 27517

Waheed Haq

PO Box 31952

Raleigh, 27622-1952

Siraj Chohan

4304 Cedar Oak Wynd

Raleigh 27612

Be not inhospitable to strangers, lest they be Angels in disguise"

Deborah Frederick-Squires GISP

Planning and Sustainability

Town of Chapel Hill

405 Martin Luther King Jr. Blvd.

Chapel Hill, NC 27514

919-969-5089



**PUBLIC WORKS DEPARTMENT
STORMWATER MANAGEMENT DIVISION**

405 Martin Luther King, Jr. Blvd.
Chapel Hill, NC 27514-5705
Telephone (919) 969-7246
Fax (919) 969-7276
www.townofchapelhill.org

8/29/2016

Andrew Porter
111 West Main St.
Durham, NC 27701

Dear Mr. Porter:

As requested, the Town Public Works Department has performed a stream determination on the property identified on the attached forms. This determination indicates whether different types of streams (perennial, intermittent, and/or ephemeral) or perennial waterbodies are present on the property in question or nearby properties. These streams and their classifications are shown on the accompanying map. Stream segments regulated by the Jordan Lake Stream Buffer ordinance are highlighted. **Locations of all features on the map are approximate and must be field surveyed for precise location.**

This stream determination information is used to determine the location and extent of the Resource Conservation District and Jordan Lake Stream Buffer. Specific land use regulations and restrictions apply within the boundaries of these protected areas. If you are considering any kind of work on your property, including clearing vegetation, paving, grading, or building, please consult with the Town Planning Department to determine the possible extent of the Resource Conservation District and Jordan Lake Stream Buffer on your property and corresponding regulations.

This classification will remain in effect for five years from the date of the site visit before a request for reclassification will be considered, unless the stream channel characteristics are significantly altered as a result of watershed changes.

In accordance with the Town's procedures, you may appeal this administrative decision to the Town Manager. If you wish to do so, you must file your written appeal accompanied by any materials you believe support your appeal, within **30** days of receipt of this letter.

If you have questions regarding stream determinations, please contact me at (919) 969-5083. If you have questions regarding the Town's Resource Conservation Districts or the Jordan Riparian Buffer regulations, please contact the Planning Department at (919) 968-2728, or view information online at <http://www.townofchapelhill.org/index.aspx?page=1615>.

Regards,

Dave Milkereit
Stormwater Specialist



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STREAM DETERMINATION SITE VISIT RESULTS

Property Information	
Parcel ID Number (PIN)	Address / Location Description
9788-41-9609	111 Purefoy Rd

These are the results of a site visit to the properties listed above for a stream determination conducted on 8/25 by Town Staff:

- No perennial, intermittent, or ephemeral streams or perennial waterbodies were identified on or near the property(ies) in question.
- Perennial, intermittent, or ephemeral streams, or perennial waterbodies, were identified on or near the property(ies) in question and shown on the attached map(s).

A map showing water features, their Town flow classifications, presence of Jordan Riparian Buffers, and their approximate locations is attached. Origins or breakpoints that have been flagged in the field are marked on the map. Stream classification forms and additional site visit notes and maps are also attached.

Other conditions exist which may affect the location of the Resource Conservation District or Jordan Stream Buffer:

- FEMA floodzone is mapped in the area. Precise location of the Base Flood Elevation and associated Resource Conservation District must determined by a field survey commissioned by the owner or a representative.
- Segments of perennial or intermittent stream are piped in the area, as shown on the map. These segments do not have an associated Jordan Stream Buffer.
- Possible Jurisdictional Wetlands have been identified in the area. A formal review by a professional certified in Jurisdictional Wetland Delineation is recommended.

Town Staff signature

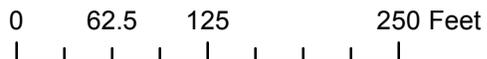
8/29/2016
date

Stream Determination Area Map

- ⋯ Unclassified Stream
- · - · Ephemeral Stream
- - - - Intermittent Stream
- Perennial Stream
-  Culverts
-  2-foot Contours
-  10-foot Contours
-  Buildings
-  Parcels
-  Site visited
-  Non-regulated Waterbody
-  Non-perennial Waterbody
-  Wide Perennial Stream
-  Perennial Waterbody
-  Approximate Jordan Buffer
-  Ephemeral Breakpoint
-  Intermittent Breakpoint
-  Perennial Breakpoint

Address: 111 Purefoy Rd

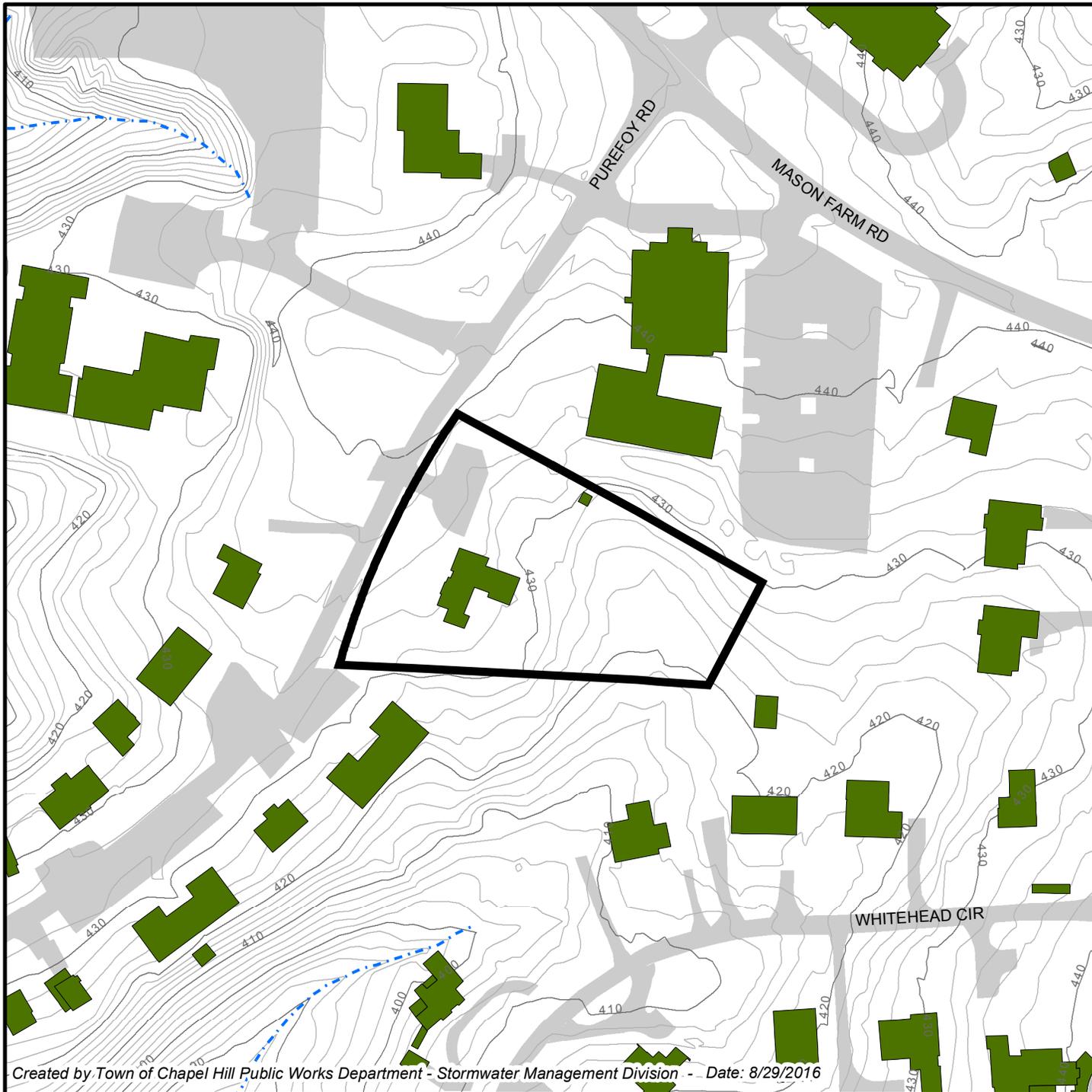
Parcel ID: 9788-41-9609



1 inch = 125 feet

Wider RCD Buffers may apply

Stream locations are approximate and must be verified by survey.



USGS 24K Topographic / County Soil Survey Maps

 Site Parcel Boundary

Address: 111 Purefoy Rd

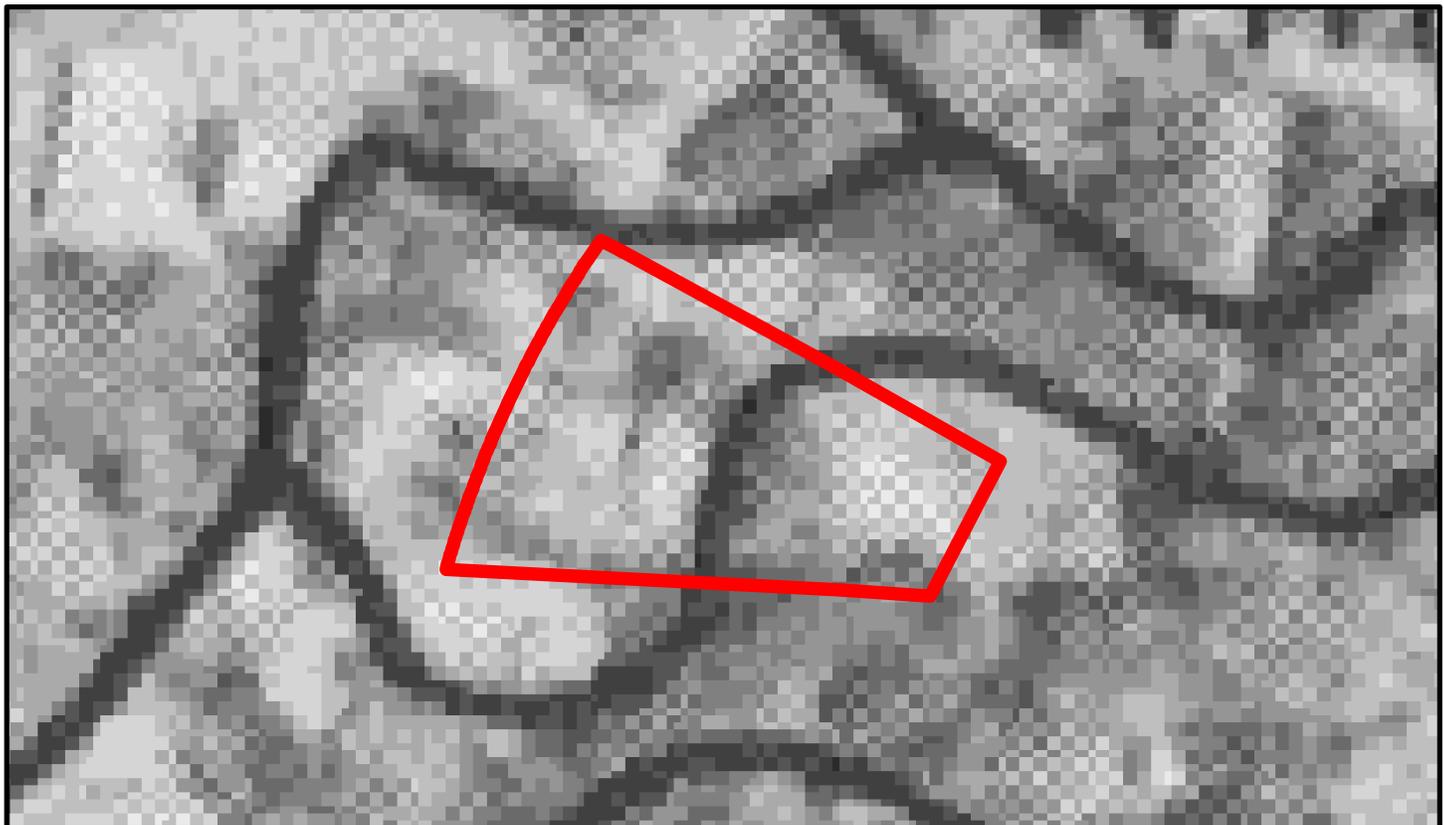
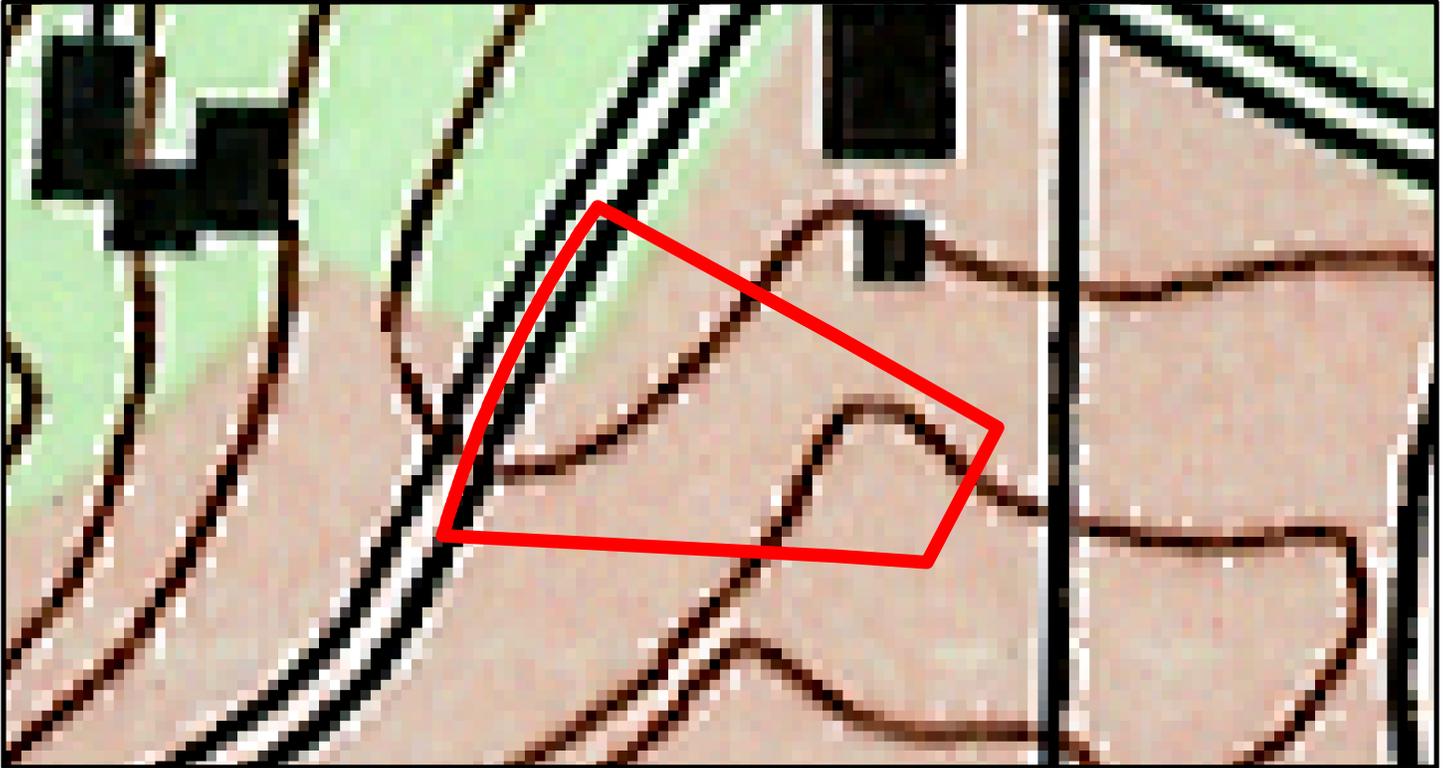
0 30 60 90 120 Feet

Parcel ID: 9788-41-9609



1 inch = 125 feet

Created by Town of Chapel Hill Public Works Department - Stormwater Management Division- 8/29/2016





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STORMWATER MANAGEMENT DIVISION**

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REQUEST FOR STREAM DETERMINATION

Stream determinations provide information used to determine whether the Town's Resource Conservation District (RCD) or Jordan Watershed Riparian Buffer Protection regulations apply to a property. Town staff will typically conduct a field visit to classify streams on the property(ies) indicated below within two weeks of a request, depending on weather conditions, staff availability, and scope of the request. Please note that stream determinations cannot be conducted within 48 hours of a rain event. There is no fee for stream determinations conducted by Town staff.

A stream determination report indicates the results of a stream classification. Stream classifications expire after five years. If a stream determination has been completed on or near the property(ies) listed below within the last five years, a site visit may not be required unless local hydrology has changed significantly or the stream classification has expired. If a site visit is not required, the stream determination will be based on a records review.

Requests may be emailed (dmilkereit@townofchapelhill.org), faxed, dropped off at Town Hall or the Stormwater Office, or mailed to the above address in care of the "Stormwater Specialist."

Requestor's Name: Coulter Jewell Thames, PA - Andrew Porter, RLA
Mailing Address: 111 West Main Street
City, State, ZIP: Durham, NC 27701
Phone / FAX / Email: 919-682-0368 / andrew.porter@cjtpa.com

Check method(s) for report to be sent: US Mail Email FAX Call for pickup

Signature of property owner or designated legal agent granting permission to Town Staff to enter the property(ies) indicated below for purposes of a Stream Determination:

Ken Gorfkle (Signature) 8/29/14 (Date)

Owner Name(s): Ken Gorfkle (Please print)

Property Information	
Fill in both columns, or fill in Parcel ID Number (PIN) and attach a site map indicating location.	
Parcel ID Number (PIN)	Address / Location Description
9788419609	111 Purefoy Road, Chapel Hill, NC 27514 / Purefoy Road Apartments

Where the total area of the property(ies) to visit is over 3 acres, please attach an as-built drawing or a topographic map with current landmarks.

From: [Andrew Porter](#)
To: "[Becky McDonnell](#)"
Cc: "[Ken Gorfkle](#)"; [Dan Jewell](#); "[Judy Johnson](#)"
Subject: RE: 111 Purefoy Meeting
Date: Friday, May 6, 2016 11:22:00 AM

Thanks Becky.

Andy Porter, RLA
Project Manager

Coulter Jewell Thames, PA

111 West Main Street
Durham, NC 27701
phone: 919-682-0368
fax: 919-688-5646

From: Becky McDonnell [<mailto:rmcdonnell@townofchapelhill.org>]
Sent: Friday, May 6, 2016 10:17 AM
To: Ken Gorfkle <kgorfkle@bellsouth.net>; Dan Jewell <djewell@cjtpa.com>; Andrew Porter <andrew.porter@cjtpa.com>; Judy Johnson <jjohnson@townofchapelhill.org>
Subject: RE: 111 Purefoy Meeting

Great, it's in the calendar for Thursday, May 19 at 11:15am. It will be held in the first floor conference room at Town Hall.

Thanks,
Becky

From: Ken Gorfkle [<mailto:kgorfkle@bellsouth.net>]
Sent: Thursday, May 05, 2016 7:28 PM
To: Becky McDonnell <rmcdonnell@townofchapelhill.org>; Dan Jewell <djewell@cjtpa.com>; Andrew Porter <andrew.porter@cjtpa.com>; Judy Johnson <jjohnson@townofchapelhill.org>
Subject: Re: 111 Purefoy Meeting

Hi, Becky,
Yes, Thursday May 19 at 11:15 works; Andy and I will be there.
Thanks,
Ken

From: Becky McDonnell <rmcdonnell@townofchapelhill.org>
Date: Thursday, May 5, 2016 at 4:12 PM

To: Ken Gorfkle <kgorfkle@bellsouth.net>

Subject: 111 Purefoy Meeting

Hi Ken,

I spoke with Judy about this project, and the earliest we can schedule you is Thursday, May 19 at 11:15am. Let me know if that works for you. If not, the next slots are on Tuesday the 24th at 1:30pm or Wednesday the 25th at 1:00pm.

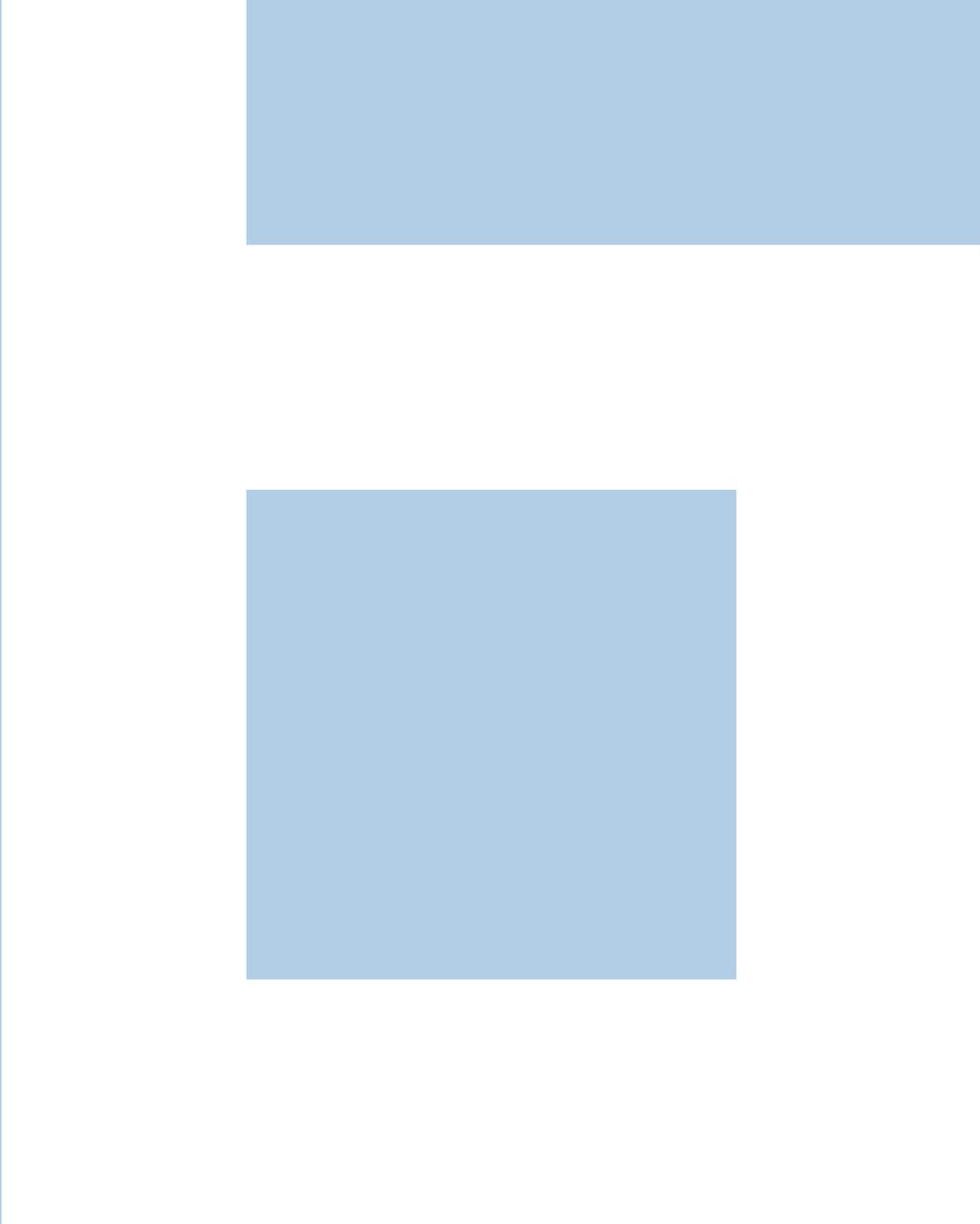
Becky



Rebecca McDonnell, Planner I

Development Services Division | Planning and Sustainability
405 Martin Luther King Jr Blvd. | Chapel Hill NC 27514

Town of Chapel Hill | www.townofchapelhill.org
t: 919-968-2982 | rmcdonnell@townofchapelhill.org



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**SITE PLAN REVIEW
APPLICATION**



TOWN OF CHAPEL HILL
Planning Department
405 Martin Luther King Jr. Blvd
phone (919) 968-2728 fax (919) 969-2014
www.townofchapelhill.org

Parcel Identifier Number (PIN): 9788419609

Date: 10-10-2016

Section A: Project Information

Project Name: Purefoy Road Apartments

Property Address: 111 Purefoy Road Zip Code: 27514

Use Groups (A, B, and/or C): A Existing Zoning District: R-4 Medium Density Residential

Project Description: Renovation / Addition of existing one story ~~duplex~~ building and addition of two new duplex buildings to the property.

Section B: Applicant, Owner and/or Contract Purchaser Information

Applicant Information (to whom correspondence will be mailed)

Name: Coulter Jewell Thames, PA - Andrew Porter

Address: 111 West Main Street

City: Durham State: NC Zip Code: 27701

Phone: (919) 682-0368 Email: andrew.porter@cjtpa.com

The undersigned applicant hereby certifies that, to the best of his knowledge and belief, all information supplied with this application is true and accurate.

Signature: *Andrew Porter* Date: 10-10-2016

Owner/Contract Purchaser Information:

Owner

Contract Purchaser

Name: Ken Gorfkle

Address: 1436 Poinsett Drive

City: Chapel Hill State: NC Zip Code: 27517

Phone: (919) 942-1467 Email: kgorfkle@bellsouth.net

The undersigned applicant hereby certifies that, to the best of his knowledge and belief, all information supplied with this application is true and accurate.

Signature: *Ken Gorfkle* Date: 8/24/16



PROJECT FACT SHEET
TOWN OF CHAPEL HILL
Planning Department

Section A: Project Information

Application type: Site Plan review Date: 10/10/2016

Project Name: Purefoy Road Apartments

Use Type: (check/list all that apply)

Office/Institutional Residential Mixed-Use Other: Multi-Family

Overlay District: (check all those that apply)

Historic District Neighborhood Conservation District Airport Hazard Zone

Section B: Land Area

Net Land Area (NLA): Area within zoning lot boundaries		NLA=	56,805.72	sq. ft.
Choose one, or both, of the following (a or b,) not to exceed 10% of NLA	a) Credited Street Area (total adjacent frontage) x ½ width of public right-of-way	CSA=	2,805	sq. ft.
	b) Credited Permanent Open Space (total adjacent frontage) x ½ public or dedicated open space	COS=	N/A	sq. ft.
TOTAL: NLA + CSA and/or COS = Gross Land Area (not to exceed NLA + 10%)		GLA=	59,610.72	sq. ft.

Section C: Special Protection Areas, Land Disturbance, and Impervious Area

Special Protection Areas: (check all those that apply)

Jordan Buffer Resource Conservation District 100 Year Floodplain Watershed Protection District

Land Disturbance	Total (sq ft)
Area of Land Disturbance (Includes: Footprint of proposed activity plus work area envelope, staging area for materials, access/equipment paths, all grading, including off-site clearing)	53,281SF
Area of Land Disturbance within RCD	N/A
Area of Land Disturbance within Jordan Buffer	N/A

Impervious Areas	Existing (sq ft)	Demolition (sq ft)	Proposed (sq ft)	Total (sq ft)
Impervious Surface Area (ISA)	5,746	3,110	16,306	18,942
Impervious Surface Ratio: Percent Impervious Surface Area of Gross Land Area (ISA/NET) %	10.12%	5.47%	28.70%	33.34%
If located in Watershed Protection District, % of impervious surface on 7/1/1993	10.12%	5.47%	28.70%	33.34%



PROJECT FACT SHEET
TOWN OF CHAPEL HILL
Planning Department

Section D: Dimensions

Dimensional Unit (sq ft)	Existing (sq ft)	Demolition (sq ft)	Proposed (sq ft)	Total (sq ft)
Number of Buildings	1	0	2	3
Number of Floors	1	0	3	3
Recreational Space	N/A	N/A	Payment-in-lieu	Payment-in-lieu

Residential Space				
Dimensional Unit (sq ft)	Existing (sq ft)	Demolition (sq ft)	Proposed (sq ft)	Total (sq ft)
Floor Area (all floors – heated and unheated)	2,470	0	11,025	13,495
Total Square Footage of All Units	2,470	0	11,025	13,495
Total Square Footage of Affordable Units	N/A	N/A	N/A	N/A
Total Residential Density	0.77	0	3.08	3.85
Number of Dwelling Units	1	0	4	5
Number of Affordable Dwelling Units	N/A	N/A	N/A	N/A
Number of Single Bedroom Units	N/A	N/A	N/A	N/A
Number of Two Bedroom Units	N/A	N/A	N/A	N/A
Number of Three Bedroom Units	N/A	N/A	N/A	N/A

Non-Residential Space (Gross Floor Area in Square Feet)					
Use Type	Existing	Proposed	Uses	Existing	Proposed
Commercial					
Restaurant			# of Seats		
Government					
Institutional					
Medical					
Office					
Hotel			# of Rooms		
Industrial					
Place of Worship			# of Seats		
Other					

Dimensional Requirements		Required by Ordinance	Existing	Proposed
Setbacks (minimum)	Street	50'	72' from ex. ROW	50' from ex. ROW
	Interior (neighboring property lines)	25'	38'	25'
	Solar (northern property line)	9'	96'	32'
Height (maximum)	Primary	30'	20'	30'
	Secondary	30'	20'	30'
Streets	Frontages	40'	187	220
	Widths	50'	230	230



PROJECT FACT SHEET
TOWN OF CHAPEL HILL
Planning Department

Section F: Adjoining or Connecting Streets and Sidewalks

(Note: For approval of proposed street names, contact the Engineering Department)

Street Name	Right-of-way Width	Pavement Width	Number of Lanes	Existing Sidewalk*	Existing curb/gutter
Purefoy Road	45'	19.5' Varries	2	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
				<input type="checkbox"/> Yes	<input type="checkbox"/> Yes

List Proposed Points of Access (Ex: Number, Street Name):

*If existing sidewalks do not exist and the applicant is adding sidewalks, please provide the following information:

Sidewalk Information			
Street Names	Dimensions	Surface	Handicapped Ramps
Purefoy Road	220 LF	Asphalt	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
			<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Section G: Parking Information

Parking Spaces	Minimum	Maximum	Proposed
Regular Spaces	9	12	12
Handicap Spaces	1	1	1
Total Spaces	10	13	13
Loading Spaces	N/A	N/A	N/A
Bicycle Spaces	2	N/A	2
Surface Type	Asphalt		

Section H: Landscape Buffers

Location (North, South, Street, Etc.)	Minimum Width	Proposed Width	Alternate Buffer	Modify Buffer
North (R4-R4(Church))	20'	10'	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes
West (Purefoy Road)(collector street)	20'	20'	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
South (R4-R4/R-LD1)	10'	10'	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
East (R4-R-LD1)	10'	10'	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes



PROJECT FACT SHEET
 TOWN OF CHAPEL HILL
 Planning Department

Section I: Land Use Intensity

Existing Zoning District:
 Proposed Zoning Change (if any):

Note: Refer to Table 3.8-1 (Dimensional Matrix) in the Land Use Management Ordinance for help completing this table.

Zoning – Area – Ratio			Impervious Surface Thresholds			Minimum and Maximum Limitations	
Zoning District(s)	Floor Area Ratio (FAR)	Recreation Space Ratio (RSR)	Low Density Residential (0.24)	High Density Residential (0.50)	Non-Residential (0.70)	Maximum Floor Area (MFA) = FAR x GLA	Minimum Recreation Space (MSR) = RSR x GLA
R-4	.230	.039	N/A	29,805.36 SF	N/A	13,710.47 SF	2,325 SF
TOTAL	13,495 SF	2,325 SF					
RCD Streamside	N/A	0.01	N/A				N/A
RCD Managed	N/A	0.019	N/A				N/A
RCD Upland	N/A	N/A					N/A

Section J: Utility Service

Check all that apply

Water	<input checked="" type="checkbox"/> OWASA	<input type="checkbox"/> Individual Well	<input type="checkbox"/> Community Well	<input type="checkbox"/> Other
Sewer	<input checked="" type="checkbox"/> OWASA	<input type="checkbox"/> Individual Septic Tank	<input type="checkbox"/> Community Package Plant	<input type="checkbox"/> Other
Electrical	<input checked="" type="checkbox"/> Underground	<input type="checkbox"/> Above Ground		
Telephone	<input checked="" type="checkbox"/> Underground	<input type="checkbox"/> Above Ground		
Solid Waste	<input checked="" type="checkbox"/> Town	<input type="checkbox"/> Private		



**SITE PLAN REVIEW APPLICATION
SUBMITTAL REQUIREMENTS
TOWN OF CHAPEL HILL
Planning Department**

The following must accompany your application. Failure to do so will result in your application being considered incomplete. For assistance with this application, please contact the Chapel Hill Planning Department (Planning) at (919)968-2728 or at planning@townofchapelhill.org. For detailed information, please refer to the Description of Detailed Information handout.

X	Application fee (including Engineering Review fee) (refer to fee schedule)	Amount Paid \$ See attached
X	Pre-application meeting – with appropriate staff	
X	Digital Files - provide digital files of all plans and documents	
X	Recorded Plat or Deed of Property	
X	Project Fact Sheet	
N/A	Traffic Impact Statement – completed by Town’s consultant (or exemption)	
X	Mailing list of owners of property within 1,000 feet perimeter of subject property (see GIS notification tool)	
Y	Mailing fee for above mailing list (mailing fee is double due to 2 mailing)	Amount Paid \$ \$99.20
Y	Written Narrative describing the proposal	
Y	Resource Conservation District, Floodplain, & Jordan Buffers Determination - necessary for all submittals	
N/A	Jurisdictional Wetland Determination – if applicable	
N/A	Resource Conservation District Encroachment Exemption or Variance (determined by Planning)	
N/A	Jordan Buffer Authorization Certificate or Mitigation Plan Approval (determined by Planning)	
X	Reduced Site Plan Set (reduced to 8.5"x11")	

Stormwater Impact Statement (1 copy to be submitted)

- a) Written narrative describing existing & proposed conditions, anticipated stormwater impacts and management structures and strategies to mitigate impacts
- b) Description of land uses and area (in square footage)
- c) Existing and proposed Impervious surface area in square feet for all subareas and project area
- d) Ground cover and uses information
- e) Soil information (classification, infiltration rates, depth to groundwater and bedrock)
- f) Time of concentration calculations and assumptions
- g) Topography (2-foot contours)
- h) Pertinent on-site and off-site drainage conditions
- i) Upstream and/or downstream volumes
- j) Discharges and velocities
- k) Backwater elevations and effects on existing drainage conveyance facilities
- l) Location of jurisdictional wetlands and regulatory FEMA Special Flood Hazard Areas
- m) Water quality volume calculations
- n) Drainage areas and sub-areas delineated
- o) Peak discharge calculations and rates (1, 2, and 25-year storms)
- p) Hydrographs for pre- & post-development without mitigation, post-development with mitigation
- q) Volume calculations and documentation of retention for 2-year storm
- r) 85% TSS removal for post-development stormwater run-off



**SITE PLAN REVIEW APPLICATION
SUBMITTAL REQUIREMENTS
TOWN OF CHAPEL HILL
Planning Department**

- s) Nutrient loading calculations
- t) BMP sizing calculations
- u) Pipe sizing calculations and schedule (include HGL & EGL calculations and profiles)

Plan Sets (10 copies to be submitted no larger than 24"x36")

Plans should be legible and clearly drawn. All plan sets sheets should include the following:

- Project Name
- Legend
- Labels
- North Arrow (North oriented toward top of page)
- Property Boundaries with bearing and distances
- Scale (Engineering), denoted graphically and numerically
- Setbacks
- Streams, RCD Boundary, Jordan Riparian Buffer Boundary, Floodplain, and Wetlands Boundary, where applicable
- Revision dates and professional seals and signatures, as applicable

Area Map

- a) Project name, applicant, contact information, location, PIN, & legend
- b) Dedicated open space, parks, greenways
- c) Overlay Districts, if applicable
- d) Property lines, zoning district boundaries, land uses, project names of site and surrounding properties, significant buildings, corporate limit lines
- e) Existing roads (public & private), rights-of-way, sidewalks, driveways, vehicular parking areas, bicycle parking, handicapped parking, street names.
- f) 1,000' notification boundary

Existing Conditions Plan

- a) Slopes, soils, environmental constraints, existing vegetation, and any existing land features
- b) Location of all existing structures and uses
- c) Existing property line and right-of-way lines
- d) Existing utilities & easements including location & sizes of water, sewer, electrical, & drainage lines
- e) Nearest fire hydrants
- f) Nearest bus shelters and transit facilities
- g) Existing topography at minimum 2-foot intervals and finished grade
- h) Natural drainage features & water bodies, floodways, floodplain, RCD, Jordan Buffers, & Watershed boundaries



Detailed Site Plan

- a) Existing and proposed building locations
- b) Description & analysis of adjacent land uses, roads, topography, soils, drainage patterns, environmental constraints, features, existing vegetation, vistas (on & off-site)
- c) Location, arrangement, & dimension of vehicular parking, width of aisles and bays, angle of parking, number of spaces, handicapped parking, bicycle parking . Typical pavement sections & surface type
- d) Location of existing and proposed fire hydrants
- e) Location and dimension of all vehicle entrances, exits, and drives
- f) Dimensioned street cross-sections and rights-of-way widths
- g) Pavement and curb & gutter construction details
- h) Dimensioned sidewalk and tree lawn cross-sections
- i) Proposed transit improvements including bus pull-off and/or bus shelter
- j) Required landscape buffers (or proposed alternate/modified buffers)
- k) Required recreation area/space (including written statement of recreation plans)
- l) Refuse collection facilities (existing and proposed) or shared dumpster agreement
- m) Construction parking, staging, storage area, and construction trailer location
- n) Sight distance triangles at intersections
- o) Proposed location of street lights and underground utility lines and/or conduit lines to be installed
- p) Easements
- q) Clearing and construction limits
- r) Traffic Calming Plan – detailed construction designs of devices proposed & associated sign & marking plan

Stormwater Management Plan

- a) Topography (2-foot contours)
- b) Existing drainage conditions
- c) RCD and Jordan Riparian Buffer delineation and boundary (perennial & intermittent streams, note ephemeral streams on site)
- d) Proposed drainage and stormwater conditions
- e) Drainage conveyance system (piping)
- f) Roof drains
- g) Easements
- h) BMP plans, dimensions, details, and cross-sections
- i) Planting and stabilization plans and specifications

Landscape Protection Plan

- a) Rare, specimen, and significant tree survey within 50 feet of construction area
- b) Rare and specimen tree critical root zones
- c) Rare and specimen trees proposed to be removed
- d) Certified arborist tree evaluation, if applicable



- e) Significant tree stand survey
- f) Clearing limit line
- g) Proposed tree protection /silt fence location
- h) Pre-construction/demolition conference note
- j) Landscape protection supervisor note
- k) Existing and proposed tree canopy calculations, if applicable

Planting Plan

- a) Dimensioned and labeled perimeter landscape bufferyard
- b) Off-site buffer
- c) Landscape buffer and parking lot planting plan (including planting strip between parking and building, entryway planting, and 35% shading requirement)

Steep Slope Plan

- a) Classify and quantify slopes 0-10%, 10-15%, 15-25% and 25% and greater
- b) Show and quantify areas of disturbance in each slope category
- c) Provide/show specialized site design and construction techniques

Grading and Erosion Control Plan

- a) Topography (2-foot contours)
- b) Limits of Disturbance
- c) Pertinent off-site drainage features
- d) Existing and proposed impervious surface tallies

Streetscape Plan, if applicable

- a) Public right-of-way existing conditions plan
- b) Streetscape demolition plan
- c) Streetscape proposed improvement plan
- d) Streetscape proposed utility plan and details
- e) Streetscape proposed pavement/sidewalk details
- f) Streetscape proposed furnishing details
- g) Streetscape proposed lighting details



Solid Waste Plan

- a) Preliminary Solid Waste Management Plan
- b) Existing and proposed dumpster pads
- c) Proposed dumpster pad layout design
- d) Proposed heavy duty pavement locations and pavement construction detail
- e) Preliminary Shared dumpster agreement, if applicable

Construction Management Plan

- a) Construction trailer location
- b) Location of construction personnel parking and construction equipment parking
- c) Location and size of staging and materials storage area
- d) Description of emergency vehicle access to and around project site during construction
- e) Delivery truck routes shown or noted on plan sheets

Energy Management Plan

- a) Description of how project will be 20% more energy efficient than ASHRAE Standards
- b) Description of utilization of sustainable forms of energy (Solar, Wind, Hydroelectric, and Biofuels)
- c) Participation in NC GreenPower program
- d) Description of how project will ensure indoor air quality, adequate access to natural lighting, and allow for proposed utilization of sustainable energy
- e) Description of how project will maintain commitment to energy efficiency and reduced carbon footprint over time
- f) Description of how the project's Transportation Management Plan will support efforts to reduce energy consumption as it affects the community

Exterior Elevations

- a) An outline of each elevation of the building, including the finished grade line along the foundation (height of building measured from mean natural grade).



