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April 2, 2015

VIA ELECTRONIC MAIL AND HAND-DELIVERY

Mr. Robert Stein, Chairman
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

**Re: Petition of SolarCity Corporation for a Declaratory Ruling for the Location
and Construction of a 3.1 Megawatt Solar Electric Generating Facility on
Brush Hill Road, Bozrah, Connecticut**

Dear Chairman Stein:

On behalf of SolarCity Corporation ("SolarCity"), we are submitting an original and fifteen (15) copies of the above-captioned Petition of SolarCity Corporation for a Declaratory Ruling ("Petition"), together with a filing fee of \$625.

In the Petition, SolarCity requests that the Connecticut Siting Council approve the location and construction of a 3.1 megawatt solar electric generating facility to be located on Brush Hill Road in Bozrah, Connecticut. Please contact Thomas J. Regan, Esq. at 860-509-6522 or me at 860-509-6575 with any questions or if you need additional information.

Very truly yours,

BROWN RUDNICK LLP

By:

Philip M. Small
Counsel for SolarCity Corporation

PMS/jmb
Enclosures

61917260 v1-WorksiteUS-031819/0001

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

PETITION OF SOLARCITY CORPORATION FOR A : PETITION NO. _____
DECLARATORY RULING FOR THE LOCATION :
AND CONSTRUCTION OF A 3.1 MEGAWATT :
SOLAR ELECTRIC GENERATING FACILITY ON :
BRUSH HILL ROAD, BOZRAH, CONNECTICUT : APRIL 2, 2015
: _____

PETITION OF SOLARCITY CORPORATION
FOR A DECLARATORY RULING

Pursuant to Conn. Gen. Stat. §§ 4-176 and 16-50k(a) and Conn. Agencies Regs. § 16-50j-38 *et seq.*, SolarCity Corporation (“SolarCity”) requests that the Connecticut Siting Council (“Council”) approve by declaratory ruling SolarCity’s location and construction of a 3.1 megawatt (“MW”) solar electric generating facility (the “Facility”), located on Brush Hill Road in Bozrah, Connecticut (the “Site”).

Conn. Gen. Stat. § 16-50k(a) provides that:

“Notwithstanding the provisions of this chapter or title 16a, the council shall, in the exercise of its jurisdiction over the siting of generating facilities, approve by declaratory ruling... (B) the construction or location ... of any customer-side distributed resources project or facility or grid-side distributed resources project or facility with a capacity of not more than sixty-five megawatts, as long as such project meets air and water quality standards of the Department of Energy and Environmental Protection....”

As discussed fully in this petition, the Facility will be a “grid-side distributed resources” facility, as defined in Conn. Gen. Stat. §16-1(a)(38) (revised to January 1, 2015),¹ under 65 MW that complies with the air and water quality standards of the Connecticut

¹ Formerly Conn. Gen. Stat. § 16-1(a)(43).

Department of Energy and Environmental Protection (“DEEP”). Additionally, the Facility will not have a substantial adverse environmental effect in the State of Connecticut.

I. COMMUNICATIONS

Correspondence and other communication regarding this petition should be directed to the following parties:

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II. DISCUSSION

A. Background

SolarCity’s proposed solar array will consist of approximately 10,206 Hanwha solar panels and up to four utility scale inverters with a total output of approximately 3.1 MW located on approximately 11.5 acres on Brush Hill Road in Bozrah, Connecticut. The Facility will be a Community Shared Solar facility that is being developed in conjunction with the Connecticut Municipal Electric Energy Cooperative. The Facility will afford all Bozrah Light

and Power customers access to renewable energy at market rate pricing without the need for special equipment or complex contracts with third party renewable energy providers.

Prior to filing this petition, SolarCity met with the Town of Bozrah ("Town" or "Bozrah") to review its proposed solar array and continues a dialogue with Town officials. Although this Facility is not subject to Bozrah's land use application processes, SolarCity has designed it to meet the intent of Bozrah's local land use regulations. Finally, a copy of this filing and the site plan was provided to the Town for its review.

B. Description of the Site and the Facility

1. The Site

The proposed Facility will be located on Brush Hill Road² in Bozrah, Connecticut (a sparsely developed portion of Bozrah) on a 25.2± acre parcel identified as Map 4, Lot 006A1 by the Bozrah Assessor's office. The Site is zoned "I-80 - Industrial" but has never been developed. Generally, the eastern portion of the Site is wooded while the western part has been cleared. The Facility in its entirety will encompass 15.8 acres of the Site with the solar panels, associated equipment and access road comprising 11.5 acres of that. Approximately 9 acres of mature forest will require clearing and grading to facilitate the installation of the solar arrays and associated equipment. A copy of the site plan for the Facility is attached hereto as Exhibit 1.

² Please note that the Town of Bozrah will issue a street address for the Site once the building permit is filed.

The Site is bound to the north by a cleared agricultural field and woods; to the west by Brush Hill Road, agricultural land and one single-family residence; to the east by undeveloped wooded land; and to the south by a single-family residence and undeveloped woods.

The Site contains four wetland areas (as described in more detail in the Environmental Assessment (“EA”) attached as Exhibit 2), none of which will be directly or indirectly impacted by the proposed Facility. In addition, there is an off-site area potentially supporting a vernal pool breeding habitat approximately 600 feet to the north of the Site (Exhibit 2, p.4). There are no public water supply wells proximate to the Site, the Site is not located within an Aquifer Protection Area and no private water supply wells exist on the Site. Based on the DEEP’s Natural Diversity Database mapping and confirmed during consultations, no threatened, endangered, or special concern species or critical habitats are located at, or in the vicinity of, the Site.

2. The Facility

The proposed solar array will consist of approximately 10,206 Hanwha solar panels, each measuring approximately 6.4 feet by 3.25 feet by 1.57 inches. Collectively, the solar panels will generate approximately 3.1 MW and will cover approximately 11.5 acres. The Facility will also include four utility scale inverters (Solectria SGI 750XTM and Solectria SGI 500XTM). SolarCity will use cast-in-place concrete ballasts and a GameChange racking system. Each concrete ballast will cover approximately 8.6 square feet and will be spaced approximately every 13 feet along each row of solar arrays. Individual panels will be placed at a 25° tilt to the south. A gravel access drive will utilize the existing entrance off of Brush Hill

Road and will extend approximately 1,475 feet eastward through the Site and end in a round-about. The entire Facility will be surrounded by a 6-foot tall chain link fence. The Facility will not consume any raw materials, will not produce any byproducts and will not be staffed during normal operating conditions.

C. The Facility Complies with DEEP's Air and Water Quality Standards and Will Not Have a Substantial Adverse Environmental Effect

The construction and operation of the Facility will comply with DEEP's air and water quality standards and will not have a substantial adverse environmental effect.

The proposed Facility will not have any air emission sources and therefore, will not have any effect on air quality.

The solar array areas will be regraded with existing or imported soil and then covered with native grasses and vegetation. The only impervious areas will be the concrete ballasts located beneath the solar panels and racking. A stormwater management system has been designed for this Facility. This system is described in the Stormwater Management Report attached as Exhibit 3. The stormwater management system contains measures for controlling and capturing potential erosion and sedimentation during construction and regulating peak, post-development stormwater flows for maintaining consistency with pre-development, peak stormwater flows to adjacent properties. The system will include stormwater basins and infiltration trenches with outlet control structures that will provide detention as well as water quality enhancement for the stormwater runoff. The peak rate of Site stormwater is expected to increase slightly due to the installation of the impervious surfaces (concrete ballasts).

However, post-development, off-site flow rates will not be increased by construction of the Facility.

The proposed Facility will require clearing of 9 acres and grading of approximately 15.8 acres of the Site to facilitate the proposed solar development. Of the approximate 15.8 acres, approximately 6.8 have been previously cleared, with an additional 9 acres of mature forest that will need to be removed. The development area contains a moderate slope which generally can be reshaped without significant cutting and filling. No wetlands or watercourses will be permanently impacted by the proposed Facility. Although the clearing limits are in proximity to the four wetlands detailed in the EA ([Exhibit 2](#)), they are **not** within the wetland areas. The closest construction activity to a wetland or watercourse resource is to the intermittent watercourse feature referred to as Wetland 3. The clearing limits will be approximately 15 feet north of this wetlands with a stormwater outfall located approximately 70 feet to the north of this wetland's northernmost point. Similarly, clearing limits would also extend within approximately 20 feet of an intermittent watercourse feature associated with Wetland 2; a stormwater outfall along the access road would be located approximately 70 feet to the north of this wetland.

There will be minor short term, temporary impacts associated with the construction activities at the Site due to the proximity to wetland and intermittent watercourse resources. To mitigate those impacts, sedimentation and erosion controls will be designed, installed and maintained during construction activities in accordance with the DEEP's General Permit for Stormwater and Dewatering Wastewaters from Construction (the "DEEP General Permit") and

the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. In addition, SolarCity will create a wetland protection plan which will provide additional measures to avoid temporary wetland impacts. Any long term secondary impacts to wetland resources possibly associated with operation of the Facility will be minimized by the fact that the development is unstaffed and generates minimal traffic. SolarCity minimizes the creation of impervious surfaces with the use of a gravel access drive, and with the majority of the surface treatment around the solar installation consisting of native grasses/vegetation.

The stormwater generated by the proposed Facility will be properly handled and treated in accordance with the DEEP General Permit and DEEP's 2004 *Connecticut Stormwater Quality Manual*. As part of the EA, All-Points Technology Corporation ("APT") performed an evaluation of the potential impacts that the proposed solar development may have on vernal pool habitat. The evaluation concluded that the construction and operation of the Facility will not result in direct physical impact to the potential vernal pool resource. Specifically, the critical 100-foot area around the vernal pool will not be impacted as the proposed clearing limits are approximately 390 feet south of the closest vernal pool edge.

The proposed Facility may, however, result in a slight increase in impacts to the terrestrial habitat integrity of the vernal pool. Therefore, SolarCity plans to conduct a thorough vernal pool survey this spring to collect the necessary biological data so that the Project's potential impacts to vernal pool terrestrial habitat can be more accurately assessed and quantified.

The proposed construction activities will result in the clearing of trees and mature vegetation that has the potential to support breeding birds. Once the Council approves the Facility, a construction schedule will be determined, and SolarCity will evaluate whether the potential exists for nest disturbance and plan accordingly. To avoid potential disturbance during periods of high bird activity, SolarCity will use the following schedule as a general guideline. If construction activities should occur during the peak nesting period of April 15 through July 15,¹ a visual nesting (presence/absence) survey may be conducted to determine if breeding birds would be disturbed. If the visual nesting survey concludes that breeding birds would be disturbed, tree clearing activities may be restricted from the April 15 through July 15 peak nesting period (or a modified time frame based on the specific findings of the survey).

A review request was sent to the DEEP's Natural Resources Database in September 2014 to confirm no threatened, endangered, or special concern species or critical habitats exist at the Site. On February 23, 2015 the DEEP responded (response included as attachment in Exhibit 2, Environmental Assessment) and indicated that "after review of the proposed plans for this solar development, it is unlikely that it will negatively impact State-listed species in the area." Although no State-listed species will be impacted, the DEEP's February 23, 2015 correspondence suggests consideration of other sensitive wildlife species of conservation concern. SolarCity's consultant, APT, is currently consulting with the DEEP to determine the appropriateness of the suggestions relative to this Facility.

¹ The United States Fish and Wildlife Service ("USFWS") identifies the peak avian nesting season as April 15 through July 15 and recommends clearing activities be performed before this period in order to comply with the Migratory Bird Treaty Act, personal communication with Maria Tur, USFWS New England Field Office, February 27, 2014.

III. NOTICE

SolarCity has provided notice of this petition to all persons and appropriate municipal officials and governmental agencies to whom notice is required to be given pursuant to Conn. Agencies Regs. § 16-50j-40(a).³ A copy of the notice letter and a service list is attached as Exhibit 4.

IV. BASIS FOR GRANTING OF THE PETITION

Under Conn. Gen. Stat. § 16-50k(a), the Council is required to approve by declaratory ruling the construction or location of a grid-side distributed resources project or facility with a capacity of not more than 65 MW, as long as the facility meets DEEP air and water quality standards. The proposed Facility meets both of these criteria. First, the Facility is a “grid-side distributed resources” project, as defined in Conn. Gen. Stat. § 16-1(a)(38), because the Facility is “a unit with a rating of not more than sixty-five megawatts that is connected to the transmission or distribution system....” Second, as demonstrated above and in the EA, the Facility will meet DEEP air and water quality standards. In addition, as demonstrated above, the construction and operation of the Facility will not have a substantial adverse environmental effect in the State of Connecticut.

V. CONCLUSION

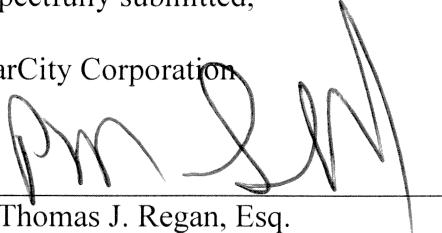
For the reasons stated above, SolarCity respectfully requests that the Council approve the location and construction of the Facility by declaratory ruling.

³ Conn. Agencies Regs. § 16-50j-40(a) requires that “[p]rior to submitting a petition for a declaratory ruling to the Council, the petitioner shall, where applicable, provide notice to each person other than the petitioner appearing of record as an owner of property which abuts the proposed primary or alternative sites of the proposed facility, each person appearing of record as an owner of the property or properties on which the primary or alternative proposed facility is to be located, and the appropriate municipal officials and government agencies [listed in Section 16-50l of the Connecticut General Statutes].”

Respectfully submitted,

SolarCity Corporation

By:



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Philip M. Small, Esq.

Brown Rudnick LLP

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EXHIBITS

Exhibit 1 – Site Plan

Exhibit 2 – Environmental Assessment

Exhibit 3 – Stormwater Management Report

Exhibit 4 – Notice

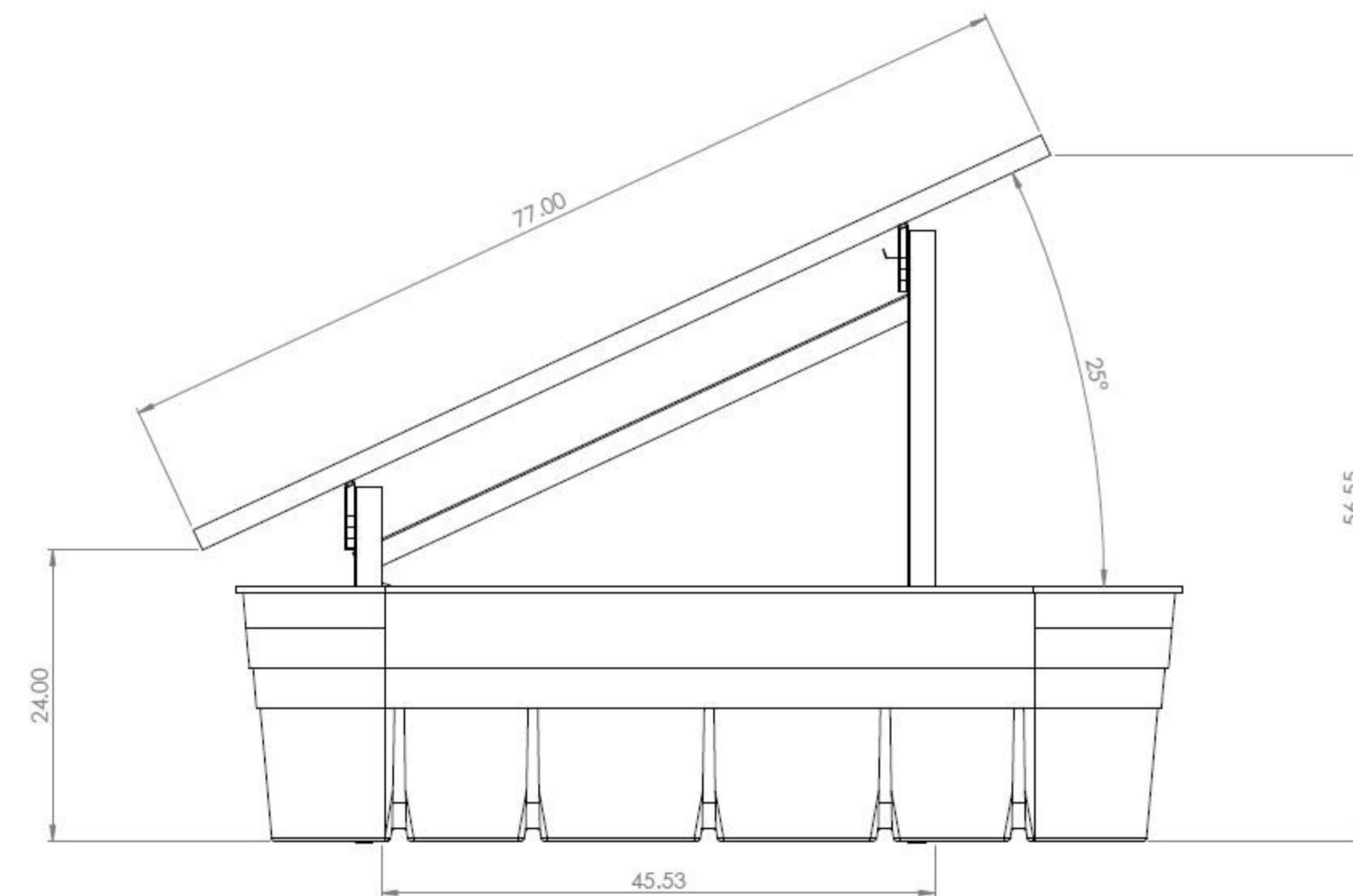
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EXHIBIT 1

SITE PLAN

3,163.86 KW SOLAR PV SYSTEM FOR CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE - BOZRAH

SOLAR MODULE RACKING



VICINITY MAP



SYSTEM SUMMARY

TOTAL SYSTEM SIZE : 3,163.86 KW
MODULE: (10206)HANWHA
QCells#Q.PRO L-G2 310
PV MODULE; 310W, 283.8W PTC, 40MM,
SILVER FRAME, MC4

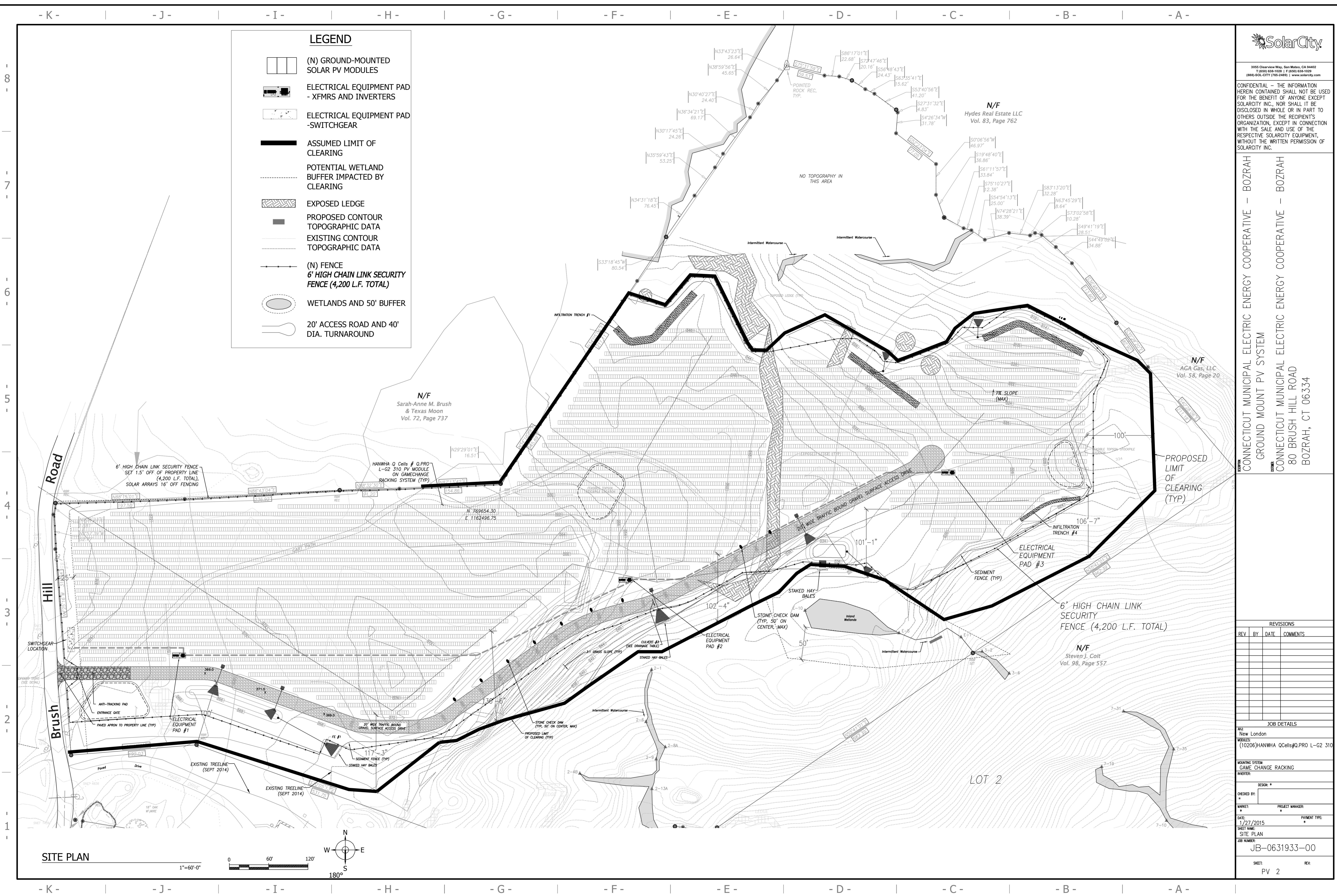
RACK TYPE: GAME CHANGE

ARRAY TILT: 25°

AZIMUTH: 180

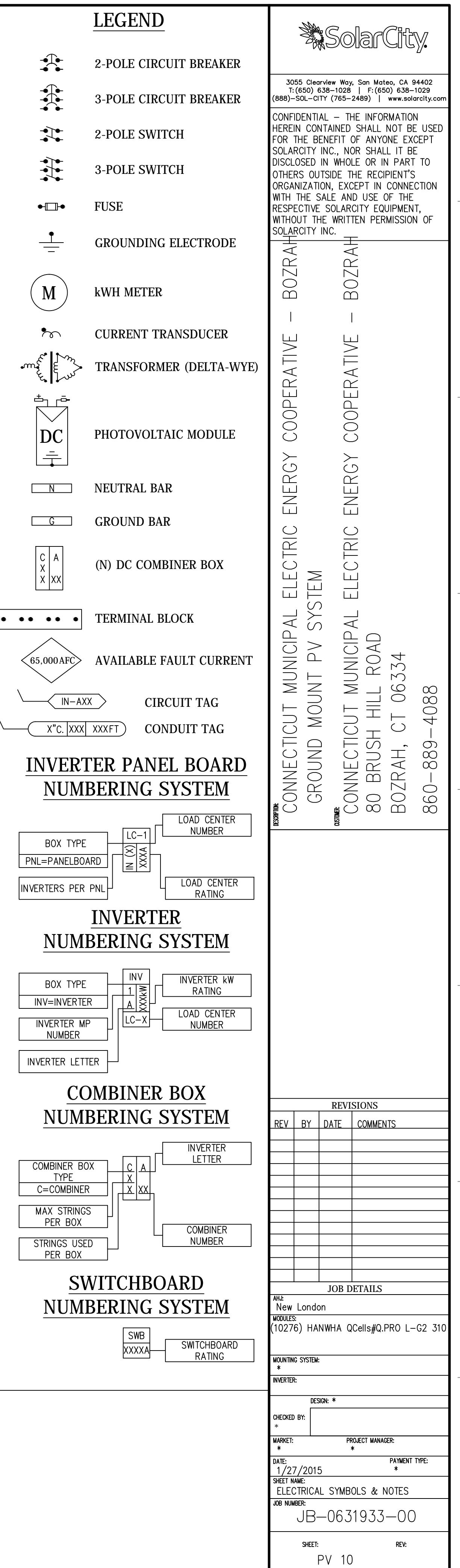
DEPTON: CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE – BOZRAH
GROUND MOUNT PV SYSTEM

DEPTON: CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE – BOZRAH
80 BRUSH HILL ROAD
BOZRAH, CT 06334



EXTERNAL TRANSFORMER REQUIREMENTS FOR SOLECTRIA XTM INVERTER				ELECTRICAL NOTES				LEGEND		SolarCity	
1. TRANSFORMER TYPE THE TRANSFORMER SHALL BE THREE PHASE, SELF-COOLED, AND DESIGNED FOR STEP-UP OPERATION. TRANSFORMER SHALL BE UL LISTED. PAD MOUNT, DISTRIBUTION TYPE TRANSFORMERS SHALL COMPLY WITH THE LATEST ISSUE OF IEEE/ANSI C57.12.34. TRANSFORMER SHALL OPERATE AT 60HZ NOMINAL AND SHALL BE TOLERANT OF CONTINUOUS FREQUENCIES BETWEEN 54.0HZ AND 60.5HZ. TRANSFORMER SHALL BE CAPABLE OF OPERATING AT 1.1P.U. VOLTAGE AT FULL LOAD WITHOUT SATURATION FOR PERIODS OF TIME TYPICAL OF THE EXPECTED GENERATION PROFILE. DIFFERENT FREQUENCY AND VOLTAGE REQUIREMENTS MAY BE NECESSARY FOR PROJECTS WITH VOLTAGE OR FREQUENCY RIDE THROUGH REQUIREMENTS OTHER THAN THOSE DEFINED IN IEEE 1547-2003. REQUIREMENTS OUTSIDE OF THIS STANDARD RANGE MUST BE REVIEWED AND APPROVED BY SOLECTRIA.	Number of 380V Windings (Inverters)	Impedance (Absolute Minimum)	7. ELECTROSTATIC SHIELD TRANSFORMERS WITH THREE WINDINGS SHALL INCLUDE ELECTROSTATIC SHIELDING BETWEEN THE LOW AND HIGH VOLTAGE WINDINGS. THE SHIELDING MUST BE GROUNDED TO THE TRANSFORMER TANK OR ENCLOSURE.	GENERAL NOTES 1. ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2011 NATIONAL ELECTRIC CODE AS AMENDED BY APPLICABLE STATE AND LOCAL CODES.	GROUNDING NOTES 1. SINGLE-CONDUCTOR CABLE USED AS A GROUNDED CONDUCTOR IN PHOTOVOLTAIC POWER SYSTEMS SHALL BE IDENTIFIED AT THE TIME OF INSTALLATION BY DISTINCTIVE WHITE MARKING AT ALL TERMINATIONS PER ART 200.6.	INTERCONNECTION NOTES 1. LOAD SIDE INTERCONNECTIONS SHALL COMPLY WITH ART. 705.12(D) AND ART 230 FOR THE INSTALLATION OF AN ADDITIONAL SERVICE ENTRANCE.		2-POLE CIRCUIT BREAKER		3-POLE CIRCUIT BREAKER	
1	1.80%		2. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART 210.5.	2. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART 210.5.	2. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART 210.5.	2. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART 210.5.		2-POLE SWITCH		3-POLE SWITCH	
2	High-Low#1 4%	High-Low #2 4%	3. ALL EQUIPMENT SHALL BE LISTED BY A NRTL IN COMPLIANCE WITH ART 110.3.	3. ALL EQUIPMENT SHALL BE LISTED BY A NRTL IN COMPLIANCE WITH ART 110.3.	3. ALL EQUIPMENT SHALL BE LISTED BY A NRTL IN COMPLIANCE WITH ART 110.3.	3. ALL EQUIPMENT SHALL BE LISTED BY A NRTL IN COMPLIANCE WITH ART 110.3.		FUSE			
	Low#1-Low#2 7%	Table 1 – Percent Impedance %Z	4. DC CONDUCTORS INSIDE BUILDING SHALL BE IN METALLIC RACEWAY PER ART 690.31(E).	4. DC CONDUCTORS INSIDE BUILDING SHALL BE IN METALLIC RACEWAY PER ART 690.31(E).	4. DC CONDUCTORS INSIDE BUILDING SHALL BE IN METALLIC RACEWAY PER ART 690.31(E).	4. DC CONDUCTORS INSIDE BUILDING SHALL BE IN METALLIC RACEWAY PER ART 690.31(E).		GROUNDING ELECTRODE			
4. PRIMARY CONFIGURATION THE PRIMARY WINDING(S) SHALL BE COMPLETELY FLOATING OR GROUNDED THROUGH A HIGH IMPEDANCE (>1MOHMS). 380V NOMINAL DELTA OR 380V NOMINAL WYE WITH THE NEUTRAL FULLY INSULATED FROM GROUND AND CONSTRUCTED SUCH THAT THE NEUTRAL TERMINAL IS NOT ACCESSIBLE		5. TAPS THE TRANSFORMER SHALL BE FURNISHED WITH SECONDARY CAPACITY HIGH-VOLTAGE TAPS WITH A MINIMUM OF TWO - 2½% TAPS ABOVE AND BELOW THE RATED NAMEPLATE VOLTAGE.	6. SECONDARY CONFIGURATION THE SECONDARY WINDING CONFIGURATION SHALL BE EITHER: DELTA OR FLOATING WYE OR GROUNDED WYE NOTE FOR GROUNDED WYE CONFIGURATION: A TRANSFORMER CONFIGURATION OF SOLIDLY GROUNDED WYE ON THE SECONDARY AND DELTA ON THE PRIMARY INDUCES NEUTRAL CURRENT TO THE TRANSFORMER AND THROUGH THREE-PHASE OVER CURRENT PROTECTION DEVICES ON THE SECONDARY SIDE OF THE TRANSFORMER. THE ADDITIONAL CURRENT COULD LEAD TO UNINTENDED ACTIVATION OF THE OVER CURRENT PROTECTION. IT MAY ALSO REDUCE THE INVERTER'S ABILITY TO DETECT A SINGLE OPEN PHASE CONDITION. FOR THIS TRANSFORMER CONFIGURATION, THE CUSTOMER MUST PROVIDE SUPPLEMENTAL SINGLE OPEN PHASE DETECTION.	7. ELECTROSTATIC SHIELD TRANSFORMERS WITH THREE WINDINGS SHALL INCLUDE ELECTROSTATIC SHIELDING BETWEEN THE LOW AND HIGH VOLTAGE WINDINGS. THE SHIELDING MUST BE GROUNDED TO THE TRANSFORMER TANK OR ENCLOSURE.	GENERAL NOTES 1. ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2011 NATIONAL ELECTRIC CODE AS AMENDED BY APPLICABLE STATE AND LOCAL CODES.	GROUNDING NOTES 1. SINGLE-CONDUCTOR CABLE USED AS A GROUNDED CONDUCTOR IN PHOTOVOLTAIC POWER SYSTEMS SHALL BE IDENTIFIED AT THE TIME OF INSTALLATION BY DISTINCTIVE WHITE MARKING AT ALL TERMINATIONS PER ART 200.6.	INTERCONNECTION NOTES 1. LOAD SIDE INTERCONNECTIONS SHALL COMPLY WITH ART. 705.12(D) AND ART 230 FOR THE INSTALLATION OF AN ADDITIONAL SERVICE ENTRANCE.		2-POLE CIRCUIT BREAKER		3-POLE CIRCUIT BREAKER
2. TRANSFORMER RATING A SINGLE INVERTER ISOLATED BY ONE TRANSFORMER SHALL HAVE ONE PRIMARY WINDING AND ONE SECONDARY WINDING. THE KVA RATING OF THE TRANSFORMER MUST AT LEAST BE EQUAL TO THE KVA RATING OF THE INVERTER. TWO INVERTERS ISOLATED BY ONE TRANSFORMER SHALL HAVE THREE WINDINGS TOTAL; ONE SECONDARY WINDING AND TWO PRIMARY WINDINGS. EACH PRIMARY WINDING MUST HAVE A KVA RATING AT LEAST BE EQUAL TO THE KVA RATING FOR THE INVERTER THIS WINDING ISOLATES. THE SECONDARY WINDING MUST HAVE A KVA RATING AT LEAST BE EQUAL TO THE SUM OF THE KVA RATING FOR THE TWO INVERTERS CONNECTED TO THE TRANSFORMER. THE TWO PRIMARY WINDINGS SHALL HAVE THE SAME VOLTAGE, WINDING CONFIGURATION AND BIL. THE THREE WINDINGS SHALL BE CONSTRUCTED IN A LOW-HIGH-LOW CONFIGURATION.		5. TAPS THE TRANSFORMER SHALL BE FURNISHED WITH SECONDARY CAPACITY HIGH-VOLTAGE TAPS WITH A MINIMUM OF TWO - 2½% TAPS ABOVE AND BELOW THE RATED NAMEPLATE VOLTAGE.	6. SECONDARY CONFIGURATION THE SECONDARY WINDING CONFIGURATION SHALL BE EITHER: DELTA OR FLOATING WYE OR GROUNDED WYE NOTE FOR GROUNDED WYE CONFIGURATION: A TRANSFORMER CONFIGURATION OF SOLIDLY GROUNDED WYE ON THE SECONDARY AND DELTA ON THE PRIMARY INDUCES NEUTRAL CURRENT TO THE TRANSFORMER AND THROUGH THREE-PHASE OVER CURRENT PROTECTION DEVICES ON THE SECONDARY SIDE OF THE TRANSFORMER. THE ADDITIONAL CURRENT COULD LEAD TO UNINTENDED ACTIVATION OF THE OVER CURRENT PROTECTION. IT MAY ALSO REDUCE THE INVERTER'S ABILITY TO DETECT A SINGLE OPEN PHASE CONDITION. FOR THIS TRANSFORMER CONFIGURATION, THE CUSTOMER MUST PROVIDE SUPPLEMENTAL SINGLE OPEN PHASE DETECTION.	7. ELECTROSTATIC SHIELD TRANSFORMERS WITH THREE WINDINGS SHALL INCLUDE ELECTROSTATIC SHIELDING BETWEEN THE LOW AND HIGH VOLTAGE WINDINGS. THE SHIELDING MUST BE GROUNDED TO THE TRANSFORMER TANK OR ENCLOSURE.	GENERAL NOTES 1. ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2011 NATIONAL ELECTRIC CODE AS AMENDED BY APPLICABLE STATE AND LOCAL CODES.	GROUNDING NOTES 1. SINGLE-CONDUCTOR CABLE USED AS A GROUNDED CONDUCTOR IN PHOTOVOLTAIC POWER SYSTEMS SHALL BE IDENTIFIED AT THE TIME OF INSTALLATION BY DISTINCTIVE WHITE MARKING AT ALL TERMINATIONS PER ART 200.6.	INTERCONNECTION NOTES 1. LOAD SIDE INTERCONNECTIONS SHALL COMPLY WITH ART. 705.12(D) AND ART 230 FOR THE INSTALLATION OF AN ADDITIONAL SERVICE ENTRANCE.		2-POLE SWITCH		3-POLE SWITCH
3. TRANSFORMER IMPEDANCE FOR TRANSFORMERS WITH THREE WINDINGS, THE PERCENT IMPEDANCE BETWEEN BOTH LOW VOLTAGE PRIMARY WINDINGS MUST BE GREATER THAN 7%. THE PERCENT IMPEDANCE BETWEEN LOW VOLTAGE WINDING #1 AND THE HIGH VOLTAGE WINDING AS WELL AS PERCENT IMPEDANCE BETWEEN LOW VOLTAGE WINDING #2 AND THE HIGH VOLTAGE WINDING MUST SATISFY THE MINIMUM IMPEDANCE REQUIREMENTS IN TABLE 1 ON THE FOLLOWING PAGE. FOR STANDARD TWO WINDING TRANSFORMERS, THE TRANSFORMER IMPEDANCE VOLTAGE Z(%) MUST SATISFY THE CONDITIONS IN TABLE 1.				GENERAL NOTES 1. ALL EQUIPMENT SHALL BE LISTED BY A NRTL IN COMPLIANCE WITH ART 110.3.	GROUNDING NOTES 1. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY NRTL LISTING.	INTERCONNECTION NOTES 1. LOAD SIDE INTERCONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S INSTRUCTIONS AND SHALL NOT INVALIDATE THE NRTL LISTING OF THE EQUIPMENT.		2-POLE CIRCUIT BREAKER		3-POLE CIRCUIT BREAKER	
				2. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART 210.5.	2. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART 210.5.	2. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART 210.5.		2-POLE SWITCH		3-POLE SWITCH	
				3. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY NRTL LISTING.	3. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY NRTL LISTING.	3. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY NRTL LISTING.		FUSE			
				4. INSTALL PARALLEL CONDUCTORS PER ART 310.10(H)	4. INSTALL PARALLEL CONDUCTORS PER ART 310.10(H)	4. INSTALL PARALLEL CONDUCTORS PER ART 310.10(H)		GROUNDING ELECTRODE			
				5. ALL VALUES FOR IMP AND ISC AND VMP ARE MANUFACTURER'S LISTED DATA UNCORRECTED BY NEC.	5. ALL VALUES FOR IMP AND ISC AND VMP ARE MANUFACTURER'S LISTED DATA UNCORRECTED BY NEC.	5. ALL VALUES FOR IMP AND ISC AND VMP ARE MANUFACTURER'S LISTED DATA UNCORRECTED BY NEC.					
				6. REFER TO CURRENT MANUFACTURER'S PLANNING AND INSTALLATION MANUAL FOR TORQUE SPECS FOR ALL BOLTS AND TERMINAL CONNECTIONS.	6. REFER TO CURRENT MANUFACTURER'S PLANNING AND INSTALLATION MANUAL FOR TORQUE SPECS FOR ALL BOLTS AND TERMINAL CONNECTIONS.	6. REFER TO CURRENT MANUFACTURER'S PLANNING AND INSTALLATION MANUAL FOR TORQUE SPECS FOR ALL BOLTS AND TERMINAL CONNECTIONS.					
				7. ALL EXPOSED METAL PARTS (MODULE FRAMES, RAIL, PIPE, BOXES, ETC) SHALL BE GROUNDED USING TIN-PLATED COPPER LAY-IN LUGS OR GROUNDING CLIPS LISTED FOR THE PURPOSE. RAIL CLAMPS SHALL BE MADE ELECTRICALLY CONTINUOUS WITH ATTACHED RAIL.	7. ALL EXPOSED METAL PARTS (MODULE FRAMES, RAIL, PIPE, BOXES, ETC) SHALL BE GROUNDED USING TIN-PLATED COPPER LAY-IN LUGS OR GROUNDING CLIPS LISTED FOR THE PURPOSE. RAIL CLAMPS SHALL BE MADE ELECTRICALLY CONTINUOUS WITH ATTACHED RAIL.	7. ALL EXPOSED METAL PARTS (MODULE FRAMES, RAIL, PIPE, BOXES, ETC) SHALL BE GROUNDED USING TIN-PLATED COPPER LAY-IN LUGS OR GROUNDING CLIPS LISTED FOR THE PURPOSE. RAIL CLAMPS SHALL BE MADE ELECTRICALLY CONTINUOUS WITH ATTACHED RAIL.					
				8. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY NRTL LISTING.	8. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY NRTL LISTING.	8. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY NRTL LISTING.					
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Photovoltaic Module Electrical Specifications:			Model:	Hanwha Q.Pro L G2 310		
Voc=	45.37	V at STC				
Vmp=	36.68	V at STC				
Isc=	9.06	A at STC		Temperature Data		
Imp=	8.45	A at STC		ASHRAE Mean Low Temp	-19	deg C
Tvoc=	-0.13611	V/deg C		ASHRAE 2% Dry Bulb Temp	32	deg C
Tisc=	3.624	mA/deg C				
Tvmp=	-0.150388	V/deg C				



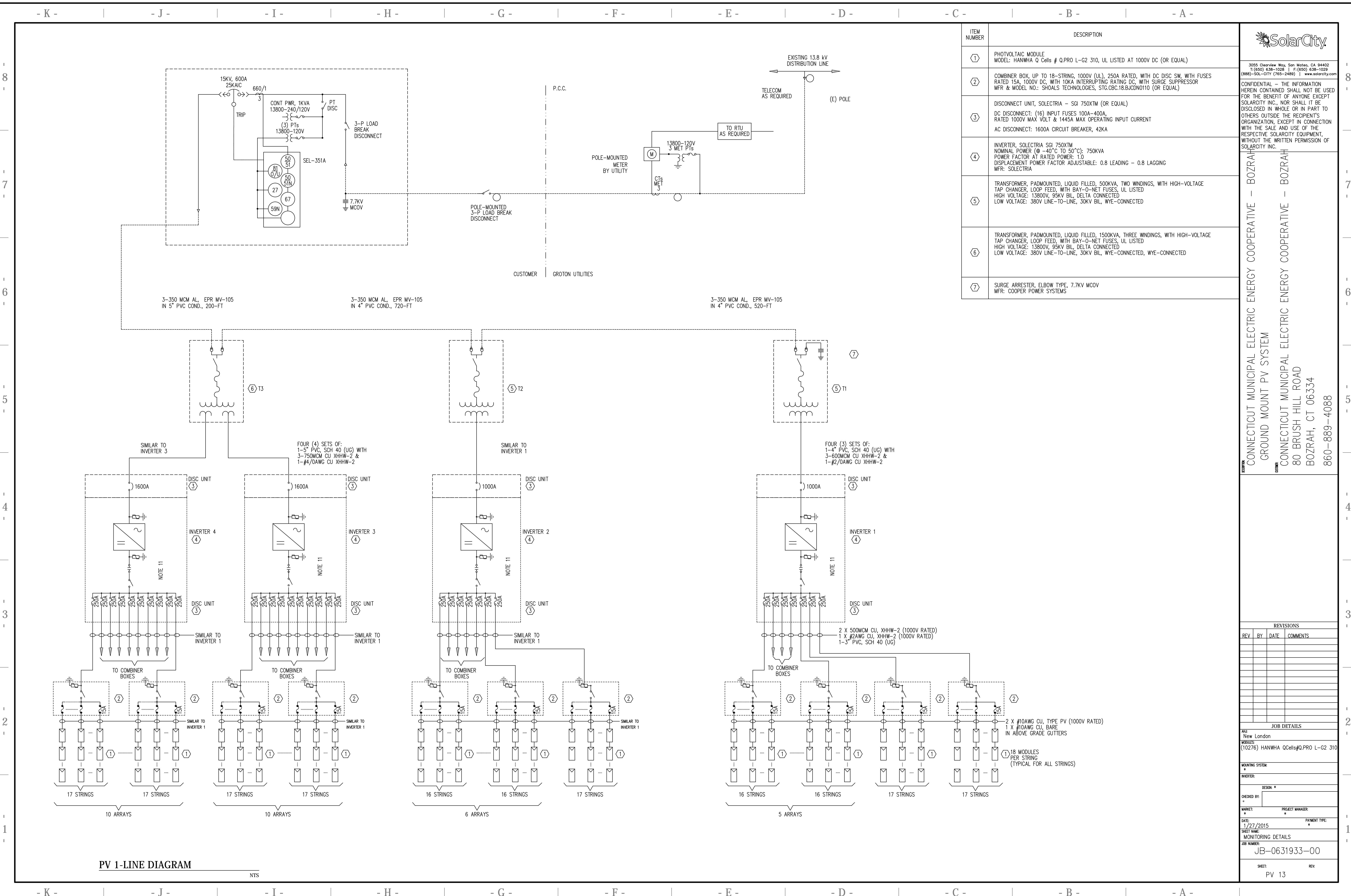


EXHIBIT 3

STORMWATER MANAGEMENT REPORT

John U. Faulise Jr. L.S.
James McNally, Jr., L.S.

David C. McKay, P.E.
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STORMWATER MANAGEMENT REPORT

PROPOSED SOLAR PHOTOVOLTAIC SYSTEM INSTALLATION

PREPARED FOR:

BRIGHTFIELDS DEVELOPMENT, LLC

BRUSH HILL ROAD
BOZRAH, CONNECTICUT

OCTOBER 2014
(REVISED DECEMBER 2014)

Prepared by:



David C. McKay, P.E.
Professional Engineer #29102



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SOILS MAP (3 pages)	
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WATERSHED MAP- PRE-DEVELOPED CONDITIONS (SHEET 1 OF 2)	
WATERSHED MAP- POST-DEVELOPED CONDITIONS (SHEET 2 OF 2)	

EXECUTIVE DRAINAGE SUMMARY

Proposed Solar Photovoltaic System Installation

Applicant: Brightfields Development, LLC

Brush Hill Road (Assessor's I.D. 04/0006A1)

Bozrah, CT

October 2014 (Revised December 2014)

Overall Project Description

This proposal involves the installation of an $11.5\pm$ acre solar farm on a $25.2\pm$ acre property located in an I-80 (industrial zone) in the Town of Bozrah.

The site has road frontage on Brush Hill Road to the west and is bordered by a residential house (zoned industrial property) to the southwest. An industrial development is under construction on property to the southeast. The abutting property to the east is wooded. The property to the north is used for agricultural purposes.

The project will be constructed in 1 phase and involves installing solar panel assembly with associated ballasts and racking system, a 20' wide, $1,460\pm$ long traffic bound gravel surface access drive, various concrete pads for electrical equipment, installation of a 6' high chain link security fence surrounding the entire perimeter of the solar arrays and associated equipment, a stormwater management system and associated site improvements.

Installation of the solar arrays will consist of clearing and removing all vegetation within the proposed clearing limits, grubbing and disposing of stumps, regrading the array areas to a maximum of a 7% slope and associated side slopes not greater than 3:1, importing fill material as required to accomplish regrading, placing and compacting fill as required, installing stormwater management system below the solar arrays in some areas, placing proposed cast-in-place concrete ballasts and racking system, installing and anchoring the $6.4\pm \times 3.25\pm$ solar array panels to the racking system, and installing the necessary electrical equipment for harvesting power.

Site Topography

The majority of the site is wooded although there is a $5.8\pm$ acre field in the area abutting Brush Hill Road that was once cleared but has since become overgrown. The site topography in this cleared area varies 1% to 8% and generally slopes down to the south. The rest of the site topography varies considerably throughout the site from 3% to 50% and slopes down to the northeast, north and southeast. The site elevations change significantly from the westerly portion at the frontage on Brush Hill Road (elevation $374\pm$) to the eastern property boundary (elevation $290\pm$). The development area will include only areas where moderate slopes exist (1-8%) and where regrading can be generally accomplished without cuts and fills exceeding 4'. The runoff from the site contributes to a large wetland area to the south and east of the project area before it flows to the Yantic River.

Soils

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey, the soils located in the areas of the proposed solar array areas consist mostly of Hollis-Chatfield-Rock Outcrop complex, 3 to 15% slopes; Charlton Chatfield complex, 3 to 15% slopes, very rocky; and Sutton fine sandy loam, 2 to 15% slopes, extremely stony. There are rock/ledge outcrops visible throughout the proposed development area. The Hollis-Chatfield-Rock Outcrop complex is classified as a Hydrologic Soil Group (HSG) "D" soil. The Charlton Chatfield complex and the Sutton HSG is "B". Soils data is included in the Appendix of this report.

There are areas of regulated inland wetlands and watercourses on the property as delineated by Demian Sorrentino, a certified soil scientist. There is no proposed filling or disturbance of any inland wetlands or watercourses with this proposal.

Watershed Areas

The site consists of 4 separate drainage areas as follows:

Drainage Area #1 (DA #1)

This $9.0\pm$ acre drainage area encompasses the western portion of the site bordering Brush Hill Road including the existing field. The drainage area is about 4.2 acres of the field and about 4.8 acres of woods. This area drains generally easterly via overland flow and eventually flows offsite to the south via an intermittent watercourse and by overland sheet flow.

DA #2

This $4.0\pm$ acre drainage area encompasses the central northern portion of the site bordering the north property line and includes some of the existing field. The drainage area is about 2.0 acres of the field and about 2.0 acres of woods. This area drains generally northerly via overland flow and eventually flows offsite to the northeast via an intermittent watercourse and by overland sheet flow.

DA #3

This $4.2\pm$ acre drainage area encompasses the southeastern portion of the site bordering the southerly property line. The drainage area is almost entirely wooded. This area drains generally southerly via overland flow and eventually flows offsite to the south via an inland wetland/intermittent watercourse and by overland sheet flow.

DA #4

This $5.9\pm$ acre drainage area encompasses the northwestern portion of the site and for these calculations, extended out to the existing intermittent watercourse in the northeast portion of the site. The drainage area is entirely wooded and consists of steep slopes to the northeast and ledge outcrops throughout. This area drains generally northeasterly via overland flow and eventually flows offsite to the northeast via an intermittent watercourse and by overland sheet flow to the north and east.

Design Criteria

Maintaining water quality onsite and offsite and controlling peak rate attenuation were critical components in the design of the proposed stormwater management system for this project. The design incorporates measures for controlling/capturing potential erosion and sedimentation during construction through erosion control measures and regulating peak post-development stormwater flows so they do not exceed pre-developed peak stormwater flows to downgradient properties. Stormwater measures include stormwater basins and infiltration trenches which will control stormwater runoff from the site and provide a 0% increase in stormwater runoff rates after development.

The individual drainage areas were determined using the existing topography obtained by field survey. The soils information was obtained from the National Resources Conservation Service (NRCS) Web Soil Survey. Overall site hydrologic calculations for pre-development and post-development conditions including watershed modeling were prepared for the 2, 10, 25 and 100-year, 24-hour design storm events using the HydroCAD® Version 10.00, Build 13. Watershed maps for the “Pre-Development Conditions” and “Post-Development Conditions” are located in the Appendix of this report.

The solar array areas will be regraded with existing or imported soil covered with a minimum of 4” of seeded topsoil. Impervious area is limited to the cast-in-place concrete ballasts for the

proposed GameChange racking system and the proposed gravel access drive. Each concrete ballast covers approximately 8.6 square feet and they are spaced approximately 10 feet along each row of solar arrays. The increases in impervious area in each drainage area due to the concrete ballasts are presented below in Table #1 – Impervious Area Summary.

Table #1- Impervious Area Summary

Drainage Area	Gravel Access Drive	Concrete Ballasts	Total Impervious Area	Total Drainage Area Size	Percent Impervious Area
DA-1	20,647 sf	7,631 sf	28,278 sf	402,180 sf	7.0%
DA-2	0 sf	10,870 sf	10,870 sf	174,055 sf	6.2%
DA-3	6,195 sf	3,396 sf	9,591 sf	184,745 sf	5.2%
DA-4	7,276 sf	8,958 sf	16,234 sf	255,138 sf	6.4%
TOTAL	34,118 sf	30,855 sf	64,973 sf	1,016,118 sf	6.4%

Due to the change in surface conditions for the site development area, the peak rate of stormwater runoff after this development is constructed will be increased. Therefore, to comply with guidelines set forth in the 2004 Connecticut Stormwater Quality Manual, a stormwater management system has been incorporated into the development of the site. This system includes stormwater basins and infiltration trenches that will have outlet control structures that will provide detention as well as water quality enhancement of stormwater runoff. The systems are proposed in locations downgradient of the solar farm in areas where slopes or ledge outcrops do not prevent their installation or effectiveness. The stormwater management system has been designed with capacity for the 10-year design storm except for Drainage Area #4, which has been designed for the 5-year design storm due to the site limitations described above, including the ledge outcrops and steep slopes which prevent the construction of detention/retention ponds. Table #2 – Stormwater Management System Design indicates the pre- versus post- development off-site flow rates by drainage area for the stormwater management system design storms.

Table #2- Stormwater Management System Design

Design Storm	Pre-Development Conditions	Post-Development Conditions	Stormwater Management System Description
Drainage Area #1			
2 Year	6.9 cfs	4.2 cfs	Stormwater Basin with Outlet Control Structure (#1)
10 Year	15.3 cfs	11.5 cfs	
Drainage Area #2			
2 Year	3.2 cfs	1.5 cfs	Crushed Stone Infiltration Trench (#1)
10 Year	7.5 cfs	5.6 cfs	
Drainage Area #3			
2 Year	1.1 cfs	1.0 cfs	Stormwater Basin with Outlet Control Structure (#2) and Crushed Stone Infiltration Trench (#4)
10 Year	3.9 cfs	3.9 cfs	
Drainage Area #4			
2 Year	1.5 cfs	1.4 cfs	Crushed Stone Infiltration Trench (#2 and #3)
5 Year	3.3 cfs	3.3 cfs	

Table #3- Peak Flow Summary (below) indicates the pre-development and post-development peak flows for the project area as a whole for the 2, 10, 25 and 100-year design storm events as

well as the change in peak rates. Peak runoff rates off-site do not increase as a result of the proposed development.

Table #3- Peak Flow Summary

Design Storm	Pre-Development Conditions	Post-Development Conditions	Change (%)
Total Off-Site Flow (23.3+/- acres)			
2 Year	11.8 cfs	7.9 cfs	-3.9 cfs (-33.1%)
10 Year	29.8 cfs	24.6 cfs	-5.2 cfs (-17.4%)
25 Year	38.8 cfs	35.3 cfs	-3.5 cfs (-9.0%)
100 Year	58.2 cfs	56.9 cfs	-1.3 cfs (-2.2%)

The proposed stormwater management system has been designed in general conformance with the guidelines set forth in the 2004 Connecticut Stormwater Quality Manual.

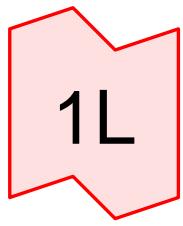
The proposed improvements are shown on plans titled “**Site Development Plan**, Proposed Solar Photovoltaic System Installation, Prepared for Brightfields Development, LLC, Property of: Richard L. Gilman, Trustee, Lawrence M. Gilman 1989 Trust, Brush Hill Road, Bozrah, Connecticut, Assessor’s I.D. 04/0006A1, October 2014, Job I.D. No. 14-2279, Cover Sheet through Sheet 6 of 6” prepared by Boundaries LLC.

HYDROLOGY

PRE-DEVELOPED CONDITIONS



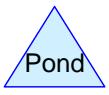
Outlets offsite to north



PreDevelopment Off
Site Flow



Outlets offsite to south



Routing Diagram for Pre-Development Total Off Site Flow
Prepared by Boundaries LLC - DCM, Printed 12/24/2014
HydroCAD® 10.00-13 s/n 04031 © 2014 HydroCAD Software Solutions LLC

Pre-Development Total Off Site Flow

Prepared by Boundaries LLC - DCM

HydroCAD® 10.00-13 s/n 04031 © 2014 HydroCAD Software Solutions LLC

Printed 12/24/2014

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	TOTAL AREA

Pre-Development Total Off Site Flow

Prepared by Boundaries LLC - DCM

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Printed 12/24/2014

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		TOTAL AREA

Pre-Development Total Off Site Flow

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.000	0.000	TOTAL AREA	

Pre-Development Total Off Site Flow

Prepared by Boundaries LLC - DCM

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Type III 24-hr 2-Year Rainfall=3.40"

Printed 12/24/2014

Page 5

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Link 1L: PreDevelopmentOff Site FlowInflow=11.8 cfs 1.531 af
Primary=11.8 cfs 1.531 af

Link 2-Year Primary Outflow Imported from Pre-Development North Outlet~Link Out.hce Inflow=3.9 cfs 0.551 af
Area= 9.853 ac Primary=3.9 cfs 0.551 af

Link 2-Year Primary Outflow Imported from Pre-Development South Outlet~Link Out.hce Inflow=8.0 cfs 0.980 af
Area= 13.474 ac Primary=8.0 cfs 0.980 af

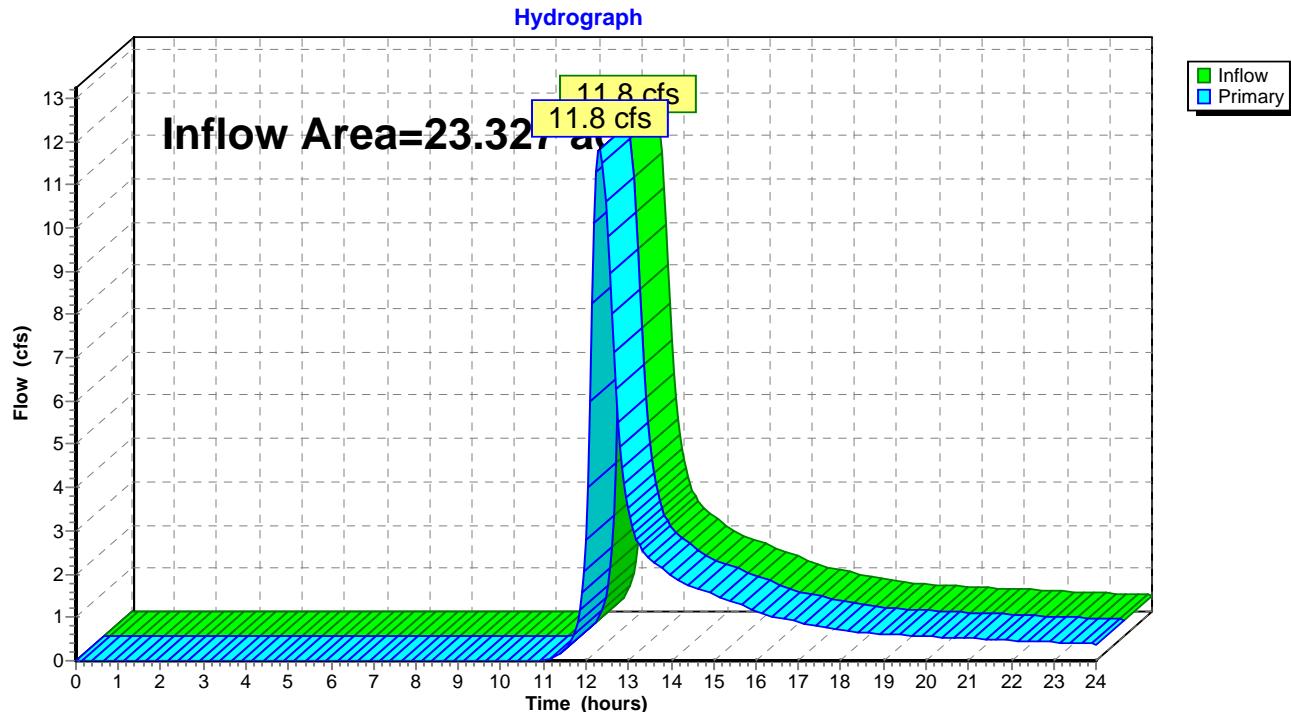
Summary for Link 1L: PreDevelopment Off Site Flow

Inflow Area = 23.327 ac, 0.00% Impervious, Inflow Depth > 0.79" for 2-Year event

Inflow = 11.8 cfs @ 12.32 hrs, Volume= 1.531 af

Primary = 11.8 cfs @ 12.32 hrs, Volume= 1.531 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: PreDevelopment Off Site Flow

Summary for Link OutN: Outlets offsite to north

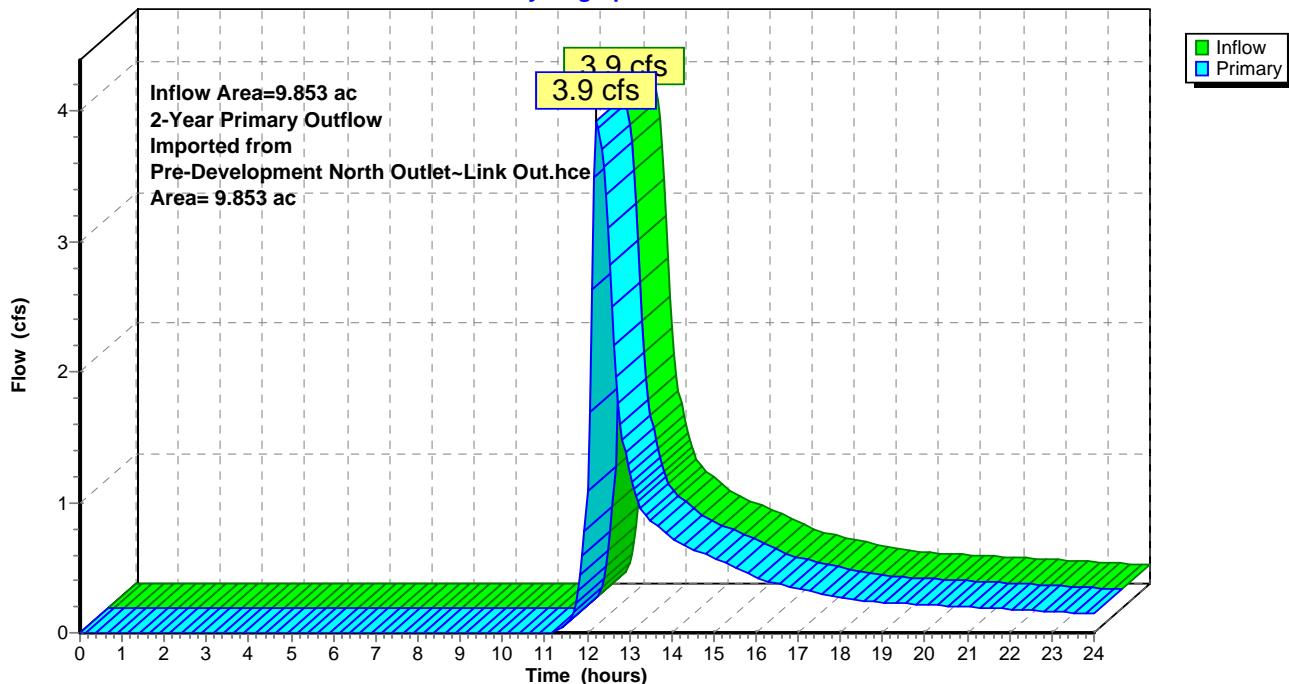
Inflow Area = 9.853 ac, 0.00% Impervious, Inflow Depth > 0.67" for 2-Year event

Inflow = 3.9 cfs @ 12.23 hrs, Volume= 0.551 af

Primary = 3.9 cfs @ 12.23 hrs, Volume= 0.551 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

2-Year Primary Outflow Imported from Pre-Development North Outlet~Link Out.hce

Link OutN: Outlets offsite to north**Hydrograph**

Summary for Link OutS: Outlets offsite to south

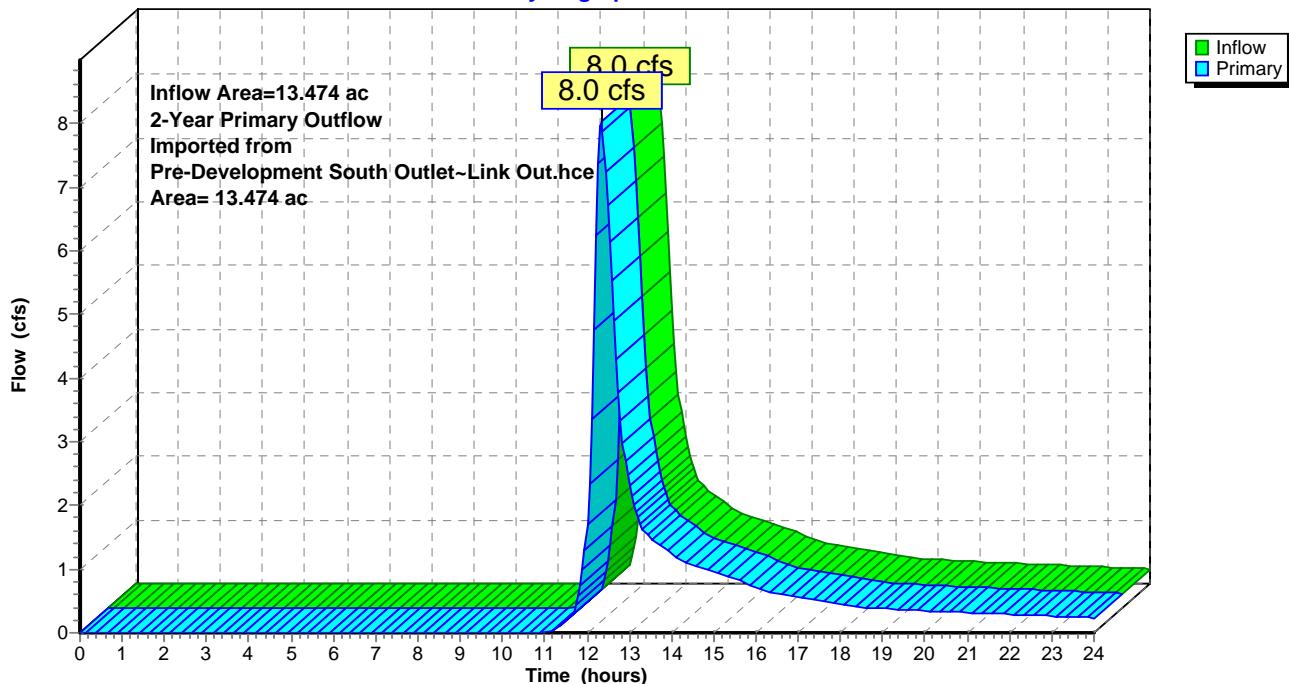
Inflow Area = 13.474 ac, 0.00% Impervious, Inflow Depth > 0.87" for 2-Year event

Inflow = 8.0 cfs @ 12.33 hrs, Volume= 0.980 af

Primary = 8.0 cfs @ 12.33 hrs, Volume= 0.980 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

2-Year Primary Outflow Imported from Pre-Development South Outlet~Link Out.hce

Link OutS: Outlets offsite to south**Hydrograph**

Pre-Development Total Off Site Flow

Prepared by Boundaries LLC - DCM

HydroCAD® 10.00-13 s/n 04031 © 2014 HydroCAD Software Solutions LLC

Type III 24-hr 10-Year Rainfall=5.00"

Printed 12/24/2014

Page 9

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Link 1L: PreDevelopmentOff Site FlowInflow=29.8 cfs 3.448 af
Primary=29.8 cfs 3.448 af

Link 10-Year Primary Outflow Imported from Pre-Development North Outlet~Link Out.hce Inflow=11.1 cfs 1.307 af
Area= 9.853 ac Primary=11.1 cfs 1.307 af

Link 10-Year Primary Outflow Imported from Pre-Development South Outlet~Link Out.hce Inflow=19.2 cfs 2.140 af
Area= 13.474 ac Primary=19.2 cfs 2.140 af

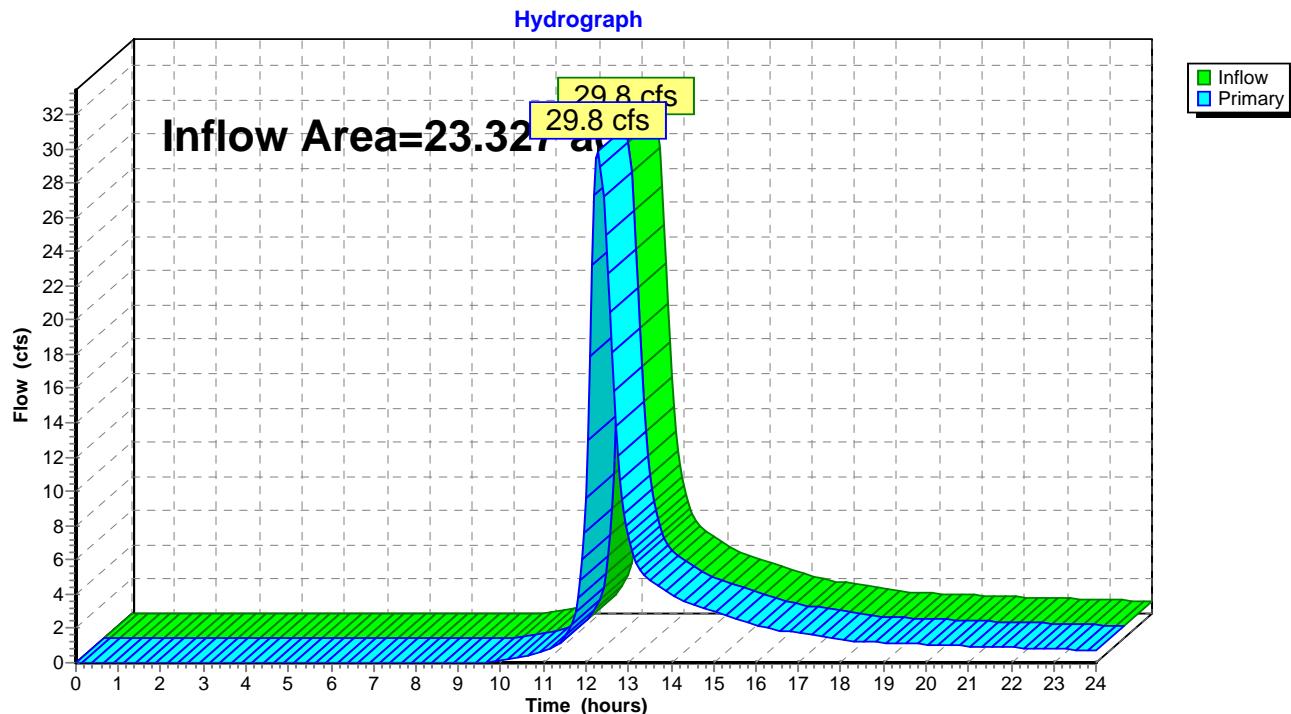
Summary for Link 1L: PreDevelopment Off Site Flow

Inflow Area = 23.327 ac, 0.00% Impervious, Inflow Depth > 1.77" for 10-Year event

Inflow = 29.8 cfs @ 12.29 hrs, Volume= 3.448 af

Primary = 29.8 cfs @ 12.29 hrs, Volume= 3.448 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: PreDevelopment Off Site Flow

Summary for Link OutN: Outlets offsite to north

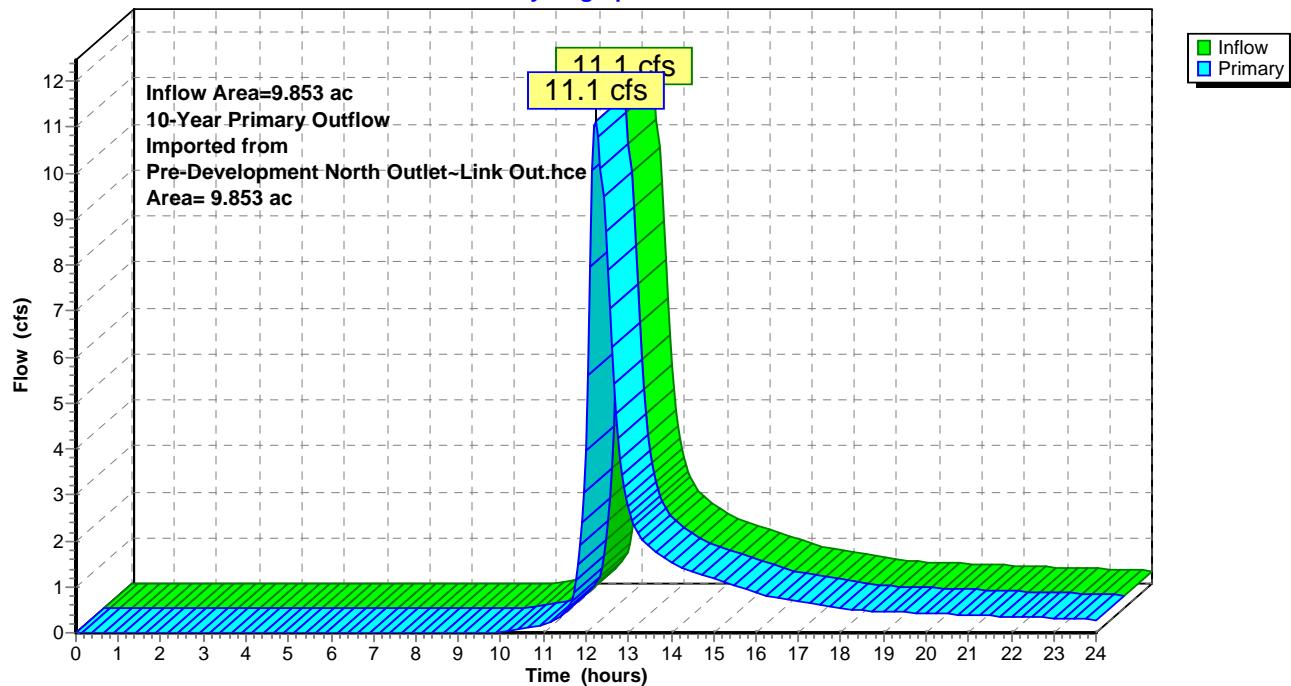
Inflow Area = 9.853 ac, 0.00% Impervious, Inflow Depth > 1.59" for 10-Year event

Inflow = 11.1 cfs @ 12.22 hrs, Volume= 1.307 af

Primary = 11.1 cfs @ 12.22 hrs, Volume= 1.307 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10-Year Primary Outflow Imported from Pre-Development North Outlet~Link Out.hce

Link OutN: Outlets offsite to north**Hydrograph**

Summary for Link OutS: Outlets offsite to south

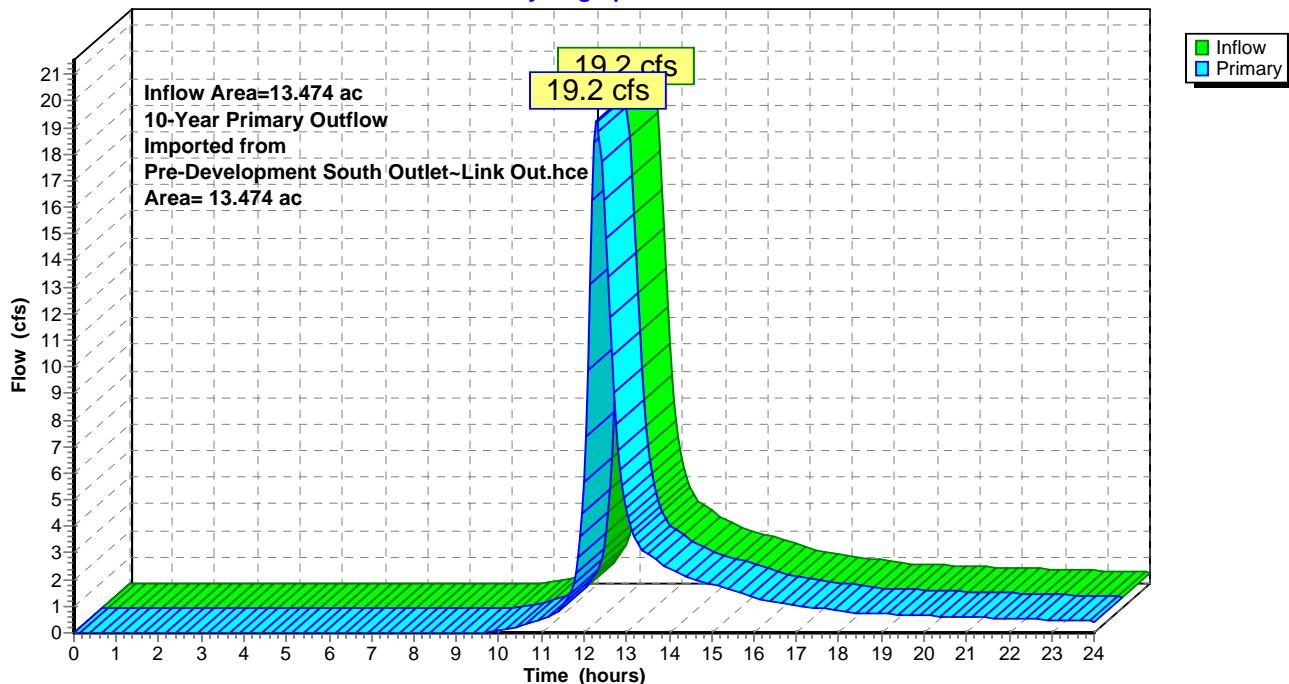
Inflow Area = 13.474 ac, 0.00% Impervious, Inflow Depth > 1.91" for 10-Year event

Inflow = 19.2 cfs @ 12.31 hrs, Volume= 2.140 af

Primary = 19.2 cfs @ 12.31 hrs, Volume= 2.140 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10-Year Primary Outflow Imported from Pre-Development South Outlet~Link Out.hce

Link OutS: Outlets offsite to south**Hydrograph**

Pre-Development Total Off Site Flow

Prepared by Boundaries LLC - DCM

HydroCAD® 10.00-13 s/n 04031 © 2014 HydroCAD Software Solutions LLC

Type III 24-hr 25-Year Rainfall=5.70"

Printed 12/24/2014

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Link 1L: PreDevelopmentOff Site FlowInflow=38.8 cfs 4.406 af
Primary=38.8 cfs 4.406 af

Link 1L 25-Year Primary Outflow Imported from Pre-Development North Outlet~Link Out.hce Inflow=14.8 cfs 1.692 af
Area= 9.853 ac Primary=14.8 cfs 1.692 af

Link 2L 25-Year Primary Outflow Imported from Pre-Development South Outlet~Link Out.hce Inflow=24.7 cfs 2.714 af
Area= 13.474 ac Primary=24.7 cfs 2.714 af

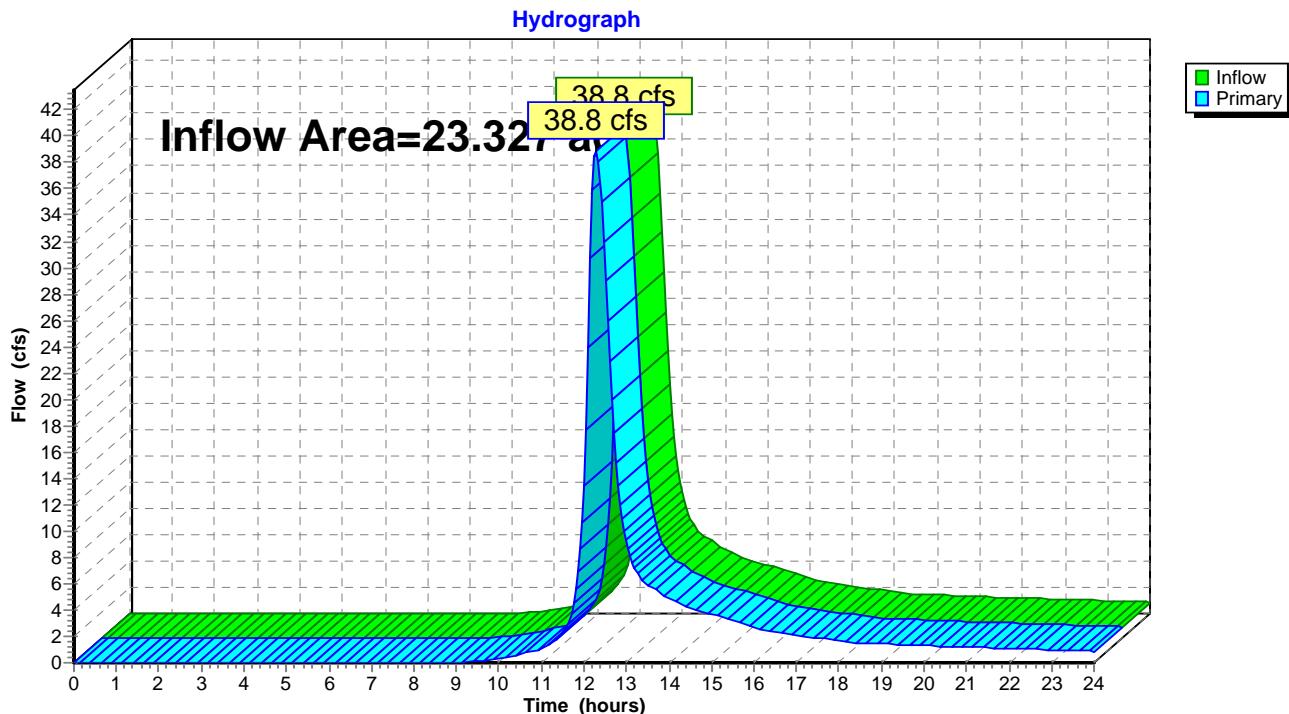
Summary for Link 1L: PreDevelopment Off Site Flow

Inflow Area = 23.327 ac, 0.00% Impervious, Inflow Depth > 2.27" for 25-Year event

