Town of Manlius

Planning Board Meeting

January 10, 2022

6:30PM

1. Zoom Meeting Instructions

   Documents:

   ZOOM PLANNING BOARD MEETING INSTRUCTIONS JANUARY 10, 2022.PDF

2. Pledge Of Allegiance

3. Approval Of Minutes - December 13, 2021

4. Organizational Meeting

   Documents:

   2022 ORGANIZATIONAL MEETING.PDF

5. William T. Adams - 7145 Ferstler Road, Kirkville, NY 13082 - Public Hearing - 2-Lot Subdivision - 7063 Ferstler Road, Kirkville, NY 13082 Tax Map # 042.-01-21.1

   Documents:

   7063 FERSTLER ROAD - 2-LOT SUBDIVISON APPLICATION.PDF
   7063 FERSTLER ROAD - SUBDIVISON MAP.PDF
   7063 FERSTLER ROAD - UPDATED MAP.PDF

6. Harrington Homes - 3848 Henneberry Road, Jamesville, NY 13078 - Public Hearing -34 Lot Subdivision & Site Plan – Harrington Homes At Brandywine - Brandywine Off Of Henneberry Road Tax Map # 109.-02-07.1

   Documents:

   BRANDYWINE - 34 - LOT SUBDIVISION - PLAT PHASE 3_PP.PDF
   BRANDYWINE - 34 - LOT SUBDIVISION - PEER REVIEW COMMENTS.PDF
   BRANDYWINE - 34 - LOT SUBDIVISION - PRELIMINARY LAYOUT PLAN.PDF
   BRANDYWINE - 34 - LOT SUBDIVISION - SHORT FORM EAF - SIGNED.PDF
   BRANDYWINE - 34 - LOT SUBDIVISION - SITE PLANS 2020-09-17.PDF
   BRANDYWINE - 34 - LOT SUBDIVISION - SWPPP 2020-09-17.PDF
   BRANDYWINE - 34 - LOT SUBDIVISION - WELL REPORT MANLIUS PB RESPONSE LETTER.PDF
   BRANDYWINE - 34 - LOT SUBDIVISION - WELL REPORT.PDF
   BRANDYWINE - 34 - LOT SUBDIVISON - PB APPLICATION-SIGNED.PDF
   BRANDYWINE LETTER FROM GERRY GOULD.PDF
   OCPB REFERAL -HARRINGTON HOMES - BRANDYWINE - 34 LOT SUBDIVISION.PDF
   OCPB RESPONSE - HARRINGTON HOMES - BRANDYWINE - 34 - LOT SUBDIVISION.PDF
   UPDATED - BRANDYWINE - 34 - LOT - SUBDIVISION - 2021-12-01 SITE PLAN

SET.PDF
UPDATED - BRANDYWINE - 34 - LOT - SUBDIVISION - LETTER REPORT HARRINGTON REPONSE TO GOULD NOV 2021.PDF
UPDATED - BRANDYWINE - 34 - LOT SUBDIVISON - SWPPP 2021-12-01.PDF

7. Abundant Solar - 700 W. Metro Park, Rochester, NY 14623 - 2nd Presentation - Site Plan And Special Use Permit - Solar Array - 5701 Bowman Road East Syracuse, NY 13057 Tax Map # 074.-01-06.1

   Documents:

   5701 BOWMAN ROAD - SOLAR ARRAY - SPECIAL PERMIT - SUPPLEMENTAL INFORMATION.PDF
   5701 BOWMAN ROAD - SOLAR ARRAY - APPLICATION AND DISCLOSURE AFFIDAVIT.PDF
   5701 BOWMAN ROAD - SOLAR ARRAY - COVER LETTER.PDF
   5701 BOWMAN ROAD - SOLAR ARRAY - DELINEATED WETLANDS MAP AND SITE CONDITION PLAN.PDF
   5701 BOWMAN ROAD - SOLAR ARRAY - LETTER TO CHAIRMAN.PDF
   5701 BOWMAN ROAD - SOLAR ARRAY - PRELIMINARY SITE PLAN.PDF
   5701 BOWMAN ROAD - SOLAR ARRAY - SHORT EAF.PDF
   5701 BOWMAN ROAD - SOLAR ARRAY - USGS MAP ONONDAGA QUAD.PDF
   ABUNDANT SOLAR LEASE.PDF
   BOWMAN ROAD - SOLAR PROJECT - SUP APPLICATION PACKAGE.PDF

8. Other Business

9. Adjournment

Town of
MANLIUS
New York

January 10, 2022

Virtual Planning Board Meeting

Instructions to attend the January 10, 2022 virtual Planning Board meeting:

The easiest way to join is to go to our website www.TownOfManlius.org and click on the link that is located on the homepage. You can also watch on our Facebook page by searching for "Town of Manlius"

Enter the meeting url web address as listed below:

https://us02web.zoom.us/j/83541361358?

Password to join when prompted:

Password: 004644

Enter your email address and name and join the meeting!

Join by telephone by dialing the number below:

1-(929) -436-2866

When prompted to enter the Webinar ID, use the number below followed by #

Webinar ID: 835 4136 1358

Press # again to skip the personal id and enter the password below followed by #

Password: 004644

2022 Town of Manlius Planning Board Organizational Meeting

The Town Board appointed Joseph Lupia Chairman of the Planning Board for a period of 1 year.

Appointment of Baldwin, Sutphen and Frateschi Law Firm as Attorney for the Planning Board. **(Need a Motion)**

Appointment of Miller Engineering as the Planning Board Engineer. **(Need a Motion)**

Appointment of Lisa Beeman as the Planning Board Clerk. **(Need a motion)**

The Planning Board 2022 Meeting Schedule, which states that the Board will meet on the 2nd and 4th Mondays of the Month at 6:30 PM and the Board approved the Application Filing Deadline Schedule is as follows: **(Need a Motion)**

Planning Board Meeting Schedule for 2022	
Meeting Date	Filing Deadline
January 10, 2022	December 29, 2021
January 24, 2022	January 13, 2022
February 14, 2022	February 3, 2022
February 28, 2022	February 16, 2022
March 14, 2022	March 3, 2022
March 28, 2022	March 17, 2022
April 11, 2022	March 31, 2022
April 25, 2022	April 14, 2022
May 9, 2022	April 28, 2022
May 23, 2022	May 12, 2022
June 13, 2022	June 2, 2022
June 27, 2022	June 16, 2022
July 11, 2022	June 30, 2022
July 25, 2022	July 14, 2022
August 8, 2022	July 28, 2022
August 22, 2022	August 11, 2022
September 12, 2022	August 26, 2022
September 26, 2022	September 14, 2022
October 10, 2022	No Meeting
October 24, 2022	October 13, 2022
November 14, 2022	November 3, 2022
November 28, 2022	November 17, 2022
December 12, 2022	December 1, 2022
December 26, 2022	No Meeting

DRAFT

Expected Fee: $300

TOWN OF MANLIUS
PLANNING DEPARTMENT
INITIAL APPEARANCE APPLICATION

adamscharli64@gmail.com

RECEIVED
SEP 27 2021
By

DATE:

Name of Project: W.T. ADAMS SR SUBDIVISION

Applicant must submit 12 copies of all site plans, surveys, and supporting data with the final application before a planning board meeting can be scheduled.

Location of Project: 7063 FERSTLER RD. KIRKVILLE NY 13082

Type of Project:

○ Division of Land ☒ Subdivision ○ Accessory Use ○ Zone Change ○ Site Review ○ Other

Developer: WILLIAM T. ADAMS SR. Phone:

Address: 7145 FERSTLER RD. KIRKVILLE Zip: 13082

Tax Map Number(#)/s: 042.-01-21.1

Present Zoning: RA Desired Zoning:

Total Acreage: Total Number of Lots: 2

Property Owner/s: WILLIAM T. ADAMS SR. Phone: (315) 558-8556

Address: 7145 FERSTLER RD KIRKVILLE Zip: 13082

Tax Map#(s): Owner's Signature: William T Adams

Printed Name: WILLIAM T. ADAMS SR

Property Owner/s: Phone:

Address: Zip:

Tax Map#(s): Owner's Signature:

Printed Name:

Use next page for additional known property owners' information

Planning Board Meeting Date Assignment:

Fee: Paid: Per: ○ Credit/Debit Card ○ Check ○ Cash

Planning Board - Initial

TOWN OF MANLIUS

DISCLOSURE AFFIDAVIT

This affidavit is a part of and must be completed and attached to every application, petition, request submitted for a *site plan, variance, amendment, change of zoning, approval of a plat, exemption from a plat or official map, license* or *permit.*

STATE OF NEW YORK)
) SS:
COUNTY OF ONONDAGA)

I. WILLIAM TADAHS, being duly sworn, deposes and says that (s) he is:

PROPERTY OWNER

(applicant, petitioner, corporation officer, property owner, *etc.)*

II. That deponent has read and is familiar with the provisions of the General Municipal Law, Section 809 which states:

A. Every application, petition or request submitted for a site plan, variance, amendment, change of zoning, approval of a plat, exemption from a plat or official map, license or permit, pursuant to the provisions or any ordinance, local law, rule or regulation constituting the zoning and planning regulations of a municipality shall state the name, residence and the nature and extent of the interest of any state officer or any officer or employee of such municipality is a part, in the person, partnership or association making such application, petition or request (hereinafter called the applicant) to the extent known to such applicant.

B. For the purpose of this action an officer or employee shall be deemed to have an interest in the applicant when (s)he, his/her spouse, or their brothers, sisters, parents, children, grandchildren, or the spouse of any of them:

1) is the applicant, or
2) is an officer, director, partner or employee of the applicant, or
3) legally or beneficially owns or controls stock of a corporate applicant or is a member of a partnership or association applicant, or
4) is a party to an agreement with such an applicant, express or implied, whereby (s) he may receive any payment or other benefit, whether or not for services rendered, or contingent upon the favorable approval of such application, petition or request.

C. Ownership of less than five percent (5%) of the stock of a corporation whose stock is listed on the New York or American Stock Exchanges shall not constitute an interest for the purposes of this section.

D. A person who knowingly and intentionally violates this section shall be guilty of a misdemeanor.

617.20
Appendix B
Short Environmental Assessment Form

Instructions for Completing

Part 1 - Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 - Project and Sponsor Information

Name of Action or Project:
W.T. ADAMS SR. SUBDIVISION

Project Location (describe, and attach a location map):
7063 FERSTLER RD. KIRKVILLE NY 13082

Brief Description of Proposed Action:
SUBDIVISION BACK TO TWO LOTS.

Name of Applicant or Sponsor:	Telephone: 315-558-8556
WILLIAM T. ADAMS SR.	E-Mail:

Address:
7145 FERSTLER RD.

City/PO:	State:	Zip Code:
KIRKVILLE	NY	13082

	NO	YES
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.	☐	☐
2. Does the proposed action require a permit, approval or funding from any other governmental Agency? If Yes, list agency(s) name and permit or approval:	☒	☐

3.a. Total acreage of the site of the proposed action? 4.4 acres
b. Total acreage to be physically disturbed? _____ acres
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? _____ acres

4. Check all land uses that occur on, adjoining and near the proposed action.
☐ Urban ☐ Rural (non-agriculture) ☐ Industrial ☐ Commercial ☒ Residential (suburban)
☐ Forest ☒ Agriculture ☐ Aquatic ☐ Other (specify): _____
☐ Parkland

	NO	YES	N/A
5. Is the proposed action,			
a. A permitted use under the zoning regulations?	☐	☒	☐
b. Consistent with the adopted comprehensive plan?	☐	☒	☐

	NO	YES
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?	☐	☒
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: _____	☒	☐
8. a. Will the proposed action result in a substantial increase in traffic above present levels?	☒	☐
b. Are public transportation service(s) available at or near the site of the proposed action?	☒	☐
c. Are any pedestrian accommodations or bicycle routes available on or near site of the proposed action?	☒	☐
9. Does the proposed action meet or exceed the state energy code requirements? If the proposed action will exceed requirements, describe design features and technologies: _____	☒	☐
10. Will the proposed action connect to an existing public/private water supply? If No, describe method for providing potable water: _____	☐	☒
11. Will the proposed action connect to existing wastewater utilities? If No, describe method for providing wastewater treatment: SEPTIC	☒	☐
12. a. Does the site contain a structure that is listed on either the State or National Register of Historic Places?	☒	☐
b. Is the proposed action located in an archeological sensitive area?	☒	☐
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency?	☒	☐
b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody? If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres: _____	☒	☐

14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply:
☐ Shoreline ☐ Forest ☒ Agricultural/grasslands ☐ Early mid-successional
☐ Wetland ☐ Urban ☐ Suburban

	NO	YES
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered?	☒	☐
16. Is the project site located in the 100 year flood plain?	☒	☐
17. Will the proposed action create storm water discharge, either from point or non-point sources? If Yes, a. Will storm water discharges flow to adjacent properties? ☒ NO ☐ YES	☒	☐
b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)? If Yes, briefly describe: ☒ NO ☐ YES		

	NO	YES
18. Does the proposed action include construction or other activities that result in the impoundment of water or other liquids (e.g. retention pond, waste lagoon, dam)? If Yes, explain purpose and size:	☒	☐
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe:	☒	☐
20. Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste? If Yes, describe:	☒	☐

I AFFIRM THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE

Applicant/sponsor name: [illegible] Date:

Signature:

STOP

Part 2 - Impact Assessment. The Lead Agency is responsible for the completion of Part 2. Answer all of the following questions in Part 2 using the information contained in Part 1 and other materials submitted by the project sponsor or otherwise available to the reviewer. When answering the questions the reviewer should be guided by the concept "Have my responses been reasonable considering the scale and context of the proposed action?"

	No, or small impact may occur	Moderate to large impact may occur
1. Will the proposed action create a material conflict with an adopted land use plan or zoning regulations?	☐	☐
2. Will the proposed action result in a change in the use or intensity of use of land?	☐	☐
3. Will the proposed action impair the character or quality of the existing community?	☐	☐
4. Will the proposed action have an impact on the environmental characteristics that caused the establishment of a Critical Environmental Area (CEA)?	☐	☐
5. Will the proposed action result in an adverse change in the existing level of traffic or affect existing infrastructure for mass transit, biking or walkway?	☐	☐
6. Will the proposed action cause an increase in the use of energy and it fails to incorporate reasonably available energy conservation or renewable energy opportunities?	☐	☐
7. Will the proposed action impact existing: a. public / private water supplies?	☐	☐
b. public / private wastewater treatment utilities?	☐	☐
8. Will the proposed action impair the character or quality of important historic, archaeological, architectural or aesthetic resources?	☐	☐
9. Will the proposed action result in an adverse change to natural resources (e.g., wetlands, waterbodies, groundwater, air quality, flora and fauna)?	☐	☐

	No, or small impact may occur	Moderate to large impact may occur
10. Will the proposed action result in an increase in the potential for erosion, flooding or drainage problems?	☐	☐
11. Will the proposed action create a hazard to environmental resources or human health?	☐	☐

Part 3 - Determination of significance. The Lead Agency is responsible for the completion of Part 3. For every question in Part 2 that was answered "moderate to large impact may occur", or if there is a need to explain why a particular element of the proposed action may or will not result in a significant adverse environmental impact, please complete Part 3. Part 3 should, in sufficient detail, identify the impact, including any measures or design elements that have been included by the project sponsor to avoid or reduce impacts. Part 3 should also explain how the lead agency determined that the impact may or will not be significant. Each potential impact should be assessed considering its setting, probability of occurring, duration, irreversibility, geographic scope and magnitude. Also consider the potential for short-term, long-term and cumulative impacts.

☐ Check this box if you have determined, based on the information and analysis above, and any supporting documentation, that the proposed action may result in one or more potentially large or significant adverse impacts and an environmental impact statement is required.

☐ Check this box if you have determined, based on the information and analysis above, and any supporting documentation, that the proposed action will not result in any significant adverse environmental impacts.

Name of Lead Agency	Date
Print or Type Name of Responsible Officer in Lead Agency	Title of Responsible Officer
Signature of Responsible Officer in Lead Agency	Signature of Preparer (if different from Responsible Officer)

PRINT

III. That no Town of Manlius officer, employee or a relative of either, as defined in Section 809 General Municipal Law has any interest in this application.

-OR-

If a Town of Manlius officer, employee or relative of either as defined in Section 809 General Municipal law has any interest in this application, the full particulars are provided on an attached sheet.

Date: September 27, 20 21.

WILLIAM T. ADAMS SR.
(Print Name)

(Signature)

(Entity Name)

By (Officer) (Title)

7145 FERSTLER RD KIRKVILLE
(Mailing Address of Applicant)

315-558-8556
(Telephone Number)

Date: _____, 20____.

(Print Name)

(Signature)

(Entity Name)

By (Officer) (Title)

(Mailing Address of Applicant)

(Telephone Number)

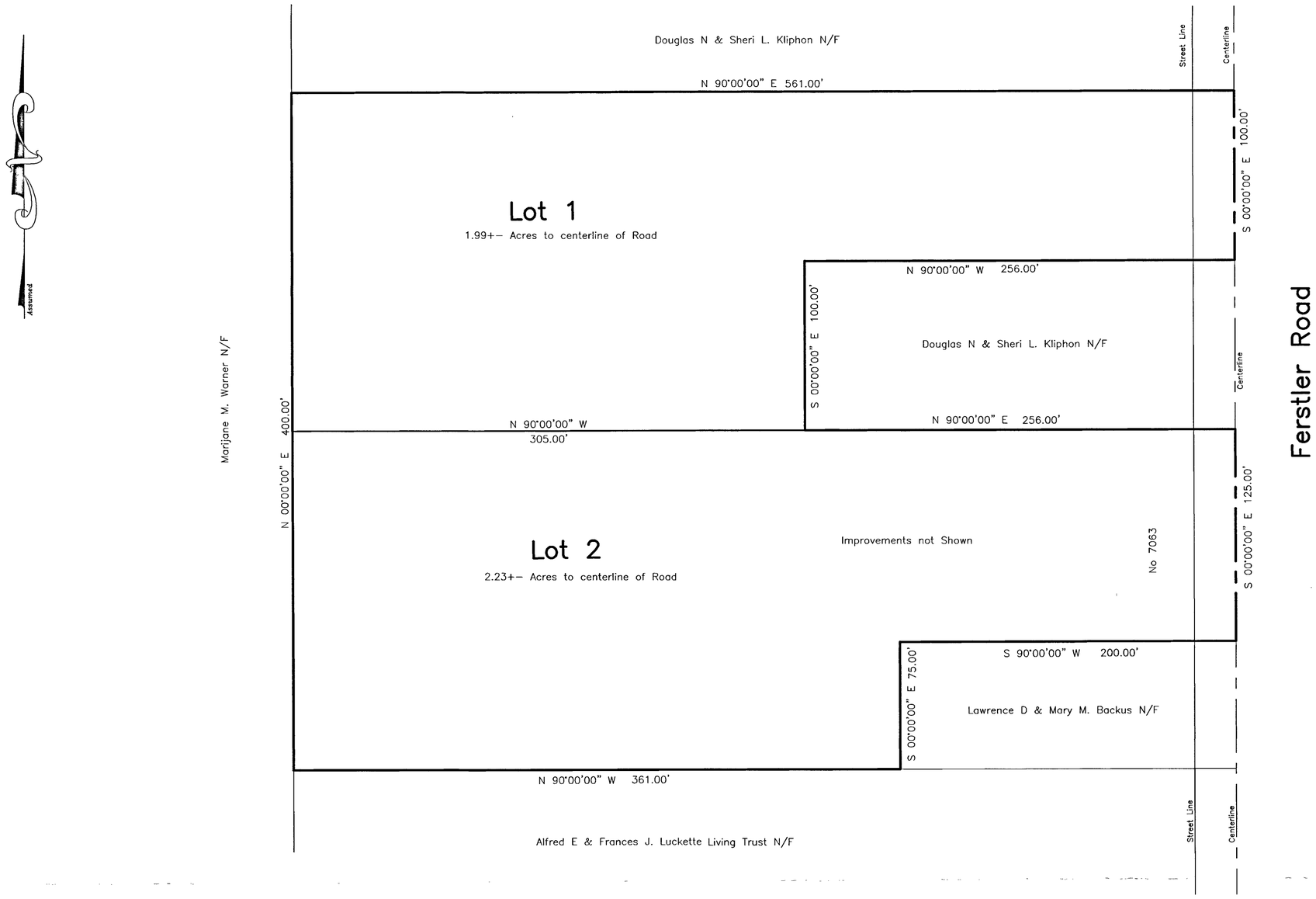
ACKNOWLEDGEMENTS

STATE OF NEW YORK)
) SS:
COUNTY OF ONONDAGA)

On this 27th day of September in the year 2021, before me, the undersigned, a notary public in and for said state, personally appeared WILLIAM T. ADAMS, SR _____, and _____ personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within Petition and acknowledged to me the he/she/they executed the same in his/her/their capacity, and that by his/her/their signature(s) on the Petition, the individual or the persons upon behalf of which the individual acted executed the instrument.

Notary Public

FRANKLIN A. JOSEF
NOTARY PUBLIC, State of New York
Qualified in Onon. Co.
My Commission Expires July 31, 2021



Approved By Town

I hereby certify that this subdivision plat was prepared by me, and was made from an actual survey completed by me on 10/14/2019.

David W. Hannig L.S. N.Y.S. Lic. No. 047411

STATE OF NEW YORK · DAVID WILLIAM HANNIG · OFFICIAL SEAL · NO. 047411 · LICENSED LAND SURVEYOR

Approved By Owner

I hereby approve this tract map.

William T. Adams
7143 Ferstler Road
Kirkville, New York 13082

The underground utilities shown have been located from field survey information and existing drawings. The surveyor makes no guarantee that the underground utilities shown comprise all such utilities in the area either in service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated although he does certify that they are located as accurately as possible from information available. The surveyor has not physically located the underground utilities – Underground Facilities Protective Organization (315) 437–7333.

Adams Subdivision Preliminary Plan
Pt of Lot 15, Town of Manlius
Onondaga Co., N.Y.

50 0 50 100 150
GRAPHIC SCALE – FEET

Scale 1' = 50'

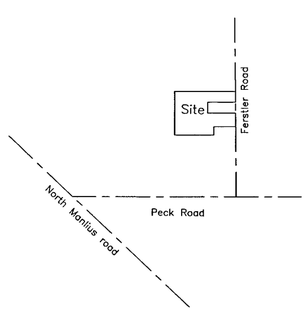
September 24, 2021

RECEIVED
SEP 27 2021
By

D. W. HANNIG L.S., P.C.
SURVEYORS - PLANNERS - CONSULTANTS
THE MARKET PLACE, BUILDING #1
MANLIUS, NEW YORK 13104
PHONE: (315) 682-5225 - FAX: (315) 682-7774

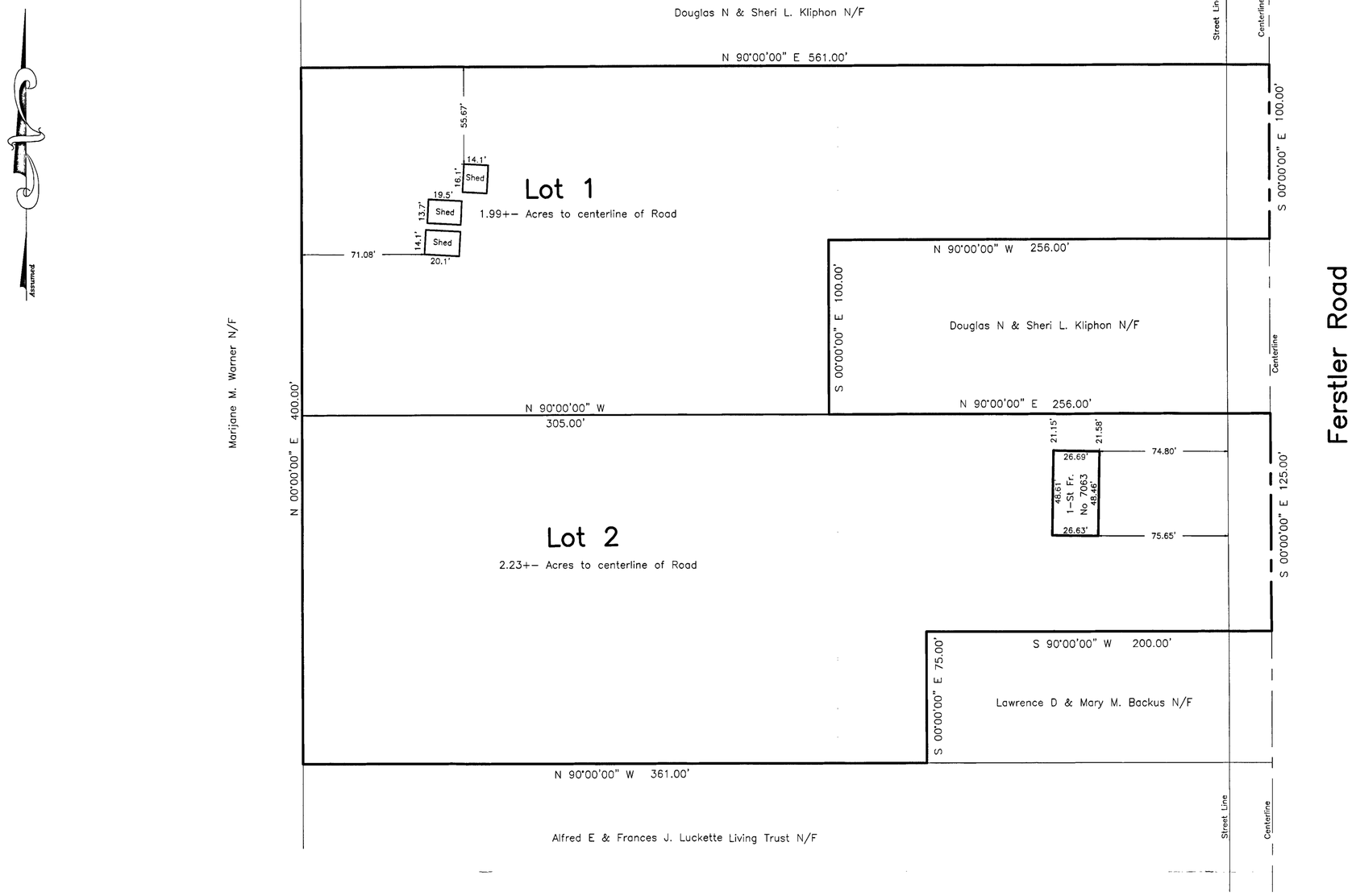
Projects/J182797/base plan/dwg/Final Map 7063 Ferstler

Revisions



Site Location

Approved By Onondaga County Health Dept.



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STATE OF NEW YORK · DAVID WILLIAM HANNIG · OFFICIAL SEAL · NO. 047411 · LICENSED LAND SURVEYOR

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Adams Subdivision Preliminary Plan
Pt of Lot 15, Town of Manlius
Onondaga Co., N.Y.

50 0 50 100 150
GRAPHIC SCALE – FEET

Scale 1' = 50'

September 24, 2021

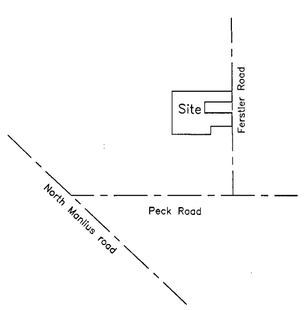
DEC 01 2021

D. W. HANNIG L.S., P.C.
SURVEYORS - PLANNERS - CONSULTANTS
THE MARKET PLACE, BUILDING #1
MANLIUS, NEW YORK 13104
PHONE: (315) 682-5225 - FAX: (315) 682-7774

Projects/J182797/base plan/dwg/Final Map 7063 Ferstler

1/30/2021	House & Sheds

Revisions



Site Location

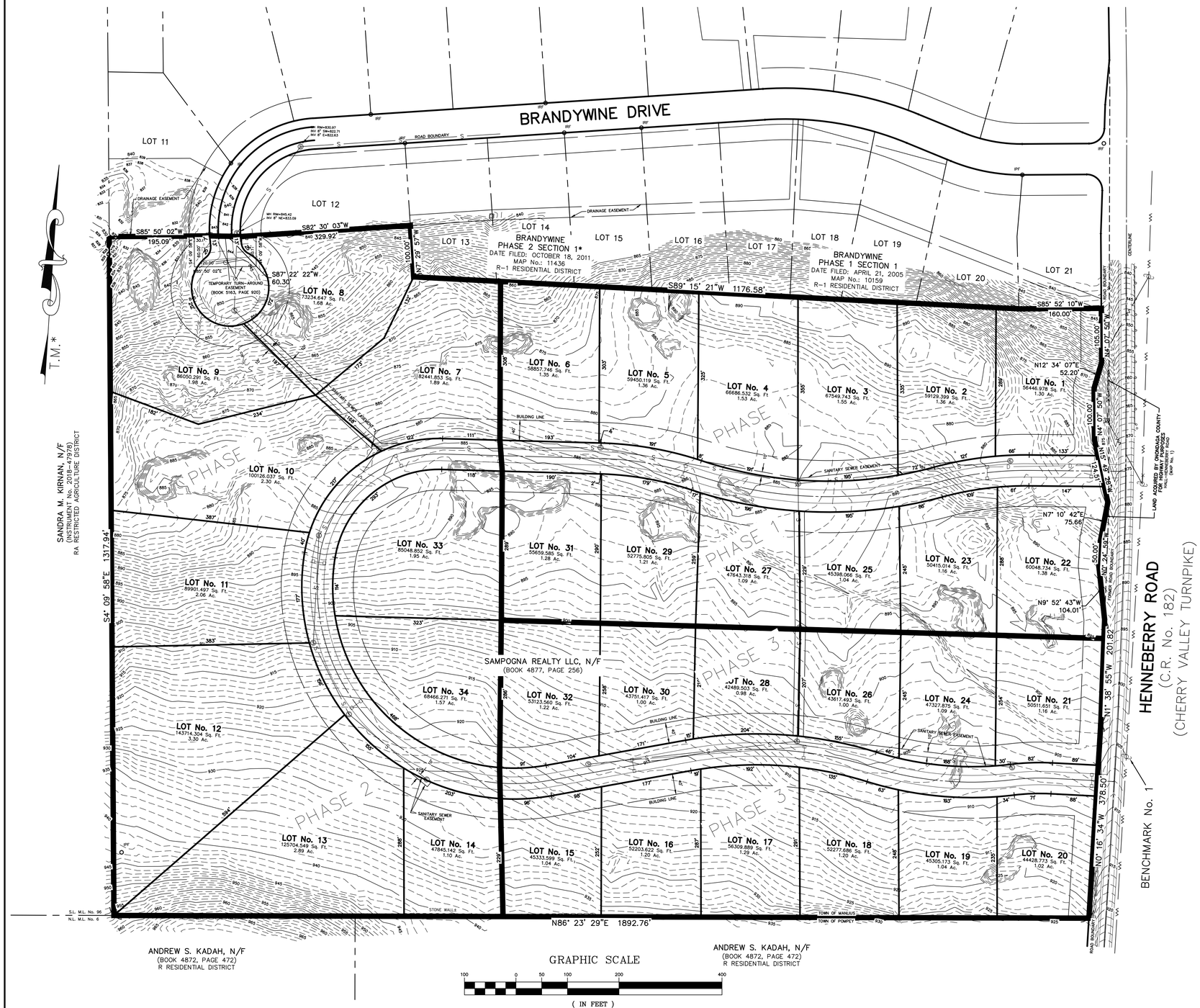
Approved By Onondaga County Health Dept.

BENCHMARKS:

BENCHMARK NO. 1 – RAILROAD SPIKE SET
1.9' UP ON W/S UTILITY POLE LI 141 NG 6
ELEV=906.26

NOTES:

Total area: 54.746± acres.
Total number of lots: 1
Present Zone: R-1 Residential District
Elevations referred to NAVD 88.
Location of underground utilities taken by field measurement where practicable, otherwise taken from various other sources and are approximate only.
The premises shown hereon is within Zone "X" (Areas determined to be outside the 0.2% annual chance floodplain.)according to Federal Emergency Management Agency National Flood Insurance Program Flood Insurance Rate Map Community Panel No. 360584 357 F, Effective date: November 4, 2016.
Tax Map No. 109.-02-7.1



GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

LEGEND:

- indicates original grade
- indicates light stand
- indicates utility pole, anchor & overhead lines
- indicates iron pipe and/or monument found
- indicates bollard
- indicates sign
- indicates storm culvert
- indicates gas main, gas valve & gas line marker
- indicates water main, water valve & hydrant
- indicates storm sewer, catch basin & manhole
- indicates sanitary sewer, sewer vent & manhole
- indicates underground telephone line, manhole & box
- indicates underground electric line & manhole
- indicates underground television cable & box
- indicates monument to be set
- indicates boundary line
- indicates adjacent parcel line
- indicates old/original parcel line
- indicates easement line
- indicates centerline road

Subject to any statement of facts an accurate and up to date abstract of title will show.

Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of section 7209, sub-division 2, of the New York State Education Law.

\\Server\Civil 3D Projects\ONONDAGA COUNTY\TRACTS\BRANDYWINE\PHASE 3\dwg\BRANDYWINE PHASE 3_PP.dwg

REVISIONS	
	7-1-2020

PRELIMINARY PLAN

BRANDYWINE
PHASE 3
PART OF FARM LOT No. 96
TOWN OF MANLIUS
ONONDAGA COUNTY, NEW YORK

STATE OF NEW YORK · TIMOTHY J. COYER · 050656 · LICENSED LAND SURVEYOR

IANUZI & ROMANS LAND SURVEYING, P.C.
5251 WITZ DRIVE
NORTH SYRACUSE, NY 13212
PHONE: (315) 457-7200
FAX: (315) 457-9251
EMAIL: mail@romanspc.com

DATE: APRIL 28, 2020
SCALE: 1" = 100'
FILE No.: 1215.054
SHEET No.
F.B. No. 1304

From: Gerald Gould - GGG <ggould@gouldgw.com>
Sent: Friday, September 24, 2021 9:26 AM
To: Doug Miller <dougmiller@millerengineers.com>
Subject: Brandywine Estates drinking water supply evaluation

Doug,
I have reviewed David Stoner's report. I agree with his conclusion that the results appear promising, however the evidence provided is not what was promised in the proposal and lacks information I consider important to understanding the aquifer and better evaluating the effects of 34 simultaneously pumping wells. It should be noted that the test described meets NYSDOH standards for a single domestic well flow, this result cannot necessarily be extrapolated to account for the additive effect of running many wells at the same time.

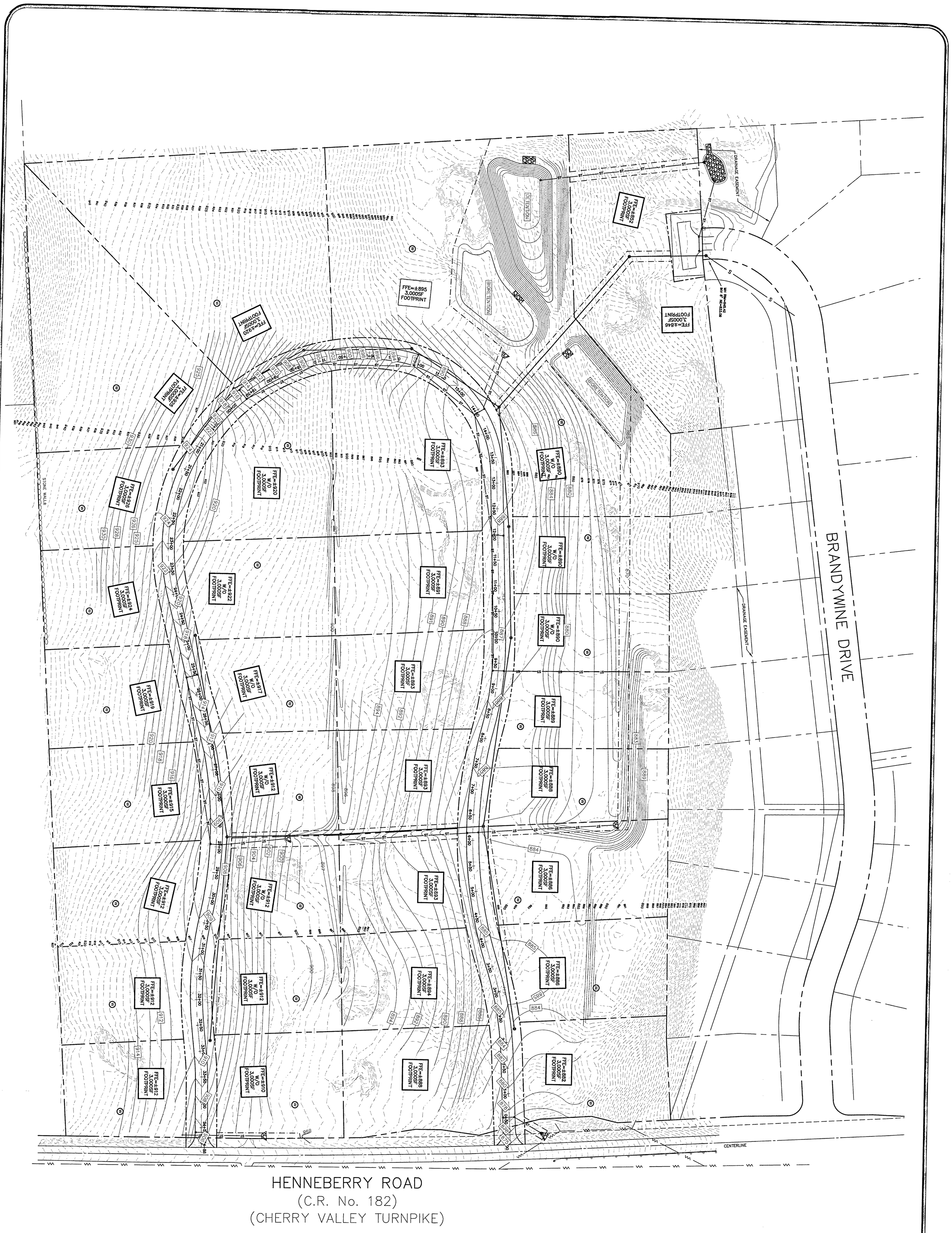
Here are my concerns, in no particular order:

1. Ground surface, well logs and drawdown elevations are not provided. A report like this typically presents the data in terms of surveyed elevations related to sea level or an assumed datum. This allows more accurate comparison of wells, geology and groundwater relationships.
2. The characterization of upgradient and cross gradient wells is speculative without the elevation data.
3. Typically a study like this would be most informative with two observation wells at 90 degree angles to the pumping well. It would also be most useful if the wells were oriented in relationship to the local fracture patterns and the strike and dip of the geologic units of interest. The well locations for this study are not easily determined from the figure and these relationships not established.
4. The distance between wells was not reported. This is important to calculating drawdown influences.
5. No geologic cross sections were included. Cross sections depicting the geology interpreted from the drilling logs and indicating the depths and casing in the wells would provide more complete information.
6. The time-draw down data is not presented in graphic form. It is very difficult to determine if the drawdown during pumping is uniform or if there are sudden drops in water level that may indicate fracture flow and possible interfering connections between wells.
7. No information is provided about weather conditions preceding or during the pumping test. If not accounted for, precipitation and barometric pressure changes can influence drawdown and effect the results interpretation.
8. It is concerning that Well #5 and Well #6 experienced identical drawdown during the pumping test. Typically a non-pumping well shows a smaller drawdown than the pumping well. This may indicate that the wells are connected by a fracture. Fractures can quickly transmit contaminants over large distances. Fractures could also de-water very quickly, especially if tapped by several pumping wells, and cause wells to go dry.
9. The report mentions image well theory, however no data or analysis is provided.
10. The report does not state how pumping test discharge water was handled. Pumped water should be discharged far enough away from the wells so as not to percolate back down to the well causing recirculation and invalidating the drawdown result.
11. Well # 6 was cased to 120 ft below ground surface. Wells #5 and #29 were cased to 30 ft. No explanation is given for the rational of casing depths.
12. There is no water chemistry data provided. This is important in considering the potability of the water and possible changes in chemistry over the duration of the pumping test.
13. The calculation of drawdown of multiple wells of 4.8 feet is not supported with any calculations or assumptions.

Call me if you have questions.

Gerry

Gerald Gould, CPG, PG
Gould Groundwater Geosciences, P.C.
300 Brooklea Drive
Fayetteville, NY 13066
(315) 569-2144 cell
www.gouldgw.com



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ANY LICENSEE WHO ALTERS THIS DOCUMENT IS REQUIRED BY LAW TO AFFIX HIS OR HER SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS OR HER SIGNATURE AND SPECIFIC DESCRIPTION OF THE ALTERATIONS

PRELIMINARY
NOT FOR CONSTRUCTION

PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

GRAPHIC SCALE
(IN FEET)
1 inch = 80 ft
0 80' 160'

RECEIVED
DEC 03 2020
By

SHEET
SK-8

PROJECT NO.
20-1906

DATE
03 DEC 2020

SCALE
1" = 80'

PREPARED BY:
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, NEW YORK 13104
email: MNAP@NAPCON.COM
PH: (315) 682-5580 FAX: (315) 682-5544

NO.	REVISION/ISSUE	DATE

SHEET TITLE:
PRELIMINARY LAYOUT PLAN

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

Short Environmental Assessment Form
Part 1 - Project Information

Instructions for Completing

Part 1 – Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 – Project and Sponsor Information		
Name of Action or Project: Harrington Homes at Brandywine		
Project Location (describe, and attach a location map): Henneberry Road		
Brief Description of Proposed Action: subdivision of 34 single family home lots		
Name of Applicant or Sponsor: Napierala Consutling	Telephone: 315-682-5580 E-Mail: nzinsmeyer@napcon.com	
Address: 110 Fayette Streeet		
City/PO: Manlius	State: NY	Zip Code: 13104

	NO	YES
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.	☑	☐
2. Does the proposed action require a permit, approval or funding from any other government Agency? If Yes, list agency(s) name and permit or approval: NYSDEC OCDOT OCWEP	☐	☑

3. a. Total acreage of the site of the proposed action? 54 acres
   b. Total acreage to be physically disturbed? 20 acres
   c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 54 acres

4. Check all land uses that occur on, are adjoining or near the proposed action:

5. ☑ Urban ☑ Rural (non-agriculture) ☐ Industrial ☐ Commercial ☑ Residential (suburban)
   ☐ Forest ☑ Agriculture ☐ Aquatic ☐ Other(Specify):
   ☐ Parkland

	NO	YES	N/A
5. Is the proposed action,			
a. A permitted use under the zoning regulations?	☐	☑	☐
b. Consistent with the adopted comprehensive plan?	☐	☑	☐

	NO	YES
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?	☐	☑
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: _____	☑	☐
8. a. Will the proposed action result in a substantial increase in traffic above present levels?	☑	☐
b. Are public transportation services available at or near the site of the proposed action?	☑	☐
c. Are any pedestrian accommodations or bicycle routes available on or near the site of the proposed action?	☑	☐
9. Does the proposed action meet or exceed the state energy code requirements? If the proposed action will exceed requirements, describe design features and technologies: _____ _____	☐	☑
10. Will the proposed action connect to an existing public/private water supply? If No, describe method for providing potable water: _____ individual wells for each proposed single family home lot _____	☑	☐
11. Will the proposed action connect to existing wastewater utilities? If No, describe method for providing wastewater treatment: _____ _____	☐	☑
12. a. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places?	☑	☐
b. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	☐	☑
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency?	☐	☑
b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody?	☑	☐
If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres: _____ _____ _____		

14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply:

☐ Shoreline ☐ Forest ☑ Agricultural/grasslands ☐ Early mid-successional

☐ Wetland ☐ Urban ☑ Suburban

	NO	YES
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered? Indiana Bat, Northern Long-...	☐	☑
16. Is the project site located in the 100-year flood plan?	☑	☐
17. Will the proposed action create storm water discharge, either from point or non-point sources? If Yes,	☐	☑
a. Will storm water discharges flow to adjacent properties?	☐	☑
b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)? If Yes, briefly describe: stormwater management systems designed to current standards	☐	☑
18. Does the proposed action include construction or other activities that would result in the impoundment of water or other liquids (e.g., retention pond, waste lagoon, dam)? If Yes, explain the purpose and size of the impoundment: stormwater management	☐	☑
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe:	☑	☐
20. Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste? If Yes, describe:	☑	☐

I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE

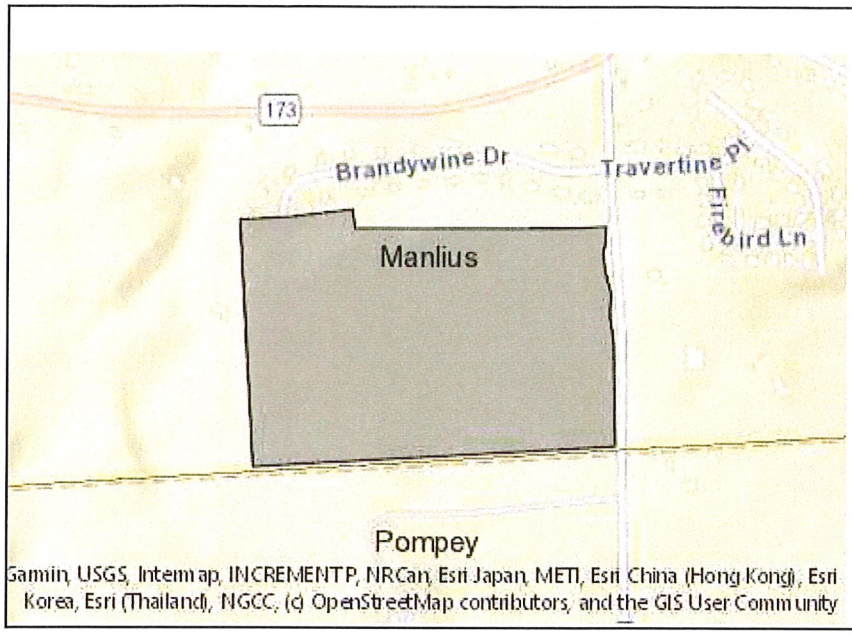
Applicant/sponsor/name: Napierala Consulting Date: 09/11/2020

Signature: Title: Project Engineer

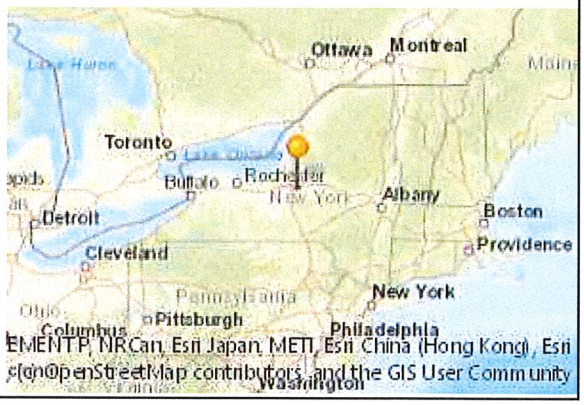
PRINT FORM

EAF Mapper Summary Report

Friday, September 11, 2020 2:31 PM



Disclaimer: The EAF Mapper is a screening tool intended to assist project sponsors and reviewing agencies in preparing an environmental assessment form (EAF). Not all questions asked in the EAF are answered by the EAF Mapper. Additional information on any EAF question can be obtained by consulting the EAF Workbooks. Although the EAF Mapper provides the most up-to-date digital data available to DEC, you may also need to contact local or other data sources in order to obtain data not provided by the Mapper. Digital data is not a substitute for agency determinations.

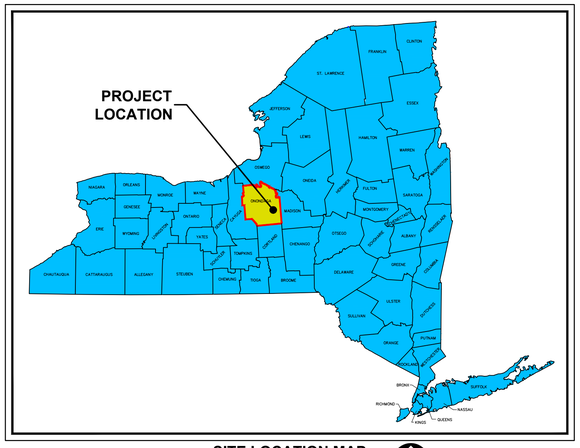


Part 1 / Question 7 [Critical Environmental Area]	No
Part 1 / Question 12a [National or State Register of Historic Places or State Eligible Sites]	No
Part 1 / Question 12b [Archeological Sites]	Yes
Part 1 / Question 13a [Wetlands or Other Regulated Waterbodies]	Yes - Digital mapping information on local and federal wetlands and waterbodies is known to be incomplete. Refer to EAF Workbook.
Part 1 / Question 15 [Threatened or Endangered Animal]	Yes
Part 1 / Question 15 [Threatened or Endangered Animal - Name]	Indiana Bat, Northern Long-eared Bat
Part 1 / Question 16 [100 Year Flood Plain]	No
Part 1 / Question 20 [Remediation Site]	No

PROPOSED BRANDYWINE ESTATES
PHASE 2 - 34 LOT SUBDIVISION

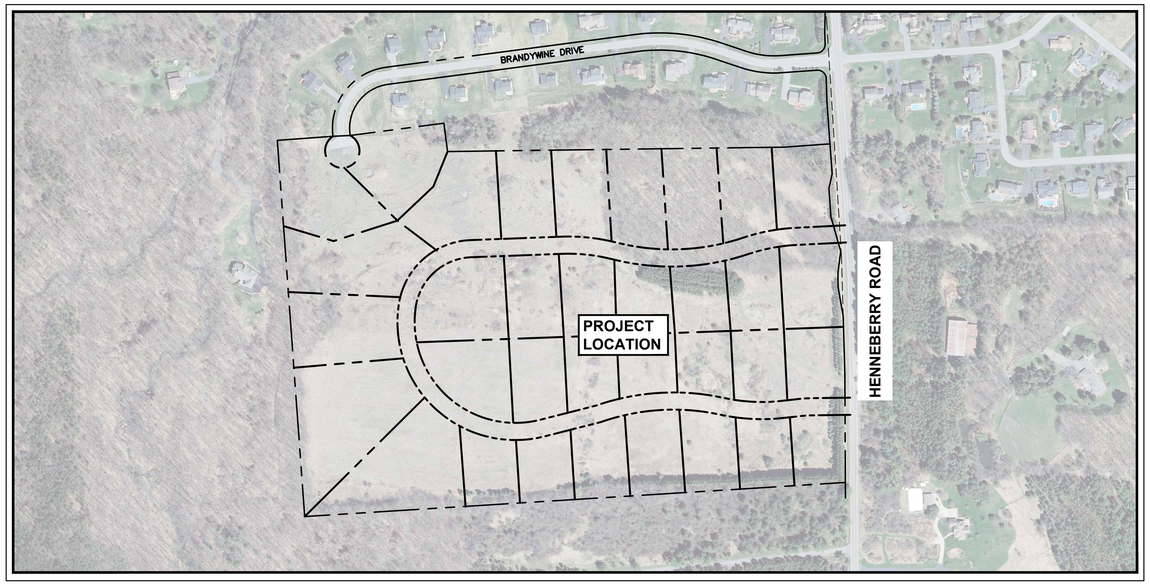
HENNEBERRY ROAD
TAX ID: 109.-02-07.1

TOWN OF MANLIUS
ONONDAGA COUNTY
NEW YORK STATE



SITE LOCATION MAP
NOT TO SCALE

PROJECT LOCATION MAP
NOT TO SCALE



AERIAL MAP
1"=250'

PREPARED BY:

NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
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110 FAYETTE STREET
MANLIUS, NEW YORK 13104

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PH: (315) 682-5580 FAX: (315) 682-5544

PREPARED FOR:

HARRINGTON HOMES
Your Builder for Life

3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET INDEX:

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OVERALL UTILITY PLAN	C-3
OVERALL ROAD PROFILE	C-4
ROAD PROFILE PLANS	C-5.0 THRU C-5.2
SEWER PROFILE PLANS	C-6.0 THRU C-6.1
SITE DETAILS	C-7.0 THRU C-7.2

PRELIMINARY PLANS - FINAL APPROVAL
REQUIRED BY ALL JURISDICTIONS

Dig Safely. New York
Call 811 before you dig

APPROVED BY OWNER

NAME DATE

SHEET TITLE:

TITLE SHEET

NO.	REVISION/ISSUE	DATE

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PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

PROJECT NO.	DATE
20-1906	17 SEP 2020

PROPOSED BRANDYWINE ESTATES PHASE 2

HENNEBERRY ROAD
TOWN OF MANLIUS
ONONDAGA COUNTY, NY

SHEET
C-0

GENERAL NOTES

1. PROPERTY LINE INFORMATION TAKEN FROM A PLAN ENTITLED "TOPOGRAPHIC SURVEY, BRANDYWINE PHASE 3 – SECTION 1 PART OF FARM LOT NUMBER 96, TOWN OF MANLIUS" PREPARED BY IANUZI & ROMANS LAND SURVEYING, P.C.

2. THE PLANS SHOW SUBSURFACE STRUCTURES, ABOVEGROUND STRUCTURES, AND/OR UTILITIES FROM FIELD LOCATION AND RECORD MAPPING. EXACT LOCATION MAY VARY FROM THE LOCATIONS INDICATED. IN PARTICULAR, THE CONTRACTOR IS WARNED THAT THE EXACT OR EVEN APPROXIMATE LOCATION OF SUCH PIPELINES, SUBSURFACE STRUCTURES AND/OR UTILITIES IN THE AREA MAY BE DIFFERENT FROM THAT SHOWN OR MAY NOT BE SHOWN AND IT SHALL BE HIS RESPONSIBILITY TO PROCEED WITH GREAT CARE IN EXECUTING ANY WORK. THE CONTRACTOR IS TO CALL DIG SAFELY NY AT 1–800–962–7962 A MINIMUM OF 72 HOURS BEFORE DIGGING, DRILLING, OR BLASTING.

3. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY CONDITIONS THAT VARY FROM THOSE SHOWN ON THE PLANS. THE CONTRACTOR'S WORK SHALL NOT VARY FROM THE PLANS WITHOUT THE EXPRESSED APPROVAL OF THE ENGINEER.

4. THE CONTRACTOR IS INSTRUCTED TO COOPERATE WITH ANY AND ALL OTHER CONTRACTORS PERFORMING WORK ON THIS JOB SITE DURING THE PERFORMANCE OF THIS CONTRACT.

5. THE CONTRACTOR SHALL RESTORE LAWNS, DRIVEWAYS, CULVERTS, SIGNS, AND OTHER PUBLIC OR PRIVATE PROPERTY DAMAGED OR REMOVED TO AT LEAST AS GOOD A CONDITION AS BEFORE BEING DISTURBED AS DETERMINED BY THE ENGINEER. ANY DAMAGED TREES, SHRUBS, AND/OR HEDGES SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND INCURRING THE COST OF ALL REQUIRED PERMITS, INSPECTIONS, CERTIFICATES, ETC. AND SHALL COMPLY WITH ALL PERMITS.

7. ALL WORK SHALL BE DONE IN STRICT COMPLIANCE WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES, STANDARDS, ORDINANCES, RULES, AND REGULATIONS.

8. ALL PROPOSED UTILITIES AND APPURTENANCES ARE TO BE CONSTRUCTED IN COMPLIANCE WITH THE LOCAL MUNICIPALITY'S CODES AND REGULATIONS GOVERNING THE INSTALLATION OF SUCH UTILITIES.

9. THE ENGINEER RESERVES THE RIGHT TO EXAMINE ANY WORK DONE ON THIS PROJECT AT ANY TIME TO DETERMINE CONFORMANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS OF THIS PROJECT AS INTENDED AND INTERPRETED BY THE ENGINEER.

10. MISCELLANEOUS WORK NOT SPECIFICALLY SHOWN ON THE CONTRACT DRAWINGS SUCH AS PATCHING, BLOCKING, TRIMMING, ETC. SHALL BE PERFORMED AS REQUIRED TO MAKE THE WORK COMPLETE.

11. THE CONTRACTOR SHALL PROTECT EXISTING PROPERTY LINE INFORMATION. ANY MONUMENTATION DISTURBED OR DESTROYED, AS JUDGED BY THE ENGINEER OR OWNER, SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE UNDER THE SUPERVISION OF A NEW YORK STATE LICENSED LAND SURVEYOR.

12. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE ALL PLAN SHEETS AND COORDINATE WORK WITH ALL OTHER CONTRACTS FOR THE SITE.

13. THE CONTRACTOR SHALL:
    A. VERIFY ALL CONDITIONS IN THE FIELD PRIOR TO COMMENCEMENT OF WORK AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
    B. EXAMINE THE SITE AND INCLUDE IN HIS WORK THE EFFECT OF ALL EXISTING CONDITIONS ON THE WORK.
    C. PROVIDE AND INSTALL ALL MATERIALS AND PERFORM ALL WORK IN ACCORDANCE WITH RECOGNIZED GOOD STANDARD PRACTICE.
    D. HOLD THE OWNER HARMLESS AGAINST ANY AND ALL CLAIMS ARISING FROM WORK DONE BY THE CONTRACTOR ON THE SITE.

14. ALL TRENCH EXCAVATION AND ANY REQUIRED SHEETING AND SHORING SHALL BE DONE IN ACCORDANCE WITH THE LATEST REVISIONS OF NEW YORK STATE INDUSTRIAL CODE RULE 23 AND OSHA REGULATIONS FOR CONSTRUCTION. SHEET PILING SHALL BE DESIGNED AND SEALED BY A NEW YORK STATE PROFESSIONAL ENGINEER.

15. CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING AND THE MAINTENANCE OF SURFACE DRAINAGE DURING THE COURSE OF WORK. HE SHALL SUBMIT A DEWATERING PLAN DESIGNED AND SEALED BY A NEW YORK STATE PROFESSIONAL ENGINEER. CONTRACTOR SHALL MAINTAIN EXISTING SITE DRAINAGE PATTERNS THROUGHOUT CONSTRUCTION.

16. ALL BACKFILL USED IN TRENCHES EXCAVATED IN EXISTING ROADWAYS SHALL BE PLACED IN MAXIMUM 6–INCH LIFTS AND COMPACTED BY MEANS OF A MECHANICAL COMPACTOR BETWEEN LIFTS TO 90% STANDARD PROCTOR COMPACTION.

17. WHEN BACKFILLING AROUND PROPOSED OR EXISTING STRUCTURES, MATERIAL SHALL BE PLACED IN MAXIMUM 6–INCH LIFTS AND COMPACTED BY MEANS OF A MECHANICAL COMPACTOR BETWEEN LIFTS TO 90% STANDARD PROCTOR COMPACTION.

18. ALL UTILITY WORK INVOLVING CONNECTIONS TO EXISTING SYSTEMS SHALL BE COORDINATED WITH THE ENGINEER AND THE UTILITY OWNER. NOTIFY THE ENGINEER AND THE UTILITY OWNER 72 HOURS BEFORE EACH AND EVERY CONNECTION TO AN EXISTING SYSTEM IS MADE.

19. CONSTRUCTION OF ALL PROPOSED UTILITIES MUST BEGIN AT ITS POINT OF CONNECTION TO THE EXISTING UTILITY OR AT THE LOWEST POINT IN THE SYSTEM. RIMS, GRATES, INVERTS, CLEARANCES, AND LOCATION AT CROSSINGS MUST BE VERIFIED PRIOR TO THE BEGINNING OF CONSTRUCTION.

20. MAINTAIN FLOW FOR ALL EXISTING UTILITIES.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL FIELD LAYOUT. THE CONTRACTOR SHALL TAKE TIES TO ALL UTILITY CONNECTIONS AND PROVIDE MARKED–UP AS–BUILT PLANS FOR ALL UTILITIES SHOWING TIES TO CONNECTIONS, BENDS, VALVES, LENGTHS OF LINES, AND INVERTS. THE OWNER AND HIS REPRESENTATIVES SHALL REVIEW AS–BUILT PLANS SHOWING ALL UNDERGROUND UTILITIES INSTALLED OR ENCOUNTERED. THE CONTRACTOR SHALL PROVIDE ANY CORRECTION OR OMISSIONS TO THE SATISFACTION OF THE OWNER AND HIS REPRESENTATIVES BEFORE UTILITIES WILL BE ACCEPTED.

22. THE CONTRACTOR SHALL MAINTAIN ALL TRAFFIC IN ALL AREAS IN ACCORDANCE WITH THE NYSDOT MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

23. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL COMMERCIAL, RESIDENTIAL, AND PUBLIC PROPERTIES OR AS DIRECTED BY THE ENGINEER.

24. ALL EXCAVATIONS SHALL BE BACKFILLED TO EXISTING GRADE AT THE END OF EACH WORKDAY.

25. THE CONTRACTOR SHALL TAKE CARE TO PREVENT DAMAGE TO EXISTING UTILITIES. DAMAGED UTILITIES SHALL BE IMMEDIATELY REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

SITE DEMOLITION NOTES

1. THE GENERAL CONSTRUCTION CONTRACTOR RESPONSIBLE FOR ANY CLEARING OR DEMOLITION WORK AS NOTED ON THIS PLAN.

2. EXISTING FEATURES ARE BASED ON A SURVEY BY IANUZI & ROMANS LAND SURVEYING, P.C.

3. OWNER WILL PROVIDE AN 'ALL CLEAR' PRIOR TO ANY CLEARING OR DEMOLITION.

4. THE CONTRACTOR SHALL CONTACT DIG SAFELY NEW YORK AT 811 FOR UTILITY STAKEOUTS A MINIMUM OF THREE (3) BUSINESS DAYS PRIOR TO ANY DEMOLITION WORK, SITE WORK, OR EXCAVATION.

5. THE CONTRACTOR SHALL COORDINATE WITH ALL PUBLIC AND PRIVATE UTILITIES FOR RESPECTIVE REQUIREMENTS FOR THE REMOVAL/ABANDONMENT OF UTILITY MAINS/LATERALS SERVICING THE SITE.

GRADING NOTES

1. MAXIMUM SLOPE FOR ALL CUT AND FILL LAWN AREAS SHALL BE 3H:1V UNLESS SHOWN OTHERWISE ON PLANS.

2. SLOPES GREATER THAN 4H:1V SHALL BE STABILIZED IMMEDIATELY AFTER GRADING OCCURS IN ACCORDANCE WITH THE NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.

3. CONTRACTOR SHALL OBTAIN A COPY OF THE GEOTECHNICAL REPORT AND BECOME FAMILIAR WITH THE SOIL CONDITIONS ON THE SITE. CONTRACTOR SHALL FOLLOW ALL RECOMMENDATIONS AND REQUIREMENTS FROM THE GEOTECHNICAL ENGINEER.

4. UNLESS OTHERWISE NOTED, LIMITS OF DISTURBANCE ARE AS REPRESENTED BY PROPOSED GRADES. NO GRADING SHALL TAKE PLACE BEYOND LIMITS SHOWN.

5. ALL SLOPES STEEPER THAN 3H:1V SHALL BE TREATED WITH AN EROSION CONTROL PRACTICE SUCH AS A ROLLED EROSION CONTROL BLANKET OR RIPRAP. SEE DESIGNATED AREAS ON PLANS.

UTILITY NOTES

1. ALL CONSTRUCTION SHALL CONFORM WITH APPROPRIATE CODE AND REGULATORY REQUIREMENTS.

2. ALL UTILITIES SHALL BE INSTALLED IN ACCORDANCE WITH MUNICIPAL REGULATIONS AND THE STANDARDS OF THE PRIVATE UTILITY COMPANIES.

3. PRIVATE UTILITY SERVICE FINAL LOCATION, SIZE AND DEPTH ARE SUBJECT TO THE APPROVAL OF THE UTILITY COMPANY.

4. EXTERIOR BUILDING LIGHTING LUMINARIES SHALL BE OF SIZE AND TYPE, AND AT LOCATIONS SPECIFIED BY THE ARCHITECTS ELECTRICAL SITE PLAN AND SHALL CONFORM TO THE MUNICIPAL ZONING REQUIREMENTS.

5. WATER
   WATER LINES, FITTINGS AND APPURTENANCES TO BE IN CONFORMANCE WITH APPROPRIATE CODE AND REGULATORY REQUIREMENTS. VERIFY EXISTING LINE SIZE AND LOCATION PRIOR TO CONSTRUCTION. ALL WATER LINES MUST MAINTAIN A MINIMUM 10' HORIZONTAL SEPARATION WITH SANITARY SEWER AND STORM SEWER LINES. ALL WATER MAIN AND SERVICE WORK MUST BE COORDINATED WITH THE MUNICIPAL WATER DEPARTMENT.

6. SOME LOTS SHALL BE SERVED BY INDIVIDUAL WATER SUPPLY WELLS, WITH THE EXCEPTION OF LOTS #8 AND #9 WHICH CAN BE SERVED BY OCWA PUBLIC WATER SUPPLY.

7. SANITARY SEWER
   SANITARY SEWERS SHALL BE PVC PER ASTM D3034 SDR 35 UNLESS OTHERWISE NOTED. SUITABLE COUPLINGS AND ADAPTERS SHALL BE PROVIDED AT BUILDING CONNECTIONS.

8. STORM DRAINAGE
   STORM DRAINAGE PIPING SHALL BE SMOOTH INTERIOR CORRUGATED PLASTIC PIPE (SICPP) UNLESS OTHERWISE NOTED (SICPP). PIPE JOINTS AND FITTINGS SHALL CONFORM TO AASHTO M252 OR AASHTO M294.

9. ELECTRIC AND GAS
   ALL ELECTRIC AND GAS INSTALLATION SHALL BE COORDINATED WITH NATIONAL GRID.

LEGEND: PROPOSED
(SEE EXISTING CONDITION SURVEY FOR LEGEND OF EXISTING ELEMENTS)

- ----- PROPOSED BUILDING
- ----- PROPERTY LINE
- ----- PROPOSED EASEMENT LINE
- ----- PROPOSED STORM INLET
- ----- PROPOSED MANHOLE (STORM OR SEWER AS NOTED)
- SAN ----- PROPOSED SANITARY PIPE
- ST ----- PROPOSED STORM PIPE
- W ----- PROPOSED WATER PIPE
- G ----- PROPOSED GAS PIPE
- UGE ----- PROPOSED UNDERGROUND ELECTRIC
- ----- PROPOSED STOCKADE FENCE

LANDSCAPE NOTES

TEMPORARY SEEDING MIXTURES

	LBS./ACRE	LBS./1000 SQ. FT
FOR SPRING, SUMMER OR EARLY FALL SEEDINGS:		
A. ANNUAL RYEGRASS –OR–	30	0.70
B. PERENNIAL RYEGRASS	30	0.70
FOR LATE FALL OR EARLY WINTER		
A. WINTER RYE (AROOSTOOK)	100	2.50

MULCH THE AREA WITH HAY OR STRAW AT 2 TONS/ACRE (APPROXIMATELY 2 LARGE ROLLED BALES/ACRE).

MULCH ANCHORING IS REQUIRED WHERE WIND OR AREAS OF CONCENTRATED WATER ARE OF CONCERN.

PERMANENT SEEDINGS SHOULD TAKE PLACE IN EARLY SPRING. PROPER MULCHING AND ADAQUATE MOISTURE MUST BE PROVIDED FOR PERMANENT SEEDING. RESEEDING OF FAILED AREAS SHALL TAKE PLACE DURING LATE SUMMER/EARLY FALL OR DURING THE FOLLOWING SPRING.

FERTILIZER:
5% NITROGEN
0% PHOSPHORUS
5% POTASH

HYDROMULCH
HYDROMULCH SHALL BE A WOOD–FIBER COMPOSITION (50% PAPER – 50% WOOD)
IF MULCHING IS NOT APPLIED WITH HYDROSEED MIXTURE, APPROVED MULCHING, CONSISTING OF STALKS OF WHEAT, OATS, OR RYE, SHALL BE SPREAD EVENLY AT A RATE OF 2 TONS PER ACRE. MULCH IS TO BE TACKED INTO PLACE.

PERMANENT SEEDING MIXTURES

	LBS./ACRE
SEED MIXTURE NO. 1	
CREEPING RED FESCUE (var. ENSYLVA)	10
PERENNIAL RYE GRASS (var. PENNFINE)	10
SEED MIXTURE NO. 2	
SWITCHGRASS (var. SHELTER, PATHFINDER, TRAILBLAZER, OR BLACKWELL)	20
SEED MIXTURE NO. 3	
BIRDSFOOT TREFOIL (var. EMPIRE, PARDEE)	10
REDTOP	2
TALL FESCUE (var. KY 31, REBEL)	20
SEED MIXTURE NO. 4	
CREEPING RED FESCUE (var. ENSYLVA)	20
CHEWINGS FESCUE (COMMON)	20
PERENNIAL RYE GRASS (var. PENNFINE)	5
RED CLOVER (COMMON)	10

SEED MIXTURE 1 TO BE APPLIED TO SHADED AREAS.

SEED MIXTURE 2 IS IN PURE LIVE SEED. TO BE APPLIED TO AREAS UPLAND OF WETLANDS AND ALONG STORMWATER MITIGATION BASIN BANKS.

SEED MIXTURE 3 TO BE APPLIED TO ALL SWALES AND WATERWAYS. WHITE CLOVER OR LADINO CLOVER MAY BE SUBSTITUTED FOR BRIDSFOOT TREFOIL AND SEEDED AT THE SAME RATE
PERENNIAL RYEGRASS MAY BE SUBSTITUTED FOR REDTOP BUT INCREASE SEEDING RATE TO 5 LBS./ACRE (0.1 LBS./1000 SQ. FT)

SEED MIXTURE 4 TO BE APPLIED TO ALL AREAS. (NOT FOR USE IN PLAYGROUNDS OR AS TURF)

METHOD OF SEEDING
BROADCAST, DRILLING WITH A CULTIPACK TYPE SEEDER, OR HYDROSEEDING ARE ACCEPTABLE. GOOD SOIL TO SEED CONTACT IS THE KEY TO SUCCESSFUL SEEDINGS.

MULCHING
APPLY STRAW MULCH AT A RATE OF 2 TON/ACRE (90 LBS./1,000 SF) ANCHORED WITH WOOD FIBER MULCH (HYDROMULCH) AT 500 – 750 LBS./ACRE (11 – 17 LBS./1,000 SF). THE WOOD FIBER MULCH MUST BE APPLIED THROUGH A HYDROSEEDER AFTER MULCHING.

IRRIGATION
WATERING MAY BE ESSENTIAL TO ESTABLISH TO NEW SEEDING. WEATHER CONDITIONS WILL DICTATE WHEN TO WATER. EACH APPLICATION MUST BE UNIFORMLY APPLIED AND 1 TO 2 INCHES OF WATER SHOULD BE APPLIED PER APPLICATION.

PERMANENT SEEDING TO OCCUR AFTER FINAL GRADING HAS OCCURRED. PERMANENT SEEDING WILL INCLUDE:
SITE PREPARATION
A. SCARIFY ALL COMPACT, SLOWLY PERMEABLE, MEDIUM AND FINE TEXTURED SUBSOIL AREAS. SCARIFY AT APPROXIMATELY RIGHT ANGLES TO THE SLOPE DIRECTION IN SOIL AREAS THAT ARE STEEPER THAN 5 PERCENT.
B. REMOVE REFUSE, WOOD PLANT PARTS, STONES OVER 3 INCHES IN DIAMETER, AND OTHER LITTER.

TOPSOIL MATERIALS
A. TOPSOIL SHALL HAVE AT LEAST 2 PERCENT AND NO GREATER THAN 6 PERCENT BY WEIGHT OF FINE TEXTURED STABLE ORGANIC MATERIAL.
B. TOPSOIL SHALL HAVE NOT LESS THAN 20 PERCENT FINE TEXTURED MATERIAL (PASSING THE NO. 200 SIEVE) AND NOT MORE THAN 15 PERCENT CLAY.
C. TOPSOIL TREATED WITH SOIL STERILANTS OR HERBICIDES SHALL BE SO IDENTIFIED TO THE PURCHASER.
D. TOPSOIL SHALL BE RELATIVELY FREE OF STONES OVER 1½" INCHES IN DIAMETER, TRASH, NOXIOUS WEEDS SUCH AS NUTSEDGE AND QUACKGRASS, AND WILL HAVE LESS THAN 10% GRAVEL BY VOLUME.
E. TOPSOIL CONTAINING SOLUBLE SALTS GREATER THAN 500 PPM SHALL NOT BE USED.

APPLICATION AND GRADING
A. TOPSOIL SHALL BE DISTRIBUTED TO A UNIFORM DEPTH OVER THE AREA. IT SHALL NOT BE PLACED WHEN IT IS PARTLY FROZEN, MUDDY, OR ON FROZEN SLOPES OR OVER ICE, SNOW, OR STANDING WATER PUDDLES.
B. TOPSOIL PLACED AND GRADED ON SLOPES STEEPER THAN 5% SHALL BE PROMPTLY FERTILIZED, SEEDED, MULCHED AND STABILIZED BY "TRACKING" WITH SUITABLE EQUIPMENT.
C. A MINIMUM OF 4 INCHES OF TOPSOIL IS TO BE USED IN ALL AREAS.

SOIL AMENDMENTS
A. LIME TO A pH OF 7.0. LIME IS NOT TO BE APPLIED WITHIN 50 FEET OF STREAMS AND WETLANDS.
B. FERTILIZER APPLICATION RATE TO BE BASED ON SOIL TESTS.
   1. IN NO CASE SHALL FERTILIZER BE APPLIED BETWEEN DECEMBER 1 AND APRIL 1 ANNUALLY.
   2. FERTILIZER SHALL NOT BE SPREAD WITHIN 20 FEET OF A SURFACE WATER.
   3. ANY FERTILIZER FALLING OR SPILLED INTO IMPERVIOUS SURFACE AREAS SUCH AS PARKING LOTS, ROADWAYS, AND SIDEWALKS SHALL BE IMMEDIATELY CONTAINED AND LEGALLY APPLIED OR PLACED IN AN APPROPRIATE CONTAINER.
   4. INCORPORATE THE FERTILIZER, AND LIME IF SPECIFIED, INTO THE TOP 2 – 4 INCHES OF THE TOPSOIL OR SOIL PROFILE.
   5. WHEN APPLYING FERTILIZER BY HYDROSEEDING CARE SHOULD BE TAKEN TO APPLY MIX ONLY TO SEED BED AREAS AT AN APPROPRIATE FLOW RATE TO PREVENT EROSION AND SPRAYING ONTO IMPERVIOUS AREAS.

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
GENERAL NOTES

NO.	REVISION/ISSUE	DATE

PREPARED BY:
NAPIERALA CONSULTING
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1101 FAYETTE STREET
MANLIUS, NEW YORK 13104
email: MNAP@NAPCON.COM
PH: (315) 682-5580 FAX: (315) 682-5544

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE NTS

PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

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SHEET **C-1**

SITE CRITERIA CHECKLIST

PROJECT SITE INFORMATION		
ADDRESS	HENNEBERRY ROAD (COUNTY ROUTE 182)	
TAX MAP ID NO.	109.-02.-07.1	
BOUNDARY SURVEY	PROPERTY LINE INFORMATION TAKEN FROM SURVEY BY IANUZI AND ROMANS	
TOTAL SITE AREA	54.746 ACRES	
LAND USE	SINGLE FAMILY RESIDENTIAL – 34 LOTS	
ZONING INFORMATION		
ZONING DISTRICT	R-1, RESIDENTIAL DISTRICT	
	REQUIRED	PROVIDED
MIN. LOT FRONTAGE	150'	150' MIN.
MIN. LOT AREA	40,000 SF	40,000 SF MIN.
MINIMUM FRONT YARD	40'	40' MIN.
MINIMUM REAR YARD	40'	40' MIN.
MINIMUM SIDE YARD	20'	20' MIN.

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
PRELIMINARY OVERALL GRADING PLAN

NO.	REVISION/ISSUE	DATE

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PRELIMINARY
NOT FOR CONSTRUCTION

PLAN SEAL BY:
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NYS REGISTRATION # 082211

PROJECT NO.	DATE	SCALE
20-1906	17 SEP 2020	1" = 80'

SHEET
C-2

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NOTE:

STORM CONVEYANCE SYSTEM PIPE SLOPE, RIM, AND INVERT ELEVATIONS CAN BE SEEN ON THE OVERALL GRADING PLAN, SHEET C-2.

GRAPHIC SCALE
0 80' 160'
(IN FEET)
1 inch = 80 ft

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
PRELIMINARY OVERALL UTILITY PLAN

NO.	REVISION/ISSUE	DATE

PREPARED BY:
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PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE 1" = 80'

SHEET C-3

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1 C-6.0 OVERALL ROAD PLAN
SCALE: 1"=100'

2 C-6.0 OVERALL ROAD PROFILE
SCALE: H: 1"=120' V:1"=12'

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
OVERALL ROAD PROFILE

NO.	REVISION/ISSUE	DATE

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PLAN SEAL BY:
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NYS REGISTRATION # 087211

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE AS NOTED

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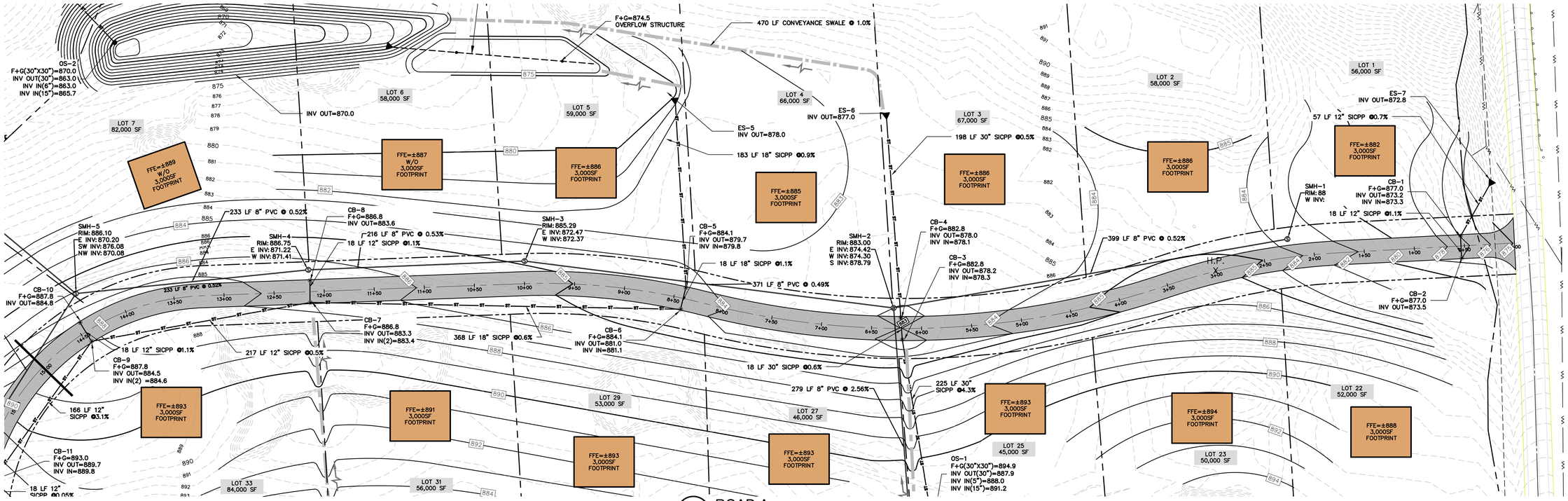
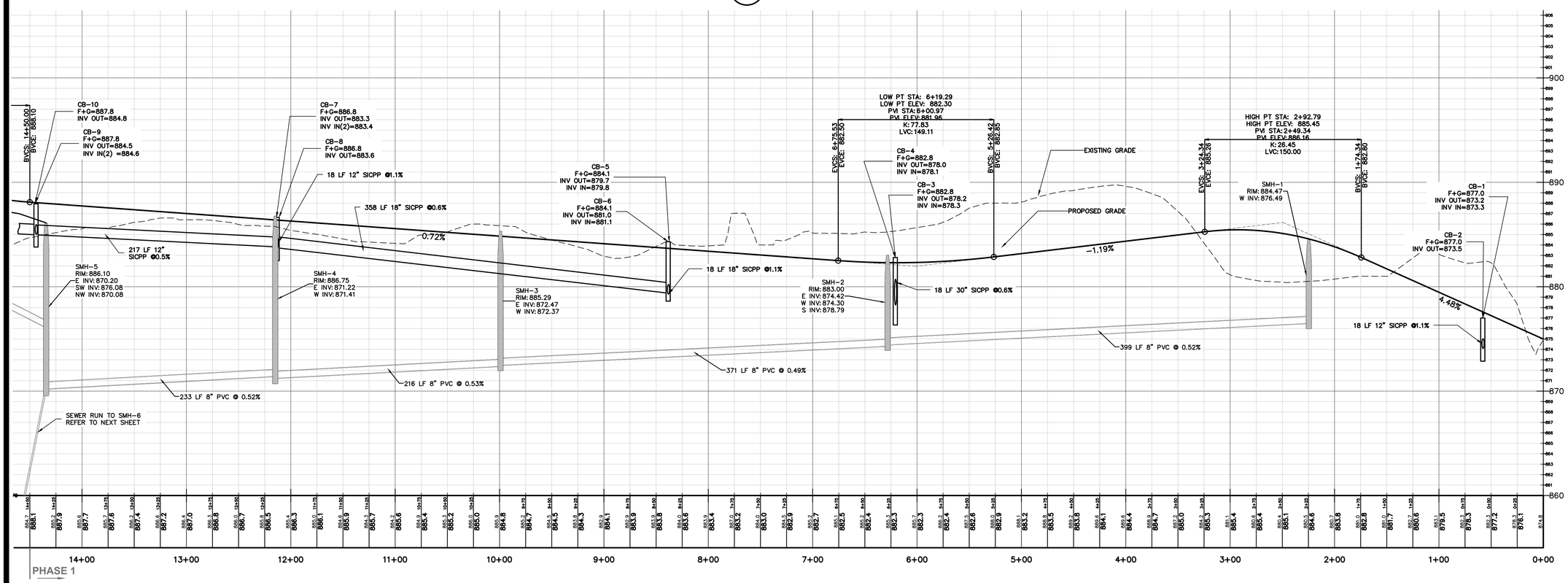
ADDITIONS TO THIS DOCUMENT BY OTHERS THE DOCUMENT BEARING THE SEAL OF JAMY TOLMATCH, 76 TIMBER RIDGE DRIVE, CHITTENANGO, NY 13037 IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF THE ALTERATIONS.