**PUREFOY ROAD APARTMENTS
SITE PLAN APPLICATION**

STORMWATER IMPACT STATEMENT

**PIN #
9788-41-9609**



**Calculations By: Andrew B. Wilson, EI
Checked By: Bryan M. Dick, PE, PH**

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NC Board of Engineers & Surveyors License No. P-1368**

**October 10, 2016
Revised:**

Project Description and Summary

The Purefoy Road Apartments Project is located at 111 Purefoy Road, Chapel Hill, NC 27514. The project involves one building addition to an existing residence, construction of two new duplexes, concrete sidewalks, and paved driveways and parking spaces. Calculations for peak discharge, runoff volume, and water quality treatment for all of the proposed improvements are provided.

The Purefoy Road Apartments site is currently zoned R-4 Medium Density Residential. Soils on the site include Appling-Urban Land Complex (hydrologic soil group B), and Wedowee (hydrologic soil group B). The proposed site is located in the Cape Fear River Basin within the Jordan Lake watershed protection district.

Per the Town of Chapel Hill stormwater ordinance, the stormwater runoff rate leaving the site under post-development conditions may not exceed the stormwater runoff rate under pre-development conditions for the 1-year, 2-year, and 25-year storms. The additional runoff volume from the pre-development to post-development conditions for the 2-year storm must also be captured on-site.

Methodology

- The Orange County Soil Survey is used to identify the soil types located on the site.
- HydroCAD software is used to calculate pre- and post-development peak flow rates and volumes for each sub-basin. HydroCAD uses the SCS TR-20 method to develop hydrographs.
- HydroCAD software is used to calculate the composite curve number for each sub-basin. HydroCAD uses the NRCS TR-55 method for calculation composite curve numbers.

Discussion of Results

Q1/Q2/Q25:

For the peak discharge calculations, the 1.3 acre site was analyzed as two basins. Based on the existing topography, Basin 1 drains to the southwest and Basin 2 drains to the southeast. Because of the small size of the site, the minimum time of concentration is assumed to be 5.0 minutes for the pre- and post-development conditions. As a result of the proposed improvements, there is an increase in impervious surface of approximately 13,196 sf. There is an increase in runoff from the 1-year, 2-year, and 25-year storms in both Basin 1 and Basin 2 as a result of proposed development. A bioretention area is proposed to provide attenuation.

With the addition of the Bioretention Area to Basin 2, all runoff is detained from the 1-year, 2-year, and 25-year storms.

2-yr Runoff Volume:

Per the Town of Chapel Hill Design Manual, “the post-development stormwater runoff rate leaving the site shall not exceed the pre-development (existing conditions) stormwater runoff rate leaving the site for the local 1-year, 2-year, and 25-year storm events.” In addition, “the post-development stormwater runoff volume leaving the site shall not exceed the pre-development (existing conditions) stormwater runoff volume leaving the site for the local 2-year frequency, 24-hour duration storm event.” The stormwater runoff volume for the site under pre-development conditions was calculated to be 2,396 cf and the post-development volume was calculated to be 5,793 cf. Because there is an increase of 3,398 cf, stormwater control measures are proposed to provide detention. The proposed bioretention area provides 2,052 cf of storage above the filter layer. The proposed storage outlet pipes and outlet structure provide an additional 1,034 cf of storage for a total of 3,086 cf of storage. While this is slightly less than the required storage volume of 3,398 cf, this number is arrived at conservatively without accounting for the storage capacity of the bioretention filter media itself. Accounting for void space in the filter media above the internal water storage, the bioretention filter media provides approximately 994 cf of storage. In addition, it should be noted that the 1,034 cf of storage reported from HydroCAD for the underground pipe retention reflects the storage at the peak stage. However, of 4,549 cf of runoff flowing into the bioretention area during the 2-year storm, 2,052 cf is captured in the 1st BMP in series (the bioretention area) and it throttles back the peak flows so that only 0.31 cfs is leaving the BMP at the point in time in which the 2nd BMP in the series (the pipe storage) begins to fill. A 1” drain orifice from the pipe storage allows some outflow and the timing of the flows does not reflect that there is 2,281 cf of available storage volume within the underground pipe retention, a 935 cf excess over the required volume. By also considering the availability of the storage within the filter media, the proposed BMP exceeds the required storage volume by 1,929 cf, even considering the timing of flows and effects of routing through BMPs in series. The proposed configuration has been analyzed with multiple iterations and reflects that best balance of retaining the 2 year, providing a means to slowly drain and recover the storage volume, and managing the peak flows during the 25 year.

85% TSS Removal:

The Town of Chapel Hill Design Manual states that BMP’s shall be designed to remove 85% average total suspended solids from the post-development stormwater runoff.

As mentioned above, the proposed project results in an increase in impervious surface of approximately 13,196 sf. As a result a BMP must be installed to treat for 85% TSS removal for the additional impervious surface added.

In order to meet this requirement, a bioretention area with internal water storage is proposed for on-site Basin #2. The total drainage area to the Bioretention Area was

calculated to be 36,458 sf. Of this area, approximately 16,634 sf of impervious surface will be treated. Since the amount of impervious surface draining to the bioretention area is greater than the proposed increase in impervious surface, the requirement for treating the runoff from all added impervious surface for 85% TSS removal is met.

Calculations for the bioretention area are included.

Drawdown:

For the first inch of rainfall, the water elevation in the bioretention area is 423.10' with the surface elevation being 423'. Using a 1"/hr media infiltration rate, the drawdown for the first inch of rainfall will be 1.2 hr. For the 2-year storm, the peak elevation of the water in the pipe storage outlet structure is 420.6' and occurs at hour 17.58. The elevation returns to 418.0' at hour 34.0. Therefore, the drawdown for the 2-year storm event is 16.42 hr. These drawdown times are very low because of the small amount of water in the bioretention system during the first inch and 2-year storm. Also, should the orifice from the pipe storage outlet structure be made smaller to increase drawdown time, it would increase the probability of clogging.

Buoyancy:

Buoyancy calculations for the downstream outlet structure have been provided. The calculations assumed that the water level would be at the top of the structure. Comparing the displaced weight to the weight of the concrete structure there is a factor of safety of 1.01. The assumed water elevation for this calculation is very conservative because according to the Seasonal High Water Table Determination, the Seasonal High Water Table is greater than 98 inches below the bottom of the outlet structure.

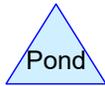
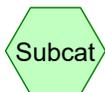
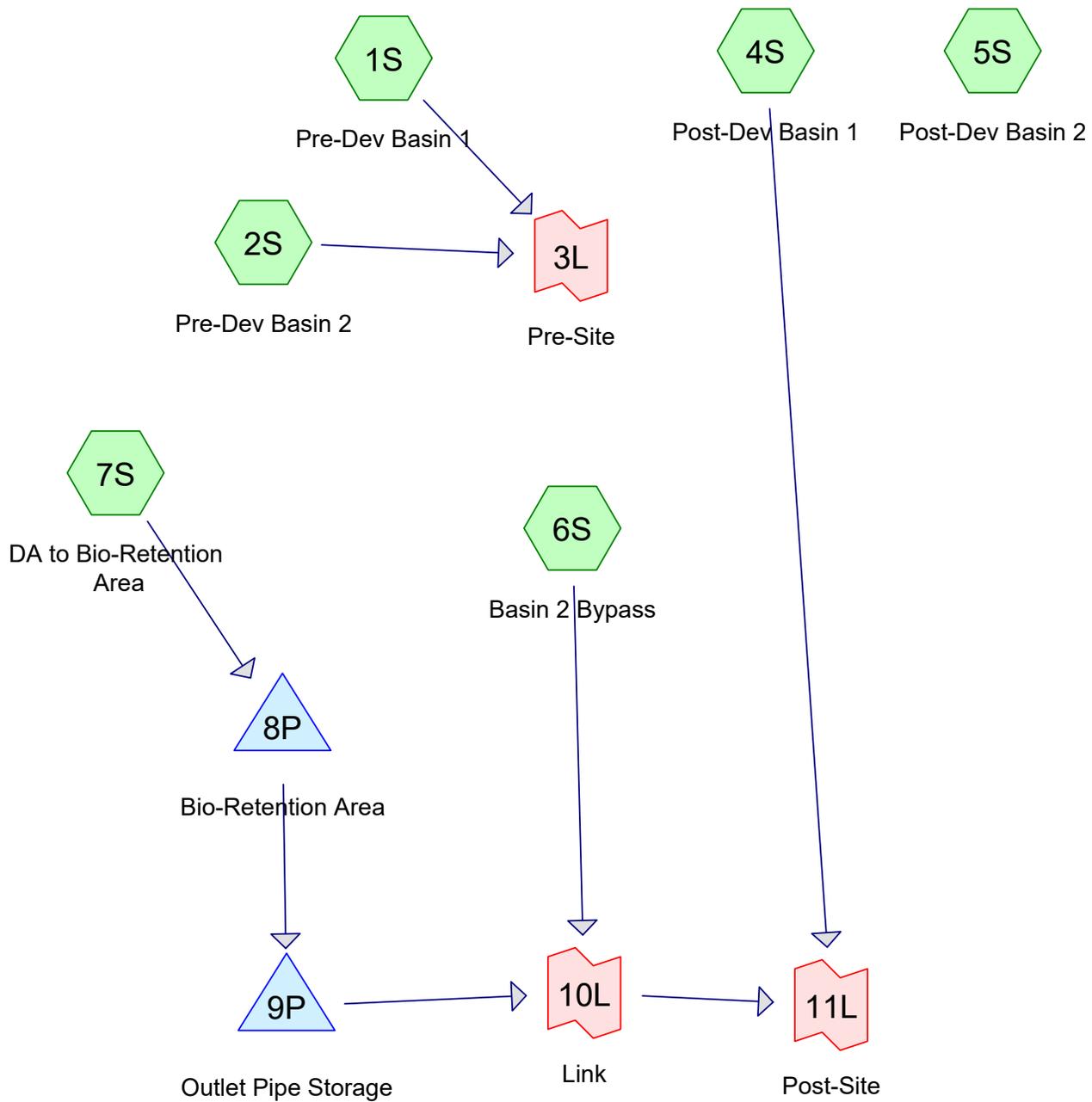
Conclusion:

Because the increase in impervious surfaces as a result of this project resulted in an increase in peak flow for the 1-year, 2-year, and 25-year storms, and in runoff volume for the 2-year storm, detention and treatment are proposed in the form of a bioretention area. The bioretention area is also proposed to treat the added impervious surface for 85% TSS removal as required by the Town of Chapel Hill's Stormwater Rules.

**STORMWATER PEAK RUNOFF
CALCULATIONS**

Run-off Summary

Drainage Basin	Pre-Dev						Post-Dev						Percentage Increase			Remark
	Tc	Area	CN	Q1	Q2	Q25	Tc	Area	CN	Q1	Q2	Q25	Q1	Q2	Q25	
	min	ac		cfs	cfs	cfs	min	ac		cfs	cfs	cfs	%	%	%	
Basin 1	5.0	0.35	58	0.11	0.23	1.14	5.0	0.35	67	0.35	0.53	1.66	218.2	130.4	45.6	DETENTION REQUIRED
Basin 2	5.0	0.95	60	0.41	0.79	3.37	5.0	0.95	76	2.14	2.88	6.95	422.0	264.6	106.2	DETENTION REQUIRED
Basin 2 - To Bioretention							5.0	0.84	78	0.03	0.04	2.85				
Basin 2 - Bypass Bioretention							5.0	0.12	61	0.06	0.11	0.43				
Basin 2 -Combined Hydrograph								0.95		0.06	0.11	3.03	-85.4	-86.1	-10.1	
Total Combined Hydrograph		1.30		0.52	1.02	4.51		1.30		0.41	0.64	4.05	-21.2	-37.3	-10.2	



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1" Rainfall=1.00"

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Summary for Subcatchment 1S: Pre-Dev Basin 1

[45] Hint: Runoff=Zero

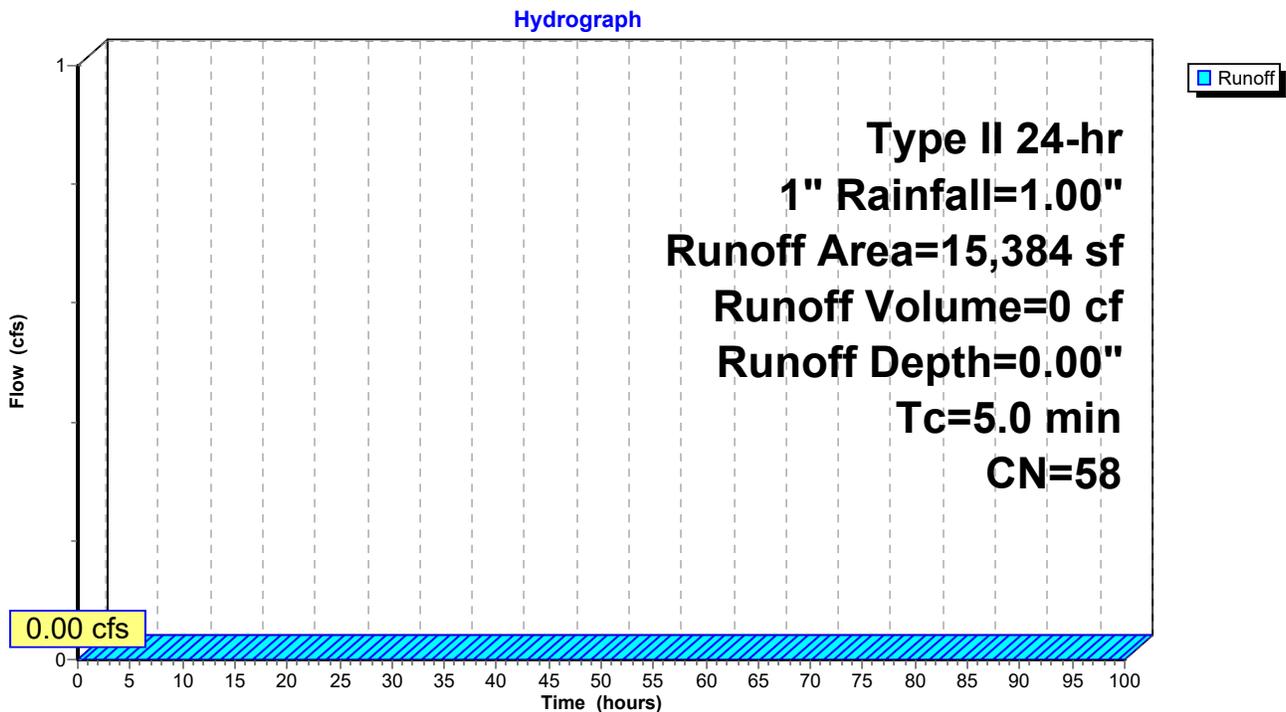
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
897	98	Roofs, HSG B
* 166	98	Sidewalk, HSG B
14,321	55	Woods, Good, HSG B
15,384	58	Weighted Average
14,321		93.09% Pervious Area
1,063		6.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5

Subcatchment 1S: Pre-Dev Basin 1



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1" Rainfall=1.00"

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Summary for Subcatchment 2S: Pre-Dev Basin 2

[45] Hint: Runoff=Zero

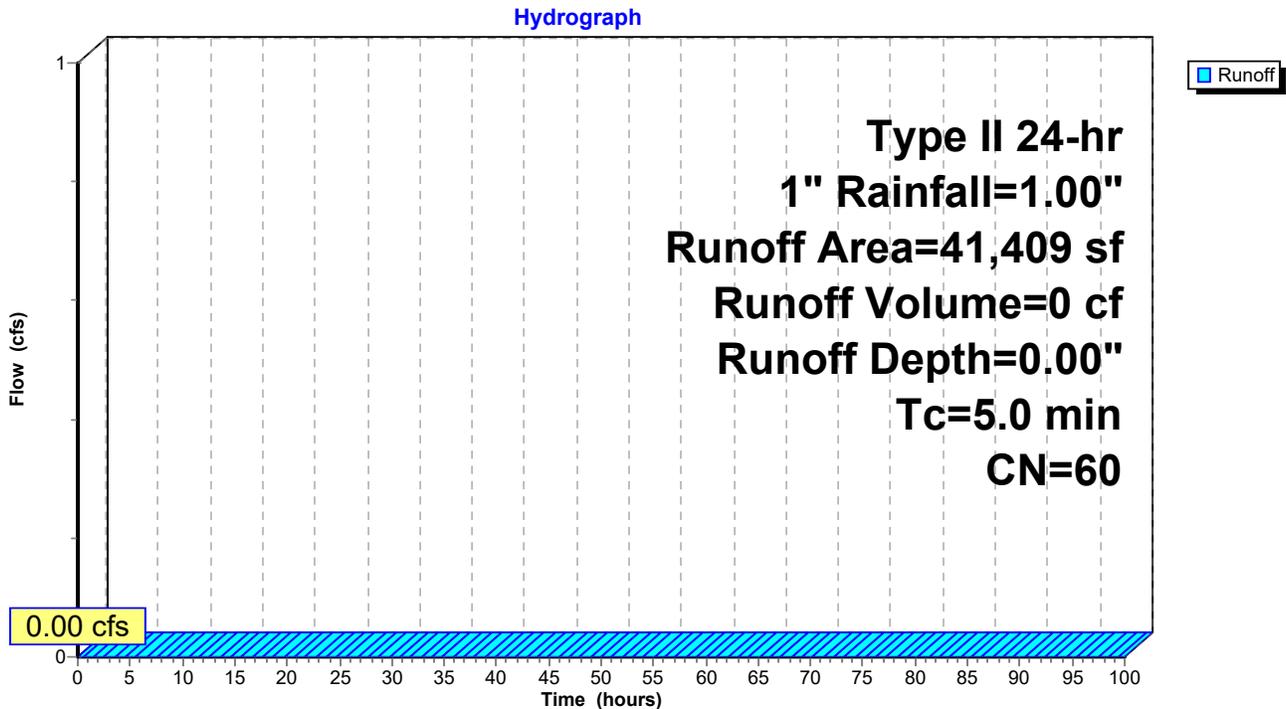
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
1,885	98	Roofs, HSG B
* 2,512	98	Paved Parking, HSG B
* 286	98	Sidewalks, HSG B
36,726	55	Woods, Good, HSG B
41,409	60	Weighted Average
36,726		88.69% Pervious Area
4,683		11.31% Impervious Area

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

Subcatchment 2S: Pre-Dev Basin 2



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1" Rainfall=1.00"

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Summary for Subcatchment 4S: Post-Dev Basin 1

Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0 cf, Depth= 0.00"

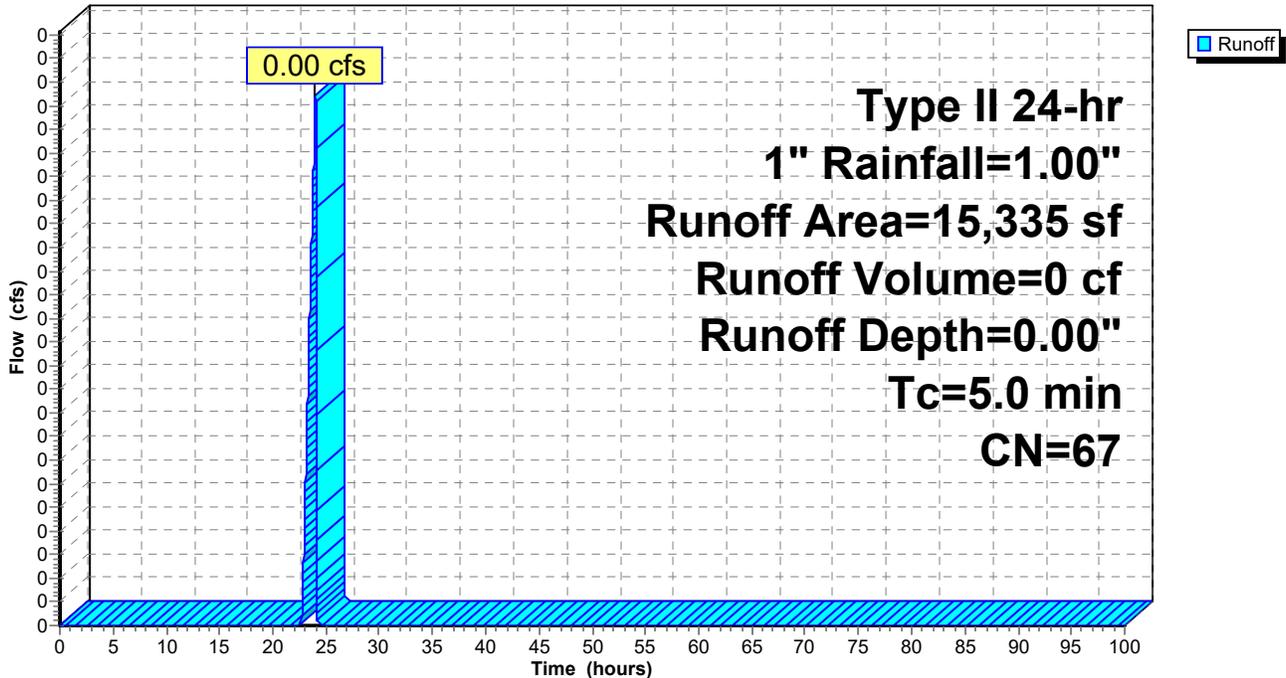
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
1,360	98	Roofs, HSG B
0	98	Paved parking, HSG B
* 948	98	Sidewalk, HSG B
13,027	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
15,335	67	Weighted Average
13,027		84.95% Pervious Area
2,308		15.05% Impervious Area

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

Subcatchment 4S: Post-Dev Basin 1

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1" Rainfall=1.00"

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Summary for Subcatchment 5S: Post-Dev Basin 2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

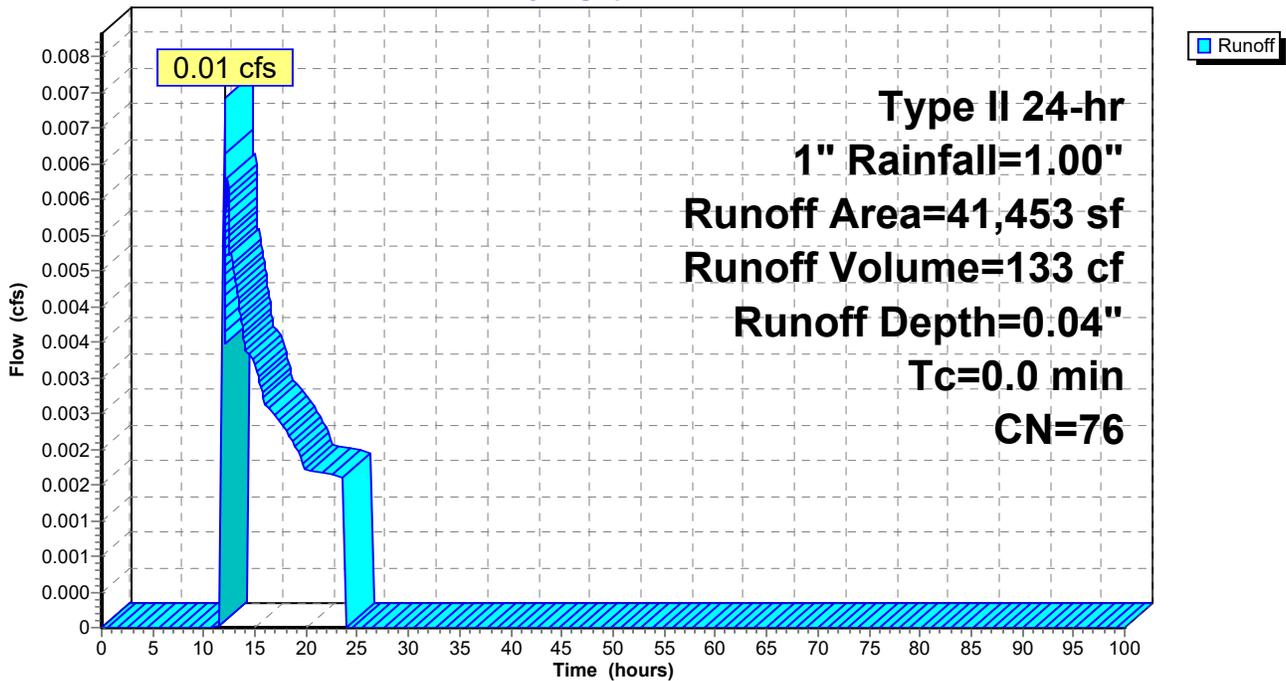
Runoff = 0.01 cfs @ 11.98 hrs, Volume= 133 cf, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
5,004	98	Roofs, HSG B
9,921	98	Paved parking, HSG B
* 1,709	98	Sidewalk, HSG B
24,819	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
41,453	76	Weighted Average
24,819		59.87% Pervious Area
16,634		40.13% Impervious Area

Subcatchment 5S: Post-Dev Basin 2

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1" Rainfall=1.00"

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Summary for Subcatchment 6S: Basin 2 Bypass

[45] Hint: Runoff=Zero

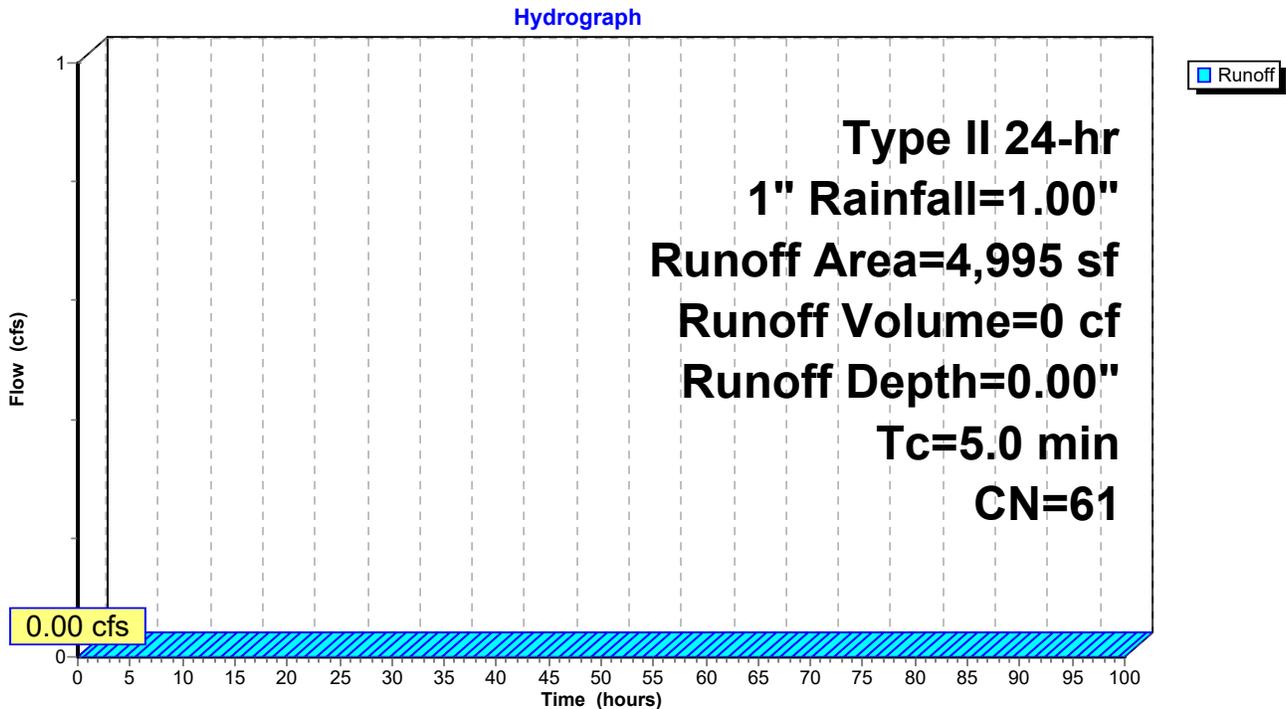
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
0	98	Roofs, HSG B
0	98	Paved parking, HSG B
0	98	Paved parking, HSG B
4,995	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
4,995	61	Weighted Average
4,995		100.00% Pervious Area

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

Subcatchment 6S: Basin 2 Bypass



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1" Rainfall=1.00"

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Summary for Subcatchment 7S: DA to Bio-Retention Area

Runoff = 0.03 cfs @ 12.02 hrs, Volume= 177 cf, Depth= 0.06"

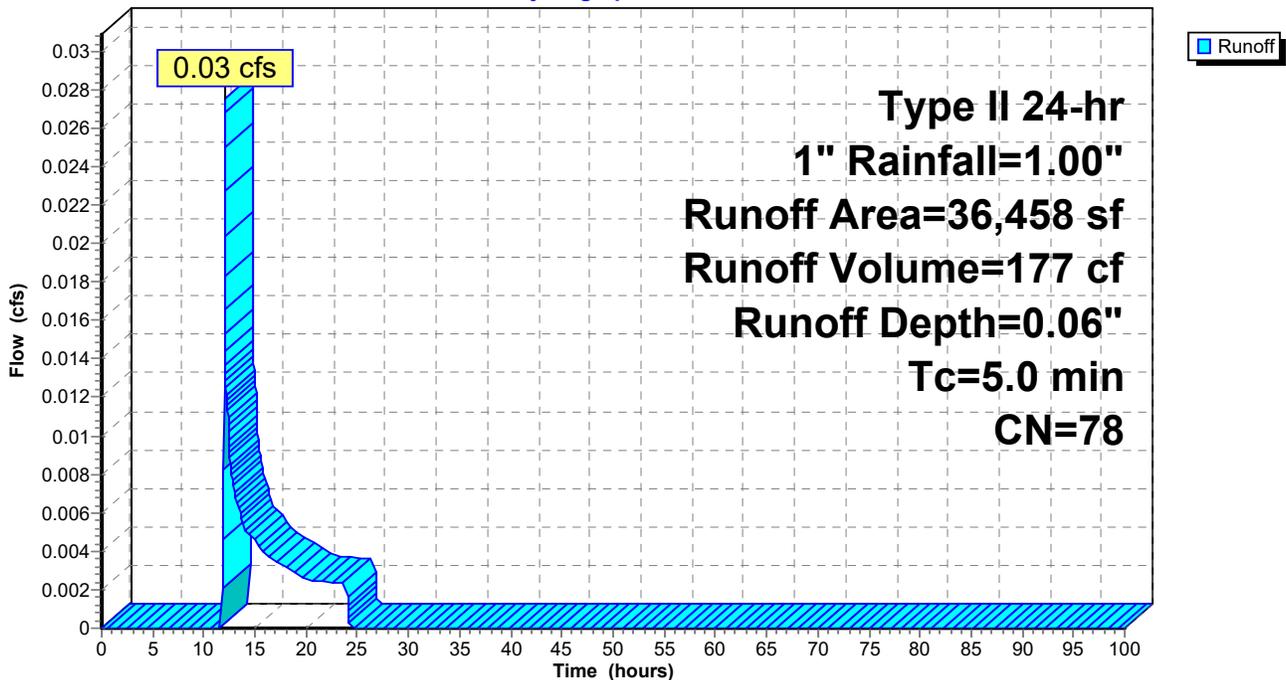
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
5,004	98	Roofs, HSG B
9,921	98	Paved parking, HSG B
* 1,709	98	Sidewalk, HSG B
19,824	61	>75% Grass cover, Good, HSG B
36,458	78	Weighted Average
19,824		54.37% Pervious Area
16,634		45.63% Impervious Area

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

Subcatchment 7S: DA to Bio-Retention Area

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1" Rainfall=1.00"

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Summary for Pond 8P: Bio-Retention Area

Inflow Area = 36,458 sf, 45.63% Impervious, Inflow Depth = 0.06" for 1" event
 Inflow = 0.03 cfs @ 12.02 hrs, Volume= 177 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 423.10' @ 24.29 hrs Surf.Area= 1,823 sf Storage= 177 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	4,668 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

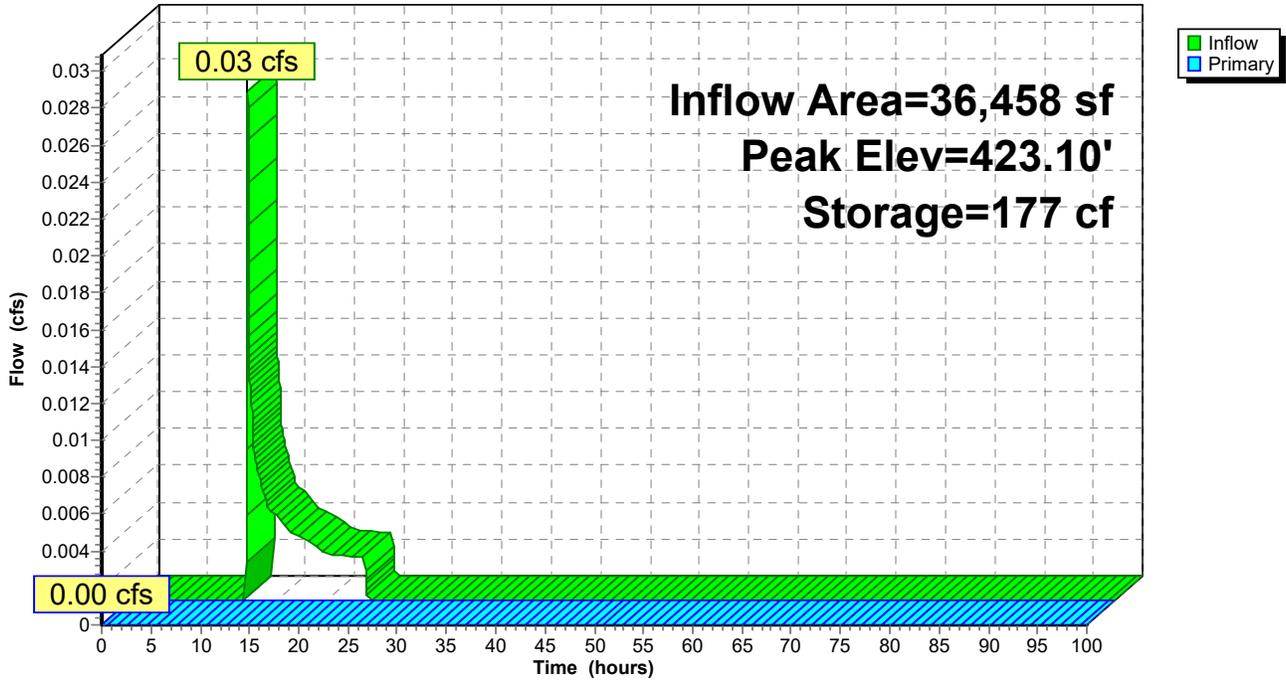
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	1,767	0	0
424.00	2,337	2,052	2,052
424.50	2,612	1,237	3,289
425.00	2,902	1,379	4,668