Inflow = 38.8 cfs @ 12.28 hrs, Volume= 4.406 af

Primary = 38.8 cfs @ 12.28 hrs, Volume= 4.406 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: PreDevelopment Off Site Flow

Summary for Link OutN: Outlets offsite to north

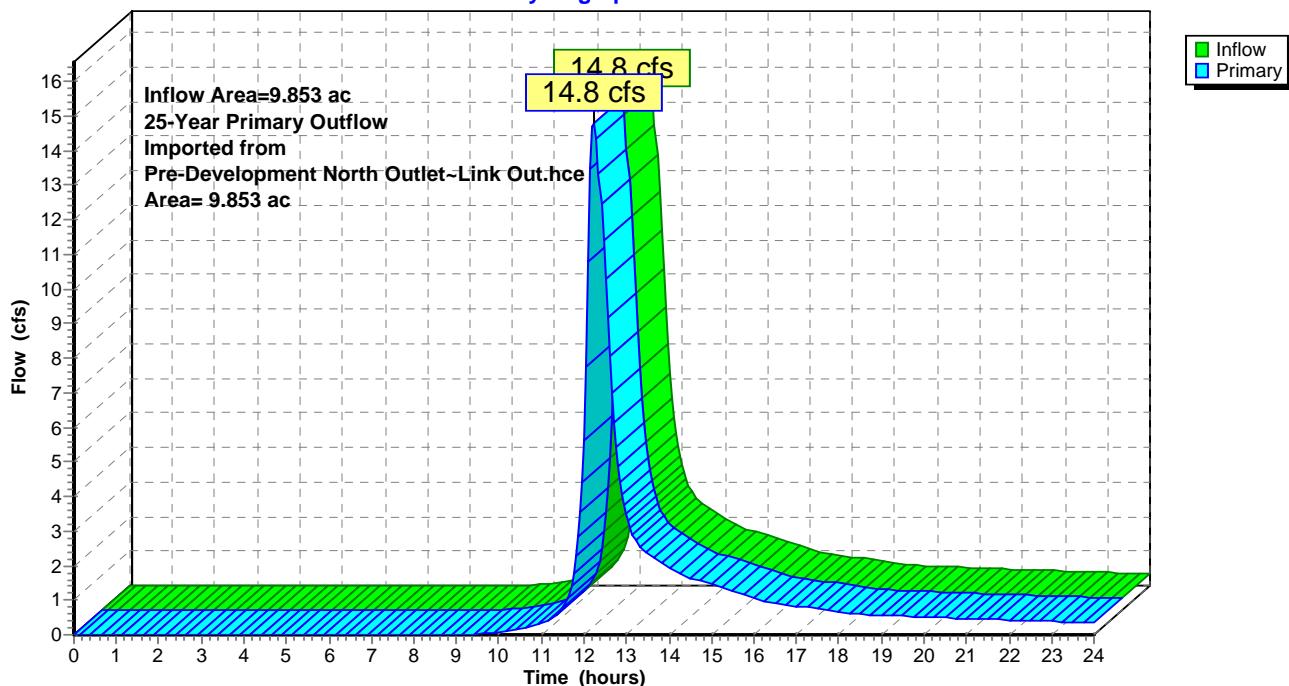
Inflow Area = 9.853 ac, 0.00% Impervious, Inflow Depth > 2.06" for 25-Year event

Inflow = 14.8 cfs @ 12.22 hrs, Volume= 1.692 af

Primary = 14.8 cfs @ 12.22 hrs, Volume= 1.692 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

25-Year Primary Outflow Imported from Pre-Development North Outlet~Link Out.hce

Link OutN: Outlets offsite to north**Hydrograph**

Summary for Link OutS: Outlets offsite to south

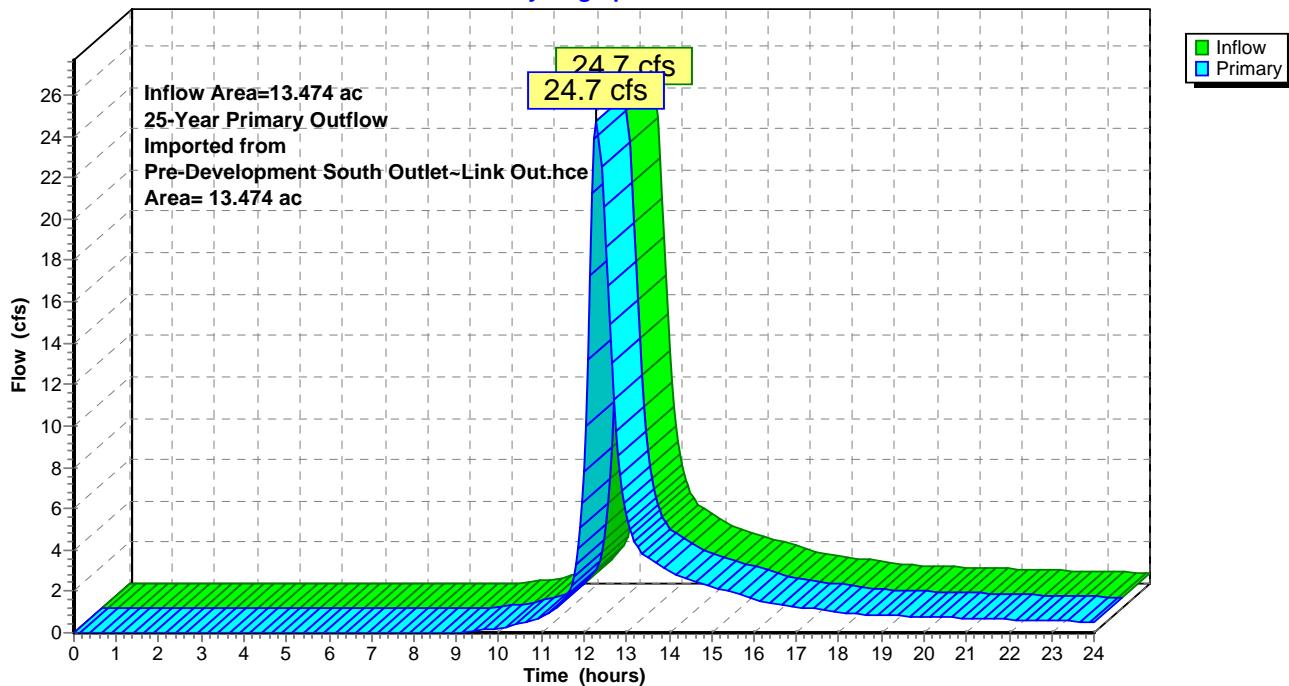
Inflow Area = 13.474 ac, 0.00% Impervious, Inflow Depth > 2.42" for 25-Year event

Inflow = 24.7 cfs @ 12.30 hrs, Volume= 2.714 af

Primary = 24.7 cfs @ 12.30 hrs, Volume= 2.714 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

25-Year Primary Outflow Imported from Pre-Development South Outlet~Link Out.hce

Link OutS: Outlets offsite to south**Hydrograph**

Pre-Development Total Off Site Flow

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Type III 24-hr 100-Year Rainfall=7.10"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Link 1L: PreDevelopmentOff Site Flow

Inflow=58.2 cfs 6.468 af

Primary=58.2 cfs 6.468 af

Link 10 10-Year Primary Outflow Imported from Pre-Development North Outlet~Link Out.hce Inflow=22.7 cfs 2.528 af
Area= 9.853 ac Primary=22.7 cfs 2.528 af**Link 10** 10-Year Primary Outflow Imported from Pre-Development South Outlet~Link Out.hce Inflow=36.4 cfs 3.940 af
Area= 13.474 ac Primary=36.4 cfs 3.940 af

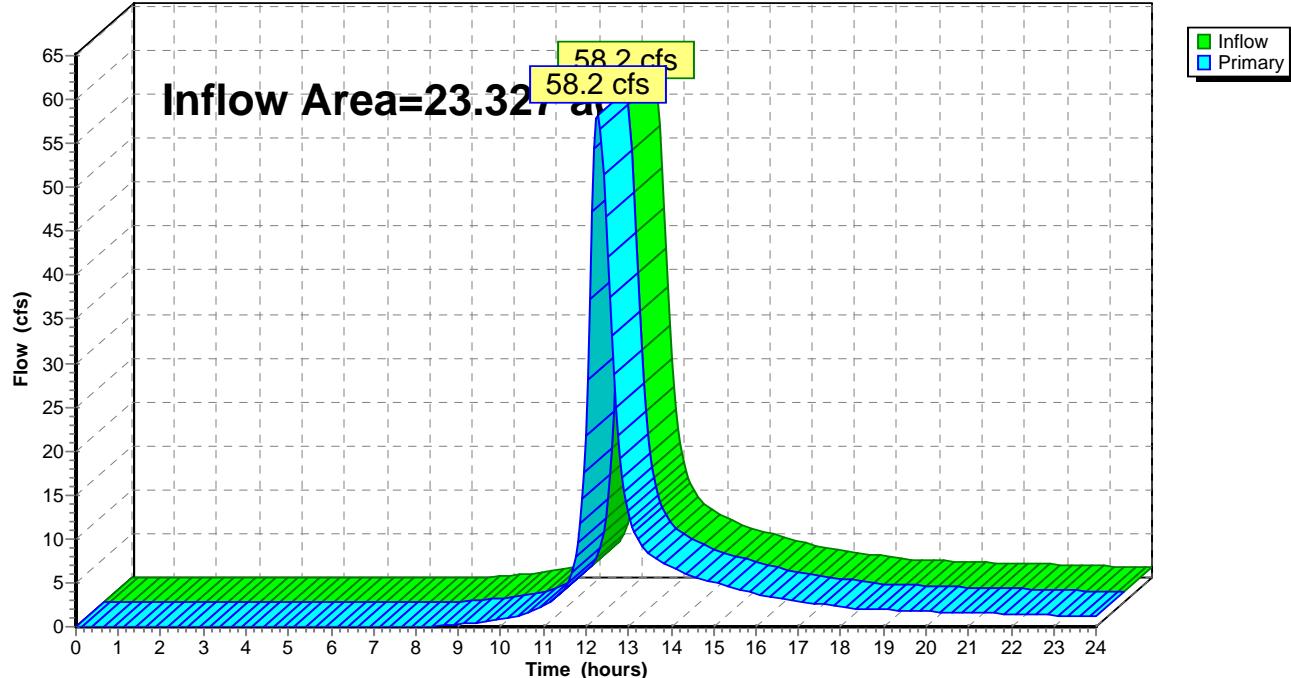
Summary for Link 1L: PreDevelopment Off Site Flow

Inflow Area = 23.327 ac, 0.00% Impervious, Inflow Depth > 3.33" for 100-Year event

Inflow = 58.2 cfs @ 12.27 hrs, Volume= 6.468 af

Primary = 58.2 cfs @ 12.27 hrs, Volume= 6.468 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: PreDevelopment Off Site Flow**Hydrograph**

Summary for Link OutN: Outlets offsite to north

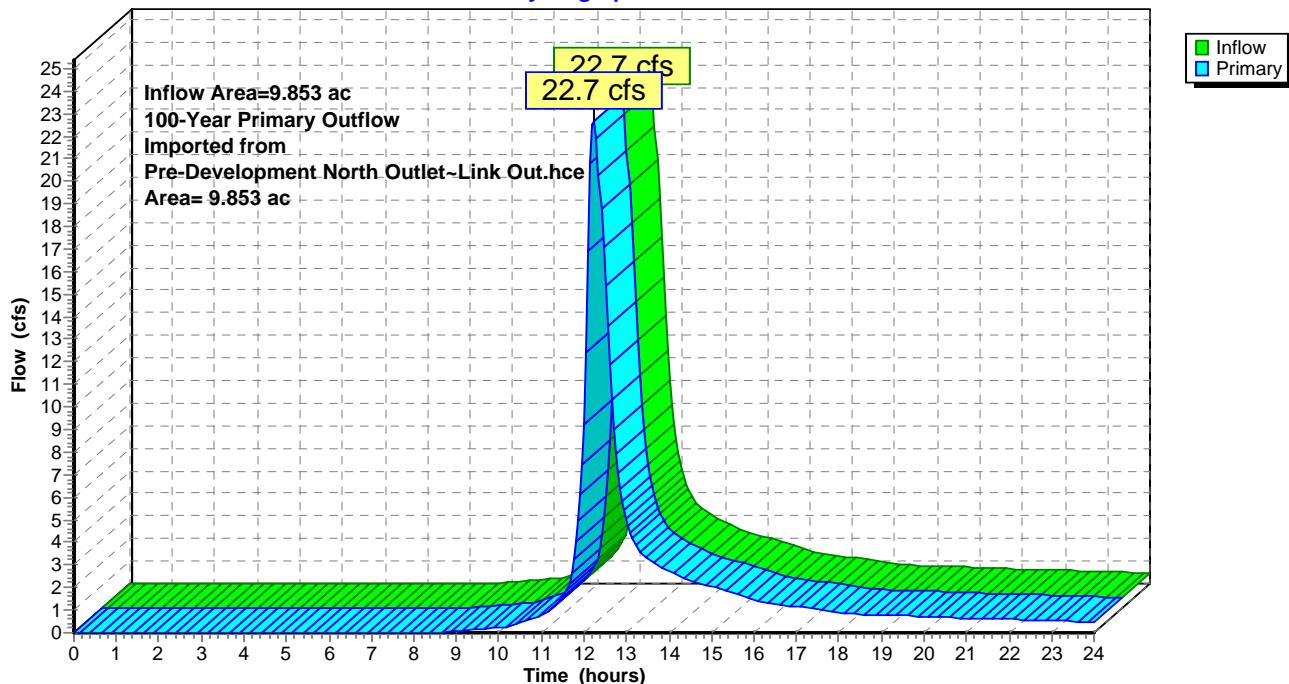
Inflow Area = 9.853 ac, 0.00% Impervious, Inflow Depth > 3.08" for 100-Year event

Inflow = 22.7 cfs @ 12.22 hrs, Volume= 2.528 af

Primary = 22.7 cfs @ 12.22 hrs, Volume= 2.528 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

100-Year Primary Outflow Imported from Pre-Development North Outlet~Link Out.hce

Link OutN: Outlets offsite to north**Hydrograph**

Summary for Link OutS: Outlets offsite to south

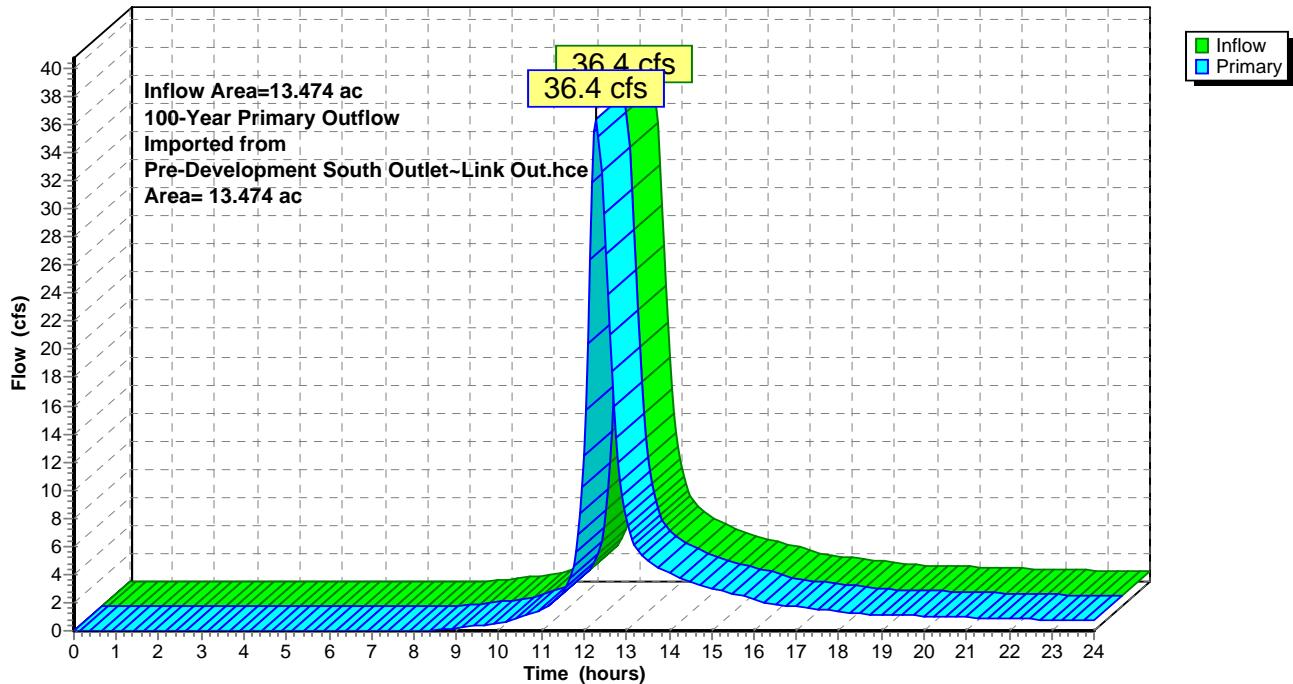
Inflow Area = 13.474 ac, 0.00% Impervious, Inflow Depth > 3.51" for 100-Year event

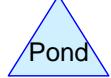
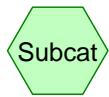
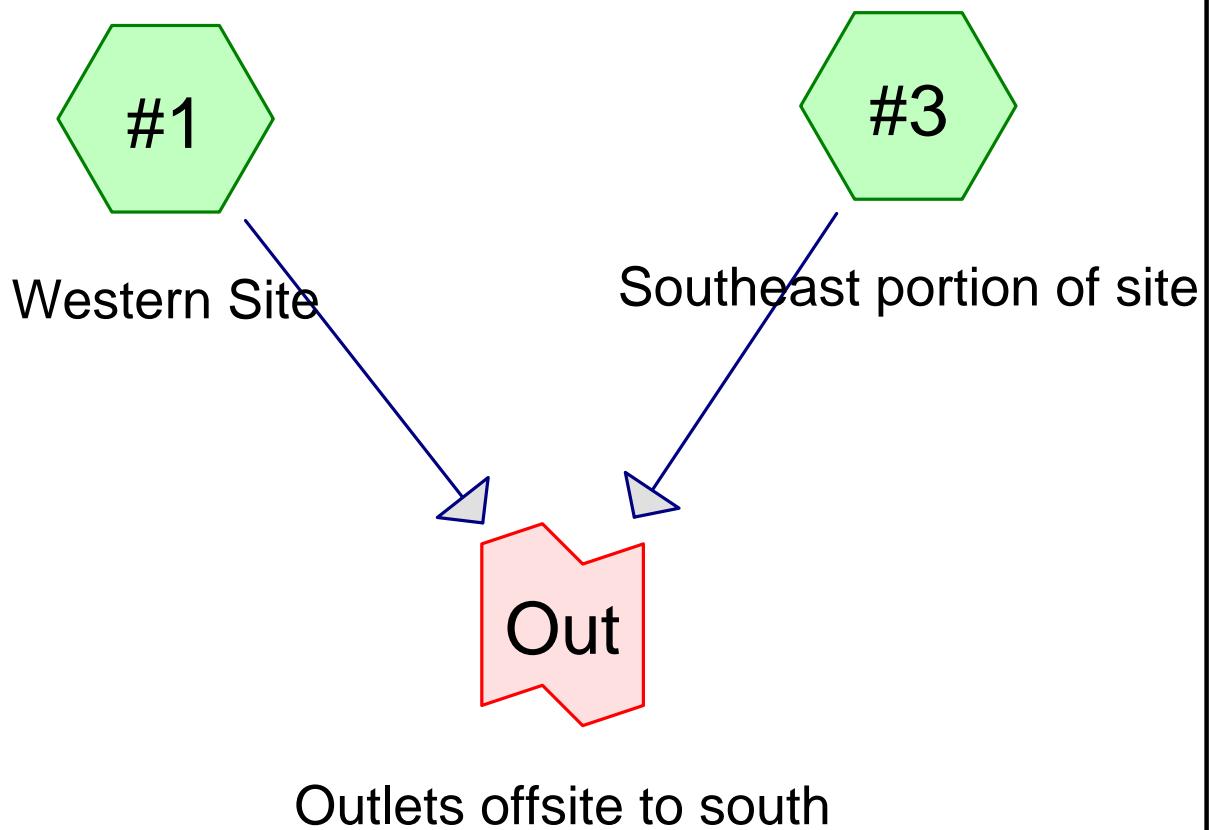
Inflow = 36.4 cfs @ 12.30 hrs, Volume= 3.940 af

Primary = 36.4 cfs @ 12.30 hrs, Volume= 3.940 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

100-Year Primary Outflow Imported from Pre-Development South Outlet~Link Out.hce

Link OutS: Outlets offsite to south**Hydrograph**



Routing Diagram for Pre-Development South Outlet
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Pre-Development South Outlet

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.179	79	<50% Grass cover, Poor, HSG B (#1, #3)
2.936	89	<50% Grass cover, Poor, HSG D (#1)
9.120	60	Woods, Fair, HSG B (#1, #3)
0.238	79	Woods, Fair, HSG D (#1)
13.474	68	TOTAL AREA

Pre-Development South Outlet

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
10.299	HSG B	#1, #3
0.000	HSG C	
3.175	HSG D	#1
0.000	Other	
13.474		TOTAL AREA

Pre-Development South Outlet

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.179	0.000	2.936	0.000	4.116	<50% Grass cover, Poor	#1, #3
0.000	9.120	0.000	0.238	0.000	9.358	Woods, Fair	#1, #3
0.000	10.299	0.000	3.175	0.000	13.474	TOTAL AREA	

Pre-Development South Outlet

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Type III 24-hr 2-Year Rainfall=3.40"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#1: Western Site

Runoff Area=402,180 sf 0.00% Impervious Runoff Depth>1.05"
Flow Length=1,170' Tc=21.6 min CN=72 Runoff=6.9 cfs 0.808 af

Subcatchment#3: Southeast portion of site

Runoff Area=184,745 sf 0.00% Impervious Runoff Depth>0.49"
Flow Length=740' Tc=19.0 min CN=60 Runoff=1.1 cfs 0.172 af

Link Out: Outlets offsite to south

Inflow=8.0 cfs 0.980 af
Primary=8.0 cfs 0.980 af

Total Runoff Area = 13.474 ac Runoff Volume = 0.980 af Average Runoff Depth = 0.87"
100.00% Pervious = 13.474 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment #1: Western Site

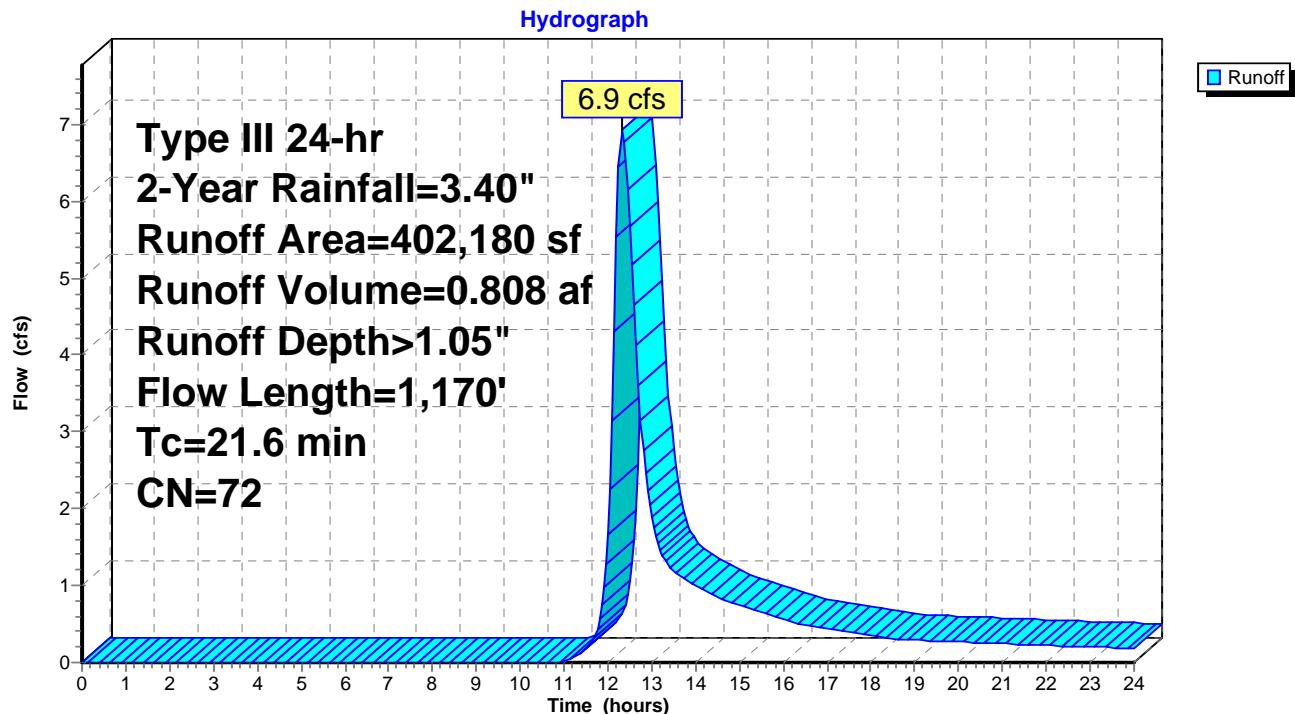
Runoff = 6.9 cfs @ 12.33 hrs, Volume= 0.808 af, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
47,620	79	<50% Grass cover, Poor, HSG B
127,909	89	<50% Grass cover, Poor, HSG D
216,270	60	Woods, Fair, HSG B
10,381	79	Woods, Fair, HSG D
402,180	72	Weighted Average
402,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	100	0.0230	0.45		Sheet Flow, Field Fallow n= 0.050 P2= 3.40"
11.8	350	0.0050	0.49		Shallow Concentrated Flow, Field Short Grass Pasture Kv= 7.0 fps
5.1	510	0.1120	1.67		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
1.0	210	0.0540	3.41	3.69	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.30' Z= 2.0 ' Top.W=4.20' n= 0.040 Earth, cobble bottom, clean sides
21.6	1,170	Total			

Subcatchment #1: Western Site



Summary for Subcatchment #3: Southeast portion of site

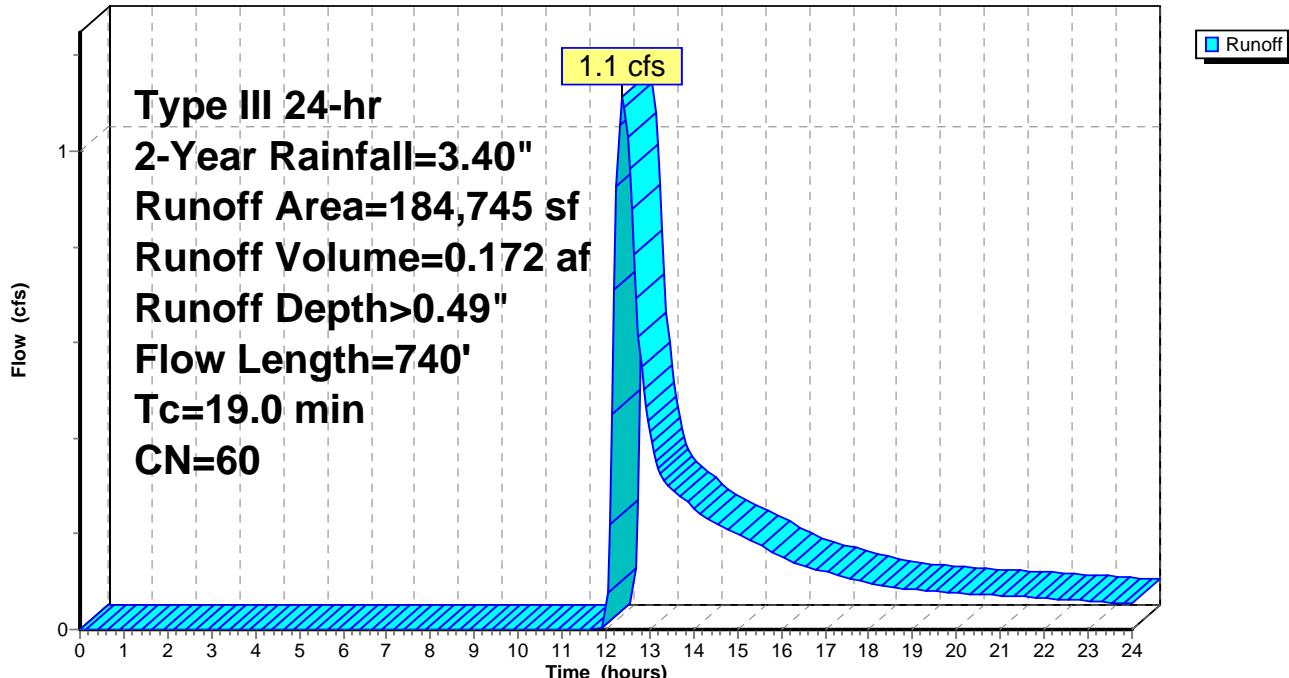
Runoff = 1.1 cfs @ 12.37 hrs, Volume= 0.172 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description			
3,745	79	<50% Grass cover, Poor, HSG B			
181,000	60	Woods, Fair, HSG B			
184,745	60	Weighted Average			
184,745		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0650	0.13		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	375	0.0770	1.39		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
1.0	75	0.0050	1.20	4.79	Parabolic Channel, Wetland W=20.00' D=0.30' Area=4.0 sf Perim=20.0' n= 0.030 Stream, clean & straight
0.5	190	0.1790	6.22	6.71	Trap/Vee/Rect Channel Flow, Watercourse Bot.W=3.00' D=0.30' Z= 2.0 ' Top.W=4.20' n= 0.040 Mountain streams
19.0	740	Total			

Subcatchment #3: Southeast portion of site

Hydrograph



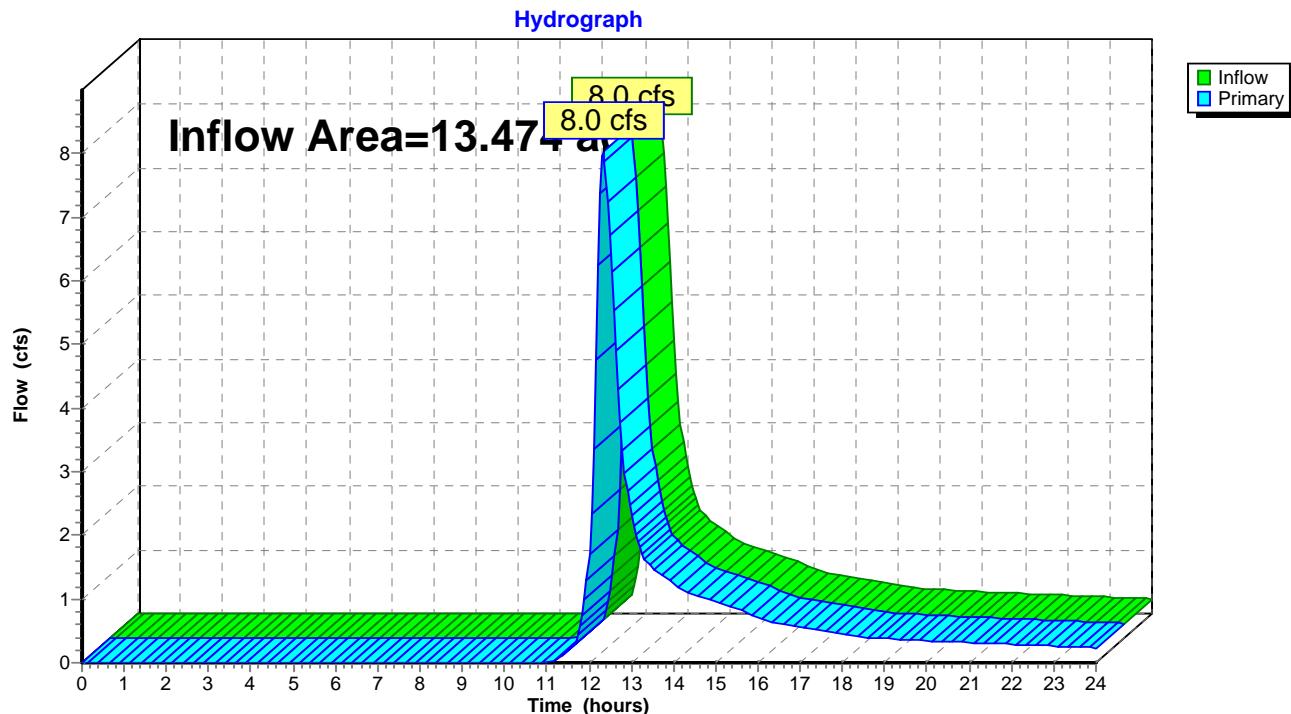
Summary for Link Out: Outlets offsite to south

Inflow Area = 13.474 ac, 0.00% Impervious, Inflow Depth > 0.87" for 2-Year event

Inflow = 8.0 cfs @ 12.33 hrs, Volume= 0.980 af

Primary = 8.0 cfs @ 12.33 hrs, Volume= 0.980 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link Out: Outlets offsite to south

Pre-Development South Outlet

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Type III 24-hr 10-Year Rainfall=5.00"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#1: Western Site

Runoff Area=402,180 sf 0.00% Impervious Runoff Depth>2.19"
Flow Length=1,170' Tc=21.6 min CN=72 Runoff=15.3 cfs 1.683 af

Subcatchment#3: Southeast portion of site

Runoff Area=184,745 sf 0.00% Impervious Runoff Depth>1.29"
Flow Length=740' Tc=19.0 min CN=60 Runoff=3.9 cfs 0.457 af

Link Out: Outlets offsite to south

Inflow=19.2 cfs 2.140 af
Primary=19.2 cfs 2.140 af

Total Runoff Area = 13.474 ac Runoff Volume = 2.140 af Average Runoff Depth = 1.91"
100.00% Pervious = 13.474 ac 0.00% Impervious = 0.000 ac

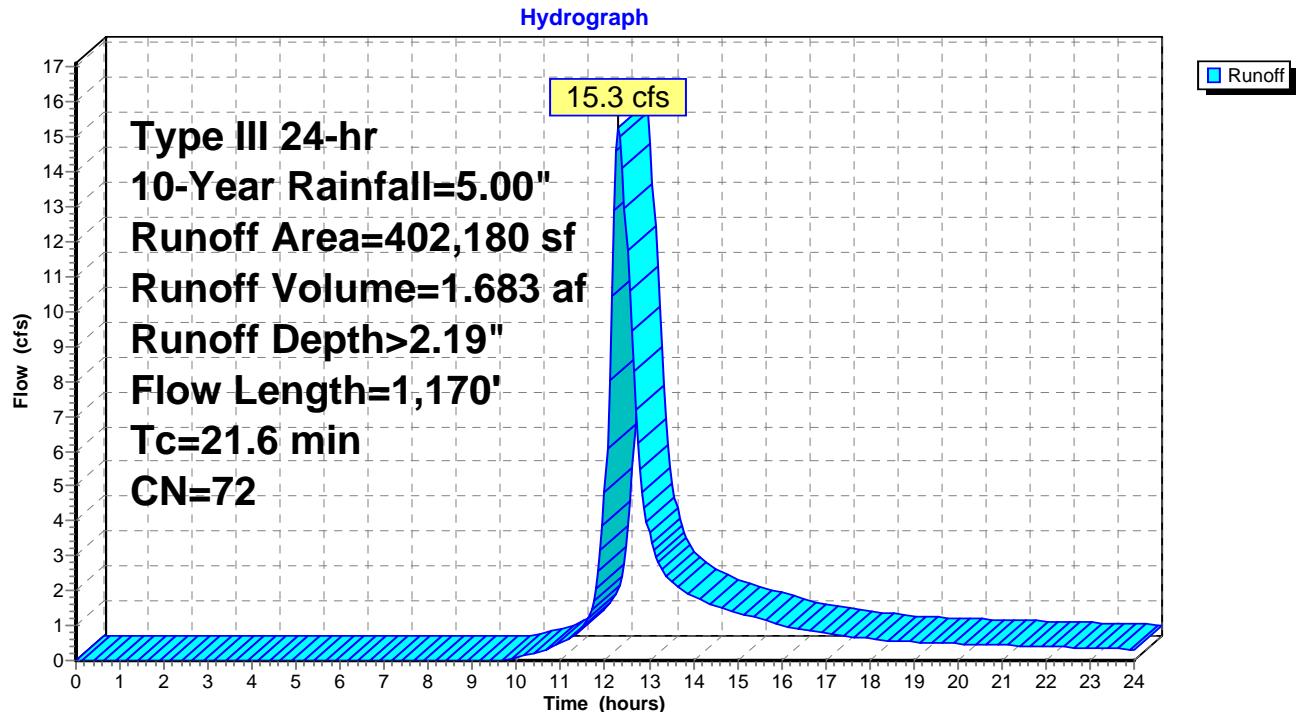
Summary for Subcatchment #1: Western Site

Runoff = 15.3 cfs @ 12.31 hrs, Volume= 1.683 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
47,620	79	<50% Grass cover, Poor, HSG B
127,909	89	<50% Grass cover, Poor, HSG D
216,270	60	Woods, Fair, HSG B
10,381	79	Woods, Fair, HSG D
402,180	72	Weighted Average
402,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	100	0.0230	0.45		Sheet Flow, Field Fallow n= 0.050 P2= 3.40"
11.8	350	0.0050	0.49		Shallow Concentrated Flow, Field Short Grass Pasture Kv= 7.0 fps
5.1	510	0.1120	1.67		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
1.0	210	0.0540	3.41	3.69	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.30' Z= 2.0 ' Top.W=4.20' n= 0.040 Earth, cobble bottom, clean sides
21.6	1,170	Total			

Subcatchment #1: Western Site

Summary for Subcatchment #3: Southeast portion of site

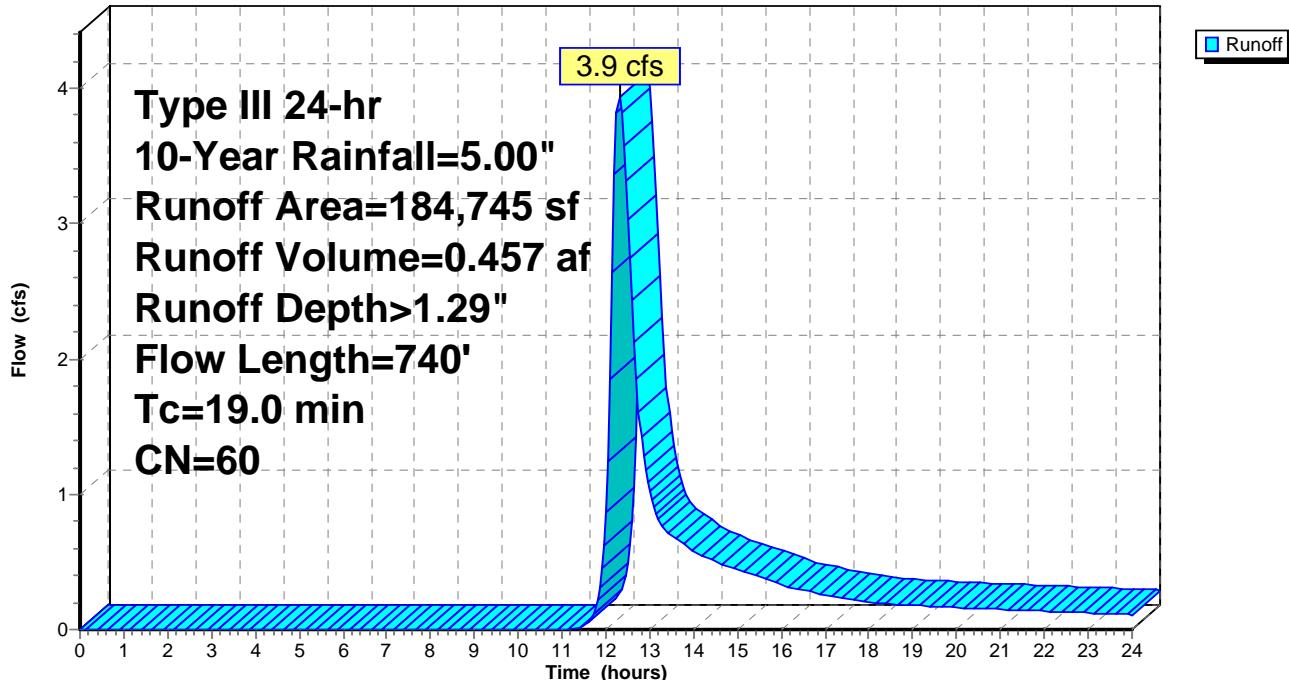
Runoff = 3.9 cfs @ 12.30 hrs, Volume= 0.457 af, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description			
3,745	79	<50% Grass cover, Poor, HSG B			
181,000	60	Woods, Fair, HSG B			
184,745	60	Weighted Average			
184,745		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0650	0.13		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	375	0.0770	1.39		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
1.0	75	0.0050	1.20	4.79	Parabolic Channel, Wetland W=20.00' D=0.30' Area=4.0 sf Perim=20.0' n= 0.030 Stream, clean & straight
0.5	190	0.1790	6.22	6.71	Trap/Vee/Rect Channel Flow, Watercourse Bot.W=3.00' D=0.30' Z= 2.0 ' Top.W=4.20' n= 0.040 Mountain streams
19.0	740	Total			

Subcatchment #3: Southeast portion of site

Hydrograph



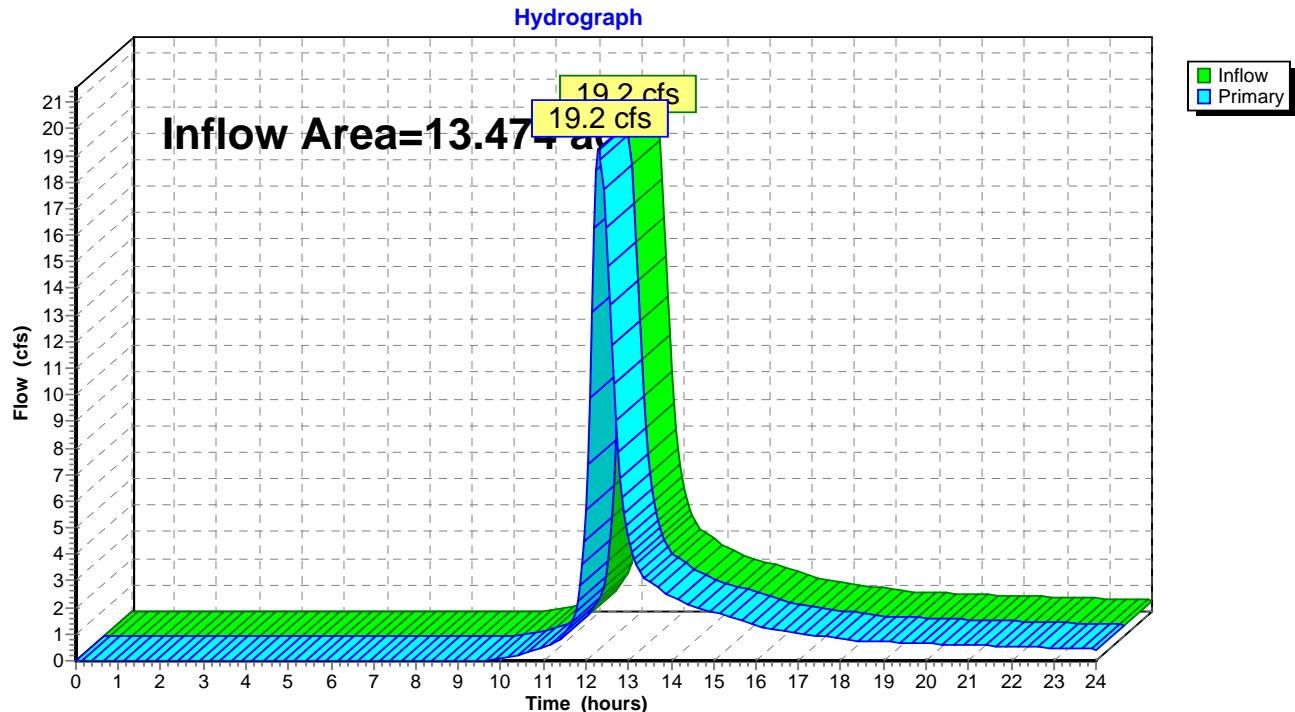
Summary for Link Out: Outlets offsite to south

Inflow Area = 13.474 ac, 0.00% Impervious, Inflow Depth > 1.91" for 10-Year event

Inflow = 19.2 cfs @ 12.31 hrs, Volume= 2.140 af

Primary = 19.2 cfs @ 12.31 hrs, Volume= 2.140 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link Out: Outlets offsite to south

Pre-Development South Outlet

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Type III 24-hr 25-Year Rainfall=5.70"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#1: Western Site

Runoff Area=402,180 sf 0.00% Impervious Runoff Depth>2.74"
Flow Length=1,170' Tc=21.6 min CN=72 Runoff=19.3 cfs 2.106 af

Subcatchment#3: Southeast portion of site

Runoff Area=184,745 sf 0.00% Impervious Runoff Depth>1.72"
Flow Length=740' Tc=19.0 min CN=60 Runoff=5.5 cfs 0.608 af

Link Out: Outlets offsite to south

Inflow=24.7 cfs 2.714 af
Primary=24.7 cfs 2.714 af

Total Runoff Area = 13.474 ac Runoff Volume = 2.714 af Average Runoff Depth = 2.42"
100.00% Pervious = 13.474 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment #1: Western Site

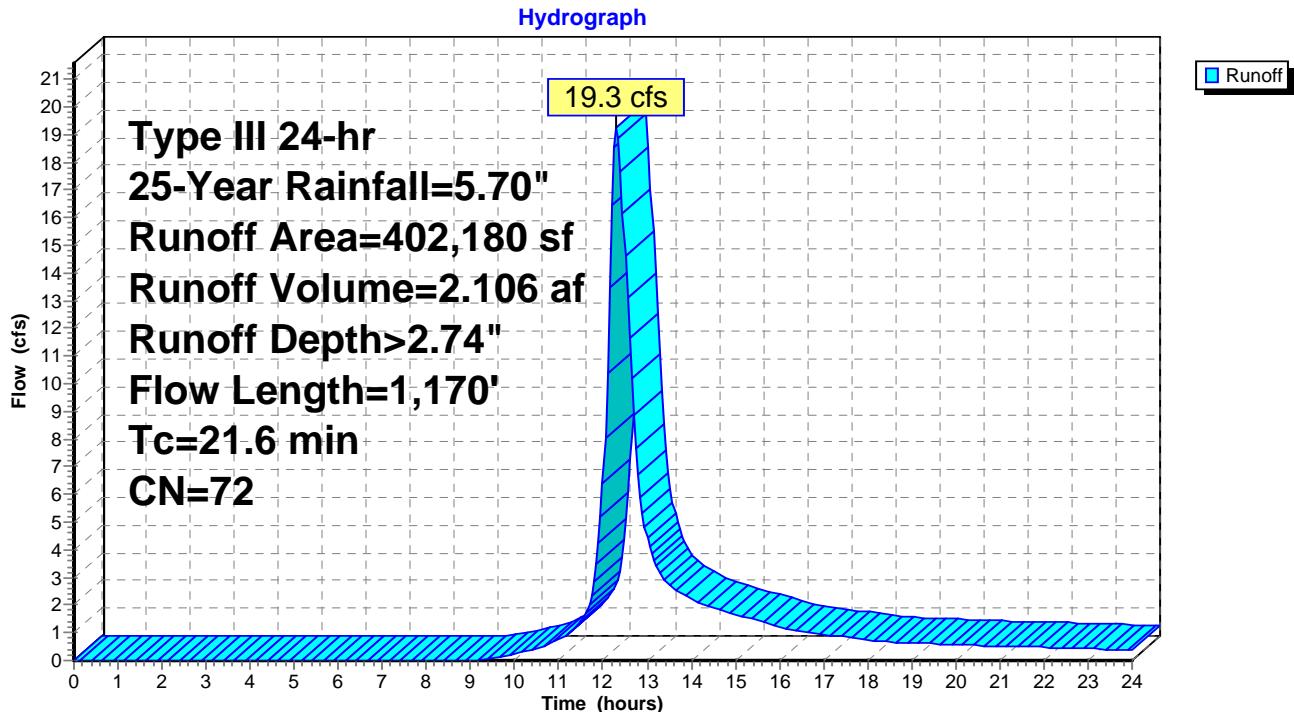
Runoff = 19.3 cfs @ 12.31 hrs, Volume= 2.106 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
47,620	79	<50% Grass cover, Poor, HSG B
127,909	89	<50% Grass cover, Poor, HSG D
216,270	60	Woods, Fair, HSG B
10,381	79	Woods, Fair, HSG D
402,180	72	Weighted Average
402,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	100	0.0230	0.45		Sheet Flow, Field Fallow n= 0.050 P2= 3.40"
11.8	350	0.0050	0.49		Shallow Concentrated Flow, Field Short Grass Pasture Kv= 7.0 fps
5.1	510	0.1120	1.67		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
1.0	210	0.0540	3.41	3.69	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.30' Z= 2.0 ' Top.W=4.20' n= 0.040 Earth, cobble bottom, clean sides
21.6	1,170	Total			

Subcatchment #1: Western Site



Summary for Subcatchment #3: Southeast portion of site

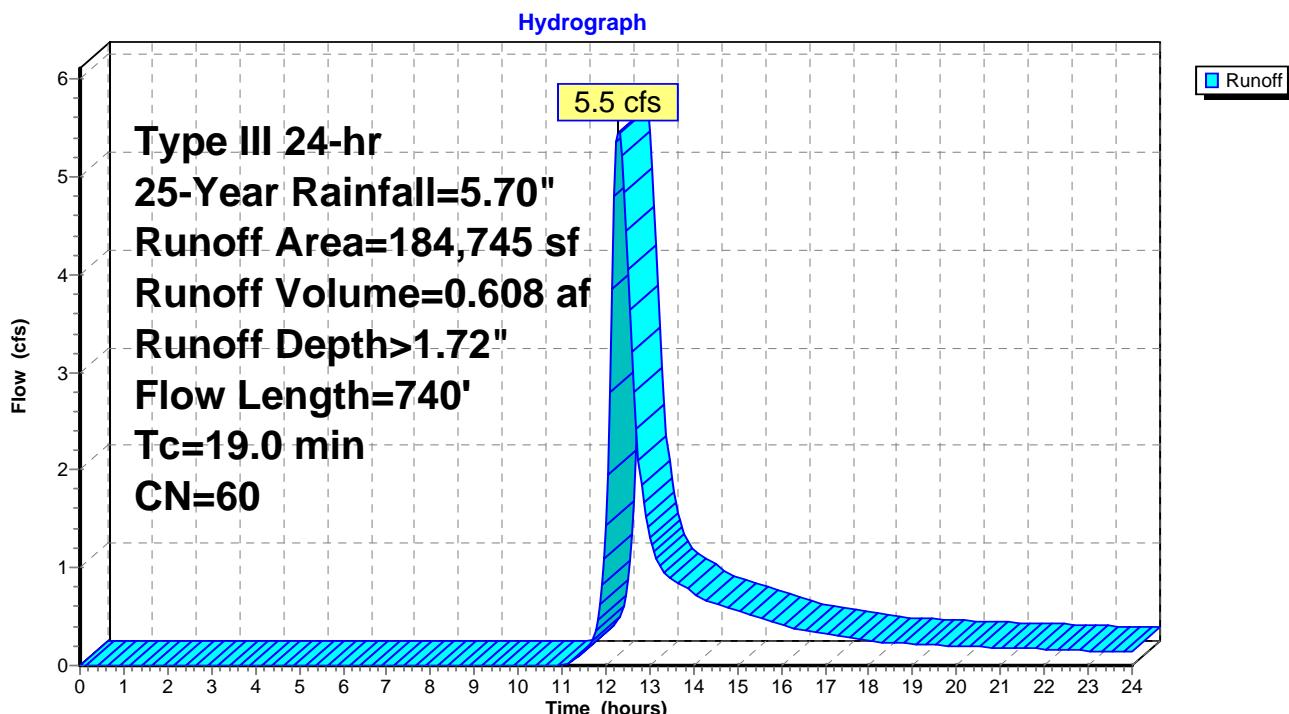
Runoff = 5.5 cfs @ 12.29 hrs, Volume= 0.608 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
3,745	79	<50% Grass cover, Poor, HSG B
181,000	60	Woods, Fair, HSG B
184,745	60	Weighted Average
184,745		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0650	0.13		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	375	0.0770	1.39		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
1.0	75	0.0050	1.20	4.79	Parabolic Channel, Wetland W=20.00' D=0.30' Area=4.0 sf Perim=20.0' n= 0.030 Stream, clean & straight
0.5	190	0.1790	6.22	6.71	Trap/Vee/Rect Channel Flow, Watercourse Bot.W=3.00' D=0.30' Z= 2.0 ' Top.W=4.20' n= 0.040 Mountain streams
19.0	740	Total			

Subcatchment #3: Southeast portion of site



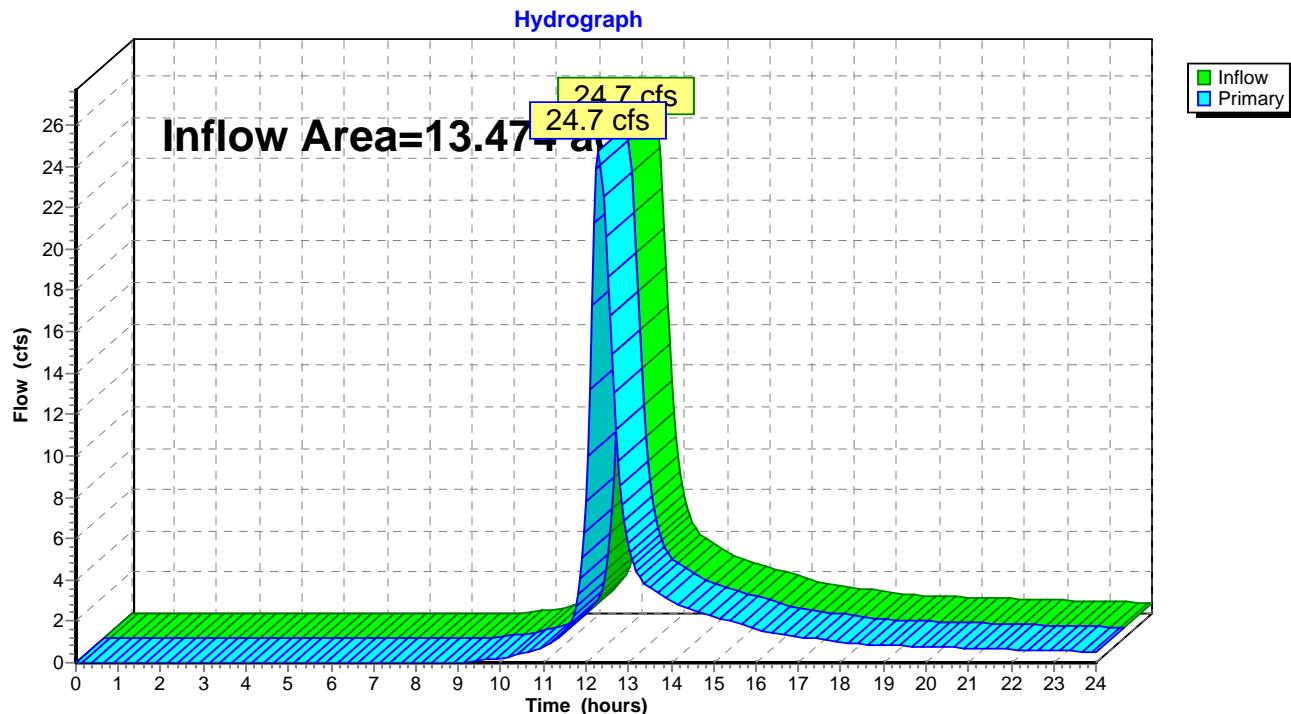
Summary for Link Out: Outlets offsite to south

Inflow Area = 13.474 ac, 0.00% Impervious, Inflow Depth > 2.42" for 25-Year event

Inflow = 24.7 cfs @ 12.30 hrs, Volume= 2.714 af

Primary = 24.7 cfs @ 12.30 hrs, Volume= 2.714 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link Out: Outlets offsite to south

Pre-Development South Outlet

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Type III 24-hr 100-Year Rainfall=7.10"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#1: Western Site

Runoff Area=402,180 sf 0.00% Impervious Runoff Depth>3.90"
Flow Length=1,170' Tc=21.6 min CN=72 Runoff=27.6 cfs 2.999 af

Subcatchment#3: Southeast portion of site

Runoff Area=184,745 sf 0.00% Impervious Runoff Depth>2.66"
Flow Length=740' Tc=19.0 min CN=60 Runoff=8.8 cfs 0.941 af

Link Out: Outlets offsite to south

Inflow=36.4 cfs 3.940 af
Primary=36.4 cfs 3.940 af

Total Runoff Area = 13.474 ac Runoff Volume = 3.940 af Average Runoff Depth = 3.51"
100.00% Pervious = 13.474 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment #1: Western Site

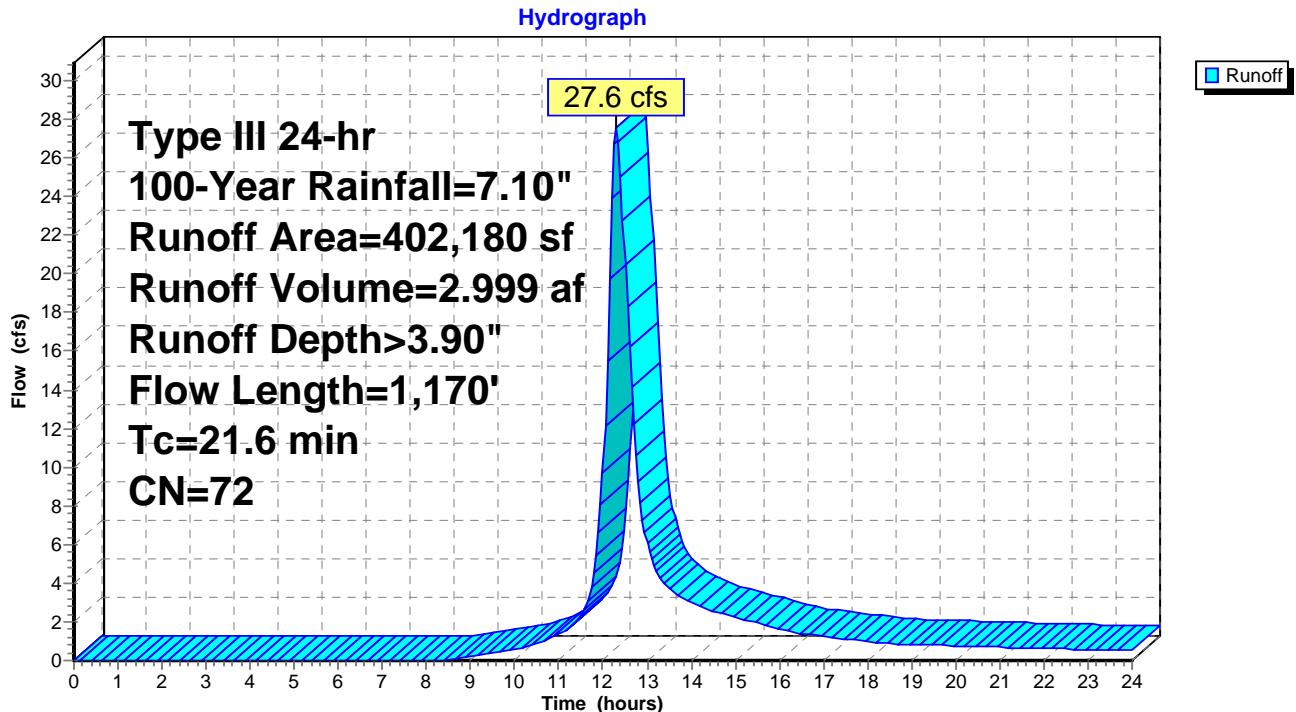
Runoff = 27.6 cfs @ 12.30 hrs, Volume= 2.999 af, Depth> 3.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)	CN	Description
47,620	79	<50% Grass cover, Poor, HSG B
127,909	89	<50% Grass cover, Poor, HSG D
216,270	60	Woods, Fair, HSG B
10,381	79	Woods, Fair, HSG D
402,180	72	Weighted Average
402,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	100	0.0230	0.45		Sheet Flow, Field Fallow n= 0.050 P2= 3.40"
11.8	350	0.0050	0.49		Shallow Concentrated Flow, Field Short Grass Pasture Kv= 7.0 fps
5.1	510	0.1120	1.67		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
1.0	210	0.0540	3.41	3.69	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.30' Z= 2.0 ' Top.W=4.20' n= 0.040 Earth, cobble bottom, clean sides
21.6	1,170	Total			

Subcatchment #1: Western Site



Summary for Subcatchment #3: Southeast portion of site

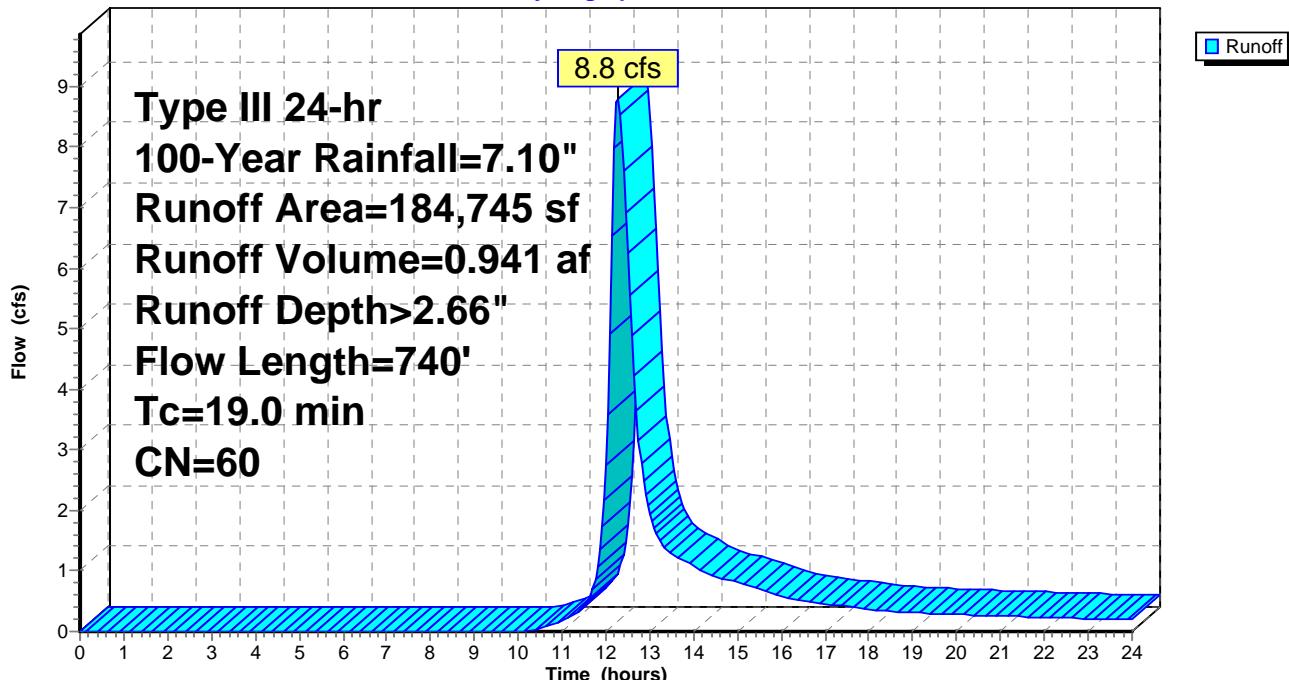
Runoff = 8.8 cfs @ 12.28 hrs, Volume= 0.941 af, Depth> 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)	CN	Description			
3,745	79	<50% Grass cover, Poor, HSG B			
181,000	60	Woods, Fair, HSG B			
184,745	60	Weighted Average			
184,745		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0650	0.13		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	375	0.0770	1.39		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
1.0	75	0.0050	1.20	4.79	Parabolic Channel, Wetland W=20.00' D=0.30' Area=4.0 sf Perim=20.0' n= 0.030 Stream, clean & straight
0.5	190	0.1790	6.22	6.71	Trap/Vee/Rect Channel Flow, Watercourse Bot.W=3.00' D=0.30' Z= 2.0 ' Top.W=4.20' n= 0.040 Mountain streams
19.0	740	Total			

Subcatchment #3: Southeast portion of site

Hydrograph



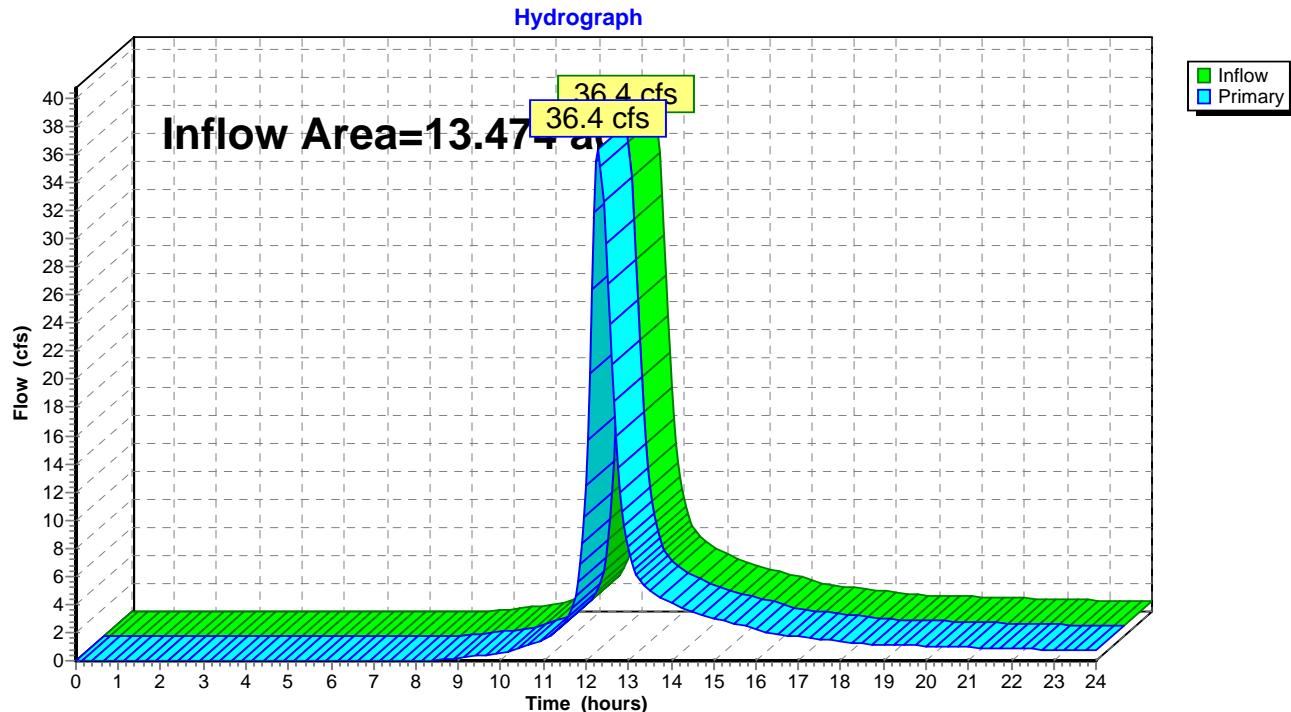
Summary for Link Out: Outlets offsite to south

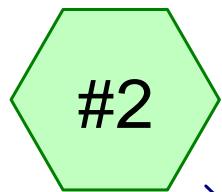
Inflow Area = 13.474 ac, 0.00% Impervious, Inflow Depth > 3.51" for 100-Year event

Inflow = 36.4 cfs @ 12.30 hrs, Volume= 3.940 af

Primary = 36.4 cfs @ 12.30 hrs, Volume= 3.940 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link Out: Outlets offsite to south



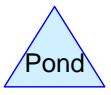
North central site



Northeast portion of site



Outlets offsite to north



Routing Diagram for Pre-Development North Outlet
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Pre-Development North Outlet

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.496	79	<50% Grass cover, Poor, HSG B (#2)
0.431	89	<50% Grass cover, Poor, HSG D (#2)
7.910	60	Woods, Fair, HSG B (#2, #4)
0.016	79	Woods, Fair, HSG D (#2)
9.853	64	TOTAL AREA

Pre-Development North Outlet

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
9.406	HSG B	#2, #4
0.000	HSG C	
0.447	HSG D	#2
0.000	Other	
9.853		TOTAL AREA

Pre-Development North Outlet

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.496	0.000	0.431	0.000	1.927	<50% Grass cover, Poor	#2
0.000	7.910	0.000	0.016	0.000	7.926	Woods, Fair	#2, #4
0.000	9.406	0.000	0.447	0.000	9.853	TOTAL AREA	

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#2: North central site

Runoff Area=174,055 sf 0.00% Impervious Runoff Depth>0.94"
Flow Length=805' Tc=12.2 min CN=70 Runoff=3.2 cfs 0.314 af

Subcatchment#4: Northeast portion of site

Runoff Area=255,138 sf 0.00% Impervious Runoff Depth>0.48"
Flow Length=600' Tc=23.0 min CN=60 Runoff=1.5 cfs 0.237 af

Link Out: Outlets offsite to north

Inflow=3.9 cfs 0.551 af
Primary=3.9 cfs 0.551 af

Total Runoff Area = 9.853 ac Runoff Volume = 0.551 af Average Runoff Depth = 0.67"
100.00% Pervious = 9.853 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment #2: North central site

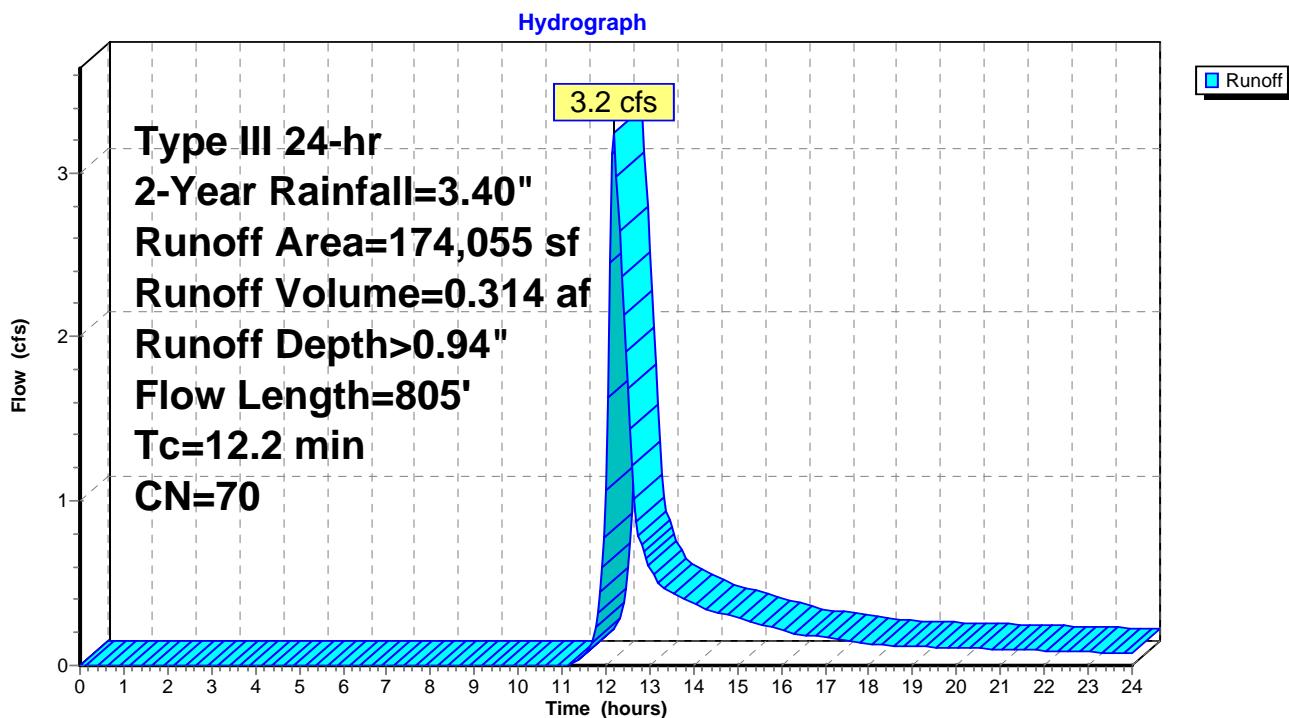
Runoff = 3.2 cfs @ 12.19 hrs, Volume= 0.314 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
65,159	79	<50% Grass cover, Poor, HSG B
18,776	89	<50% Grass cover, Poor, HSG D
89,437	60	Woods, Fair, HSG B
683	79	Woods, Fair, HSG D
174,055	70	Weighted Average
174,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	100	0.0500	0.61		Sheet Flow, Field Fallow n= 0.050 P2= 3.40"
2.1	181	0.0420	1.43		Shallow Concentrated Flow, Field Short Grass Pasture Kv= 7.0 fps
7.4	524	0.0553	1.18		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
12.2	805				Total

Subcatchment #2: North central site



Summary for Subcatchment #4: Northeast portion of site

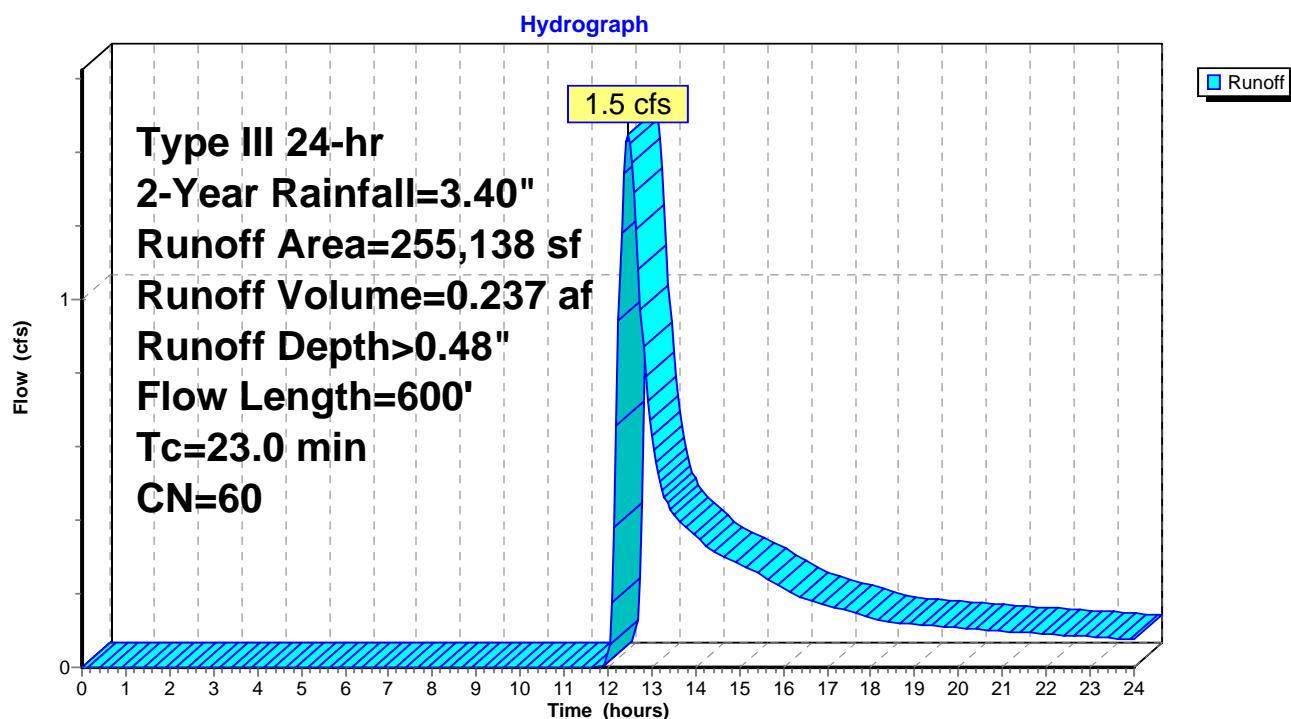
Runoff = 1.5 cfs @ 12.45 hrs, Volume= 0.237 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
255,138	60	Woods, Fair, HSG B
255,138		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0300	0.09		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
5.3	500	0.0980	1.57		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
23.0	600				Total

Subcatchment #4: Northeast portion of site



Summary for Link Out: Outlets offsite to north

Inflow Area = 9.853 ac, 0.00% Impervious, Inflow Depth > 0.67" for 2-Year event

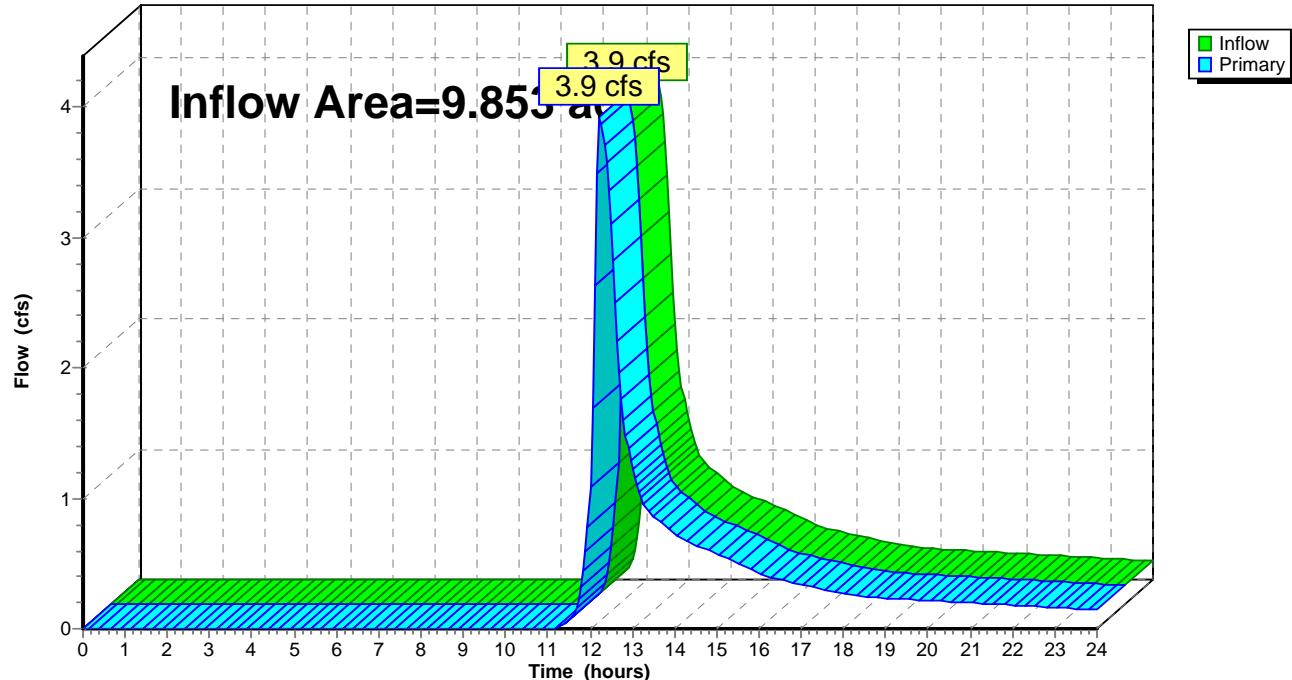
Inflow = 3.9 cfs @ 12.23 hrs, Volume= 0.551 af

Primary = 3.9 cfs @ 12.23 hrs, Volume= 0.551 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link Out: Outlets offsite to north

Hydrograph



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#2: North central site

Runoff Area=174,055 sf 0.00% Impervious Runoff Depth>2.03"
Flow Length=805' Tc=12.2 min CN=70 Runoff=7.5 cfs 0.676 af