SHEET **C-4**



1 ROAD A
C-5.0 SCALE: 1"=50'



2 ROAD A PROFILE - SUBDIVISION PHASE 1
C-5.0 SCALE: H:1"=50' V:1"=5'

GRAPHIC SCALE
0 50' 100'
(IN FEET)
1 inch = 50 ft

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
ROAD PROFILE PLAN

NO.	REVISION/ISSUE	DATE

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PLAN SEAL BY:
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NYS REGISTRATION # 087211

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE 1" = 50'
SHEET C-5.0

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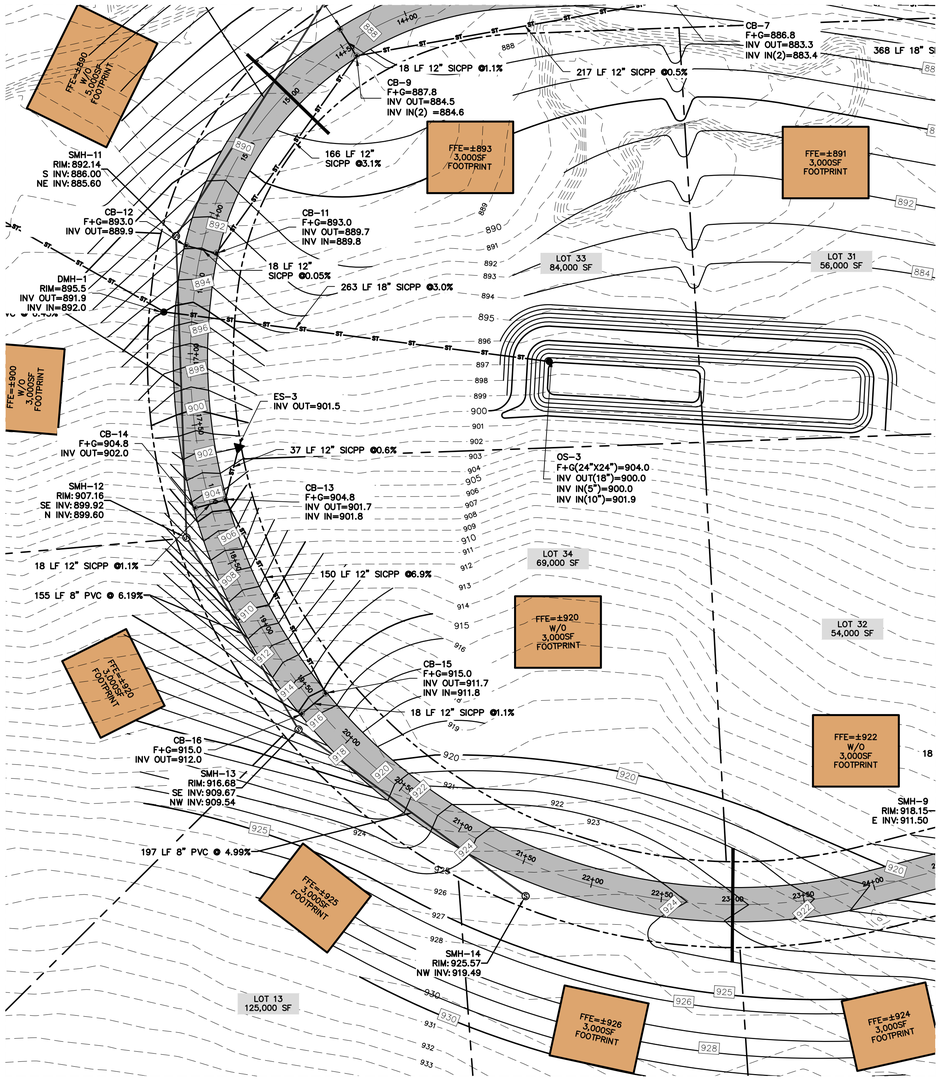
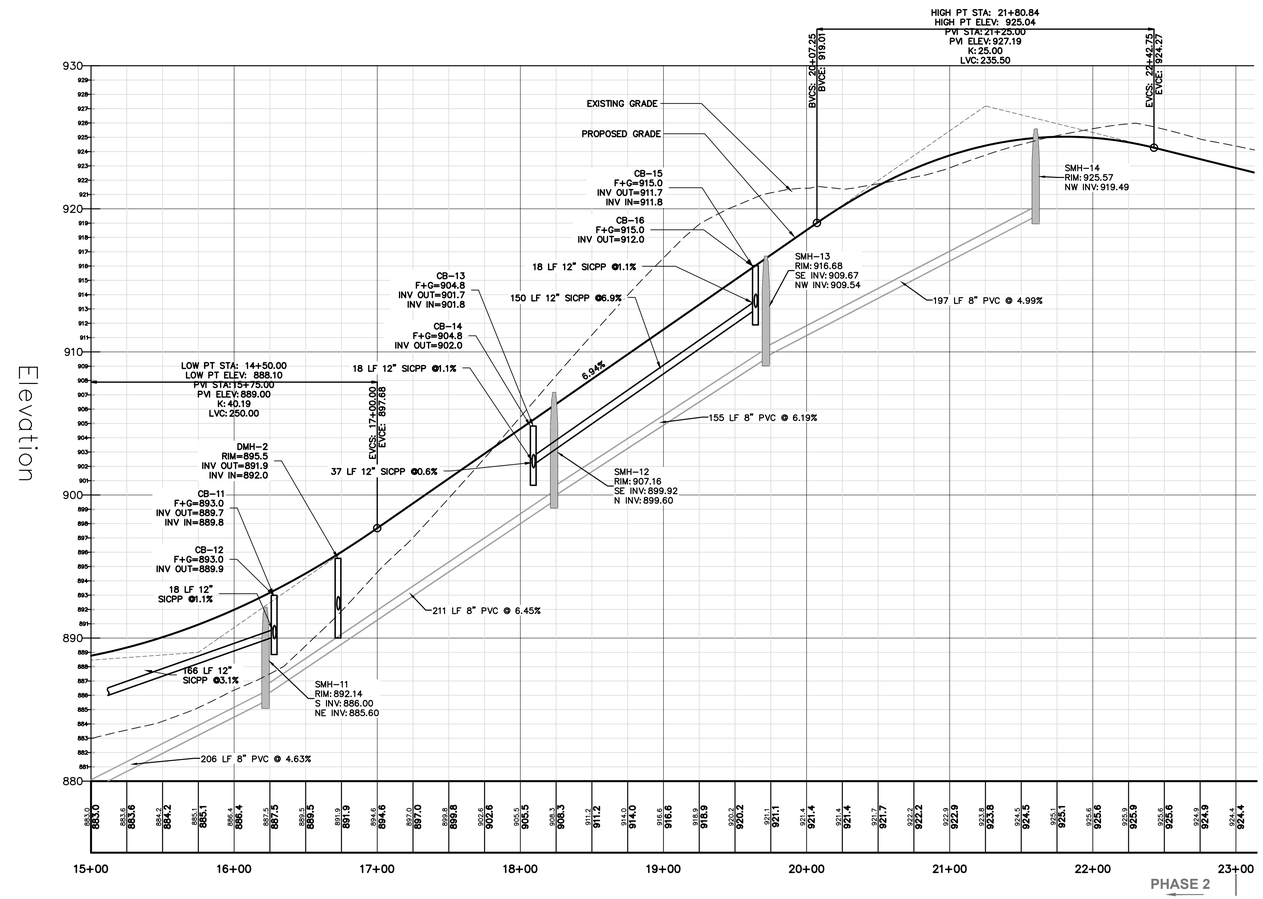


1 C-5.1 ROAD A PLAN
SCALE: 1"=50'



2 C-5.1 ROAD A PROFILE - SUBDIVISION PHASE 2
SCALE: H: 1"=50' V: 1"=5'

GRAPHIC SCALE
0 50' 100'
(IN FEET)
1 inch = 50 ft

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PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
ROAD PROFILE PLAN

NO.	REVISION/ISSUE	DATE

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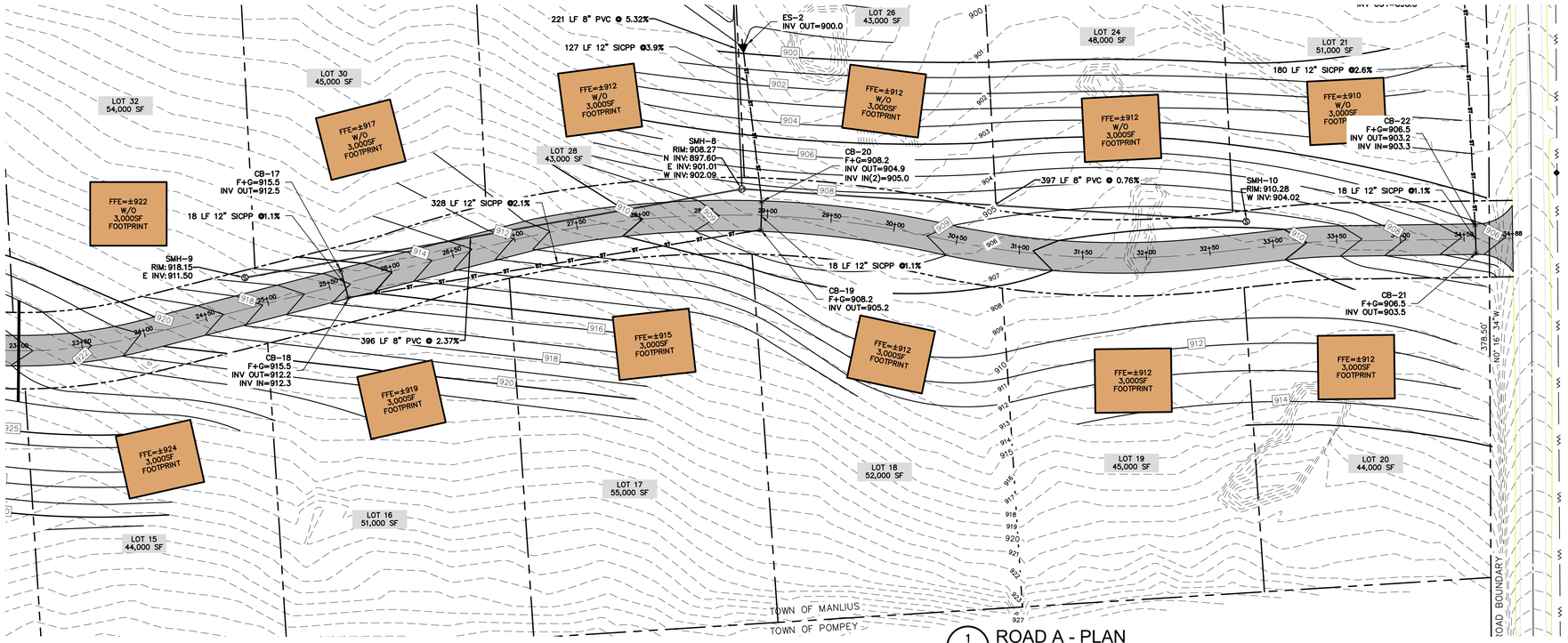
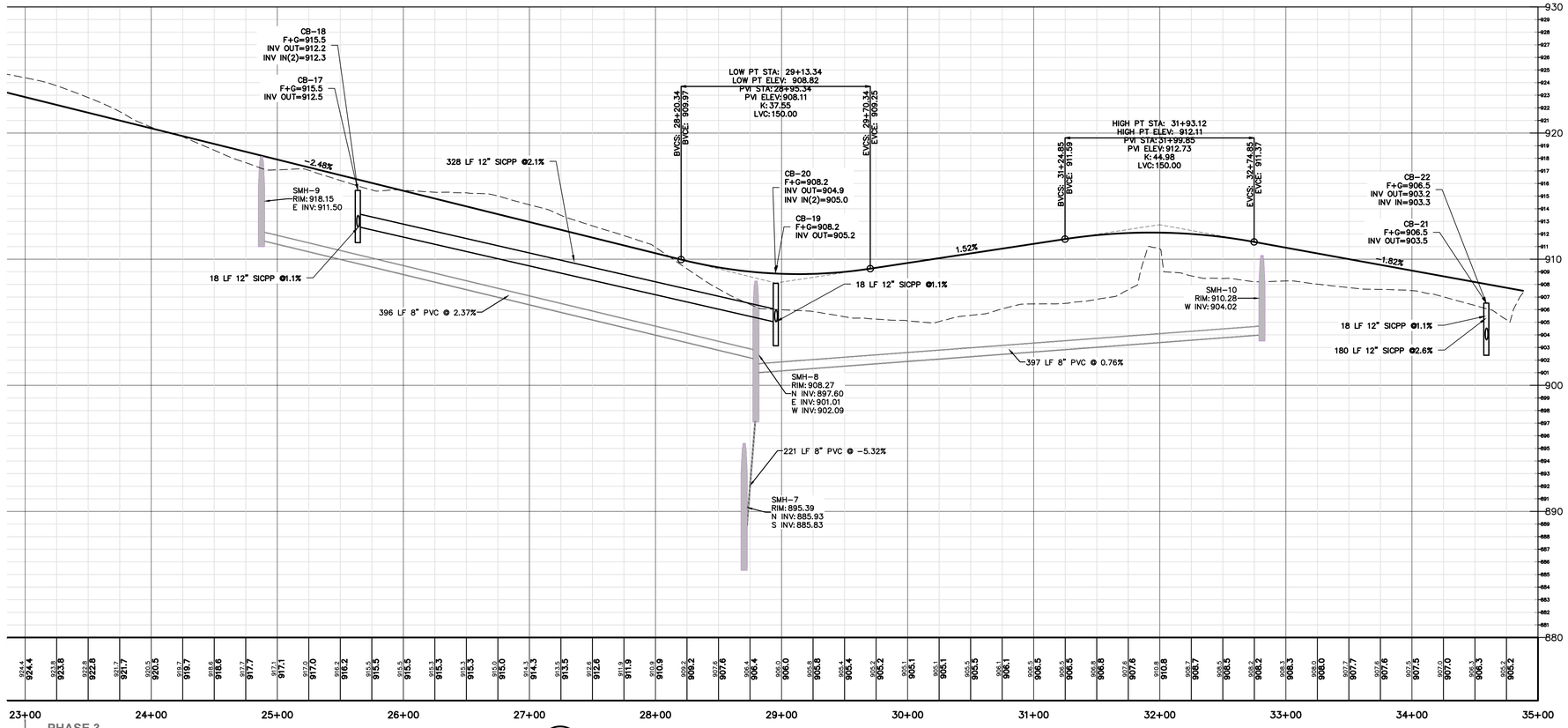
PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE 1" = 50'

SHEET C-5.1



1 C-5.2 ROAD A - PLAN
SCALE: 1"=50'



2 C-5.2 ROAD A PROFILE - SUBDIVISION PHASE 3
SCALE: H:1"=50' V:1"=5'

GRAPHIC SCALE
0 50' 100'
(IN FEET)
1 inch = 50 ft

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
ROAD PROFILE PLAN

NO.	REVISION/ISSUE	DATE

PREPARED BY:
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PRELIMINARY
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PLAN SEAL BY:
NEAL H. ZINSMEYER, JR. P.E.
NYS REGISTRATION # 087211

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE 1" = 50'

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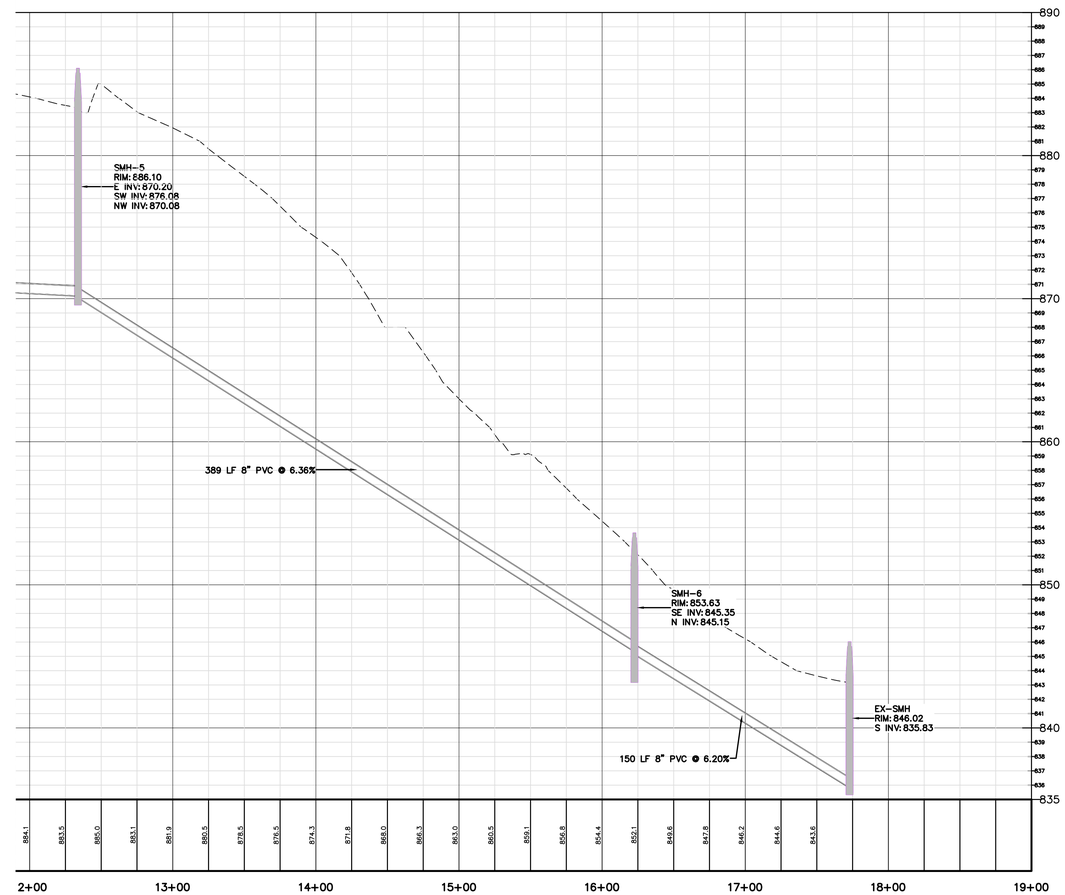
SHEET C-5.2

2 C-6.0 SEWER PLAN
SCALE: 1"=50'



3 C-6.0 SEWER PROFILE
SCALE: H: 1"=50' V: 1"=5'

1 C-6.0 OVERALL SEWER LAYOUT
SCALE: NTS

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
SEWER PROFILE PLAN

NO.	REVISION/ISSUE	DATE

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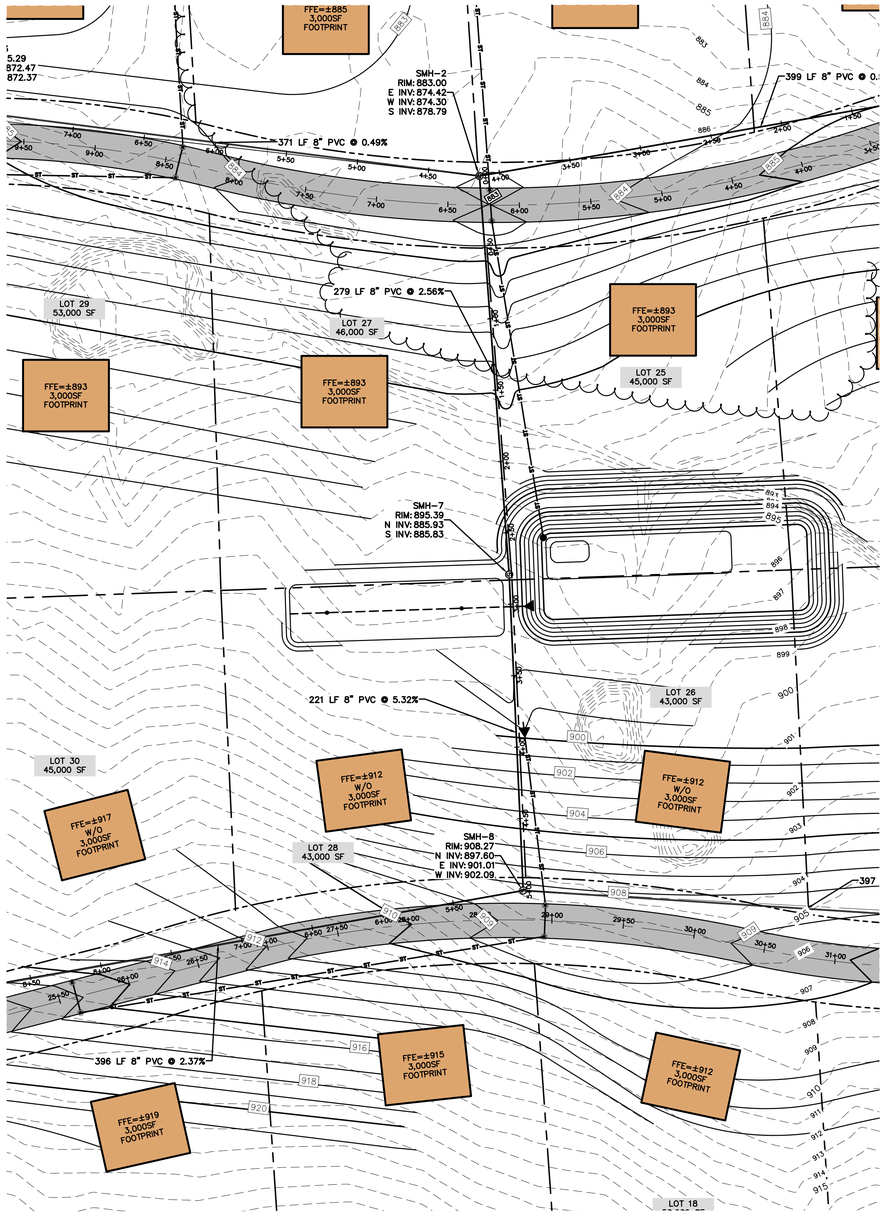
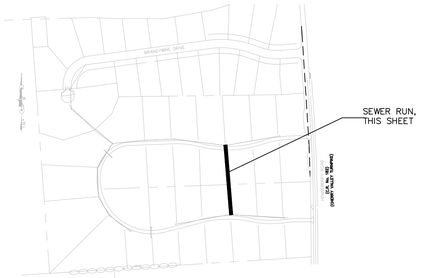
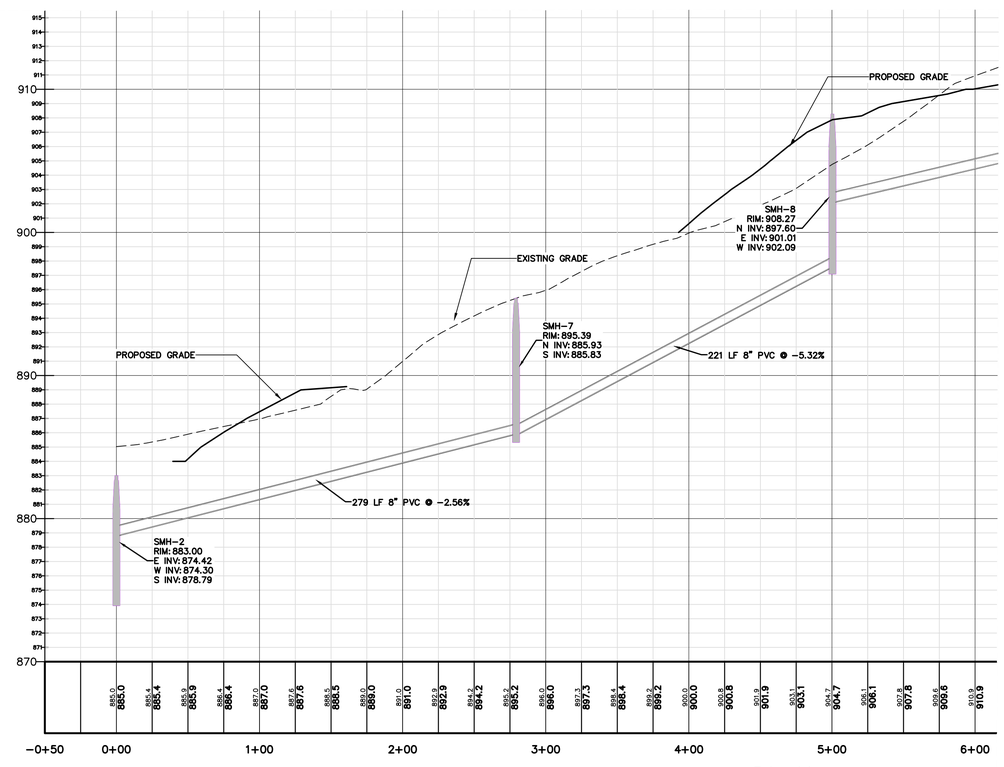
PROJECT NO. 20-1906
DATE 15 SEP 2020
SCALE 1" = 50'
SHEET C-6.0



2 C-6.1 SANITARY SEWER PLAN
SCALE: 1"=50'



1 C-6.1 OVERALL SEWER LAYOUT
SCALE: NTS



3 C-6.1 SANITARY SEWER PROFILE
SCALE: H: 1"=50' V: 1"=5'

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
SEWER PROFILE PLAN

NO.	REVISION/ISSUE	DATE

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PLAN SEAL BY:
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NYS REGISTRATION # 087211

PROJECT NO. 20-1906
DATE 15 SEP 2020
SCALE 1" = 50'

SHEET C-6.1

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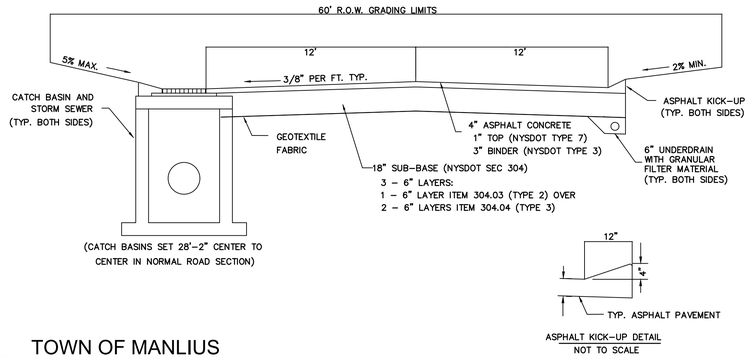
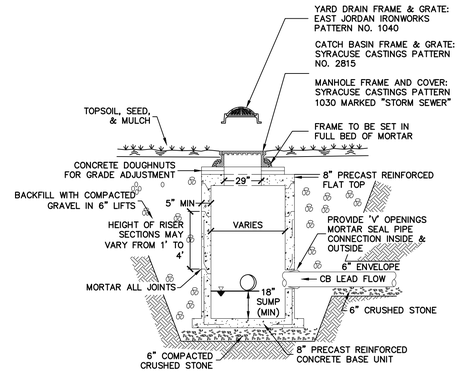


1 C-7.0 TOWN OF MANLIUS RESIDENTIAL STREET CROSS SECTION

SCALE: NTS

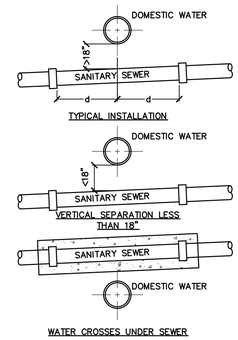


DRAINAGE STRUCTURE GENERAL NOTES

1. ALL STRUCTURES SHALL BE RATED FOR H–20 LOADING
2. REINFORCING FOR ALL SECTIONS SHALL BE AS FOLLOWS:
   TOP: #3 BARS SPACED AT 4" IN BOTH DIRECTIONS.
   BOTTOM: #3 BARS SPACED AT 4" IN BOTH DIRECTIONS.
   SIDES: #3 BARS SPACED AT 8" IN BOTH HORIZONTAL AND VERTICAL.
3. ALL REINFORCEMENT SHALL BE PLACED SO IT WILL HAVE A MINIMUM COVER OF 2" AND BE LOCATED APPROXIMATELY WITHIN THE CENTER OF THE SECTION.
4. TOP SLAB AND/OR FRAME ADJUSTMENT: FOR ALL DRAINAGE STRUCTURES A MAXIMUM OF 6 INCHES OF BRICK AND MORTAR OR A MAXIMUM OF 2 INCHES OF MORTAR ALONE SHALL BE USED FOR TOP SLAB AND/OR FRAME & GRATE ADJUSTMENT. FOR ADJUSTMENTS OVER 6 INCHES AND NOT TO EXCEED 12 INCHES, PRECAST CONCRETE ADJUSTMENT ELEMENT(S) MANUFACTURED IN ACCORDANCE WITH NYS–DOT STANDARD SPEC SUB–SECTION #706–04 SHALL BE USED; A MAXIMUM OF 2 INCHES OF MORTAR SHALL BE ALLOWED ON BOTH THE TOP AND BOTTOM OF THE PRECAST DEVICES. BRICK SHALL BE PRECAST PAVERS CONFORMING TO NYS–DOT STANDARD SPEC SUB–SECTION #704–13 AND MORTAR SHALL BE MORTAR FOR CONCRETE MASONRY CONFORMING TO NYS–DOT STANDARD SPEC SUB–SECTION #705–21.
5. MANHOLE STEPS SHALL BE REQUIRED IN ALL DRAINAGE STRUCTURES DEEPER THAN 4 FEET. STEPS SHALL CONFORM TO NYS–DOT STANDARD SPEC SUB–SECTION #725–02.
6. BASE OF PRECAST CATCH BASIN SHALL REST ON BASE MATERIAL COMPACTED IN PLACE WITH A VIBRATORY MECHANICAL TAMPER IN LIFTS NOT TO EXCEED 6" AT A TIME.
7. TRENCH SIDES SHALL CONFORM TO NYS DEPT OF LABOR AND OSHA SAFETY REGULATIONS.
8. MANHOLE INLET AND OUTLET PIPE CONNECTIONS MUST BE JOINED TO THE MANHOLE WITH A GASKETED, FLEXIBLE, WATERTIGHT CONNECTION OR IN ANY WATERTIGHT ARRANGEMENT THAT ALLOWS DIFFERENTIAL SETTLING OF THE MANHOLE WALL AND PIPE TO TAKE PLACE.

2 C-7.0 CATCH BASIN

SCALE: NTS



TYPICAL INSTALLATION

1. MINIMUM VERTICAL SEPARATION IS 18" FROM TOP OF PIPE TO BOTTOM OF PIPE.
2. SEWER JOINTS ARE TO SPACED EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.

VERTICAL SEPARATION LESS THAN 18"

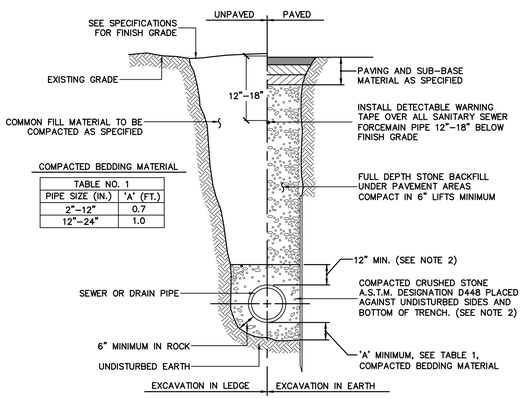
1. SEWER SHALL BE DESIGNED AND CONSTRUCTED EQUAL TO THE WATER PIPE, AND SHALL BE PRESSURE TESTED AT 150 PSI TO ASSURE WATER TIGHTNESS PRIOR TO BACKFILLING.
2. SEWER JOINTS ARE TO SPACED EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.

WATER CROSSES UNDER SEWER

1. SEWER SHALL BE DESIGNED AND CONSTRUCTED EQUAL TO THE WATER PIPE, AND SHALL BE PRESSURE TESTED AT 150 PSI TO ASSURE WATER TIGHTNESS PRIOR TO BACKFILLING.
2. SEWER JOINTS ARE TO SPACED EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.
3. PROVIDE ADEQUATE STRUCTURAL SUPPORT FOR SEWER TO MAINTAIN LINE AND GRADE

3 C-7.0 WATER AND SEWER SEPARATION

SCALE: NTS



COMPACTED BEDDING MATERIAL

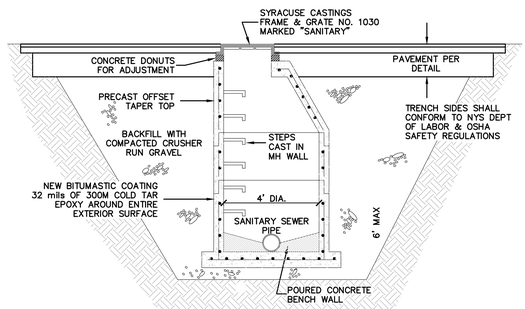
TABLE NO. 1	
PIPE SIZE (IN.)	'A' (FT.)
2"–12"	0.7
12"–24"	1.0

NOTES:

1. SHEETING, WHEN REQUIRED, TO BE CUT OFF AT LEAST 5 FEET BELOW STREET AND A MINIMUM OF 1 FOOT ABOVE TOP OF PIPE. WOOD SHEETING DRIVEN BELOW MID–DIAMETER OF THE PIPE SHALL BE LEFT IN PLACE. STEEL SHEETING DRIVEN BELOW MID–DIAMETER MAY BE WITHDRAWN IF APPROVED IN WRITING BY THE ENGINEER. FOR PVC PIPE ALL SHEETING DRIVEN BELOW MID–DIAMETER SHALL BE LEFT IN PLACE.
2. WHEN APPROVED BY THE ENGINEER FOR PIPES OTHER THAN PVC SELECTED GRAVEL FILL MATERIAL MAY BE USED FROM MID–DIAMETER OF PIPE TO 12" ABOVE TOP OF PIPE. NO STONES LARGER THAN 2 INCHES IN ANY DIMENSION WILL BE PERMITTED IN THIS AREA 3. TRENCHES LOCATED ON THE ROAD SHOULDER SHALL BE TREATED THE SAME AS EXCEPT FOR PAVING.
4. PROVIDE AT LEAST ONE IMPERVIOUS DAM IN GRAVEL BEDDING BETWEEN EACH MANHOLE WHERE DIRECTED, OR EVERY 300 FEET, WHICHEVER IS LESS. SEE DETAIL.
5. BEDDING MATERIAL FOR PVC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D2321 CLASS I OR CLASS II EMBEDMENT MATERIALS.

4 C-7.0 TYPICAL SEWER AND DRAIN TRENCH

SCALE: NTS

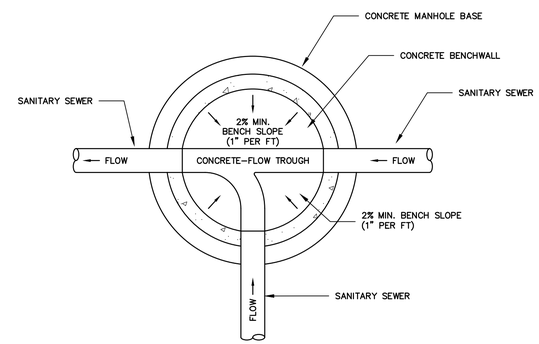


SANITARY MANHOLE GENERAL NOTES

1. ALL SANITARY SEWER MANHOLES TO BE RATED FOR H–20 LOADING
2. PRECAST REINFORCED CONCRETE OFFSET TAPER TOP TO BE MANUFACTURED IN ACCORDANCE WITH ASTM C–478. TOP SECTION IS TO BE 3' LONG.
3. PRECAST REINFORCED CONCRETE MANHOLE RISER SECTIONS ARE TO BE MANUFACTURED IN ACCORDANCE WITH ASTM C–478. RISER SECTIONS ARE TO HAVE A 48" INSIDE DIAMETER x 5" WALL AVAILABLE IN 2', 3', OR 4' LENGTHS.
4. PRECAST REINFORCED CONCRETE MANHOLE BASE IS TO MANUFACTURED IN ACCORDANCE WITH ASTM C–478. BASE IS TO HAVE A 48" INSIDE DIAMETER x 5" WALL WITH RUBBER BOOTS AS REQUIRED.
5. REINFORCING FOR ALL SECTIONS SHALL BE 2X4, ⅝ W.W. MESH.
6. ALL REINFORCEMENT SHALL BE PLACED SO IT WILL HAVE A MINIMUM COVER OF 2" AND BE LOCATED APPROXIMATELY WITHIN THE CENTER OF THE SECTION.
7. COURSES OF BRICK OR CONCRETE DONUTS ARE TO BE USED FOR RIM GRADE ADJUSTMENTS.
8. BASE OF PRECAST MANHOLE SHALL REST ON UNDISTURBED UNIFORM VIRGIN SOIL OR COMPACTED GRAVEL, COMPACTED IN PLACE WITH VIBRATORY MECHANICAL TAMPERS IN LIFTS NOT TO EXCEED 6" AT A TIME.
9. TRENCH SIDES SHALL CONFORM TO NYS LABOR DEPARTMENT SAFETY REGULATIONS.

5 C-7.0 SANITARY MANHOLE STRUCTURE

SCALE: NTS



6 C-7.0 SANITARY SEWER MANHOLE BENCH

SCALE: NTS

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
SITE DETAILS

NO.	REVISION/ISSUE	DATE

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PLAN SEAL BY:
NEALE F. ZINSMEISTER, JR., P.E.
NYS LICENSED PROFESSIONAL ENGINEER

PROJECT NO.	DATE	SCALE
20-1906	17 SEP 2020	NTS

SHEET **C-7.0**

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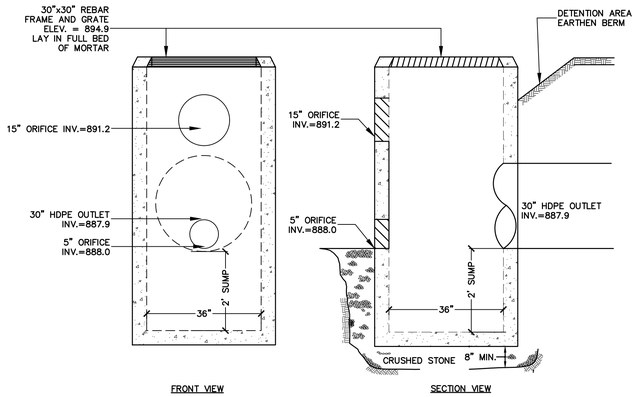
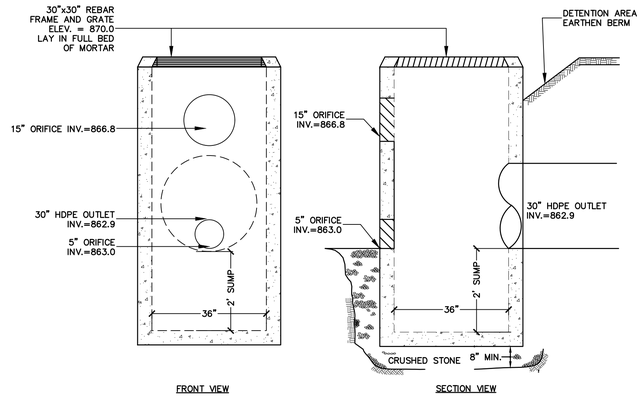
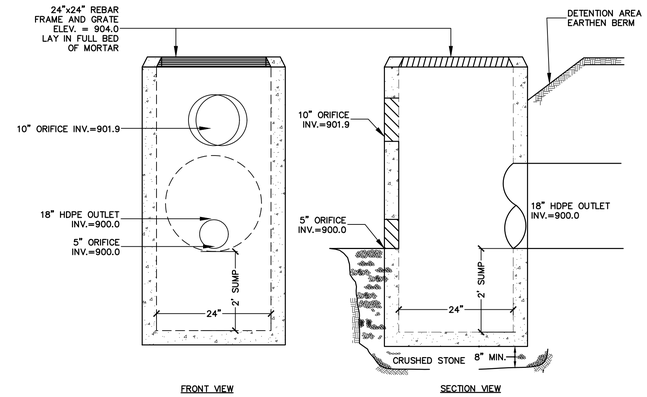


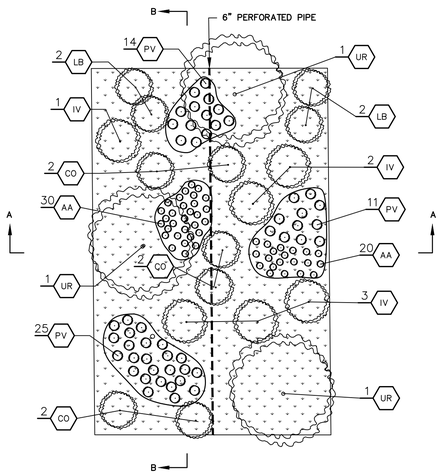
1 C-7.1 DETENTION BASIN #1
PRECAST CONCRETE OUTLET STRUCTURE
SCALE: NTS



2 C-7.1 DETENTION BASIN #2
PRECAST CONCRETE OUTLET STRUCTURE
SCALE: NTS



3 C-7.1 DETENTION BASIN #3
PRECAST CONCRETE OUTLET STRUCTURE
SCALE: NTS



*PLANTING QUANTITIES SHOWN IN THE GRAPHIC ABOVE ARE FOR A TYPICAL 1,000 SF BIORETENTION AREA. SPECIFIC QUANTITIES FOR THE BIORETENTION AREA ARE PROVIDED IN THE CORRESPONDING LANDSCAPING TABLE.

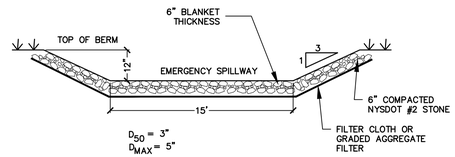
BIORETENTION AREA #1 (±6,250 SF) – LANDSCAPE TABLE

KEY	QUANTITY*	LATIN NAME	COMMON NAME	CALIPER	HEIGHT
TREES					
UR	6	ULMUS RUBRA	SLIPPERY ELM	6'–8'	B&B
SHRUBS					
LB	25	LINDERA BENZOIN	COMMON SPICE	18"–24"	B&B
IV	30	ILEX VERTICILLATA	WINTER BERRY	2'–3'	B&B
CO	25	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	18"–24"	B&B
HERBACEOUS PLANTS					
PV	300	PANICUM VIRGATUM	SWITCH GRASS		
AA	300	AGROSTIS ALBA	REDTOP		

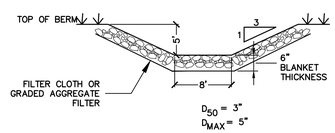
BIORETENTION AREA #2 (±5,400 SF) – LANDSCAPE TABLE

KEY	QUANTITY*	LATIN NAME	COMMON NAME	CALIPER	HEIGHT
TREES					
UR	5	ULMUS RUBRA	SLIPPERY ELM	6'–8'	B&B
SHRUBS					
LB	25	LINDERA BENZOIN	COMMON SPICE	18"–24"	B&B
IV	25	ILEX VERTICILLATA	WINTER BERRY	2'–3'	B&B
CO	25	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	18"–24"	B&B
HERBACEOUS PLANTS					
PV	250	PANICUM VIRGATUM	SWITCH GRASS		
AA	250	AGROSTIS ALBA	REDTOP		

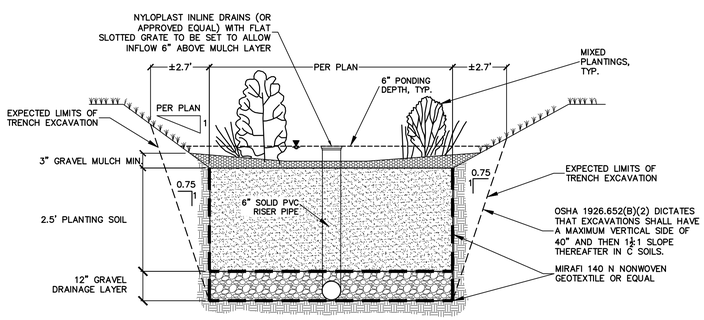
4 C-7.1 BIORETENTION FILTER SPECIES
SCALE: NTS



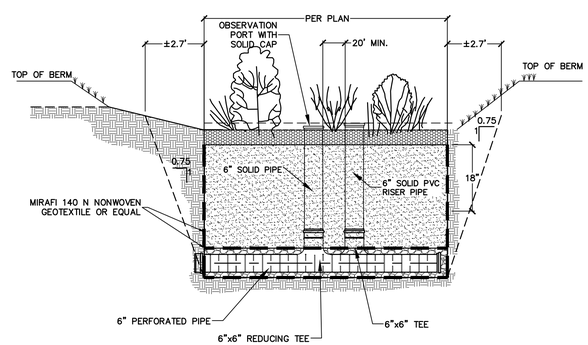
5 C-7.1 RIP RAP EMERGENCY SPILLWAY
SCALE: NTS



6 C-7.1 RIP RAP BIORETENTION SPILLWAY
SCALE: NTS



PROFILE VIEW SECTION A–A



PROFILE VIEW SECTION B–B

7 C-7.1 BIORETENTION FILTER CROSS SECTIONS
SCALE: NTS

BIORETENTION NOTES:

1. PLANTING SOIL MEDIA SHALL BE:
   A.) 85% TO 88% COARSE TO MEDIUM SAND
   B.) 12%–15% LEAF COMPOST OR TOPSOIL
2. PEA GRAVEL MULCH CONFORMING TO ASTM D 448 No. 6.
3. UNDERDRAIN GRAVEL TO BE AASHTO M–43 No. 67, 0.25" TO 0.75".
4. GEOTEXTILE FILTER FABRIC (SEPARATION LAYER):
   ASTM D–751 (PUNCTURE STRENGTH – 125 LB)
   ASTM D–1117 (MULLEN BURST STRENGTH – 400 PSI)
   ASTM D–1682 (TENSILE STRENGTH – 300 LB)
   SIZE – 0.08" THICK; EQUIVALENT OPENING SIZE OF #80 SIEVE
5. COMPACT WITH WATER–FILLED HAND ROLLER. COMPACTION TO BE FIRM BUT EASY (UTILIZE PENCIL TEST).
6. ENGINEER TO TEST IN PLACE COMPACTION AND INFILTRATION OF PLANTING SOIL.
7. ENGINEER TO PERFORM INSPECTION OF BIORETENTION PLANTING SOIL IMMEDIATELY FOLLOWING PLACEMENT AND PERFORM AN IN PLACE PERCOLATION TEST TO CONFIRM THAT THE IN PLACE MATERIAL PERCOLATES AT A RATE FASTER THAN 10 MIN/INCH.

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
SITE DETAILS

NO.	REVISION/ISSUE	DATE

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PLAN SEAL BY:
NEAL H. ZIMMERTER, JR., P.E.
NYS LICENSED PROFESSIONAL ENGINEER

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE AS SHOWN

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SHEET
C-7.1

EROSION CONTROL NOTES

EROSION AND SEDIMENT CONTROLS

1. STABILIZATION PRACTICES (TEMPORARY)
   a) TEMPORARY SEEDING AND PLANTING OF ALL UNPAVED AREAS WHEN CONSTRUCTION ACTIVITY HAS CEASED, OR WILL CEASE, IN AN AREA FOR 14 DAYS. SEEDING MIXTURES AND APPLICATION RATES ARE LISTED ON SHEET C-2.
   b) MULCHING EXPOSED AREAS.
   c) FREQUENT WATERING TO MINIMIZE WIND EROSION DURING CONSTRUCTION.

2. STABILIZATION PRACTICES (PERMANENT)
   a) LAND CLEARING ACTIVITIES SHALL BE DONE ONLY IN AREAS WHERE EARTHWORK WILL BE PERFORMED AND SHALL PROGRESS AS EARTHWORK IS NEEDED.
   b) PERMANENT SEEDING AND PLANTING OF ALL UNPAVED AREAS.

3. STRUCTURAL MEASURES TEMPORARY
   a. STABILIZED CONSTRUCTION ENTRANCE: AT THE ENTRANCE TO THE ALL DISTURBED AREAS FROM AN EXISTING ROADWAY A STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROVIDED. THE PURPOSE OF THE STABILIZED CONSTRUCTION ENTRANCE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO THE PUBLIC RIGHT-OF-WAY.
   b. SILT FENCE: SILT FENCE SHALL BE INSTALLED AS SHOWN ON THE EROSION CONTROL PLAN . THE FABRIC SHALL MEET THE SPECIFICATIONS NOTED ON THE DETAILS UNLESS OTHERWISE APPROVED BY THE APPROPRIATE EROSION AND SEDIMENT CONTROL PLAN APPROVAL AUTHORITY. SUCH APPROVAL SHALL NOT CONSTITUTE STATEWIDE ACCEPTANCE.
   c. DUST CONTROL: DUST CONTROL IS THE CONTROL OF DUST RESULTING FROM LAND-DISTURBING ACTIVITIES. THE PURPOSE IS TO PREVENT SURFACE AND AIR MOVEMENT OF DUST FROM DISTURBED SOIL SURFACES THAT MAY CAUSE OFF-SITE DAMAGE, HEALTH HAZARDS, AND TRAFFIC SAFETY PROBLEMS.
   d. SEDIMENT TRAP: SEDIMENT TRAP TO BE INSTALLED IN DETENTION BASIN AREA FOR USE DURING CONSTRUCTION. STONE OUTLET SEDIMENT TRAP TO BE INSTALLED AS PER DETAIL TO ELIMINATE SEDIMENT DISCHARGE TO DOWNSTREAM AREAS DURING CONSTRUCTION PHASE.

4. STRUCTURAL PRACTICES (PERMANENT)
   a. ROCK OUTLET PROTECTION: ROCK OUTLET PROTECTION IS A SECTION OF ROCK PROTECTION PLACED AT THE OUTLET END OF CULVERTS, CONDUITS, OR CHANNELS. THE PURPOSE OF THE ROCK OUTLET PROTECTION IS TO REDUCE THE DEPTH, VELOCITY, AND ENERGY OF WATER, SUCH THAT THE FLOW WILL NOT ERODE THE RECEIVING DOWNSTREAM REACH.
   b. REINFORCED SLOPE PROTECTION: A TEMPORARY PROTECTIVE COVERING PLACED ON A PREPARED PLANTING AREA THAT IS ANCHORED IN PLACE BY STAPLES OR OTHER MEANS TO AID IN CONTROLLING EROSION BY ABSORBING RAIN SPLASH ENERGY AND WITHSTAND OVERLAND FLOW AS WELL AS PROVIDE A MICROCLIMATE TO PROTECT AND PROMOTE SEED ESTABLISHMENT.
   c. LAND GRADING: PERMANENT RESHAPING OF THE EXISTING LAND SURFACE BY GRADING IN ACCORDANCE WITH AN ENGINEERING TOPOGRAPHIC PLAN AND SPECIFICATION TO PROVIDE EROSION CONTROL AND VEGETATIVE ESTABLISHMENT ON DISTURBED, RESHAPED AREAS.

5. SEQUENCE OF MAJOR ACTIVITIES
   THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING THE ABOVE LISTED EROSION AND SEDIMENT CONTROL PRACTICES. THE CONTRACTOR MAY DESIGNATE THESE TASKS TO CERTAIN SUBCONTRACTORS AS IS SEEN FIT, BUT THE ULTIMATE RESPONSIBILITY FOR IMPLEMENTING THESE CONTROLS AND ENSURING THEIR PROPER FUNCTION REMAINS WITH THE CONTRACTOR. THE ORDER OF ACTIVITIES WILL BE AS FOLLOWS:
   a) CONDUCT PRECONSTRUCTION MEETING
   b) CONSTRUCT TEMPORARY CONSTRUCTION ENTRANCE/EXIT AT THE LOCATION SHOWN ON THE PLAN.
   c) INSTALL PERIMETER SILT FENCE AND SECURITY CONSTRUCTION FENCE IN THE LOCATIONS SHOWN ON THE PLAN.
   d) ESTABLISH STAGING AREA ON PROJECT SITE
   e) CONSTRUCT TEMPORARY SEDIMENT TRAP
   f) REMOVE TOPSOIL, STOCKPILE AND STABILIZE
   g) SITE GRADING. IMPORT OF FILL MATERIAL TO RAISE SITE TO PROPOSED GRADE (OR SUB-GRADE, AS APPROPRIATE).
   h) BUILDING FOUNDATION EXCAVATION (BUILDING CONSTRUCTION TO CONTINUE CONCURRENTLY WITH REMAINING SITE WORK).
   i) DISTURBED AREAS OF THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED FOR MORE THAN 14 DAYS SHALL BE TEMPORARILY SEEDED AND WATERED.
   j) UNDERGROUND UTILITY INSTALLATIONS.
   k) INSTALL FILTER FABRIC DROP INLET PROTECTION AT ALL STORM INLETS.
   l) COMPACT GRAVEL ALONG ALL DRIVE AISLES AND PARKING AREAS
   m) SITE CONCRETE CONSTRUCTION.
   n) FINALIZE PAVEMENT SUBGRADE PREPARATION.
   o) REMOVE INLET PROTECTION NO MORE THAN 24 HOURS PRIOR TO PLACING ASPHALT PAVEMENT.
   p) PAVE AREAS NOTED ON PLAN.
   q) DEEP RIPPING OF NON-PAVED AREAS AS REQUIRED (NON-PAVED AREAS THAT HAVE BEEN COMPACTED DURING CONSTRUCTION VIA CONSTRUCTION TRAFFIC).
   r) FINAL GRADING, SEEDING, AND PLANTING.
   s) CONSTRUCT BIORETENTION BASINS AND OUTLET CONTROLS UPON UPSTREAM STABILIZATION OF SITE
   t) REMOVE SEDIMENT TRAP AND FINALIZE GRADING OF DETENTION BASIN
   u) REMOVE SILT FENCE ONLY AFTER ALL PAVING IS COMPLETE AND EXPOSED SURFACES ARE STABILIZED.

MAINTENANCE/INSPECTION PROCEDURES

THE FOLLOWING INSPECTION AND MAINTENANCE PRACTICES WILL BE USED TO MAINTAIN EROSION AND SEDIMENT CONTROLS AND STABILIZATION MEASURES.

1. ALL CONTROL MEASURES WILL BE INSPECTED AT LEAST TWICE EVERY SEVEN (7) CALENDAR DAYS
2. ALL MEASURES WILL BE MAINTAINED IN GOOD WORKING ORDER; IF REPAIRS OR OTHER EROSION CONTROL MEASURES ARE FOUND TO BE NECESSARY, THEY WILL BE INITIATED WITHIN 24 HOURS OF REPORT.
3. BUILT UP SEDIMENT WILL BE REMOVED FROM SILT FENCE WHEN IT HAS REACHED ONE-THIRD THE HEIGHT OF THE FENCE.
4. SILT FENCES WILL BE INSPECTED FOR DEPTH OF SEDIMENT, TEARS, ETC., TO SEE IF THE FABRIC IS SECURELY ATTACHED TO THE FENCE POSTS, AND TO SEE THAT THE FENCE POSTS ARE SECURELY IN THE GROUND.
5. TEMPORARY AND PERMANENT SEEDING AND ALL OTHER STABILIZATION MEASURES WILL BE INSPECTED FOR BARE SPOTS, WASHOUTS, AND HEALTHY GROWTH.
6. A MAINTENANCE INSPECTION REPORT WILL BE MADE AFTER EACH INSPECTION. COPIES OF THE REPORT FORMS TO BE COMPLETED BY THE INSPECTOR ARE INCLUDED IN THIS SWPPP.
7. THE OPERATOR SHALL HAVE A "QUALIFIED PROFESSIONAL" CONDUCT SITE INSPECTIONS FOLLOWING THE COMMENCEMENT OF CONSTRUCTION. A "QUALIFIED PROFESSIONAL" IS A PERSON KNOWLEDGEABLE IN THE PRINCIPLES AND PRACTICE OF EROSION AND SEDIMENT CONTROLS, SUCH AS A LICENSED PROFESSIONAL ENGINEER, CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC), OR SOIL SCIENTIST.
8. DISTURBED AREAS AND MATERIALS STORAGE AREAS WILL BE INSPECTED FOR EVIDENCE OF OR POTENTIAL FOR POLLUTANTS ENTERING STORMWATER SYSTEMS.
9. REPORT TO NYS DEC WITHIN 24 HOURS ANY NONCOMPLIANCE WITH THE SWPPP THAT WILL ENDANGER PUBLIC HEALTH OR THE ENVIRONMENT. FOLLOW UP WITH A WRITTEN REPORT WITHIN 5 DAYS OF THE NONCOMPLIANCE EVENT. THE FOLLOWING EVENTS REQUIRE 24 HOUR REPORTING: A) ANY UNANTICIPATED BYPASS WHICH EXCEEDS ANY EFFLUENT LIMITATION IN THE PERMIT, B) ANY UPSET WHICH EXCEEDS ANY EFFLUENT LIMITATION IN THE PERMIT, AND C) A VIOLATION OF A MAXIMUM DAILY DISCHARGE LIMITATION FOR ANY OF THE POLLUTANTS LISTED BY THE EPA IN THE PERMIT TO BE REPORTED WITHIN 24 HOURS. THE WRITTEN SUBMISSION MUST CONTAIN A DESCRIPTION OF THE NON-COMPLIANCE AND ITS CAUSE; THE PERIOD OF NON-COMPLIANCE, INCLUDING EXACT DATES AND TIMES, AND IF THE NON-COMPLIANCE HAS NOT BEEN CORRECTED, THE ANTICIPATED TIME IT IS EXPECTED TO CONTINUE; AND STEPS TAKEN OR PLANNED TO REDUCE, ELIMINATE, AND PREVENT RECURRENCE OF THE NON-COMPLIANCE.
10. RELEASES OF HAZARDOUS SUBSTANCES OR OIL IN EXCESS OF REPORTABLE QUANTITIES (AS ESTABLISHED UNDER 40 CFR 110, 40 CFR 117 OR 40 CFR 302) MUST BE REPORTED. FORM G-1 PROVIDES FURTHER DETAILS ON THE NOTIFICATION AND REPORTING PROCESS.

INSPECTION AND MAINTENANCE REPORT FORMS

ONCE INSTALLATION OF ANY REQUIRED OR OPTIONAL EROSION CONTROL DEVICE OR MEASURE HAS BEEN IMPLEMENTED, AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND SHALL BE PERFORMED BY A QUALIFIED PROFESSIONAL. THE FORMS FOUND IN THIS SWPPP SHALL BE USED BY THE INSPECTORS TO INVENTORY AND REPORT THE CONDITION OF EACH MEASURE TO ASSIST IN MAINTAINING THE EROSION AND SEDIMENT CONTROL MEASURES IN GOOD WORKING ORDER.

THESE REPORT FORMS SHALL BECOME AN INTEGRAL PART OF THE SWPPP AND SHALL BE MADE READILY ACCESSIBLE TO GOVERNMENTAL INSPECTION OFFICIALS, THE OPERATOR'S ENGINEER, AND THE OPERATOR FOR REVIEW UPON REQUEST DURING VISITS TO THE PROJECT SITE. IN ADDITION, COPIES OF THE REPORTS SHALL BE PROVIDED TO ANY OF THESE PERSONS, UPON REQUEST, VIA MAIL OR FACSIMILE TRANSMISSION. INSPECTION AND MAINTENANCE REPORT FORMS ARE TO BE MAINTAINED BY THE PERMITTEE FOR FIVE YEARS FOLLOWING THE FINAL STABILIZATION OF THE SITE.

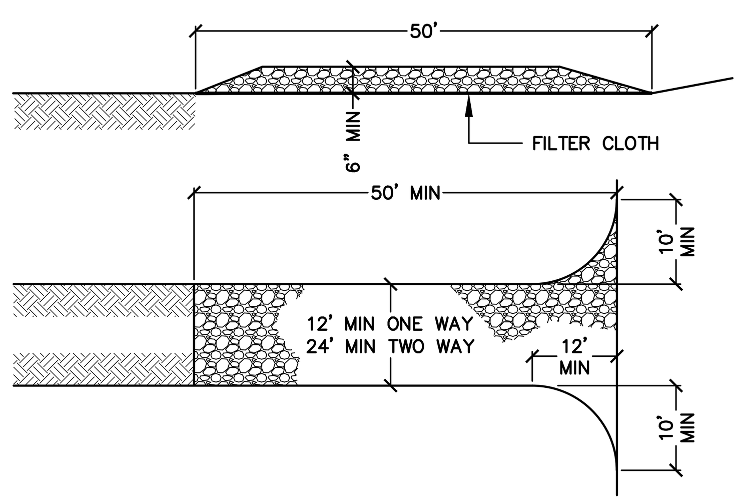
OTHER RECORD-KEEPING REQUIREMENTS

THE CONTRACTOR SHALL KEEP THE FOLLOWING RECORDS RELATED TO CONSTRUCTION ACTIVITIES AT THE SITE:

- DATES WHEN MAJOR GRADING ACTIVITIES OCCUR AND THE AREAS WHICH WERE GRADED
- DATES AND DETAILS CONCERNING THE INSTALLATION OF STRUCTURAL CONTROLS
- DATES WHEN CONSTRUCTION ACTIVITIES CEASE IN AN AREA
- DATES WHEN AN AREAS IS STABILIZED, EITHER TEMPORARILY OR PERMANENTLY
- DATES OF RAINFALL AND THE AMOUNT OF RAINFALL
- DATES AND DESCRIPTIONS OF THE CHARACTER AND AMOUNT OF ANY SPILLS OF HAZARDOUS MATERIALS
- RECORDS OF REPORTS FILED WITH REGULATORY AGENCIES IF REPORTABLE QUANTITIES OF HAZARDOUS MATERIALS SPILLED

EROSION CONTROL NOTES

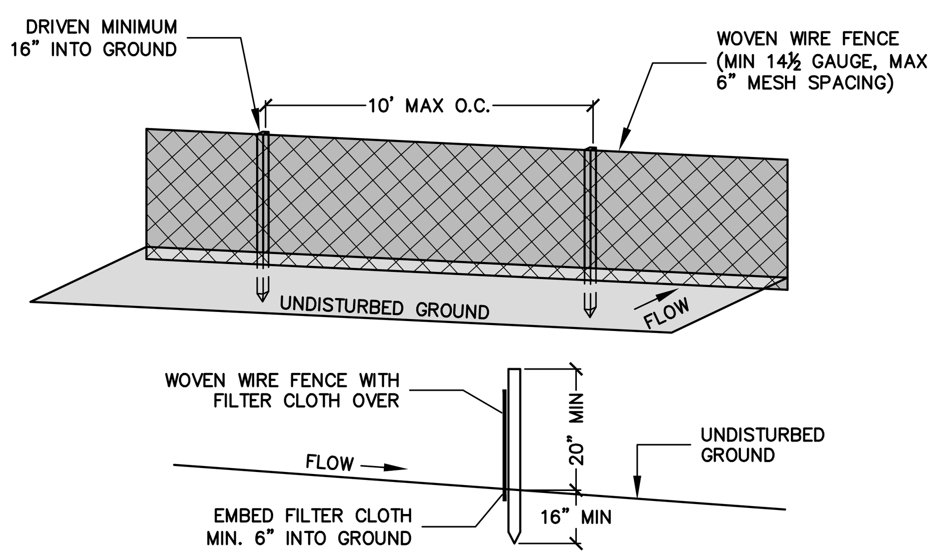
1. LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY GOVERNING AUTHORITIES. THE GENERAL CONTRACTOR SHALL STRICTLY ADHERE TO THE APPROVED SWPPP DRAWINGS DURING CONSTRUCTION OPERATIONS.
2. NO LAND CLEARING OR GRADING SHALL BEGIN UNTIL THE APPROPRIATE EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
3. ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 7 DAYS OF FINAL GRADING.
4. SHOULD CONSTRUCTION STOP FOR LONGER THAN 14 DAYS, THE SITE SHALL BE SEEDED AS SPECIFIED.
5. MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN AND AT LEAST ONCE A WEEK.
6. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
7. GENERAL CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
8. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON SITE INSPECTION.
9. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
11. ALL WORK TO BE DONE IN STRICT ACCORDANCE WITH THE NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.



1. STONE SIZE – USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – NOT LESS THAN 50 FEET.
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – 24 FEET MINIMUM.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

1 C-7.2 CONSTRUCTION ENTRANCE

SCALE: NTS



POSTS: STEEL, EITHER "T" OR "U" TYPE OR 2" HARDWOOD

FENCE: WOVEN WIRE, 14 1/2 GAUGE, 6" MAX. MESH OPENING

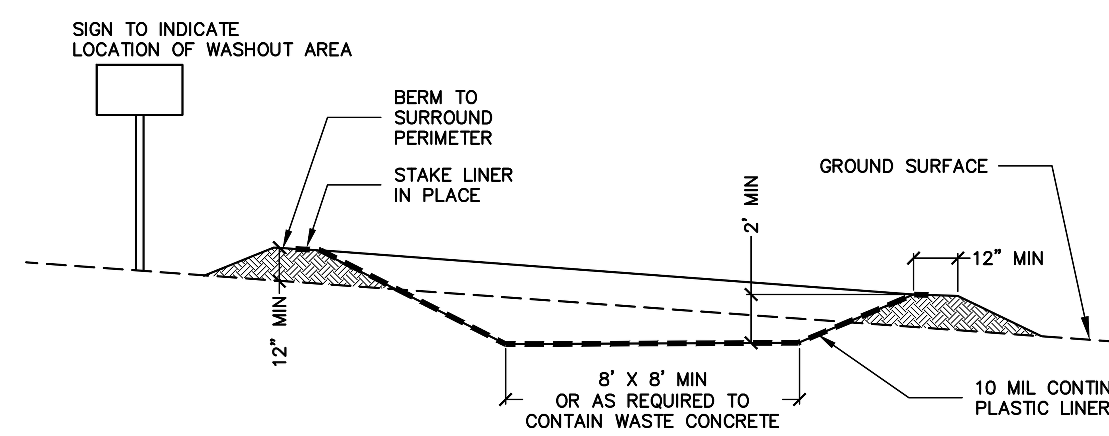
FILTER CLOTH: FILTER X., MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

2 C-7.2 SILT FENCE

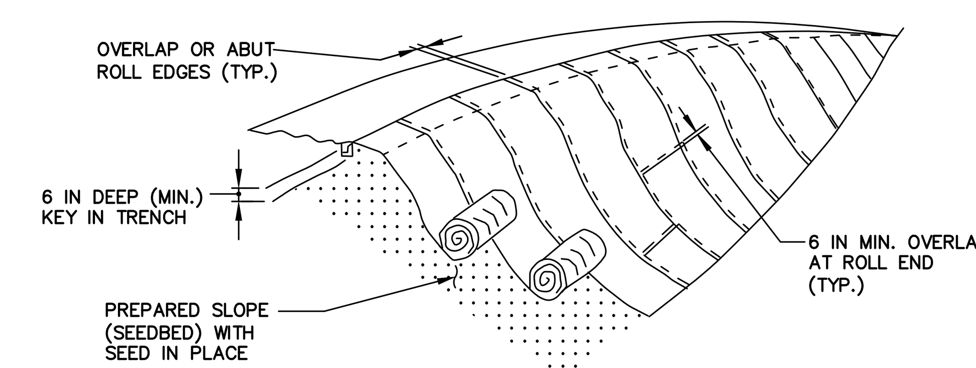
SCALE: NTS



NOTES:
1. CONCRETE WAHSOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.
2. CONCRETE WASHOUT OUT AREA SHALL BE LINED WITH A 10 MIL IMPERMEABLE LINER AND STAKED IN PLACE.
3. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE LOCATION OF CONCRETE WASHOUT AREA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
4. THE CONCRETE WAHSOUT AREA SHALL BE REPAIRED AND ENLARGED OR CLEANED OUT AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
5. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM SITE AND DISPOSED OF AT AN ACCEPTED WASTE SITE.
6. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, THE DISTURBED AREA SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED.

3 C-7.2 CONCRETE WASHOUT AREA

SCALE: NTS



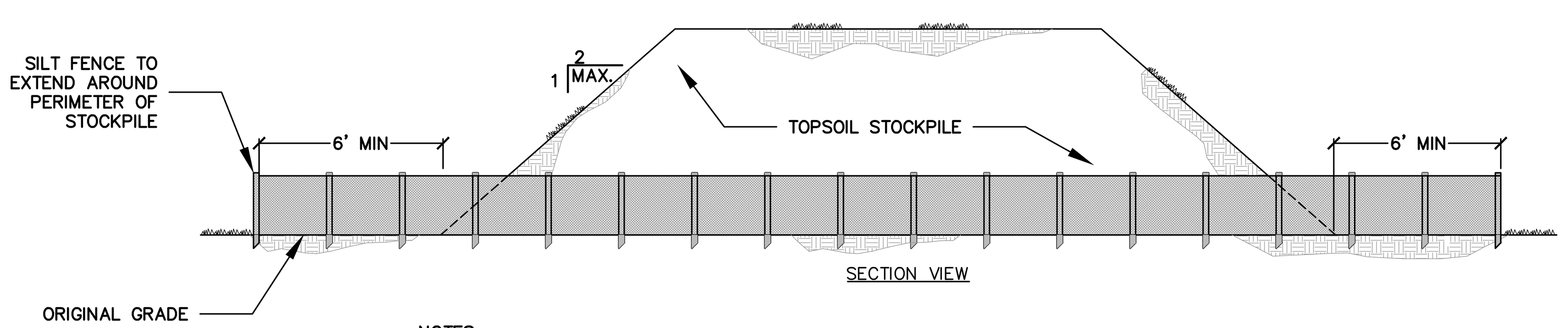
ISOMETRIC VIEW

CONSTRUCTION SPECIFICATIONS

1. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN-MADE FIBERS (MOSTLY ORGANIC).
2. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION & SEDIMENT CONTROL PLAN.
3. OVERLAP OR ABUT ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSLOPE MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.

4 C-7.2 SLOPE STABILIZATION MATTING

SCALE: NTS

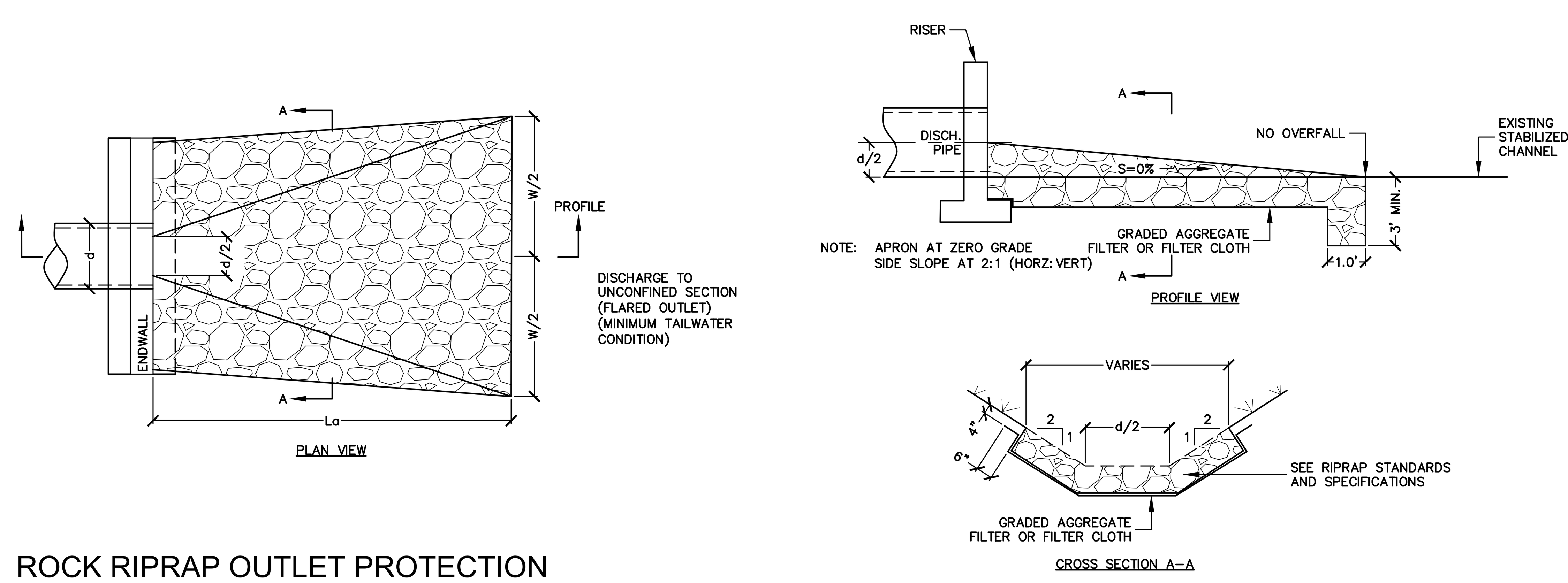


SECTION VIEW

NOTES:
1. SEE EROSION CONTROL PLAN FOR LOCATION OF STOCKPILE
2. REFER TO SILT FENCE DETAIL FOR INSTALLATION OF SILT FENCE
3. IF THE STOCKPILE IS TO REMAIN FOR MORE THAN 14 DAYS IT SHALL BE TEMPORARILY SEEDED FOR STABILIZATION
4. SILT FENCES TO BE MAINTAINED IN PLACE UNTIL TOPSOIL STOCKPILE HAS BEEN REMOVED

5 C-7.2 TYPICAL TOPSOIL STOCKPILE

SCALE: NTS



6 C-7.2 ROCK RIPRAP OUTLET PROTECTION UNCONFINED DOWNSTREAM SECTION

SCALE: NTS

PRELIMINARY
FOR PLANNING PURPOSES ONLY, NOT FOR CONSTRUCTION.

PROJECT TITLE: BRANDYWINE ESTATES PHASE 2 HENNEBERRY ROAD

TOWN OF MANLIUS ONONDAGA COUNTY, NY

PREPARED FOR: HARRINGTON HOMES 3848 HENNEBERRY ROAD JAMESVILLE, NY 13078

SHEET TITLE: SITE DETAILS

NO.	REVISION/ISSUE	DATE

PREPARED BY: NAPIERALA CONSULTING PROFESSIONAL ENGINEER, P.C.
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PLAN SEAL BY: NEAL H. ZINSMEYER, JR., P.E. NYS REGISTRATION # 087211

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ANY LICENSEE WHO ALTERS THIS DOCUMENT IS REQUIRED BY LAW TO AFFIX HIS OR HER SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS OR HER SIGNATURE AND SPECIFIC DESCRIPTION OF THE ALTERATIONS.

PROJECT NO. 20-1906

DATE 17 SEP 2020

SCALE AS SHOWN

SHEET C-7.2

PRELIMINARY STORMWATER POLLUTION PREVENTION PLAN

For the:

Proposed Brandywine Estates – Phase 2
Henneberry Road
Town of Manlius

Prepared for:

HARRINGTON HOMES

Your Builder for Life

Harrington Homes, Inc
3848 Henneberry Road
Jamesville, NY 13078

Prepared by:

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Project No. 20-1906

September 2020

DRAFT

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EXECUTIVE SUMMARY

A. Purpose

The following Stormwater Pollution Prevention Plan (SWPPP) has been developed to control stormwater runoff and pollutants from a site during and after construction activities. The objective of this SWPPP is to comply with the NYSDEC SPDES Stormwater Permit from Construction Activities by planning and implementing standard design practices.

B. Project Description

The ±54 acre property is located on the west side of Henneberry Road in the Town of Manlius, Onondaga County, NY. This project consists of the subdivision and development of 34 single family homes. The development will also include necessary amenities such as public street(s), public/private utility extensions/connections, and applicable stormwater management facilities.

C. Stormwater Practices

Stormwater practices are categorized as either temporary construction measures or permanent operation measures. The temporary measures that will be used on this site for erosion and sediment control include (but are not limited to): stabilized construction entrance, silt fencing, and temporary sediment basins. The permanent stormwater practices to be installed are a series of vegetated swales, two bioretention areas, and four above ground grass-line detention basins which will provide water quality, runoff reduction, and storage for quantity control. All practices, both the temporary construction measures and the permanent operation measures, have been designed in accordance with the established standards.

D. Water Quality Treatment

The water quality volume treatment characteristics are summarized below. The entire water quality descriptions and calculations are further detailed in Section III.E and F.

Water Quality Volume	
Required WQv (ac-ft)	**Total Provided WQv (ac-ft)**
0.431	0.427

E. Runoff Reduction Volume (RRv)

The NYSDEC regulation requires all construction projects that disturb greater than one acre of land to provide runoff reduction through the implementation of green infrastructure practices. Runoff reduction volume for this project is achieved using vegetated swales and bioretention areas. This volume is summarized below and further detailed in Section III.D, E, and F.

Runoff Reduction Volume	
Required RRv (ac-ft)	**Total Provided RRv (ac-ft)**
0.051	0.143

F. Stormwater Quantity

The impacts to stormwater runoff quantity (i.e. peak flows) will be mitigated in the aboveground grass-lined detention basins throughout the site. The detention basins will be constructed with sufficient volume to store additional runoff from the site and discharge it in a controlled manner. The chart below summarizes the stormwater discharges from the site and is further detailed in Section III.G and H.

	Existing Peak Runoff Rate (cfs)			**Proposed Peak Runoff Rate (cfs)**		
Point of Study	Pt. 1B	Pt. 2	Pt. 3	Pt. 1B	Pt. 2	Pt. 3
10-Year Storm	69.99	7.68	9.35	28.86	1.33	5.84
100-Year Storm	163.03	18.46	22.06	101.76	3.01	12.42

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Section I. SCOPE

A. PURPOSE

Napierala Consulting, Professional Engineer, P.C., has prepared this Stormwater Pollution Prevention Plan (SWPPP) in compliance with the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) Construction General Permit governing stormwater discharges during construction. The contractor's participation and adherence to this plan is mandatory. Non-compliance with the plan is subject to various remedies including, without limitation, monetary set-offs, withholding payments, reimbursement for costs, expenses (including reasonable attorney's fees), fines and civil penalties incurred and/or liquidated damages. This section provides a descriptive explanation of the Stormwater Pollution Prevention Plan and required contractor participation.

B. SPDES GENERAL PERMIT GP-0-20-001

Regulations enacted by the New York State Department of Environmental Conservation require permitting for the discharge of stormwater from construction activities on sites where an area of one acre or more of soil disturbance is proposed. To comply with these regulations, the developer of the site must request coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-20-001). In order to obtain coverage under the General Permit a Stormwater Pollution Prevention Plan (SWPPP) for the site must be prepared following the requirements of the New York State Stormwater Management Design Manual and the New York State Standards and Specifications for Erosion and Sediment Control.

The NOI, the SWPPP, and any amendments to the SWPPP, as well as any reports required by the SPDES General Permit for Stormwater Discharges from Construction Activity, must also be submitted concurrently to the local governing body and any other authorized agency having jurisdiction or regulatory control over the construction project.

C. RESPONSIBILITIES OF THE OWNER

The owner/operator shall identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP. The owner/operator shall identify the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The owner/operator shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. The owner/operator shall ensure that at least one trained contractor is on site on a daily basis when soil disturbance activities are being performed. The owner/operator shall have a qualified inspector conduct site inspections.

D. RESPONSIBILITIES OF THE CONTRACTOR

The contractor shall manage the discharge of stormwater from the site in accordance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity. The owner shall be responsible for conducting the stormwater management practices in accordance with the permit. The contractor shall be responsible for providing qualified inspectors to conduct the inspections required by the SWPPP. The contractor shall be responsible for any enforcement action taken or imposed by federal, state, or local agencies, including the cost of fines, construction delays, and remedial actions resulting from the contractor's failure to comply with the permit provisions. It shall be the responsibility of the contractor to make any changes to the SWPPP necessary when the contractor or any of his subcontractors elects to use borrow or fill or material storage sites, either contiguous to or remote from the construction

site, when such sites are used solely for this construction site. Such sites are considered to be part of the construction site covered by the permit and this SWPPP. Off-site borrow, fill, or material storage sites which are used for multiple construction projects are not subject to this requirement, unless specifically required by state or local jurisdictional entity regulations. The contractor should consider this requirement in negotiating with earthwork subcontractors, since the choice of an off-site borrow, fill, or material storage site may impact their duty to implement, make changes to, and perform inspections required by the SWPPP for the site.

The SWPPP shall provide forms for both the general contractor and subcontractor(s) identifying the company name, business address and telephone number along with the responsible person for the contractor and all subcontractors' who will implement the measures identified in the SWPPP. **The general contractor shall sign the "General Contractor's Certification" and all subcontractors shall sign the "Subcontractor's Certification",** verifying they have been instructed on how to comply with and fully understand the requirements of the NYSDEC and SWPPP. **This certification must be signed, by a fully qualified individual on behalf of each entity, prior to the beginning of any construction activities and shall be filed in the projects SWPPP.**

The SWPPP is meant to be a working document that shall be maintained at the site of the construction activities at all times throughout the project, shall be readily available upon request by the operator's personnel or NYSDEC or any other agency with regulatory authority over storm water issues, and shall be kept on-site until the site complies with the Final Stabilization section of this document. **A sign or other notice must be posted near the main entrance of the construction site which contains a completed NOI, the location of the SWPPP and the name and phone number of a contact person responsible for scheduling SWPPP viewing times, and any other state specific requirements.**

E. NOTICE OF INTENT

The operator has petitioned the NYSDEC for the stormwater discharges during construction at this site to be covered by the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity. A **Notice of Intent** (NOI) to be covered under this permit has been filed by the operator. The signatory on the NOI must sign all documents (i.e., inspection reports) associated with the SWPPP. If the signatory chooses not to sign all documents, he/she must designate a duly authorized representative to sign all relevant documents. This designation must be made in writing and be included in the SWPPP. The duly authorized representative may be either a named individual or any individual occupying a named position. Additionally, the written designation must be submitted to the NYSDEC.

F. STORMWATER INSPECTIONS

1. Inspection Procedures

Inspections of the erosion control practices are required every seven days by a qualified professional. All inspections will continue until the site complies with the final stabilization section of this document. **Weekly Inspections must be conducted by a "Qualified Professional". "Qualified Professional" means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a licensed Professional Engineer (PE), Certified Professional in Erosion and Sediment Control (CPESC), or soil scientist.** Each inspection must be followed up by a report documenting the inspector's findings and request the required maintenance and/or repair for the erosion and sedimentation control measures. It is imperative that the contractor documents the inspection and maintenance of all erosion and sedimentation control measures as soon as possible after the inspection and/or maintenance have been completed. These records are used to prove that the required inspection and maintenance were performed. The records shall be placed in the SWPPP. In addition to inspection and maintenance reports, records should be kept of the construction activities that occur on the site. The operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

2. Record Keeping

The operator shall also prepare a written summary of its status with respect to compliance with this

general permit at a minimum frequency of every three months during which coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity exists. The summary should address the status of achieving each component of the SWPPP. The reports shall be signed by the signatory of the NOI or a duly-authorized person and be retained at the construction site.

The contractor shall retain copies of the SWPPP, all reports and data for a minimum of five (5) years after the project. The following list identifies the required inspection and maintenance documentation that must be maintained by the contractor under this SWPPP.

- Inspection Report
- Stabilization Schedule
- Implementation Schedule
- Status Report

G. SWPPP MODIFICATIONS

The inspection report should also identify if any revisions to the SWPPP are warranted due to unexpected conditions. The SWPPP is meant to be a dynamic working guide that is to be kept current and amended whenever:

- The NYSDEC provides notification that the SWPPP does not comply with the minimum permit requirements.
- The design, construction, operation, or maintenance of the site changes in a way which significantly affects the potential for the discharge of pollutants or when the plan proves to be ineffective in eliminating or significantly minimizing pollutant discharges
- Within seven (7) calendar days of knowledge of a reportable release.

Any such changes to the SWPPP must be made in writing within seven (7) days of the date such modification or amendment is made. The contractor's failure to monitor or report deficiencies to the operator will result in the contractor being liable for fines and construction delays resulting from any federal, state, or local agency enforcement action.

H. FINAL STABILIZATION AND TERMINATION OF PERMIT COVERAGE

A site can be considered stabilized when all soil disturbing activities have been completed and a uniform perennial vegetative cover with a density of 80% over the unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures have been established and the facility no longer discharges stormwater associated with construction activities, and a **Notice of Termination** (NOT) form has been filed by the operator(s) with the NYSDEC. Prior to filing of the Notice of Termination, the operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fence) not needed for long-term erosion control have been removed. The filing of the NOT terminates coverage under the General Permit and terminates the contractor's responsibility to implement the SWPPP, but the requirements of the SWPPP, including periodic inspections, must be continued until the NOT is filed. Upon achieving this milestone, the contractor shall also submit "Final Stabilization Certification/Termination Checklist". Final payment and/or the release of any retainer will be withheld until all provisions of the SWPPP have been submitted, completed and accepted by the operator.

Section II. SITE DESCRIPTION

A. PROJECT NAME AND LOCATION

Harrington Home, Inc
Brandywine Estates, Phase 2
Henneberry Road
Town of Manlius
Onondaga County, New York

UTM Coordinates from NYSDEC Interactive Map: E: 417962; N: 4759972
NYSDEC Region 7

The ±54 acre property is located on the west side of Henneberry Road in the Town of Manlius, Onondaga County, NY. Figure 1 shows the project location on a street map and Figure 2 shows an aerial image of the proposed site in its existing condition.

B. OWNER/OPERATOR NAME AND ADDRESS

Harrington Homes, Inc
3848 Henneberry Road
Jamesville, NY 10378

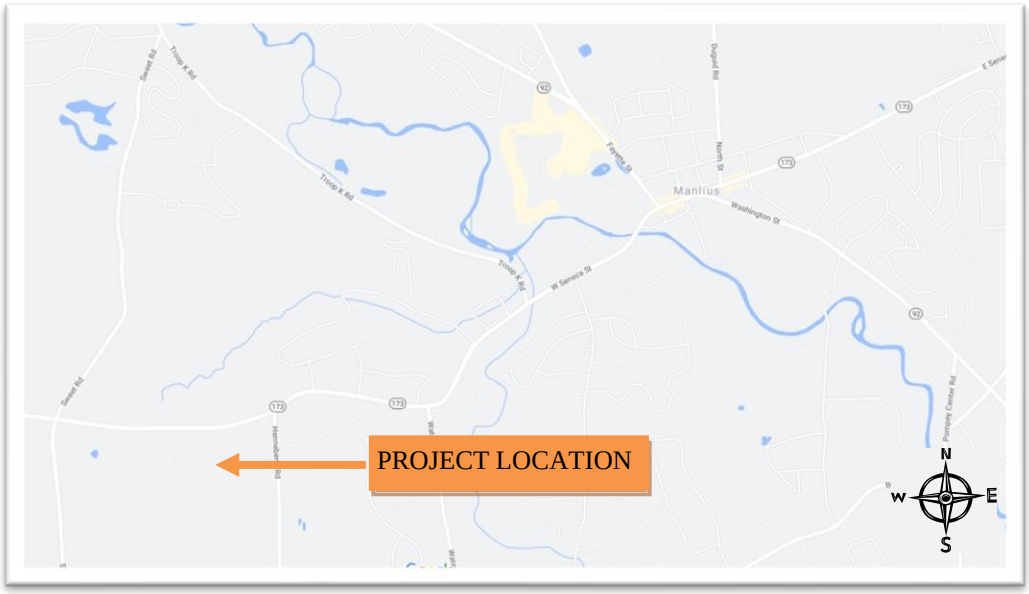


Figure 1: Site Location Map

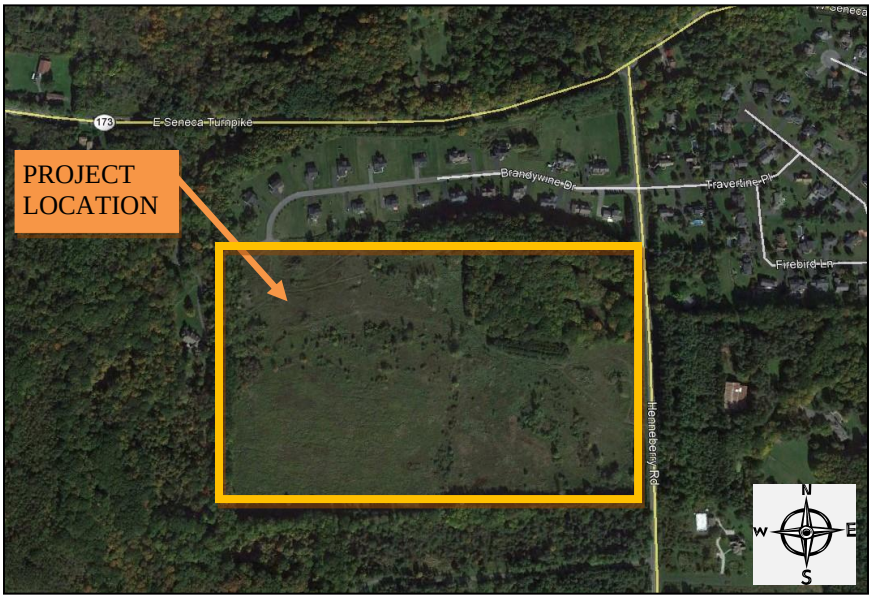


Figure 2: Proposed Site Aerial Image - Google Earth

C. PROJECT DESCRIPTION

The ±54 acre property is located on the west side of Henneberry Road in the Town of Manlius, Onondaga County, NY. This project consists of the subdivision and development of 34 single family homes. The development will also include necessary amenities such as public street(s), public/private utility extensions/connections, and applicable stormwater management facilities.

D. RECEIVING WATERS

Runoff from the site generally flows to the north toward Limestone Creek. This site is within a regulated MS4 (municipal separate storm sewer system). Figure 3 shows the project site location in relation to certain environmental boundaries using the NYSDEC Environmental Resource Mapper. The NYSDEC Environmental Resource Mapper shows that no regulated wetlands are within the vicinity of the project.

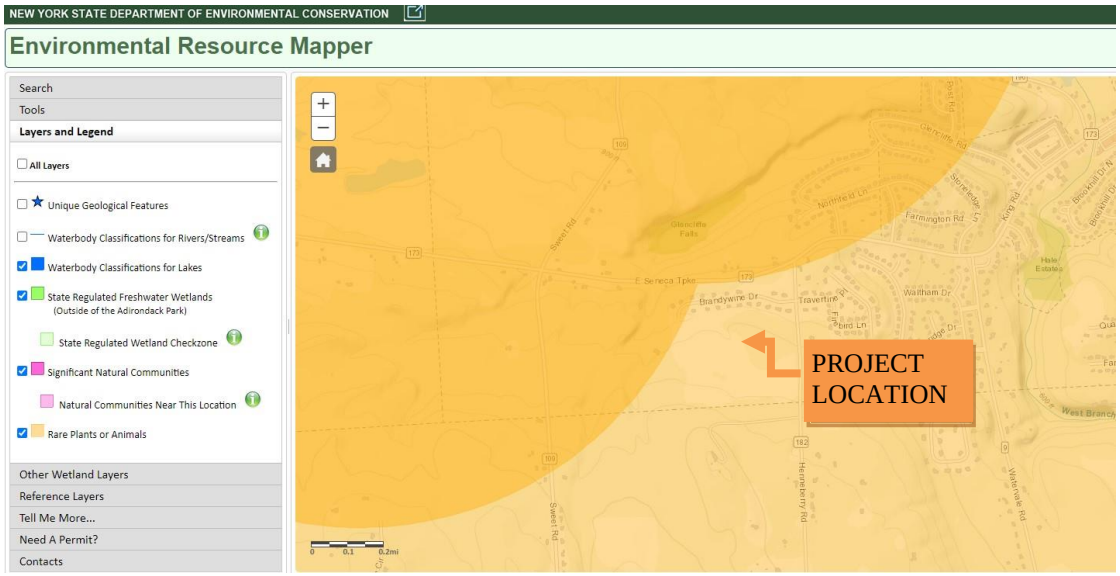


Figure 3: NYS DEC Environmental Resource Mapper

E. ENDANGERED OR THREATENED SPECIES

The NYS DEC Environmental Resource Mapper does not identify the site as containing any rare significant natural communities but is within the check zone for rare plants or animals. The site has been previously disturbed and therefore will not have an impact on plant or animal species but we have reached out to Natural Heritage for confirmation.

F. FEDERAL AND STATE HISTORIC PRESERVATION

The SPDES (State Pollutant Discharge Elimination System) GP-0-20-001 requires that the discharge from construction activities shall not influence properties listed as or eligible for listing on the State or National Register of Historic Places. Figure 4 shows the SHPO (State Historic Preservation) map which indicates the project is not within an archeological check zone.

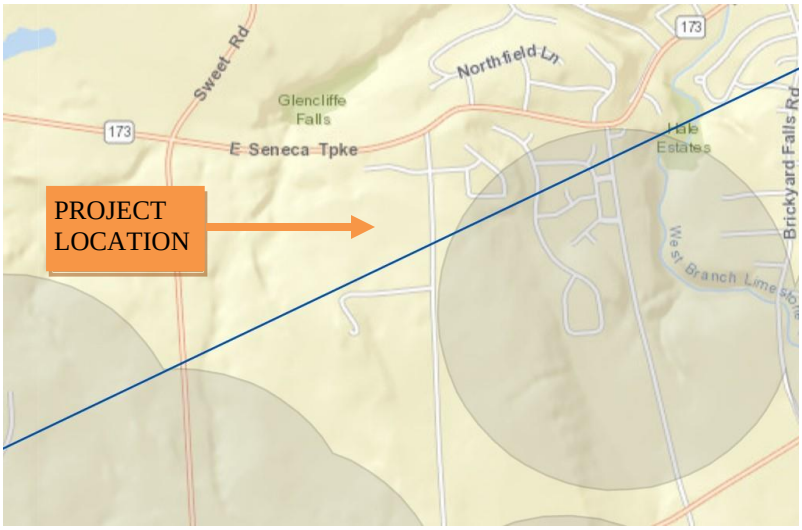


Figure 4: State Historic Preservation Office Map

G. FEMA

Based on local GIS mapping, there are no floodplain/floodway boundaries on this property, as shown on Figure 5 below. This is also confirmed on the site survey by Ianuzi and Romans Land Surveying, P.C., noting the project is in Zone X.

Figure 5: Onondaga County GIS Mapping

Section III. STORMWATER MANAGEMENT

A. METHODOLOGY

1. Hydrologic Conditions

The peak runoff rates for the site were calculated for the existing and proposed hydrologic conditions using HydroCAD software. The HydroCAD program uses the standard SCS TR-55 Curve Number Method for calculation of the time of concentration, composite curve number, and peak runoff rates for the drainage area(s) based on input by the user. The input data was taken from soil maps, detailed topographic and utility survey information, rainfall distribution maps, and aerial images. The required Water Quality Volume (WQ_v) was calculated in accordance with the New York State Stormwater Management Design Manual. The Channel Protection Volume (Cp_v) was calculated based on the release of the 1-year storm runoff volume over a 24-hour period. The hydrologic conditions are used to assess the impacts to the runoff characteristics and to design appropriate measures to mitigate these impacts. The NYS SPDES General Permit for Stormwater Discharges from Construction Activity requires that a stormwater mitigation system meet the following five design criteria.

a. Water Quality Volume: The system must capture and treat 90% of the average annual runoff volume.
b. Runoff Reduction Volume: The system must apply green infrastructure techniques and Stormwater Management Practices to replicate pre-development hydrology.
c. Provide 24-hour extended detention of the runoff from the one-year, 24-hour rainfall event.
d. Attenuation of the post-development 10-year, 24-hour peak discharge rate to predevelopment levels.
e. Attenuation of the post-development 100-year, 24-hour peak discharge rate to predevelopment levels.

2. Rainfall Information

The following table shows the rainfall values used in the design of the stormwater mitigation basin. These values are taken from rainfall distribution maps provided by the Northeast Regional Climate Center and the New York State Stormwater Management Design Manual, which can be seen on the following page. These values are applied to a Type II 24-hour rainfall distribution in the modeling of the watersheds using the HydroCAD program.

Table 1: Rainfall Information

Precipitation Event	Rainfall in inches
90% Rainfall (WQ_v)	1.0
1-Yr, 24-Hr (Cp_v)	2.04
10-Yr, 24-Hr (Q_p)	3.43
50-Yr, 24-Hr	4.94
100-Yr, 24-Hr (Q_f)	5.78

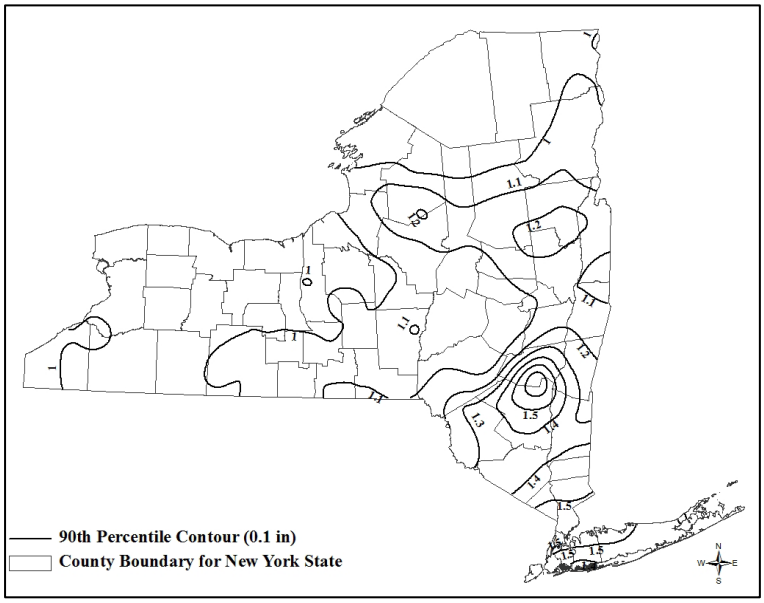


Figure 6: New York State 90% Rainfall Map

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New York
Location	
Longitude	76.007 degrees West
Latitude	42.988 degrees North
Elevation	0 feet
Date/Time	Thu, 20 Aug 2020 10:25:27 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr
1yr	0.28	0.43	0.53	0.69	0.86	1.06	**1yr**	0.75	0.96	1.21	1.45	1.73	2.04	2.29
2yr	0.33	0.50	0.63	0.82	1.04	1.28	**2yr**	0.89	1.16	1.44	1.73	2.04	2.39	2.68
5yr	0.39	0.61	0.76	1.02	1.31	1.61	**5yr**	1.13	1.44	1.83	2.17	2.54	2.93	3.31
10yr	0.44	0.70	0.88	1.20	1.55	1.93	**10yr**	1.34	1.69	2.19	2.59	3.00	3.43	3.88
25yr	0.53	0.84	1.07	1.48	1.96	2.44	**25yr**	1.69	2.10	2.76	3.25	3.73	4.22	4.80
50yr	0.60	0.97	1.24	1.74	2.34	2.93	**50yr**	2.02	2.48	3.32	3.88	4.41	4.94	5.63
100yr	0.70	1.13	1.46	2.06	2.80	3.51	**100yr**	2.42	2.94	3.96	4.60	5.21	5.78	6.62
200yr	0.80	1.31	1.69	2.43	3.35	4.20	**200yr**	2.89	3.47	4.74	5.48	6.15	6.77	7.78
500yr	0.98	1.61	2.09	3.04	4.25	5.33	**500yr**	3.67	4.35	5.99	6.88	7.65	8.35	9.65

Figure 7: Northeast Regional Climate Center Design Storms

3. Soil Information

The majority of the soils within the project site area consist of Aurora silt loam and Angola-Darien silt loams which are classified as Hydrologic Soil Group D. This indicates that the site should have low transmissive soils if undeveloped. The NRCS Soil Survey Map is shown in Figure 8 below and the soil descriptions can be reviewed in Appendix C.

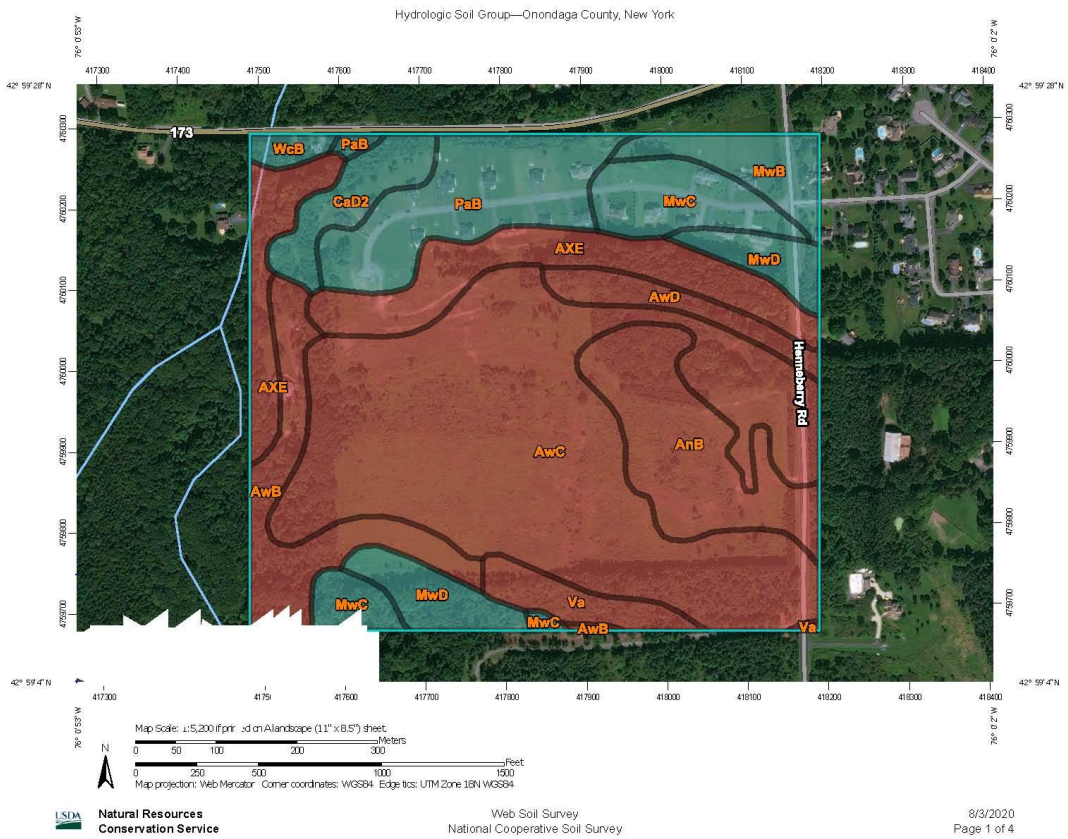


Figure 8: Project Site NRCS Soil Survey Map

B. EXISTING CONDITIONS

The existing project drainage area consists of approximately ±56 acres of mixed woods, brush, and grass area located on the west side of Henneberry Road and to the south of the Brandywine Road subdivision. The only impervious area in the existing drainage area is the hammerhead at the end of Brandywine Drive to the northwest. The entirety of the subject site slopes generally towards the north at grades varying between ±3% and 13%. The overall drainage area has three main points of study at which the peak runoff rates for pre and post-development conditions were analyzed. Point of Study 1 is split into two drainage areas: DA-1, which drains to Point 1A, and DA-2, which drains to Point 1B. These two points combine at a common drainage channel offsite to the west, and are therefore being treated as a common point of study in an effort to be more conservative. DA-3 and DA-4 drain to Point 2 and Point 3, respectively.

DA-1 includes a significant offsite wooded area to the south of the project site. This area sheet flows to the existing grass area on-site before being channelized in a drainage ditch that flows from east to west across the width of the project site. This ditch discharges to an offsite drainage ditch to the west of the subject site at Point 1A before combining with the discharge of Point 1B downstream of the project site.

Table 2: Existing Drainage Area 1 Curve Number Calculation

Area (ac)	CN	Description
12.250	77	Woods, Good, HSG D
28.140	80	>75% Grass cover, Good, HSG D
40.390	79	Weighted Average
40.390		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.39"
3.6	885	0.0650	4.10		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
2.2	1,127	0.0080	8.44	135.03	**Channel Flow, Swale** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & straight
21.8	2,112	Total			

DA-2 includes wooded, grass, and brush area that drain to the northeast to Point 1B. There is a series of existing drainage swales that channelize flow towards this point of study. This area is located to the north of the existing drainage ditch that cuts through the site and includes the hammerhead at the end of Brandywine Drive.

Table 3: Existing Drainage Area 2 Curve Number Calculation

Area (ac)	CN	Description
0.650	77	Woods, Good, HSG D
4.040	80	>75% Grass cover, Good, HSG D
0.070	98	Paved parking, HSG D
4.760	80	Weighted Average
4.690		98.53% Pervious Area
0.070		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0650	0.16		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
0.5	144	0.0833	4.65		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.6	726	0.0440	21.93	307.08	**Channel Flow, Swale** Area= 14.0 sf Perim= 6.0' r= 2.33' n= 0.025 Earth, clean & straight
11.4	970	Total			

DA-3 consists of a significant portion of wooded area and grass area on the north side of the subject site. This portion drains to Point 2 which is a drainage structure locate within a drainage easement on the southern boundary of the existing Brandywine subdivision. Flow from this structure enters a conveyance system which drains towards the XXXX.

Table 4: Existing Drainage Area 3 Curve Number Calculation

Area (ac)	CN	Description
3.330	77	Woods, Good, HSG D
2.740	80	>75% Grass cover, Good, HSG D
6.070	78	Weighted Average
6.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
14.2	555	0.0170	0.65		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
1.5	281	0.0360	3.05		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.2	280	0.1210	20.51	205.13	**Channel Flow, Swale** Area= 10.0 sf Perim= 5.0' r= 2.00' n= 0.040 Earth, dense weeds
28.4	1,216	Total			

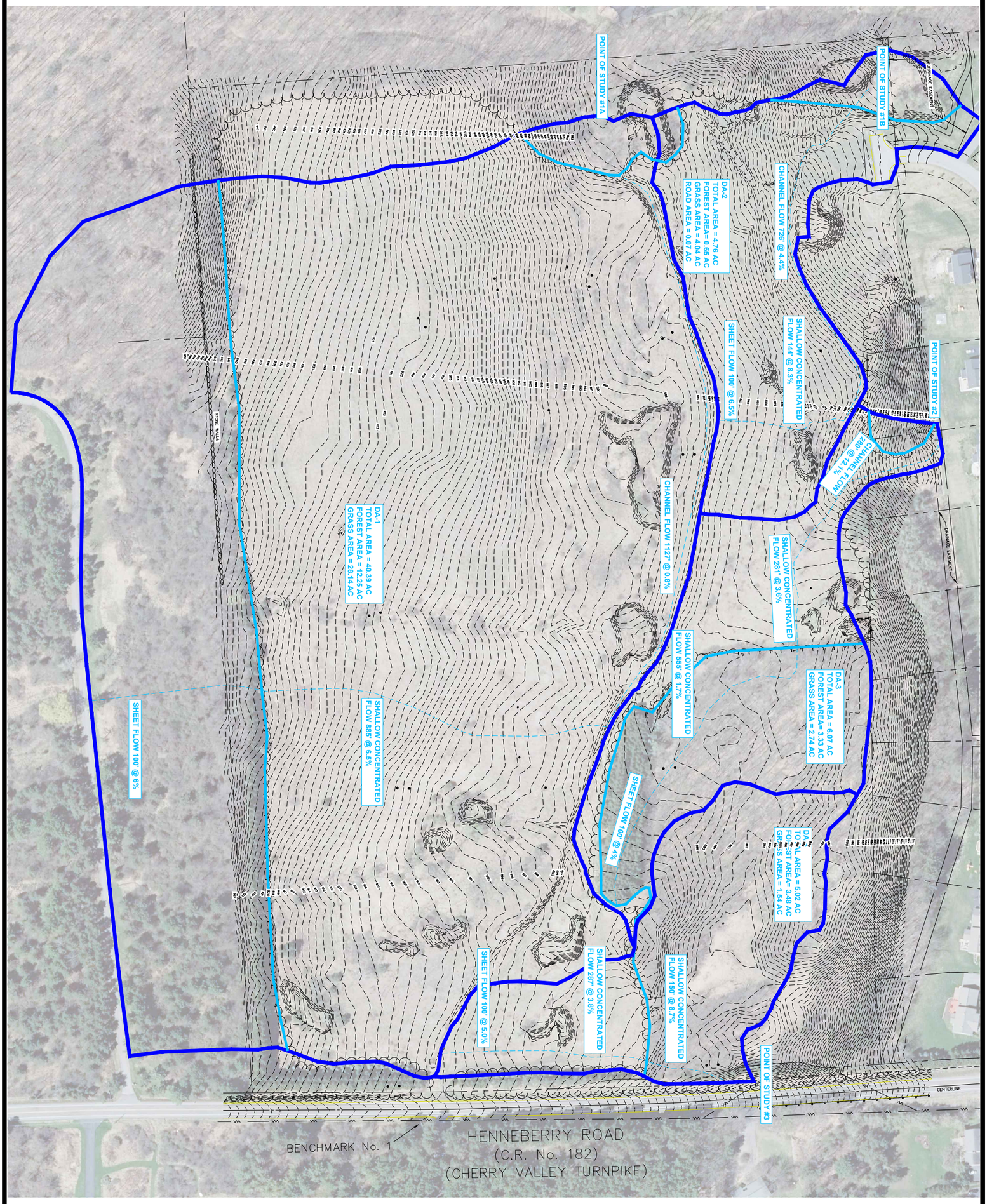
DA-4 includes the wooded and grassed area in the northeast portion of the subject site. This area drains to Point 3 and represents the tributary area to the drainage ditch within the right-of-way on the west side of Henneberry Road.

Table 5: Existing Drainage Area 4 Curve Number Calculation

Area (ac)	CN	Description
3.480	77	Woods, Good, HSG D
1.540	80	>75% Grass cover, Good, HSG D
5.020	78	Weighted Average
5.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
1.5	287	0.0380	3.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
1.7	150	0.0870	1.47		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.6	537	Total			

The map on the following page summarizes the hydrology of the proposed condition watershed.



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PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

SHEET	PROJECT NO.	PREPARED BY:	NO.	REVISION/ISSUE	DATE	SHEET TITLE:	PROJECT TITLE:
EX	20-1906	NAPIERALA CONSULTING PROFESSIONAL ENGINEER, P.C. SITE • DESIGN • ENGINEERING				EXISTING DRAINAGE AREA	BRANDYWINE ESTATES PHASE 2 HENNEBERRY ROAD
	DATE 17 SEP 2020	110 FAYETTE STREET MANLIUS, NEW YORK 13104					TOWN OF MANLIUS ONONDAGA COUNTY, NY
	SCALE 1" = 80'	email: MNAP@NAPCON.COM PH: (315) 682-5580 FAX: (315) 682-5544					PREPARED FOR: HARRINGTON HOMES 3848 HENNEBERRY ROAD JAMESVILLE, NY 13078

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C. PROPOSED CONDITIONS

This project consists of the construction of a 34-lot subdivision of single-family homes. The impervious area on each lot will consist of rooftop area, which will be properly disconnected via gutter discharge to grass buffer strips, and asphalt driveway area, which is assumed to be approximately 1,200 square-feet (about 0.03 acres) for each individual lot. The development will also include necessary amenities such as public street(s), public/private utility extensions/connections, and applicable stormwater management facilities. The stormwater mitigation area will collect and treat runoff in order to meet the objectives of the SPDES General Permit for Stormwater Discharges from Construction Activity and local regulations.