Device	Routing	Invert	Outlet Devices
#1	Primary	424.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
 ↑1=Orifice/Grate (Controls 0.00 cfs)

Pond 8P: Bio-Retention Area

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1" Rainfall=1.00"

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Summary for Pond 9P: Outlet Pipe Storage

Inflow Area = 36,458 sf, 45.63% Impervious, Inflow Depth = 0.00" for 1" event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 418.00' @ 0.00 hrs Surf.Area= 49 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	418.50'	138 cf	5.00'W x 5.50'L x 5.00'H Prismatoid
#2	418.00'	113 cf	36.0" Round RCP_Round 36" L= 16.0' S= 0.0300 1'
#3	418.00'	294 cf	7.00'W x 7.00'L x 6.00'H Prismatoid
#4	418.00'	1,782 cf	66.0" Round RCP_Round 66" L= 75.0' S= 0.0050 1'
		2,326 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	418.00'	1.0" Vert. Orifice/Grate C= 0.600
#2	Primary	421.00'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
#3	Primary	423.50'	5.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=418.00' (Free Discharge)

- 1=Orifice/Grate (Controls 0.00 cfs)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Purefoy Rd - Peak Flow Analysis_10-9-16

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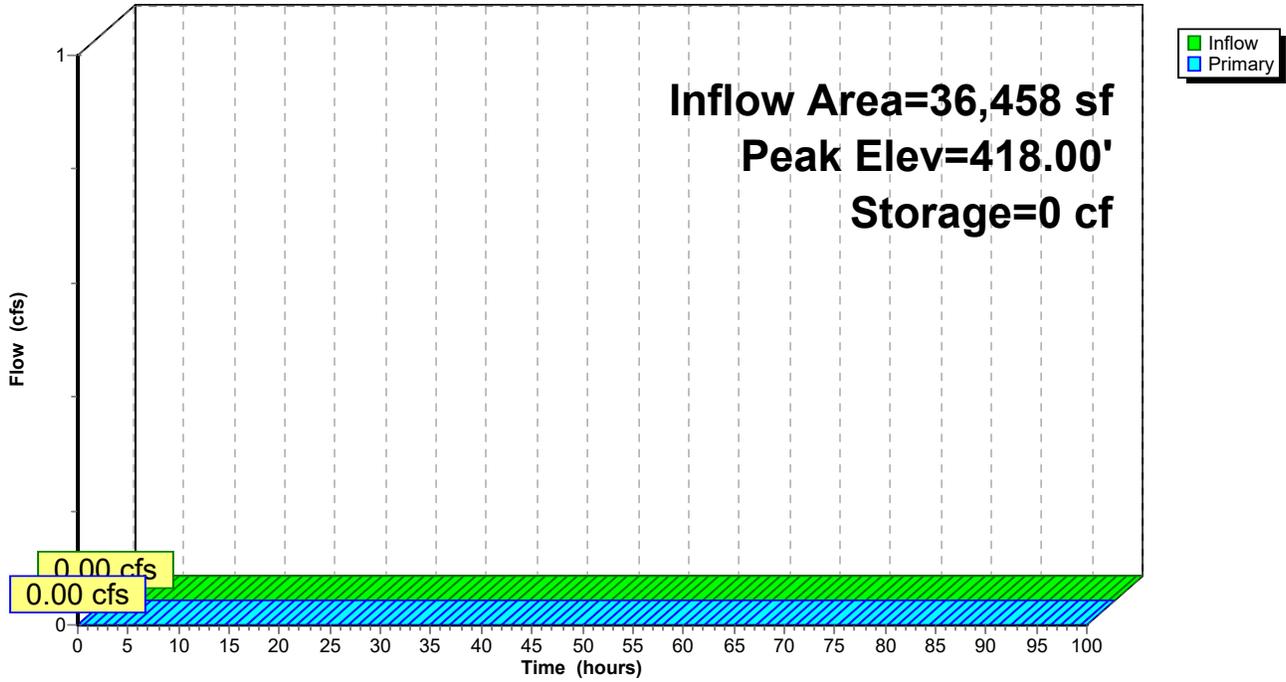
Type II 24-hr 1" Rainfall=1.00"

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Pond 9P: Outlet Pipe Storage

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1" Rainfall=1.00"

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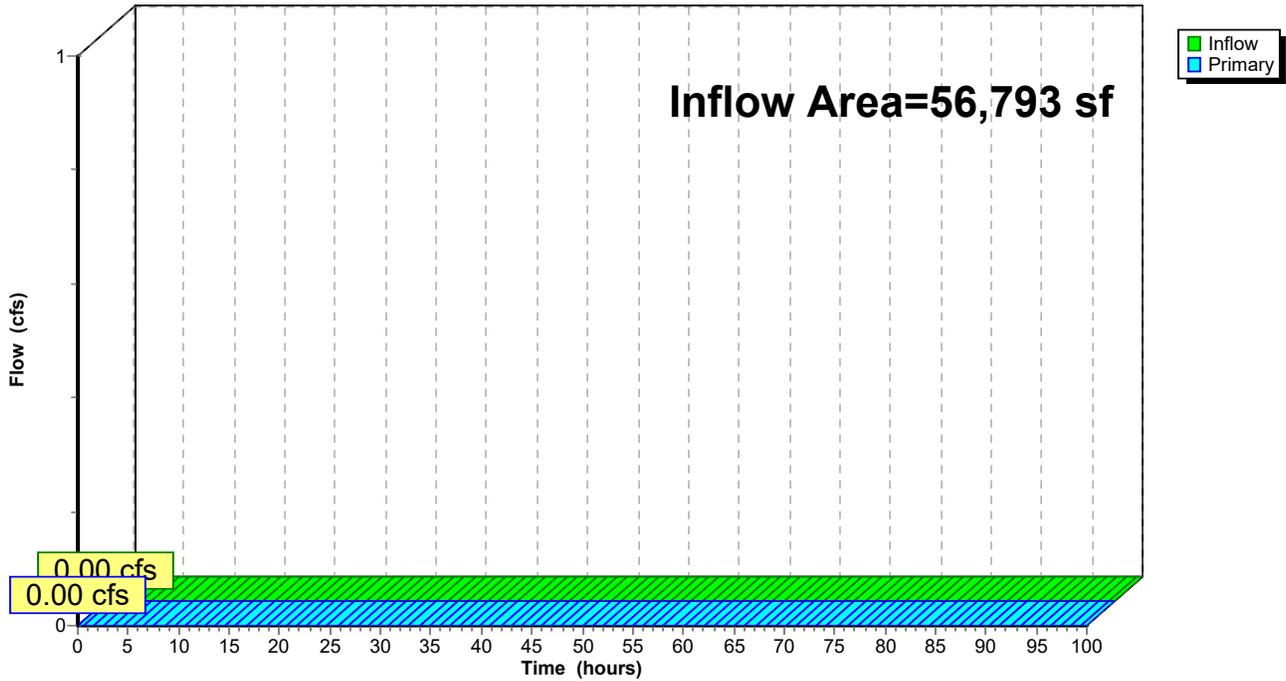
Summary for Link 3L: Pre-Site

Inflow Area = 56,793 sf, 10.12% Impervious, Inflow Depth = 0.00" for 1" event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 3L: Pre-Site

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1" Rainfall=1.00"

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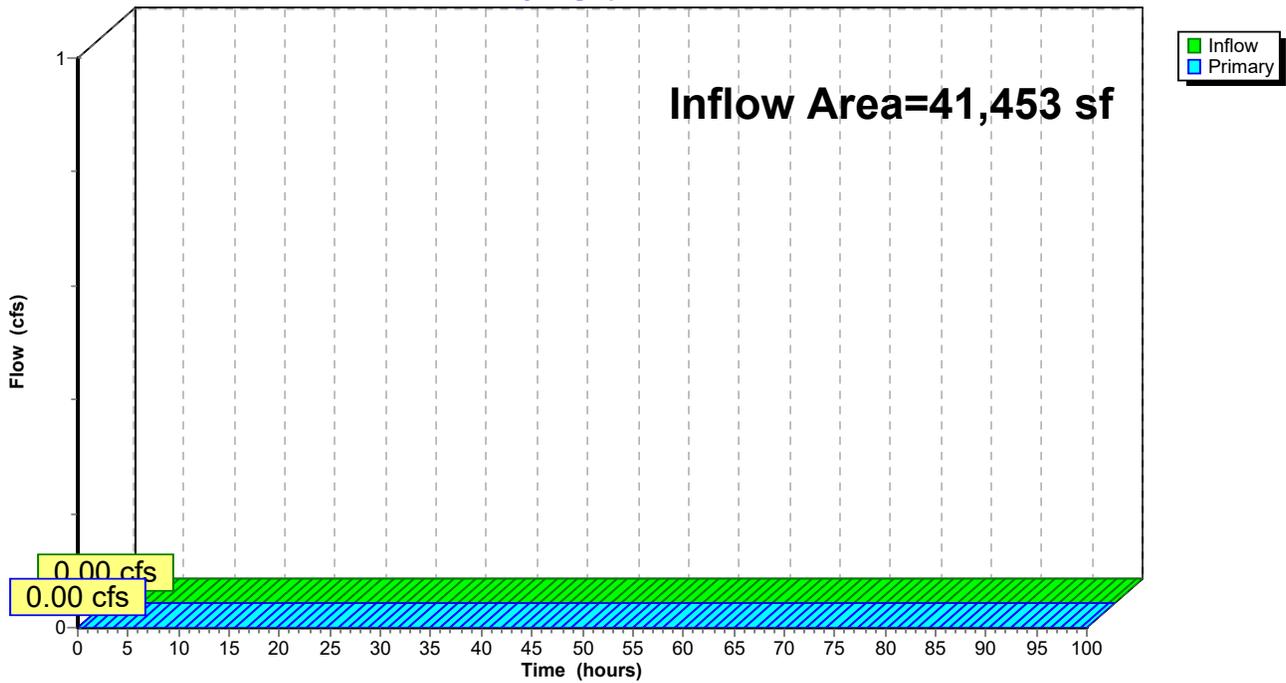
Summary for Link 10L: Link

Inflow Area = 41,453 sf, 40.13% Impervious, Inflow Depth = 0.00" for 1" event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 10L: Link

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

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Type II 24-hr 1" Rainfall=1.00"

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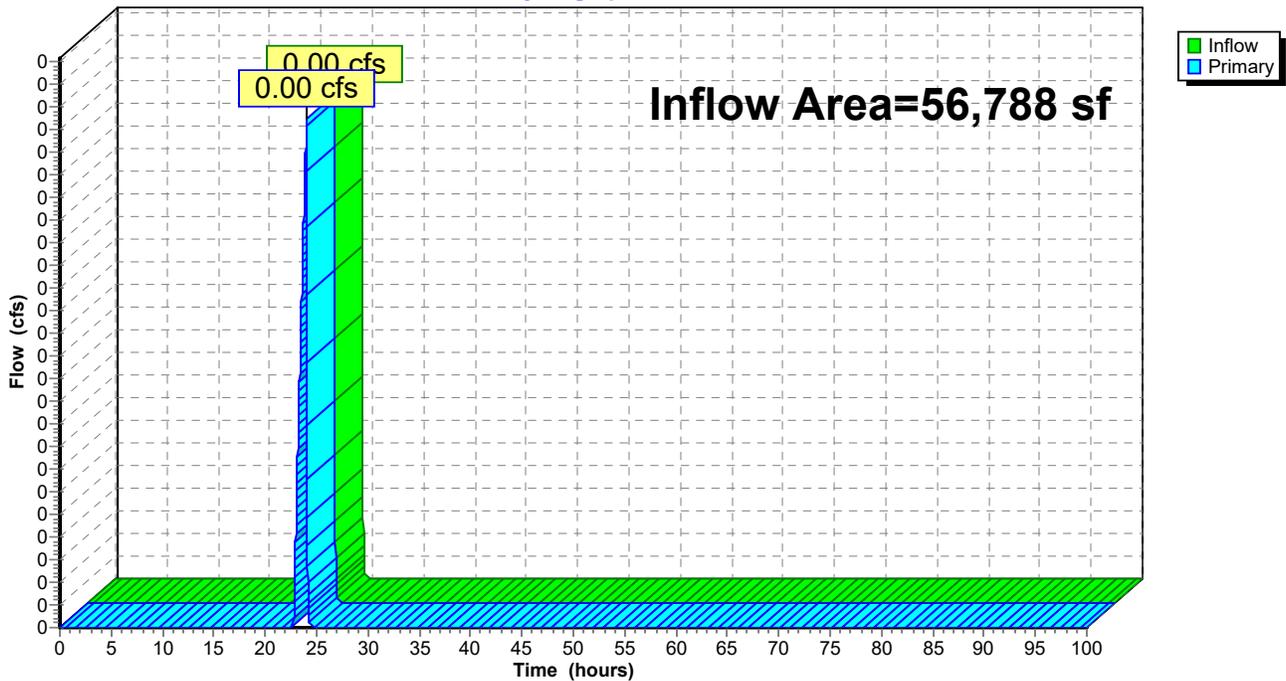
Summary for Link 11L: Post-Site

Inflow Area = 56,788 sf, 33.36% Impervious, Inflow Depth = 0.00" for 1" event
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 24.01 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Post-Site

Hydrograph





Pre-Dev Basin 1



Post-Dev Basin 1



Post-Dev Basin 2



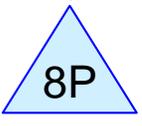
Pre-Dev Basin 2



Pre-Site



DA to Bio-Retention Area



Bio-Retention Area



Outlet Pipe Storage



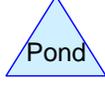
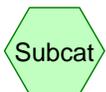
Basin 2 Bypass



Link



Post-Site



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1-Year Rainfall=3.00"

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Summary for Subcatchment 1S: Pre-Dev Basin 1

Runoff = 0.11 cfs @ 12.00 hrs, Volume= 351 cf, Depth= 0.27"

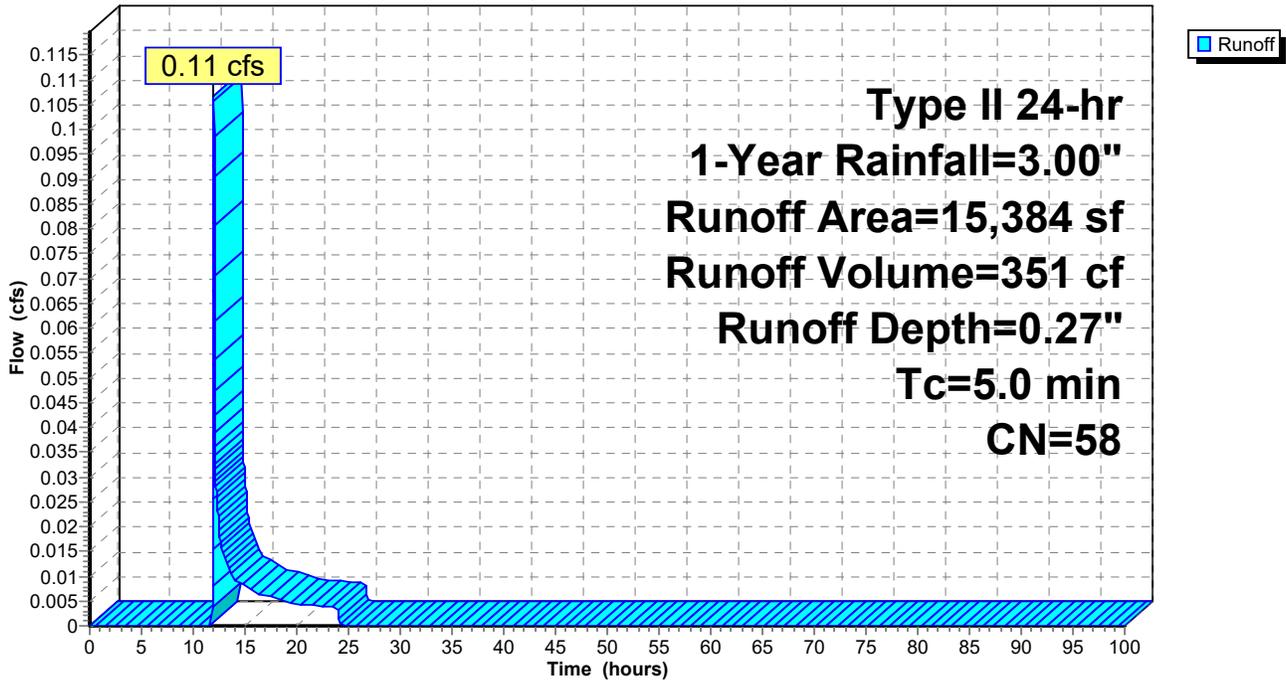
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=3.00"

Area (sf)	CN	Description
897	98	Roofs, HSG B
* 166	98	Sidewalk, HSG B
14,321	55	Woods, Good, HSG B
15,384	58	Weighted Average
14,321		93.09% Pervious Area
1,063		6.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5

Subcatchment 1S: Pre-Dev Basin 1

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1-Year Rainfall=3.00"

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Summary for Subcatchment 2S: Pre-Dev Basin 2

Runoff = 0.41 cfs @ 11.99 hrs, Volume= 1,150 cf, Depth= 0.33"

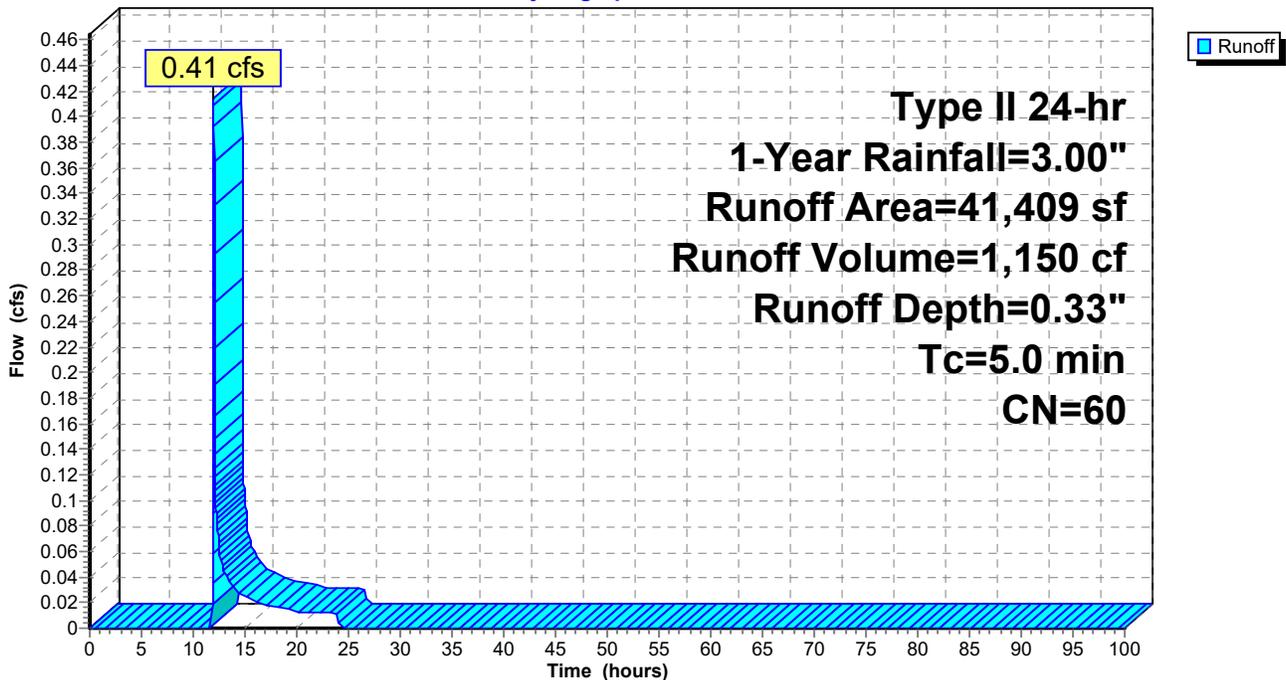
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=3.00"

	Area (sf)	CN	Description
	1,885	98	Roofs, HSG B
*	2,512	98	Paved Parking, HSG B
*	286	98	Sidewalks, HSG B
	36,726	55	Woods, Good, HSG B
	41,409	60	Weighted Average
	36,726		88.69% Pervious Area
	4,683		11.31% Impervious Area

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

Subcatchment 2S: Pre-Dev Basin 2

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1-Year Rainfall=3.00"

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Summary for Subcatchment 4S: Post-Dev Basin 1

Runoff = 0.35 cfs @ 11.98 hrs, Volume= 748 cf, Depth= 0.58"

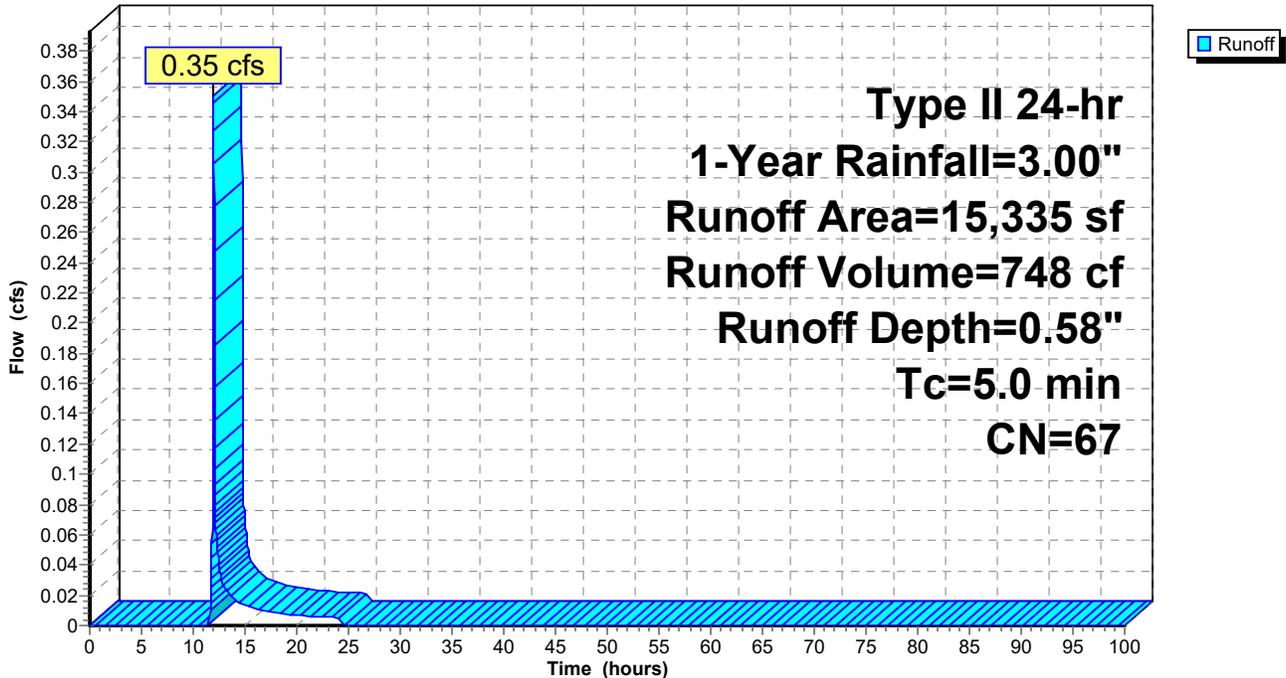
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=3.00"

Area (sf)	CN	Description
1,360	98	Roofs, HSG B
0	98	Paved parking, HSG B
* 948	98	Sidewalk, HSG B
13,027	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
15,335	67	Weighted Average
13,027		84.95% Pervious Area
2,308		15.05% Impervious Area

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

Subcatchment 4S: Post-Dev Basin 1

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1-Year Rainfall=3.00"

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Summary for Subcatchment 5S: Post-Dev Basin 2

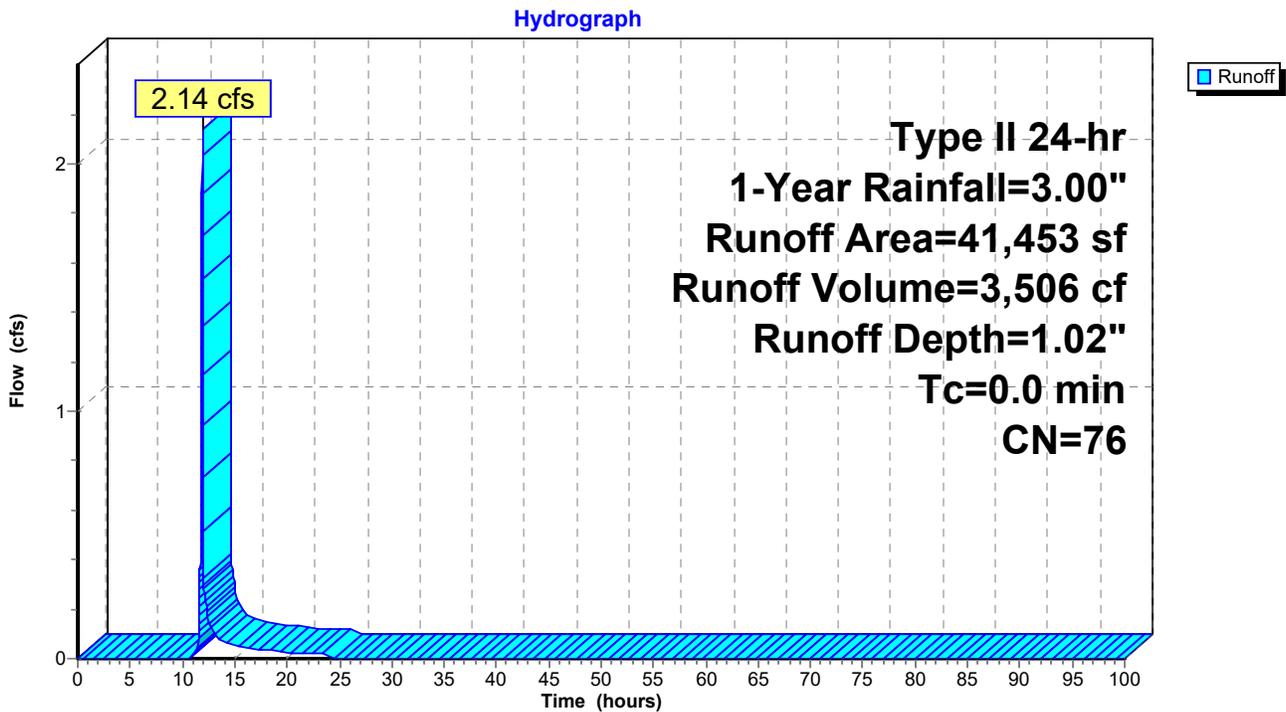
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.14 cfs @ 11.90 hrs, Volume= 3,506 cf, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=3.00"

Area (sf)	CN	Description
5,004	98	Roofs, HSG B
9,921	98	Paved parking, HSG B
* 1,709	98	Sidewalk, HSG B
24,819	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
41,453	76	Weighted Average
24,819		59.87% Pervious Area
16,634		40.13% Impervious Area

Subcatchment 5S: Post-Dev Basin 2



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1-Year Rainfall=3.00"

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Summary for Subcatchment 6S: Basin 2 Bypass

Runoff = 0.06 cfs @ 11.99 hrs, Volume= 152 cf, Depth= 0.37"

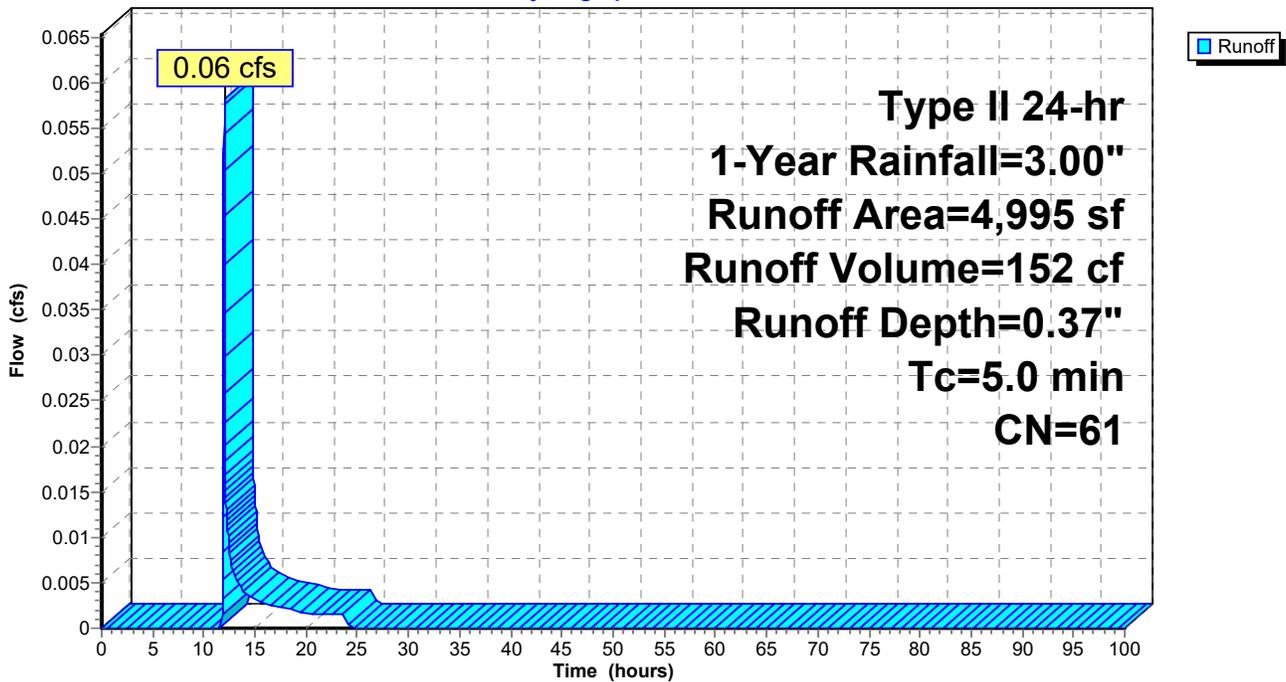
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=3.00"

Area (sf)	CN	Description
0	98	Roofs, HSG B
0	98	Paved parking, HSG B
0	98	Paved parking, HSG B
4,995	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
4,995	61	Weighted Average
4,995		100.00% Pervious Area

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

Subcatchment 6S: Basin 2 Bypass

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1-Year Rainfall=3.00"

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Summary for Subcatchment 7S: DA to Bio-Retention Area

Runoff = 1.76 cfs @ 11.97 hrs, Volume= 3,430 cf, Depth= 1.13"

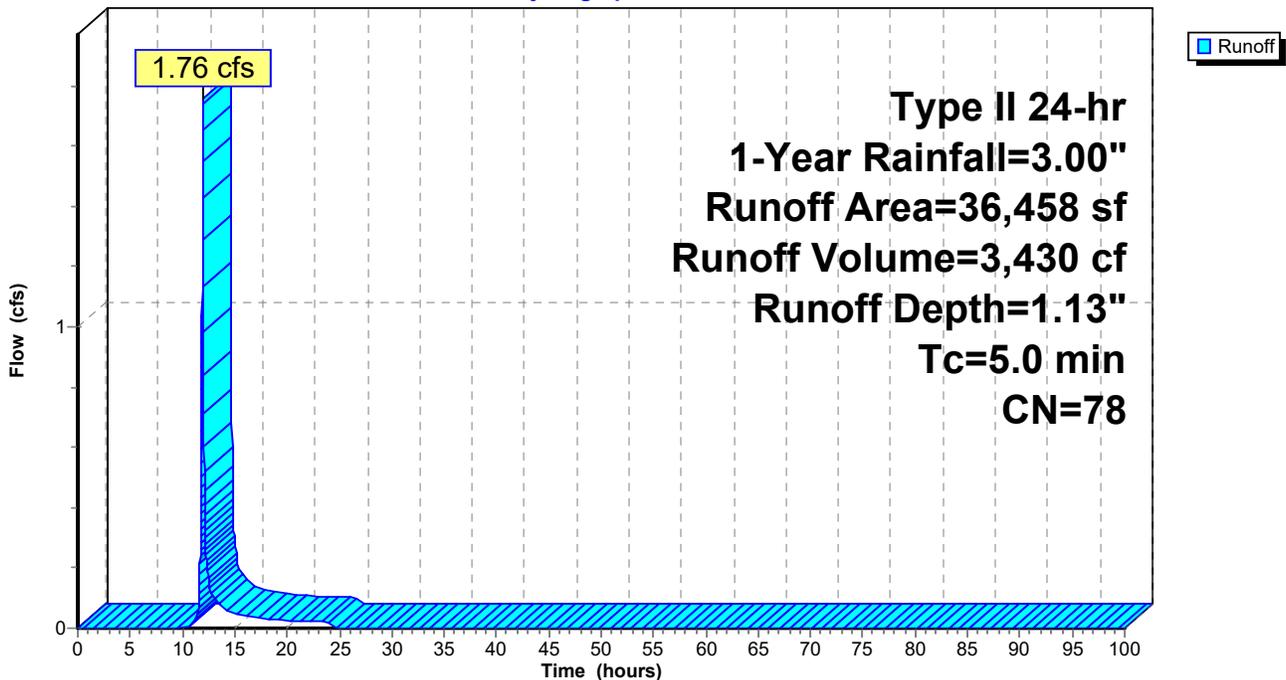
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=3.00"

Area (sf)	CN	Description
5,004	98	Roofs, HSG B
9,921	98	Paved parking, HSG B
* 1,709	98	Sidewalk, HSG B
19,824	61	>75% Grass cover, Good, HSG B
36,458	78	Weighted Average
19,824		54.37% Pervious Area
16,634		45.63% Impervious Area

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

Subcatchment 7S: DA to Bio-Retention Area

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1-Year Rainfall=3.00"

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Summary for Pond 8P: Bio-Retention Area

Inflow Area = 36,458 sf, 45.63% Impervious, Inflow Depth = 1.13" for 1-Year event
 Inflow = 1.76 cfs @ 11.97 hrs, Volume= 3,430 cf
 Outflow = 0.08 cfs @ 13.41 hrs, Volume= 1,378 cf, Atten= 95%, Lag= 86.4 min
 Primary = 0.08 cfs @ 13.41 hrs, Volume= 1,378 cf

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 424.01' @ 13.41 hrs Surf.Area= 2,343 sf Storage= 2,078 cf

Plug-Flow detention time= 327.5 min calculated for 1,377 cf (40% of inflow)
 Center-of-Mass det. time= 191.3 min (1,039.8 - 848.5)