Subcatchment#4: Northeast portion of site

Runoff Area=255,138 sf 0.00% Impervious Runoff Depth>1.29"
Flow Length=600' Tc=23.0 min CN=60 Runoff=5.1 cfs 0.631 af

Link Out: Outlets offsite to north

Inflow=11.1 cfs 1.307 af
Primary=11.1 cfs 1.307 af

Total Runoff Area = 9.853 ac Runoff Volume = 1.307 af Average Runoff Depth = 1.59"
100.00% Pervious = 9.853 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment #2: North central site

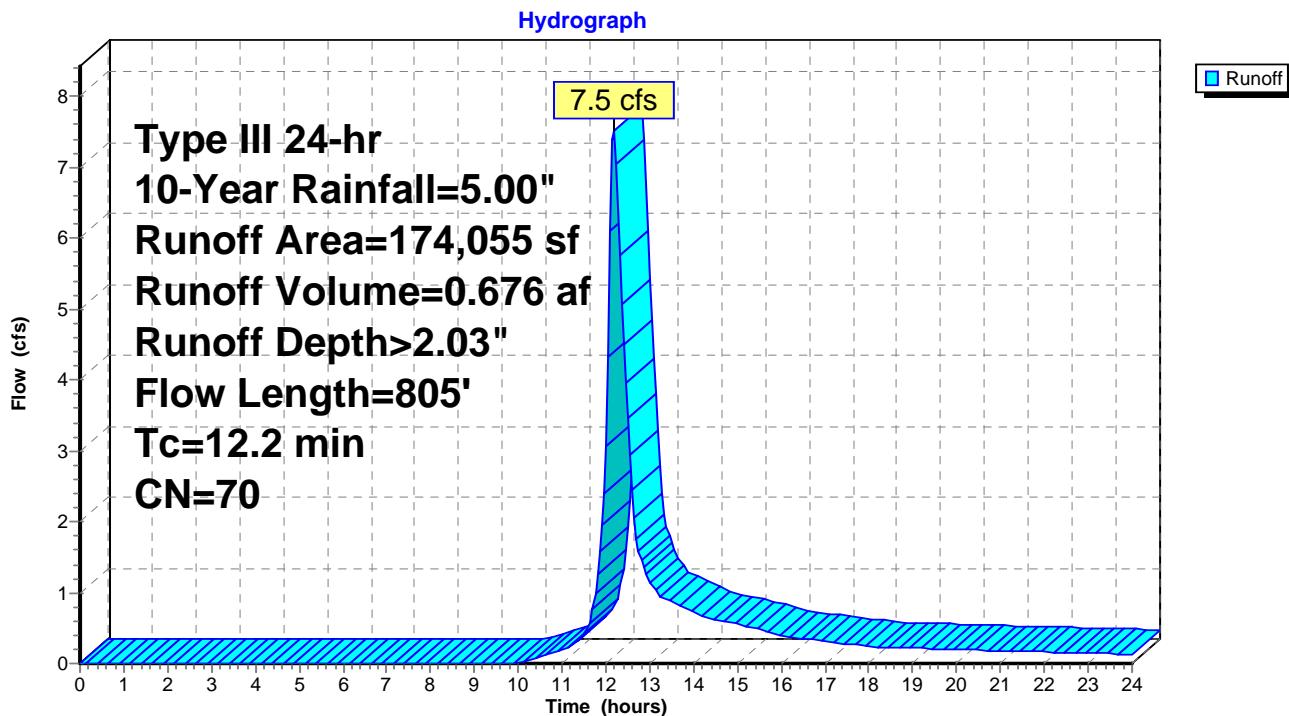
Runoff = 7.5 cfs @ 12.18 hrs, Volume= 0.676 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
65,159	79	<50% Grass cover, Poor, HSG B
18,776	89	<50% Grass cover, Poor, HSG D
89,437	60	Woods, Fair, HSG B
683	79	Woods, Fair, HSG D
174,055	70	Weighted Average
174,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	100	0.0500	0.61		Sheet Flow, Field Fallow n= 0.050 P2= 3.40"
2.1	181	0.0420	1.43		Shallow Concentrated Flow, Field Short Grass Pasture Kv= 7.0 fps
7.4	524	0.0553	1.18		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
12.2	805	Total			

Subcatchment #2: North central site



Summary for Subcatchment #4: Northeast portion of site

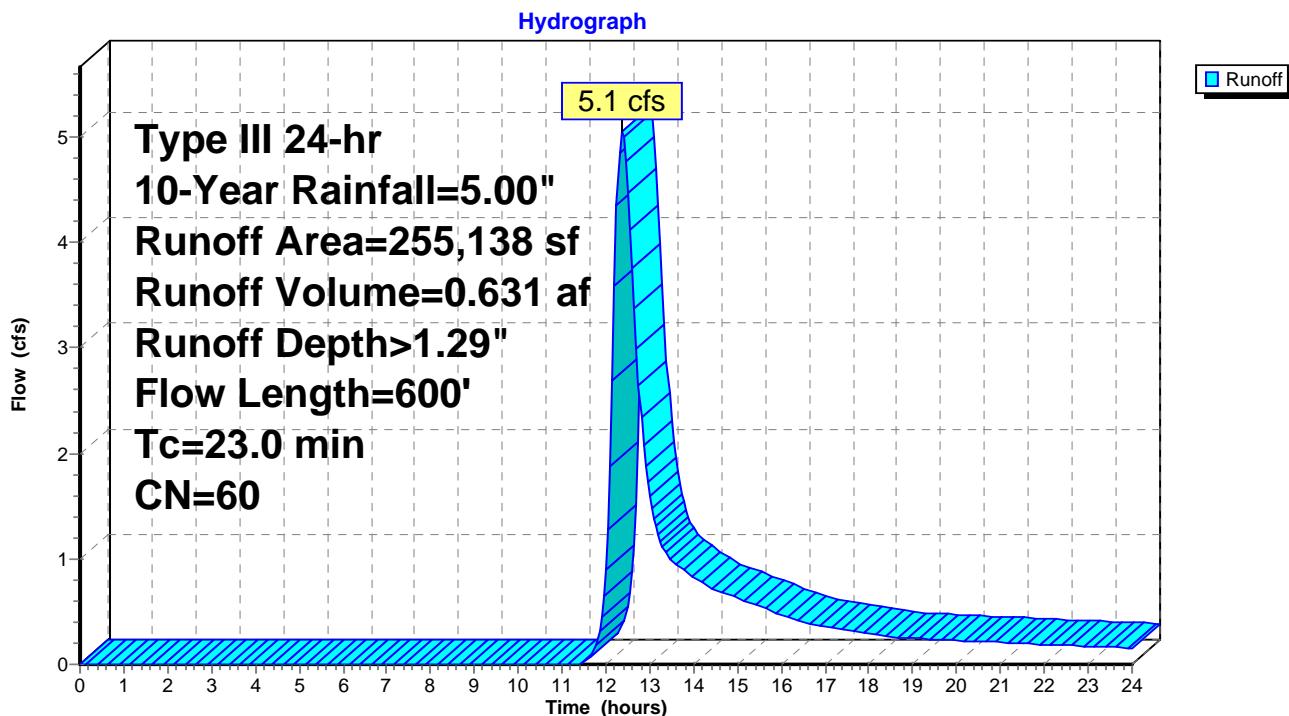
Runoff = 5.1 cfs @ 12.36 hrs, Volume= 0.631 af, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
255,138	60	Woods, Fair, HSG B
255,138		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0300	0.09		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
5.3	500	0.0980	1.57		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
23.0	600				Total

Subcatchment #4: Northeast portion of site



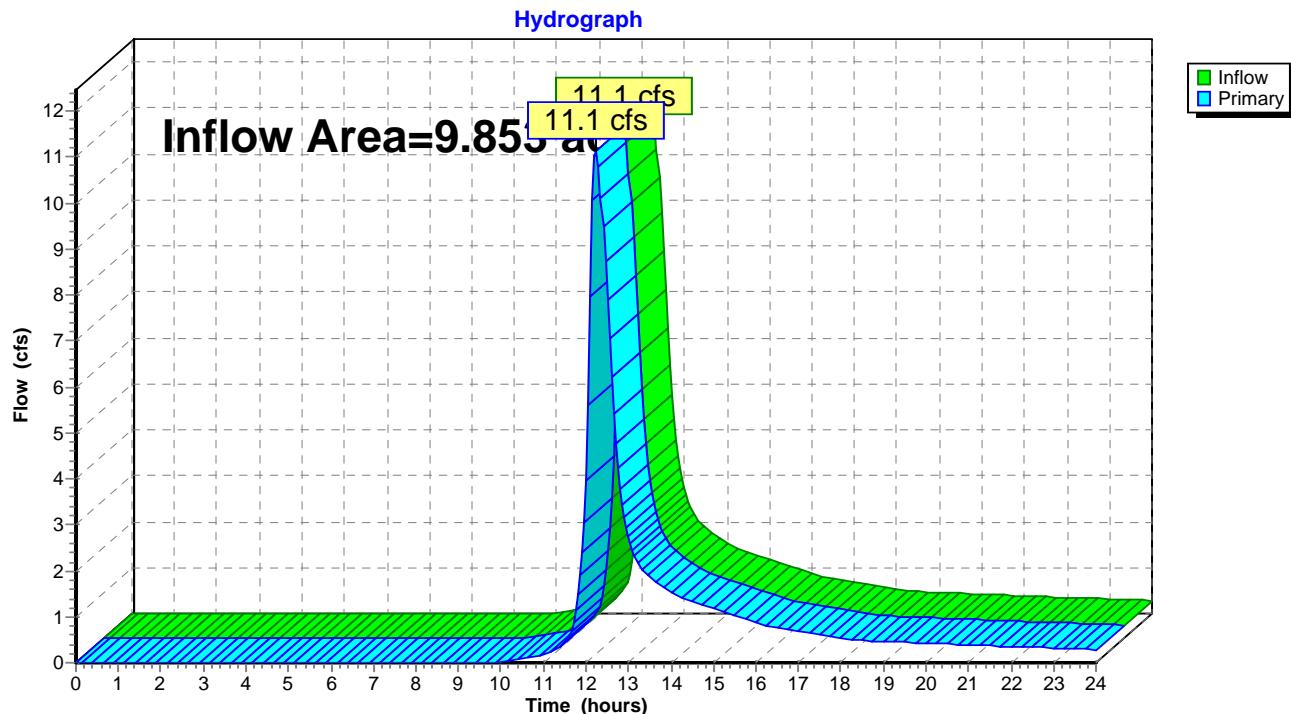
Summary for Link Out: Outlets offsite to north

Inflow Area = 9.853 ac, 0.00% Impervious, Inflow Depth > 1.59" for 10-Year event

Inflow = 11.1 cfs @ 12.22 hrs, Volume= 1.307 af

Primary = 11.1 cfs @ 12.22 hrs, Volume= 1.307 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link Out: Outlets offsite to north

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#2: North central site

Runoff Area=174,055 sf 0.00% Impervious Runoff Depth>2.56"
Flow Length=805' Tc=12.2 min CN=70 Runoff=9.7 cfs 0.853 af

Subcatchment#4: Northeast portion of site

Runoff Area=255,138 sf 0.00% Impervious Runoff Depth>1.72"
Flow Length=600' Tc=23.0 min CN=60 Runoff=7.0 cfs 0.838 af

Link Out: Outlets offsite to north

Inflow=14.8 cfs 1.692 af
Primary=14.8 cfs 1.692 af

Total Runoff Area = 9.853 ac Runoff Volume = 1.692 af Average Runoff Depth = 2.06"
100.00% Pervious = 9.853 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment #2: North central site

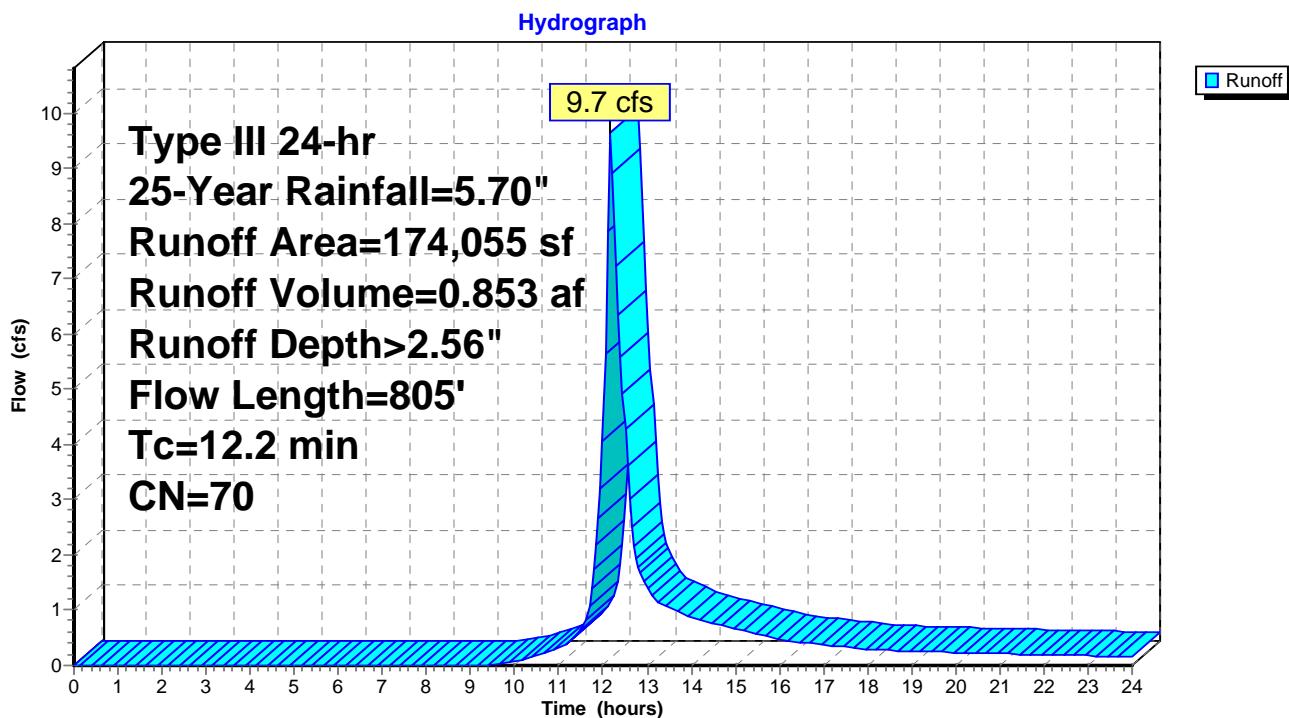
Runoff = 9.7 cfs @ 12.17 hrs, Volume= 0.853 af, Depth> 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
65,159	79	<50% Grass cover, Poor, HSG B
18,776	89	<50% Grass cover, Poor, HSG D
89,437	60	Woods, Fair, HSG B
683	79	Woods, Fair, HSG D
174,055	70	Weighted Average
174,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	100	0.0500	0.61		Sheet Flow, Field Fallow n= 0.050 P2= 3.40"
2.1	181	0.0420	1.43		Shallow Concentrated Flow, Field Short Grass Pasture Kv= 7.0 fps
7.4	524	0.0553	1.18		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
12.2	805	Total			

Subcatchment #2: North central site



Summary for Subcatchment #4: Northeast portion of site

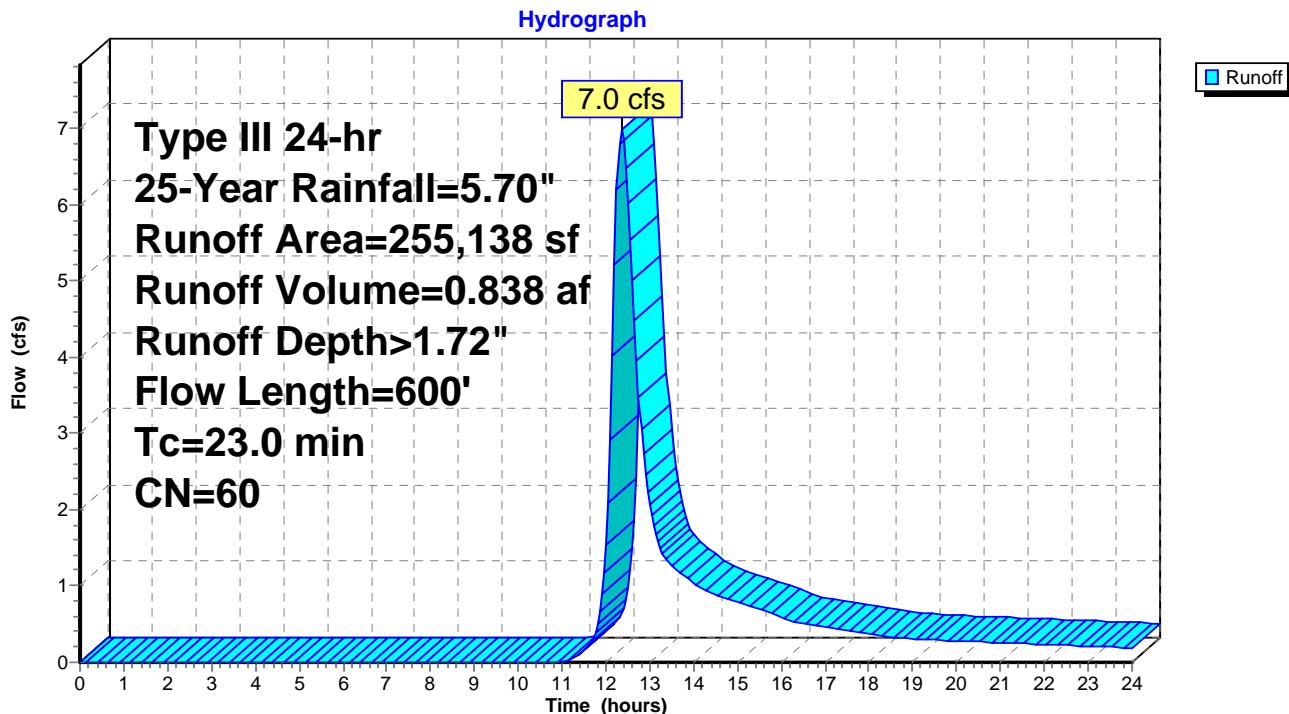
Runoff = 7.0 cfs @ 12.35 hrs, Volume= 0.838 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
255,138	60	Woods, Fair, HSG B
255,138		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0300	0.09		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
5.3	500	0.0980	1.57		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
23.0	600				Total

Subcatchment #4: Northeast portion of site



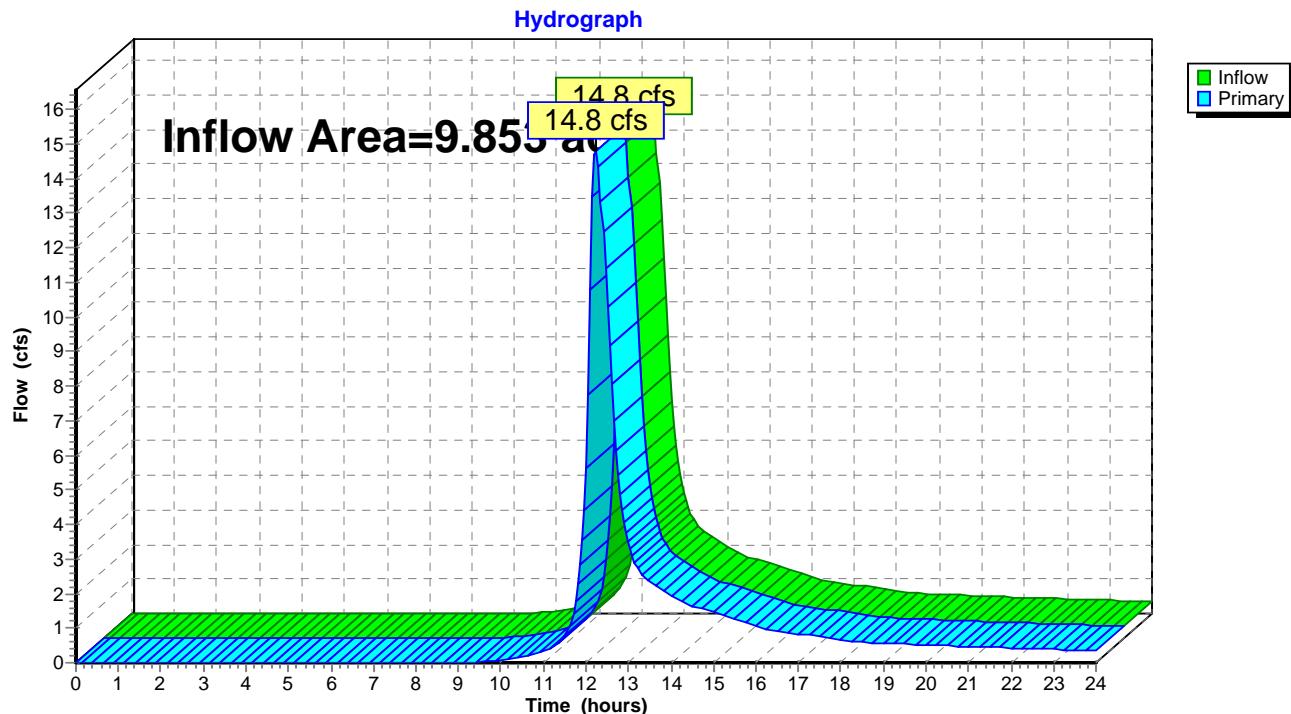
Summary for Link Out: Outlets offsite to north

Inflow Area = 9.853 ac, 0.00% Impervious, Inflow Depth > 2.06" for 25-Year event

Inflow = 14.8 cfs @ 12.22 hrs, Volume= 1.692 af

Primary = 14.8 cfs @ 12.22 hrs, Volume= 1.692 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link Out: Outlets offsite to north

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#2: North central site

Runoff Area=174,055 sf 0.00% Impervious Runoff Depth>3.69"
Flow Length=805' Tc=12.2 min CN=70 Runoff=14.1 cfs 1.230 af

Subcatchment#4: Northeast portion of site Runoff Area=255,138 sf 0.00% Impervious Runoff Depth>2.66"
Flow Length=600' Tc=23.0 min CN=60 Runoff=11.3 cfs 1.298 af

Link Out: Outlets offsite to north

Inflow=22.7 cfs 2.528 af
Primary=22.7 cfs 2.528 af

Total Runoff Area = 9.853 ac Runoff Volume = 2.528 af Average Runoff Depth = 3.08"
100.00% Pervious = 9.853 ac 0.00% Impervious = 0.000 ac

Pre-Development North Outlet

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Type III 24-hr 100-Year Rainfall=7.10"

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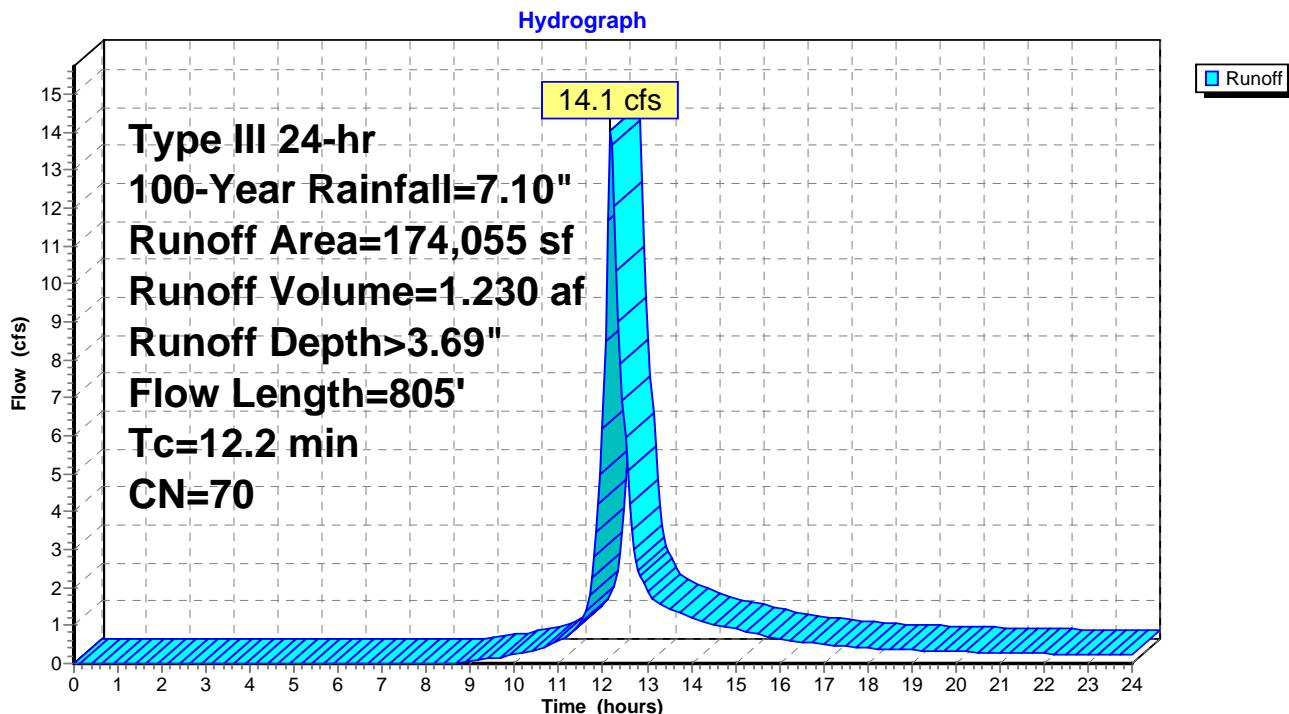
Summary for Subcatchment #2: North central site

Runoff = 14.1 cfs @ 12.17 hrs, Volume= 1.230 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)	CN	Description
65,159	79	<50% Grass cover, Poor, HSG B
18,776	89	<50% Grass cover, Poor, HSG D
89,437	60	Woods, Fair, HSG B
683	79	Woods, Fair, HSG D
174,055	70	Weighted Average
174,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	100	0.0500	0.61		Sheet Flow, Field Fallow n= 0.050 P2= 3.40"
2.1	181	0.0420	1.43		Shallow Concentrated Flow, Field Short Grass Pasture Kv= 7.0 fps
7.4	524	0.0553	1.18		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
12.2	805				Total

Subcatchment #2: North central site

Summary for Subcatchment #4: Northeast portion of site

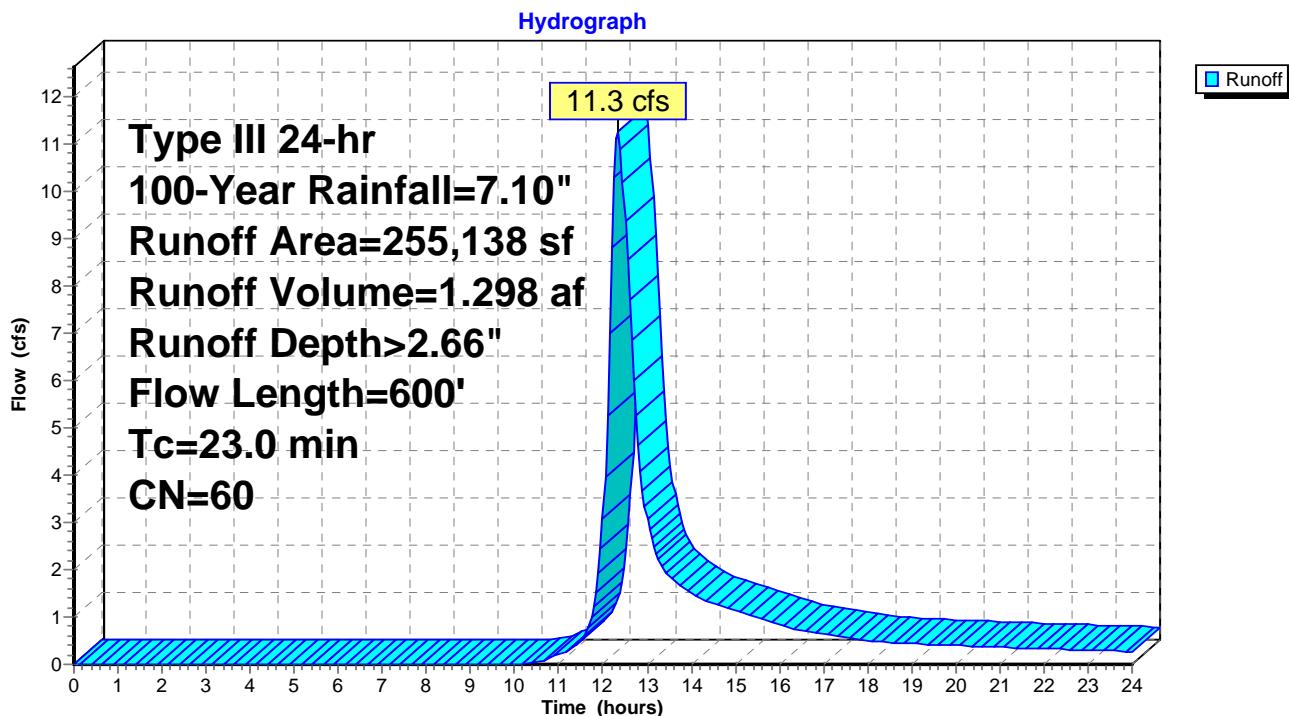
Runoff = 11.3 cfs @ 12.34 hrs, Volume= 1.298 af, Depth> 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)	CN	Description
255,138	60	Woods, Fair, HSG B
255,138		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0300	0.09		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
5.3	500	0.0980	1.57		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
23.0	600				Total

Subcatchment #4: Northeast portion of site



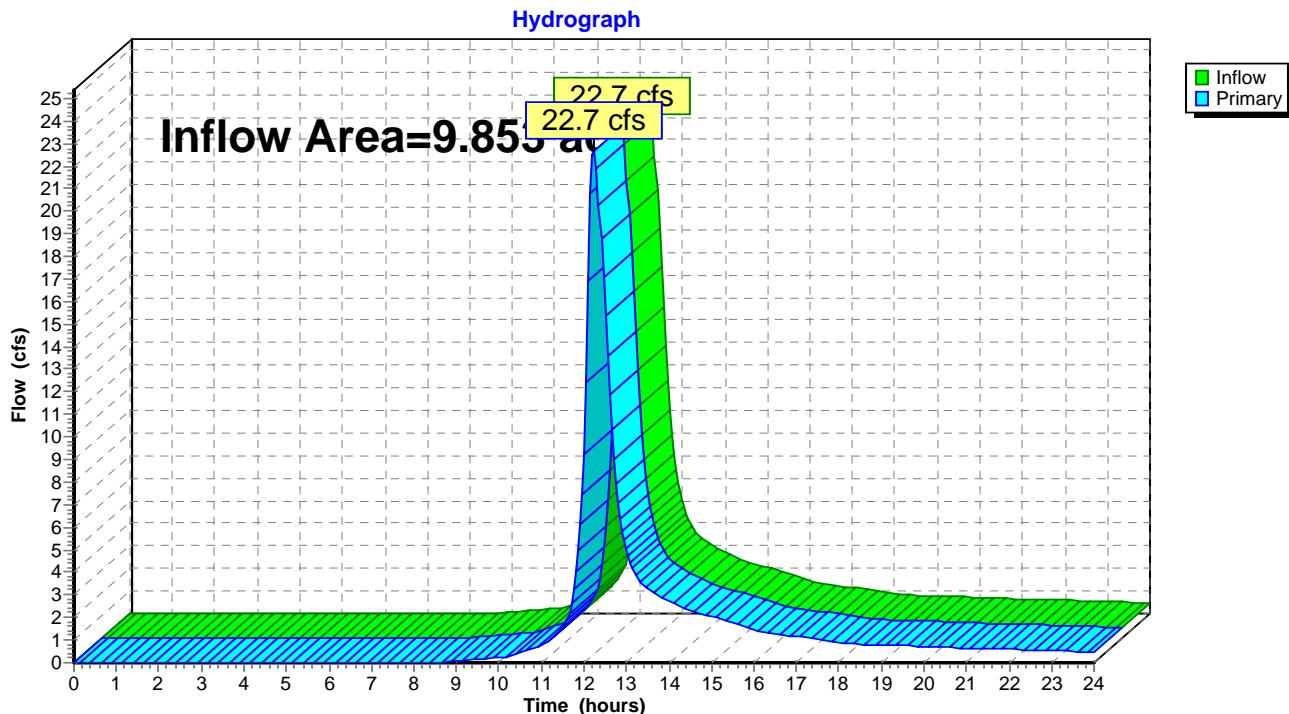
Summary for Link Out: Outlets offsite to north

Inflow Area = 9.853 ac, 0.00% Impervious, Inflow Depth > 3.08" for 100-Year event

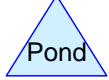
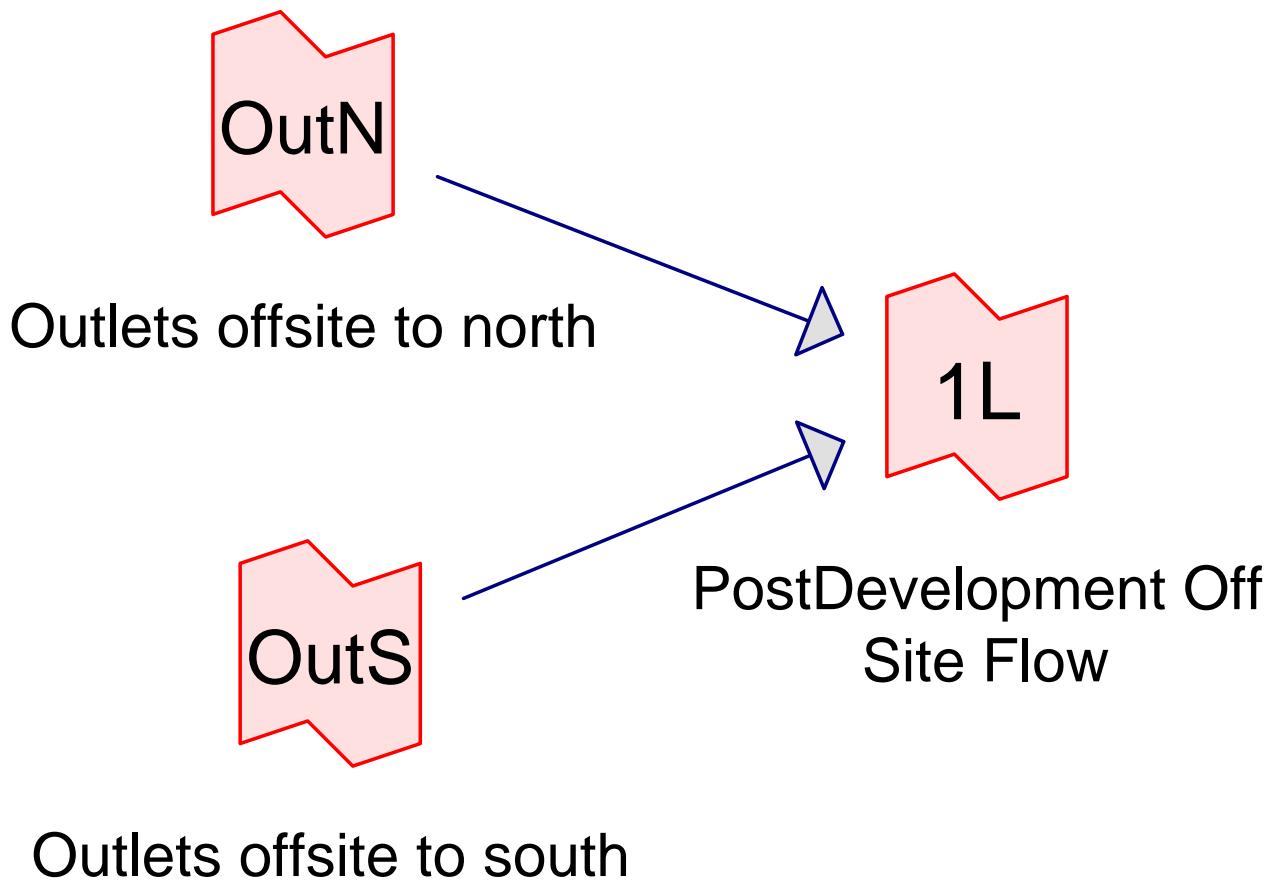
Inflow = 22.7 cfs @ 12.22 hrs, Volume= 2.528 af

Primary = 22.7 cfs @ 12.22 hrs, Volume= 2.528 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link Out: Outlets offsite to north

HYDROLOGY
POST-DEVELOPED CONDITIONS



Routing Diagram for Post-Development Total Off Site Flow
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Post-Development Total Off Site Flow

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	TOTAL AREA

Post-Development Total Off Site Flow

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		TOTAL AREA

Post-Development Total Off Site Flow

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.000	0.000	TOTAL AREA	

Post-Development Total Off Site Flow

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Type III 24-hr 2-Year Rainfall=3.40"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Link 1L: PostDevelopmentOff Site Flow

Inflow=7.9 cfs 1.334 af

Primary=7.9 cfs 1.334 af

Link2-Year Primary Outflow Imported from Post-Development North Outlet~Link Out.hce Inflow=2.8 cfs 0.469 af
Area= 9.853 ac 4.62% Imperv. Primary=2.8 cfs 0.469 af**Link2-Year Primary Outflow** Imported from Post-Development South Outlet~Link Out.hce Inflow=5.1 cfs 0.865 af
Area= 13.474 ac 2.03% Imperv. Primary=5.1 cfs 0.865 af

Post-Development Total Off Site Flow

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Type III 24-hr 2-Year Rainfall=3.40"

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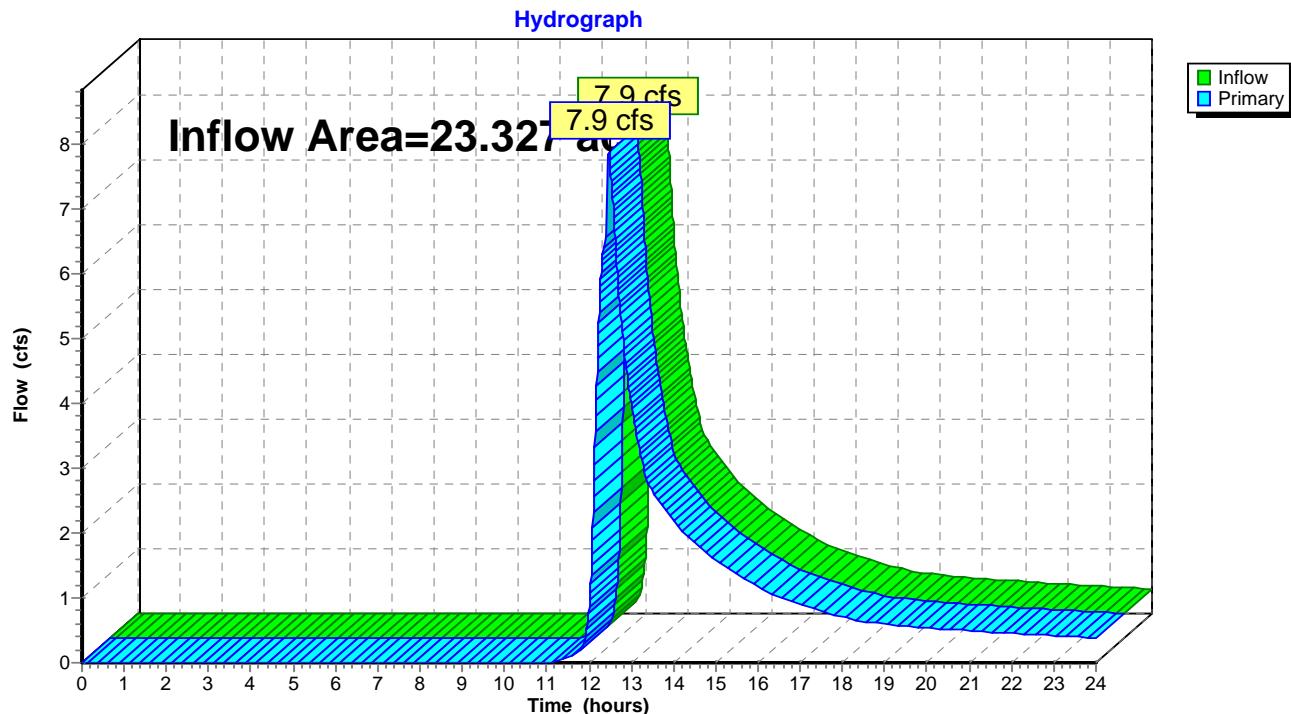
Summary for Link 1L: PostDevelopment Off Site Flow

Inflow Area = 23.327 ac, 3.12% Impervious, Inflow Depth > 0.69" for 2-Year event

Inflow = 7.9 cfs @ 12.47 hrs, Volume= 1.334 af

Primary = 7.9 cfs @ 12.47 hrs, Volume= 1.334 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 1L: PostDevelopment Off Site Flow

Post-Development Total Off Site Flow

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Type III 24-hr 2-Year Rainfall=3.40"

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Summary for Link OutN: Outlets offsite to north

Inflow Area = 9.853 ac, 4.62% Impervious, Inflow Depth > 0.57" for 2-Year event

Inflow = 2.8 cfs @ 12.47 hrs, Volume= 0.469 af

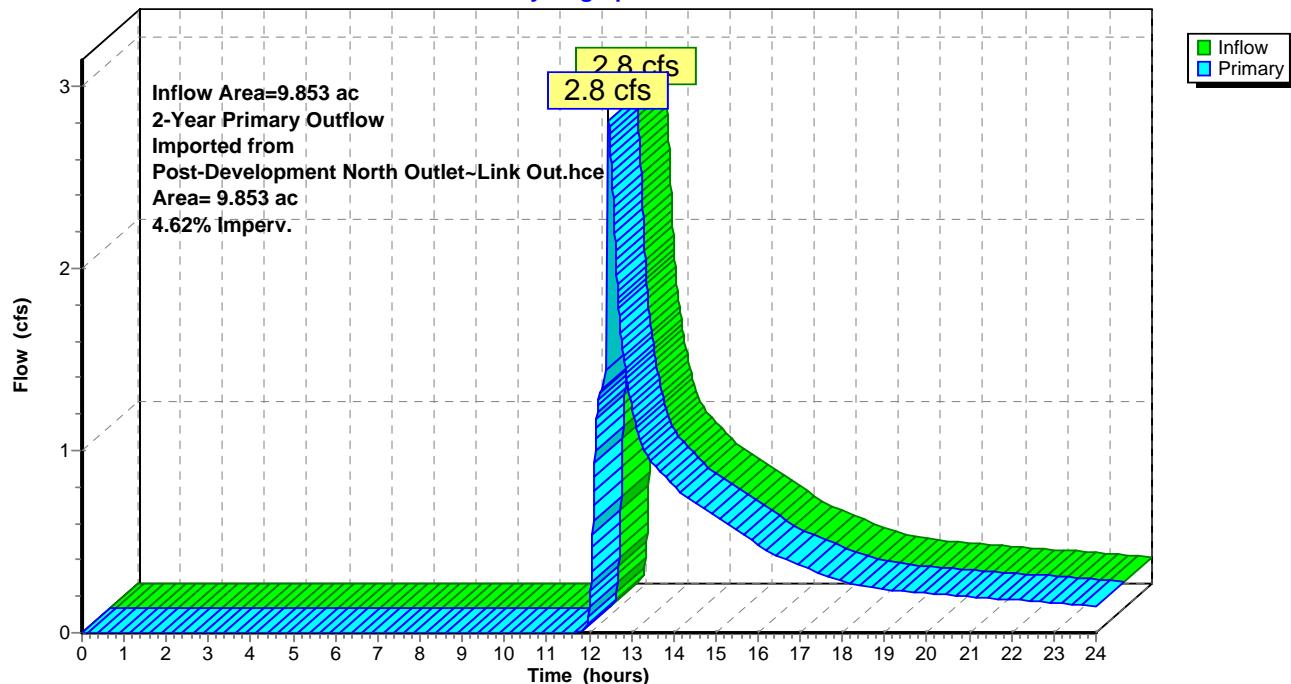
Primary = 2.8 cfs @ 12.47 hrs, Volume= 0.469 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

2-Year Primary Outflow Imported from Post-Development North Outlet-Link Out.hce

Link OutN: Outlets offsite to north

Hydrograph



Post-Development Total Off Site Flow

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Type III 24-hr 2-Year Rainfall=3.40"

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Summary for Link OutS: Outlets offsite to south

Inflow Area = 13.474 ac, 2.03% Impervious, Inflow Depth > 0.77" for 2-Year event

Inflow = 5.1 cfs @ 12.40 hrs, Volume= 0.865 af

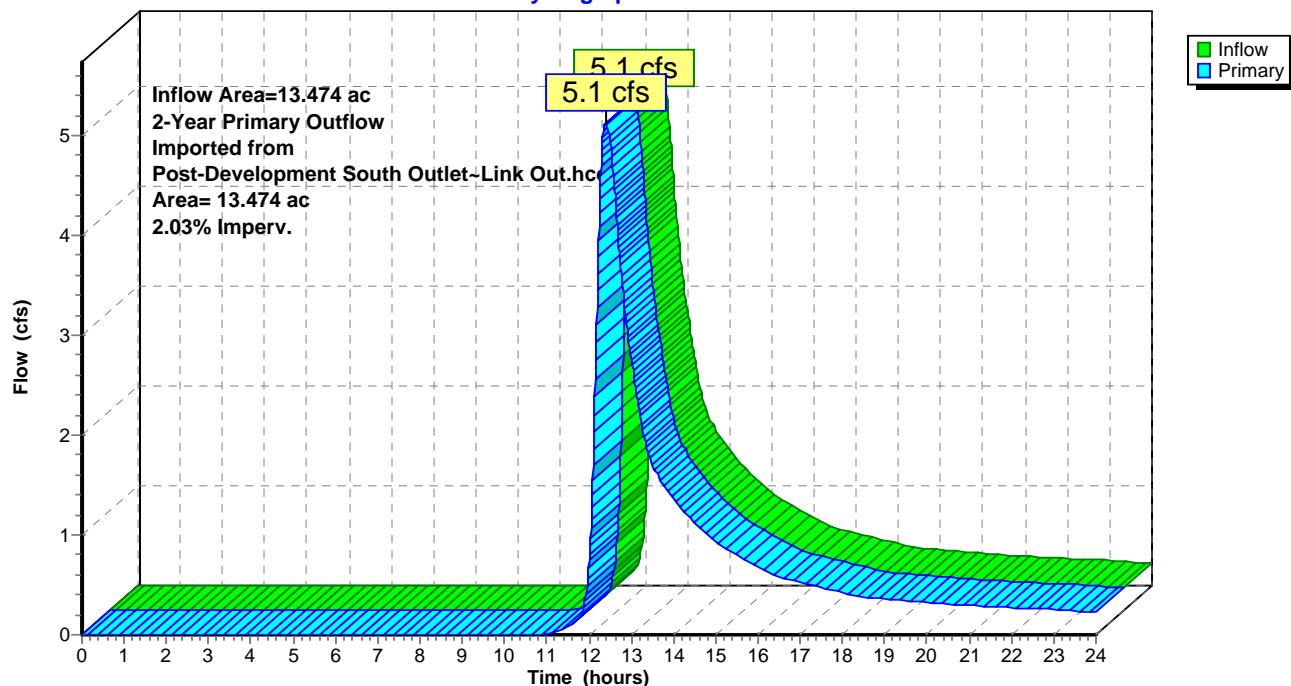
Primary = 5.1 cfs @ 12.40 hrs, Volume= 0.865 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

2-Year Primary Outflow Imported from Post-Development South Outlet~Link Out.hce

Link OutS: Outlets offsite to south

Hydrograph



Post-Development Total Off Site Flow

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Type III 24-hr 10-Year Rainfall=5.00"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Link 1L: PostDevelopmentOff Site Flow

Inflow=24.6 cfs 3.194 af

Primary=24.6 cfs 3.194 af

Link 1L-Year Primary Outflow Imported from Post-Development North Outlet~Link Out.hce Inflow=11.5 cfs 1.222 af
Area= 9.853 ac 4.62% Imperv. Primary=11.5 cfs 1.222 af**Link 1L**-Year Primary Outflow Imported from Post-Development South Outlet~Link Out.hce Inflow=14.8 cfs 1.973 af
Area= 13.474 ac 2.03% Imperv. Primary=14.8 cfs 1.973 af

Post-Development Total Off Site Flow

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Type III 24-hr 10-Year Rainfall=5.00"

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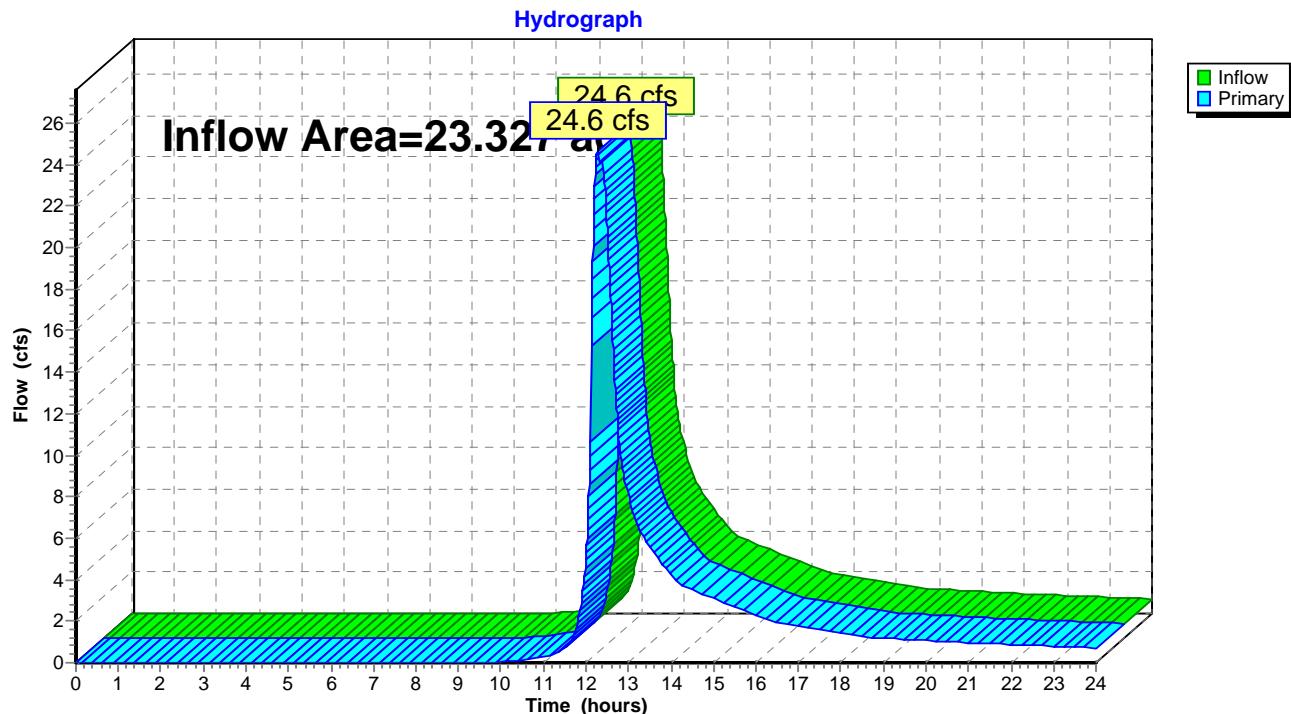
Summary for Link 1L: PostDevelopment Off Site Flow

Inflow Area = 23.327 ac, 3.12% Impervious, Inflow Depth > 1.64" for 10-Year event

Inflow = 24.6 cfs @ 12.27 hrs, Volume= 3.194 af

Primary = 24.6 cfs @ 12.27 hrs, Volume= 3.194 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 1L: PostDevelopment Off Site Flow

Post-Development Total Off Site Flow

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Type III 24-hr 10-Year Rainfall=5.00"

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Summary for Link OutN: Outlets offsite to north

Inflow Area = 9.853 ac, 4.62% Impervious, Inflow Depth > 1.49" for 10-Year event

Inflow = 11.5 cfs @ 12.25 hrs, Volume= 1.222 af

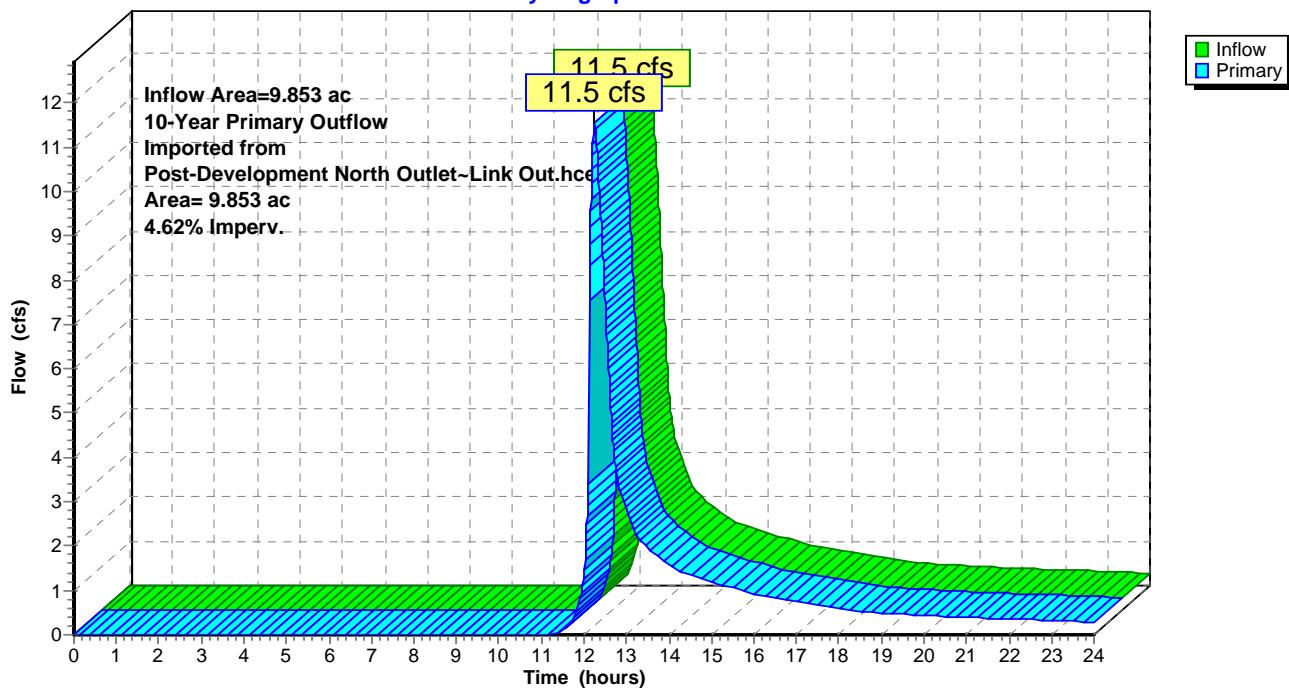
Primary = 11.5 cfs @ 12.25 hrs, Volume= 1.222 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

10-Year Primary Outflow Imported from Post-Development North Outlet~Link Out.hce

Link OutN: Outlets offsite to north

Hydrograph



Post-Development Total Off Site Flow

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Type III 24-hr 10-Year Rainfall=5.00"

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Summary for Link OutS: Outlets offsite to south

Inflow Area = 13.474 ac, 2.03% Impervious, Inflow Depth > 1.76" for 10-Year event

Inflow = 14.8 cfs @ 12.41 hrs, Volume= 1.973 af

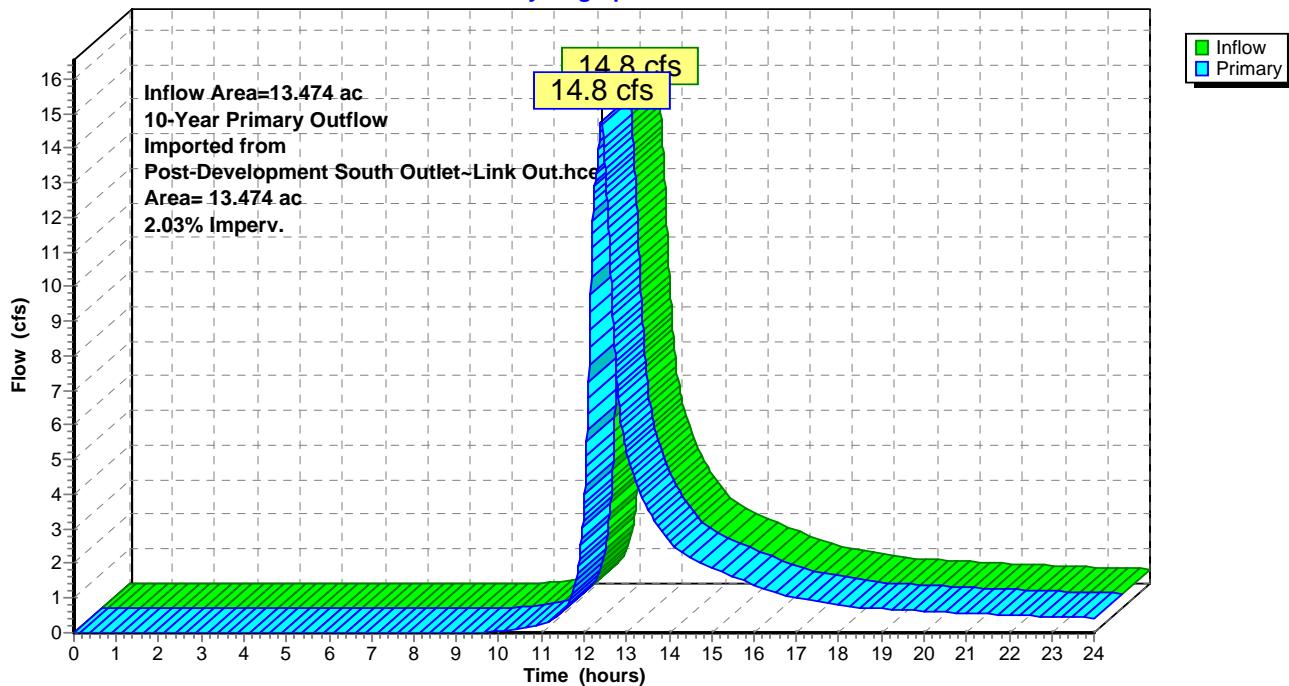
Primary = 14.8 cfs @ 12.41 hrs, Volume= 1.973 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

10-Year Primary Outflow Imported from Post-Development South Outlet~Link Out.hce

Link OutS: Outlets offsite to south

Hydrograph



Post-Development Total Off Site Flow

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Type III 24-hr 25-Year Rainfall=5.70"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Link 1L: PostDevelopmentOff Site Flow

Inflow=35.3 cfs 4.130 af

Primary=35.3 cfs 4.130 af

~~Link~~ 25-Year Primary Outflow Imported from Post-Development North Outlet~Link Out.hce Inflow=16.7 cfs 1.605 af
Area= 9.853 ac 4.62% Imperv. Primary=16.7 cfs 1.605 af~~Link~~ 25-Year Primary Outflow Imported from Post-Development South Outlet~Link Out.hce Inflow=21.2 cfs 2.526 af
Area= 13.474 ac 2.03% Imperv. Primary=21.2 cfs 2.526 af

Post-Development Total Off Site Flow

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Type III 24-hr 25-Year Rainfall=5.70"

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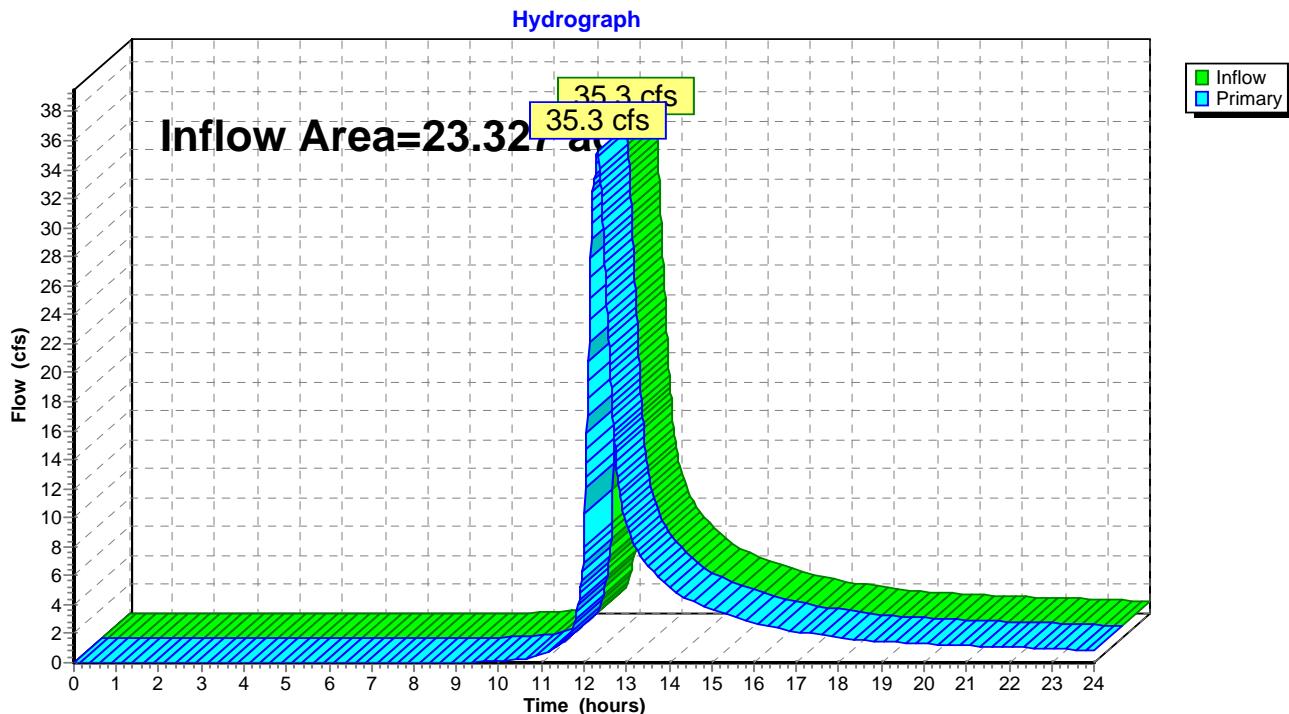
Summary for Link 1L: PostDevelopment Off Site Flow

Inflow Area = 23.327 ac, 3.12% Impervious, Inflow Depth > 2.12" for 25-Year event

Inflow = 35.3 cfs @ 12.32 hrs, Volume= 4.130 af

Primary = 35.3 cfs @ 12.32 hrs, Volume= 4.130 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 1L: PostDevelopment Off Site Flow

Post-Development Total Off Site Flow

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Type III 24-hr 25-Year Rainfall=5.70"

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Summary for Link OutN: Outlets offsite to north

Inflow Area = 9.853 ac, 4.62% Impervious, Inflow Depth > 1.95" for 25-Year event

Inflow = 16.7 cfs @ 12.23 hrs, Volume= 1.605 af

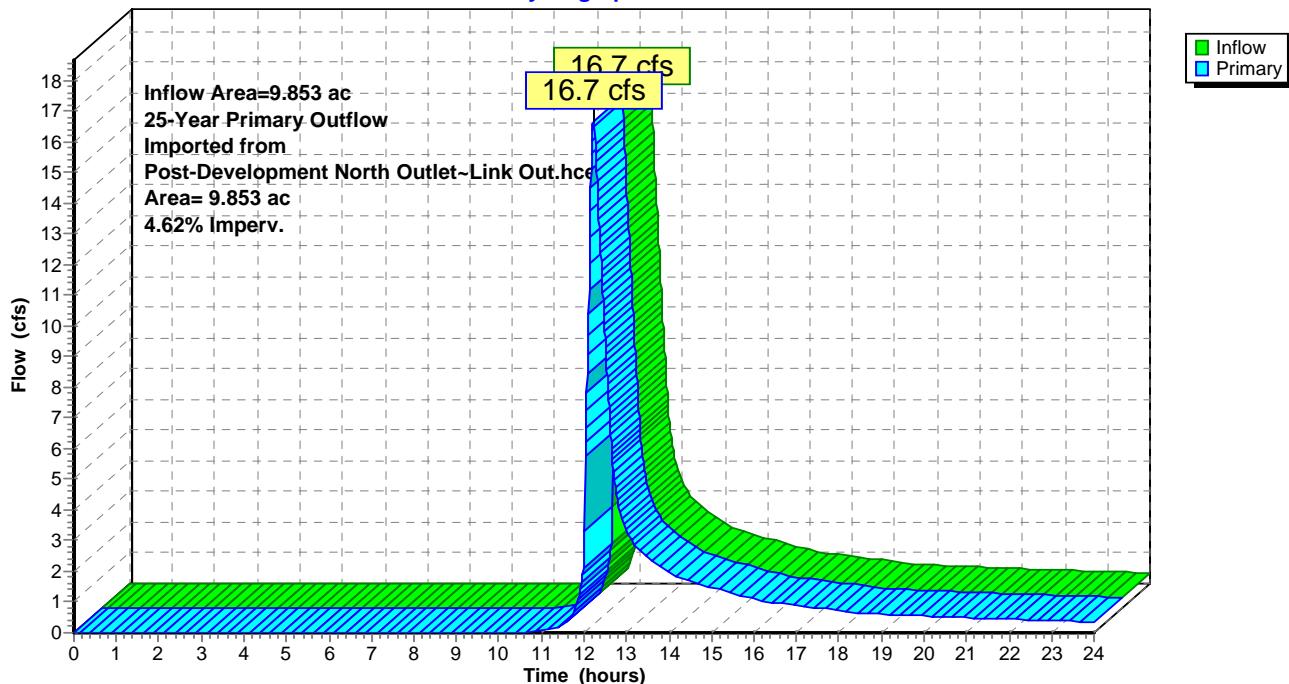
Primary = 16.7 cfs @ 12.23 hrs, Volume= 1.605 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

25-Year Primary Outflow Imported from Post-Development North Outlet~Link Out.hce

Link OutN: Outlets offsite to north

Hydrograph



Post-Development Total Off Site Flow

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Type III 24-hr 25-Year Rainfall=5.70"

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Summary for Link OutS: Outlets offsite to south

Inflow Area = 13.474 ac, 2.03% Impervious, Inflow Depth > 2.25" for 25-Year event

Inflow = 21.2 cfs @ 12.35 hrs, Volume= 2.526 af

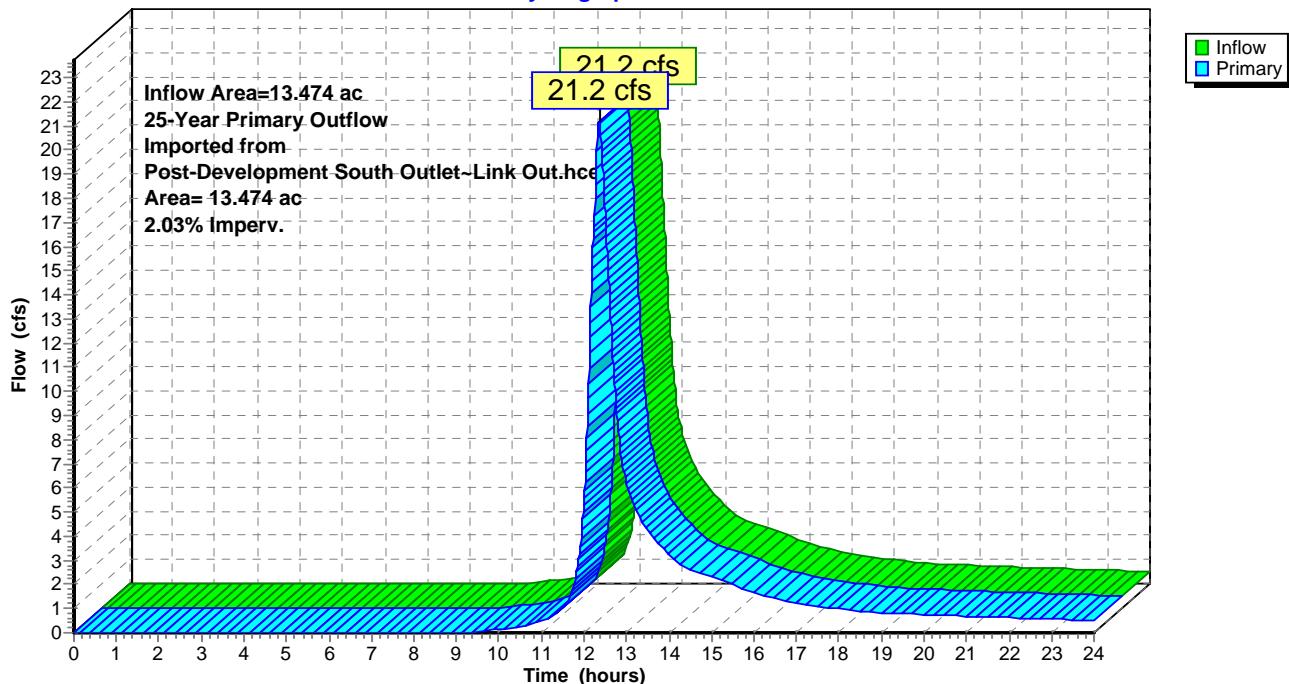
Primary = 21.2 cfs @ 12.35 hrs, Volume= 2.526 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

25-Year Primary Outflow Imported from Post-Development South Outlet~Link Out.hce

Link OutS: Outlets offsite to south

Hydrograph



Post-Development Total Off Site Flow

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Type III 24-hr 100-Year Rainfall=7.10"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Link 1L: PostDevelopmentOff Site Flow

Inflow=56.9 cfs 6.154 af

Primary=56.9 cfs 6.154 af

~~Link~~-Year Primary Outflow Imported from Post-Development North Outlet~Link Out.hce Inflow=25.8 cfs 2.439 af
Area= 9.853 ac 4.62% Imperv. Primary=25.8 cfs 2.439 af~~Link~~-Year Primary Outflow Imported from Post-Development South Outlet~Link Out.hce Inflow=33.2 cfs 3.716 af
Area= 13.474 ac 2.03% Imperv. Primary=33.2 cfs 3.716 af

Post-Development Total Off Site Flow

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Type III 24-hr 100-Year Rainfall=7.10"

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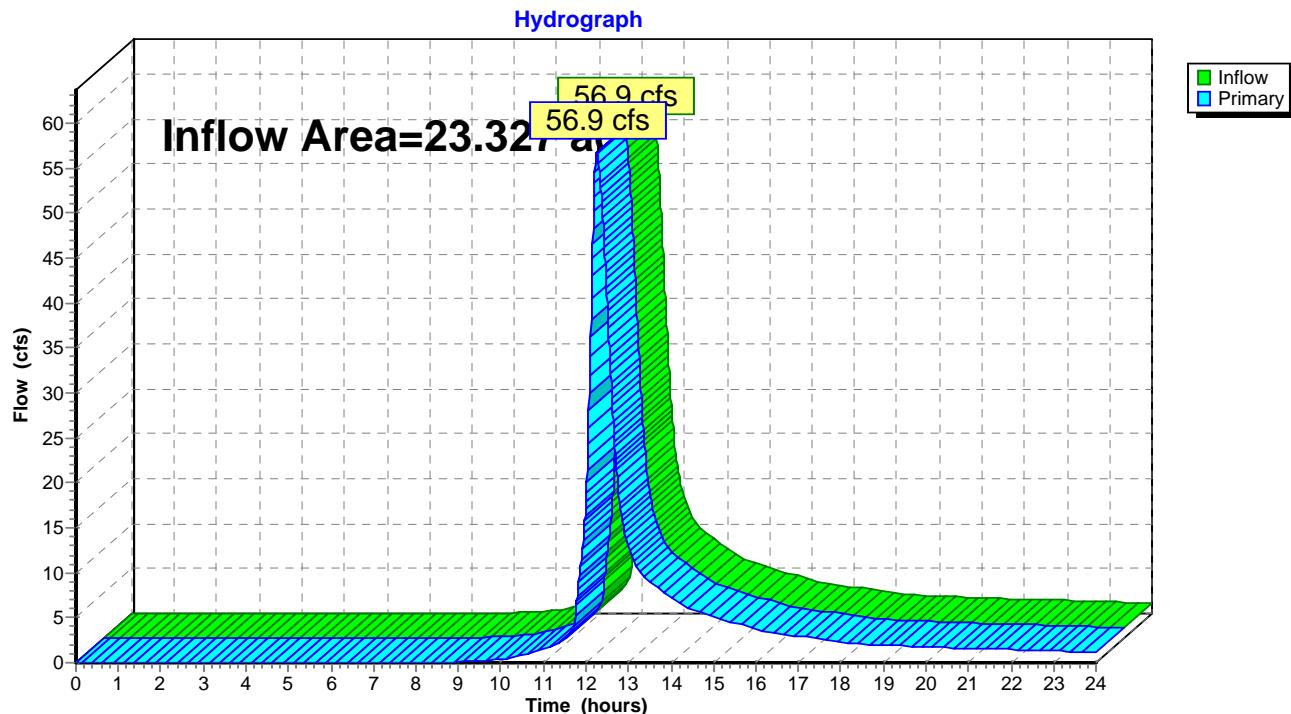
Summary for Link 1L: PostDevelopment Off Site Flow

Inflow Area = 23.327 ac, 3.12% Impervious, Inflow Depth > 3.17" for 100-Year event

Inflow = 56.9 cfs @ 12.26 hrs, Volume= 6.154 af

Primary = 56.9 cfs @ 12.26 hrs, Volume= 6.154 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 1L: PostDevelopment Off Site Flow

Post-Development Total Off Site Flow

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Type III 24-hr 100-Year Rainfall=7.10"

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Summary for Link OutN: Outlets offsite to north

Inflow Area = 9.853 ac, 4.62% Impervious, Inflow Depth > 2.97" for 100-Year event

Inflow = 25.8 cfs @ 12.21 hrs, Volume= 2.439 af

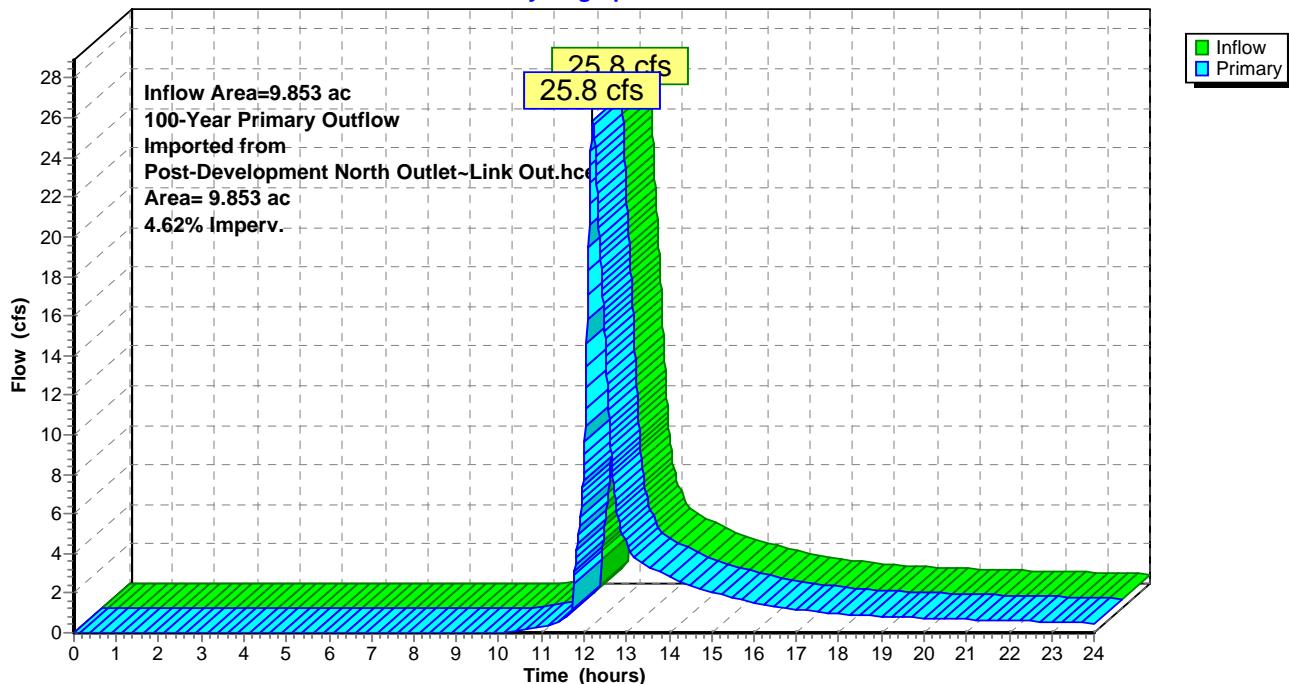
Primary = 25.8 cfs @ 12.21 hrs, Volume= 2.439 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

100-Year Primary Outflow Imported from Post-Development North Outlet~Link Out.hce

Link OutN: Outlets offsite to north

Hydrograph



Post-Development Total Off Site Flow

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Type III 24-hr 100-Year Rainfall=7.10"

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Summary for Link OutS: Outlets offsite to south

Inflow Area = 13.474 ac, 2.03% Impervious, Inflow Depth > 3.31" for 100-Year event

Inflow = 33.2 cfs @ 12.30 hrs, Volume= 3.716 af

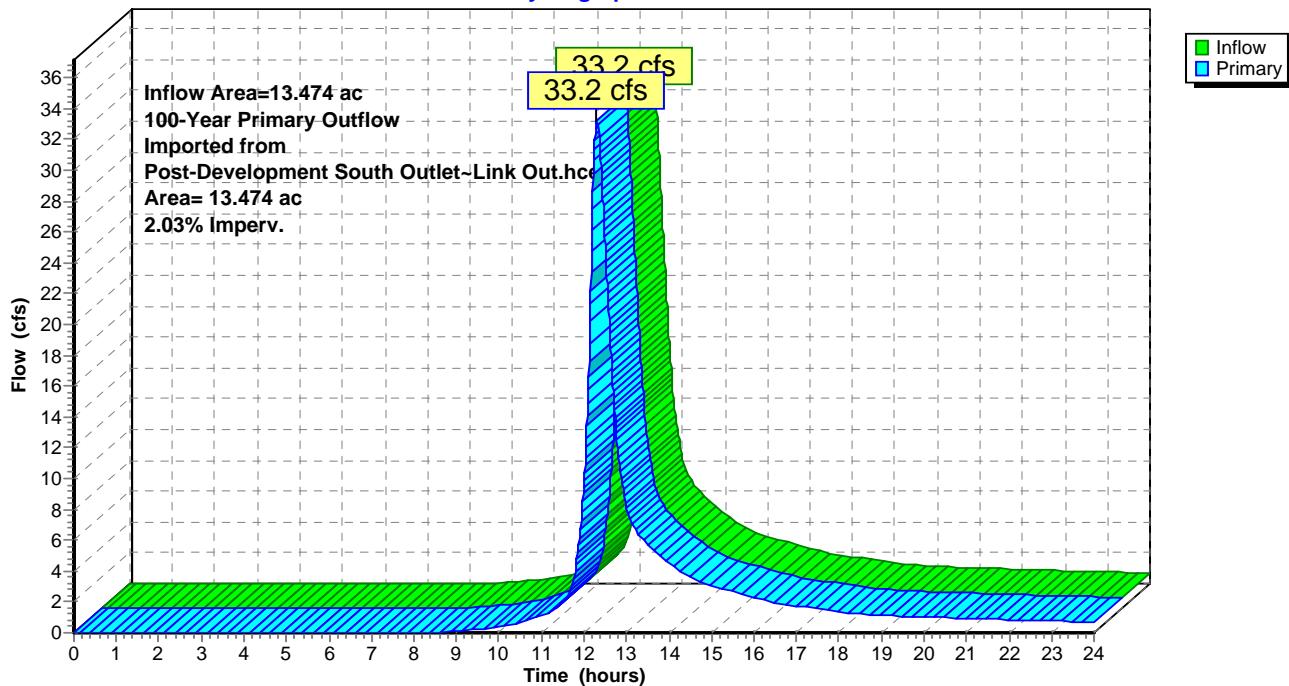
Primary = 33.2 cfs @ 12.30 hrs, Volume= 3.716 af, Atten= 0%, Lag= 0.0 min