The stormwater management system includes several management practices to capture, treat and control the release of runoff from the site. Runoff from the impervious areas, both rooftop and asphalt, will be directed to practices to provide infiltration/runoff reduction, water quality treatment and water quantity storage. The following stormwater management practices will be constructed:

- Bioretention Areas: Bioretention filters are considered a standard stormwater management practice with runoff reduction capacity to decrease stormwater quantity and improve water quality (NYSDEC Stormwater Management Design Manual, p. 5-97)[1]. The filters collect runoff from rainfall events, temporarily store it, and filter it through the root structure of the plants and the planting soil media. Through the plants' uptake of runoff and the filtering through the soil media, the amount of runoff the site generates is reduced and the remaining runoff from these frequent, but less intense, rainfall events is treated to remove pollutants such as suspended solids and phosphorus. The runoff in excess of the water quality event (the 90th-percentile rain event) will discharge to the downstream detention basin.
- Vegetated Swale: Vegetated swales are open drainage channel systems lined with grass and designed to capture and divert stormwater runoff to a downstream point of collection or discharge. Vegetated swales temporarily store, infiltrate, and treat stormwater runoff from lower intensity storms while providing a path of conveyance for higher intensity storm events.
- Detention Basin: The detention basin will collect runoff from the more intense but less frequent rainfall events and temporarily store and released in a controlled manner such that the peak rates of runoff to the downstream design points will not be adversely impacted.

DA-A includes off-site wooded area and portions of the proposed development. This area is treated by a vegetated swale and is directly tributary to Detention Basin #1.

Table 6: Proposed Drainage Area A Curve Number Calculations

Area (ac)	CN	Description
0.270	98	Paved parking, HSG D
2.580	80	>75% Grass cover, Good, HSG D
1.540	77	Woods, Good, HSG D
0.280	98	Roofs, HSG D
4.670	81	Weighted Average
4.120		88.22% Pervious Area
0.550		11.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 2.39"
2.5	188	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.8	202	0.0650	4.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	230	0.0200	16.17	32.33	**Channel Flow, GUTTER** Area= 2.0 sf Perim= 2.0' r= 1.00' n= 0.013 Asphalt, smooth
19.5	720	Total			

[1] The "biogeochemical process" in terms of stormwater management is the pathway by which water is recycled through plant material where the plant can consume it or return it to the atmosphere through evapotranspiration.

DA-B includes ±8 acres of off-site wooded area, and significant portions of the proposed development. This area is treated by Bioretention Area #1 and is directly tributary to Detention Basin #1.

Table 7: Proposed Drainage Area B Curve Number Calculations

Area (ac)	CN	Description
0.740	98	Paved parking, HSG D
7.140	80	>75% Grass cover, Good, HSG D
7.840	77	Woods, Good, HSG D
0.490	98	Roofs, HSG D
16.210	80	Weighted Average
14.980		92.41% Pervious Area
1.230		7.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 2.39"
4.8	370	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.8	200	0.0650	4.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.3	290	0.0200	16.17	32.33	**Channel Flow, GUTTER** Area= 2.0 sf Perim= 2.0' r= 1.00' n= 0.013 Asphalt, smooth
21.9	960	Total			

DA-C includes portions of the proposed development within the middle of the proposed loop road. This area is treated by a vegetated swale and is directly tributary to Detention Basin #3.

Table 8: Proposed Drainage Area C Curve Number Calculations

Area (ac)	CN	Description
0.060	98	Paved parking, HSG D
3.200	80	>75% Grass cover, Good, HSG D
0.180	98	Roofs, HSG D
3.440	81	Weighted Average
3.200		93.02% Pervious Area
0.240		6.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
1.5	270	0.0370	3.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.1	370	Total			

DA-D includes portions of the proposed development on the inside and outside of the proposed loop road. This area is treated by a vegetated swale and is directly tributary to Detention Basin #3.

Table 9: Proposed Drainage Area D Curve Number Calculations

Area (ac)	CN	Description
0.310	98	Paved parking, HSG D
2.560	80	>75% Grass cover, Good, HSG D
0.170	98	Roofs, HSG D
3.040	83	Weighted Average
2.560		84.21% Pervious Area
0.480		15.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0700	0.17		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.5	140	0.0900	4.83		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.3	200	0.0200	9.55	76.42	**Channel Flow, swale flow** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
10.8	440	Total			

DA-E includes portions of the proposed development to northwest of the proposed loop road. This area is treated by a vegetated swale before draining to Point 1B.

Table 10: Proposed Drainage Area E Curve Number Calculations

Area (ac)	CN	Description
0.030	98	Paved parking, HSG D
1.800	80	>75% Grass cover, Good, HSG D
0.070	98	Roofs, HSG D
1.900	81	Weighted Average
1.800		94.74% Pervious Area
0.100		5.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.3	85	0.0950	4.96		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
11.7	185	Total			

DA-F includes portions of the proposed development on the inside and outside of the proposed loop road. This area is treated by a vegetated swale and Bioretention #2 before draining to Detention Basin #2.

Table 11: Proposed Drainage Area F Curve Number Calculations

Area (ac)	CN	Description
0.090	98	Paved parking, HSG D
2.040	80	>75% Grass cover, Good, HSG D
0.140	98	Roofs, HSG D
2.270	82	Weighted Average
2.040		89.87% Pervious Area
0.230		10.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.7	150	0.0500	3.60		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.1	250	Total			

DA-G includes portions of the proposed development on the inside and outside of the proposed loop road. This area is treated by Bioretention #2 and is directly tributary to Detention Basin #2.

Table 12: Proposed Drainage Area G Curve Number Calculations

Area (ac)	CN	Description
1.050	98	Paved parking, HSG D
8.080	80	>75% Grass cover, Good, HSG D
0.490	98	Roofs, HSG D
9.620	83	Weighted Average
8.080		83.99% Pervious Area
1.540		16.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 2.39"
1.1	250	0.0550	3.78		**Shallow Concentrated Flow, shallow conc flow** Unpaved Kv= 16.1 fps
12.5	350	Total			

DA-H includes on-site wooded area and portions of the proposed development on the inside and outside of the proposed loop road. This area is treated by a vegetated swale before draining to Detention Basin #2.

Table 13: Proposed Drainage Area H Curve Number Calculations

Area (ac)	CN	Description
0.060	98	Paved parking, HSG D
2.100	80	>75% Grass cover, Good, HSG D
1.030	77	Woods, Good, HSG D
0.210	98	Roofs, HSG D
3.400	81	Weighted Average
3.130		92.06% Pervious Area
0.270		7.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0300	0.12		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.9	155	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
14.9	255	Total			

DA-1 includes off-site wooded area and on-site grass area that is tributary to Point 1A.

Table 14: Proposed Drainage Area 1 Curve Number Calculations

Area (ac)	CN	Description
3.390	80	>75% Grass cover, Good, HSG D
2.850	77	Woods, Good, HSG D
0.030	98	Paved parking, HSG D
0.070	98	Roofs, HSG D
6.340	79	Weighted Average
6.240		98.42% Pervious Area
0.100		1.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
5.4	485	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.8	517	0.0900	4.83		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	300	0.0860	27.67	442.73	**Channel Flow, SWALE** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & winding
18.0	1,402	Total			

DA-2 includes a portion of the development in the northwest portion of the subject site including the cul-de-sac at the end of Brandywine Drive. DA-2 is tributary to Point 1B.

Table 15: Proposed Drainage Area 2 Curve Number Calculations

Area (ac)	CN	Description
2.070	80	>75% Grass cover, Good, HSG D
0.660	77	Woods, Good, HSG D
0.220	98	Paved parking, HSG D
0.140	98	Roofs, HSG D
3.090	81	Weighted Average
2.730		88.35% Pervious Area
0.360		11.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0700	0.17		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.2	56	0.1300	5.80		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	367	0.0820	27.02	432.31	**Channel Flow, SWALE** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & winding
10.4	523	Total			

DA-3 includes a minor portion of wooded area and on-site grass area that is tributary to Point 2.

Table 16: Proposed Drainage Area 3 Curve Number Calculations

Area (ac)	CN	Description
0.390	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
0.530	79	Weighted Average
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1500	0.23		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.3	104	0.1300	5.80		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.7	204	Total			

DA-4 includes the northeastern-most portion of the development that drains to Point 3.

Table 17: Proposed Drainage Area 4 Curve Number Calculations

Area (ac)	CN	Description
2.020	80	>75% Grass cover, Good, HSG D
0.250	98	Paved parking, HSG D
0.140	98	Roofs, HSG D
2.410	83	Weighted Average
2.020		83.82% Pervious Area
0.390		16.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0450	0.14		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
1.5	307	0.0450	3.42		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	80	0.0200	6.42	5.04	**Pipe Channel, storm pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
13.6	487	Total			

The map on the following page summarizes the hydrology of the proposed condition watershed.

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POINT OF STUDY #1B

DA-2
TOTAL AREA = 3.09 AC
WOODS AREA = 0.66 AC
GRASS AREA = 2.21 AC
ROAD AREA = 0.16 AC
DRIVE AREA = 0.06 AC

FFE=±852 3,000SF FOOTPRINT

CHANNEL FLOW
367' @ 8.2%

SHALLOW CONCENTRATED
FLOW 56' @ 13%

SHEET FLOW 100' @ 7%

POINT OF STUDY #1A

CHANNEL FLOW

DA-1
TOTAL AREA = 6.34 AC
WOODS AREA = 2.92 AC
GRASS AREA = 3.39 AC
DRIVE AREA=0.03 AC

FFE=±860 3,000SF FOOTPRINT

SHALLOW CONCENTRATED
FLOW 140' @ 9.8%

SHALLOW CONCENTRATED
FLOW 517' @ 9.0%

SHALLOW CONCENTRATED
FLOW 485' @ 9.8%

SHEET FLOW 100' @ 7%

SHEET FLOW 100' @ 6%

POINT OF STUDY #2

SHALLOW CONCENTRATED
FLOW 104' @ 13%

SHEET FLOW 100' @ 15%

DRAINAGE EASEMENT

DA-3
TOTAL AREA = 0.53 AC
WOODS AREA = 0.14 AC
GRASS AREA = 0.39 AC

FFE=±854 3,000SF FOOTPRINT

DA-E
TOTAL AREA = 1.98 AC
DRIVE AREA = 0.03 AC
GRASS AREA = 1.87 AC

FFE=±869 W/O 3,000SF FOOTPRINT

DA-F
TOTAL AREA = 2.27 AC
DRIVE AREA = 0.09 AC
GRASS AREA = 2.18 AC

FFE=±887 W/O 3,000SF FOOTPRINT

FFE=±886 3,000SF FOOTPRINT

DA-H
TOTAL AREA = 3.96 AC
WOODED AREA = 1.22 AC
DRIVE AREA = 0.09 AC
LAWN AREA = 2.65 AC

FFE=±885 3,000SF FOOTPRINT

FFE=±886 3,000SF FOOTPRINT

FFE=±886 3,000SF FOOTPRINT

DA-4
TOTAL AREA = 2.41 AC
DRIVE AREA = 0.12 AC
ROAD AREA = 0.13 AC
GRASS AREA = 2.16 AC

FFE=±882 3,000SF FOOTPRINT

POINT OF STUDY #3

SHALLOW CONCENTRATED
FLOW 307' @ 4.5%

SHEET FLOW 100' @ 4.5%

DA-G
TOTAL AREA = 9.62 AC
ROAD AREA = 0.85 AC
DRIVE AREA = 0.20 AC
GRASS AREA = 8.57 AC

FFE=±897 3,000SF FOOTPRINT

FFE=±891 3,000SF FOOTPRINT

FFE=±893 3,000SF FOOTPRINT

FFE=±893 3,000SF FOOTPRINT

FFE=±893 3,000SF FOOTPRINT

FFE=±894 3,000SF FOOTPRINT

FFE=±888 3,000SF FOOTPRINT

CHANNEL FLOW

DA-D
TOTAL AREA = 3.04 AC
ROAD AREA = 0.21 AC
DRIVE AREA = 0.10 AC
LAWN AREA = 2.73 AC

FFE=±920 W/O 3,000SF FOOTPRINT

SHALLOW CONCENTRATED
FLOW 210' @ 3.7%

DA-C
TOTAL AREA = 3.44 AC
DRIVE AREA = 0.06 AC
LAWN AREA = 3.38 AC

FFE=±917 W/O 3,000SF FOOTPRINT

FFE=±922 W/O 3,000SF FOOTPRINT

SHEET FLOW 100' @ 6%

FFE=±912 W/O 3,000SF FOOTPRINT

FFE=±912 W/O 3,000SF FOOTPRINT

FFE=±912 W/O 3,000SF FOOTPRINT

FFE=±910 3,000SF FOOTPRINT

DA-A
TOTAL AREA = 4.67 AC
ROAD AREA = 0.16 AC
DRIVE AREA = 0.11 AC
LAWN AREA = 2.86 AC
WOODS AREA = 1.54 AC

CHANNEL FLOW

FFE=±925 3,000SF FOOTPRINT

CHANNEL FLOW

FFE=±919 3,000SF FOOTPRINT

FFE=±915 3,000SF FOOTPRINT

FFE=±912 3,000SF FOOTPRINT

FFE=±912 3,000SF FOOTPRINT

FFE=±912 3,000SF FOOTPRINT

FFE=±926 3,000SF FOOTPRINT

FFE=±924 3,000SF FOOTPRINT

DA-B
TOTAL AREA = 16.21 AC
ROAD AREA = 0.55 AC
DRIVE AREA = 0.19 AC
LAWN AREA = 7.63 AC
WOODS AREA = 7.84 AC

SHALLOW CONCENTRATED
FLOW 200' @ 6.5%

SHALLOW CONCENTRATED
FLOW 202' @ 6.5%

SHALLOW CONCENTRATED
FLOW 188' @ 6.5%

SHALLOW CONCENTRATED
FLOW 370' @ 6.5%

SHEET FLOW 100' @ 6%

SHEET FLOW 100' @ 6%

SHEET FLOW 100' @ 6%

HENNEBERRY ROAD
(C.R. No. 182)
(CHERRY VALLEY TURNPIKE)

BENCHMARK No. 1

STONE WALLS

CENTERLINE

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
PROPOSED DRAINAGE AREA

NO.	REVISION/ISSUE	DATE

PREPARED BY:
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, NEW YORK 13104
email MNAPIERALA@NYCON.COM
PH: (315) 682-5280 FAX: (315) 682-5544

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE 1" = 80'

SHEET **PR**

PLAN SEAL BY:
NEAL H. ZABSMEYER, JR., P.E.
NYS REGISTRATION # 097251

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NAPIERALA CONSULTING,
PROFESSIONAL ENGINEER, PC

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D. RUNOFF REDUCTION VOLUME (RRV)

The NYSDEC implemented regulations effective March 1, 2011 that requires all construction projects that disturb greater than one acre of land to provide runoff reduction through the implementation of green infrastructure practices. The goal of the runoff reduction volume criteria is to implement stormwater management practices and green infrastructure techniques to replicate pre-development hydrology. The NYS Stormwater Management Design Manual provides the acceptable green planning techniques and green infrastructure techniques to meet the runoff reduction volume criteria. The following narrative and calculations detail the implementation of the planning and infrastructure techniques on the site to achieve the minimum runoff reduction volume. The narrative follows the Design Manual, Chapter 5.

PLANNING

1. Plan to preserve, avoid, and minimize:

	Applicable	Not Applicable
a. Preserve undisturbed, natural buffer, and critical environmental areas.	☐	☒
b. Employ open space, conservation, and clustering site design techniques.	☒	☐
c. Avoid developing in environmentally sensitive areas: floodplain, steep slopes, habitat, ecosystems, bedrock, wetlands, shorelines, shallow groundwater, impervious soils and unstable soils.	☒	☐
d. Minimize impervious surfaces: building footprints, parking, roads, sidewalks, and driveways.	☒	☐
e. Minimize clearing and grading	☒	☐

Discussion:

a. The project does not have any critical environmental areas.

b. Open space is used in projects on tracts of land where the development can be concentrated in a portion of the site while maintaining large portions of undisturbed land. Open space design was taking into consideration when planning the subdivision of the property. Town code requires lot sizes to be a minimum of 40,000 square feet and this plan proposes lots between 43,000 sf and 100,000 sf.

c. The project does not have any critical environmental areas with the exception of steep slopes. Development in steep slopes will be minimized as much as possible and is limited to areas of the individual homes.

d. The NYS Stormwater Design Manual discusses building footprint reduction in terms of building multiple floors to achieve the same, or comparable, square footage as a single-floor footprint. The majority of these house are expected to be two-story homes to reduce the footprint and achieve more square foot area of the house.

e. The proposed grading plan for the project minimizes the amount of grading to the maximum extent practicable. Grade requirements for a functional site, including slopes to meet the buildable lots, were taken into account during the design phase. The off-grading was designed to catch up to the existing grade in the shortest distance possible (i.e., minimize off-grading) while still meeting acceptable standards for slope stabilization and erosion control.

Disconnection of Rooftop Runoff

All direct runoff from residential rooftop areas has been designed to be distributed to surrounding pervious areas to promote overland vegetative filtering and infiltration. As such, all rooftop impervious area is treated as pervious lawn area when calculating the required water quality volume and runoff reduction volume. The rooftop impervious area is not deducted when calculating the water quantity mitigation in the detention basins.

E. WATER QUALITY VOLUME (WQ_v) REQUIRED:

1. Calculate the required water quality volume for new impervious area within DA-1

$$\mathbf{WQ_v = \frac{PR_vA}{12}}$$

90-th Percentile Rainfall (P) = 1.0 inch

Drainage Area (A) = 44.55 acres

Impervious Area (A_I) = 3.22 acres

$$R_v = 0.05 + 0.9\left(\frac{A_I}{A}\right)$$

$$R_v = 0.05 + 0.9(0.0754)$$

$R_v = 0.115$

therefore:

$$WQ_v = \frac{1.0*0.115*44.55}{12}$$

Total WQ_v Required= 0.427 ac·ft (18,600 cf)

2. Minimum RR_v requirements

Calculate minimum required Runoff Reduction Volume (RR_v) for DA-1 using:

$$\mathbf{RR_v = \frac{P \cdot Rv \cdot S \cdot A_I}{12}}$$

A_I = total impervious area

S = 0.55 (A Soils), 0.40 (B Soils), 0.30 (C Soils), 0.20 (D Soils), or weighted HSG average in drainage area

$$RR_v = \frac{1.0(0.95)(0.20)(3.22)}{12}$$

Total Minimum RR_v required = 0.051 ac·ft (2,220 cf)

F. WATER QUALITY VOLUME (WQV) PROVIDED

Water quality treatment for the runoff from proposed impervious surfaces will be provided by a combination of vegetated swales and bioretention areas. Rooftop area is assumed to be properly disconnected from nearby impervious surfaces, and is therefore treated as pervious area in analysis.

Vegetated Swale Design #1 (DA-A)

The *Simplified Peak Flow Estimating Method* outlined in Appendix B.2 of the Stormwater Design Manual was used to calculate the peak rate of runoff during the water quality event.

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25QP}}$$

Where,

CN = the computed runoff curve number

P = rainfall, in inches (use the 90% rainfall event for the Water Quality Storm, 1.0")

Q = runoff volume ($P*R_v$), in inches

Drainage Area Tributary to Practice = 4.67 acres

Impervious Areas (A_I) = 0.27 acres

$$R_v = 0.05 + 0.9\left(\frac{0.27\text{ ac}}{4.67\text{ ac}}\right) = 0.102$$

$\therefore$ CN = 81

Time of Concentration, t_c, is **19.5** minutes (minimum TR-55 value)

From Table 4-1 of TR-55, the initial abstraction, I_a, for a watershed is 0.469

$$\frac{I_a}{P} = \frac{0.469}{1.0} = 0.469$$

Using the I_a/P and the t_c, the unit peak discharge, q_u, is **350** csm/in (from Exhibit 4-II, TR-55)

The peak rate of runoff is then calculated using the following formula: $Q_p = q_u \times A \times WQ_v$

Where, Q_p = the peak discharge, in cfs

q_u = the unit peak discharge, in cfs/mi^2/inch

A = drainage area, in square miles (acres/640)

WQ_v = water quality volume, in watershed inches ($P*R_v$)

$$Q_p = 350\frac{\text{csm}}{\text{in}} \times \frac{4.67\text{ acres}}{\frac{640\text{ ac}}{\text{mi}^2}} \times (0.102) \times 1.0"$$

$\mathbf{Q_p = 0.26\ cfs}$

The required swale length must provide an average of <u>10 minutes</u> of retention time where:

base width = 4 ft

side slope = 3H:1V

slope = 0.02 ft/ft

depth = 0.25 ft

V = 0.28 fps (calculated using Hyroflow Express in AutoCAD)

$$\text{Required Length} = 0.28\frac{\text{ft}}{\text{sec}} \cdot 10\text{ min} \cdot \frac{60\text{ sec}}{\text{min}} = 168\text{ ft}$$

Length provided = 255 ft

$\mathbf{WQ_v\ Provided\ in\ Swale} = \frac{1.0*0.102*4.67}{12} = \mathbf{0.040\ ac \cdot ft}$ (1,730 cf)

The RR_v provided is calculated as follows:

Bioretention areas in C and D soils have a RRv factor of 0.2 * WQv.

$RR_v = 0.2 * 0.040\text{ ac} \bullet \text{ft}$

RR_v Provided in Swale = 0.008 ac·ft

Vegetated Swale Design #2 (DA-C)

The *Simplified Peak Flow Estimating Method* outlined in Appendix B.2 of the Stormwater Design Manual was used to calculate the peak rate of runoff during the water quality event.

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25QP}}$$

Where,

CN = the computed runoff curve number

P = rainfall, in inches (use the 90% rainfall event for the Water Quality Storm, 1.0")

Q = runoff volume ($P*R_v$), in inches

Drainage Area Tributary to Practice = 3.44 acres

Impervious Areas (A_I) = 0.06 acres

$$R_v = 0.05 + 0.9\left(\frac{0.06\text{ ac}}{3.44\text{ ac}}\right) = 0.066$$

$\therefore CN = 81$

Time of Concentration, t_c, is **12.1** minutes (minimum TR-55 value)

From Table 4-1 of TR-55, the initial abstraction, I_a, for a watershed is 0.469

$$\frac{I_a}{P} = \frac{0.532}{1.0} = 0.532$$

Using the I_a/P and the t_c, the unit peak discharge, q_u, is **325** csm/in (from Exhibit 4-II, TR-55)

The peak rate of runoff is then calculated using the following formula: $Q_p = q_u \times A \times WQ_v$

Where, Q_p = the peak discharge, in cfs

q_u = the unit peak discharge, in cfs/mi²/inch

A = drainage area, in square miles (acres/640)

WQ_v = water quality volume, in watershed inches ($P*R_v$)

$$Q_p = 325\frac{\text{csm}}{\text{in}} \times \frac{3.44\text{ acres}}{\frac{640\text{ ac}}{\text{mi}^2}} \times (0.066) \times 1.0"$$

$$\mathbf{Q_p = 0.11\ cfs}$$

The required swale length must provide an average of 10 minutes of retention time where:

base width = 4 ft

side slope = 3H:1V

slope = 0.02 ft/ft

depth = 0.25 ft

V = 0.21 fps (calculated using Hyroflow Express in AutoCAD)

$$\text{Required Length} = 0.21\frac{\text{ft}}{\text{sec}} \cdot 10\text{ min} \cdot \frac{60\text{ sec}}{\text{min}} = 126\text{ ft}$$

Length provided = 290 ft

$\mathbf{WQ_v\ Provided\ in\ Swale} = \frac{1.0*0.066*3.44}{12} = \mathbf{0.019\ ac \cdot ft}$ (825 cf)

The RR_v provided is calculated as follows:

Bioretention areas in C and D soils have a RRv factor of 0.2 * WQv.

$RR_v = 0.2 * 0.019\ ac \bullet ft$

RR_v Provided in Swale = 0.004 ac·ft

<u>Vegetated Swale Design #3 (DA-D)</u>

The *Simplified Peak Flow Estimating Method* outlined in Appendix B.2 of the <u>Stormwater Design Manual</u> was used to calculate the peak rate of runoff during the water quality event.

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25QP}}$$

Where,

CN = the computed runoff curve number

P = rainfall, in inches (use the 90% rainfall event for the Water Quality Storm, 1.0")

Q = runoff volume ($P*R_v$), in inches

Drainage Area Tributary to Practice = 3.04 acres

Impervious Areas (A_I) = 0.31 acres

$$R_v = 0.05 + 0.9\left(\frac{0.31\ ac}{3.04\ ac}\right) = 0.142$$

$\therefore CN = 84$

Time of Concentration, t_c, is **12.2** minutes (minimum TR-55 value)

From Table 4-1 of TR-55, the initial abstraction, I_a, for a watershed is 0.41

$$\frac{I_a}{P} = \frac{0.41}{1.0} = 0.41$$

Using the I_a/P and the t_c, the unit peak discharge, q_u, is **500** csm/in (from Exhibit 4-II, TR-55)

The peak rate of runoff is then calculated using the following formula: $Q_p = q_u \times A \times WQ_v$

Where, Q_p = the peak discharge, in cfs

q_u = the unit peak discharge, in cfs/mi²/inch

A = drainage area, in square miles (acres/640)

WQ_v = water quality volume, in watershed inches ($P*R_v$)

$$Q_p = 500\frac{csm}{in} \times \frac{3.04\ acres}{\frac{640\ ac}{mi^2}} \times (0.142) \times 1.0"$$

$\mathbf{Q_p = 0.34\ cfs}$

The required swale length must provide an average of <u>10 minutes</u> of retention time where:

base width = 4 ft

side slope = 3H:1V

slope = 0.02 ft/ft

depth = 0.25 ft

V = 0.33 fps (calculated using Hyroflow Express in AutoCAD)

$$\text{Required Length} = 0.33\frac{\text{ft}}{\text{sec}} \cdot 10\text{ min} \cdot \frac{60\text{ sec}}{\text{min}} = 198\text{ ft}$$

Length provided = 210 ft

$$\mathbf{WQ_v\ Provided\ in\ Swale} = \frac{1.0*0.142*3.04}{12} = \mathbf{0.036\ ac \cdot ft}\ (1{,}570\text{ cf})$$

The RR_v provided is calculated as follows:

Bioretention areas in C and D soils have a RRv factor of 0.2 * WQv.

$RR_v = 0.2 * 0.036$ ac • ft

RR_v Provided in Swale = 0.007 ac·ft

<u>Vegetated Swale Design #4 (DA-E)</u>

The *Simplified Peak Flow Estimating Method* outlined in Appendix B.2 of the <u>Stormwater Design Manual</u> was used to calculate the peak rate of runoff during the water quality event.

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25QP}}$$

Where,

CN = the computed runoff curve number

P = rainfall, in inches (use the 90% rainfall event for the Water Quality Storm, 1.0")

Q = runoff volume ($P*R_v$), in inches

Drainage Area Tributary to Practice = 1.9 acres

Impervious Areas (A_I) = 0.03 acres

$$R_v = 0.05 + 0.9\left(\frac{0.03\text{ ac}}{1.9\text{ ac}}\right) = 0.064$$

$\therefore CN = 79$

Time of Concentration, t_c, is **15.5** minutes (minimum TR-55 value)

From Table 4-1 of TR-55, the initial abstraction, I_a, for a watershed is 0.469

$$\frac{I_a}{P} = \frac{0.532}{1.0} = 0.532$$

Using the I_a/P and the t_c, the unit peak discharge, q_u, is **300** csm/in (from Exhibit 4-II, TR-55)

The peak rate of runoff is then calculated using the following formula: $Q_p = q_u \times A \times WQ_v$

Where, Q_p = the peak discharge, in cfs

q_u = the unit peak discharge, in cfs/mi^2/inch

A = drainage area, in square miles (acres/640)

WQ_v = water quality volume, in watershed inches ($P*R_v$)

$$Q_p = 300\frac{\text{csm}}{\text{in}} \times \frac{1.9\text{ acres}}{\frac{640\text{ ac}}{\text{mi}^2}} \times (0.064) \times 1.0"$$

$\mathbf{Q_p = 0.09\ cfs}$

The required swale length must provide an average of <u>10 minutes</u> of retention time where:

base width = 4 ft

side slope = 3H:1V

slope = 0.02 ft/ft

depth = 0.25 ft

V = 0.20 fps (calculated using Hyroflow Express in AutoCAD)

$$\text{Required Length} = 0.20\frac{\text{ft}}{\text{sec}} \cdot 10\text{ min} \cdot \frac{60\text{ sec}}{\text{min}} = 120\text{ ft}$$

Length provided = 250 ft

$\mathbf{WQ_v\ Provided\ in\ Swale} = \frac{1.0*0.064*1.9}{12} = \mathbf{0.010\ ac \cdot ft}$ (440 cf)

The RR_v provided is calculated as follows:

Bioretention areas in C and D soils have a RRv factor of 0.2 * WQv.

$RR_v = 0.2 * 0.010\text{ ac} \bullet \text{ft}$

RR_v Provided in Swale = 0.002 ac·ft

<u>Vegetated Swale Design #5 (DA-F)</u>

The *Simplified Peak Flow Estimating Method* outlined in Appendix B.2 of the <u>Stormwater Design Manual</u> was used to calculate the peak rate of runoff during the water quality event.

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25QP}}$$

Where,

CN = the computed runoff curve number

P = rainfall, in inches (use the 90% rainfall event for the Water Quality Storm, 1.0")

Q = runoff volume ($P*R_v$), in inches

Drainage Area Tributary to Practice = 2.27 acres

Impervious Areas (A_I) = 0.09 acres

$$R_v = 0.05 + 0.9\left(\frac{0.09\text{ ac}}{2.27\text{ ac}}\right) = 0.086$$

$\therefore CN = 80$

Time of Concentration, t_c, is **11** minutes (minimum TR-55 value)

From Table 4-1 of TR-55, the initial abstraction, I_a, for a watershed is 0.469

$$\frac{I_a}{P} = \frac{0.50}{1.0} = 0.50$$

Using the I_a/P and the t_c, the unit peak discharge, q_u, is **375** csm/in (from Exhibit 4-II, TR-55)

The peak rate of runoff is then calculated using the following formula: $Q_p = q_u \times A \times WQ_v$

Where, Q_p = the peak discharge, in cfs

q_u = the unit peak discharge, in cfs/mi²/inch

A = drainage area, in square miles (acres/640)

WQ_v = water quality volume, in watershed inches ($P*R_v$)

$$Q_p = 375\frac{\text{csm}}{\text{in}} \times \frac{2.27\text{ acres}}{\frac{640\text{ ac}}{\text{mi}^2}} \times (0.086) \times 1.0"$$

$$\mathbf{Q_p = 0.11\ cfs}$$

The required swale length must provide an average of <u>10 minutes</u> of retention time where:

base width = 4 ft

side slope = 3H:1V

slope = 0.02 ft/ft

depth = 0.25 ft

V = 0.26 fps (calculated using Hyroflow Express in AutoCAD)

$$\text{Required Length} = 0.26\frac{\text{ft}}{\text{sec}} \cdot 10\text{ min} \cdot \frac{60\text{ sec}}{\text{min}} = 156\text{ ft}$$

Length provided = 156 ft

$$\mathbf{WQ_v\ Provided\ in\ Swale} = \frac{1.0*0.086*2.27}{12} = \mathbf{0.016\ ac \cdot ft}\ (710\text{ cf})$$

The RR_v provided is calculated as follows:

Bioretention areas in C and D soils have a RRv factor of 0.2 * WQv.

$RR_v = 0.2 * 0.016\text{ ac} \bullet \text{ft}$

RR_v Provided in Swale = 0.003 ac·ft

<u>Vegetated Swale Design #6 (DA-H)</u>

The *Simplified Peak Flow Estimating Method* outlined in Appendix B.2 of the <u>Stormwater Design Manual</u> was used to calculate the peak rate of runoff during the water quality event.

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25QP}}$$

Where,

CN = the computed runoff curve number

P = rainfall, in inches (use the 90% rainfall event for the Water Quality Storm, 1.0")

Q = runoff volume ($P*R_v$), in inches

Drainage Area Tributary to Practice = 3.96 acres

Impervious Areas (A_I) = 0.09 acres

$$R_v = 0.05 + 0.9\left(\frac{0.09\text{ ac}}{3.96\text{ ac}}\right) = 0.070$$

$\therefore$ CN = 79

Time of Concentration, t_c, is **14.9** minutes (minimum TR-55 value)

From Table 4-1 of TR-55, the initial abstraction, I_a, for a watershed is 0.469

$$\frac{I_a}{P} = \frac{0.532}{1.0} = 0.532$$

Using the I_a/P and the t_c, the unit peak discharge, q_u, is **325** csm/in (from Exhibit 4-II, TR-55)

The peak rate of runoff is then calculated using the following formula: $Q_p = q_u \times A \times WQ_v$

Where, Q_p = the peak discharge, in cfs

q_u = the unit peak discharge, in cfs/mi^2/inch

A = drainage area, in square miles (acres/640)

WQ_v = water quality volume, in watershed inches ($P*R_v$)

$$Q_p = 325\frac{\text{csm}}{\text{in}} \times \frac{3.96\text{ acres}}{\frac{640\text{ ac}}{\text{mi}^2}} \times (0.070) \times 1.0"$$

$$\mathbf{Q_p = 0.14\ cfs}$$

The required swale length must provide an average of <u>10 minutes</u> of retention time where:

base width = 4 ft

side slope = 3H:1V

slope = 0.02 ft/ft

depth = 0.25 ft

V = 0.26 fps (calculated using Hyroflow Express in AutoCAD)

$$\text{Required Length} = 0.26\frac{\text{ft}}{\text{sec}} \cdot 10\text{ min} \cdot \frac{60\text{ sec}}{\text{min}} = 156\text{ ft}$$

Length provided = 500 ft

$$\mathbf{WQ_v\ Provided\ in\ Swale} = \frac{1.0*0.070*3.96}{12} = \mathbf{0.023\ ac \cdot ft}\ (1{,}006\text{ cf})$$

The RR_v provided is calculated as follows:

Bioretention areas in C and D soils have a RRv factor of 0.2 * WQv.

$RR_v = 0.2 * 0.023$ ac • ft

RR_v Provided in Swale = 0.005 ac·ft

Bioretention Basin #1 (DA-B)

$$\mathbf{WQ_v = \frac{PR_vA}{12}}$$

90-th Percentile Rainfall (P) = 1.0 inch

Drainage Area (A) = 16.21 acres

Impervious Area (A_I) = 0.74 acres

Total Af provided = 6,250 sf

$$A_f = \frac{(WQ_v)(d_f)}{(k)(h_f + d_f)(t_f)}$$

Where,

A_f	=	Area of the filter (ft^2)
WQ_v	=	Water Quality Volume (ft^3)
d_f	=	depth of the bioretention soil media (2.5 feet as required in NYS Design Manual)
k	=	coefficient of permeability (0.5 ft/day per NYS Design Manual)
h_f	=	average height of water above the filter bed (0.25 ft)
t_f	=	design filter bed drain time (2 days per NYS Design Manual)

$$6{,}000\ \text{ft}^2 = \frac{(WQ_v)(2.5\ \text{ft})}{\left(0.5\ \frac{\text{ft}}{\text{day}}\right)(0.25\ \text{ft} + 2.5\ \text{ft})(2\ \text{days})}$$

$$WQ_V = 0.151\ ac \cdot ft$$

∴Total WQ_v provided = 0.151 ac-ft

The RR_v provided is calculated as follows:

Bioretention areas in C and D soils have a RRv factor of 0.4 * WQv.

$RR_v = 0.4 * 0.151$ ac • ft

RR_v provided = 0.060 ac·ft

Bioretention Basin #2 (DA-G)

$$\mathbf{WQ_v = \frac{PR_vA}{12}}$$

90-th Percentile Rainfall (P) = 1.0 inch

Drainage Area (A) = 16.21 acres

Impervious Area (A_I) = 0.74 acres

Total Af provided = 5,400 sf

$$A_f = \frac{(WQ_v)(d_f)}{(k)(h_f + d_f)(t_f)}$$

Where,

A_f	=	Area of the filter (ft^2)

WQ_v	=	Water Quality Volume (ft^3)
d_f	=	depth of the bioretention soil media (2.5 feet as required in NYS Design Manual)
k	=	coefficient of permeability (0.5 ft/day per NYS Design Manual)
h_f	=	average height of water above the filter bed (0.25 ft)
t_f	=	design filter bed drain time (2 days per NYS Design Manual)

$$5{,}400\ \text{ft}^2 = \frac{(\text{WQ}_\text{v})(2.5\ \text{ft})}{\left(0.5\ \frac{\text{ft}}{\text{day}}\right)(0.25\ \text{ft} + 2.5\ \text{ft})(2\ \text{days})}$$

$$WQ_V = 0.136\ ac \cdot ft$$

∴ Total WQ_v provided = 0.136 ac-ft

The RR_v provided is calculated as follows:
Bioretention areas in C and D soils have a RRv factor of 0.4 * WQv.

$$\text{RR}_\text{v} = 0.4 * 0.136\ \text{ac} \bullet \text{ft}$$

RR_v provided = 0.054 ac·ft

Total RR_v provided = 0.008 + 0.004 + 0.007 + 0.002 + 0.003 + 0.005 + 0.060 + 0.054
= **0.143 ac·ft** (0.051 ac-ft Required)

Total WQ_v provided = 0.040 + 0.019 + 0.036 + 0.010 + 0.016 + 0.023 + 0.151 + 0.136
= **0.431 ac·ft** (0.427 ac-ft Required)

G. CHANNEL PROTECTION VOLUME (CP_V)

The proposed project must provide sufficient storage of the channel protection volume (CPv), which is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event, remained from runoff reduction. The NYS Stormwater Design Manual methodology for determining the storage volume was used (Appendix B.1) and is discussed below. Below is a summary of the calculations for DA-1.

Proposed Detention Basins 1, 2, &3

Tributary Area = 43.21 acres, CN = 81, & t_c = 22 minutes

I_a = 0.469, P = 1.0"

$$\frac{I_a}{P} = 0.469$$

Using I_a/P and T_c, q_u = 330 csm/in (TR-55, Exhibit 4-II)

Using q_u and T = 24 hr, q_o/q_i = 0.051 (Design Manual, Figure B.1)

Using formula 2.1.16 (Design Manual, Appendix B.1), calculate V_s/V_r

$$\frac{V_s}{V_r} = 0.61$$

Using formula 2.1.17 (Design Manual, Appendix B.1), calculate V_s

$$V_s = \frac{\left(\frac{V_s}{V_r}\right) Q_d A}{12}$$

$V_s = (0.61)2.303\ \mathrm{ac \cdot ft}$ (total tributary from HydroCAD)

$V_s = 1.40\ \mathrm{ac \cdot ft}$ (60,984 cf)

CPv required = CPv - RR_V Provided

CPv required = 60,984 ft^3 – 6,185 ft^3 = **54,799 ft^3 required**

CPv Provided in Bioretention #1 = 3,438 ft^3

CPv Provided in Bioretention #2 = 2,970 ft^3

CPv Provided in Detention #1 = 20,168 ft^3

CPv Provided in Detention #2 = 22,999 ft^3

CPv Provided in Detention #3 = 6,010 ft^3

Total* CPv =55,585 ft^3 *Provided

H. PEAK FLOW MITIGATION (Q_{p10} and Q_{p100})

The remaining two requirements of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity are that the stormwater system cannot discharge runoff from the site during the 10-year and 100-year, 24-hour rainfall events at rates higher than the existing condition peak rates of runoff during the correlating rainfall events. To meet these requirements, the underground stormwater chamber system will act as a detention basin that capture the runoff, temporarily store it, and release the runoff in a controlled manner to the existing drainage ditch such that the proposed project will not adversely impact the downstream areas. The following tables summarize the HydroCAD results for the 10-year and 100-year rainfall events.

Table 18: Peak Flow Rates for 10-Year & 100-Year Rainfall Events

	Existing Peak Runoff Rate (cfs)			**Proposed Peak Runoff Rate (cfs)**		
Point of Study	Pt. 1B	Pt. 2	Pt. 3	Pt. 1B	Pt. 2	Pt. 3
10-Year Storm	69.99	7.68	9.35	28.86	1.33	5.84
100-Year Storm	163.03	18.46	22.06	101.76	3.01	12.42

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.00	373	0	0
889.00	3,768	2,071	2,071
890.00	11,124	7,446	9,517
891.00	12,590	11,857	21,374
892.00	14,113	13,352	34,725
893.00	15,691	14,902	49,627
894.00	17,327	16,509	66,136
895.00	19,019	18,173	84,309
896.00	20,768	19,894	104,203

Device	Routing	Invert	Outlet Devices
#1	Primary	887.90'	**30.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 887.90' / 886.90' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	888.00'	**5.0" Vert. Orifice1** C= 0.600
#3	Device 1	891.20'	**15.0" Vert. Orifice2** C= 0.600
#4	Device 1	894.90'	**30.0" x 30.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	896.00'	**25.0' 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

Figure 11: Proposed Detention Basin #1 Summary

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
863.00	335	0	0
864.00	3,479	1,907	1,907
865.00	5,953	4,716	6,623
866.00	7,741	6,847	13,470
867.00	9,739	8,740	22,210
868.00	11,941	10,840	33,050
869.00	14,156	13,049	46,099
870.00	16,371	15,264	61,362
871.00	18,599	17,485	78,847
872.00	20,845	19,722	98,569

Device	Routing	Invert	Outlet Devices
#1	Secondary	872.00'	**20.0' 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
#2	Primary	862.90'	**30.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 862.90' / 861.00' S= 0.0950 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#3	Device 2	863.00'	**5.0" Vert. Orifice1** C= 0.600
#4	Device 2	866.80'	**15.0" Vert. Orifice2** C= 0.600
#5	Device 2	870.00'	**30.0" x 30.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Figure 12: Proposed Detention Basin #2 Summary

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
900.00	2,381	0	0
901.00	3,197	2,789	2,789
902.00	7,737	5,467	8,256
903.00	9,288	8,513	16,769
904.00	10,896	10,092	26,861
905.00	12,560	11,728	38,589

Device	Routing	Invert	Outlet Devices
#1	Secondary	905.00'	**20.0' 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
#2	Primary	900.00'	**18.0" Round Culvert** L= 330.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 900.00' / 889.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	900.00'	**5.0" Vert. Orifice1** C= 0.600
#4	Device 2	901.90'	**10.0" Vert. Orifice2** C= 0.600
#5	Device 2	904.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Figure 13: Proposed Detention Basin #3 Summary

Section IV. CONTROLS

A. EROSION AND SEDIMENT CONTROLS

Prior to the commencement of construction, the operator will identify the contractor(s) and subcontractor(s) that will implement each erosion and sediment control measure identified in this SWPPP. All contractors and subcontractors identified in the SWPPP must sign a copy of the certification statement in Part III.E. of the NYS DEC SPDES General Permit for Stormwater Discharges from Construction Activities in accordance with Part V.H. of the SPDES General Permit.

1. Stabilization Practices (Permanent)
   Permanent stabilization practices for this site include:

   a. Land clearing activities shall be done only in areas where earthwork will be performed and shall progress as earthwork is needed.
   b. Permanent seeding and planting of all unpaved areas.

2. Stabilization Practices (Temporary) Temporary stabilization practices for this site include:
   a. Temporary seeding and planting of all unpaved areas when construction activity has ceased, or will cease, in an area for 14 days. Seeding mixtures and application rates are listed in the erosion and sediment control notes on the plans.
   b. Mulching exposed areas. Mulching rates are listed in the erosion and sediment control notes on the plan sheet C-15.
   c. Frequent watering to minimize wind erosion during construction.

3. Structural Practices (Permanent)Permanent structural practices for this site include:
   a. Bioretention Areas. Bioretention filters are considered a standard stormwater management practice with runoff reduction capacity to decrease stormwater quantity and improve water quality.
   b. Land grading. Land grading is the reshaping of the existing land surface in accordance with a plan as determined by the engineering survey and layout. The purpose of a land grading specification is to provide erosion control and vegetative establishment on areas where the existing land is to be reshaped according to the plan.

4. Structural Practices (Temporary)
   Temporary structural practices for this site include:

   a. Silt fence. Silt fence is a temporary barrier of geotextile fabric installed on the contours across from a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil. The purpose of silt fence is to reduce runoff velocity and effect deposition of transported sediment load.
   b. Stabilized construction entrance/exit. A stabilized construction entrance/exit is a stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area. The purpose of the stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets
      1. Aggregate size: Use a matrix of one to four-inch stone, or reclaimed or recycled equivalent
      2. Thickness: Not less than six inches
      3. Width: 24-foot minimum
      4. Length: As required, but not less than 50 feet
      5. Geotextile: To be placed over the entire area to be covered with aggregate. Piping of surface water under entrance shall be provided as necessary.

c. Sediment trap. The detention basins will be used as a sediment trap during construction. The sediment basin will have a riprap outlet sediment trap in place of the emergency spillway. Upon completion of construction, the sediment basin will be cleaned of all sediment buildup and the basin shall be finalized per plans.
d. Concrete washout area. A temporary excavated or above ground lined constructed pit where concrete truck mixers and equipment can be washed after their loads have been discharged to prevent highly alkaline runoff from entering storm drainage systems or leaching into the soil.
    1. The washout facility is sized to contain solids, wash water and rainfall. The maximum size shall be eight feet by eight feet at the bottom and two feet deep. If excavated, then the side slopes shall be 2:1 (horizontal to vertical).
    2. The facility shall be located a minimum of 100 feet from drainage swales, storm drain inlets, wetlands, streams, and other surface waters. Surface waters shall be prevented from entering the structure except got the access road. Appropriate access shall be provided with a gravel access road sloped down to the structure. Signs shall be placed to direct drivers to the facility after their load is discharged.
    3. All washout facilities will be lined to prevent leaching of liquids into the ground. The liner shall be plastic sheeting with a minimum thickness of 10 mils with no holes or tears, and anchored beyond the top of the pit with an earthen berm, sand bags, stone, or other structural appurtenance except at the access point.

5. Sequence of Major Activities

The contractor will be responsible for implementing the above listed erosion and sediment control practices. The contractor may designate these tasks to certain subcontractors as is seen fit, but the ultimate responsibility for implementing these controls and ensuring their proper function remains with the contractor. The order of activities shall be as follows:

a. Conduct a preconstruction meeting with all involved parties
b. Delineate boundaries of disturbance as per the layout and grading plans
c. Construct construction entrance at the location shown on the erosion and sediment control plan
d. Install silt fence in locations shown on the layout and grading plans
e. Establish staging areas on the project site
f. Construct sediment trap(s) and overflow spillways for use during construction
g. Excavate detention basin and install overflow spillway
h. Remove topsoil, stockpile and stabilize
i. Rough grade site including swales and provide temporary stabilization when idle for more than 7 days
j. Building foundation excavation
k. Install underground stormwater management system
l. Compact gravel along driveways and parking areas
m. Utility installations.
n. Install concrete washout, complete concrete site work.
o. Complete final grading of the site
p. Restore all compacted soils in accordance with section 5.1.6 of the NYS Stormwater Design Manual
q. Provide final stabilization and landscaping of new area
r. Site Paving
s. Provide final stabilization of disturbed areas via seeding mulching.
t. Construct bioretention basins and outlet controls upon upstream stabilization
u. Remove all temporary stabilization control practices

Disturbed areas of the site where construction activity has ceased for more than seven (7) days shall be temporarily seeded and mulched. The Erosion & Sediment Control plan is shown in Appendix F.

B. INSPECTION AND MAINTENANCE REQUIREMENTS

Best management practices, both construction and operational, must be inspected and maintained on a routine basis to ensure continued compliance with the NYS SPDES General Permit for Stormwater Discharges from Construction Activity. The contractor is responsible for inspecting the erosion and sediment control practices, the operator/owner is responsible for providing a qualified professional, as defined in the SPDES General Permit, to perform the required weekly inspections of the construction site from the time earth-disturbing activities begin until final stabilization is achieved and the Notice of Termination is filed. The contractor will obtain copies of all local and state regulations that are applicable to stormwater management, erosion control, and pollution minimization at this job site and will comply fully with such regulations. The contractor will submit written evidence of such compliance if requested by the operator or any agent of a regulatory body. The contractor will comply with all conditions of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity, including the conditions related to maintaining the SWPPP and evidence of compliance with the SWPPP at the job site and allowing regulatory personnel access to the job site and to records to determine compliance.

C. CONSTRUCTION MAINTENANCE/INSPECTION PROCEDURES

The operator shall maintain a record of all inspection reports in a site logbook. The logbook shall be maintained on site and be made available to the permitting authority upon request. Prior to the commencement of construction, the operator shall certify in the site logbook that the SWPPP, prepared in accordance with Part III.D. of the NYS DEC SPDES General Permit for Discharges from Construction Activities, meets all Federal, State and local erosion and sediment control requirements. The operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities monthly. The following inspection and maintenance practices will be used to maintain erosion and sediment controls and stabilization measures.

1. Inspection and Maintenance Practices
    a. Inspections shall occur once every seven calendar days.
    b. At a minimum, the qualified inspector shall inspect all erosion and sediment control practices to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved final stabilization, all points of discharge to natural surface waterbodies located within or immediately adjacent to the property boundaries of the construction site, and all points of discharge from the construction site.
    c. The qualified inspector shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:
        i. Date and time of inspection;
        ii. Name and title of person(s) performing inspection;
        iii. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;
        iv. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;
        v. A description of the condition of all natural surface water bodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface water body;
        vi. Identification of all erosion and sediment control practices that need repair or maintenance;
        vii. Identification of all erosion and sediment control practices that were not installed or are not functioning as designed and need to be reinstalled or replaced;
        viii. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporarily and/or final) since the last inspection;

ix. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

x. Corrective action(s) that must be taken to install, repair, replace, or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s); and

xi. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The qualified inspector shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

d. Within one business day of the completion of an inspection, the qualified inspector shall notify the owner or operator and appropriate contractor or subcontractor of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

e. All inspection reports shall be signed by the qualified inspector. The inspection reports shall be maintained on the site.

f. Erosion and Sediment Control Inspection/Maintenance

i. Silt Fence: Silt fence shall be inspected for depth of sediment, tears, etc., to see if the fabric is securely attached to the fence posts, and to see that the fence posts are securely in the ground. Built up sediment will be removed from silt fence when it has reached one-third the height of the fence.

ii. Stabilized Construction Entrance/Exit: The entrance shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately. When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or water courses.

iii. Seeding: Temporary and permanent seeding and all other stabilization measures will be inspected for bare spots, washouts, and healthy growth.

2. Inspection and Maintenance Report Forms

- Once installation of any required or optional erosion control device or measure has been implemented, at least twice every seven calendar days a Qualified Professional shall inspect each practice. The inspector shall use the forms found in this SWPPP to inventory and report the condition of each measure to assist in maintaining the erosion and sediment control measures in good working order.
- These report forms shall become an integral part of the SWPPP and shall be made readily accessible to governmental inspection officials, the operator's engineer, and the operator for review upon request during visits to the project site. In addition, copies of the reports shall be provided to any of these persons upon requires, via mail or facsimile transmission. Inspection and maintenance report forms are to be maintained by the permittee for three years following the final stabilization of the site.
- The operator shall also prepare a written summary of its status with respect to compliance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity at a minimum frequency of every three months during which coverage under the SPDES General Permit exists. The summary should address the status of achieving each

component of the SWPPP. The reports shall be signed by the signatory of the NOI or a duly authorized person and be retained at the construction site.

1. Other Record Keeping Requirements

   The contractor shall keep the following records related to construction activities at the site:

   - Dates when major grading activities occur and the areas which were graded.
   - Dates and details concerning the installation of structural controls.
   - Dates when construction activities cease in an area.
   - Dates when an area is stabilized, either temporarily or permanently.
   - Dates of rainfall and the amount of rainfall.
   - Dates and descriptions of the character and amount of any spills of hazardous materials.
   - Records of reports filed with regulatory agencies if reportable quantities of hazardous materials are spilled.

D. OPERATION MAINTENANCE AND INSPECTION PROCEDURES

Long-term maintenance of the stormwater mitigation basins and swales will be the responsibility of the owner and/or the tenant. Maintenance and inspection check lists have been included in Appendix D.

1. Embankments and emergency spillways will be inspected annually and after major storm events. Items to be inspected include:
   a. Vegetation and ground cover is adequate to prevent erosion.
   b. No embankment erosion has occurred.
   c. No animal burrows into embankments.
   d. No unauthorized planting.
   e. No cracking, bulging or sliding of dam.
   f. Emergency spillway is in good condition, free of silt buildup and debris.
   g. No leaks or seepage is occurring on downstream face.
   h. All slope protection and riprap is intact and no failure has occurred.

2. Bioretention basins will be inspected monthly and after major storm events. Items to be inspected include:
   a. Debris and undesirable vegetative growth shall be removed.
   b. Sediment depth shall be noted. Sediment shall be removed prior to reaching 50% of the design depth.
   c. No visible pollution within basins.

3. Grass lined swales shall be inspected and maintained as follows:
   a. All channels are free of debris on monthly basis.
   b. No visible evidence of erosion.
   c. Mowing shall be performed as needed. Inspect to ensure minimum mowing depth has not been exceeded.
   d. Dewatering of swales between storms. Inspect monthly or as necessary.
   e. Inspect swales for sediment deposition annually and clean as necessary.

Section V. MATERIALS MANAGEMENT PLAN

A. MATERIALS COVERED

The following materials or substances are expected to be present onsite during construction:

Concrete/Additives/Wastes	Cleaning Solvents
Detergents	Petroleum Based Products
Paints/Solvents	Pesticides
Acids	Solid and Construction Wastes
Sanitary Wastes	Soil Stabilization Additives

B. MATERIAL MANAGEMENT PRACTICES

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff. The job site superintendent will be responsible for ensuring that these procedures are followed.

1. Good Housekeeping
   The following good housekeeping practices will be followed onsite during the construction project.
   a. An effort will be made to store only enough products required to do the job.
   b. All materials stored onsite will be stored in a neat, orderly manner and, if possible, under a roof or in a containment area. At a minimum, all containers will be stored with their lids on when not in use. Drip pans shall be provided under all dispensers.
   c. Products will be kept in their original containers with the original manufacturer's label in legible condition.
   d. Substances will not be mixed with one another unless recommended by the manufacturer.
   e. Whenever possible, all of a product will be used up before disposing of the container.
   f. Manufacturer's recommendations for proper use and disposal will be followed.
   g. The job site superintendent will be responsible for daily inspections to ensure proper use and disposal of materials.

2. Hazardous Products
   These practices will be used to reduce the risks associated with hazardous materials. Material Safety Data Sheets (MSDS's) for each substance with hazardous properties that is used on the job site will be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of each MSDS will be maintained in the SWPPP file at the job site construction trailer office. Each employee who must handle a substance with hazardous properties will be instructed on the use of MSDS sheets and the specific information in the applicable MSDS for the product he/she is using, particularly regarding spill control techniques.
   a. Products will be kept in original containers with the original labels in legible condition.
   b. Original labels and material safety data sheets (MSDS's) will be procured and used for each material.
   c. If surplus product must be disposed of, manufacturer's or local/state/federal recommended methods for proper disposal will be followed.

3. Hazardous Waste
   All hazardous waste materials will be disposed of by the contractor in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products. Site personnel will be instructed in these practices by the job site superintendent, who will also be responsible for seeing that these practices are followed.

4. Product Specific Practices
   The following product specific practices will be followed on the job site.

   a. Petroleum Products
      All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled. Any petroleum storage tanks used onsite will have a dike or berm containment structure constructed around it to contain any spills, which may occur. Drip pans shall be provided for all dispensers. Any asphalt substances used onsite will be applied per the manufacturer's recommendations.

   b. Fertilizers
      Due to the onsite public water supply that will be constructed as part of this project, the use of fertilizers is not allowed without the written authorization of the operator. Authorization will be based on the specific product's possible contaminants and impacts to the groundwater.

   c. Paints, Paint Solvents, and Cleaning Solvents
      All containers will be tightly sealed and stored when not in use. Excess paint and solvents will not be discharged to the storm sewer system but will be properly disposed of per manufacturer's instructions or state and federal regulations.

5. Concrete Wastes
   Concrete trucks will be allowed to wash out or discharge surplus concrete or drum wash water on the site, but only in either (1) specifically designated area which has been prepared to prevent contact between the concrete and/or washout and stormwater which will be discharged from the site or (2) in locations where waste concrete can be poured into forms to make riprap or other useful concrete products.

   The hardened residue from the concrete washout areas will be disposed of in the same manner as other non-hazardous construction waste materials or may be broken up and used on site as deemed appropriate by the contractor. The job site superintendent will be responsible for seeing that these procedures are followed.

   All concrete washout areas will be in an area where the likelihood of the area contributing to storm water discharges is negligible. If required, additional BMPs must be implemented to prevent concrete wastes from contributing to storm water discharges.

6. Solid and Construction Wastes
   All waste materials will be collected and stored in a securely lidded metal dumpster rented from a local waste management company which must be a solid waste management company licensed to do business in New York State. The dumpster will comply with all local and state solid waste management regulations.

   All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied a minimum of twice per week or more often if necessary, and the trash will be hauled to a landfill approved by New York State. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal.

   All waste dumpsters and roll-off containers will be in an area where the likelihood of the containers contributing to storm water discharges is negligible. If required, additional BMPs must be implemented, such as sandbags around the base, to prevent wastes from contributing to storm water discharges.

7. Sanitary Wastes
   All sanitary waste will be collected from the portable units a minimum of three times per week by a licensed portable facility provider in complete compliance with local and state regulation.

   All sanitary waste units will be in an area where the likelihood of the unit contributing to storm water discharges is negligible. If required, additional BMPs must be implemented, such as sandbags around the base, to prevent wastes from contributing to storm water discharges.

Section VI. SPILL PREVENTION AND RESPONSE PROCEDURES

The contractor will train all personnel in the proper handling and cleanup of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with storm water discharges. If such contact occurs, the storm water discharge will be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated storm water. It shall be the responsibility of the job site superintendent to properly train all personnel in spill prevention and clean up procedures.

In order to minimize the potential for a spill of hazardous materials to come into contact with storm water, the following steps will be implemented:

1. All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, cleaning solvents, additives for soil stabilization, concrete curing compounds and additives, etc.) will be stored in a secure location, with their lids on, preferably under cover, when not in use.
2. The minimum practical quantity of all such materials will be kept on the job site.
3. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided at the storage site.
4. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

In the event of a spill, the following procedures should be followed

1. All spills will be cleaned up immediately after discovery.
2. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with the hazardous substances.
3. The project manager and the Engineer of Record will be notified immediately.

   Spills of toxic or hazardous materials will be reported to the appropriate federal, state, and/or local government agency, regardless of the size of the spill. Spills of amounts that exceed Reportable Quantities of certain substances specifically mentioned in federal regulations (40 CFR 110, 40 CFR 117, and 40 CFR 302) must be immediately reported to the NYSDEC 24-Hour Spill Hotline at **1-800-457-7362.**

4. If the spill exceeds a Reportable Quantity, the SWPPP must be modified within seven (7) calendar days of knowledge of the discharge to provide a description of the release, the circumstances leading to the release, and the date of the release. The plans must identify measures to prevent the recurrence of such releases and to respond to such releases.

The job site superintendent will be the spill prevention and response coordinator. He will designate the individuals who will receive spill prevention and response training. These individuals will each become responsible for a particular phase of prevention and response. The names of these personnel will be posted in the material storage area and in the office trailer onsite.

Section VII. CONTROL OF NON-STORMWATER DISCHARGES

Certain types of discharges are allowable under the NYS-DEC SPDES General Permit for Stormwater Discharges from Construction Activity, and it is the intent of this SWPPP to allow such discharges. These types of discharges will be allowed under the conditions that no pollutants will be allowed to come in contact with the water prior to or after its discharge. The control measures, which have been outlined previously in this SWPPP, will be strictly followed to ensure that no contamination of these non-stormwater discharges takes place. The following non-storm water discharges are allowed by the NYS-DEC and may occur at the job site:

1. Discharges from firefighting activities
2. Fire hydrant flushing
3. Waters to which cleansers or other components have not been added that are used to wash vehicles or control dust
4. Routine external building wash down which does not use detergents
5. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
6. Air conditioning condensate
7. Springs
8. Foundation or footing drains where flows are not contaminated with process materials such as solvents.

Section VIII. CERTIFICATION AND NOTIFICATION

The New York State Department of Environmental Conservation requires that the operator and the contractor make certifications of knowledge of the contents of this SWPPP and agreement to follow the SWPPP. The terms of the General Permit also require that each contractor sign the SWPPP plan, thereby making them co-permittees and acknowledging their responsibility for certain operational aspects of the plan. These certifications should be signed before the contractor begins activities and should be filed with the site's SWPPP at the jobsite.

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APPENDIX A: HYDRO CAD – EXISTING CONDITIONS

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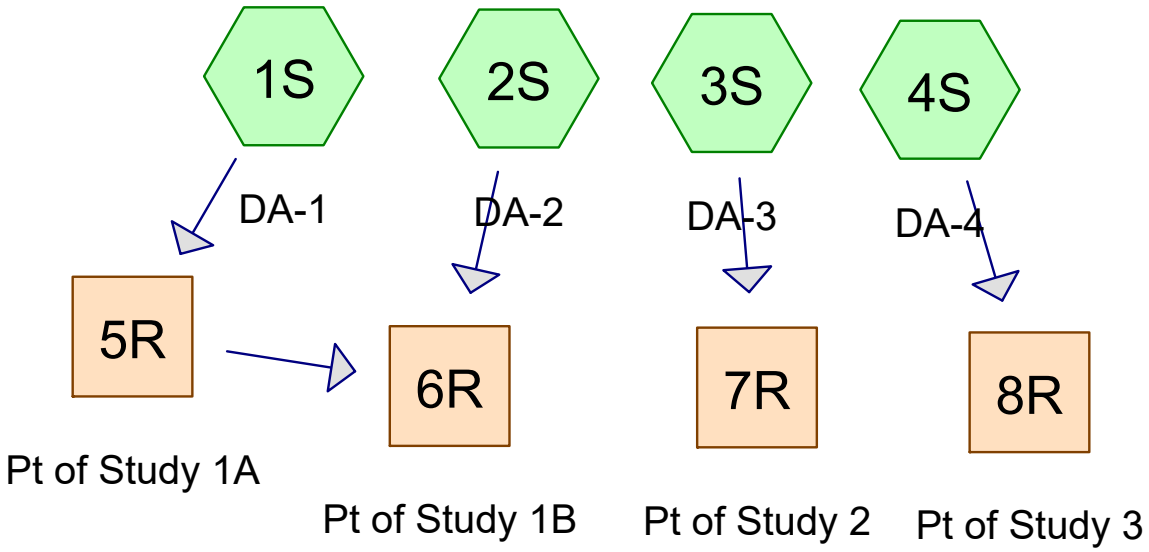
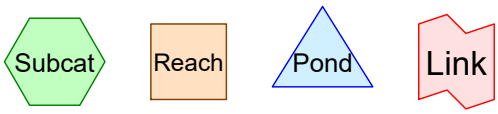




Routing Diagram for Existing Drainage Areas
Prepared by Napierala Consulting, P.C., Printed 9/3/2020
HydroCAD® 10.00-18 s/n 01332 © 2016 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: DA-1

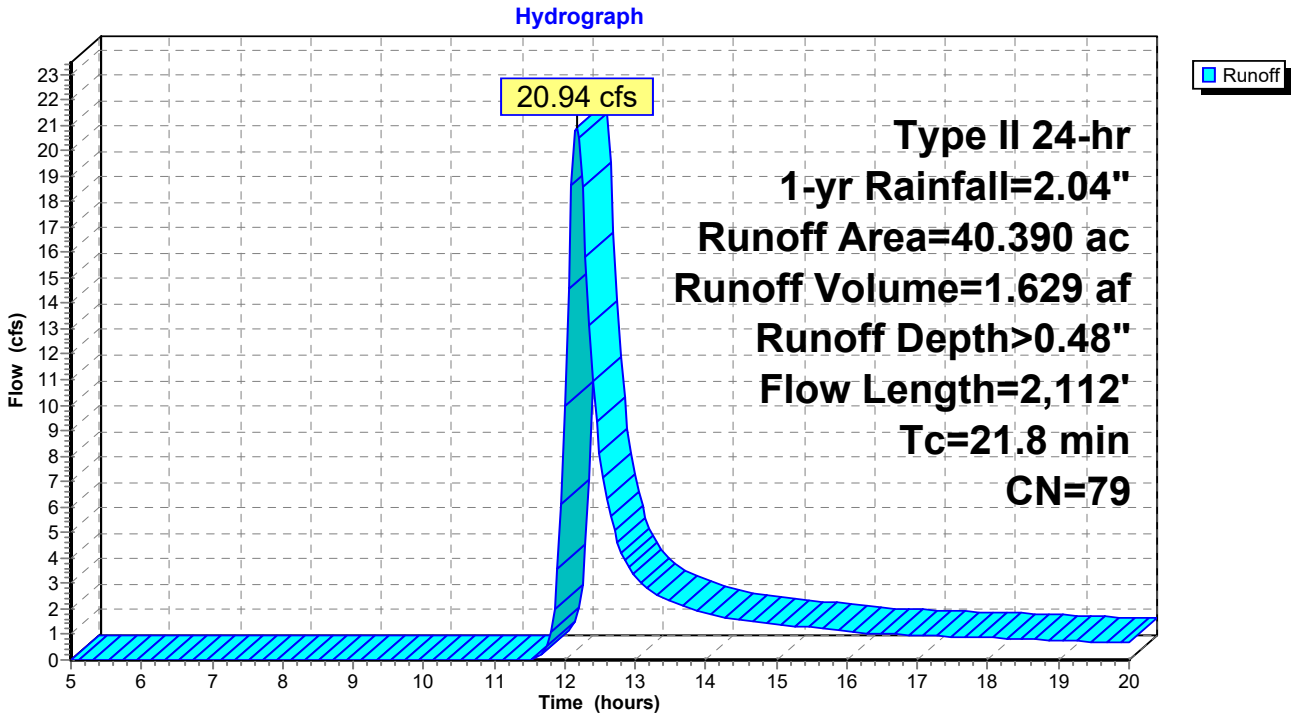
Runoff = 20.94 cfs @ 12.17 hrs, Volume= 1.629 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
12.250	77	Woods, Good, HSG D
28.140	80	>75% Grass cover, Good, HSG D
40.390	79	Weighted Average
40.390		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.39"
3.6	885	0.0650	4.10		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
2.2	1,127	0.0080	8.44	135.03	**Channel Flow, Swale** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & straight
21.8	2,112	Total			

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

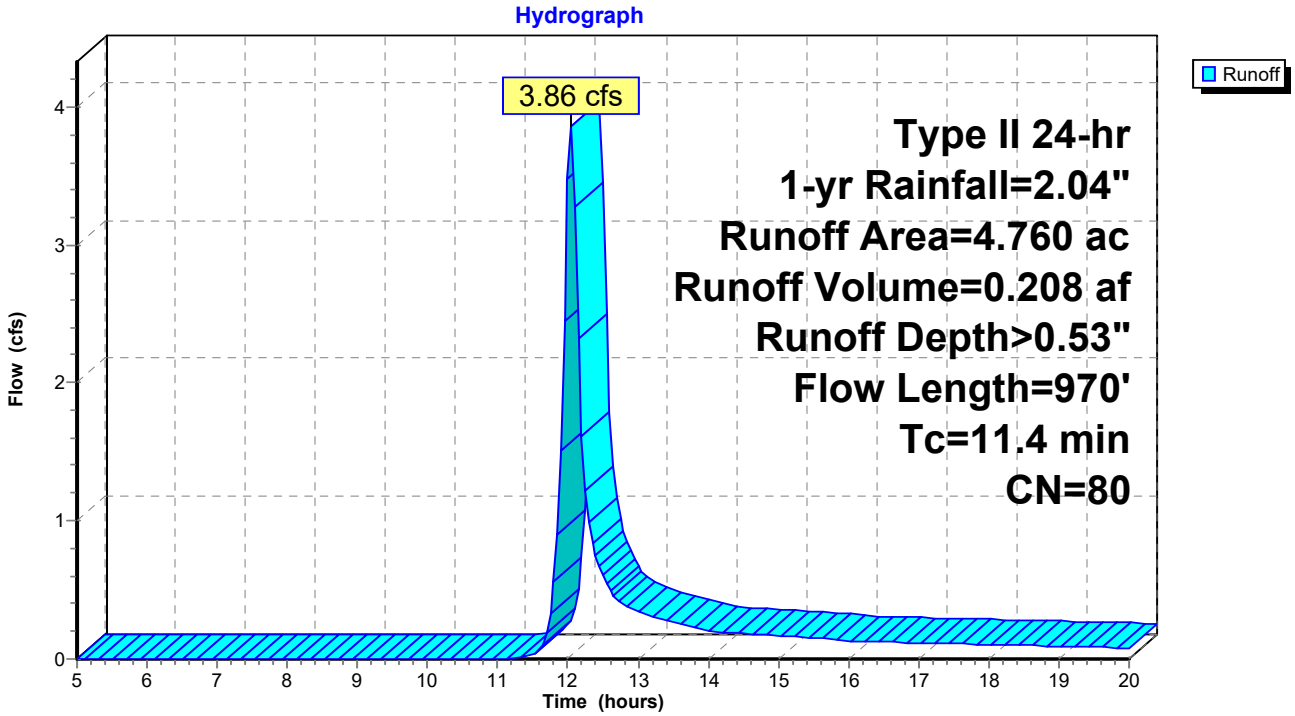
Runoff = 3.86 cfs @ 12.04 hrs, Volume= 0.208 af, Depth> 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.650	77	Woods, Good, HSG D
4.040	80	>75% Grass cover, Good, HSG D
0.070	98	Paved parking, HSG D
4.760	80	Weighted Average
4.690		98.53% Pervious Area
0.070		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0650	0.16		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
0.5	144	0.0833	4.65		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.6	726	0.0440	21.93	307.08	**Channel Flow, Swale** Area= 14.0 sf Perim= 6.0' r= 2.33' n= 0.025 Earth, clean & straight
11.4	970	Total			

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

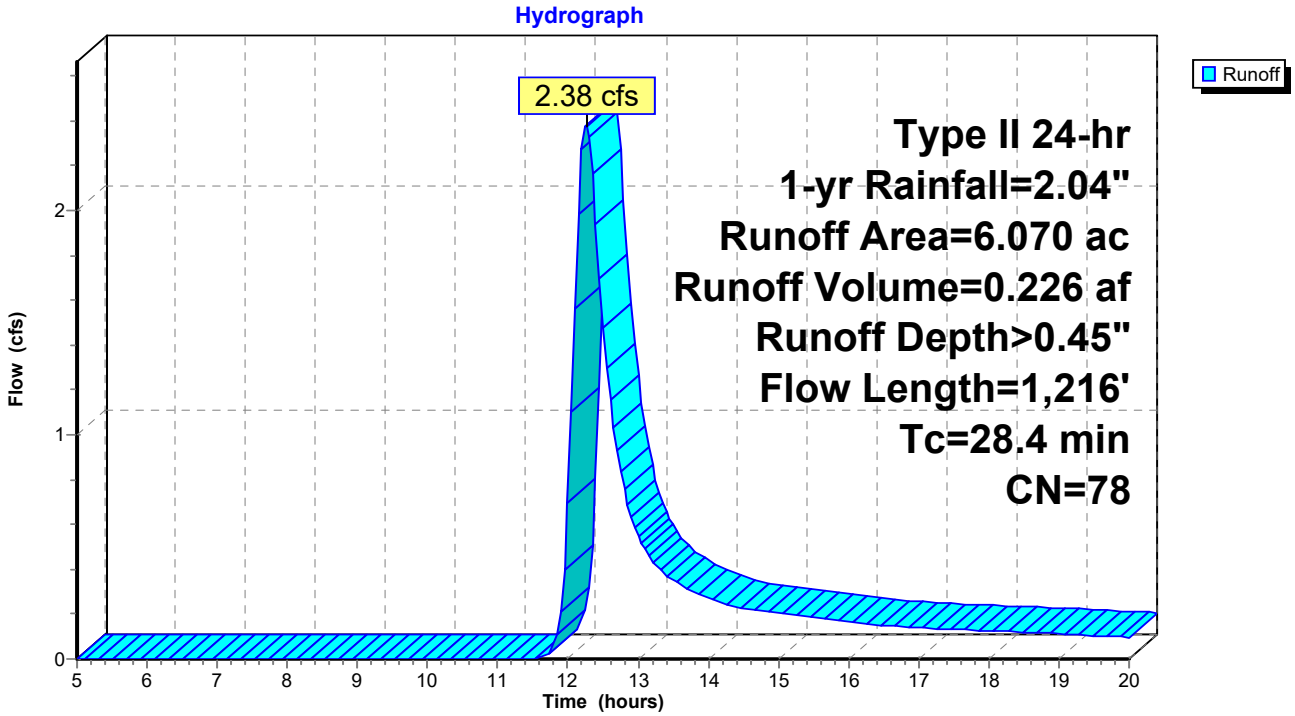
Runoff = 2.38 cfs @ 12.26 hrs, Volume= 0.226 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
3.330	77	Woods, Good, HSG D
2.740	80	>75% Grass cover, Good, HSG D
6.070	78	Weighted Average
6.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
14.2	555	0.0170	0.65		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
1.5	281	0.0360	3.05		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.2	280	0.1210	20.51	205.13	**Channel Flow, Swale** Area= 10.0 sf Perim= 5.0' r= 2.00' n= 0.040 Earth, dense weeds
28.4	1,216	Total			

Subcatchment 3S: DA-3



Summary for Subcatchment 4S: DA-4

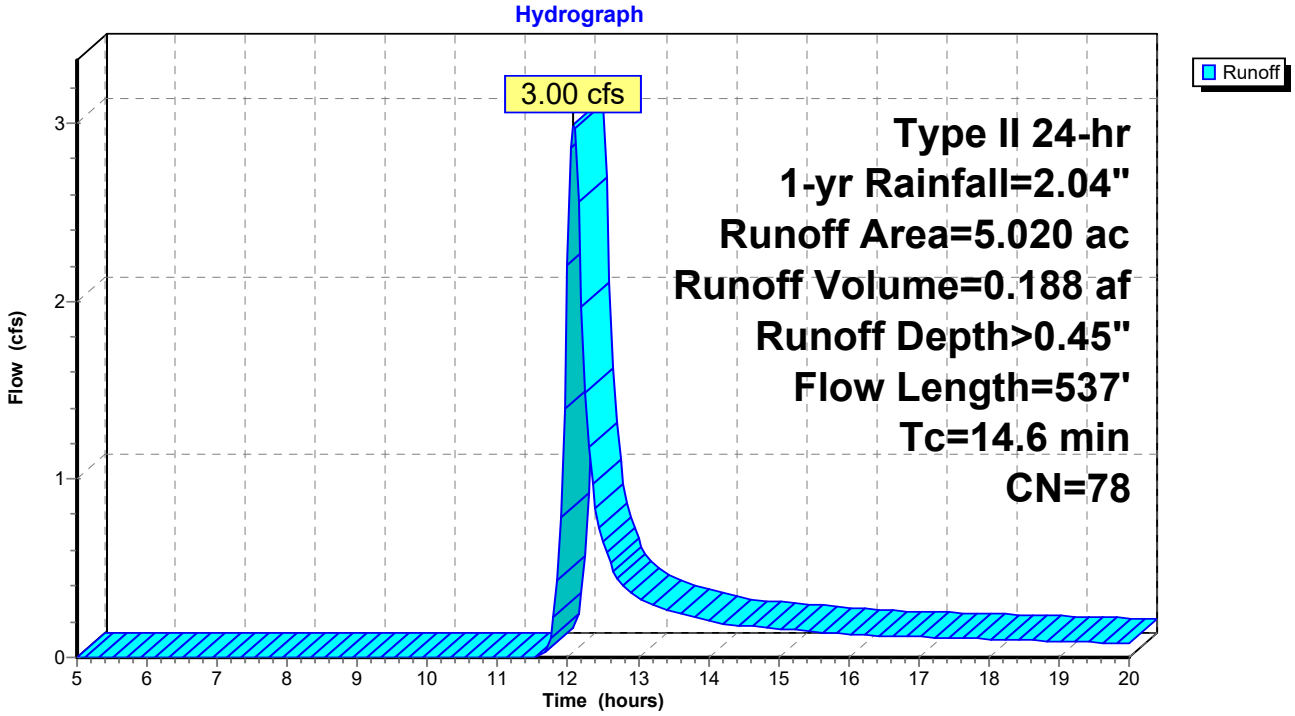
Runoff = 3.00 cfs @ 12.09 hrs, Volume= 0.188 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
3.480	77	Woods, Good, HSG D
1.540	80	>75% Grass cover, Good, HSG D
5.020	78	Weighted Average
5.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
1.5	287	0.0380	3.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
1.7	150	0.0870	1.47		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.6	537	Total			

Subcatchment 4S: DA-4

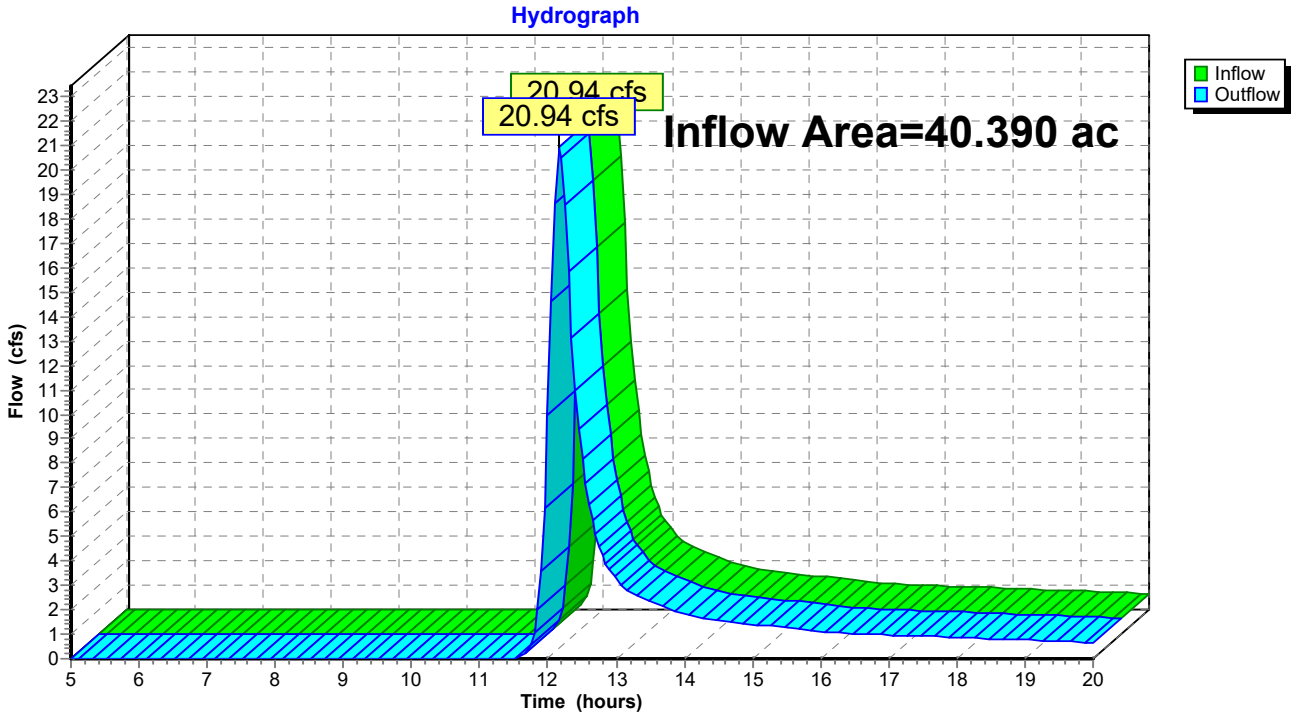


Summary for Reach 5R: Pt of Study 1A

Inflow Area = 40.390 ac, 0.00% Impervious, Inflow Depth > 0.48" for 1-yr event
Inflow = 20.94 cfs @ 12.17 hrs, Volume= 1.629 af
Outflow = 20.94 cfs @ 12.17 hrs, Volume= 1.629 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: Pt of Study 1A

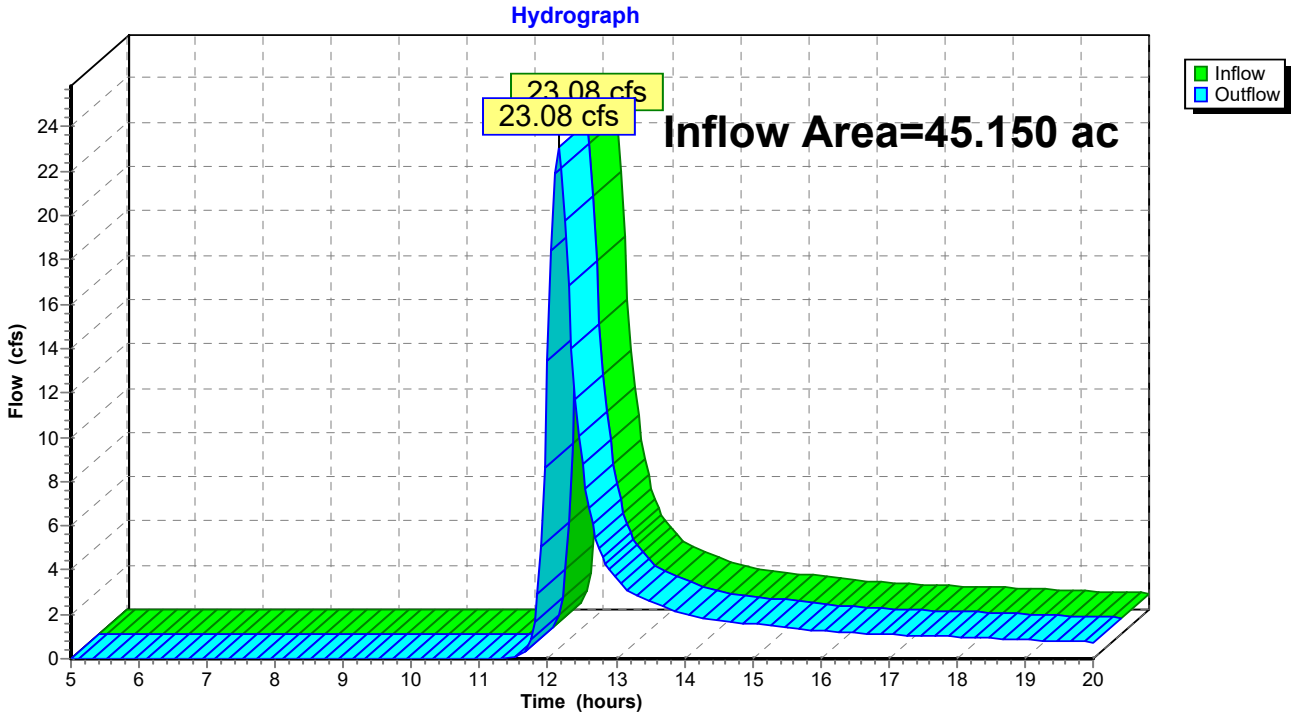


Summary for Reach 6R: Pt of Study 1B

Inflow Area = 45.150 ac, 0.16% Impervious, Inflow Depth > 0.49" for 1-yr event
Inflow = 23.08 cfs @ 12.15 hrs, Volume= 1.837 af
Outflow = 23.08 cfs @ 12.15 hrs, Volume= 1.837 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: Pt of Study 1B

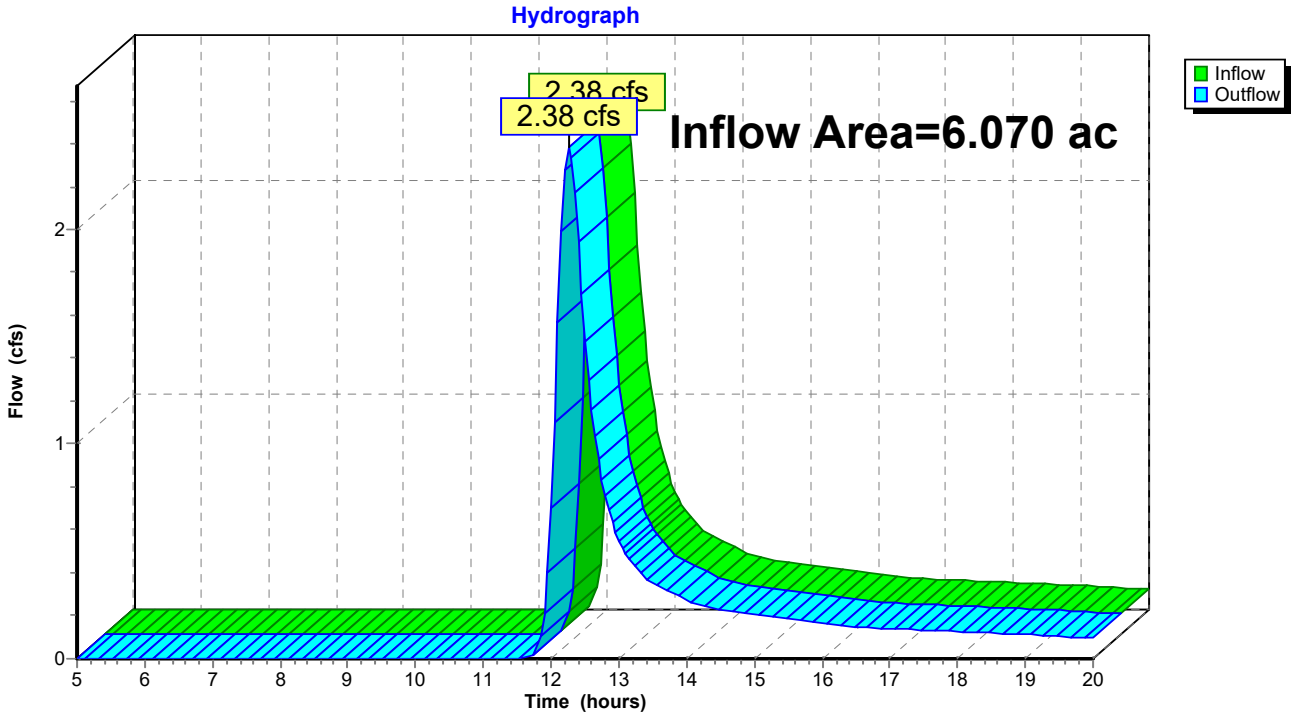


Summary for Reach 7R: Pt of Study 2

Inflow Area = 6.070 ac, 0.00% Impervious, Inflow Depth > 0.45" for 1-yr event
Inflow = 2.38 cfs @ 12.26 hrs, Volume= 0.226 af
Outflow = 2.38 cfs @ 12.26 hrs, Volume= 0.226 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: Pt of Study 2

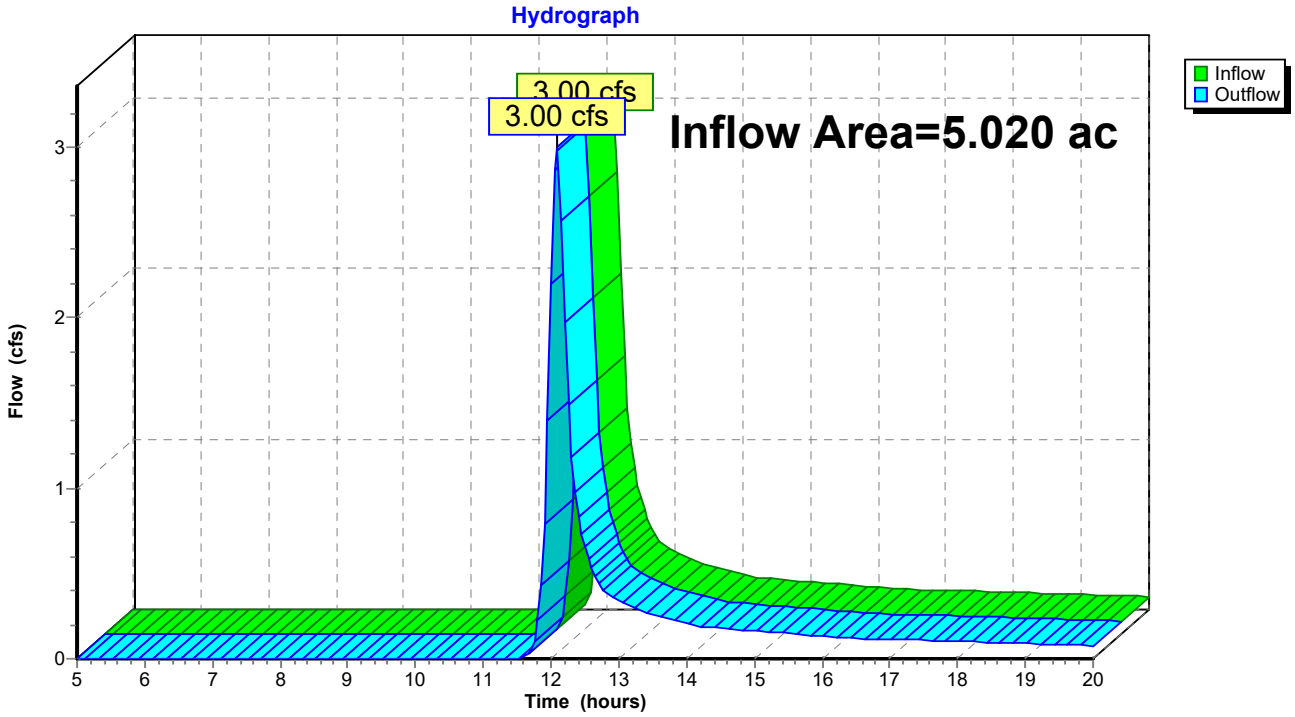


Summary for Reach 8R: Pt of Study 3

Inflow Area = 5.020 ac, 0.00% Impervious, Inflow Depth > 0.45" for 1-yr event
Inflow = 3.00 cfs @ 12.09 hrs, Volume= 0.188 af
Outflow = 3.00 cfs @ 12.09 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 8R: Pt of Study 3



Summary for Subcatchment 1S: DA-1

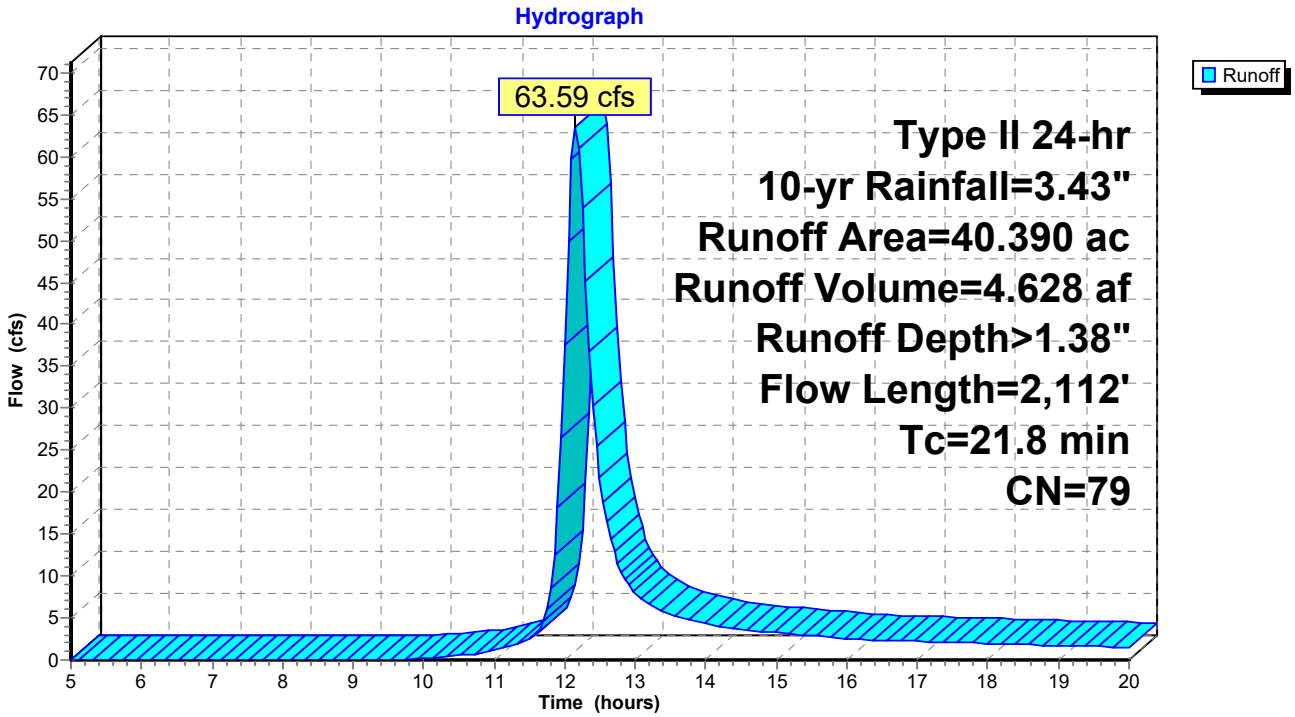
Runoff = 63.59 cfs @ 12.15 hrs, Volume= 4.628 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
12.250	77	Woods, Good, HSG D
28.140	80	>75% Grass cover, Good, HSG D
40.390	79	Weighted Average
40.390		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.39"
3.6	885	0.0650	4.10		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
2.2	1,127	0.0080	8.44	135.03	**Channel Flow, Swale** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & straight
21.8	2,112	Total			

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

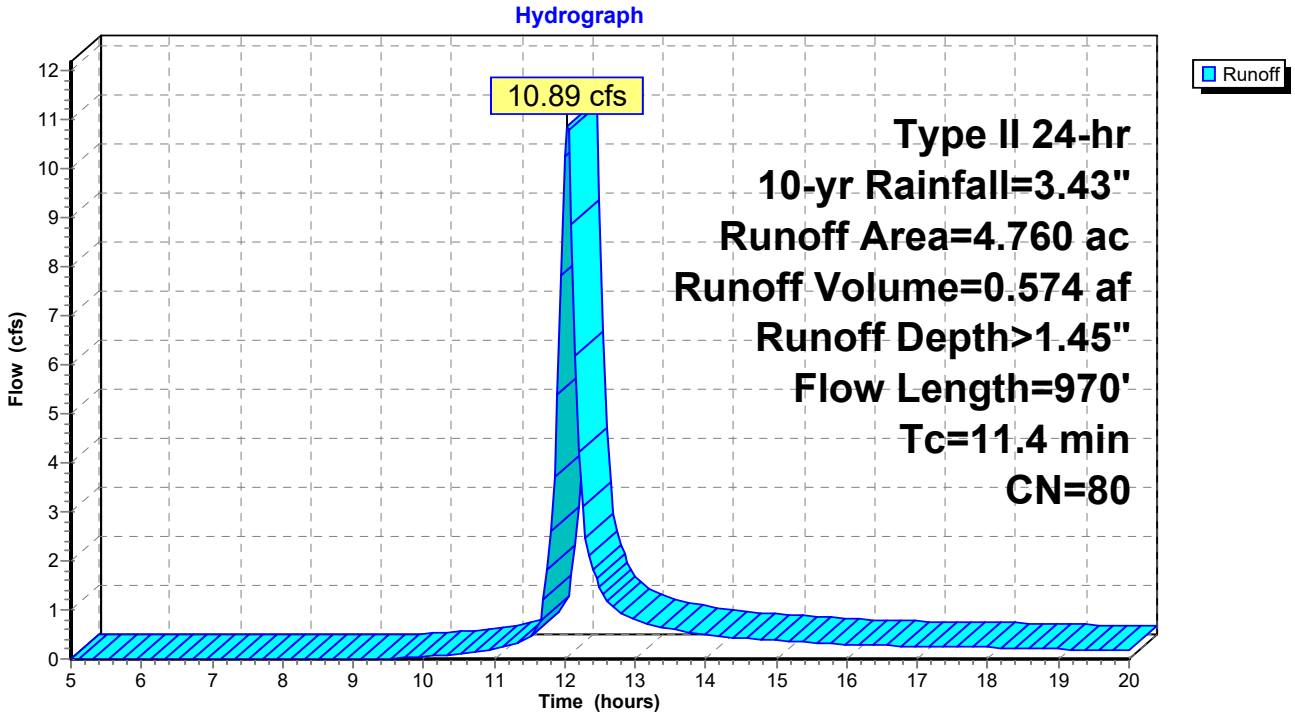
Runoff = 10.89 cfs @ 12.04 hrs, Volume= 0.574 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.650	77	Woods, Good, HSG D
4.040	80	>75% Grass cover, Good, HSG D
0.070	98	Paved parking, HSG D
4.760	80	Weighted Average
4.690		98.53% Pervious Area
0.070		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0650	0.16		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
0.5	144	0.0833	4.65		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.6	726	0.0440	21.93	307.08	**Channel Flow, Swale** Area= 14.0 sf Perim= 6.0' r= 2.33' n= 0.025 Earth, clean & straight
11.4	970	Total			