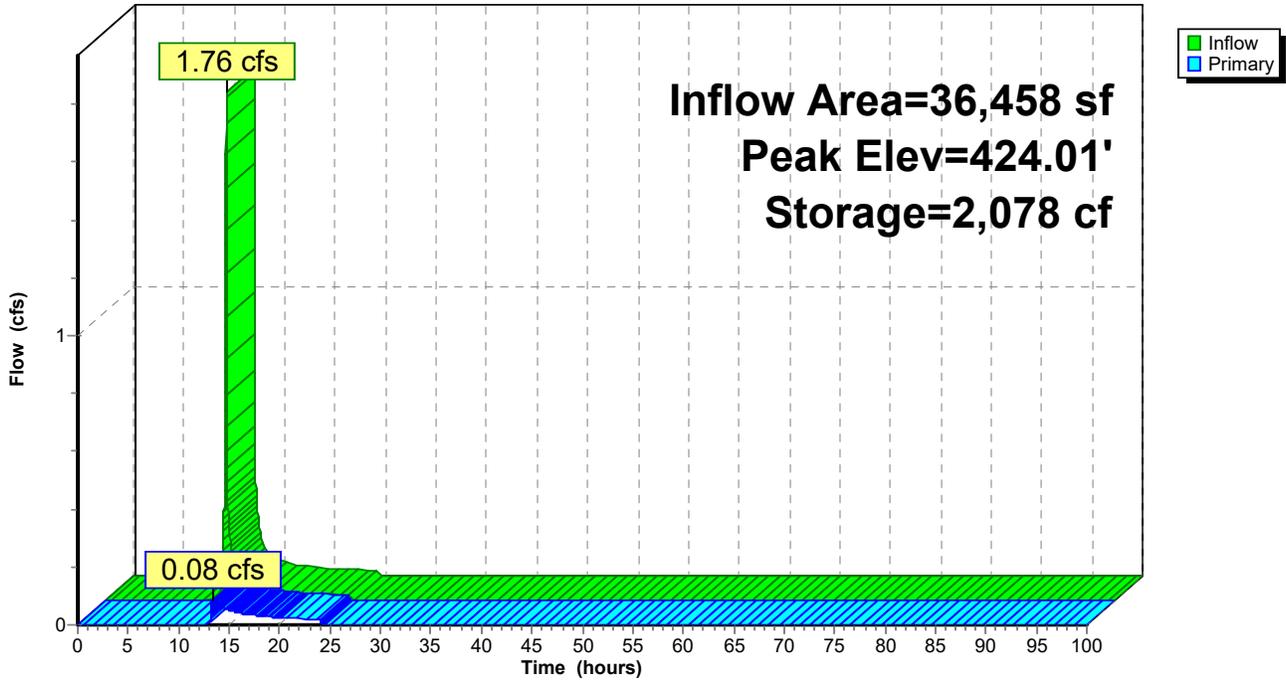
Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	4,668 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	1,767	0	0
424.00	2,337	2,052	2,052
424.50	2,612	1,237	3,289
425.00	2,902	1,379	4,668

Device	Routing	Invert	Outlet Devices
#1	Primary	424.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.06 cfs @ 13.41 hrs HW=424.01' (Free Discharge)
 ↑1=Orifice/Grate (Weir Controls 0.06 cfs @ 0.35 fps)

Pond 8P: Bio-Retention Area

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 1-Year Rainfall=3.00"

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Summary for Pond 9P: Outlet Pipe Storage

Inflow Area = 36,458 sf, 45.63% Impervious, Inflow Depth = 0.45" for 1-Year event
 Inflow = 0.08 cfs @ 13.41 hrs, Volume= 1,378 cf
 Outflow = 0.03 cfs @ 18.47 hrs, Volume= 1,378 cf, Atten= 64%, Lag= 303.7 min
 Primary = 0.03 cfs @ 18.47 hrs, Volume= 1,378 cf

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 419.34' @ 18.47 hrs Surf.Area= 458 sf Storage= 400 cf

Plug-Flow detention time= 177.1 min calculated for 1,377 cf (100% of inflow)
 Center-of-Mass det. time= 177.2 min (1,217.0 - 1,039.8)

Volume	Invert	Avail.Storage	Storage Description
#1	418.50'	138 cf	5.00'W x 5.50'L x 5.00'H Prismatoid
#2	418.00'	113 cf	36.0" Round RCP_Round 36" L= 16.0' S= 0.0300 1'
#3	418.00'	294 cf	7.00'W x 7.00'L x 6.00'H Prismatoid
#4	418.00'	1,782 cf	66.0" Round RCP_Round 66" L= 75.0' S= 0.0050 1'
		2,326 cf	Total Available Storage

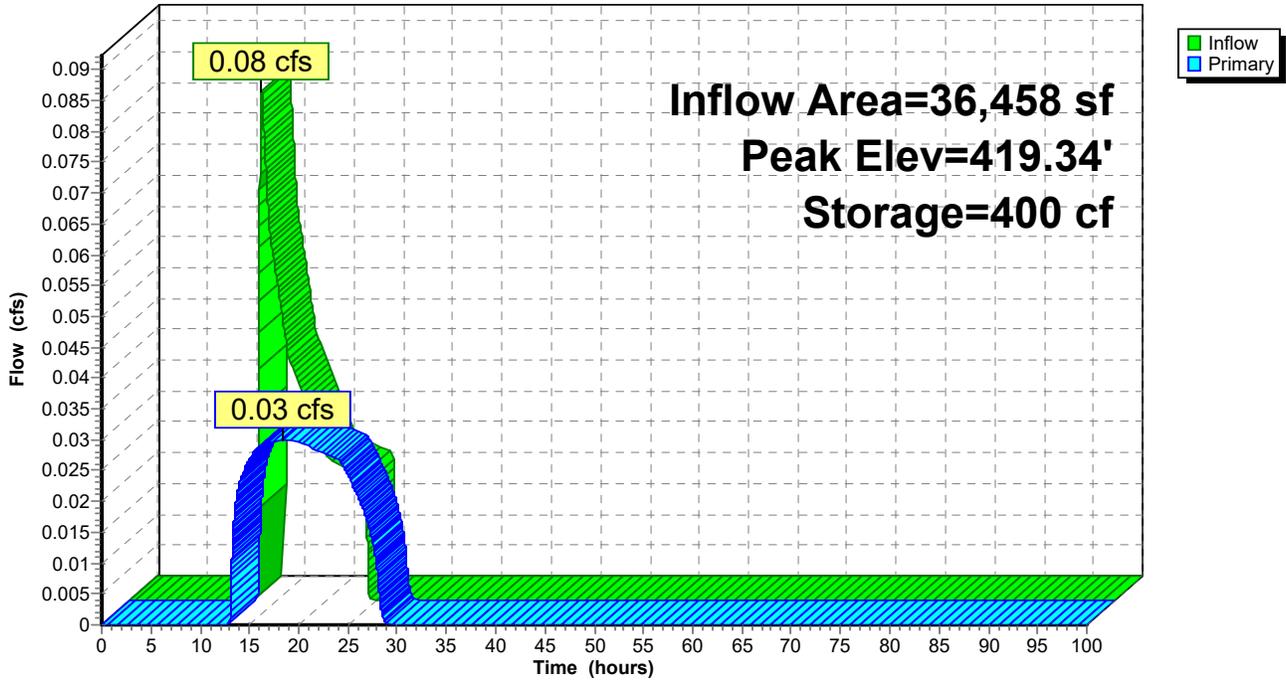
Device	Routing	Invert	Outlet Devices
#1	Primary	418.00'	1.0" Vert. Orifice/Grate C= 0.600
#2	Primary	421.00'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
#3	Primary	423.50'	5.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.03 cfs @ 18.47 hrs HW=419.34' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.03 cfs @ 5.49 fps)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 9P: Outlet Pipe Storage

Hydrograph



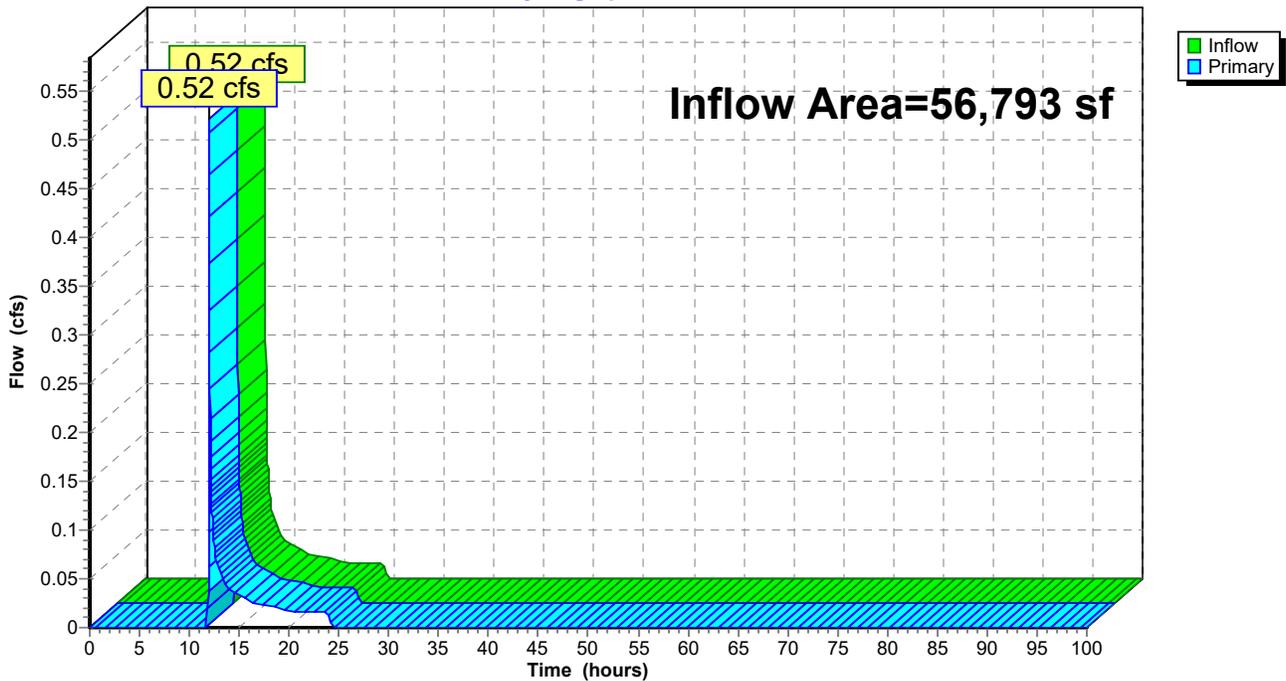
Summary for Link 3L: Pre-Site

Inflow Area = 56,793 sf, 10.12% Impervious, Inflow Depth = 0.32" for 1-Year event
Inflow = 0.52 cfs @ 11.99 hrs, Volume= 1,501 cf
Primary = 0.52 cfs @ 11.99 hrs, Volume= 1,501 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 3L: Pre-Site

Hydrograph



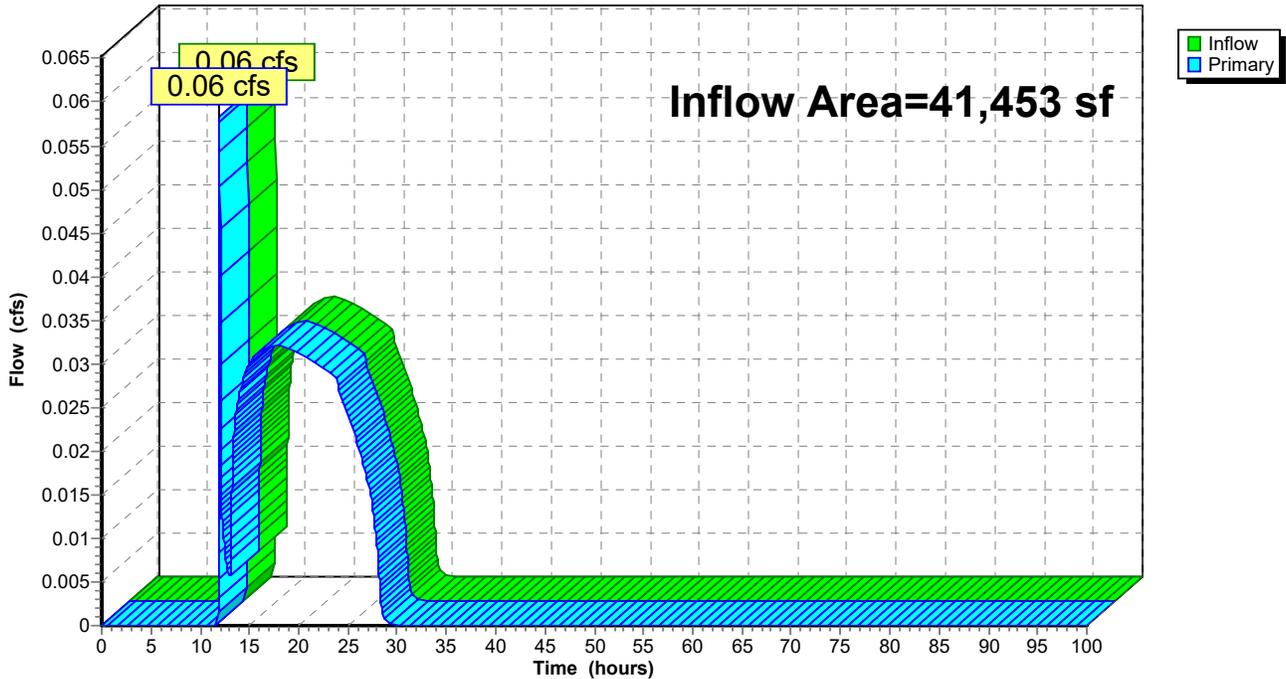
Summary for Link 10L: Link

Inflow Area = 41,453 sf, 40.13% Impervious, Inflow Depth = 0.44" for 1-Year event
Inflow = 0.06 cfs @ 11.99 hrs, Volume= 1,530 cf
Primary = 0.06 cfs @ 11.99 hrs, Volume= 1,530 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 10L: Link

Hydrograph



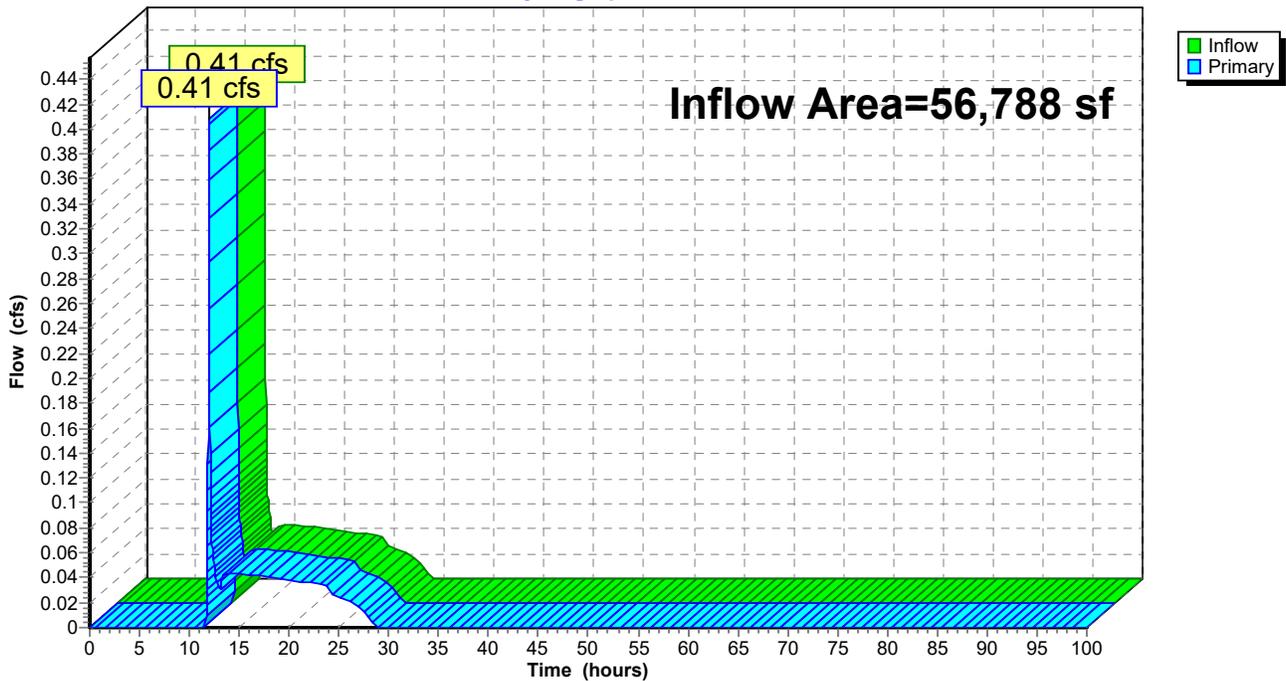
Summary for Link 11L: Post-Site

Inflow Area = 56,788 sf, 33.36% Impervious, Inflow Depth = 0.48" for 1-Year event
Inflow = 0.41 cfs @ 11.98 hrs, Volume= 2,277 cf
Primary = 0.41 cfs @ 11.98 hrs, Volume= 2,277 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Post-Site

Hydrograph





Pre-Dev Basin 1



Post-Dev Basin 1



Post-Dev Basin 2



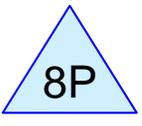
Pre-Dev Basin 2



Pre-Site



DA to Bio-Retention Area



Bio-Retention Area



Outlet Pipe Storage



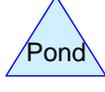
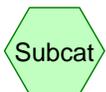
Basin 2 Bypass



Link



Post-Site



Routing Diagram for Purefoy Rd - Peak Flow Analysis
Prepared by Microsoft, Printed 10/4/2016
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Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

Prepared by {enter your company name here}

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Summary for Subcatchment 1S: Pre-Dev Basin 1

Runoff = 0.23 cfs @ 11.99 hrs, Volume= 581 cf, Depth= 0.45"

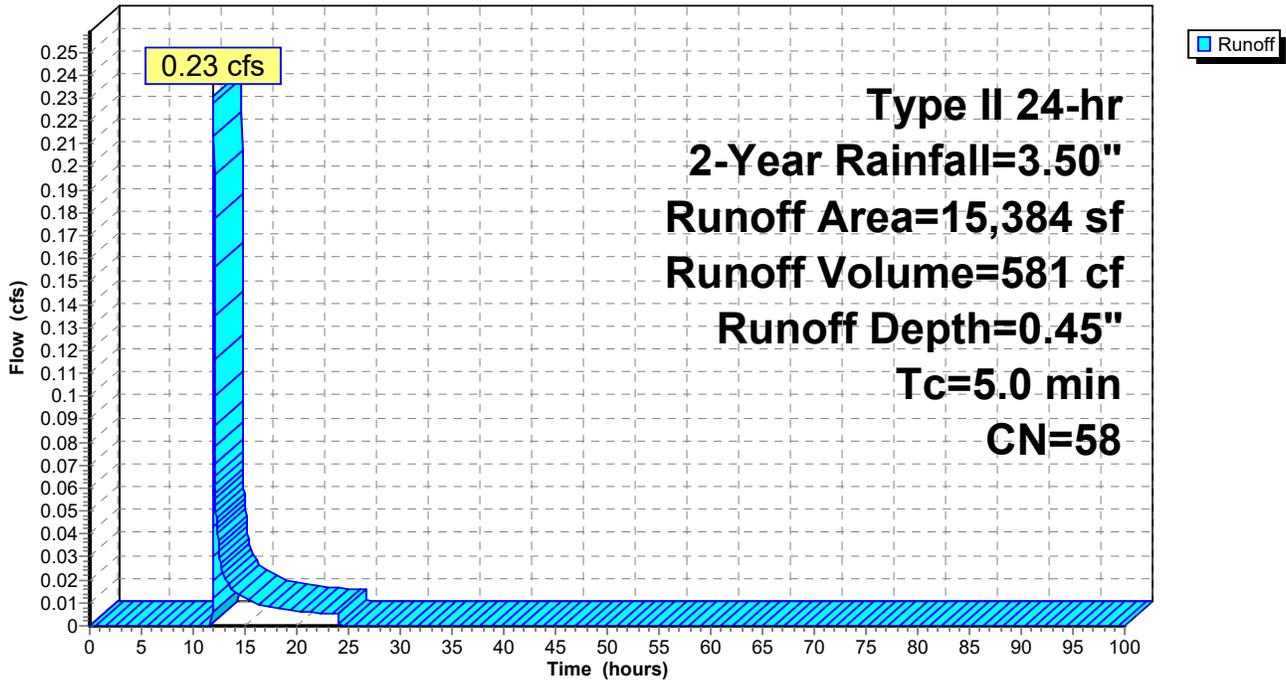
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
897	98	Roofs, HSG B
* 166	98	Sidewalk, HSG B
14,321	55	Woods, Good, HSG B
15,384	58	Weighted Average
14,321		93.09% Pervious Area
1,063		6.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5

Subcatchment 1S: Pre-Dev Basin 1

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 2S: Pre-Dev Basin 2

Runoff = 0.79 cfs @ 11.98 hrs, Volume= 1,834 cf, Depth= 0.53"

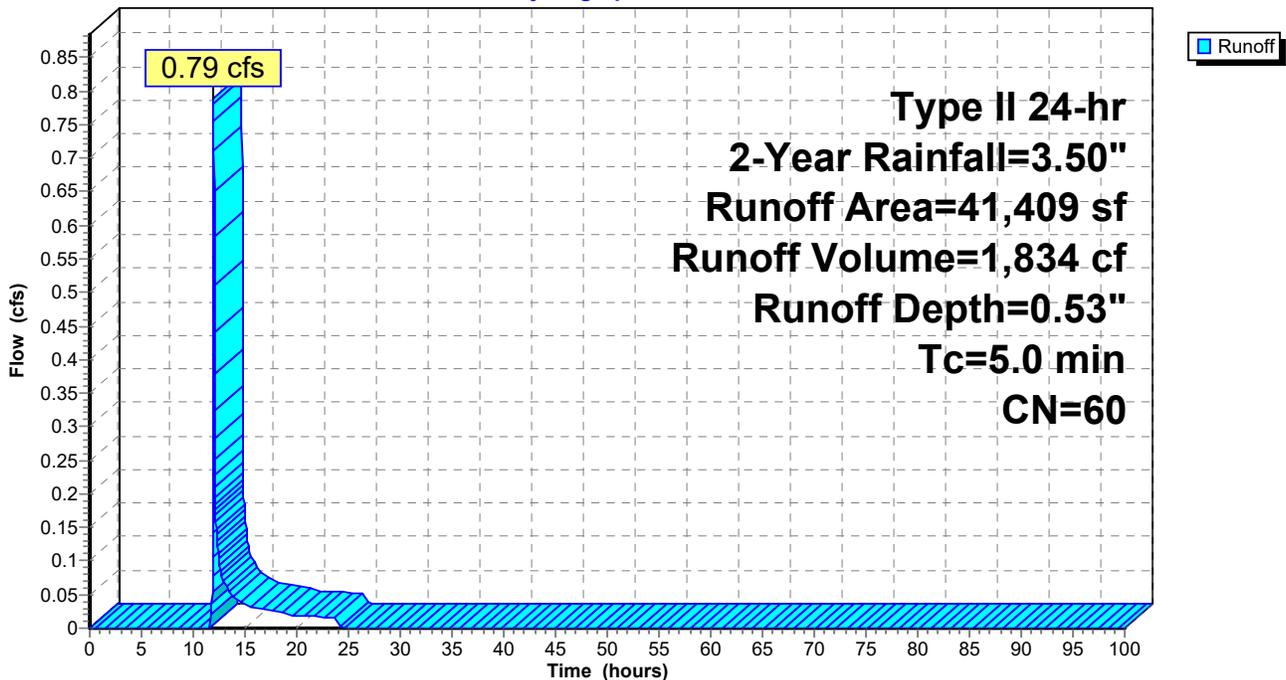
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
1,885	98	Roofs, HSG B
* 2,512	98	Paved Parking, HSG B
* 286	98	Sidewalks, HSG B
36,726	55	Woods, Good, HSG B
41,409	60	Weighted Average
36,726		88.69% Pervious Area
4,683		11.31% Impervious Area

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

Subcatchment 2S: Pre-Dev Basin 2

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 4S: Post-Dev Basin 1

Runoff = 0.53 cfs @ 11.97 hrs, Volume= 1,086 cf, Depth= 0.85"

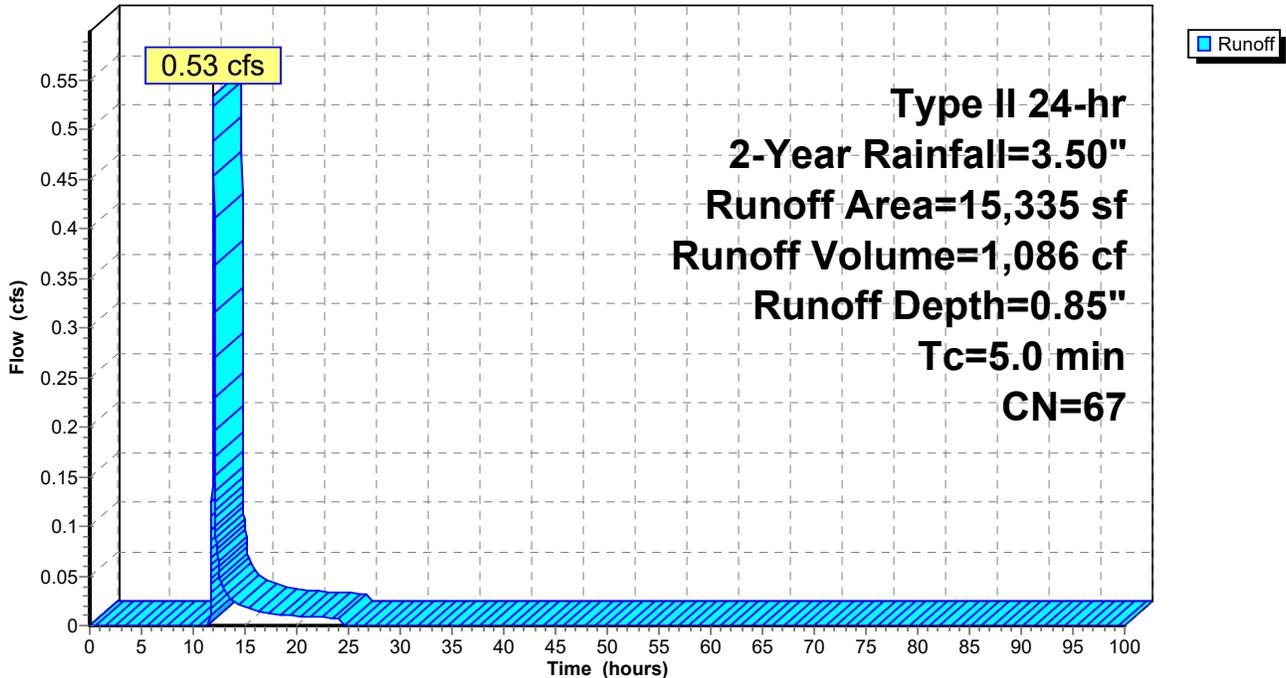
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
1,360	98	Roofs, HSG B
0	98	Paved parking, HSG B
* 948	98	Sidewalk, HSG B
13,027	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
15,335	67	Weighted Average
13,027		84.95% Pervious Area
2,308		15.05% Impervious Area

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

Subcatchment 4S: Post-Dev Basin 1

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

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Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 5S: Post-Dev Basin 2

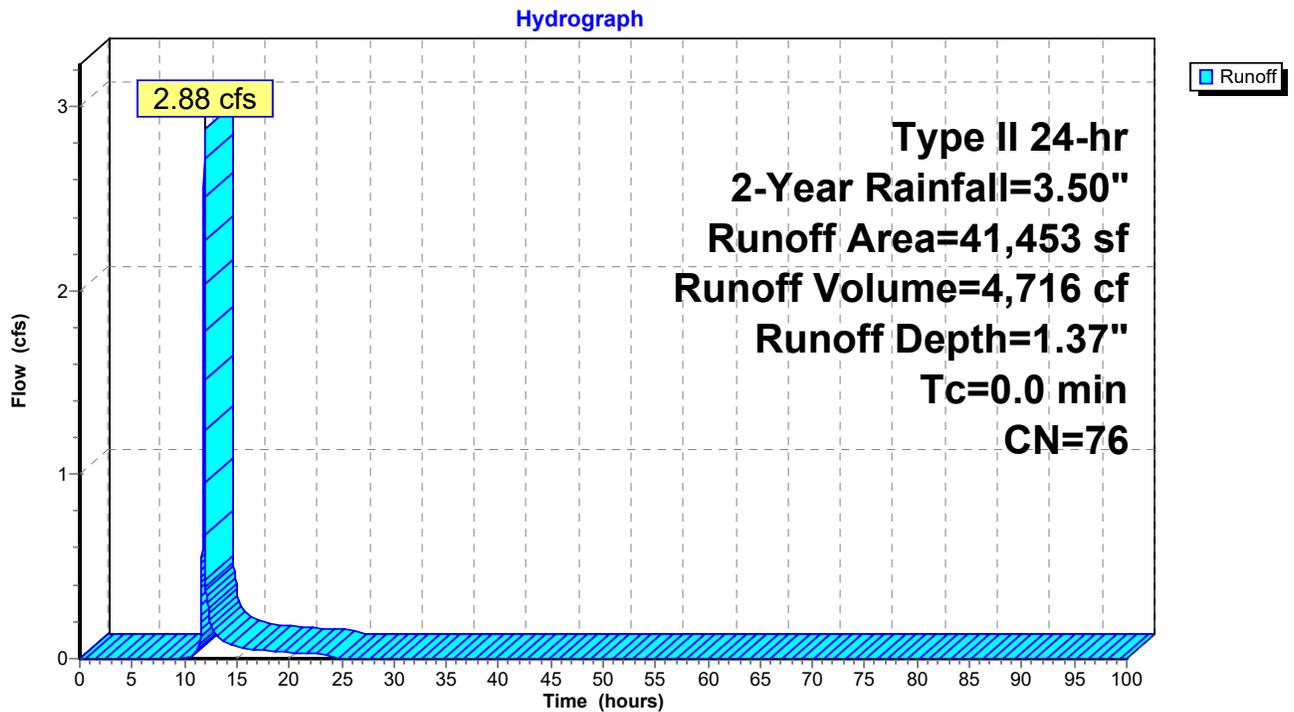
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.88 cfs @ 11.90 hrs, Volume= 4,716 cf, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
5,004	98	Roofs, HSG B
9,921	98	Paved parking, HSG B
* 1,709	98	Sidewalk, HSG B
24,819	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
41,453	76	Weighted Average
24,819		59.87% Pervious Area
16,634		40.13% Impervious Area

Subcatchment 5S: Post-Dev Basin 2



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 6S: Basin 2 Bypass

Runoff = 0.11 cfs @ 11.98 hrs, Volume= 238 cf, Depth= 0.57"

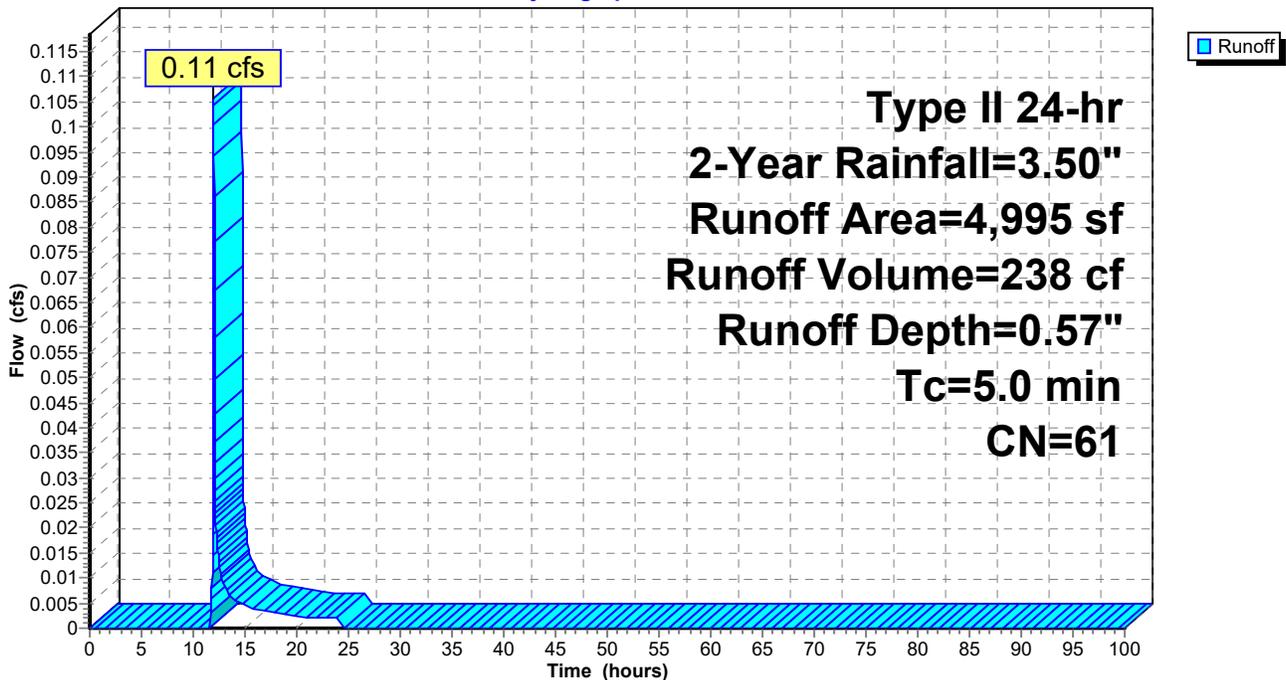
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
0	98	Roofs, HSG B
0	98	Paved parking, HSG B
0	98	Paved parking, HSG B
4,995	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
4,995	61	Weighted Average
4,995		100.00% Pervious Area

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

Subcatchment 6S: Basin 2 Bypass

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 7S: DA to Bio-Retention Area

Runoff = 2.33 cfs @ 11.96 hrs, Volume= 4,549 cf, Depth= 1.50"

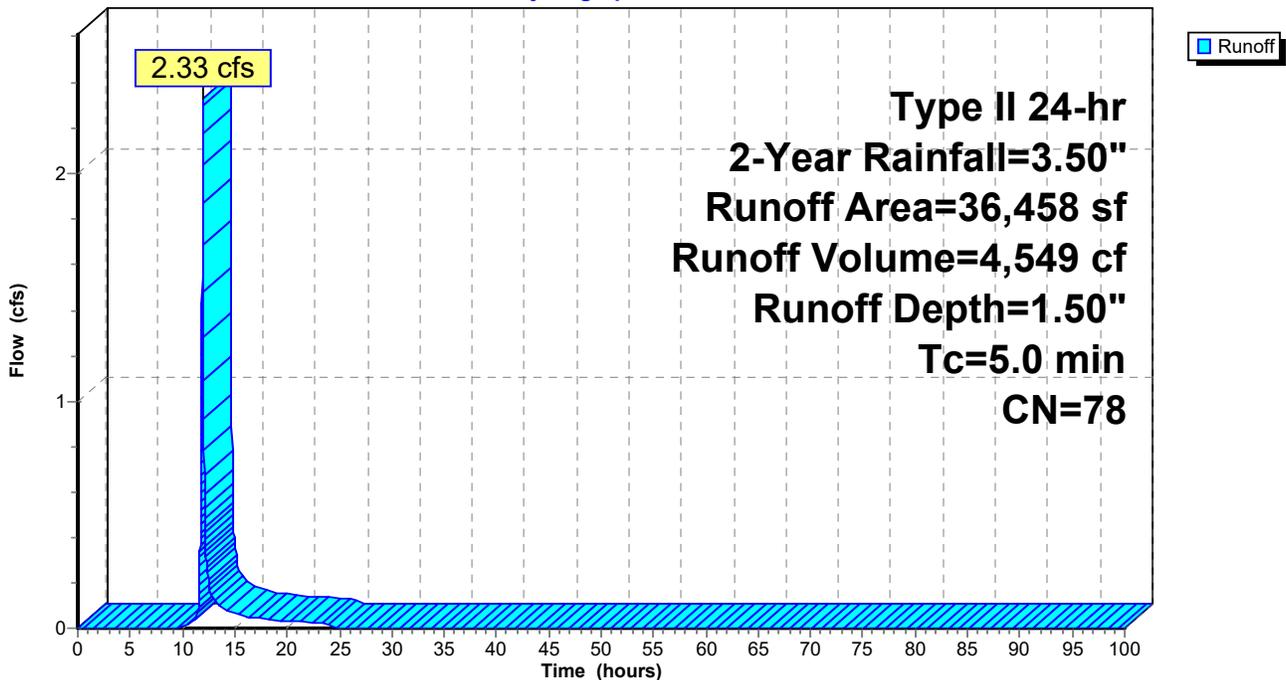
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
5,004	98	Roofs, HSG B
9,921	98	Paved parking, HSG B
* 1,709	98	Sidewalk, HSG B
19,824	61	>75% Grass cover, Good, HSG B
36,458	78	Weighted Average
19,824		54.37% Pervious Area
16,634		45.63% Impervious Area

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

Subcatchment 7S: DA to Bio-Retention Area

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Pond 8P: Bio-Retention Area

Inflow Area = 36,458 sf, 45.63% Impervious, Inflow Depth = 1.50" for 2-Year event
 Inflow = 2.33 cfs @ 11.96 hrs, Volume= 4,549 cf
 Outflow = 0.31 cfs @ 12.23 hrs, Volume= 2,497 cf, Atten= 87%, Lag= 16.1 min
 Primary = 0.31 cfs @ 12.23 hrs, Volume= 2,497 cf

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 424.03' @ 12.23 hrs Surf.Area= 2,355 sf Storage= 2,127 cf

Plug-Flow detention time= 236.1 min calculated for 2,497 cf (55% of inflow)
 Center-of-Mass det. time= 111.4 min (951.6 - 840.1)