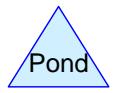
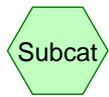
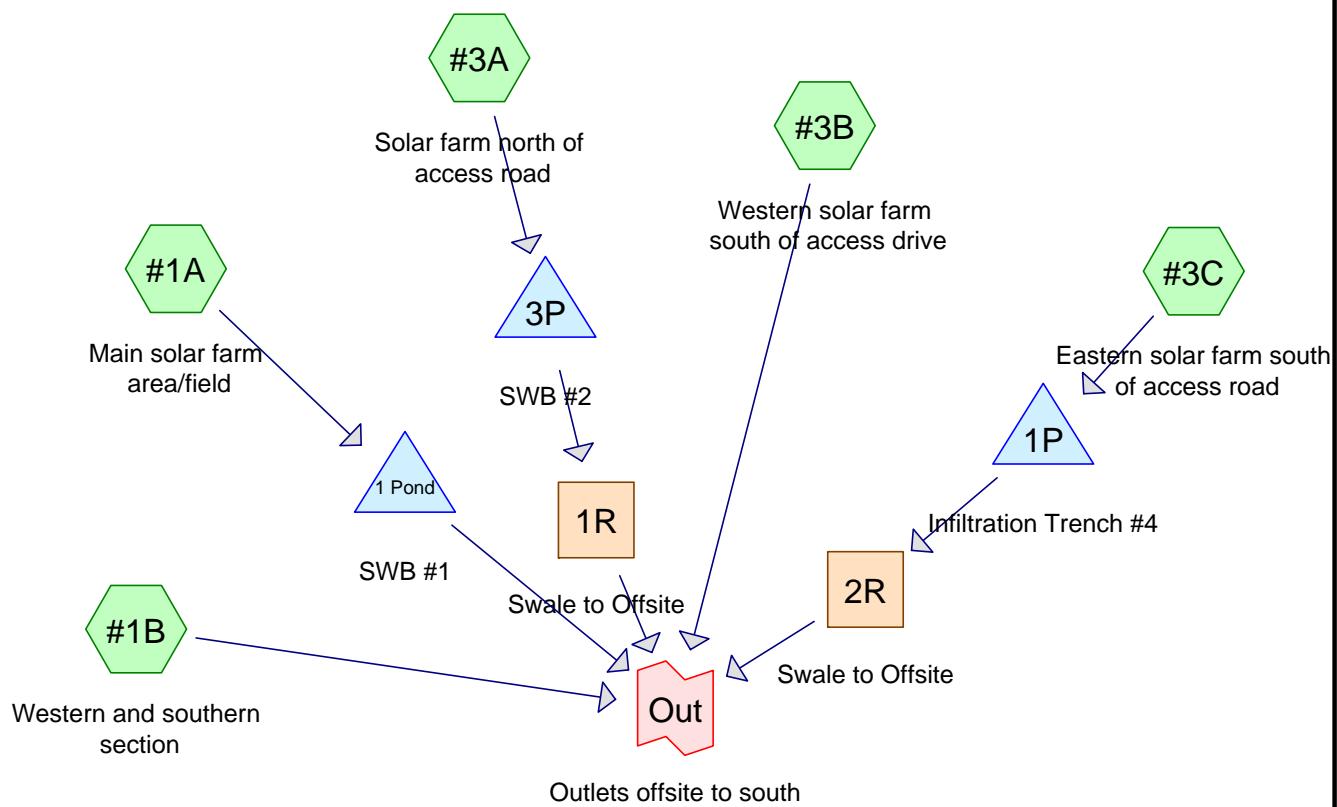
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

100-Year Primary Outflow Imported from Post-Development South Outlet~Link Out.hce

Link OutS: Outlets offsite to south

Hydrograph





Routing Diagram for Post-Development South Outlet
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Post-Development South Outlet

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.892	61	>75% Grass cover, Good, HSG B (#1B, #3A, #3B)
2.324	80	>75% Grass cover, Good, HSG D (#1A, #1B)
0.078	98	Concrete Ballast, HSG B (#3A, #3B, #3C)
0.008	98	Concrete Pads and Ballast, HSG B (#1A)
0.133	98	Concrete Pads and Ballast, HSG D (#1A, #1B)
0.035	98	Concrete Pads and Ballasts, HSG B (#1B)
0.408	96	Gravel surface, HSG B (#1B, #3A, #3B)
0.208	96	Gravel surface, HSG D (#1A, #1B)
0.020	98	Ledge, HSG B (#3A)
1.377	61	Solar Array Area (grass), Good, HSG B (#1A, #1B, #3B, #3C)
0.505	80	Solar Array Area (grass), Good, HSG D (#1A, #1B)
0.431	61	Solar Arrays (Grass), Good, HSG B (#3A)
5.056	60	Woods, Fair, HSG B (#1B, #3B)
13.474	67	TOTAL AREA

Post-Development South Outlet

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
10.304	HSG B	#1A, #1B, #3A, #3B, #3C
0.000	HSG C	
3.169	HSG D	#1A, #1B
0.000	Other	
13.474		TOTAL AREA

Post-Development South Outlet

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	2.892	0.000	2.324	0.000	5.216	>75% Grass cover, Good	#1A, #1B, #3A, #3B
0.000	0.078	0.000	0.000	0.000	0.078	Concrete Ballast	#3A, #3B
0.000	0.008	0.000	0.133	0.000	0.140	Concrete Pads and Ballast	#1A, #1B
0.000	0.035	0.000	0.000	0.000	0.035	Concrete Pads and Ballasts	#1B
0.000	0.408	0.000	0.208	0.000	0.616	Gravel surface	#1A, #1B, #3A, #3B
0.000	0.020	0.000	0.000	0.000	0.020	Ledge	#3A
0.000	1.377	0.000	0.505	0.000	1.882	Solar Array Area (grass), Good	#1A, #1B, #3A, #3B
0.000	10.304	0.000	3.169	0.000	13.474	TOTAL AREA	#3C

Post-Development South Outlet

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	#3A	0.00	0.00	33.0	0.0300	0.013	15.0	0.0	0.0
2	1 Pond	366.00	365.50	100.0	0.0050	0.013	15.0	0.0	0.0
3	3P	332.75	332.57	35.0	0.0051	0.013	12.0	0.0	0.0

Post-Development South Outlet

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Type III 24-hr 2-Year Rainfall=3.40"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#1A: Main solar farm

Runoff Area=115,617 sf 4.76% Impervious Runoff Depth>1.55"
Flow Length=430' Tc=21.5 min CN=80 Runoff=3.1 cfs 0.343 af

Subcatchment#1B: Western and southern

Runoff Area=286,563 sf 0.74% Impervious Runoff Depth>0.65"
Flow Length=860' Tc=21.2 min CN=64 Runoff=2.6 cfs 0.357 af

Subcatchment#3A: Solar farm north of

Runoff Area=28,517 sf 7.60% Impervious Runoff Depth>0.89"
Flow Length=526' Tc=10.0 min CN=69 Runoff=0.5 cfs 0.049 af

Subcatchment#3B: Western solar farm

Runoff Area=140,575 sf 0.70% Impervious Runoff Depth>0.53"
Flow Length=476' Tc=15.4 min CN=61 Runoff=1.0 cfs 0.141 af

Subcatchment#3C: Eastern solar farm

Runoff Area=15,653 sf 7.08% Impervious Runoff Depth>0.65"
Flow Length=203' Tc=10.0 min CN=64 Runoff=0.2 cfs 0.020 af

Reach 1R: Swale to Offsite

Avg. Flow Depth=0.03' Max Vel=1.61 fps Inflow=0.1 cfs 0.034 af
n=0.030 L=155.0' S=0.2387 '/' Capacity=113.8 cfs Outflow=0.1 cfs 0.034 af

Reach 2R: Swale to Offsite

Avg. Flow Depth=0.01' Max Vel=0.88 fps Inflow=0.0 cfs 0.001 af
n=0.030 L=132.0' S=0.2424 '/' Capacity=63.2 cfs Outflow=0.0 cfs 0.001 af

Pond 1 Pond: SWB #1

Peak Elev=367.78' Storage=0.082 af Inflow=3.1 cfs 0.343 af
Outflow=1.8 cfs 0.332 af

Pond 1P: Infiltration Trench #4

Peak Elev=324.50' Storage=0.019 af Inflow=0.2 cfs 0.020 af
Outflow=0.0 cfs 0.001 af

Pond 3P: SWB #2

Peak Elev=333.20' Storage=0.018 af Inflow=0.5 cfs 0.049 af
Outflow=0.1 cfs 0.034 af

Link Out: Outlets offsite to south

Inflow=5.1 cfs 0.865 af
Primary=5.1 cfs 0.865 af

Total Runoff Area = 13.474 ac Runoff Volume = 0.909 af Average Runoff Depth = 0.81"
97.97% Pervious = 13.201 ac 2.03% Impervious = 0.273 ac

Summary for Subcatchment #1A: Main solar farm area/field

Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

Runoff = 3.1 cfs @ 12.30 hrs, Volume= 0.343 af, Depth> 1.55"

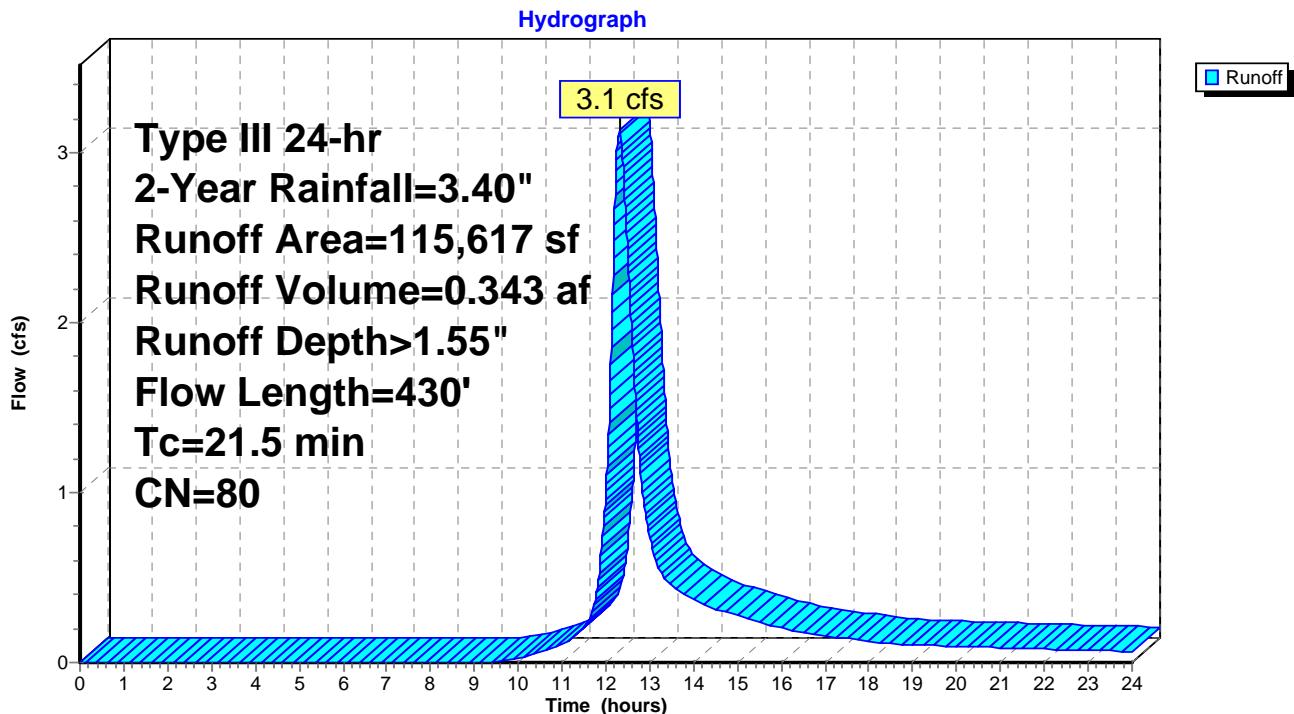
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
4,489	96	Gravel surface, HSG D
*	10,268	Solar Array Area (grass), Good, HSG B
62,737	80	>75% Grass cover, Good, HSG D
*	6,809	Solar Array Area (grass), Good, HSG D
*	4,745	Concrete Pads and Ballast, HSG D
*	335	Concrete Pads and Ballast, HSG B
2,798	96	Gravel surface, HSG D
*	7,105	Solar Array Area (grass), Good, HSG D
15,911	80	>75% Grass cover, Good, HSG D
*	420	Concrete Pads and Ballast, HSG D

115,617 80 Weighted Average
110,117 95.24% Pervious Area
5,500 4.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	60	0.0150	0.10		Sheet Flow, Grass Grass: Dense n= 0.240 P2= 3.40"
4.8	40	0.0180	0.14		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
6.4	330	0.0152	0.86		Shallow Concentrated Flow, Solar Array Area (Grass) Short Grass Pasture Kv= 7.0 fps
21.5	430	Total			

Subcatchment #1A: Main solar farm area/field



Summary for Subcatchment #1B: Western and southern section

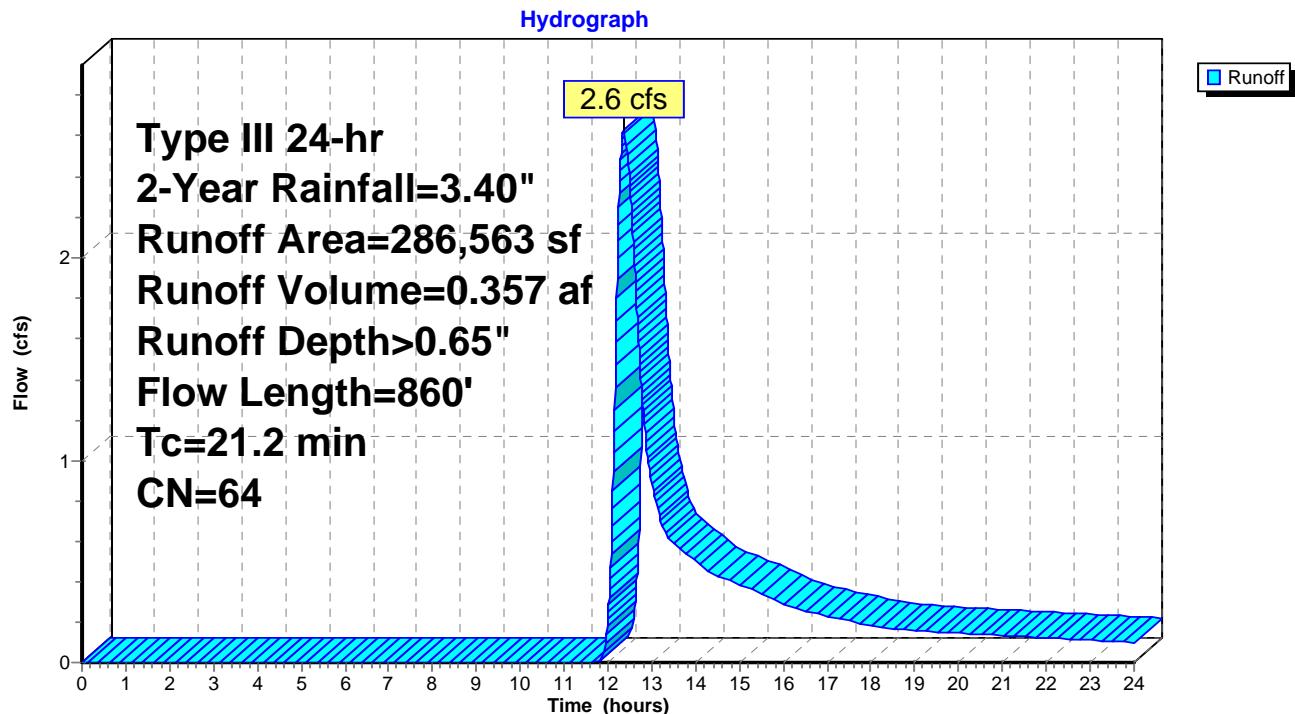
Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

Runoff = 2.6 cfs @ 12.37 hrs, Volume= 0.357 af, Depth> 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
1,770	96	Gravel surface, HSG D
22,572	80	>75% Grass cover, Good, HSG D
*	8,095	Solar Array Area (grass), Good, HSG D
*	611	Concrete Pads and Ballast, HSG D
11,590	96	Gravel surface, HSG B
55,889	61	>75% Grass cover, Good, HSG B
163,099	60	Woods, Fair, HSG B
*	21,417	Solar Array Area (grass), Good, HSG B
*	1,520	Concrete Pads and Ballasts, HSG B
286,563	64	Weighted Average
284,432		99.26% Pervious Area
2,131		0.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0200	0.12		Sheet Flow, Grass/Woods at PL Grass: Dense n= 0.240 P2= 3.40"
4.3	245	0.0367	0.96		Shallow Concentrated Flow, Woods on PL Woodland Kv= 5.0 fps
2.4	295	0.1627	2.02		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.7	220	0.1182	5.16		Shallow Concentrated Flow, Wetland Grassed Waterway Kv= 15.0 fps
21.2	860	Total			

Subcatchment #1B: Western and southern section

Post-Development South Outlet

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Type III 24-hr 2-Year Rainfall=3.40"

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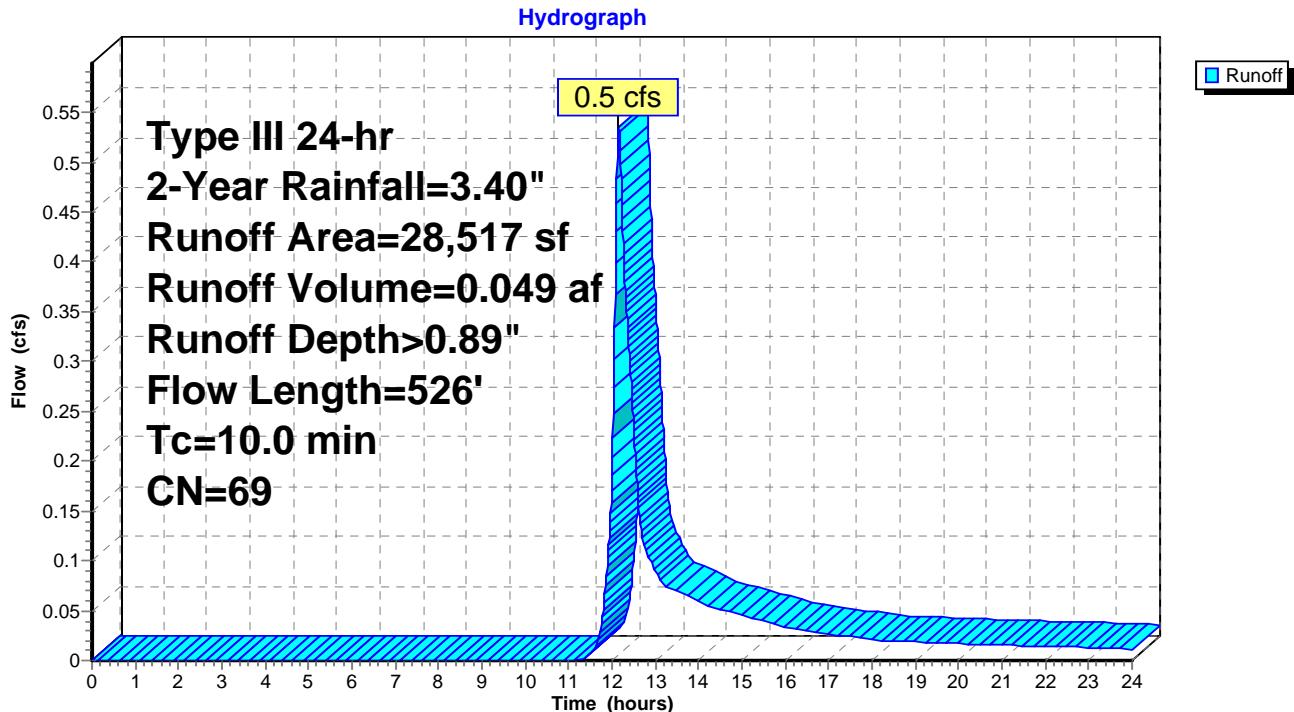
Summary for Subcatchment #3A: Solar farm north of access road

Runoff = 0.5 cfs @ 12.15 hrs, Volume= 0.049 af, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	18,767	61	Solar Arrays (Grass), Good, HSG B
*	861	98	Ledge, HSG B
	4,292	96	Gravel surface, HSG B
	3,290	61	>75% Grass cover, Good, HSG B
*	1,307	98	Concrete Ballast, HSG B
	28,517	69	Weighted Average
	26,349		92.40% Pervious Area
	2,168		7.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.1300	0.25		Sheet Flow, Grass Grass: Dense n= 0.240 P2= 3.40"
1.6	323	0.0520	3.42		Shallow Concentrated Flow, Solar Arrays and grass swale Grassed Waterway Kv= 15.0 fps
0.1	33	0.0300	9.12	11.19	Pipe Channel, Pipe 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	22	0.3300	4.02		Shallow Concentrated Flow, Stormwater Basin Slope Short Grass Pasture Kv= 7.0 fps
0.1	48		8.02		Lake or Reservoir, Stormwater Basin Mean Depth= 2.00'
8.4	526				Total, Increased to minimum Tc = 10.0 min

Subcatchment #3A: Solar farm north of access road

Post-Development South Outlet

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Type III 24-hr 2-Year Rainfall=3.40"

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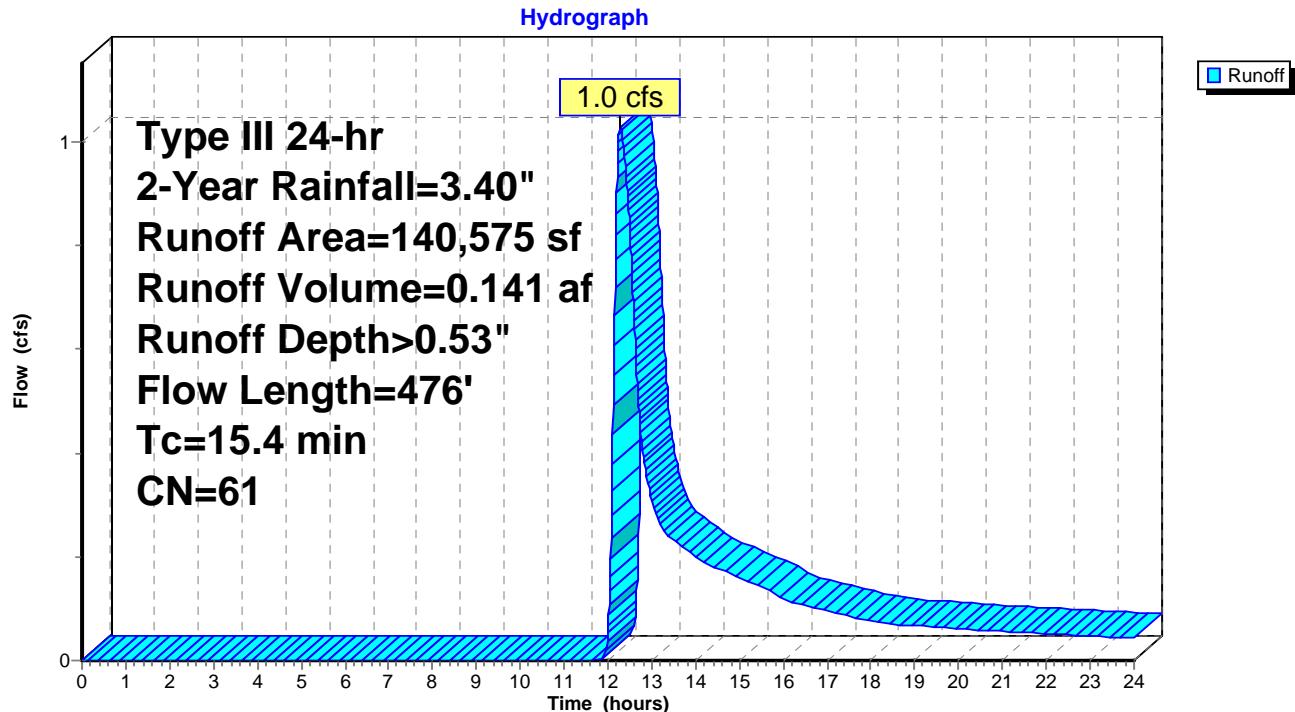
Summary for Subcatchment #3B: Western solar farm south of access drive

Runoff = 1.0 cfs @ 12.28 hrs, Volume= 0.141 af, Depth> 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	13,760	61	Solar Array Area (grass), Good, HSG B
	66,807	61	>75% Grass cover, Good, HSG B
	57,125	60	Woods, Fair, HSG B
	1,903	96	Gravel surface, HSG B
*	980	98	Concrete Ballast, HSG B
	140,575	61	Weighted Average
	139,595		99.30% Pervious Area
	980		0.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	60	0.3300	0.33		Sheet Flow, Grass Slope Grass: Dense n= 0.240 P2= 3.40"
8.2	40	0.0333	0.08		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
4.0	236	0.0381	0.98		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.2	140	0.2286	13.43	29.99	Parabolic Channel, Intermittent Watercourse W=5.00' D=0.67' Area=2.2 sf Perim=5.2' n= 0.030
15.4	476	Total			

Subcatchment #3B: Western solar farm south of access drive

Summary for Subcatchment #3C: Eastern solar farm south of access road

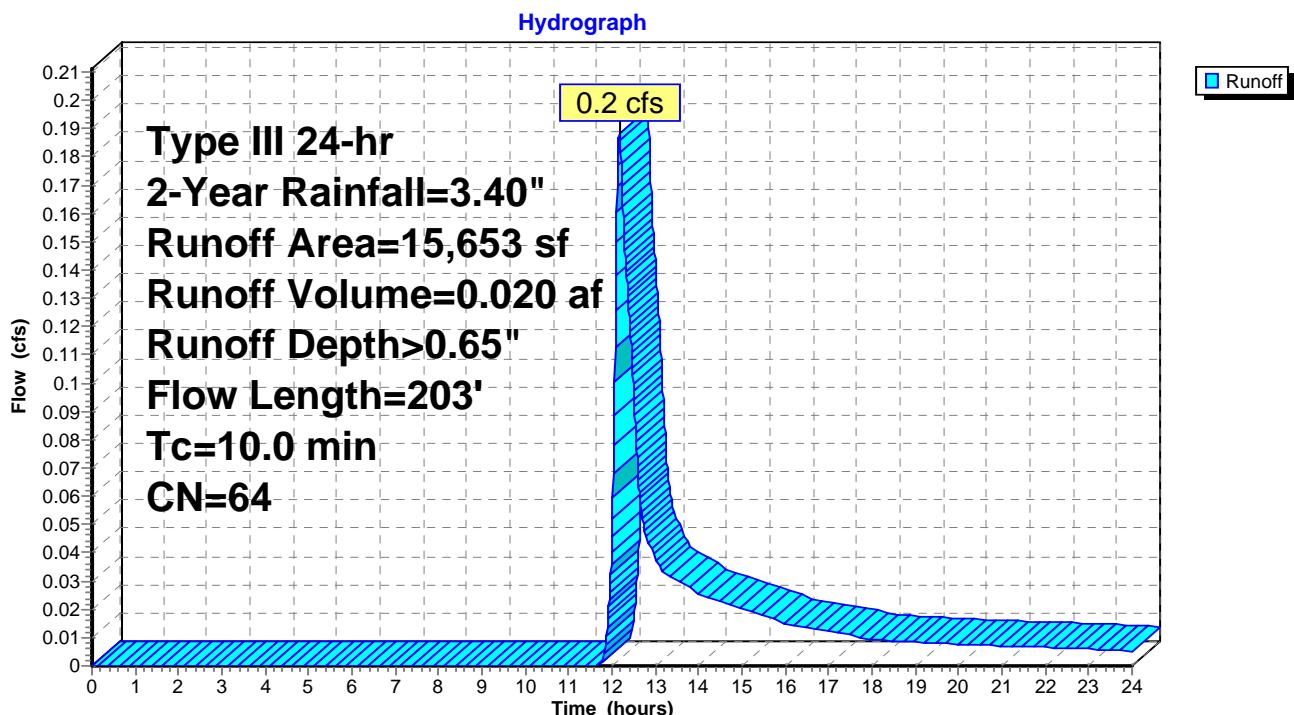
Runoff = 0.2 cfs @ 12.17 hrs, Volume= 0.020 af, Depth> 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
* 14,544	61	Solar Array Area (grass), Good, HSG B
* 1,109	98	Concrete Ballast, HSG B

15,653	64	Weighted Average
14,544		92.92% Pervious Area
1,109		7.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0600	0.27		Sheet Flow, Grassed Solar Array Area Grass: Short n= 0.150 P2= 3.40"
1.2	103	0.0388	1.38		Shallow Concentrated Flow, Solar Array Area Grassed Short Grass Pasture Kv= 7.0 fps
7.3	203				Total, Increased to minimum Tc = 10.0 min

Subcatchment #3C: Eastern solar farm south of access road

Summary for Reach 1R: Swale to Offsite

Inflow Area = 0.655 ac, 7.60% Impervious, Inflow Depth > 0.63" for 2-Year event

Inflow = 0.1 cfs @ 12.77 hrs, Volume= 0.034 af

Outflow = 0.1 cfs @ 12.82 hrs, Volume= 0.034 af, Atten= 0%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 1.61 fps, Min. Travel Time= 1.6 min

Avg. Velocity = 1.10 fps, Avg. Travel Time= 2.3 min

Peak Storage= 11 cf @ 12.79 hrs

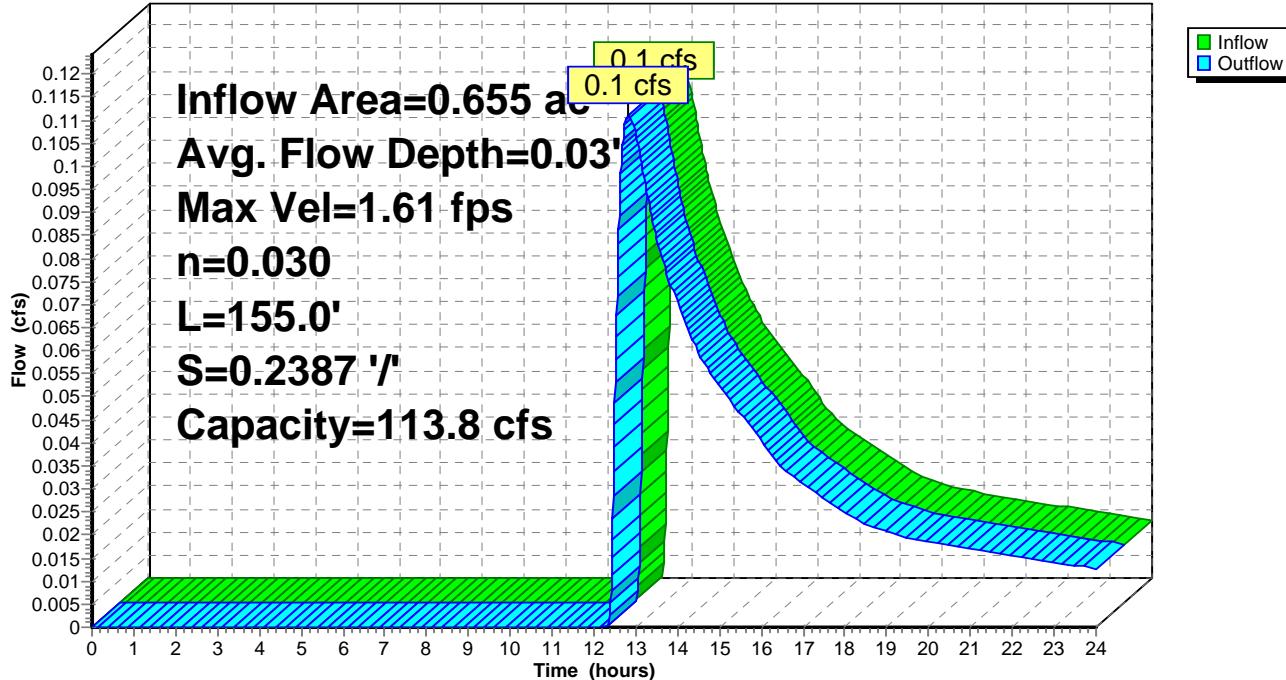
Average Depth at Peak Storage= 0.03'

Bank-Full Depth= 0.63' Flow Area= 8.4 sf, Capacity= 113.8 cfs

20.00' x 0.63' deep Parabolic Channel, n= 0.030

Length= 155.0' Slope= 0.2387 '/'

Inlet Invert= 332.00', Outlet Invert= 295.00'

**Reach 1R: Swale to Offsite****Hydrograph**

Summary for Reach 2R: Swale to Offsite

Inflow Area = 0.359 ac, 7.08% Impervious, Inflow Depth > 0.03" for 2-Year event

Inflow = 0.0 cfs @ 22.38 hrs, Volume= 0.001 af

Outflow = 0.0 cfs @ 22.59 hrs, Volume= 0.001 af, Atten= 2%, Lag= 12.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.88 fps, Min. Travel Time= 2.5 min

Avg. Velocity = 0.85 fps, Avg. Travel Time= 2.6 min

Peak Storage= 1 cf @ 22.55 hrs

Average Depth at Peak Storage= 0.01'

Bank-Full Depth= 0.67' Flow Area= 4.5 sf, Capacity= 63.2 cfs

10.00' x 0.67' deep Parabolic Channel, n= 0.030

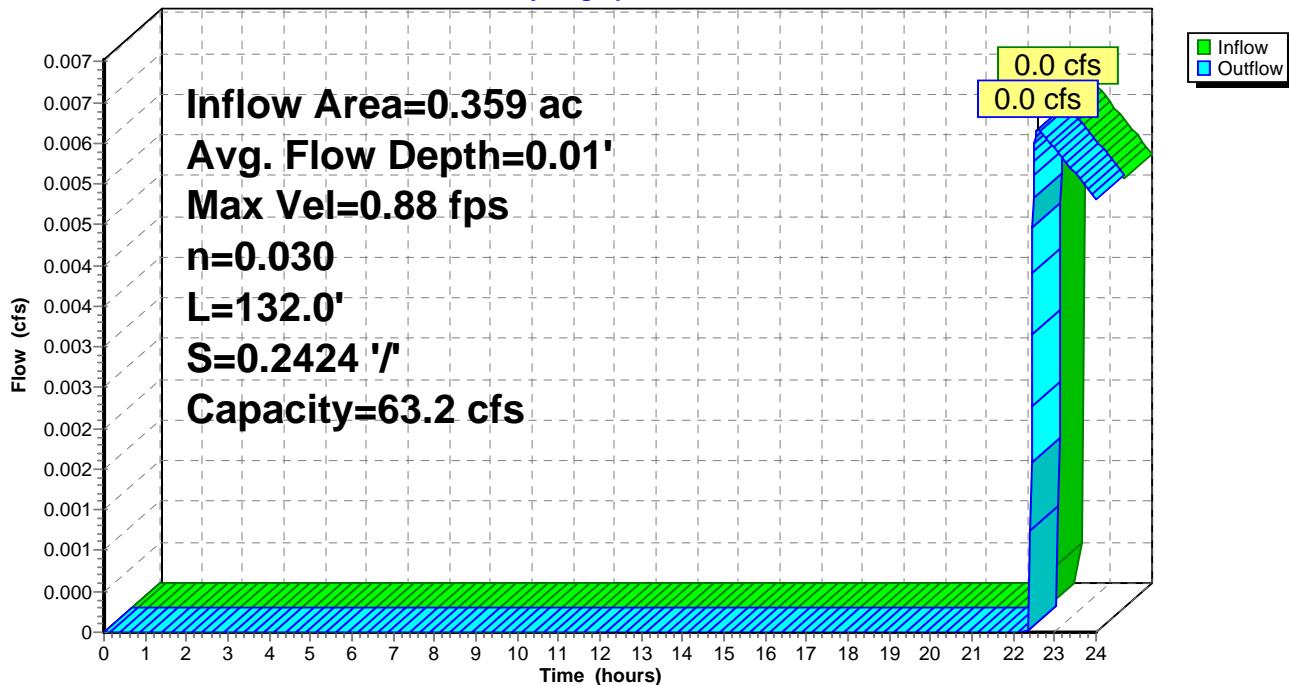
Length= 132.0' Slope= 0.2424 '/'

Inlet Invert= 324.00', Outlet Invert= 292.00'



Reach 2R: Swale to Offsite

Hydrograph



Post-Development South Outlet

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Type III 24-hr 2-Year Rainfall=3.40"

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Summary for Pond 1 Pond: SWB #1

Inflow Area = 2.654 ac, 4.76% Impervious, Inflow Depth > 1.55" for 2-Year event
 Inflow = 3.1 cfs @ 12.30 hrs, Volume= 0.343 af
 Outflow = 1.8 cfs @ 12.63 hrs, Volume= 0.332 af, Atten= 44%, Lag= 19.4 min
 Primary = 1.8 cfs @ 12.63 hrs, Volume= 0.332 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 367.78' @ 12.63 hrs Surf.Area= 0.067 ac Storage= 0.082 af

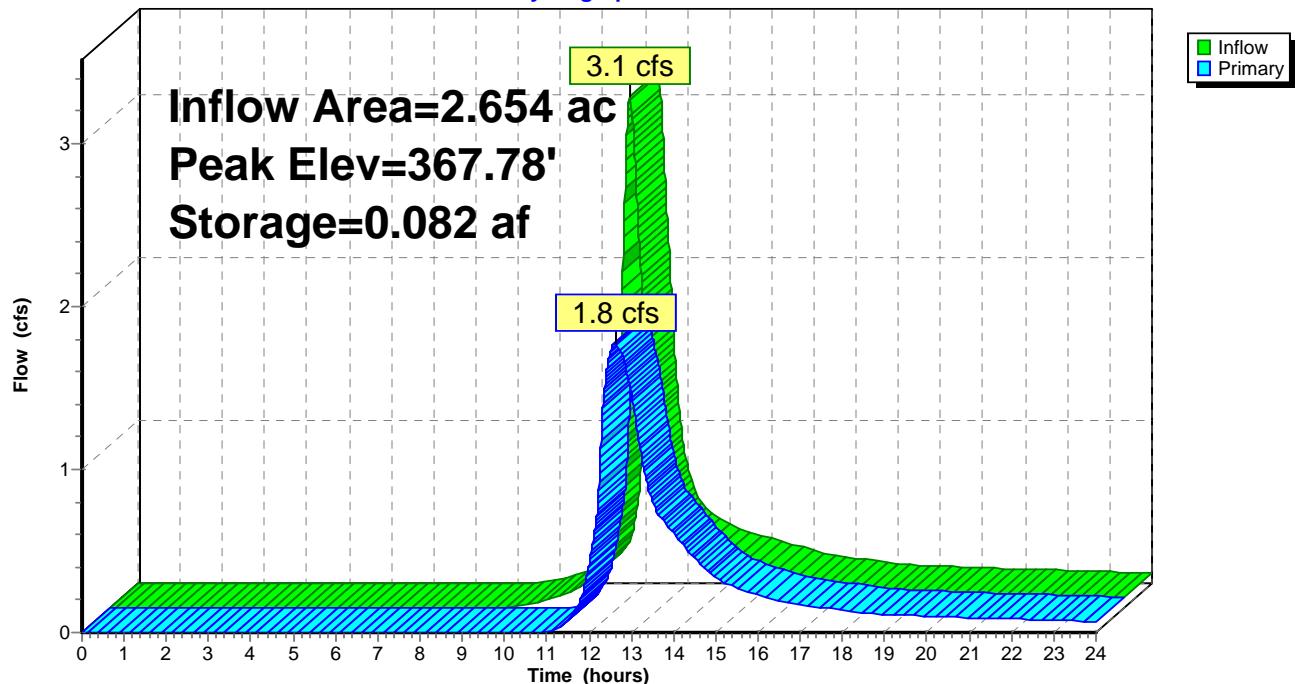
Plug-Flow detention time= 45.6 min calculated for 0.332 af (97% of inflow)
 Center-of-Mass det. time= 28.5 min (879.6 - 851.1)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	0.154 af	8.00'W x 145.00'L x 2.70'H Prismatoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	366.00'	<p>15.0" Round Culvert L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 366.00' / 365.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf</p> <p>#2 Device 1 366.20' 6.0" Vert. Orifice/Grate C= 0.600</p> <p>#3 Device 1 367.00' 6.0" Vert. Orifice/Grate C= 0.600</p> <p>#4 Device 1 368.25' 30.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads</p> <p>#5 Primary 368.50' 20.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63</p>

Primary OutFlow Max=1.8 cfs @ 12.63 hrs HW=367.78' (Free Discharge)

↑
 1=Culvert (Passes 1.8 cfs of 5.1 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 1.1 cfs @ 5.54 fps)
 3=Orifice/Grate (Orifice Controls 0.7 cfs @ 3.49 fps)
 4=Orifice/Grate (Controls 0.0 cfs)
 5=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 1 Pond: SWB #1**Hydrograph**

Summary for Pond 1P: Infiltration Trench #4

Inflow Area = 0.359 ac, 7.08% Impervious, Inflow Depth > 0.65" for 2-Year event
 Inflow = 0.2 cfs @ 12.17 hrs, Volume= 0.020 af
 Outflow = 0.0 cfs @ 22.38 hrs, Volume= 0.001 af, Atten= 97%, Lag= 612.8 min
 Primary = 0.0 cfs @ 22.38 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 324.50' @ 22.38 hrs Surf.Area= 0.024 ac Storage= 0.019 af

Plug-Flow detention time= 669.3 min calculated for 0.001 af (4% of inflow)
 Center-of-Mass det. time= 494.1 min (1,389.7 - 895.6)

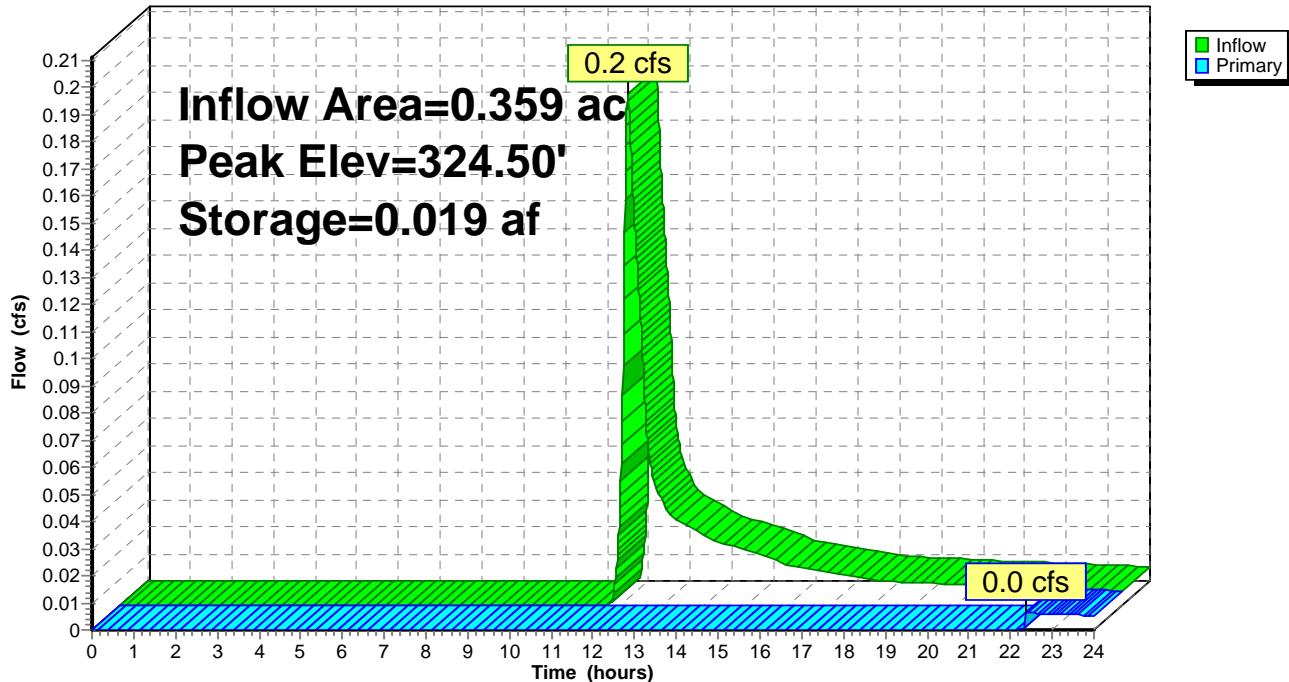
Volume	Invert	Avail.Storage	Storage Description
#1	322.50'	0.024 af	10.00'W x 100.00'L x 2.50'H Crushed Stone Infiltration Trench Z=0.1 0.059 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	100.0' long x 10.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.0 cfs @ 22.38 hrs HW=324.50' (Free Discharge)
 ↑1=Overflow (Weir Controls 0.0 cfs @ 0.03 fps)

Pond 1P: Infiltration Trench #4

Hydrograph



Summary for Pond 3P: SWB #2

Inflow Area = 0.655 ac, 7.60% Impervious, Inflow Depth > 0.89" for 2-Year event
 Inflow = 0.5 cfs @ 12.15 hrs, Volume= 0.049 af
 Outflow = 0.1 cfs @ 12.77 hrs, Volume= 0.034 af, Atten= 79%, Lag= 37.1 min
 Primary = 0.1 cfs @ 12.77 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 333.20' @ 12.77 hrs Surf.Area= 0.030 ac Storage= 0.018 af

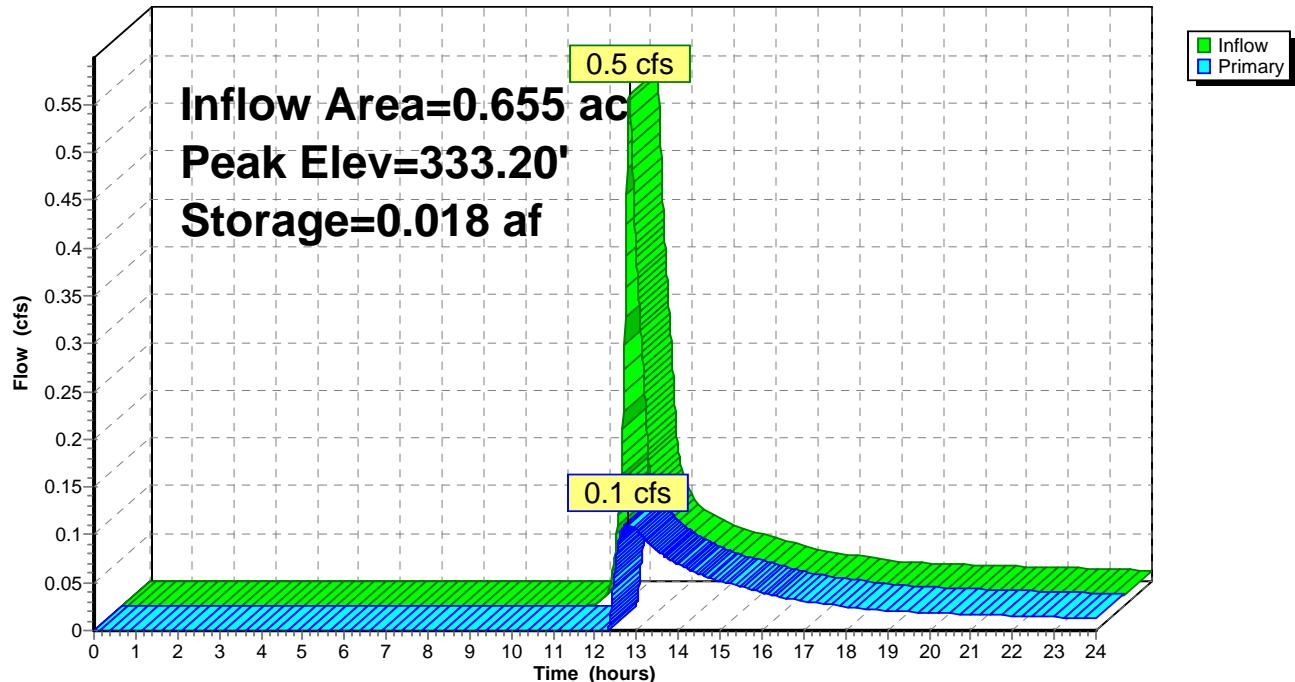
Plug-Flow detention time= 192.1 min calculated for 0.034 af (70% of inflow)
 Center-of-Mass det. time= 86.8 min (963.6 - 876.8)

Volume	Invert	Avail.Storage	Storage Description
#1	332.50'	0.106 af	20.00'W x 50.00'L x 2.76'H Prismatoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	332.75'	12.0" Round Culvert L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 332.75' / 332.57' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	333.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	334.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	335.00'	30.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	335.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.1 cfs @ 12.77 hrs HW=333.20' (Free Discharge)

↑ 1=Culvert (Passes 0.1 cfs of 0.6 cfs potential flow)
 ↑ 2=Orifice/Grate (Orifice Controls 0.1 cfs @ 1.52 fps)
 ↑ 3=Orifice/Grate (Controls 0.0 cfs)
 ↑ 4=Orifice/Grate (Controls 0.0 cfs)
 ↑ 5=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 3P: SWB #2**Hydrograph**

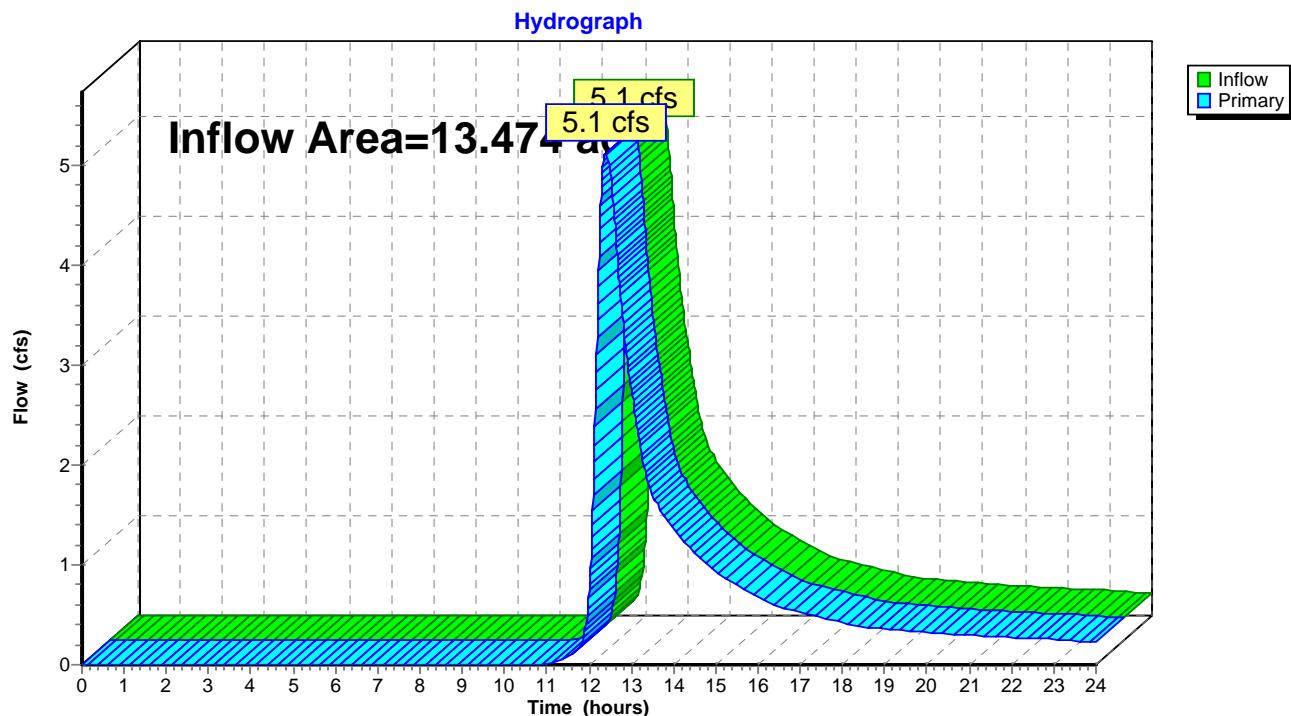
Summary for Link Out: Outlets offsite to south

Inflow Area = 13.474 ac, 2.03% Impervious, Inflow Depth > 0.77" for 2-Year event

Inflow = 5.1 cfs @ 12.40 hrs, Volume= 0.865 af

Primary = 5.1 cfs @ 12.40 hrs, Volume= 0.865 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link Out: Outlets offsite to south

Post-Development South Outlet

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Type III 24-hr 10-Year Rainfall=5.00"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#1A: Main solar farm

Runoff Area=115,617 sf 4.76% Impervious Runoff Depth>2.88"
Flow Length=430' Tc=21.5 min CN=80 Runoff=5.9 cfs 0.637 af

Subcatchment#1B: Western and southern Runoff Area=286,563 sf 0.74% Impervious Runoff Depth>1.57"
Flow Length=860' Tc=21.2 min CN=64 Runoff=7.5 cfs 0.861 af

Subcatchment#3A: Solar farm north of

Runoff Area=28,517 sf 7.60% Impervious Runoff Depth>1.95"
Flow Length=526' Tc=10.0 min CN=69 Runoff=1.3 cfs 0.107 af

Subcatchment#3B: Western solar farm

Runoff Area=140,575 sf 0.70% Impervious Runoff Depth>1.36"
Flow Length=476' Tc=15.4 min CN=61 Runoff=3.5 cfs 0.367 af

Subcatchment#3C: Eastern solar farm

Runoff Area=15,653 sf 7.08% Impervious Runoff Depth>1.58"
Flow Length=203' Tc=10.0 min CN=64 Runoff=0.5 cfs 0.047 af

Reach 1R: Swale to Offsite

Avg. Flow Depth=0.05' Max Vel=2.66 fps Inflow=0.6 cfs 0.091 af
n=0.030 L=155.0' S=0.2387 '/' Capacity=113.8 cfs Outflow=0.6 cfs 0.091 af

Reach 2R: Swale to Offsite

Avg. Flow Depth=0.05' Max Vel=2.42 fps Inflow=0.3 cfs 0.028 af
n=0.030 L=132.0' S=0.2424 '/' Capacity=63.2 cfs Outflow=0.2 cfs 0.028 af

Pond 1 Pond: SWB #1

Peak Elev=368.44' Storage=0.132 af Inflow=5.9 cfs 0.637 af
Outflow=4.8 cfs 0.625 af

Pond 1P: Infiltration Trench #4

Peak Elev=324.51' Storage=0.019 af Inflow=0.5 cfs 0.047 af
Outflow=0.3 cfs 0.028 af

Pond 3P: SWB #2

Peak Elev=333.61' Storage=0.032 af Inflow=1.3 cfs 0.107 af
Outflow=0.6 cfs 0.091 af

Link Out: Outlets offsite to south

Inflow=14.8 cfs 1.973 af
Primary=14.8 cfs 1.973 af

Total Runoff Area = 13.474 ac Runoff Volume = 2.019 af Average Runoff Depth = 1.80"
97.97% Pervious = 13.201 ac 2.03% Impervious = 0.273 ac

Summary for Subcatchment #1A: Main solar farm area/field

Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

Runoff = 5.9 cfs @ 12.30 hrs, Volume= 0.637 af, Depth> 2.88"

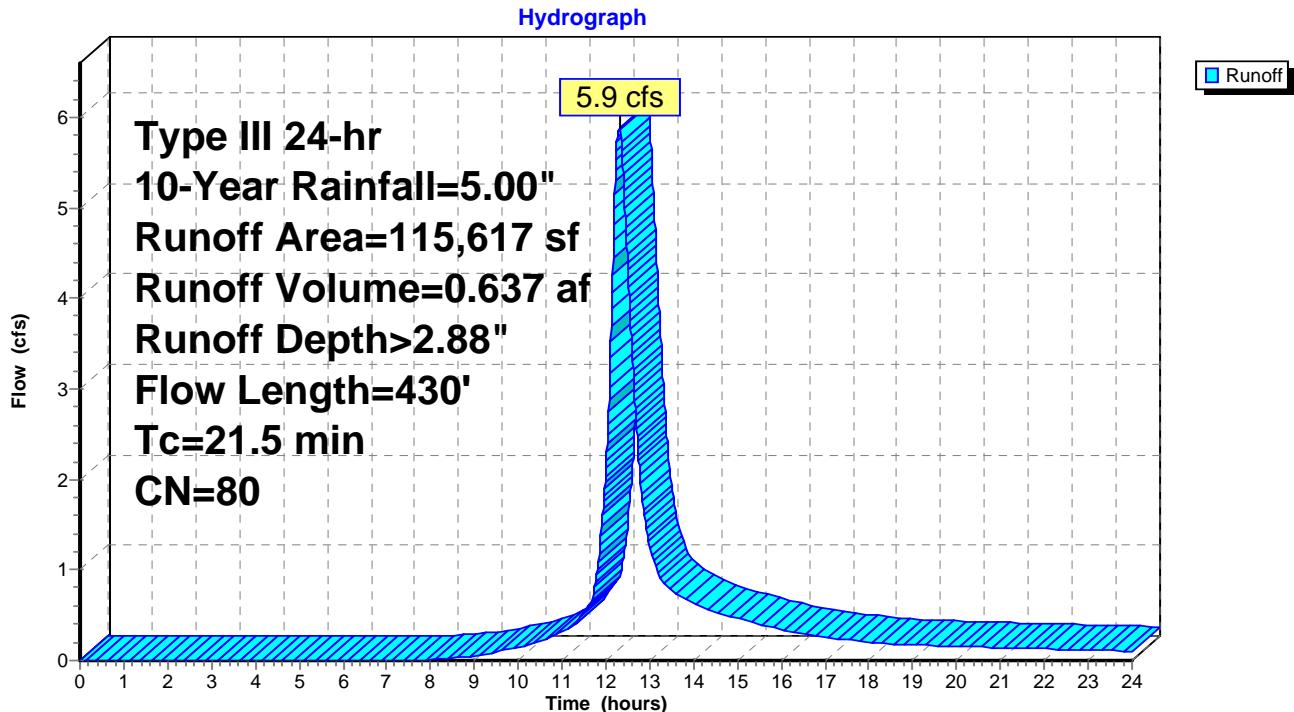
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
4,489	96	Gravel surface, HSG D
*	10,268	Solar Array Area (grass), Good, HSG B
62,737	80	>75% Grass cover, Good, HSG D
*	6,809	Solar Array Area (grass), Good, HSG D
*	4,745	Concrete Pads and Ballast, HSG D
*	335	Concrete Pads and Ballast, HSG B
2,798	96	Gravel surface, HSG D
*	7,105	Solar Array Area (grass), Good, HSG D
15,911	80	>75% Grass cover, Good, HSG D
*	420	Concrete Pads and Ballast, HSG D

115,617 80 Weighted Average
110,117 95.24% Pervious Area
5,500 4.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	60	0.0150	0.10		Sheet Flow, Grass Grass: Dense n= 0.240 P2= 3.40"
4.8	40	0.0180	0.14		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
6.4	330	0.0152	0.86		Shallow Concentrated Flow, Solar Array Area (Grass) Short Grass Pasture Kv= 7.0 fps
21.5	430	Total			

Subcatchment #1A: Main solar farm area/field



Summary for Subcatchment #1B: Western and southern section

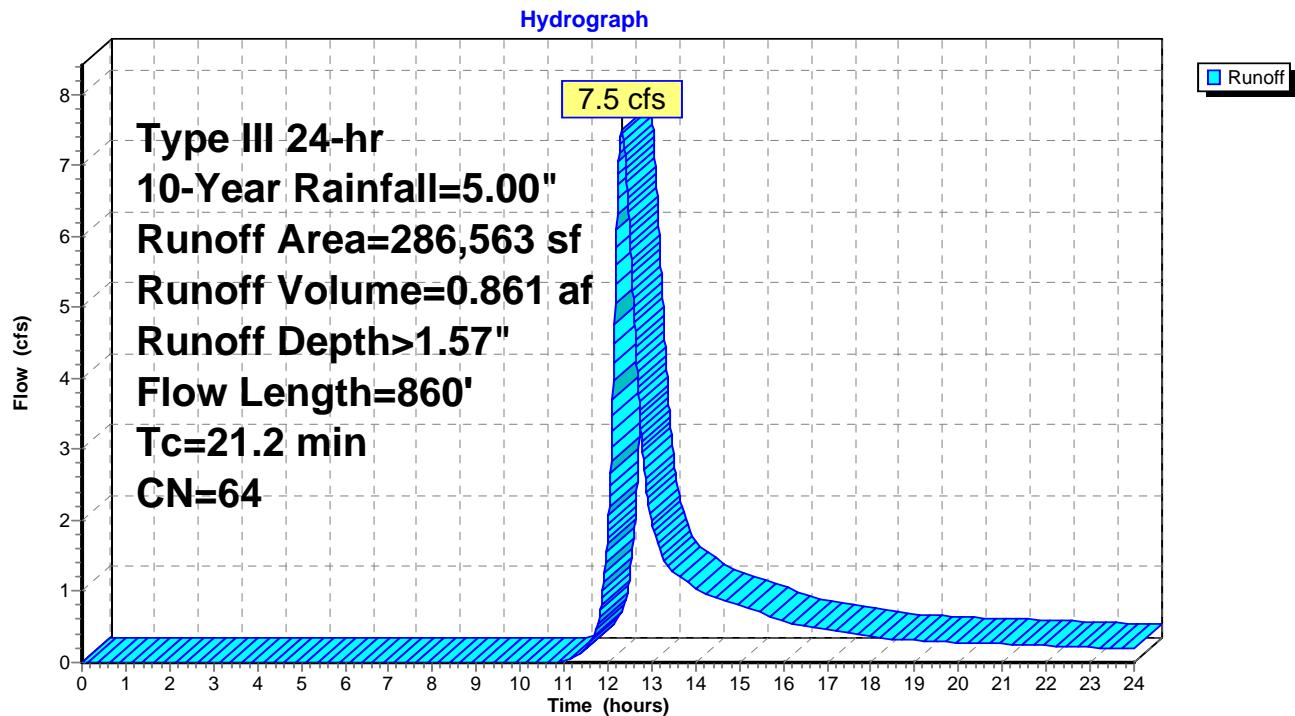
Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

Runoff = 7.5 cfs @ 12.32 hrs, Volume= 0.861 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
1,770	96	Gravel surface, HSG D
22,572	80	>75% Grass cover, Good, HSG D
*	8,095	Solar Array Area (grass), Good, HSG D
*	611	Concrete Pads and Ballast, HSG D
11,590	96	Gravel surface, HSG B
55,889	61	>75% Grass cover, Good, HSG B
163,099	60	Woods, Fair, HSG B
*	21,417	Solar Array Area (grass), Good, HSG B
*	1,520	Concrete Pads and Ballasts, HSG B
286,563	64	Weighted Average
284,432		99.26% Pervious Area
2,131		0.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0200	0.12		Sheet Flow, Grass/Woods at PL Grass: Dense n= 0.240 P2= 3.40"
4.3	245	0.0367	0.96		Shallow Concentrated Flow, Woods on PL Woodland Kv= 5.0 fps
2.4	295	0.1627	2.02		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.7	220	0.1182	5.16		Shallow Concentrated Flow, Wetland Grassed Waterway Kv= 15.0 fps
21.2	860	Total			

Subcatchment #1B: Western and southern section

Post-Development South Outlet

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Type III 24-hr 10-Year Rainfall=5.00"

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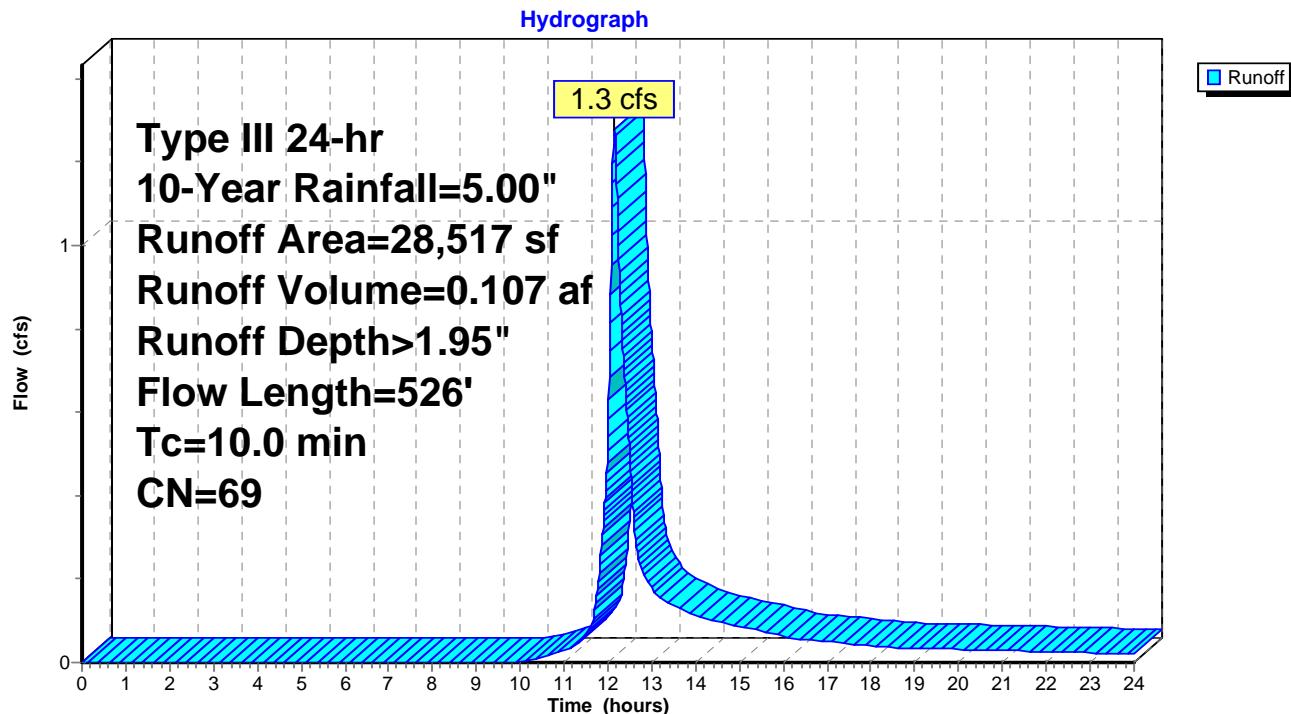
Summary for Subcatchment #3A: Solar farm north of access road

Runoff = 1.3 cfs @ 12.15 hrs, Volume= 0.107 af, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
*	18,767	61	Solar Arrays (Grass), Good, HSG B
*	861	98	Ledge, HSG B
	4,292	96	Gravel surface, HSG B
	3,290	61	>75% Grass cover, Good, HSG B
*	1,307	98	Concrete Ballast, HSG B
	28,517	69	Weighted Average
	26,349		92.40% Pervious Area
	2,168		7.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.1300	0.25		Sheet Flow, Grass Grass: Dense n= 0.240 P2= 3.40"
1.6	323	0.0520	3.42		Shallow Concentrated Flow, Solar Arrays and grass swale Grassed Waterway Kv= 15.0 fps
0.1	33	0.0300	9.12	11.19	Pipe Channel, Pipe 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	22	0.3300	4.02		Shallow Concentrated Flow, Stormwater Basin Slope Short Grass Pasture Kv= 7.0 fps
0.1	48		8.02		Lake or Reservoir, Stormwater Basin Mean Depth= 2.00'
8.4	526				Total, Increased to minimum Tc = 10.0 min

Subcatchment #3A: Solar farm north of access road

Post-Development South Outlet

Prepared by Boundaries LLC - DCM

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Type III 24-hr 10-Year Rainfall=5.00"

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Summary for Subcatchment #3B: Western solar farm south of access drive

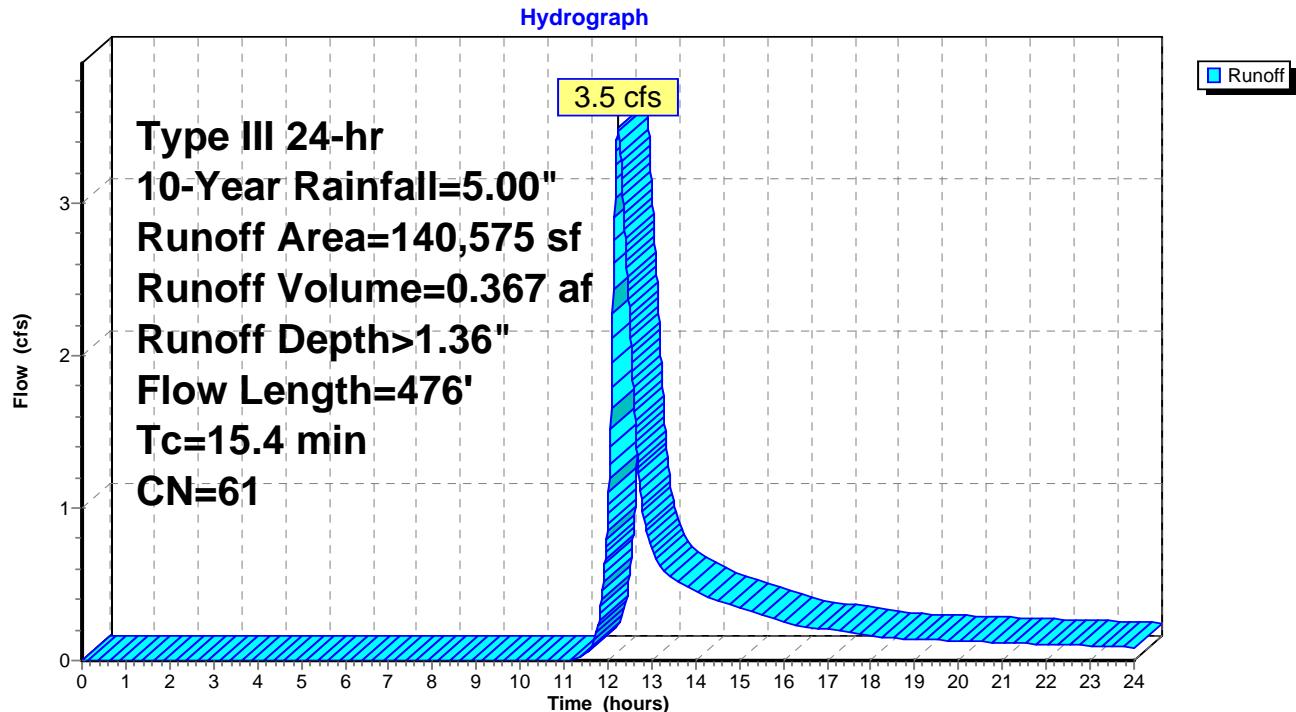
Runoff = 3.5 cfs @ 12.23 hrs, Volume= 0.367 af, Depth> 1.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
*	13,760	61	Solar Array Area (grass), Good, HSG B
	66,807	61	>75% Grass cover, Good, HSG B
	57,125	60	Woods, Fair, HSG B
	1,903	96	Gravel surface, HSG B
*	980	98	Concrete Ballast, HSG B
	140,575	61	Weighted Average
	139,595		99.30% Pervious Area
	980		0.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	60	0.3300	0.33		Sheet Flow, Grass Slope Grass: Dense n= 0.240 P2= 3.40"
8.2	40	0.0333	0.08		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
4.0	236	0.0381	0.98		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.2	140	0.2286	13.43	29.99	Parabolic Channel, Intermittent Watercourse W=5.00' D=0.67' Area=2.2 sf Perim=5.2' n= 0.030
15.4	476	Total			

Subcatchment #3B: Western solar farm south of access drive



Summary for Subcatchment #3C: Eastern solar farm south of access road

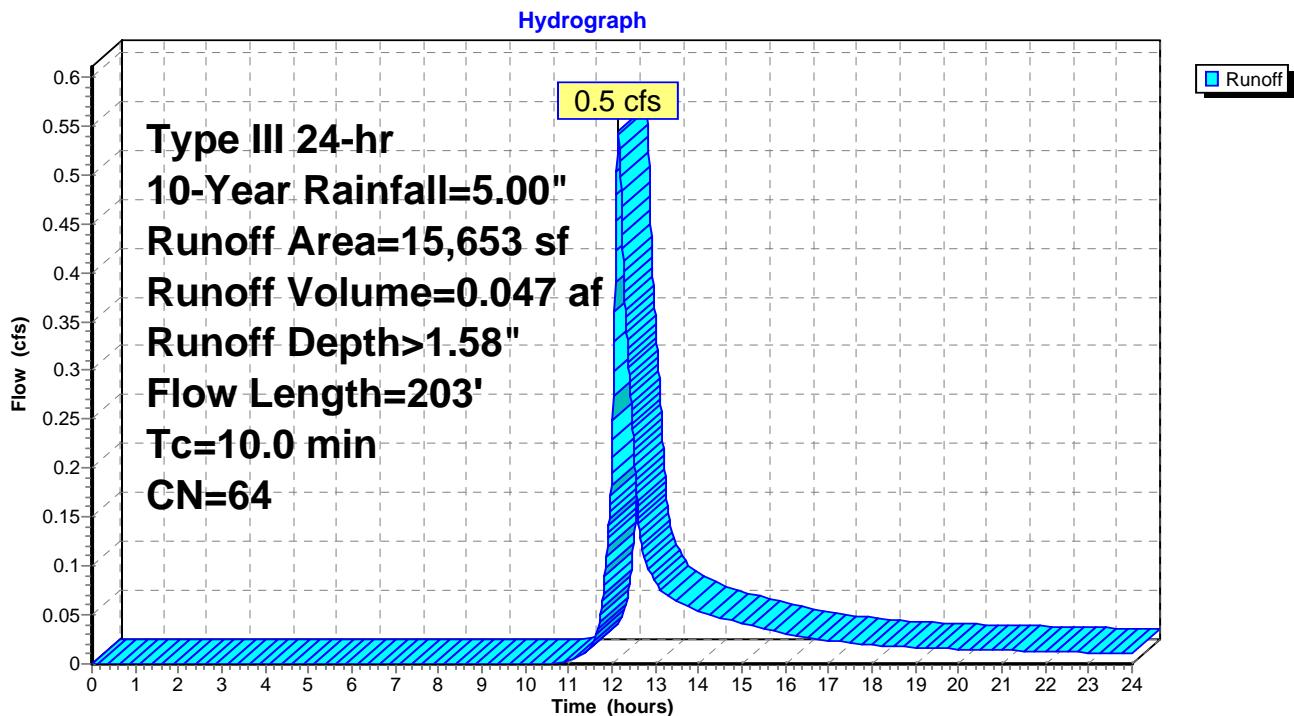
Runoff = 0.5 cfs @ 12.15 hrs, Volume= 0.047 af, Depth> 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
* 14,544	61	Solar Array Area (grass), Good, HSG B
* 1,109	98	Concrete Ballast, HSG B

15,653	64	Weighted Average
14,544		92.92% Pervious Area
1,109		7.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0600	0.27		Sheet Flow, Grassed Solar Array Area Grass: Short n= 0.150 P2= 3.40"
1.2	103	0.0388	1.38		Shallow Concentrated Flow, Solar Array Area Grassed Short Grass Pasture Kv= 7.0 fps
7.3	203				Total, Increased to minimum Tc = 10.0 min

Subcatchment #3C: Eastern solar farm south of access road

Summary for Reach 1R: Swale to Offsite

Inflow Area = 0.655 ac, 7.60% Impervious, Inflow Depth > 1.68" for 10-Year event

Inflow = 0.6 cfs @ 12.45 hrs, Volume= 0.091 af

Outflow = 0.6 cfs @ 12.48 hrs, Volume= 0.091 af, Atten= 0%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.66 fps, Min. Travel Time= 1.0 min

Avg. Velocity = 1.38 fps, Avg. Travel Time= 1.9 min

Peak Storage= 33 cf @ 12.46 hrs

Average Depth at Peak Storage= 0.05'

Bank-Full Depth= 0.63' Flow Area= 8.4 sf, Capacity= 113.8 cfs

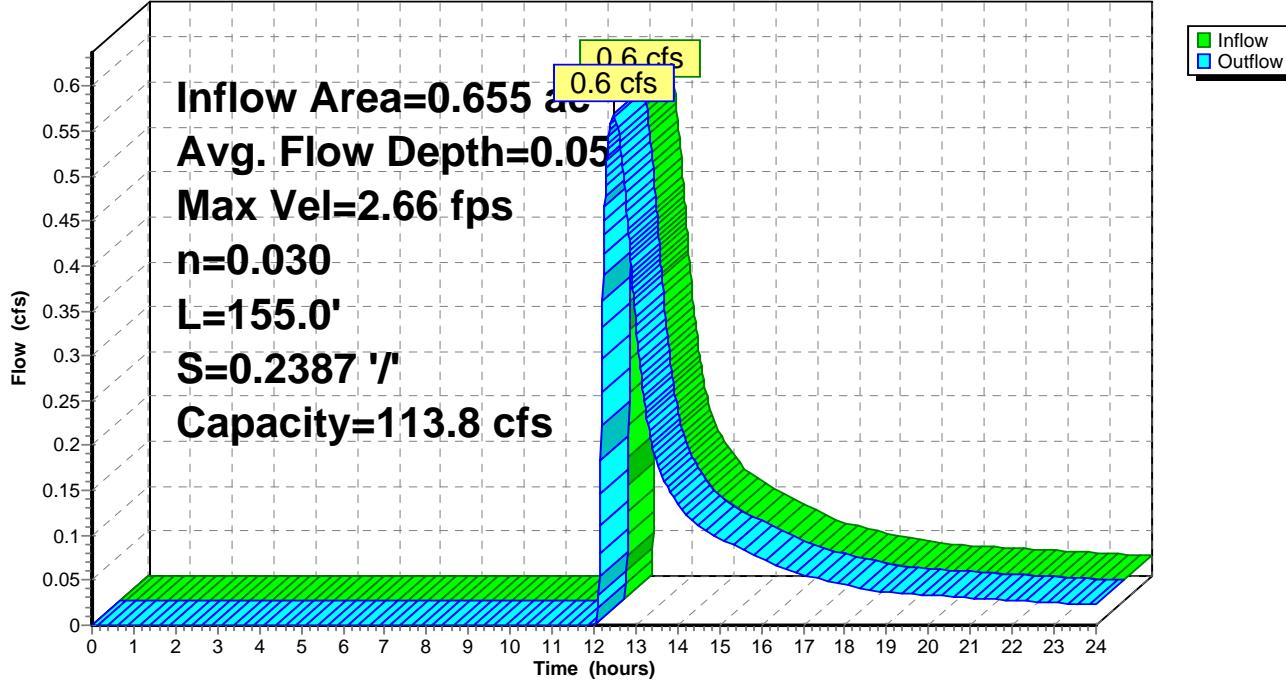
20.00' x 0.63' deep Parabolic Channel, n= 0.030

Length= 155.0' Slope= 0.2387 '/'

Inlet Invert= 332.00', Outlet Invert= 295.00'



‡

Reach 1R: Swale to Offsite**Hydrograph**

Summary for Reach 2R: Swale to Offsite

Inflow Area = 0.359 ac, 7.08% Impervious, Inflow Depth > 0.95" for 10-Year event

Inflow = 0.3 cfs @ 12.50 hrs, Volume= 0.028 af

Outflow = 0.2 cfs @ 12.55 hrs, Volume= 0.028 af, Atten= 20%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.42 fps, Min. Travel Time= 0.9 min