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

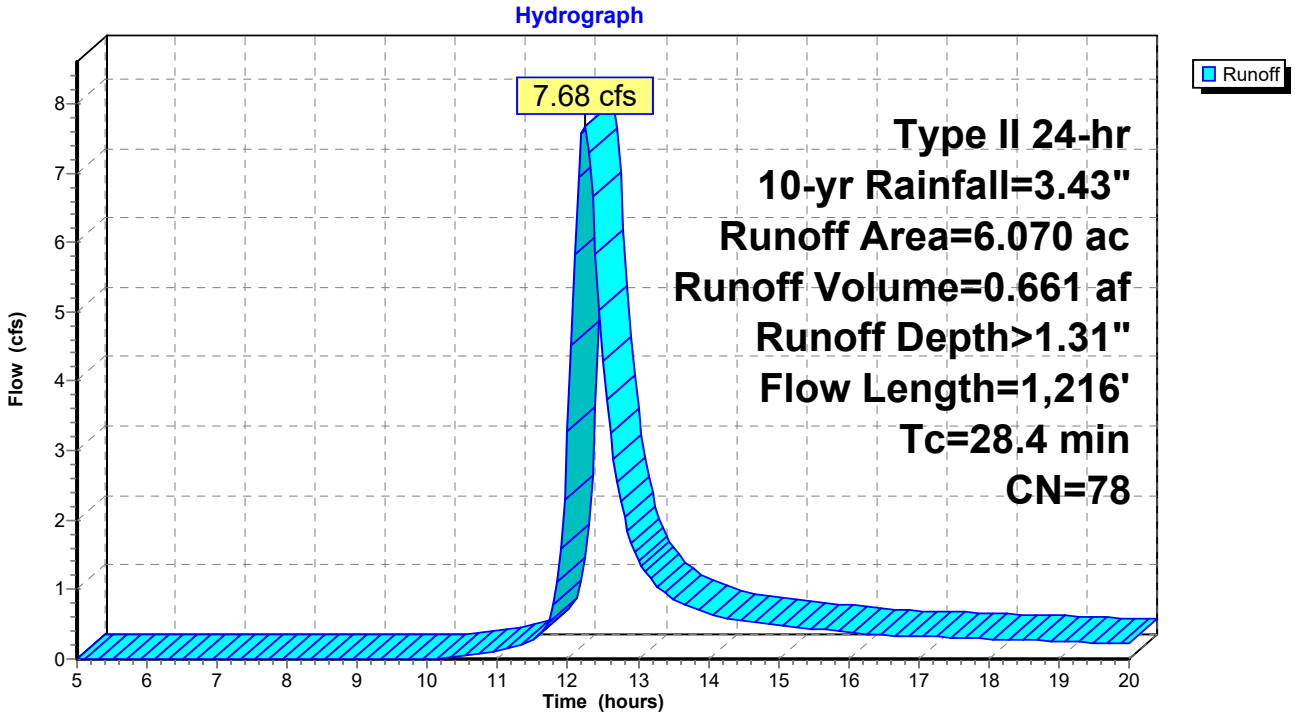
Runoff = 7.68 cfs @ 12.23 hrs, Volume= 0.661 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
3.330	77	Woods, Good, HSG D
2.740	80	>75% Grass cover, Good, HSG D
6.070	78	Weighted Average
6.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
14.2	555	0.0170	0.65		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
1.5	281	0.0360	3.05		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.2	280	0.1210	20.51	205.13	**Channel Flow, Swale** Area= 10.0 sf Perim= 5.0' r= 2.00' n= 0.040 Earth, dense weeds
28.4	1,216	Total			

Subcatchment 3S: DA-3



Summary for Subcatchment 4S: DA-4

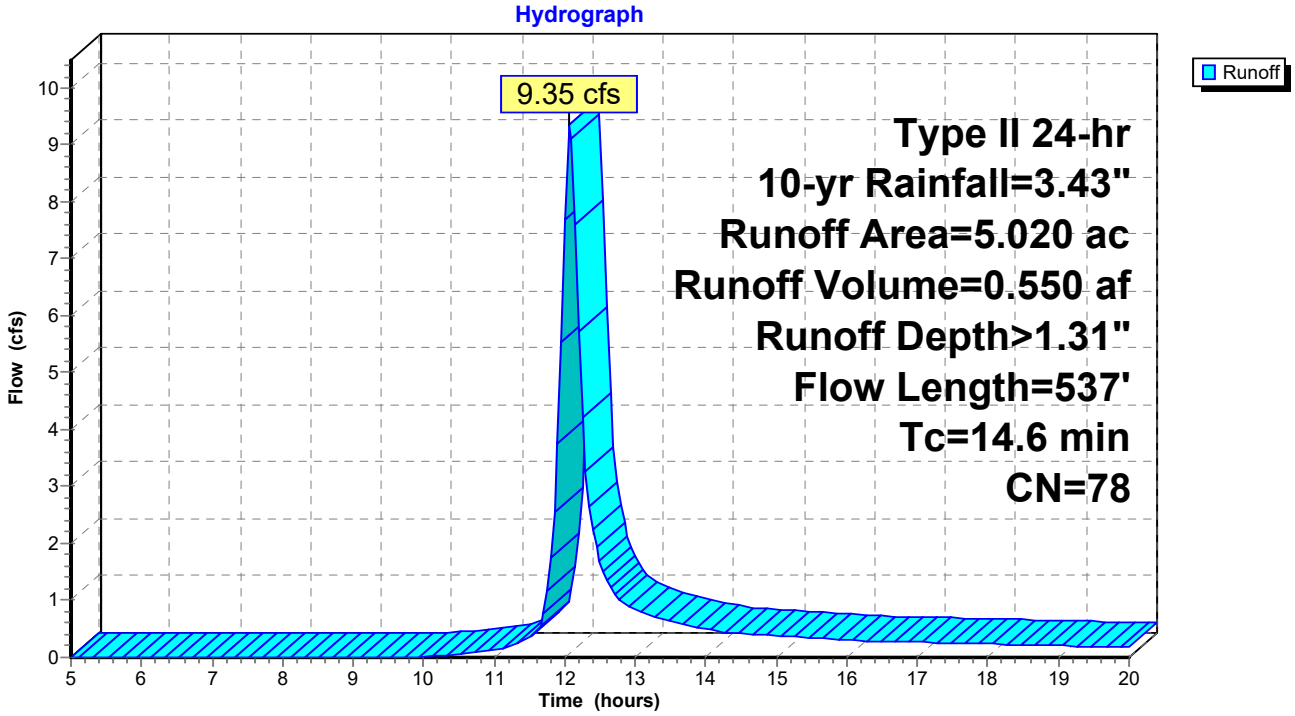
Runoff = 9.35 cfs @ 12.07 hrs, Volume= 0.550 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
3.480	77	Woods, Good, HSG D
1.540	80	>75% Grass cover, Good, HSG D
5.020	78	Weighted Average
5.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
1.5	287	0.0380	3.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
1.7	150	0.0870	1.47		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.6	537	Total			

Subcatchment 4S: DA-4

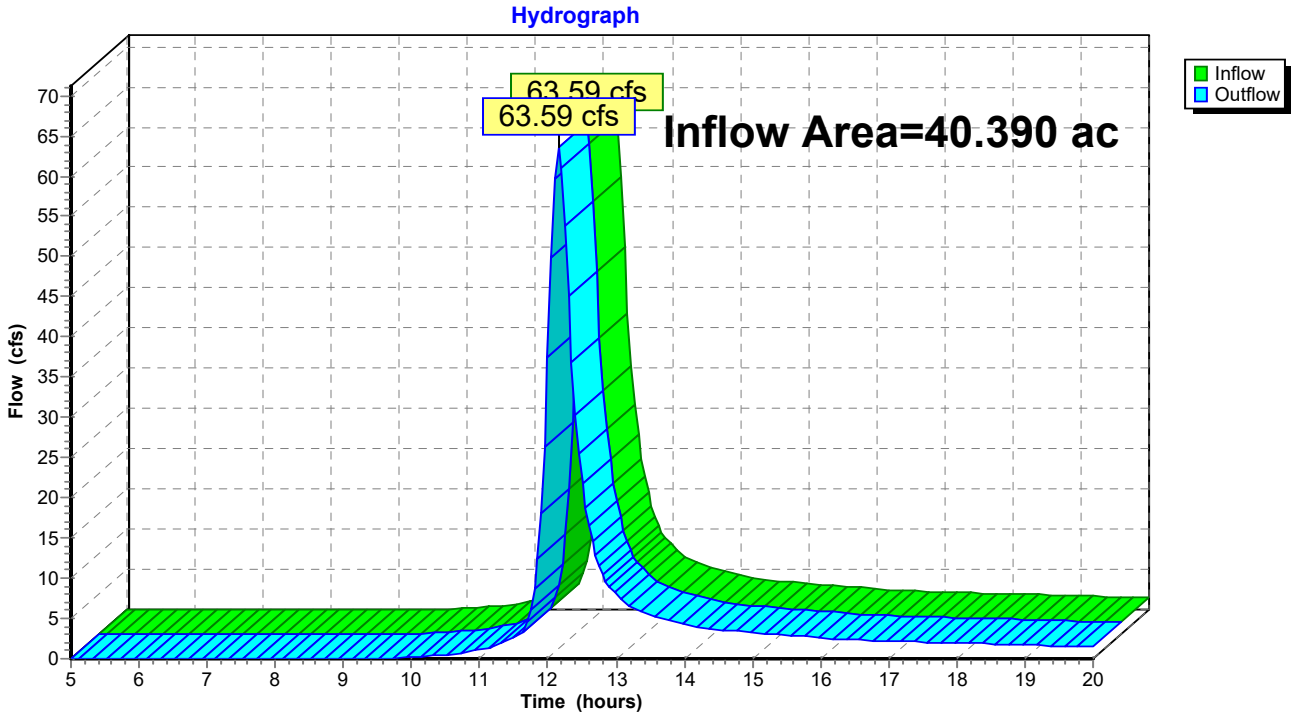


Summary for Reach 5R: Pt of Study 1A

Inflow Area = 40.390 ac, 0.00% Impervious, Inflow Depth > 1.38" for 10-yr event
Inflow = 63.59 cfs @ 12.15 hrs, Volume= 4.628 af
Outflow = 63.59 cfs @ 12.15 hrs, Volume= 4.628 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: Pt of Study 1A

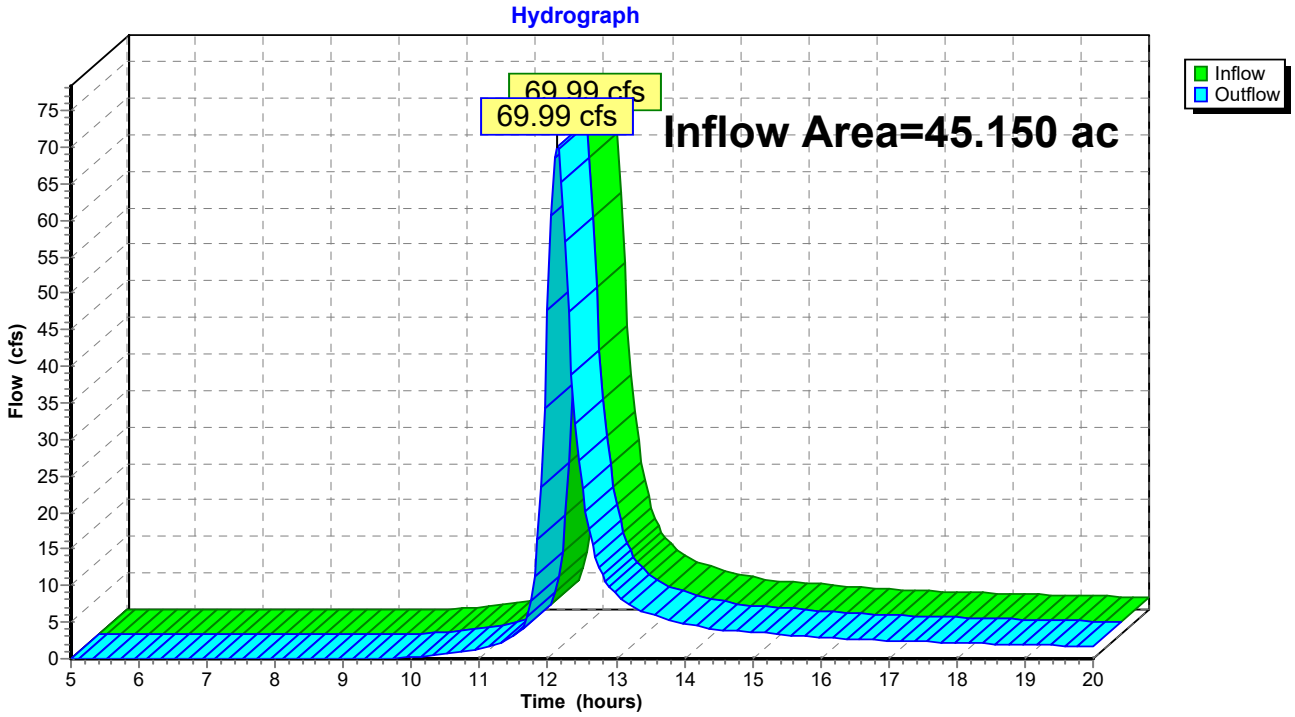


Summary for Reach 6R: Pt of Study 1B

Inflow Area = 45.150 ac, 0.16% Impervious, Inflow Depth > 1.38" for 10-yr event
Inflow = 69.99 cfs @ 12.14 hrs, Volume= 5.202 af
Outflow = 69.99 cfs @ 12.14 hrs, Volume= 5.202 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: Pt of Study 1B

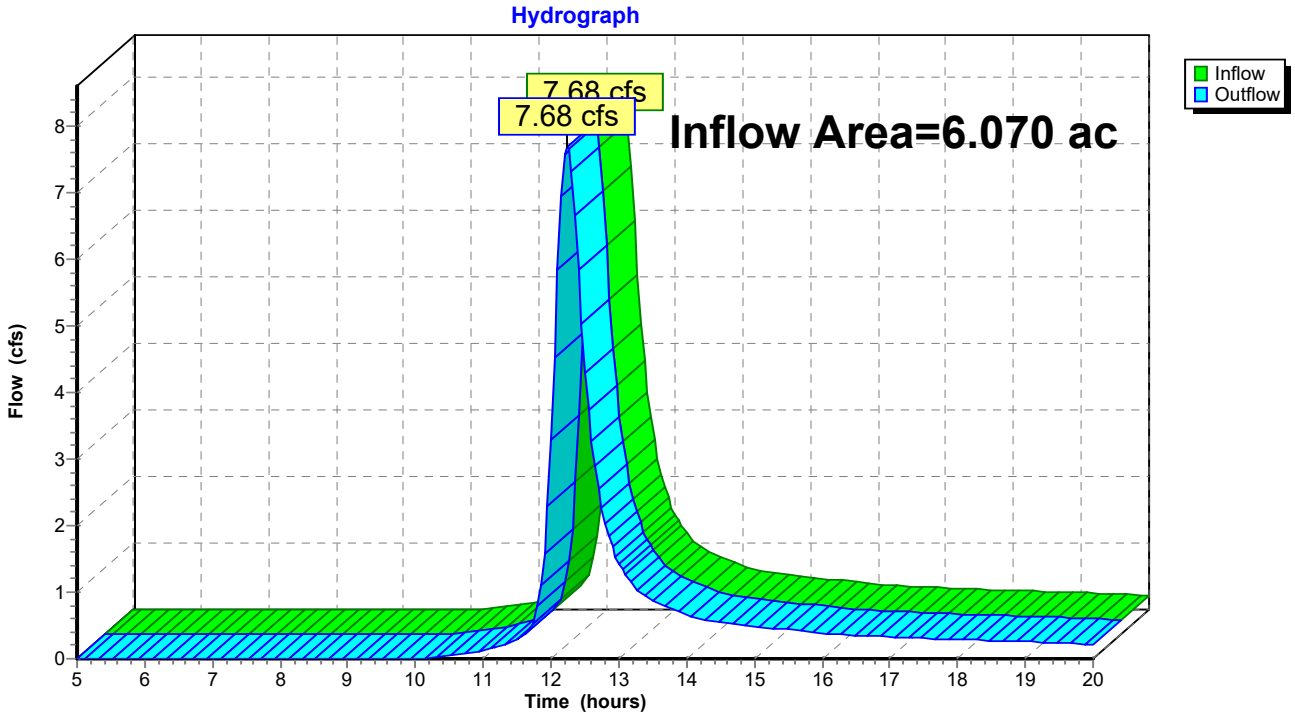


Summary for Reach 7R: Pt of Study 2

Inflow Area = 6.070 ac, 0.00% Impervious, Inflow Depth > 1.31" for 10-yr event
Inflow = 7.68 cfs @ 12.23 hrs, Volume= 0.661 af
Outflow = 7.68 cfs @ 12.23 hrs, Volume= 0.661 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: Pt of Study 2

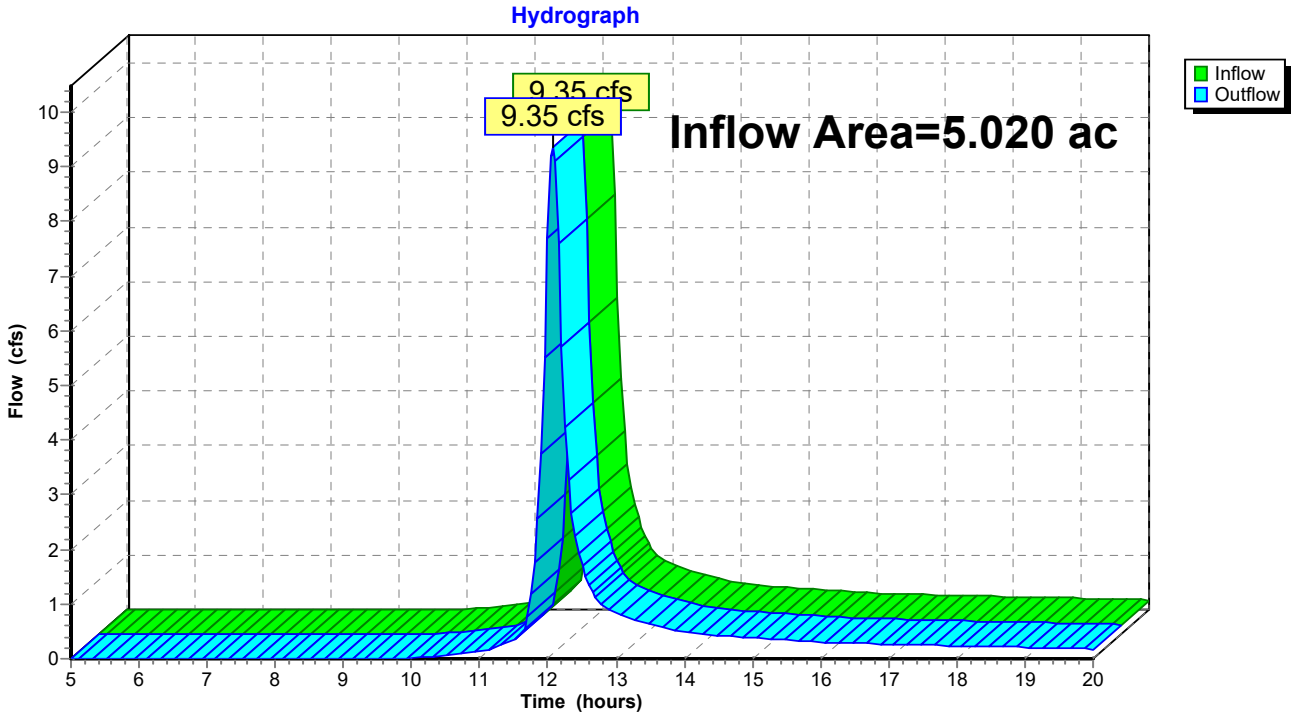


Summary for Reach 8R: Pt of Study 3

Inflow Area = 5.020 ac, 0.00% Impervious, Inflow Depth > 1.31" for 10-yr event
Inflow = 9.35 cfs @ 12.07 hrs, Volume= 0.550 af
Outflow = 9.35 cfs @ 12.07 hrs, Volume= 0.550 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 8R: Pt of Study 3



Summary for Subcatchment 1S: DA-1

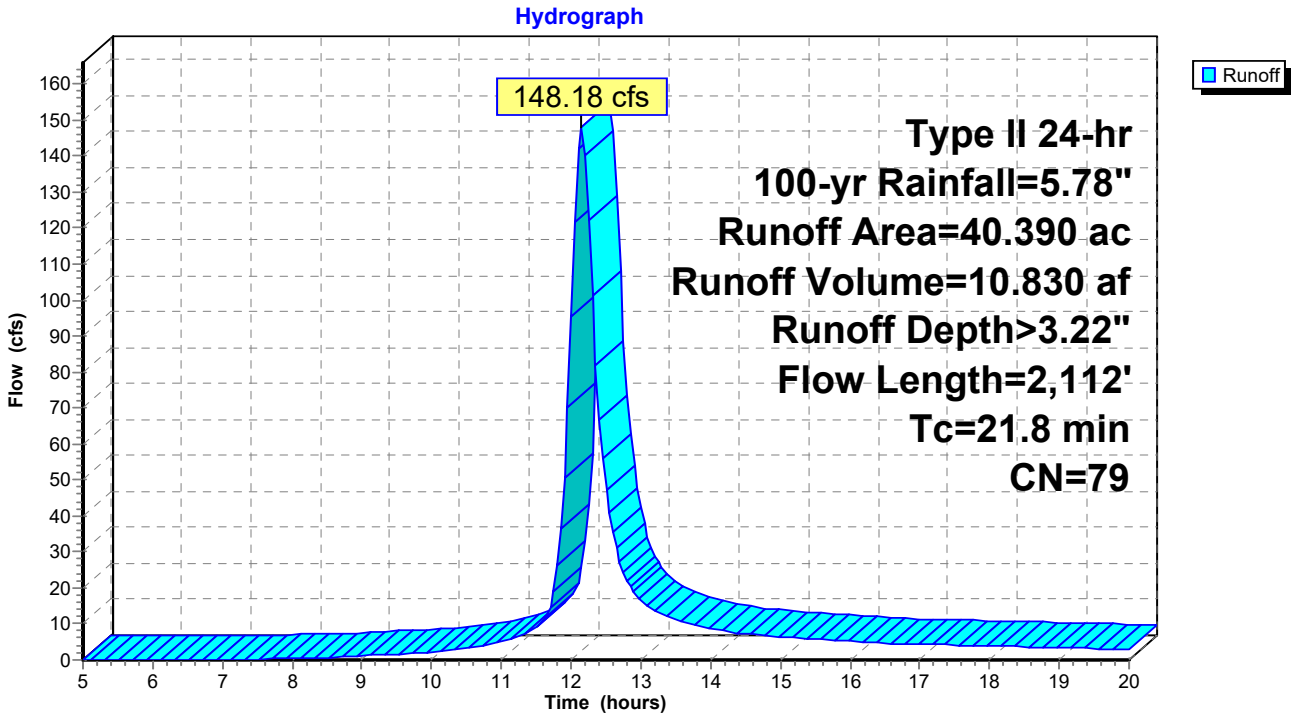
Runoff = 148.18 cfs @ 12.15 hrs, Volume= 10.830 af, Depth> 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
12.250	77	Woods, Good, HSG D
28.140	80	>75% Grass cover, Good, HSG D
40.390	79	Weighted Average
40.390		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.39"
3.6	885	0.0650	4.10		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
2.2	1,127	0.0080	8.44	135.03	**Channel Flow, Swale** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & straight
21.8	2,112	Total			

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

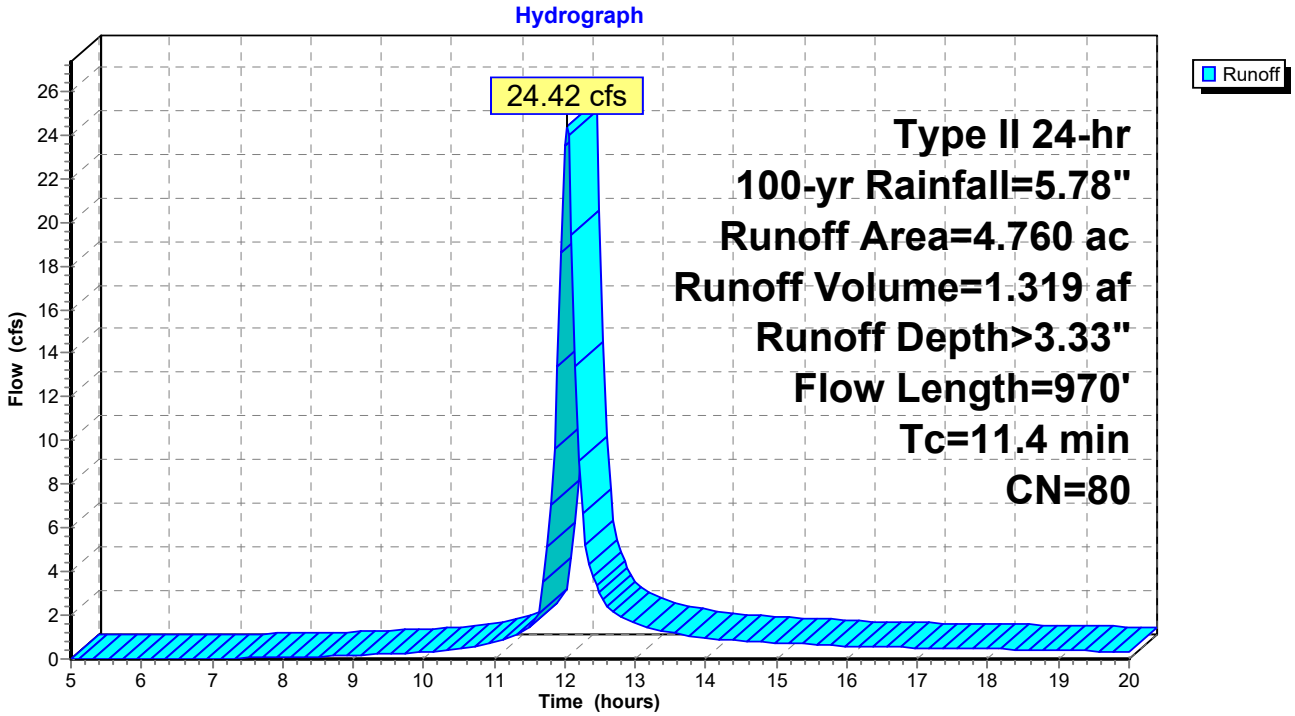
Runoff = 24.42 cfs @ 12.03 hrs, Volume= 1.319 af, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.650	77	Woods, Good, HSG D
4.040	80	>75% Grass cover, Good, HSG D
0.070	98	Paved parking, HSG D
4.760	80	Weighted Average
4.690		98.53% Pervious Area
0.070		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0650	0.16		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
0.5	144	0.0833	4.65		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.6	726	0.0440	21.93	307.08	**Channel Flow, Swale** Area= 14.0 sf Perim= 6.0' r= 2.33' n= 0.025 Earth, clean & straight
11.4	970	Total			

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

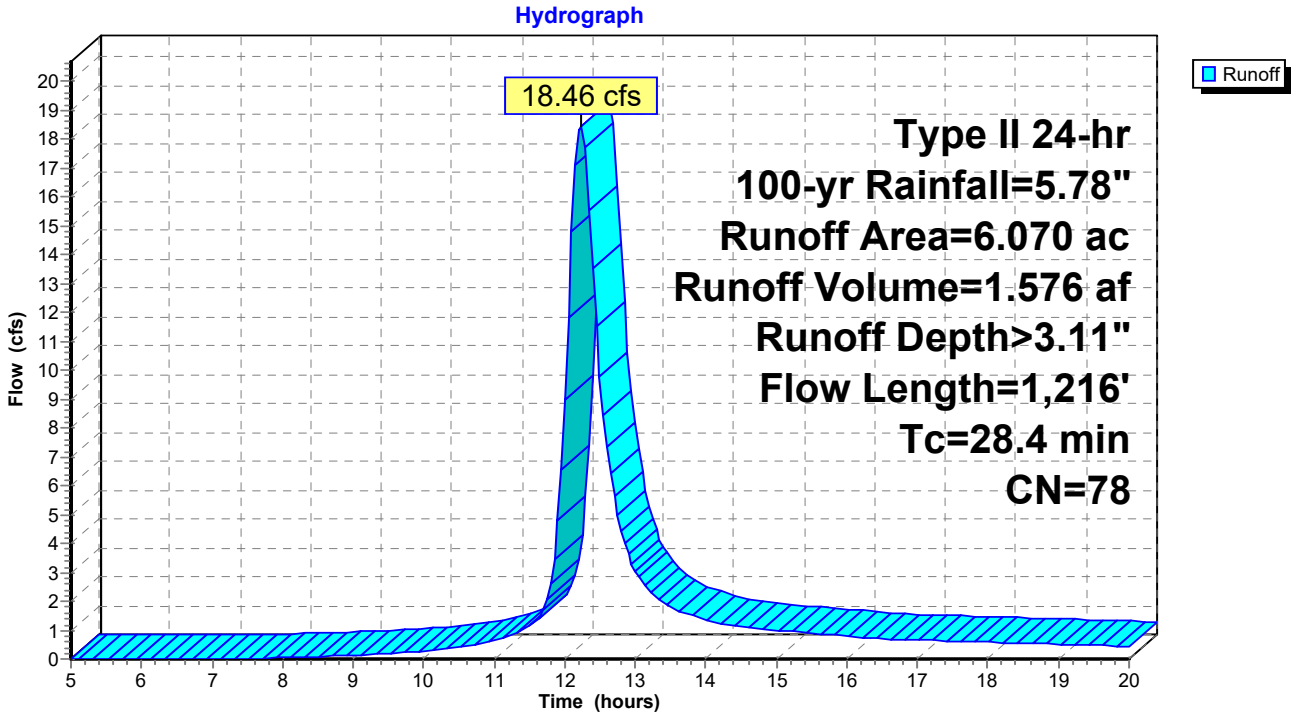
Runoff = 18.46 cfs @ 12.22 hrs, Volume= 1.576 af, Depth> 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
3.330	77	Woods, Good, HSG D
2.740	80	>75% Grass cover, Good, HSG D
6.070	78	Weighted Average
6.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
14.2	555	0.0170	0.65		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
1.5	281	0.0360	3.05		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.2	280	0.1210	20.51	205.13	**Channel Flow, Swale** Area= 10.0 sf Perim= 5.0' r= 2.00' n= 0.040 Earth, dense weeds
28.4	1,216	Total			

Subcatchment 3S: DA-3



Summary for Subcatchment 4S: DA-4

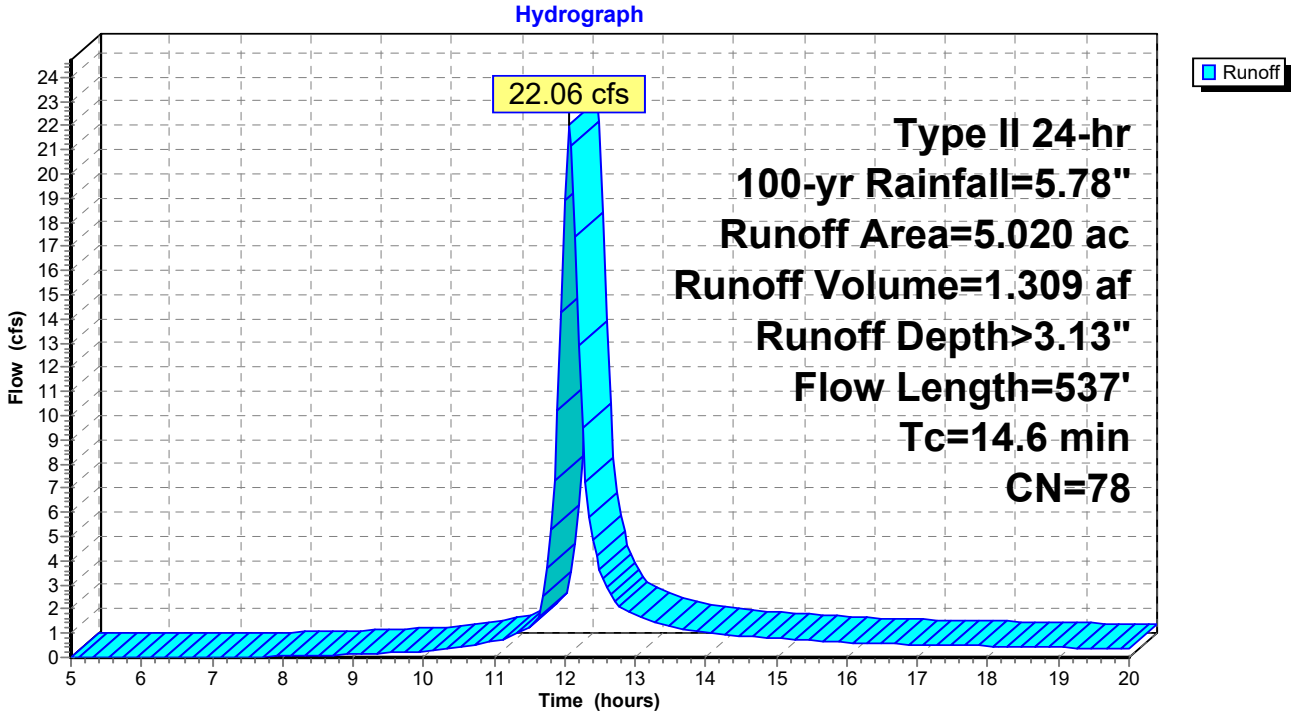
Runoff = 22.06 cfs @ 12.07 hrs, Volume= 1.309 af, Depth> 3.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
3.480	77	Woods, Good, HSG D
1.540	80	>75% Grass cover, Good, HSG D
5.020	78	Weighted Average
5.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
1.5	287	0.0380	3.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
1.7	150	0.0870	1.47		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.6	537	Total			

Subcatchment 4S: DA-4

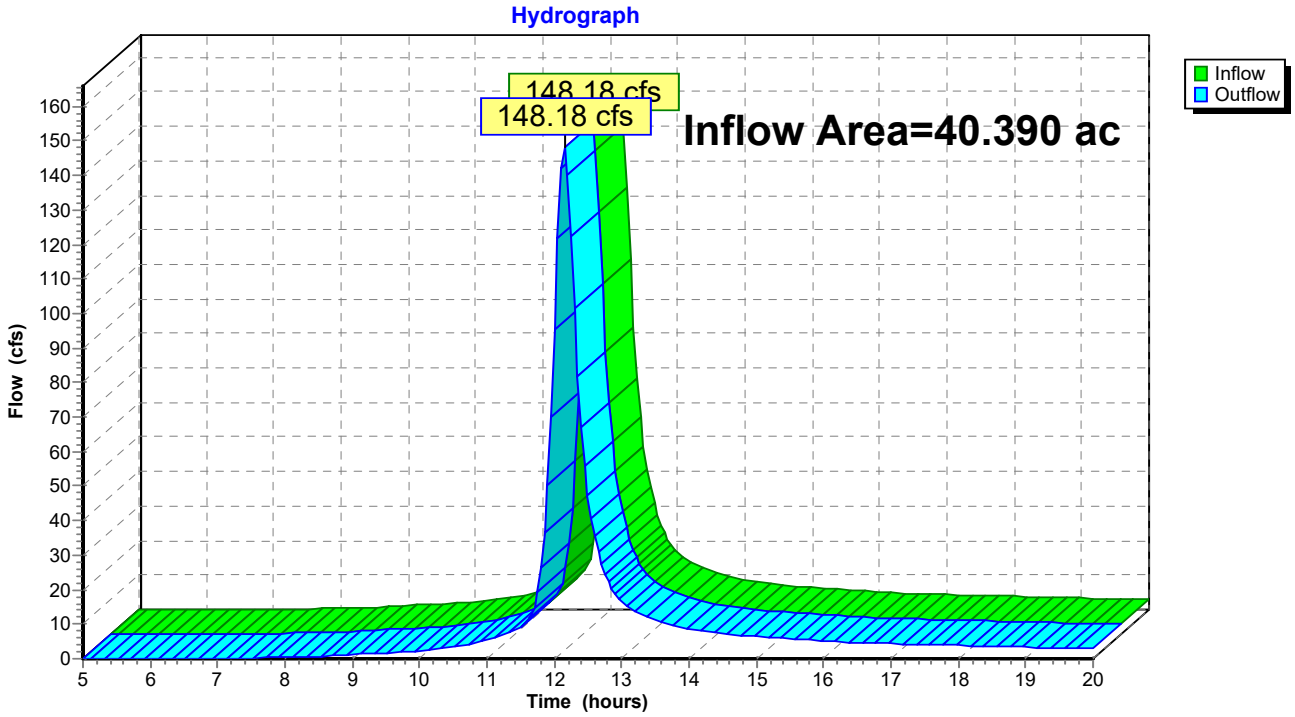


Summary for Reach 5R: Pt of Study 1A

Inflow Area = 40.390 ac, 0.00% Impervious, Inflow Depth > 3.22" for 100-yr event
Inflow = 148.18 cfs @ 12.15 hrs, Volume= 10.830 af
Outflow = 148.18 cfs @ 12.15 hrs, Volume= 10.830 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: Pt of Study 1A

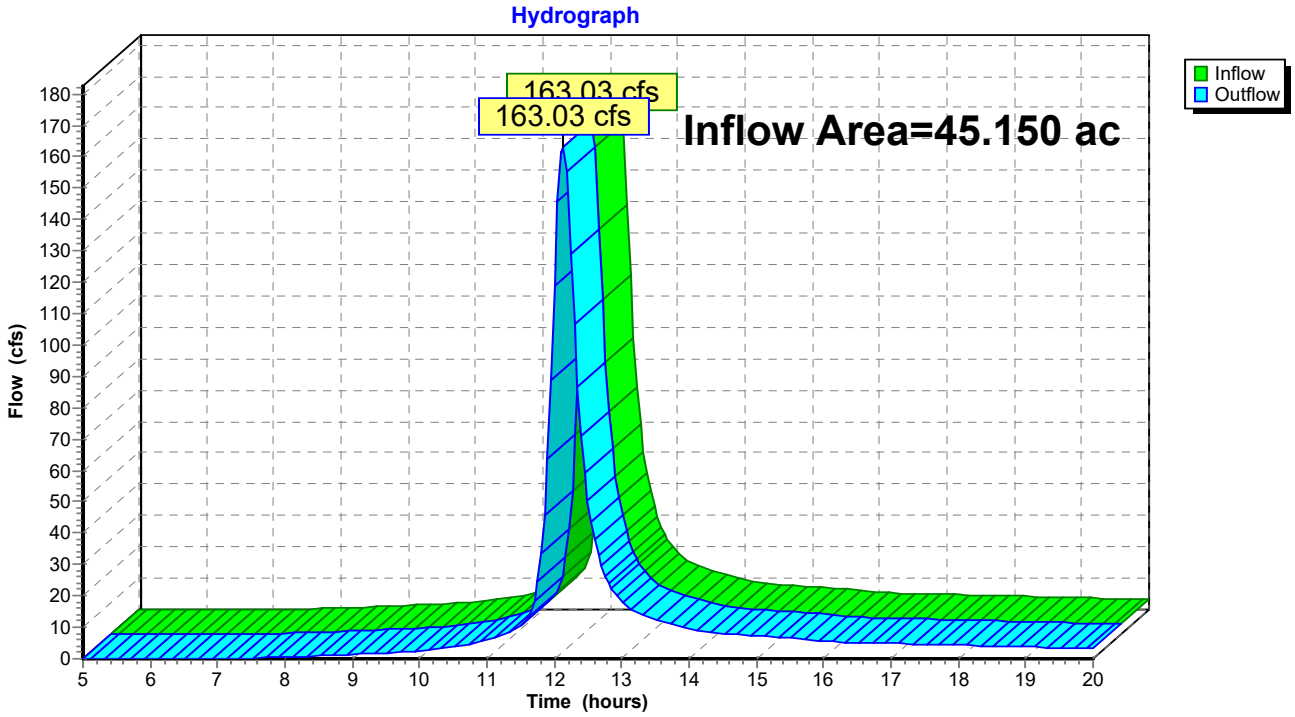


Summary for Reach 6R: Pt of Study 1B

Inflow Area = 45.150 ac, 0.16% Impervious, Inflow Depth > 3.23" for 100-yr event
Inflow = 163.03 cfs @ 12.13 hrs, Volume= 12.149 af
Outflow = 163.03 cfs @ 12.13 hrs, Volume= 12.149 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: Pt of Study 1B

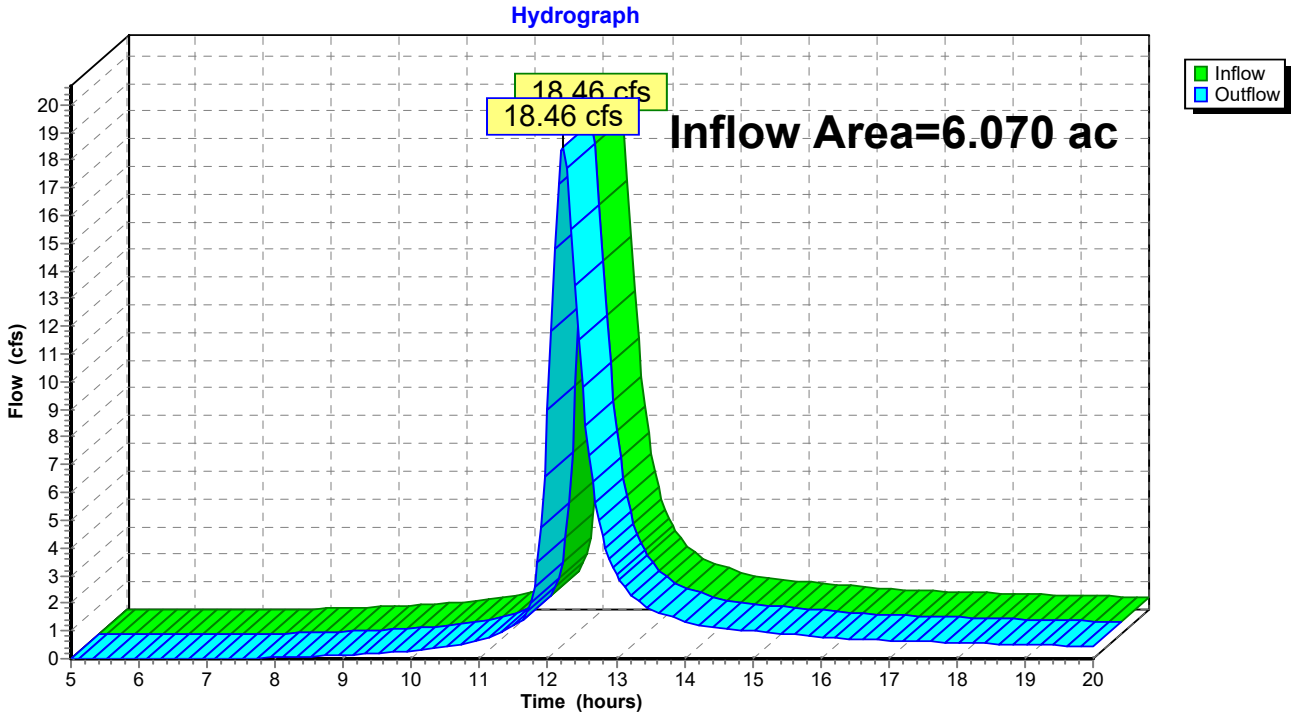


Summary for Reach 7R: Pt of Study 2

Inflow Area = 6.070 ac, 0.00% Impervious, Inflow Depth > 3.11" for 100-yr event
Inflow = 18.46 cfs @ 12.22 hrs, Volume= 1.576 af
Outflow = 18.46 cfs @ 12.22 hrs, Volume= 1.576 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: Pt of Study 2

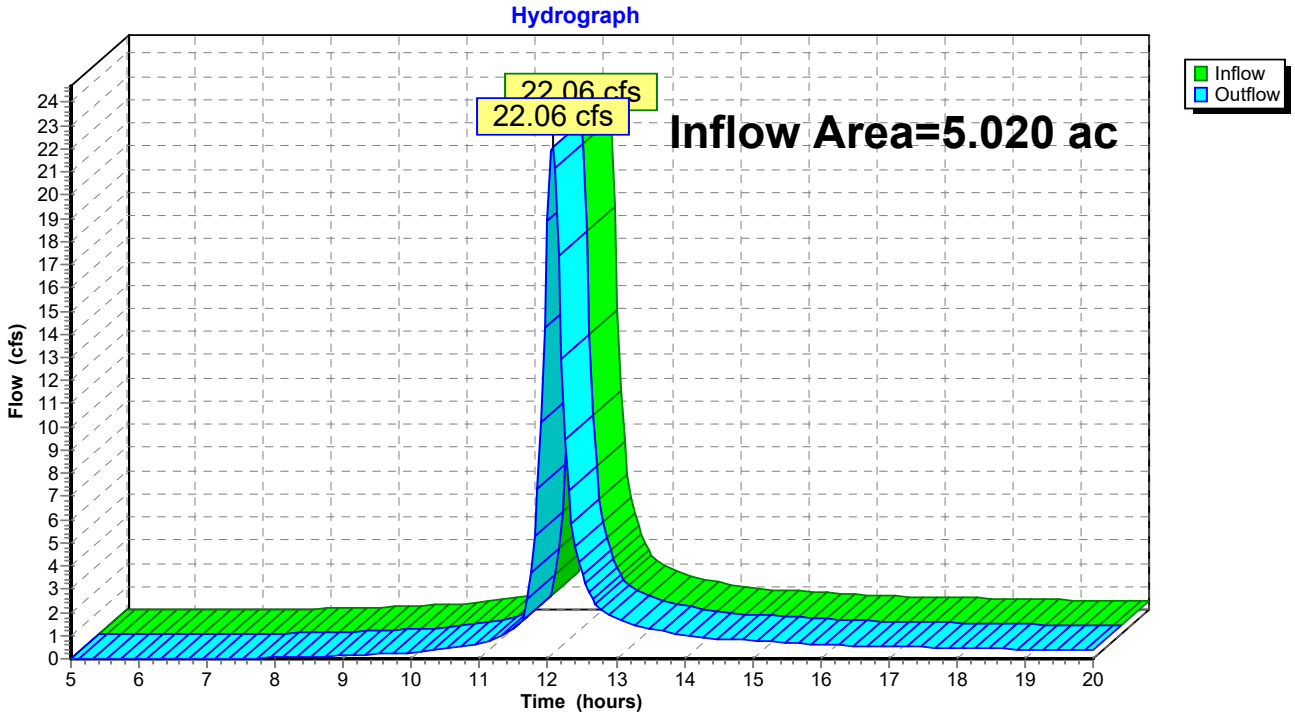


Summary for Reach 8R: Pt of Study 3

Inflow Area = 5.020 ac, 0.00% Impervious, Inflow Depth > 3.13" for 100-yr event
Inflow = 22.06 cfs @ 12.07 hrs, Volume= 1.309 af
Outflow = 22.06 cfs @ 12.07 hrs, Volume= 1.309 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 8R: Pt of Study 3



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APPENDIX B: HYDRO CAD – PROPOSED CONDITIONS

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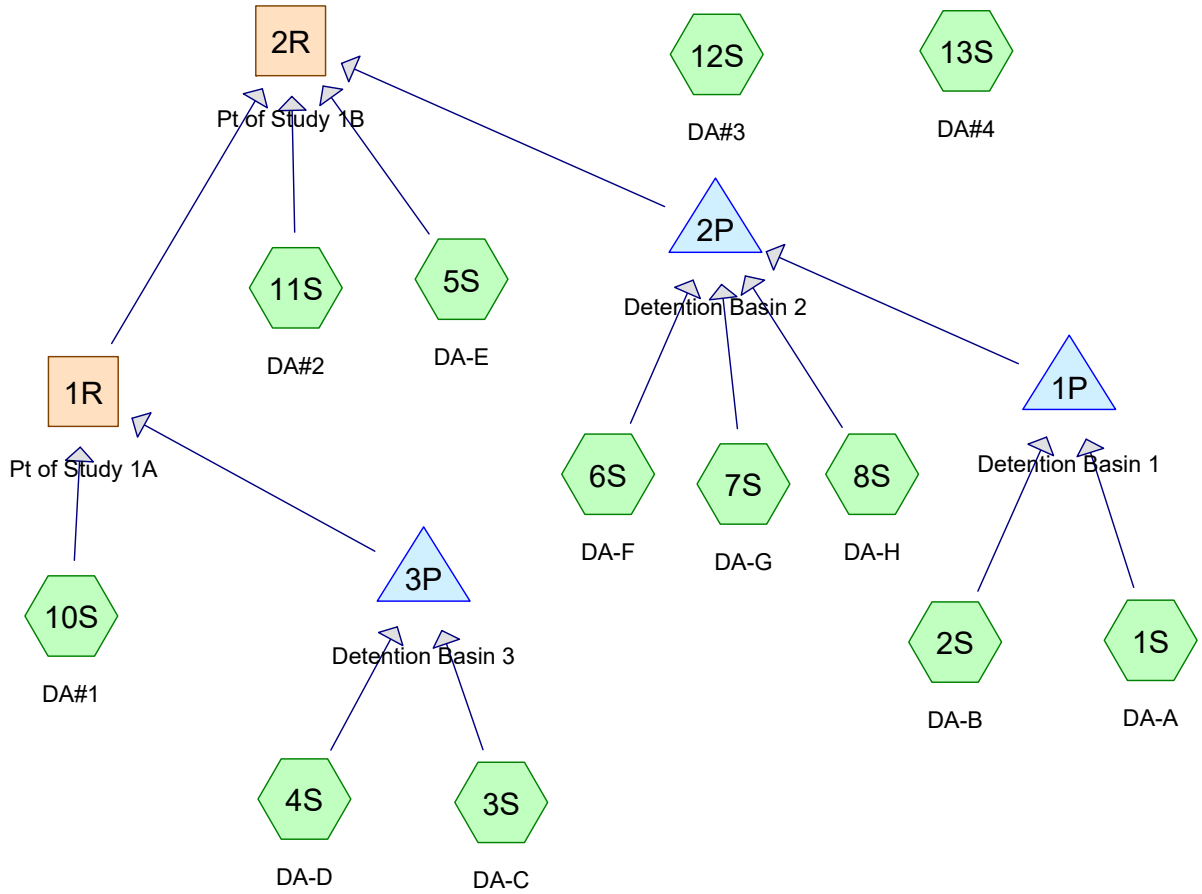
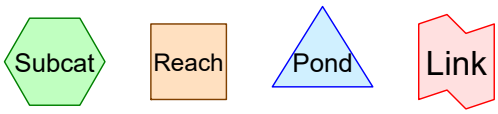




Routing Diagram for Proposed Drainage Areas
Prepared by Napierala Consulting, P.C., Printed 9/10/2020
HydroCAD® 10.00-18 s/n 01332 © 2016 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: DA-A

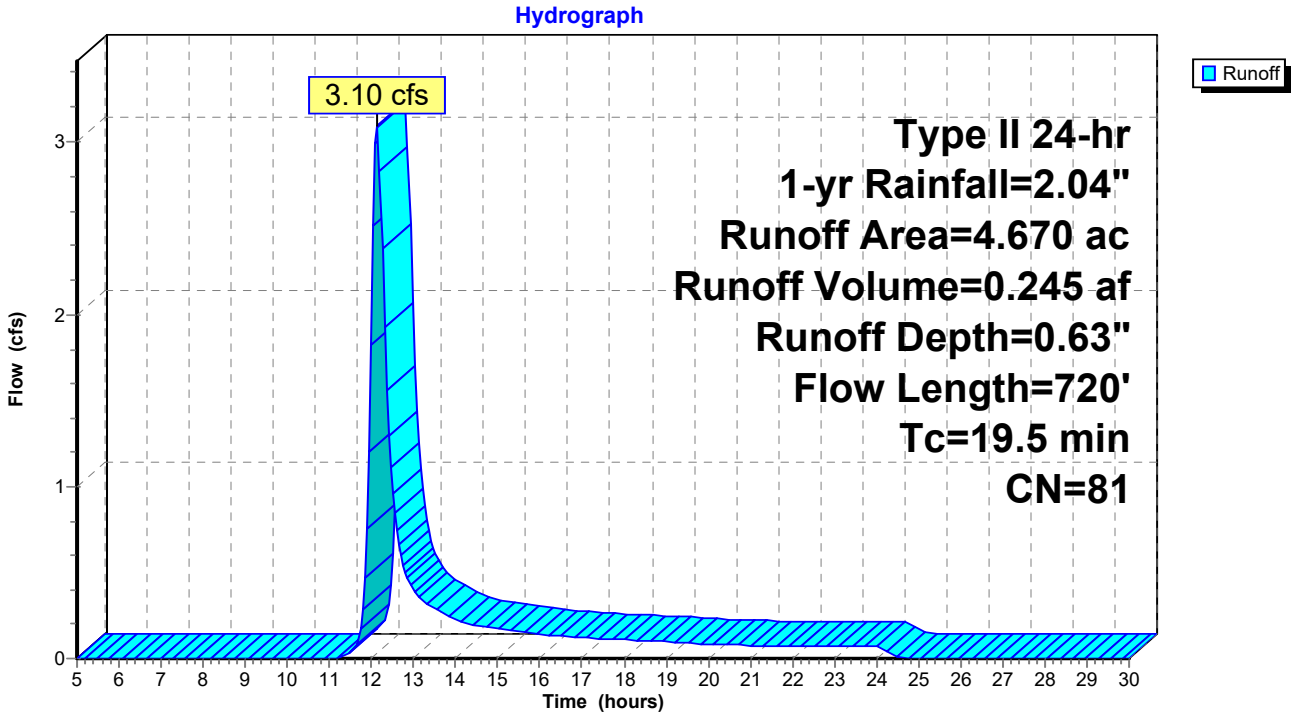
Runoff = 3.10 cfs @ 12.14 hrs, Volume= 0.245 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.270	98	Paved parking, HSG D
2.580	80	>75% Grass cover, Good, HSG D
1.540	77	Woods, Good, HSG D
0.280	98	Roofs, HSG D
4.670	81	Weighted Average
4.120		88.22% Pervious Area
0.550		11.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 2.39"
2.5	188	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.8	202	0.0650	4.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	230	0.0200	16.17	32.33	**Channel Flow, GUTTER** Area= 2.0 sf Perim= 2.0' r= 1.00' n= 0.013 Asphalt, smooth
19.5	720	Total			

Subcatchment 1S: DA-A



Summary for Subcatchment 2S: DA-B

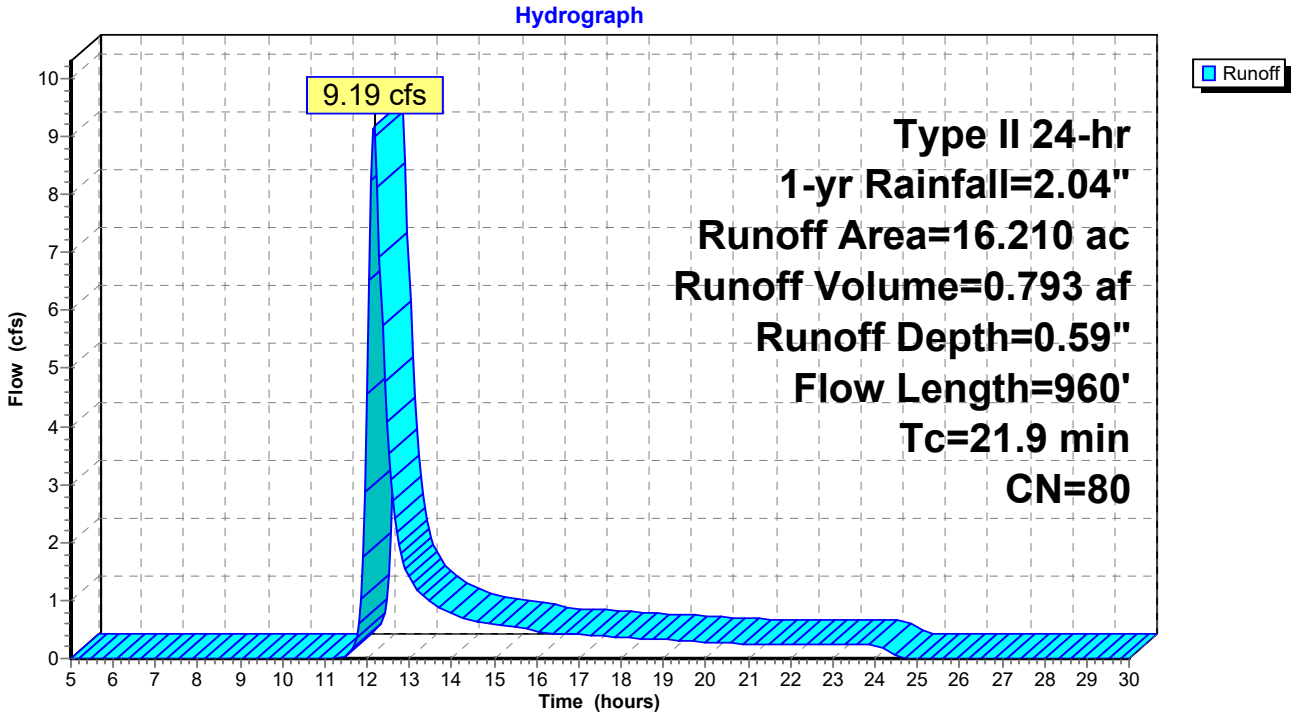
Runoff = 9.19 cfs @ 12.17 hrs, Volume= 0.793 af, Depth= 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.740	98	Paved parking, HSG D
7.140	80	>75% Grass cover, Good, HSG D
7.840	77	Woods, Good, HSG D
0.490	98	Roofs, HSG D
16.210	80	Weighted Average
14.980		92.41% Pervious Area
1.230		7.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 2.39"
4.8	370	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.8	200	0.0650	4.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.3	290	0.0200	16.17	32.33	**Channel Flow, GUTTER** Area= 2.0 sf Perim= 2.0' r= 1.00' n= 0.013 Asphalt, smooth
21.9	960	Total			

Subcatchment 2S: DA-B



Summary for Subcatchment 3S: DA-C

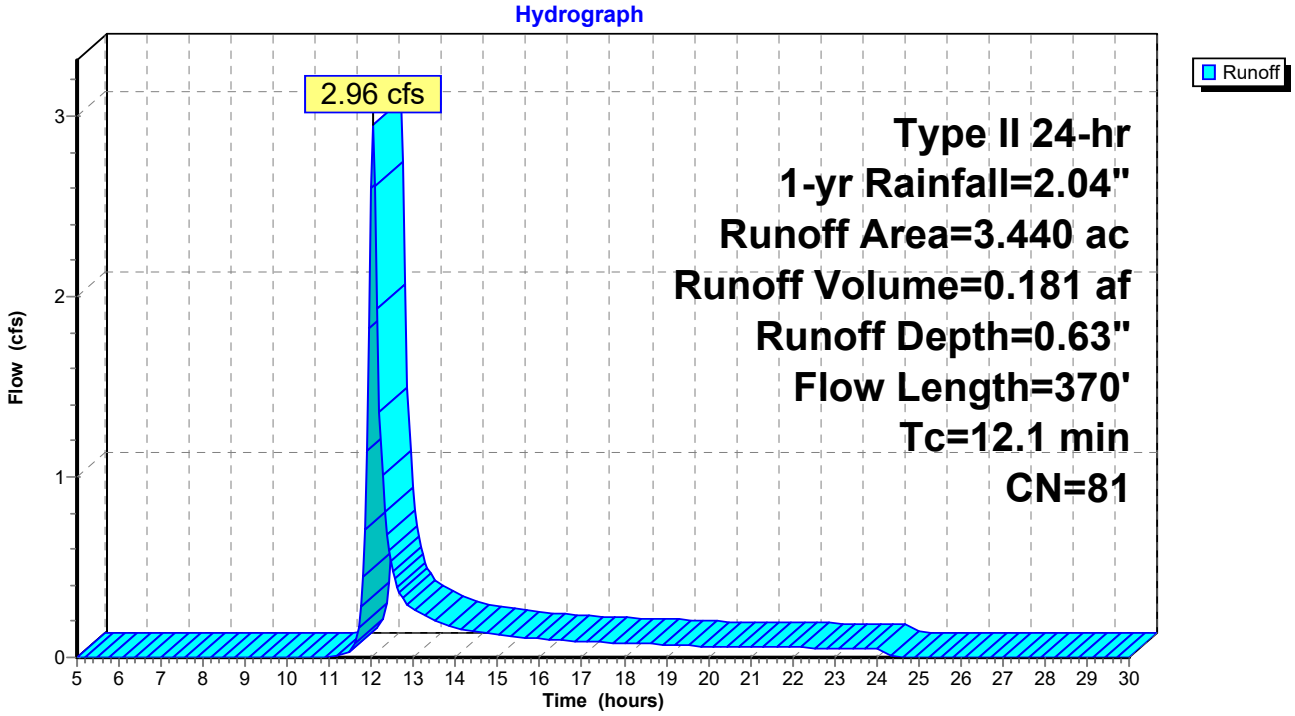
Runoff = 2.96 cfs @ 12.05 hrs, Volume= 0.181 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.060	98	Paved parking, HSG D
3.200	80	>75% Grass cover, Good, HSG D
0.180	98	Roofs, HSG D
3.440	81	Weighted Average
3.200		93.02% Pervious Area
0.240		6.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
1.5	270	0.0370	3.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.1	370	Total			

Subcatchment 3S: DA-C



Summary for Subcatchment 4S: DA-D

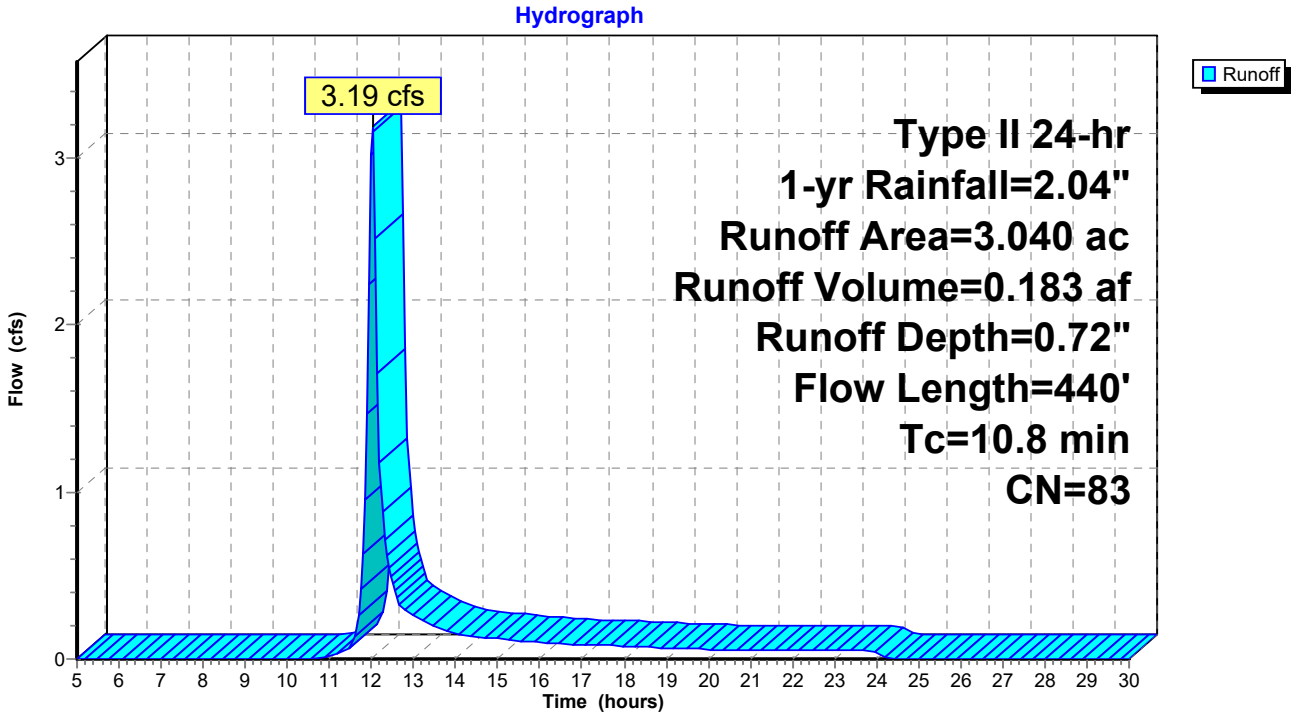
Runoff = 3.19 cfs @ 12.03 hrs, Volume= 0.183 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.310	98	Paved parking, HSG D
2.560	80	>75% Grass cover, Good, HSG D
0.170	98	Roofs, HSG D
3.040	83	Weighted Average
2.560		84.21% Pervious Area
0.480		15.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0700	0.17		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.5	140	0.0900	4.83		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.3	200	0.0200	9.55	76.42	**Channel Flow, swale flow** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
10.8	440	Total			

Subcatchment 4S: DA-D



Summary for Subcatchment 5S: DA-E

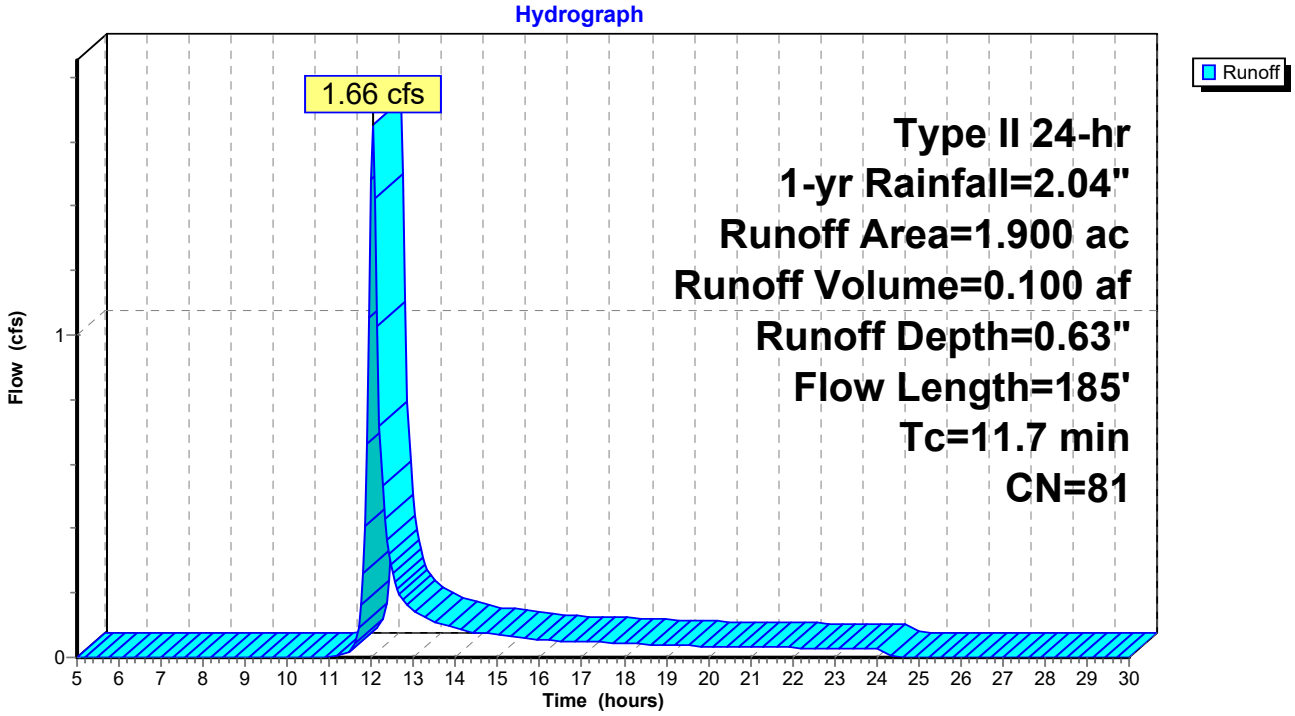
Runoff = 1.66 cfs @ 12.05 hrs, Volume= 0.100 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.030	98	Paved parking, HSG D
1.800	80	>75% Grass cover, Good, HSG D
0.070	98	Roofs, HSG D
1.900	81	Weighted Average
1.800		94.74% Pervious Area
0.100		5.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.3	85	0.0950	4.96		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
11.7	185	Total			

Subcatchment 5S: DA-E



Summary for Subcatchment 6S: DA-F

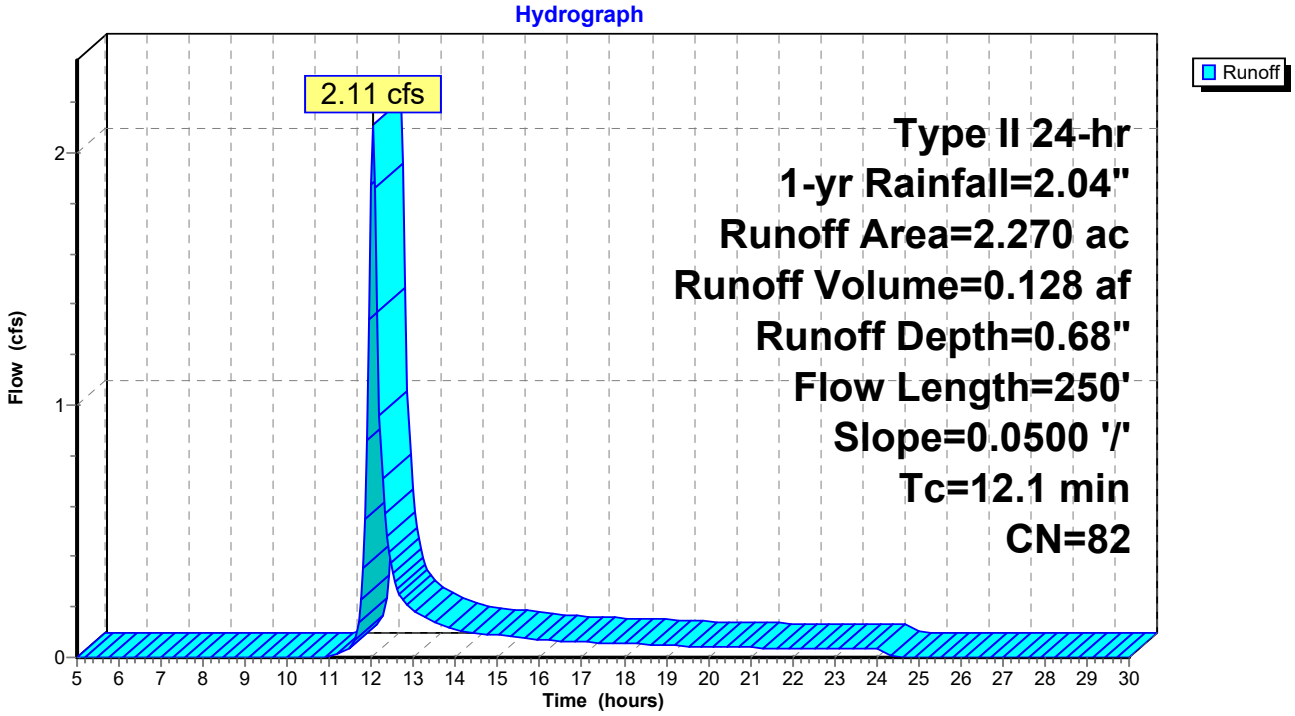
Runoff = 2.11 cfs @ 12.05 hrs, Volume= 0.128 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.090	98	Paved parking, HSG D
2.040	80	>75% Grass cover, Good, HSG D
0.140	98	Roofs, HSG D
2.270	82	Weighted Average
2.040		89.87% Pervious Area
0.230		10.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.7	150	0.0500	3.60		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.1	250	Total			

Subcatchment 6S: DA-F



Summary for Subcatchment 7S: DA-G

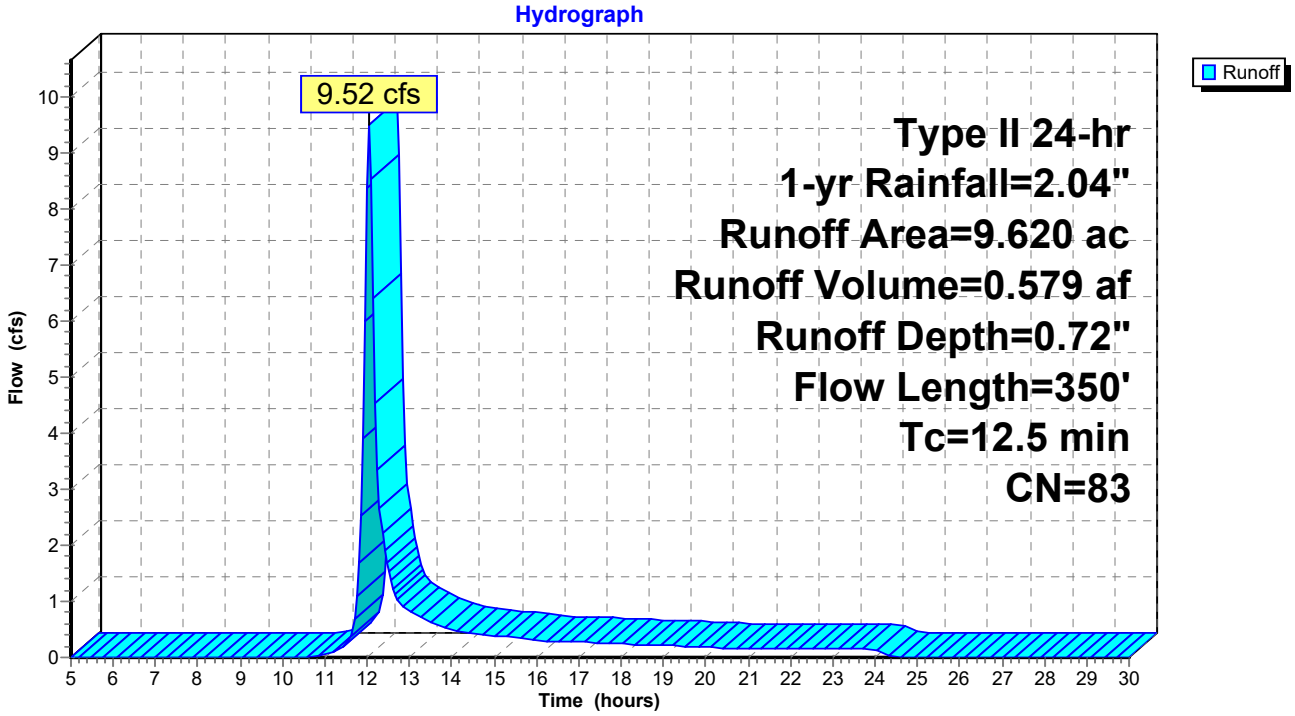
Runoff = 9.52 cfs @ 12.05 hrs, Volume= 0.579 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
1.050	98	Paved parking, HSG D
8.080	80	>75% Grass cover, Good, HSG D
0.490	98	Roofs, HSG D
9.620	83	Weighted Average
8.080		83.99% Pervious Area
1.540		16.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 2.39"
1.1	250	0.0550	3.78		**Shallow Concentrated Flow, shallow conc flow** Unpaved Kv= 16.1 fps
12.5	350	Total			

Subcatchment 7S: DA-G



Summary for Subcatchment 8S: DA-H

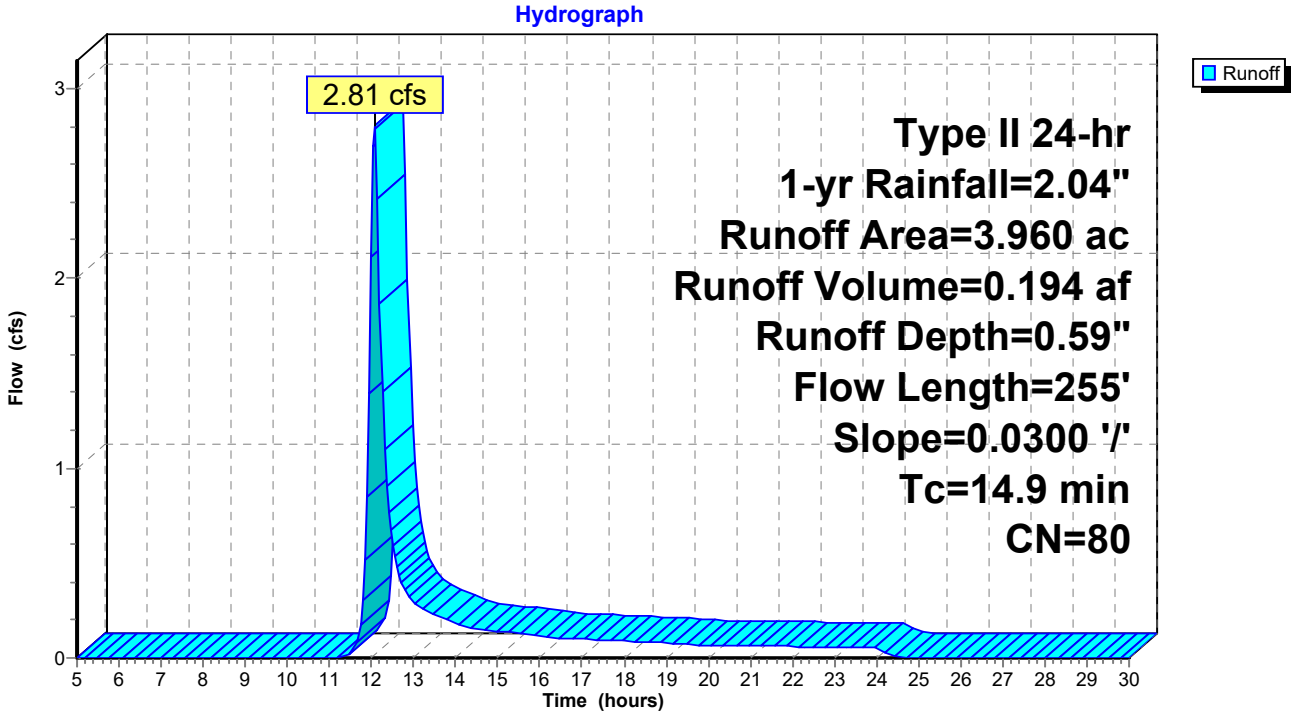
Runoff = 2.81 cfs @ 12.09 hrs, Volume= 0.194 af, Depth= 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.090	98	Paved parking, HSG D
2.440	80	>75% Grass cover, Good, HSG D
1.220	77	Woods, Good, HSG D
0.210	98	Roofs, HSG D
3.960	80	Weighted Average
3.660		92.42% Pervious Area
0.300		7.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0300	0.12		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.9	155	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
14.9	255	Total			

Subcatchment 8S: DA-H



Summary for Subcatchment 10S: DA#1

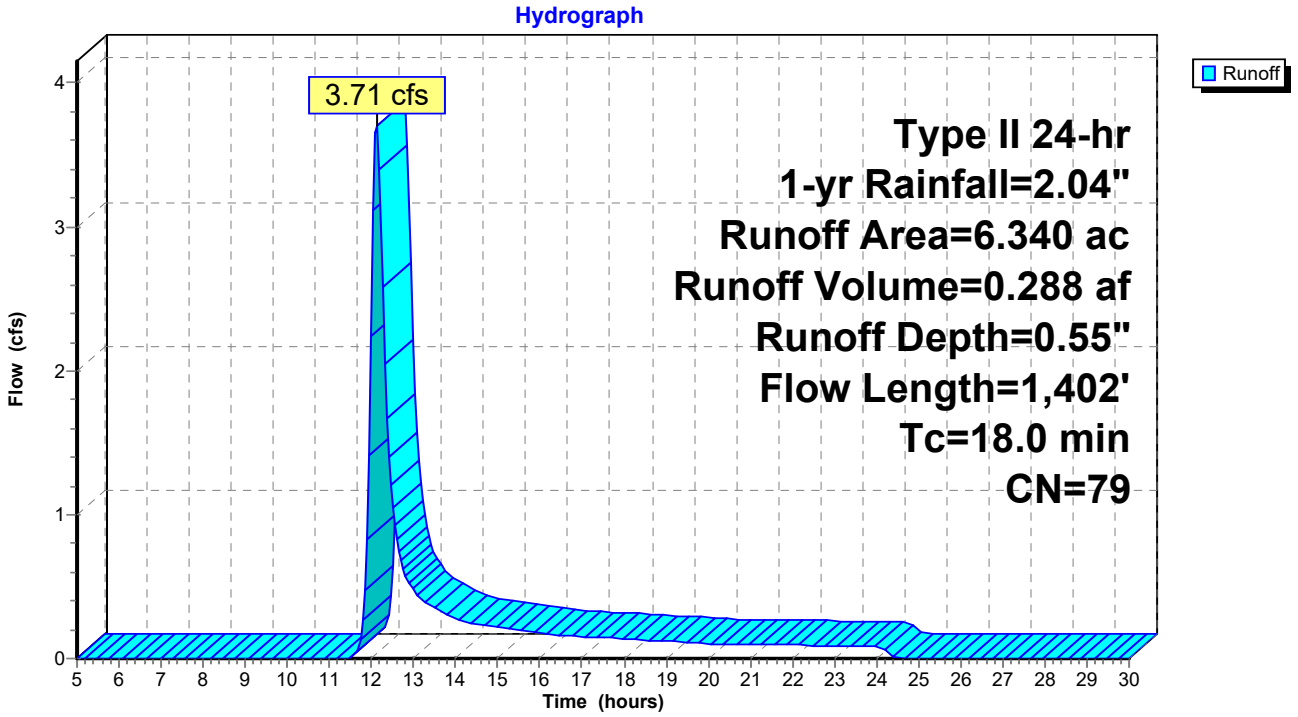
Runoff = 3.71 cfs @ 12.12 hrs, Volume= 0.288 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
3.390	80	>75% Grass cover, Good, HSG D
2.850	77	Woods, Good, HSG D
0.030	98	Paved parking, HSG D
0.070	98	Roofs, HSG D
6.340	79	Weighted Average
6.240		98.42% Pervious Area
0.100		1.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
5.4	485	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.8	517	0.0900	4.83		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	300	0.0860	27.67	442.73	**Channel Flow, SWALE** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & winding
18.0	1,402	Total			

Subcatchment 10S: DA#1



Summary for Subcatchment 11S: DA#2

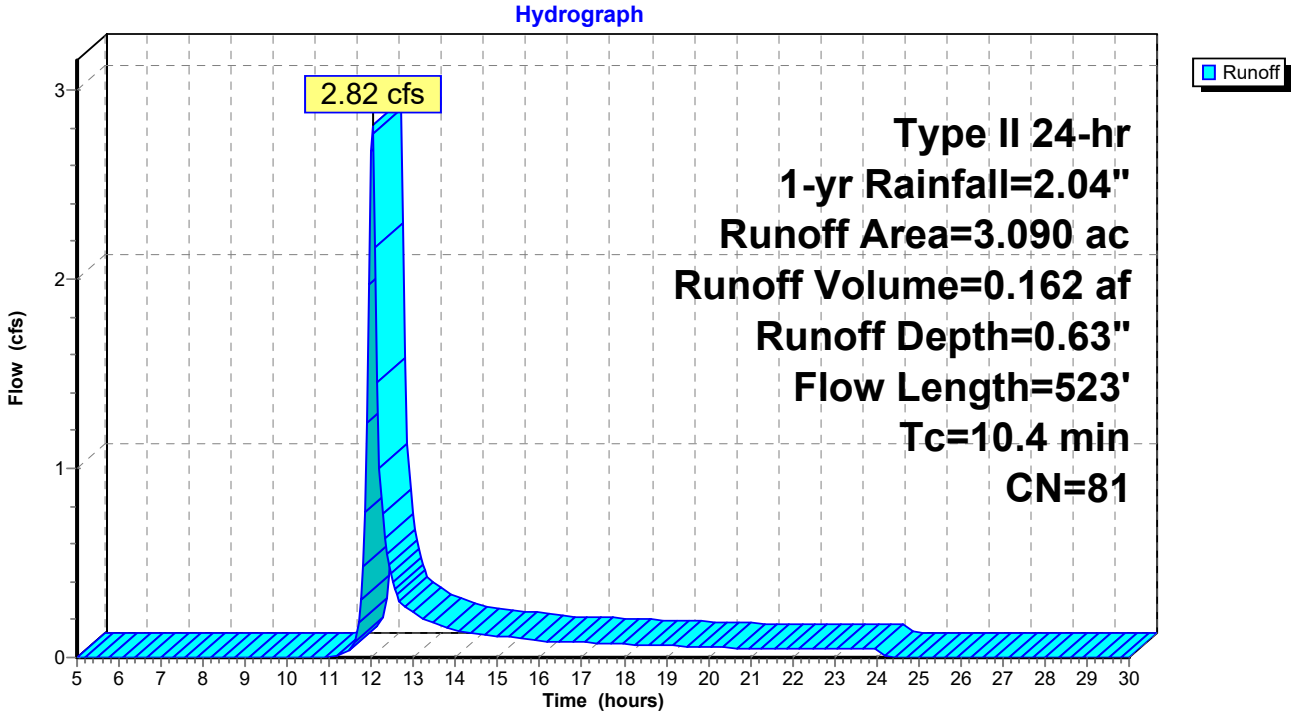
Runoff = 2.82 cfs @ 12.03 hrs, Volume= 0.162 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
2.070	80	>75% Grass cover, Good, HSG D
0.660	77	Woods, Good, HSG D
0.220	98	Paved parking, HSG D
0.140	98	Roofs, HSG D
3.090	81	Weighted Average
2.730		88.35% Pervious Area
0.360		11.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0700	0.17		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.2	56	0.1300	5.80		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	367	0.0820	27.02	432.31	**Channel Flow, SWALE** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & winding
10.4	523	Total			

Subcatchment 11S: DA#2



Summary for Subcatchment 12S: DA#3

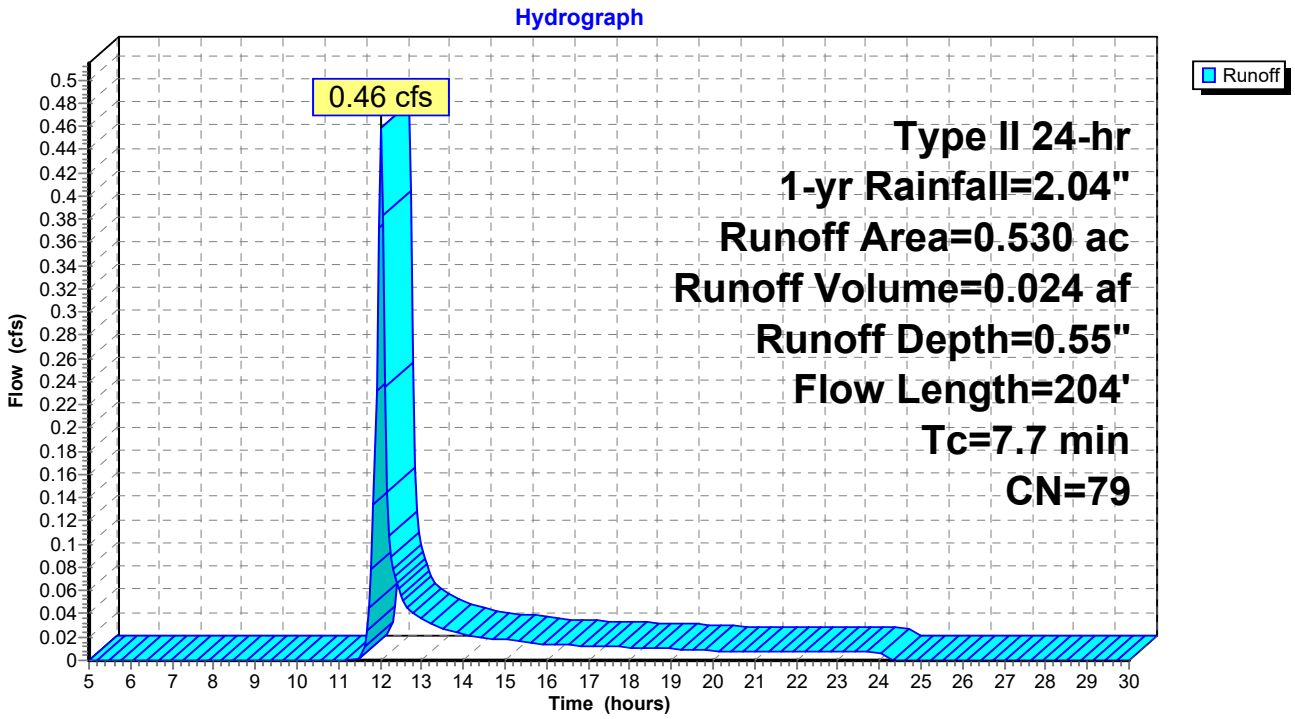
Runoff = 0.46 cfs @ 12.00 hrs, Volume= 0.024 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.390	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
0.530	79	Weighted Average
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1500	0.23		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.3	104	0.1300	5.80		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.7	204	Total			

Subcatchment 12S: DA#3



Summary for Subcatchment 13S: DA#4

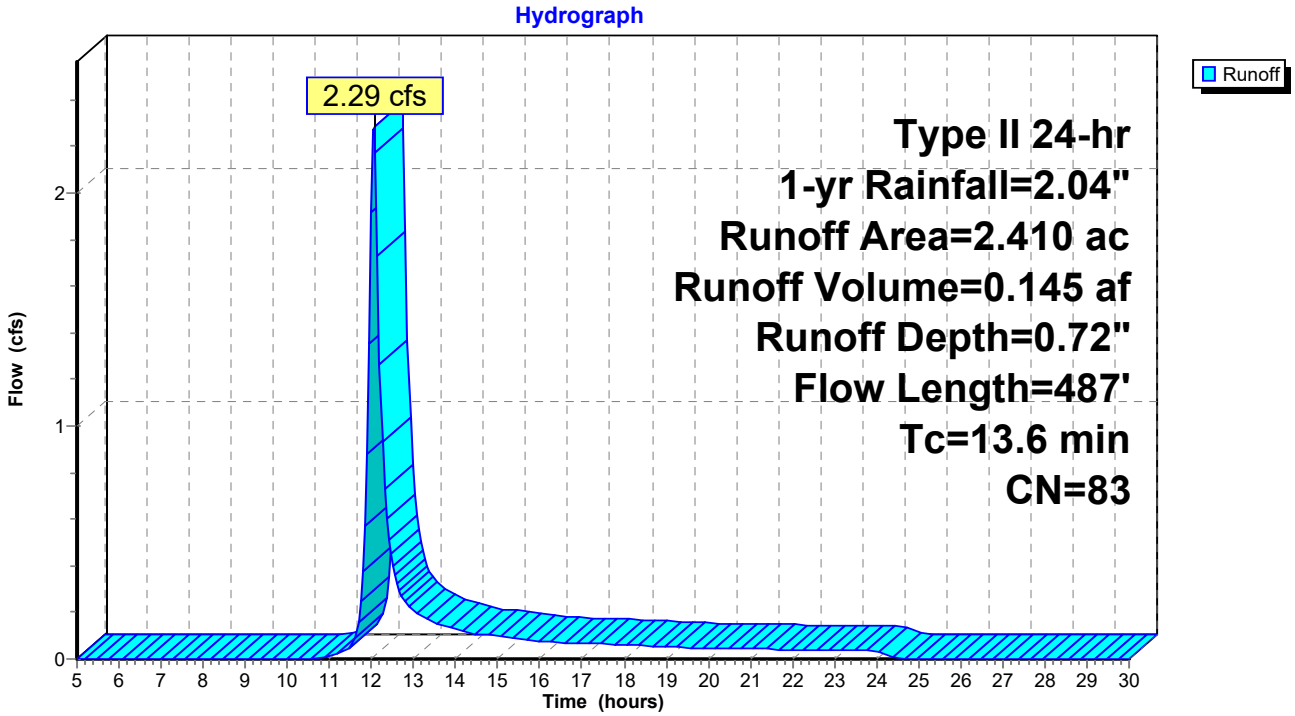
Runoff = 2.29 cfs @ 12.06 hrs, Volume= 0.145 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
2.020	80	>75% Grass cover, Good, HSG D
0.250	98	Paved parking, HSG D
0.140	98	Roofs, HSG D
2.410	83	Weighted Average
2.020		83.82% Pervious Area
0.390		16.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0450	0.14		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
1.5	307	0.0450	3.42		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	80	0.0200	6.42	5.04	**Pipe Channel, storm pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
13.6	487	Total			

Subcatchment 13S: DA#4

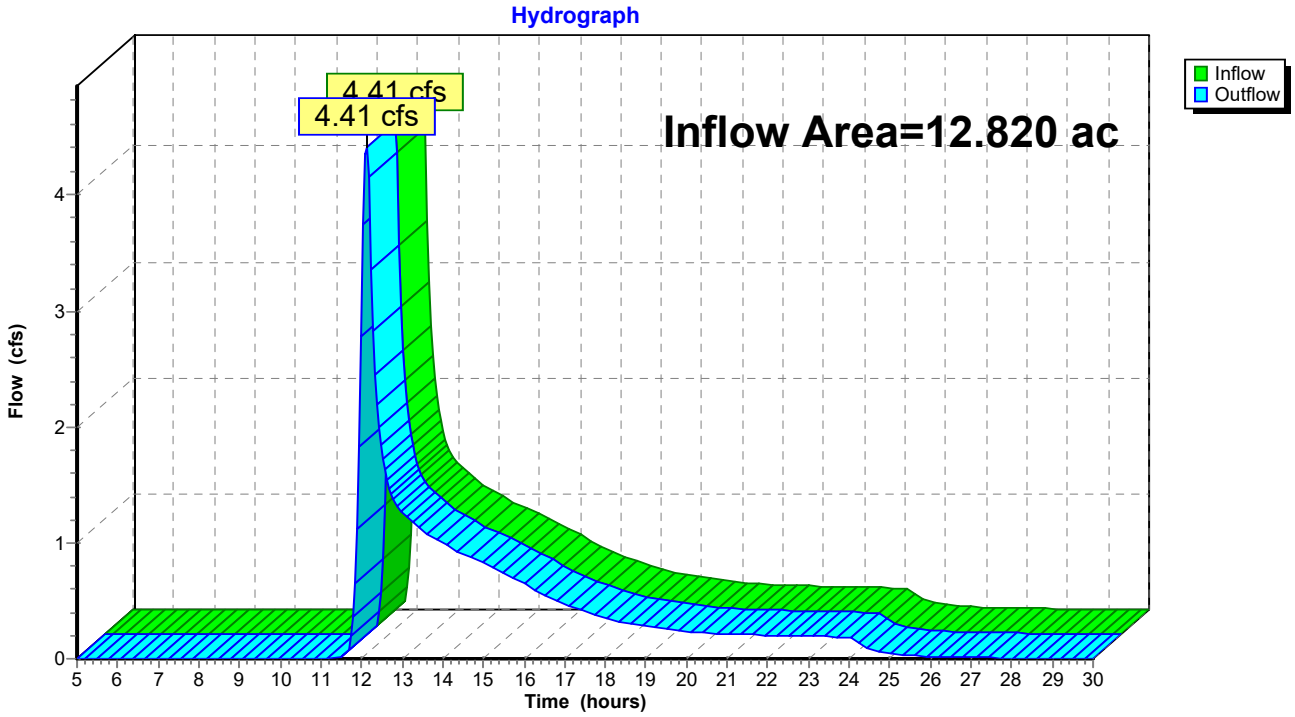


Summary for Reach 1R: Pt of Study 1A

Inflow Area = 12.820 ac, 6.40% Impervious, Inflow Depth > 0.61" for 1-yr event
Inflow = 4.41 cfs @ 12.13 hrs, Volume= 0.650 af
Outflow = 4.41 cfs @ 12.13 hrs, Volume= 0.650 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Reach 1R: Pt of Study 1A