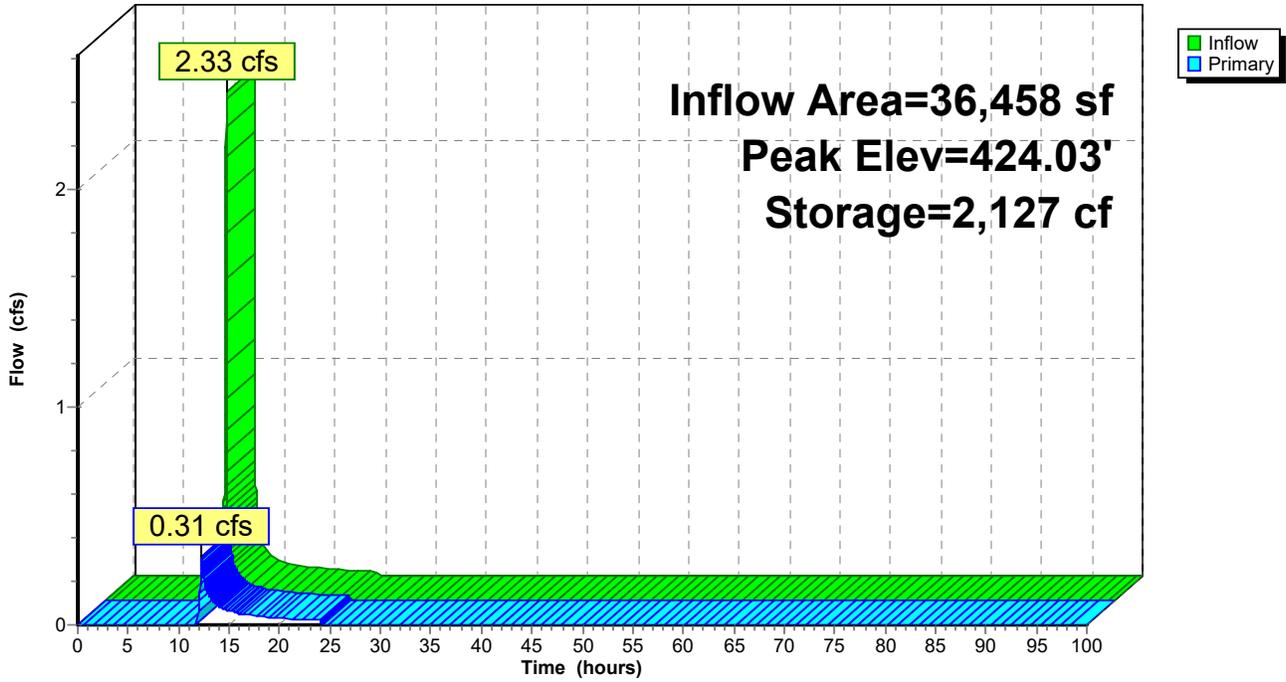
Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	4,668 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	1,767	0	0
424.00	2,337	2,052	2,052
424.50	2,612	1,237	3,289
425.00	2,902	1,379	4,668

Device	Routing	Invert	Outlet Devices
#1	Primary	424.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.30 cfs @ 12.23 hrs HW=424.03' (Free Discharge)
 ↑1=Orifice/Grate (Weir Controls 0.30 cfs @ 0.59 fps)

Pond 8P: Bio-Retention Area

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

Prepared by {enter your company name here}

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Summary for Pond 9P: Outlet Pipe Storage

Inflow Area = 36,458 sf, 45.63% Impervious, Inflow Depth = 0.82" for 2-Year event
 Inflow = 0.31 cfs @ 12.23 hrs, Volume= 2,497 cf
 Outflow = 0.04 cfs @ 17.58 hrs, Volume= 2,497 cf, Atten= 87%, Lag= 321.0 min
 Primary = 0.04 cfs @ 17.58 hrs, Volume= 2,497 cf

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.60' @ 17.58 hrs Surf.Area= 524 sf Storage= 1,034 cf

Plug-Flow detention time= 322.7 min calculated for 2,497 cf (100% of inflow)
 Center-of-Mass det. time= 322.7 min (1,274.3 - 951.6)

Volume	Invert	Avail.Storage	Storage Description
#1	418.50'	138 cf	5.00'W x 5.50'L x 5.00'H Prismatoid
#2	418.00'	113 cf	36.0" Round RCP_Round 36" L= 16.0' S= 0.0300 1'
#3	418.00'	294 cf	7.00'W x 7.00'L x 6.00'H Prismatoid
#4	418.00'	1,782 cf	66.0" Round RCP_Round 66" L= 75.0' S= 0.0050 1'
		2,326 cf	Total Available Storage

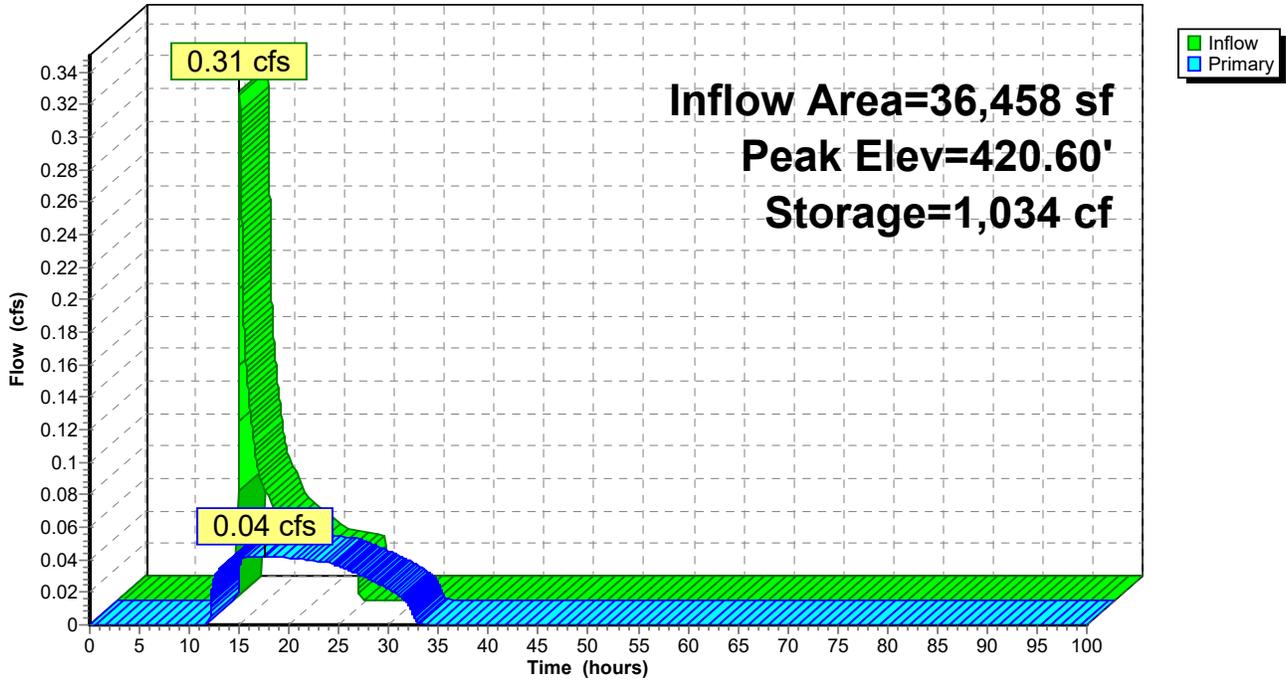
Device	Routing	Invert	Outlet Devices
#1	Primary	418.00'	1.0" Vert. Orifice/Grate C= 0.600
#2	Primary	421.00'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
#3	Primary	423.50'	5.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.04 cfs @ 17.58 hrs HW=420.60' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.04 cfs @ 7.71 fps)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 9P: Outlet Pipe Storage

Hydrograph



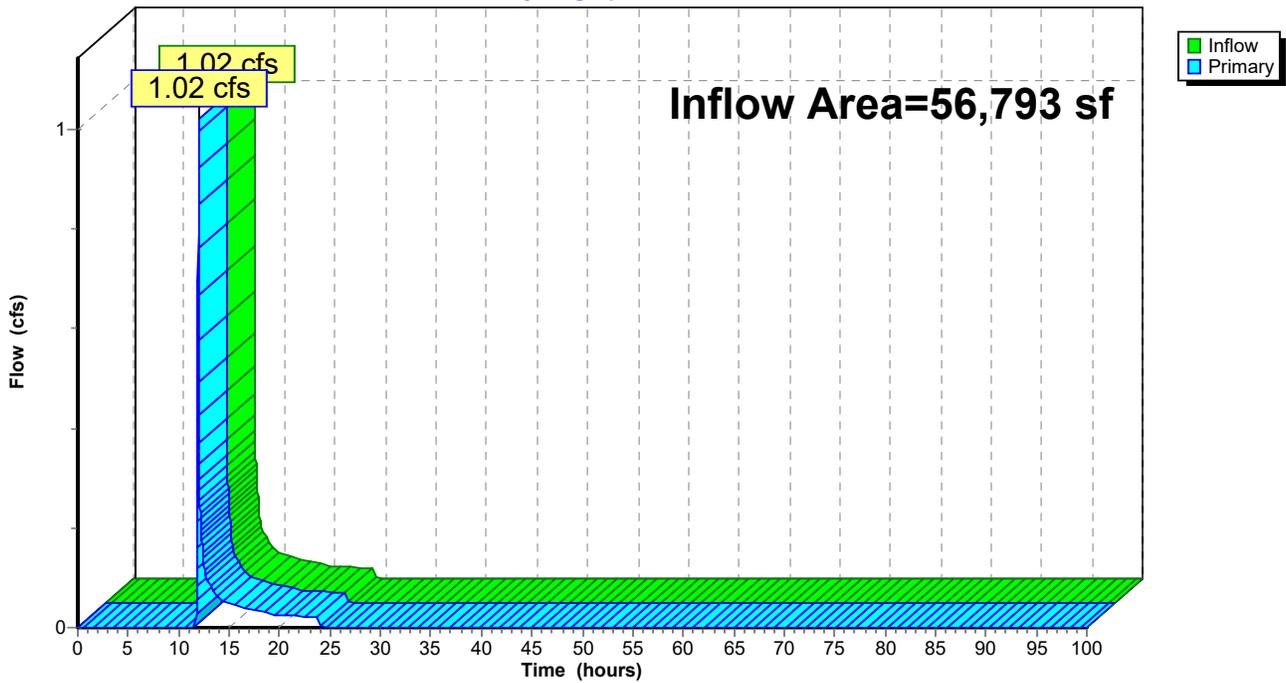
Summary for Link 3L: Pre-Site

Inflow Area = 56,793 sf, 10.12% Impervious, Inflow Depth = 0.51" for 2-Year event
Inflow = 1.02 cfs @ 11.98 hrs, Volume= 2,415 cf
Primary = 1.02 cfs @ 11.98 hrs, Volume= 2,415 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 3L: Pre-Site

Hydrograph



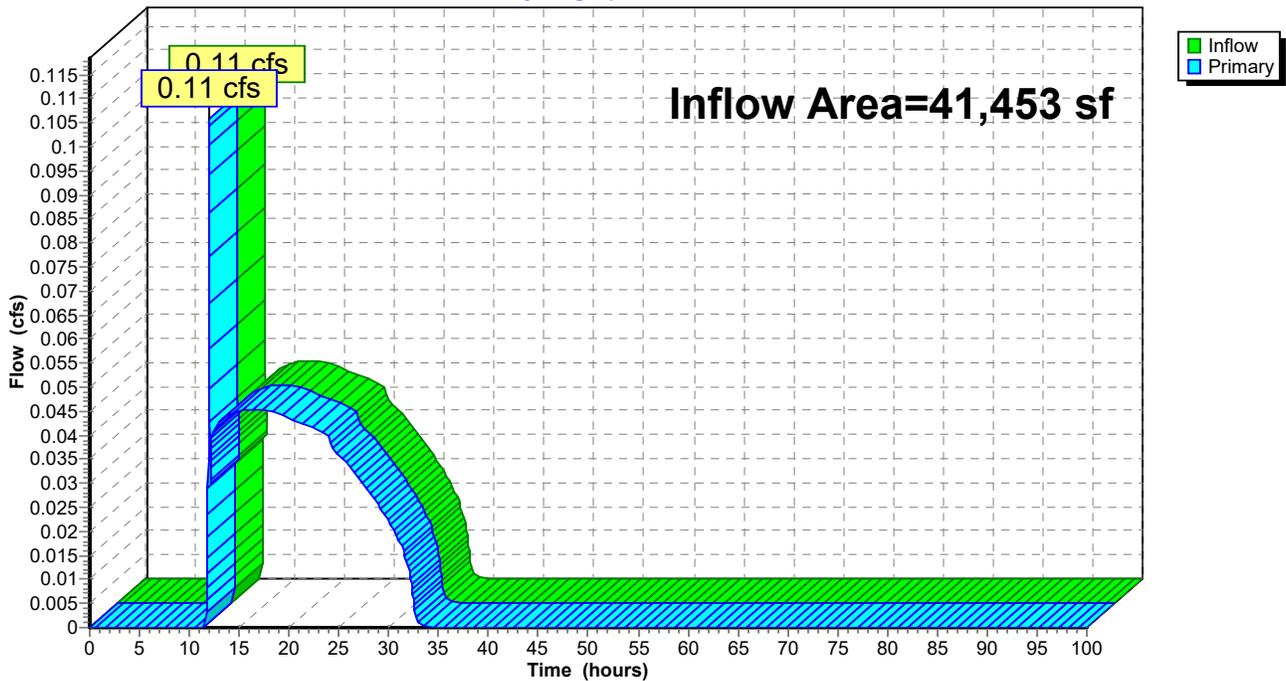
Summary for Link 10L: Link

Inflow Area = 41,453 sf, 40.13% Impervious, Inflow Depth = 0.79" for 2-Year event
Inflow = 0.11 cfs @ 11.98 hrs, Volume= 2,736 cf
Primary = 0.11 cfs @ 11.98 hrs, Volume= 2,736 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 10L: Link

Hydrograph



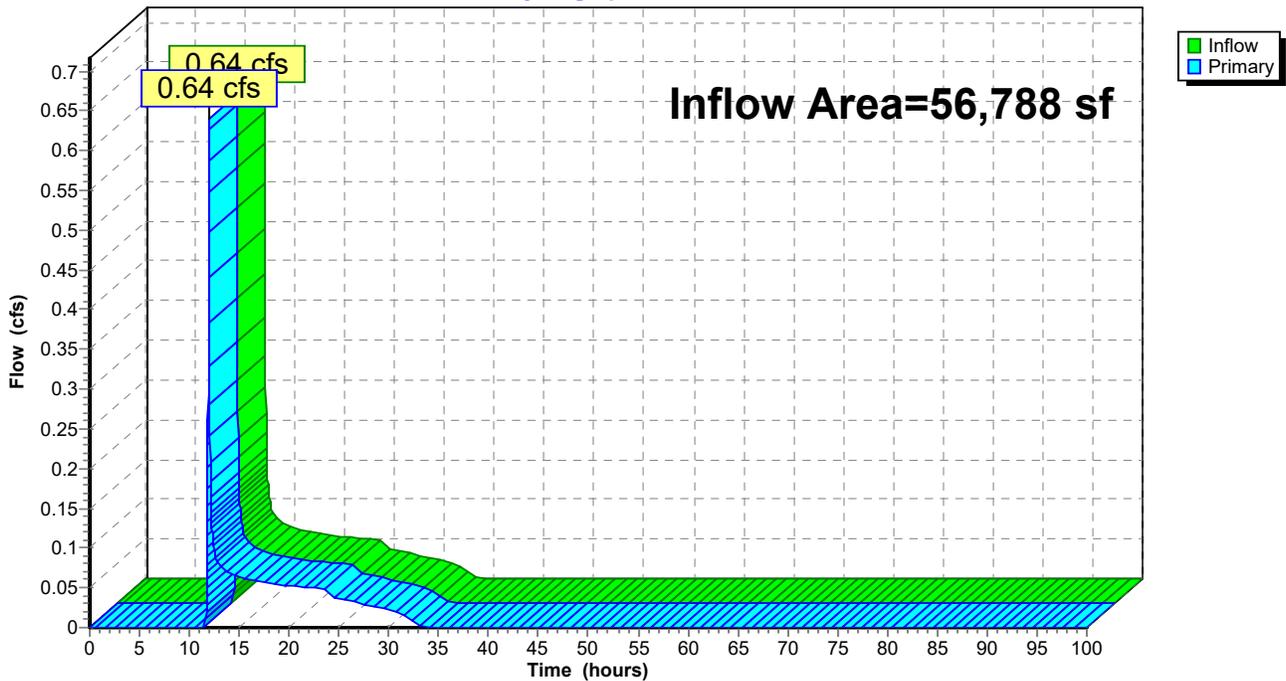
Summary for Link 11L: Post-Site

Inflow Area = 56,788 sf, 33.36% Impervious, Inflow Depth = 0.81" for 2-Year event
Inflow = 0.64 cfs @ 11.97 hrs, Volume= 3,822 cf
Primary = 0.64 cfs @ 11.97 hrs, Volume= 3,822 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Post-Site

Hydrograph





Pre-Dev Basin 1



Post-Dev Basin 1



Post-Dev Basin 2



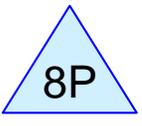
Pre-Dev Basin 2



Pre-Site



DA to Bio-Retention Area



Bio-Retention Area



Outlet Pipe Storage



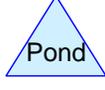
Basin 2 Bypass



Link



Post-Site



Routing Diagram for Purefoy Rd - Peak Flow Analysis
Prepared by Microsoft, Printed 10/4/2016
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Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 25-Year Rainfall=6.00"

Prepared by {enter your company name here}

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Summary for Subcatchment 1S: Pre-Dev Basin 1

Runoff = 1.14 cfs @ 11.97 hrs, Volume= 2,252 cf, Depth= 1.76"

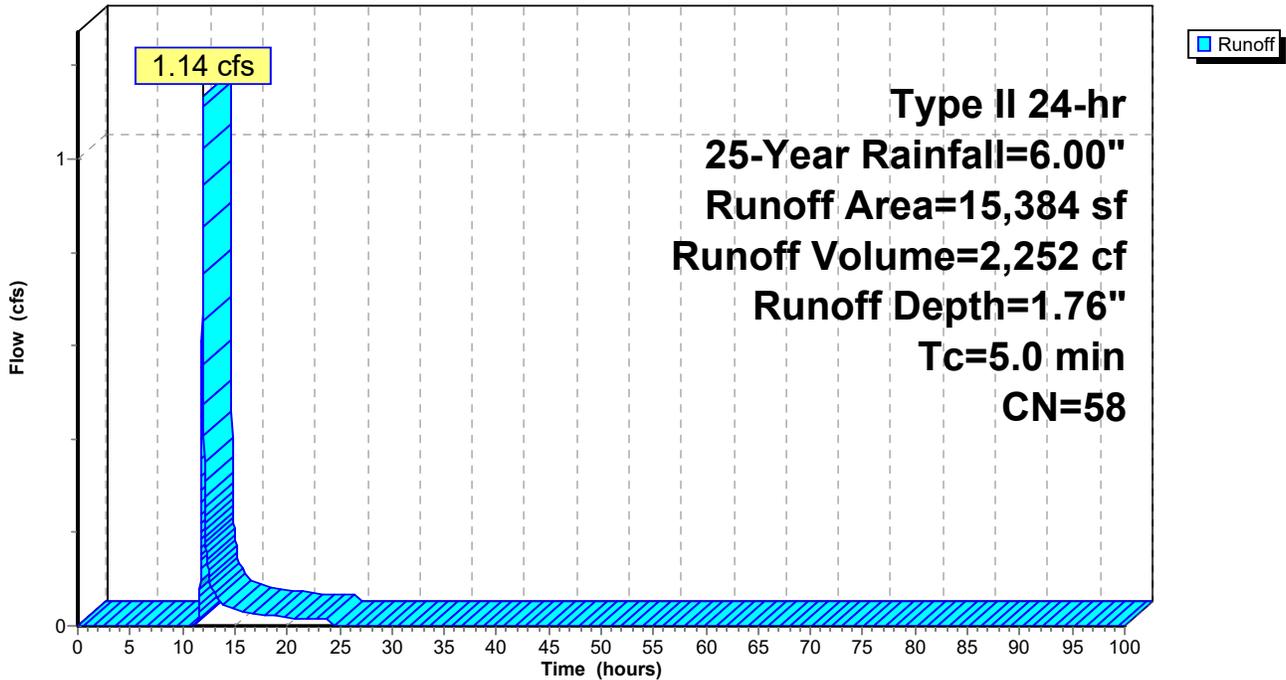
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=6.00"

Area (sf)	CN	Description
897	98	Roofs, HSG B
* 166	98	Sidewalk, HSG B
14,321	55	Woods, Good, HSG B
15,384	58	Weighted Average
14,321		93.09% Pervious Area
1,063		6.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5

Subcatchment 1S: Pre-Dev Basin 1

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 25-Year Rainfall=6.00"

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Summary for Subcatchment 2S: Pre-Dev Basin 2

Runoff = 3.37 cfs @ 11.97 hrs, Volume= 6,631 cf, Depth= 1.92"

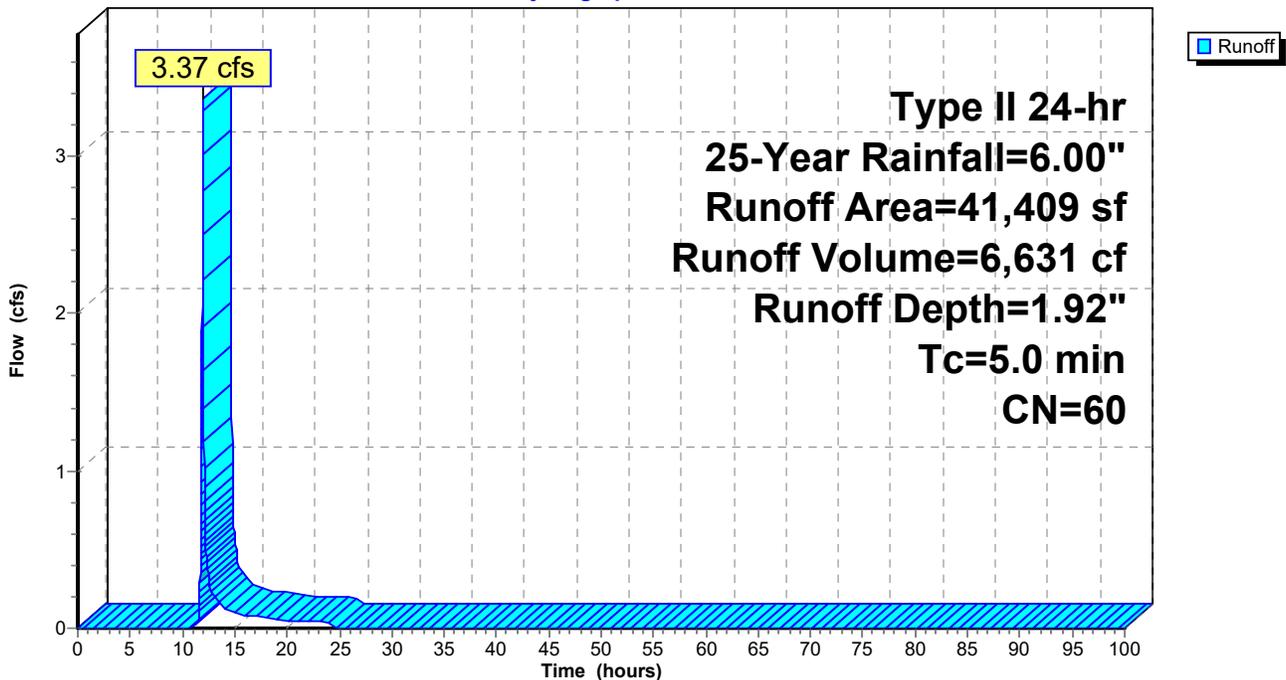
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=6.00"

Area (sf)	CN	Description
1,885	98	Roofs, HSG B
* 2,512	98	Paved Parking, HSG B
* 286	98	Sidewalks, HSG B
36,726	55	Woods, Good, HSG B
41,409	60	Weighted Average
36,726		88.69% Pervious Area
4,683		11.31% Impervious Area

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

Subcatchment 2S: Pre-Dev Basin 2

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 25-Year Rainfall=6.00"

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Summary for Subcatchment 4S: Post-Dev Basin 1

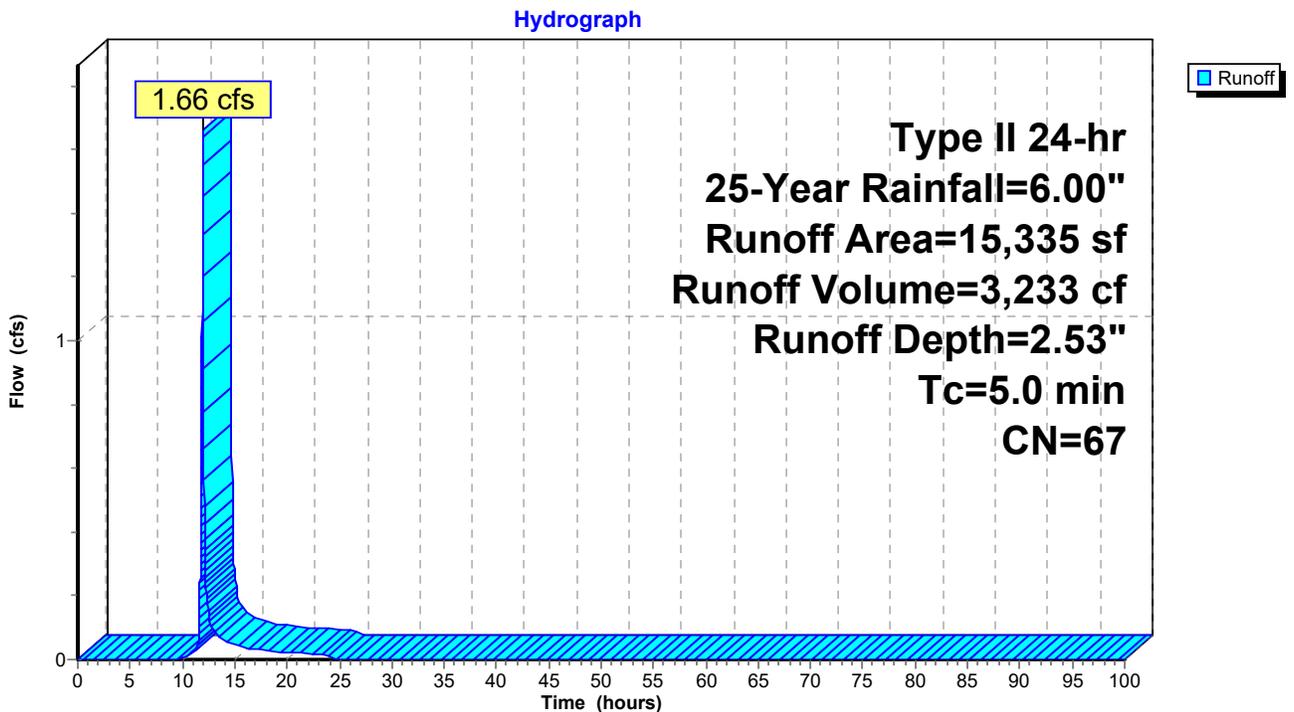
Runoff = 1.66 cfs @ 11.96 hrs, Volume= 3,233 cf, Depth= 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=6.00"

Area (sf)	CN	Description
1,360	98	Roofs, HSG B
0	98	Paved parking, HSG B
* 948	98	Sidewalk, HSG B
13,027	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
15,335	67	Weighted Average
13,027		84.95% Pervious Area
2,308		15.05% Impervious Area

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

Subcatchment 4S: Post-Dev Basin 1



Purefoy Rd - Peak Flow Analysis_10-9-16

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Type II 24-hr 25-Year Rainfall=6.00"

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Summary for Subcatchment 5S: Post-Dev Basin 2

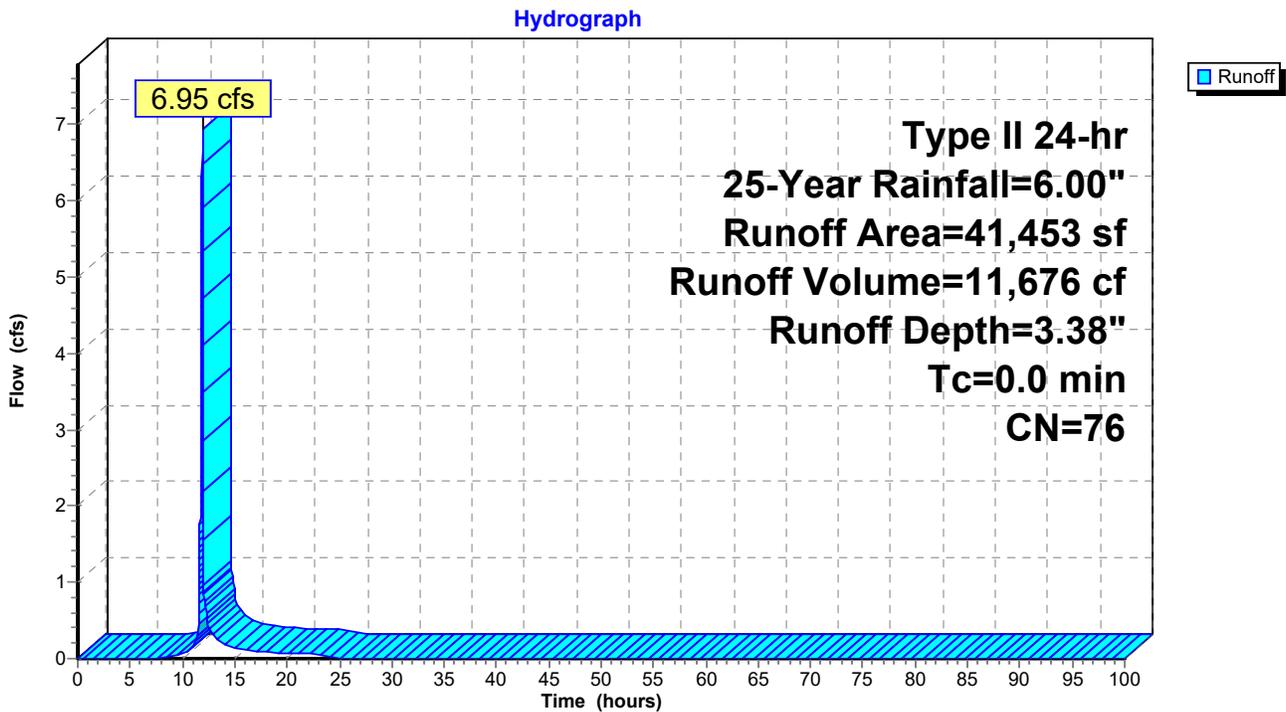
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 6.95 cfs @ 11.90 hrs, Volume= 11,676 cf, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=6.00"

Area (sf)	CN	Description
5,004	98	Roofs, HSG B
9,921	98	Paved parking, HSG B
* 1,709	98	Sidewalk, HSG B
24,819	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
41,453	76	Weighted Average
24,819		59.87% Pervious Area
16,634		40.13% Impervious Area

Subcatchment 5S: Post-Dev Basin 2



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 25-Year Rainfall=6.00"

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Summary for Subcatchment 6S: Basin 2 Bypass

Runoff = 0.43 cfs @ 11.97 hrs, Volume= 835 cf, Depth= 2.01"

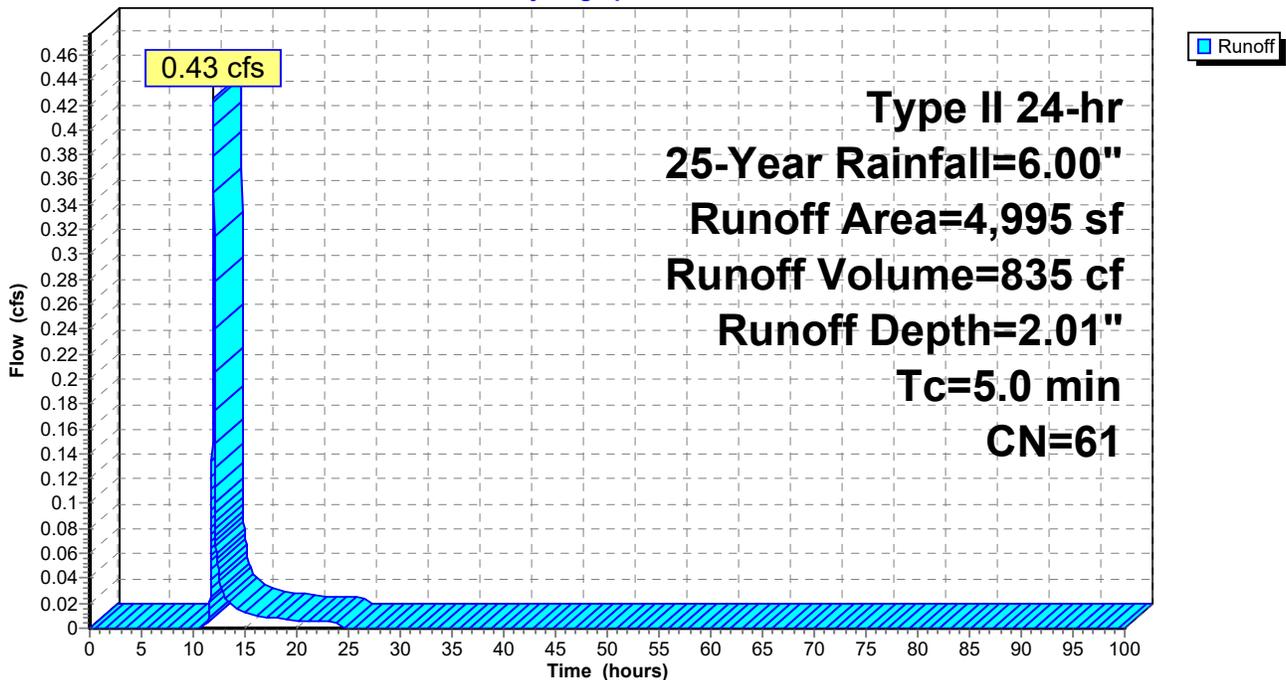
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-Year Rainfall=6.00"

Area (sf)	CN	Description
0	98	Roofs, HSG B
0	98	Paved parking, HSG B
0	98	Paved parking, HSG B
4,995	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
4,995	61	Weighted Average
4,995		100.00% Pervious Area

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

Subcatchment 6S: Basin 2 Bypass

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 25-Year Rainfall=6.00"

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Summary for Subcatchment 7S: DA to Bio-Retention Area

Runoff = 5.46 cfs @ 11.96 hrs, Volume= 10,873 cf, Depth= 3.58"

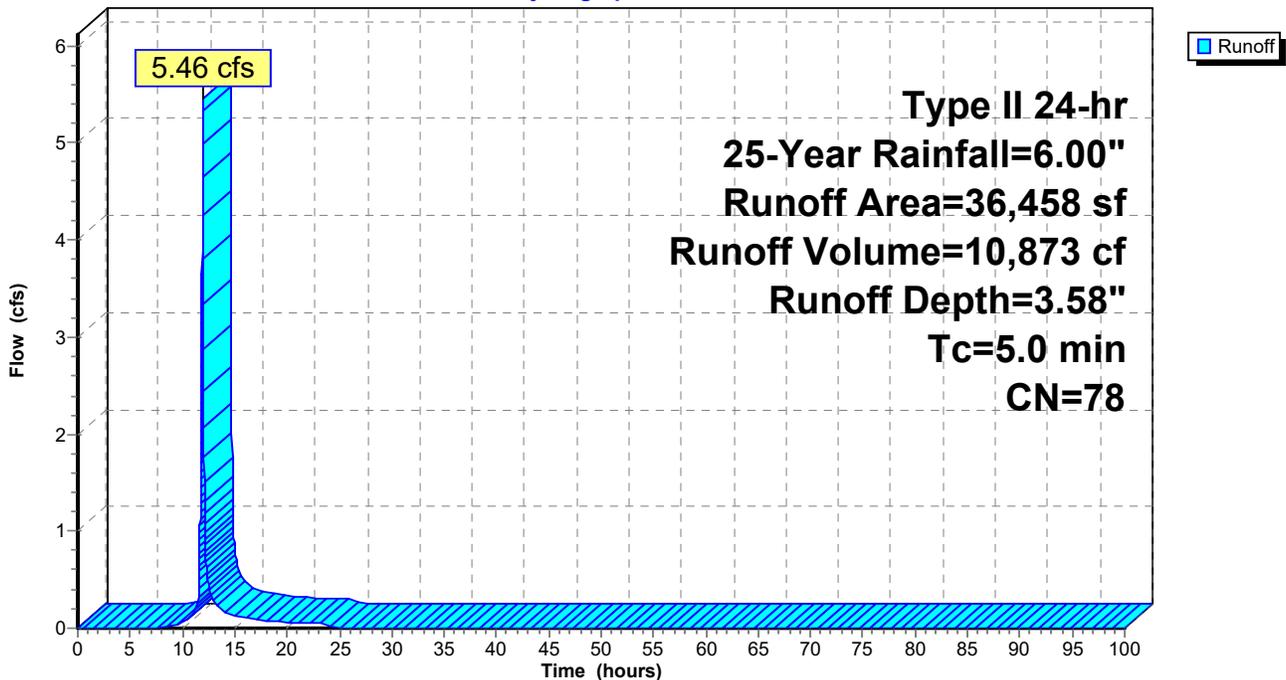
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=6.00"