Avg. Velocity = 1.29 fps, Avg. Travel Time= 1.7 min

Peak Storage= 11 cf @ 12.54 hrs

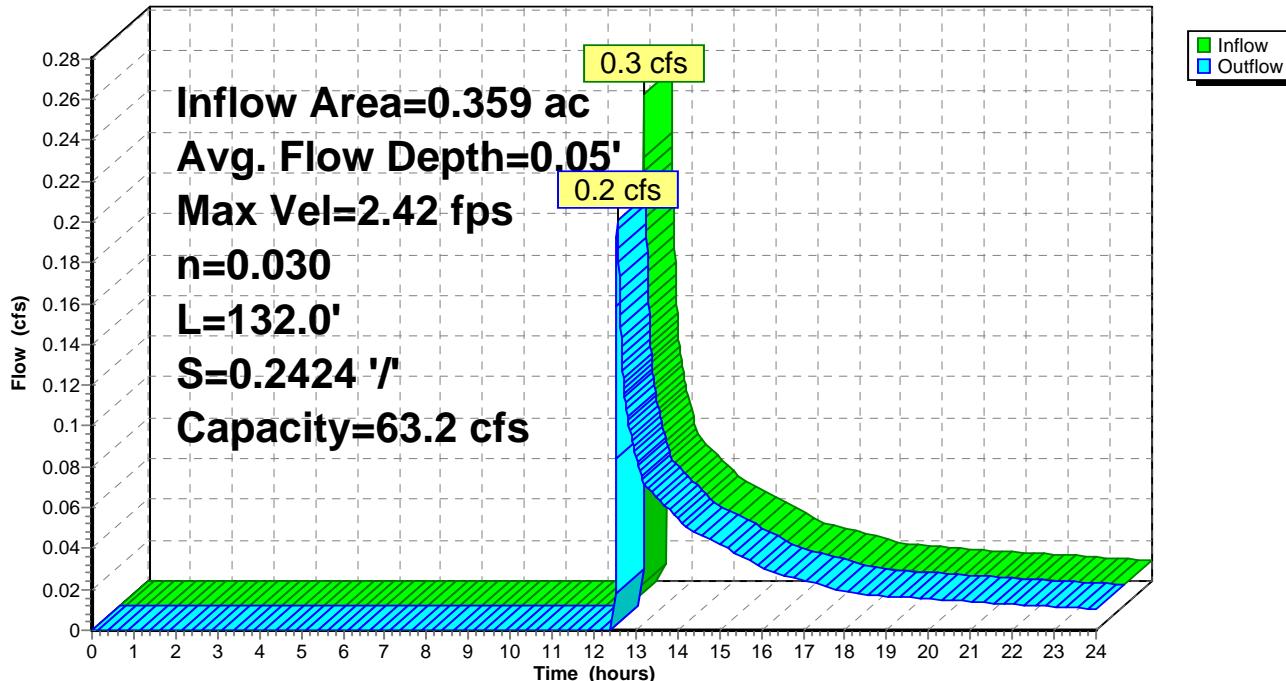
Average Depth at Peak Storage= 0.05'

Bank-Full Depth= 0.67' Flow Area= 4.5 sf, Capacity= 63.2 cfs

10.00' x 0.67' deep Parabolic Channel, n= 0.030

Length= 132.0' Slope= 0.2424 '/'

Inlet Invert= 324.00', Outlet Invert= 292.00'

**Reach 2R: Swale to Offsite****Hydrograph**

Summary for Pond 1 Pond: SWB #1

Inflow Area = 2.654 ac, 4.76% Impervious, Inflow Depth > 2.88" for 10-Year event
 Inflow = 5.9 cfs @ 12.30 hrs, Volume= 0.637 af
 Outflow = 4.8 cfs @ 12.45 hrs, Volume= 0.625 af, Atten= 19%, Lag= 9.1 min
 Primary = 4.8 cfs @ 12.45 hrs, Volume= 0.625 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 368.44' @ 12.45 hrs Surf.Area= 0.083 ac Storage= 0.132 af

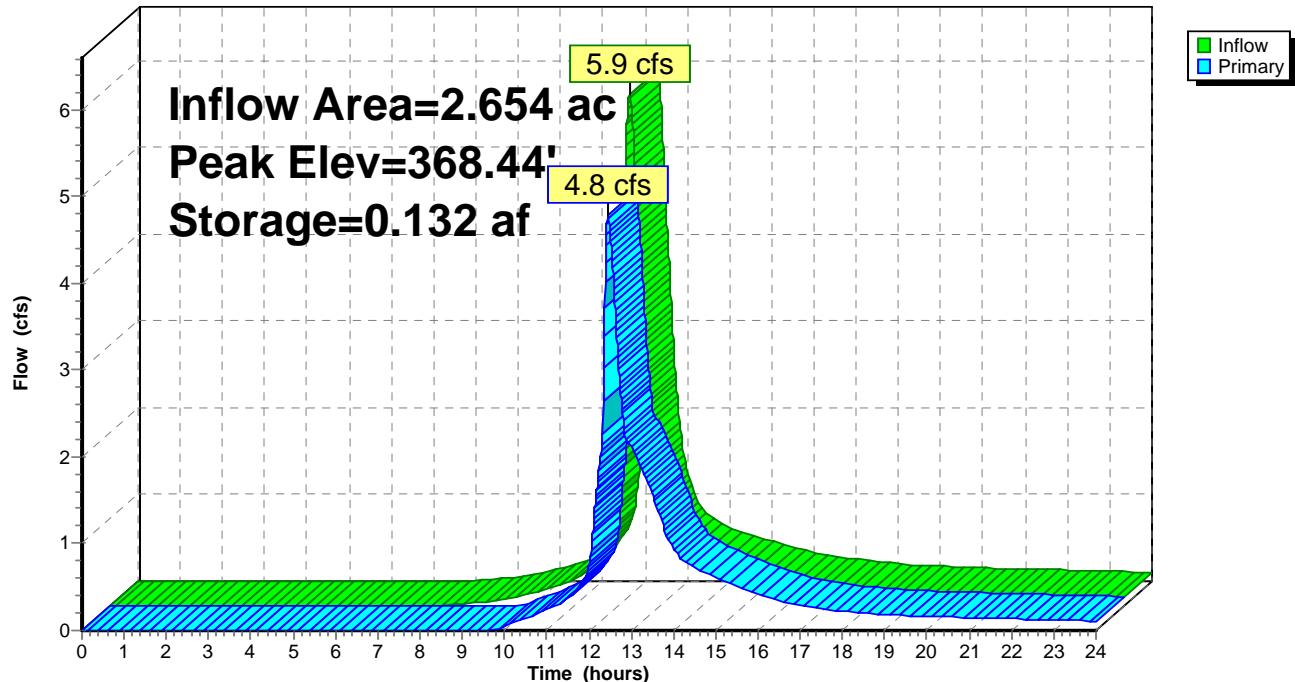
Plug-Flow detention time= 38.0 min calculated for 0.625 af (98% of inflow)
 Center-of-Mass det. time= 26.9 min (860.4 - 833.5)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	0.154 af	8.00'W x 145.00'L x 2.70'H Prismatoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	366.00'	15.0" Round Culvert L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 366.00' / 365.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	366.20'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	367.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	368.25'	30.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	368.50'	20.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.8 cfs @ 12.45 hrs HW=368.44' (Free Discharge)

- ↑ 1=Culvert (Passes 4.8 cfs of 6.5 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.3 cfs @ 6.79 fps)
- 3=Orifice/Grate (Orifice Controls 1.0 cfs @ 5.25 fps)
- 4=Orifice/Grate (Weir Controls 2.4 cfs @ 1.42 fps)
- 5=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 1 Pond: SWB #1**Hydrograph**

Summary for Pond 1P: Infiltration Trench #4

Inflow Area = 0.359 ac, 7.08% Impervious, Inflow Depth > 1.58" for 10-Year event

Inflow = 0.5 cfs @ 12.15 hrs, Volume= 0.047 af

Outflow = 0.3 cfs @ 12.50 hrs, Volume= 0.028 af, Atten= 54%, Lag= 21.3 min

Primary = 0.3 cfs @ 12.50 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 324.51' @ 12.50 hrs Surf.Area= 0.024 ac Storage= 0.019 af

Plug-Flow detention time= 210.2 min calculated for 0.028 af (60% of inflow)

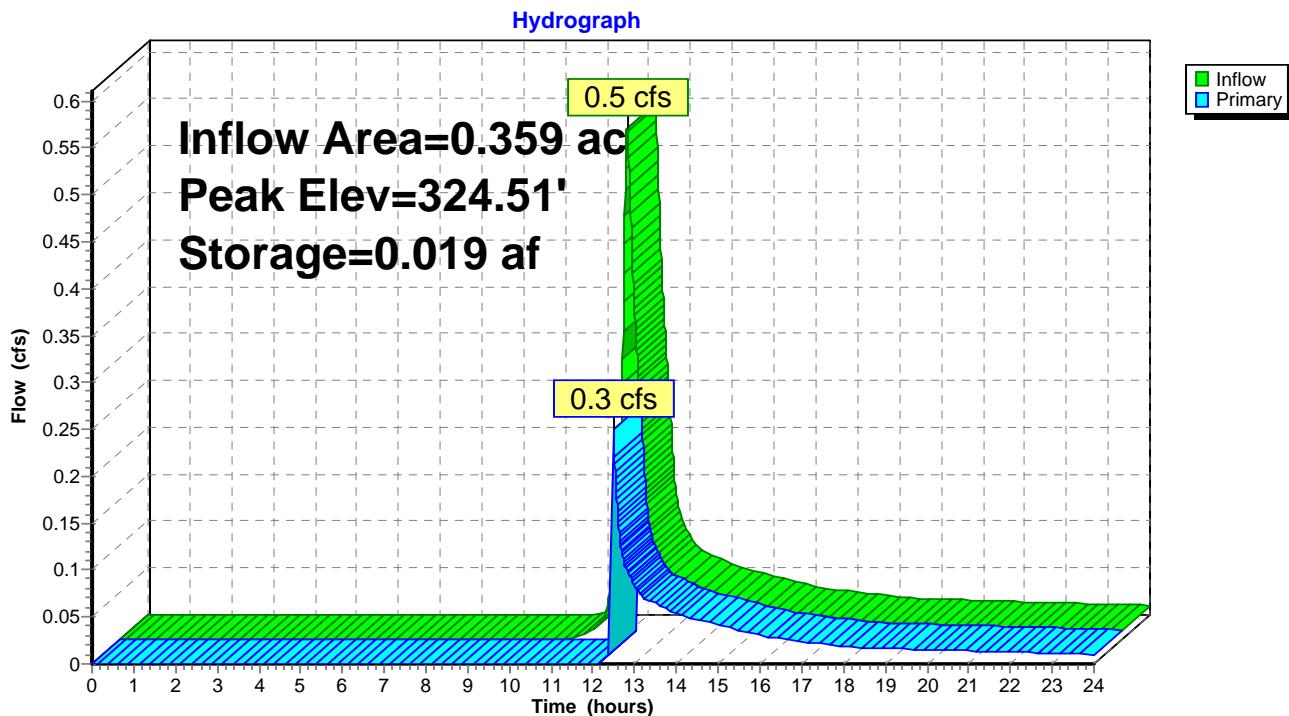
Center-of-Mass det. time= 90.8 min (956.6 - 865.8)

Volume	Invert	Avail.Storage	Storage Description
#1	322.50'	0.024 af	10.00'W x 100.00'L x 2.50'H Crushed Stone Infiltration Trench Z=0.1 0.059 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	100.0' long x 10.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.1 cfs @ 12.50 hrs HW=324.51' (Free Discharge)

↑1=Overflow (Weir Controls 0.1 cfs @ 0.19 fps)

Pond 1P: Infiltration Trench #4

Summary for Pond 3P: SWB #2

Inflow Area = 0.655 ac, 7.60% Impervious, Inflow Depth > 1.95" for 10-Year event
 Inflow = 1.3 cfs @ 12.15 hrs, Volume= 0.107 af
 Outflow = 0.6 cfs @ 12.45 hrs, Volume= 0.091 af, Atten= 55%, Lag= 18.3 min
 Primary = 0.6 cfs @ 12.45 hrs, Volume= 0.091 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 333.61' @ 12.45 hrs Surf.Area= 0.035 ac Storage= 0.032 af

Plug-Flow detention time= 106.5 min calculated for 0.091 af (86% of inflow)
 Center-of-Mass det. time= 43.5 min (896.0 - 852.5)

Volume	Invert	Avail.Storage	Storage Description
#1	332.50'	0.106 af	20.00'W x 50.00'L x 2.76'H Prismatoid Z=3.0

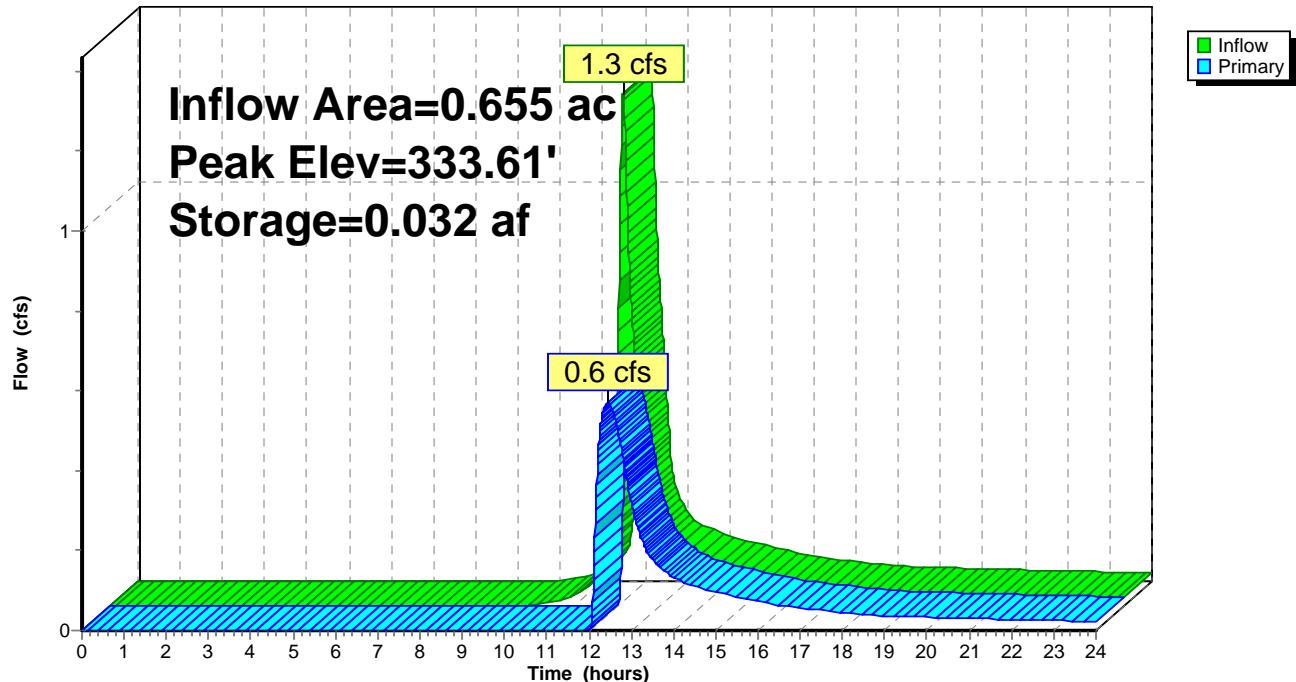
Device	Routing	Invert	Outlet Devices
#1	Primary	332.75'	12.0" Round Culvert L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 332.75' / 332.57' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	333.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	334.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	335.00'	30.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	335.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.6 cfs @ 12.45 hrs HW=333.61' (Free Discharge)

↑
 1=Culvert (Passes 0.6 cfs of 1.7 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.6 cfs @ 2.90 fps)
 3=Orifice/Grate (Controls 0.0 cfs)
 4=Orifice/Grate (Controls 0.0 cfs)
 5=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 3P: SWB #2

Hydrograph



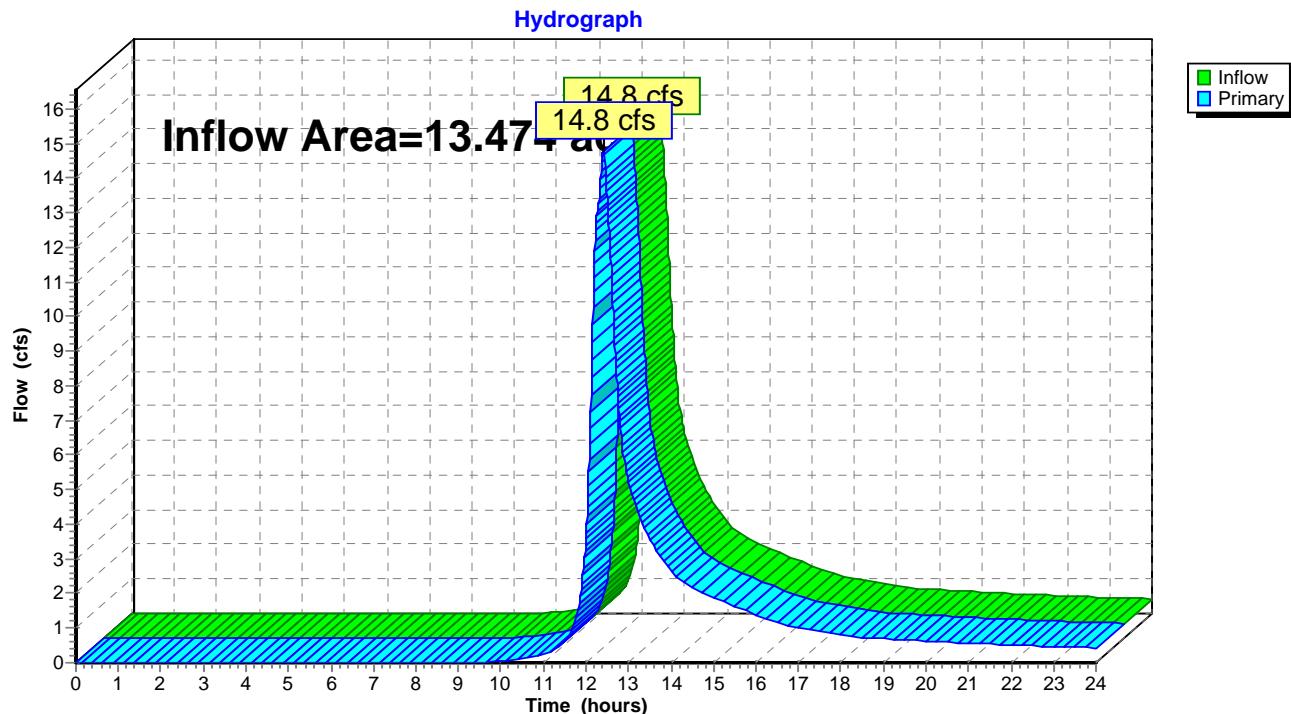
Summary for Link Out: Outlets offsite to south

Inflow Area = 13.474 ac, 2.03% Impervious, Inflow Depth > 1.76" for 10-Year event

Inflow = 14.8 cfs @ 12.41 hrs, Volume= 1.973 af

Primary = 14.8 cfs @ 12.41 hrs, Volume= 1.973 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link Out: Outlets offsite to south

Post-Development South Outlet

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Type III 24-hr 25-Year Rainfall=5.70"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#1A: Main solar farm

Runoff Area=115,617 sf 4.76% Impervious Runoff Depth>3.50"
Flow Length=430' Tc=21.5 min CN=80 Runoff=7.1 cfs 0.774 af

Subcatchment#1B: Western and southern Runoff Area=286,563 sf 0.74% Impervious Runoff Depth>2.04"
Flow Length=860' Tc=21.2 min CN=64 Runoff=10.0 cfs 1.119 af

Subcatchment#3A: Solar farm north of

Runoff Area=28,517 sf 7.60% Impervious Runoff Depth>2.47"
Flow Length=526' Tc=10.0 min CN=69 Runoff=1.6 cfs 0.135 af

Subcatchment#3B: Western solar farm

Runoff Area=140,575 sf 0.70% Impervious Runoff Depth>1.80"
Flow Length=476' Tc=15.4 min CN=61 Runoff=4.8 cfs 0.484 af

Subcatchment#3C: Eastern solar farm

Runoff Area=15,653 sf 7.08% Impervious Runoff Depth>2.05"
Flow Length=203' Tc=10.0 min CN=64 Runoff=0.7 cfs 0.061 af

Reach 1R: Swale to Offsite

Avg. Flow Depth=0.06' Max Vel=2.87 fps Inflow=0.7 cfs 0.120 af
n=0.030 L=155.0' S=0.2387 '/' Capacity=113.8 cfs Outflow=0.7 cfs 0.120 af

Reach 2R: Swale to Offsite

Avg. Flow Depth=0.07' Max Vel=3.16 fps Inflow=0.5 cfs 0.043 af
n=0.030 L=132.0' S=0.2424 '/' Capacity=63.2 cfs Outflow=0.5 cfs 0.042 af

Pond 1 Pond: SWB #1

Peak Elev=368.52' Storage=0.138 af Inflow=7.1 cfs 0.774 af
Outflow=6.5 cfs 0.761 af

Pond 1P: Infiltration Trench #4

Peak Elev=324.51' Storage=0.019 af Inflow=0.7 cfs 0.061 af
Outflow=0.5 cfs 0.043 af

Pond 3P: SWB #2

Peak Elev=333.84' Storage=0.040 af Inflow=1.6 cfs 0.135 af
Outflow=0.7 cfs 0.120 af

Link Out: Outlets offsite to south

Inflow=21.2 cfs 2.526 af
Primary=21.2 cfs 2.526 af

Total Runoff Area = 13.474 ac Runoff Volume = 2.573 af Average Runoff Depth = 2.29"
97.97% Pervious = 13.201 ac 2.03% Impervious = 0.273 ac

Summary for Subcatchment #1A: Main solar farm area/field

Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

Runoff = 7.1 cfs @ 12.30 hrs, Volume= 0.774 af, Depth> 3.50"

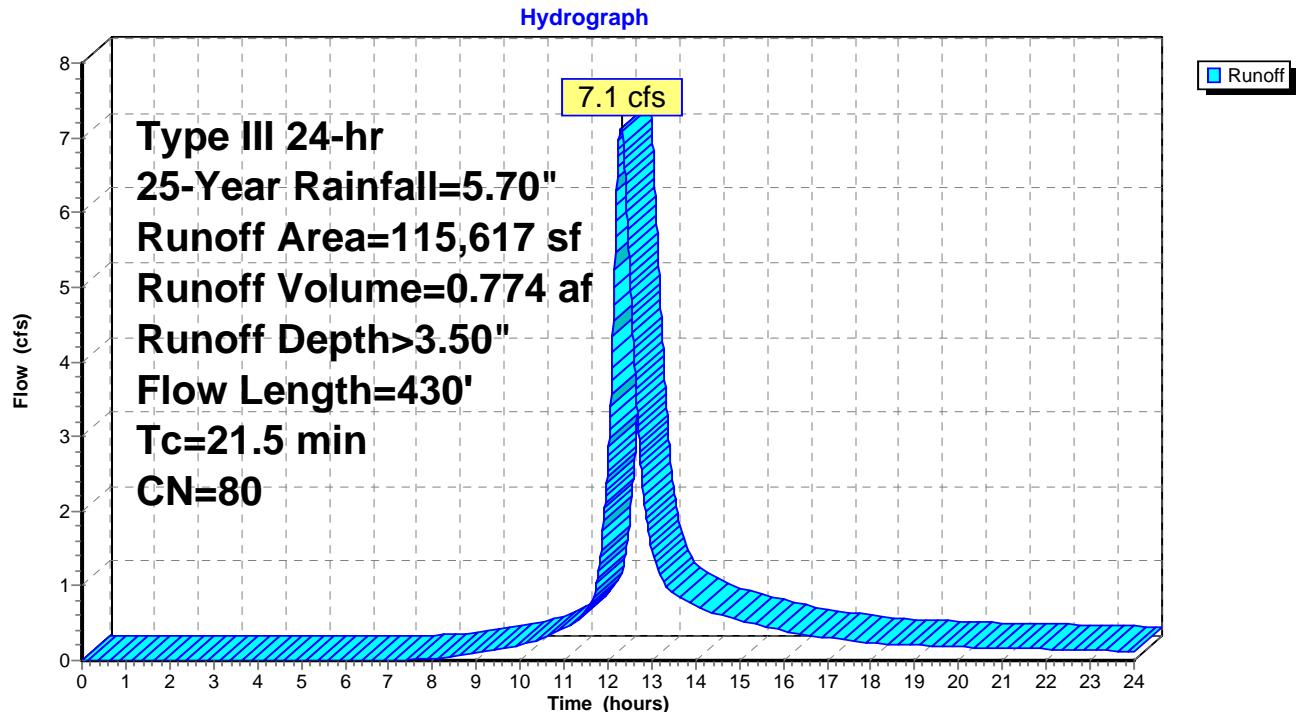
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
4,489	96	Gravel surface, HSG D
*	10,268	Solar Array Area (grass), Good, HSG B
62,737	80	>75% Grass cover, Good, HSG D
*	6,809	Solar Array Area (grass), Good, HSG D
*	4,745	Concrete Pads and Ballast, HSG D
*	335	Concrete Pads and Ballast, HSG B
2,798	96	Gravel surface, HSG D
*	7,105	Solar Array Area (grass), Good, HSG D
15,911	80	>75% Grass cover, Good, HSG D
*	420	Concrete Pads and Ballast, HSG D

115,617 80 Weighted Average
110,117 95.24% Pervious Area
5,500 4.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	60	0.0150	0.10		Sheet Flow, Grass Grass: Dense n= 0.240 P2= 3.40"
4.8	40	0.0180	0.14		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
6.4	330	0.0152	0.86		Shallow Concentrated Flow, Solar Array Area (Grass) Short Grass Pasture Kv= 7.0 fps
21.5	430	Total			

Subcatchment #1A: Main solar farm area/field



Summary for Subcatchment #1B: Western and southern section

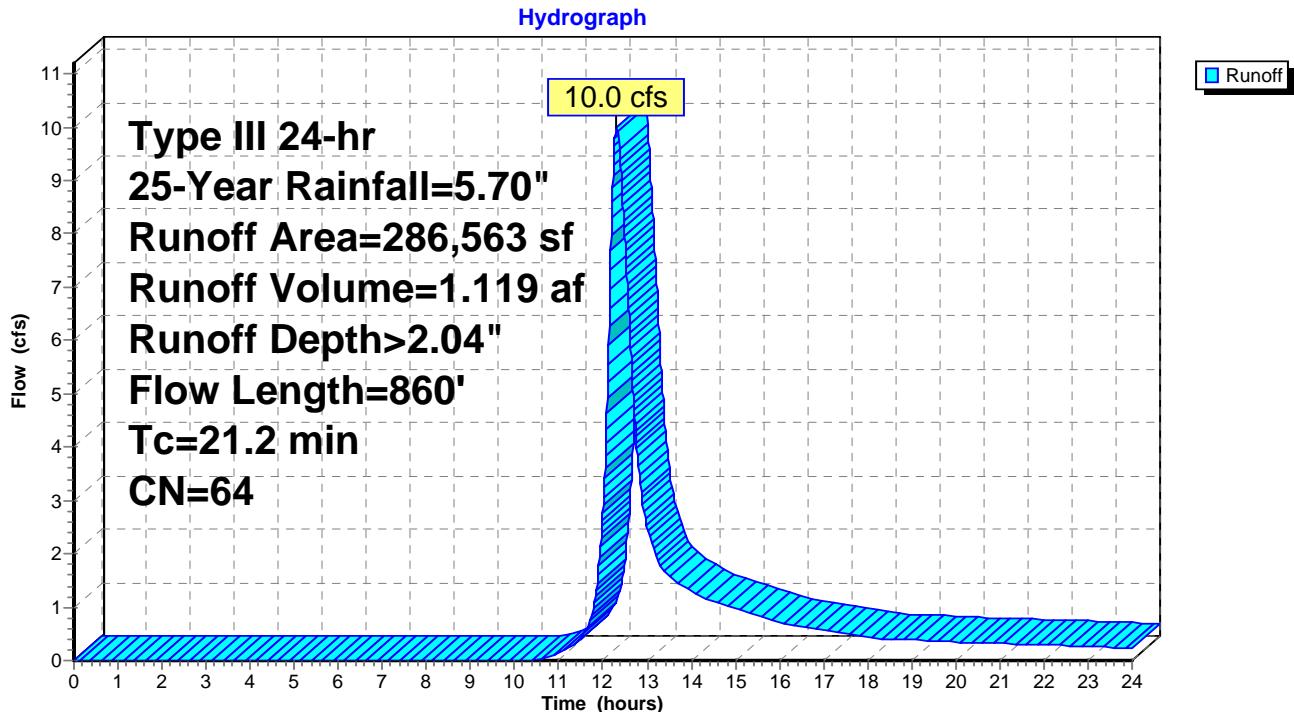
Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

Runoff = 10.0 cfs @ 12.32 hrs, Volume= 1.119 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
1,770	96	Gravel surface, HSG D
22,572	80	>75% Grass cover, Good, HSG D
*	8,095	Solar Array Area (grass), Good, HSG D
*	611	Concrete Pads and Ballast, HSG D
11,590	96	Gravel surface, HSG B
55,889	61	>75% Grass cover, Good, HSG B
163,099	60	Woods, Fair, HSG B
*	21,417	Solar Array Area (grass), Good, HSG B
*	1,520	Concrete Pads and Ballasts, HSG B
286,563	64	Weighted Average
284,432		99.26% Pervious Area
2,131		0.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0200	0.12		Sheet Flow, Grass/Woods at PL Grass: Dense n= 0.240 P2= 3.40"
4.3	245	0.0367	0.96		Shallow Concentrated Flow, Woods on PL Woodland Kv= 5.0 fps
2.4	295	0.1627	2.02		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.7	220	0.1182	5.16		Shallow Concentrated Flow, Wetland Grassed Waterway Kv= 15.0 fps
21.2	860	Total			

Subcatchment #1B: Western and southern section

Post-Development South Outlet

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Type III 24-hr 25-Year Rainfall=5.70"

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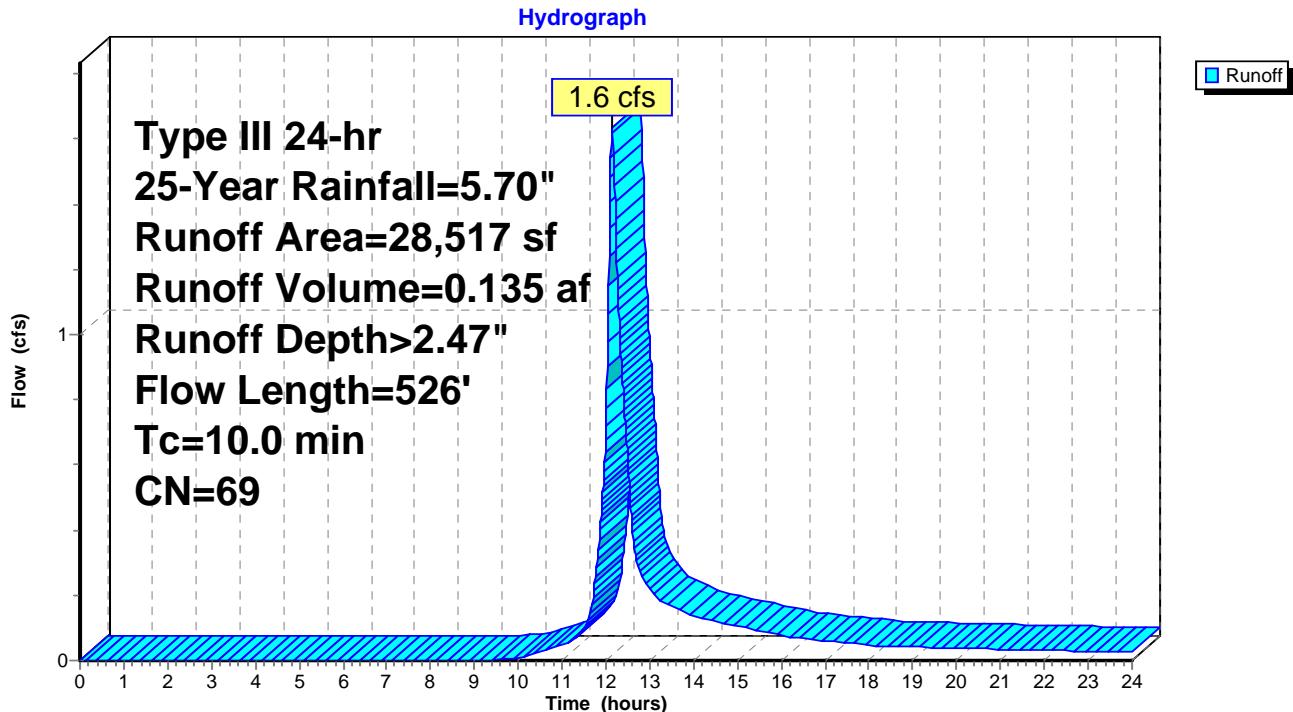
Summary for Subcatchment #3A: Solar farm north of access road

Runoff = 1.6 cfs @ 12.14 hrs, Volume= 0.135 af, Depth> 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
*	18,767	61	Solar Arrays (Grass), Good, HSG B
*	861	98	Ledge, HSG B
	4,292	96	Gravel surface, HSG B
	3,290	61	>75% Grass cover, Good, HSG B
*	1,307	98	Concrete Ballast, HSG B
	28,517	69	Weighted Average
	26,349		92.40% Pervious Area
	2,168		7.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.1300	0.25		Sheet Flow, Grass Grass: Dense n= 0.240 P2= 3.40"
1.6	323	0.0520	3.42		Shallow Concentrated Flow, Solar Arrays and grass swale Grassed Waterway Kv= 15.0 fps
0.1	33	0.0300	9.12	11.19	Pipe Channel, Pipe 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	22	0.3300	4.02		Shallow Concentrated Flow, Stormwater Basin Slope Short Grass Pasture Kv= 7.0 fps
0.1	48		8.02		Lake or Reservoir, Stormwater Basin Mean Depth= 2.00'
8.4	526				Total, Increased to minimum Tc = 10.0 min

Subcatchment #3A: Solar farm north of access road

Post-Development South Outlet

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Type III 24-hr 25-Year Rainfall=5.70"

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Summary for Subcatchment #3B: Western solar farm south of access drive

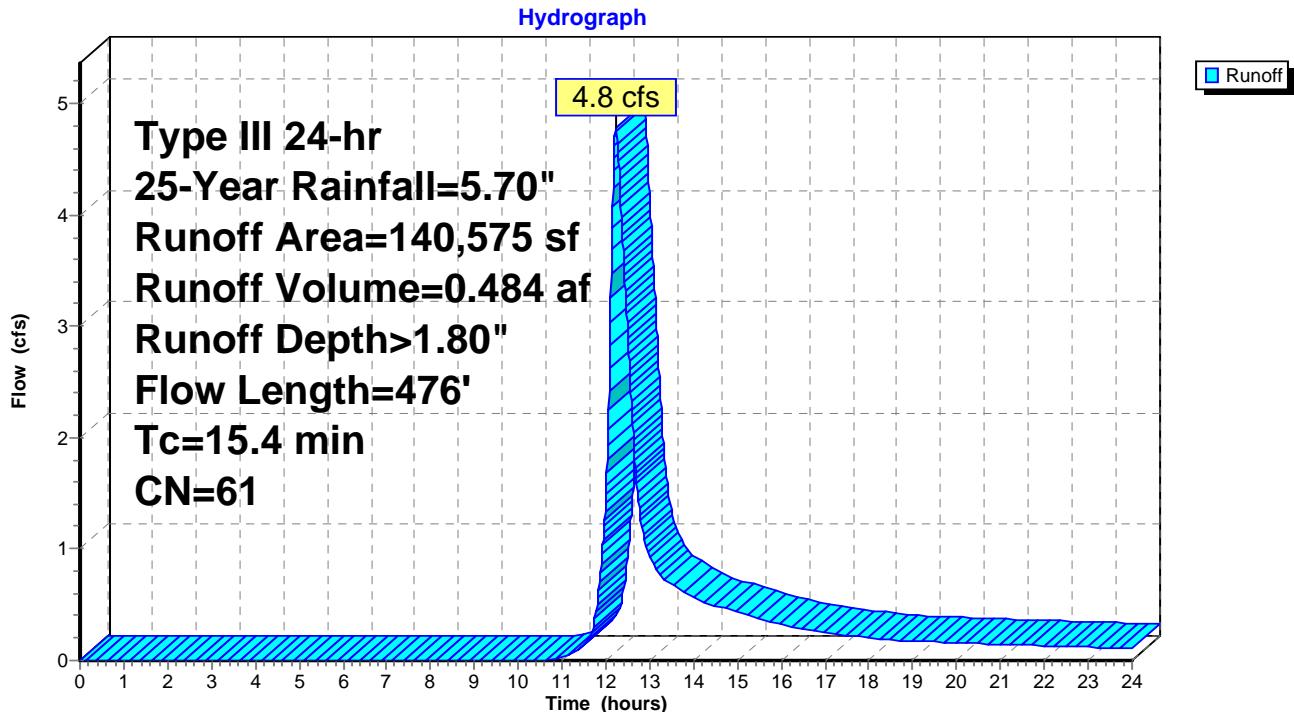
Runoff = 4.8 cfs @ 12.23 hrs, Volume= 0.484 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
*	13,760	61	Solar Array Area (grass), Good, HSG B
	66,807	61	>75% Grass cover, Good, HSG B
	57,125	60	Woods, Fair, HSG B
	1,903	96	Gravel surface, HSG B
*	980	98	Concrete Ballast, HSG B
	140,575	61	Weighted Average
	139,595		99.30% Pervious Area
	980		0.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	60	0.3300	0.33		Sheet Flow, Grass Slope Grass: Dense n= 0.240 P2= 3.40"
8.2	40	0.0333	0.08		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
4.0	236	0.0381	0.98		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.2	140	0.2286	13.43	29.99	Parabolic Channel, Intermittent Watercourse W=5.00' D=0.67' Area=2.2 sf Perim=5.2' n= 0.030
15.4	476	Total			

Subcatchment #3B: Western solar farm south of access drive



Summary for Subcatchment #3C: Eastern solar farm south of access road

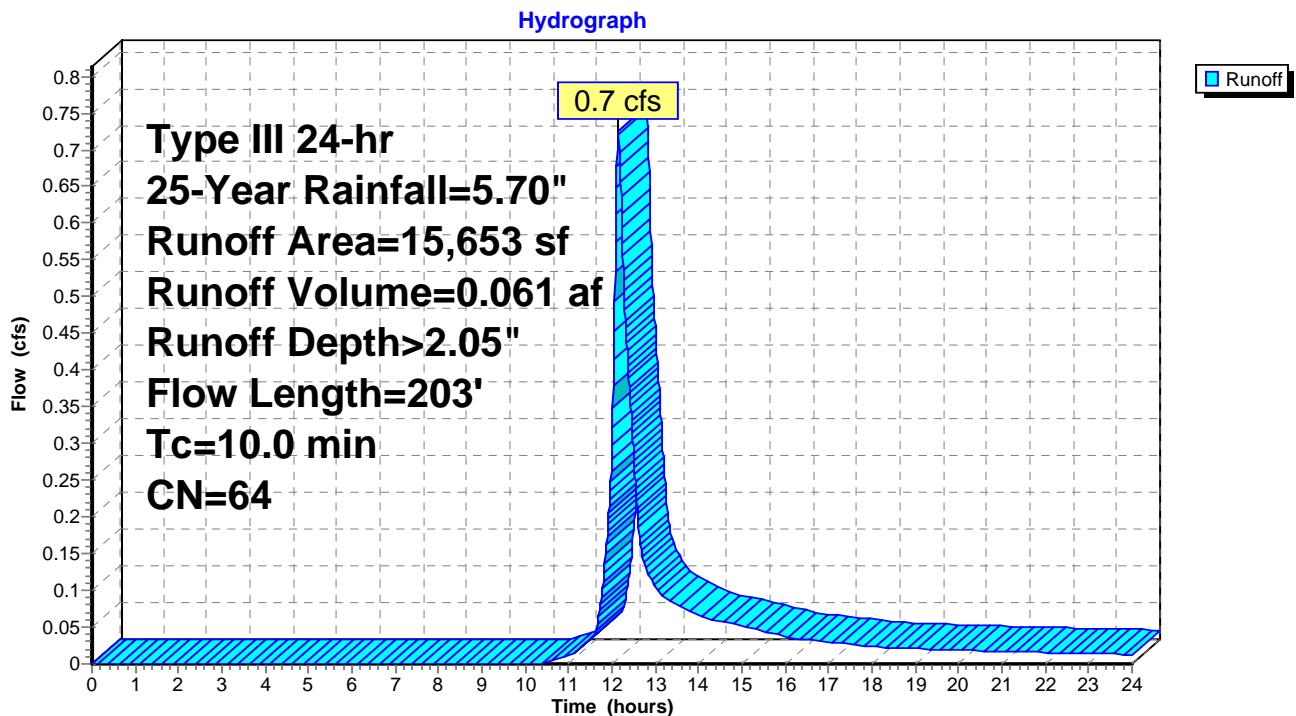
Runoff = 0.7 cfs @ 12.15 hrs, Volume= 0.061 af, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
* 14,544	61	Solar Array Area (grass), Good, HSG B
* 1,109	98	Concrete Ballast, HSG B

15,653	64	Weighted Average
14,544		92.92% Pervious Area
1,109		7.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0600	0.27		Sheet Flow, Grassed Solar Array Area Grass: Short n= 0.150 P2= 3.40"
1.2	103	0.0388	1.38		Shallow Concentrated Flow, Solar Array Area Grassed Short Grass Pasture Kv= 7.0 fps
7.3	203				Total, Increased to minimum Tc = 10.0 min

Subcatchment #3C: Eastern solar farm south of access road

Summary for Reach 1R: Swale to Offsite

Inflow Area = 0.655 ac, 7.60% Impervious, Inflow Depth > 2.19" for 25-Year event

Inflow = 0.7 cfs @ 12.44 hrs, Volume= 0.120 af

Outflow = 0.7 cfs @ 12.47 hrs, Volume= 0.120 af, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.87 fps, Min. Travel Time= 0.9 min

Avg. Velocity = 1.48 fps, Avg. Travel Time= 1.8 min

Peak Storage= 39 cf @ 12.45 hrs

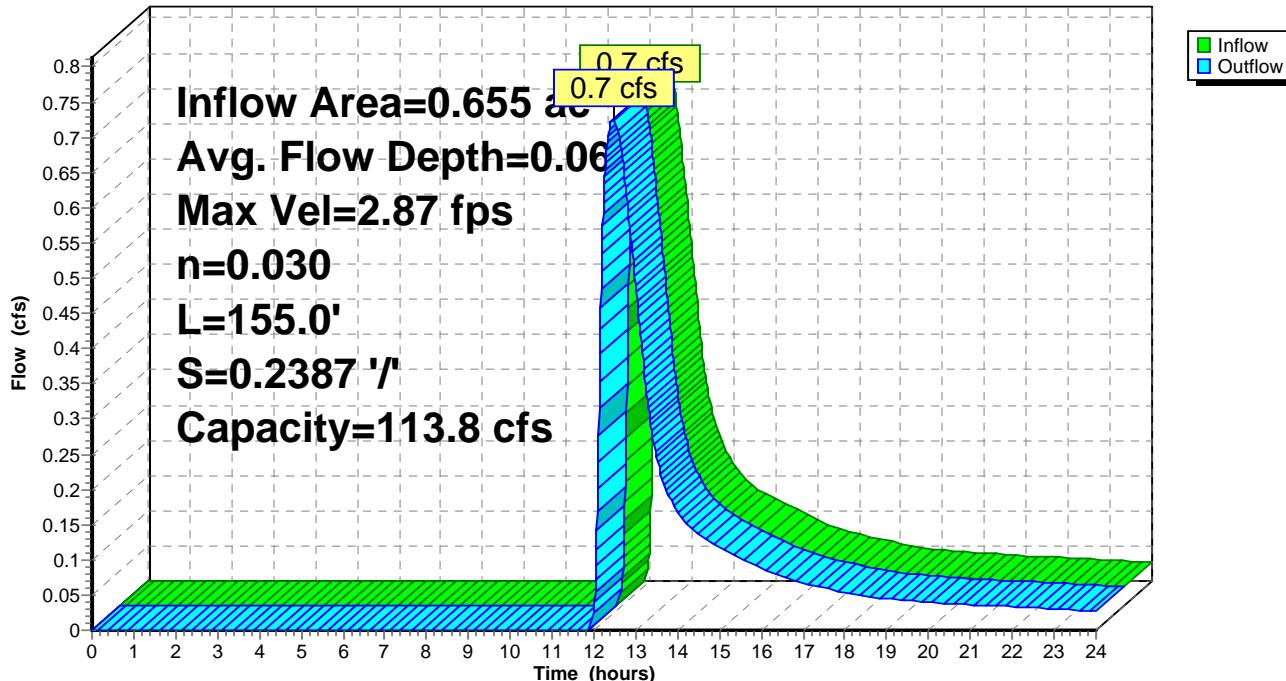
Average Depth at Peak Storage= 0.06'

Bank-Full Depth= 0.63' Flow Area= 8.4 sf, Capacity= 113.8 cfs

20.00' x 0.63' deep Parabolic Channel, n= 0.030

Length= 155.0' Slope= 0.2387 '/'

Inlet Invert= 332.00', Outlet Invert= 295.00'

**Reach 1R: Swale to Offsite****Hydrograph**

Summary for Reach 2R: Swale to Offsite

Inflow Area = 0.359 ac, 7.08% Impervious, Inflow Depth > 1.42" for 25-Year event

Inflow = 0.5 cfs @ 12.29 hrs, Volume= 0.043 af

Outflow = 0.5 cfs @ 12.32 hrs, Volume= 0.042 af, Atten= 5%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 3.16 fps, Min. Travel Time= 0.7 min

Avg. Velocity = 1.40 fps, Avg. Travel Time= 1.6 min

Peak Storage= 20 cf @ 12.31 hrs

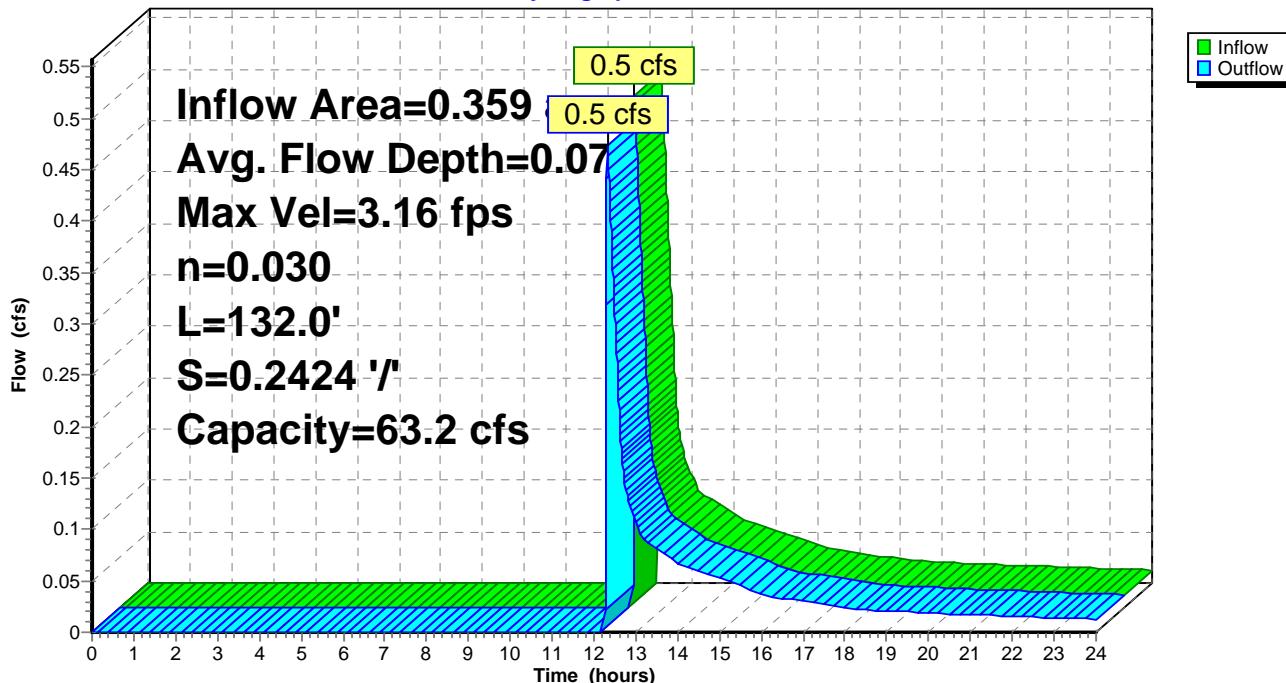
Average Depth at Peak Storage= 0.07'

Bank-Full Depth= 0.67' Flow Area= 4.5 sf, Capacity= 63.2 cfs

10.00' x 0.67' deep Parabolic Channel, n= 0.030

Length= 132.0' Slope= 0.2424 '/'

Inlet Invert= 324.00', Outlet Invert= 292.00'

**Reach 2R: Swale to Offsite****Hydrograph**

Summary for Pond 1 Pond: SWB #1

Inflow Area = 2.654 ac, 4.76% Impervious, Inflow Depth > 3.50" for 25-Year event
 Inflow = 7.1 cfs @ 12.30 hrs, Volume= 0.774 af
 Outflow = 6.5 cfs @ 12.39 hrs, Volume= 0.761 af, Atten= 9%, Lag= 5.4 min
 Primary = 6.5 cfs @ 12.39 hrs, Volume= 0.761 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 368.52' @ 12.39 hrs Surf.Area= 0.085 ac Storage= 0.138 af

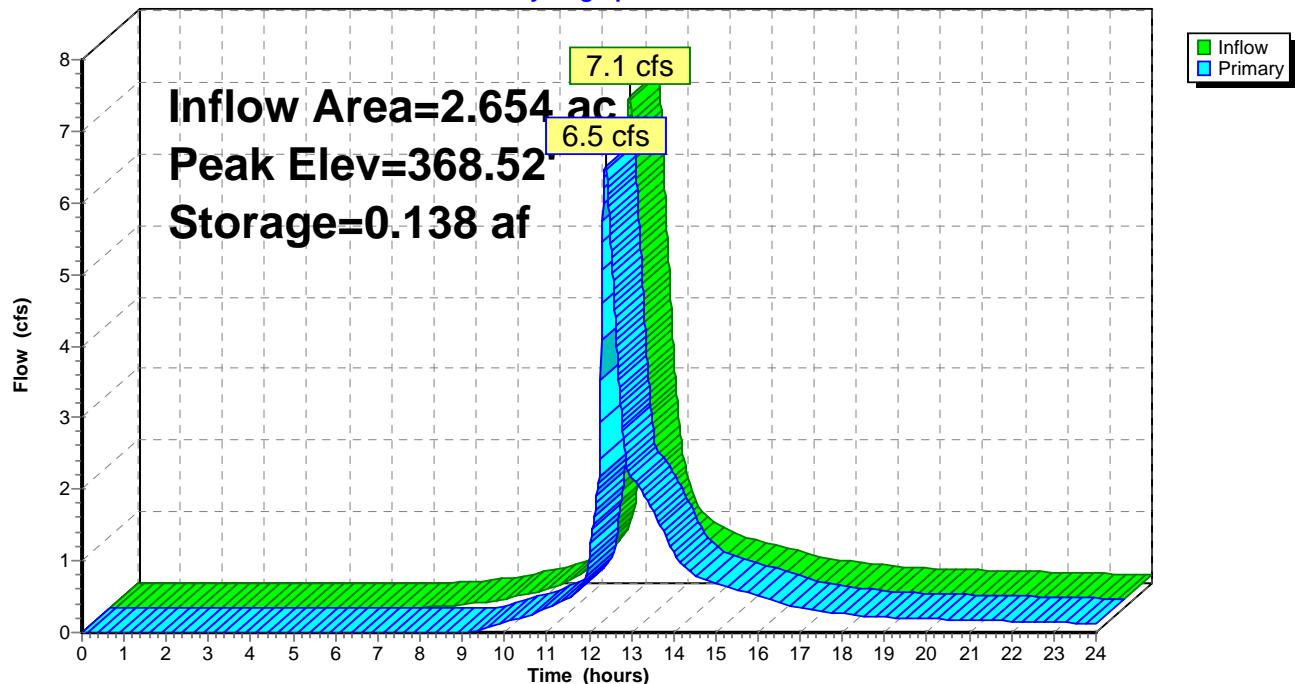
Plug-Flow detention time= 35.0 min calculated for 0.761 af (98% of inflow)
 Center-of-Mass det. time= 25.2 min (853.3 - 828.0)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	0.154 af	8.00'W x 145.00'L x 2.70'H Prismatoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	366.00'	15.0" Round Culvert L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 366.00' / 365.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	366.20'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	367.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	368.25'	30.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	368.50'	20.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=6.5 cfs @ 12.39 hrs HW=368.52' (Free Discharge)

- ↑ 1=Culvert (Passes 6.4 cfs of 6.7 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.4 cfs @ 6.92 fps)
- 3=Orifice/Grate (Orifice Controls 1.1 cfs @ 5.42 fps)
- 4=Orifice/Grate (Weir Controls 4.0 cfs @ 1.68 fps)
- 5=Broad-Crested Rectangular Weir (Weir Controls 0.1 cfs @ 0.33 fps)

Pond 1 Pond: SWB #1**Hydrograph**

Summary for Pond 1P: Infiltration Trench #4

Inflow Area = 0.359 ac, 7.08% Impervious, Inflow Depth > 2.05" for 25-Year event

Inflow = 0.7 cfs @ 12.15 hrs, Volume= 0.061 af

Outflow = 0.5 cfs @ 12.29 hrs, Volume= 0.043 af, Atten= 31%, Lag= 8.4 min

Primary = 0.5 cfs @ 12.29 hrs, Volume= 0.043 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 324.51' @ 12.29 hrs Surf.Area= 0.024 ac Storage= 0.019 af

Plug-Flow detention time= 163.6 min calculated for 0.043 af (69% of inflow)

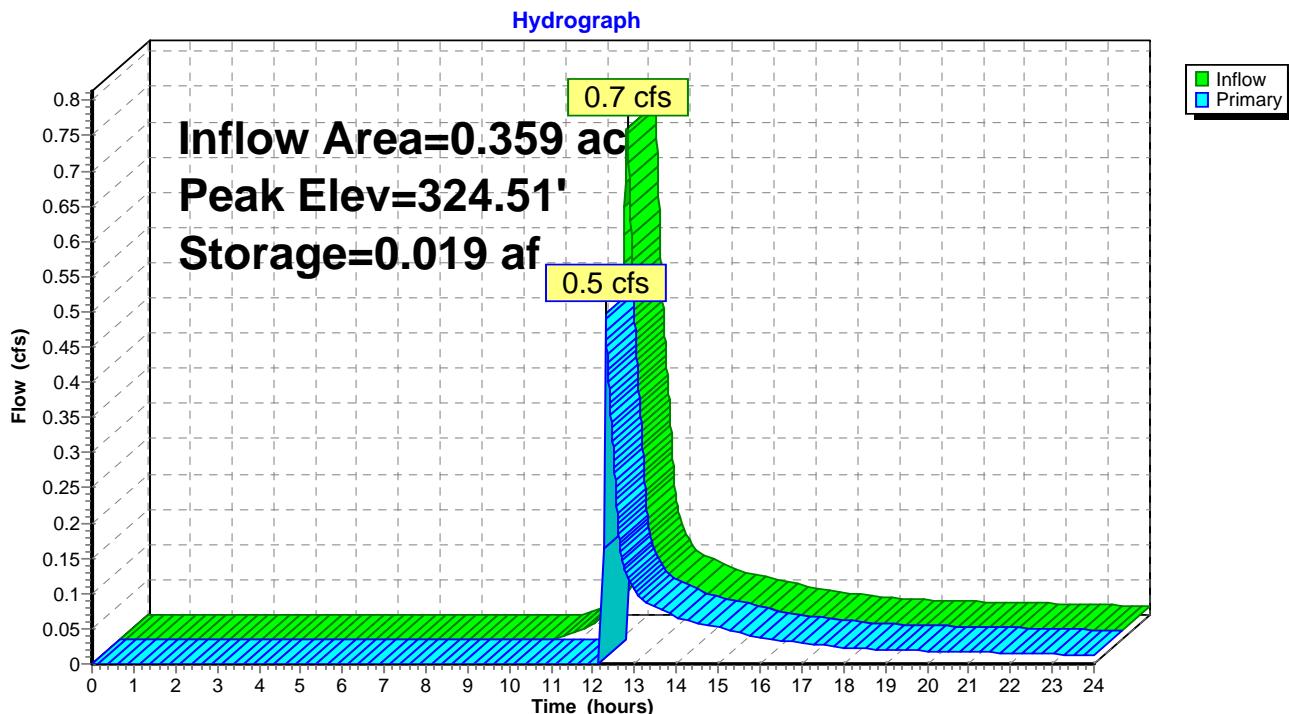
Center-of-Mass det. time= 60.8 min (918.6 - 857.8)

Volume	Invert	Avail.Storage	Storage Description
#1	322.50'	0.024 af	10.00'W x 100.00'L x 2.50'H Crushed Stone Infiltration Trench Z=0.1 0.059 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	100.0' long x 10.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.4 cfs @ 12.29 hrs HW=324.51' (Free Discharge)

↑1=Overflow (Weir Controls 0.4 cfs @ 0.28 fps)

Pond 1P: Infiltration Trench #4

Summary for Pond 3P: SWB #2

Inflow Area = 0.655 ac, 7.60% Impervious, Inflow Depth > 2.47" for 25-Year event
 Inflow = 1.6 cfs @ 12.14 hrs, Volume= 0.135 af
 Outflow = 0.7 cfs @ 12.44 hrs, Volume= 0.120 af, Atten= 56%, Lag= 17.9 min
 Primary = 0.7 cfs @ 12.44 hrs, Volume= 0.120 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 333.84' @ 12.44 hrs Surf.Area= 0.037 ac Storage= 0.040 af

Plug-Flow detention time= 92.4 min calculated for 0.120 af (89% of inflow)
 Center-of-Mass det. time= 39.1 min (884.7 - 845.6)

Volume	Invert	Avail.Storage	Storage Description
#1	332.50'	0.106 af	20.00'W x 50.00'L x 2.76'H Prismatoid Z=3.0

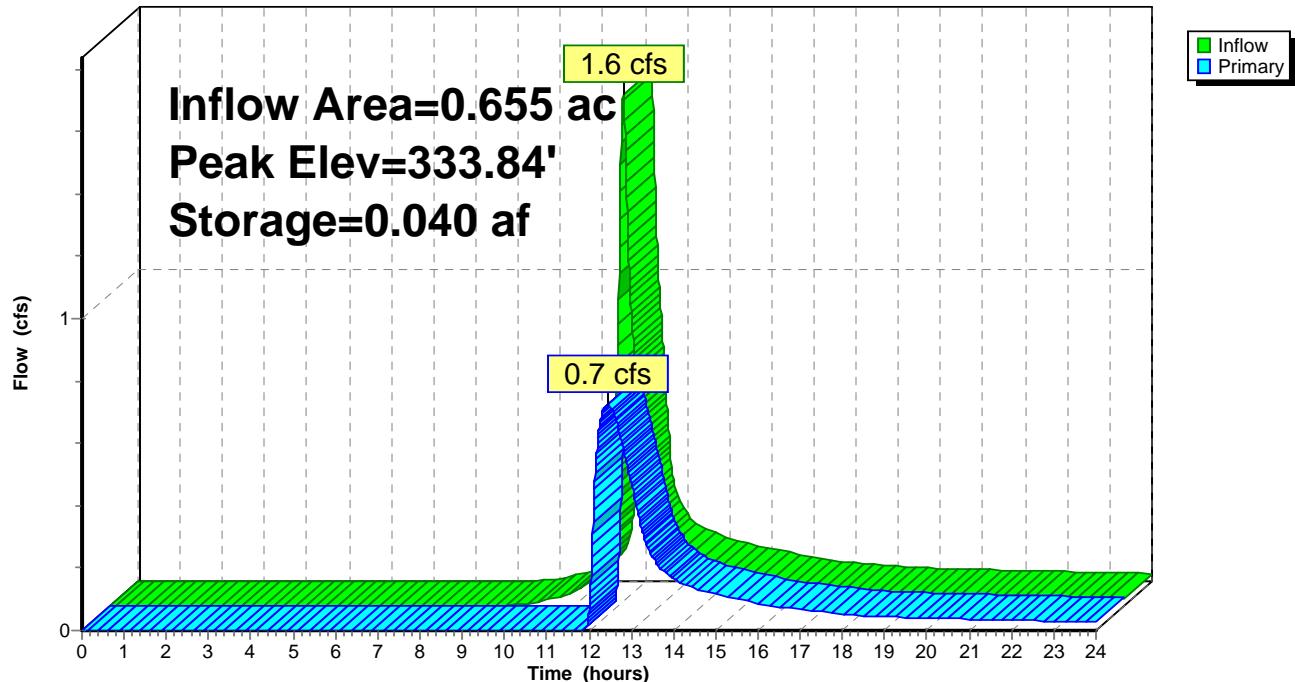
Device	Routing	Invert	Outlet Devices
#1	Primary	332.75'	12.0" Round Culvert L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 332.75' / 332.57' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	333.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	334.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	335.00'	30.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	335.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.7 cfs @ 12.44 hrs HW=333.84' (Free Discharge)

↑ 1=Culvert (Passes 0.7 cfs of 2.4 cfs potential flow)
 ↑ 2=Orifice/Grate (Orifice Controls 0.7 cfs @ 3.70 fps)
 ↑ 3=Orifice/Grate (Controls 0.0 cfs)
 ↑ 4=Orifice/Grate (Controls 0.0 cfs)
 ↑ 5=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 3P: SWB #2

Hydrograph



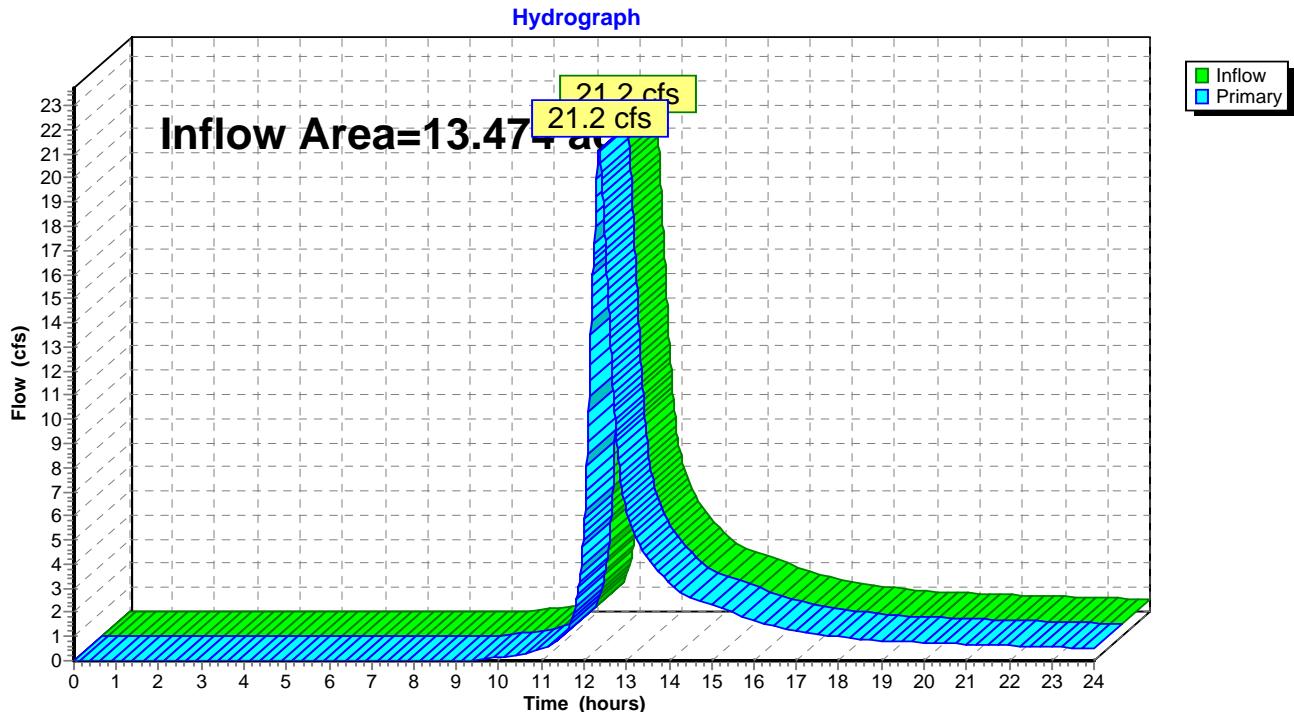
Summary for Link Out: Outlets offsite to south

Inflow Area = 13.474 ac, 2.03% Impervious, Inflow Depth > 2.25" for 25-Year event

Inflow = 21.2 cfs @ 12.35 hrs, Volume= 2.526 af

Primary = 21.2 cfs @ 12.35 hrs, Volume= 2.526 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link Out: Outlets offsite to south

Post-Development South Outlet

Prepared by Boundaries LLC - DCM

HydroCAD® 10.00-13 s/n 04031 © 2014 HydroCAD Software Solutions LLC

Type III 24-hr 100-Year Rainfall=7.10"

Printed 12/24/2014

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment#1A: Main solar farm

Runoff Area=115,617 sf 4.76% Impervious Runoff Depth>4.77"
Flow Length=430' Tc=21.5 min CN=80 Runoff=9.7 cfs 1.055 af

Subcatchment#1B: Western and southern Runoff Area=286,563 sf 0.74% Impervious Runoff Depth>3.06"
Flow Length=860' Tc=21.2 min CN=64 Runoff=15.4 cfs 1.679 af

Subcatchment#3A: Solar farm north of

Runoff Area=28,517 sf 7.60% Impervious Runoff Depth>3.59"
Flow Length=526' Tc=10.0 min CN=69 Runoff=2.4 cfs 0.196 af

Subcatchment#3B: Western solar farm

Runoff Area=140,575 sf 0.70% Impervious Runoff Depth>2.76"
Flow Length=476' Tc=15.4 min CN=61 Runoff=7.6 cfs 0.743 af

Subcatchment#3C: Eastern solar farm

Runoff Area=15,653 sf 7.08% Impervious Runoff Depth>3.07"
Flow Length=203' Tc=10.0 min CN=64 Runoff=1.1 cfs 0.092 af

Reach 1R: Swale to Offsite

Avg. Flow Depth=0.07' Max Vel=3.28 fps Inflow=1.1 cfs 0.180 af
n=0.030 L=155.0' S=0.2387 '/' Capacity=113.8 cfs Outflow=1.1 cfs 0.180 af

Reach 2R: Swale to Offsite

Avg. Flow Depth=0.10' Max Vel=4.10 fps Inflow=1.1 cfs 0.073 af
n=0.030 L=132.0' S=0.2424 '/' Capacity=63.2 cfs Outflow=1.1 cfs 0.073 af

Pond 1 Pond: SWB #1

Peak Elev=368.63' Storage=0.148 af Inflow=9.7 cfs 1.055 af
Outflow=9.4 cfs 1.041 af

Pond 1P: Infiltration Trench #4

Peak Elev=324.53' Storage=0.019 af Inflow=1.1 cfs 0.092 af
Outflow=1.1 cfs 0.073 af

Pond 3P: SWB #2

Peak Elev=334.26' Storage=0.057 af Inflow=2.4 cfs 0.196 af
Outflow=1.1 cfs 0.180 af

Link Out: Outlets offsite to south

Inflow=33.2 cfs 3.716 af
Primary=33.2 cfs 3.716 af

Total Runoff Area = 13.474 ac Runoff Volume = 3.764 af Average Runoff Depth = 3.35"
97.97% Pervious = 13.201 ac 2.03% Impervious = 0.273 ac

Summary for Subcatchment #1A: Main solar farm area/field

Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

Runoff = 9.7 cfs @ 12.30 hrs, Volume= 1.055 af, Depth> 4.77"

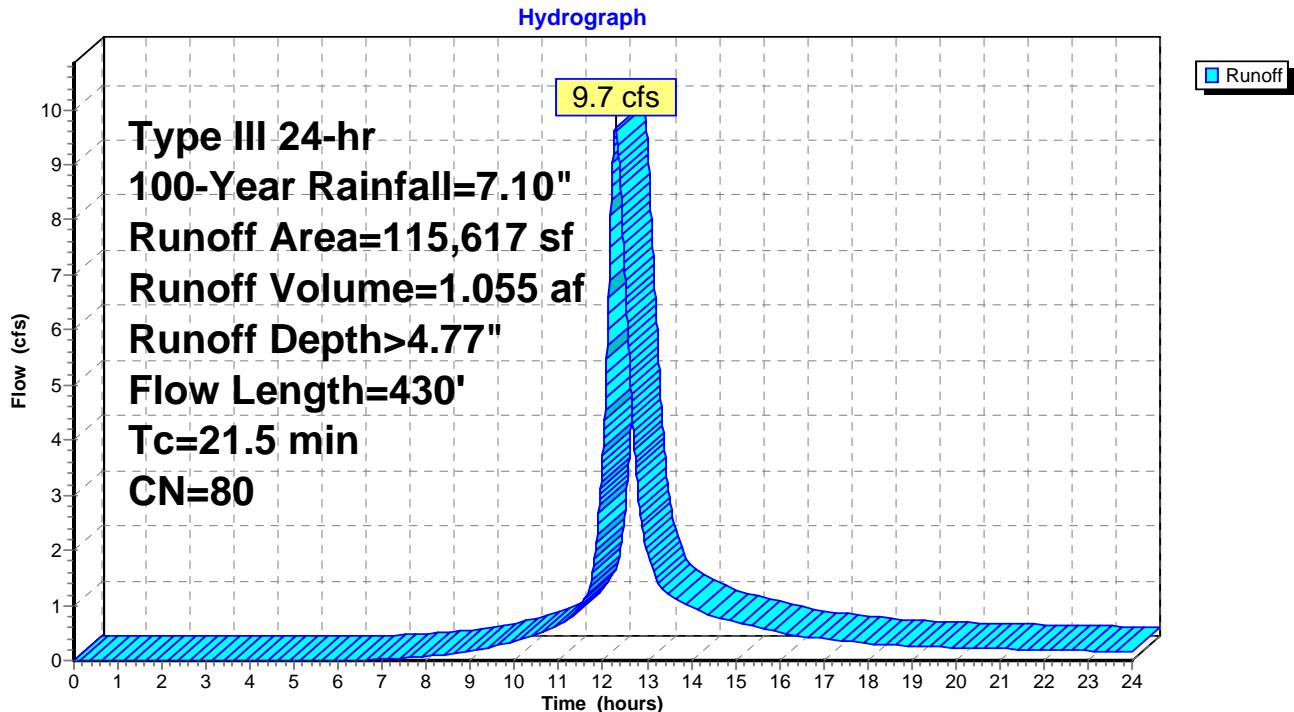
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)	CN	Description
4,489	96	Gravel surface, HSG D
*	10,268	Solar Array Area (grass), Good, HSG B
62,737	80	>75% Grass cover, Good, HSG D
*	6,809	Solar Array Area (grass), Good, HSG D
*	4,745	Concrete Pads and Ballast, HSG D
*	335	Concrete Pads and Ballast, HSG B
2,798	96	Gravel surface, HSG D
*	7,105	Solar Array Area (grass), Good, HSG D
15,911	80	>75% Grass cover, Good, HSG D
*	420	Concrete Pads and Ballast, HSG D

115,617 80 Weighted Average
110,117 95.24% Pervious Area
5,500 4.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	60	0.0150	0.10		Sheet Flow, Grass Grass: Dense n= 0.240 P2= 3.40"
4.8	40	0.0180	0.14		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
6.4	330	0.0152	0.86		Shallow Concentrated Flow, Solar Array Area (Grass) Short Grass Pasture Kv= 7.0 fps
21.5	430	Total			

Subcatchment #1A: Main solar farm area/field



Summary for Subcatchment #1B: Western and southern section

Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

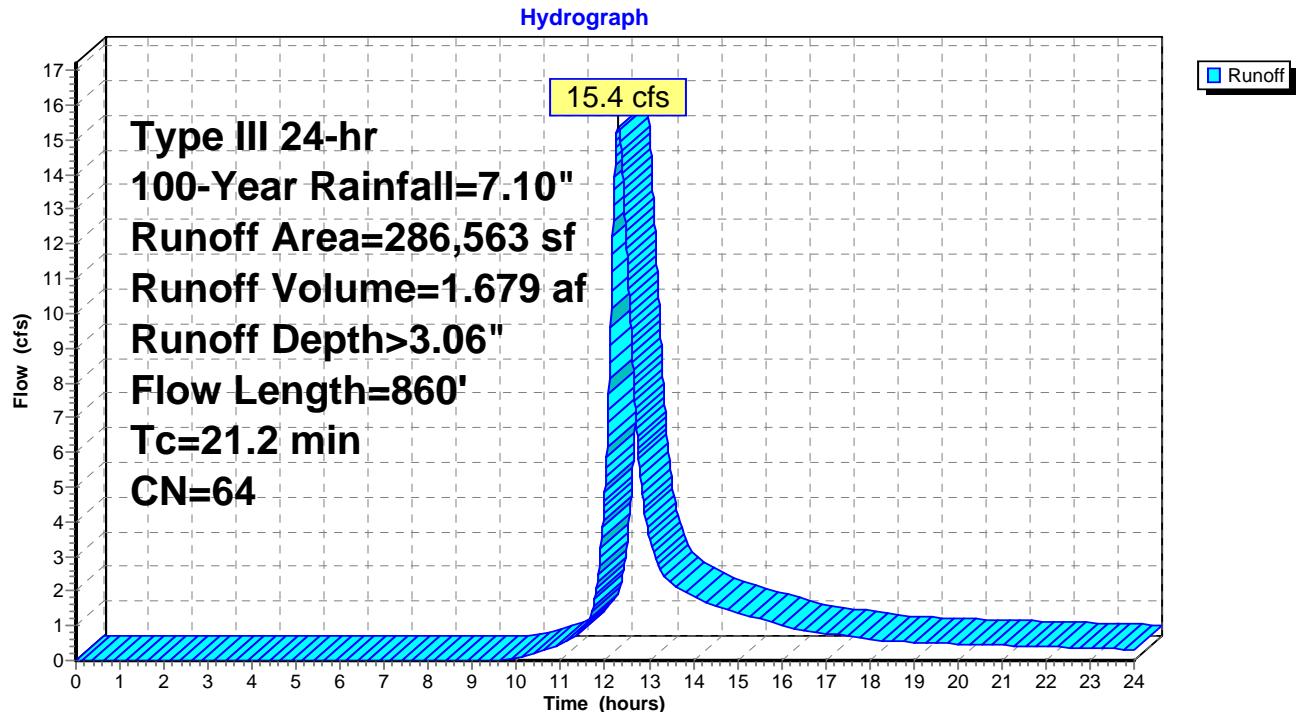
Runoff = 15.4 cfs @ 12.30 hrs, Volume= 1.679 af, Depth> 3.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)	CN	Description
1,770	96	Gravel surface, HSG D
22,572	80	>75% Grass cover, Good, HSG D
*	8,095	Solar Array Area (grass), Good, HSG D
*	611	Concrete Pads and Ballast, HSG D
11,590	96	Gravel surface, HSG B
55,889	61	>75% Grass cover, Good, HSG B
163,099	60	Woods, Fair, HSG B
*	21,417	Solar Array Area (grass), Good, HSG B
*	1,520	Concrete Pads and Ballasts, HSG B
286,563	64	Weighted Average
284,432		99.26% Pervious Area
2,131		0.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0200	0.12		Sheet Flow, Grass/Woods at PL Grass: Dense n= 0.240 P2= 3.40"
4.3	245	0.0367	0.96		Shallow Concentrated Flow, Woods on PL Woodland Kv= 5.0 fps
2.4	295	0.1627	2.02		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.7	220	0.1182	5.16		Shallow Concentrated Flow, Wetland Grassed Waterway Kv= 15.0 fps
21.2	860	Total			

Subcatchment #1B: Western and southern section



Post-Development South Outlet

Prepared by Boundaries LLC - DCM

HydroCAD® 10.00-13 s/n 04031 © 2014 HydroCAD Software Solutions LLC

Type III 24-hr 100-Year Rainfall=7.10"

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Summary for Subcatchment #3A: Solar farm north of access road

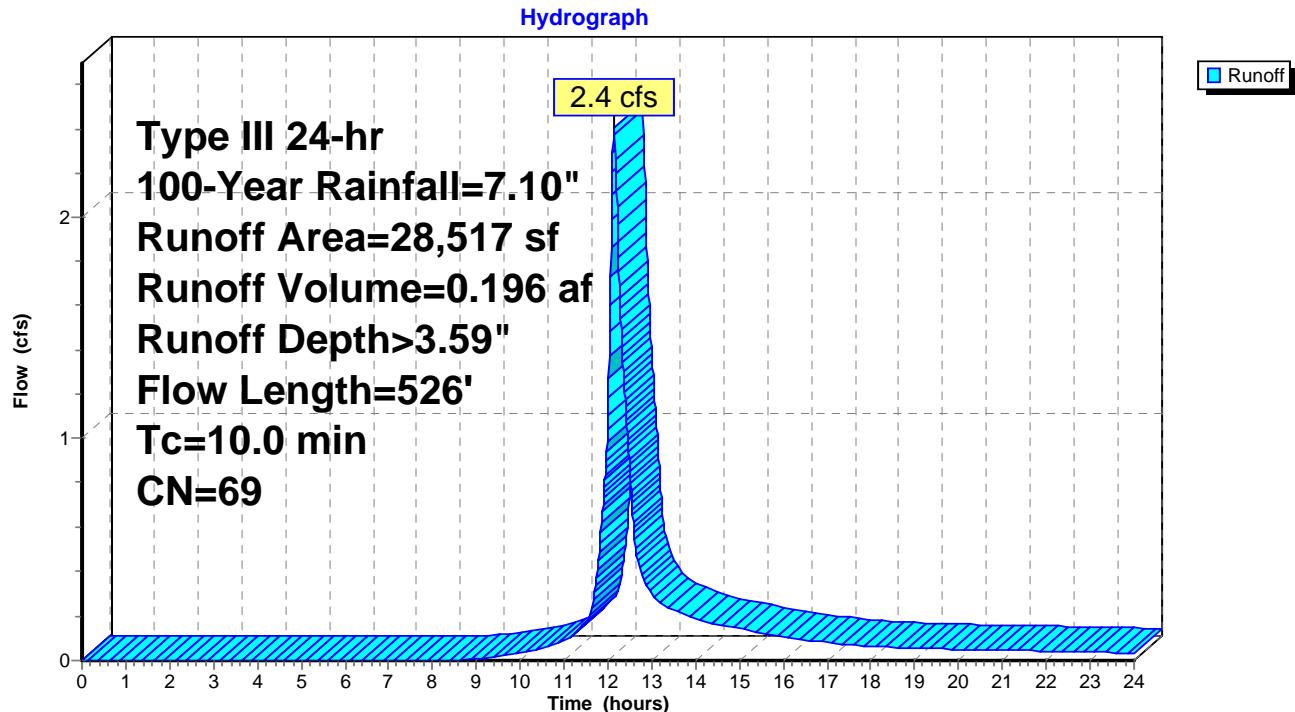
Runoff = 2.4 cfs @ 12.14 hrs, Volume= 0.196 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
*	18,767	61	Solar Arrays (Grass), Good, HSG B
*	861	98	Ledge, HSG B
	4,292	96	Gravel surface, HSG B
	3,290	61	>75% Grass cover, Good, HSG B
*	1,307	98	Concrete Ballast, HSG B
	28,517	69	Weighted Average
	26,349		92.40% Pervious Area
	2,168		7.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.1300	0.25		Sheet Flow, Grass Grass: Dense n= 0.240 P2= 3.40"
1.6	323	0.0520	3.42		Shallow Concentrated Flow, Solar Arrays and grass swale Grassed Waterway Kv= 15.0 fps
0.1	33	0.0300	9.12	11.19	Pipe Channel, Pipe 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	22	0.3300	4.02		Shallow Concentrated Flow, Stormwater Basin Slope Short Grass Pasture Kv= 7.0 fps
0.1	48		8.02		Lake or Reservoir, Stormwater Basin Mean Depth= 2.00'
8.4	526				Total, Increased to minimum Tc = 10.0 min