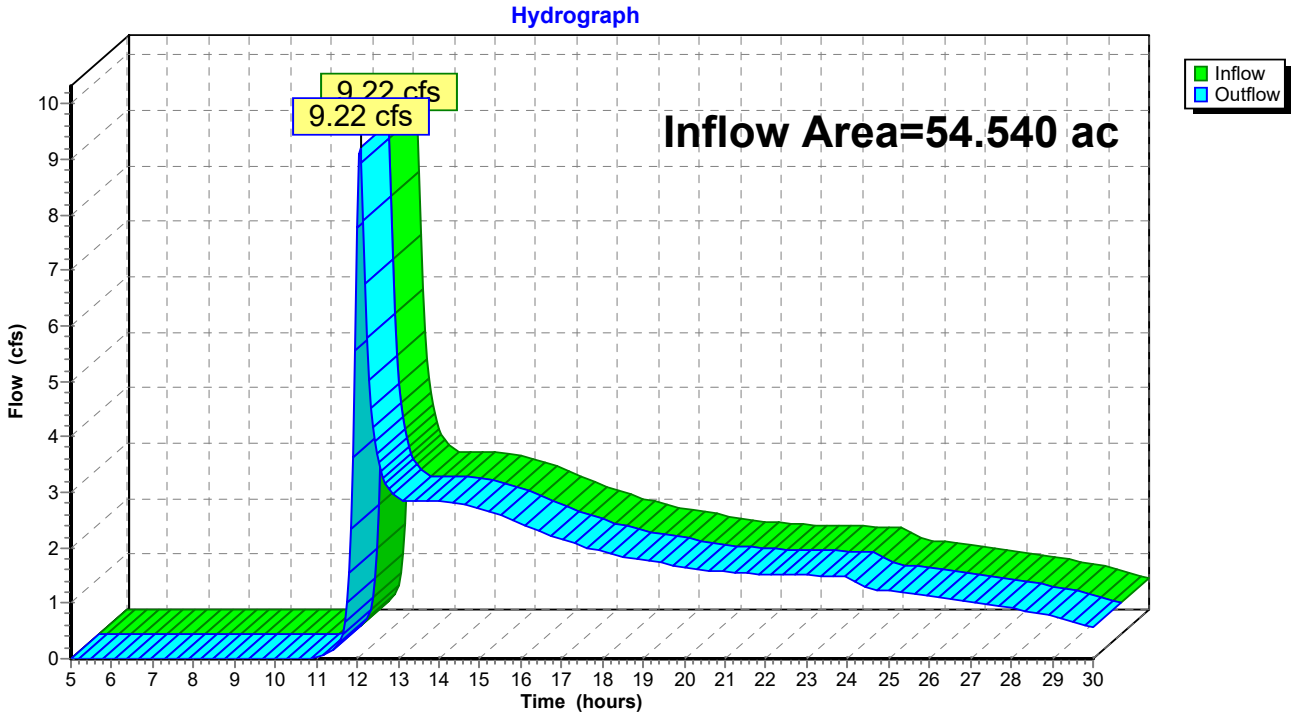


Summary for Reach 2R: Pt of Study 1B

Inflow Area = 54.540 ac, 9.41% Impervious, Inflow Depth > 0.62" for 1-yr event
Inflow = 9.22 cfs @ 12.07 hrs, Volume= 2.811 af
Outflow = 9.22 cfs @ 12.07 hrs, Volume= 2.811 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Reach 2R: Pt of Study 1B



Summary for Pond 1P: Detention Basin 1

Inflow Area = 20.880 ac, 8.52% Impervious, Inflow Depth = 0.60" for 1-yr event
Inflow = 12.24 cfs @ 12.16 hrs, Volume= 1.038 af
Outflow = 1.08 cfs @ 13.84 hrs, Volume= 1.038 af, Atten= 91%, Lag= 100.9 min
Primary = 1.08 cfs @ 13.84 hrs, Volume= 1.038 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 890.90' @ 13.84 hrs Surf.Area= 12,449 sf Storage= 20,168 cf

Plug-Flow detention time= 217.0 min calculated for 1.038 af (100% of inflow)
Center-of-Mass det. time= 216.9 min (1,096.1 - 879.3)

Volume	Invert	Avail.Storage	Storage Description
#1	888.00'	104,203 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

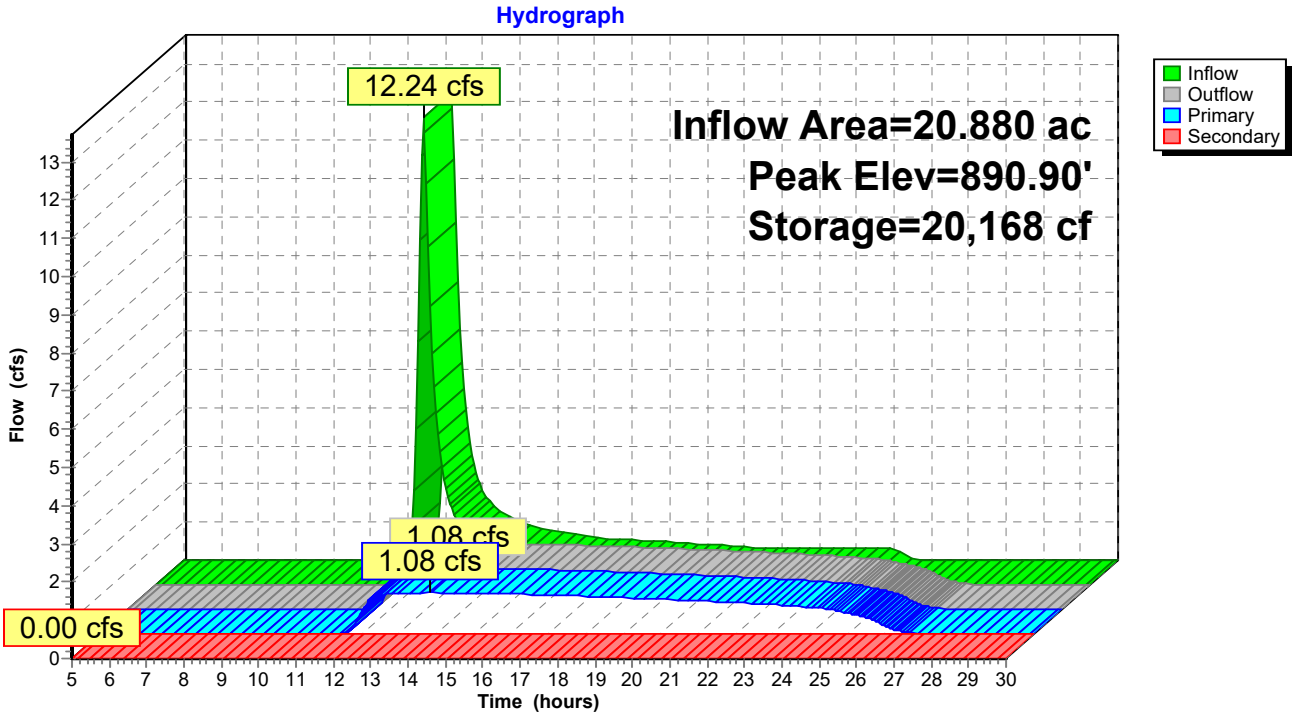
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.00	373	0	0
889.00	3,768	2,071	2,071
890.00	11,124	7,446	9,517
891.00	12,590	11,857	21,374
892.00	14,113	13,352	34,725
893.00	15,691	14,902	49,627
894.00	17,327	16,509	66,136
895.00	19,019	18,173	84,309
896.00	20,768	19,894	104,203

Device	Routing	Invert	Outlet Devices
#1	Primary	887.90'	**30.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 887.90' / 886.90' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	888.00'	**5.0" Vert. Orifice1** C= 0.600
#3	Device 1	891.20'	**15.0" Vert. Orifice2** C= 0.600
#4	Device 1	894.90'	**30.0" x 30.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	896.00'	**25.0' 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=1.08 cfs @ 13.84 hrs HW=890.90' (Free Discharge)
└─**1=Culvert** (Passes 1.08 cfs of 24.71 cfs potential flow)
  ├─**2=Orifice1** (Orifice Controls 1.08 cfs @ 7.91 fps)
  ├─**3=Orifice2** (Controls 0.00 cfs)
  └─**4=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=888.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin 1



Summary for Pond 2P: Detention Basin 2

Inflow Area = 36.730 ac, 10.48% Impervious, Inflow Depth = 0.63" for 1-yr event
Inflow = 15.04 cfs @ 12.06 hrs, Volume= 1.939 af
Outflow = 1.70 cfs @ 14.90 hrs, Volume= 1.899 af, Atten= 89%, Lag= 170.5 min
Primary = 1.70 cfs @ 14.90 hrs, Volume= 1.899 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 867.09' @ 14.90 hrs Surf.Area= 9,939 sf Storage= 23,105 cf

Plug-Flow detention time= 225.1 min calculated for 1.899 af (98% of inflow)
Center-of-Mass det. time= 213.5 min (1,201.4 - 987.8)

Volume	Invert	Avail.Storage	Storage Description
#1	863.00'	98,569 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

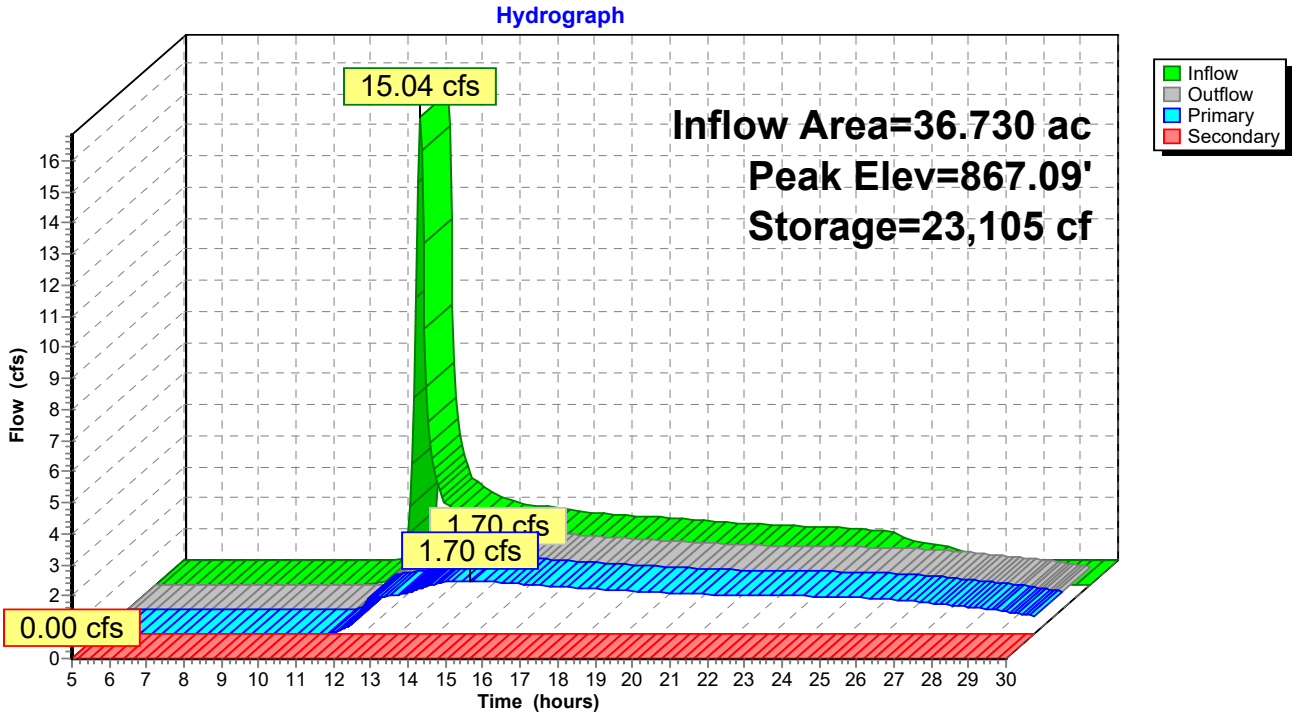
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
863.00	335	0	0
864.00	3,479	1,907	1,907
865.00	5,953	4,716	6,623
866.00	7,741	6,847	13,470
867.00	9,739	8,740	22,210
868.00	11,941	10,840	33,050
869.00	14,156	13,049	46,099
870.00	16,371	15,264	61,362
871.00	18,599	17,485	78,847
872.00	20,845	19,722	98,569

Device	Routing	Invert	Outlet Devices
#1	Secondary	872.00'	**20.0' 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
#2	Primary	862.90'	**30.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 862.90' / 861.00' S= 0.0950 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#3	Device 2	863.00'	**5.0" Vert. Orifice1** C= 0.600
#4	Device 2	866.80'	**15.0" Vert. Orifice2** C= 0.600
#5	Device 2	870.00'	**30.0" x 30.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.69 cfs @ 14.90 hrs HW=867.09' (Free Discharge)
└─**2=Culvert** (Passes 1.69 cfs of 32.00 cfs potential flow)
  ├─**3=Orifice1** (Orifice Controls 1.29 cfs @ 9.49 fps)
  ├─**4=Orifice2** (Orifice Controls 0.40 cfs @ 1.84 fps)
  └─**5=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=863.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Detention Basin 2



Summary for Pond 3P: Detention Basin 3

Inflow Area = 6.480 ac, 11.11% Impervious, Inflow Depth = 0.67" for 1-yr event
Inflow = 6.12 cfs @ 12.04 hrs, Volume= 0.364 af
Outflow = 0.80 cfs @ 12.58 hrs, Volume= 0.362 af, Atten= 87%, Lag= 32.0 min
Primary = 0.80 cfs @ 12.58 hrs, Volume= 0.362 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 901.68' @ 12.58 hrs Surf.Area= 6,282 sf Storage= 6,010 cf

Plug-Flow detention time= 90.6 min calculated for 0.362 af (100% of inflow)
Center-of-Mass det. time= 87.9 min (950.4 - 862.5)

Volume	Invert	Avail.Storage	Storage Description
#1	900.00'	38,589 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

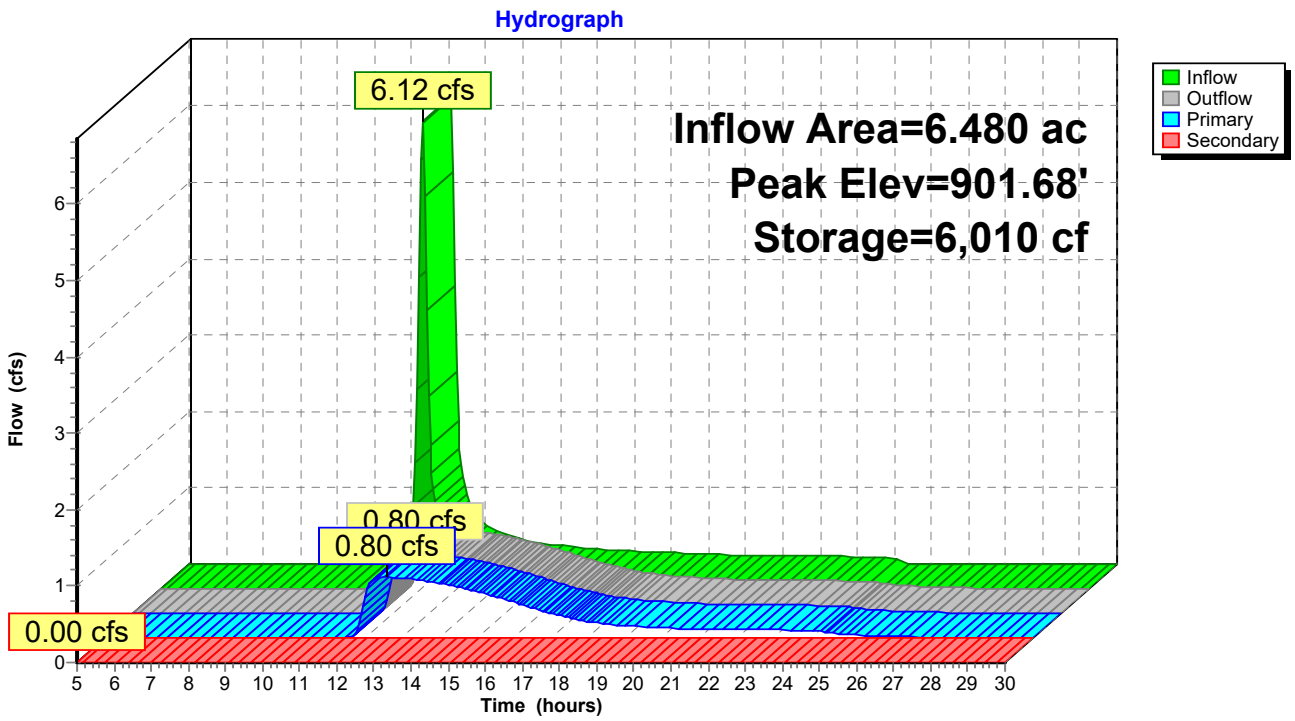
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
900.00	2,381	0	0
901.00	3,197	2,789	2,789
902.00	7,737	5,467	8,256
903.00	9,288	8,513	16,769
904.00	10,896	10,092	26,861
905.00	12,560	11,728	38,589

Device	Routing	Invert	Outlet Devices
#1	Secondary	905.00'	**20.0' 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
#2	Primary	900.00'	**18.0" Round Culvert** L= 330.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 900.00' / 889.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	900.00'	**5.0" Vert. Orifice1** C= 0.600
#4	Device 2	901.90'	**10.0" Vert. Orifice2** C= 0.600
#5	Device 2	904.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.80 cfs @ 12.58 hrs HW=901.68' (Free Discharge)
└─**2=Culvert** (Passes 0.80 cfs of 6.48 cfs potential flow)
  ├─**3=Orifice1** (Orifice Controls 0.80 cfs @ 5.84 fps)
  ├─**4=Orifice2** (Controls 0.00 cfs)
  └─**5=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=900.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention Basin 3



Summary for Subcatchment 1S: DA-A

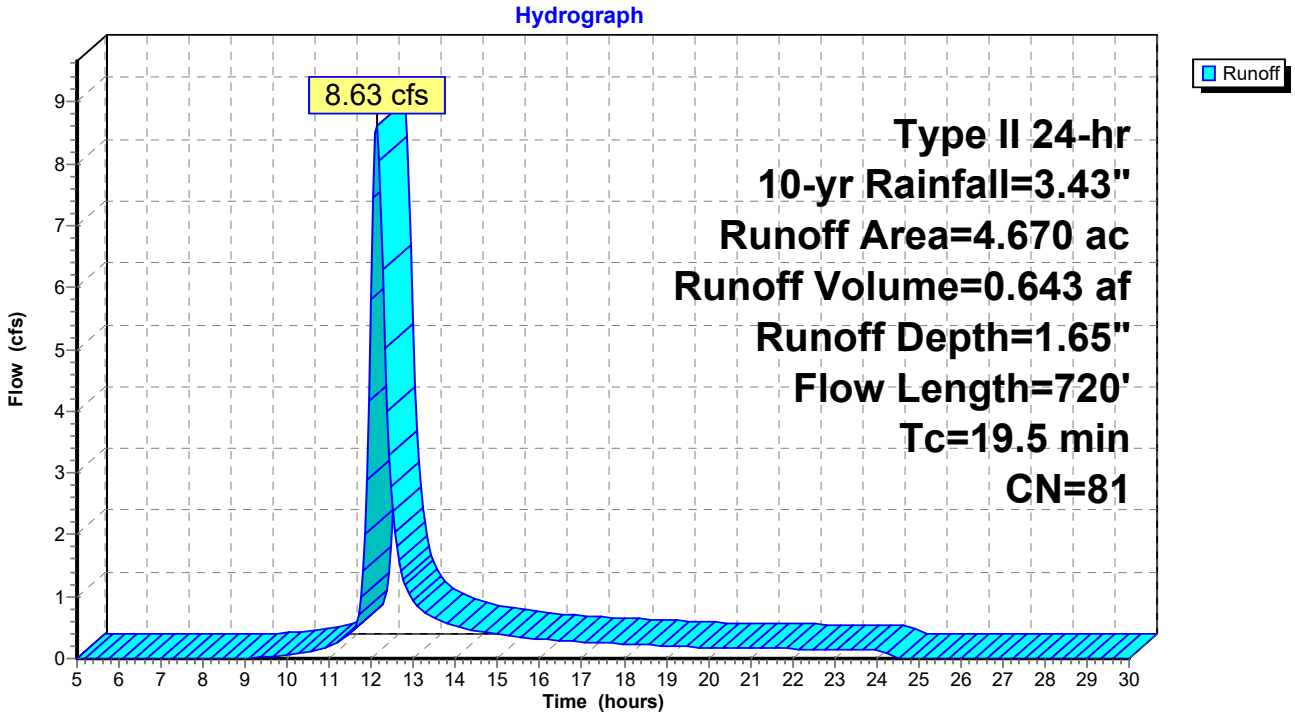
Runoff = 8.63 cfs @ 12.12 hrs, Volume= 0.643 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.270	98	Paved parking, HSG D
2.580	80	>75% Grass cover, Good, HSG D
1.540	77	Woods, Good, HSG D
0.280	98	Roofs, HSG D
4.670	81	Weighted Average
4.120		88.22% Pervious Area
0.550		11.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 2.39"
2.5	188	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.8	202	0.0650	4.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	230	0.0200	16.17	32.33	**Channel Flow, GUTTER** Area= 2.0 sf Perim= 2.0' r= 1.00' n= 0.013 Asphalt, smooth
19.5	720	Total			

Subcatchment 1S: DA-A



Summary for Subcatchment 2S: DA-B

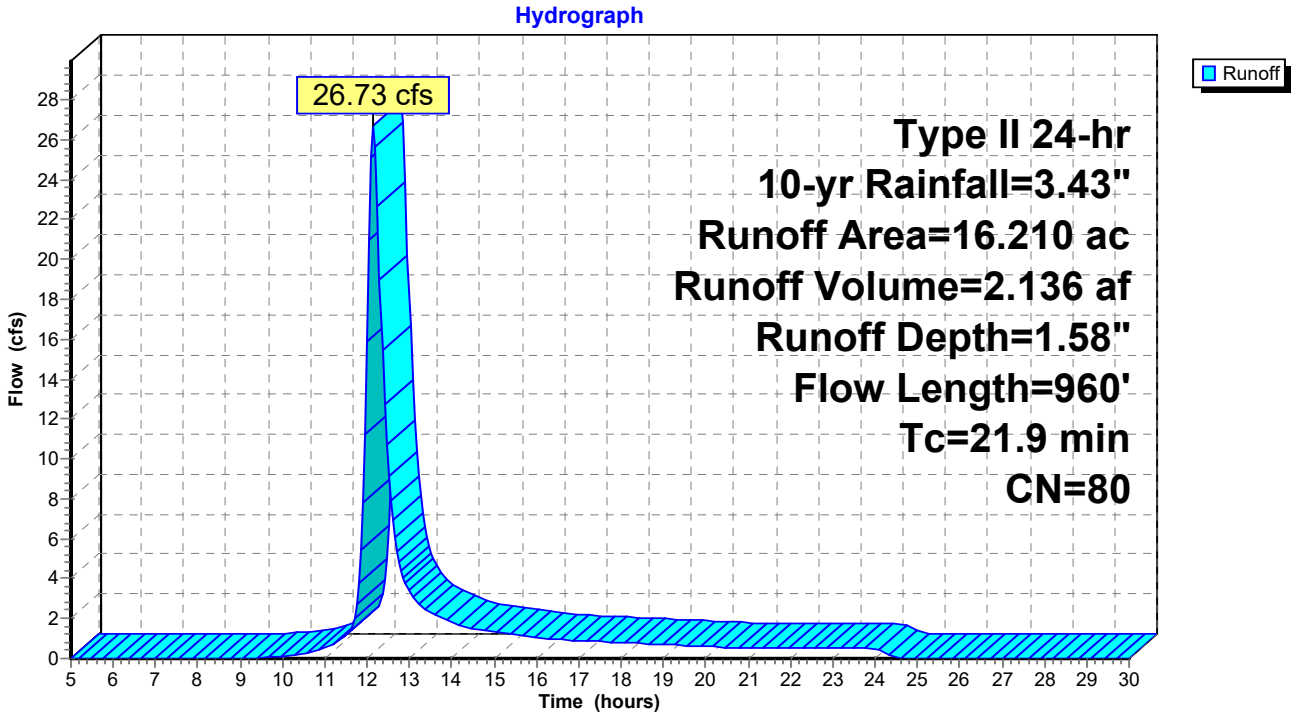
Runoff = 26.73 cfs @ 12.15 hrs, Volume= 2.136 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.740	98	Paved parking, HSG D
7.140	80	>75% Grass cover, Good, HSG D
7.840	77	Woods, Good, HSG D
0.490	98	Roofs, HSG D
16.210	80	Weighted Average
14.980		92.41% Pervious Area
1.230		7.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 2.39"
4.8	370	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.8	200	0.0650	4.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.3	290	0.0200	16.17	32.33	**Channel Flow, GUTTER** Area= 2.0 sf Perim= 2.0' r= 1.00' n= 0.013 Asphalt, smooth
21.9	960	Total			

Subcatchment 2S: DA-B



Summary for Subcatchment 3S: DA-C

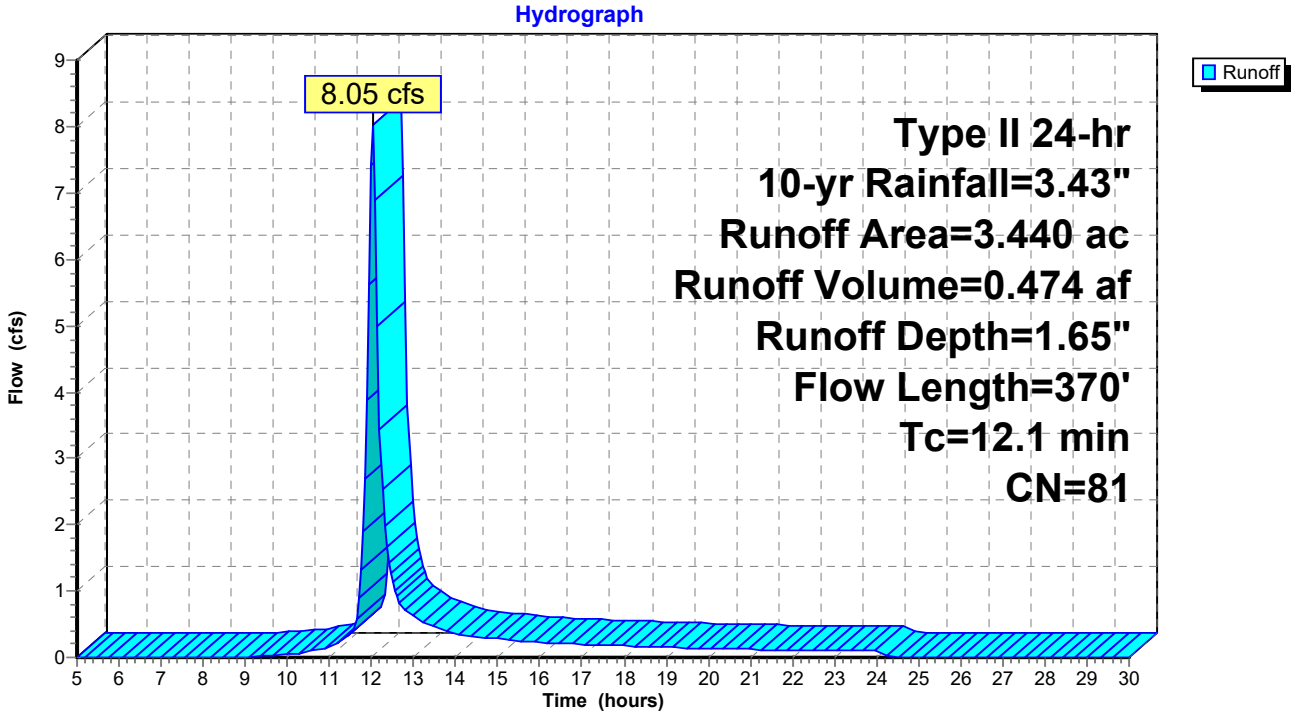
Runoff = 8.05 cfs @ 12.04 hrs, Volume= 0.474 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.060	98	Paved parking, HSG D
3.200	80	>75% Grass cover, Good, HSG D
0.180	98	Roofs, HSG D
3.440	81	Weighted Average
3.200		93.02% Pervious Area
0.240		6.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
1.5	270	0.0370	3.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.1	370	Total			

Subcatchment 3S: DA-C



Summary for Subcatchment 4S: DA-D

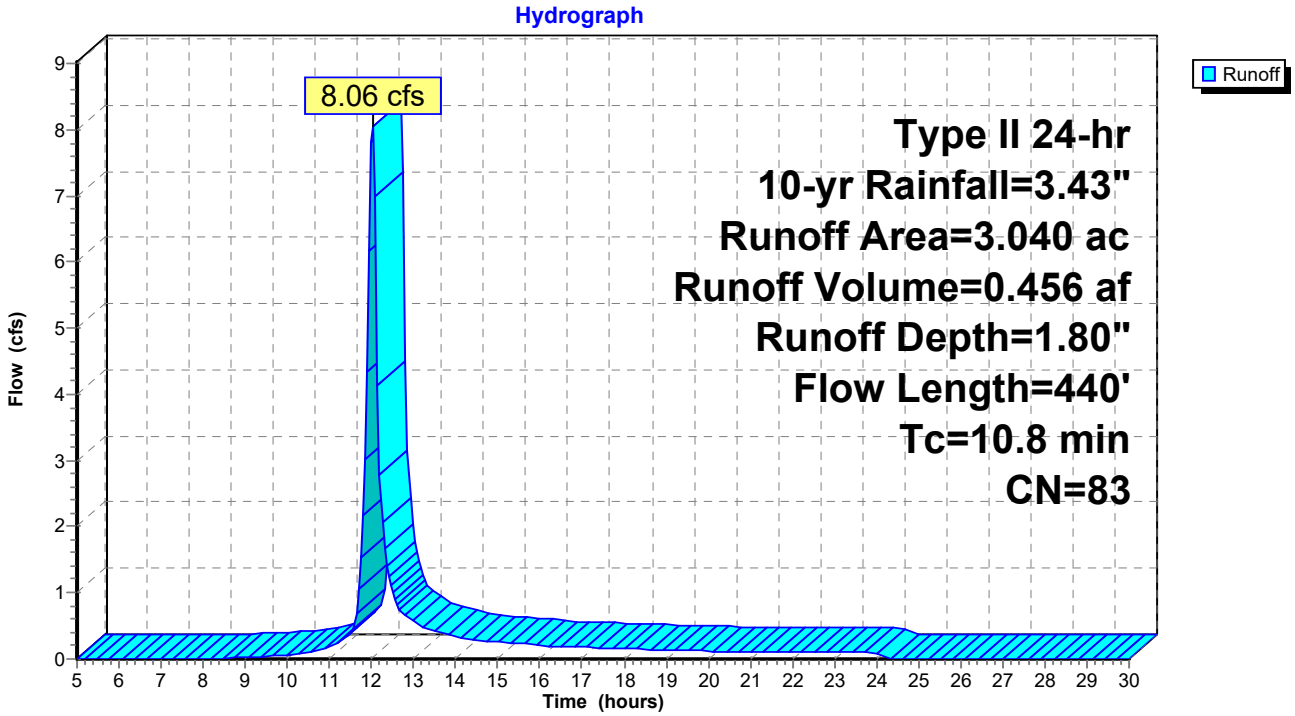
Runoff = 8.06 cfs @ 12.03 hrs, Volume= 0.456 af, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.310	98	Paved parking, HSG D
2.560	80	>75% Grass cover, Good, HSG D
0.170	98	Roofs, HSG D
3.040	83	Weighted Average
2.560		84.21% Pervious Area
0.480		15.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0700	0.17		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.5	140	0.0900	4.83		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.3	200	0.0200	9.55	76.42	**Channel Flow, swale flow** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
10.8	440	Total			

Subcatchment 4S: DA-D



Summary for Subcatchment 5S: DA-E

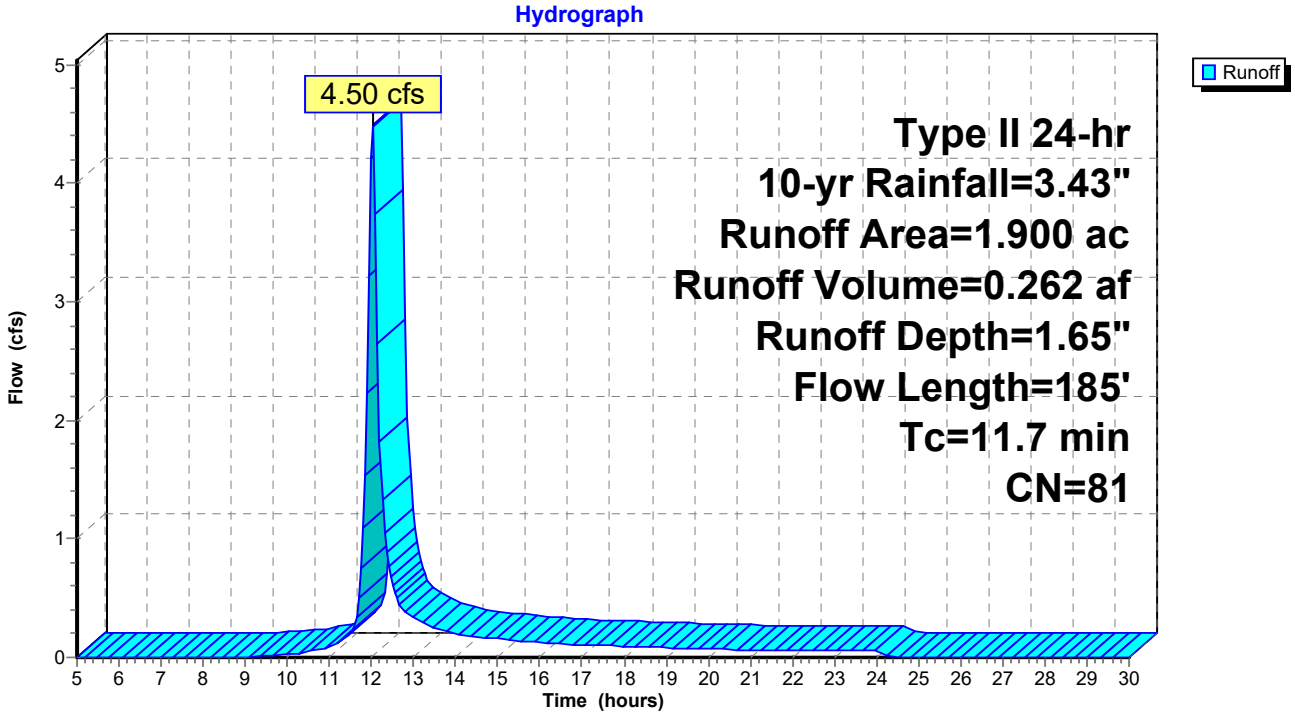
Runoff = 4.50 cfs @ 12.04 hrs, Volume= 0.262 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.030	98	Paved parking, HSG D
1.800	80	>75% Grass cover, Good, HSG D
0.070	98	Roofs, HSG D
1.900	81	Weighted Average
1.800		94.74% Pervious Area
0.100		5.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.3	85	0.0950	4.96		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
11.7	185	Total			

Subcatchment 5S: DA-E



Summary for Subcatchment 6S: DA-F

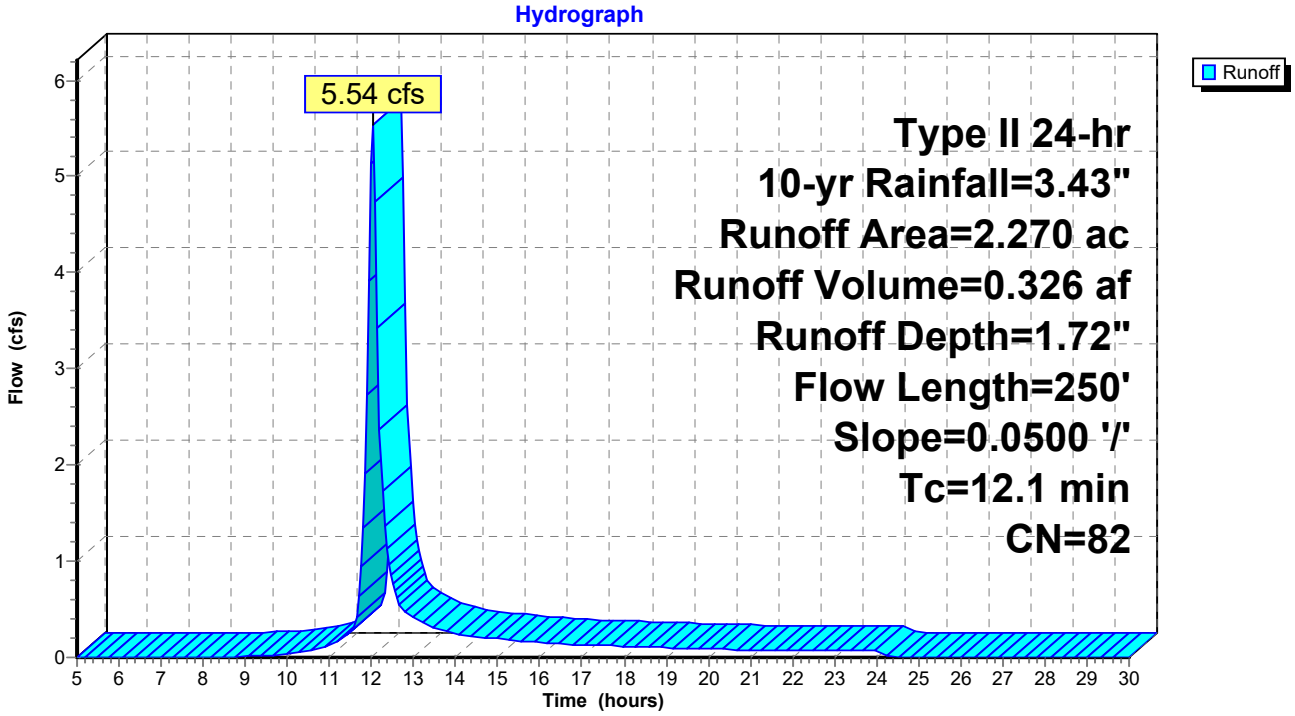
Runoff = 5.54 cfs @ 12.04 hrs, Volume= 0.326 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.090	98	Paved parking, HSG D
2.040	80	>75% Grass cover, Good, HSG D
0.140	98	Roofs, HSG D
2.270	82	Weighted Average
2.040		89.87% Pervious Area
0.230		10.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.7	150	0.0500	3.60		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.1	250	Total			

Subcatchment 6S: DA-F



Summary for Subcatchment 7S: DA-G

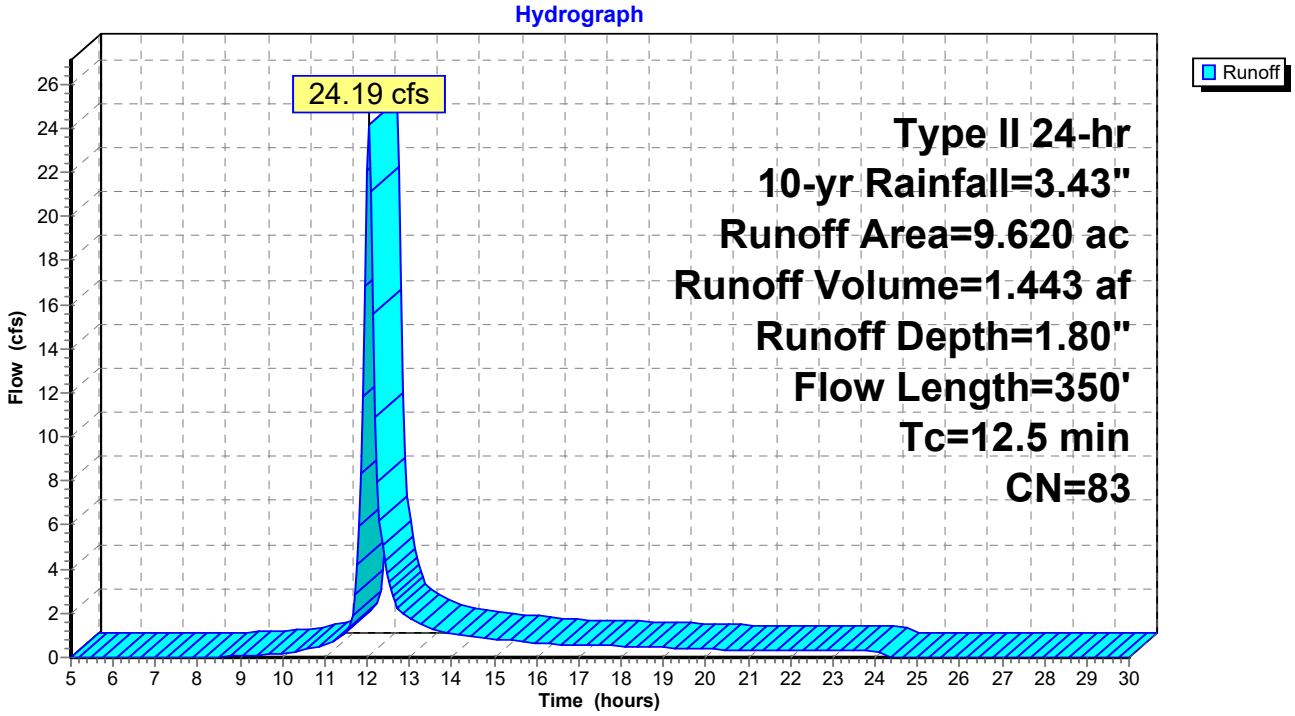
Runoff = 24.19 cfs @ 12.05 hrs, Volume= 1.443 af, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
1.050	98	Paved parking, HSG D
8.080	80	>75% Grass cover, Good, HSG D
0.490	98	Roofs, HSG D
9.620	83	Weighted Average
8.080		83.99% Pervious Area
1.540		16.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 2.39"
1.1	250	0.0550	3.78		**Shallow Concentrated Flow, shallow conc flow** Unpaved Kv= 16.1 fps
12.5	350	Total			

Subcatchment 7S: DA-G



Summary for Subcatchment 8S: DA-H

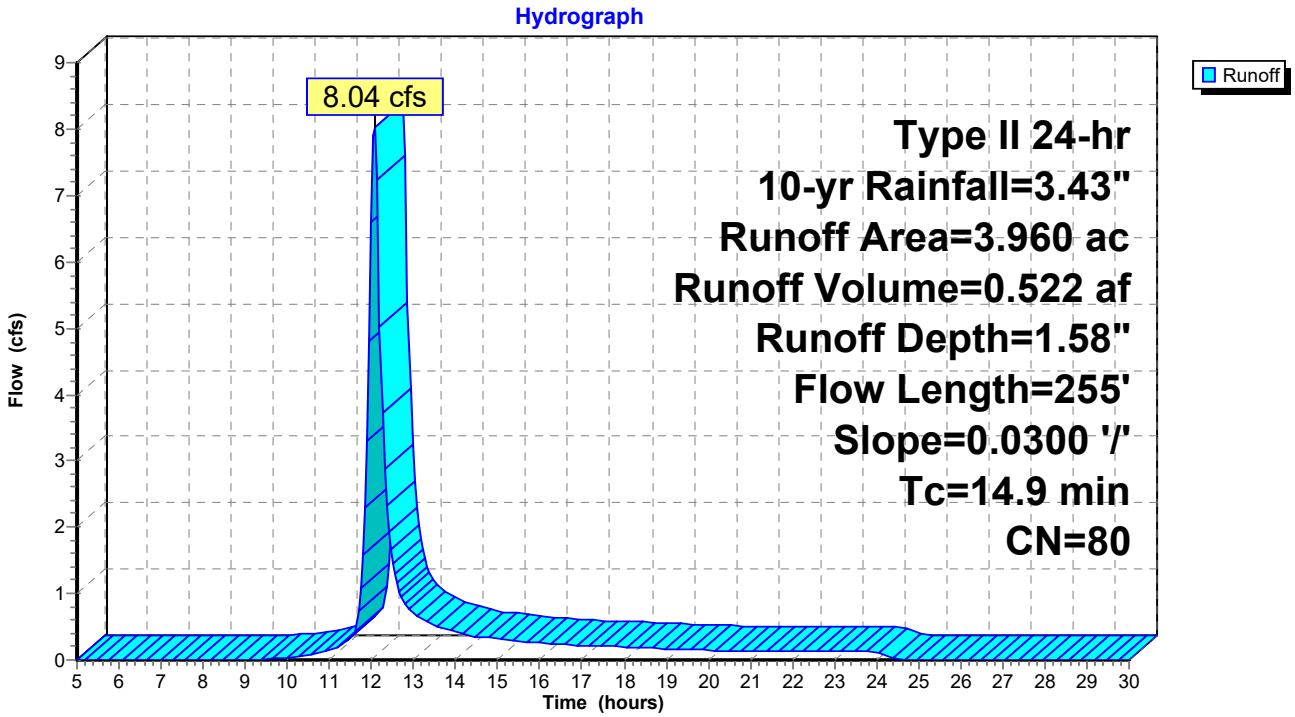
Runoff = 8.04 cfs @ 12.07 hrs, Volume= 0.522 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.090	98	Paved parking, HSG D
2.440	80	>75% Grass cover, Good, HSG D
1.220	77	Woods, Good, HSG D
0.210	98	Roofs, HSG D
3.960	80	Weighted Average
3.660		92.42% Pervious Area
0.300		7.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0300	0.12		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.9	155	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
14.9	255	Total			

Subcatchment 8S: DA-H



Summary for Subcatchment 10S: DA#1

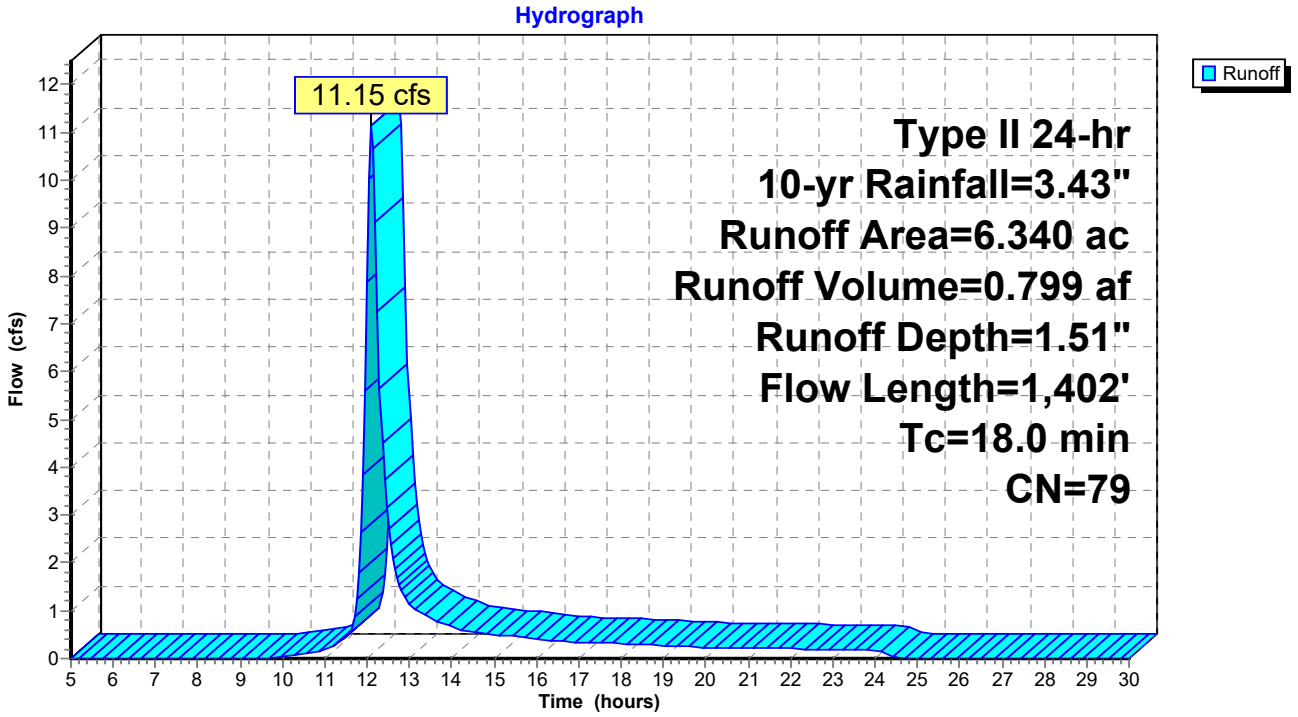
Runoff = 11.15 cfs @ 12.11 hrs, Volume= 0.799 af, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
3.390	80	>75% Grass cover, Good, HSG D
2.850	77	Woods, Good, HSG D
0.030	98	Paved parking, HSG D
0.070	98	Roofs, HSG D
6.340	79	Weighted Average
6.240		98.42% Pervious Area
0.100		1.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
5.4	485	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.8	517	0.0900	4.83		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	300	0.0860	27.67	442.73	**Channel Flow, SWALE** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & winding
18.0	1,402	Total			

Subcatchment 10S: DA#1



Summary for Subcatchment 11S: DA#2

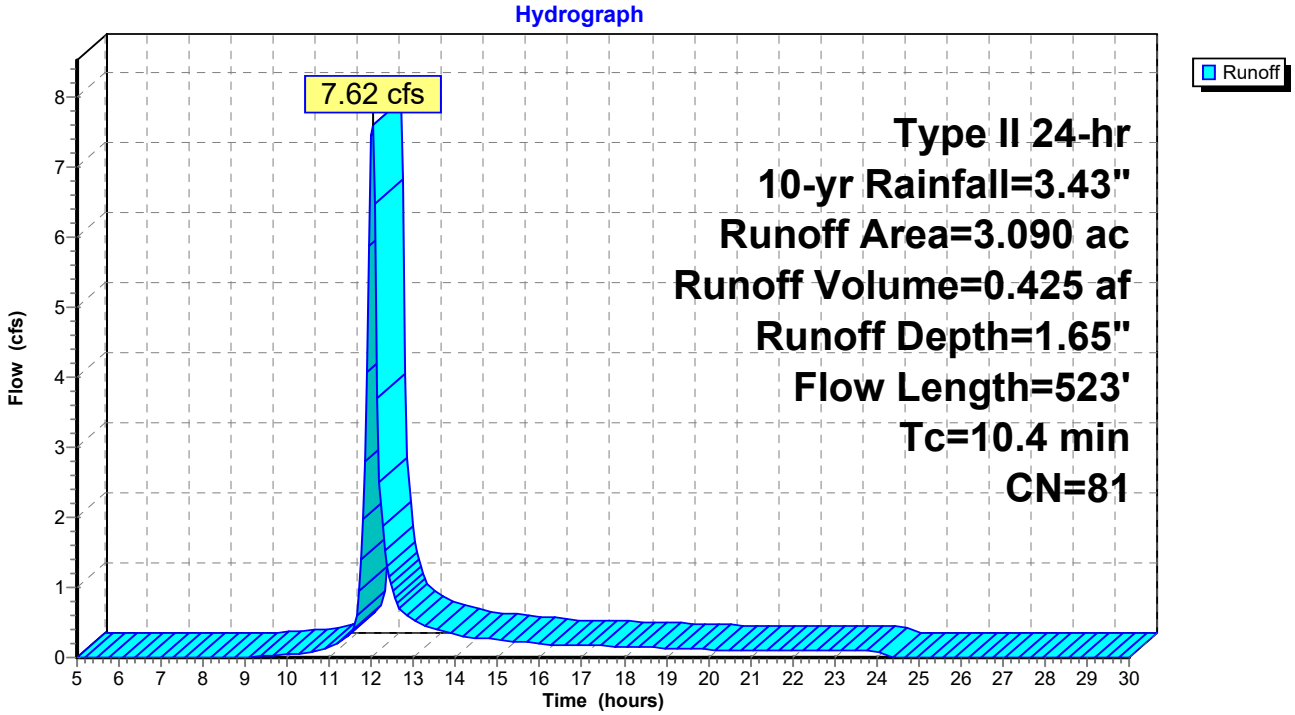
Runoff = 7.62 cfs @ 12.02 hrs, Volume= 0.425 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
2.070	80	>75% Grass cover, Good, HSG D
0.660	77	Woods, Good, HSG D
0.220	98	Paved parking, HSG D
0.140	98	Roofs, HSG D
3.090	81	Weighted Average
2.730		88.35% Pervious Area
0.360		11.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0700	0.17		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.2	56	0.1300	5.80		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	367	0.0820	27.02	432.31	**Channel Flow, SWALE** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & winding
10.4	523	Total			

Subcatchment 11S: DA#2



Summary for Subcatchment 12S: DA#3

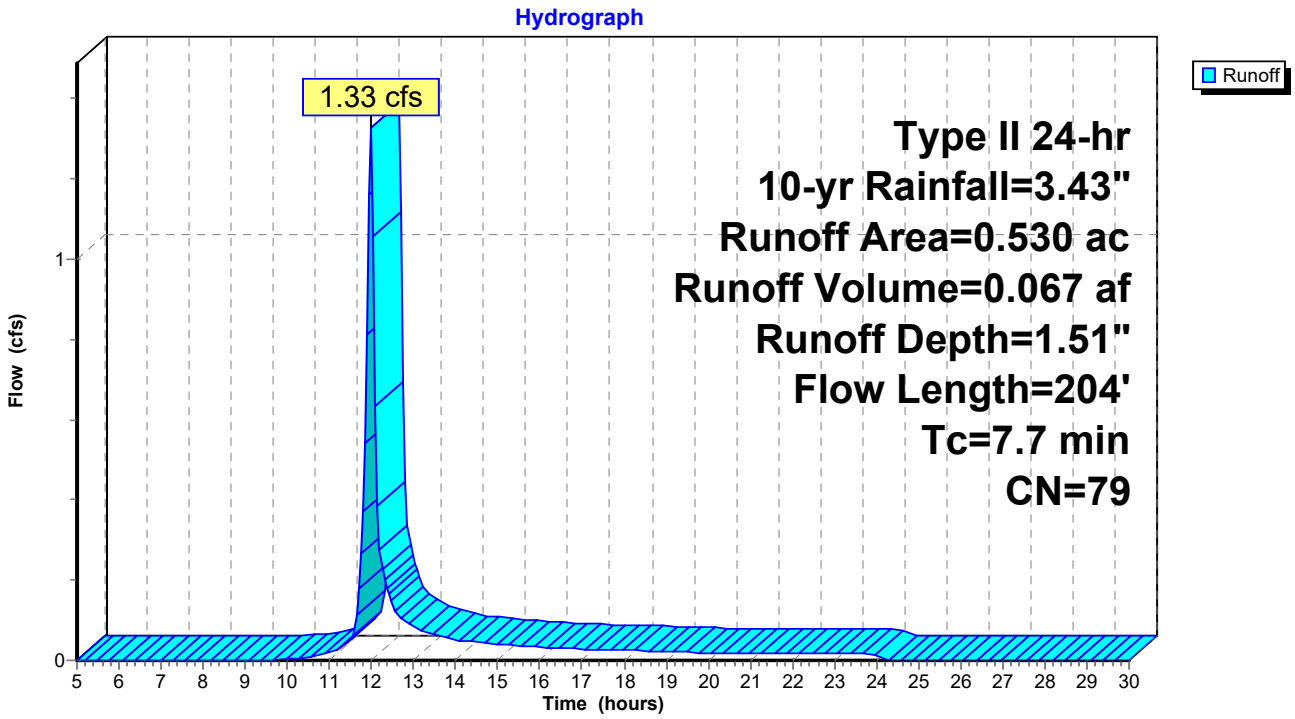
Runoff = 1.33 cfs @ 11.99 hrs, Volume= 0.067 af, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.390	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
0.530	79	Weighted Average
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1500	0.23		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.3	104	0.1300	5.80		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.7	204	Total			

Subcatchment 12S: DA#3



Summary for Subcatchment 13S: DA#4

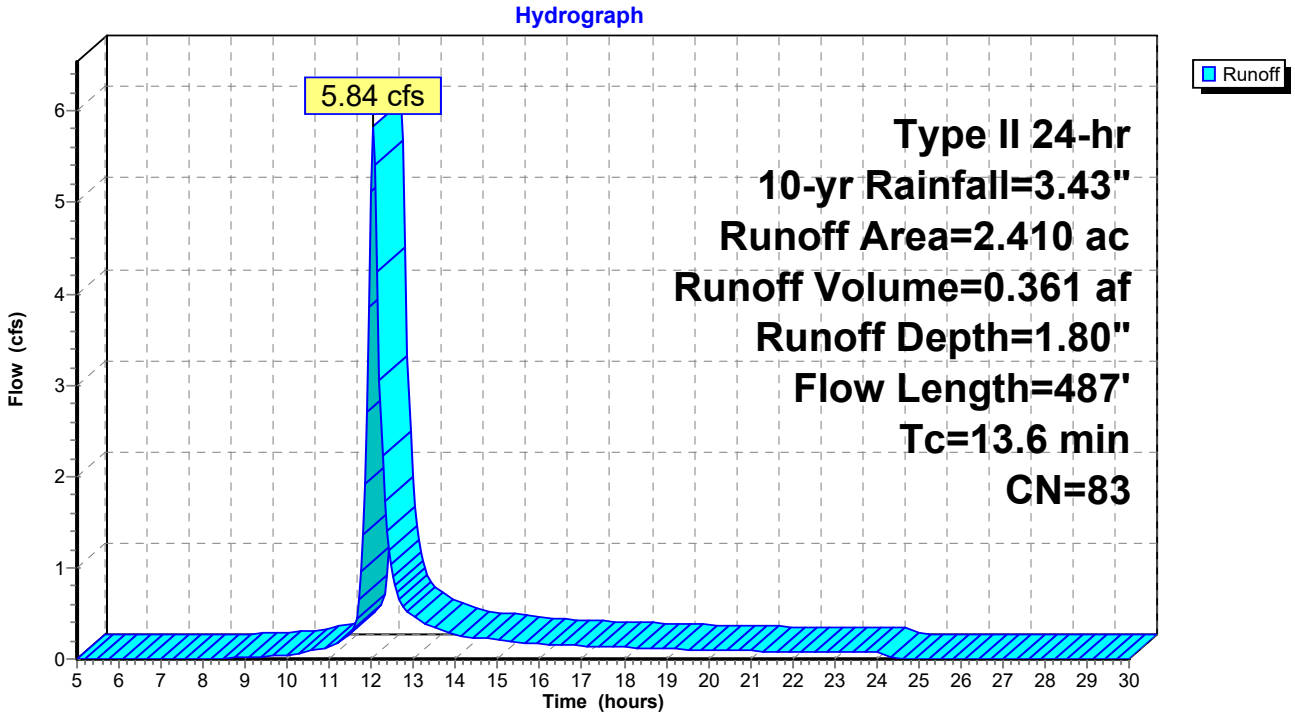
Runoff = 5.84 cfs @ 12.06 hrs, Volume= 0.361 af, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
2.020	80	>75% Grass cover, Good, HSG D
0.250	98	Paved parking, HSG D
0.140	98	Roofs, HSG D
2.410	83	Weighted Average
2.020		83.82% Pervious Area
0.390		16.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0450	0.14		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
1.5	307	0.0450	3.42		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	80	0.0200	6.42	5.04	**Pipe Channel, storm pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
13.6	487	Total			

Subcatchment 13S: DA#4

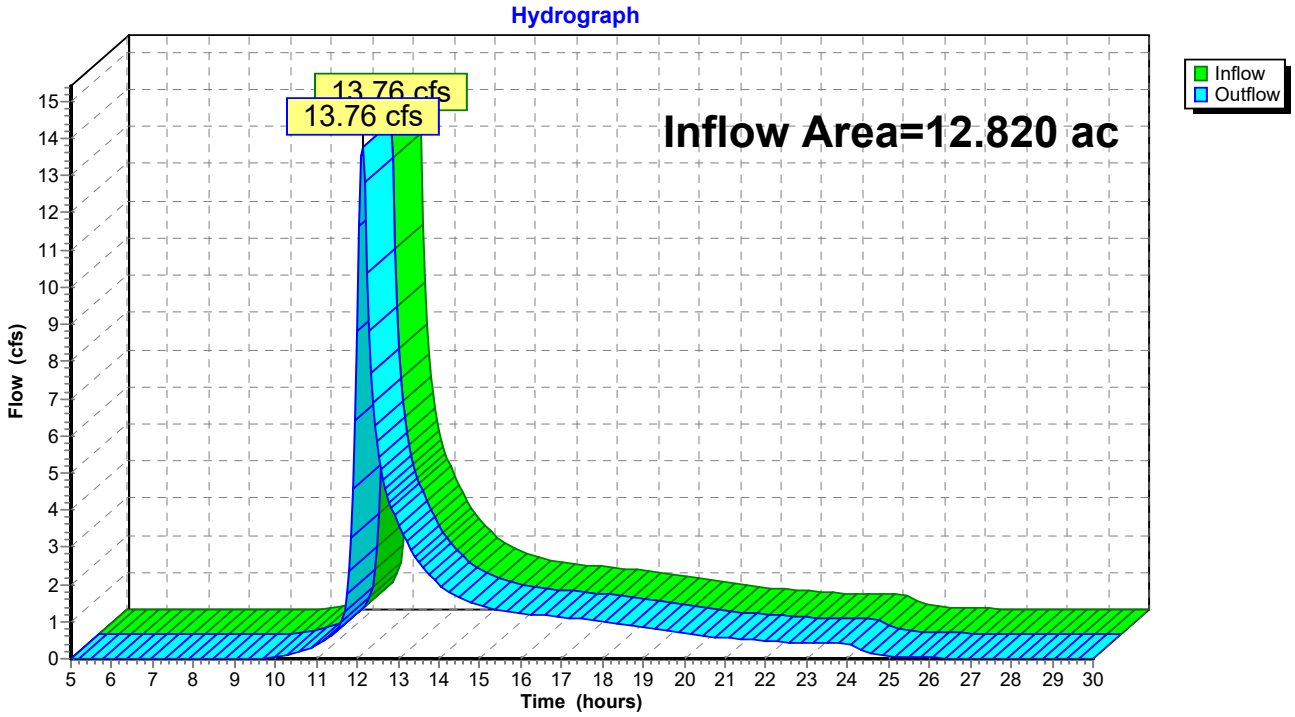


Summary for Reach 1R: Pt of Study 1A

Inflow Area = 12.820 ac, 6.40% Impervious, Inflow Depth > 1.62" for 10-yr event
Inflow = 13.76 cfs @ 12.12 hrs, Volume= 1.726 af
Outflow = 13.76 cfs @ 12.12 hrs, Volume= 1.726 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Reach 1R: Pt of Study 1A

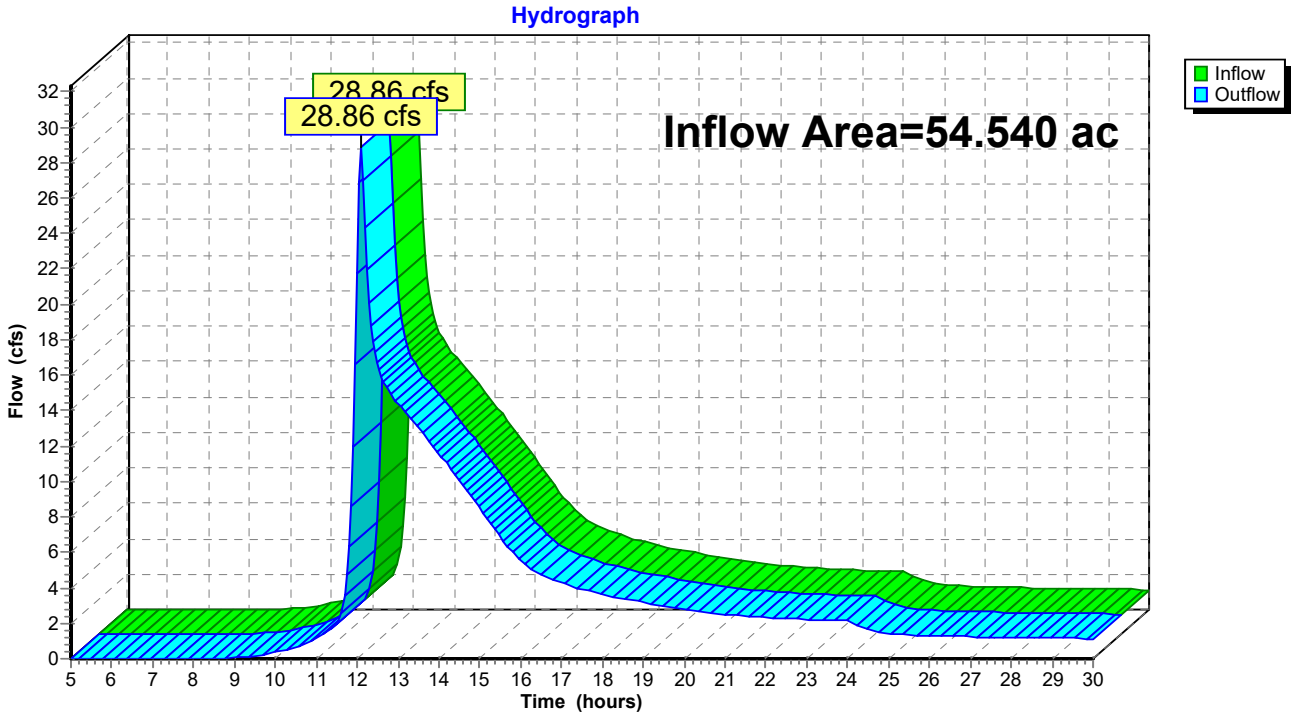


Summary for Reach 2R: Pt of Study 1B

Inflow Area = 54.540 ac, 9.41% Impervious, Inflow Depth > 1.57" for 10-yr event
Inflow = 28.86 cfs @ 12.10 hrs, Volume= 7.139 af
Outflow = 28.86 cfs @ 12.10 hrs, Volume= 7.139 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Reach 2R: Pt of Study 1B



Summary for Pond 1P: Detention Basin 1

Inflow Area =	20.880 ac,	8.52% Impervious,	Inflow Depth =	1.60"	for 10-yr event
Inflow =	35.22 cfs @	12.15 hrs,	Volume=	2.779 af	
Outflow =	7.84 cfs @	12.64 hrs,	Volume=	2.755 af,	Atten= 78%, Lag= 29.8 min
Primary =	7.84 cfs @	12.64 hrs,	Volume=	2.755 af	
Secondary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 893.00' @ 12.64 hrs Surf.Area= 15,687 sf Storage= 49,591 cf

Plug-Flow detention time= 194.2 min calculated for 2.755 af (99% of inflow)
Center-of-Mass det. time= 189.2 min (1,038.7 - 849.5)

Volume	Invert	Avail.Storage	Storage Description
#1	888.00'	104,203 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

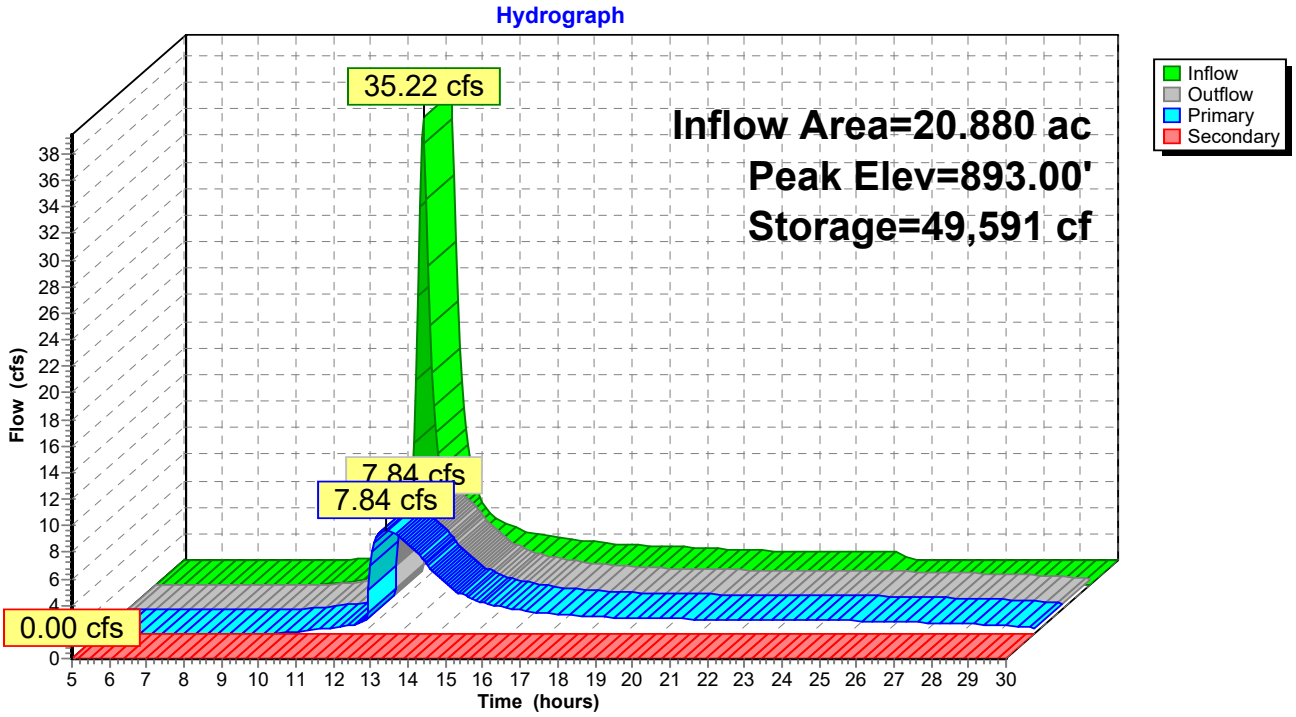
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.00	373	0	0
889.00	3,768	2,071	2,071
890.00	11,124	7,446	9,517
891.00	12,590	11,857	21,374
892.00	14,113	13,352	34,725
893.00	15,691	14,902	49,627
894.00	17,327	16,509	66,136
895.00	19,019	18,173	84,309
896.00	20,768	19,894	104,203

Device	Routing	Invert	Outlet Devices
#1	Primary	887.90'	**30.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 887.90' / 886.90' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	888.00'	**5.0" Vert. Orifice1** C= 0.600
#3	Device 1	891.20'	**15.0" Vert. Orifice2** C= 0.600
#4	Device 1	894.90'	**30.0" x 30.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	896.00'	**25.0' 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=7.83 cfs @ 12.64 hrs HW=893.00' (Free Discharge)
└─**1=Culvert** (Passes 7.83 cfs of 36.60 cfs potential flow)
  ├─**2=Orifice1** (Orifice Controls 1.44 cfs @ 10.54 fps)
  ├─**3=Orifice2** (Orifice Controls 6.40 cfs @ 5.21 fps)
  └─**4=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=888.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin 1



Summary for Pond 2P: Detention Basin 2

Inflow Area = 36.730 ac, 10.48% Impervious, Inflow Depth > 1.65" for 10-yr event
Inflow = 38.60 cfs @ 12.05 hrs, Volume= 5.046 af
Outflow = 9.89 cfs @ 13.09 hrs, Volume= 4.726 af, Atten= 74%, Lag= 62.1 min
Primary = 9.89 cfs @ 13.09 hrs, Volume= 4.726 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 869.38' @ 13.09 hrs Surf.Area= 14,995 sf Storage= 51,620 cf

Plug-Flow detention time= 128.9 min calculated for 4.717 af (93% of inflow)
Center-of-Mass det. time= 82.3 min (1,028.8 - 946.5)

Volume	Invert	Avail.Storage	Storage Description
#1	863.00'	98,569 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

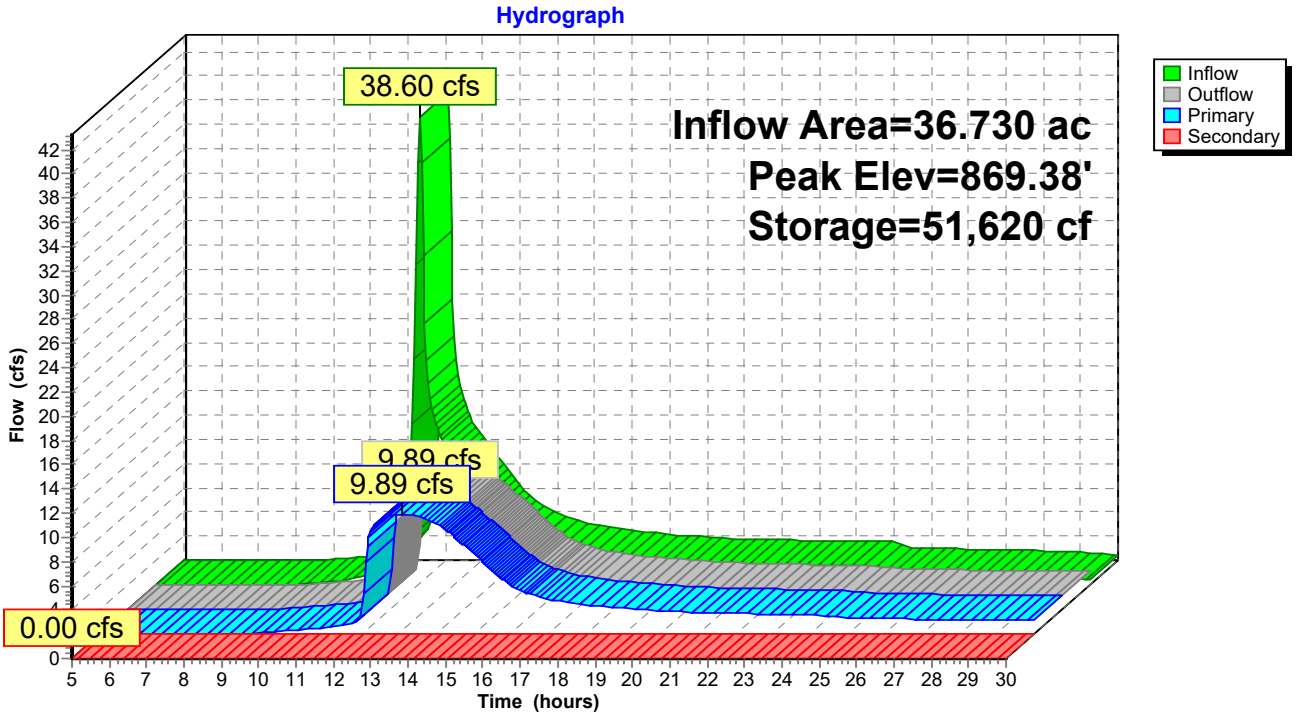
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
863.00	335	0	0
864.00	3,479	1,907	1,907
865.00	5,953	4,716	6,623
866.00	7,741	6,847	13,470
867.00	9,739	8,740	22,210
868.00	11,941	10,840	33,050
869.00	14,156	13,049	46,099
870.00	16,371	15,264	61,362
871.00	18,599	17,485	78,847
872.00	20,845	19,722	98,569

Device	Routing	Invert	Outlet Devices
#1	Secondary	872.00'	**20.0' 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
#2	Primary	862.90'	**30.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 862.90' / 861.00' S= 0.0950 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#3	Device 2	863.00'	**5.0" Vert. Orifice1** C= 0.600
#4	Device 2	866.80'	**15.0" Vert. Orifice2** C= 0.600
#5	Device 2	870.00'	**30.0" x 30.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.89 cfs @ 13.09 hrs HW=869.38' (Free Discharge)
└─**2=Culvert** (Passes 9.89 cfs of 42.67 cfs potential flow)
  ├─**3=Orifice1** (Orifice Controls 1.63 cfs @ 11.96 fps)
  ├─**4=Orifice2** (Orifice Controls 8.26 cfs @ 6.73 fps)
  └─**5=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=863.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Detention Basin 2



Summary for Pond 3P: Detention Basin 3

Inflow Area = 6.480 ac, 11.11% Impervious, Inflow Depth = 1.72" for 10-yr event
Inflow = 16.06 cfs @ 12.03 hrs, Volume= 0.930 af
Outflow = 3.16 cfs @ 12.35 hrs, Volume= 0.928 af, Atten= 80%, Lag= 18.6 min
Primary = 3.16 cfs @ 12.35 hrs, Volume= 0.928 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 902.94' @ 12.35 hrs Surf.Area= 9,197 sf Storage= 16,224 cf

Plug-Flow detention time= 100.3 min calculated for 0.926 af (100% of inflow)
Center-of-Mass det. time= 99.4 min (934.3 - 834.8)

Volume	Invert	Avail.Storage	Storage Description
#1	900.00'	38,589 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

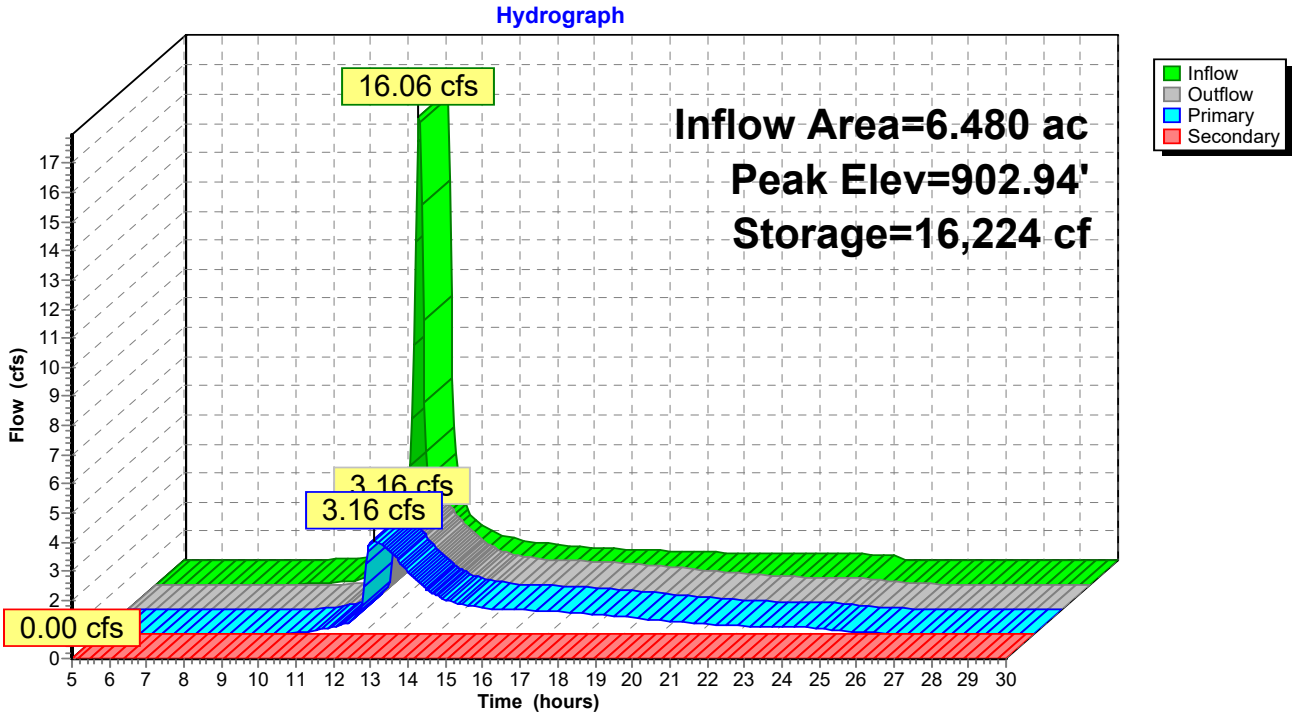
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
900.00	2,381	0	0
901.00	3,197	2,789	2,789
902.00	7,737	5,467	8,256
903.00	9,288	8,513	16,769
904.00	10,896	10,092	26,861
905.00	12,560	11,728	38,589

Device	Routing	Invert	Outlet Devices
#1	Secondary	905.00'	**20.0' 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
#2	Primary	900.00'	**18.0" Round Culvert** L= 330.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 900.00' / 889.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	900.00'	**5.0" Vert. Orifice1** C= 0.600
#4	Device 2	901.90'	**10.0" Vert. Orifice2** C= 0.600
#5	Device 2	904.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.16 cfs @ 12.35 hrs HW=902.94' (Free Discharge)
└─**2=Culvert** (Passes 3.16 cfs of 9.94 cfs potential flow)
  ├─**3=Orifice1** (Orifice Controls 1.09 cfs @ 7.96 fps)
  ├─**4=Orifice2** (Orifice Controls 2.07 cfs @ 3.80 fps)
  └─**5=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=900.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention Basin 3



Summary for Subcatchment 1S: DA-A

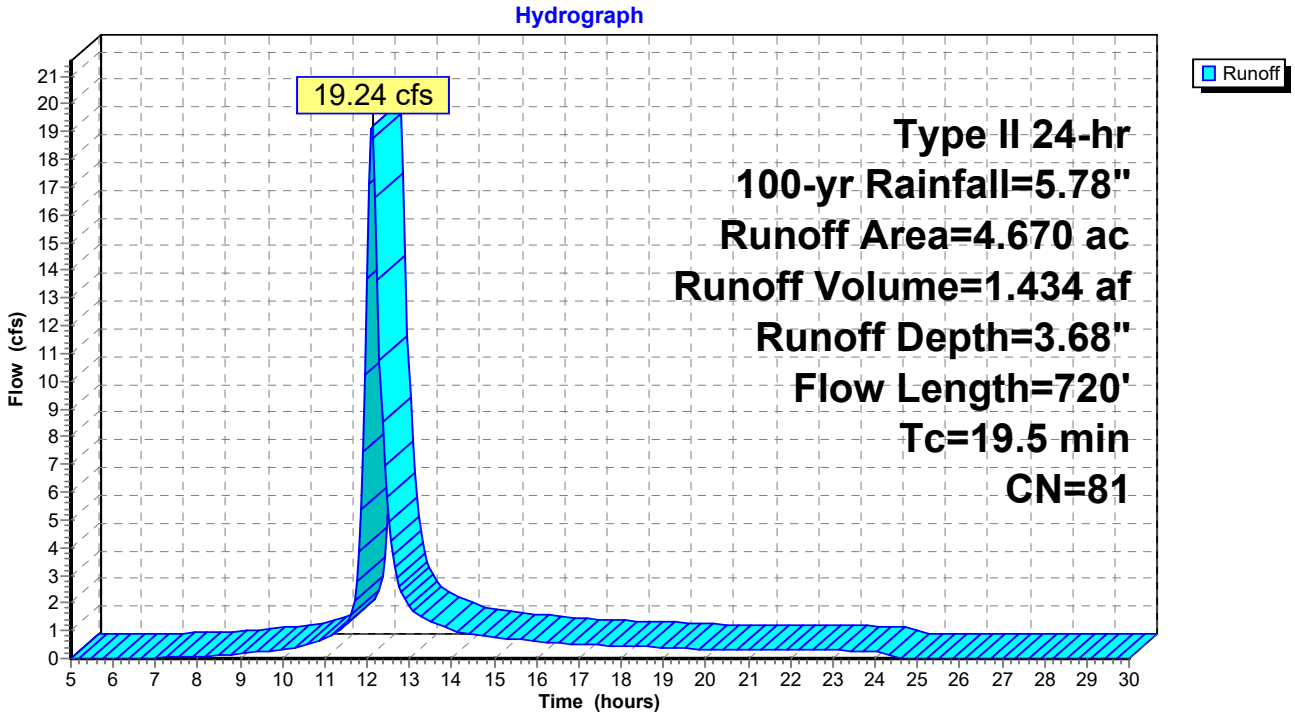
Runoff = 19.24 cfs @ 12.12 hrs, Volume= 1.434 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.270	98	Paved parking, HSG D
2.580	80	>75% Grass cover, Good, HSG D
1.540	77	Woods, Good, HSG D
0.280	98	Roofs, HSG D
4.670	81	Weighted Average
4.120		88.22% Pervious Area
0.550		11.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 2.39"
2.5	188	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.8	202	0.0650	4.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	230	0.0200	16.17	32.33	**Channel Flow, GUTTER** Area= 2.0 sf Perim= 2.0' r= 1.00' n= 0.013 Asphalt, smooth
19.5	720	Total			

Subcatchment 1S: DA-A



Summary for Subcatchment 2S: DA-B

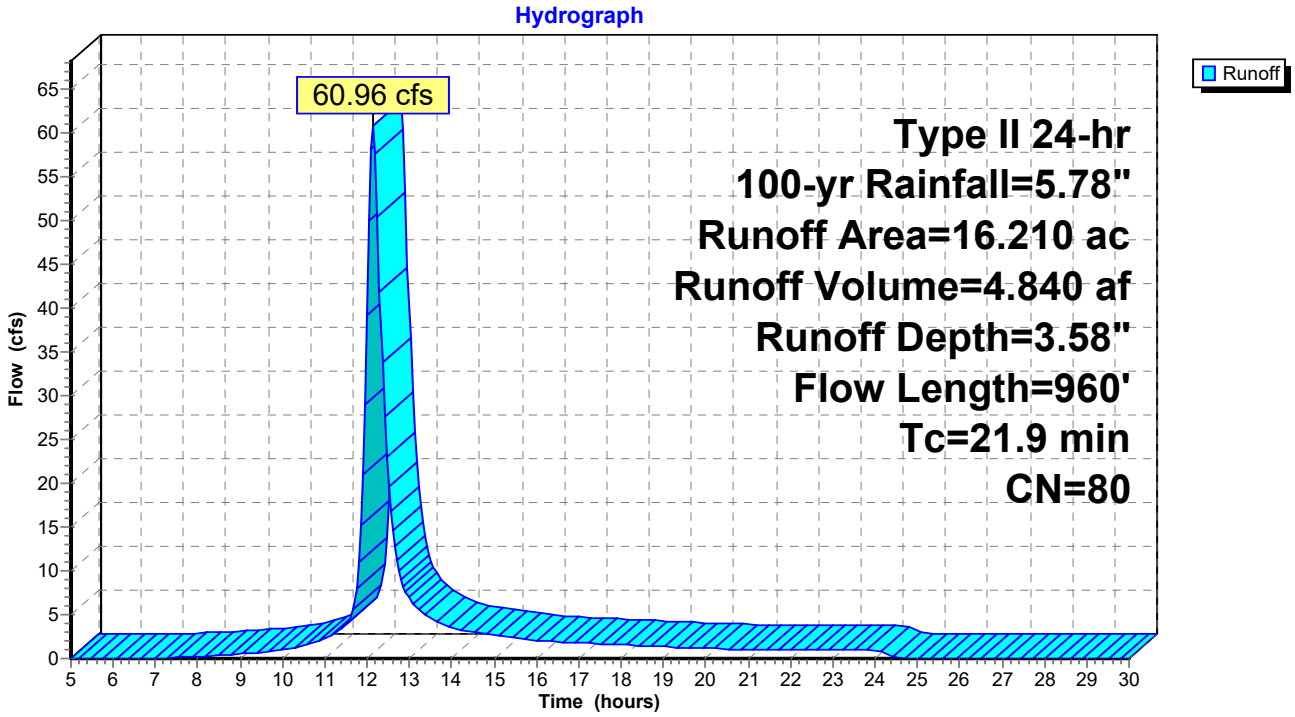
Runoff = 60.96 cfs @ 12.15 hrs, Volume= 4.840 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.740	98	Paved parking, HSG D
7.140	80	>75% Grass cover, Good, HSG D
7.840	77	Woods, Good, HSG D
0.490	98	Roofs, HSG D
16.210	80	Weighted Average
14.980		92.41% Pervious Area
1.230		7.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 2.39"
4.8	370	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.8	200	0.0650	4.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.3	290	0.0200	16.17	32.33	**Channel Flow, GUTTER** Area= 2.0 sf Perim= 2.0' r= 1.00' n= 0.013 Asphalt, smooth
21.9	960	Total			

Subcatchment 2S: DA-B



Summary for Subcatchment 3S: DA-C

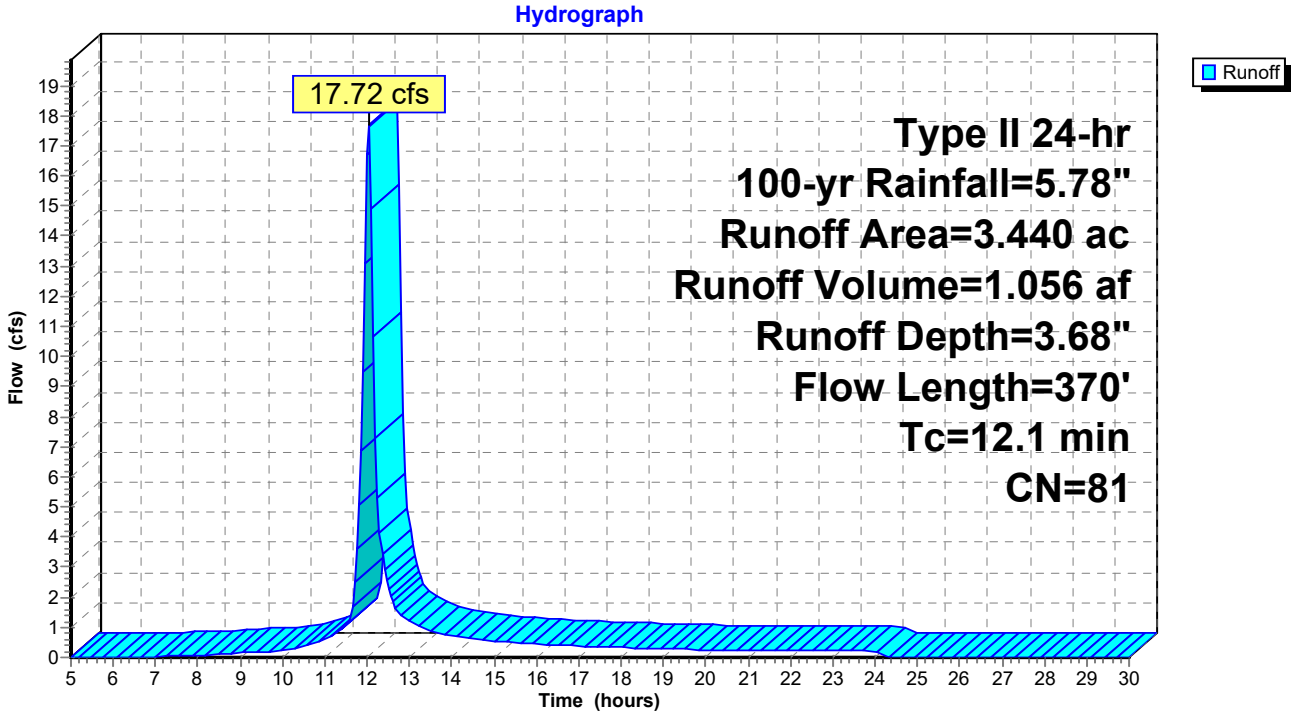
Runoff = 17.72 cfs @ 12.04 hrs, Volume= 1.056 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.060	98	Paved parking, HSG D
3.200	80	>75% Grass cover, Good, HSG D
0.180	98	Roofs, HSG D
3.440	81	Weighted Average
3.200		93.02% Pervious Area
0.240		6.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
1.5	270	0.0370	3.10		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.1	370	Total			

Subcatchment 3S: DA-C



Summary for Subcatchment 4S: DA-D

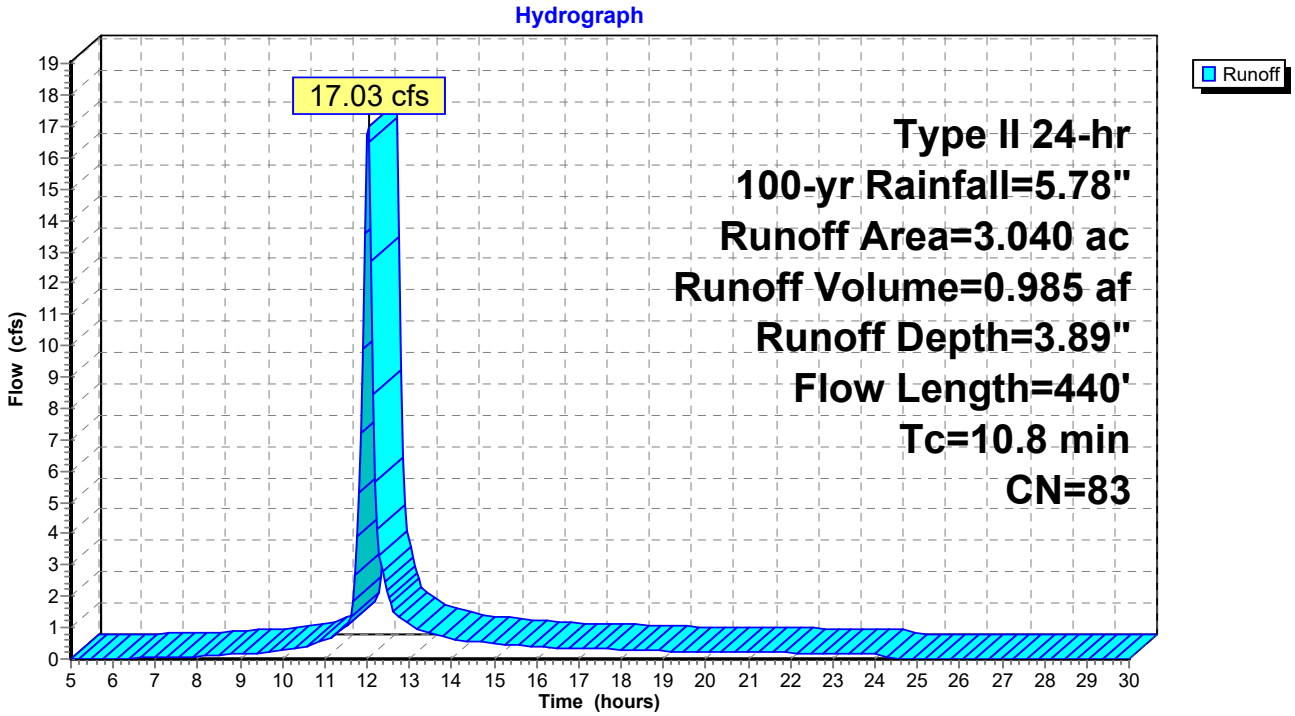
Runoff = 17.03 cfs @ 12.02 hrs, Volume= 0.985 af, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.310	98	Paved parking, HSG D
2.560	80	>75% Grass cover, Good, HSG D
0.170	98	Roofs, HSG D
3.040	83	Weighted Average
2.560		84.21% Pervious Area
0.480		15.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0700	0.17		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.5	140	0.0900	4.83		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.3	200	0.0200	9.55	76.42	**Channel Flow, swale flow** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
10.8	440	Total			