Area (sf)	CN	Description
5,004	98	Roofs, HSG B
9,921	98	Paved parking, HSG B
* 1,709	98	Sidewalk, HSG B
19,824	61	>75% Grass cover, Good, HSG B
36,458	78	Weighted Average
19,824		54.37% Pervious Area
16,634		45.63% Impervious Area

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

Subcatchment 7S: DA to Bio-Retention Area

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 25-Year Rainfall=6.00"

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Summary for Pond 8P: Bio-Retention Area

Inflow Area = 36,458 sf, 45.63% Impervious, Inflow Depth = 3.58" for 25-Year event
 Inflow = 5.46 cfs @ 11.96 hrs, Volume= 10,873 cf
 Outflow = 5.30 cfs @ 11.98 hrs, Volume= 8,821 cf, Atten= 3%, Lag= 1.0 min
 Primary = 5.30 cfs @ 11.98 hrs, Volume= 8,821 cf

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 424.22' @ 11.98 hrs Surf.Area= 2,456 sf Storage= 2,573 cf

Plug-Flow detention time= 117.0 min calculated for 8,820 cf (81% of inflow)
 Center-of-Mass det. time= 37.3 min (852.4 - 815.1)

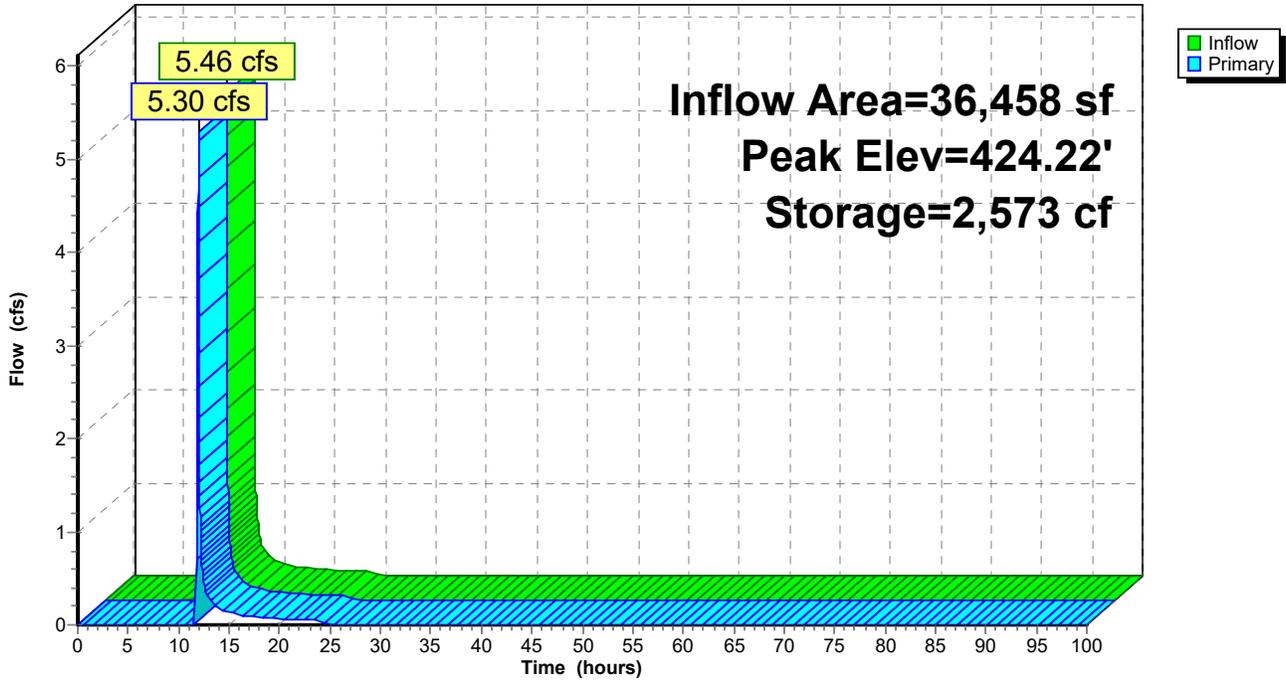
Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	4,668 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	1,767	0	0
424.00	2,337	2,052	2,052
424.50	2,612	1,237	3,289
425.00	2,902	1,379	4,668

Device	Routing	Invert	Outlet Devices
#1	Primary	424.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.29 cfs @ 11.98 hrs HW=424.22' (Free Discharge)
 ↑1=Orifice/Grate (Weir Controls 5.29 cfs @ 1.52 fps)

Pond 8P: Bio-Retention Area

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 25-Year Rainfall=6.00"

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Summary for Pond 9P: Outlet Pipe Storage

Inflow Area = 36,458 sf, 45.63% Impervious, Inflow Depth = 2.90" for 25-Year event
 Inflow = 5.30 cfs @ 11.98 hrs, Volume= 8,821 cf
 Outflow = 2.85 cfs @ 12.06 hrs, Volume= 8,821 cf, Atten= 46%, Lag= 5.1 min
 Primary = 2.85 cfs @ 12.06 hrs, Volume= 8,821 cf

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 423.42' @ 12.06 hrs Surf.Area= 250 sf Storage= 2,262 cf

Plug-Flow detention time= 148.2 min calculated for 8,820 cf (100% of inflow)
 Center-of-Mass det. time= 148.3 min (1,000.7 - 852.4)

Volume	Invert	Avail.Storage	Storage Description
#1	418.50'	138 cf	5.00'W x 5.50'L x 5.00'H Prismatoid
#2	418.00'	113 cf	36.0" Round RCP_Round 36" L= 16.0' S= 0.0300 1'
#3	418.00'	294 cf	7.00'W x 7.00'L x 6.00'H Prismatoid
#4	418.00'	1,782 cf	66.0" Round RCP_Round 66" L= 75.0' S= 0.0050 1'
		2,326 cf	Total Available Storage

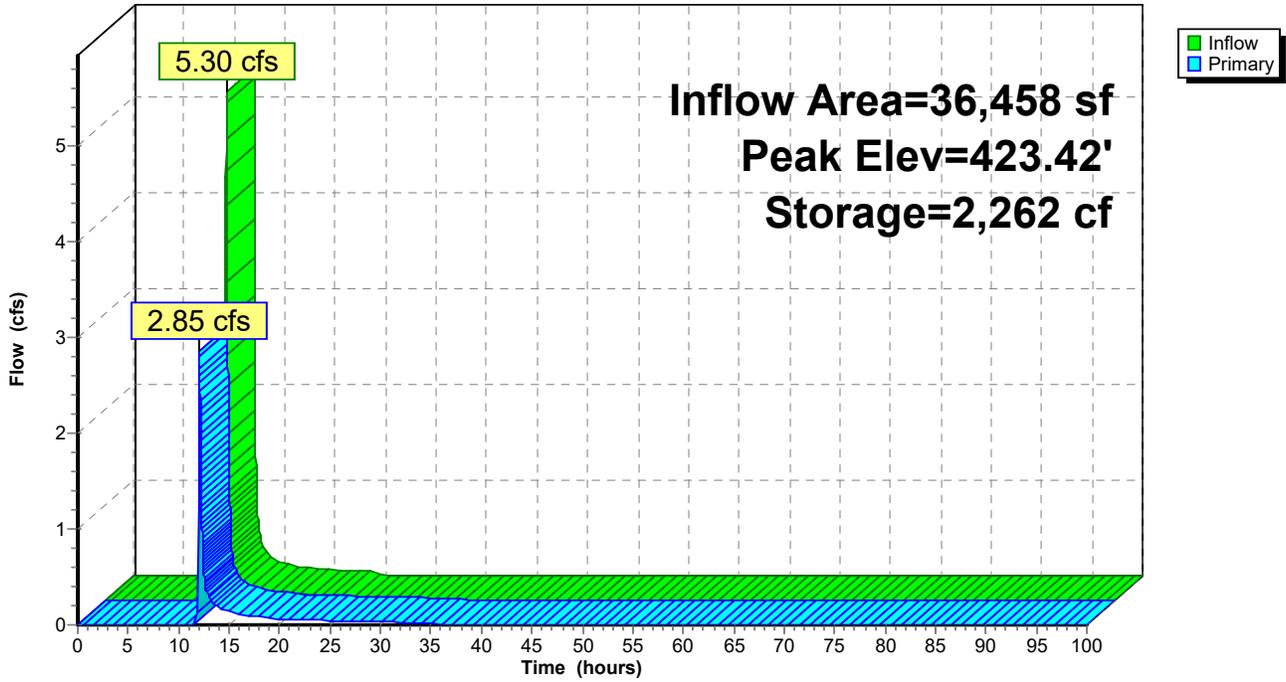
Device	Routing	Invert	Outlet Devices
#1	Primary	418.00'	1.0" Vert. Orifice/Grate C= 0.600
#2	Primary	421.00'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
#3	Primary	423.50'	5.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.84 cfs @ 12.06 hrs HW=423.41' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.06 cfs @ 11.16 fps)
- 2=Orifice/Grate (Orifice Controls 2.78 cfs @ 7.08 fps)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 9P: Outlet Pipe Storage

Hydrograph



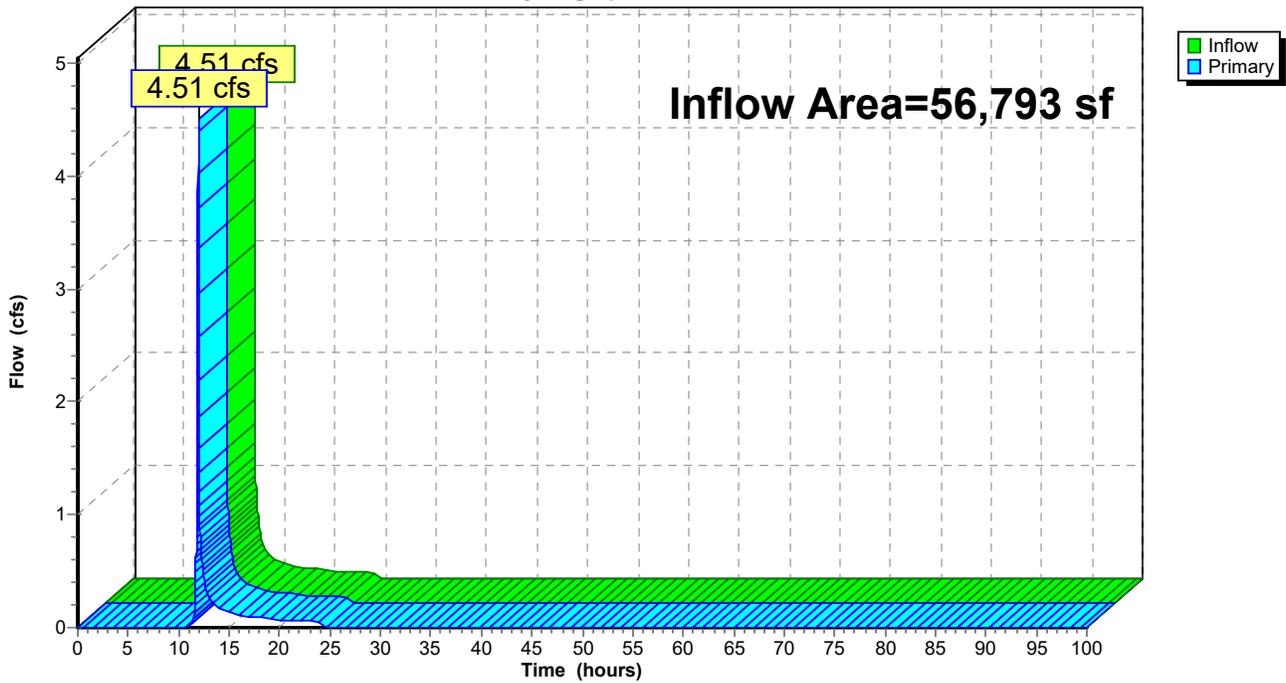
Summary for Link 3L: Pre-Site

Inflow Area = 56,793 sf, 10.12% Impervious, Inflow Depth = 1.88" for 25-Year event
Inflow = 4.51 cfs @ 11.97 hrs, Volume= 8,883 cf
Primary = 4.51 cfs @ 11.97 hrs, Volume= 8,883 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 3L: Pre-Site

Hydrograph



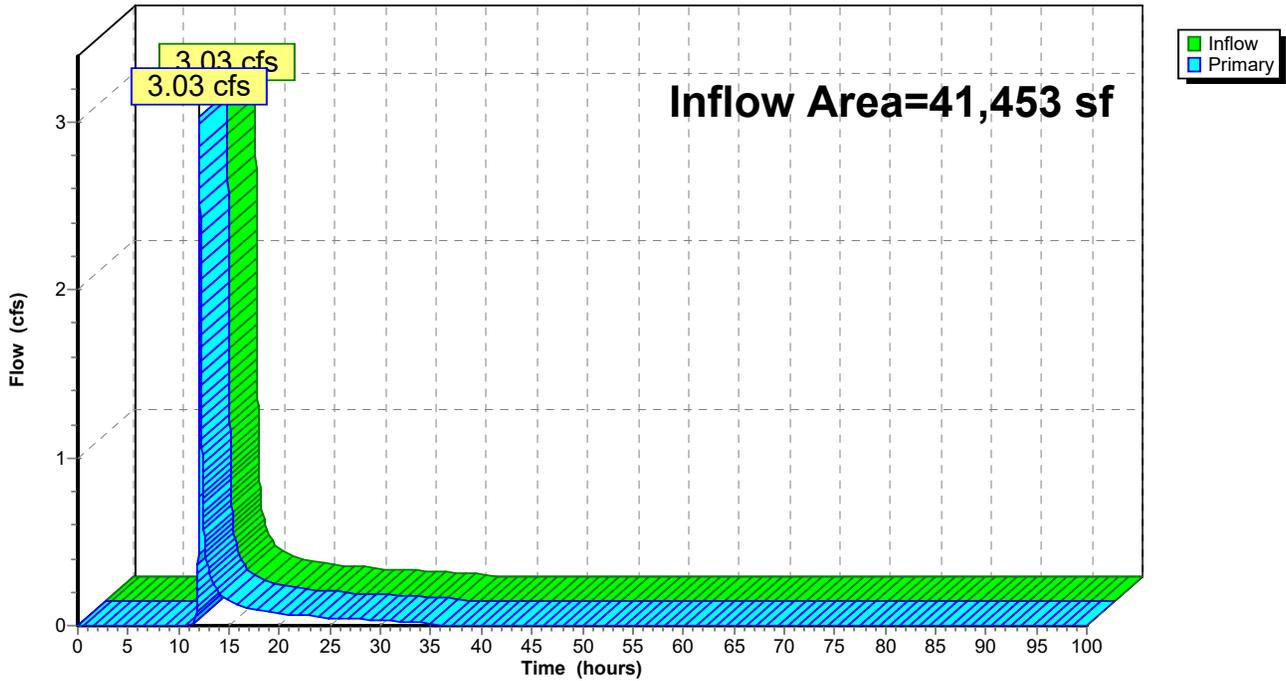
Summary for Link 10L: Link

Inflow Area = 41,453 sf, 40.13% Impervious, Inflow Depth = 2.80" for 25-Year event
Inflow = 3.03 cfs @ 12.05 hrs, Volume= 9,656 cf
Primary = 3.03 cfs @ 12.05 hrs, Volume= 9,656 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 10L: Link

Hydrograph



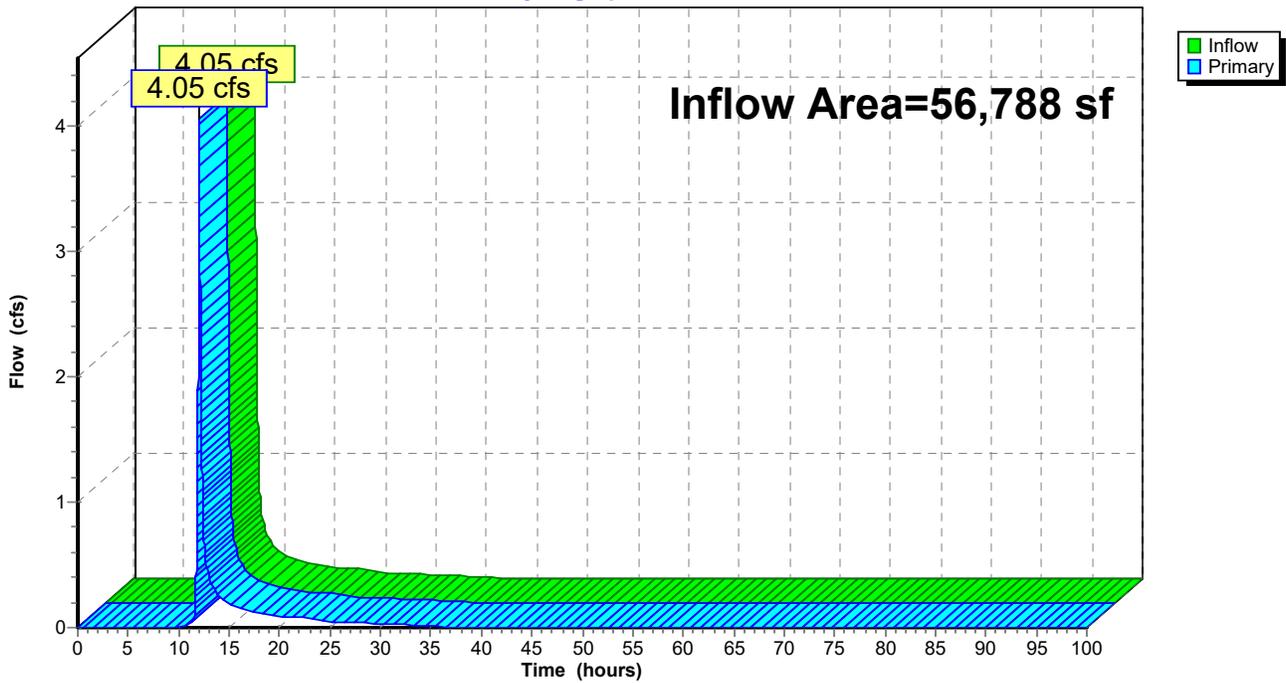
Summary for Link 11L: Post-Site

Inflow Area = 56,788 sf, 33.36% Impervious, Inflow Depth = 2.72" for 25-Year event
Inflow = 4.05 cfs @ 12.01 hrs, Volume= 12,889 cf
Primary = 4.05 cfs @ 12.01 hrs, Volume= 12,889 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Post-Site

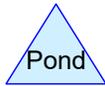
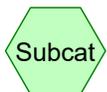
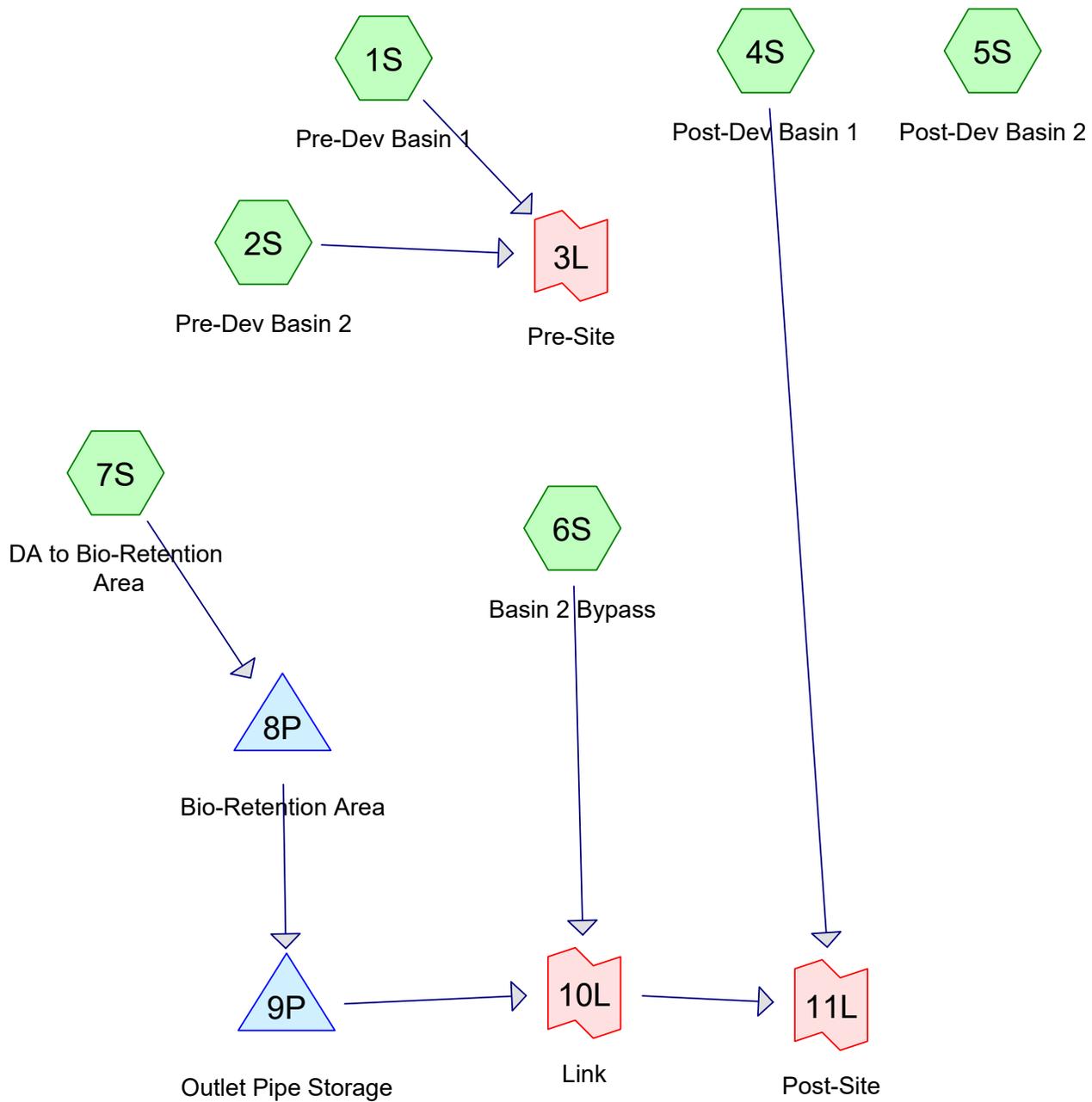
Hydrograph



**STORMWATER VOLUME
CALCULATIONS (2-YR STORM)**

2-YEAR VOLUME SUMMARY

		2-YEAR VOLUME			
		PRE-DEVELOPMENT		POST-DEVELOPMENT	
BASIN 1	566	CF	1089	CF	
BASIN 2	1830	CF	4704	CF	
	2396	CF	5793	CF	
			3398	CF	INCREASE
BIOA	2052	CF			PROVIDED ABOVE FILTER MEDIA
BIOA	994	CF			PROVIDED IN FILTER MEDIA
OUTLET	1,034	CF			
		CF			
			4080	CF	PROVIDED
			-682	CF	EXCESS



Routing Diagram for Purefoy Rd - Peak Flow Analysis_10-9-16
 Prepared by {enter your company name here}, Printed 10/9/2016
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Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

Prepared by {enter your company name here}

Printed 10/9/2016

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Summary for Subcatchment 1S: Pre-Dev Basin 1

Runoff = 0.23 cfs @ 11.99 hrs, Volume= 581 cf, Depth= 0.45"

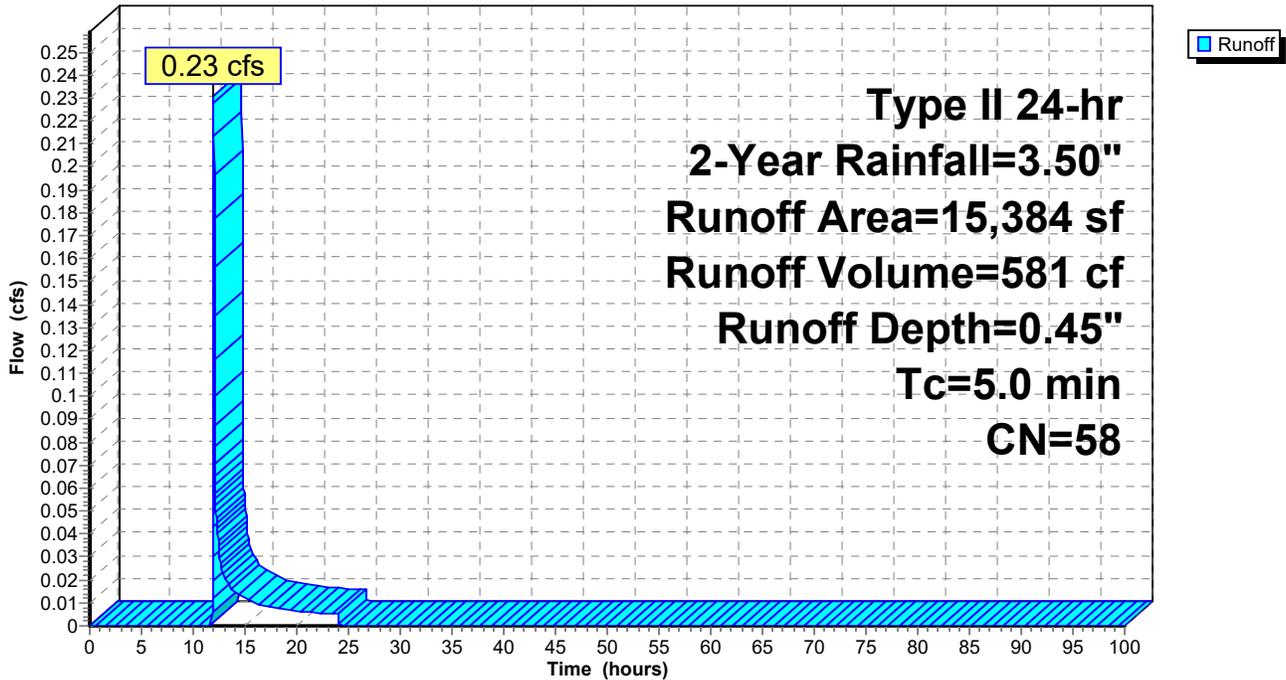
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
897	98	Roofs, HSG B
* 166	98	Sidewalk, HSG B
14,321	55	Woods, Good, HSG B
15,384	58	Weighted Average
14,321		93.09% Pervious Area
1,063		6.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5

Subcatchment 1S: Pre-Dev Basin 1

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 2S: Pre-Dev Basin 2

Runoff = 0.79 cfs @ 11.98 hrs, Volume= 1,834 cf, Depth= 0.53"

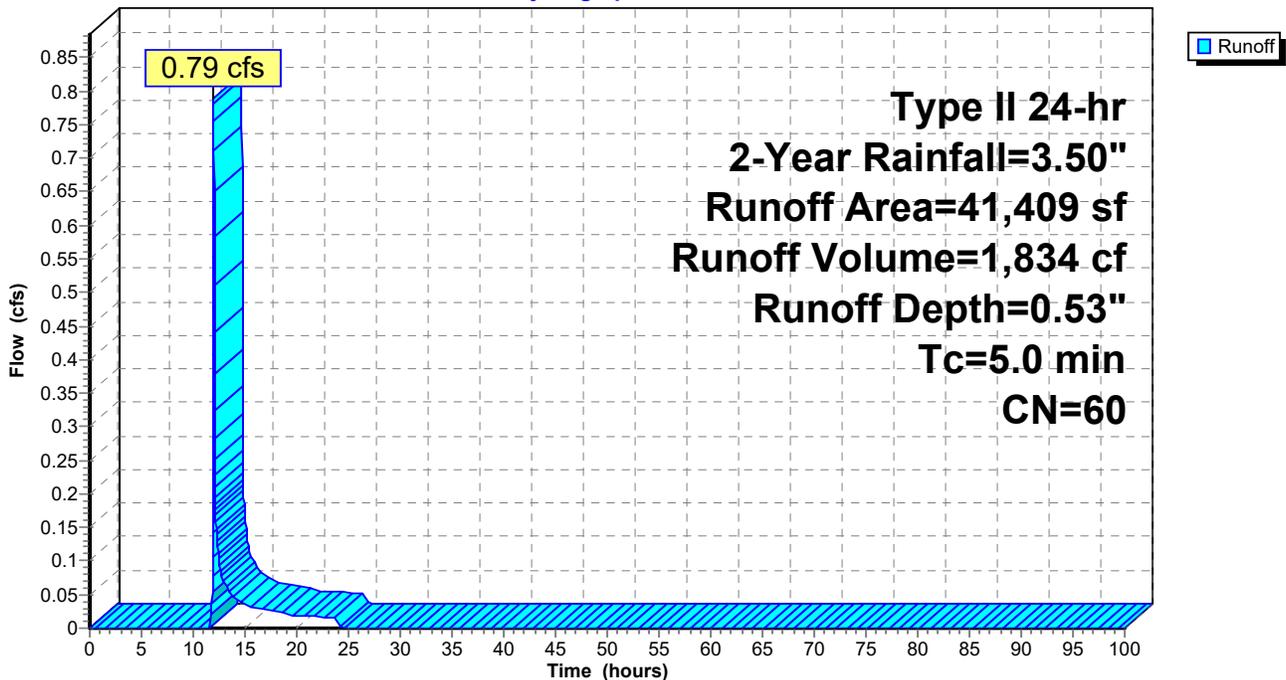
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
1,885	98	Roofs, HSG B
* 2,512	98	Paved Parking, HSG B
* 286	98	Sidewalks, HSG B
36,726	55	Woods, Good, HSG B
41,409	60	Weighted Average
36,726		88.69% Pervious Area
4,683		11.31% Impervious Area

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

Subcatchment 2S: Pre-Dev Basin 2

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

Prepared by {enter your company name here}

Printed 10/9/2016

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Summary for Subcatchment 4S: Post-Dev Basin 1

Runoff = 0.53 cfs @ 11.97 hrs, Volume= 1,086 cf, Depth= 0.85"

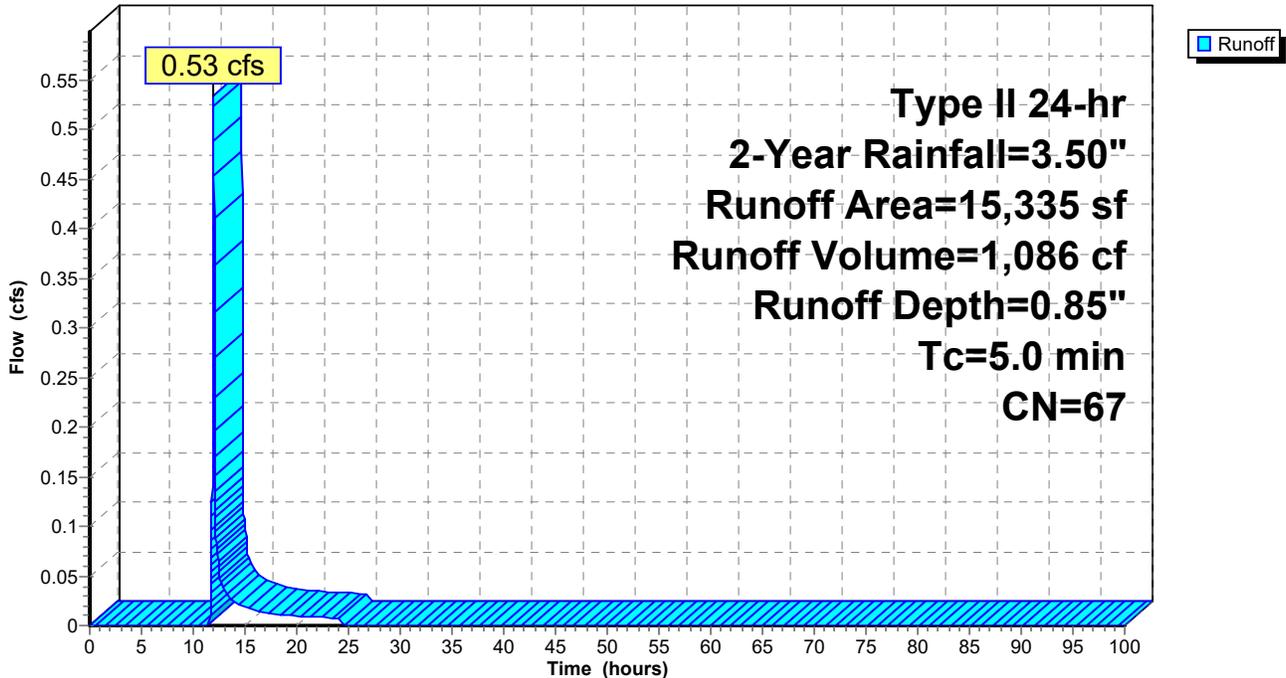
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
1,360	98	Roofs, HSG B
0	98	Paved parking, HSG B
* 948	98	Sidewalk, HSG B
13,027	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
15,335	67	Weighted Average
13,027		84.95% Pervious Area
2,308		15.05% Impervious Area

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

Subcatchment 4S: Post-Dev Basin 1

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 5S: Post-Dev Basin 2

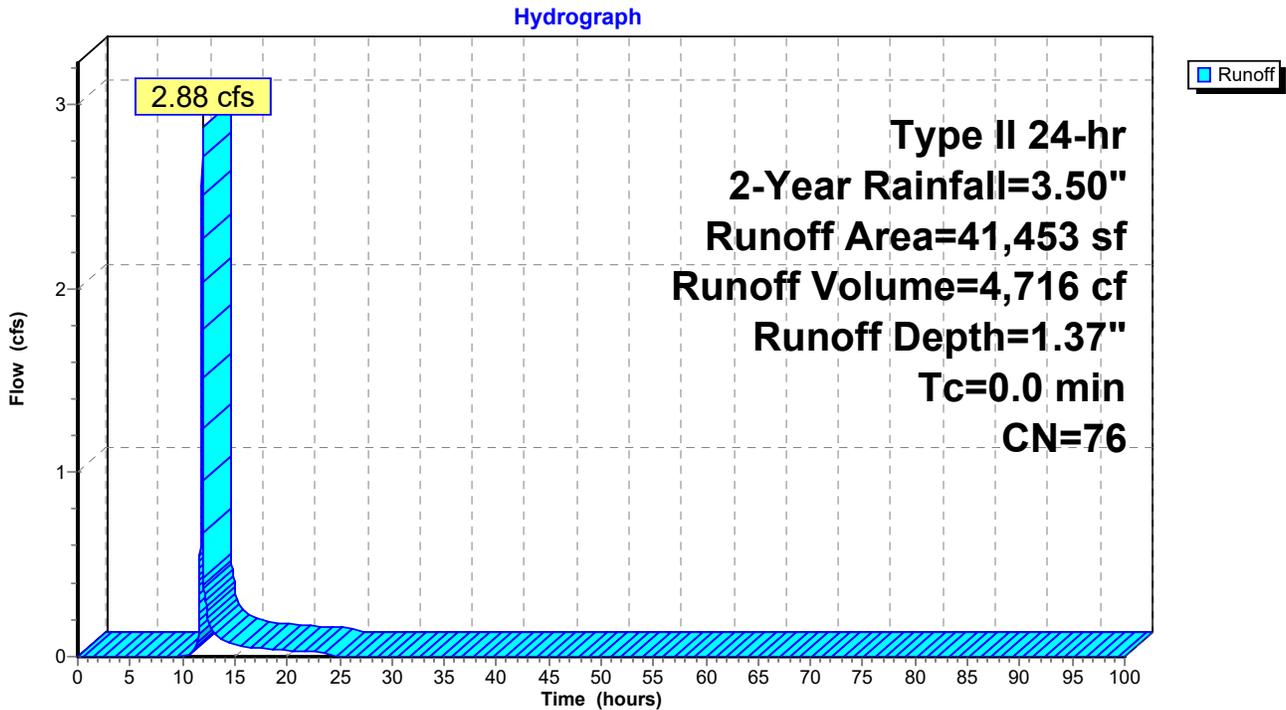
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.88 cfs @ 11.90 hrs, Volume= 4,716 cf, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
5,004	98	Roofs, HSG B
9,921	98	Paved parking, HSG B
* 1,709	98	Sidewalk, HSG B
24,819	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
41,453	76	Weighted Average
24,819		59.87% Pervious Area
16,634		40.13% Impervious Area

Subcatchment 5S: Post-Dev Basin 2



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 6S: Basin 2 Bypass

Runoff = 0.11 cfs @ 11.98 hrs, Volume= 238 cf, Depth= 0.57"