Subcatchment #3A: Solar farm north of access road



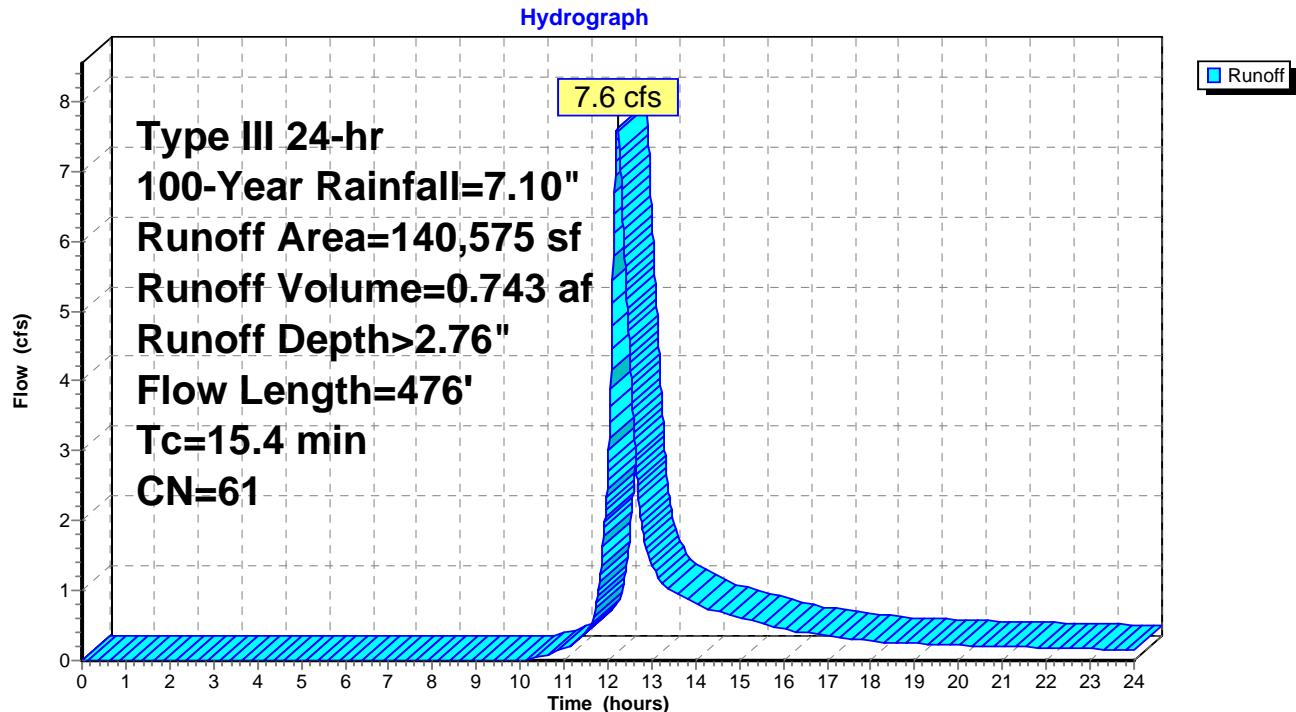
Summary for Subcatchment #3B: Western solar farm south of access drive

Runoff = 7.6 cfs @ 12.22 hrs, Volume= 0.743 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
*	13,760	61	Solar Array Area (grass), Good, HSG B
	66,807	61	>75% Grass cover, Good, HSG B
	57,125	60	Woods, Fair, HSG B
	1,903	96	Gravel surface, HSG B
*	980	98	Concrete Ballast, HSG B
	140,575	61	Weighted Average
	139,595		99.30% Pervious Area
	980		0.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	60	0.3300	0.33		Sheet Flow, Grass Slope Grass: Dense n= 0.240 P2= 3.40"
8.2	40	0.0333	0.08		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.40"
4.0	236	0.0381	0.98		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.2	140	0.2286	13.43	29.99	Parabolic Channel, Intermittent Watercourse W=5.00' D=0.67' Area=2.2 sf Perim=5.2' n= 0.030
15.4	476	Total			

Subcatchment #3B: Western solar farm south of access drive

Summary for Subcatchment #3C: Eastern solar farm south of access road

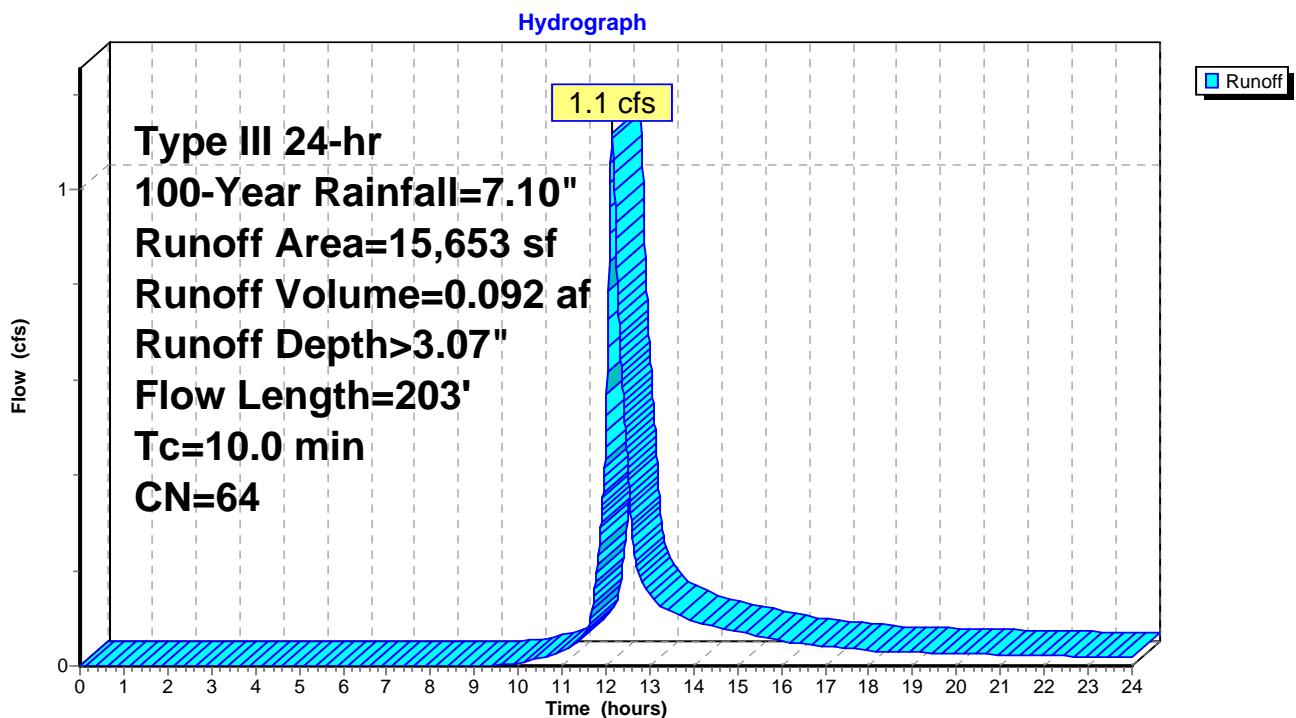
Runoff = 1.1 cfs @ 12.14 hrs, Volume= 0.092 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)	CN	Description
* 14,544	61	Solar Array Area (grass), Good, HSG B
* 1,109	98	Concrete Ballast, HSG B

15,653	64	Weighted Average
14,544		92.92% Pervious Area
1,109		7.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0600	0.27		Sheet Flow, Grassed Solar Array Area Grass: Short n= 0.150 P2= 3.40"
1.2	103	0.0388	1.38		Shallow Concentrated Flow, Solar Array Area Grassed Short Grass Pasture Kv= 7.0 fps
7.3	203				Total, Increased to minimum Tc = 10.0 min

Subcatchment #3C: Eastern solar farm south of access road

Summary for Reach 1R: Swale to Offsite

Inflow Area = 0.655 ac, 7.60% Impervious, Inflow Depth > 3.30" for 100-Year event

Inflow = 1.1 cfs @ 12.41 hrs, Volume= 0.180 af

Outflow = 1.1 cfs @ 12.43 hrs, Volume= 0.180 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 3.28 fps, Min. Travel Time= 0.8 min

Avg. Velocity = 1.63 fps, Avg. Travel Time= 1.6 min

Peak Storage= 53 cf @ 12.42 hrs

Average Depth at Peak Storage= 0.07'

Bank-Full Depth= 0.63' Flow Area= 8.4 sf, Capacity= 113.8 cfs

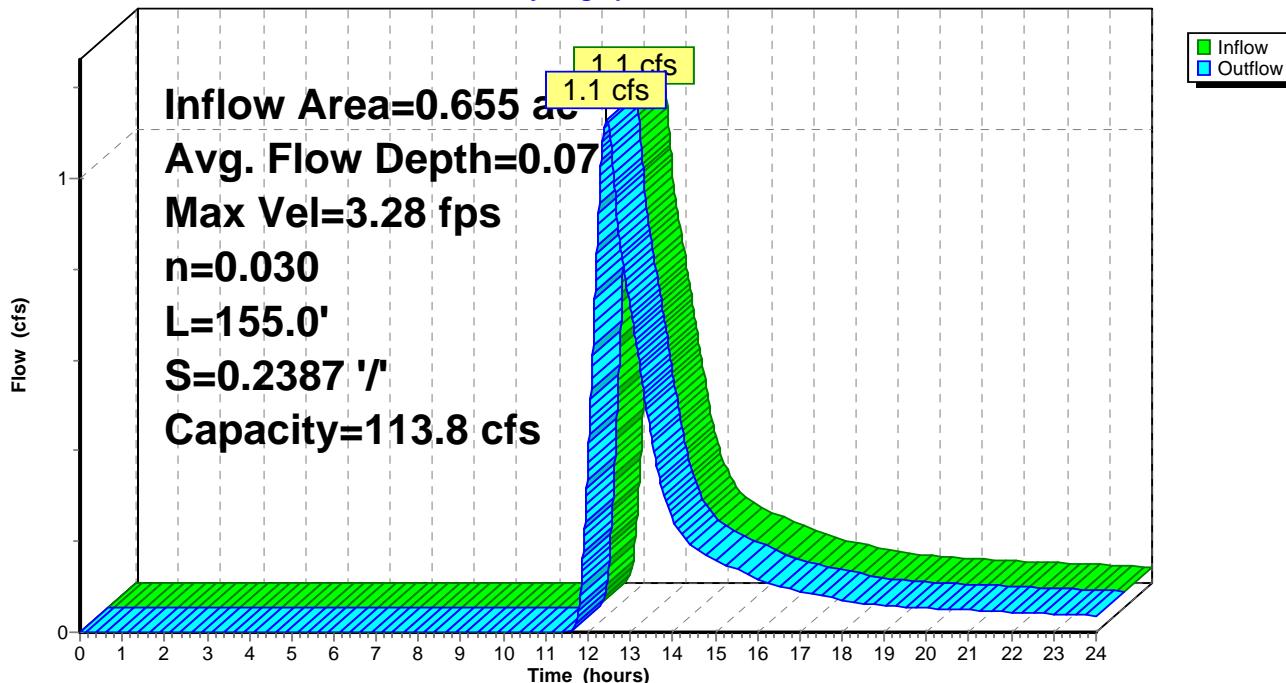
20.00' x 0.63' deep Parabolic Channel, n= 0.030

Length= 155.0' Slope= 0.2387 '/'

Inlet Invert= 332.00', Outlet Invert= 295.00'

**Reach 1R: Swale to Offsite**

Hydrograph



Summary for Reach 2R: Swale to Offsite

Inflow Area = 0.359 ac, 7.08% Impervious, Inflow Depth > 2.44" for 100-Year event

Inflow = 1.1 cfs @ 12.15 hrs, Volume= 0.073 af

Outflow = 1.1 cfs @ 12.16 hrs, Volume= 0.073 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 4.10 fps, Min. Travel Time= 0.5 min

Avg. Velocity = 1.59 fps, Avg. Travel Time= 1.4 min

Peak Storage= 36 cf @ 12.15 hrs

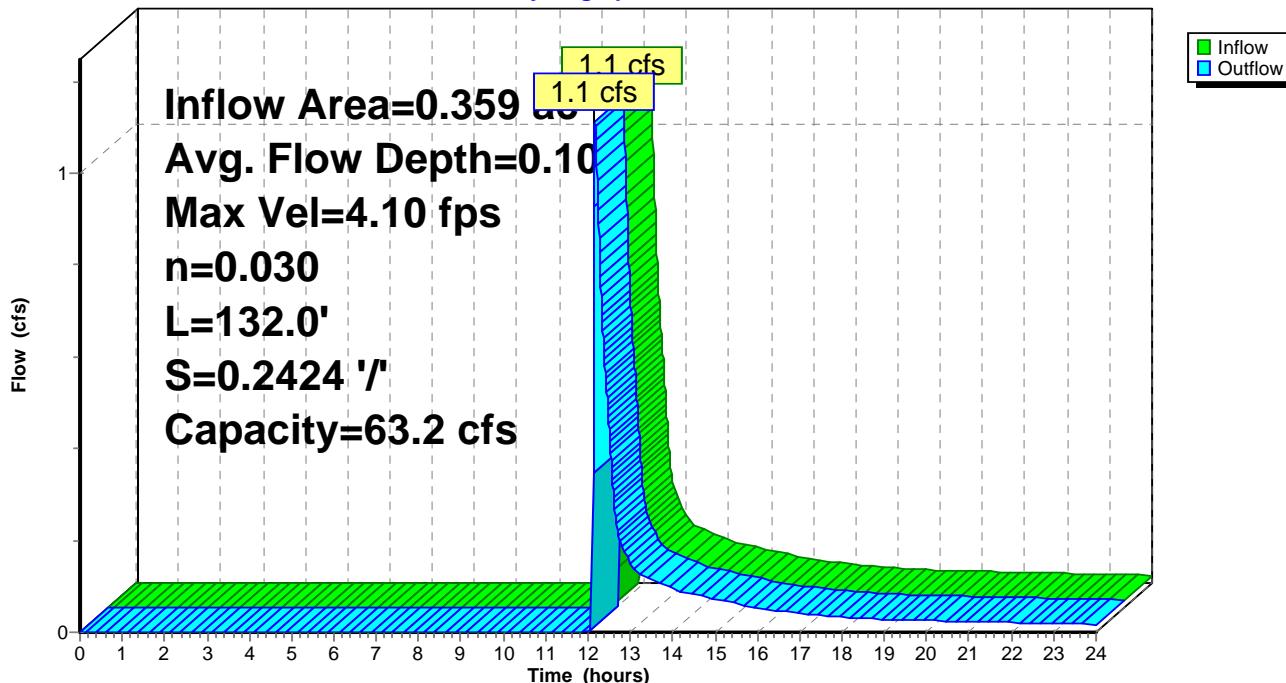
Average Depth at Peak Storage= 0.10'

Bank-Full Depth= 0.67' Flow Area= 4.5 sf, Capacity= 63.2 cfs

10.00' x 0.67' deep Parabolic Channel, n= 0.030

Length= 132.0' Slope= 0.2424 '/'

Inlet Invert= 324.00', Outlet Invert= 292.00'

**Reach 2R: Swale to Offsite****Hydrograph**

Summary for Pond 1 Pond: SWB #1

Inflow Area = 2.654 ac, 4.76% Impervious, Inflow Depth > 4.77" for 100-Year event
 Inflow = 9.7 cfs @ 12.30 hrs, Volume= 1.055 af
 Outflow = 9.4 cfs @ 12.34 hrs, Volume= 1.041 af, Atten= 3%, Lag= 2.6 min
 Primary = 9.4 cfs @ 12.34 hrs, Volume= 1.041 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 368.63' @ 12.34 hrs Surf.Area= 0.088 ac Storage= 0.148 af

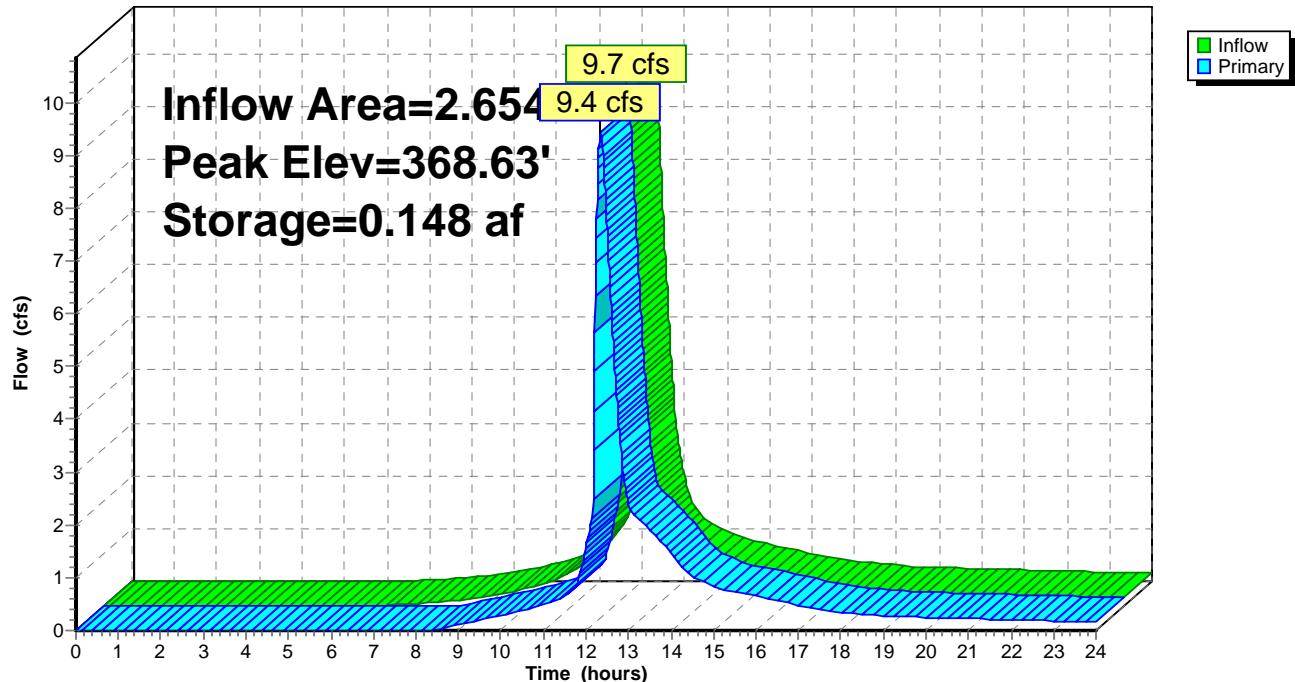
Plug-Flow detention time= 30.8 min calculated for 1.041 af (99% of inflow)
 Center-of-Mass det. time= 22.9 min (842.2 - 819.3)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	0.154 af	8.00'W x 145.00'L x 2.70'H Prismatoid Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	366.00'	15.0" Round Culvert L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 366.00' / 365.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	366.20'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	367.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	368.25'	30.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	368.50'	20.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=9.4 cfs @ 12.34 hrs HW=368.63' (Free Discharge)

- ↑ 1=Culvert (Barrel Controls 6.9 cfs @ 5.62 fps)
- 2=Orifice/Grate (Passes < 1.4 cfs potential flow)
- 3=Orifice/Grate (Passes < 1.1 cfs potential flow)
- 4=Orifice/Grate (Passes < 6.9 cfs potential flow)
- 5=Broad-Crested Rectangular Weir (Weir Controls 2.5 cfs @ 0.97 fps)

Pond 1 Pond: SWB #1**Hydrograph**

Summary for Pond 1P: Infiltration Trench #4

Inflow Area = 0.359 ac, 7.08% Impervious, Inflow Depth > 3.07" for 100-Year event

Inflow = 1.1 cfs @ 12.14 hrs, Volume= 0.092 af

Outflow = 1.1 cfs @ 12.15 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.1 min

Primary = 1.1 cfs @ 12.15 hrs, Volume= 0.073 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 324.53' @ 12.15 hrs Surf.Area= 0.024 ac Storage= 0.019 af

Plug-Flow detention time= 116.1 min calculated for 0.073 af (80% of inflow)

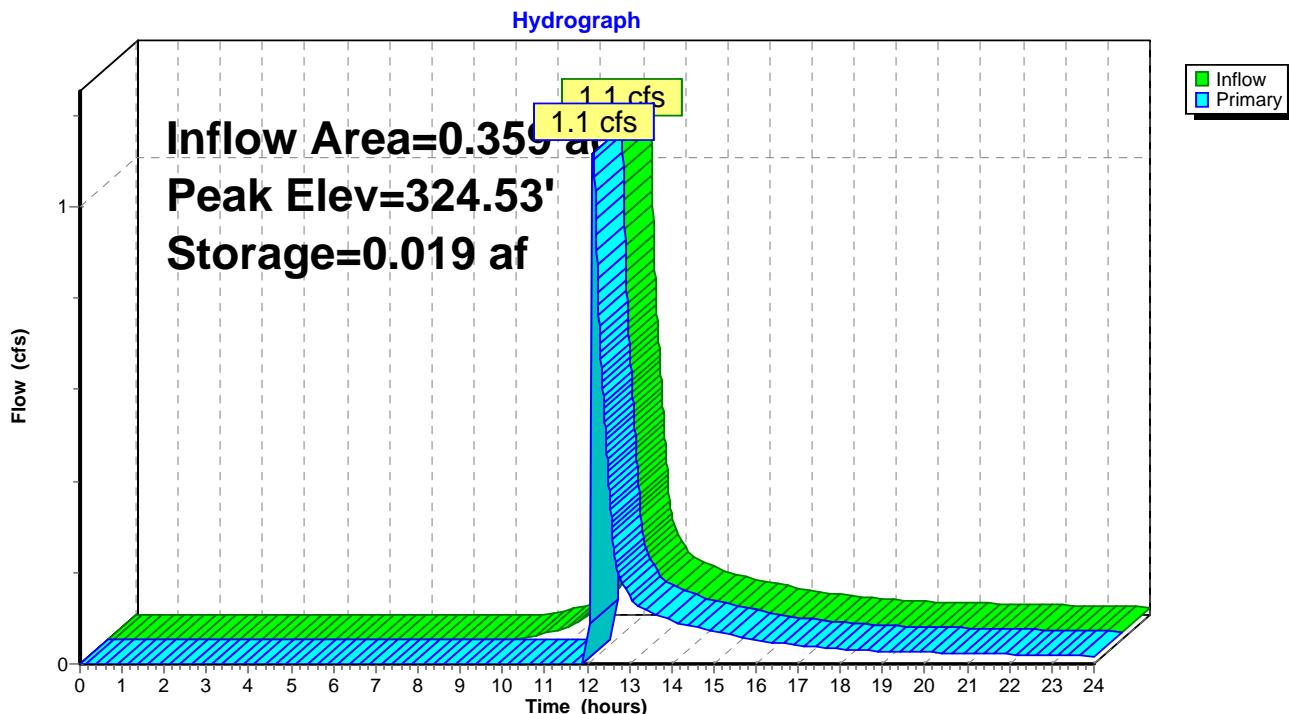
Center-of-Mass det. time= 36.2 min (882.1 - 845.8)

Volume	Invert	Avail.Storage	Storage Description
#1	322.50'	0.024 af	10.00'W x 100.00'L x 2.50'H Crushed Stone Infiltration Trench Z=0.1 0.059 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	100.0' long x 10.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.1 cfs @ 12.15 hrs HW=324.53' (Free Discharge)

↑ 1=Overflow (Weir Controls 1.1 cfs @ 0.41 fps)

Pond 1P: Infiltration Trench #4

Summary for Pond 3P: SWB #2

Inflow Area = 0.655 ac, 7.60% Impervious, Inflow Depth > 3.59" for 100-Year event
 Inflow = 2.4 cfs @ 12.14 hrs, Volume= 0.196 af
 Outflow = 1.1 cfs @ 12.41 hrs, Volume= 0.180 af, Atten= 53%, Lag= 15.9 min
 Primary = 1.1 cfs @ 12.41 hrs, Volume= 0.180 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 334.26' @ 12.41 hrs Surf.Area= 0.042 ac Storage= 0.057 af

Plug-Flow detention time= 76.3 min calculated for 0.180 af (92% of inflow)
 Center-of-Mass det. time= 35.7 min (870.6 - 834.8)

Volume	Invert	Avail.Storage	Storage Description
#1	332.50'	0.106 af	20.00'W x 50.00'L x 2.76'H Prismatoid Z=3.0

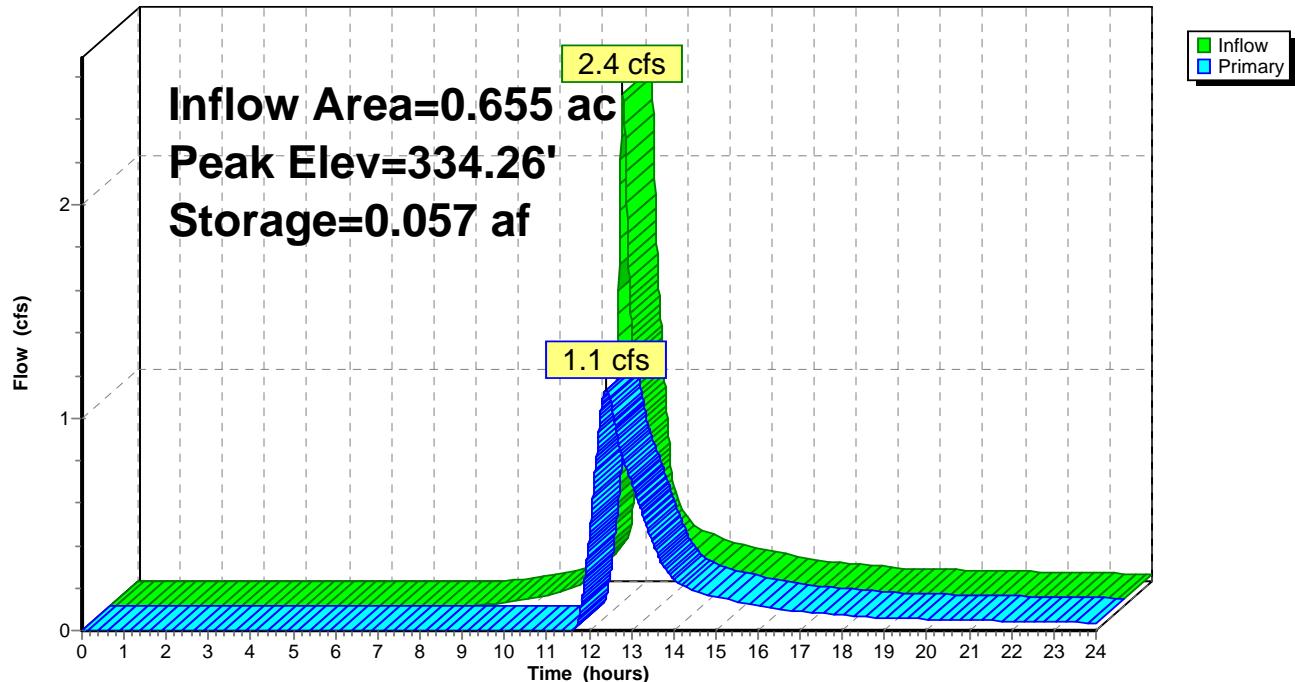
Device	Routing	Invert	Outlet Devices
#1	Primary	332.75'	12.0" Round Culvert L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 332.75' / 332.57' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	333.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	334.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	335.00'	30.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Primary	335.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.1 cfs @ 12.41 hrs HW=334.26' (Free Discharge)

↑
 1=Culvert (Passes 1.1 cfs of 3.2 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.9 cfs @ 4.84 fps)
 3=Orifice/Grate (Orifice Controls 0.2 cfs @ 1.73 fps)
 4=Orifice/Grate (Controls 0.0 cfs)
 5=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 3P: SWB #2

Hydrograph



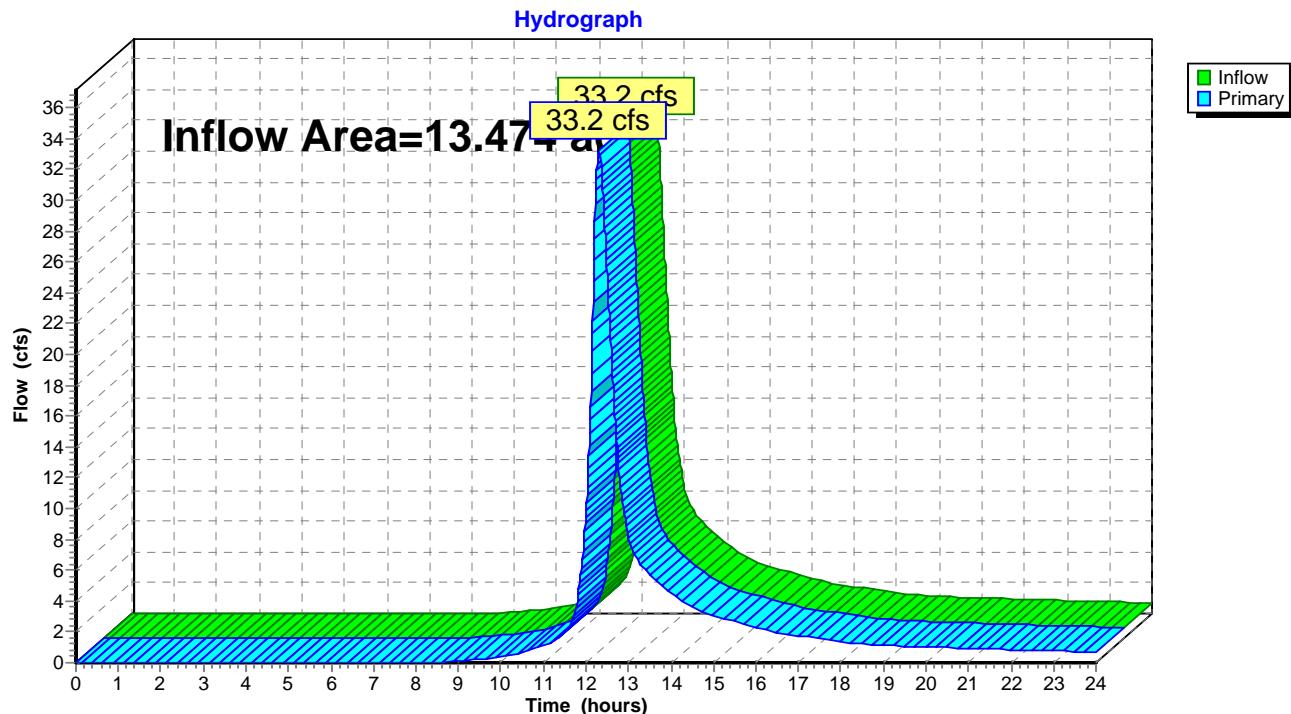
Summary for Link Out: Outlets offsite to south

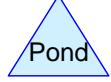
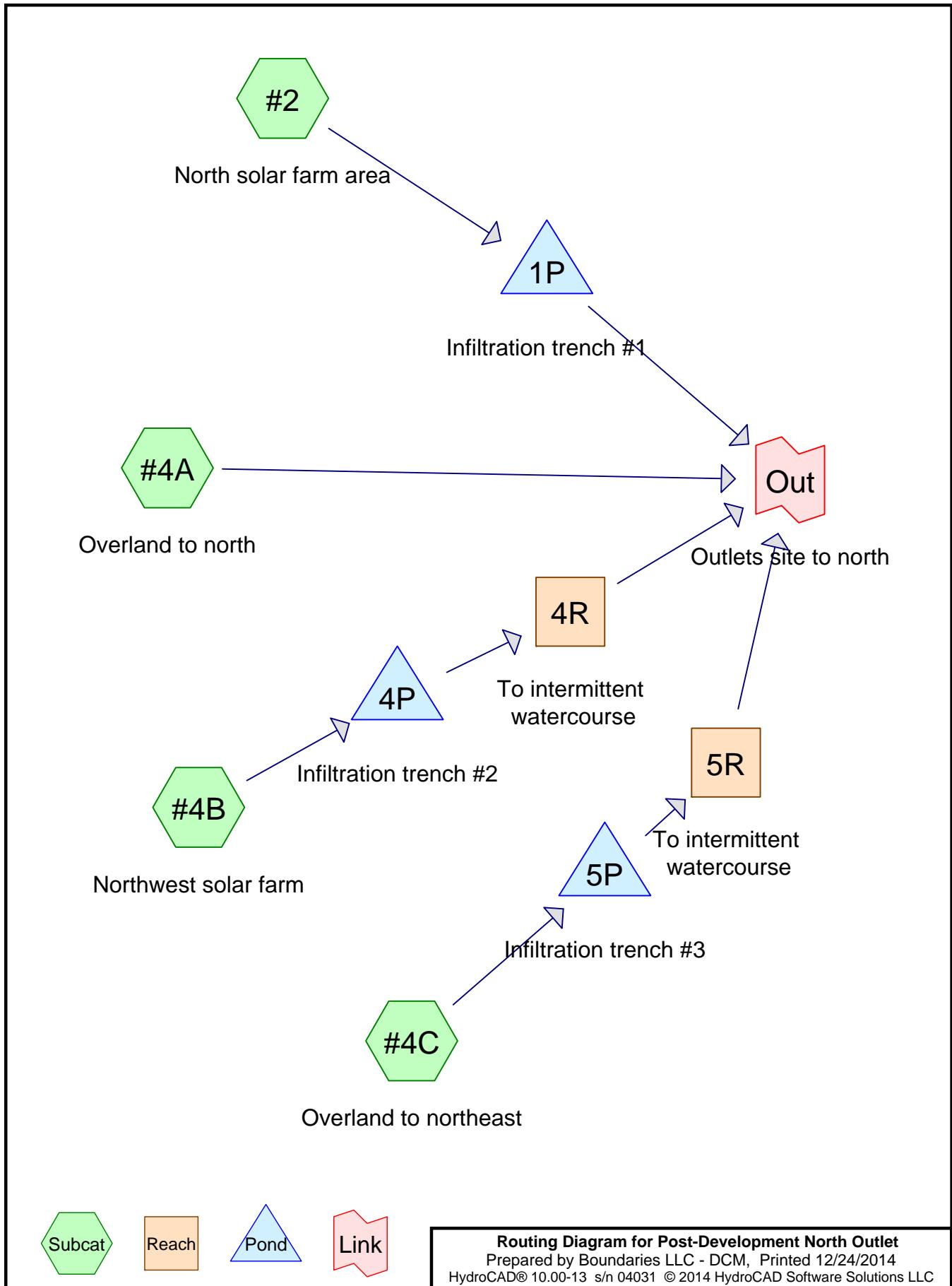
Inflow Area = 13.474 ac, 2.03% Impervious, Inflow Depth > 3.31" for 100-Year event

Inflow = 33.2 cfs @ 12.30 hrs, Volume= 3.716 af

Primary = 33.2 cfs @ 12.30 hrs, Volume= 3.716 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link Out: Outlets offsite to south



Routing Diagram for Post-Development North Outlet
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Post-Development North Outlet

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.833	61	>75% Grass cover, Good, HSG B (#4A, #4B, #4C)
0.057	98	Concrete Ballast, HSG B (#4A)
0.073	98	Concrete Ballasts, HSG B (#4B)
0.219	98	Concrete Pads and Ballast, HSG B (#2)
0.030	98	Concrete Pads and Ballast, HSG D (#2)
0.076	98	Concrete pads and ballast, HSG B (#4C)
0.167	96	Gravel surface, HSG B (#4C)
5.816	61	Solar Array Area (grass), Good, HSG B (#2, #4A, #4B, #4C)
0.422	80	Solar Array Area (grass), Good, HSG D (#2)
2.159	60	Woods, Fair, HSG B (#2, #4A)
9.853	64	TOTAL AREA

Post-Development North Outlet

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
9.400	HSG B	#2, #4A, #4B, #4C
0.000	HSG C	
0.452	HSG D	#2
0.000	Other	
9.853		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.833	0.000	0.000	0.000	0.833	>75% Grass cover, Good	#4A, #4B, #4C
0.000	0.057	0.000	0.000	0.000	0.057	Concrete Ballast	#4A
0.000	0.073	0.000	0.000	0.000	0.073	Concrete Ballasts	#4B
0.000	0.219	0.000	0.030	0.000	0.250	Concrete Pads and Ballast	#2
0.000	0.076	0.000	0.000	0.000	0.076	Concrete pads and ballast	#4C
0.000	0.167	0.000	0.000	0.000	0.167	Gravel surface	#4C
0.000	5.816	0.000	0.422	0.000	6.238	Solar Array Area (grass), Good	#2, #4A, #4B, #4C
0.000	2.159	0.000	0.000	0.000	2.159	Woods, Fair	#2, #4A
0.000	9.400	0.000	0.452	0.000	9.853	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	4P	324.33	322.00	20.0	0.1165	0.013	10.0	0.0	0.0
2	5P	312.33	311.90	20.0	0.0215	0.013	8.0	0.0	0.0

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Type III 24-hr 2-Year Rainfall=3.40"

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Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment#2: North solar farm area Runoff Area=174,055 sf 6.25% Impervious Runoff Depth>0.70" Flow Length=687' Tc=14.6 min CN=65 Runoff=2.0 cfs 0.232 af**Subcatchment#4A: Overland to north** Runoff Area=153,066 sf 1.62% Impervious Runoff Depth>0.53" Flow Length=706' Tc=13.1 min CN=61 Runoff=1.2 cfs 0.154 af**Subcatchment#4B: Northwest solar farm** Runoff Area=46,946 sf 6.78% Impervious Runoff Depth>0.65" Flow Length=400' Tc=11.4 min CN=64 Runoff=0.5 cfs 0.059 af**Subcatchment#4C: Overland to northeast** Runoff Area=55,126 sf 5.97% Impervious Runoff Depth>0.84" Flow Length=366' Tc=10.0 min CN=68 Runoff=1.0 cfs 0.089 af**Reach 4R: To intermittent watercourse** Avg. Flow Depth=0.13' Max Vel=0.23 fps Inflow=0.2 cfs 0.057 af
n=0.400 L=155.0' S=0.0968 '/' Capacity=6.0 cfs Outflow=0.2 cfs 0.057 af**Reach 5R: To intermittent watercourse** Avg. Flow Depth=0.19' Max Vel=0.29 fps Inflow=0.4 cfs 0.087 af
n=0.400 L=140.0' S=0.0929 '/' Capacity=5.9 cfs Outflow=0.4 cfs 0.086 af**Pond 1P: Infiltration trench #1** Peak Elev=344.52' Storage=2,633 cf Inflow=2.0 cfs 0.232 af
Outflow=1.5 cfs 0.172 af**Pond 4P: Infiltration trench #2** Peak Elev=326.11' Storage=0.014 af Inflow=0.5 cfs 0.059 af
Outflow=0.2 cfs 0.057 af**Pond 5P: Infiltration trench #3** Peak Elev=314.44' Storage=0.022 af Inflow=1.0 cfs 0.089 af
Outflow=0.4 cfs 0.087 af**Link Out: Outlets site to north** Inflow=2.8 cfs 0.469 af
Primary=2.8 cfs 0.469 af**Total Runoff Area = 9.853 ac Runoff Volume = 0.533 af Average Runoff Depth = 0.65"**
95.38% Pervious = 9.398 ac 4.62% Impervious = 0.455 ac

Post-Development North Outlet

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Type III 24-hr 2-Year Rainfall=3.40"

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Summary for Subcatchment #2: North solar farm area

Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

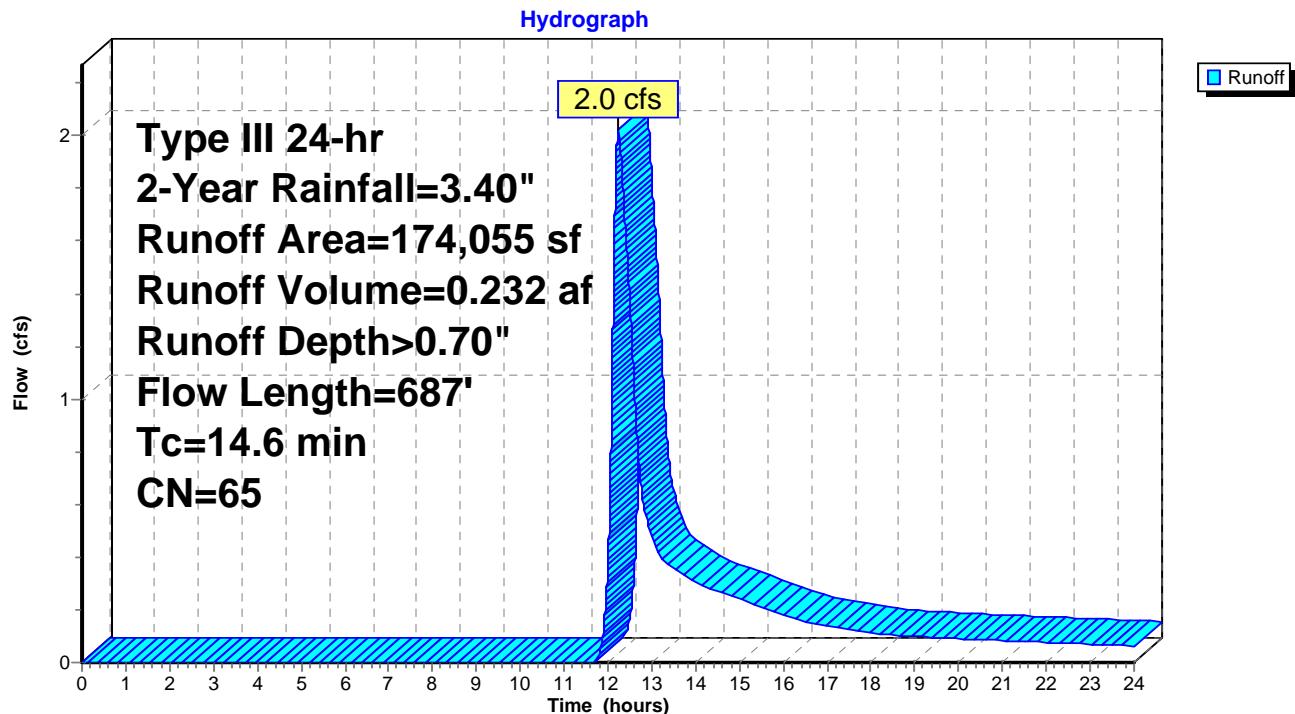
Runoff = 2.0 cfs @ 12.25 hrs, Volume= 0.232 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
*	136,434	61 Solar Array Area (grass), Good, HSG B
*	18,384	80 Solar Array Area (grass), Good, HSG D
	8,367	60 Woods, Fair, HSG B
*	1,324	98 Concrete Pads and Ballast, HSG D
*	9,546	98 Concrete Pads and Ballast, HSG B
174,055	65	Weighted Average
163,185		93.75% Pervious Area
10,870		6.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	66	0.0455	0.22		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
3.0	34	0.0408	0.19		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
0.5	49	0.0533	1.62		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
2.7	215	0.0372	1.35		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
1.4	157	0.0764	1.93		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
2.1	166	0.0361	1.33		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
14.6	687	Total			

Subcatchment #2: North solar farm area



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Type III 24-hr 2-Year Rainfall=3.40"

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Summary for Subcatchment #4A: Overland to north

Runoff = 1.2 cfs @ 12.24 hrs, Volume= 0.154 af, Depth> 0.53"

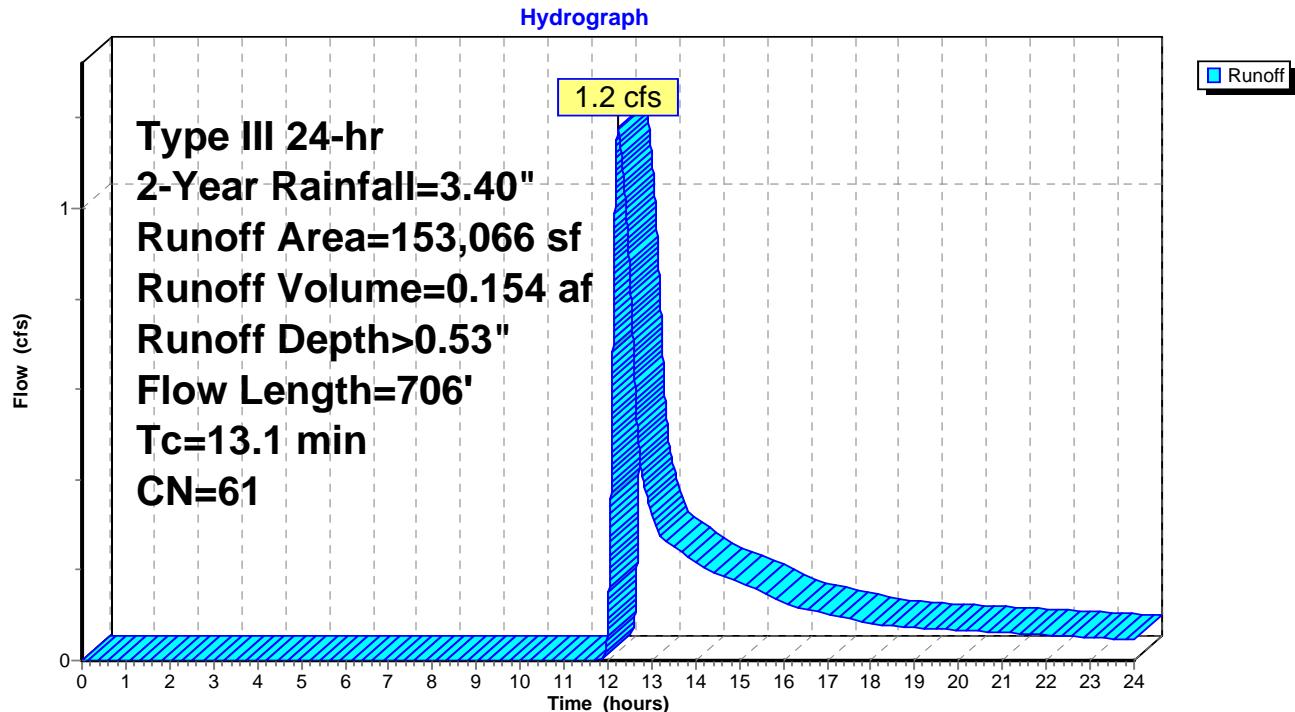
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	33,101	61	Solar Array Area (grass), Good, HSG B
	31,799	61	>75% Grass cover, Good, HSG B
	85,681	60	Woods, Fair, HSG B
*	2,485	98	Concrete Ballast, HSG B
	153,066	61	Weighted Average
	150,581		98.38% Pervious Area
	2,485		1.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.18		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
2.1	166	0.0361	1.33		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
1.0	125	0.1600	2.00		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.5	315	0.0762	10.46	52.30	Trap/Vee/Rect Channel Flow, Wetland Bot.W=3.00' D=1.00' Z= 2.0 '/' Top.W=7.00' n= 0.030

13.1 706 Total

Subcatchment #4A: Overland to north



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Type III 24-hr 2-Year Rainfall=3.40"

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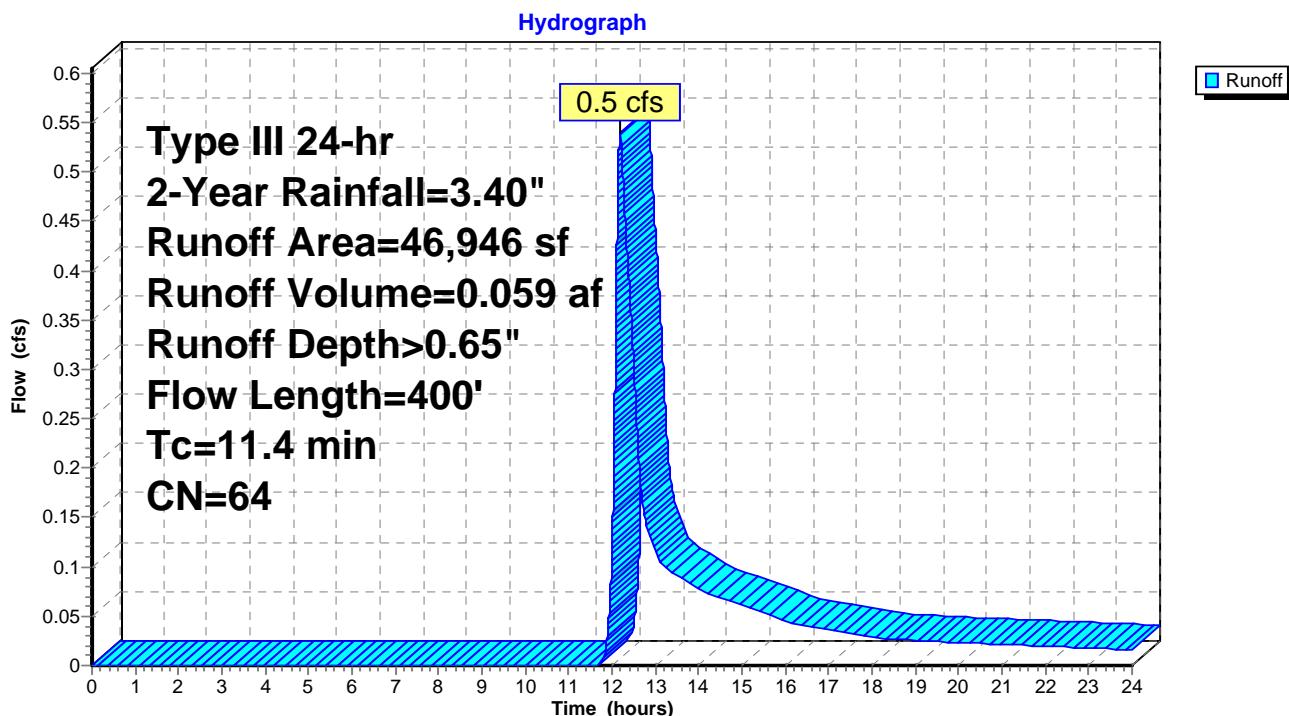
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Summary for Subcatchment #4B: Northwest solar farm

Runoff = 0.5 cfs @ 12.19 hrs, Volume= 0.059 af, Depth> 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description		
*	42,814	61	Solar Array Area (grass), Good, HSG B		
	950	61	>75% Grass cover, Good, HSG B		
*	3,182	98	Concrete Ballasts, HSG B		
	46,946	64	Weighted Average		
	43,764		93.22% Pervious Area		
	3,182		6.78% Impervious Area		
Tc	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.0250	0.19		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
0.5	56	0.0720	1.88		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
0.1	20	0.3000	5.48		Shallow Concentrated Flow, Ledge Outcrop Nearly Bare & Untilled Kv= 10.0 fps
2.1	224	0.0666	1.81		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
11.4	400	Total			

Subcatchment #4B: Northwest solar farm

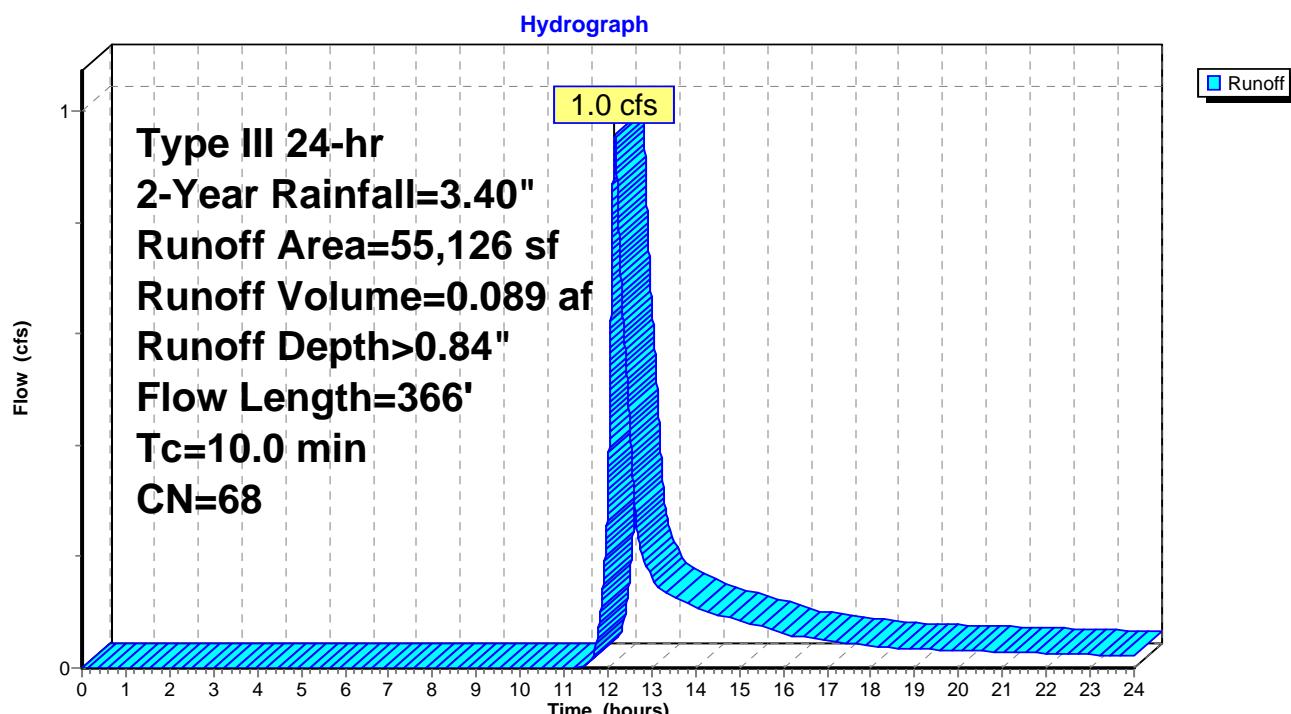
Summary for Subcatchment #4C: Overland to northeast

Runoff = 1.0 cfs @ 12.16 hrs, Volume= 0.089 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	41,012	61	Solar Array Area (grass), Good, HSG B
	7,276	96	Gravel surface, HSG B
	3,547	61	>75% Grass cover, Good, HSG B
*	3,291	98	Concrete pads and ballast, HSG B
	55,126	68	Weighted Average
	51,835		94.03% Pervious Area
	3,291		5.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0550	2.13		Sheet Flow, Gravel access road Smooth surfaces n= 0.011 P2= 3.40"
0.2	35	0.0550	3.78		Shallow Concentrated Flow, Gravel access drive Unpaved Kv= 16.1 fps
2.1	231	0.0667	1.81		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
3.1	366				Total, Increased to minimum Tc = 10.0 min

Subcatchment #4C: Overland to northeast

Summary for Reach 4R: To intermittent watercourse

Inflow Area = 1.078 ac, 6.78% Impervious, Inflow Depth > 0.64" for 2-Year event

Inflow = 0.2 cfs @ 12.64 hrs, Volume= 0.057 af

Outflow = 0.2 cfs @ 12.79 hrs, Volume= 0.057 af, Atten= 7%, Lag= 9.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3

Max. Velocity= 0.23 fps, Min. Travel Time= 11.3 min

Avg. Velocity = 0.15 fps, Avg. Travel Time= 17.3 min

Peak Storage= 122 cf @ 12.79 hrs

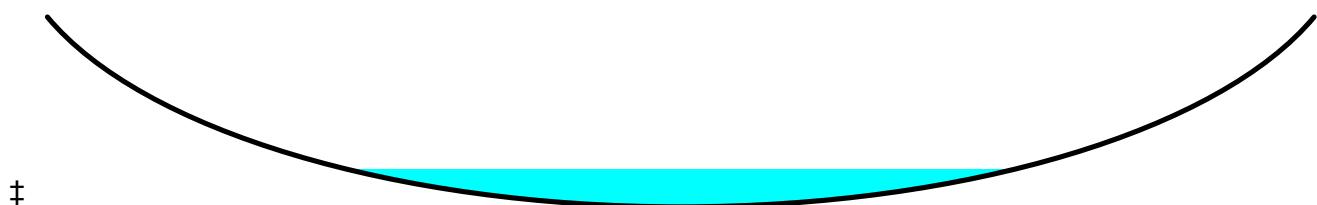
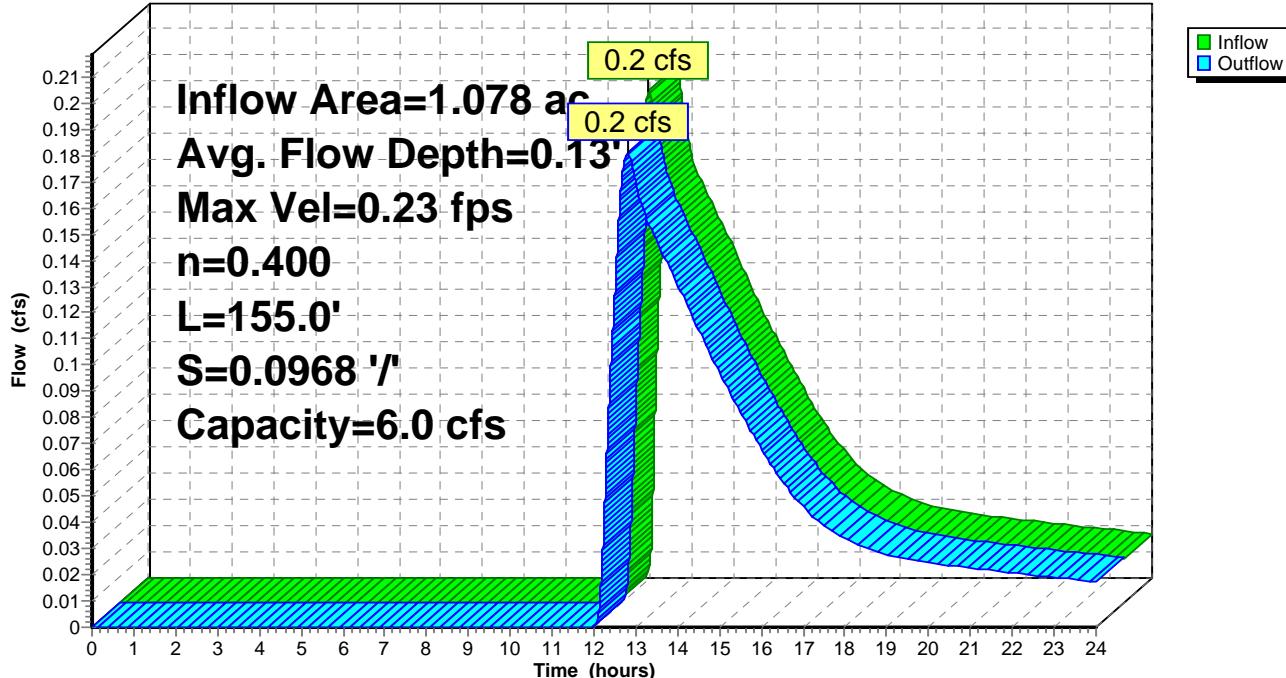
Average Depth at Peak Storage= 0.13'

Bank-Full Depth= 0.67' Flow Area= 8.9 sf, Capacity= 6.0 cfs

20.00' x 0.67' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush

Length= 155.0' Slope= 0.0968 '/'

Inlet Invert= 321.00', Outlet Invert= 306.00'

**Reach 4R: To intermittent watercourse****Hydrograph**

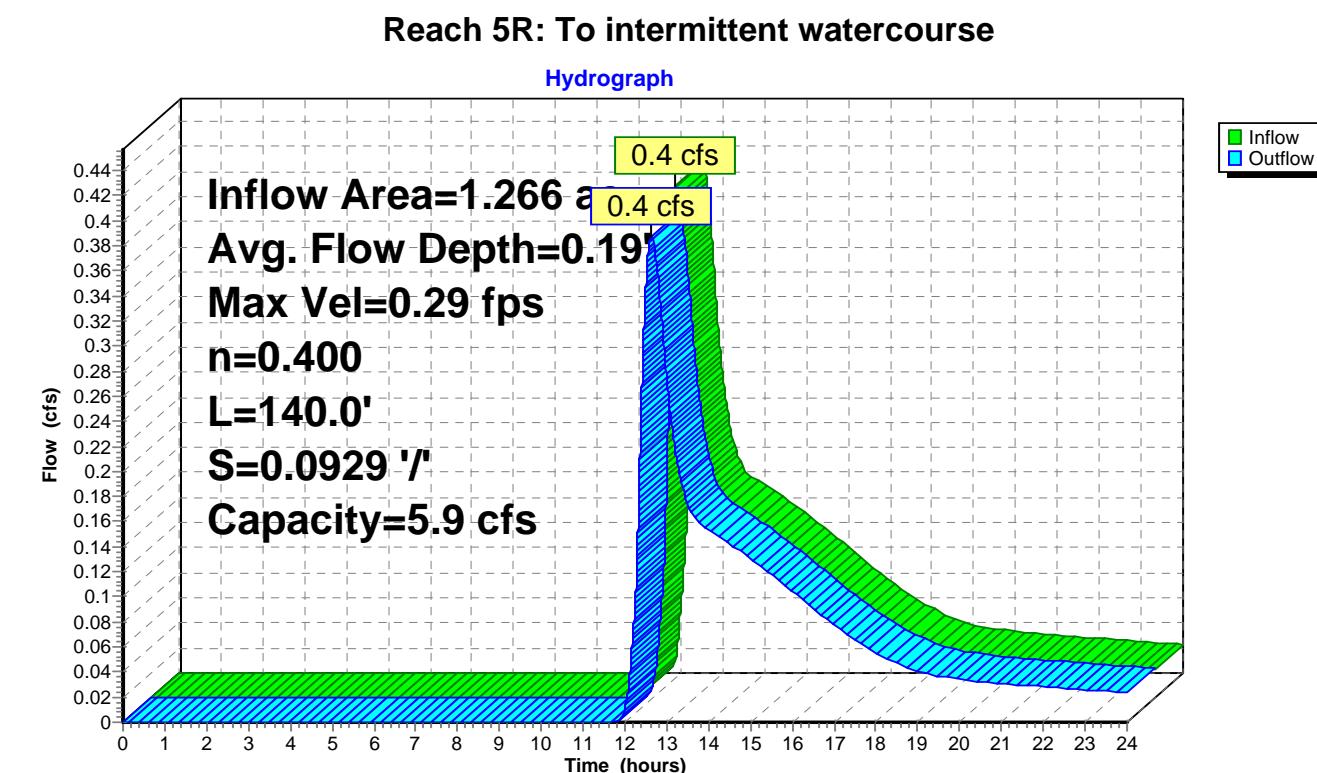
Summary for Reach 5R: To intermittent watercourse

Inflow Area = 1.266 ac, 5.97% Impervious, Inflow Depth > 0.83" for 2-Year event
Inflow = 0.4 cfs @ 12.52 hrs, Volume= 0.087 af
Outflow = 0.4 cfs @ 12.64 hrs, Volume= 0.086 af, Atten= 5%, Lag= 7.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
Max. Velocity= 0.29 fps, Min. Travel Time= 8.2 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 14.2 min

Peak Storage= 189 cf @ 12.64 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.67' Flow Area= 8.9 sf, Capacity= 5.9 cfs

20.00' x 0.67' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush
Length= 140.0' Slope= 0.0929 '/'
Inlet Invert= 311.00', Outlet Invert= 298.00'



Summary for Pond 1P: Infiltration trench #1

Inflow Area = 3.996 ac, 6.25% Impervious, Inflow Depth > 0.70" for 2-Year event
 Inflow = 2.0 cfs @ 12.25 hrs, Volume= 0.232 af
 Outflow = 1.5 cfs @ 12.47 hrs, Volume= 0.172 af, Atten= 28%, Lag= 13.4 min
 Primary = 1.5 cfs @ 12.47 hrs, Volume= 0.172 af

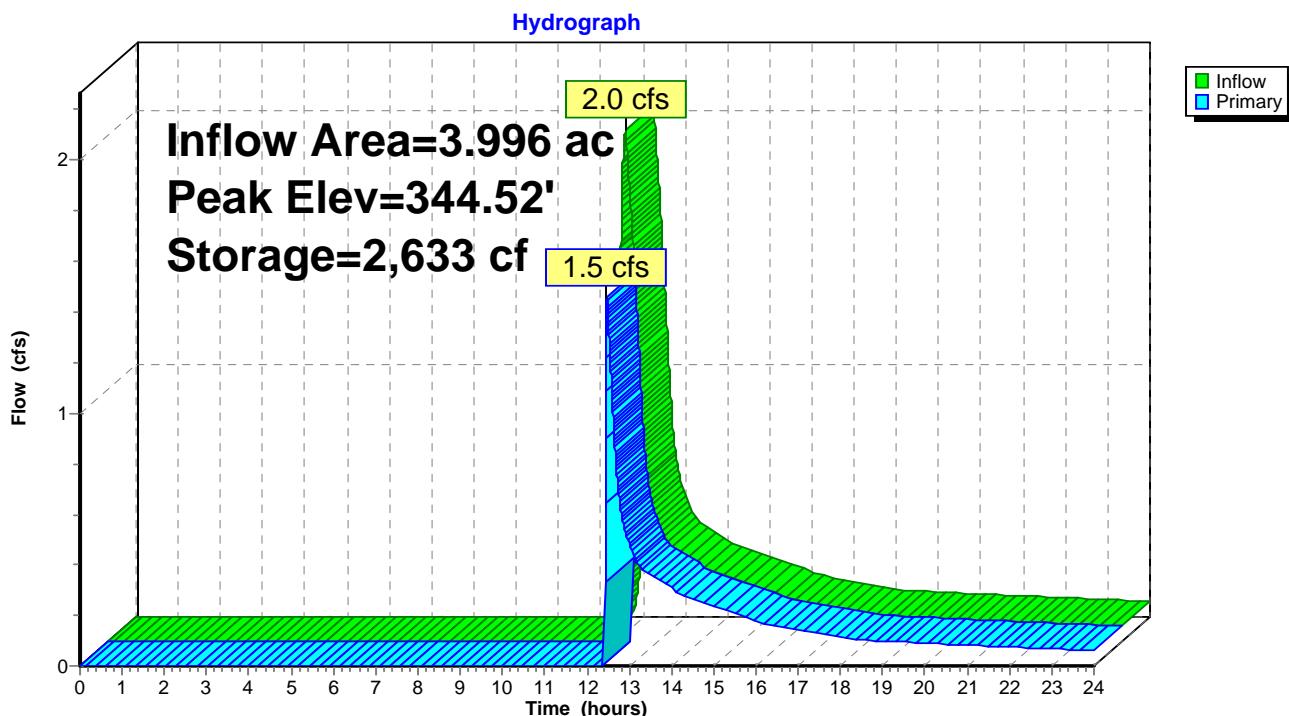
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 344.52' @ 12.47 hrs Surf.Area= 1,774 sf Storage= 2,633 cf

Plug-Flow detention time= 154.5 min calculated for 0.172 af (74% of inflow)
 Center-of-Mass det. time= 56.2 min (951.1 - 894.9)

Volume	Invert	Avail.Storage	Storage Description
#1	340.68'	2,850 cf	11.00'W x 150.00'L x 4.15'H Crushed Stone Infiltration Trench Z=0.1 7,126 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	344.50'	150.0' long x 10.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.5 cfs @ 12.47 hrs HW=344.52' TW=0.00' (Dynamic Tailwater)
 ↗1=Overflow (Weir Controls 1.5 cfs @ 0.39 fps)

Pond 1P: Infiltration trench #1

Summary for Pond 4P: Infiltration trench #2

Inflow Area = 1.078 ac, 6.78% Impervious, Inflow Depth > 0.65" for 2-Year event
 Inflow = 0.5 cfs @ 12.19 hrs, Volume= 0.059 af
 Outflow = 0.2 cfs @ 12.64 hrs, Volume= 0.057 af, Atten= 64%, Lag= 27.1 min
 Primary = 0.2 cfs @ 12.64 hrs, Volume= 0.057 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 326.11' @ 12.64 hrs Surf.Area= 0.031 ac Storage= 0.014 af

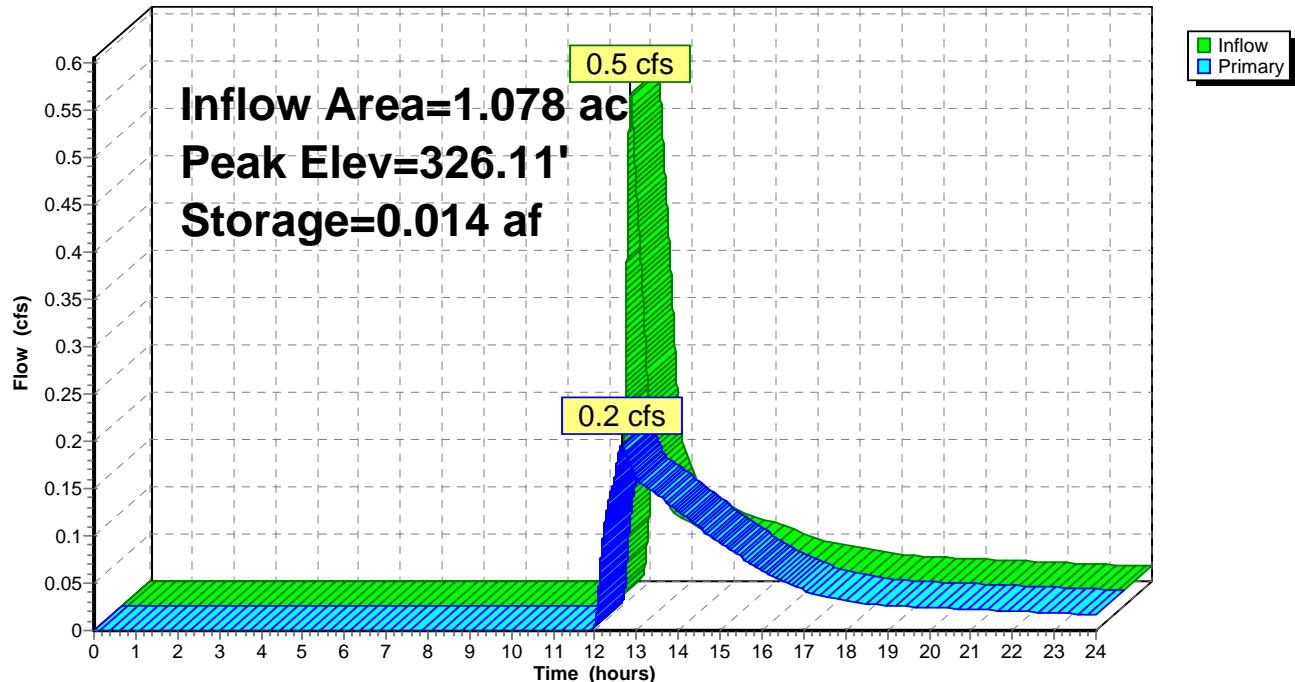
Plug-Flow detention time= 45.2 min calculated for 0.057 af (98% of inflow)
 Center-of-Mass det. time= 34.7 min (931.3 - 896.6)

Volume	Invert	Avail.Storage	Storage Description
#1	325.00'	0.041 af	10.00'W x 130.00'L x 3.33'H Prismatoid Z=0.1 0.103 af Overall - 0.000 af Embedded = 0.103 af x 40.0% Voids
#2	325.50'	0.000 af	ADS_StormTech SC-310 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
0.041 af			Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	324.33'	10.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.33' / 322.00' S= 0.1165 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Device 1	325.00'	2.5" Vert. Orifice/Grate C= 0.600
#3	Device 1	326.00'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	326.60'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.2 cfs @ 12.64 hrs HW=326.11' TW=321.13' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 0.2 cfs of 3.1 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.2 cfs @ 4.84 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 0.0 cfs @ 1.15 fps)
- ↑ 4=Sharp-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 4P: Infiltration trench #2**Hydrograph**

Summary for Pond 5P: Infiltration trench #3

Inflow Area = 1.266 ac, 5.97% Impervious, Inflow Depth > 0.84" for 2-Year event
 Inflow = 1.0 cfs @ 12.16 hrs, Volume= 0.089 af
 Outflow = 0.4 cfs @ 12.52 hrs, Volume= 0.087 af, Atten= 57%, Lag= 21.8 min
 Primary = 0.4 cfs @ 12.52 hrs, Volume= 0.087 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 314.44' @ 12.52 hrs Surf.Area= 0.038 ac Storage= 0.022 af

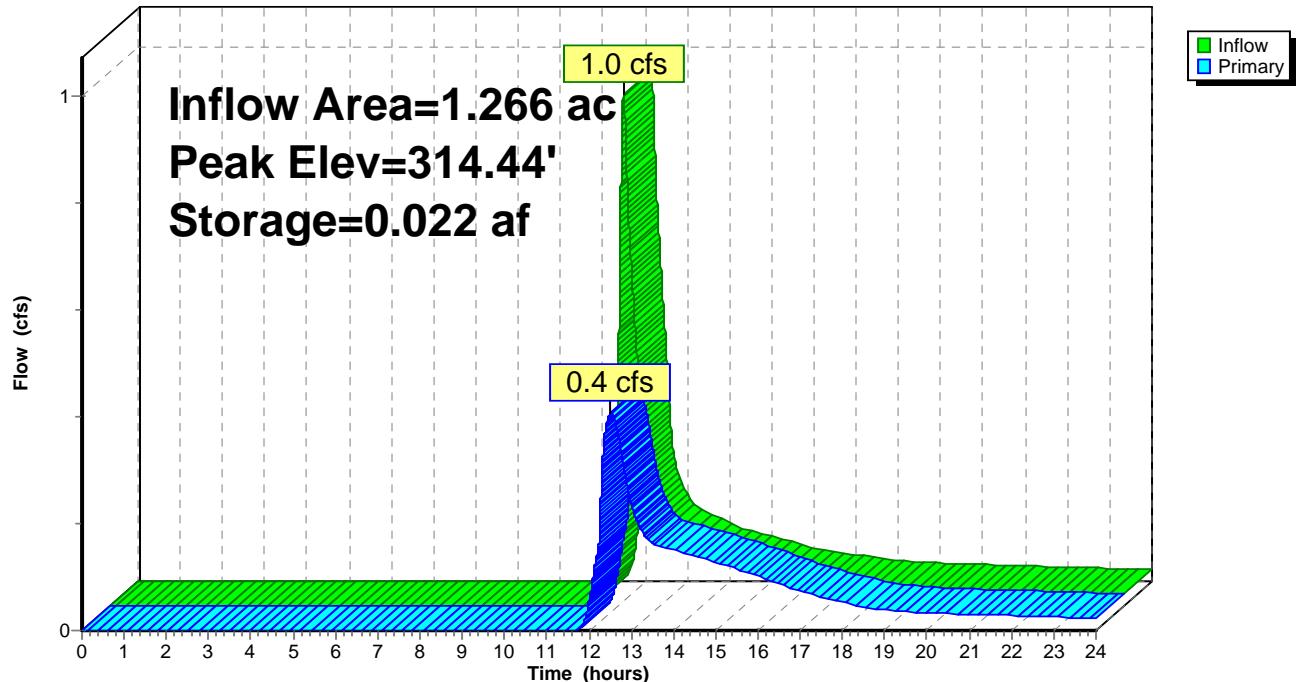
Plug-Flow detention time= 52.0 min calculated for 0.087 af (98% of inflow)
 Center-of-Mass det. time= 41.6 min (921.8 - 880.2)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	0.058 af	10.00'W x 160.00'L x 3.83'H Prismatoid Z=0.1 0.146 af Overall - 0.000 af Embedded = 0.146 af x 40.0% Voids
#2	313.50'	0.000 af	ADS_StormTech SC-310 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
0.059 af			Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	312.33'	8.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 312.33' / 311.90' S= 0.0215 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	313.00'	2.5" Vert. Orifice/Grate C= 0.600
#3	Device 1	314.00'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	315.20'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.4 cfs @ 12.52 hrs HW=314.44' TW=311.18' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 0.4 cfs of 2.2 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.2 cfs @ 5.56 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 0.2 cfs @ 2.50 fps)
- ↑ 4=Sharp-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 5P: Infiltration trench #3**Hydrograph**

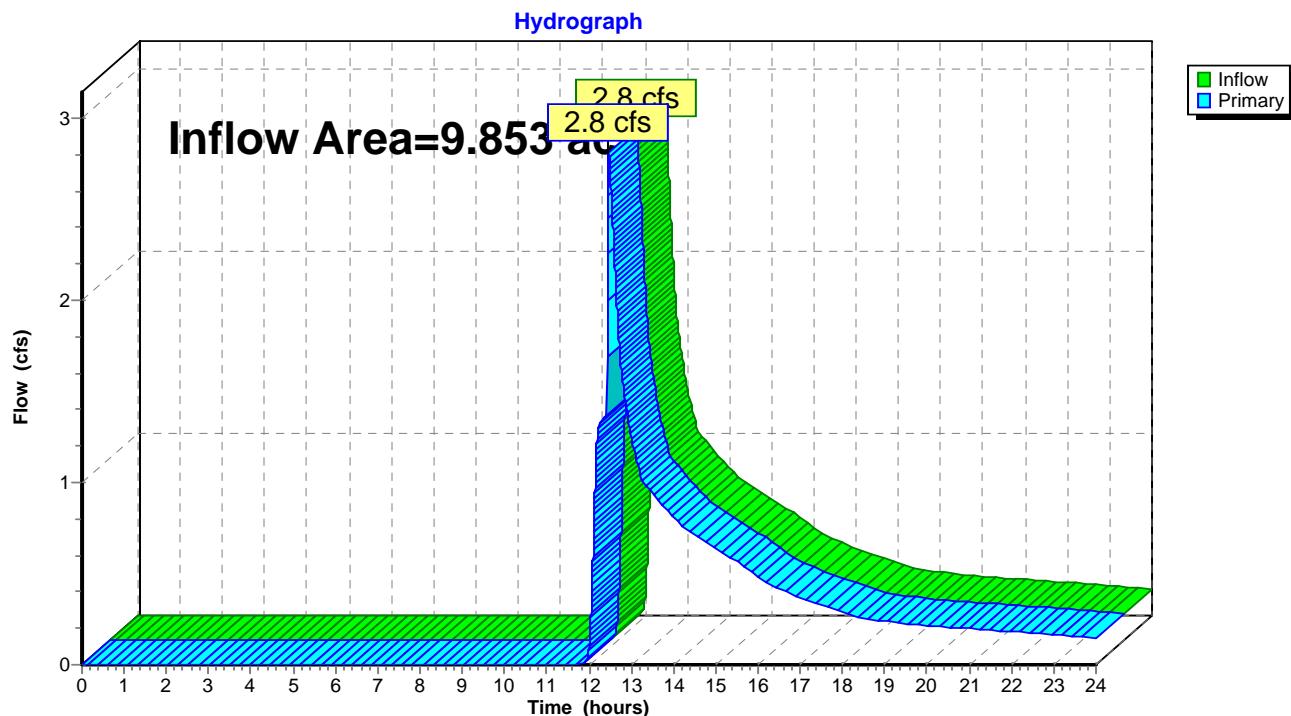
Summary for Link Out: Outlets site to north

Inflow Area = 9.853 ac, 4.62% Impervious, Inflow Depth > 0.57" for 2-Year event

Inflow = 2.8 cfs @ 12.47 hrs, Volume= 0.469 af

Primary = 2.8 cfs @ 12.47 hrs, Volume= 0.469 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs

Link Out: Outlets site to north

Post-Development North Outlet

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Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment#2: North solar farm area Runoff Area=174,055 sf 6.25% Impervious Runoff Depth>1.65" Flow Length=687' Tc=14.6 min CN=65 Runoff=5.6 cfs 0.548 af**Subcatchment#4A: Overland to north** Runoff Area=153,066 sf 1.62% Impervious Runoff Depth>1.36" Flow Length=706' Tc=13.1 min CN=61 Runoff=4.0 cfs 0.399 af**Subcatchment#4B: Northwest solar farm** Runoff Area=46,946 sf 6.78% Impervious Runoff Depth>1.58" Flow Length=400' Tc=11.4 min CN=64 Runoff=1.6 cfs 0.142 af**Subcatchment#4C: Overland to northeast** Runoff Area=55,126 sf 5.97% Impervious Runoff Depth>1.87" Flow Length=366' Tc=10.0 min CN=68 Runoff=2.4 cfs 0.198 af**Reach 4R: To intermittent watercourse** Avg. Flow Depth=0.30' Max Vel=0.40 fps Inflow=1.4 cfs 0.140 af
n=0.400 L=155.0' S=0.0968 '/' Capacity=6.0 cfs Outflow=1.1 cfs 0.139 af**Reach 5R: To intermittent watercourse** Avg. Flow Depth=0.37' Max Vel=0.44 fps Inflow=2.0 cfs 0.195 af
n=0.400 L=140.0' S=0.0929 '/' Capacity=5.9 cfs Outflow=1.6 cfs 0.194 af**Pond 1P: Infiltration trench #1** Peak Elev=344.56' Storage=2,659 cf Inflow=5.6 cfs 0.548 af
Outflow=5.6 cfs 0.488 af**Pond 4P: Infiltration trench #2** Peak Elev=326.73' Storage=0.021 af Inflow=1.6 cfs 0.142 af
Outflow=1.4 cfs 0.140 af**Pond 5P: Infiltration trench #3** Peak Elev=315.37' Storage=0.036 af Inflow=2.4 cfs 0.198 af
Outflow=2.0 cfs 0.195 af**Link Out: Outlets site to north** Inflow=11.5 cfs 1.221 af
Primary=11.5 cfs 1.221 af**Total Runoff Area = 9.853 ac Runoff Volume = 1.287 af Average Runoff Depth = 1.57"**
95.38% Pervious = 9.398 ac 4.62% Impervious = 0.455 ac

Post-Development North Outlet

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Type III 24-hr 10-Year Rainfall=5.00"

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Summary for Subcatchment #2: North solar farm area

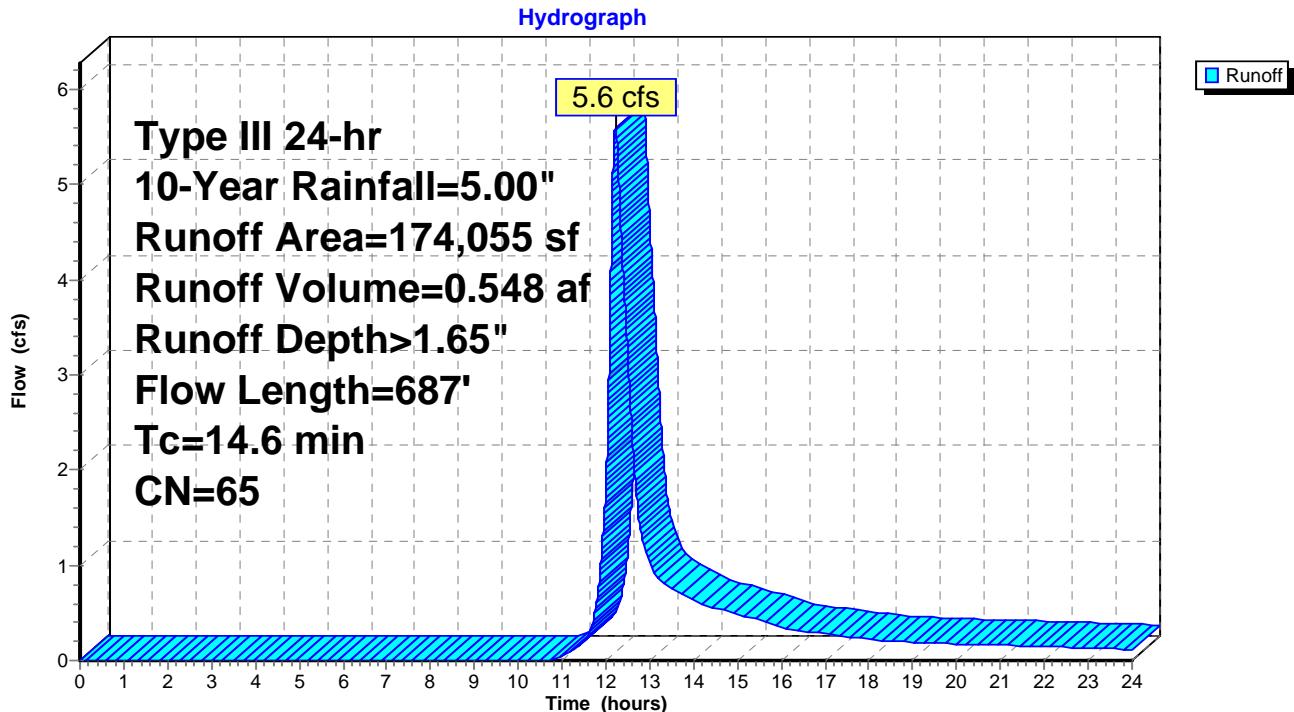
Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

Runoff = 5.6 cfs @ 12.22 hrs, Volume= 0.548 af, Depth> 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
*	136,434	Solar Array Area (grass), Good, HSG B
*	18,384	Solar Array Area (grass), Good, HSG D
	8,367	Woods, Fair, HSG B
*	1,324	Concrete Pads and Ballast, HSG D
*	9,546	Concrete Pads and Ballast, HSG B
174,055	65	Weighted Average
163,185		93.75% Pervious Area
10,870		6.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	66	0.0455	0.22		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
3.0	34	0.0408	0.19		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
0.5	49	0.0533	1.62		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
2.7	215	0.0372	1.35		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
1.4	157	0.0764	1.93		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
2.1	166	0.0361	1.33		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
14.6	687	Total			

Subcatchment #2: North solar farm area

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Type III 24-hr 10-Year Rainfall=5.00"

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Summary for Subcatchment #4A: Overland to north

Runoff = 4.0 cfs @ 12.20 hrs, Volume= 0.399 af, Depth> 1.36"

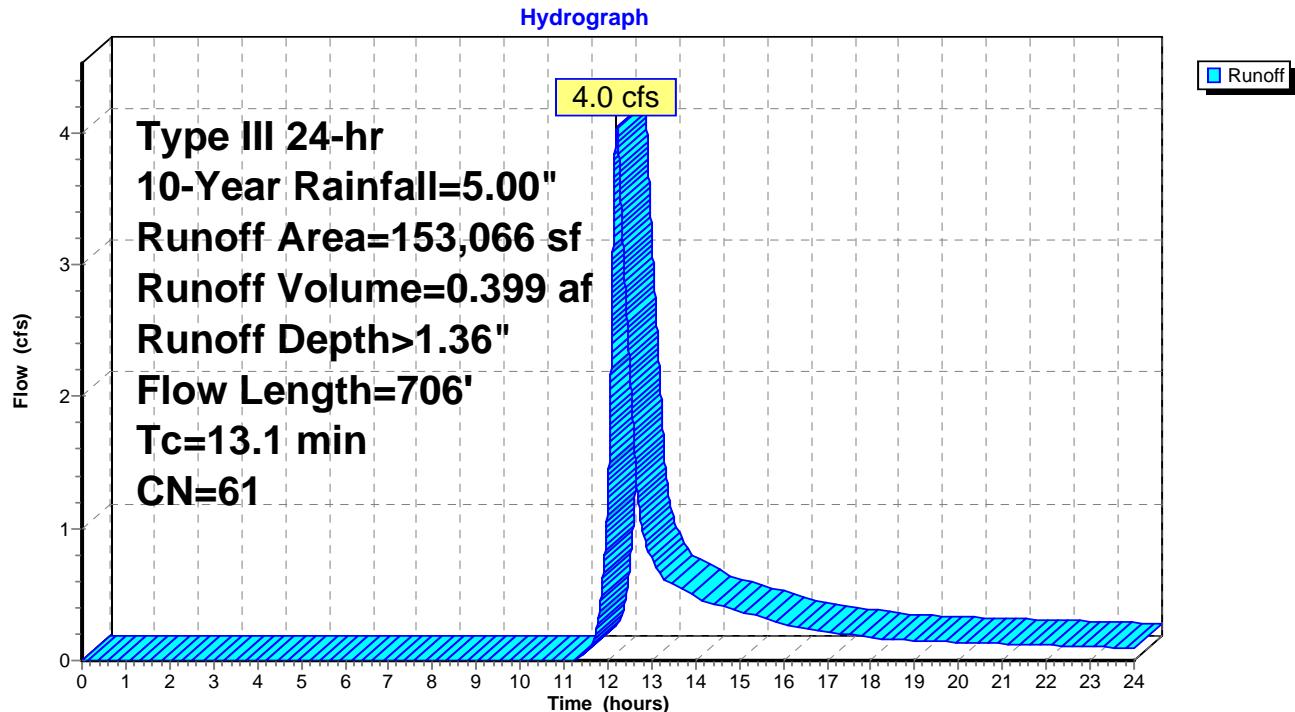
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
*	33,101	61	Solar Array Area (grass), Good, HSG B
	31,799	61	>75% Grass cover, Good, HSG B
	85,681	60	Woods, Fair, HSG B
*	2,485	98	Concrete Ballast, HSG B
	153,066	61	Weighted Average
	150,581		98.38% Pervious Area
	2,485		1.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.18		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
2.1	166	0.0361	1.33		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
1.0	125	0.1600	2.00		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.5	315	0.0762	10.46	52.30	Trap/Vee/Rect Channel Flow, Wetland Bot.W=3.00' D=1.00' Z= 2.0 '/' Top.W=7.00' n= 0.030

13.1 706 Total

Subcatchment #4A: Overland to north



Post-Development North Outlet

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Type III 24-hr 10-Year Rainfall=5.00"

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Summary for Subcatchment #4B: Northwest solar farm

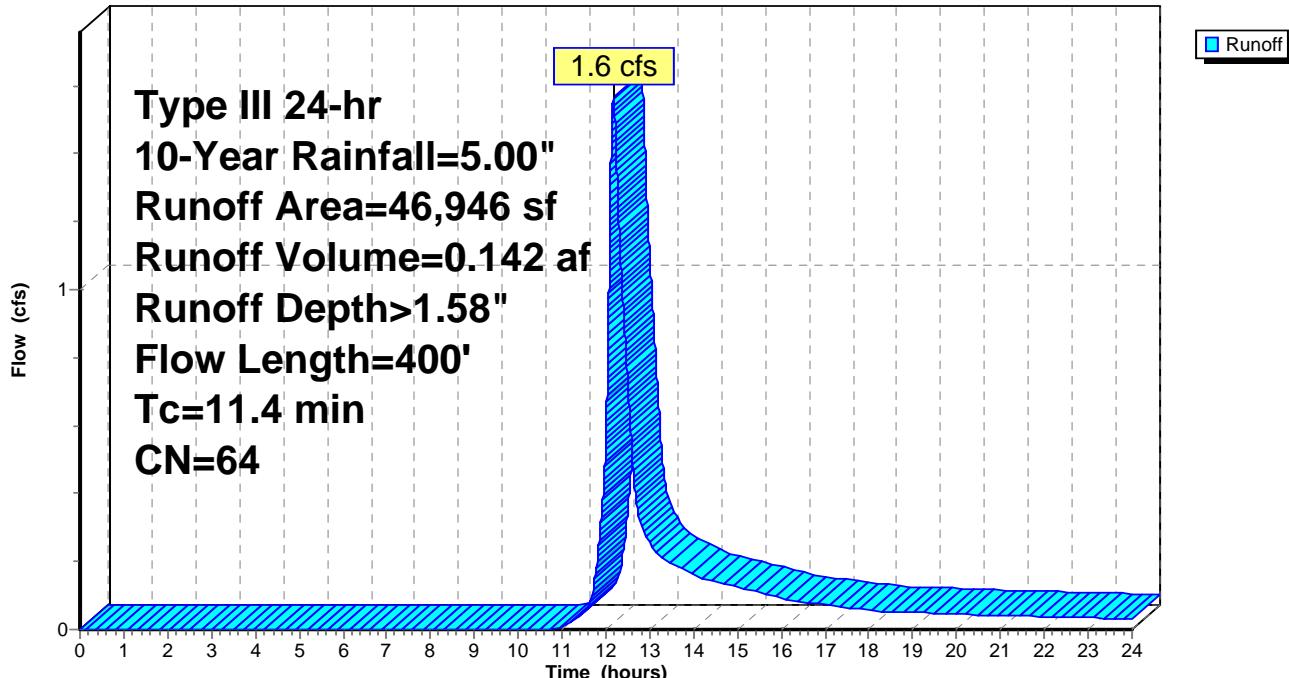
Runoff = 1.6 cfs @ 12.17 hrs, Volume= 0.142 af, Depth> 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)		CN	Description		
* 42,814		61	Solar Array Area (grass), Good, HSG B		
950		61	>75% Grass cover, Good, HSG B		
* 3,182		98	Concrete Ballasts, HSG B		
46,946		64	Weighted Average		
43,764			93.22% Pervious Area		
3,182			6.78% Impervious Area		
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.0250	0.19		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
0.5	56	0.0720	1.88		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
0.1	20	0.3000	5.48		Shallow Concentrated Flow, Ledge Outcrop Nearly Bare & Untilled Kv= 10.0 fps
2.1	224	0.0666	1.81		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
11.4	400				Total

Subcatchment #4B: Northwest solar farm

Hydrograph



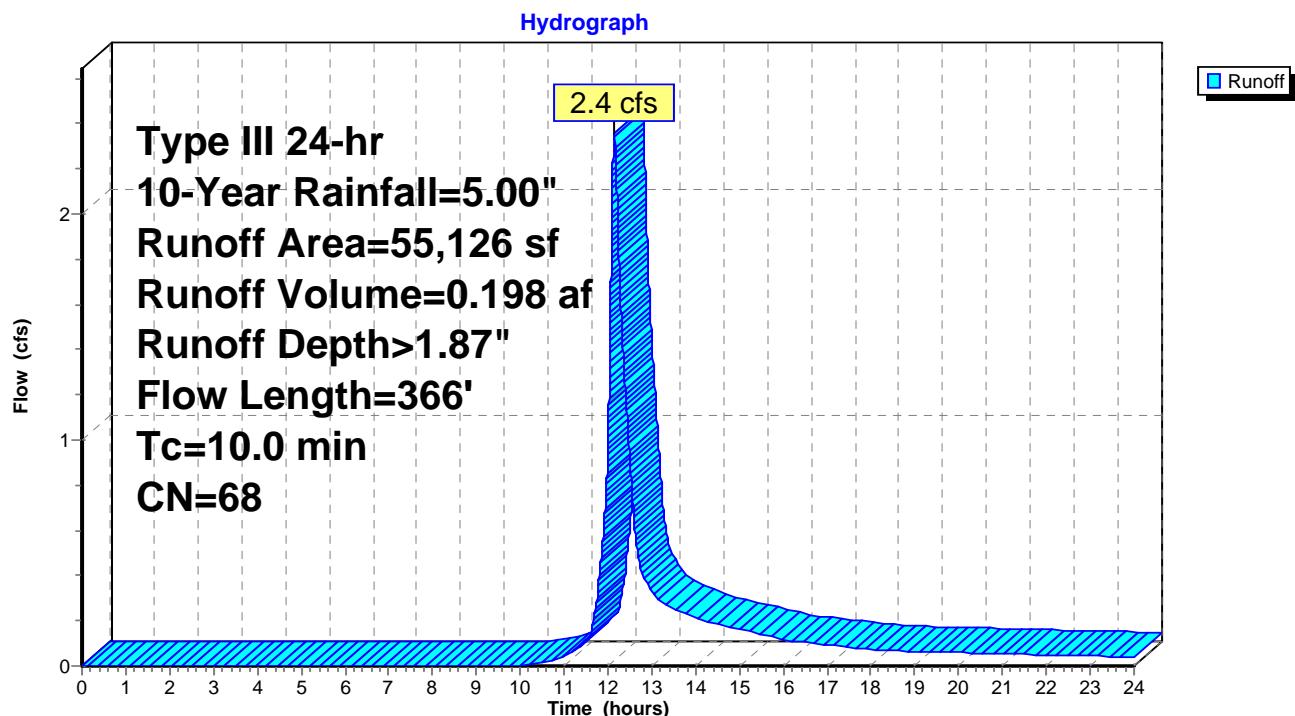
Summary for Subcatchment #4C: Overland to northeast

Runoff = 2.4 cfs @ 12.14 hrs, Volume= 0.198 af, Depth> 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
*	41,012	61	Solar Array Area (grass), Good, HSG B
	7,276	96	Gravel surface, HSG B
	3,547	61	>75% Grass cover, Good, HSG B
*	3,291	98	Concrete pads and ballast, HSG B
	55,126	68	Weighted Average
	51,835		94.03% Pervious Area
	3,291		5.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0550	2.13		Sheet Flow, Gravel access road Smooth surfaces n= 0.011 P2= 3.40"
0.2	35	0.0550	3.78		Shallow Concentrated Flow, Gravel access drive Unpaved Kv= 16.1 fps
2.1	231	0.0667	1.81		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
3.1	366				Total, Increased to minimum Tc = 10.0 min

Subcatchment #4C: Overland to northeast

Summary for Reach 4R: To intermittent watercourse

Inflow Area = 1.078 ac, 6.78% Impervious, Inflow Depth > 1.56" for 10-Year event

Inflow = 1.4 cfs @ 12.22 hrs, Volume= 0.140 af

Outflow = 1.1 cfs @ 12.35 hrs, Volume= 0.139 af, Atten= 24%, Lag= 7.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3

Max. Velocity= 0.40 fps, Min. Travel Time= 6.5 min

Avg. Velocity = 0.18 fps, Avg. Travel Time= 14.1 min

Peak Storage= 424 cf @ 12.35 hrs

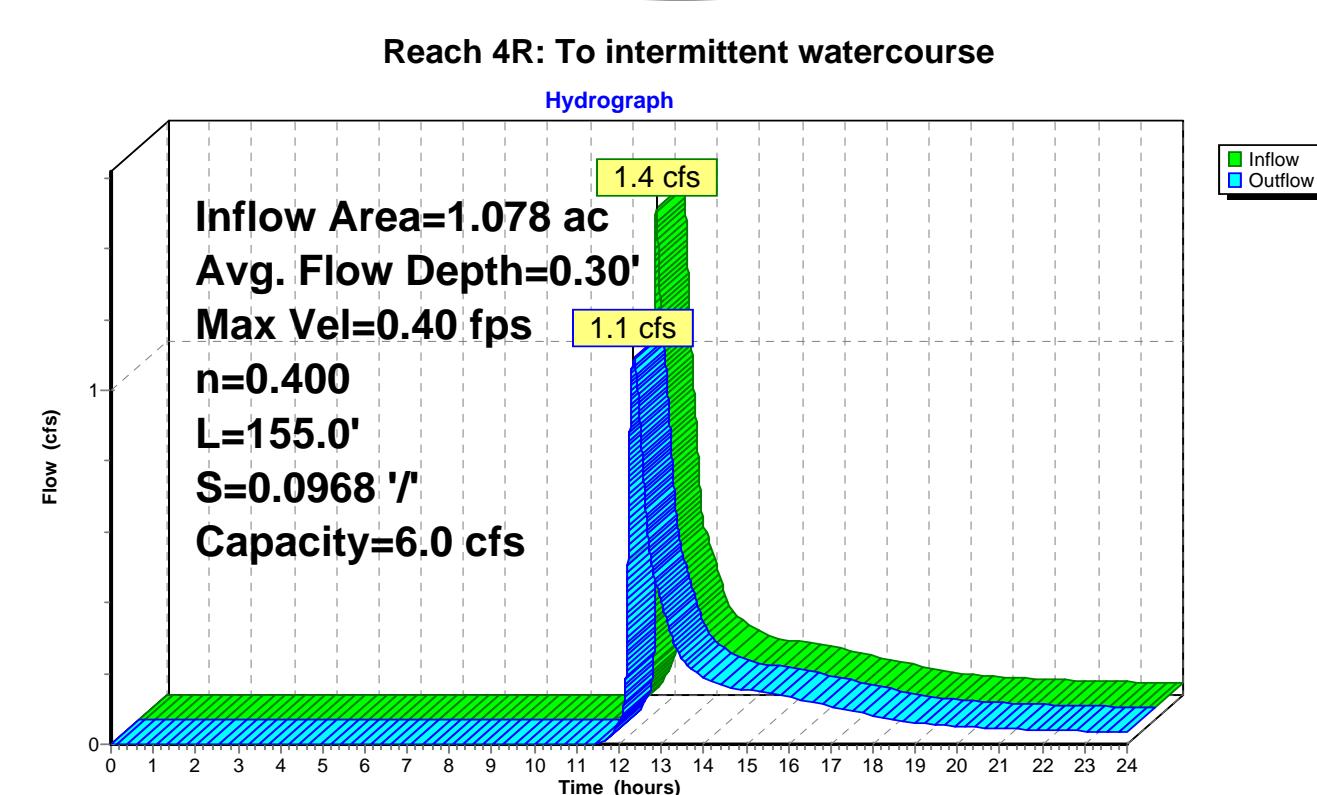
Average Depth at Peak Storage= 0.30'

Bank-Full Depth= 0.67' Flow Area= 8.9 sf, Capacity= 6.0 cfs

20.00' x 0.67' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush

Length= 155.0' Slope= 0.0968 '/'

Inlet Invert= 321.00', Outlet Invert= 306.00'



Summary for Reach 5R: To intermittent watercourse

Inflow Area = 1.266 ac, 5.97% Impervious, Inflow Depth > 1.85" for 10-Year event

Inflow = 2.0 cfs @ 12.21 hrs, Volume= 0.195 af

Outflow = 1.6 cfs @ 12.31 hrs, Volume= 0.194 af, Atten= 22%, Lag= 5.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3

Max. Velocity= 0.44 fps, Min. Travel Time= 5.3 min

Avg. Velocity = 0.20 fps, Avg. Travel Time= 11.9 min

Peak Storage= 506 cf @ 12.31 hrs

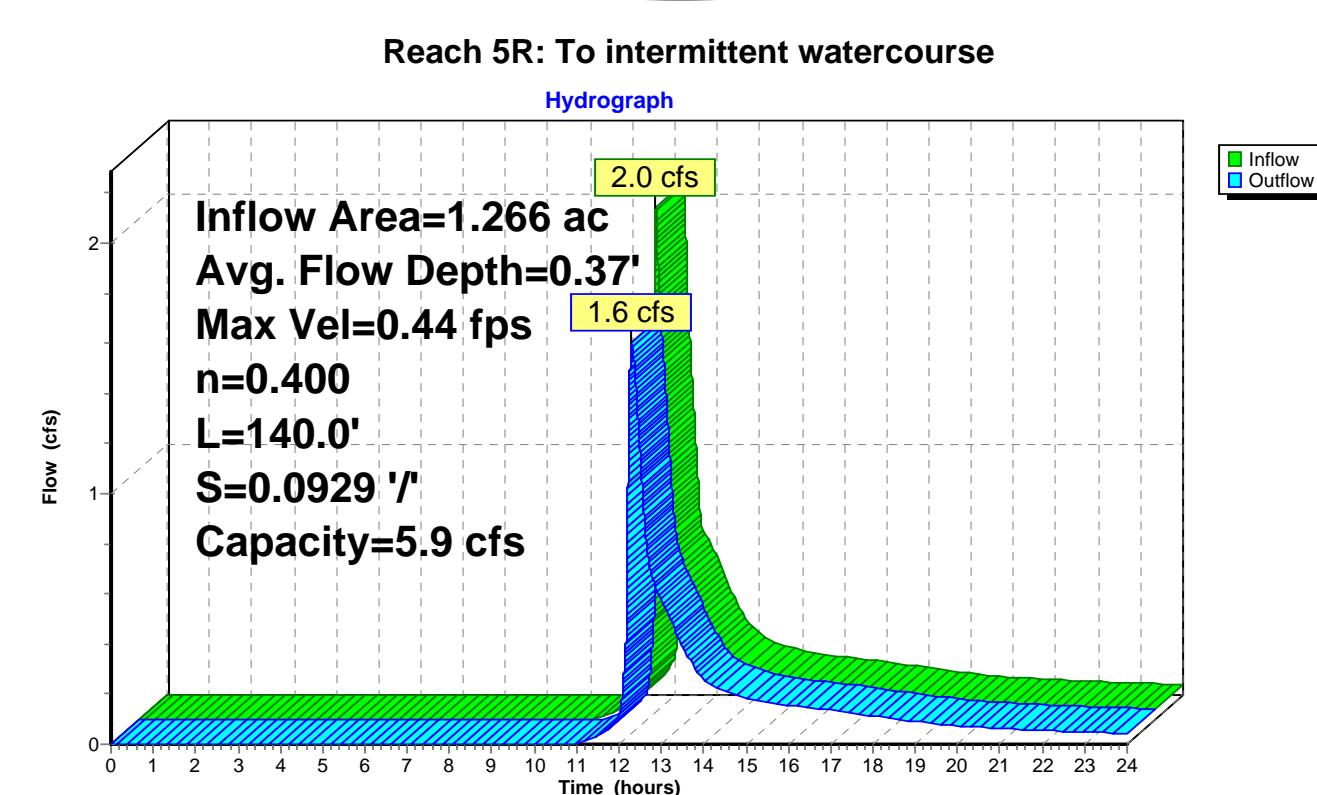
Average Depth at Peak Storage= 0.37'

Bank-Full Depth= 0.67' Flow Area= 8.9 sf, Capacity= 5.9 cfs

20.00' x 0.67' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush

Length= 140.0' Slope= 0.0929 '/'

Inlet Invert= 311.00', Outlet Invert= 298.00'



Summary for Pond 1P: Infiltration trench #1

Inflow Area = 3.996 ac, 6.25% Impervious, Inflow Depth > 1.65" for 10-Year event
 Inflow = 5.6 cfs @ 12.22 hrs, Volume= 0.548 af
 Outflow = 5.6 cfs @ 12.22 hrs, Volume= 0.488 af, Atten= 0%, Lag= 0.1 min
 Primary = 5.6 cfs @ 12.22 hrs, Volume= 0.488 af

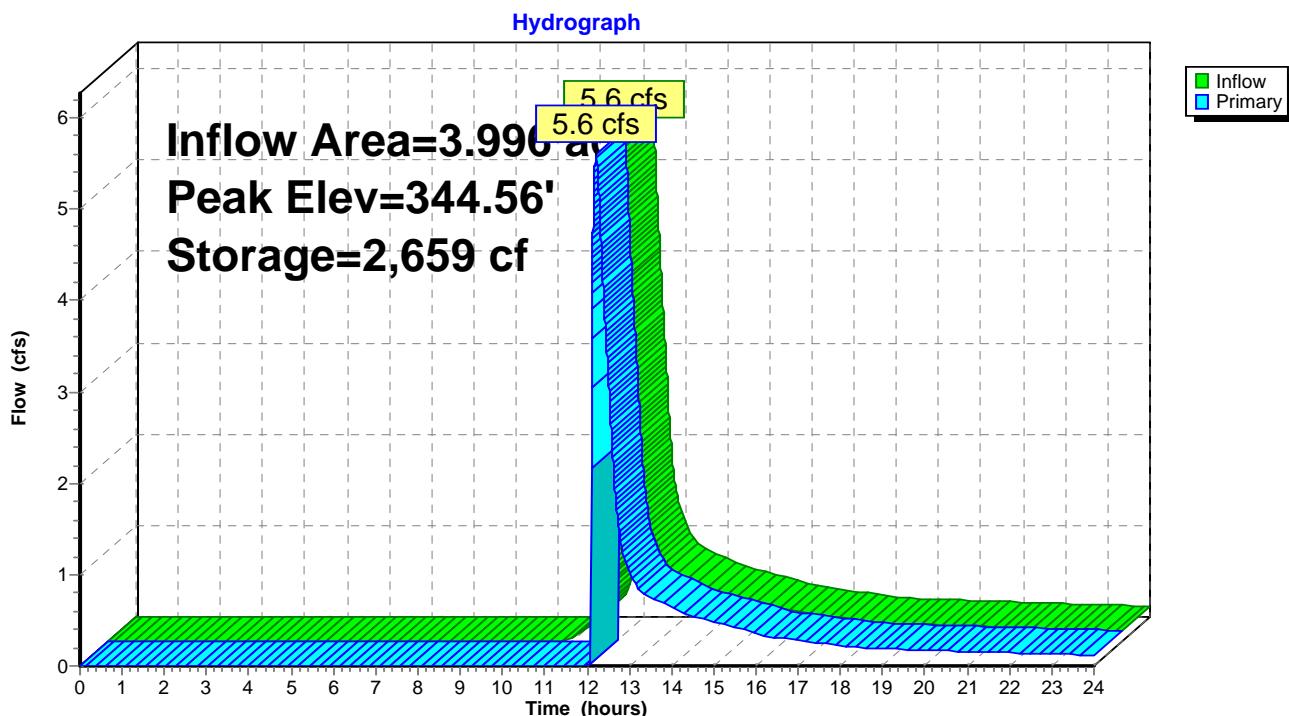
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 344.56' @ 12.22 hrs Surf.Area= 1,776 sf Storage= 2,659 cf

Plug-Flow detention time= 70.5 min calculated for 0.488 af (89% of inflow)
 Center-of-Mass det. time= 19.0 min (885.5 - 866.6)

Volume	Invert	Avail.Storage	Storage Description
#1	340.68'	2,850 cf	11.00'W x 150.00'L x 4.15'H Crushed Stone Infiltration Trench Z=0.1 7,126 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	344.50'	150.0' long x 10.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.6 cfs @ 12.22 hrs HW=344.56' TW=0.00' (Dynamic Tailwater)
 ↗1=Overflow (Weir Controls 5.6 cfs @ 0.61 fps)

Pond 1P: Infiltration trench #1

Summary for Pond 4P: Infiltration trench #2

Inflow Area = 1.078 ac, 6.78% Impervious, Inflow Depth > 1.58" for 10-Year event
 Inflow = 1.6 cfs @ 12.17 hrs, Volume= 0.142 af
 Outflow = 1.4 cfs @ 12.22 hrs, Volume= 0.140 af, Atten= 8%, Lag= 3.0 min
 Primary = 1.4 cfs @ 12.22 hrs, Volume= 0.140 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 326.73' @ 12.22 hrs Surf.Area= 0.031 ac Storage= 0.021 af

Plug-Flow detention time= 35.3 min calculated for 0.140 af (99% of inflow)
 Center-of-Mass det. time= 28.6 min (895.4 - 866.8)

Volume	Invert	Avail.Storage	Storage Description
#1	325.00'	0.041 af	10.00'W x 130.00'L x 3.33'H Prismatoid Z=0.1 0.103 af Overall - 0.000 af Embedded = 0.103 af x 40.0% Voids
#2	325.50'	0.000 af	ADS_StormTech SC-310 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
0.041 af			Total Available Storage

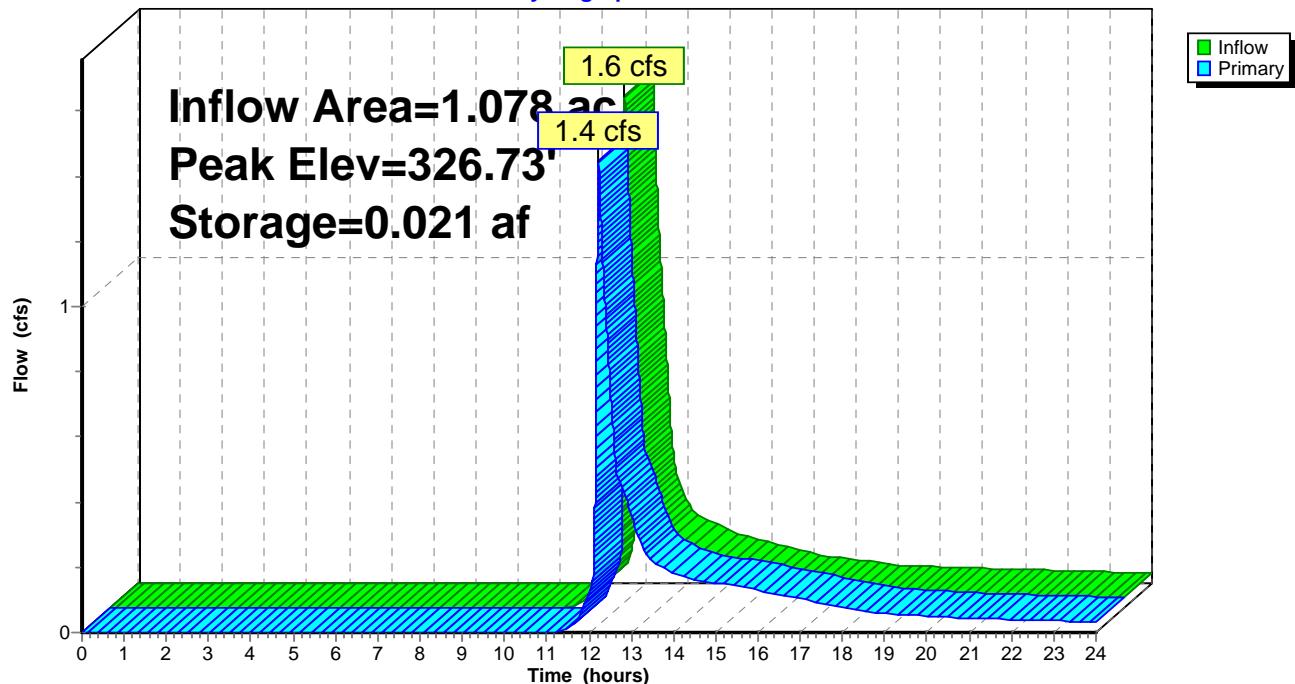
Device	Routing	Invert	Outlet Devices
#1	Primary	324.33'	10.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.33' / 322.00' S= 0.1165 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Device 1	325.00'	2.5" Vert. Orifice/Grate C= 0.600
#3	Device 1	326.00'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	326.60'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=1.4 cfs @ 12.22 hrs HW=326.73' TW=321.23' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 1.4 cfs of 3.7 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.2 cfs @ 6.14 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 0.3 cfs @ 3.62 fps)
- ↑ 4=Sharp-Crested Rectangular Weir (Weir Controls 0.9 cfs @ 1.18 fps)

Pond 4P: Infiltration trench #2

Hydrograph



Summary for Pond 5P: Infiltration trench #3

Inflow Area = 1.266 ac, 5.97% Impervious, Inflow Depth > 1.87" for 10-Year event
 Inflow = 2.4 cfs @ 12.14 hrs, Volume= 0.198 af
 Outflow = 2.0 cfs @ 12.21 hrs, Volume= 0.195 af, Atten= 14%, Lag= 4.0 min
 Primary = 2.0 cfs @ 12.21 hrs, Volume= 0.195 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 315.37' @ 12.21 hrs Surf.Area= 0.039 ac Storage= 0.036 af

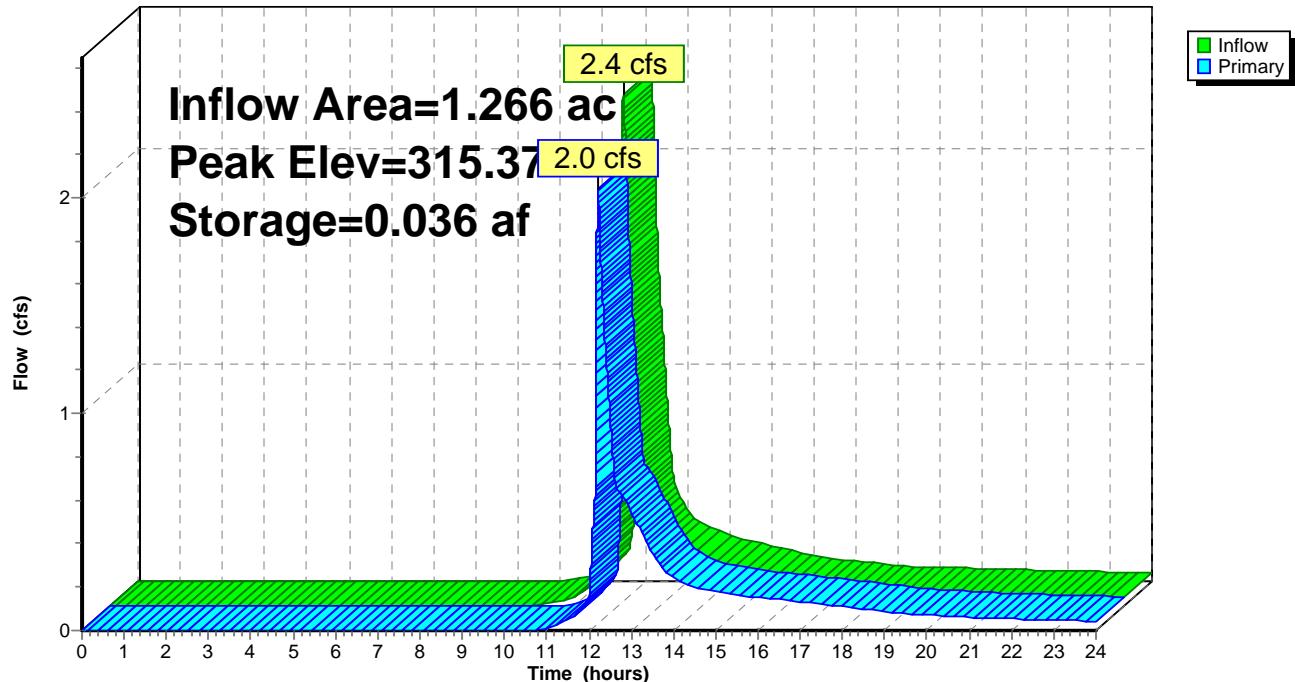
Plug-Flow detention time= 41.6 min calculated for 0.195 af (99% of inflow)
 Center-of-Mass det. time= 34.4 min (889.4 - 855.1)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	0.058 af	10.00'W x 160.00'L x 3.83'H Prismatoid Z=0.1 0.146 af Overall - 0.000 af Embedded = 0.146 af x 40.0% Voids
#2	313.50'	0.000 af	ADS_StormTech SC-310 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
0.059 af			Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	312.33'	8.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 312.33' / 311.90' S= 0.0215 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	313.00'	2.5" Vert. Orifice/Grate C= 0.600
#3	Device 1	314.00'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	315.20'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=2.0 cfs @ 12.21 hrs HW=315.37' TW=311.30' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 2.0 cfs of 2.8 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.2 cfs @ 7.24 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 0.5 cfs @ 5.28 fps)
- ↑ 4=Sharp-Crested Rectangular Weir (Weir Controls 1.3 cfs @ 1.34 fps)

Pond 5P: Infiltration trench #3**Hydrograph**

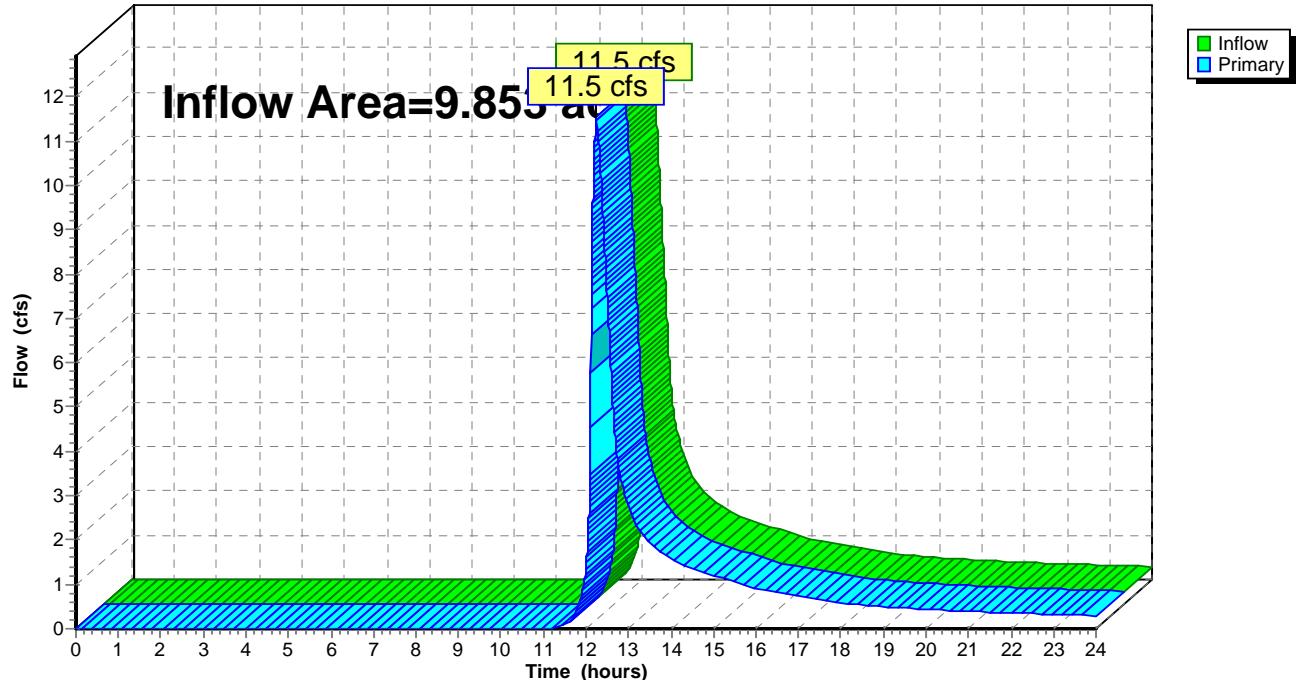
Summary for Link Out: Outlets site to north

Inflow Area = 9.853 ac, 4.62% Impervious, Inflow Depth > 1.49" for 10-Year event

Inflow = 11.5 cfs @ 12.25 hrs, Volume= 1.221 af

Primary = 11.5 cfs @ 12.25 hrs, Volume= 1.221 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs

Link Out: Outlets site to north**Hydrograph**

Post-Development North Outlet

Prepared by Boundaries LLC - DCM

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Type III 24-hr 25-Year Rainfall=5.70"

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Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment#2: North solar farm area Runoff Area=174,055 sf 6.25% Impervious Runoff Depth>2.13" Flow Length=687' Tc=14.6 min CN=65 Runoff=7.4 cfs 0.708 af**Subcatchment#4A: Overland to north** Runoff Area=153,066 sf 1.62% Impervious Runoff Depth>1.80" Flow Length=706' Tc=13.1 min CN=61 Runoff=5.5 cfs 0.527 af**Subcatchment#4B: Northwest solar farm** Runoff Area=46,946 sf 6.78% Impervious Runoff Depth>2.05" Flow Length=400' Tc=11.4 min CN=64 Runoff=2.1 cfs 0.184 af**Subcatchment#4C: Overland to northeast** Runoff Area=55,126 sf 5.97% Impervious Runoff Depth>2.39" Flow Length=366' Tc=10.0 min CN=68 Runoff=3.1 cfs 0.252 af**Reach 4R: To intermittent watercourse** Avg. Flow Depth=0.37' Max Vel=0.45 fps Inflow=2.1 cfs 0.182 af
n=0.400 L=155.0' S=0.0968 '/' Capacity=6.0 cfs Outflow=1.7 cfs 0.181 af**Reach 5R: To intermittent watercourse** Avg. Flow Depth=0.45' Max Vel=0.51 fps Inflow=2.8 cfs 0.249 af
n=0.400 L=140.0' S=0.0929 '/' Capacity=5.9 cfs Outflow=2.5 cfs 0.248 af**Pond 1P: Infiltration trench #1** Peak Elev=344.57' Storage=2,667 cf Inflow=7.4 cfs 0.708 af
Outflow=7.4 cfs 0.648 af**Pond 4P: Infiltration trench #2** Peak Elev=326.78' Storage=0.022 af Inflow=2.1 cfs 0.184 af
Outflow=2.1 cfs 0.182 af**Pond 5P: Infiltration trench #3** Peak Elev=315.47' Storage=0.037 af Inflow=3.1 cfs 0.252 af
Outflow=2.8 cfs 0.249 af**Link Out: Outlets site to north** Inflow=16.7 cfs 1.604 af
Primary=16.7 cfs 1.604 af**Total Runoff Area = 9.853 ac Runoff Volume = 1.671 af Average Runoff Depth = 2.04"**
95.38% Pervious = 9.398 ac 4.62% Impervious = 0.455 ac

Summary for Subcatchment #2: North solar farm area

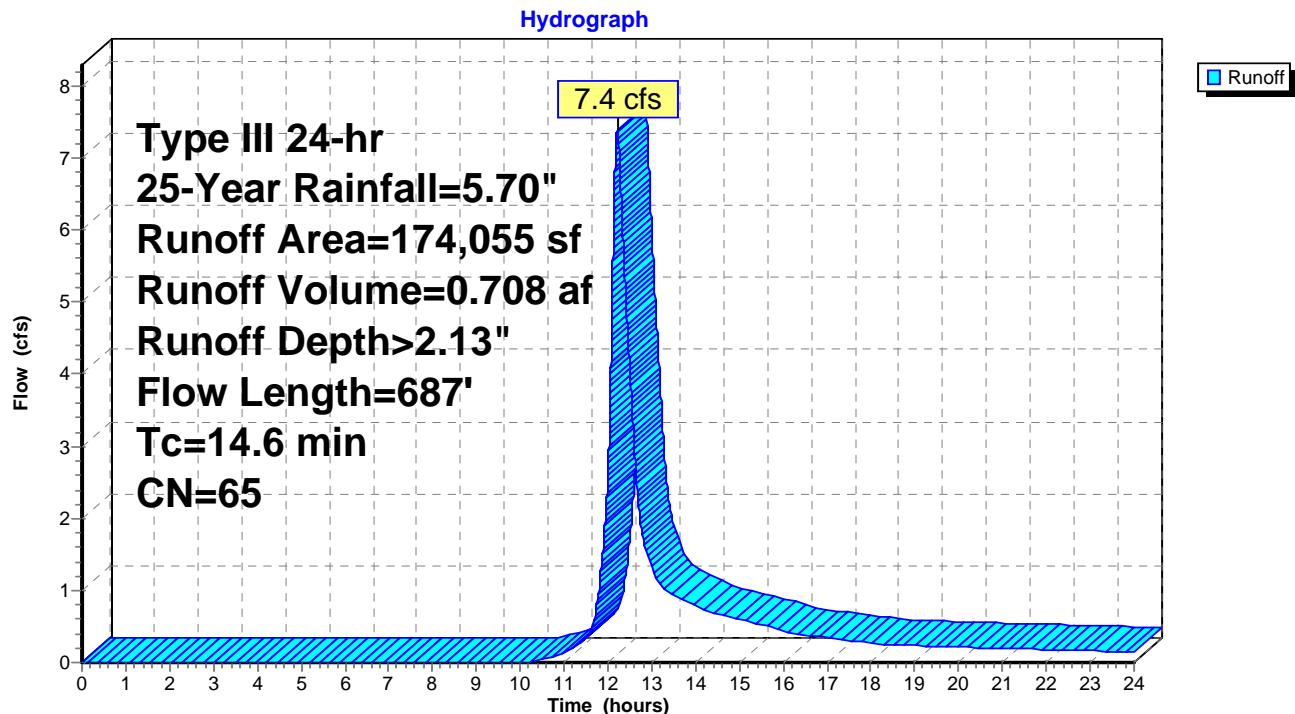
Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

Runoff = 7.4 cfs @ 12.21 hrs, Volume= 0.708 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
*	136,434	61 Solar Array Area (grass), Good, HSG B
*	18,384	80 Solar Array Area (grass), Good, HSG D
	8,367	60 Woods, Fair, HSG B
*	1,324	98 Concrete Pads and Ballast, HSG D
*	9,546	98 Concrete Pads and Ballast, HSG B
174,055	65	Weighted Average
163,185		93.75% Pervious Area
10,870		6.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	66	0.0455	0.22		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
3.0	34	0.0408	0.19		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
0.5	49	0.0533	1.62		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
2.7	215	0.0372	1.35		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
1.4	157	0.0764	1.93		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
2.1	166	0.0361	1.33		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
14.6	687	Total			

Subcatchment #2: North solar farm area

Post-Development North Outlet

Prepared by Boundaries LLC - DCM

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Type III 24-hr 25-Year Rainfall=5.70"

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Summary for Subcatchment #4A: Overland to north

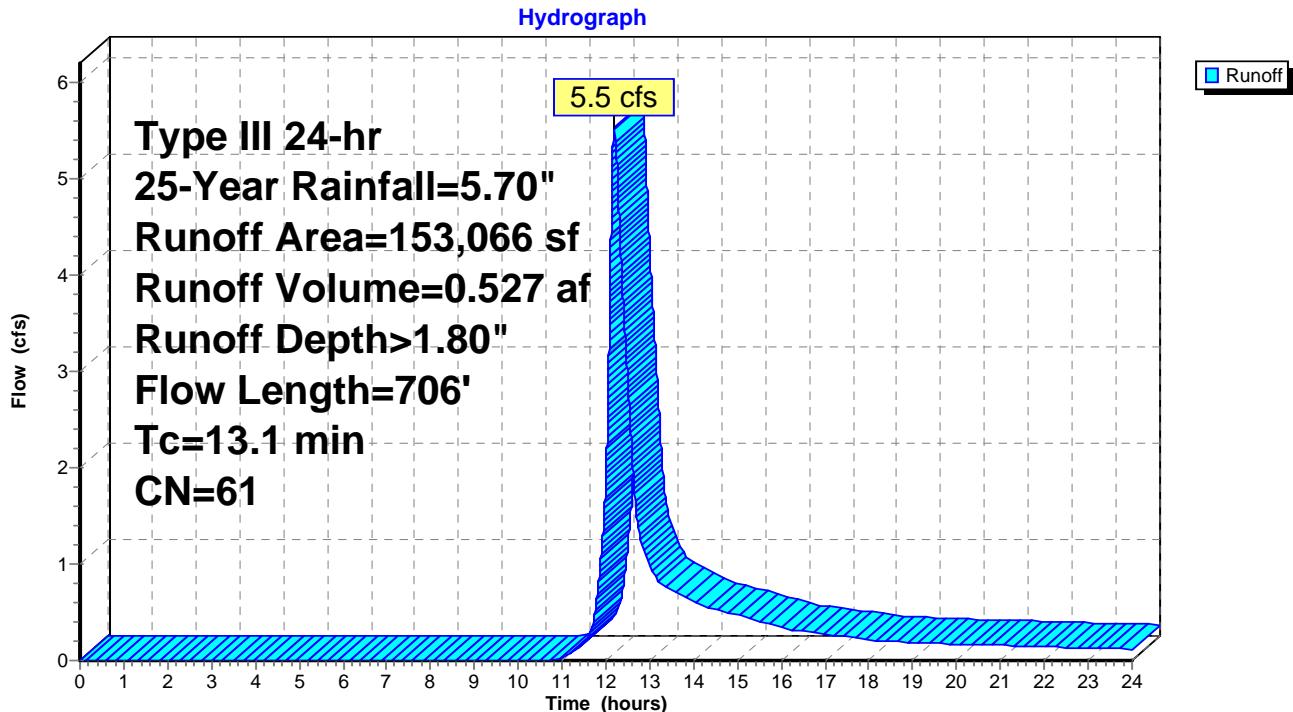
Runoff = 5.5 cfs @ 12.20 hrs, Volume= 0.527 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
*	33,101	61	Solar Array Area (grass), Good, HSG B
	31,799	61	>75% Grass cover, Good, HSG B
	85,681	60	Woods, Fair, HSG B
*	2,485	98	Concrete Ballast, HSG B
	153,066	61	Weighted Average
	150,581		98.38% Pervious Area
	2,485		1.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.18		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
2.1	166	0.0361	1.33		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
1.0	125	0.1600	2.00		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.5	315	0.0762	10.46	52.30	Trap/Vee/Rect Channel Flow, Wetland Bot.W=3.00' D=1.00' Z= 2.0 '/' Top.W=7.00' n= 0.030

13.1 706 Total

Subcatchment #4A: Overland to north

Summary for Subcatchment #4B: Northwest solar farm

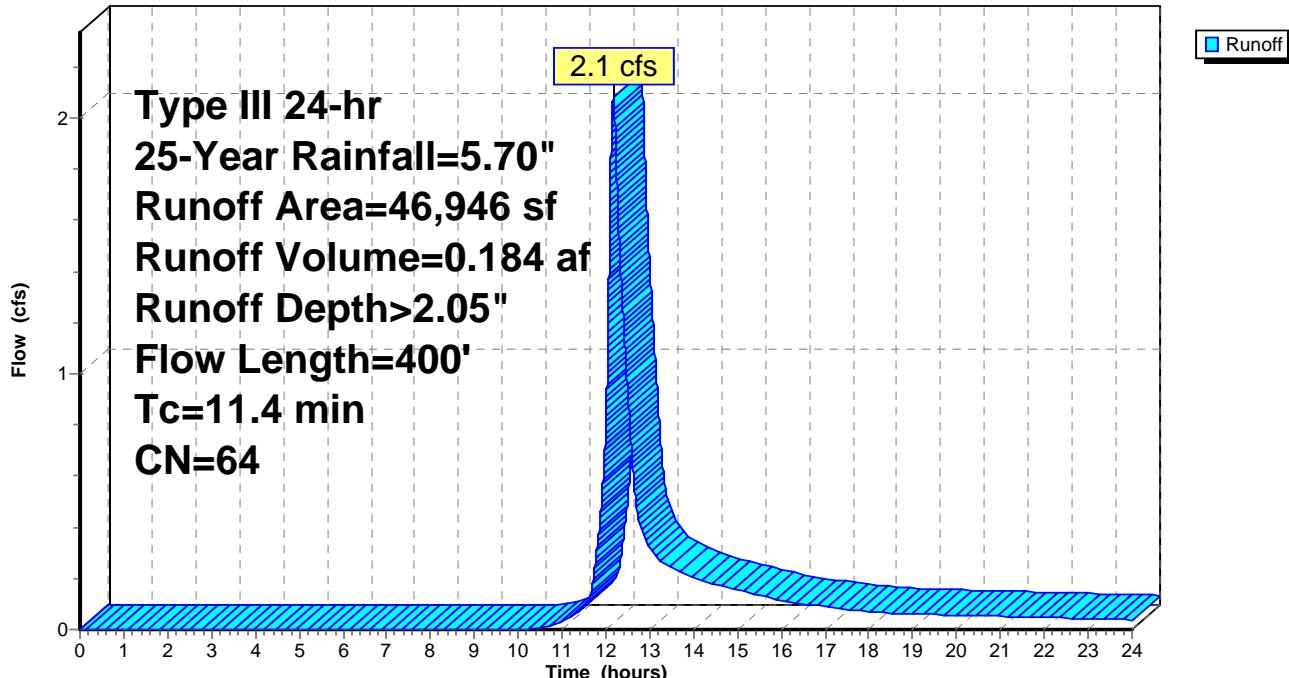
Runoff = 2.1 cfs @ 12.17 hrs, Volume= 0.184 af, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)		CN	Description		
* 42,814		61	Solar Array Area (grass), Good, HSG B		
950		61	>75% Grass cover, Good, HSG B		
* 3,182		98	Concrete Ballasts, HSG B		
46,946		64	Weighted Average		
43,764			93.22% Pervious Area		
3,182			6.78% Impervious Area		
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.0250	0.19		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
0.5	56	0.0720	1.88		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
0.1	20	0.3000	5.48		Shallow Concentrated Flow, Ledge Outcrop Nearly Bare & Untilled Kv= 10.0 fps
2.1	224	0.0666	1.81		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
11.4	400				Total

Subcatchment #4B: Northwest solar farm

Hydrograph



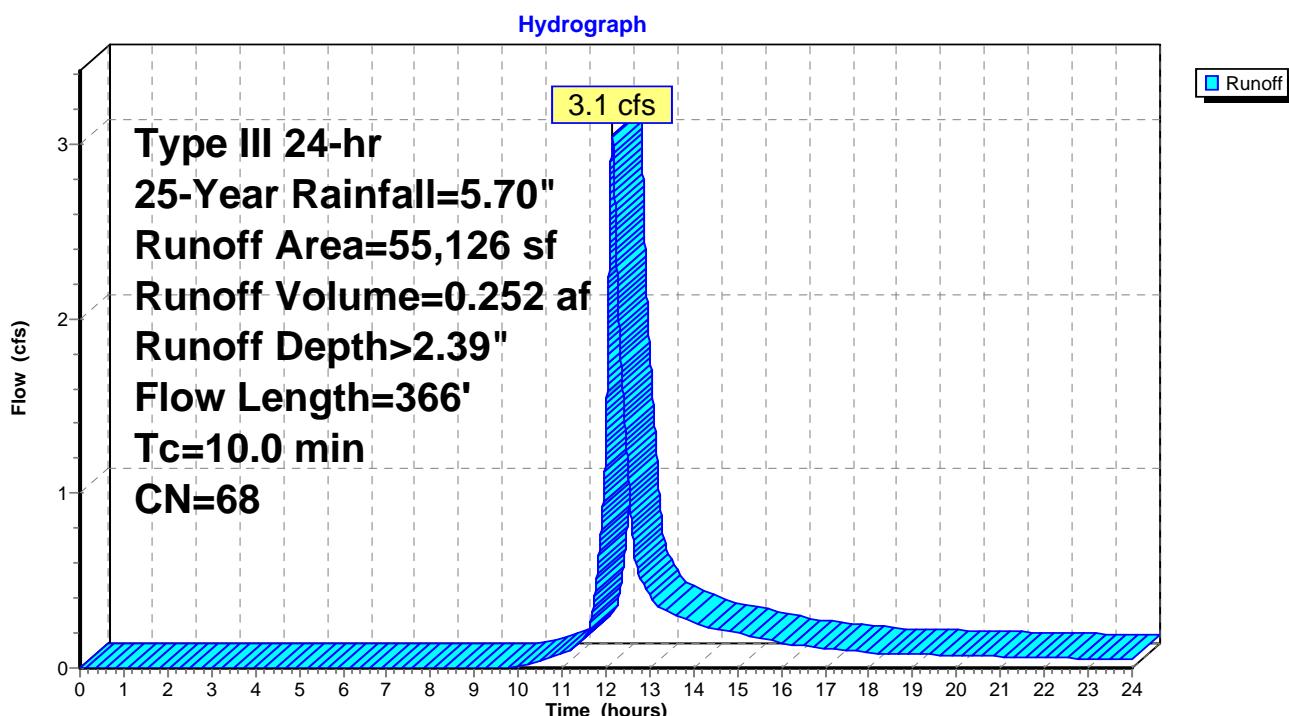
Summary for Subcatchment #4C: Overland to northeast

Runoff = 3.1 cfs @ 12.14 hrs, Volume= 0.252 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
*	41,012	61	Solar Array Area (grass), Good, HSG B
	7,276	96	Gravel surface, HSG B
	3,547	61	>75% Grass cover, Good, HSG B
*	3,291	98	Concrete pads and ballast, HSG B
	55,126	68	Weighted Average
	51,835		94.03% Pervious Area
	3,291		5.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0550	2.13		Sheet Flow, Gravel access road Smooth surfaces n= 0.011 P2= 3.40"
0.2	35	0.0550	3.78		Shallow Concentrated Flow, Gravel access drive Unpaved Kv= 16.1 fps
2.1	231	0.0667	1.81		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
3.1	366				Total, Increased to minimum Tc = 10.0 min

Subcatchment #4C: Overland to northeast

Summary for Reach 4R: To intermittent watercourse

Inflow Area = 1.078 ac, 6.78% Impervious, Inflow Depth > 2.02" for 25-Year event

Inflow = 2.1 cfs @ 12.18 hrs, Volume= 0.182 af

Outflow = 1.7 cfs @ 12.28 hrs, Volume= 0.181 af, Atten= 19%, Lag= 5.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3

Max. Velocity= 0.45 fps, Min. Travel Time= 5.7 min

Avg. Velocity = 0.19 fps, Avg. Travel Time= 13.3 min

Peak Storage= 570 cf @ 12.28 hrs

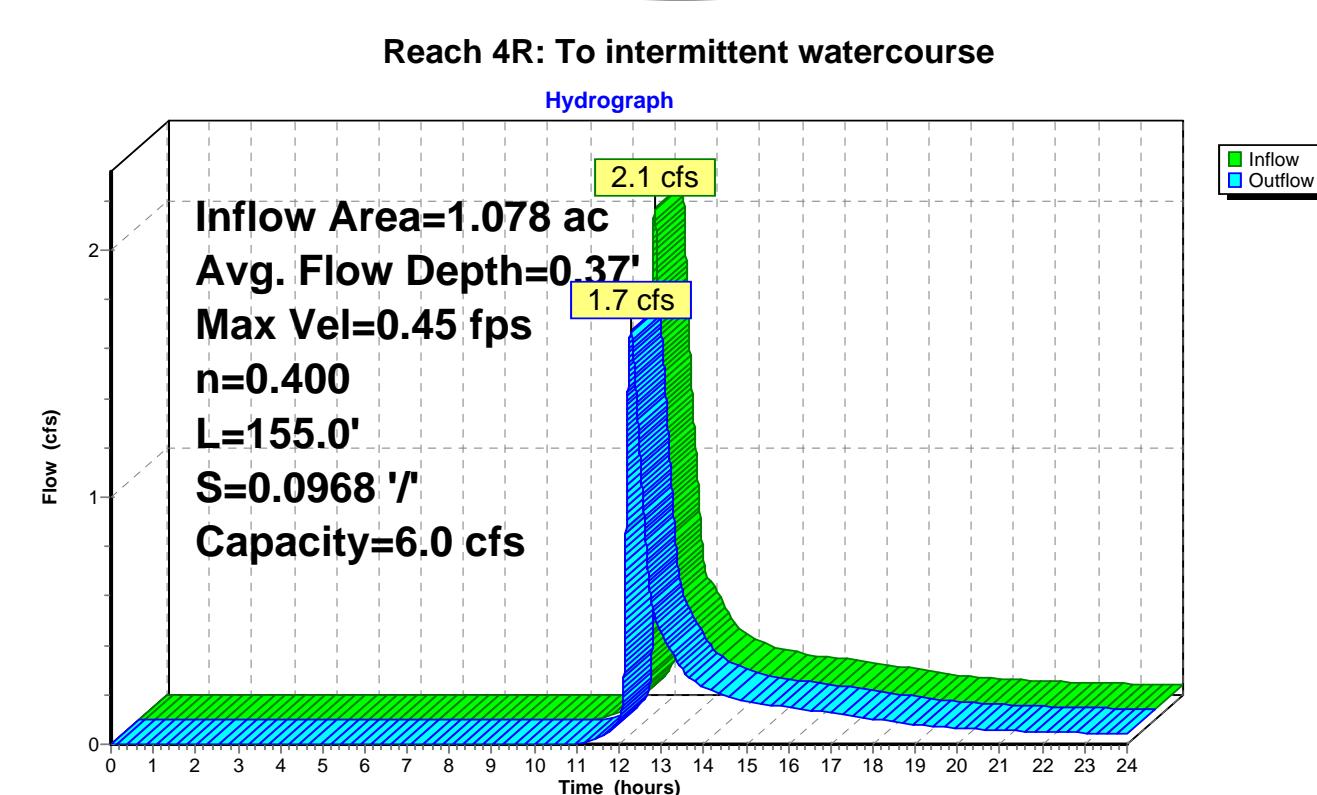
Average Depth at Peak Storage= 0.37'

Bank-Full Depth= 0.67' Flow Area= 8.9 sf, Capacity= 6.0 cfs

20.00' x 0.67' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush

Length= 155.0' Slope= 0.0968 '/'

Inlet Invert= 321.00', Outlet Invert= 306.00'



Summary for Reach 5R: To intermittent watercourse

Inflow Area = 1.266 ac, 5.97% Impervious, Inflow Depth > 2.36" for 25-Year event

Inflow = 2.8 cfs @ 12.19 hrs, Volume= 0.249 af

Outflow = 2.5 cfs @ 12.25 hrs, Volume= 0.248 af, Atten= 11%, Lag= 3.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3

Max. Velocity= 0.51 fps, Min. Travel Time= 4.6 min

Avg. Velocity = 0.21 fps, Avg. Travel Time= 11.4 min

Peak Storage= 689 cf @ 12.25 hrs

Average Depth at Peak Storage= 0.45'

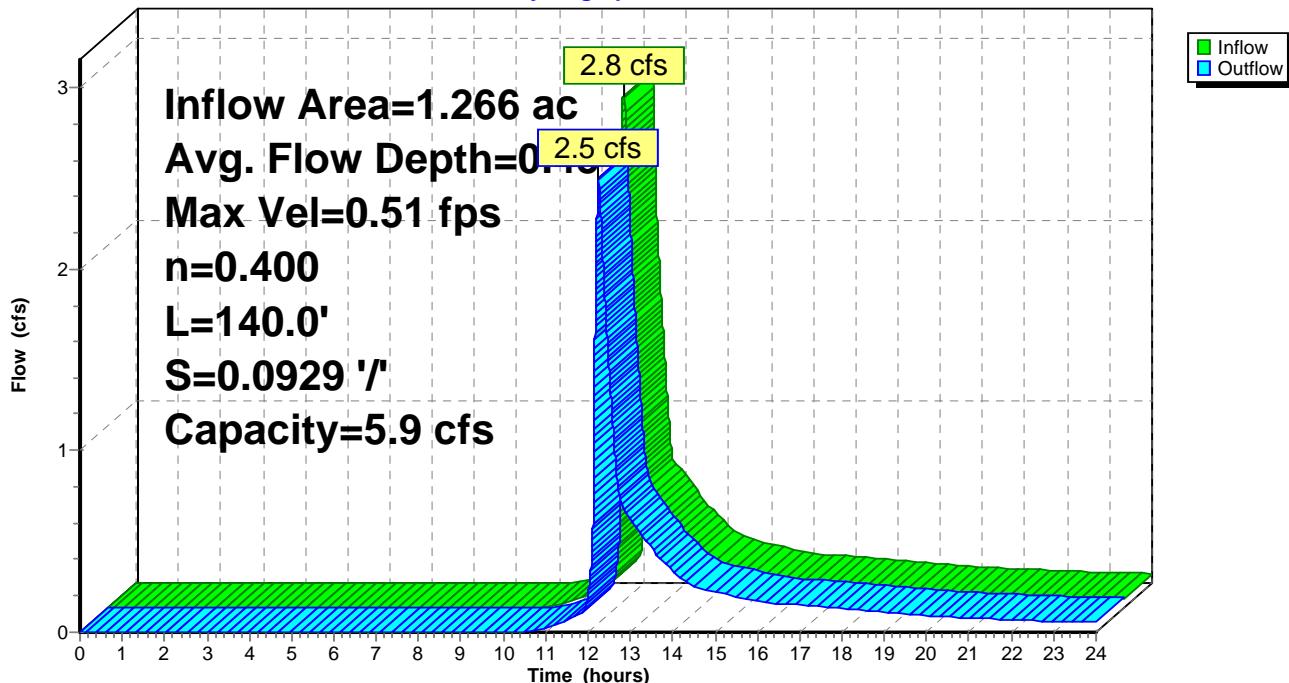
Bank-Full Depth= 0.67' Flow Area= 8.9 sf, Capacity= 5.9 cfs

20.00' x 0.67' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush

Length= 140.0' Slope= 0.0929 '/'

Inlet Invert= 311.00', Outlet Invert= 298.00'

‡

Reach 5R: To intermittent watercourse**Hydrograph**

Summary for Pond 1P: Infiltration trench #1

Inflow Area = 3.996 ac, 6.25% Impervious, Inflow Depth > 2.13" for 25-Year event
 Inflow = 7.4 cfs @ 12.21 hrs, Volume= 0.708 af
 Outflow = 7.4 cfs @ 12.22 hrs, Volume= 0.648 af, Atten= 0%, Lag= 0.1 min
 Primary = 7.4 cfs @ 12.22 hrs, Volume= 0.648 af

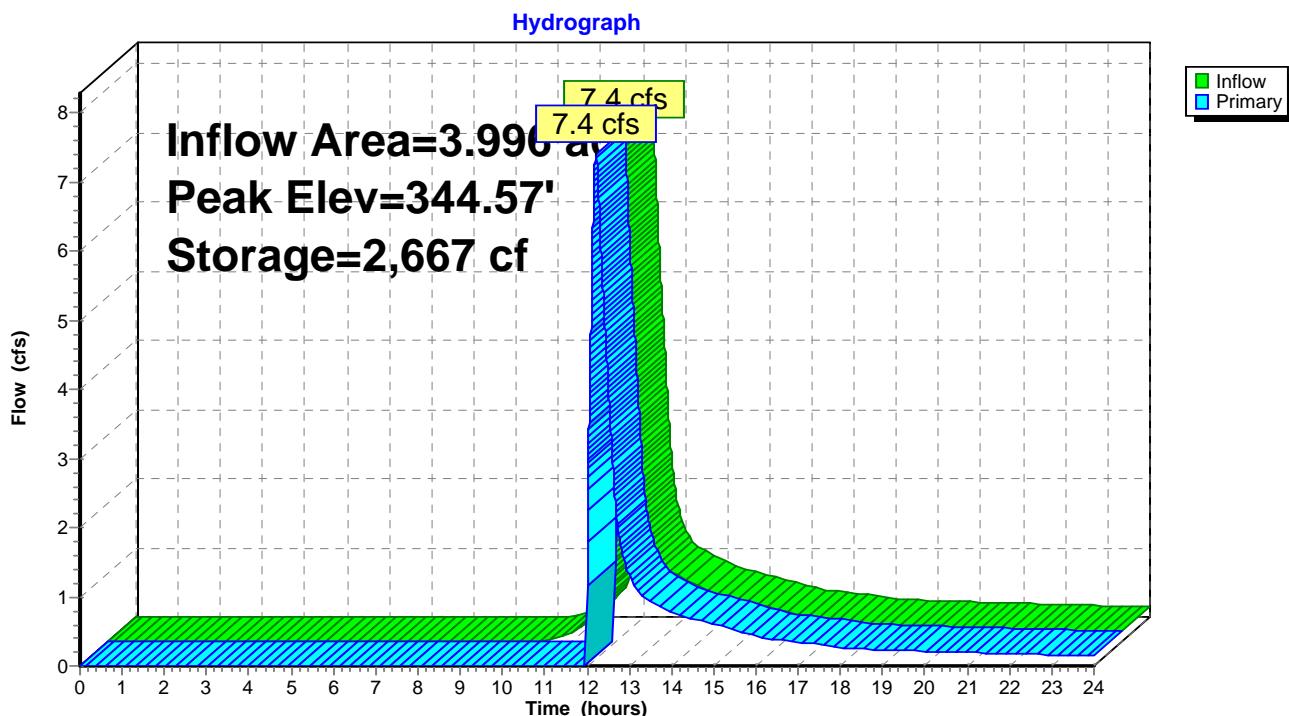
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 344.57' @ 12.22 hrs Surf.Area= 1,776 sf Storage= 2,667 cf

Plug-Flow detention time= 56.5 min calculated for 0.648 af (92% of inflow)
 Center-of-Mass det. time= 14.7 min (873.6 - 858.9)

Volume	Invert	Avail.Storage	Storage Description
#1	340.68'	2,850 cf	11.00'W x 150.00'L x 4.15'H Crushed Stone Infiltration Trench Z=0.1 7,126 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	344.50'	150.0' long x 10.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.4 cfs @ 12.22 hrs HW=344.57' TW=0.00' (Dynamic Tailwater)
 ↗1=Overflow (Weir Controls 7.4 cfs @ 0.67 fps)

Pond 1P: Infiltration trench #1

Summary for Pond 4P: Infiltration trench #2

Inflow Area = 1.078 ac, 6.78% Impervious, Inflow Depth > 2.05" for 25-Year event
 Inflow = 2.1 cfs @ 12.17 hrs, Volume= 0.184 af
 Outflow = 2.1 cfs @ 12.18 hrs, Volume= 0.182 af, Atten= 1%, Lag= 0.5 min
 Primary = 2.1 cfs @ 12.18 hrs, Volume= 0.182 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 326.78' @ 12.18 hrs Surf.Area= 0.031 ac Storage= 0.022 af

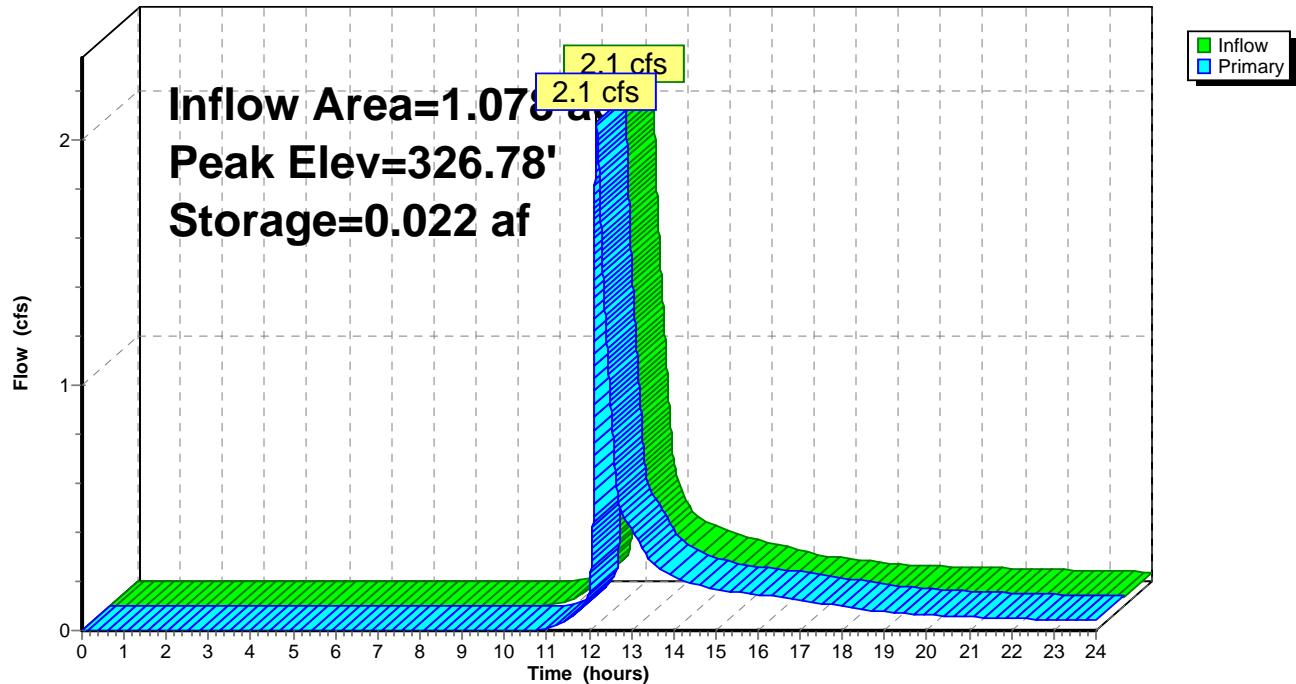
Plug-Flow detention time= 32.0 min calculated for 0.182 af (99% of inflow)
 Center-of-Mass det. time= 26.0 min (884.8 - 858.9)

Volume	Invert	Avail.Storage	Storage Description
#1	325.00'	0.041 af	10.00'W x 130.00'L x 3.33'H Prismatoid Z=0.1 0.103 af Overall - 0.000 af Embedded = 0.103 af x 40.0% Voids
#2	325.50'	0.000 af	ADS_StormTech SC-310 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
0.041 af			Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	324.33'	10.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.33' / 322.00' S= 0.1165 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Device 1	325.00'	2.5" Vert. Orifice/Grate C= 0.600
#3	Device 1	326.00'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	326.60'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=2.1 cfs @ 12.18 hrs HW=326.78' TW=321.30' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 2.1 cfs of 3.7 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.2 cfs @ 6.24 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 0.3 cfs @ 3.78 fps)
- ↑ 4=Sharp-Crested Rectangular Weir (Weir Controls 1.5 cfs @ 1.40 fps)

Pond 4P: Infiltration trench #2**Hydrograph**

Summary for Pond 5P: Infiltration trench #3

Inflow Area = 1.266 ac, 5.97% Impervious, Inflow Depth > 2.39" for 25-Year event
 Inflow = 3.1 cfs @ 12.14 hrs, Volume= 0.252 af
 Outflow = 2.8 cfs @ 12.19 hrs, Volume= 0.249 af, Atten= 8%, Lag= 2.7 min
 Primary = 2.8 cfs @ 12.19 hrs, Volume= 0.249 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 315.47' @ 12.19 hrs Surf.Area= 0.039 ac Storage= 0.037 af

Plug-Flow detention time= 37.8 min calculated for 0.249 af (99% of inflow)
 Center-of-Mass det. time= 30.9 min (878.8 - 847.9)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	0.058 af	10.00'W x 160.00'L x 3.83'H Prismatoid Z=0.1 0.146 af Overall - 0.000 af Embedded = 0.146 af x 40.0% Voids
#2	313.50'	0.000 af	ADS_StormTech SC-310 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
0.059 af			Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	312.33'	8.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 312.33' / 311.90' S= 0.0215 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	313.00'	2.5" Vert. Orifice/Grate C= 0.600
#3	Device 1	314.00'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	315.20'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

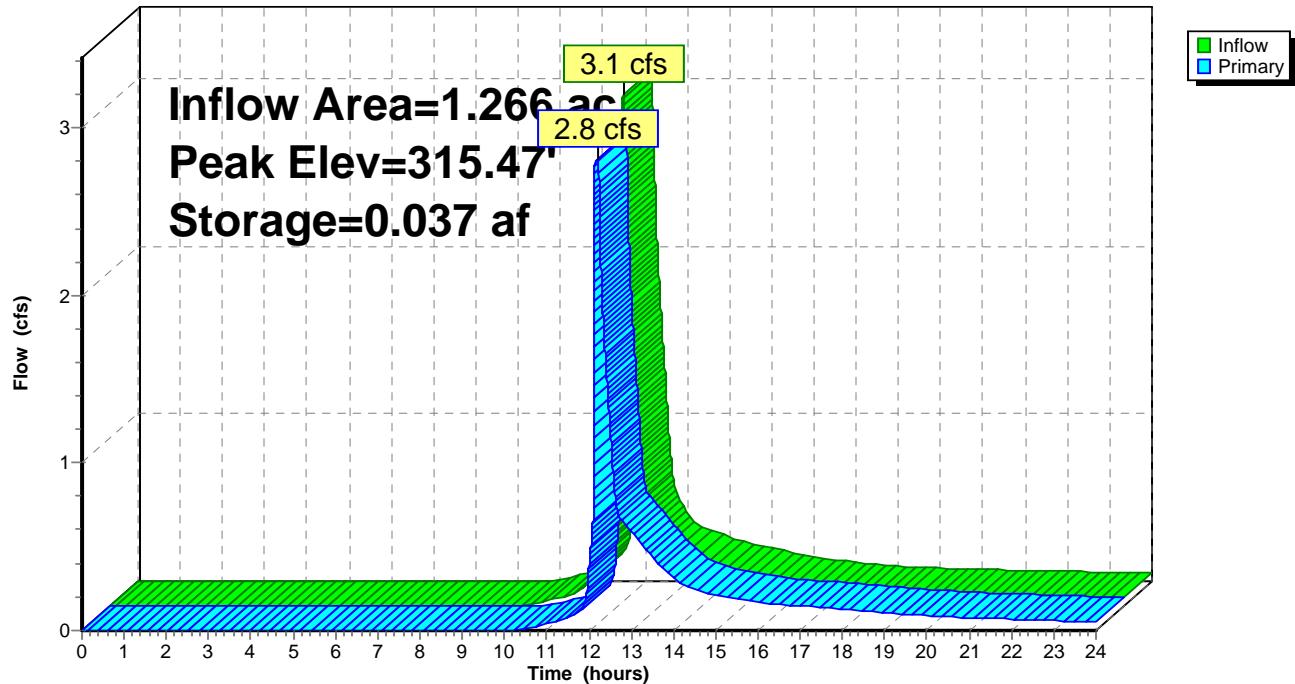
Primary OutFlow Max=2.8 cfs @ 12.19 hrs HW=315.47' TW=311.41' (Dynamic Tailwater)

1=Culvert (Inlet Controls 2.8 cfs @ 8.06 fps)

2=Orifice/Grate (Passes < 0.3 cfs potential flow)

3=Orifice/Grate (Passes < 0.5 cfs potential flow)

4=Sharp-Crested Rectangular Weir (Passes < 2.7 cfs potential flow)

Pond 5P: Infiltration trench #3**Hydrograph**

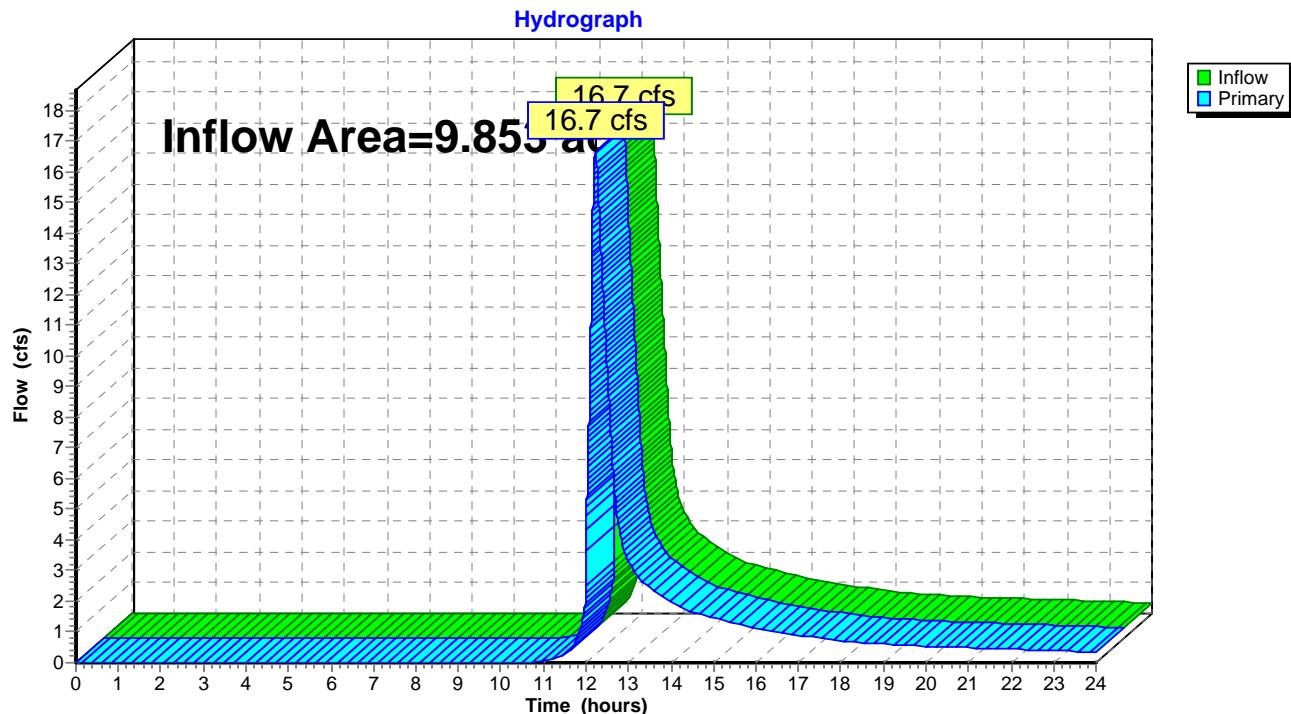
Summary for Link Out: Outlets site to north

Inflow Area = 9.853 ac, 4.62% Impervious, Inflow Depth > 1.95" for 25-Year event

Inflow = 16.7 cfs @ 12.23 hrs, Volume= 1.604 af

Primary = 16.7 cfs @ 12.23 hrs, Volume= 1.604 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs

Link Out: Outlets site to north

Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment#2: North solar farm area Runoff Area=174,055 sf 6.25% Impervious Runoff Depth>3.17" Flow Length=687' Tc=14.6 min CN=65 Runoff=11.3 cfs 1.055 af**Subcatchment#4A: Overland to north** Runoff Area=153,066 sf 1.62% Impervious Runoff Depth>2.77" Flow Length=706' Tc=13.1 min CN=61 Runoff=8.9 cfs 0.810 af**Subcatchment#4B: Northwest solar farm** Runoff Area=46,946 sf 6.78% Impervious Runoff Depth>3.07" Flow Length=400' Tc=11.4 min CN=64 Runoff=3.2 cfs 0.276 af**Subcatchment#4C: Overland to northeast** Runoff Area=55,126 sf 5.97% Impervious Runoff Depth>3.48" Flow Length=366' Tc=10.0 min CN=68 Runoff=4.5 cfs 0.367 af**Reach 4R: To intermittent watercourse** Avg. Flow Depth=0.48' Max Vel=0.54 fps Inflow=3.2 cfs 0.273 af
n=0.400 L=155.0' S=0.0968 '/' Capacity=6.0 cfs Outflow=2.9 cfs 0.272 af**Reach 5R: To intermittent watercourse** Avg. Flow Depth=0.51' Max Vel=0.55 fps Inflow=3.2 cfs 0.363 af
n=0.400 L=140.0' S=0.0929 '/' Capacity=5.9 cfs Outflow=3.2 cfs 0.362 af**Pond 1P: Infiltration trench #1** Peak Elev=344.60' Storage=2,684 cf Inflow=11.3 cfs 1.055 af
Outflow=11.3 cfs 0.995 af**Pond 4P: Infiltration trench #2** Peak Elev=326.86' Storage=0.023 af Inflow=3.2 cfs 0.276 af
Outflow=3.2 cfs 0.273 af**Pond 5P: Infiltration trench #3** Peak Elev=316.40' Storage=0.052 af Inflow=4.5 cfs 0.367 af
Outflow=3.2 cfs 0.363 af**Link Out: Outlets site to north** Inflow=25.8 cfs 2.438 af
Primary=25.8 cfs 2.438 af**Total Runoff Area = 9.853 ac Runoff Volume = 2.508 af Average Runoff Depth = 3.05"**
95.38% Pervious = 9.398 ac 4.62% Impervious = 0.455 ac

Summary for Subcatchment #2: North solar farm area

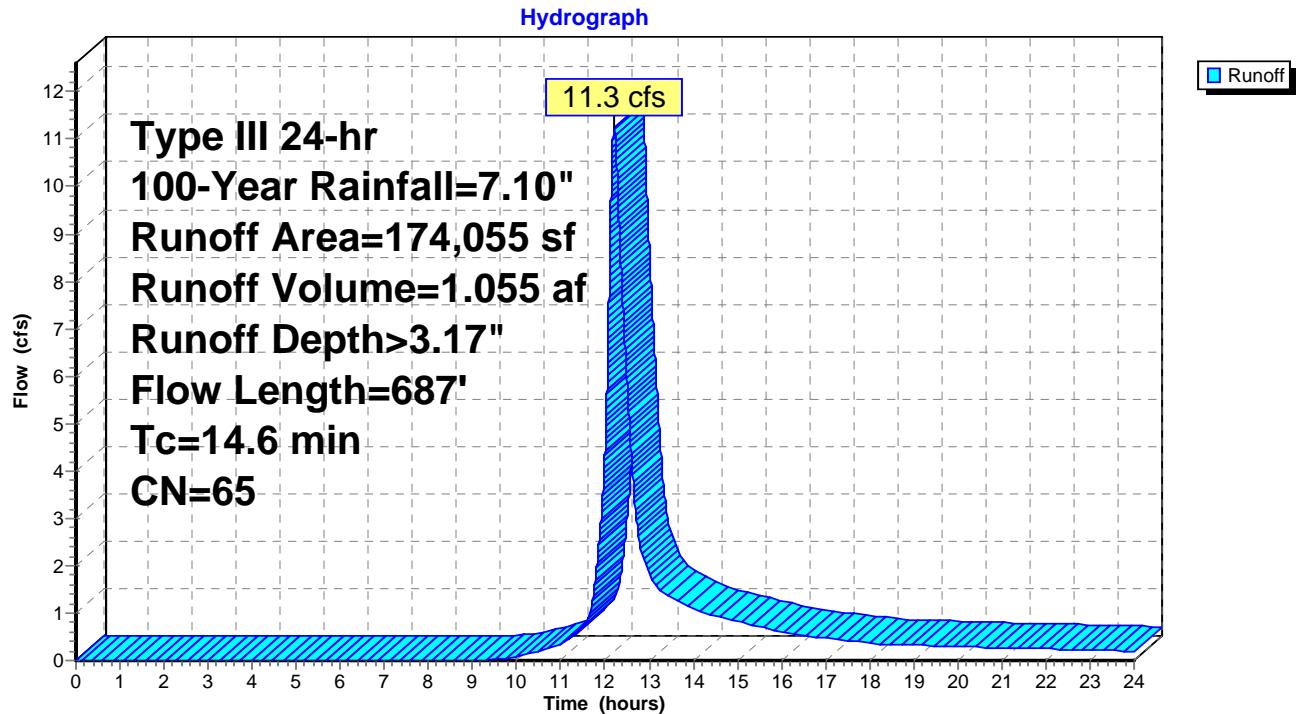
Areas to be utilized with solar arrays with 4" of 3/4" crushed stone over a filter fabric and existing graded soil have been assigned CN Values are 85 for HSG "D" and 69 for HSG "B".