Subcatchment 4S: DA-D



Summary for Subcatchment 5S: DA-E

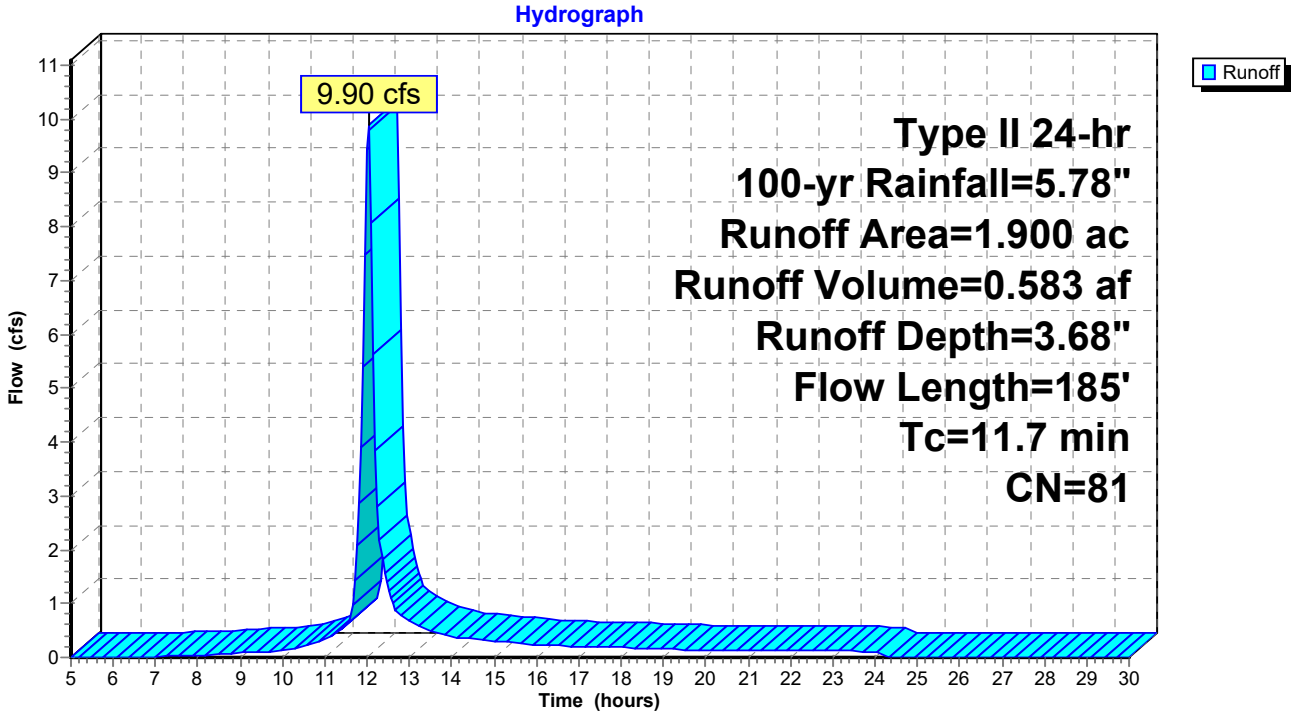
Runoff = 9.90 cfs @ 12.03 hrs, Volume= 0.583 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.030	98	Paved parking, HSG D
1.800	80	>75% Grass cover, Good, HSG D
0.070	98	Roofs, HSG D
1.900	81	Weighted Average
1.800		94.74% Pervious Area
0.100		5.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.3	85	0.0950	4.96		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
11.7	185	Total			

Subcatchment 5S: DA-E



Summary for Subcatchment 6S: DA-F

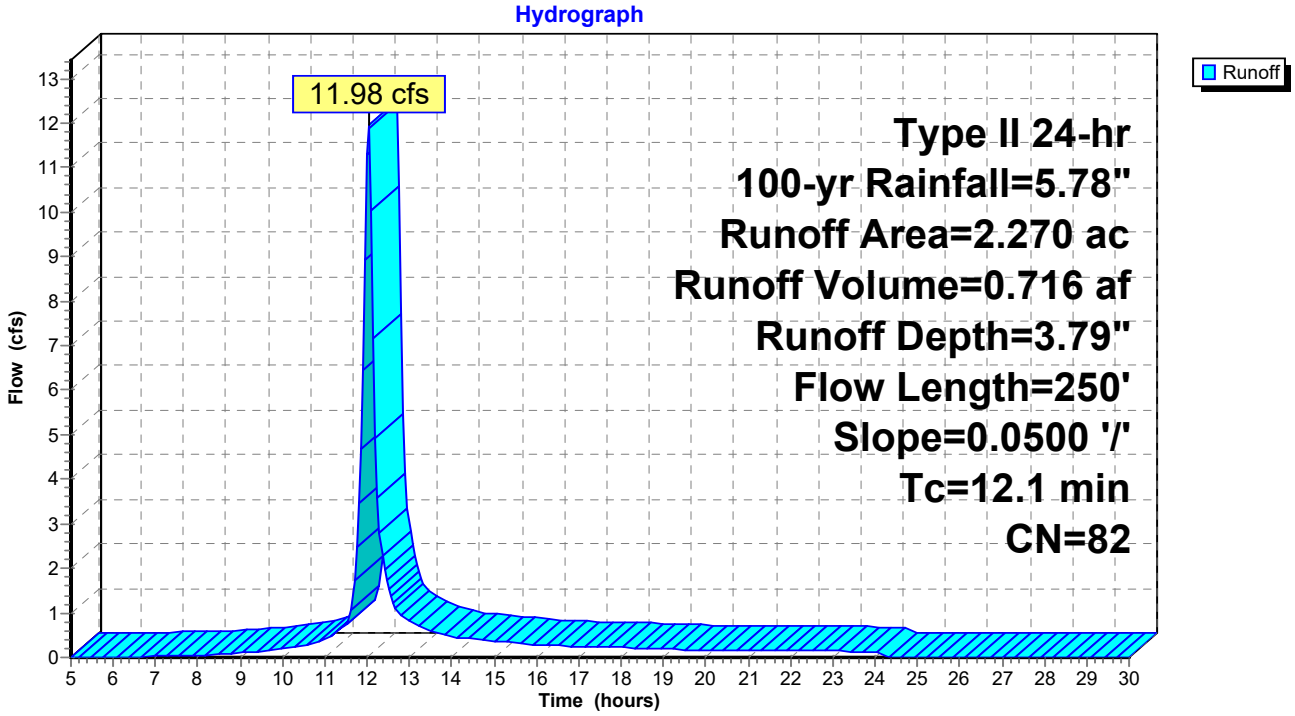
Runoff = 11.98 cfs @ 12.04 hrs, Volume= 0.716 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.090	98	Paved parking, HSG D
2.040	80	>75% Grass cover, Good, HSG D
0.140	98	Roofs, HSG D
2.270	82	Weighted Average
2.040		89.87% Pervious Area
0.230		10.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.7	150	0.0500	3.60		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.1	250	Total			

Subcatchment 6S: DA-F



Summary for Subcatchment 7S: DA-G

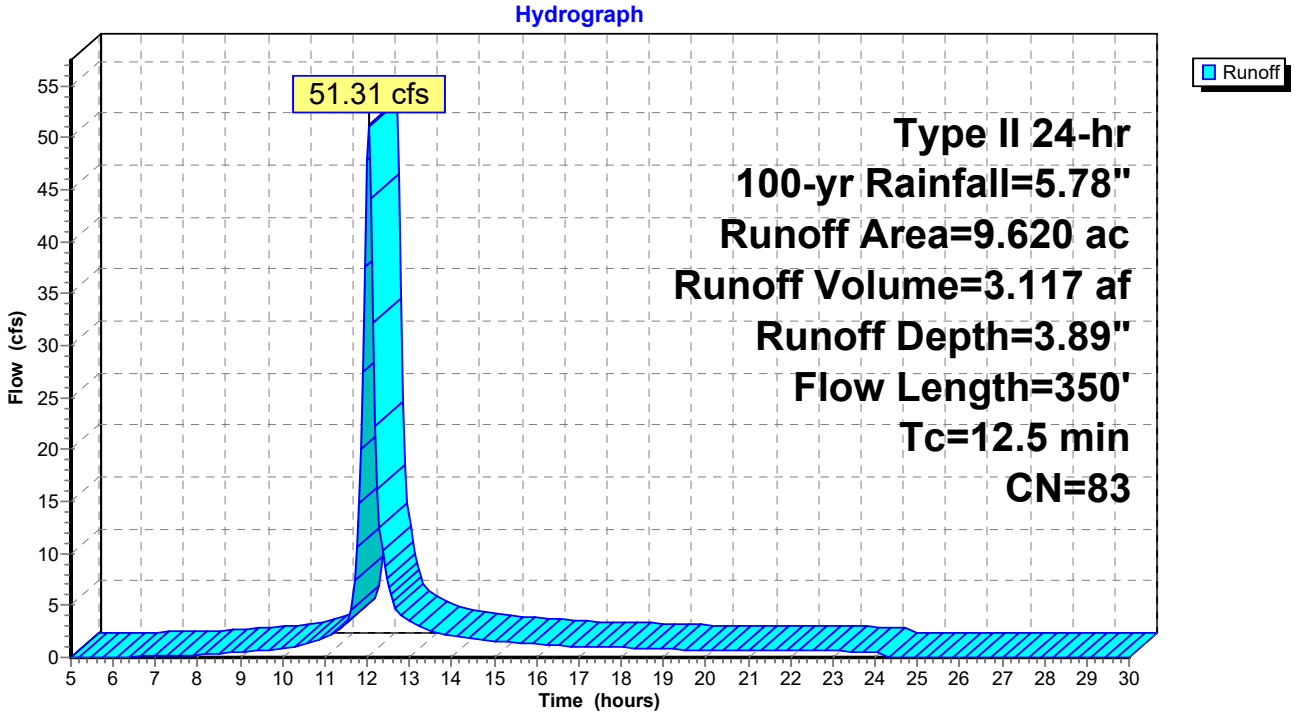
Runoff = 51.31 cfs @ 12.04 hrs, Volume= 3.117 af, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
1.050	98	Paved parking, HSG D
8.080	80	>75% Grass cover, Good, HSG D
0.490	98	Roofs, HSG D
9.620	83	Weighted Average
8.080		83.99% Pervious Area
1.540		16.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 2.39"
1.1	250	0.0550	3.78		**Shallow Concentrated Flow, shallow conc flow** Unpaved Kv= 16.1 fps
12.5	350	Total			

Subcatchment 7S: DA-G



Summary for Subcatchment 8S: DA-H

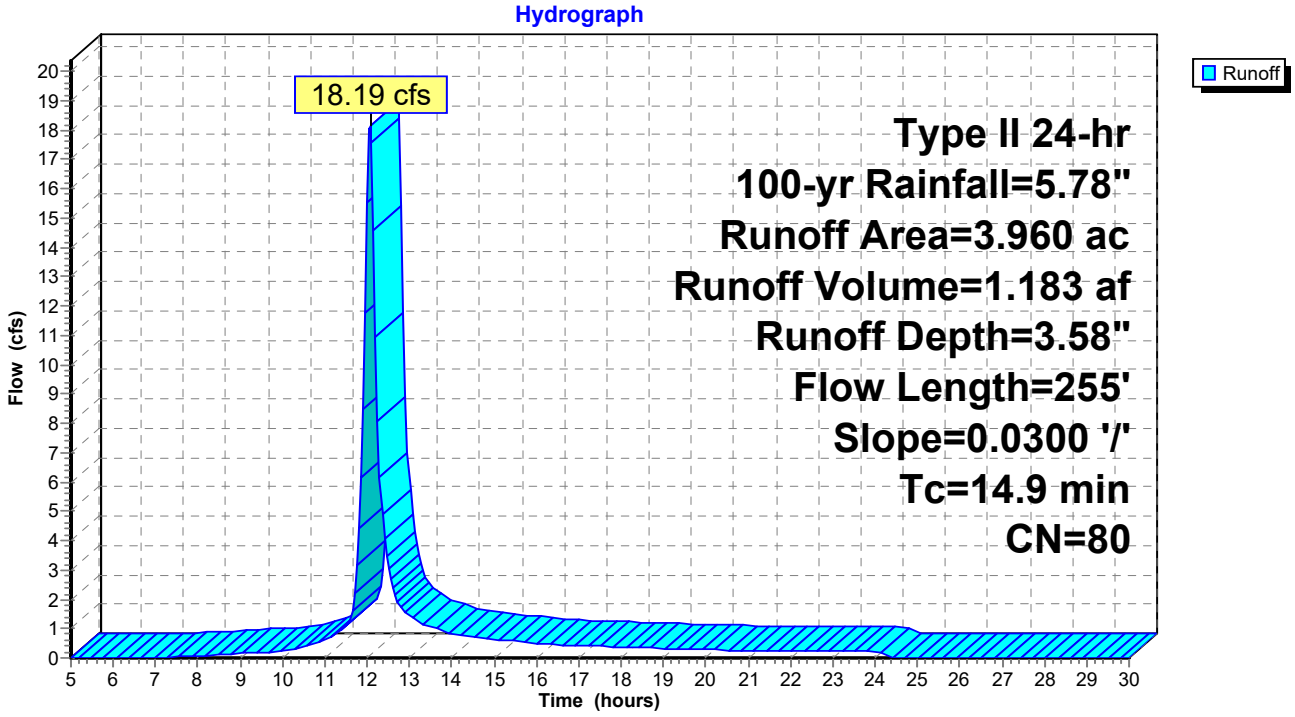
Runoff = 18.19 cfs @ 12.07 hrs, Volume= 1.183 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.090	98	Paved parking, HSG D
2.440	80	>75% Grass cover, Good, HSG D
1.220	77	Woods, Good, HSG D
0.210	98	Roofs, HSG D
3.960	80	Weighted Average
3.660		92.42% Pervious Area
0.300		7.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0300	0.12		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.9	155	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
14.9	255	Total			

Subcatchment 8S: DA-H



Summary for Subcatchment 10S: DA#1

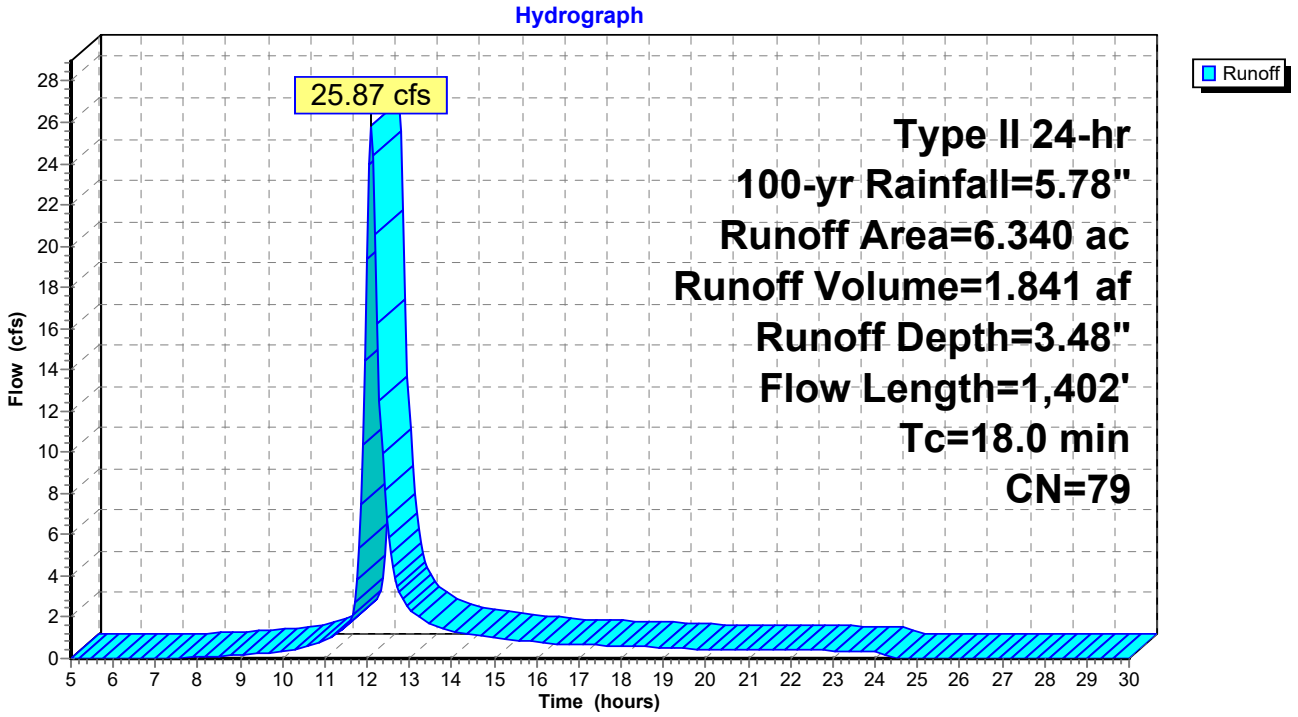
Runoff = 25.87 cfs @ 12.10 hrs, Volume= 1.841 af, Depth= 3.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
3.390	80	>75% Grass cover, Good, HSG D
2.850	77	Woods, Good, HSG D
0.030	98	Paved parking, HSG D
0.070	98	Roofs, HSG D
6.340	79	Weighted Average
6.240		98.42% Pervious Area
0.100		1.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
5.4	485	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.8	517	0.0900	4.83		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	300	0.0860	27.67	442.73	**Channel Flow, SWALE** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & winding
18.0	1,402	Total			

Subcatchment 10S: DA#1



Summary for Subcatchment 11S: DA#2

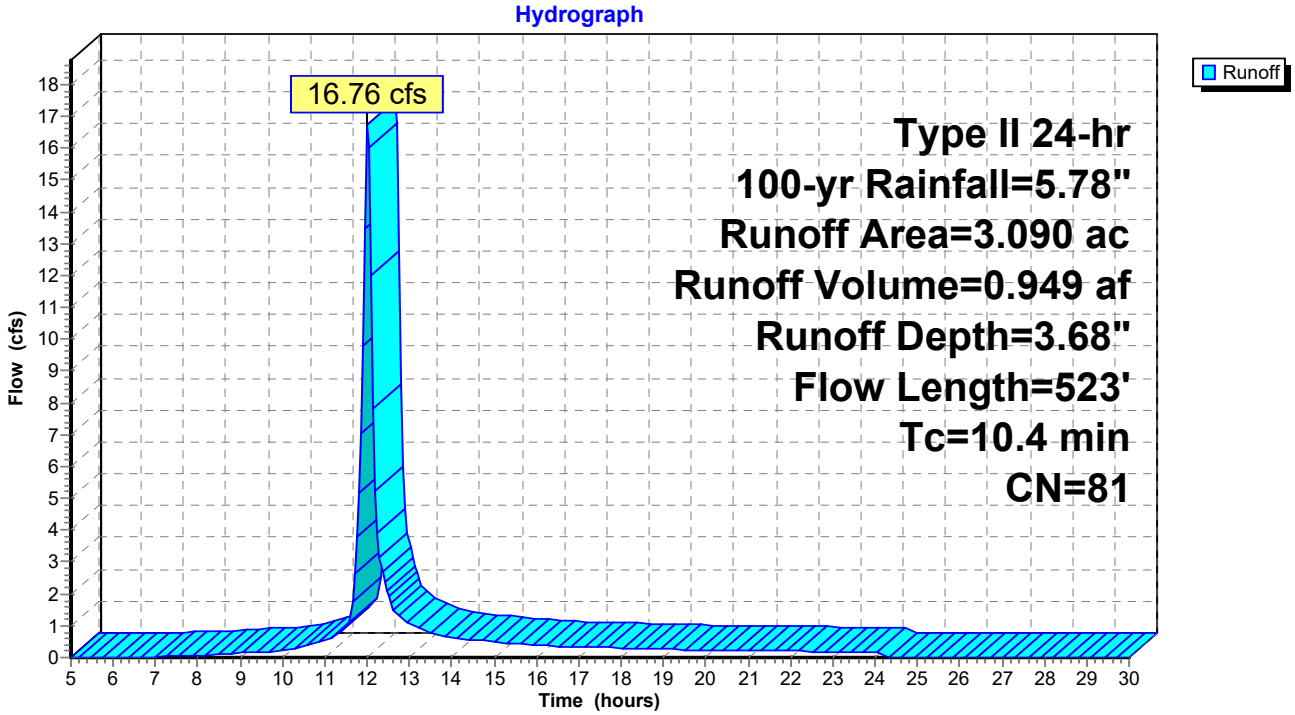
Runoff = 16.76 cfs @ 12.02 hrs, Volume= 0.949 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
2.070	80	>75% Grass cover, Good, HSG D
0.660	77	Woods, Good, HSG D
0.220	98	Paved parking, HSG D
0.140	98	Roofs, HSG D
3.090	81	Weighted Average
2.730		88.35% Pervious Area
0.360		11.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0700	0.17		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.2	56	0.1300	5.80		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	367	0.0820	27.02	432.31	**Channel Flow, SWALE** Area= 16.0 sf Perim= 8.0' r= 2.00' n= 0.025 Earth, clean & winding
10.4	523	Total			

Subcatchment 11S: DA#2



Summary for Subcatchment 12S: DA#3

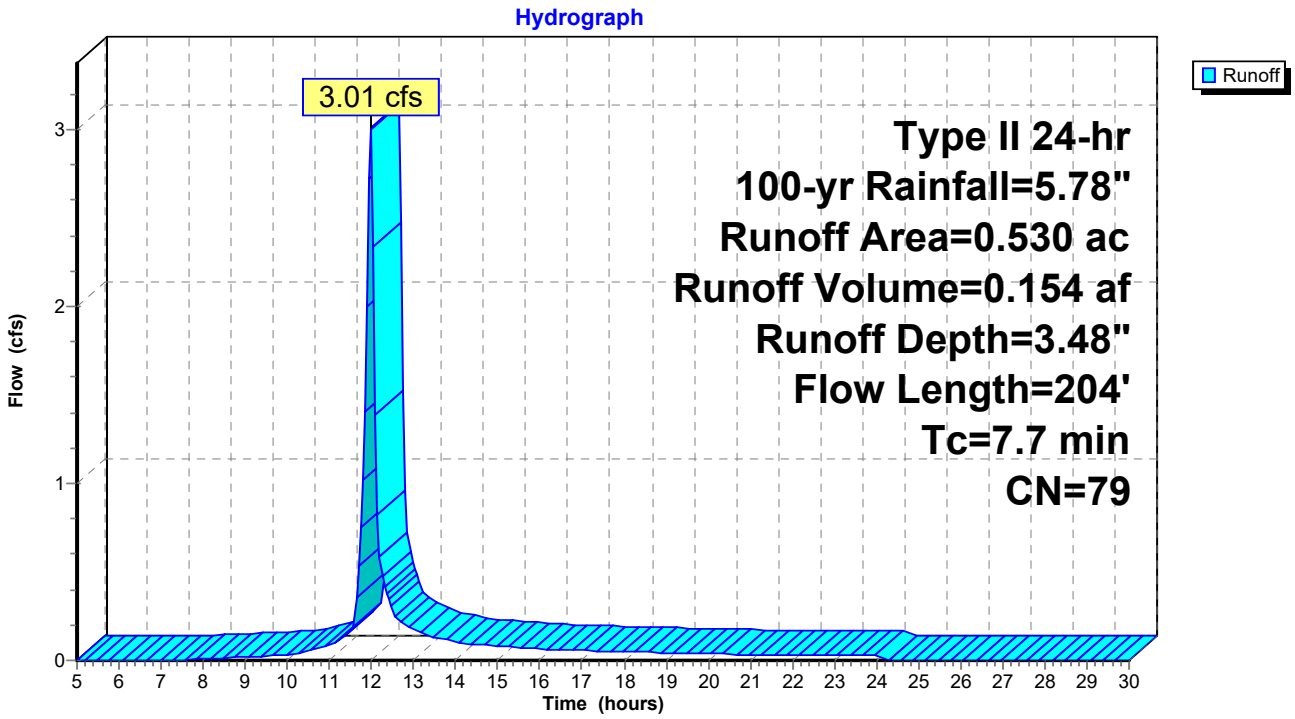
Runoff = 3.01 cfs @ 11.99 hrs, Volume= 0.154 af, Depth= 3.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.390	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
0.530	79	Weighted Average
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1500	0.23		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.3	104	0.1300	5.80		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.7	204	Total			

Subcatchment 12S: DA#3



Summary for Subcatchment 13S: DA#4

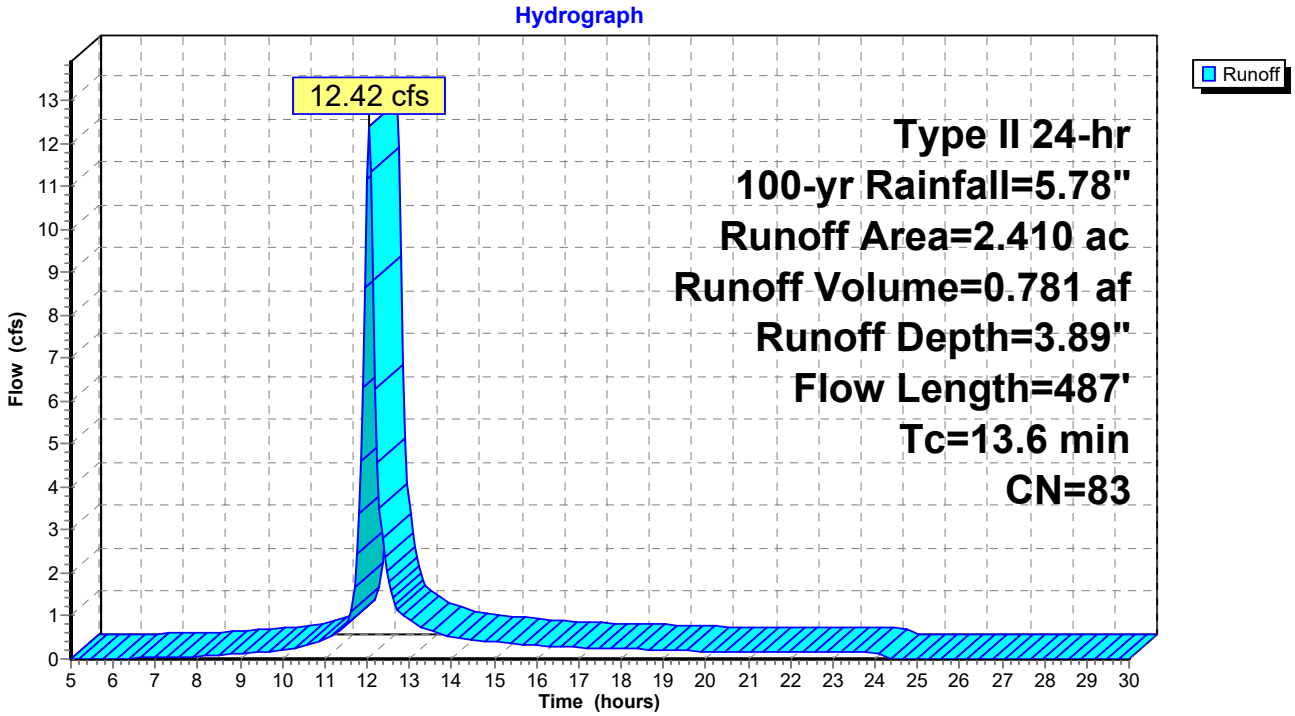
Runoff = 12.42 cfs @ 12.05 hrs, Volume= 0.781 af, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
2.020	80	>75% Grass cover, Good, HSG D
0.250	98	Paved parking, HSG D
0.140	98	Roofs, HSG D
2.410	83	Weighted Average
2.020		83.82% Pervious Area
0.390		16.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0450	0.14		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
1.5	307	0.0450	3.42		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.2	80	0.0200	6.42	5.04	**Pipe Channel, storm pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
13.6	487	Total			

Subcatchment 13S: DA#4

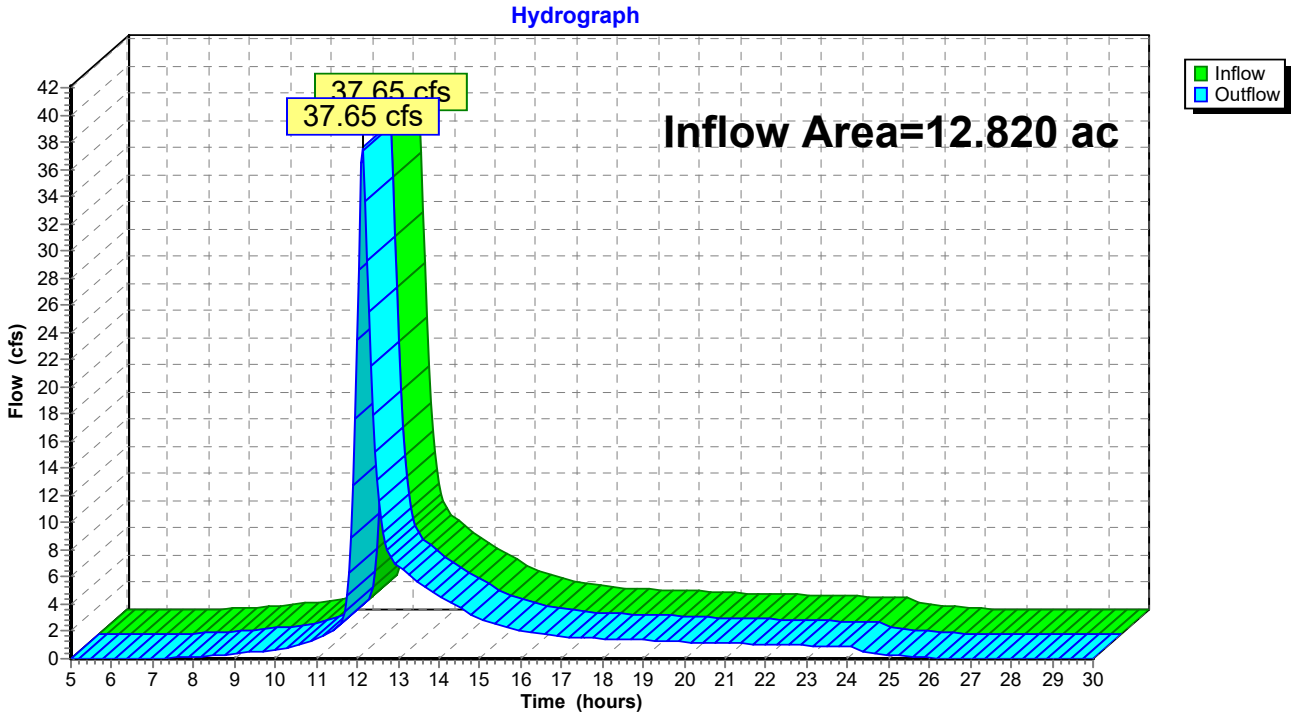


Summary for Reach 1R: Pt of Study 1A

Inflow Area = 12.820 ac, 6.40% Impervious, Inflow Depth > 3.63" for 100-yr event
Inflow = 37.65 cfs @ 12.13 hrs, Volume= 3.879 af
Outflow = 37.65 cfs @ 12.13 hrs, Volume= 3.879 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Reach 1R: Pt of Study 1A

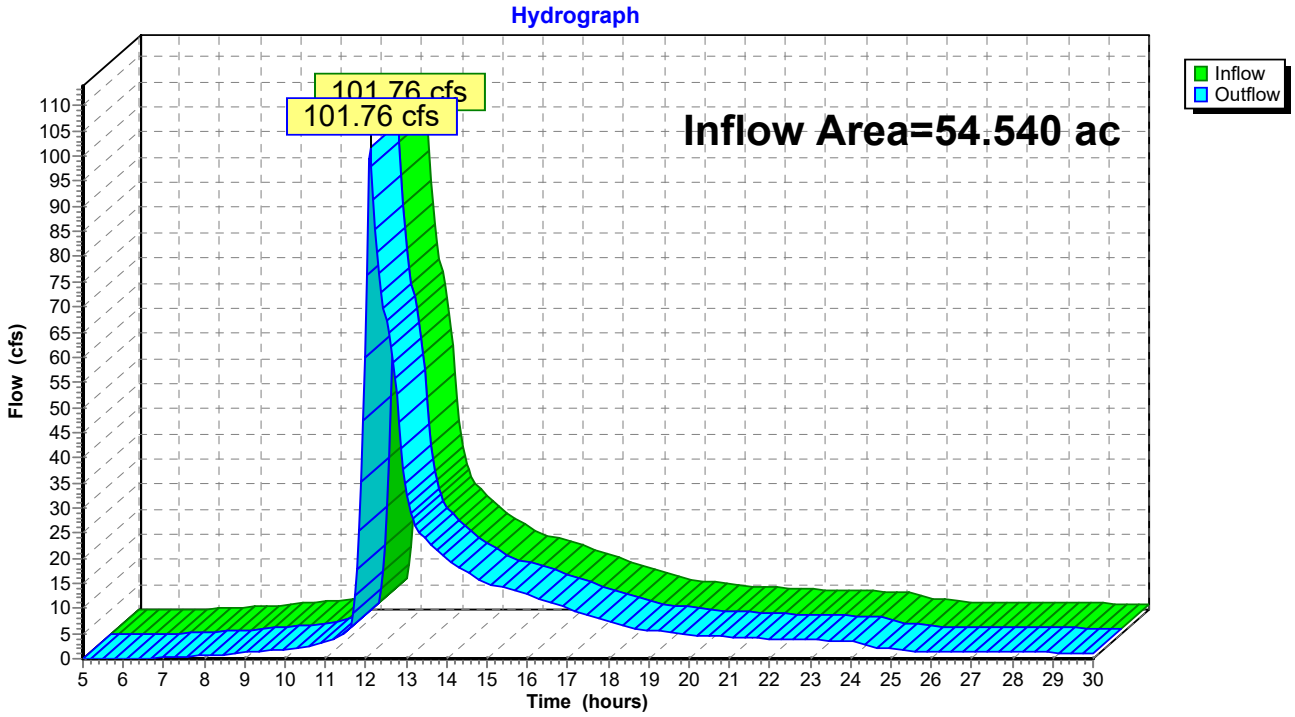


Summary for Reach 2R: Pt of Study 1B

Inflow Area = 54.540 ac, 9.41% Impervious, Inflow Depth > 3.56" for 100-yr event
Inflow = 101.76 cfs @ 12.12 hrs, Volume= 16.174 af
Outflow = 101.76 cfs @ 12.12 hrs, Volume= 16.174 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Reach 2R: Pt of Study 1B



Summary for Pond 1P: Detention Basin 1

Inflow Area =	20.880 ac,	8.52% Impervious,	Inflow Depth =	3.61"	for 100-yr event
Inflow =	79.89 cfs @	12.14 hrs,	Volume=	6.274 af	
Outflow =	41.08 cfs @	12.37 hrs,	Volume=	6.140 af,	Atten= 49%, Lag= 13.6 min
Primary =	41.08 cfs @	12.37 hrs,	Volume=	6.140 af	
Secondary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 895.80' @ 12.37 hrs Surf.Area= 20,411 sf Storage= 100,002 cf

Plug-Flow detention time= 127.9 min calculated for 6.127 af (98% of inflow)
Center-of-Mass det. time= 115.5 min (941.7 - 826.2)

Volume	Invert	Avail.Storage	Storage Description
#1	888.00'	104,203 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

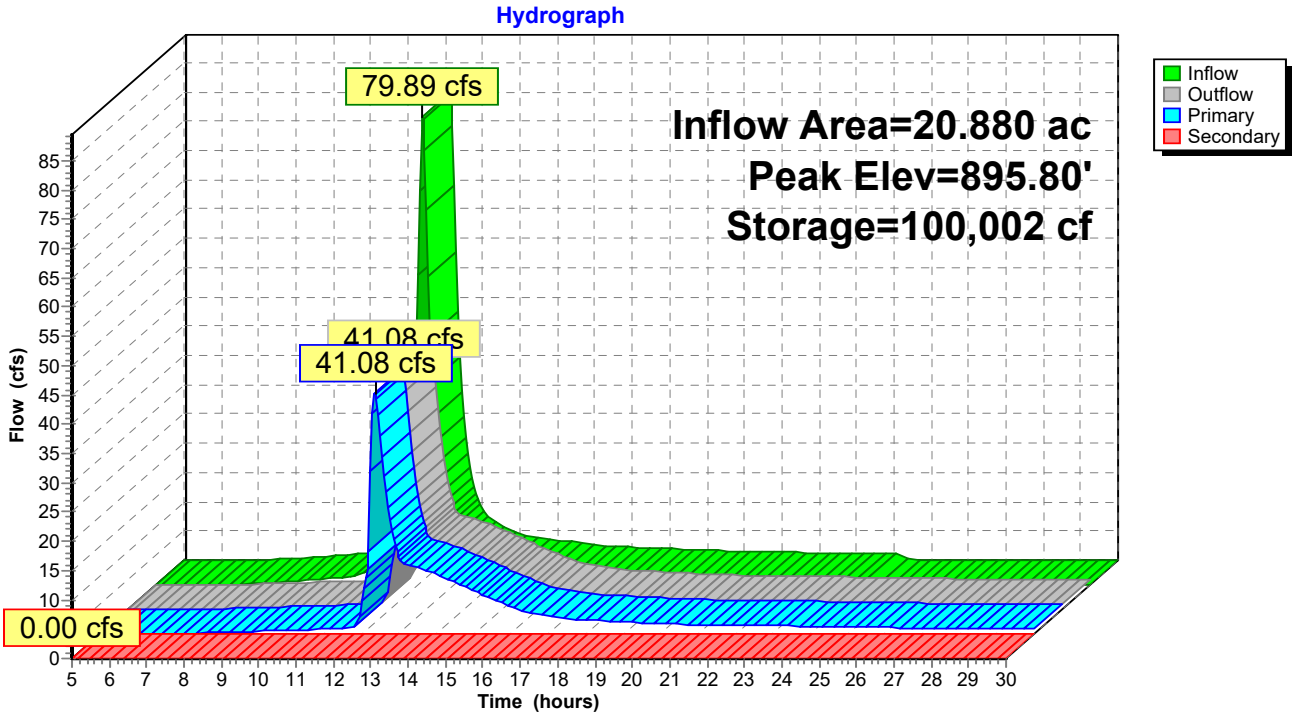
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.00	373	0	0
889.00	3,768	2,071	2,071
890.00	11,124	7,446	9,517
891.00	12,590	11,857	21,374
892.00	14,113	13,352	34,725
893.00	15,691	14,902	49,627
894.00	17,327	16,509	66,136
895.00	19,019	18,173	84,309
896.00	20,768	19,894	104,203

Device	Routing	Invert	Outlet Devices
#1	Primary	887.90'	**30.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 887.90' / 886.90' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	888.00'	**5.0" Vert. Orifice1** C= 0.600
#3	Device 1	891.20'	**15.0" Vert. Orifice2** C= 0.600
#4	Device 1	894.90'	**30.0" x 30.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	896.00'	**25.0' 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=40.85 cfs @ 12.37 hrs HW=895.79' (Free Discharge)
└─**1=Culvert** (Passes 40.85 cfs of 48.07 cfs potential flow)
  ├─**2=Orifice1** (Orifice Controls 1.81 cfs @ 13.25 fps)
  ├─**3=Orifice2** (Orifice Controls 11.76 cfs @ 9.58 fps)
  └─**4=Grate** (Weir Controls 27.28 cfs @ 3.08 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=888.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin 1



Summary for Pond 2P: Detention Basin 2

Inflow Area = 36.730 ac, 10.48% Impervious, Inflow Depth > 3.64" for 100-yr event
Inflow = 88.94 cfs @ 12.05 hrs, Volume= 11.155 af
Outflow = 50.98 cfs @ 12.44 hrs, Volume= 10.763 af, Atten= 43%, Lag= 23.4 min
Primary = 50.98 cfs @ 12.44 hrs, Volume= 10.763 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 871.61' @ 12.44 hrs Surf.Area= 19,979 sf Storage= 90,701 cf

Plug-Flow detention time= 79.9 min calculated for 10.763 af (96% of inflow)
Center-of-Mass det. time= 52.2 min (936.2 - 884.0)

Volume	Invert	Avail.Storage	Storage Description
#1	863.00'	98,569 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

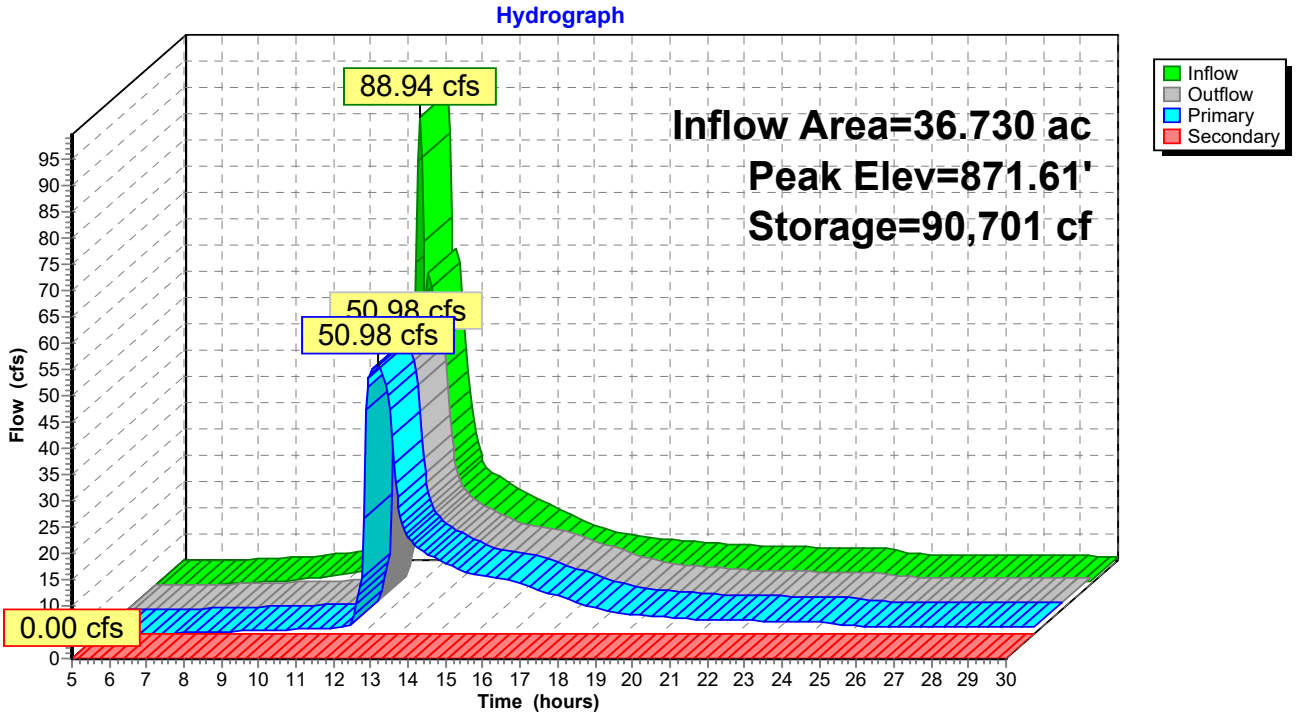
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
863.00	335	0	0
864.00	3,479	1,907	1,907
865.00	5,953	4,716	6,623
866.00	7,741	6,847	13,470
867.00	9,739	8,740	22,210
868.00	11,941	10,840	33,050
869.00	14,156	13,049	46,099
870.00	16,371	15,264	61,362
871.00	18,599	17,485	78,847
872.00	20,845	19,722	98,569

Device	Routing	Invert	Outlet Devices
#1	Secondary	872.00'	**20.0' 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
#2	Primary	862.90'	**30.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 862.90' / 861.00' S= 0.0950 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#3	Device 2	863.00'	**5.0" Vert. Orifice1** C= 0.600
#4	Device 2	866.80'	**15.0" Vert. Orifice2** C= 0.600
#5	Device 2	870.00'	**30.0" x 30.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=50.97 cfs @ 12.44 hrs HW=871.61' (Free Discharge)
└─**2=Culvert** (Inlet Controls 50.97 cfs @ 10.38 fps)
  ├─**3=Orifice1** (Passes < 1.90 cfs potential flow)
  ├─**4=Orifice2** (Passes < 12.09 cfs potential flow)
  └─**5=Grate** (Passes < 38.20 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=863.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Detention Basin 2



Summary for Pond 3P: Detention Basin 3

Inflow Area = 6.480 ac, 11.11% Impervious, Inflow Depth = 3.78" for 100-yr event
Inflow = 34.67 cfs @ 12.03 hrs, Volume= 2.041 af
Outflow = 13.14 cfs @ 12.21 hrs, Volume= 2.038 af, Atten= 62%, Lag= 10.5 min
Primary = 13.14 cfs @ 12.21 hrs, Volume= 2.038 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 904.58' @ 12.21 hrs Surf.Area= 11,859 sf Storage= 33,447 cf

Plug-Flow detention time= 89.6 min calculated for 2.038 af (100% of inflow)
Center-of-Mass det. time= 88.8 min (901.3 - 812.5)

Volume	Invert	Avail.Storage	Storage Description
#1	900.00'	38,589 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

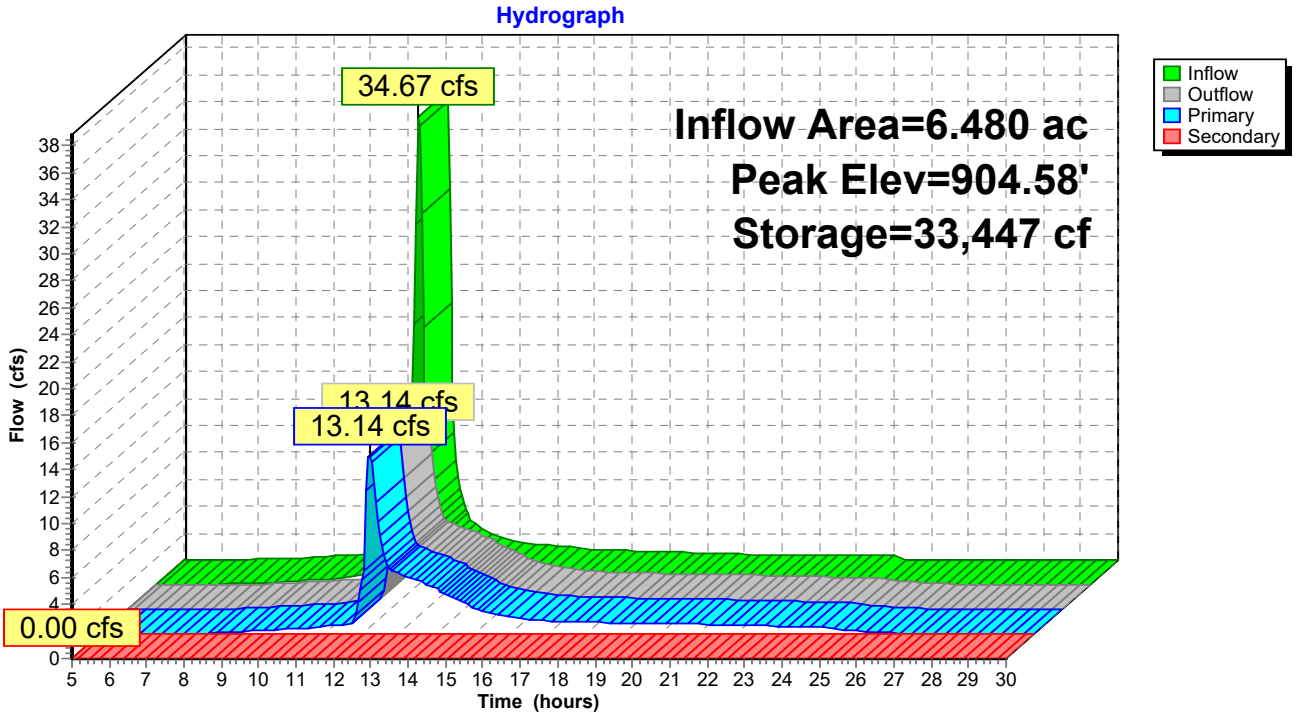
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
900.00	2,381	0	0
901.00	3,197	2,789	2,789
902.00	7,737	5,467	8,256
903.00	9,288	8,513	16,769
904.00	10,896	10,092	26,861
905.00	12,560	11,728	38,589

Device	Routing	Invert	Outlet Devices
#1	Secondary	905.00'	**20.0' 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
#2	Primary	900.00'	**18.0" Round Culvert** L= 330.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 900.00' / 889.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	900.00'	**5.0" Vert. Orifice1** C= 0.600
#4	Device 2	901.90'	**10.0" Vert. Orifice2** C= 0.600
#5	Device 2	904.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=13.14 cfs @ 12.21 hrs HW=904.58' (Free Discharge)
└─**2=Culvert** (Inlet Controls 13.14 cfs @ 7.43 fps)
  ├─**3=Orifice1** (Passes < 1.37 cfs potential flow)
  ├─**4=Orifice2** (Passes < 3.95 cfs potential flow)
  └─**5=Grate** (Passes < 11.42 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=900.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention Basin 3



APPENDIX C: SOIL DESCRIPTIONS

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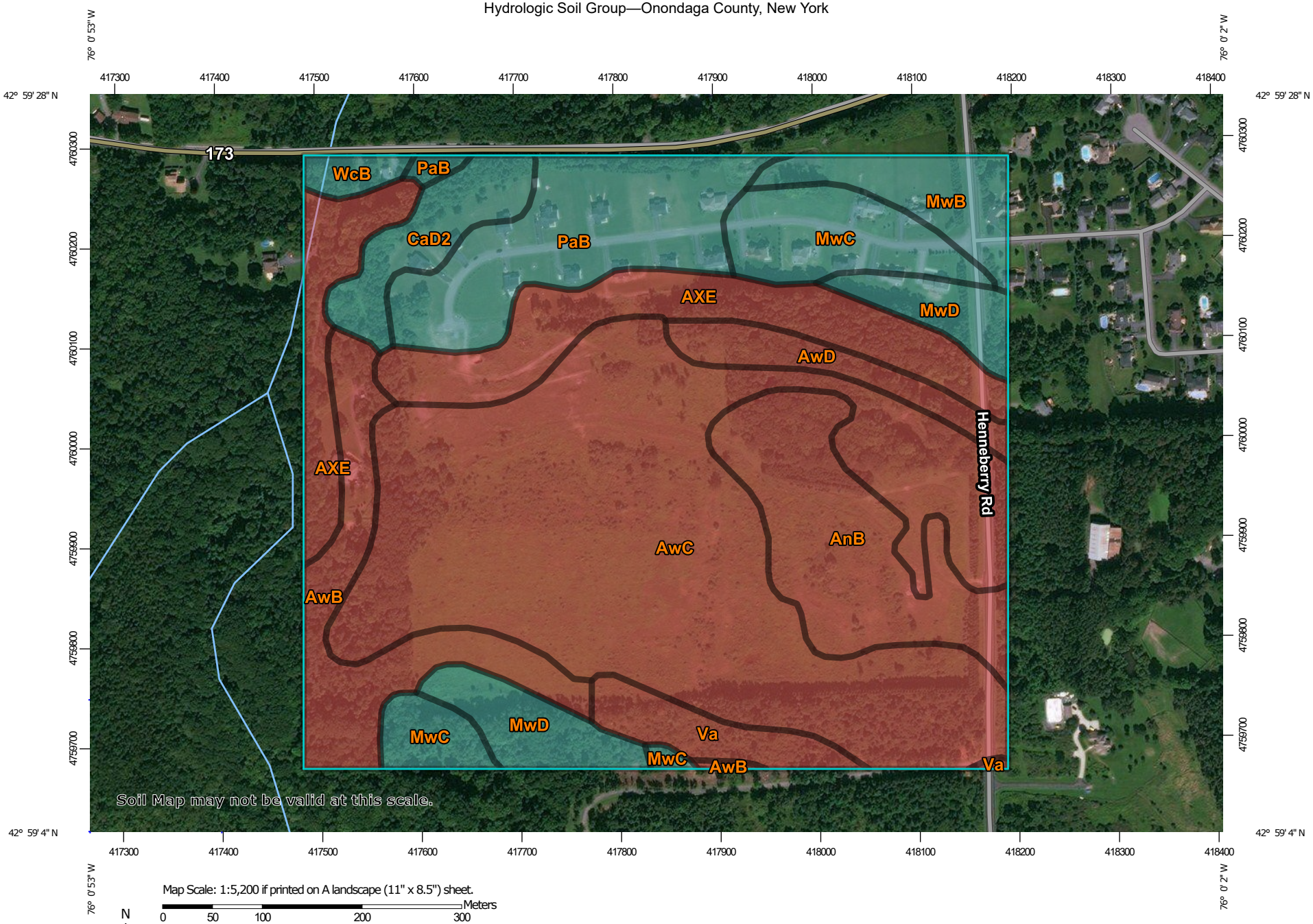
Hydrologic Soil Group—Onondaga County, New York



Map Scale: 1:5,200 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

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

Background

Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Onondaga County, New York
Survey Area Data: Version 15, Jun 11, 2020

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

Date(s) aerial images were photographed: Jun 18, 2011—Oct 10, 2016

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AnB	Angola-Darien silt loams, 0 to 6 percent slopes	D	10.0	9.3%
AwB	Aurora silt loam, 0 to 6 percent slopes	D	7.7	7.1%
AwC	Aurora silt loam, 6 to 12 percent slopes	D	41.7	38.7%
AwD	Aurora silt loam, 12 to 18 percent slopes	D	2.9	2.7%
AXE	Aurora-Farmington-Rock outcrop association, steep	D	12.5	11.6%
CaD2	Camillus silt loam, 12 to 18 percent slopes eroded	C	3.7	3.4%
MwB	Mohawk silt loam, 2 to 8 percent slopes	C	3.7	3.4%
MwC	Mohawk silt loam, 8 to 15 percent slopes	C	6.6	6.1%
MwD	Mohawk silt loam, 15 to 25 percent slopes	C	5.3	4.9%
PaB	Palatine shaly silt loam, 2 to 6 percent slopes	C	9.9	9.2%
Va	Varick silt loam	D	2.9	2.6%
WcB	Wassaic silt loam, 0 to 8 percent slopes	C	0.9	0.9%
Totals for Area of Interest			**107.8**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX D: BIORETENTION BASIN CONSTRUCTION AND MAINTENANCE

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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Bioretention Stormwater Management Practices
Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

BR Drainage Area

Look for areas that are uphill from the Bioretention cell.

Problem (Check if Present)	**Follow-Up Actions**
 ☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and mulch areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and seed and straw to establish vegetation. ☐ If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ Other:

BR Drainage Area

Look for areas that are uphill from the Bioretention cell.

Problem (Check if Present)	Follow-Up Actions
	☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Other:
☐ Open containers of oil, grease, paint, or other substances	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. ☐ Other:

BR Inlets

Stand in the Bioretention cell itself and look for all the places where water flows in. Often there will be multiple points of inflow to the practice.

Problem (Check if Present)	Follow-Up Actions
 ☐ Inlets collect grit and debris or grass/weeds. Some water may not be getting into the Bioretention cell. The objective is to have a clear pathway for water to flow into the cell.	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that will accumulate at these spots. ☐ Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in. ☐ Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets. ☐ For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Bioretention cell. ☐ Dispose of all material properly where it will not re-enter the Bioretention cell. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the Bioretention cell.
 ☐ Some or all of the inlets are eroding so that rills, gullies, and other erosion is present, or there is bare dirt that is washing into the Bioretention cell.	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. ☐ In some cases, reseeding and applying erosion-control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets, and it looks like there is too much water that is concentrating at these points. The inlet design may have to be modified.

BR Ponding Area

Examine the entire Bioretention surface and side slopes

Problem (Check if Present)	Follow-Up Actions
 ☐ Mulch (if used) needs to be replaced or replenished. The mulch layer had decomposed or is less than 1-inch thick.	☐ Add new mulch to a total depth (including any existing mulch that is left) of 2 to 3 inches. The mulch should be shredded hardwood mulch that is less likely to float away during rainstorms. ☐ Avoid adding too much mulch so that inlets are obstructed or certain areas become higher than the rest of the Bioretention surface. ☐ Other:
 ☐ Minor areas of sediment, grit, trash, or other debris are accumulating on the bottom.	☐ Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the Bioretention cell . ☐ If removing the material creates a hole or low area, fill with soil mix that matches original mix and cover with mulch so that the Bioretention surface area is as flat as possible. ☐ Remove trash, vegetative debris, and other undesirable materials. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 2-inches deep and covers 25% or more of the Bioretention surface. ☐ Kick-Out to Level 2 Inspection: The Bioretention cell is too densely vegetated to assess sediment accumulation or ponding; see BR-4, Vegetation.

BR Ponding Area

Examine the entire Bioretention surface and side slopes

Problem (Check if Present)	Follow-Up Actions
 ☐ There is erosion in the bottom or on the side slopes. Water seems to be carving out rills as it flows across the Bioretention surface or on the slopes, or sinkholes are forming in certain areas. ☐ Source: Stormwater Maintenance, LLC.	☐ Try filling the eroded areas with clean topsoil or sand, and cover with mulch. ☐ If the problem recurs, you may have to use stone (e.g., river cobble) to fill in problem areas. ☐ If the erosion is on a side slope, fill with clay that can be compacted and seed and mulch the area. ☐ Other: ☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3-inches deep and seems to be an issue with how water enters and moves through the Bioretention cell. ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water, but a collapse or sinking of the surface (e.g., “sinkhole”) due to some underground problem.
 ☐ The bottom of the Bioretention cell is not flat, and the water pools at one end, along an edge, or in certain pockets. The whole bottom is not uniformly covered with water. See design plan to verify that bioretention surface is intended to be flat. Check during or immediately after a rainstorm.	☐ If the problem is minor (just small, isolated areas are not covered with water), try raking the surface OR adding mulch to low spots to create a more level surface. You may need to remove and replace plantings in order to properly even off the surface. ☐ Check the surface with a string and bubble level to get the surface as flat as possible. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Ponding water is isolated to less than half of the Bioretention surface area, and there seem to be elevation differences of more than a couple of inches across the surface.

BR Ponding Area

Examine the entire Bioretention surface and side slopes

Problem (Check if Present)	Follow-Up Actions
 ☐ Water stands on the surface more than 72 hours after a rainstorm and /or wetland-type vegetation is present. The Bioretention cell does not appear to be draining properly.	☐ Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.

BR Vegetation

Examine all Bioretention cell vegetation.

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation requires regular maintenance—pulling weeds, removing dead and diseased plants, replacing mulch around plants, adding plants to fill in areas that are not well vegetated, etc.	☐ If you can identify which plants are weeds or not intended to be part of the planting plan, eliminate these, preferably by hand pulling. ☐ If weeds are widespread, check with the local stormwater authority and/or Extension Office about proper use of herbicides for areas connected with the flow of water. ☐ Even vegetation that is intended to be present can become large, overgrown, and/or crowd out surrounding plants. Prune and thin accordingly. ☐ If weeds or invasive plants have overtaken the whole Bioretention cell , bush-hog the entire area before seedheads form in the spring. It will be necessary to remove the root mat manually or with appropriate herbicides, as noted above. ☐ Re-plant with species that are aesthetically pleasing and seem to be doing well in the Bioretention cell. ☐ Other: ☐ Kick-Out to Level 2 Inspection: You are unsure of the original planting design, or the vegetation maintenance task is beyond your capabilities of time, expertise, or resources. If you are unsure of the health of the vegetation (e.g. salt damage, invasives, which plants are undesirable) or the appropriate season to conduct vegetation management, consult a landscape professional before undertaking any cutting, pruning, mowing, or brush hogging.

BR Vegetation

Examine all Bioretention cell vegetation.

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation is too thin, is not healthy, and there are many spots that are not well vegetated.	☐ The original plants are likely not suited for the actual conditions within the Bioretention cell . If you are knowledgeable about plants, select and plant more appropriate vegetation (preferably native plants) so that almost the entire surface area will be covered by the end of the second growing season. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: For all but small practices (e.g., rain gardens), this task will likely require a landscape design professional or horticulturalist.

BR Outlets

Examine outlets that release water out of the Bioretention cell.

Problem (Check if Present)	Follow-Up Actions
☐ Erosion at outlet	☐ Add stone to reduce the impact from the water flowing out of the outlet pipe or weir during storms. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Rills have formed and erosion problem becomes more severe.
 ☐ Outlet obstructed with mulch, sediment, debris, trash, etc.	☐ Remove the debris and dispose of it where it cannot re-enter the Bioretention cell . ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Outlet is completely clogged or obstructed; there is too much material to remove by hand or with simple hand tools.

Additional Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Bioretention Stormwater Management Practices
Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

Level 2 Inspection: BIORETENTION
NOTE: Key Source for this Information *(CSN, 2013)*

Recommended Repairs	Triggers for Level 3 Inspection
Observed Condition: Water Stands on Surface for More than 72 Hours after Storm	
☐ Condition 1: Small pockets of standing water Use a soil probe or auger to examine the soil profile. If isolated areas have accumulated grit, fines, or vegetative debris or have bad soil media, try scraping off top 3 inches of media and replacing with clean material. Also check to see that surface is level and water is not ponding selectively in certain areas. ☐ Condition 2: Standing water is widespread or covers entire surface Requires diagnosis and resolution of problem: • Clogged underdrain? • Filter fabric between soil media and underdrain stone? • Need to install underdrain if not present? • Too much sediment/grit washing in from drainage area? • Too much ponding depth? • Improper soil media?	• Soil media is clogged and problem is not evident from Level 2 inspection. • Level 2 inspection identifies problem, but it cannot be resolved easily or is associated with the original design of the practice. ☐ Level 3 inspection necessary
Observed Condition: Vegetation is sparse or out of control	
☐ Condition 1: Original design planting plan seems good but has not been maintained, so there are many invasives and/or dead plants Will require some horticultural experience to restore vegetation to intended condition by weeding, pruning, removing plants, and adding new plants. ☐ Condition 2: Original design planting plan is unknown or cannot be actualized A landscape architect or horticulturalist will be needed to redo the planting plan. Will likely require analysis of soil pH, moisture, organic content, sun/shade, and other conditions to make sure plants match conditions. Plan should include invasive plant management and maintenance plan to include mulching, watering, disease intervention, periodic thinning/pruning, etc.	• Vegetation deviates significantly from original planting plan; Bioretention has been neglected and suffered from deferred maintenance. • Owner/responsible party does not know how to maintain the practice. ☐ Level 3 inspection necessary
Observed Condition: Bioretention does not conform to original design plan in surface area or storage	
☐ Condition 1: Level 2 Inspection reveals that practice is too small based on design dimension, does not have adequate storage (e.g., ponding depth) based on the plan, and/or does not treat the drainage area runoff as indicated on the plan Small areas of deviation can be corrected by the property owner or responsible party, but it is likely that a Qualified Professional will have to revisit the design and attempt a redesign that meets original objectives or that can be resubmitted to the municipality for approval.	• More than a 25% departure from the approved plan in surface area, storage, or drainage area; sometimes less than this threshold at the discretion of the Level 2 inspector. ☐ Level 3 inspection necessary

Level 2 Inspection: BIORETENTION
NOTE: Key Source for this Information *(CSN, 2013)*

Recommended Repairs	Triggers for Level 3 Inspection
Observed Condition: Severe erosion of filter bed, inlets, or around outlets	
☐ Condition 1: Erosion at inlets The lining (e.g., grass, matting, stone, rock) may not be adequate for the actual flow velocities coming through the inlets. First line of defense is to try a more non-erosive lining and/or to extend the lining further down to where inlet slopes meet the Bioretention surface. If problem persists, analysis by a Qualified Professional is warranted. ☐ Condition 2: Erosion of Bioretention filter bed This is often caused by "preferential flow paths" through and along the Bioretention surface. The source of flow should be analyzed and methods employed to dissipate energy and disperse the flow (e.g., check dams, rock splash pads). ☐ Condition 3: Erosion on side slopes Again, the issue is likely linked with unanticipated flow paths down the side slopes (probably overland flow that concentrates as it hits the edge of the slope). For small or isolated areas, try filling, compacting, and re-establishing healthy ground cover vegetation. If the problem is more widespread, further analysis is required to determine how to redirect the flow.	• Erosion (rills, gullies) is more than 12 inches deep at inlets or the filter bed or more than 3 inches deep on side slopes. • If the issue is not caused by moving water but some sort of subsurface defect. This may manifest as a sinkhole or linear depression and be associated with problems with the underdrain stone or pipe or underlying soil. ☐ Level 3 inspection necessary
Observed Condition: Significant sediment accumulation, indicating an uncontrolled source of sediment	
☐ Condition 1: Isolated areas of sediment accumulation, generally less than 3-inches deep Sediment source may be from a one-time or isolated event. Remove accumulated sediment and top 2 to 3 inches of Bioretention soil media; replace with clean material. Check drainage area for any ongoing sources of sediment. ☐ Condition 2: Majority of the surface is caked with "hard pan" (thin layer of clogging material) or accumulated sediment that is 3-inches deep or more This can be caused by an improper construction sequence (drainage area not fully stabilized prior to installation of Bioretention soil media) or another chronic source of sediment in the drainage area. Augering several holes down through the media can indicate how severe the problem is; often the damage is confined to the first several inches of soil media. Removing and replacing this top layer (or to the depth where sediment incursion is seen in auger holes) can be adequate, as long as the problem does not recur.	• More than 2 inches of accumulated sediment cover 25% or more of the Bioretention surface area. • "Hard pan" of thin, crusty layer covers majority of Bioretention surface area and seems to be impeding flow of water down through the soil media. • New sources of sediment seem to be accumulating with each significant rainfall event. ☐ Level 3 inspection necessary

Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Pond and Wetland Stormwater Management Practices Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

PW Drainage Area

Look for areas that are uphill from the pond.

Problem (Check if Present)	**Follow-Up Actions**
☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and straw areas of bare soil to establish vegetation. ☐ Fill in eroded areas with soil, compact, seed and mulch with straw to establish vegetation. ☐ Other:

☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Kick-Out to Level 2 Inspection: If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ If large areas of soil have been eroded or larger channels are forming, this may require rerouting of flow paths or use of an erosion-control seed mat or blanket to reestablish acceptable ground cover or anchor sod where it is practical.
☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Remove excessive vegetation or woody debris that can block drainage systems. ☐ Other:
☐ Open containers of oil, grease, paint, or other substances exposed to rain in the drainage area	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. ☐ Other:

Pond Inlets

Look for all areas where water flows into the pond during storms. Note that there may be multiple points of inflow and types of structures (e.g., pipes, open ditches, etc.).

Problem (Check if Present)	Follow-Up Actions
☐ Inlets are buried, covered or filled with silt, debris, or trash, or blocked by excessive vegetation.	☐ If the problem can be remedied with hand tools and done in a safe manner, remove vegetation, trash, woody debris, etc. from blocking inlet structures. ☐ Other:
	☐ Kick-Out to Level 2 or 3 Inspection: If the amount of material is too large to handle OR there are ANY safety concerns about working in standing water, soft sediment, etc., the work will likely have to be performed by a qualified contractor.

Pond Inlets

Look for all areas where water flows into the pond during storms. Note that there may be multiple points of inflow and types of structures (e.g., pipes, open ditches, etc.).

Problem (Check if Present)		Follow-Up Actions
	☐ Inlets are buried, covered or filled with silt, debris, or trash, or blocked by excessive vegetation.	☐ Kick-Out to Level 2 or 3 Inspection: If the amount of material is too large to handle OR there are ANY safety concerns about working in standing water, soft sediment, etc., the work will likely have to be performed by a qualified contractor.
	☐ Inlets are broken, and, with pieces of pipe or concrete falling into the pond, there is erosion around the inlet, there is open space under the pipe, or there is erosion where the inlet meets the pond	☐ Kick-Out to Level 2 Inspection: These types of structural or erosion problems are more serious and will require a qualified contractor to repair.

PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions
	☐ The pretreatment area(s) or forebay(s) are filled with sediment, trash, vegetation, or other debris.	☐ If the problem can be remedied with hand tools and done in a safe manner, use a flat shovel or other equipment to remove small amounts of sediment. ☐ Remove trash and excessive vegetation from forebays if this can be done in a safe manner. ☐ Other:

PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions
	☐ The pretreatment area(s) or forebay(s) are filled with sediment, trash, vegetation, or other debris.	☐ Kick-Out to Level 2 Inspection: Large amounts of sediment or debris will have to be removed by a qualified contractor. ANY condition that poses a safety concern for working in standing water or soft sediments should be referred to a Level 2 Inspection or qualified contractor.
	☐ The pond area itself has accumulated sediment, trash, debris, or excessive vegetation that is choking the flow of the water, OR the pond area is covered with algae or aquatic plants.	☐ Level 1 includes handling only small amounts of material that can be removed by hand, or with rakes or other hand tools. Do not attempt any repair that poses a safety issue. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Most cases will call for a Level 2 Inspection and/or a qualified contractor. ☐ You are not sure what type and amount of vegetation is supposed to be in the pond. ☐ The algae or aquatic plants should be identified so that proper control techniques can be applied.
	☐ The side slopes of the pond are unstable, eroding, and have areas of bare dirt.	☐ If there are only minor areas, try filling in small rills or gullies with topsoil, compacting, and seeding and mulching all bare dirt areas with an appropriate seed. Alternatively, try using herbaceous plugs to get vegetation established in tricky areas, such as steep slopes. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Erosion and many bare dirt areas on steep side slopes will require a Level 2 Inspection and repair by a qualified contractor.

PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions
	☐ The riser structure is clogged with trash, debris, sediment, vegetation, etc., OR is open, unlocked, or has a steep drop and poses a safety concern. The pond level may have dropped below its "normal" level.	☐ If you can safely access the riser on foot or with a small boat, clear minor amounts of debris and remove it from the pond area for safe disposal. ☐ Other: ☐ Kick-Out to Level 2 Inspection: The riser cannot be accessed safely, the amount of debris is substantial, or the riser seems to be completely clogged and the water level has risen too high. ☐ There are safety issues with the riser and concern about access to pipes, drops, or any other life safety concern. ☐ The riser is leaning, broken, settling or slumping, corroded, eroded or any other structural problem.
	☐ The dam/embankment is slumping, sinking, settling, eroding, or has medium or large trees growing on it.	☐ If there are small isolated areas, try to fix them by adding clean material (clay and topsoil) and seeding and mulching. ☐ Periodically mow embankments to enable inspection of the banks and to minimize establishment of woody vegetation. ☐ Remove any woody vegetation that has already established on embankments. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Most of these situations will require a Level 2 Inspection or evaluation and repair by a qualified contractor. Seepage through the dam or problems with the pipe through the dam can be a serious issue that should be addressed to avoid possible dam failure.

PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions
	☐ The emergency spillway or outfall (if it exists) has ☐ Erosion, settlement, or loss of material. Rock-lined spillways have excessive debris or vegetation.	☐ Clear light debris and vegetation. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Displacement of rock lining, excessive vegetation and erosion/settlement may warrant review and decision by Level 2 Inspector to check against original plan. ☐ Any uncertainty about the integrity of the emergency spillway should be referred to a Level 2 Inspector. ☐ Erosion or settlement such that design has been compromised should be reviewed by an engineer.

PW Pond Outlet

Examine the outlet of the pipe on the downstream side of the dam/embankment where it empties into a stream, channel, or drainage system.

Problem (Check if Present)	Follow-Up Actions
 ☐ The pond outlet is clogged with sediment, trash, debris, vegetation, or is eroding, caving in, slumping, or falling apart.	☐ If there is a minor blockage, remove the debris or vegetation to allow free flow of water. ☐ Remove any accumulated trash at the outlet. ☐ Outlet: ☐ Kick-Out to Level 2 Inspection: ☐ If the area at the outlet cannot be easily accessed or if the blockage is substantial, a Level 2 Inspection is warranted. ☐ Erosion at and downstream of the outfall should be evaluated by a qualified professional. ☐ Any structural problems, such as broken pipes, structures falling into the stream, or holes or tunnels around the outfall pipe, should be evaluated by a Level 2 Inspector and will require repair by a qualified contractor. ☐ The pool of water at the outlet pipe is discolored, has an odor, or has excessive algae or vegetative growth.

Additional Notes:

Inspector:_____ Date: _____

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Certified Completion of Follow-Up Actions:

> "I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Pond and Wetland Stormwater Management Practices Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

Level 2 Inspection: PONDS and WETLANDS

Recommended Repairs and Required Skills	Triggers for Level 3 Inspection
Observed Condition: Bare Soil or Erosion in the Drainage Area	
☐ Condition 1: Extensive problem spots, but no channels or rills forming Reseed problem areas. If problem persists or grass does not take, consider hiring a landscape contractor. ☐ Condition 2: Problem is extensive, and rills/channels are beginning to form May be necessary to divert or redirect water that is causing the erosion problem. If it appears that simple regrading—such as installing a berm or leveling a low spot–will fix the problem, make repairs and ensure that the problem is repaired after the next storm.	• Large rills or gullies are forming in the drainage area. • An attempt to regrade the drainage area has been unsuccessful. • Fixing the problem would require major regrading (i.e., redirecting more than a 100-square-foot area. • It is not clear why the problem is occurring. ☐ Level 3 inspection necessary
Observed Condition: Manholes or Inlet Pipe Buried or Covered with Vegetation	
☐ Condition 1: Nearest manhole and inlet pipe not found Consult as-built drawings to get to closest suspected location and use metal detector to search for metal manhole cover. If unsuccessful, identify nearest drain inlets and approximate pipe direction to locate next manhole. ☐ Condition 2: Manhole located and inspected Never enter a manhole, except by following confined-space entry protocols. If outlet pipe is not visible or greater than 25% full of sediment/debris or trash, it will typically require a qualified contractor to flush, clean and clear blockages. ☐ Condition 3: Inlet pipe not found at pond Clear vegetation and brush that may be covering the inlet pipe. Buried inlet pipes may be found through use of a metal probe. ☐ Condition 4: Inlet pipe buried in sediment or blocked by vegetation Once located, the pipe path can be cleared of vegetation with brush hook or other brush tools. Light digging may clear sediment from the end of the pipe.	• To locate buried manholes and lost storm lines, it is sometimes necessary to hire a pipeline inspection contractor with televising equipment or ground-penetrating radar and enter at the closest upstream access point. • Locating a buried inlet pipe may require wading in the edge of the pond and using a metal probe and brush axe to find and expose the pipe. • If other than light digging is necessary to remove accumulated sediment, a contractor with heavy equipment may be required. ☐ Level 3 inspection necessary

Level 2 Inspection: PONDS and WETLANDS	
Recommended Repairs and Required Skills	**Triggers for Level 3 Inspection**
Observed Condition: Pipe or Headwall Settlement, Erosion, Corrosion or Failure	
☐ Condition 1: Pipe or headwall settlement or failure Severe sinkholes, settlement or corrosion should be kicked out to Level 3 Inspection. ☐ Condition 2: Flow not confined to pipe and visible outside pipe wall With flashlight, observe the inside of the pipe and note its condition. Take photographs. Look for sinkholes developing that indicate pipe failure beneath the surface. Kick out to Level 3 inspection.	• Where blockages are visible, a decision is needed on whether to clear them or leave in place. If a third of the pipe is full of sediment, it should be removed by a contractor with pipe-cleaning equipment. • Corrosion of inlet pipes that allows flow around the pipe exterior is a structural concern because it can lead to settlement, sinkholes and undermining pond embankment. Evidence of this type of failure may require specialized pipe-inspection equipment and investigation by an engineer. ☐ Level 3 inspection necessary
Observed Condition: Pond Conditions	
☐ Condition 1: Pond pre-treatment zone is full of sediment or not constructed as shown on as-built drawings. ☐ Condition 2: Excessive buildup of sediment or overgrowth If the pre-treatment area or pond pool is overgrown or filled with sediment so that the original design is compromised, corrective measures are required. If plants have died, then replanting is necessary. If none of the original design exists due to alteration or sediment, kick out to Level 3 inspection.	• It may require inspection by an engineer to determine next steps for clearing, replanting or reconstruction. • Erosion or settlement such that design has been compromised should be reviewed by an engineer. Recurring erosion may require redesign and/or regrading to direct flow away from eroding area. • If sediment has filled more than 50% of the pond's capacity, dredging is likely needed and should be evaluated by a qualified contractor. • Removal or control of excessive algae or aquatic plants can be assessed by a qualified pond maintenance company. ☐ Level 3 inspection necessary

Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

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Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Swale Stormwater Management Practices
Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

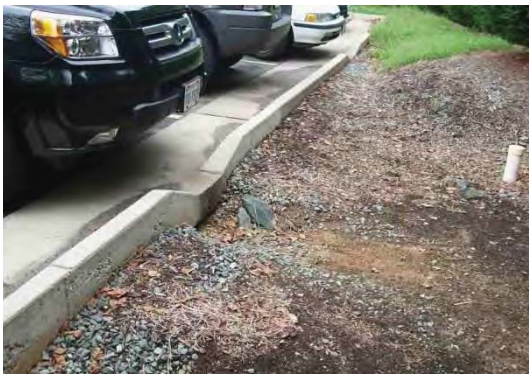
SW Drainage Area

Look at areas that are uphill from the swale.

Problem (Check if Present)	Follow-Up Actions
☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and mulch or sod areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and add seed and straw to establish vegetation. ☐ If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths
☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Other:
☐ Open containers of oil, grease, paint, or other substances	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous.
☐ Grass dying at edge of road	☐ Seed and mulch; add topsoil or compost if needed. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Grass on edge of pavement continues to die off for unknown reasons. Swale edge may need to be replaced with other materials (e.g., stone diaphragm).

SW Inlets

Stand in the swale and look for all the places where water flows in.

Problem (Check if Present)	Follow-Up Actions
☐ Inlets or the swale edge are collecting grit, grass clippings, or debris or have grass/weeds growing. Some water may not be getting into the swale. The objective is to have a clear pathway for water to flow into the swale.	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or opening). Parking lots will generate fine grit that will accumulate at these spots. ☐ Pull out clumps of growing grass or weeds, and scoop out the soil or grit that the plants are growing in. ☐ Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets or along the edge of the swale where water is supposed to enter. ☐ For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the swale. ☐ Dispose of all material properly in an area where it will not re-enter the swale. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the swale.
 ☐ Some or all of the inlets are eroding so that rills, gullies, and other erosion are present, or there is bare dirt that is washing into the swale.	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. ☐ In some cases, reseeding and applying an erosion control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. ☐ Other:
	☐ Level 2 Inspection: Erosion is occurring at most of the inlets or along much of the swale edge. The inlet design may have to be modified.

SW Surface Area

Examine the entire swale surface and side slopes.

Problem (Check if Present)	Follow-Up Actions
☐ Minor areas of sediment, grit, trash, or other debris are accumulating in the swale.	☐ Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the swale. ☐ If removing the material creates a hole or low area, fill with good topsoil and add seed and straw to re-vegetate. ☐ Remove trash, vegetative debris, and other undesirable materials. ☐ If the swale is densely vegetated, it may be difficult to do the maintenance; check for excessive ponding or other issues described in this section to see if the accumulated material is causing a problem. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 3 inches deep and covers 25% or more of the swale surface. ☐ The source of sediment is unknown or cannot be controlled with simple measures.
 ☐ There is erosion in the bottom or on the side slopes. Water seems to be carving out rills as it flows through the swale or on the slopes.	☐ Try filling the eroded areas with clean topsoil, and then seed and mulch to establish vegetation. ☐ If the problem recurs, you may have to use some type of matting, stone (e.g., river cobble), or other material to fill in eroded areas. ☐ If the erosion is on a side slope, fill with soil and cover with erosion-control matting or at least straw mulch after re-seeding.
	☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3 inches deep and seems to be an issue with how water enters and moves through the swale. ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water, but a collapse or sinking of the surface (e.g., “sinkhole”) due to some underground problem.
☐ Water does not flow evenly down the length of the swale, but ponds in certain areas for long periods of time (e.g., 72 hours after a storm). The swale does not seem to have “positive drainage.” Check during or immediately after a rain storm.	☐ If the problem is minor (just small, isolated areas), try using a metal rake or other tools to create a more even flow path; remove excessive vegetative growth, sediment, or other debris that may be blocking the flow. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Water ponds in more than 25% of the swale for three days or more after a storm. The issue may be with the underlying soil or the grade of the swale. ☐ Water ponds behind check dams for three days or more after a storm. Check dams may be clogged or not functioning properly.

SW Surface Area

Examine the entire swale surface and side slopes.

Problem (Check if Present)	Follow-Up Actions
 ☐ Check dams (if present): water is flowing around the edges of check dams, creating erosion or sinkholes on the uphill or downhill side, or the check dams are breaking apart or breaching .	☐ If the problem is isolated to just a few check dams, try simple repairs. ☐ It is very important for the center of each check dam (where most of the water flows) to be lower (by at least several inches) than the edges of the check dams where they meet the side slopes. Also, the check dams should be keyed into side slopes so water does not flow between the check dam and side slope. ☐ Use a level to check the right check-dam configuration, as noted above. Repair by moving around stone, filling and compacting soil, or adding new material so that water will be directed to the center of the check dam instead of the edges. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Many check dams are impacted and/or the problem seems to be a design issue with height, spacing, shape, or materials used to construct them.

SW Vegetation

Assess the swale vegetation.

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation is too overgrown to access swale for maintenance activities	☐ Mow or bush-hog the path. ☐ Other:

SW Vegetation

Assess the swale vegetation.

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation requires regular maintenance: pulling weeds, removing dead and diseased plants, adding plants to fill in areas that are not well vegetated, etc.	☐ If you can identify which plants are weeds or not intended to be part of the planting plan, eliminate these, preferably by hand pulling. ☐ If weeds are widespread, check with the local stormwater authority and/or Extension Office about proper use of herbicides for areas connected with the flow of water. ☐ Even vegetation that is intended to be present can become large, overgrown, block flow, and/or crowd out surrounding plants. Prune and thin accordingly. ☐ If weeds or invasive plants have overtaken the whole swale, bush-hog the entire area before seed heads form in the spring. It will be necessary to remove the root mat manually or with appropriate herbicides, as noted above. ☐ Replant with species that are aesthetically pleasing and seem to be doing well in the swale. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: You are unsure of the original planting design or the vegetation maintenance task is beyond your capabilities of time, expertise, or resources. If you are unsure of the health of the vegetation (e.g. salt damage, invasives, which plants are undesirable) or the appropriate season to conduct vegetation management, consult a landscape professional before undertaking any cutting, pruning, mowing, or brush hogging.
☐ Vegetation is too thin, is not healthy, and there are many spots that are not well vegetated.	☐ The original plants are likely not suited for the actual conditions within the swale. If you are knowledgeable about plants, select and plant more appropriate vegetation (preferably native plants) so that almost the entire surface area will be covered by the end of the second growing season. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: For all but small practices (e.g., in residential yards), this task will likely require a landscape design professional or horticulturalist.

SW Outlets

Examine outlets that release water out of the swale.

Problem (Check if Present)	Follow-Up Actions
☐ Outlet is obstructed with mulch, sediment, debris, trash, etc.	☐ Remove the debris and dispose of it where it cannot re-enter the swale. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Outlet is completely clogged or obstructed; there is too much material to remove by hand or with simple hand tools.

Additional Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Swale Stormwater Management Practices
Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

Level 2 Inspection: SWALE	
Recommended Repairs	**Triggers for Level 3 Inspection**
Observed Condition: Water Stands on Surface for More than 72 Hours after Storm	
☐ Condition 1: Small pockets of standing water Use a soil probe or auger to examine the soil profile. If isolated areas have accumulated grit, fines, or vegetative debris or have compacted soil, try scraping off top 3 to 6 inches of soil and replacing with clean material. Also check to see that surface is level and water is not ponding selectively in certain areas. ☐ Condition 2: Standing water is widespread or covers entire surface Requires diagnosis and resolution of problem: • Bad or compacted soil • Filter fabric on the swale bottom • Too much sediment/grit washing in from drainage area? • Too much ponding depth? • Longitudinal slope is too flat?	• Soil is overly compacted or clogged and problem is not evident from Level 2 inspection. • Level 2 inspection identifies problem, but it cannot be resolved easily or is associated with the original design of the practice (e.g., not enough slope down through the swale). ☐ Level 3 inspection necessary
Observed Condition: Vegetation is predominantly weeds and invasive species	
For a small area, weed and dig up invasive plants. Replant with natives or plants from original planting plan. If longer than 100 feet, develop a new planting plan and have it professionally reviewed.	• Vegetation deviates significantly from original planting plan; swale has been neglected and suffered from deferred maintenance. • Owner/responsible party does not know how to maintain the practice. • For large area, hire a professional to develop a grading plan and develop a planting plan. ☐ Level 3 inspection necessary

Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

> "I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

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APPENDIX E: SWPPP FORMS
Notice of Intent
Notice of Termination
Contractor Forms

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0644089821

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR ☐☐☐☐☐☐
(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-20-001

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-

RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Owner/Operator Contact Person First Name

Owner/Operator Mailing Address

City

State

Zip -

Phone (Owner/Operator) - -

Fax (Owner/Operator) - -

Email (Owner/Operator)

FED TAX ID - (not required for individuals)

Project Site Information

Project/Site Name

Street Address (NOT P.O. BOX)

Side of Street

○ **North** ○ **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)

State N Y

Zip -

County

DEC Region

Name of Nearest Cross Street

Distance to Nearest Cross Street (Feet)

Project In Relation to Cross Street

○ **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)

Y Coordinates (Northing)

4

2. What is the nature of this construction project?

○ **New Construction**

○ **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***Note**: for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	Total Area To Be Disturbed	Existing Impervious Area To Be Disturbed	Future Impervious Area Within Disturbed Area
____.__	____.__	____.__	____.__

5. Do you plan to disturb more than 5 acres of soil at any one time? ○ **Yes** ○ **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
___ %	___ %	___ %	___ %

7. Is this a phased project? ○ **Yes** ○ **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date __ / __ / ____ – **End Date** __ / __ / ____

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

9a. Type of waterbody identified in Question 9?

- ○ Wetland / State Jurisdiction On Site (Answer 9b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001? ○ **Yes** ○ **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-20-001? ○ **Yes** ○ **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ○ **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

.

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ○ **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ○ **Yes** ○ **No** ○ **Unknown**

16. What is the name of the municipality/entity that owns the separate storm sewer system?

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ **Yes** ○ **No** ○ **Unknown**

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ **Yes** ○ **No**

19. Is this property owned by a state authority, state agency, federal government or local government? ○ **Yes** ○ **No**

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ○ **Yes** ○ **No**

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ○ **Yes** ○ **No**

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ○ **Yes** ○ **No**
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ○ **Yes** ○ **No**

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ○ **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer

Contact Name (Last, Space, First)

Mailing Address

City

State Zip -

Phone - -

Fax - -

Email

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name **MI**

Last Name

Signature

Date / /

25. Has a construction sequence schedule for the planned management practices been prepared? ○ **Yes** ○ **No**

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ **Check Dams**
- ○ **Construction Road Stabilization**
- ○ **Dust Control**
- ○ **Earth Dike**
- ○ **Level Spreader**
- ○ **Perimeter Dike/Swale**
- ○ **Pipe Slope Drain**
- ○ **Portable Sediment Tank**
- ○ **Rock Dam**
- ○ **Sediment Basin**
- ○ **Sediment Traps**
- ○ **Silt Fence**
- ○ **Stabilized Construction Entrance**
- ○ **Storm Drain Inlet Protection**
- ○ **Straw/Hay Bale Dike**
- ○ **Temporary Access Waterway Crossing**
- ○ **Temporary Stormdrain Diversion**
- ○ **Temporary Swale**
- ○ **Turbidity Curtain**
- ○ **Water bars**

Biotechnical

- ○ **Brush Matting**
- ○ **Wattling**

Vegetative Measures

- ○ **Brush Matting**
- ○ **Dune Stabilization**
- ○ **Grassed Waterway**
- ○ **Mulching**
- ○ **Protecting Vegetation**
- ○ **Recreation Area Improvement**
- ○ **Seeding**
- ○ **Sodding**
- ○ **Straw/Hay Bale Dike**
- ○ **Streambank Protection**
- ○ **Temporary Swale**
- ○ **Topsoiling**
- ○ **Vegetating Waterways**

Permanent Structural

- ○ **Debris Basin**
- ○ **Diversion**
- ○ **Grade Stabilization Structure**
- ○ **Land Grading**
- ○ **Lined Waterway (Rock)**
- ○ **Paved Channel (Concrete)**
- ○ **Paved Flume**
- ○ **Retaining Wall**
- ○ **Riprap Slope Protection**
- ○ **Rock Outlet Protection**
- ○ **Streambank Protection**

Other

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ○ **Preservation of Undisturbed Areas**
- ○ **Preservation of Buffers**
- ○ **Reduction of Clearing and Grading**
- ○ **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ○ **Sidewalk Reduction**
- ○ **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ○ **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- ○ All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

☐☐☐.☐☐☐ **acre-feet**

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area (acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1) ...	___.___	and/or	___.___
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)	___.___	and/or	___.___
○ Tree Planting/Tree Pit (RR-3)	___.___	and/or	___.___
○ Disconnection of Rooftop Runoff (RR-4) ..	___.___	and/or	___.___
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			___.___
○ Rain Garden (RR-6)			___.___
○ Stormwater Planter (RR-7)			___.___
○ Rain Barrel/Cistern (RR-8)			___.___
○ Porous Pavement (RR-9)			___.___
○ Green Roof (RR-10)			___.___
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			___.___
○ Infiltration Basin (I-2)			___.___
○ Dry Well (I-3)			___.___
○ Underground Infiltration System (I-4)			___.___
○ Bioretention (F-5)			___.___
○ Dry Swale (O-1)			___.___
Standard SMPs			
○ Micropool Extended Detention (P-1)			___.___
○ Wet Pond (P-2)			___.___
○ Wet Extended Detention (P-3)			___.___
○ Multiple Pond System (P-4)			___.___
○ Pocket Pond (P-5)			___.___
○ Surface Sand Filter (F-1)			___.___
○ Underground Sand Filter (F-2)			___.___
○ Perimeter Sand Filter (F-3)			___.___
○ Organic Filter (F-4)			___.___
○ Shallow Wetland (W-1)			___.___
○ Extended Detention Wetland (W-2)			___.___
○ Pond/Wetland System (W-3)			___.___
○ Pocket Wetland (W-4)			___.___
○ Wet Swale (O-2)			___.___

Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	Total Contributing Impervious Area (acres)
○ **Hydrodynamic**	___ . ___
○ **Wet Vault**	___ . ___
○ **Media Filter**	___ . ___
○ **Other** _____	___ . ___

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name _____

Manufacturer _____

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

___ . ___ **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

○ **Yes** ○ **No**

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

___ . ___ **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

○ **Yes** ○ **No**

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

☐☐☐.☐☐☐ **acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a). ☐☐☐.☐☐☐

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ○ **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required

☐☐☐.☐☐☐ **acre-feet**

CPv Provided

☐☐☐.☐☐☐ **acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development

☐☐☐.☐☐☐ **CFS**

Post-development

☐☐☐.☐☐☐ **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

☐☐☐.☐☐☐ **CFS**

Post-development

☐☐☐.☐☐☐ **CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ○ **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP N Y R
- ○ Other
- ○ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ○ **Yes** ○ **No**
If Yes, Indicate Size of Impact. .

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ **Yes** ○ **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ **Yes** ○ **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. N Y R

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name

MI

Print Last Name

Owner/Operator Signature

Date

/ /

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4:
12. MS4 SPDES Permit Identification Number: NYR20A
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505
(NOTE: Submit completed form to address above)

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person:	4a.Telephone:

4b. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

9a. □ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP. ***Date final stabilization completed** (month/year): _____

9b. □ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ___ ___ ___ ___ ___ ___
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? □ yes □ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed? □ yes □ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

_____

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? □ yes □ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

□ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.

□ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).

□ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.

□ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? _____ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? □ yes □ no

(If Yes, complete section VI - "MS4 Acceptance" statement

V. Additional Information/Explanation:

(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:

Title/Position:

Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued	
VII. Qualified Inspector Certification - Final Stabilization:	
I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):	
I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
IX. Owner or Operator Certification	
I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2015)

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NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING

110 FAYETTE STREET
MANLIUS, NEW YORK 13104

October 4th, 2021

Mr. Joseph Lupia and Manlius Planning Board Members
Town of Manlius
Planning Board Chairman
301 Brooklea Drive
Fayetteville, New York 13066

Re: Brandywine Estates Drinking Water Supply Evaluation

Dear Joe and Planning Board Members,

Following the review of comments made by Mr. Gerald Gould, C.P.G., P.G., & Mr. Doug Miller, P.E., regarding the drinking water supply evaluation for the Brandywine Estates project, we've prepared the following responses addressing the concerns that have recently been raised. Below is the question in italics with our team's response below.

With these responses, we would like to be on the next planning board agenda for the October 25, 2021 meeting.

1. ***Ground surface, well logs and drawdown elevations are not provided. A report like this typically presents the data in terms of surveyed elevations related to sea level or an assumed datum. This allows more accurate comparison of wells, geology, and groundwater relationships.***

   Response courtesy of David Stoner
   Ground surface elevations, well logs and drawdown data are included in the attachments to the August 11, 2021 report. A brief summary is as follows: Well #5- elevation 894, the lithology of all three wells is similar with about 20 feet of glacial till underlain by about 50 feet of shale, in turn underlain by about 190 feet of hard limestone, in turn underlain by a loose and soft limestone Depth to water pre-test 287 ft., groundwater elevation 607 ft.

   -Well #6- elevation 898, depth to water pre-test 289 ft., groundwater elevation 609 ft.
   -Well #29- elevation 920, depth to water pre-test 271 ft., groundwater elevation 649 ft.

   The data show that the groundwater elevations in Wells #5 and #6 are similar (607 and 609 ft.) and that Well #29 is higher in surface elevation and had a pretest water level that is about 40 feet higher than water levels in Wells 5 and 6.

PH 315-682-5580 • FAX 315-682-5544 • EMAIL:MNAP@NAPCON.COM

2. ***The characterization of upgradient and cross gradient wells is speculative without the elevation data.***

   Response courtesy of David Stoner
   Based on the data from the three wells the question of what is cross gradient and what is upgradient indicates that groundwater flows, generally, from south to north. Cross gradient is east and west.

   Summary Response By Matt Napierala
   As stated in Mr. Stoner's response to question 1, elevation information for each well and water surface elevations have been provided, therefore, the characterization for the upgradient and cross gradient wells is not speculative.

3. ***Typically, a study like this would be most informative with two observation wells at 90-degree angles to the pumping well. It would also be useful if the wells were oriented in relationship to the local fracture patterns and the strike and dip of the geologic units of interest. The well locations for the study are not easily determined from the figure and these relationships not established.***

   Response courtesy of David Stoner
   The study design was intended to provide an observation well cross gradient (approximately 90 degrees) and upgradient (approximately 90 degrees) from the pumping well. Due to site access difficulties, the locations of the three wells were changed from lots 1, 2 and 23 to locations on lots 5, 6 and 29. The geometry of the well locations was maintained i.e. we have two observation wells at right angles to the pumping well. The well locations and elevations are shown on the site layout figure and the well logs.

4. ***The distance between wells was not reported. This is important to calculating drawdown influence.***

   Response courtesy of David Stoner
   The distance from well 5 to well 6 is approximately 200 feet and the distance to well 29 is approximately 100 feet. These distances can be tape measured and provided to the town as necessary.

5. ***No geologic cross section were included. Cross sections depicting the geology interpreted from the drilling logs and indicating the depths and casings in the wells would provide more complete information.***

   Response courtesy of David Stoner
   Cross sections were not provided because the limited number of wells did not warrant it. Nevertheless the well logs show that the lithology is fairly uniform as described in section one above.

6. ***The time-drawdown data is not presented in graphic form. It is very difficult to determine if the drawdown during pumping is uniform or if there are sudden drops in water level that may indicate fracture flow and possible interfering connections between wells.***

Response courtesy of David Stoner

Time drawdown data was not presented in graphical form because there were 1380 data points during the pumping test. The drawdown data was included in the attachment to the report. Examination of the data from the pumping well indicates that water levels were: 0.74 ft. at 30 minutes, 1.05 ft. at 2 hours, and the maximum drawdown was at about 21.5 hours. It is hard to interpret the subtleties that might exist in the pattern of water levels with such a small amount of drawdown.

There is no doubt that the water in the Onondaga formation (the aquifer that is being used) is being carried in fractures. Based on the well logs it appears that the zone between 260 feet below ground surface and the bottom of each well is highly fractured. There is no evidence in the well logs or the pumping test results that indicate that singular fractures are conducting or storing water. The bottom 60 feet or so is described as soft and loose.

7. ***No information is provided about weather conditions preceding or during the pumping test. If not accounted for, precipitation and barometric pressure changes can influence drawdown and effect the results interpretation.***

Response courtesy of David Stoner

It is true that barometric pressure change, recharge and other factors can affect water levels in wells. The pumping test was run over a three-day period and any effect of barometric pressure change would be uniform between the three wells. It is very difficult to say what role recharge might have over a three-day period but it seems likely that a water bearing zone lying beneath glacial till and shale would not react quickly to short term recharge events.