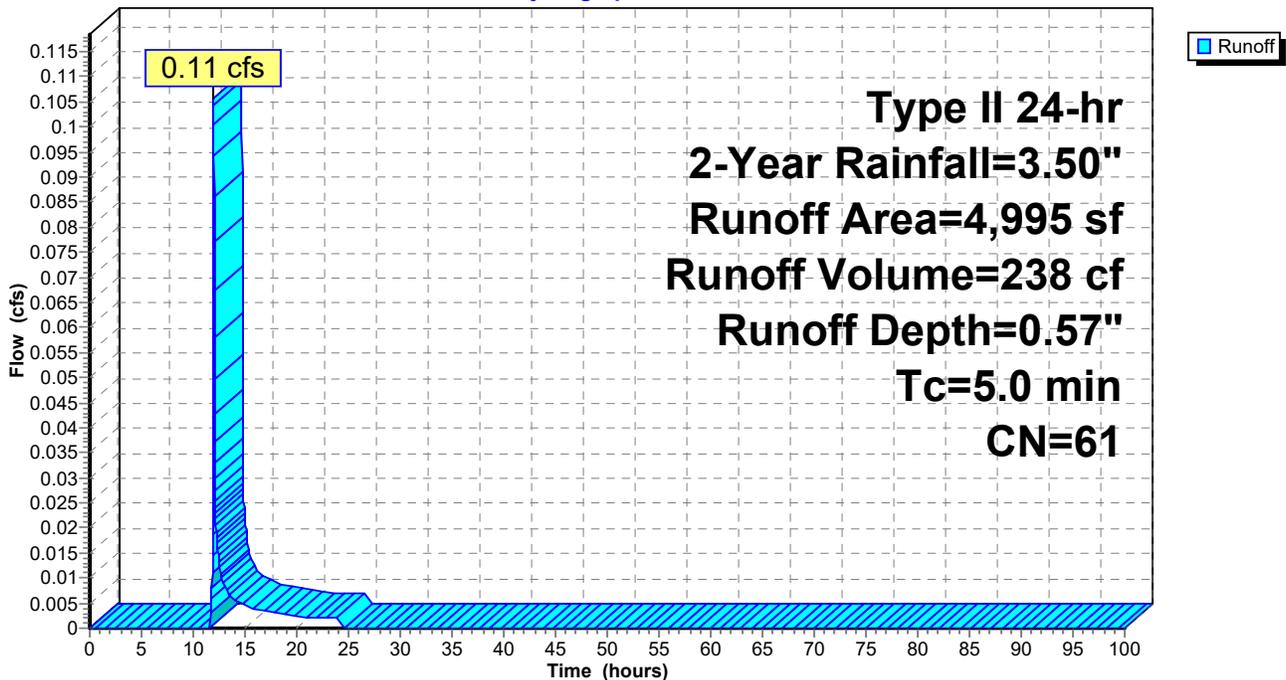
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
0	98	Roofs, HSG B
0	98	Paved parking, HSG B
0	98	Paved parking, HSG B
4,995	61	>75% Grass cover, Good, HSG B
0	55	Woods, Good, HSG B
4,995	61	Weighted Average
4,995		100.00% Pervious Area

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

Subcatchment 6S: Basin 2 Bypass

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Subcatchment 7S: DA to Bio-Retention Area

Runoff = 2.33 cfs @ 11.96 hrs, Volume= 4,549 cf, Depth= 1.50"

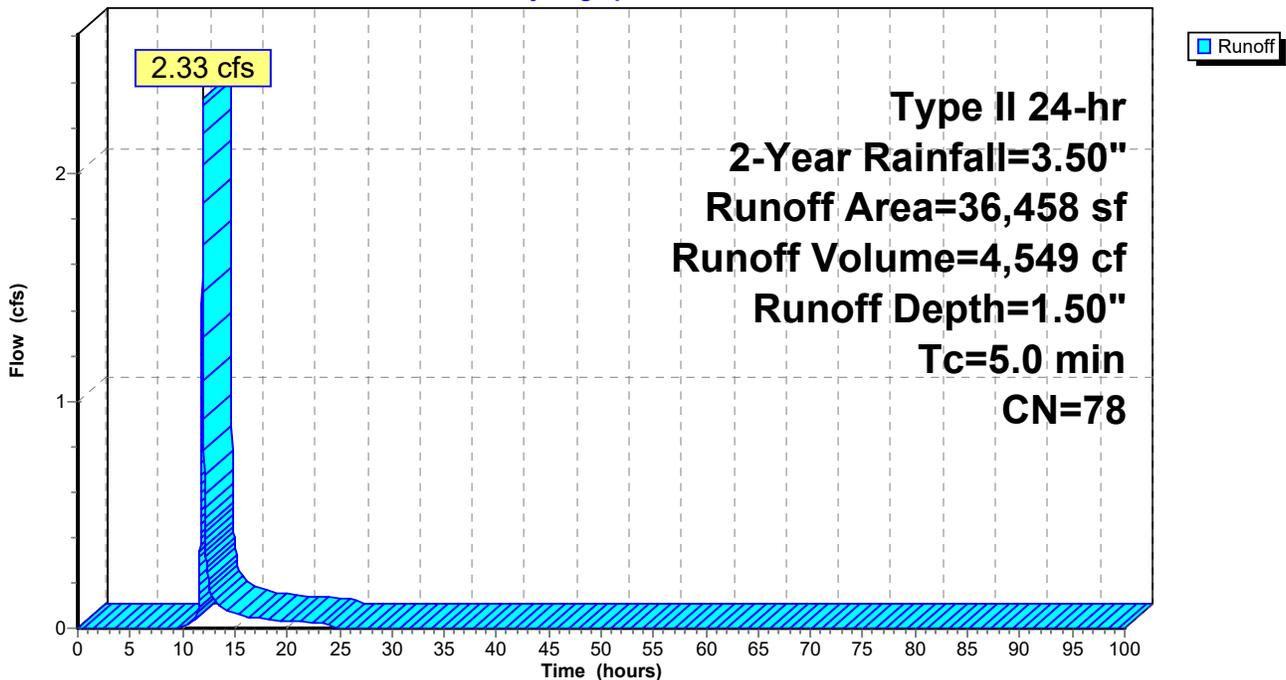
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
5,004	98	Roofs, HSG B
9,921	98	Paved parking, HSG B
* 1,709	98	Sidewalk, HSG B
19,824	61	>75% Grass cover, Good, HSG B
36,458	78	Weighted Average
19,824		54.37% Pervious Area
16,634		45.63% Impervious Area

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

Subcatchment 7S: DA to Bio-Retention Area

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Pond 8P: Bio-Retention Area

Inflow Area = 36,458 sf, 45.63% Impervious, Inflow Depth = 1.50" for 2-Year event
Inflow = 2.33 cfs @ 11.96 hrs, Volume= 4,549 cf
Outflow = 0.31 cfs @ 12.23 hrs, Volume= 2,497 cf, Atten= 87%, Lag= 16.1 min
Primary = 0.31 cfs @ 12.23 hrs, Volume= 2,497 cf

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 424.03' @ 12.23 hrs Surf.Area= 2,355 sf Storage= 2,127 cf

Plug-Flow detention time= 236.1 min calculated for 2,497 cf (55% of inflow)
Center-of-Mass det. time= 111.4 min (951.6 - 840.1)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	4,668 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

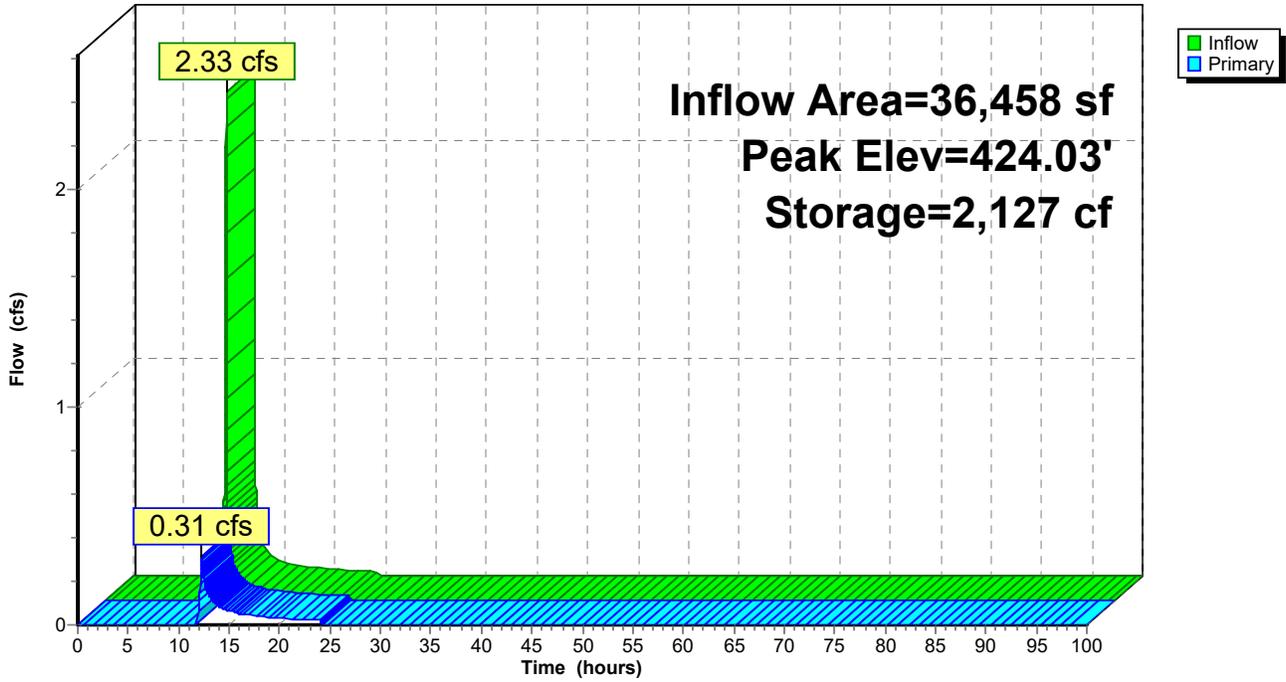
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	1,767	0	0
424.00	2,337	2,052	2,052
424.50	2,612	1,237	3,289
425.00	2,902	1,379	4,668

Device	Routing	Invert	Outlet Devices
#1	Primary	424.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.30 cfs @ 12.23 hrs HW=424.03' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 0.30 cfs @ 0.59 fps)

Pond 8P: Bio-Retention Area

Hydrograph



Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

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Summary for Pond 9P: Outlet Pipe Storage

Inflow Area = 36,458 sf, 45.63% Impervious, Inflow Depth = 0.82" for 2-Year event
 Inflow = 0.31 cfs @ 12.23 hrs, Volume= 2,497 cf
 Outflow = 0.04 cfs @ 17.58 hrs, Volume= 2,497 cf, Atten= 87%, Lag= 321.0 min
 Primary = 0.04 cfs @ 17.58 hrs, Volume= 2,497 cf

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.60' @ 17.58 hrs Surf.Area= 524 sf Storage= 1,034 cf

Plug-Flow detention time= 322.7 min calculated for 2,497 cf (100% of inflow)
 Center-of-Mass det. time= 322.7 min (1,274.3 - 951.6)

Volume	Invert	Avail.Storage	Storage Description
#1	418.50'	138 cf	5.00'W x 5.50'L x 5.00'H Prismatoid
#2	418.00'	113 cf	36.0" Round RCP_Round 36" L= 16.0' S= 0.0300 1'
#3	418.00'	294 cf	7.00'W x 7.00'L x 6.00'H Prismatoid
#4	418.00'	1,782 cf	66.0" Round RCP_Round 66" L= 75.0' S= 0.0050 1'
		2,326 cf	Total Available Storage

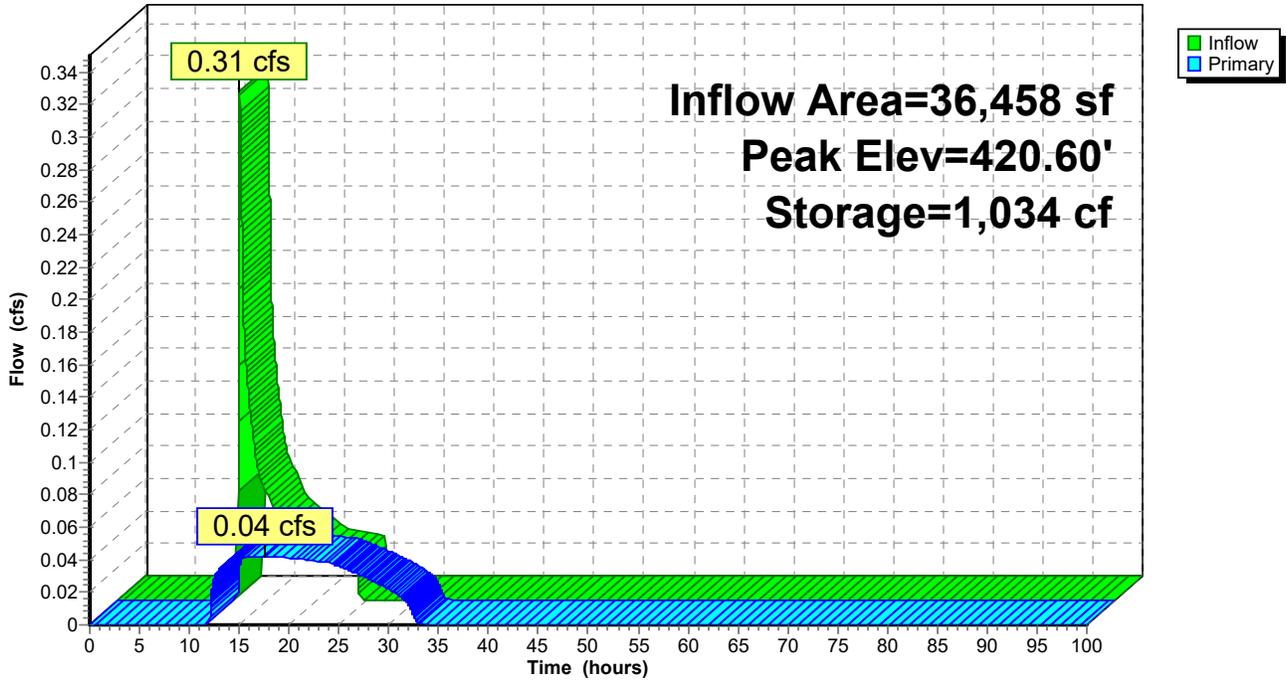
Device	Routing	Invert	Outlet Devices
#1	Primary	418.00'	1.0" Vert. Orifice/Grate C= 0.600
#2	Primary	421.00'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
#3	Primary	423.50'	5.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.04 cfs @ 17.58 hrs HW=420.60' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.04 cfs @ 7.71 fps)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 9P: Outlet Pipe Storage

Hydrograph



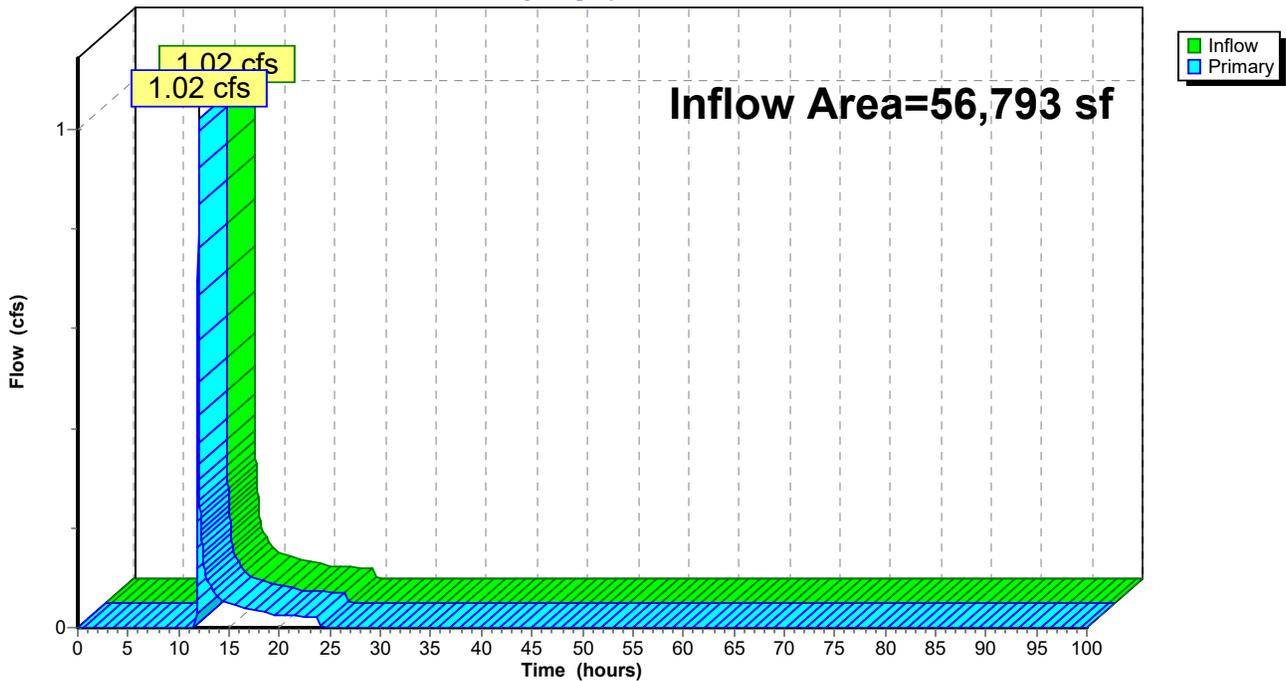
Summary for Link 3L: Pre-Site

Inflow Area = 56,793 sf, 10.12% Impervious, Inflow Depth = 0.51" for 2-Year event
Inflow = 1.02 cfs @ 11.98 hrs, Volume= 2,415 cf
Primary = 1.02 cfs @ 11.98 hrs, Volume= 2,415 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 3L: Pre-Site

Hydrograph



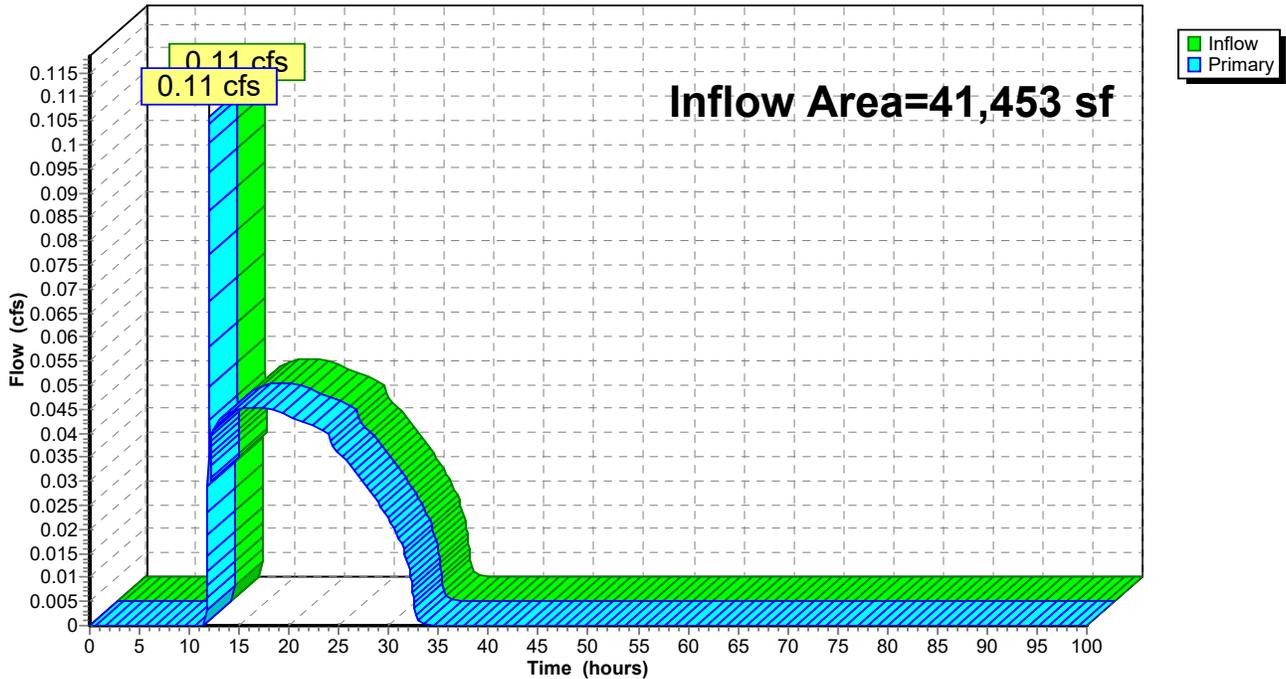
Summary for Link 10L: Link

Inflow Area = 41,453 sf, 40.13% Impervious, Inflow Depth = 0.79" for 2-Year event
Inflow = 0.11 cfs @ 11.98 hrs, Volume= 2,736 cf
Primary = 0.11 cfs @ 11.98 hrs, Volume= 2,736 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 10L: Link

Hydrograph



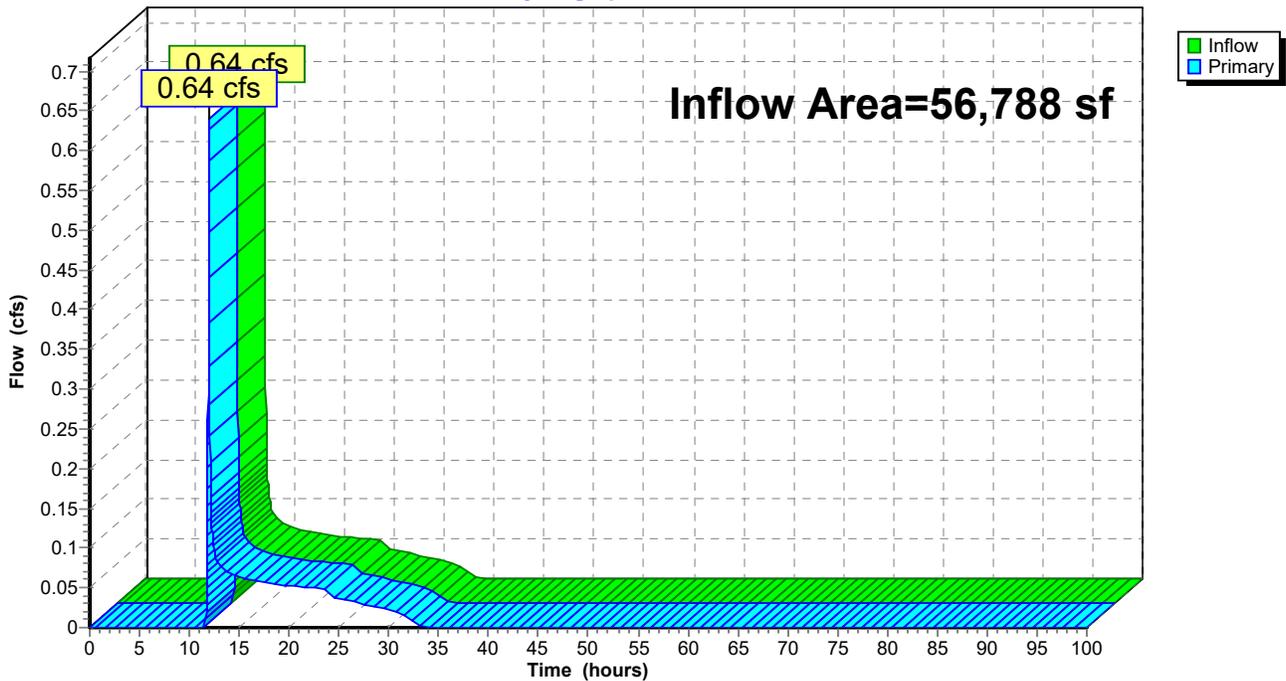
Summary for Link 11L: Post-Site

Inflow Area = 56,788 sf, 33.36% Impervious, Inflow Depth = 0.81" for 2-Year event
Inflow = 0.64 cfs @ 11.97 hrs, Volume= 3,822 cf
Primary = 0.64 cfs @ 11.97 hrs, Volume= 3,822 cf, Atten= 0%, Lag= 0.0 min

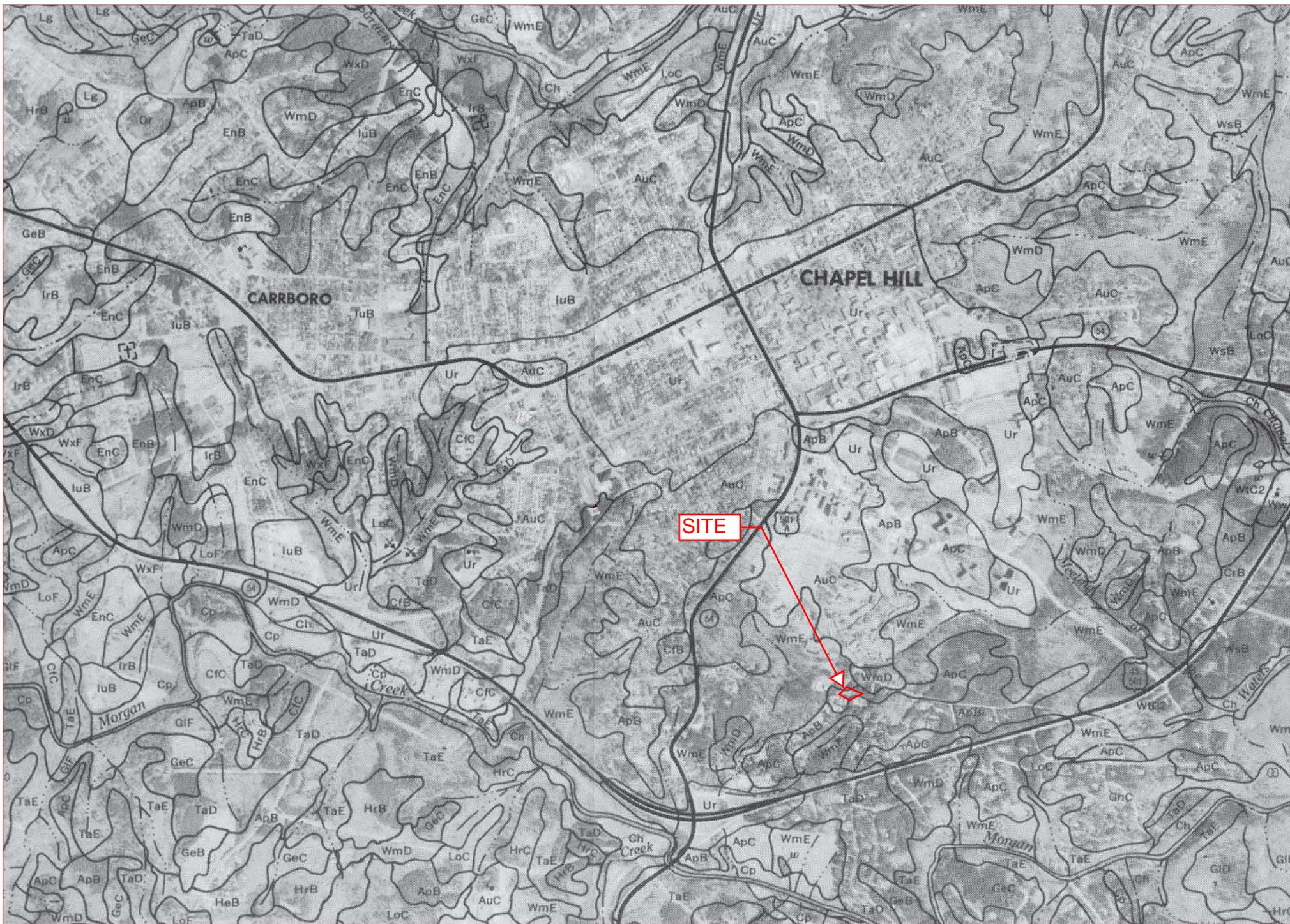
Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Post-Site

Hydrograph



SOILS, FLOOD, & USGS MAPS



COULTER JEWELL THAMES, PA
 111 WEST MAIN STREET
 DURHAM, NC 27701
 (919) 682-0368

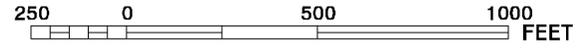
ORANGE COUNTY SOIL SURVEY
 Purefoy Road Apartments

October 7, 2016
 SCALE: 1"=2000'
 DRAWN BY: A. Wilson



GRID NORTH

MAP SCALE 1" = 500' (1 : 6,000)



NFIP

PANEL 9788J

FIRM
FLOOD INSURANCE RATE MAP
 NORTH CAROLINA

PANEL 9788

(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	CID No.	PANEL	SUFFIX
CARRBORO, TOWN OF	370275	9788	J
CHAPEL HILL, TOWN OF	370180	9788	J
ORANGE COUNTY	370342	9788	J

NATIONAL FLOOD INSURANCE PROGRAM

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

EFFECTIVE DATE
FEBRUARY 2, 2007

MAP NUMBER
3710978800J



State of North Carolina
 Federal Emergency Management Agency

Town of Chapel Hill
 Extraterritorial Jurisdiction

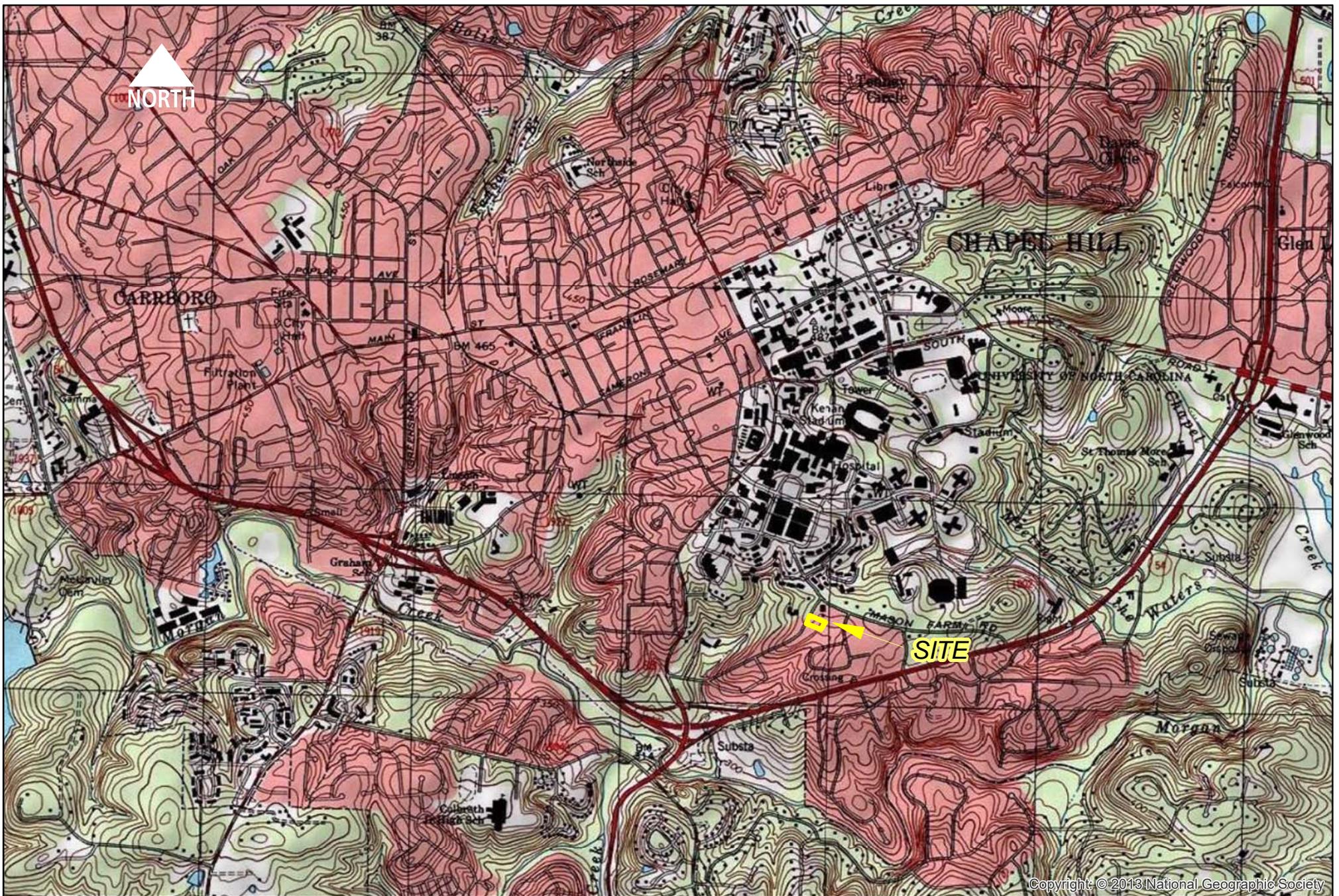
370180

FLOODING EFFECTS FROM
 MORGAN CREEK

ZONE AE
 (EL 305)

ZONE X

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



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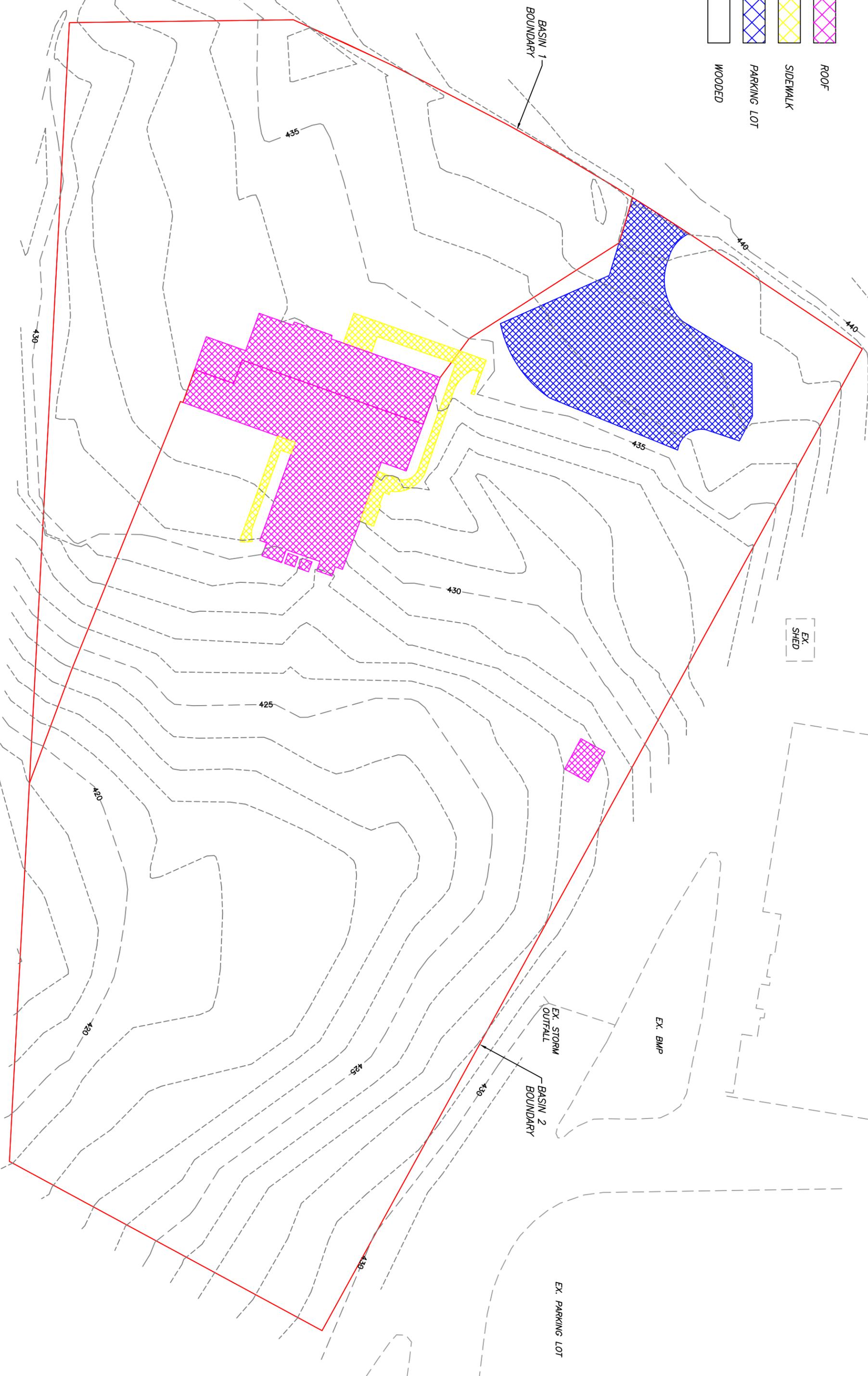
LOTIC TECHNICAL SERVICES, PLLC
200 N. MAIN ST, SUITE 300
GRAHAM, NC 27253
(864)506-1465

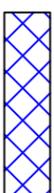
USGS QUAD MAP - CHAPEL HILL
PUREFOY RD APARTMENTS