Runoff = 11.3 cfs @ 12.21 hrs, Volume= 1.055 af, Depth> 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)	CN	Description
*	136,434	61 Solar Array Area (grass), Good, HSG B
*	18,384	80 Solar Array Area (grass), Good, HSG D
	8,367	60 Woods, Fair, HSG B
*	1,324	98 Concrete Pads and Ballast, HSG D
*	9,546	98 Concrete Pads and Ballast, HSG B
174,055	65	Weighted Average
163,185		93.75% Pervious Area
10,870		6.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	66	0.0455	0.22		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
3.0	34	0.0408	0.19		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
0.5	49	0.0533	1.62		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
2.7	215	0.0372	1.35		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
1.4	157	0.0764	1.93		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
2.1	166	0.0361	1.33		Shallow Concentrated Flow, Solar Arrays Short Grass Pasture Kv= 7.0 fps
14.6	687	Total			

Subcatchment #2: North solar farm area

Post-Development North Outlet

Prepared by Boundaries LLC - DCM

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Type III 24-hr 100-Year Rainfall=7.10"

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Summary for Subcatchment #4A: Overland to north

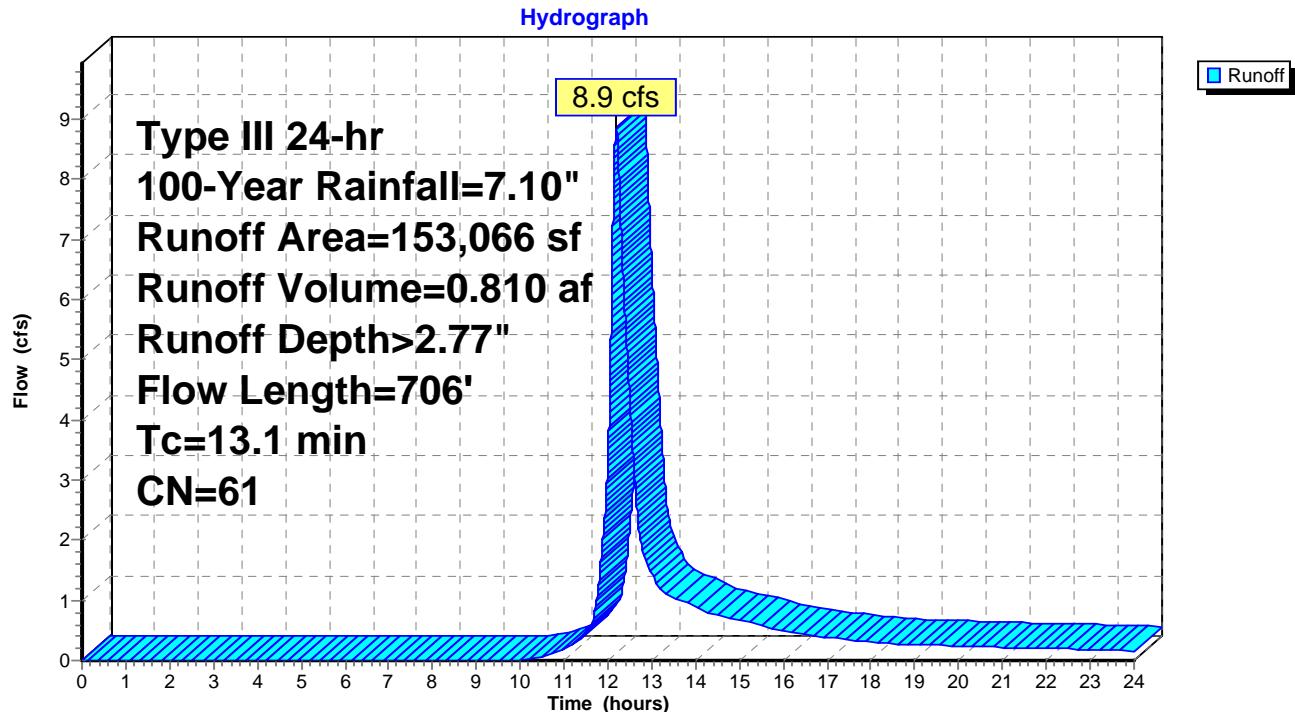
Runoff = 8.9 cfs @ 12.18 hrs, Volume= 0.810 af, Depth> 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
*	33,101	61	Solar Array Area (grass), Good, HSG B
	31,799	61	>75% Grass cover, Good, HSG B
	85,681	60	Woods, Fair, HSG B
*	2,485	98	Concrete Ballast, HSG B
	153,066	61	Weighted Average
	150,581		98.38% Pervious Area
	2,485		1.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.18		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
2.1	166	0.0361	1.33		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
1.0	125	0.1600	2.00		Shallow Concentrated Flow, Woods Woodland Kv= 5.0 fps
0.5	315	0.0762	10.46	52.30	Trap/Vee/Rect Channel Flow, Wetland Bot.W=3.00' D=1.00' Z= 2.0 '/' Top.W=7.00' n= 0.030

13.1 706 Total

Subcatchment #4A: Overland to north

Post-Development North Outlet

Prepared by Boundaries LLC - DCM

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Type III 24-hr 100-Year Rainfall=7.10"

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Summary for Subcatchment #4B: Northwest solar farm

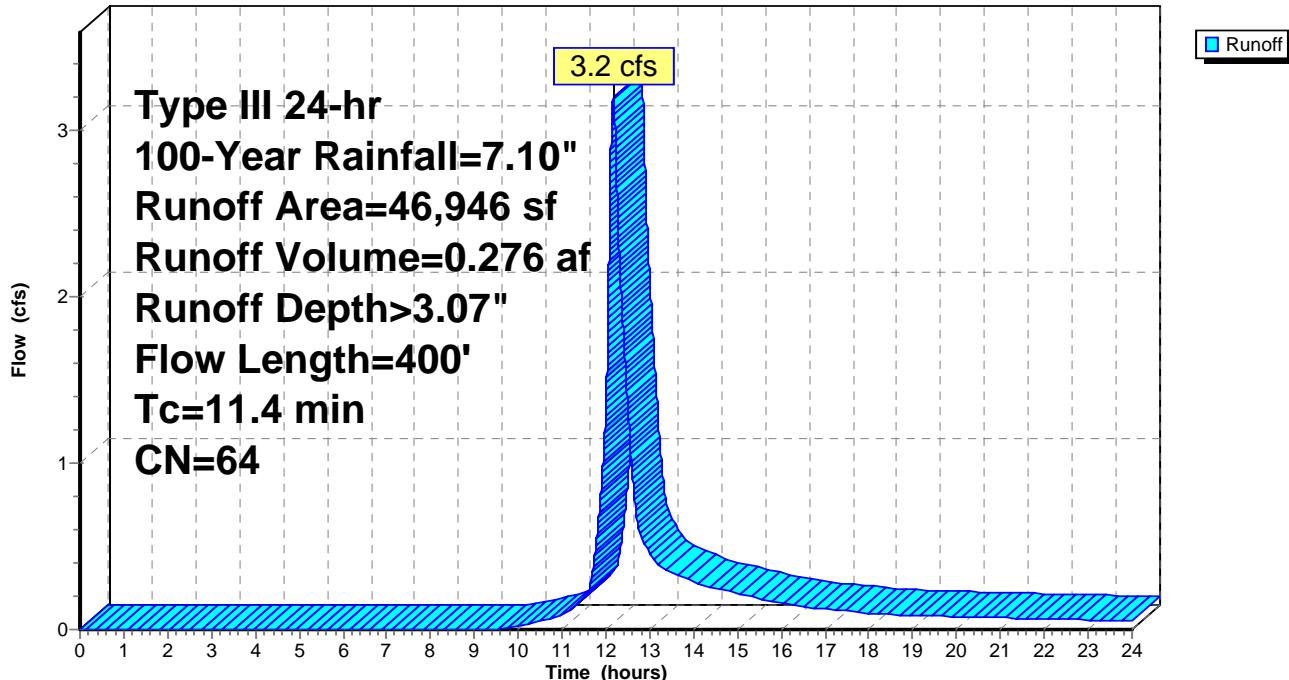
Runoff = 3.2 cfs @ 12.16 hrs, Volume= 0.276 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)		CN	Description		
* 42,814		61	Solar Array Area (grass), Good, HSG B		
950		61	>75% Grass cover, Good, HSG B		
* 3,182		98	Concrete Ballasts, HSG B		
46,946		64	Weighted Average		
43,764			93.22% Pervious Area		
3,182			6.78% Impervious Area		
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.0250	0.19		Sheet Flow, Solar Arrays Grass: Short n= 0.150 P2= 3.40"
0.5	56	0.0720	1.88		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
0.1	20	0.3000	5.48		Shallow Concentrated Flow, Ledge Outcrop Nearly Bare & Untilled Kv= 10.0 fps
2.1	224	0.0666	1.81		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
11.4	400				Total

Subcatchment #4B: Northwest solar farm

Hydrograph



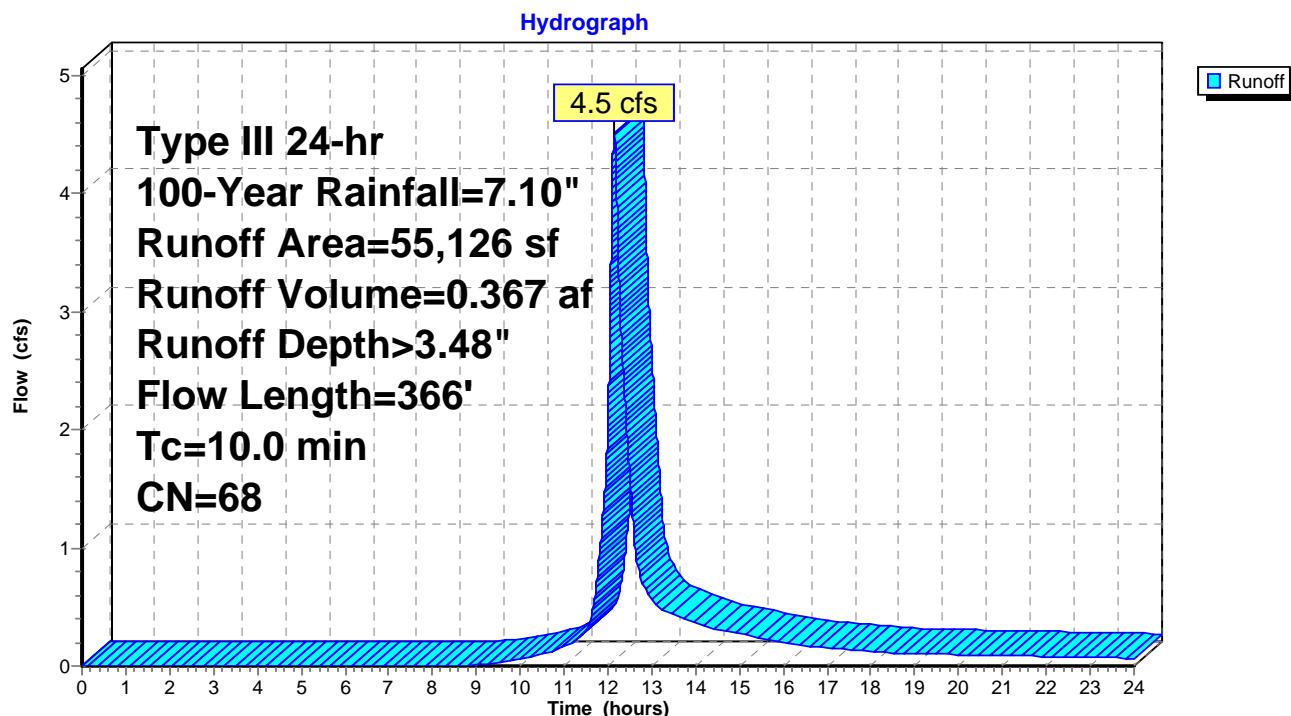
Summary for Subcatchment #4C: Overland to northeast

Runoff = 4.5 cfs @ 12.14 hrs, Volume= 0.367 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
*	41,012	61	Solar Array Area (grass), Good, HSG B
	7,276	96	Gravel surface, HSG B
	3,547	61	>75% Grass cover, Good, HSG B
*	3,291	98	Concrete pads and ballast, HSG B
	55,126	68	Weighted Average
	51,835		94.03% Pervious Area
	3,291		5.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0550	2.13		Sheet Flow, Gravel access road Smooth surfaces n= 0.011 P2= 3.40"
0.2	35	0.0550	3.78		Shallow Concentrated Flow, Gravel access drive Unpaved Kv= 16.1 fps
2.1	231	0.0667	1.81		Shallow Concentrated Flow, Solar arrays, grass Short Grass Pasture Kv= 7.0 fps
3.1	366				Total, Increased to minimum Tc = 10.0 min

Subcatchment #4C: Overland to northeast

Summary for Reach 4R: To intermittent watercourse

Inflow Area = 1.078 ac, 6.78% Impervious, Inflow Depth > 3.04" for 100-Year event

Inflow = 3.2 cfs @ 12.17 hrs, Volume= 0.273 af

Outflow = 2.9 cfs @ 12.23 hrs, Volume= 0.272 af, Atten= 10%, Lag= 3.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3

Max. Velocity= 0.54 fps, Min. Travel Time= 4.8 min

Avg. Velocity = 0.21 fps, Avg. Travel Time= 12.2 min

Peak Storage= 829 cf @ 12.23 hrs

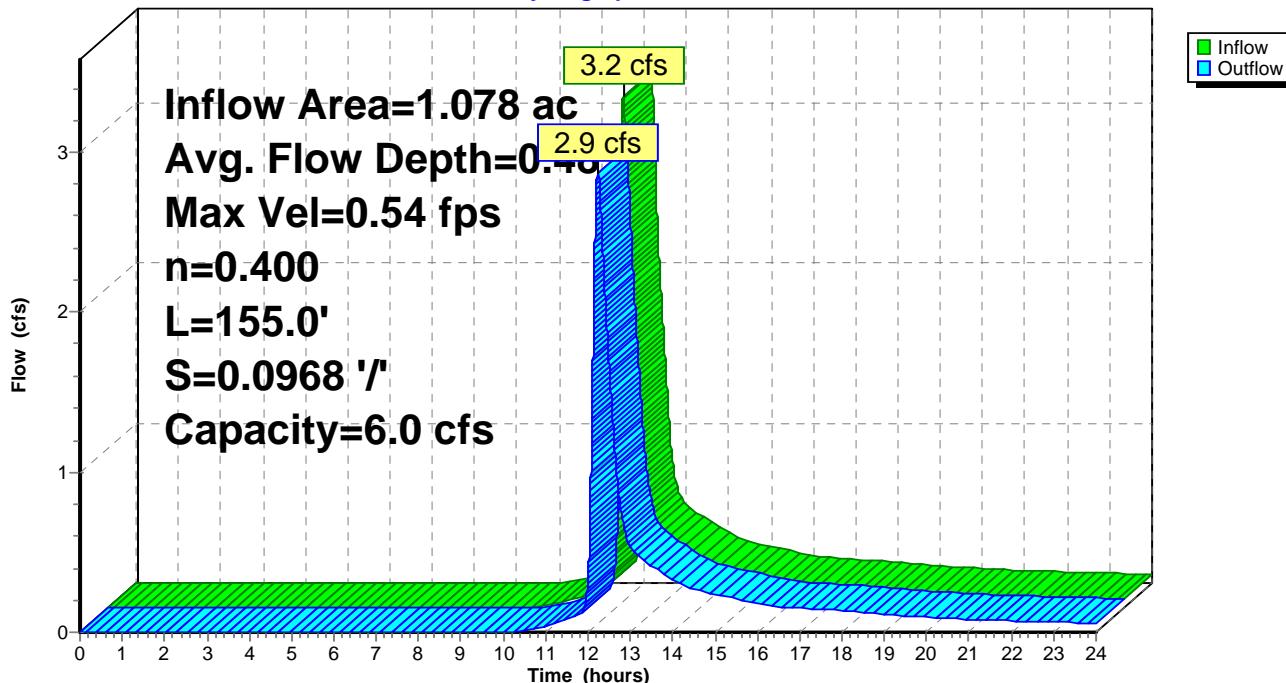
Average Depth at Peak Storage= 0.48'

Bank-Full Depth= 0.67' Flow Area= 8.9 sf, Capacity= 6.0 cfs

20.00' x 0.67' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush

Length= 155.0' Slope= 0.0968 '/'

Inlet Invert= 321.00', Outlet Invert= 306.00'

**Reach 4R: To intermittent watercourse****Hydrograph**

Summary for Reach 5R: To intermittent watercourse

Inflow Area = 1.266 ac, 5.97% Impervious, Inflow Depth > 3.44" for 100-Year event

Inflow = 3.2 cfs @ 12.25 hrs, Volume= 0.363 af

Outflow = 3.2 cfs @ 12.32 hrs, Volume= 0.362 af, Atten= 1%, Lag= 3.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3

Max. Velocity= 0.55 fps, Min. Travel Time= 4.3 min

Avg. Velocity = 0.22 fps, Avg. Travel Time= 10.5 min

Peak Storage= 820 cf @ 12.32 hrs

Average Depth at Peak Storage= 0.51'

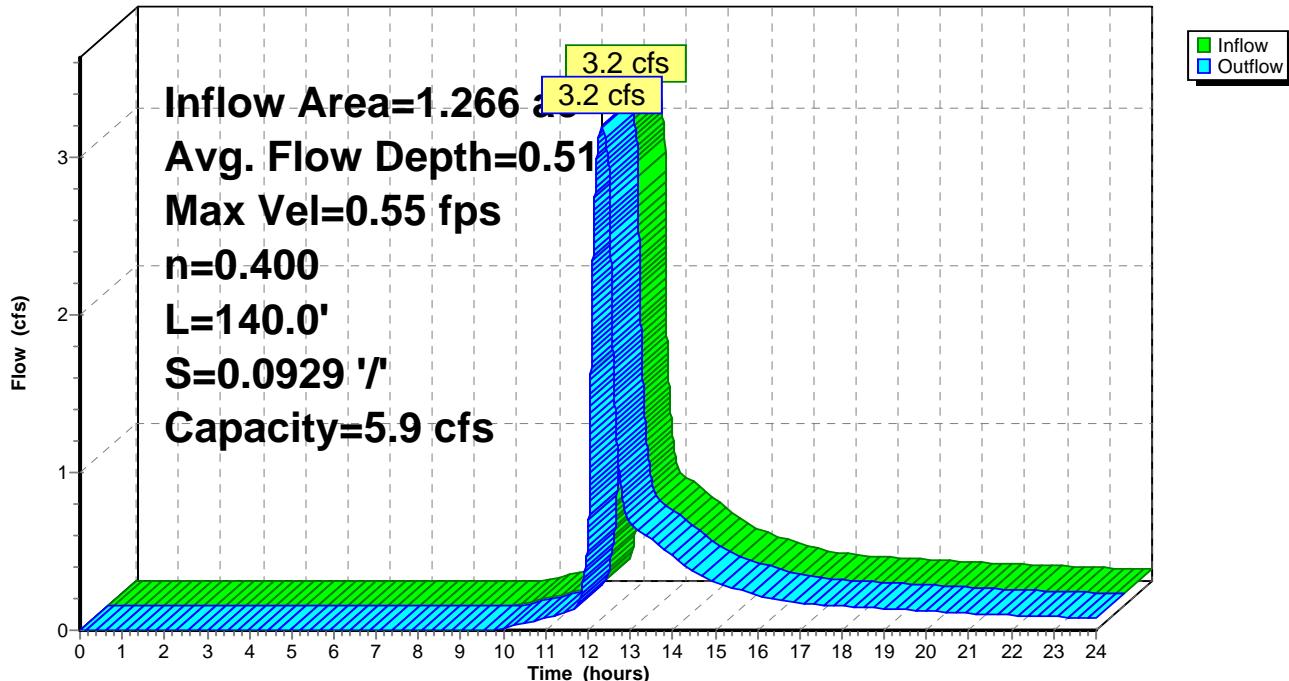
Bank-Full Depth= 0.67' Flow Area= 8.9 sf, Capacity= 5.9 cfs

20.00' x 0.67' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush

Length= 140.0' Slope= 0.0929 '/'

Inlet Invert= 311.00', Outlet Invert= 298.00'

‡

Reach 5R: To intermittent watercourse**Hydrograph**

Summary for Pond 1P: Infiltration trench #1

Inflow Area = 3.996 ac, 6.25% Impervious, Inflow Depth > 3.17" for 100-Year event

Inflow = 11.3 cfs @ 12.21 hrs, Volume= 1.055 af

Outflow = 11.3 cfs @ 12.21 hrs, Volume= 0.995 af, Atten= 0%, Lag= 0.0 min

Primary = 11.3 cfs @ 12.21 hrs, Volume= 0.995 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3

Peak Elev= 344.60' @ 12.21 hrs Surf.Area= 1,777 sf Storage= 2,684 cf

Plug-Flow detention time= 40.7 min calculated for 0.995 af (94% of inflow)

Center-of-Mass det. time= 10.9 min (858.1 - 847.2)

Volume	Invert	Avail.Storage	Storage Description
#1	340.68'	2,850 cf	11.00'W x 150.00'L x 4.15'H Crushed Stone Infiltration Trench Z=0.1 7,126 cf Overall x 40.0% Voids

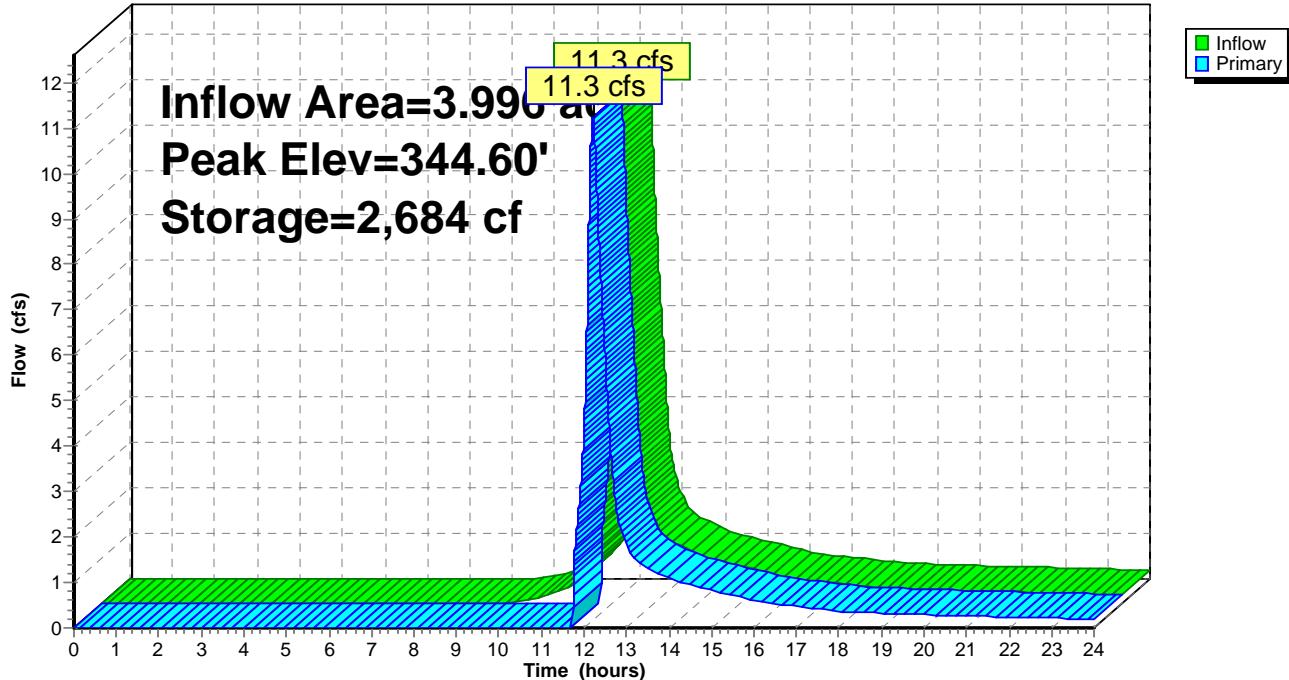
Device	Routing	Invert	Outlet Devices
#1	Primary	344.50'	150.0' long x 10.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=11.3 cfs @ 12.21 hrs HW=344.60' TW=0.00' (Dynamic Tailwater)

↑1=Overflow (Weir Controls 11.3 cfs @ 0.77 fps)

Pond 1P: Infiltration trench #1

Hydrograph



Summary for Pond 4P: Infiltration trench #2

Inflow Area = 1.078 ac, 6.78% Impervious, Inflow Depth > 3.07" for 100-Year event
 Inflow = 3.2 cfs @ 12.16 hrs, Volume= 0.276 af
 Outflow = 3.2 cfs @ 12.17 hrs, Volume= 0.273 af, Atten= 0%, Lag= 0.8 min
 Primary = 3.2 cfs @ 12.17 hrs, Volume= 0.273 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 326.86' @ 12.17 hrs Surf.Area= 0.031 ac Storage= 0.023 af

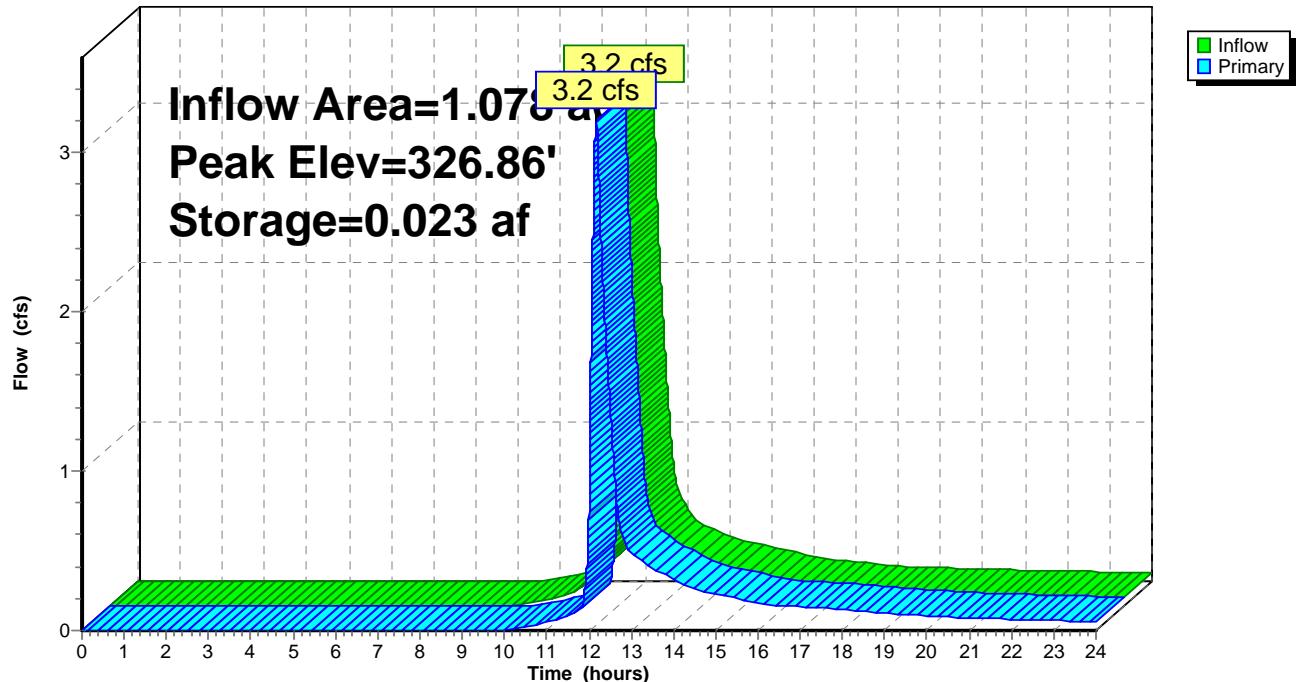
Plug-Flow detention time= 27.4 min calculated for 0.273 af (99% of inflow)
 Center-of-Mass det. time= 21.9 min (868.7 - 846.9)

Volume	Invert	Avail.Storage	Storage Description
#1	325.00'	0.041 af	10.00'W x 130.00'L x 3.33'H Prismatoid Z=0.1 0.103 af Overall - 0.000 af Embedded = 0.103 af x 40.0% Voids
#2	325.50'	0.000 af	ADS_StormTech SC-310 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
0.041 af			Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	324.33'	10.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.33' / 322.00' S= 0.1165 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Device 1	325.00'	2.5" Vert. Orifice/Grate C= 0.600
#3	Device 1	326.00'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	326.60'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=3.2 cfs @ 12.17 hrs HW=326.86' TW=321.45' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 3.2 cfs of 3.8 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.2 cfs @ 6.39 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 0.4 cfs @ 4.02 fps)
- ↑ 4=Sharp-Crested Rectangular Weir (Weir Controls 2.6 cfs @ 1.68 fps)

Pond 4P: Infiltration trench #2**Hydrograph**

Summary for Pond 5P: Infiltration trench #3

Inflow Area = 1.266 ac, 5.97% Impervious, Inflow Depth > 3.48" for 100-Year event
 Inflow = 4.5 cfs @ 12.14 hrs, Volume= 0.367 af
 Outflow = 3.2 cfs @ 12.25 hrs, Volume= 0.363 af, Atten= 28%, Lag= 6.6 min
 Primary = 3.2 cfs @ 12.25 hrs, Volume= 0.363 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3
 Peak Elev= 316.40' @ 12.25 hrs Surf.Area= 0.039 ac Storage= 0.052 af

Plug-Flow detention time= 33.5 min calculated for 0.363 af (99% of inflow)
 Center-of-Mass det. time= 26.4 min (863.3 - 837.0)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	0.058 af	10.00'W x 160.00'L x 3.83'H Prismatoid Z=0.1 0.146 af Overall - 0.000 af Embedded = 0.146 af x 40.0% Voids
#2	313.50'	0.000 af	ADS_StormTech SC-310 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
0.059 af			Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	312.33'	8.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 312.33' / 311.90' S= 0.0215 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	313.00'	2.5" Vert. Orifice/Grate C= 0.600
#3	Device 1	314.00'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	315.20'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

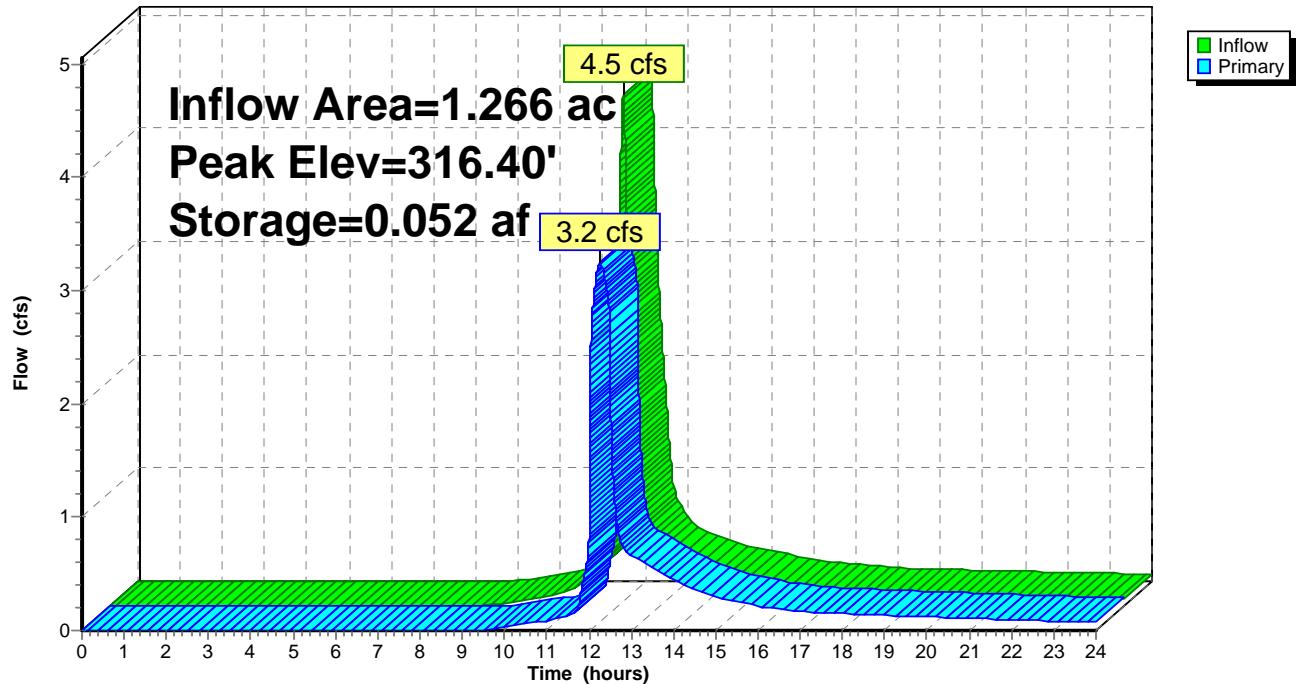
Primary OutFlow Max=3.2 cfs @ 12.25 hrs HW=316.40' TW=311.50' (Dynamic Tailwater)

1=Culvert (Inlet Controls 3.2 cfs @ 9.31 fps)

2=Orifice/Grate (Passes < 0.3 cfs potential flow)

3=Orifice/Grate (Passes < 0.6 cfs potential flow)

4=Sharp-Crested Rectangular Weir (Passes < 24.8 cfs potential flow)

Pond 5P: Infiltration trench #3**Hydrograph**

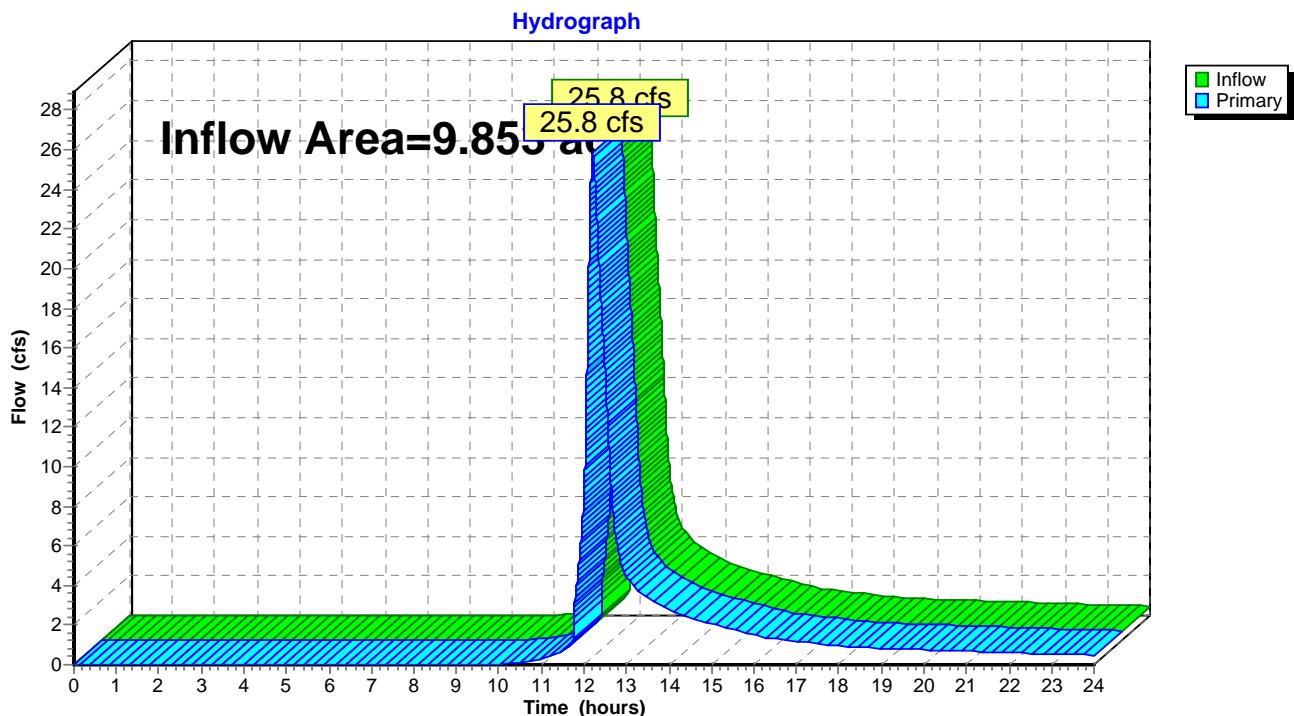
Summary for Link Out: Outlets site to north

Inflow Area = 9.853 ac, 4.62% Impervious, Inflow Depth > 2.97" for 100-Year event

Inflow = 25.8 cfs @ 12.21 hrs, Volume= 2.438 af

Primary = 25.8 cfs @ 12.21 hrs, Volume= 2.438 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs

Link Out: Outlets site to north

RIP RAP APRON SIZING CALCULATIONS

RIP RAP APRON SIZING CALCULATIONS- FE #1

LENGTH OF APRON: $L_a = \frac{1.7 Q}{D_o^{1.5}} + 8 D_o$ where L_a = length of apron
 Q = pipe discharge in cfs = 4.8 cfs
 D_o = pipe diameter = 15 in
 $L_a = 15.8 \text{ ft } \sim \mathbf{16 \text{ FT}}$

WIDTH OF APRON (W)

For no well-defined channel downstream of the apron:

Apron width at the culvert outlet = $3 D_o = 3.75 \text{ ft } \sim \mathbf{4 \text{ FT}}$

Apron width at end of apron:

$W = 3 D_o + L_a$ for tailwater < the elevation of the center of the pipe

$W = 16 \text{ ft} + 4 \text{ ft } \sim \mathbf{20 \text{ FT}}$

SIZE OF RIP RAP

Discharge velocity = 3.9 fps

Outlet Velocity (fps)	Rip Rap Specification
0-8	Modified
8-10	Intermediate
10-14	Standard

FROM CONNDOT DRAINAGE MANUAL, OCTOBER 2000

Use modified rip rap

RIP RAP APRON SIZING CALCULATIONS- FE #2

LENGTH OF APRON: $L_a = \frac{1.7 Q}{D_o^{1.5}} + 8 D_o$ where L_a = length of apron
 Q = pipe discharge in cfs = 0.6 cfs
 D_o = pipe diameter = 12 in
 $L_a = 8.2 \text{ ft } \sim \mathbf{10 \text{ FT}}$

WIDTH OF APRON (W)

For no well-defined channel downstream of the apron:

Apron width at the culvert outlet = $3 D_o = 3.00 \text{ ft } \sim \mathbf{3 \text{ FT}}$

Apron width at end of apron:

$$W = 3 D_o + L_a \quad \text{for tailwater} < \text{the elevation of the center of the pipe}$$

$$W = 3 \text{ ft} + 10 \text{ ft} \sim \mathbf{13 \text{ FT}}$$

SIZE OF RIP RAP

Discharge velocity = 2.9 fps

Outlet Velocity (fps)	Rip Rap Specification
0-8	Modified
8-10	Intermediate
10-14	Standard

FROM CONNDOT DRAINAGE MANUAL, OCTOBER 2000

Use modified rip rap

RIP RAP APRON SIZING CALCULATIONS- FE #3

LENGTH OF APRON:
$$L_a = \frac{1.7 Q}{D_o^{1.5}} + 8 D_o \quad \text{where } L_a = \text{length of apron}$$
$$Q = \text{pipe discharge in cfs} = 1.4$$
$$D_o = \text{pipe diameter} = 10 \text{ in}$$
$$L_a = 9.8 \text{ ft } \sim \mathbf{10 \text{ FT}}$$

WIDTH OF APRON (W)

For no well-defined channel downstream of the apron:

$$\text{Apron width at the culvert outlet} = 3 D_o = 2.5 \text{ ft } \sim \mathbf{3 \text{ FT}}$$

Apron width at end of apron:

$$W = 3 D_o + L_a \quad \text{for tailwater} < \text{the elevation of the center of the pipe}$$

$$W = 3 \text{ ft} + 10 \text{ ft} \sim \mathbf{13 \text{ FT}}$$

SIZE OF RIP RAP

Discharge velocity = 6.1 fps

Outlet Velocity (fps)	Rip Rap Specification
0-8	Modified
8-10	Intermediate
10-14	Standard

FROM CONNDOT DRAINAGE MANUAL, OCTOBER 2000

Use modified rip rap

RIP RAP APRON SIZING CALCULATIONS- FE #4

LENGTH OF APRON: $L_a = \frac{1.7 Q}{D_o^{1.5}} + 8 D_o$ where L_a = length of apron
 Q = pipe discharge in cfs = 2.0 cfs
 D_o = pipe diameter = 8 in
 $L_a = 11.6 \text{ ft} \sim \mathbf{12 \text{ FT}}$

WIDTH OF APRON (W)

For no well-defined channel downstream of the apron:

Apron width at the culvert outlet = $3 D_o = 1.8 \text{ ft} \sim \mathbf{3 \text{ FT}}$

Apron width at end of apron:

$W = 3 D_o + L_a$ for tailwater < the elevation of the center of the pipe

$W = 3 \text{ ft} + 12 \text{ ft} \sim \mathbf{15 \text{ FT}}$

SIZE OF RIP RAP

Discharge velocity = 5.7 fps

Outlet Velocity (fps)	Rip Rap Specification
0-8	Modified
8-10	Intermediate
10-14	Standard

FROM CONNDOT DRAINAGE MANUAL, OCTOBER 2000

Use **modified** rip rap

RIP RAP APRON SIZING CALCULATIONS

OUTLET AT CULVERT #1

LENGTH OF APRON: $L_a = \frac{1.7 Q}{D_o^{1.5}} + 8 D_o$ where L_a = length of apron
 Q = pipe discharge in cfs = 3.6 cfs
 D_o = pipe diameter = 12 in
 $L_a = 14.1 \text{ ft } \sim \mathbf{14 \text{ FT}}$

WIDTH OF APRON (W)

For no well-defined channel downstream of the apron:

Apron width at the culvert outlet = $3 D_o = 3.0 \text{ ft } \sim \mathbf{4 \text{ FT}}$

Apron width at end of apron:

$W = 3 D_o + L_a$ for tailwater < the elevation of the center of the pipe

$W = 3.0 \text{ ft} + 14.0 \text{ ft } \sim \mathbf{17 \text{ FT}}$

SIZE OF RIP RAP

Discharge velocity = 4.5 fps

Outlet Velocity (fps)	Rip Rap Specification
0-8	Modified
8-10	Intermediate
10-14	Standard

FROM CONNDOT DRAINAGE MANUAL, OCTOBER 2000

Use **modified** rip rap

RIP RAP APRON SIZING CALCULATIONS **OUTLET AT CULVERT #2**

LENGTH OF APRON: $L_a = \frac{1.7 Q}{D_o^{1.5}} + 8 D_o$ where L_a = length of apron
 Q = pipe discharge in cfs = 3.6 cfs
 D_o = pipe diameter = 12 in
 $L_a = 14.1 \text{ ft } \sim \mathbf{14 \text{ FT}}$

WIDTH OF APRON (W)

For no well-defined channel downstream of the apron:

Apron width at the culvert outlet = $3 D_o = 3.0 \text{ ft } \sim \mathbf{3 \text{ FT}}$

Apron width at end of apron:

$W = 3 D_o + L_a$ for tailwater < the elevation of the center of the pipe

$W = 3.0 \text{ ft} + 14.0 \text{ ft } \sim \mathbf{17 \text{ FT}}$

SIZE OF RIP RAP

Discharge velocity = 4.5 fps

Outlet Velocity (fps)	Rip Rap Specification
0-8	Modified
8-10	Intermediate
10-14	Standard

FROM CONNDOT DRAINAGE MANUAL, OCTOBER 2000

Use **modified** rip rap

RIP RAP APRON SIZING CALCULATIONS **OUTLET AT CULVERT #3**

LENGTH OF APRON: $L_a = \frac{1.7 Q}{D_o^{1.5}} + 8 D_o$ where L_a = length of apron
 Q = pipe discharge in cfs = 7.5 cfs
 D_o = pipe diameter = 15 in
 $L_a = 19.1 \text{ ft } \sim \mathbf{19 \text{ FT}}$

WIDTH OF APRON (W)

For no well-defined channel downstream of the apron:

Apron width at the culvert outlet = $3 D_o = 3.75 \text{ ft } \sim \mathbf{5 \text{ FT}}$

Apron width at end of apron:

$W = 3 D_o + L_a$ for tailwater < the elevation of the center of the pipe

$W = 3.75 \text{ ft} + 19.1 \text{ ft } \sim \mathbf{23 \text{ FT}}$

SIZE OF RIP RAP

Discharge velocity = 9.8 fps

Outlet Velocity (fps)	Rip Rap Specification
0-8	Modified
8-10	Intermediate
10-14	Standard

FROM CONNDOT DRAINAGE MANUAL, OCTOBER 2000

Use intermediate rip rap

RIP RAP APRON SIZING CALCULATIONS **OUTLET AT CULVERT #4**

LENGTH OF APRON: $L_a = \frac{1.7 Q}{D_o^{1.5}} + 8 D_o$ where L_a = length of apron
 Q = pipe discharge in cfs = 1.3 cfs
 D_o = pipe diameter = 12 in
 $L_a = 10.21 \text{ ft } \sim \mathbf{11 \text{ FT}}$

WIDTH OF APRON (W)

For no well-defined channel downstream of the apron:

Apron width at the culvert outlet = $3 D_o = 3.75 \text{ ft } \sim \mathbf{5 \text{ FT}}$

Apron width at end of apron:

$W = 3 D_o + L_a$ for tailwater < the elevation of the center of the pipe
 $W = 3.75 \text{ ft} + 10.2 \text{ ft } \sim \mathbf{14 \text{ FT}}$

SIZE OF RIP RAP

Discharge velocity = 7.1 fps

Outlet Velocity (fps)	Rip Rap Specification
0-8	Modified
8-10	Intermediate
10-14	Standard

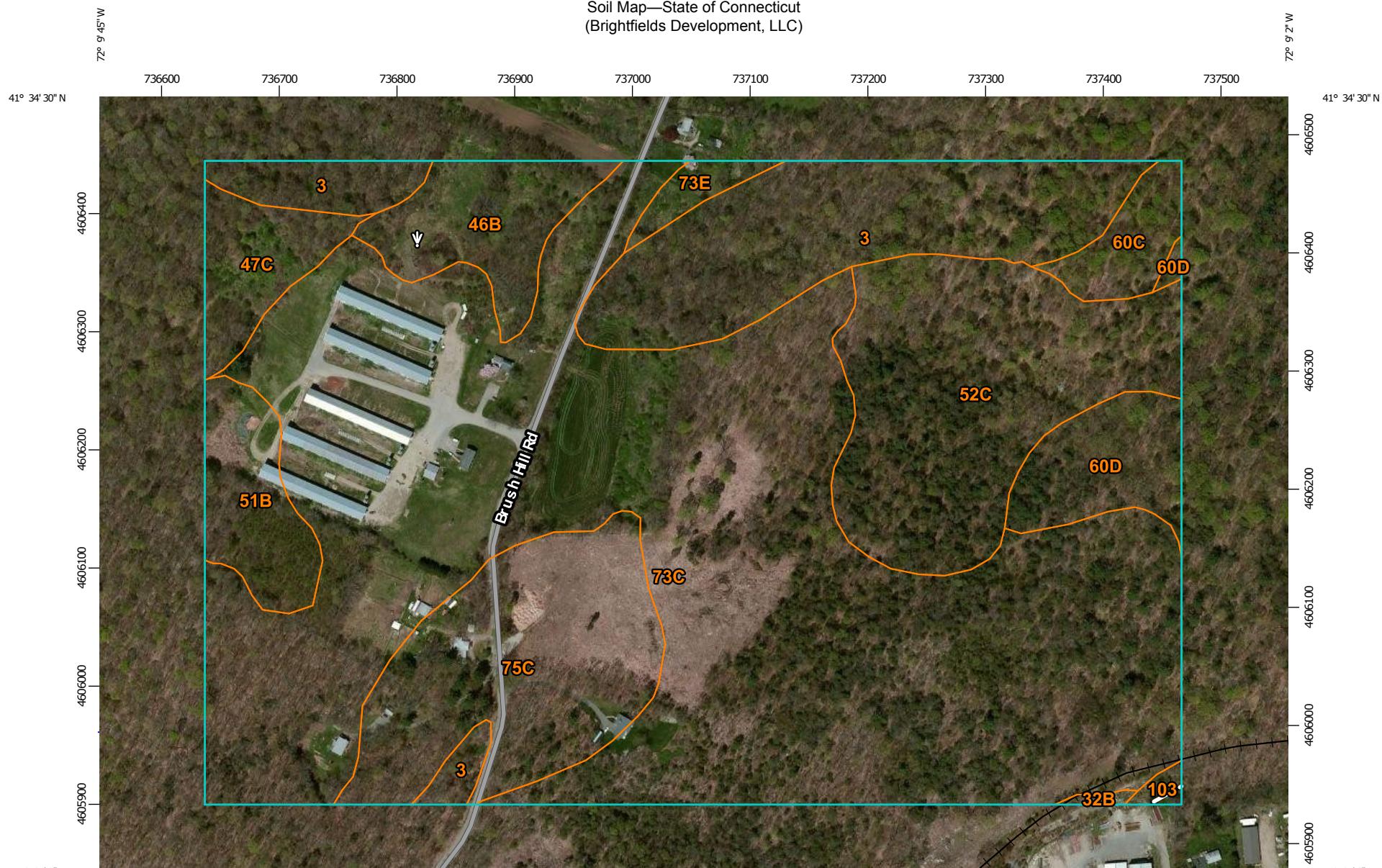
FROM CONNDOT DRAINAGE MANUAL, OCTOBER 2000

Use **modified** rip rap

APPENDIX

NRCS SOILS MAP

Soil Map—State of Connecticut
(Brightfields Development, LLC)



Map Scale: 1:4,620 if printed on A landscape (11" x 8.5") sheet.

0 50 100 150 200 250 300 Meters

0 200 400 600 800 1000 1200 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

9/11/2014
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)	
	Area of Interest (AOI)
Soils	
	Soil Map Unit Polygons
	Soil Map Unit Lines
	Soil Map Unit Points
Special Point Features	
	Blowout
	Borrow Pit
	Clay Spot
	Closed Depression
	Gravel Pit
	Gravelly Spot
	Landfill
	Lava Flow
	Marsh or swamp
	Mine or Quarry
	Miscellaneous Water
	Perennial Water
	Rock Outcrop
	Saline Spot
	Sandy Spot
	Severely Eroded Spot
	Sinkhole
	Slide or Slip
	Sodic Spot
Spoil Area	
	Stony Spot
	Very Stony Spot
	Wet Spot
	Other
	Special Line Features
Water Features	
	Streams and Canals
Transportation	
	Rails
	Interstate Highways
	US Routes
	Major Roads
	Local Roads
Background	
	Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut

Survey Area Data: Version 11, Nov 19, 2013

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

Date(s) aerial images were photographed: Mar 28, 2011—May 12, 2011

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

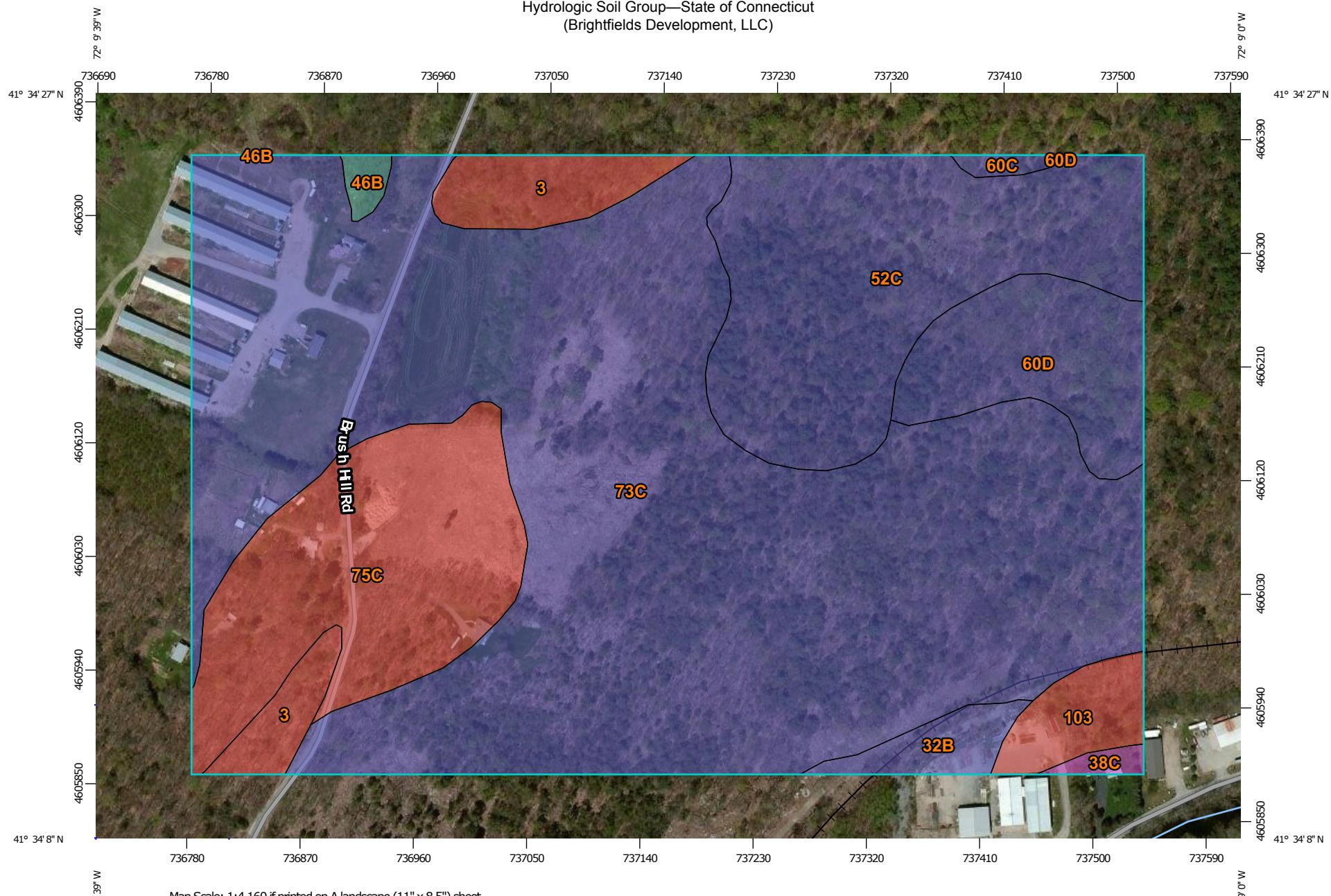


Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, extremely stony	12.8	11.4%
32B	Haven and Enfield soils, 3 to 8 percent slopes	0.1	0.1%
46B	Woodbridge fine sandy loam, 2 to 8 percent slopes, very stony	4.0	3.6%
47C	Woodbridge fine sandy loam, 2 to 15 percent slopes, extremely stony	2.7	2.4%
51B	Sutton fine sandy loam, 2 to 8 percent slopes, very stony	3.3	2.9%
52C	Sutton fine sandy loam, 2 to 15 percent slopes, extremely stony	12.9	11.5%
60C	Canton and Charlton soils, 8 to 15 percent slopes	1.8	1.6%
60D	Canton and Charlton soils, 15 to 25 percent slopes	3.4	3.0%
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	59.7	53.2%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	0.8	0.7%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	10.4	9.2%
103	Rippowam fine sandy loam	0.3	0.2%
Totals for Area of Interest		112.2	100.0%

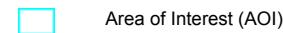
NRCS HYDROLOGIC SOIL GROUPS MAP

Hydrologic Soil Group—State of Connecticut
(Brightfields Development, LLC)



MAP LEGEND

Area of Interest (AOI)



Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

	A
	A/D
	B
	B/D

C

C/D

D

Not rated or not available

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut

Survey Area Data: Version 11, Nov 19, 2013

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

Date(s) aerial images were photographed: Mar 28, 2011—May 12, 2011

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



Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — State of Connecticut (CT600)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, extremely stony	D	3.4	3.7%
32B	Haven and Enfield soils, 3 to 8 percent slopes	B	1.3	1.4%
38C	Hinckley gravelly sandy loam, 3 to 15 percent slopes	A	0.3	0.3%
46B	Woodbridge fine sandy loam, 2 to 8 percent slopes, very stony	C	0.4	0.4%
52C	Sutton fine sandy loam, 2 to 15 percent slopes, extremely stony	B	13.6	14.7%
60C	Charlton and Charlton soils, 8 to 15 percent slopes	B	0.3	0.3%
60D	Charlton and Charlton soils, 15 to 25 percent slopes	B	5.1	5.5%
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	B	55.2	60.0%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	D	10.7	11.6%
103	Rippowam fine sandy loam	D	1.8	2.0%
Totals for Area of Interest			92.1	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

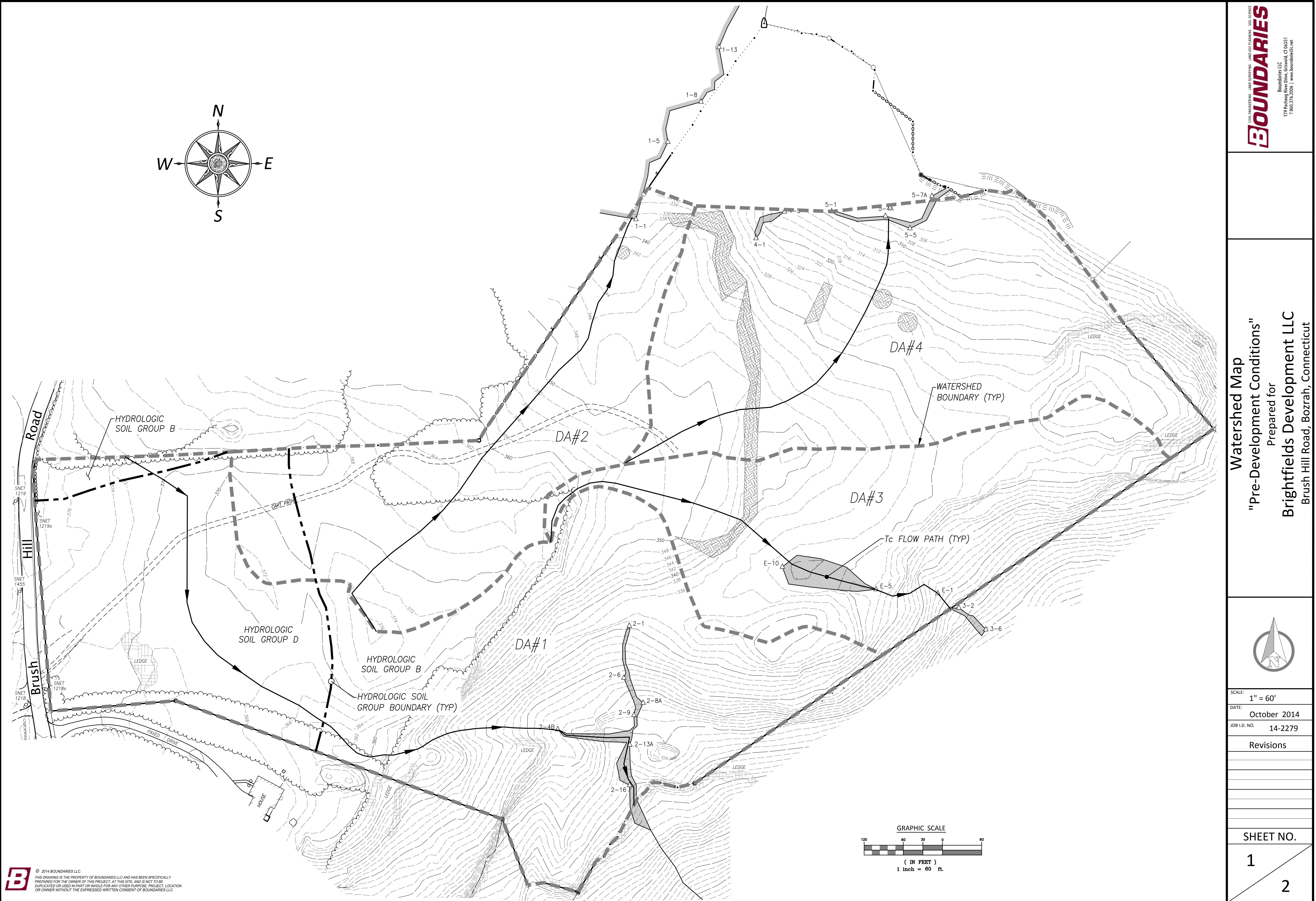
Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

WATERSHED MAPS



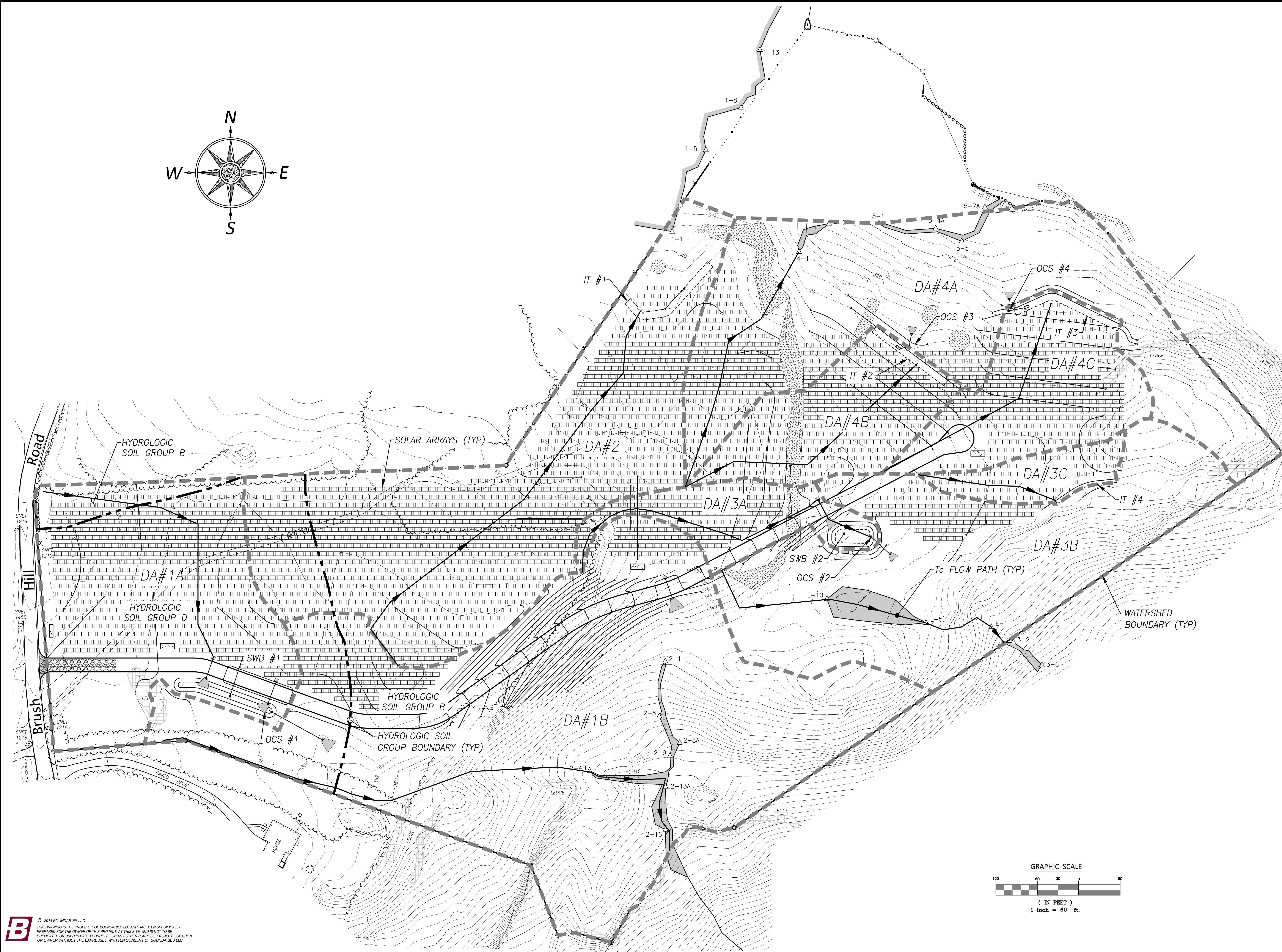


EXHIBIT 4

NOTICE



BROWN RUDNICK

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ATTORNEY-AT-LAW

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tel 860.509.6500
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March 31, 2015

VIA FIRST CLASS MAIL

Re: **Petition of SolarCity Corporation to the Connecticut Siting Council for a Declaratory Ruling for the Location and Construction of a 3.1 Megawatt Solar Electric Generating Facility at 80 Brush Hill Road, Bozrah, Connecticut**

To the Persons on the Attached List:

Pursuant to Section 16-50j-40 of the Connecticut Siting Council's (the "Council") regulations, we are notifying you that SolarCity Corporation intends to file on or shortly after April 1, 2015, a petition for declaratory ruling with the Council. The petition will request the Council's approval of the location and construction of an approximately 3.1 megawatt ("MW") solar electric generating facility (the "Facility") at 80 Brush Hill Road, Bozrah, Connecticut (the "Site"). The Facility will be a "grid-side distributed resources" facility (as defined in Conn. Gen. Stat. §16-1(a)(38)) under 65 MW that complies with the air and water quality standards of the Connecticut Department of Energy and Environmental Protection ("DEEP"), and that will not have a substantial adverse environmental effect. Electricity generated by the Facility will be exported to the electric grid.

If you have any questions regarding the proposed Facility, please contact any of the following:

Robert Miller
SolarCity Corporation
714 Brook Street
Rocky Hill, CT 06067
Tel: (914) 584-6894
Fax: (866) 270-6397
E-mail: rmiller@solarcity.com

Philip M. Small, Esq.
Brown Rudnick LLP
185 Asylum Street, 38th Floor
Hartford, CT 06103-3402
Tel: (860) 509-6575
Fax: (860) 509-6501
E-mail: psmall@brownrudnick.com

Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051
Tel: (860) 827-2935
Fax: (860) 827-2950
E-mail: siting.council@ct.gov



Letter to Abutters of 80 Brush Hill Road, Bozrah, Connecticut
March 31, 2015
Page 2

Very truly yours,

BROWN RUDNICK LLP

By:

Philip M. Small

A handwritten signature in black ink, appearing to read 'PM' and 'Philip M. Small'.

PMS/jmb

61911809 v1-WorkSiteUS-031819/0001

<i>MUNICIPAL OFFICIAL / AGENCY</i>	<i>NAME/ADDRESS</i>
Chief Executive Officer	William Ballinger, First Selectman Bozrah Town Hall 1 River Road Bozrah, CT 06334
Inland Wetlands Commission	Scott Taylor, Chair Inland Wetlands Commission Bozrah Town Hall 1 River Road Bozrah, CT 06334
Conservation Commission	Scott Taylor, Chair Inland Wetlands Commission Bozrah Town Hall 1 River Road Bozrah, CT 06334
Planning & Zoning Commission	Seymour Adelman, Chair Inland Wetlands Commission Bozrah Town Hall 1 River Road Bozrah, CT 06334
Regional Planning Agency	Richard Serra, Senior Planner Regional Planning Agency Southeastern Connecticut Council of Government 5 Connecticut Avenue Norwich, Connecticut 06360
State Senator	Paul Formica, State Senator Legislative Office Building, Room 3400 300 Capitol Avenue Hartford, CT 06106
State Representative	Kevin Ryan, State Representative Legislative Office Building, Room 4012 300 Capitol Avenue Hartford, CT 06106

MUNICIPAL OFFICIAL / AGENCY	NAME/ADDRESS
Connecticut Attorney General	George Jepsen, Attorney General Office of the Attorney General 55 Elm Street Hartford, CT 06106
State Department of Energy and Environmental Protection	Rob Klee, Commissioner Department of Energy and Environmental Protection 79 Elm Street Hartford, CT 06106-5127
State Public Utilities Regulatory Authority	Arthur House, Chairman Public Utilities Regulatory Authority Department of Energy and Environmental Protection 10 Franklin Square New Britain, CT 06051
State Department of Public Health	Dr. Jewel Mullen, Commissioner Department of Public Health 410 Capitol Avenue P.O. Box 340308 Hartford, CT 06134
State Council on Environmental Quality	Susan D. Merrow, Chair Council on Environmental Quality 79 Elm Street Hartford, CT 06106
State Department of Agriculture	Steven K. Reviczky, Commissioner Department of Agriculture 165 Capitol Avenue Hartford, CT 06106
Office of Policy & Management	Benjamin Barnes, Secretary Office of Policy and Management 450 Capitol Avenue Hartford, CT 06106
State Department of Economic & Community Development	Catherine Smith, Commissioner Department of Economic and Community Development 505 Hudson Street Hartford, CT 06106
State Department of Transportation	James P. Redeker, Commissioner Department of Transportation 2800 Berlin Turnpike Newington, CT 06111
Any Federal Agencies with Jurisdiction Over the Site	None

<i>ABUTTER PROPERTY</i>	<i>ABUTTER NAME/MAILING ADDRESS</i>
73 Brush Hill Road Bozrah, CT 06334 (Map 04, Lot 001)	Sarah Brush and Texas Moon 87 Brush Hill Rd Bozrah, CT 06334
100 Lebanon Road Bozrah, CT 06334 (Map 04, Lot 005)	Hydes Real Estate LLC 137 Lebanon Rd Franklin, CT 06254
80 Stockhouse Rd Bozrah, CT 06334 (Map 04, Lot 006)	AirGas Merchant Gases, LLC Corporate Tax Department, PO Box 6675 Radnor, PA 19087
28 Stockhouse Rd Bozrah, CT 06334 (Map 04, Lot 006A2)	Steven J Coit 161 Hough Road Bozrah, CT 06334
Fitchville Road Bozrah, CT 06334 (Map 03, Lot 044)	L M Gilman Trust & Richard Gilman PO Box 21 Gilman, CT 06336
41 Brush Hill Rd Bozrah, CT 06334 (Map 03, Lot 043)	Craig & Laura Stauning 41 Brush Hill Road Bozrah, CT 06334
Schwartz Road/ Blue Hill Road 25 Bozrah, CT 06334 (Map 03, Lot 020)	Kofkoff Egg Farm 17 Schwartz Rd Bozrah, CT 06334
46 Brush Hill Rd Bozrah, CT 06334 (Map 03, Lot 030)	James and Dorothy Clemens 46 Brush Hill Rd Bozrah, CT 06334
42 Brush Hill Rd Bozrah, CT 06334 (Map 03, Lot 039)	Janice Wells & Arthur Tylenda 42 Brush Hill Rd Bozrah, CT 06334