8. ***It is concerning that Well #5 and Well #6 experienced identical drawdown during the pumping test. Typically, a non-pumping well shows smaller drawdown than the pumping well. This may indicate the wells are connected by a fracture. Fracturs can quickly transmit contaminants over large distances. Fractures could also de-water very quickly, especially if tapped by several pumping wells, and cause wells to go dry.***

Response courtesy of David Stoner

It is surprising that the drawdown in well #6 is almost as much as seen in the pumping well. It reflects the relatively high hydraulic conductivity of the formation. Concern about fractures being dewatered and wells going dry is, generally, a valid concern. There are many wells further to the south that cannot provide enough water for individual homes. In this situation the pumping well and the observation wells did not dewater during almost 24 hours of continuous pumping at a rate that exceeds what might be expected for the peak, instantaneous pumping rate. The drawdown in both well 5 and 6 stabilized before the end of the test. Well #5 discharged enough water, in less than one day, to provide an individual home with water for more than a month.

-

9. ***The report mentions image well theory, however no data or analysis is provided.***

Response courtesy of David Stoner
Drawdown of multiple wells can be estimated by superposition. Superposition is based on the concept that the aggregate drawdown is the sum of individual drawdowns. For example, if Well A is pumping at 10 gallons per minute with a drawdown of 10 feet, and Well B that is 200 feet away has a drawdown of 5 feet during the pumping of Well A then by superposition it can be estimated that with both wells pumping at 10 gallons per minute the drawdown in each well will be 15 feet. Based on the pumping test completed at Well #5. At a pumping rate and duration that far exceeds what can be expected the drawdown in wells pumping at lot 5 and 6 would be the addition of drawdowns in each well or a total of 4.48 feet. It is harder to extrapolate this further because we have no data further away. Normally the drawdown diminishes with distance so it should be expected that the drawdown on lots 7 and 8 from pumping Well #5 would be less than what is observed in the well on lot #6. Nevertheless, even if we assume that the drawdown in other cross gradient wells is additive, we would add the cumulative drawdown of four wells and the total drawdown would be 9 feet, compared to a safe yield drawdown of 23 feet.

10. ***The report does not state how pumping test discharge water was handled. Pumped water should be discharged far enough away from the wells so as not to percolate back down to the well causing recirculation and invalidating the drawdown result.***

Response courtesy of Mark Shute

The pumping test discharge water was piped approximately 80-100 feet north of Well #5. The area around Well #5 was dry throughout the test.

11. ***Well #6 was cased to 120 ft below ground surface. Wells #5 and #29 were cased to 30 ft. No explanation is given for the rational of casing depths.***

Response courtesy of Mark Shute

Between 85 – 110 ft, we encountered a fractured zone of loose limestone. We determined it may create a problem in the future with a pump installed below it and needed to be cased into the competent bedrock.

12. ***There is no water chemistry data provided. This is important in considering the potability of the water and possible changes in chemistry over the duration of the pumping test.***

Response courtesy of Mark Shute

A water analysis was conducted on the pumping well. These results were given to Dave in the same summary letter dated 7-27-21. We did not do a coliform or e. coli test. I still have the pump installed in lot #5 and can re chlorinate and get a sample if needed.

-

13. ***The calculation of drawdown of multiple wells of 4.8 feet is not supported with any calculations or assumptions.***

    Please refer to the above response for comment #9 from David Stoner regarding the calculations and assumptions made in finding of the 4.8-foot drawdown of multiple wells.

    Drawdown of multiple wells can be estimated by superposition. Superposition is based on the concept that the aggregate drawdown is the sum of individual drawdowns. For example, if Well A is pumping at 10 gallons per minute with a drawdown of 10 feet, and Well B that is 200 feet away has a drawdown of 5 feet during the pumping of Well A then by superposition it can be estimated that with both wells pumping at 10 gallons per minute the drawdown in each well will be 15 feet. Based on the pumping test completed at Well #5. At a pumping rate and duration that far exceeds what can be expected the drawdown in wells pumping at lot 5 and 6 would be the addition of drawdowns in each well or a total of 4.48 feet. It is harder to extrapolate this further because we have no data further away. Normally the drawdown diminishes with distance so it should be expected that the drawdown on lots 7 and 8 from pumping Well #5 would be less than what is observed in the well on lot #6. Nevertheless, even if we assume that the drawdown in other cross gradient wells is additive, we would add the cumulative drawdown of four wells and the total drawdown would be 9 feet, compared to a safe yield drawdown of 23 feet.

If you have any questions or if you need any other additional information, please contact us.

Respectfully submitted,

NAPIERALA CONSULTING
Professional Engineer, P.C.

Matthew R. Napierala

Matthew R. Napierala, P.E.
Managing Engineer/ President

cc: Doug Miller, P.E., Town of Manlius

Brandywine Estates
Well Report

8/31/2021

Harrington Homes Inc.

3848 Henneberry Road

Manlius, NY 13078

NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING

110 Fayette Street
Manlius, New York 13104

August 31st, 2021

Town of Manlius Planning Board
Town of Manlius
301 Brooklea Drive
Fayetteville, NY 13066

Re: Brandywine Estates, Phase II Well Report
3848 Henneberry Road
Jamesville, NY 13078

Dear Chairman Lupia and Board Members,

Following our last Planning Board meeting in December of 2020, Harrington Homes, LLC retained the services of DW Stoner & Associates, LLC to perform a well study and report at the proposed Brandywine Estates Phase II project site. This well study was conducted following concerns raised by the Planning Board regarding water availability and sustainability on-site for the proposed 34 lot single-family home subdivision.

As per the attached report, the results and testing conducted showed that the installation and utilization of individual water wells on this property is appropriate. Based on the attached pumping test performed at a pumping rate of 12gpm, the cumulative drawdown of multiple nearby wells was 4.8ft, or about 14% of the aquifer saturated thickness. In conclusion, all 34 lots on the project site, atop the geologic Onondaga Formation, is capable of yielding adequate volumes of water to each individual home without the risk of excessive drawdown.

If you have any questions or if you need any other additional information, please contact us.

Respectfully submitted,

NAPIERALA CONSULTING
Professional Engineer, P.C.

Matt Napierala
Matthew R. Napierala

cc:
Doug Miller P.E., Town Engineer
Mark Harrington, Harrington Homes

Enclosure

PH 315-682-5580 • FAX 315-682-5544 • EMAIL:MNAP@NAPCON.COM

DW Stoner & Associates, LLC

PO Box 164
Groton, Vermont 05046
Phone: 315-447-8733

August 11, 2021

Mr. Mark Harrington, President
Harrington Homes Inc.
3848 Henneberry Road
Manlius, New York 13078

RE: Well Installation and Testing Results
Brandywine Estates – Phase 2

Dear Mr. Harrington,

The purpose of this report is to describe the installation and testing of three wells on proposed lots 5, 6 and 29 of the Brandywine Estates Phase 2 subdivision located in Manlius NY.

Well Installation and Testing

In a workplan dated January 4, 2021 it was proposed that wells be installed on lots 1, 2 and 23 and that a pumping test be conducted by pumping well 2 at a safe yield pumping rate for 24 hours while measuring the water level in wells 1, 2 and 23. Due to access problems for these three lots it was agreed to install wells on lots 5,6 and 29 and conducting a pumping test by pumping the well on lot 5 and monitoring water levels in wells on lots 5,6 and 29 during the duration of the pumping test and for 24 hours after pumping had ceased. The configuration of wells 5,6 and 29 is similar to that of the original wells i.e. the pumping well and one of the observation wells are on the same elevation and the third well is uphill from the pumping well on the adjacent lot (cross-gradient and upgradient respectively).

Well locations are shown on the attached figure and well logs are also attached. Well installation and the pumping test were conducted by Shute's Lafayette Well Drilling in consultation with David W. Stoner, P.G.

The lithology at the three well locations is similar with about twenty feet of glacial till overlying bedrock. The top 40-50 feet of bedrock is shale of the Marcellus formation. The shale is underlain by a fairly hard and competent limestone to about 260 feet below ground surface (bgs). That limestone is underlain by a much softer, loose and fractured limestone from approximately 260 feet to the bottom of each well (323-327 ftbgs).The measured water level in each well demonstrates that the saturated thickness (water column) in each well ranges from 35 to 56 feet.

Following well installation and development (purging the well of sediment) a preliminary yield estimate indicated that a pumping rate of 12 gallons per minute would easily meet the safe yield metric of no greater than 2/3 of the available drawdown.

Of the three wells the least amount of pre-pumping standing water is 35 feet. Safe yield would be equal to a discharge rate resulting in a stabilized drawdown not exceeding 23 feet.

Pumping Test Results

A pump was set in well (lot) 5 and data loggers placed in all three wells. From July 21st to July 22 the well on lot 5 was pumped at a constant rate of 12 gallons per minute. The well was pumped continuously for 23 hours at which time the generator quit operating. The data loggers collected water levels every minute during the pumping period and every minute for 24 hours after pumping ceased. Those data are attached and the results are summarized as follows:

Well #5 (pumping well)

1. Pre- pumping test water level depth below grade- 286.47 ft
2. Maximum drawdown during the pumping test depth below grade-288.71 ft.
3. Equates to a drawdown of 2.24 ft
4. Well fully recovered 24 hours after pumping ceased

Well #29 (upgradient observation well)

1. Pre- pumping test water level depth below grade-263.18 ft
2. Maximum drawdown during the pumping test depth below grade-263.24 ft
3. Equates to a drawdown of 0.06 ft (3/4 inch)
3. Well fully recovered 24 hours after pumping test.

Well #6 (cross-gradient observation well)

1. Pre- pumping test water level depth below grade-279.19 ft
2. Maximum drawdown during the pumping test depth below grade-281.43 ft
3. Equates to a drawdown of 2.24 ft
4. Well fully recovered 24 hours after pumping test

Results and Discussion

The results of the pumping test indicate that wells installed at these depths and in this location perform far above what is needed for domestic supply wells. Pumping well #5 produced a total of 16650 gallons of water with less than 2.5 feet of drawdown, where a safe yield drawdown would be 23 feet. Based on the data collected via the pumping test the hydraulic conductivity of the aquifer was calculated, using the Thiem equation, as 1.7 meters per day, a relatively high rate of flow. The drawdown in the observation wells was less than 2.5 feet on well #6 and negligible in well # 29. It is very unlikely that even the maximum instantaneous demand from a home built in this neighborhood would reach 12 gallons per minute and unlikely that these homes would consume more than 500 gallons per day. Applying image well theory to the test results can provide a worst case projection of the influence of one pumping well on another. In simple

but conservative terms we can project that at a sustained pumping rate of 12 gallons per minute the combined drawdown of well #5 with well #6 pumping at the same would produce a drawdown of about 4.8 feet in well #6. This amount of drawdown is about 12 percent of the water column in well #6. The projected drawdown produced by pumping well #5 on well 29 is negligible.

The well logs and testing information indicate that this aquifer is unconfined; that is the static water level in each well is below the top of the more permeable limestone unit. The natural hydraulic gradient is from south to north. For an unconfined aquifer the amount of water stored in the aquifer is equivalent to the effective porosity which Bouwer (Groundwater Hydrology, 1978) estimates for this type of aquifer as being between 10 and 20 percent. For frame of reference an aquifer with this amount of storage (say 10 percent) has about 32000 gallons of water in each acre foot of aquifer.

It should be noted that this productive aquifer is part of the Onondaga formation which dips gently to the south and is overlain by the relatively impermeable Marcellus shale. The presence of the Marcellus shale offers some protection for the Onondaga from surface activities. However this highly productive aquifer is accessible in a zone that runs east-west about 250 miles but is only 2-5 miles from north to south (USGS).

The Harrington Homes development appears to be located to take advantage of this productive zone. The results of this testing indicate that the installation and use of individual water wells on this property will be appropriate. Based on the pumping test performed at a pumping rate of 12gpm it is calculated that the cumulative drawdown of multiple wells will be 4.8 feet or about 14% of the aquifer saturated thickness throughout the proposed subdivision. While an instantaneous demand of 12 gpm for a single home is possible the average daily demand will probably less than 500 gallons. The pumping test indicates that wells installed on all 34 lots, completed in the Onondaga Formation will be capable of yielding adequate water to individual homes without excessive drawdown. I would be happy to answer any questions that you or the Manlius Planning Board might have about this report.

Very Truly Yours,

David W. Stoner, P.G.

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Appendix A

Site Plan

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
WELL WATER STUDY PLAN

NO.	REVISION/ISSUE	DATE

PREPARED BY:
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, NEW YORK 13104
email: MNAP@NAPCON.COM
PH: (315) 682-5580 FAX: (315) 682-5544

PRELIMINARY
NOT FOR CONSTRUCTION

PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

PROJECT NO. 20-1906
DATE 26 AUG 2021
SCALE 1" = 80'

SHEET
SK-8

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NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, PC
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED ARCHITECT, ENGINEER, LANDSCAPE ARCHITECT OR LAND SURVEYOR TO ALTER IN ANY WAY AN ITEM BEARING THE SEAL OF THE LICENSED PERSON.
ITEMS MARKED WITH A "STEP" TYPE DOCUMENT IS RECORDED BY LAW TO APPLY TO ALL ITEMS ON THIS DOCUMENT. ADDITIONS, ALTERES BY PLOTTERS BY ANY OR HER OTHER THAN THE ORIGINAL PRODUCER OF THE ALTERATIONS.

Appendix B

Well Reports

(1) COUNTY Onondaga

(2) TOWN Manlius town

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WATER WELL COMPLETION REPORT

(3) DEC Well Number: OD3152

(4) OWNER: Harrington Homes
Same as owner address

(5) ADDRESS: 3848 Henneberry Rd
Manlius, NY

(6) LOCATION OF WELL (See Instructions on Reverse): Brandywine Estates Lot 5 Manlius, NY

(7) LATITUDE LONGITUDE AND METHOD USED (8) TAX MAP NO
☑ GPS ☐ Map Lat: 42.9884 Long -76.007267

(9) DEPTH OF WELL BELOW LAND SURFACE (feet)	(10) DEPTH TO GROUNDWATER LAND SURFACE (feet)	DATE MEASURED	(12) FLOWING?
323	300	6/9/2021	NO

CASINGS

(13) DIAMETER	6 in	in	in	in
(14) LENGTH	30 ft	ft	ft	ft

(15) GROUT TYPE / SEALING: Bentonite/slurry

(16) GROUT / SEALING INTERVAL (feet): 0 30

SCREENS

(17) MAKE & MATERIAL

(18) SLOT SIZE

(19) DIAMETER	in	in	in	in
(20) LENGTH	ft	ft	ft	ft

(21) DEPTH TO TOP OF SCREEN FROM TOP OF CASIN (Feet)

YIELD TEST

(22) DATE: 6/10/2021

(23) DURATION OF TEST: 2Hr 0 Min

(24) LIFT METHOD: Pump X Air Lift Bail

(25) STABILIZED DISCHARGE (GPM): 20

(26) STATIC LEVEL PRIOR TO TEST: 287

(27) MAXIMUM DRAWDOWN (Stabilized)

(28) RECOVERY (Time in Hours/minutes): Hr Min

(29) Was the water produced during the test discharged away from the immediate area? YES ☐ NO ☑

DRILLER INFORMATION

(30) METHOD OF DRILLING: X Rotary Cable Tool Other

(31) USE OF WATER: Domestic

(32) DATE DRILLING WORK STARTED: 6/9/2021

(33) DATE DRILLING WORK COMPLETED: 6/10/2021

(34) DATE REPORT FILED: 7/23/2021

(35) REGISTERED COMPANY: Shute's LaFayette Well Drilling LLC

(35) DEC REGISTRATION NO: NYRD 10613

(37) REGISTERED COMPANY ADDRESS: 5954 US Route 20 LaFayette NY 13084

(38) CERTIFIED DRILLER (Print name): Jeff Shute

(44) CERTIFIED DRILLER SIGNATURE: Jeff M. Shute

PUMP INSTALLATION

(40) PUMP INSTALLED: Yes ☐ No ☑

(41) DATE

(42) TYPE

(43) MAKE

(44) MODEL

(45) MAXIMUM CAPACITY (GPM)

(46) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

(47) DATE REPORT FILED

(48) REGISTERED COMPANY

(49) DEC REGISTRATION NO: NYRD

(37) REGISTERED COMPANY ADDRESS

WELL LOG

DEPTH TO BEDROCK (ft below land surface): 22

GROUND ELEVATION (ft above sea level): 894

TOP OF CASING (ft above (+) or below (-) ground surface): +2

TOP OF WELL

0	5	Brown Hardpan Hard
5	22	Brown Clay Gravel Stones Medium
22	28	Black Shale Soft
28	60	Black Shale Medium
60	260	Gray Limestone Hard
260	300	Brown Limestone Soft
300	323	Brown Limestone Loose

(1) COUNTY Onondaga

(2) TOWN Manlius town

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WATER WELL COMPLETION REPORT

(3) DEC Well Number OD3153

(4) OWNER Harrington Homes
Same as owner address

(5) ADDRESS 3848 Henneberry Rd
Manlius, NY

(6) LOCATION OF WELL (See Instructions on Reverse
Brandywine Estates Lot 6 Manlius, NY

(7) LATITUDE LONGITUDE AND METHOD USED (8) TAX MAP NO
☑ GPS ☐ Map Lat: 42.9885 Long: -76.007833

(9) DEPTH OF WELL BELOW LAND SURFACE (feet)	(10) DEPTH TO GROUNDWATER LAND SURFACE (feet)	DATE MEASURED	(12) FLOWING?
327	303	6/11/2021	NO

CASINGS

(13) DIAMETER	6 in	in	in	in
(14) LENGTH	120 ft	ft	ft	ft

(15) GROUT TYPE / SEALING: Bentonite/slurry

(16) GROUT / SEALING INTERVAL (feet) 5 115

SCREENS

(17) MAKE & MATERIAL

(18) SLOT SIZE

(19) DIAMETER	in	in	in	in
(20) LENGTH	ft	ft	ft	ft

(21) DEPTH TO TOP OF SCREEN FROM TOP OF CASIN (Feet)

YIELD TEST

(22) DATE 6/11/2021

(23) DURATION OF TEST 2Hr 0 Min

(24) LIFT METHOD Pump X Air Lift Bail

(25) STABILIZED DISCHARGE (GPM) 20

(26) STATIC LEVEL PRIOR TO TEST 289

(27) MAXIMUM DRAWDOWN (Stabilized)

(28) RECOVERY (Time in Hours/minutes) Hr Min

(29) Was the water produced during the test discharged away from the immediate area? YES ☐ NO ☑

DRILLER INFORMATION

(30) METHOD OF DRILLING X Rotary Cable Tool Other

(31) USE OF WATER Domestic

(32) DATE DRILLING WORK STARTED 6/11/2021

(33) DATE DRILLING WORK COMPLETED 6/11/2021

(34) DATE REPORT FILED 7/23/2021

(35) REGISTERED COMPANY Shute's LaFayette Well Drilling LLC

(35) DEC REGISTRATION NO NYRD 10613

(37) REGISTERED COMPANY ADDRESS
5954 US Route 20 LaFayette NY 13084

(38) CERTIFIED DRILLER (Print name) Jeff Shute

(44) CERTIFIED DRILLER SIGNATURE Jeff Shute

PUMP INSTALLATION

(40) PUMP INSTALLED Yes ☐ No ☑

(41) DATE

(42) TYPE

(43) MAKE

(44) MODEL

(45) MAXIMUM CAPACITY (GPM)

(46) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

(47) DATE REPORT FILED

(48) REGISTERED COMPANY

(49) DEC REGISTRATION NO NYRD

(37) REGISTERED COMPANY ADDRESS

WELL LOG

DEPTH TO BEDROCK 21 ft below land surface

GROUND ELEVATION 898 ft above sea level

TOP OF CASING +2 ft above (+) or below (-) ground surface

TOP OF WELL

0	6	Brown Hardpan Hard
6	21	Brown Clay & Stones Medium
21	65	Black Shale Soft
65	85	Gray Limestone Hard
85	110	Gray Limestone Loose
110	262	Gray Limestone Hard
262	303	Brown Limestone Soft
303	327	Brown Limestone Loose

(1) COUNTY Onondaga

(2) TOWN Manlius town

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WATER WELL COMPLETION REPORT

(3) DEC Well Number: OD3154

(4) OWNER: Harrington Homes
Same as owner address

(5) ADDRESS: 3848 Henneberry Rd
Manlius, NY

(6) LOCATION OF WELL (See Instructions on Reverse): Brandywine Estates Lot 29 Manlius, NY

(7) LATITUDE LONGITUDE AND METHOD USED: ☑ GPS ☐ Map Lat: 42.9881 Long: -76.007167

(8) TAX MAP NO

(9) DEPTH OF WELL BELOW LAND SURFACE (feet)	(10) DEPTH TO GROUNDWATER LAND SURFACE (feet)	DATE MEASURED	(12) FLOWING?
327	299	6/12/2021	NO

CASINGS

(13) DIAMETER	6 in	in	in	in
(14) LENGTH	30 ft	ft	ft	ft

(15) GROUT TYPE / SEALING: Bentonite/slurry

(16) GROUT / SEALING INTERVAL (feet): 0 30

SCREENS

(17) MAKE & MATERIAL

(18) SLOT SIZE

(19) DIAMETER	in	in	in	in
(20) LENGTH	ft	ft	ft	ft

(21) DEPTH TO TOP OF SCREEN FROM TOP OF CASIN (Feet)

YIELD TEST

(22) DATE: 6/12/2021

(23) DURATION OF TEST: 2Hr 0 Min

(24) LIFT METHOD: Pump X Air Lift Bail

(25) STABILIZED DISCHARGE (GPM): 20

(26) STATIC LEVEL PRIOR TO TEST: 271

(27) MAXIMUM DRAWDOWN (Stabilized)

(28) RECOVERY (Time in Hours/minutes): Hr Min

(29) Was the water produced during the test discharged away from the immediate area? YES ☐ NO ☑

DRILLER INFORMATION

(30) METHOD OF DRILLING: X Rotary Cable Tool Other

(31) USE OF WATER: Domestic

(32) DATE DRILLING WORK STARTED: 6/12/2021

(33) DATE DRILLING WORK COMPLETED: 6/12/2021

(34) DATE REPORT FILED: 7/23/2021

(35) REGISTERED COMPANY: Shute's LaFayette Well Drilling LLC

(36) DEC REGISTRATION NO: NYRD 10613

(37) REGISTERED COMPANY ADDRESS: 5954 US Route 20 LaFayette NY 13084

(38) CERTIFIED DRILLER (Print name): Jeff Shute

(44) CERTIFIED DRILLER SIGNATURE*: Jeff Shute

PUMP INSTALLATION

(40) PUMP INSTALLED: Yes ☐ No ☑

(41) DATE

(42) TYPE

(43) MAKE

(44) MODEL

(45) MAXIMUM CAPACITY (GPM)

(46) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

(47) DATE REPORT FILED

(48) REGISTERED COMPANY

(49) DEC REGISTRATION NO: NYRD

(37) REGISTERED COMPANY ADDRESS

WELL LOG

DEPTH TO BEDROCK (ft below land surface): 21

GROUND ELEVATION (ft above sea level): 920

TOP OF CASING (ft above (+) or below (-) ground surface): +2

TOP OF WELL

0	8	Brown Hardpan Medium
8	21	Brown Clay & Stones Hard
21	70	Black Shale Soft
70	268	Gray Limestone Hard
268	299	Brown Limestone Soft
299	327	Brown Limestone Loose

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Appendix C

Raw Well Drawdown Data

Data file for DataLogger.
==========
COMPANY : <Company name>
COMP.STATUS: Done (Barometer: Baro | Serial number: U0191 | Sample Interval: 01 Minute)
DATE : 28/07/2021
TIME : 08:38:19
FILENAME : C:\Users\shute\Desktop\CSV\Well Lot5 Brandywine_210728083819_R1358.CSV
CREATED BY : Diver-Office 11.2.0.0
========== BEGINNING OF DATA ==========
[Logger settings]
Instrument type =Micro-Diver=15
Status =Started =0
Serial number =..00-R1358 215.
Instrument number = UTC-4
=0
Location =Well Lot5 Brandywine
Sample period =S60
Sample method =T
Number of channels =2
[Channel 1]
Identification =WATER HEAD (TOC-CL)
Reference level =13.1234 ft
Range =352.6903 ft
Master level =0 m
Altitude =0 ft
[Channel 2]
Identification =TEMPERATURE
Reference level =-4.000 °F
Range =180.000 °F

[Series settings]
Serial number =..00-R1358 215.
Instrument number = UTC-4
Location =Well Lot5 Brandywine
Sample period =00 00:00:60 0
Sample method =T
Start date / time =00:00:17 21/07/21
End date / time =00:48:16 23/07/21
[Channel 1 from data header]
Identification =WATER HEAD (TOC-CL)
Reference level =13.1234 ft
Range =352.6903 ft
Master level =0 m
Altitude =0 ft
[Channel 2 from data header]
Identification =TEMPERATURE

Reference level =-4.000 °F
Range =180.000 °F

Date/time	Water hea	Temperature[°F]
########	286.4761	48.536
########	286.7181	48.536
########	286.7347	48.548
########	286.77	48.566
########	286.8288	48.59
########	286.8405	48.602
########	286.8405	48.602
########	286.8993	48.614
########	286.9111	48.626
########	286.9521	48.626
########	286.9707	48.638
########	286.9699	48.638
########	286.9699	48.65
########	286.9346	48.65
########	286.9923	48.668
########	287.012	48.668
########	287.0226	48.668
########	287.0814	48.68
########	287.0814	48.68
########	287.0579	48.692
########	287.0628	48.692
########	287.0981	48.692
########	287.1216	48.704
########	287.1216	48.704
########	287.1216	48.704
########	287.0932	48.716
########	287.1167	48.728
########	287.147	48.728
########	287.152	48.728
########	287.1284	48.716
########	287.1216	48.728
########	287.1921	48.74
########	287.1569	48.704
########	287.1815	48.68
########	287.1872	48.68
########	287.1637	48.668
########	287.147	48.65
########	287.1569	48.65
########	287.1921	48.65
########	287.1569	48.65
########	287.1921	48.65
########	287.1872	48.65

########	287.1872	48.65
########	287.1872	48.65
########	287.2627	48.638
########	287.2225	48.638
########	287.2274	48.638
########	287.2225	48.65
########	287.2627	48.638
########	287.2578	48.638
########	287.2274	48.65
########	287.2578	48.638
########	287.2578	48.638
########	287.298	48.638
########	287.2684	48.65
########	287.2627	48.65
########	287.2627	48.65
########	287.2684	48.65
########	287.298	48.638
########	287.298	48.638
########	287.339	48.638
########	287.298	48.638
########	287.298	48.638
########	287.339	48.638
########	287.3283	48.638
########	287.3332	48.638
########	287.3332	48.638
########	287.339	48.704
########	287.3685	48.728
########	287.339	48.74
########	287.293	48.758
########	287.3332	48.758
########	287.345	48.77
########	287.3685	48.782
########	287.3685	48.794
########	287.3332	48.782
########	287.3742	48.782
########	287.3636	48.782
########	287.3401	48.77
########	287.4095	48.782
########	287.4038	48.782
########	287.345	48.77
########	287.3742	48.74
########	287.3332	48.758
########	287.386	48.77
########	287.3742	48.758
########	287.3742	48.758
########	287.3802	48.77
########	287.4095	48.782

########	287.4038	48.758
########	287.3685	48.758
########	287.3685	48.758
########	287.386	48.77
########	287.4262	48.77
########	287.439	48.782
########	287.4448	48.794
########	287.4213	48.77
########	287.4038	48.758
########	287.386	48.77
########	287.3792	48.758
########	287.4144	48.758
########	287.4262	48.77
########	287.4448	48.782
########	287.4095	48.758
########	287.4614	48.77
########	287.4497	48.758
########	287.485	48.74
########	287.4508	48.716
########	287.4213	48.716
########	287.485	48.704
########	287.4565	48.692
########	287.4614	48.692
########	287.4614	48.692
########	287.4614	48.692
########	287.485	48.704
########	287.4614	48.692
########	287.4614	48.692
########	287.485	48.704
########	287.5153	48.704
########	287.5202	48.74
########	287.48	48.704
########	287.4967	48.692
########	287.4918	48.716
########	287.4967	48.716
########	287.5252	48.728
########	287.5074	48.716
########	287.5016	48.716
########	287.5074	48.716
########	287.5074	48.716
########	287.5309	48.704
########	287.5074	48.716
########	287.5252	48.704
########	287.532	48.692
########	287.5074	48.692
########	287.5604	48.728
########	287.5369	48.716

########	287.5252	48.704
########	287.5426	48.716
########	287.5426	48.716
########	287.5426	48.692
########	287.5426	48.668
########	287.5662	48.68
########	287.6014	48.68
########	287.5662	48.68
########	287.5426	48.692
########	287.6014	48.728
########	287.5828	48.77
########	287.576	48.758
########	287.6121	48.74
########	287.6064	48.74
########	287.5662	48.758
########	287.6416	48.782
########	287.5711	48.782
########	287.5662	48.758
########	287.6064	48.782
########	287.6064	48.758
########	287.6416	48.74
########	287.6121	48.728
########	287.6474	48.728
########	287.5711	48.758
########	287.5828	48.77
########	287.6181	48.77
########	287.5768	48.758
########	287.6474	48.74
########	287.623	48.716
########	287.6238	48.692
########	287.623	48.716
########	287.6181	48.716
########	287.6181	48.716
########	287.6238	48.716
########	287.6064	48.758
########	287.6769	48.728
########	287.6288	48.716
########	287.6474	48.704
########	287.6238	48.716
########	287.6876	48.728
########	287.6416	48.758
########	287.6474	48.782
########	287.6534	48.77
########	287.6288	48.77
########	287.6523	48.758
########	287.6826	48.74
########	287.6876	48.728

########	287.6523	48.758
########	287.6523	48.728
########	287.6876	48.74
########	287.669	48.716
########	287.7228	48.704
########	287.6591	48.716
########	287.6993	48.716
########	287.7228	48.728
########	287.6876	48.758
########	287.7228	48.728
########	287.7179	48.74
########	287.7042	48.716
########	287.7581	48.74
########	287.7277	48.728
########	287.7228	48.728
########	287.7042	48.716
########	287.7228	48.728
########	287.7179	48.728
########	287.7228	48.74
########	287.6944	48.716
########	287.7277	48.728
########	287.7228	48.728
########	287.6993	48.716
########	287.6876	48.758
########	287.7581	48.728
########	287.7228	48.74
########	287.7277	48.704
########	287.7581	48.728
########	287.7277	48.728
########	287.7179	48.704
########	287.6993	48.716
########	287.7346	48.716
########	287.6876	48.704
########	287.7983	48.74
########	287.7395	48.716
########	287.7581	48.728
########	287.7395	48.716
########	287.7748	48.716
########	287.7346	48.716
########	287.7983	48.728
########	287.7983	48.728
########	287.763	48.704
########	287.7884	48.728
########	287.763	48.728
########	287.7698	48.716
########	287.7748	48.716
########	287.8286	48.74

########	287.7934	48.728
########	287.7934	48.728
########	287.7934	48.728
########	287.7983	48.74
########	287.7581	48.728
########	287.763	48.74
########	287.7581	48.728
########	287.7983	48.74
########	287.7983	48.728
########	287.7983	48.704
########	287.7983	48.704
########	287.81	48.716
########	287.7748	48.716
########	287.8335	48.704
########	287.81	48.692
########	287.8335	48.704
########	287.7983	48.704
########	287.8335	48.68
########	287.7748	48.692
########	287.81	48.716
########	287.8335	48.728
########	287.8335	48.728
########	287.8393	48.728
########	287.8158	48.692
########	287.8158	48.716
########	287.8158	48.716
########	287.8688	48.74
########	287.8393	48.704
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########	287.8158	48.716
########	287.856	48.716
########	287.8158	48.716
########	287.8844	48.74
########	287.8795	48.728
########	287.8795	48.728
########	287.8795	48.704
########	287.9148	48.728
########	287.9197	48.728
########	287.8795	48.728
########	287.8746	48.728
########	287.8844	48.704
########	287.8795	48.704
########	287.8962	48.716
########	287.856	48.716
########	287.8962	48.692
########	287.8912	48.692
########	287.9148	48.728

########	287.9019	48.716
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########	287.8962	48.692
########	287.8609	48.668
########	287.8852	48.704
########	287.8912	48.716
########	287.8609	48.692
########	287.8795	48.68
########	287.9254	48.704
########	287.8844	48.68
########	287.9148	48.68
########	287.9019	48.692
########	287.9205	48.68
########	287.856	48.692
########	287.8609	48.692
########	287.95	48.68
########	287.9197	48.68
########	287.9205	48.68
########	287.8962	48.692
########	287.8962	48.692
########	287.8962	48.716
########	287.9148	48.704
########	287.9019	48.716
########	287.9205	48.728
########	287.9372	48.692
########	287.9148	48.68
########	287.9549	48.68
########	287.9197	48.68
########	287.9314	48.668
########	287.897	48.692
########	287.9549	48.704
########	287.9372	48.692
########	287.9607	48.704
########	287.9656	48.704
########	287.9421	48.716
########	287.9558	48.704
########	287.9607	48.68
########	287.9607	48.68
########	287.9549	48.704
########	287.9019	48.716
########	287.9421	48.692
########	287.9421	48.668
########	287.9713	48.704
########	287.9656	48.728
########	287.9656	48.704
########	287.9713	48.68
########	287.9656	48.68

########	287.9713	48.68
########	287.9656	48.68
########	287.9724	48.668
########	287.9774	48.668
########	287.9713	48.68
########	287.9724	48.668
########	287.9713	48.65
########	287.996	48.68
########	288.0009	48.704
########	287.9774	48.692
########	287.9372	48.692
########	288.0009	48.704
########	287.9823	48.692
########	287.9421	48.692
########	287.9656	48.68
########	287.9303	48.65
########	287.9421	48.692
########	287.9774	48.692
########	288.0066	48.68
########	288.0009	48.704
########	287.996	48.704
########	287.9774	48.692
########	288.0009	48.68
########	288.0009	48.68
########	287.9372	48.716
########	287.9421	48.692
########	287.9656	48.68
########	287.9774	48.692
########	287.9724	48.692
########	288.0009	48.704
########	287.9774	48.668
########	287.9558	48.65
########	287.996	48.68
########	287.9372	48.692
########	288.0077	48.692
########	288.0361	48.704
########	287.9724	48.692
########	288.0009	48.704
########	287.9724	48.692
########	287.9774	48.692
########	288.0009	48.704
########	288.0312	48.704
########	287.996	48.68
########	288.0312	48.704
########	288.0263	48.704
########	287.9724	48.692
########	288.0077	48.716

########	288.0312	48.704
########	288.0263	48.704
########	288.0361	48.704
########	287.9774	48.716
########	288.0126	48.692
########	288.0361	48.704
########	288.0361	48.68
########	287.9774	48.692
########	288.0361	48.68
########	288.0361	48.68
########	288.0479	48.692
########	288.0361	48.68
########	288.0126	48.668
########	288.0126	48.668
########	288.0419	48.68
########	288.0772	48.68
########	288.0479	48.692
########	288.0479	48.668
########	288.0479	48.692
########	288.0479	48.692
########	288.0479	48.692
########	288.0772	48.68
########	288.0479	48.692
########	288.0665	48.68
########	288.0772	48.68
########	288.0832	48.692
########	288.0714	48.68
########	288.1067	48.68
########	288.1067	48.68
########	288.0881	48.692
########	288.0889	48.692
########	288.0832	48.692
########	288.0832	48.692
########	288.1173	48.68
########	288.1067	48.68
########	288.0832	48.692
########	288.0821	48.68
########	288.0714	48.68
########	288.0832	48.692
########	288.0714	48.68
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END OF DATA FILE OF DATALOGGER FOR WINDOWS

Data file for DataLogger.
==========
COMPANY : <Company name>
COMP.STATUS: Done (Barometer: Baro | Serial number: U0191 | Sample Interval: 01 Minute)
DATE : 28/07/2021
TIME : 08:38:20
FILENAME : C:\Users\shute\Desktop\CSV\Well Lot6 Brandywine_210728083819_L8333.CSV
CREATED BY : Diver-Office 11.2.0.0
========== BEGINNING OF DATA ==========
[Logger settings]
Instrument type =Micro-Diver=15
Status =Started =0
Serial number =..00-L8333 215.
Instrument number = UTC-4
=0
Location =Well Lot6 Brandywine
Sample period =S60
Sample method =T
Number of channels =2
[Channel 1]
Identification =WATER HEAD (TOC-CL)
Reference level =13.1234 ft
Range =352.6903 ft
Master level =0 m
Altitude =0 ft
[Channel 2]
Identification =TEMPERATURE
Reference level =-4.000 °F
Range =180.000 °F

[Series settings]
Serial number =..00-L8333 215.
Instrument number = UTC-4
Location =Well Lot6 Brandywine
Sample period =00 00:00:60 0
Sample method =T
Start date / time =00:00:17 21/07/21
End date / time =00:52:16 23/07/21
[Channel 1 from data header]
Identification =WATER HEAD (TOC-CL)
Reference level =13.1234 ft
Range =352.6903 ft
Master level =0 m
Altitude =0 ft
[Channel 2 from data header]
Identification =TEMPERATURE

Reference level =-4.000 °F
Range =180.000 °F

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END OF DATA FILE OF DATALOGGER FOR WINDOWS

Data file for DataLogger.
==========
COMPANY : <Company name>
COMP.STATUS: Done (Barometer: Baro | Serial number: U0191 | Sample Interval: 01 Minute)
DATE : 28/07/2021
TIME : 08:25:53
FILENAME : C:\Users\shute\Desktop\CSV\Well Lot29 Brandywin_210728082553_R3296.CSV
CREATED BY : Diver-Office 11.2.0.0
========== BEGINNING OF DATA ==========
[Logger settings]
Instrument type =Micro-Diver=15
Status =Started =0
Serial number =..00-R3296 215.
Instrument number = UTC-4
=0
Location =Well Lot29 Brandywin
Sample period =S60
Sample method =T
Number of channels =2
[Channel 1]
Identification =WATER HEAD (TOC-CL)
Reference level =13.1234 ft
Range =352.6903 ft
Master level =0 m
Altitude =0 ft
[Channel 2]
Identification =TEMPERATURE
Reference level =-4.000 °F
Range =180.000 °F

[Series settings]
Serial number =..00-R3296 215.
Instrument number = UTC-4
Location =Well Lot29 Brandywin
Sample period =00 00:00:60 0
Sample method =T
Start date / time =00:00:17 21/07/21
End date / time =00:55:16 23/07/21
[Channel 1 from data header]
Identification =WATER HEAD (TOC-CL)
Reference level =13.1234 ft
Range =352.6903 ft
Master level =0 m
Altitude =0 ft
[Channel 2 from data header]
Identification =TEMPERATURE

Reference level =-4.000 °F
Range =180.000 °F

Date/time	Water hea	Temperature[°F]
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########	309.866	77.654
########	309.8141	77.474
########	309.871	77.312
########	309.7602	77.21

END OF DATA FILE OF DATALOGGER FOR WINDOWS

Expected Fee: _____

TOWN OF MANLIUS
PLANNING DEPARTMENT
INITIAL APPEARANCE APPLICATION

DATE: 09/16/20

Name of Project: Harrington Homes at Brandywine

Applicant must submit 12 copies of all site plans, surveys, and supporting data with the final application before a planning board meeting can be scheduled.

Location of Project: Henneberry Road

Type of Project:

● Division of Land ● Subdivision ○ Accessory Use ○ Zone Change ● Site Review ○ Other _____

Developer: Harrington Homes (Mark Harrington) Phone: 315-682-8851

Address: 3848 Henneberry Road, Jamesville, NY Zip: 13078

Tax Map Number(#)/s: 109.-02-07.1

Present Zoning: R-1 Desired Zoning: N/A

Total Acreage: 54 Total Number of Lots: 34

Property Owner/s: Same as Developer above Phone: _____

Address: _____ Zip: _____

Tax Map#(s): _____ Owner's Signature: X

Printed Name: MARK HARRINGTON

Property Owner/s: _____ Phone: _____

Address: _____ Zip: _____

Tax Map#(s): _____ Owner's Signature: _____

Printed Name: MARK HARRINGTON

Use next page for additional known property owners' information

---

Planning Board Meeting Date Assignment: _____

Fee: _____ Paid: _____ Per: ○ Credit/Debit Card ○ Check ○ Cash

TOWN OF MANLIUS
PLANNING DEPARTMENT
INITIAL APPEARANCE APPLICATION
(continued)

Property Owner/s: MARK HARRINGTON Phone: 315 682 8851

Address: 3848 HONEYBERRY RD JAMESVILLE NY Zip: 13078

Tax Map#(s): Owner's Signature:

Printed Name: MARK HARRINGTON

Property Owner/s: Phone:

Address: Zip:

Tax Map#(s): Owner's Signature:

Printed Name:

Property Owner/s: Phone:

Address: Zip:

Tax Map#(s): Owner's Signature:

Printed Name:

Property Owner/s: Phone:

Address: Zip:

Tax Map#(s): Owner's Signature:

Printed Name:

Property Owner/s: Phone:

Address: Zip:

Tax Map#(s): Owner's Signature:

Printed Name:

Property Owner/s: Phone:

Address: Zip:

Tax Map#(s): Owner's Signature:

Printed Name:

CORPORATE ACKNOWLEDGEMENT

STATE OF NEW YORK)
) SS:
COUNTY OF ONONDAGA)

MARK HARRINGTON, being duly sworn, deposes and says the s(he) is the OFFICER of HARRINGTON HOMES OF SYRACUSE INC corporation named in the within Application/Petition, that s(he) has read the foregoing affidavit and knows the contents thereof; that the same is true of s(he) own knowledge, except as to those matters therein stated to be alleged upon information and belief, and as to those matters s(he) believes it to be true.

Applicant Signature

Subscribed to me before this day
Of 14th SEPTEMBER, 2020

Notary Public

PARUL PATEL
NOTARY PUBLIC-STATE OF NEW YORK
No. 01PA6350018
Qualified in Onondaga County
My Commission Expires 10-31-2020

06/29/16 LB

III. That no Town of Manlius officer, employee or a relative of either, as defined in Section 809 General Municipal Law has any interest in this application.

-OR-

If a Town of Manlius officer, employee or relative of either as defined in Section 809 General Municipal law has any interest in this application, the full particulars are provided on an attached sheet.

Date: 9/14, 2020.

MARK HARRINGTON
(Print Name)

(Signature)

HARRINGTON HOMES OF JAMESVILLE INC
(Entity Name)

By (Officer) (Title)

3848 HENNEBERRY RD. JAMESVILLE NY 13078
(Mailing Address of Applicant)

315-682-8851
(Telephone Number)

Date: ——, 20——.

(Print Name)

(Signature)

(Entity Name)

By (Officer) (Title)

(Mailing Address of Applicant)

(Telephone Number)

ACKNOWLEDGEMENTS

STATE OF NEW YORK)
) SS:
COUNTY OF ONONDAGA)

On this 14th day of SEPTEMBER in the year 2020, before me, the undersigned, a notary public in and for said state, personally appeared HARRINGTON, MARK, SMYTH, and —— personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within Petition and acknowledged to me the he/she/they executed the same in his/her/their capacity, and that by his/her/their signature(s) on the Petition, the individual or the persons upon behalf of which the individual acted executed the instrument.

Notary Public

PARUL PATEL
NOTARY PUBLIC-STATE OF NEW YORK
No. 01PA6350018
Qualified in Onondaga County
My Commission Expires 10-31-2020

TOWN OF MANLIUS

DISCLOSURE AFFIDAVIT

This affidavit is a part of and must be completed and attached to every application, petition, request submitted for a *site plan, variance, amendment, change of zoning, approval of a plat, exemption from a plat or official map, license* or *permit.*

STATE OF NEW YORK)
) SS:
COUNTY OF ONONDAGA)

I. MARK HARRINGTON, being duly sworn, deposes and says that (s) he is:

_____
(applicant, petitioner, corporation officer, property owner, *etc.)*

II. That deponent has read and is familiar with the provisions of the General Municipal Law, Section 809 which states:

A. Every application, petition or request submitted for a site plan, variance, amendment, change of zoning, approval of a plat, exemption from a plat or official map, license or permit, pursuant to the provisions or any ordinance, local law, rule or regulation constituting the zoning and planning regulations of a municipality shall state the name, residence and the nature and extent of the interest of any state officer or any officer or employee of such municipality is a part, in the person, partnership or association making such application, petition or request (hereinafter called the applicant) to the extent known to such applicant.

B. For the purpose of this action an officer or employee shall be deemed to have an interest in the applicant when (s)he, his/her spouse, or their brothers, sisters, parents, children, grandchildren, or the spouse of any of them:

1) is the applicant, or
2) is an officer, director, partner or employee of the applicant, or
3) legally or beneficially owns or controls stock of a corporate applicant or is a member of a partnership or association applicant, or
4) is a party to an agreement with such an applicant, express or implied, whereby (s) he may receive any payment or other benefit, whether or not for services rendered, or contingent upon the favorable approval of such application, petition or request.

C. Ownership of less than five percent (5%) of the stock of a corporation whose stock is listed on the New York or American Stock Exchanges shall not constitute an interest for the purposes of this section.

D. A person who knowingly and intentionally violates this section shall be guilty of a misdemeanor.

Doug Miller

From: Gerald Gould - GGG <ggould@gouldgw.com>
Sent: Friday, September 24, 2021 9:26 AM
To: Doug Miller
Subject: Brandywine Estates drinking water supply evaluation

Doug,
I have reviewed David Stoner's report. I agree with his conclusion that the results appear promising, however the evidence provided is not what was promised in the proposal and lacks information I consider important to understanding the aquifer and better evaluating the effects of 34 simultaneously pumping wells. It should be noted that the test described meets NYSDOH standards for a single domestic well flow, this result cannot necessarily be extrapolated to account for the additive effect of running many wells at the same time.

Here are my concerns, in no particular order:

1. Ground surface, well logs and drawdown elevations are not provided. A report like this typically presents the data in terms of surveyed elevations related to sea level or an assumed datum. This allows more accurate comparison of wells, geology and groundwater relationships.
2. The characterization of upgradient and cross gradient wells is speculative without the elevation data.
3. Typically a study like this would be most informative with two observation wells at 90 degree angles to the pumping well. It would also be most useful if the wells were oriented in relationship to the local fracture patterns and the strike and dip of the geologic units of interest. The well locations for this study are not easily determined from the figure and these relationships not established.
4. The distance between wells was not reported. This is important to calculating drawdown influences.
5. No geologic cross sections were included. Cross sections depicting the geology interpreted from the drilling logs and indicating the depths and casing in the wells would provide more complete information.
6. The time-draw down data is not presented in graphic form. It is very difficult to determine if the drawdown during pumping is uniform or if there are sudden drops in water level that may indicate fracture flow and possible interfering connections between wells.
7. No information is provided about weather conditions preceding or during the pumping test. If not accounted for, precipitation and barometric pressure changes can influence drawdown and effect the results interpretation.
8. It is concerning that Well #5 and Well #6 experienced identical drawdown during the pumping test. Typically a non-pumping well shows a smaller drawdown than the pumping well. This may indicate that the wells are connected by a fracture. Fractures can quickly transmit contaminants over large distances. Fractures could also de-water very quickly, especially if tapped by several pumping wells, and cause wells to go dry.
9. The report mentions image well theory, however no data or analysis is provided.
10. The report does not state how pumping test discharge water was handled. Pumped water should be discharged far enough away from the wells so as not to percolate back down to the well causing recirculation and invalidating the drawdown result.
11. Well # 6 was cased to 120 ft below ground surface. Wells #5 and #29 were cased to 30 ft. No explanation is given for the rational of casing depths.
12. There is no water chemistry data provided. This is important in considering the potability of the water and possible changes in chemistry over the duration of the pumping test.
13. The calculation of drawdown of multiple wells of 4.8 feet is not supported with any calculations or assumptions.

Call me if you have questions.

Gerry

Onondaga County Planning Board

GML 239 Referral Notice

Referring Municipality/Board: Town of Manlius Planning Board

Referral Contact: Lisa Beeman

Contact Email/Phone: lbeeman@townofmanlius.org 315-637-8619

Type of Referral: ☒ General Municipal Law §239 Review ☐ Informal Review ☐ 3-Mile Limit Review

1. Project Applicant: Harrington Homes **2. Site Address:** Brandywine off of Henneberry Road

3. Tax ID Number(s): 109.-02-07.1 **4. Total Acres:** 54

5. Current Zoning: R-1 **6. Current Land Use:** Vacant

7. Project Description: Create a 34 - Lot Subdivision of single family homes

Please indicate the existing AND proposed water and wastewater service. The notes field is available to provide further details which may better describe the proposed conditions, particularly for projects with multiple lots/structures.

Water Service *Provider:* _____

8a. Existing:
- ☐ Municipal
- ☐ Individual Well
- ☒ None

8b. Proposed:
- ☐ New or Additional Municipal Connection
- ☒ New or Additional Individual Well
- ☐ No Change

Wastewater Service *Provider:* _____

9a. Existing:
- ☐ Municipal Sanitary Sewer
- ☐ Individual Septic System
- ☒ None

9b. Proposed:
- ☒ New or Additional Municipal Connection
- ☐ New or Additional Individual Septic System
- ☐ No Change

Notes: _____

10. ☒ **OCPB Jurisdiction (c**heck ALL that apply and specify)

☐ **Text Adoption/Amendment** -or- ☒ **Site is located within 500 feet of:**

- ☒ a municipal boundary: Town of Pompey
- ☒ a state or county thruway/highway/roadway: State Route 173
- ☐ an existing or proposed state or county park/recreation area: _____
- ☐ an existing or proposed county-owned stream or drainage channel: _____
- ☐ a parcel containing a state or county-owned building/institution: _____
- ☐ a farm operation located in a New York State Agricultural District (include Ag Data Statement pursuant to AML §305-a)

Referred Action(s)

If referring multiple actions related to the same project, identify the referring municipal board if different from above.

11. ☐ **Text Adoption** -or- ☐ **Text Amendment** **Referring Board:** _____

(Includes: adoption of and amendments to comprehensive plans, local laws, zoning ordinances, subdivision regulations)

Please enclose a document with changes tracked OR the existing and proposed text with a summary of the proposed change(s).

Summary of the proposed additions/changes: _____

12. ☐ **Zone Change** (Includes map amendments) **Referring Board:**

Proposed Zoning District: _____ Number of Acres Affected: _____

Purpose and Proposed Use: _____

13. ☐ **Site Plan** -or- ☐ **Project Site Review** **Referring Board:**

Proposed Use/Improvements: _____

14. ☐ **Special Permit** **Referring Board:**

Section of local zoning code that requires a special permit for this use: _____

Purpose: _____

15. ☒ **Preliminary Subdivision** -or- ☐ **Final Subdivision** **Referring Board:** Town of Manlius Planning Board

Name of Subdivision: Harrington Homes at Brandywine

Number of Proposed Lots and Use Type (residential and/or commercial): 34 Lots

Is this a cluster subdivision pursuant to Section 278 of the New York State Town Law? ☐ Yes ☒ No

16. ☐ **Use Variance** **Referring Board:**

Section(s) of local zoning code to which the variance is being sought: _____

Describe how the proposed project varies from the above code section: _____

17. ☐ **Area Variance** **Referring Board:**

Section(s) of local zoning code to which the variance is being sought: _____

Describe how the proposed project varies from the above code section: _____

18. ☐ **Other Authorization** **Referring Board:**

Indicate the referable action and provide any other applicable details: _____

SEQR Information

Action (check one):

☐ Type I
☐ Type II
☐ Unlisted Action

Determination of Significance (if known):

☐ Positive Declaration – Draft EIS Required
☐ Conditional Negative Declaration (for Unlisted Actions only)
☐ Negative Declaration
☐ No Finding (Type II Actions only)

Lead Agency (if known): _____ **Date Lead Agency Assigned:** _____

In order for a referral to be considered complete, *the Type of Action must be classified, and the appropriate EAF (Short or Long EAF) must be filled out as required under SEQR*, except in the case of Type II Actions which do not require an EAF. If the municipality possesses or will be requiring additional materials in order to make a determination under SEQR, or if a determination has been made, those materials are also required for the referral to be considered complete.

Attachments

☒ Survey ☒ Subdivision Plat ☒ EAF/Related Materials ☐ Laws/Texts
☒ Site Plan ☒ Local Application Form ☐ Ag Data Statement ☐ Other _____

This referral, as required by NYS GML §239 l, m & n, includes all materials required by and submitted to the referring body as an application on the proposed action, including all materials required by the referring body in order to make its determination of significance pursuant to SEQRA.

Lisa Beeman/ Clerk	315-637-8619 lbeeman@townofmanlius.org	09-23-2020
Name/Title of Person Completing This Form	*Phone/Email*	*Transmittal Date*

J.Ryan McMahon II
County Executive

Onondaga County Planning Board

RESOLUTION OF THE
ONONDAGA COUNTY PLANNING BOARD

Meeting Date: October 14, 2020

OCPB Case # S-20-51

WHEREAS, the Onondaga County Planning Board, pursuant to General Municipal Law, Section 239 l, m and n, has considered and reviewed the referral for a PRELIMINARY SUBDIVISION from the Town of Manlius Planning Board at the request of Harrington Homes for the property located at Brandywine Drive off Henneberry Road; and

WHEREAS, General Municipal Law Section 239-n allows the County Planning Board to review the approval of subdivisions and the site is located within 500 feet of Route 173, a state highway, Henneberry Road (Route 182), a county highway, and the municipal boundary between the Town of Manlius and the Town of Pompey; and

WHEREAS, the applicant is proposing to subdivide a 54-acre parcel into 34 single-family residential lots in a Residential (R-1) zoning district; and

WHEREAS, the site is located along the boundary between the Towns of Manlius and Pompey and just southwest of the Village boundary; surrounding land uses include low-density residential and large wooded lots to the west and south transitioning to higher density residential subdivisions occurring at the outskirts of the Village; the site abuts single-family dwellings on roughly 1-acre lots to the north; these lots have frontage on Brandywine Drive, a local road that dead ends at a hammerhead on the site; and

WHEREAS, aerial imagery dated May 2020 shows the vacant site has additional frontage on Henneberry Road, a county road, and appears to contain open fields and some wooded areas; there is an existing farm access road onto Henneberry Road; ADVISORY NOTE: per the Onondaga County Department of Transportation, all existing or proposed driveways on Henneberry Road must meet Department requirements; and

WHEREAS, the Preliminary Plan dated April 28, 2020 shows the proposed 34-lot subdivision for Harrington Homes at Brandywine will include (12) proposed lots ranging in size from 1.04 to 1.55 acres as part of Phase 1, (10) proposed lots ranging in size from 1.10 to 3.30 acres as part of Phase 2, and (12) proposed lots ranging in size from 0.98 to 1.29 acres as part of Phase 3; and

WHEREAS, the submitted Preliminary Overall Grading Plan dated September 17, 2020 shows 3,000 sf building footprints on all lots except (1) 5,000 sf building footprint on Lot 10 (2.3 acres); the hammerhead at the end of Brandywine Drive will be converted to a circle; proposed Lots 8 and 9 are shown to have frontage on the circle; all other lots will front on a proposed u-shaped road with two access points onto Henneberry Road; no connections between Brandywine Drive and Henneberry Road are shown; and

WHEREAS, per the submitted Environmental Assessment Form (EAF) dated September 11, 2020, 20 acres of the site will be physically disturbed by the proposed project; stormwater management systems will be designed to current standards; a

1100 Civic Center, 421 Montgomery Street, Syracuse, NY 13202 (315) 435-2611, Fax (315) 435-2439

E-mail Address: countyplanning@ongov.net

Stormwater Pollution Prevention Plan (SWPPP) was included with the referral materials; the plans show a proposed storm sewer network with outlet to three proposed detention basins, one near the northern lot line and two at the interior of the new road; two of the detention basins will have an adjacent bioretention area; the storm sewer lines appear to occur within a utility easement or the road right-of-way; detention basins and bioretention areas are shown to occur within access and maintenance easements on the proposed lots;
ADVISORY NOTES: per the Onondaga County Department of Transportation, additional stormwater runoff into the county's drainage system is prohibited; any project that cumulatively disturbs one acre or more of land must be covered under the NYS SPDES Permit, and the municipality is advised to ensure that the applicant has obtained the appropriate permits from the NYS Department of Environmental Conservation prior to municipal approval; and

WHEREAS, per the plans, drinking water services for each proposed lot will be provided by an individual well, except for Lots 8 and 9, which have access to public drinking water provided by OCWA; per OCWA and the Onondaga County Health Department, public drinking water service to the remaining lots is restricted by the elevation of the site, which would require an increase in water pressure via a pumping station or a new water tank;
ADVISORY NOTE: the applicant is advised to contact OCWA's Engineering Department to determine the activities and structures permitted within OCWA easements/right-of-ways, water availability and service options, obtain hydrant flow test information, evaluate backflow prevention requirements, and/or request that the Authority conduct hydrant flow testing to assess fire flow availability; and

WHEREAS, the plans show a Town sewer line along Brandywine Drive that will be extended to serve the new parcels; new sewer lines are shown to occur in a sanitary sewer easement or the road right-of-way; the site is located in the Meadowbrook-Limestone Wastewater Treatment Plant service area; per the Onondaga County Department of Water Environment Protection, the submitted project is located in an area designated as flow constrained or impacted by excessive wet weather flow or is tributary to a Combined Sewer Overflow (CSO);
ADVISORY NOTES: the Onondaga County Department of Water Environment Protection asks that the applicant contact the Department's Flow Control office to determine sewer availability and capacity; the applicant is also advised to develop a 2 gallon to 1 gallon sanitary flow offset plan/project in coordination with the municipal engineer; and

WHEREAS, the site may contain the Indiana bat or Northern long-eared bat, or their associated habitats, which have been listed by the state or federal government as threatened or endangered animal species (per EAF Mapper); impacts to bat species are often associated with tree clearing and from aerial imagery it appears that there are some wooded areas on the site;
ADVISORY NOTE: per the NYS Department of Environmental Conservation (DEC), if the site contains a threatened or endangered species and/or associated habitat, and the project requires review under the State Environmental Quality Review Act (SEQRA), a request for a project screening should be submitted to the New York Natural Heritage Program or to the regional DEC Division of Environmental Permits office; and

WHEREAS, the site or a portion of it is located in or adjacent to an area designated as sensitive for archaeological sites on the NYS Historic Preservation Office archaeological site inventory (per EAF Mapper);
ADVISORY NOTE: the applicant and/or municipality is advised to contact the NYS Historic Preservation Office to determine if the project should be submitted to the Office for review as part of the State Environmental Quality Review (SEQR) process; and

WHEREAS, ADVISORY NOTE: per GML § 239-nn, the legislative body or other authorized body having jurisdiction in a municipality shall give notice to an adjacent municipality when a hearing is held by such body relating to a subdivision, site plan, special use permit, or a use variance on property that is within five hundred feet of an adjacent municipality; such notice shall be given by mail or electronic transmission to the clerk of the adjacent municipality at least ten days prior to any such hearing; and

NOW THEREFORE BE IT RESOLVED, that the Onondaga County Planning Board recommends the following MODIFICATION(S) to the proposed action prior to local board approval of the proposed action:

Per the Onondaga County Department of Transportation, all access to the proposed lots must come from Brandywine Drive or the proposed access road. No driveways on Henneberry Road will be permitted for individual lots. The applicant must coordinate plans for the new access road with the Department, and submit a copy of the Stormwater Pollution Prevention Plan (SWPPP) for review. The municipality must ensure any mitigation as may be determined by the Department is reflected on the project plans prior to, or as a condition of, municipal approval.

The Board also offers the following comments:

1. The Town and applicant are encouraged to cluster the proposed lots to help minimize infrastructure costs and allow for the retention of existing wooded areas for shared green space, which may help to preserve open space, protect habitats, screen the development from Henneberry Road, and ensure buffering for neighboring residential lots.

2. For better access management and to better meet the needs of local emergency service providers, the Town is encouraged to require an interconnected road network to allow for vehicle and pedestrian movement between the new development and Brandywine Drive to the north. The Town may also wish to consider opportunities for future connections to parcels to the south and west given any potential for development.

3. The Town and applicant are advised that compliance with Section 10 of the Onondaga County Right of Way Designation Law (Local Law # 5-1972) is required for any new streets/street names, and the subdivision map must be modified to reflect approved street names prior to subdivision filing. The applicant should contact Rachel Woods at the Syracuse-Onondaga County Planning Agency at

rachelwoods@ongov.net for approval of street names and addresses prior to filing the subdivision.

4. The Board recommends that the Town ensure appropriate and sustained maintenance and funding mechanisms are in place for future ownership and care of stormwater management facilities to serve the subdivision. Potential strategies may include separating such areas onto non-residential parcels, to be owned and maintained by a Homeowner's Association (HOA), land trust, or the Town.

5. Per the Onondaga County Health Department, establishment of individual wells will require a series of well tests to be drilled and tested prior to the Department endorsing the proposed subdivision plan.

Daniel Cupoli, Chairman
Onondaga County Planning Board
Transmittal Date: 10-14-2020

GML 239 Report of Final Action

NYS GML § 239-m.6. and n.6. require the referring body to file a report of the final action it has taken on a referred matter with the county planning agency within 30 days after the final action (separate from the minutes taken at the meeting). A referring body which acts contrary to a County Planning Board recommendation of MODIFICATION or DISAPPROVAL of a referred matter shall also set forth the reasons for the contrary action in such report.

This section to be completed by the Syracuse-Onondaga County Planning Agency

To: Onondaga County Planning Board **From:** Town of Manlius Planning Board

Fax: 435-2439 **Phone:** 435-2611

Re:

Applicant: Harrington Homes
Address: at Brandywine Drive off Henneberry Road
Referral Type: PRELIMINARY SUBDIVISION
OCPB Date: October 14, 2020
OCPB Action: Modification
OCPB Case #: S-20-51

The local board took the following action regarding the above referenced referral (Check one box. If checking Other, please specify the final action taken. Use the space at the bottom of the report to identify reasons if acting contrary to the OCPB recommendation.):

☐ Approved the proposed action with regard to the OCPB's No Position or No Position with Comment.
☐ Approved the proposed action as modified by the OCPB.
☐ Approved the proposed action contrary to some of the modifications recommended by the OCPB.*
☐ Approved the proposed action contrary to all of the modifications recommended by the OCPB.*
☐ Approved the proposed action contrary to the disapproval recommended by the OCPB.*

☐ Disapproved the proposed action with regard to the OCPB's no position or no position with comment.
☐ Disapproved the proposed action with regard to the recommended modification(s) by the OCPB.
☐ Disapproved the proposed action as recommended and for reasons set forth by the OCPB.
☐ Disapproved the proposed action as recommended but for reasons other than those set forth by the OCPB. (Please list reasons below for local disapproval.)

☐ Other _____

Local Board Date: _____

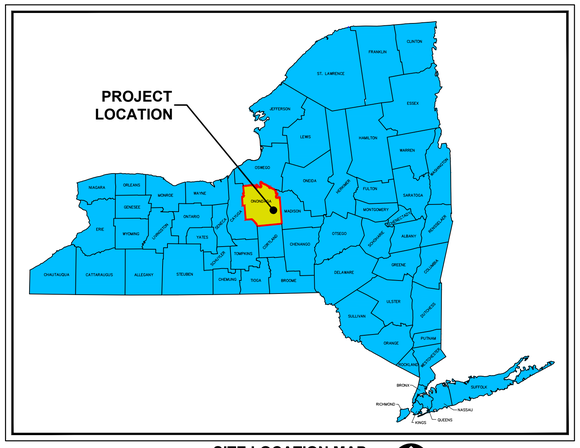
*List reasons for acting contrary to the OCPB recommendation and include a copy of the local board resolution. Attach additional reasons on a separate sheet of paper as necessary.

_____
_____
_____
_____

PROPOSED BRANDYWINE ESTATES
PHASE 2 - 34 LOT SUBDIVISION

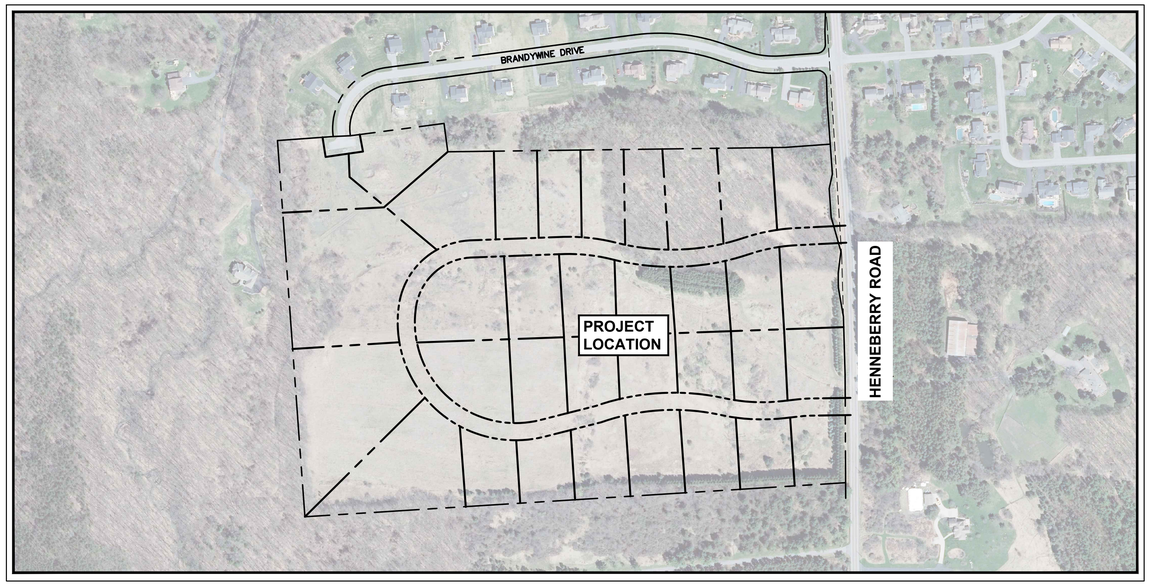
HENNEBERRY ROAD
TAX ID: 109.-02-07.1

TOWN OF MANLIUS
ONONDAGA COUNTY
NEW YORK STATE



SITE LOCATION MAP
NOT TO SCALE

PROJECT LOCATION MAP
NOT TO SCALE



AERIAL MAP
1"=250'

PREPARED BY:

NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, NEW YORK 13104

email: MNAP@NAPCON.COM
PH: (315) 682-5580 FAX: (315) 682-5544

PREPARED FOR:

HARRINGTON HOMES
Your Builder for Life

3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET INDEX:

TITLE SHEET	C-0
GENERAL NOTES	C-1
OVERALL GRADING PLAN	C-2
OVERALL UTILITY PLAN	C-3
OVERALL ROAD PROFILE	C-4
ROAD PROFILE PLANS	C-5.0 THRU C-5.2
SEWER PROFILE PLANS	C-6.0 THRU C-6.1
SITE DETAILS	C-7.0 THRU C-7.2

PRELIMINARY PLANS - FINAL APPROVAL
REQUIRED BY ALL JURISDICTIONS

Dig Safely. New York
Call 811 before you dig

APPROVED BY OWNER

NAME DATE

SHEET TITLE:

TITLE SHEET

NO.	REVISION/ISSUE	DATE
1	GENERAL REVISIONS	12/01/2021

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PRELIMINARY
NOT FOR CONSTRUCTION

PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

PROJECT NO.	DATE	SHEET
20-1906	17 SEP 2020	C-0

PROPOSED BRANDYWINE ESTATES PHASE 2

HENNEBERRY ROAD
TOWN OF MANLIUS
ONONDAGA COUNTY, NY

GENERAL NOTES

1. PROPERTY LINE INFORMATION TAKEN FROM A PLAN ENTITLED "TOPOGRAPHIC SURVEY, BRANDYWINE PHASE 3 – SECTION 1 PART OF FARM LOT NUMBER 96, TOWN OF MANLIUS" PREPARED BY IANUZI & ROMANS LAND SURVEYING, P.C.

2. THE PLANS SHOW SUBSURFACE STRUCTURES, ABOVEGROUND STRUCTURES, AND/OR UTILITIES FROM FIELD LOCATION AND RECORD MAPPING. EXACT LOCATION MAY VARY FROM THE LOCATIONS INDICATED. IN PARTICULAR, THE CONTRACTOR IS WARNED THAT THE EXACT OR EVEN APPROXIMATE LOCATION OF SUCH PIPELINES, SUBSURFACE STRUCTURES AND/OR UTILITIES IN THE AREA MAY BE DIFFERENT FROM THAT SHOWN OR MAY NOT BE SHOWN AND IT SHALL BE HIS RESPONSIBILITY TO PROCEED WITH GREAT CARE IN EXECUTING ANY WORK. THE CONTRACTOR IS TO CALL DIG SAFELY NY AT 1–800–962–7962 A MINIMUM OF 72 HOURS BEFORE DIGGING, DRILLING, OR BLASTING.

3. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY CONDITIONS THAT VARY FROM THOSE SHOWN ON THE PLANS. THE CONTRACTOR'S WORK SHALL NOT VARY FROM THE PLANS WITHOUT THE EXPRESSED APPROVAL OF THE ENGINEER.

4. THE CONTRACTOR IS INSTRUCTED TO COOPERATE WITH ANY AND ALL OTHER CONTRACTORS PERFORMING WORK ON THIS JOB SITE DURING THE PERFORMANCE OF THIS CONTRACT.

5. THE CONTRACTOR SHALL RESTORE LAWNS, DRIVEWAYS, CULVERTS, SIGNS, AND OTHER PUBLIC OR PRIVATE PROPERTY DAMAGED OR REMOVED TO AT LEAST AS GOOD A CONDITION AS BEFORE BEING DISTURBED AS DETERMINED BY THE ENGINEER. ANY DAMAGED TREES, SHRUBS, AND/OR HEDGES SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND INCURRING THE COST OF ALL REQUIRED PERMITS, INSPECTIONS, CERTIFICATES, ETC. AND SHALL COMPLY WITH ALL PERMITS.

7. ALL WORK SHALL BE DONE IN STRICT COMPLIANCE WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES, STANDARDS, ORDINANCES, RULES, AND REGULATIONS.

8. ALL PROPOSED UTILITIES AND APPURTENANCES ARE TO BE CONSTRUCTED IN COMPLIANCE WITH THE LOCAL MUNICIPALITY'S CODES AND REGULATIONS GOVERNING THE INSTALLATION OF SUCH UTILITIES.

9. THE ENGINEER RESERVES THE RIGHT TO EXAMINE ANY WORK DONE ON THIS PROJECT AT ANY TIME TO DETERMINE CONFORMANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS OF THIS PROJECT AS INTENDED AND INTERPRETED BY THE ENGINEER.

10. MISCELLANEOUS WORK NOT SPECIFICALLY SHOWN ON THE CONTRACT DRAWINGS SUCH AS PATCHING, BLOCKING, TRIMMING, ETC. SHALL BE PERFORMED AS REQUIRED TO MAKE THE WORK COMPLETE.

11. THE CONTRACTOR SHALL PROTECT EXISTING PROPERTY LINE INFORMATION. ANY MONUMENTATION DISTURBED OR DESTROYED, AS JUDGED BY THE ENGINEER OR OWNER, SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE UNDER THE SUPERVISION OF A NEW YORK STATE LICENSED LAND SURVEYOR.

12. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE ALL PLAN SHEETS AND COORDINATE WORK WITH ALL OTHER CONTRACTS FOR THE SITE.

13. THE CONTRACTOR SHALL:
    A. VERIFY ALL CONDITIONS IN THE FIELD PRIOR TO COMMENCEMENT OF WORK AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
    B. EXAMINE THE SITE AND INCLUDE IN HIS WORK THE EFFECT OF ALL EXISTING CONDITIONS ON THE WORK.
    C. PROVIDE AND INSTALL ALL MATERIALS AND PERFORM ALL WORK IN ACCORDANCE WITH RECOGNIZED GOOD STANDARD PRACTICE.
    D. HOLD THE OWNER HARMLESS AGAINST ANY AND ALL CLAIMS ARISING FROM WORK DONE BY THE CONTRACTOR ON THE SITE.

14. ALL TRENCH EXCAVATION AND ANY REQUIRED SHEETING AND SHORING SHALL BE DONE IN ACCORDANCE WITH THE LATEST REVISIONS OF NEW YORK STATE INDUSTRIAL CODE RULE 23 AND OSHA REGULATIONS FOR CONSTRUCTION. SHEET PILING SHALL BE DESIGNED AND SEALED BY A NEW YORK STATE PROFESSIONAL ENGINEER.

15. CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING AND THE MAINTENANCE OF SURFACE DRAINAGE DURING THE COURSE OF WORK. HE SHALL SUBMIT A DEWATERING PLAN DESIGNED AND SEALED BY A NEW YORK STATE PROFESSIONAL ENGINEER. CONTRACTOR SHALL MAINTAIN EXISTING SITE DRAINAGE PATTERNS THROUGHOUT CONSTRUCTION.

16. ALL BACKFILL USED IN TRENCHES EXCAVATED IN EXISTING ROADWAYS SHALL BE PLACED IN MAXIMUM 6–INCH LIFTS AND COMPACTED BY MEANS OF A MECHANICAL COMPACTOR BETWEEN LIFTS TO 90% STANDARD PROCTOR COMPACTION.

17. WHEN BACKFILLING AROUND PROPOSED OR EXISTING STRUCTURES, MATERIAL SHALL BE PLACED IN MAXIMUM 6–INCH LIFTS AND COMPACTED BY MEANS OF A MECHANICAL COMPACTOR BETWEEN LIFTS TO 90% STANDARD PROCTOR COMPACTION.

18. ALL UTILITY WORK INVOLVING CONNECTIONS TO EXISTING SYSTEMS SHALL BE COORDINATED WITH THE ENGINEER AND THE UTILITY OWNER. NOTIFY THE ENGINEER AND THE UTILITY OWNER 72 HOURS BEFORE EACH AND EVERY CONNECTION TO AN EXISTING SYSTEM IS MADE.

19. CONSTRUCTION OF ALL PROPOSED UTILITIES MUST BEGIN AT ITS POINT OF CONNECTION TO THE EXISTING UTILITY OR AT THE LOWEST POINT IN THE SYSTEM. RIMS, GRATES, INVERTS, CLEARANCES, AND LOCATION AT CROSSINGS MUST BE VERIFIED PRIOR TO THE BEGINNING OF CONSTRUCTION.

20. MAINTAIN FLOW FOR ALL EXISTING UTILITIES.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL FIELD LAYOUT. THE CONTRACTOR SHALL TAKE TIES TO ALL UTILITY CONNECTIONS AND PROVIDE MARKED–UP AS–BUILT PLANS FOR ALL UTILITIES SHOWING TIES TO CONNECTIONS, BENDS, VALVES, LENGTHS OF LINES, AND INVERTS. THE OWNER AND HIS REPRESENTATIVES SHALL REVIEW AS–BUILT PLANS SHOWING ALL UNDERGROUND UTILITIES INSTALLED OR ENCOUNTERED. THE CONTRACTOR SHALL PROVIDE ANY CORRECTION OR OMISSIONS TO THE SATISFACTION OF THE OWNER AND HIS REPRESENTATIVES BEFORE UTILITIES WILL BE ACCEPTED.

22. THE CONTRACTOR SHALL MAINTAIN ALL TRAFFIC IN ALL AREAS IN ACCORDANCE WITH THE NYSDOT MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

23. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL COMMERCIAL, RESIDENTIAL, AND PUBLIC PROPERTIES OR AS DIRECTED BY THE ENGINEER.

24. ALL EXCAVATIONS SHALL BE BACKFILLED TO EXISTING GRADE AT THE END OF EACH WORKDAY.

25. THE CONTRACTOR SHALL TAKE CARE TO PREVENT DAMAGE TO EXISTING UTILITIES. DAMAGED UTILITIES SHALL BE IMMEDIATELY REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

SITE DEMOLITION NOTES

1. THE GENERAL CONSTRUCTION CONTRACTOR RESPONSIBLE FOR ANY CLEARING OR DEMOLITION WORK AS NOTED ON THIS PLAN.

2. EXISTING FEATURES ARE BASED ON A SURVEY BY IANUZI & ROMANS LAND SURVEYING, P.C.

3. OWNER WILL PROVIDE AN 'ALL CLEAR' PRIOR TO ANY CLEARING OR DEMOLITION.

4. THE CONTRACTOR SHALL CONTACT DIG SAFELY NEW YORK AT 811 FOR UTILITY STAKEOUTS A MINIMUM OF THREE (3) BUSINESS DAYS PRIOR TO ANY DEMOLITION WORK, SITE WORK, OR EXCAVATION.

5. THE CONTRACTOR SHALL COORDINATE WITH ALL PUBLIC AND PRIVATE UTILITIES FOR RESPECTIVE REQUIREMENTS FOR THE REMOVAL/ABANDONMENT OF UTILITY MAINS/LATERALS SERVICING THE SITE.

GRADING NOTES

1. MAXIMUM SLOPE FOR ALL CUT AND FILL LAWN AREAS SHALL BE 3H:1V UNLESS SHOWN OTHERWISE ON PLANS.

2. SLOPES GREATER THAN 4H:1V SHALL BE STABILIZED IMMEDIATELY AFTER GRADING OCCURS IN ACCORDANCE WITH THE NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.

3. CONTRACTOR SHALL OBTAIN A COPY OF THE GEOTECHNICAL REPORT AND BECOME FAMILIAR WITH THE SOIL CONDITIONS ON THE SITE. CONTRACTOR SHALL FOLLOW ALL RECOMMENDATIONS AND REQUIREMENTS FROM THE GEOTECHNICAL ENGINEER.

4. UNLESS OTHERWISE NOTED, LIMITS OF DISTURBANCE ARE AS REPRESENTED BY PROPOSED GRADES. NO GRADING SHALL TAKE PLACE BEYOND LIMITS SHOWN.

5. ALL SLOPES STEEPER THAN 3H:1V SHALL BE TREATED WITH AN EROSION CONTROL PRACTICE SUCH AS A ROLLED EROSION CONTROL BLANKET OR RIPRAP. SEE DESIGNATED AREAS ON PLANS.

UTILITY NOTES

1. ALL CONSTRUCTION SHALL CONFORM WITH APPROPRIATE CODE AND REGULATORY REQUIREMENTS.

2. ALL UTILITIES SHALL BE INSTALLED IN ACCORDANCE WITH MUNICIPAL REGULATIONS AND THE STANDARDS OF THE PRIVATE UTILITY COMPANIES.

3. PRIVATE UTILITY SERVICE FINAL LOCATION, SIZE AND DEPTH ARE SUBJECT TO THE APPROVAL OF THE UTILITY COMPANY.

4. EXTERIOR BUILDING LIGHTING LUMINARIES SHALL BE OF SIZE AND TYPE, AND AT LOCATIONS SPECIFIED BY THE ARCHITECTS ELECTRICAL SITE PLAN AND SHALL CONFORM TO THE MUNICIPAL ZONING REQUIREMENTS.

5. WATER
   WATER LINES, FITTINGS AND APPURTENANCES TO BE IN CONFORMANCE WITH APPROPRIATE CODE AND REGULATORY REQUIREMENTS. VERIFY EXISTING LINE SIZE AND LOCATION PRIOR TO CONSTRUCTION. ALL WATER LINES MUST MAINTAIN A MINIMUM 10' HORIZONTAL SEPARATION WITH SANITARY SEWER AND STORM SEWER LINES. ALL WATER MAIN AND SERVICE WORK MUST BE COORDINATED WITH THE MUNICIPAL WATER DEPARTMENT.

6. SOME LOTS SHALL BE SERVED BY INDIVIDUAL WATER SUPPLY WELLS, WITH THE EXCEPTION OF LOTS #8 AND #9 WHICH CAN BE SERVED BY OCWA PUBLIC WATER SUPPLY.

7. SANITARY SEWER
   SANITARY SEWERS SHALL BE PVC PER ASTM D3034 SDR 35 UNLESS OTHERWISE NOTED. SUITABLE COUPLINGS AND ADAPTERS SHALL BE PROVIDED AT BUILDING CONNECTIONS.

8. STORM DRAINAGE
   STORM DRAINAGE PIPING SHALL BE SMOOTH INTERIOR CORRUGATED PLASTIC PIPE (SICPP) UNLESS OTHERWISE NOTED (SICPP). PIPE JOINTS AND FITTINGS SHALL CONFORM TO AASHTO M252 OR AASHTO M294.

9. ELECTRIC AND GAS
   ALL ELECTRIC AND GAS INSTALLATION SHALL BE COORDINATED WITH NATIONAL GRID.

LEGEND: PROPOSED
(SEE EXISTING CONDITION SURVEY FOR LEGEND OF EXISTING ELEMENTS)

(rectangle)	----- PROPOSED BUILDING
(long dash–double dot line)	----- PROPERTY LINE
(dashed line)	----- PROPOSED EASEMENT LINE
(grated circle)	----- PROPOSED STORM INLET
(filled circle)	----- PROPOSED MANHOLE (STORM OR SEWER AS NOTED)
——SAN——	----- PROPOSED SANITARY PIPE
——ST——	----- PROPOSED STORM PIPE
——W——	----- PROPOSED WATER PIPE
—— G ——	----- PROPOSED GAS PIPE
——UGE——	----- PROPOSED UNDERGROUND ELECTRIC

LANDSCAPE NOTES

TEMPORARY SEEDING MIXTURES

FOR SPRING, SUMMER OR EARLY FALL SEEDINGS:	LBS./ACRE	LBS./1000 SQ. FT
A. ANNUAL RYEGRASS –OR–	30	0.70
B. PERENNIAL RYEGRASS	30	0.70
FOR LATE FALL OR EARLY WINTER		
A. WINTER RYE (AROOSTOOK)	100	2.50

MULCH THE AREA WITH HAY OR STRAW AT 2 TONS/ACRE (APPROXIMATELY 2 LARGE ROLLED BALES/ACRE).

MULCH ANCHORING IS REQUIRED WHERE WIND OR AREAS OF CONCENTRATED WATER ARE OF CONCERN.

PERMANENT SEEDINGS SHOULD TAKE PLACE IN EARLY SPRING. PROPER MULCHING AND ADAQUATE MOISTURE MUST BE PROVIDED FOR PERMANENT SEEDING. RESEEDING OF FAILED AREAS SHALL TAKE PLACE DURING LATE SUMMER/EARLY FALL OR DURING THE FOLLOWING SPRING.

FERTILIZER:
5% NITROGEN
0% PHOSPHORUS
5% POTASH
HYDROMULCH
HYDROMULCH SHALL BE A WOOD–FIBER COMPOSITION (50% PAPER – 50% WOOD)
IF MULCHING IS NOT APPLIED WITH HYDROSEED MIXTURE, APPROVED MULCHING, CONSISTING OF STALKS OF WHEAT, OATS, OR RYE, SHALL BE SPREAD EVENLY AT A RATE OF 2 TONS PER ACRE. MULCH IS TO BE TACKED INTO PLACE.

PERMANENT SEEDING MIXTURES

SEED MIXTURE	LBS./ACRE
SEED MIXTURE NO. 1	
CREEPING RED FESCUE (var. ENSYLVA)	10
PERENNIAL RYE GRASS (var. PENNFINE)	10
SEED MIXTURE NO. 2	
SWITCHGRASS (var. SHELTER, PATHFINDER, TRAILBLAZER, OR BLACKWELL)	20
SEED MIXTURE NO. 3	
BIRDSFOOT TREFOIL (var. EMPIRE, PARDEE)	10
REDTOP	2
TALL FESCUE (var. KY 31, REBEL)	20
SEED MIXTURE NO. 4	
CREEPING RED FESCUE (var. ENSYLVA)	20
CHEWINGS FESCUE (COMMON)	20
PERENNIAL RYE GRASS (var. PENNFINE)	5
RED CLOVER (COMMON)	10

SEED MIXTURE 1 TO BE APPLIED TO SHADED AREAS.

SEED MIXTURE 2 IS IN PURE LIVE SEED. TO BE APPLIED TO AREAS UPLAND OF WETLANDS AND ALONG STORMWATER MITIGATION BASIN BANKS.

SEED MIXTURE 3 TO BE APPLIED TO ALL SWALES AND WATERWAYS. WHITE CLOVER OR LADINO CLOVER MAY BE SUBSTITUTED FOR BRIDSFOOT TREFOIL AND SEEDED AT THE SAME RATE PERENNIAL RYEGRASS MAY BE SUBSTITUTED FOR REDTOP BUT INCREASE SEEDING RATE TO 5 LBS./ACRE (0.1 LBS./1000 SQ. FT)

SEED MIXTURE 4 TO BE APPLIED TO ALL AREAS. (NOT FOR USE IN PLAYGROUNDS OR AS TURF)

METHOD OF SEEDING
BROADCAST, DRILLING WITH A CULTIPACK TYPE SEEDER, OR HYDROSEEDING ARE ACCEPTABLE. GOOD SOIL TO SEED CONTACT IS THE KEY TO SUCCESSFUL SEEDINGS.

MULCHING
APPLY STRAW MULCH AT A RATE OF 2 TON/ACRE (90 LBS./1,000 SF) ANCHORED WITH WOOD FIBER MULCH (HYDROMULCH) AT 500 – 750 LBS./ACRE (11 – 17 LBS./1,000 SF). THE WOOD FIBER MULCH MUST BE APPLIED THROUGH A HYDROSEEDER AFTER MULCHING.

IRRIGATION
WATERING MAY BE ESSENTIAL TO ESTABLISH TO NEW SEEDING. WEATHER CONDITIONS WILL DICTATE WHEN TO WATER. EACH APPLICATION MUST BE UNIFORMLY APPLIED AND 1 TO 2 INCHES OF WATER SHOULD BE APPLIED PER APPLICATION.

PERMANENT SEEDING TO OCCUR AFTER FINAL GRADING HAS OCCURRED. PERMANENT SEEDING WILL INCLUDE:
SITE PREPARATION
A. SCARIFY ALL COMPACT, SLOWLY PERMEABLE, MEDIUM AND FINE TEXTURED SUBSOIL AREAS. SCARIFY AT APPROXIMATELY RIGHT ANGLES TO THE SLOPE DIRECTION IN SOIL AREAS THAT ARE STEEPER THAN 5 PERCENT.
B. REMOVE REFUSE, WOOD PLANT PARTS, STONES OVER 3 INCHES IN DIAMETER, AND OTHER LITTER.

TOPSOIL MATERIALS
A. TOPSOIL SHALL HAVE AT LEAST 2 PERCENT AND NO GREATER THAN 6 PERCENT BY WEIGHT OF FINE TEXTURED STABLE ORGANIC MATERIAL.
B. TOPSOIL SHALL HAVE NOT LESS THAN 20 PERCENT FINE TEXTURED MATERIAL (PASSING THE NO. 200 SIEVE) AND NOT MORE THAN 15 PERCENT CLAY.
C. TOPSOIL TREATED WITH SOIL STERILANTS OR HERBICIDES SHALL BE SO IDENTIFIED TO THE PURCHASER.
D. TOPSOIL SHALL BE RELATIVELY FREE OF STONES OVER 1½" INCHES IN DIAMETER, TRASH, NOXIOUS WEEDS SUCH AS NUTSEDGE AND QUACKGRASS, AND WILL HAVE LESS THAN 10% GRAVEL BY VOLUME.
E. TOPSOIL CONTAINING SOLUBLE SALTS GREATER THAN 500 PPM SHALL NOT BE USED.

APPLICATION AND GRADING
A. TOPSOIL SHALL BE DISTRIBUTED TO A UNIFORM DEPTH OVER THE AREA. IT SHALL NOT BE PLACED WHEN IT IS PARTLY FROZEN, MUDDY, OR ON FROZEN SLOPES OR OVER ICE, SNOW, OR STANDING WATER PUDDLES.
B. TOPSOIL PLACED AND GRADED ON SLOPES STEEPER THAN 5% SHALL BE PROMPTLY FERTILIZED, SEEDED, MULCHED AND STABILIZED BY "TRACKING" WITH SUITABLE EQUIPMENT.
C. A MINIMUM OF 4 INCHES OF TOPSOIL IS TO BE USED IN ALL AREAS.

SOIL AMENDMENTS
A. LIME TO A pH OF 7.0. LIME IS NOT TO BE APPLIED WITHIN 50 FEET OF STREAMS AND WETLANDS.
B. FERTILIZER APPLICATION RATE TO BE BASED ON SOIL TESTS.
   1. IN NO CASE SHALL FERTILIZER BE APPLIED BETWEEN DECEMBER 1 AND APRIL 1 ANNUALLY.
   2. FERTILIZER SHALL NOT BE SPREAD WITHIN 20 FEET OF A SURFACE WATER.
   3. ANY FERTILIZER FALLING OR SPILLED INTO IMPERVIOUS SURFACE AREAS SUCH AS PARKING LOTS, ROADWAYS, AND SIDEWALKS SHALL BE IMMEDIATELY CONTAINED AND LEGALLY APPLIED OR PLACED IN AN APPROPRIATE CONTAINER.
   4. INCORPORATE THE FERTILIZER, AND LIME IF SPECIFIED, INTO THE TOP 2 – 4 INCHES OF THE TOPSOIL OR SOIL PROFILE.
   5. WHEN APPLYING FERTILIZER BY HYDROSEEDING CARE SHOULD BE TAKEN TO APPLY MIX ONLY TO SEED BED AREAS AT AN APPROPRIATE FLOW RATE TO PREVENT EROSION AND SPRAYING ONTO IMPERVIOUS AREAS.

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS
ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
GENERAL NOTES

NO.	REVISION/ISSUE	DATE
1	GENERAL REVISIONS	12/01/2021

PREPARED BY:
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PRELIMINARY
NOT FOR CONSTRUCTION

PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE NTS
SHEET **C-1**

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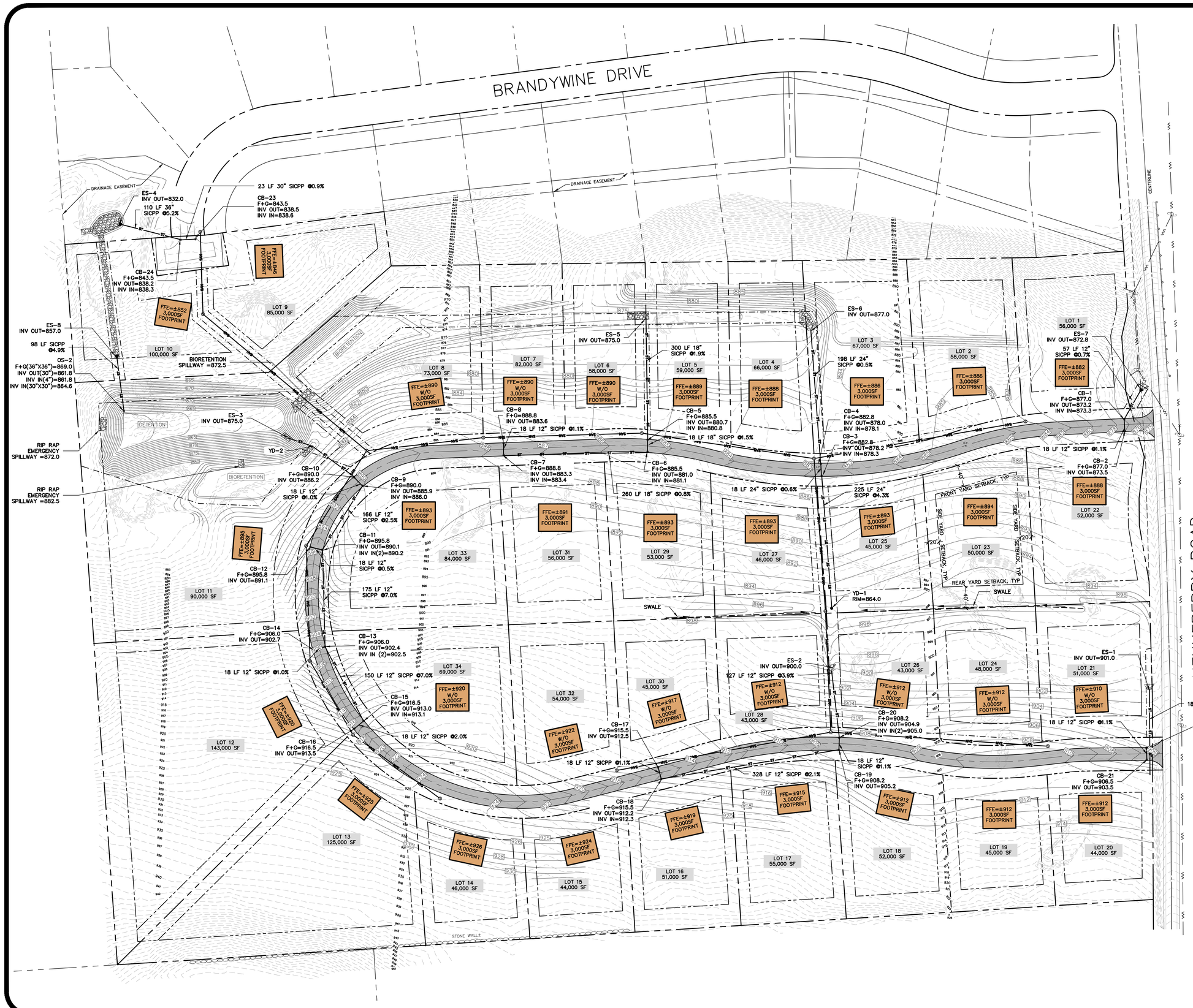

SITE CRITERIA CHECKLIST

PROJECT SITE INFORMATION		
ADDRESS	HENNEBERRY ROAD (COUNTY ROUTE 182)	
TAX MAP ID NO.	109.-02.-07.1	
BOUNDARY SURVEY	PROPERTY LINE INFORMATION TAKEN FROM SURVEY BY IANUZI AND ROMANS	
TOTAL SITE AREA	54.746 ACRES	
LAND USE	SINGLE FAMILY RESIDENTIAL – 34 LOTS	
ZONING INFORMATION		
ZONING DISTRICT	R-1, RESIDENTIAL DISTRICT	
	REQUIRED	PROVIDED
MIN. LOT FRONTAGE	150'	150' MIN.
MIN. LOT AREA	40,000 SF	40,000 SF MIN.
MINIMUM FRONT YARD	40'	40' MIN.
MINIMUM REAR YARD	40'	40' MIN.
MINIMUM SIDE YARD	20'	20' MIN.

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
OVERALL GRADING PLAN

NO.	REVISION/ISSUE	DATE
1	GENERAL REVISIONS	12/31/2021

GRAPHIC SCALE
0 — 80' — 160'
(IN FEET)
1 inch = 80 ft

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PLAN SEAL BY:
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NYS REGISTRATION # 087211

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE 1" = 80'

SHEET C-2

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NOTE:

STORM CONVEYANCE SYSTEM PIPE SLOPE, RIM, AND INVERT ELEVATIONS CAN BE SEEN ON THE OVERALL GRADING PLAN, SHEET C-2.