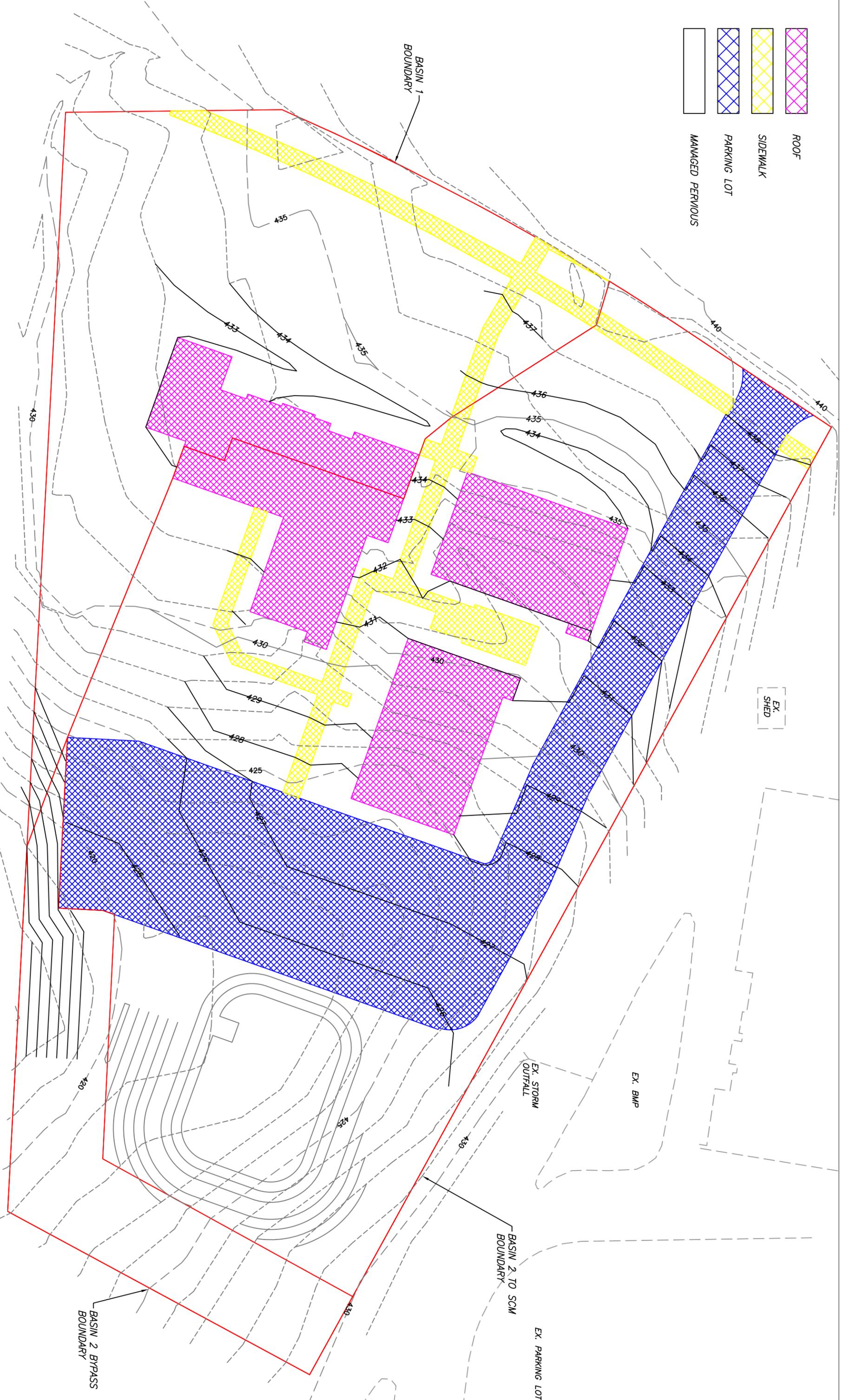
OCTOBER 7, 2016
SCALE: 1" = 2000'
DRAWN BY: I. JEWELL

DRAINAGE AREA MAPS

-  ROOF
-  SIDEWALK
-  PARKING LOT
-  WOODED



-  ROOF
-  SIDEWALK
-  PARKING LOT
-  MANAGED PERVIOUS



**BIORETENTION AREA
CALCULATIONS**



Project Name: Purefoy Rd. Apt
Project Number: 201616

By: ABW
Date: 10/4/2016

Revised:
Date:

BMP Sizing

Drainage Area = 0.84 ac
Impervious Area = 0.38 ac

Runoff Volume: Simple Method

$$V = 3630 * Rd * Rv * A$$

V = Runoff Volume (cf)
Rd = Design storm rainfall depth (1.0 in)
Rv = Runoff coefficient (unitless)
A = Drainage area (ac)

$$Rv = 0.5 + 0.9 * Ia$$

Ia = Impervious fraction

$$Ia = 0.4563$$

$$Rv = 0.4606$$

Required runoff Volume

$$V = 1,399 \text{ cf}$$

Volume Provided

$$V = 2052 \text{ cf}$$

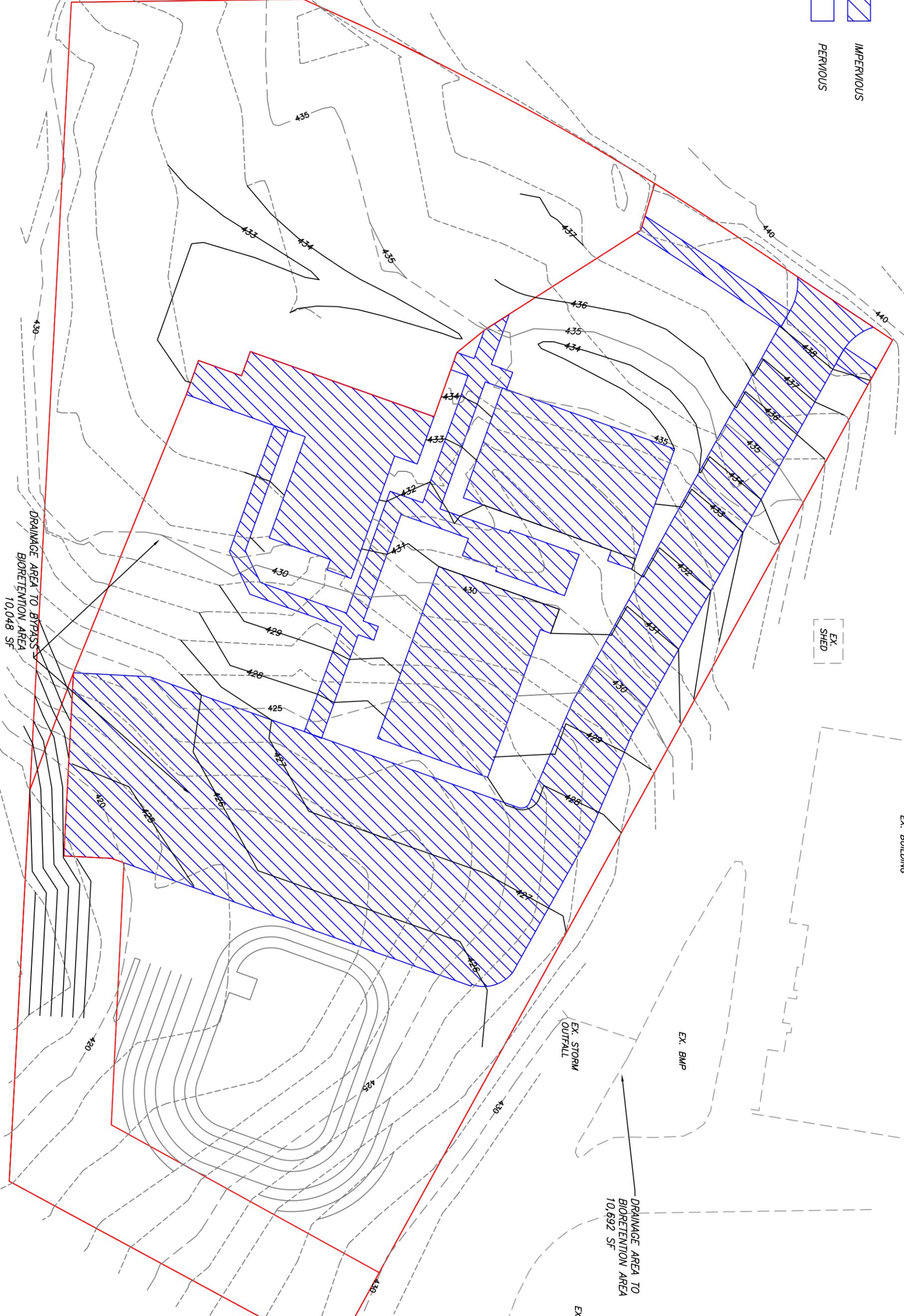
Required Surface Area:

$$\text{Ponding Depth} = 12 \text{ in}$$

$$\text{Surface Area} = 1,399 \text{ sf}$$

$$\text{Surface Area Provided} = 1,767 \text{ sf}$$

 IMPERVIOUS
 PERVIOUS



LOTIC TECHNICAL SOLUTIONS PLLC
 200 N. MAIN ST. SUITE 300
 GRAHAM, NC 27523
 (864) 506-1465

PEAK FLOW ANALYSIS - SCM
 PUREFOY ROAD APARTMENTS

SEPTEMBER 22, 2016
 SCALE: 1"=25'
 DRAWN BY: A. WILSON

Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

Prepared by {enter your company name here}

Printed 10/10/2016

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Page 2

Hydrograph for Pond 9P: Outlet Pipe Storage (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
10.60	0.00	0	418.00	0.00
10.80	0.00	0	418.00	0.00
11.00	0.00	0	418.00	0.00
11.20	0.00	0	418.00	0.00
11.40	0.00	0	418.00	0.00
11.60	0.00	0	418.00	0.00
11.80	0.00	0	418.00	0.00
12.00	0.00	0	418.00	0.00
12.20	0.31	69	418.49	0.02
12.40	0.26	266	419.04	0.03
12.60	0.18	405	419.36	0.03
12.80	0.15	502	419.56	0.03
13.00	0.14	583	419.73	0.03
13.20	0.12	650	419.86	0.04
13.40	0.11	708	419.97	0.04
13.60	0.10	756	420.07	0.04
13.80	0.09	797	420.15	0.04
14.00	0.08	832	420.22	0.04
14.20	0.08	861	420.27	0.04
14.40	0.07	886	420.32	0.04
14.60	0.07	909	420.36	0.04
14.80	0.07	930	420.40	0.04
15.00	0.07	949	420.44	0.04
15.20	0.06	966	420.47	0.04
15.40	0.06	980	420.50	0.04
15.60	0.06	992	420.52	0.04
15.80	0.05	1,002	420.54	0.04
16.00	0.05	1,010	420.56	0.04
16.20	0.05	1,016	420.57	0.04
16.40	0.05	1,021	420.58	0.04
16.60	0.05	1,025	420.59	0.04
16.80	0.05	1,028	420.59	0.04
17.00	0.04	1,031	420.60	0.04
17.20	0.04	1,033	420.60	0.04
17.40	0.04	1,034	420.60	0.04
17.60	0.04	1,034	420.60	0.04
17.80	0.04	1,034	420.60	0.04
18.00	0.04	1,032	420.60	0.04
18.20	0.04	1,031	420.60	0.04
18.40	0.04	1,028	420.59	0.04
18.60	0.04	1,025	420.59	0.04
18.80	0.04	1,021	420.58	0.04
19.00	0.03	1,016	420.57	0.04
19.20	0.03	1,011	420.56	0.04
19.40	0.03	1,005	420.55	0.04
19.60	0.03	998	420.53	0.04
19.80	0.03	990	420.52	0.04
20.00	0.03	982	420.50	0.04
20.20	0.03	974	420.49	0.04
20.40	0.03	965	420.47	0.04
20.60	0.03	956	420.45	0.04
20.80	0.03	947	420.44	0.04
21.00	0.03	937	420.42	0.04

Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

Prepared by {enter your company name here}

Printed 10/10/2016

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Page 3

Hydrograph for Pond 9P: Outlet Pipe Storage (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
21.20	0.03	928	420.40	0.04
21.40	0.03	919	420.38	0.04
21.60	0.03	910	420.37	0.04
21.80	0.03	901	420.35	0.04
22.00	0.03	891	420.33	0.04
22.20	0.03	882	420.31	0.04
22.40	0.03	873	420.30	0.04
22.60	0.03	864	420.28	0.04
22.80	0.03	854	420.26	0.04
23.00	0.03	845	420.24	0.04
23.20	0.03	835	420.22	0.04
23.40	0.03	826	420.20	0.04
23.60	0.03	816	420.19	0.04
23.80	0.03	807	420.17	0.04
24.00	0.02	797	420.15	0.04
24.20	0.01	783	420.12	0.04
24.40	0.00	757	420.07	0.04
24.60	0.00	731	420.02	0.04
24.80	0.00	704	419.97	0.04
25.00	0.00	678	419.92	0.04
25.20	0.00	653	419.87	0.04
25.40	0.00	627	419.82	0.03
25.60	0.00	602	419.77	0.03
25.80	0.00	578	419.72	0.03
26.00	0.00	553	419.67	0.03
26.20	0.00	529	419.62	0.03
26.40	0.00	506	419.57	0.03
26.60	0.00	483	419.52	0.03
26.80	0.00	460	419.47	0.03
27.00	0.00	437	419.42	0.03
27.20	0.00	415	419.38	0.03
27.40	0.00	394	419.33	0.03
27.60	0.00	372	419.28	0.03
27.80	0.00	352	419.24	0.03
28.00	0.00	331	419.19	0.03
28.20	0.00	311	419.14	0.03
28.40	0.00	291	419.10	0.03
28.60	0.00	272	419.05	0.03
28.80	0.00	253	419.01	0.03
29.00	0.00	235	418.96	0.03
29.20	0.00	217	418.92	0.02
29.40	0.00	200	418.87	0.02
29.60	0.00	183	418.83	0.02
29.80	0.00	166	418.78	0.02
30.00	0.00	150	418.74	0.02
30.20	0.00	135	418.70	0.02
30.40	0.00	119	418.65	0.02
30.60	0.00	105	418.61	0.02
30.80	0.00	91	418.56	0.02
31.00	0.00	78	418.52	0.02
31.20	0.00	65	418.47	0.02
31.40	0.00	53	418.42	0.02
31.60	0.00	42	418.37	0.02

Purefoy Rd - Peak Flow Analysis_10-9-16

Type II 24-hr 2-Year Rainfall=3.50"

Prepared by {enter your company name here}

Printed 10/10/2016

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Page 4

Hydrograph for Pond 9P: Outlet Pipe Storage (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
31.80	0.00	31	418.32	0.01
32.00	0.00	22	418.26	0.01
32.20	0.00	14	418.19	0.01
32.40	0.00	8	418.12	0.01
32.60	0.00	4	418.07	0.00
32.80	0.00	2	418.03	0.00
33.00	0.00	1	418.01	0.00
33.20	0.00	0	418.01	0.00
33.40	0.00	0	418.00	0.00
33.60	0.00	0	418.00	0.00
33.80	0.00	0	418.00	0.00
34.00	0.00	0	418.00	0.00
34.20	0.00	0	418.00	0.00
34.40	0.00	0	418.00	0.00
34.60	0.00	0	418.00	0.00
34.80	0.00	0	418.00	0.00
35.00	0.00	0	418.00	0.00
35.20	0.00	0	418.00	0.00
35.40	0.00	0	418.00	0.00
35.60	0.00	0	418.00	0.00
35.80	0.00	0	418.00	0.00
36.00	0.00	0	418.00	0.00
36.20	0.00	0	418.00	0.00
36.40	0.00	0	418.00	0.00
36.60	0.00	0	418.00	0.00
36.80	0.00	0	418.00	0.00
37.00	0.00	0	418.00	0.00
37.20	0.00	0	418.00	0.00
37.40	0.00	0	418.00	0.00
37.60	0.00	0	418.00	0.00
37.80	0.00	0	418.00	0.00
38.00	0.00	0	418.00	0.00
38.20	0.00	0	418.00	0.00
38.40	0.00	0	418.00	0.00
38.60	0.00	0	418.00	0.00
38.80	0.00	0	418.00	0.00
39.00	0.00	0	418.00	0.00
39.20	0.00	0	418.00	0.00
39.40	0.00	0	418.00	0.00
39.60	0.00	0	418.00	0.00
39.80	0.00	0	418.00	0.00
40.00	0.00	0	418.00	0.00
40.20	0.00	0	418.00	0.00
40.40	0.00	0	418.00	0.00
40.60	0.00	0	418.00	0.00
40.80	0.00	0	418.00	0.00
41.00	0.00	0	418.00	0.00
41.20	0.00	0	418.00	0.00
41.40	0.00	0	418.00	0.00
41.60	0.00	0	418.00	0.00
41.80	0.00	0	418.00	0.00
42.00	0.00	0	418.00	0.00
42.20	0.00	0	418.00	0.00

BUOYANCY CALCULATIONS



Project Name: Purefoy Road Apartments
Project Number: 201616

By: ABW
Date: 10/9/2016

Revised:
Date:

Anti-Floatation Sizing Calculations

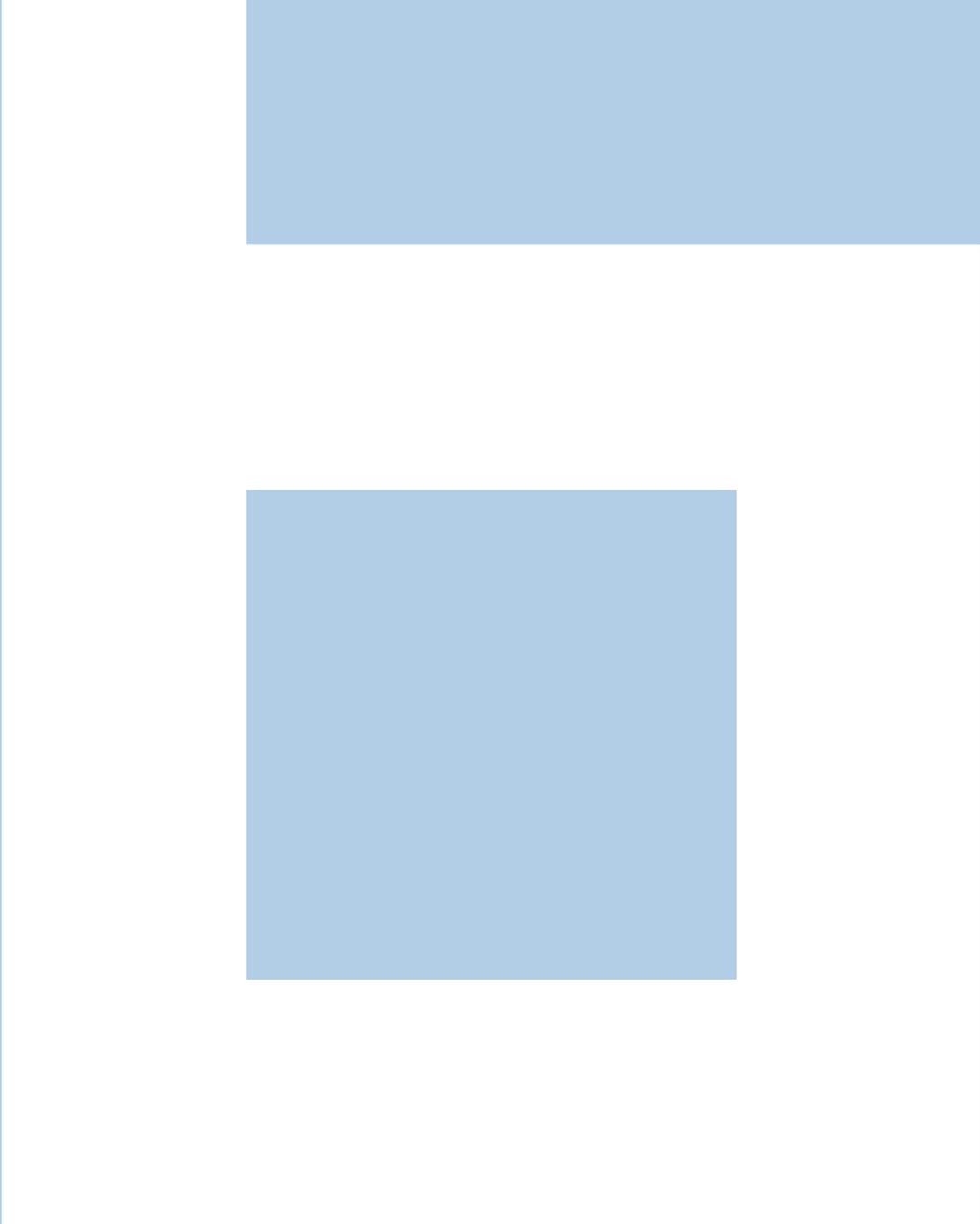
Outlet Structure Dimension

Inside Riser Width:	7 ft	Outside Riser Width:	8 ft
Wall Thickness:	0.5 ft		
Top Elevation:	425 ft		
Top Thickness:	0.5 ft		
Invert Elevation:	418 ft		
Bottom Elevation:	416.3 ft		
Weir Elevation:	423.5 ft		
Weir Size:	3.5 cu ft		

Displaced Volume:	557 cu ft
Displaced Weight:	34744 lbs

Volume of Actual Structure:	234.80 cu ft
Weight of Concrete Structure:	35220 lbs
Total Weight of Structure:	35220 lbs

Factor of Safety:	1.01
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Public Information Meeting Notice

Purefoy Rd Apartments

Address: 111 Purefoy Rd

Application Type: Site Plan Review Application

Meeting Date and Time: Wednesday, November 16, 2016 at 5:15pm

Meeting Location: First Floor Conference Room, Town Hall, 405 Martin Luther King Jr Blvd

Applicant Name: Andrew Porter, Coulter Jewell Thames, P.A.

Description: Construction of two new two-unit apartment buildings, addition to and conversion of an existing single family house to a multi-family dwelling and associated site improvements

Proposed Floor Area: 13,495 square feet

Proposed New Dwelling Units: 4; **Total:** 5

Project # 16-106

Property Location: See map on reverse side.

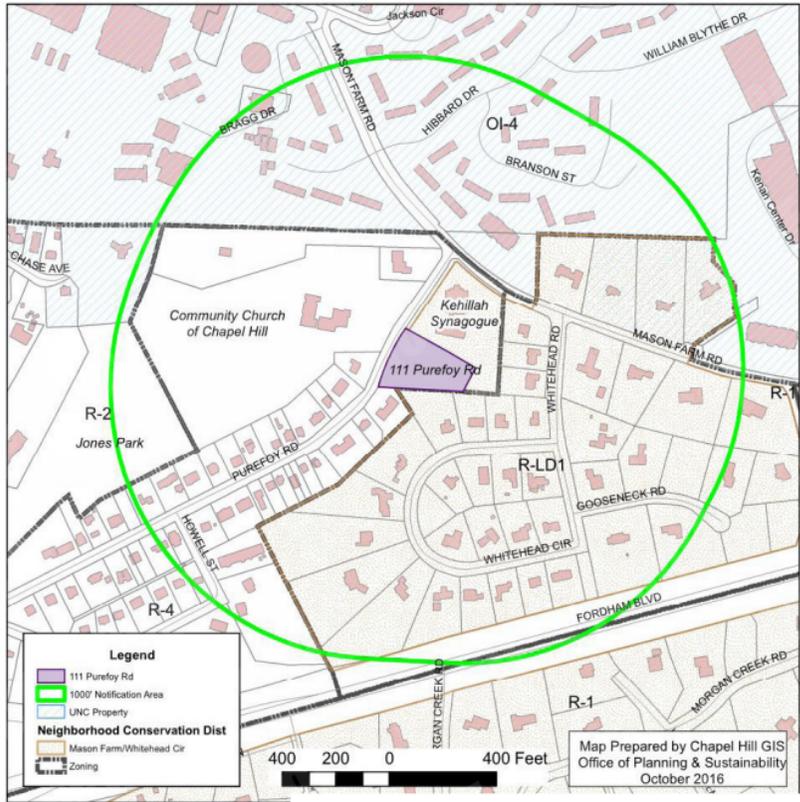
Property ID: Orange County PIN 9788-41-9609

Zoning: Residential -3, Mason Farm/Whitehead Circle Neighborhood Conservation District (R-3, CD-5)

Public Information Meetings are an informal opportunity for the applicant to share their project with community members and for community members to share feedback with the applicant and Town staff. This application will be acted upon by the Planning Commission at a future, unscheduled meeting. For more information visit the Town's website at <http://chplan.us/16-106> or call Jay Heikes in Planning and Sustainability at 919-969-5082

111 Purefoy Road 1000' Notification Map

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Development Services Division
Town of Chapel Hill
405 Martin Luther King Jr. Blvd.
Chapel Hill, NC 27514



ALEXANDER HERBERT MARION
401 WHITEHEAD CIR
CHAPEL HILL, NC 27514

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Development Services Division
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Chapel Hill, NC 27514

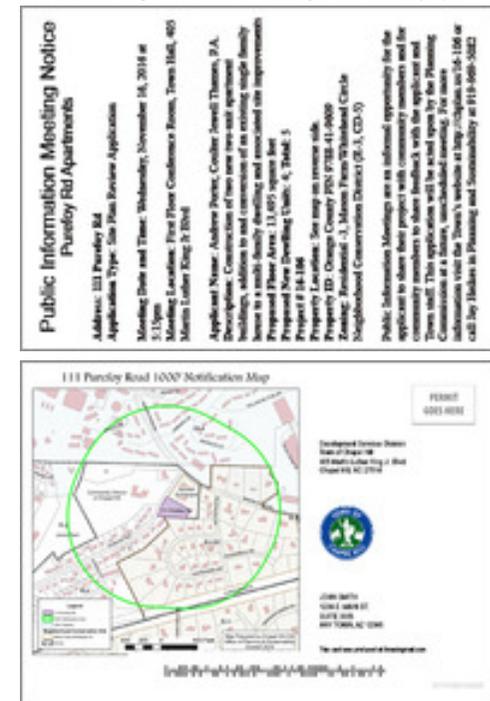
Customer Support

1.888.681.1214 6:30AM-4PM (PST)
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Details about your mailing

Date/Time PDF generated: October 31st, 2016 at 6:56am MST
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Session Information: 198.85.222.1, 20161031065027953021
Postage: First Class Mail
- Cards will be mailed to all recipients, both verified and unverified.
File used from postcard gallery: 16-106 111 Purefoy Rd PIM (3042381)
Total Postcards to be mailed: 62
Projected mailing date: November 1st, 2016

Proof below shows 1 out of 62 cards.



Customer Support recommendations

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Gene Poveromo

From: Mike Klein
Sent: Monday, April 11, 2016 2:19 PM
To: 'Ken Gorfkle'
Cc: Becky McDonnell; Phil Mason; Jay Heikes; Judy Johnson; Kay Pearlstein
Subject: RE: 111 Purefoy

Ken, sounds like you need to schedule a conference with CD staff. We have vacancies. You want to work on that with Becky?

Otherwise....

This property lies within the Mason Farm/Whitehead Circle NCD (CD-5) and the FAR is .15, and there are increased setbacks.

The credited street area adjustment to NLA is half the right-of-way width, times length of frontage, but not more than a maximum of 10% of NLA.

In R-4 zoning you'd need 5 acres minimum for more than 7 units. And anything above 2 units would trigger application of current design standards (section 5 of the LUMO).

It's in the watershed, not in the buffer. That generally means if you go over 50% impervious coverage on any lot you have to provide onsite stormwater management.

Mike

From: Ken Gorfkle [mailto:kgorfkle@bellsouth.net]
Sent: Monday, April 11, 2016 1:45 PM
To: Mike Klein <mklein@townofchapelhill.org>
Subject: 111 Purefoy

Hi, Mike,

111 Purefoy is either 1.3 acres or 1.18 acres (the latter is "calculated acres"). Could you tell me which one I should use in my calculations – 1.3 acres or 1.18 acres? Also, I am multiplying by 1.10 to obtain GLA – any reason I can't do that on this lot?

As I understand it, the lot is R4, which means that minimum lot size is 5500 sf and FAR is .23. Is that correct?

How many units can I put on this lot if I do a site plan evaluation (since I don't want to go before Town Council)? It seems like I can put 11 units, just with a site plan evaluation, but maybe there are some restrictions that I don't know about.

I believe this lot is in the Jordan Lake Protected Buffer. What does that mean to me?

Is there anything else that I should know about this lot that might prohibit me from developing it?

Thanks,
Ken

Gene Poveromo

From: Mike Klein
Sent: Wednesday, April 13, 2016 11:42 AM
To: 'Ken Gorfkle'
Subject: 111 Purefoy

Ken, I think this is what you're looking for, excerpt from LUMO section 3.6.4 Watershed Protection Overlay District.

Sorry the formatting gets a little scrambled. You're basically interested in the table at the end of the excerpt.

Mike

- (c)

Development in the Watershed Protection District.

This Article shall apply to development and land-disturbing activities within the WPD after the effective date (July 1, 1993) of this article unless exempted by this section, or permitted by section 3.6.4(d), or allowed pursuant to a variance authorized by this article and approved by the board of adjustment.

- (1)

Application of watershed protection district to development existing on July 1, 1993.

This article shall not apply to the continued use, operation or maintenance of any development existing, or for which construction had substantially begun, on or before July 1, 1993. In addition, the article shall not apply to existing development which has established a vested right under North Carolina zoning law as of July 1, 1993, based on the following criteria:

- A.

Substantial expenditure of resources (time, labor, money) based on a good faith reliance upon having received a valid approval to proceed with the project;

- B.

Having an outstanding valid building permit; or

- C.

Having expended substantial resources (time, labor, money) and having an approved site specific development plan pursuant to section 20.4 of the Development Ordinance.

With respect to the requirements of this article, such development shall not be considered as nonconforming within the meaning of [article 7](#) of this appendix.

Multiple lots under single ownership as of July 1, 1993 are not subject to the provisions of this ordinance if vested rights have been established in accordance with North Carolina law. If no vested rights are established, then owners must comply with the provisions of this ordinance. Compliance may include requiring the recombination of lots.

- (2)

Application to existing single family and two-family lots.

This article shall not apply to single family and two-family development constructed or to be constructed on existing single-family lots created prior to July 1, 1993. This exemption is not applicable to multiple lots under single ownership. For purposes of constructing a single-family or two-family dwelling, lots of record as of July 1, 1993 which are established through a duly approved and properly recorded final plat shall be exempt from the provisions of this appendix.

- (3)

Application of the watershed protection district to the redevelopment or expansion of development.

Redevelopment is allowed under the provisions of this article if the redevelopment activity does not have a net increase of built-upon area or provides equal or greater stormwater control than the previous development, except that there are no restrictions on lawfully established single family and two-family residential redevelopment.

Expansions to existing development as of July 1, 1993 must meet the requirements of this Article; however, the built-upon area of existing development is not required to be included in density and impervious surface area calculations, and there are no restrictions on expansion of lawfully established single family and two-family development.

(d)

Permitted uses within the watershed protection district.

(1)

The requirements or permitted uses indicated in the underlying zoning district, or any applicable overlay zone, apply in the watershed protection district, provided the standards of sections 3.6.4(e) and 3.6.4(g) are met.

(e)

Intensity regulations.

(1)

Land use intensity regulations.

The intensity regulations are those generally applicable to the underlying zoning district, or any applicable overlay zone, except as modified below.

(2)

Additional intensity regulations.

In order to prevent an excessive amount of stormwater runoff from damaging the water quality of the reservoirs, it is desirable to require as much infiltration as possible of runoff from hard surfaces onto land areas which can absorb and filter runoff.

Any development in the watershed protection district shall be subject to one (1) of two (2) options, or a combination of options, to control non-point source and stormwater pollution, as described in Table 3.6.4-1.

Table 3.6.4-1: Development Options

Option	Standards
Low density option	Development activities shall not exceed two (2) dwelling units per acre (gross land area) or twenty-four (24) per cent built-upon area (impervious surface area) of gross land area.
High density option	Development activities which exceed the low density option requirements must control the runoff from the first inch of rainfall. In addition, the built-upon area may not exceed fifty (50) per cent of gross land area for residential development or seventy (70) per cent for development with a non-residential component. All development under the high density option must meet the applicable performance standards of section 3.6.4(g).

From: Jay Heikes
Sent: Friday, October 28, 2016 10:50 AM
To: Deborah Squires <dsquires@townofchapelhill.org>
Subject: RE: Map Request: 111 Purefoy Rd

Thanks Deborah,

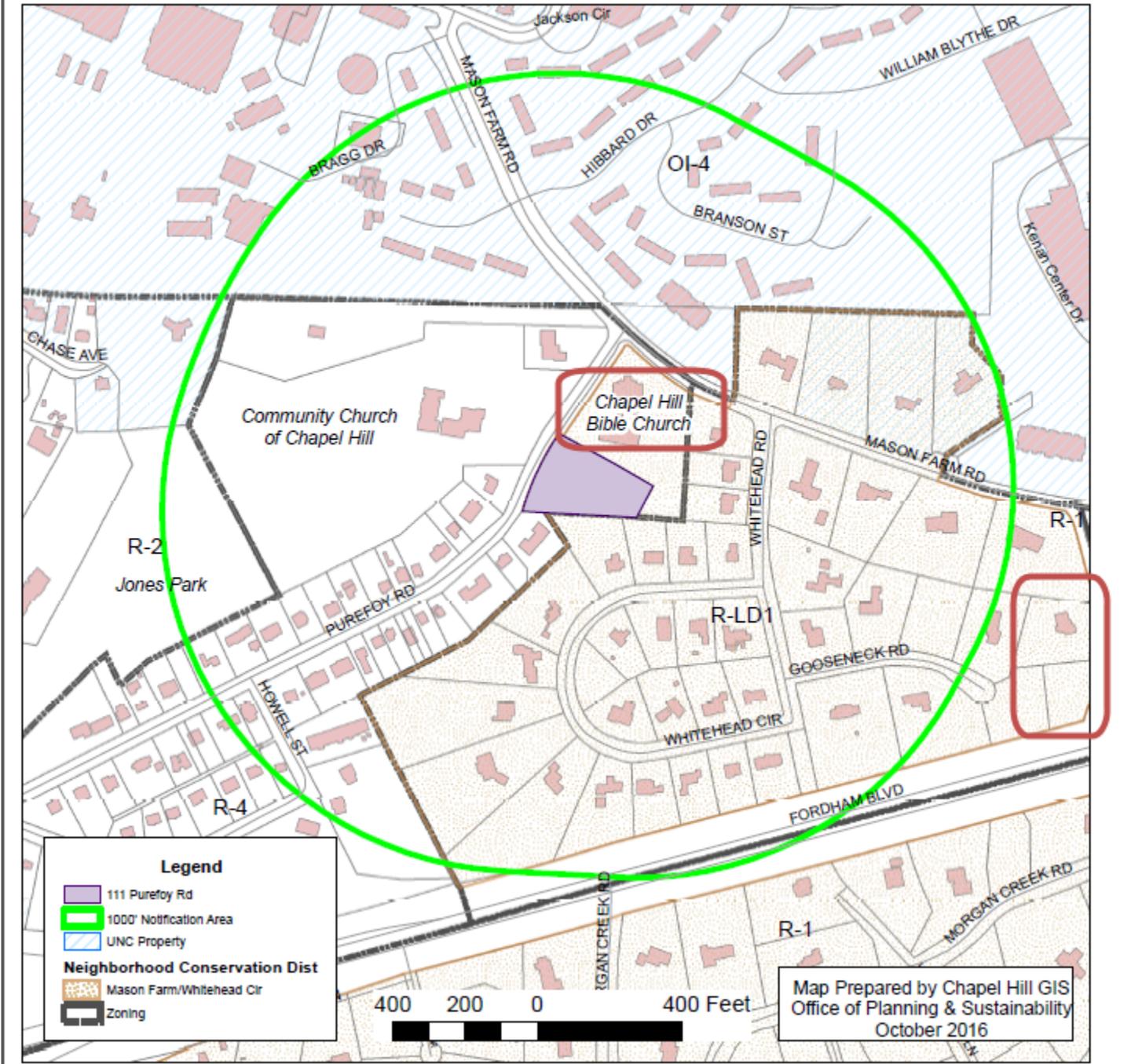
A few quick changes / requests:

- Replace “Chapel Hill Bible Church” with “Kehillah Synagogue”
- Add a call-out for this project that reads “111 Purefoy Rd” – I think this will be helpful since two adjacent parcels are labeled.
- Can you give me the property owners name and mailing address for the three parcels highlighted in the lower right. I want to make sure I get all of the properties in the NCD

Thanks for your help!

Jay

111 Purefoy Road 1000' Notification Map



Jay Heikes, Planner

Development Services Division | Planning and Sustainability
405 Martin Luther King Jr Blvd. | Chapel Hill NC 27514

Town of Chapel Hill | www.townofchapelhill.org
t: 919-969-5082 | jheikes@townofchapelhill.org

From: Deborah Squires
Sent: Friday, October 28, 2016 10:32 AM

To: Jay Heikes
Subject: RE: Map Request: 111 Purefoy Rd

Here you go, let me know if I need to add anything else.

Be not inhospitable to strangers, lest they be Angels in disguise"

Deborah Frederick-Squires GISP
Planning and Sustainability
Town of Chapel Hill
405 Martin Luther King Jr. Blvd.
Chapel Hill, NC 27514
919-969-5089

From: Jay Heikes
Sent: Thursday, October 27, 2016 6:30 PM
To: Deborah Squires <dsquires@townofchapelhill.org>
Subject: Map Request: 111 Purefoy Rd

Hi Deborah,

I need a notification postcard map with a 1000 foot boundary for this project.

Thanks!

Jay



Jay Heikes, Planner

Development Services Division | Planning and Sustainability
405 Martin Luther King Jr Blvd. | Chapel Hill NC 27514

Town of Chapel Hill | www.townofchapelhill.org
t: 919-969-5082 | jheikes@townofchapelhill.org