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2 HENNEBERRY ROAD
TOWN OF MANLIUS ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
OVERALL UTILITY PLAN

NO.	REVISION/ISSUE	DATE
1	GENERAL REVISIONS	12/01/2021

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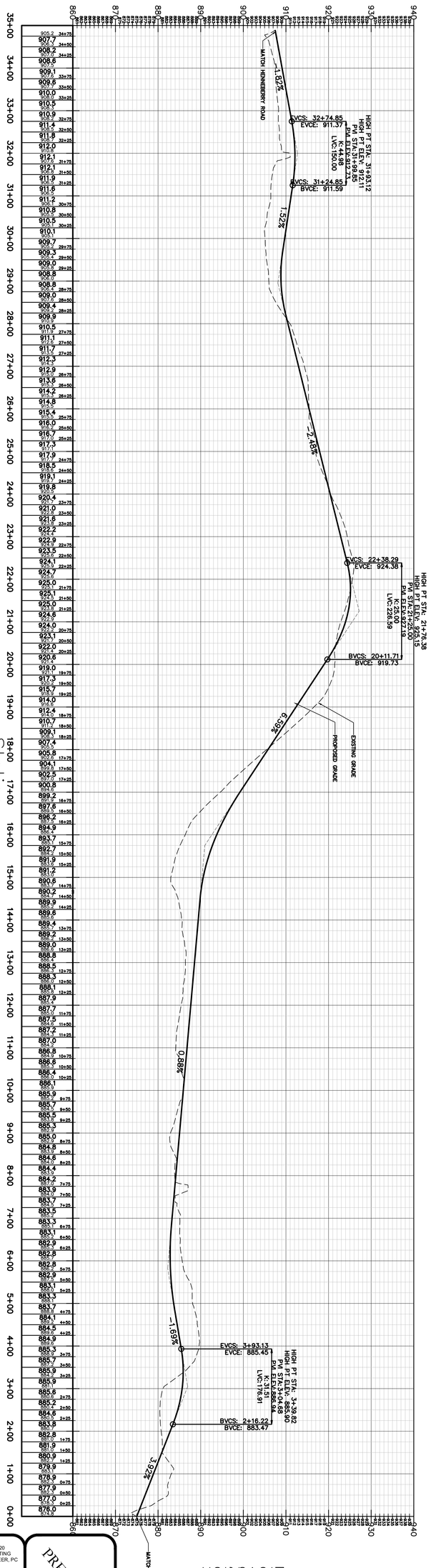
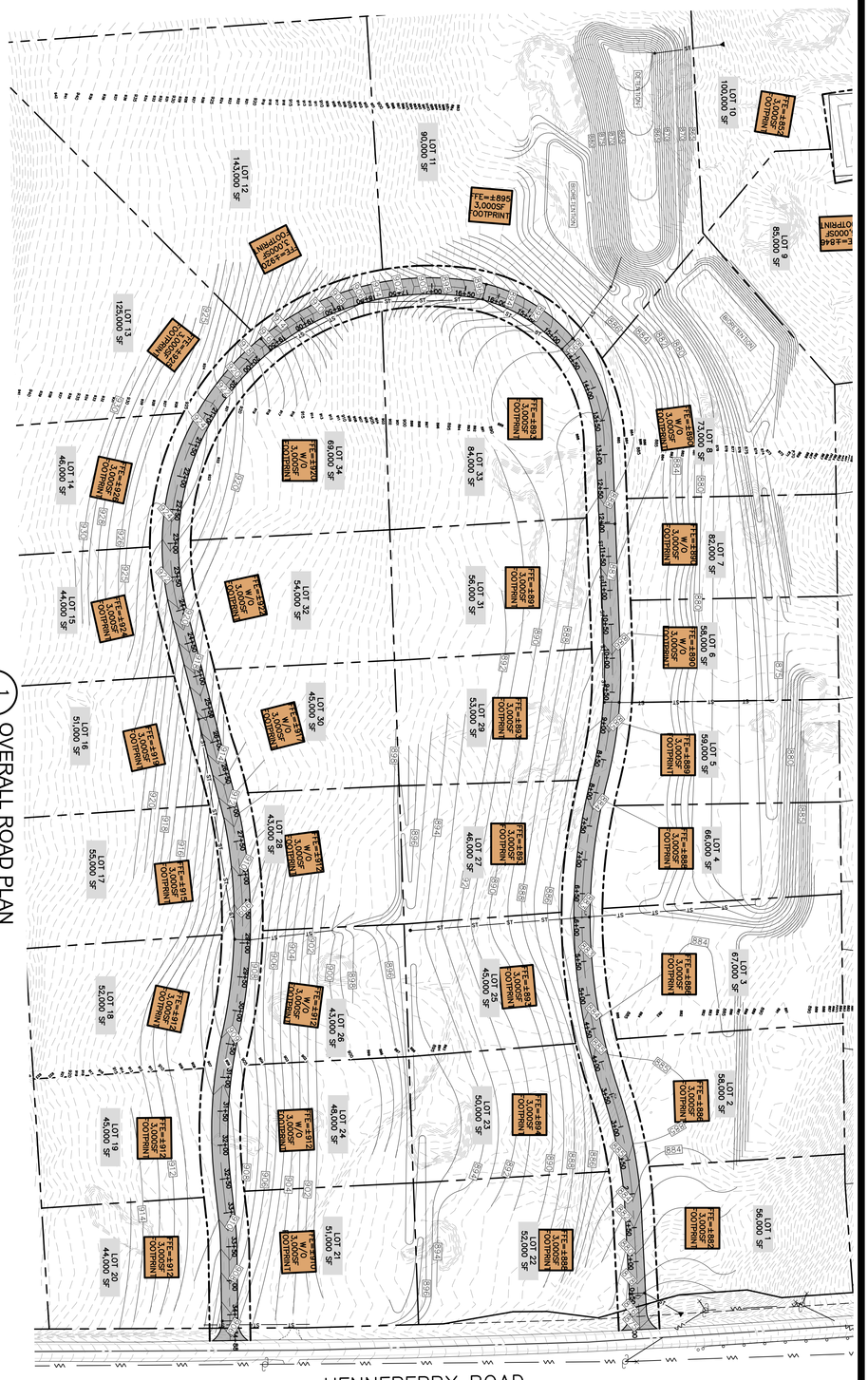
PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE 1" = 80'
SHEET C-3



2 C-4 OVERALL ROAD PROFILE

SCALE: H: 1"=120' V:1"=12'



1 C-4 OVERALL ROAD PLAN

SCALE: 1"=100'

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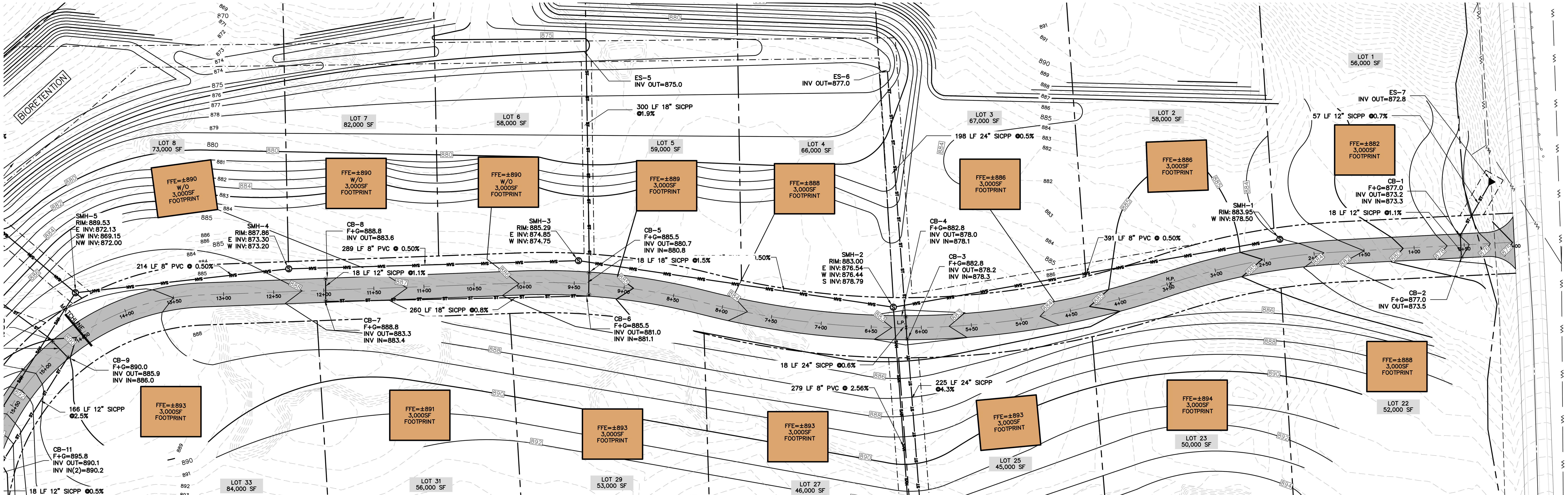
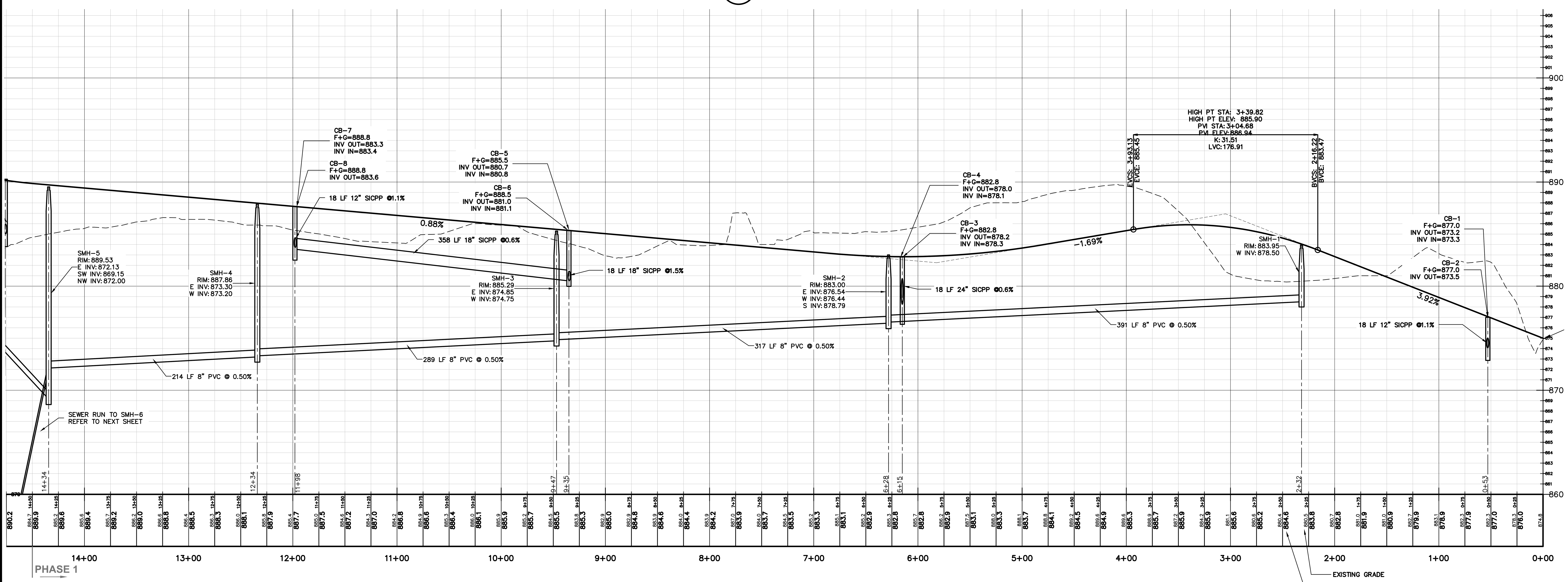
NYS REGISTRATION # 087211

SHEET	PROJECT NO.	PREPARED BY:			SHEET TITLE:	PROJECT TITLE:
C-4	20-1906	NAPIERALA CONSULTING PROFESSIONAL ENGINEER, P.C. SITE • DESIGN • ENGINEERING	1	GENERAL REVISIONS	12/01/2021	OVERALL ROAD PROFILE	BRANDYWINE ESTATES PHASE 2 HENNEBERRY ROAD
	DATE 17 SEP 2020	110 FAYETTE STREET MANLIUS, NEW YORK 13104	NO.	REVISION/ISSUE	DATE		TOWN OF MANLIUS ONONDAGA COUNTY, NY
	SCALE AS NOTED	email: MNAP@NAPCON.COM PH: (315) 682-5580 FAX: (315) 682-5544					PREPARED FOR: HARRINGTON HOMES 3848 HENNEBERRY ROAD JAMESVILLE, NY 13078



1 ROAD A
C-5.0 SCALE: 1"=50'



2 ROAD A PROFILE - SUBDIVISION PHASE 1
C-5.0 SCALE: H: 1"=50' V: 1"=5'

GRAPHIC SCALE
0 50' 100'
(IN FEET)
1 inch = 50 ft

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PLAN SEAL BY:
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PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS
ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
ROAD PROFILE PLAN

NO.	REVISION/ISSUE	DATE
1	GENERAL REVISIONS	12/01/2021

PREPARED BY:
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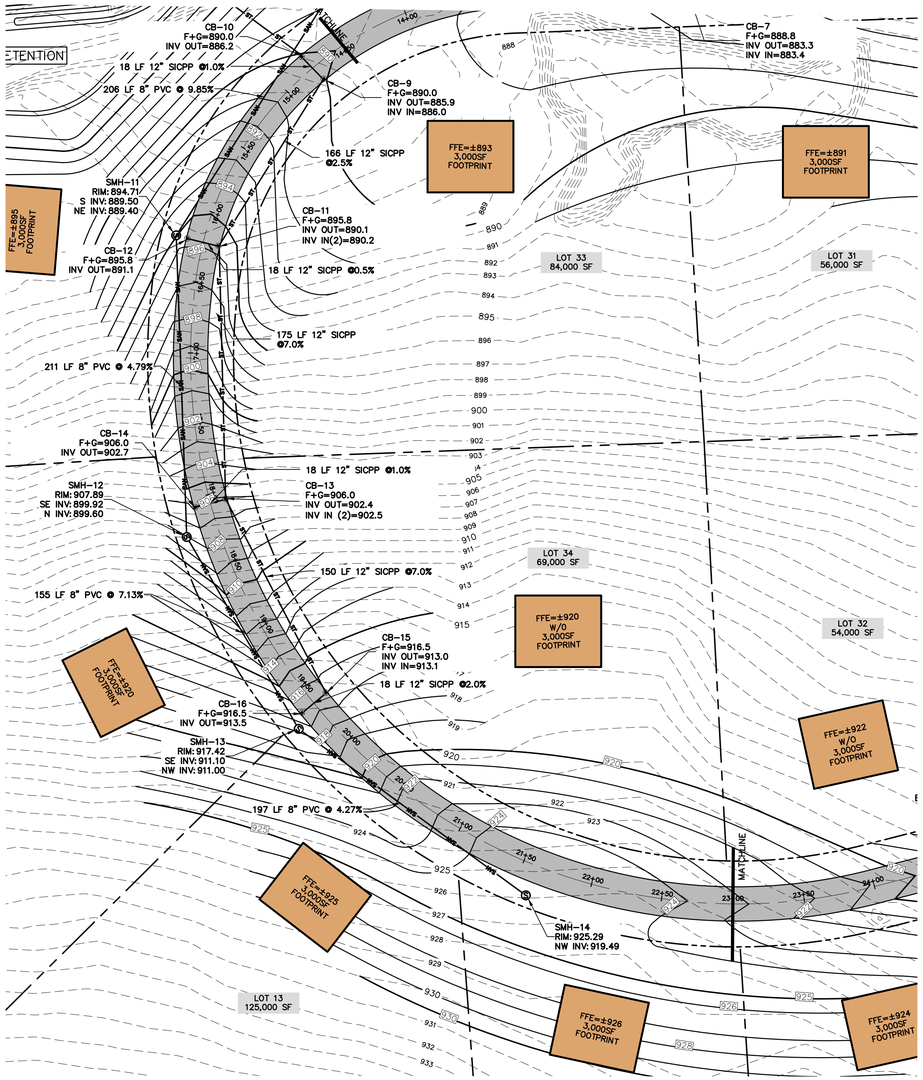
PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE 1" = 50'
SHEET C-5.0



1 C-5.1 ROAD A PLAN
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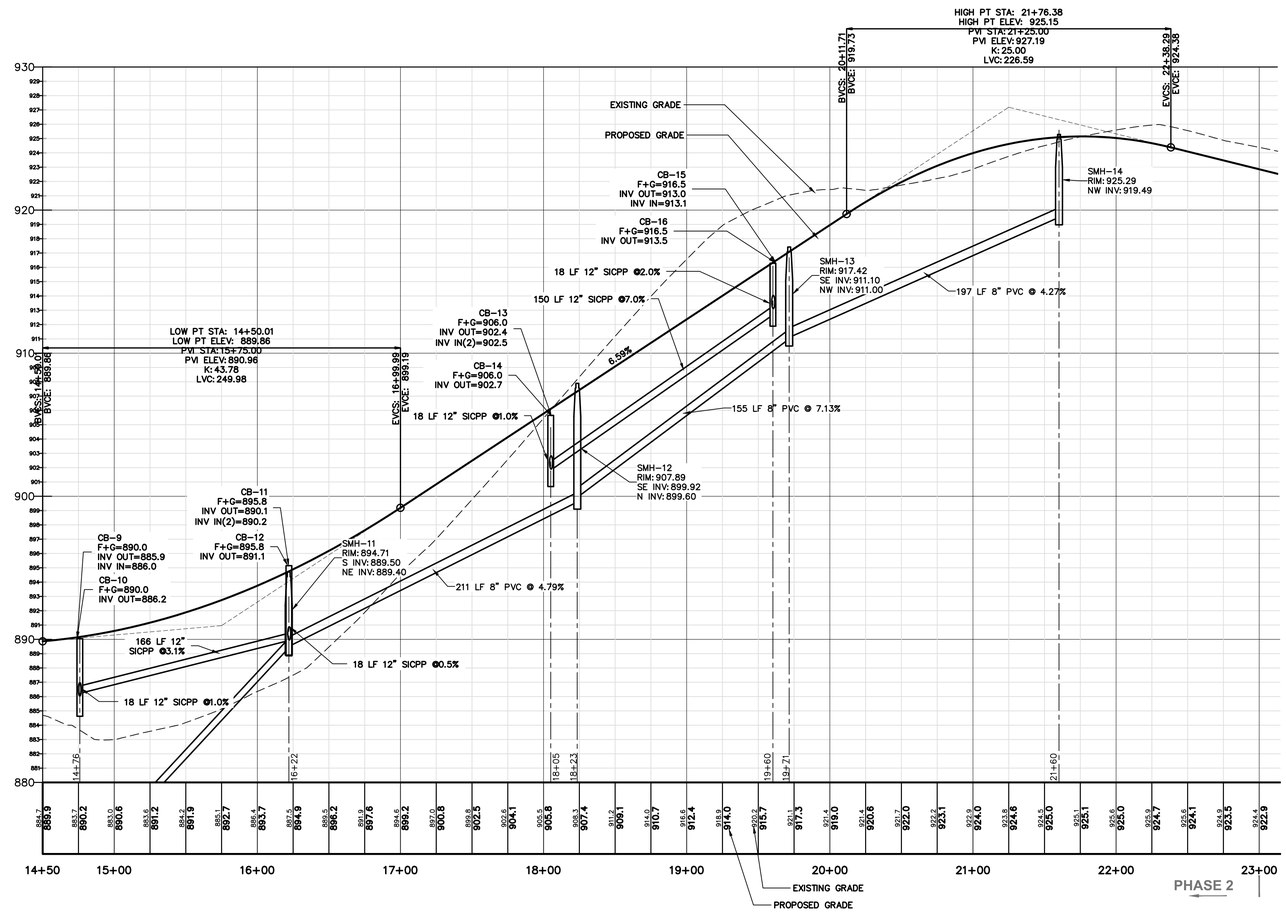

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SCALE: H: 1"=50' V: 1"=5'

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(IN FEET)
1 inch = 50 ft

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JAMESVILLE, NY 13078

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PROJECT NO. 20-1906
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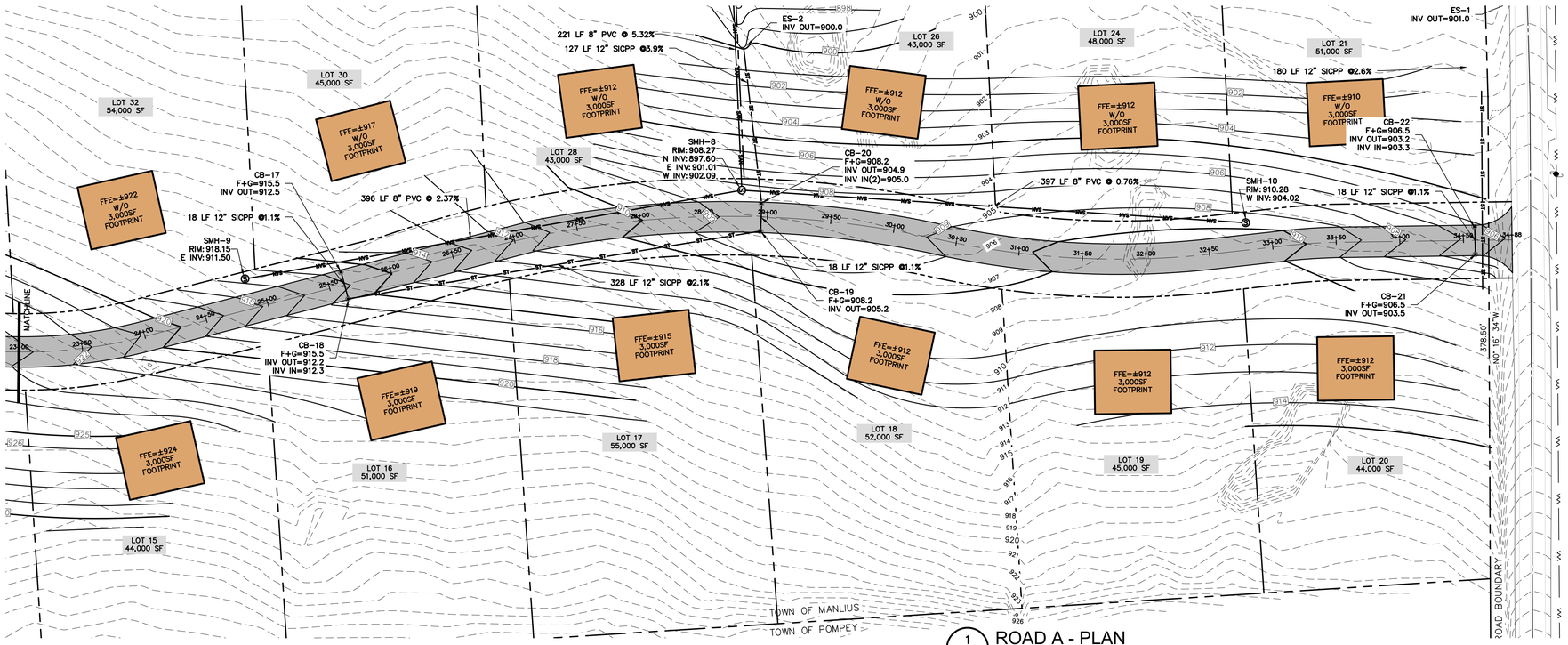

1 C-5.2 ROAD A - PLAN
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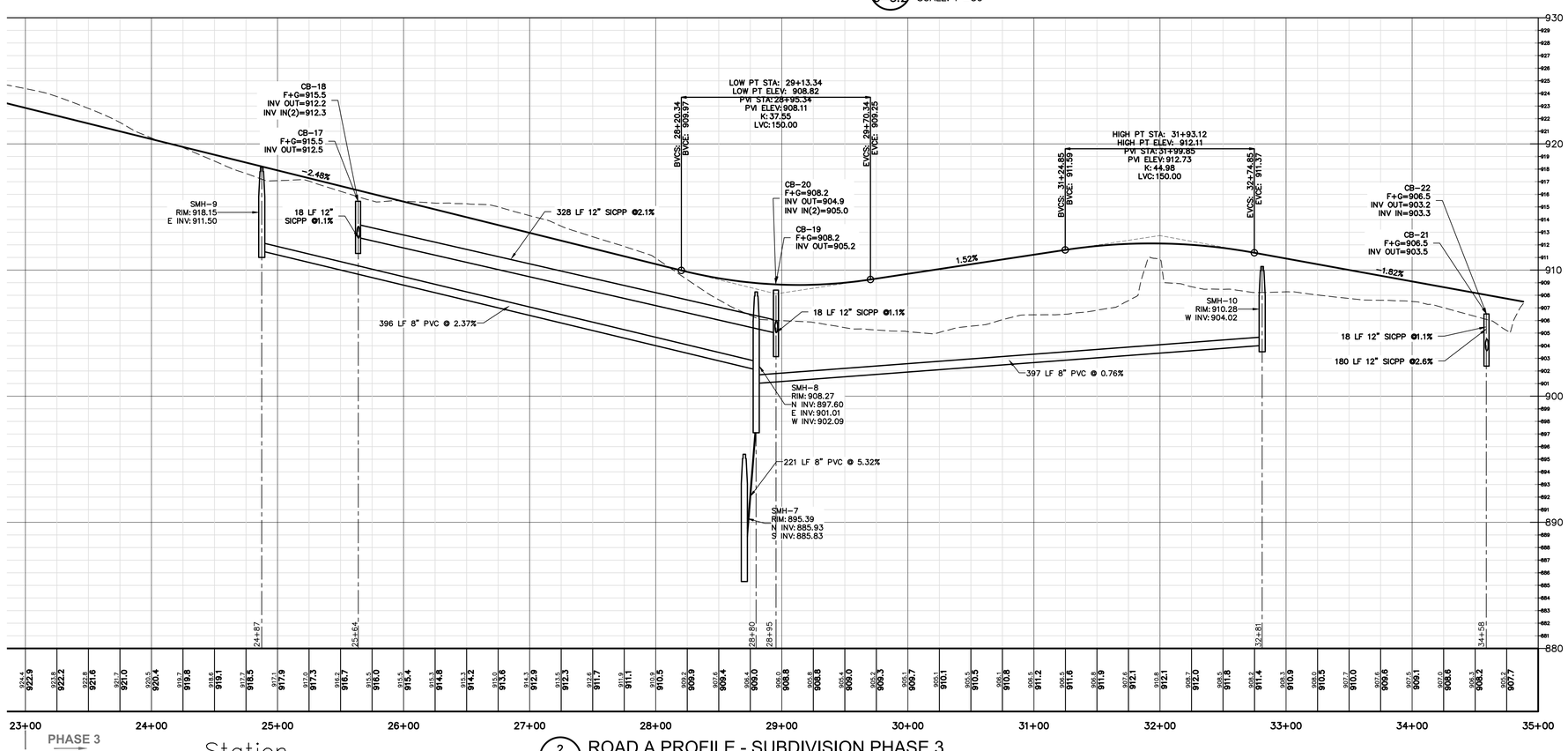

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SCALE: H:1"=50' V:1"=5'

GRAPHIC SCALE
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(IN FEET)
1 inch = 50 ft

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PROJECT NO. 20-1906
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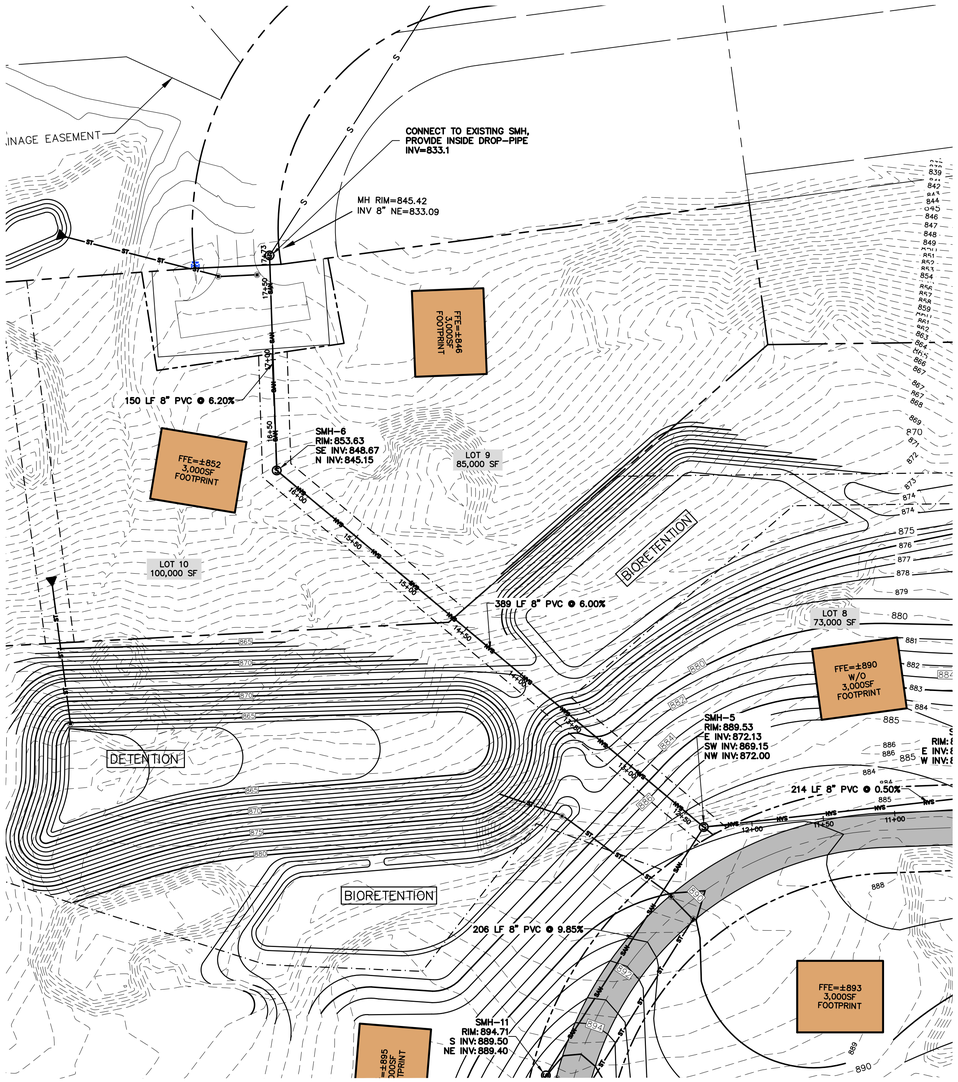

2 C-6.0 SEWER PLAN
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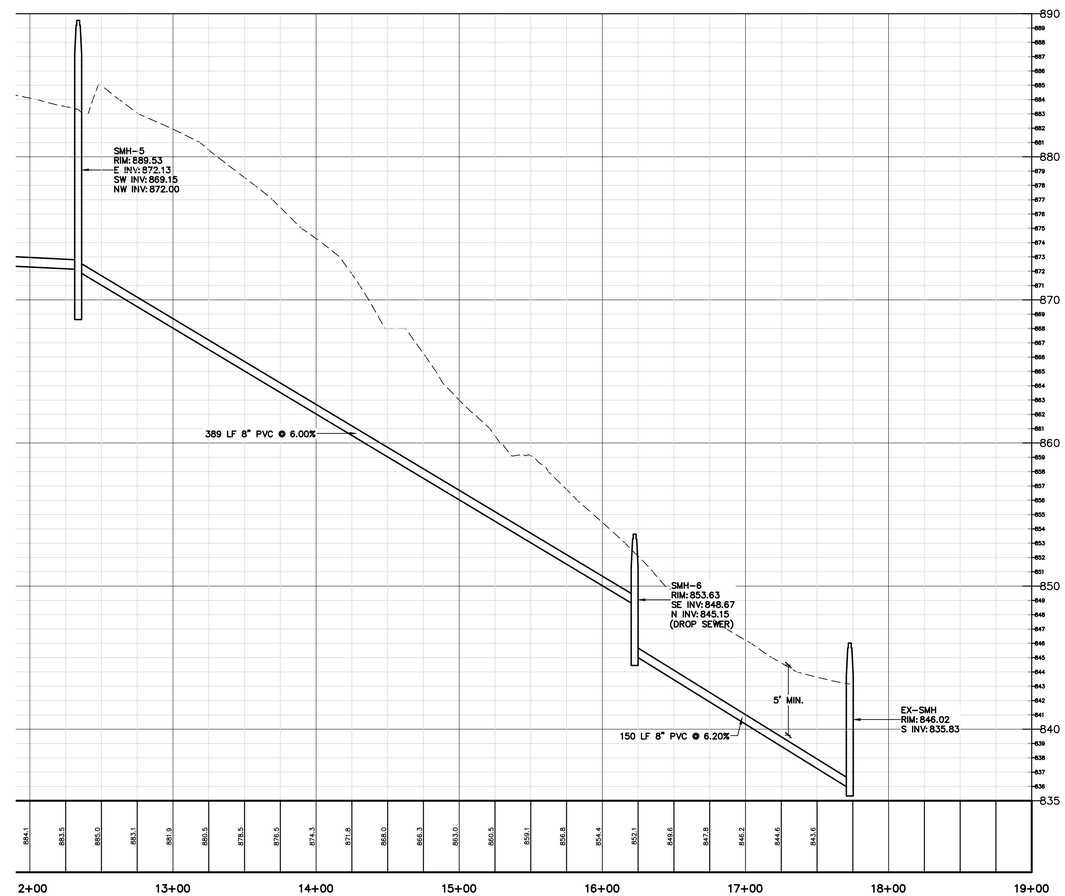

3 C-6.0 SEWER PROFILE
SCALE: H: 1"=50' V: 1"=5'

1 C-6.0 OVERALL SEWER LAYOUT
SCALE: NTS

PROJECT TITLE:
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SHEET TITLE:
SEWER PROFILE PLAN

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PROJECT NO. 20-1906
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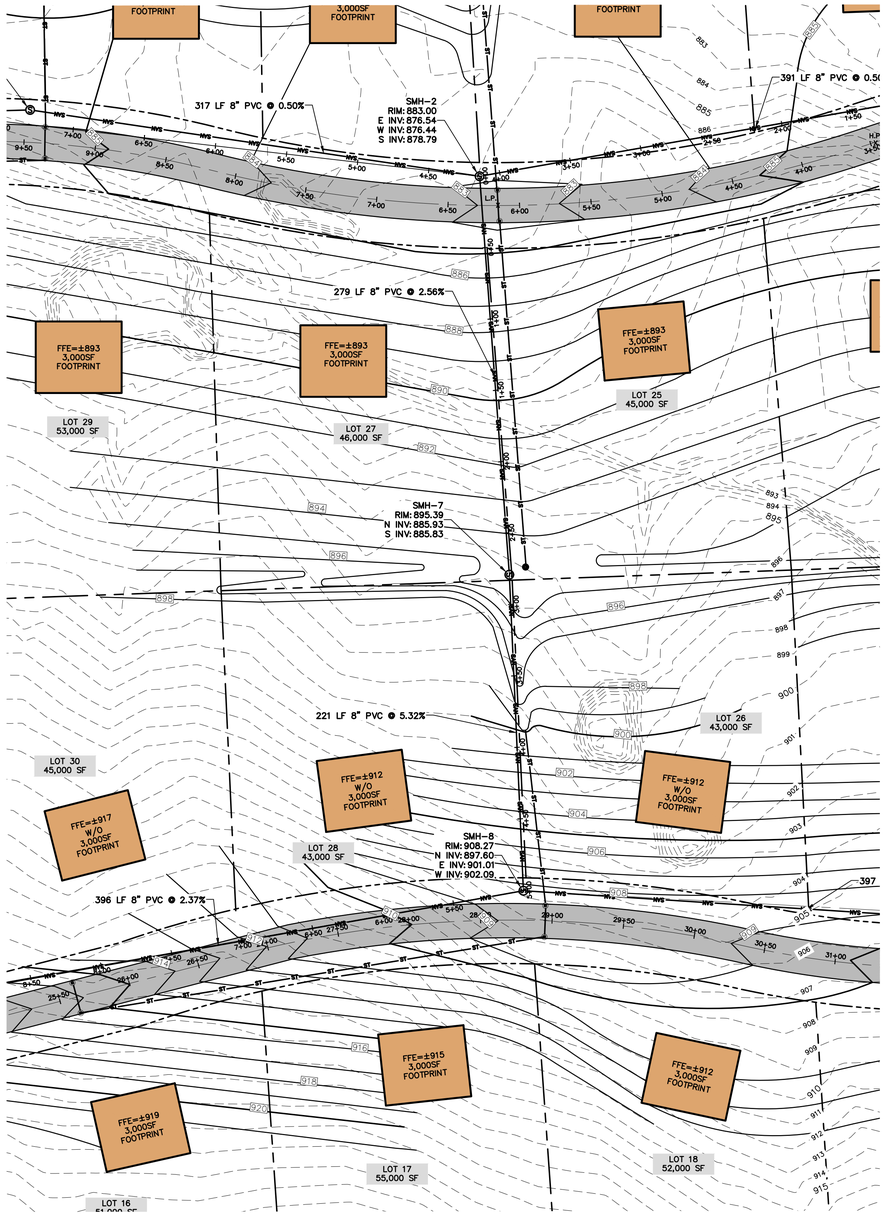
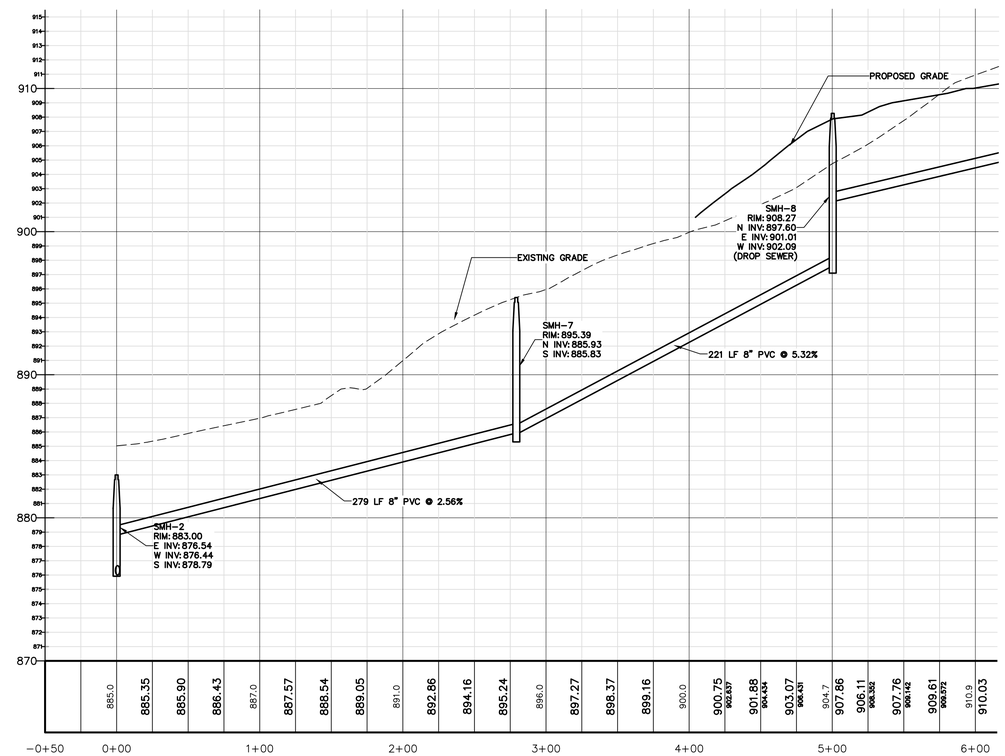
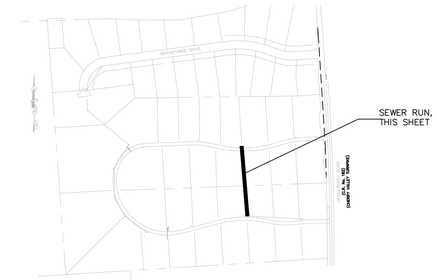


2 C-6.1 SANITARY SEWER PLAN
SCALE: 1"=50'



3 C-6.1 SANITARY SEWER PROFILE
SCALE: H:1"=50' V:1"=5'



1 C-6.1 OVERALL SEWER LAYOUT
SCALE: NTS

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PROJECT NO. 20-1906
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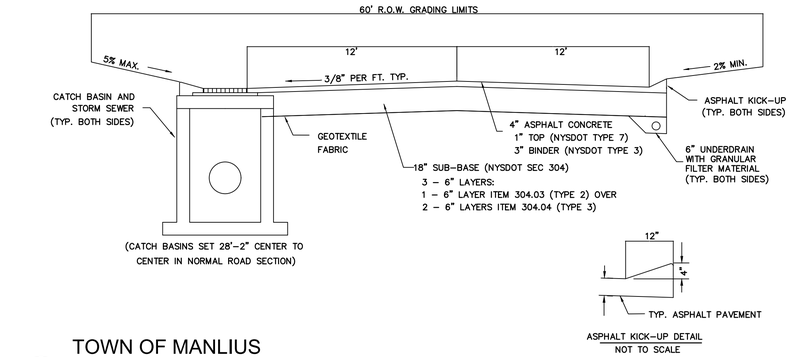
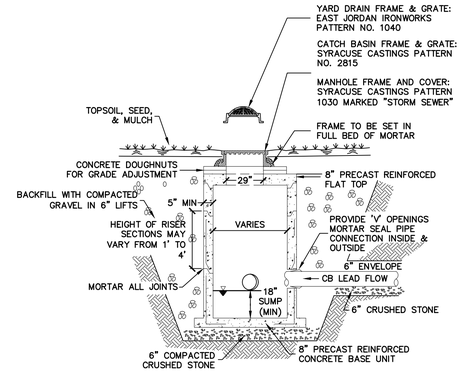


1 C-7.0 TOWN OF MANLIUS RESIDENTIAL STREET CROSS SECTION

SCALE: NTS

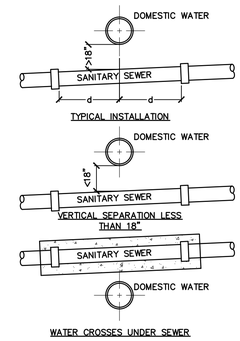


DRAINAGE STRUCTURE GENERAL NOTES

1. ALL STRUCTURES SHALL BE RATED FOR H-20 LOADING
2. REINFORCING FOR ALL SECTIONS SHALL BE AS FOLLOWS:
   TOP: #3 BARS SPACED AT 4" IN BOTH DIRECTIONS.
   BOTTOM: #3 BARS SPACED AT 4" IN BOTH DIRECTIONS.
   SIDES: #3 BARS SPACED AT 8" IN BOTH HORIZONTAL AND VERTICAL.
3. ALL REINFORCEMENT SHALL BE PLACED SO IT WILL HAVE A MINIMUM COVER OF 2" AND BE LOCATED APPROXIMATELY WITHIN THE CENTER OF THE SECTION.
4. TOP SLAB AND/OR FRAME ADJUSTMENT: FOR ALL DRAINAGE STRUCTURES A MAXIMUM OF 6 INCHES OF BRICK AND MORTAR OR A MAXIMUM OF 2 INCHES OF MORTAR ALONE SHALL BE USED FOR TOP SLAB AND/OR FRAME & GRATE ADJUSTMENT. FOR ADJUSTMENTS OVER 6 INCHES AND NOT TO EXCEED 12 INCHES, PRECAST CONCRETE ADJUSTMENT ELEMENT(S) MANUFACTURED IN ACCORDANCE WITH NYS-DOT STANDARD SPEC SUB-SECTION #706-04 SHALL BE USED; A MAXIMUM OF 2 INCHES OF MORTAR SHALL BE ALLOWED ON BOTH THE TOP AND BOTTOM OF THE PRECAST DEVICES. BRICK SHALL BE PRECAST PAVERS CONFORMING TO NYS-DOT STANDARD SPEC SUB-SECTION #704-13 AND MORTAR SHALL BE MORTAR FOR CONCRETE MASONRY CONFORMING TO NYS-DOT STANDARD SPEC SUB-SECTION #705-21.
5. MANHOLE STEPS SHALL BE REQUIRED IN ALL DRAINAGE STRUCTURES DEEPER THAN 4 FEET. STEPS SHALL CONFORM TO NYS-DOT STANDARD SPEC SUB-SECTION #725-02.
6. BASE OF PRECAST CATCH BASIN SHALL REST ON BASE MATERIAL COMPACTED IN PLACE WITH A VIBRATORY MECHANICAL TAMPER IN LIFTS NOT TO EXCEED 6" AT A TIME.
7. TRENCH SIDES SHALL CONFORM TO NYS DEPT OF LABOR AND OSHA SAFETY REGULATIONS.
8. MANHOLE INLET AND OUTLET PIPE CONNECTIONS MUST BE JOINED TO THE MANHOLE WITH A GASKETED, FLEXIBLE, WATERTIGHT CONNECTION OR IN ANY WATERTIGHT ARRANGEMENT THAT ALLOWS DIFFERENTIAL SETTLING OF THE MANHOLE WALL AND PIPE TO TAKE PLACE.

2 C-7.0 CATCH BASIN

SCALE: NTS



TYPICAL INSTALLATION

1. MINIMUM VERTICAL SEPARATION IS 18" FROM TOP OF PIPE TO BOTTOM OF PIPE.
2. SEWER JOINTS ARE TO SPACED EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.

VERTICAL SEPARATION LESS THAN 18"

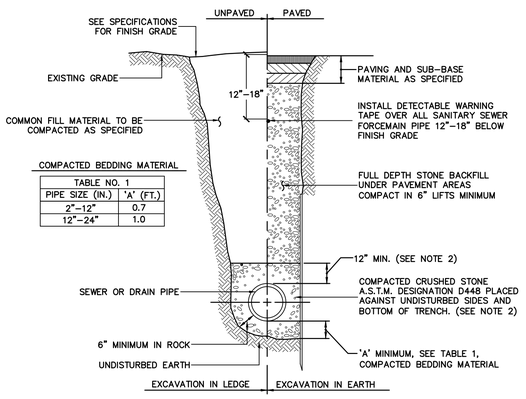
1. SEWER SHALL BE DESIGNED AND CONSTRUCTED EQUAL TO THE WATER PIPE, AND SHALL BE PRESSURE TESTED AT 150 PSI TO ASSURE WATER TIGHTNESS PRIOR TO BACKFILLING.
2. SEWER JOINTS ARE TO SPACED EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.

WATER CROSSES UNDER SEWER

1. SEWER SHALL BE DESIGNED AND CONSTRUCTED EQUAL TO THE WATER PIPE, AND SHALL BE PRESSURE TESTED AT 150 PSI TO ASSURE WATER TIGHTNESS PRIOR TO BACKFILLING.
2. SEWER JOINTS ARE TO SPACED EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.
3. PROVIDE ADEQUATE STRUCTURAL SUPPORT FOR SEWER TO MAINTAIN LINE AND GRADE

3 C-7.0 WATER AND SEWER SEPARATION

SCALE: NTS



COMPACTED BEDDING MATERIAL

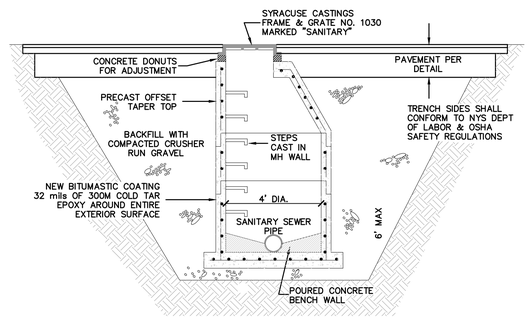
TABLE NO. 1	
PIPE SIZE (IN.)	'A' (FT.)
2"-12"	0.7
12"-24"	1.0

NOTES:

1. SHEETING, WHEN REQUIRED, TO BE CUT OFF AT LEAST 5 FEET BELOW STREET AND A MINIMUM OF 1 FOOT ABOVE TOP OF PIPE. WOOD SHEETING DRIVEN BELOW MID-DIAMETER OF THE PIPE SHALL BE LEFT IN PLACE. STEEL SHEETING DRIVEN BELOW MID-DIAMETER MAY BE WITHDRAWN IF APPROVED IN WRITING BY THE ENGINEER. FOR PVC PIPE ALL SHEETING DRIVEN BELOW MID-DIAMETER SHALL BE LEFT IN PLACE.
2. WHEN APPROVED BY THE ENGINEER FOR PIPES OTHER THAN PVC SELECTED GRAVEL FILL MATERIAL MAY BE USED FROM MID-DIAMETER OF PIPE TO 12" ABOVE TOP OF PIPE. NO STONES LARGER THAN 2 INCHES IN ANY DIMENSION WILL BE PERMITTED IN THIS AREA 3. TRENCHES LOCATED ON THE ROAD SHOULDER SHALL BE TREATED THE SAME AS EXCEPT FOR PAVING.
4. PROVIDE AT LEAST ONE IMPERVIOUS DAM IN GRAVEL BEDDING BETWEEN EACH MANHOLE WHERE DIRECTED, OR EVERY 300 FEET, WHICHEVER IS LESS. SEE DETAIL.
5. BEDDING MATERIAL FOR PVC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D2321 CLASS I OR CLASS II EMBEDMENT MATERIALS.

4 C-7.0 TYPICAL SEWER AND DRAIN TRENCH

SCALE: NTS

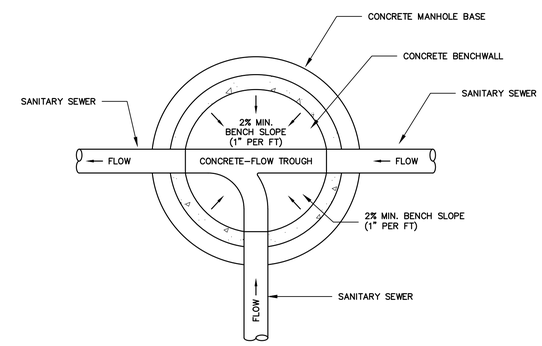


SANITARY MANHOLE GENERAL NOTES

1. ALL SANITARY SEWER MANHOLES TO BE RATED FOR H-20 LOADING
2. PRECAST REINFORCED CONCRETE OFFSET TAPER TOP TO BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478. TOP SECTION IS TO BE 3' LONG.
3. PRECAST REINFORCED CONCRETE MANHOLE RISER SECTIONS ARE TO BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478. RISER SECTIONS ARE TO HAVE A 48" INSIDE DIAMETER x 5" WALL AVAILABLE IN 2', 3', OR 4' LENGTHS.
4. PRECAST REINFORCED CONCRETE MANHOLE BASE IS TO MANUFACTURED IN ACCORDANCE WITH ASTM C-478. BASE IS TO HAVE A 48" INSIDE DIAMETER x 5" WALL WITH RUBBER BOOTS AS REQUIRED.
5. REINFORCING FOR ALL SECTIONS SHALL BE 2X4, 16 W.W. MESH.
6. ALL REINFORCEMENT SHALL BE PLACED SO IT WILL HAVE A MINIMUM COVER OF 2" AND BE LOCATED APPROXIMATELY WITHIN THE CENTER OF THE SECTION.
7. COURSES OF BRICK OR CONCRETE DONUTS ARE TO BE USED FOR RIM GRADE ADJUSTMENTS.
8. BASE OF PRECAST MANHOLE SHALL REST ON UNDISTURBED UNIFORM VIRGIN SOIL OR COMPACTED GRAVEL, COMPACTED IN PLACE WITH VIBRATORY MECHANICAL TAMPERS IN LIFTS NOT TO EXCEED 6" AT A TIME.
9. TRENCH SIDES SHALL CONFORM TO NYS LABOR DEPARTMENT SAFETY REGULATIONS.

5 C-7.0 SANITARY MANHOLE STRUCTURE

SCALE: NTS



6 C-7.0 SANITARY SEWER MANHOLE BENCH

SCALE: NTS

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SHEET TITLE:
SITE DETAILS

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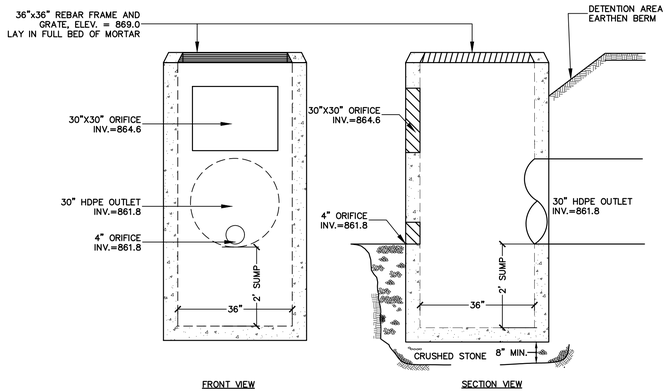
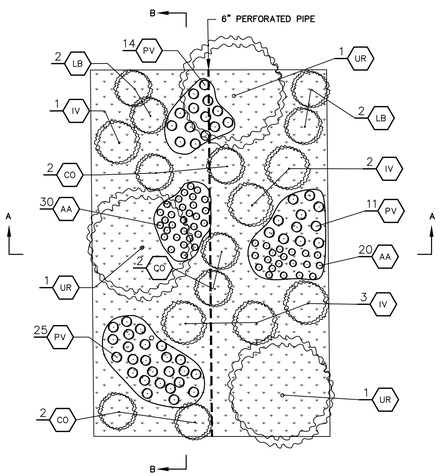


DETENTION BASIN #1 PRECAST CONCRETE OUTLET STRUCTURE

1 / C-7.1 SCALE: NTS



*PLANTING QUANTITIES SHOWN IN THE GRAPHIC ABOVE ARE FOR A TYPICAL 1,000 SF BIORETENTION AREA. SPECIFIC QUANTITIES FOR THE BIORETENTION AREA ARE PROVIDED IN THE CORRESPONDING LANDSCAPING TABLE.

BIORETENTION AREA #1 (±12,800 SF) – LANDSCAPE TABLE

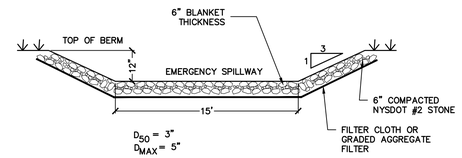
KEY	QUANTITY*	LATIN NAME	COMMON NAME	CALIPER	HEIGHT
TREES					
UR	16	ULMUS RUBRA	SLIPPERY ELM	6'–8'	B&B
SHRUBS					
LB	45	LINDERA BENZOIN	COMMON SPICE	18"–24"	B&B
IV	65	ILEX VERTICILLATA	WINTER BERRY	2'–3'	B&B
CO	65	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	18"–24"	B&B
HERBACEOUS PLANTS					
PV	600	PANICUM VIRGATUM	SWITCH GRASS		
AA	600	AGROSTIS ALBA	REDTOP		

BIORETENTION AREA #2 (±6,200 SF) – LANDSCAPE TABLE

KEY	QUANTITY*	LATIN NAME	COMMON NAME	CALIPER	HEIGHT
TREES					
UR	8	ULMUS RUBRA	SLIPPERY ELM	6'–8'	B&B
SHRUBS					
LB	25	LINDERA BENZOIN	COMMON SPICE	18"–24"	B&B
IV	35	ILEX VERTICILLATA	WINTER BERRY	2'–3'	B&B
CO	30	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	18"–24"	B&B
HERBACEOUS PLANTS					
PV	300	PANICUM VIRGATUM	SWITCH GRASS		
AA	300	AGROSTIS ALBA	REDTOP		

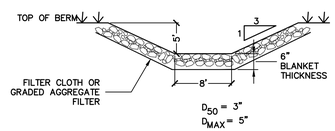
BIORETENTION FILTER SPECIES

2 / C-7.1 SCALE: NTS



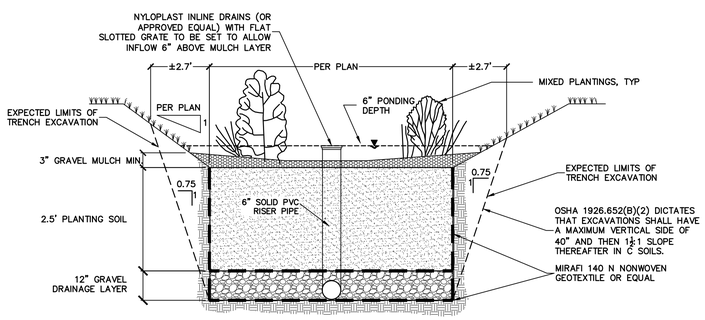
RIP RAP EMERGENCY SPILLWAY

3 / C-7.1 SCALE: NTS

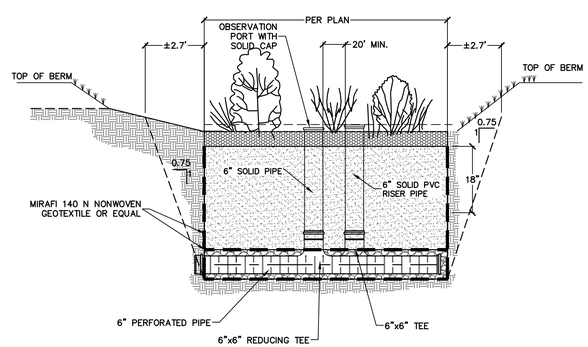


RIP RAP BIORETENTION SPILLWAY

4 / C-7.1 SCALE: NTS



PROFILE VIEW SECTION A–A



PROFILE VIEW SECTION B–B

BIORETENTION FILTER CROSS SECTIONS

5 / C-7.1 SCALE: NTS

BIORETENTION NOTES:

1. PLANTING SOIL MEDIA SHALL BE:
   A.) 85% TO 88% COARSE TO MEDIUM SAND
   B.) 12%–15% LEAF COMPOST OR TOPSOIL
2. PEA GRAVEL MULCH CONFORMING TO ASTM D 448 No. 6.
3. UNDERDRAIN GRAVEL TO BE AASHTO M–43 No. 67, 0.25" TO 0.75".
4. GEOTEXTILE FILTER FABRIC (SEPARATION LAYER):
   ASTM D–751 (PUNCTURE STRENGTH – 125 LB)
   ASTM D–1117 (MULLEN BURST STRENGTH – 400 PSI)
   ASTM D–1682 (TENSILE STRENGTH – 300 LB)
   SIZE – 0.08" THICK; EQUIVALENT OPENING SIZE OF #80 SIEVE
5. COMPACT WITH WATER–FILLED HAND ROLLER. COMPACTION TO BE FIRM BUT EASY (UTILIZE PENCIL TEST).
6. ENGINEER TO TEST IN PLACE COMPACTION AND INFILTRATION OF PLANTING SOIL.
7. ENGINEER TO PERFORM INSPECTION OF BIORETENTION PLANTING SOIL IMMEDIATELY FOLLOWING PLACEMENT AND PERFORM AN IN PLACE PERCOLATION TEST TO CONFIRM THAT THE IN PLACE MATERIAL PERCOLATES AT A RATE FASTER THAN 10 MIN/INCH.

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
SITE DETAILS

NO.	REVISION/ISSUE	GENERAL REVISIONS	DATE
1			12/31/2021

PREPARED BY:
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
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MANLIUS, NEW YORK 13104
email: MNAP@NAPCON.COM
PH: (315) 682-5580 FAX: (315) 682-5544

PRELIMINARY
NOT FOR CONSTRUCTION

PLAN SEAL BY:
NEAL H. ZINSMEYER, JR. P.E.
NYS REGISTRATION # 67271

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE AS SHOWN

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SHEET C-7.1

EROSION CONTROL NOTES

EROSION AND SEDIMENT CONTROLS

1. STABILIZATION PRACTICES (TEMPORARY)
   a) TEMPORARY SEEDING AND PLANTING OF ALL UNPAVED AREAS WHEN CONSTRUCTION ACTIVITY HAS CEASED, OR WILL CEASE, IN AN AREA FOR 14 DAYS. SEEDING MIXTURES AND APPLICATION RATES ARE LISTED ON SHEET C–2.
   b) MULCHING EXPOSED AREAS.
   c) FREQUENT WATERING TO MINIMIZE WIND EROSION DURING CONSTRUCTION.

2. STABILIZATION PRACTICES (PERMANENT)
   a) LAND CLEARING ACTIVITIES SHALL BE DONE ONLY IN AREAS WHERE EARTHWORK WILL BE PERFORMED AND SHALL PROGRESS AS EARTHWORK IS NEEDED.
   b) PERMANENT SEEDING AND PLANTING OF ALL UNPAVED AREAS.

3. STRUCTURAL MEASURES TEMPORARY
   a. STABILIZED CONSTRUCTION ENTRANCE: AT THE ENTRANCE TO THE ALL DISTURBED AREAS FROM AN EXISTING ROADWAY A STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROVIDED. THE PURPOSE OF THE STABILIZED CONSTRUCTION ENTRANCE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO THE PUBLIC RIGHT–OF–WAY.
   b. SILT FENCE: SILT FENCE SHALL BE INSTALLED AS SHOWN ON THE EROSION CONTROL PLAN . THE FABRIC SHALL MEET THE SPECIFICATIONS NOTED ON THE DETAILS UNLESS OTHERWISE APPROVED BY THE APPROPRIATE EROSION AND SEDIMENT CONTROL PLAN APPROVAL AUTHORITY. SUCH APPROVAL SHALL NOT CONSTITUTE STATEWIDE ACCEPTANCE.
   c. DUST CONTROL: DUST CONTROL IS THE CONTROL OF DUST RESULTING FROM LAND–DISTURBING ACTIVITIES. THE PURPOSE IS TO PREVENT SURFACE AND AIR MOVEMENT OF DUST FROM DISTURBED SOIL SURFACES THAT MAY CAUSE OFF–SITE DAMAGE, HEALTH HAZARDS, AND TRAFFIC SAFETY PROBLEMS.
   d. SEDIMENT TRAP: SEDIMENT TRAP TO BE INSTALLED IN DETENTION BASIN AREA FOR USE DURING CONSTRUCTION. STONE OUTLET SEDIMENT TRAP TO BE INSTALLED AS PER DETAIL TO ELIMINATE SEDIMENT DISCHARGE TO DOWNSTREAM AREAS DURING CONSTRUCTION PHASE.

4. STRUCTURAL PRACTICES (PERMANENT)
   a. ROCK OUTLET PROTECTION: ROCK OUTLET PROTECTION IS A SECTION OF ROCK PROTECTION PLACED AT THE OUTLET END OF CULVERTS, CONDUITS, OR CHANNELS. THE PURPOSE OF THE ROCK OUTLET PROTECTION IS TO REDUCE THE DEPTH, VELOCITY, AND ENERGY OF WATER, SUCH THAT THE FLOW WILL NOT ERODE THE RECEIVING DOWNSTREAM REACH.
   b. REINFORCED SLOPE PROTECTION: A TEMPORARY PROTECTIVE COVERING PLACED ON A PREPARED PLANTING AREA THAT IS ANCHORED IN PLACE BY STAPLES OR OTHER MEANS TO AID IN CONTROLLING EROSION BY ABSORBING RAIN SPLASH ENERGY AND WITHSTAND OVERLAND FLOW AS WELL AS PROVIDE A MICROCLIMATE TO PROTECT AND PROMOTE SEED ESTABLISHMENT.
   c. LAND GRADING: PERMANENT RESHAPING OF THE EXISTING LAND SURFACE BY GRADING IN ACCORDANCE WITH AN ENGINEERING TOPOGRAPHIC PLAN AND SPECIFICATION TO PROVIDE EROSION CONTROL AND VEGETATIVE ESTABLISHMENT ON DISTURBED, RESHAPED AREAS.

5. SEQUENCE OF MAJOR ACTIVITIES
   THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING THE ABOVE LISTED EROSION AND SEDIMENT CONTROL PRACTICES. THE CONTRACTOR MAY DESIGNATE THESE TASKS TO CERTAIN SUBCONTRACTORS AS IS SEEN FIT, BUT THE ULTIMATE RESPONSIBILITY FOR IMPLEMENTING THESE CONTROLS AND ENSURING THEIR PROPER FUNCTION REMAINS WITH THE CONTRACTOR. THE ORDER OF ACTIVITIES WILL BE AS FOLLOWS:
   a) CONDUCT PRECONSTRUCTION MEETING
   b) CONSTRUCT TEMPORARY CONSTRUCTION ENTRANCE/EXIT AT THE LOCATION SHOWN ON THE PLAN.
   c) INSTALL PERIMETER SILT FENCE AND SECURITY CONSTRUCTION FENCE IN THE LOCATIONS SHOWN ON THE PLAN.
   d) ESTABLISH STAGING AREA ON PROJECT SITE
   e) CONSTRUCT TEMPORARY SEDIMENT TRAP
   f) REMOVE TOPSOIL, STOCKPILE AND STABILIZE
   g) SITE GRADING. IMPORT OF FILL MATERIAL TO RAISE SITE TO PROPOSED GRADE (OR SUB–GRADE, AS APPROPRIATE).
   h) BUILDING FOUNDATION EXCAVATION (BUILDING CONSTRUCTION TO CONTINUE CONCURRENTLY WITH REMAINING SITE WORK).
   i) DISTURBED AREAS OF THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED FOR MORE THAN 14 DAYS SHALL BE TEMPORARILY SEEDED AND WATERED.
   j) UNDERGROUND UTILITY INSTALLATIONS.
   k) INSTALL FILTER FABRIC DROP INLET PROTECTION AT ALL STORM INLETS.
   l) COMPACT GRAVEL ALONG ALL DRIVE AISLES AND PARKING AREAS
   m) SITE CONCRETE CONSTRUCTION.
   n) FINALIZE PAVEMENT SUBGRADE PREPARATION.
   o) REMOVE INLET PROTECTION NO MORE THAN 24 HOURS PRIOR TO PLACING ASPHALT PAVEMENT.
   p) PAVE AREAS NOTED ON PLAN.
   q) DEEP RIPPING OF NON–PAVED AREAS AS REQUIRED (NON–PAVED AREAS THAT HAVE BEEN COMPACTED DURING CONSTRUCTION VIA CONSTRUCTION TRAFFIC).
   r) FINAL GRADING, SEEDING, AND PLANTING.
   s) CONSTRUCT BIORETENTION BASINS AND OUTLET CONTROLS UPON UPSTREAM STABILIZATION OF SITE
   t) REMOVE SEDIMENT TRAP AND FINALIZE GRADING OF DETENTION BASIN
   u) REMOVE SILT FENCE ONLY AFTER ALL PAVING IS COMPLETE AND EXPOSED SURFACES ARE STABILIZED.

MAINTENANCE/INSPECTION PROCEDURES

THE FOLLOWING INSPECTION AND MAINTENANCE PRACTICES WILL BE USED TO MAINTAIN EROSION AND SEDIMENT CONTROLS AND STABILIZATION MEASURES.

1. ALL CONTROL MEASURES WILL BE INSPECTED AT LEAST TWICE EVERY SEVEN (7) CALENDAR DAYS
2. ALL MEASURES WILL BE MAINTAINED IN GOOD WORKING ORDER; IF REPAIRS OR OTHER EROSION CONTROL MEASURES ARE FOUND TO BE NECESSARY, THEY WILL BE INITIATED WITHIN 24 HOURS OF REPORT.
3. BUILT UP SEDIMENT WILL BE REMOVED FROM SILT FENCE WHEN IT HAS REACHED ONE–THIRD THE HEIGHT OF THE FENCE.
4. SILT FENCES WILL BE INSPECTED FOR DEPTH OF SEDIMENT, TEARS, ETC., TO SEE IF THE FABRIC IS SECURELY ATTACHED TO THE FENCE POSTS, AND TO SEE THAT THE FENCE POSTS ARE SECURELY IN THE GROUND.
5. TEMPORARY AND PERMANENT SEEDING AND ALL OTHER STABILIZATION MEASURES WILL BE INSPECTED FOR BARE SPOTS, WASHOUTS, AND HEALTHY GROWTH.
6. A MAINTENANCE INSPECTION REPORT WILL BE MADE AFTER EACH INSPECTION. COPIES OF THE REPORT FORMS TO BE COMPLETED BY THE INSPECTOR ARE INCLUDED IN THIS SWPPP.
7. THE OPERATOR SHALL HAVE A "QUALIFIED PROFESSIONAL" CONDUCT SITE INSPECTIONS FOLLOWING THE COMMENCEMENT OF CONSTRUCTION. A "QUALIFIED PROFESSIONAL" IS A PERSON KNOWLEDGEABLE IN THE PRINCIPLES AND PRACTICE OF EROSION AND SEDIMENT CONTROLS, SUCH AS A LICENSED PROFESSIONAL ENGINEER, CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC), OR SOIL SCIENTIST.
8. DISTURBED AREAS AND MATERIALS STORAGE AREAS WILL BE INSPECTED FOR EVIDENCE OF OR POTENTIAL FOR POLLUTANTS ENTERING STORMWATER SYSTEMS.
9. REPORT TO NYS DEC WITHIN 24 HOURS ANY NONCOMPLIANCE WITH THE SWPPP THAT WILL ENDANGER PUBLIC HEALTH OR THE ENVIRONMENT. FOLLOW UP WITH A WRITTEN REPORT WITHIN 5 DAYS OF THE NONCOMPLIANCE EVENT. THE FOLLOWING EVENTS REQUIRE 24 HOUR REPORTING: A) ANY UNANTICIPATED BYPASS WHICH EXCEEDS ANY EFFLUENT LIMITATION IN THE PERMIT, B) ANY UPSET WHICH EXCEEDS ANY EFFLUENT LIMITATION IN THE PERMIT, AND C) A VIOLATION OF A MAXIMUM DAILY DISCHARGE LIMITATION FOR ANY OF THE POLLUTANTS LISTED BY THE EPA IN THE PERMIT TO BE REPORTED WITHIN 24 HOURS. THE WRITTEN SUBMISSION MUST CONTAIN A DESCRIPTION OF THE NON–COMPLIANCE AND ITS CAUSE; THE PERIOD OF NON–COMPLIANCE, INCLUDING EXACT DATES AND TIMES, AND IF THE NON–COMPLIANCE HAS NOT BEEN CORRECTED, THE ANTICIPATED TIME IT IS EXPECTED TO CONTINUE; AND STEPS TAKEN OR PLANNED TO REDUCE, ELIMINATE, AND PREVENT RECURRENCE OF THE NON–COMPLIANCE.
10. RELEASES OF HAZARDOUS SUBSTANCES OR OIL IN EXCESS OF REPORTABLE QUANTITIES (AS ESTABLISHED UNDER 40 CFR 110, 40 CFR 117 OR 40 CFR 302) MUST BE REPORTED. FORM G–1 PROVIDES FURTHER DETAILS ON THE NOTIFICATION AND REPORTING PROCESS.

INSPECTION AND MAINTENANCE REPORT FORMS

ONCE INSTALLATION OF ANY REQUIRED OR OPTIONAL EROSION CONTROL DEVICE OR MEASURE HAS BEEN IMPLEMENTED, AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND SHALL BE PERFORMED BY A QUALIFIED PROFESSIONAL. THE FORMS FOUND IN THIS SWPPP SHALL BE USED BY THE INSPECTORS TO INVENTORY AND REPORT THE CONDITION OF EACH MEASURE TO ASSIST IN MAINTAINING THE EROSION AND SEDIMENT CONTROL MEASURES IN GOOD WORKING ORDER.

THESE REPORT FORMS SHALL BECOME AN INTEGRAL PART OF THE SWPPP AND SHALL BE MADE READILY ACCESSIBLE TO GOVERNMENTAL INSPECTION OFFICIALS, THE OPERATOR'S ENGINEER, AND THE OPERATOR FOR REVIEW UPON REQUEST DURING VISITS TO THE PROJECT SITE. IN ADDITION, COPIES OF THE REPORTS SHALL BE PROVIDED TO ANY OF THESE PERSONS, UPON REQUEST, VIA MAIL OR FACSIMILE TRANSMISSION. INSPECTION AND MAINTENANCE REPORT FORMS ARE TO BE MAINTAINED BY THE PERMITTEE FOR FIVE YEARS FOLLOWING THE FINAL STABILIZATION OF THE SITE.

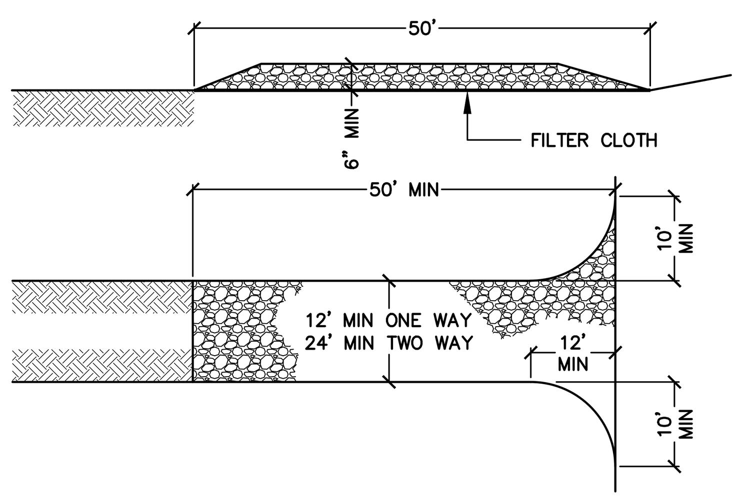
OTHER RECORD–KEEPING REQUIREMENTS

THE CONTRACTOR SHALL KEEP THE FOLLOWING RECORDS RELATED TO CONSTRUCTION ACTIVITIES AT THE SITE:

– DATES WHEN MAJOR GRADING ACTIVITIES OCCUR AND THE AREAS WHICH WERE GRADED
– DATES AND DETAILS CONCERNING THE INSTALLATION OF STRUCTURAL CONTROLS
– DATES WHEN CONSTRUCTION ACTIVITIES CEASE IN AN AREA
– DATES WHEN AN AREAS IS STABILIZED, EITHER TEMPORARILY OR PERMANENTLY
– DATES OF RAINFALL AND THE AMOUNT OF RAINFALL
– DATES AND DESCRIPTIONS OF THE CHARACTER AND AMOUNT OF ANY SPILLS OF HAZARDOUS MATERIALS
– RECORDS OF REPORTS FILED WITH REGULATORY AGENCIES IF REPORTABLE QUANTITIES OF HAZARDOUS MATERIALS SPILLED

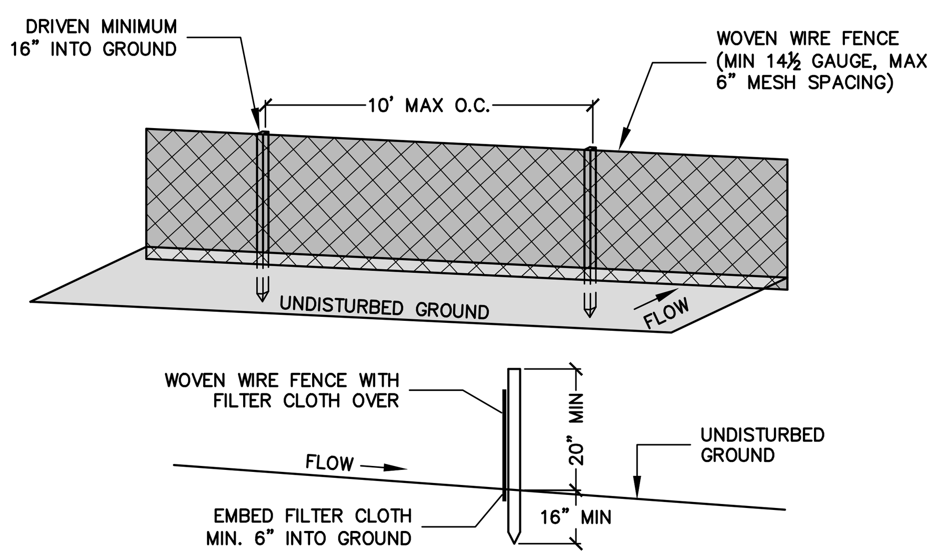
EROSION CONTROL NOTES

1. LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY GOVERNING AUTHORITIES. THE GENERAL CONTRACTOR SHALL STRICTLY ADHERE TO THE APPROVED SWPPP DRAWINGS DURING CONSTRUCTION OPERATIONS.
2. NO LAND CLEARING OR GRADING SHALL BEGIN UNTIL THE APPROPRIATE EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
3. ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 7 DAYS OF FINAL GRADING.
4. SHOULD CONSTRUCTION STOP FOR LONGER THAN 14 DAYS, THE SITE SHALL BE SEEDED AS SPECIFIED.
5. MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN AND AT LEAST ONCE A WEEK.
6. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
7. GENERAL CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
8. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON SITE INSPECTION.
9. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
11. ALL WORK TO BE DONE IN STRICT ACCORDANCE WITH THE NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.



1. STONE SIZE – USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – NOT LESS THAN 50 FEET.
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – 24 FEET MINIMUM.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

1 / C–7.2 CONSTRUCTION ENTRANCE
SCALE: NTS



POSTS: STEEL, EITHER "T" OR "U" TYPE OR 2" HARDWOOD

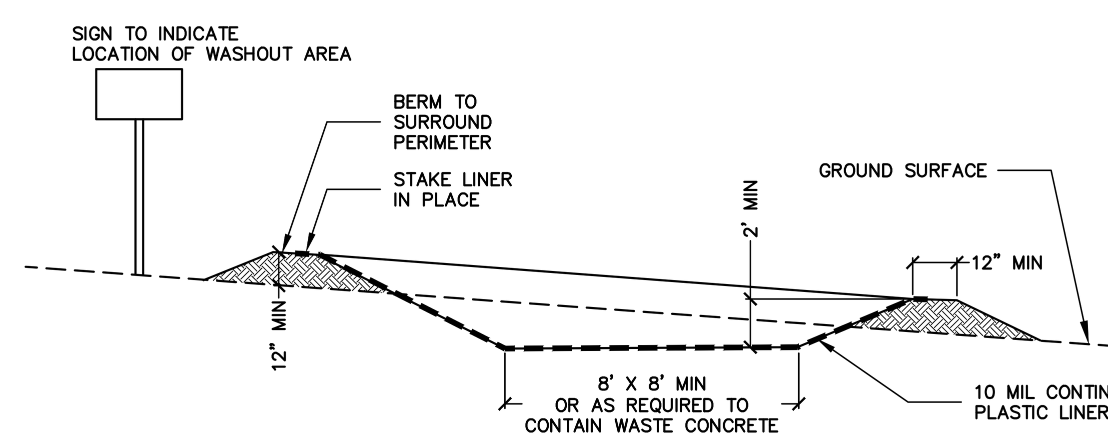
FENCE: WOVEN WIRE, 14 1/2 GAUGE, 6" MAX. MESH OPENING

FILTER CLOTH: FILTER X., MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL

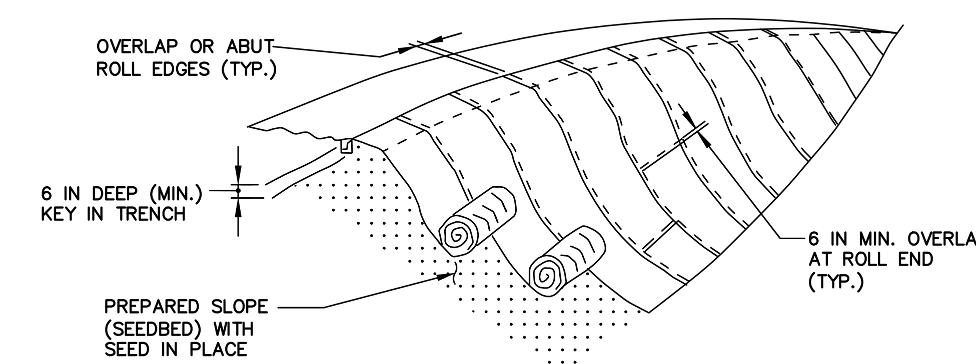
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

2 / C–7.2 SILT FENCE
SCALE: NTS



NOTES:
1. CONCRETE WAHSOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.
2. CONCRETE WASHOUT OUT AREA SHALL BE LINED WITH A 10 MIL IMPERMEABLE LINER AND STAKED IN PLACE.
3. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE LOCATION OF CONCRETE WASHOUT AREA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
4. THE CONCRETE WAHSOUT AREA SHALL BE REPAIRED AND ENLARGED OR CLEANED OUT AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
5. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM SITE AND DISPOSED OF AT AN ACCEPTED WASTE SITE.
6. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, THE DISTURBED AREA SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED.

3 / C–7.2 CONCRETE WASHOUT AREA
SCALE: NTS

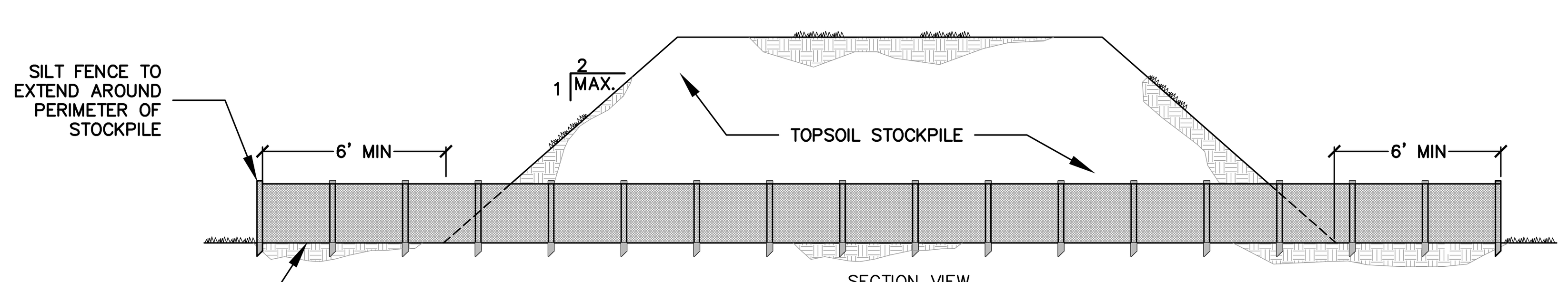


ISOMETRIC VIEW

CONSTRUCTION SPECIFICATIONS

1. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN–MADE FIBERS (MOSTLY ORGANIC).
2. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION & SEDIMENT CONTROL PLAN.
3. OVERLAP OR ABUT ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSLOPE MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.

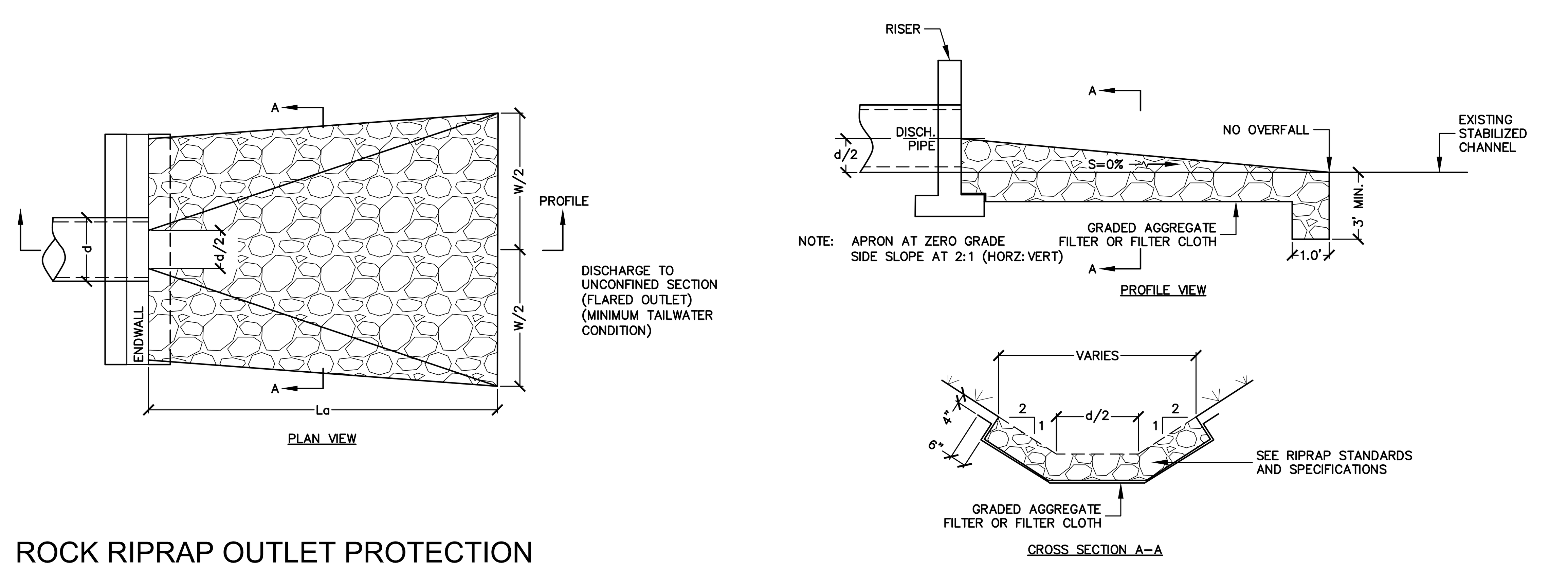
4 / C–7.2 SLOPE STABILIZATION MATTING
SCALE: NTS



SECTION VIEW

NOTES:
1. SEE EROSION CONTROL PLAN FOR LOCATION OF STOCKPILE
2. REFER TO SILT FENCE DETAIL FOR INSTALLATION OF SILT FENCE
3. IF THE STOCKPILE IS TO REMAIN FOR MORE THAN 14 DAYS IT SHALL BE TEMPORARILY SEEDED FOR STABILIZATION
4. SILT FENCES TO BE MAINTAINED IN PLACE UNTIL TOPSOIL STOCKPILE HAS BEEN REMOVED

5 / C–7.2 TYPICAL TOPSOIL STOCKPILE
SCALE: NTS



NOTE: APRON AT ZERO GRADE SIDE SLOPE AT 2:1 (HORZ: VERT)

6 / C–7.2 ROCK RIPRAP OUTLET PROTECTION UNCONFINED DOWNSTREAM SECTION
SCALE: NTS

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2 HENNEBERRY ROAD
TOWN OF MANLIUS ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
SITE DETAILS

NO.	REVISION/ISSUE	DATE
1	GENERAL REVISIONS	12/01/2021

PREPARED BY:

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PRELIMINARY
NOT FOR CONSTRUCTION

PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

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NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, PC

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ANY LICENSEE WHO ALTERS THIS DOCUMENT IS REQUIRED BY LAW TO AFFIX HIS OR HER SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS OR HER SIGNATURE AND SPECIFIC DESCRIPTION OF THE ALTERATIONS.

PROJECT NO. 20-1906

DATE 17 SEP 2020

SCALE AS SHOWN

SHEET C-7.2

DW Stoner
& Associates, LLC

1012 Branch Brook Road
Groton, Vermont 05046
Phone: 315-447-8733

November 14, 2021

Mr. Mark Harrington, President
Harrington Homes Inc.
3848 Henneberry Road
Manlius, New York 13078

RE: Comments by G. Gould relative to Pumping test results and reporting

Dear Mr. Harrington,

The purpose of this letter is to respond to two sets of comments made by G. Gould about the pumping test and subsequent report relative to the groundwater supply underlying the proposed Brandywine Estates Phase 2 project. My responses to Mr. Gould's original comments were included in a letter prepared by Mr. Napierala and addressed to the Planning Board on October 4, 2021.

It occurred to me that we are using terms that are not necessarily familiar to the Planning Board so I am including a definition of some terms as follow:

AQUIFER

An aquifer is a groundwater bearing geologic formation sufficiently permeable to transmit and yield water in usable quantities.

DEWATERING

For an aquifer dewatering would involve a rate of removal of water that would result in the material becoming (effectively) dry.

DRAWDOWN

Drawdown is referring to the lowering of the water level in a well. The water level is measured in the well that is being pumped (the pumping well) and observation wells located at some distance from the pumping well. The drawdown produced at a certain pumping rate in the well being pumped and the observation wells (in this instance the wells installed on two adjacent lots, lots 6 and 29) can be used to calculate the permeability of the aquifer, the porosity of the aquifer and can aid in forecasting the performance of the aquifer.

MAXIMUM DAILY WATER USE

Each home uses a certain amount of water on a daily basis. The total amount has been estimated by a number of entities. The American Water Works Association

estimates the per capita use, including both indoor and outdoor use a 110 gallons/person/day. There is no regulatory standard that establishes daily household water use standard but the NYSDOH sets a standard for design of onsite wastewater disposal at 110 gallons per bedroom per day. The Brandywine Phase 2 project is planned for 3-4 bedroom homes or 330-440 gallons per day. For purposes of our calculations we are assuming that each home will use an average of 500 gallons per day and that is the daily total that is withdrawn from each well.

PEAK DEMAND

In terms of water use there are times of the day when there is zero water use (late at night) and times of the day when a number of people may be using showers, toilets, faucets and washing machines all during the same time period. The AWWA estimates that peak demand for a four bedroom house may be 110 gallons per hour. We are estimating that for short periods of time each home may be using 5-10 gallons/minute but the daily total is still less than 500 gallons per home per day.

PERMEABILITY

The permeability of any water bearing material is its ability to transmit water. For sake of illustration gravel has a high permeability and clay has a low permeability.

POROSITY/AQUIFER STORAGE

Porosity is the portion or percentage of a soil or rock material that is occupied by pores or interstices. It is possible for a material to have a low permeability but a high porosity such as a clay or a relatively high permeability but relatively low porosity such as karstic carbonate rock.

PUMPING TEST

A pumping test is a method of measuring the performance of an aquifer. It is typically carried out by installing a water well and pumping that well at a set rate while measuring both the well discharge and the drawdown over time. One or more observation wells are measured to see how much drawdown occurs. As previously mentioned the results can be used to calculate the permeability and porosity of the aquifer and those results were included in my August 11, 2021 report. Those calculations are done using one of a number of formulas. The Theim equation that I used was included in the software package referenced by Mr. Gould.

RECHARGE

Any aquifer is replenished by infiltrating water. It is challenging to determine how much recharge is occurring in any given location. Recharge can be localized or some aquifers can be recharged in areas at some distance from where the water is withdrawn.

RECOVERY

During a pumping test, at a certain time the well discharge is ceased and the water levels in the pumping well and any observation wells are measured to see how quickly the water levels rise back to the pre-pumping elevations. If a well is being pumped at a rate that is effectively dewatering the aquifer or pumping at a rate faster than recharge is occurring the well recovery will show this. If a pumping test is run for a certain period of time (say 24 hours) then the amount of recovery after the pump is turned off is the best indicator of how the aquifer is performing and whether a lack of recharge is resulting in dewatering of the aquifer. If the water level in the pumping well is lower than the pre-pumping test water level 24 hours after the pumping has ceased then the rate of withdrawal has exceeded the recharge rate of the aquifer.

Pumping test approach and procedures

There are no existing rules, regulations or standards at the state, county or local level, applicable to Individual Supply Wells, that set procedures for conducting a pumping test such as the one we conducted. We wrote a workplan to describe the approach we would take to conduct an aquifer test based on technical practices appropriate for a development of this size. That workplan, including the methods to be used were approved in a memo from Doug Miller to the Planning Board dated February 9, 2021. With the exception of the well locations that needed to be adjusted due to site access issues the workplan was carried out as proposed. Mr. Gould has suggested that the work should have been carried out in accordance with a NYSDEC document entitled “Pumping Test Procedures for Water Withdrawal Permit Applications”. That document applies to groundwater withdrawals of 100,000 gallons per day or greater. The Brandywine phase 2 project will withdraw less than 17,000 gallons per day. While it is possible that individual homes may withdraw 5-10 gallons per minute during peak use times the maximum daily use will not exceed 440 gallons per day. This number is based on NYSDOH handbook for Residential onsite system design. The design standard of 110 gallons per bedroom per day is intended to conservatively estimate water use ie is unlikely to be exceeded. To add a margin of safety we will assume that the average daily use of groundwater, per home, per day will be 500 gallons. The idea, suggested by Mr. Gould that we should evaluate this project by assuming that 34 wells are pumping 5 gallons per minute, 24 hours per day is unrealistic and unfair. On average each well will be withdrawing 0.34 gallons per minute continuously.

Data Accuracy

As previously reported the pumping test was carried out by Mr. Mark Shute, a licensed and highly respected water well driller in consultation with me. Water levels were measured with a water level indicator, data loggers were used for

the duration of the drawdown and recovery. Mr. Gould has suggested that the data logger cables could have stretched and that the flow meter could have malfunctioned, that excessive rainfall could have recharged the aquifer during the pumping test and that surface water could have affected or could be affected by pumping wells. In response to these concerns we do not think that the cables stretched, or that the flow meter was malfunctioning or that surface water or recharge events could have affected the aquifer which is over 200 feet below the ground surface and protected by glacial till and shale that is fairly impermeable.

Pumping Test Results and What They Mean

There are some key facts that need to be highlighted:

1. The pumping well pumped at 12 gallons per minute for 23 hours and produced a drawdown of less than 2.5 feet out of a water column of 35 feet.
2. If 34 homes were built and each home used 500 gallons per day the total average withdrawal from the entire subdivision would be slightly less than 12 gallons per minute.
3. Mr. Gould has expressed concern that over the long term the aquifer will be depleted because the rate of withdrawal exceeds the recharge. If that were true then that depletion would show up in the well recovery data. If the water level in the pumping well did not recover to the pre-pumping elevation within 23 hours after pumping had ceased it would show that the aquifer was being depleted. However in less than 19 hours after the pumping had ceased in well #5 the water level had recovered to the pre-pumping elevation.

A Proposal to address Town Concerns

NYSDOH Individual Water Supply Wells Fact sheet #2 states that a water well that can produce 5 gallons per minute or more should be adequate to meet Peak Demand. It is also important that any future wells used on the Brandywine Phase 2 property perform in a similar fashion to the Well that was installed on lot #5. To account for some variability it seems reasonable to expect that each new well will produce at least 5 gallons per minute with no more than 10 feet of drawdown. As you are aware Harrington is proposing that Brandywine Phase 2 be built as a phased development. We are suggesting that each phase be approved contingent on the installation of a well on each lot that demonstrates a yield of 5 gallons per minute with no more than 10 feet of drawdown and that the well logs demonstrate that each well is

installed in geologic strata similar to that encountered during the installation of well #5. For any well that does not meet this requirement additional storage can be considered in consultation between the Town and Harrington. A contingent approval should be a way to demonstrate to the town that all 34 lots will have wells that will provide adequate sources of water supply to each home.

We look forward to moving forward with an approval that is adequately protective of future homeowners in Brandywine Phase 2.

Very Truly Yours,

David W. Stoner, P.G.

STORMWATER POLLUTION PREVENTION PLAN

For the:

Proposed Brandywine Estates – Phase 2
Henneberry Road
Town of Manlius

Prepared for:

HARRINGTON HOMES

Your Builder for Life

Harrington Homes, Inc
3848 Henneberry Road
Jamesville, NY 13078

Prepared by:

NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, NEW YORK 13104
Telephone: (315) 682-5580
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Project No. 20-1906

Revised December 2021

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EXECUTIVE SUMMARY

A. Purpose

The following Stormwater Pollution Prevention Plan (SWPPP) has been developed to control stormwater runoff and pollutants from a site during and after construction activities. The objective of this SWPPP is to comply with the NYSDEC SPDES Stormwater Permit from Construction Activities by planning and implementing standard design practices.

B. Project Description

The ±54 acre property is located on the west side of Henneberry Road in the Town of Manlius, Onondaga County, NY. This project consists of the subdivision and development of 34 single family homes. The development will also include necessary amenities such as public street(s), public/private utility extensions/connections, and applicable stormwater management facilities.

C. Stormwater Practices

Stormwater practices are categorized as either temporary construction measures or permanent operation measures. The temporary measures that will be used on this site for erosion and sediment control include (but are not limited to): stabilized construction entrance, silt fencing, and temporary sediment basins. The permanent stormwater practices to be installed are a series of two bioretention areas, and an above ground grass-line detention basin which will provide water quality, runoff reduction, and storage for quantity control. All practices, both the temporary construction measures and the permanent operation measures, have been designed in accordance with the established standards.

D. Water Quality Treatment

The water quality volume treatment characteristics are summarized below. The entire water quality descriptions and calculations are further detailed in Section III.E and F.

Water Quality Volume	
Required WQv (ac-ft)	**Total Provided WQv (ac-ft)**
0.469	0.469

E. Runoff Reduction Volume (RRv)

The NYSDEC regulation requires all construction projects that disturb greater than one acre of land to provide runoff reduction through the implementation of green infrastructure practices. Runoff reduction volume for this project is achieved using bioretention areas. This volume is summarized below and further detailed in Section III.D, E, and F.

Runoff Reduction Volume	
Required RRv (ac-ft)	**Total Provided RRv (ac-ft)**
0.054	0.188

F. Stormwater Quantity

The impacts to stormwater runoff quantity (i.e. peak flows) will be mitigated in the aboveground grass-lined detention basins throughout the site. The detention basins will be constructed with sufficient volume to store additional runoff from the site and discharge it in a controlled manner. The chart below summarizes the stormwater discharges from the site and is further detailed in Section III.G and H.

	Existing Peak Runoff Rate (cfs)			**Proposed Peak Runoff Rate (cfs)**		
Point of Study	Pt. 1B	Pt. 2	Pt. 3	Pt. 1B	Pt. 2	Pt. 3
10-Year Storm	75.01	7.68	9.35	45.27	2.07	9.31
100-Year Storm	175.87	18.46	22.06	86.52	4.70	21.06

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Section I. SCOPE

A. PURPOSE

Napierala Consulting, Professional Engineer, P.C., has prepared this Stormwater Pollution Prevention Plan (SWPPP) in compliance with the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) Construction General Permit governing stormwater discharges during construction. The contractor's participation and adherence to this plan is mandatory. Non-compliance with the plan is subject to various remedies including, without limitation, monetary set-offs, withholding payments, reimbursement for costs, expenses (including reasonable attorney's fees), fines and civil penalties incurred and/or liquidated damages. This section provides a descriptive explanation of the Stormwater Pollution Prevention Plan and required contractor participation.

B. SPDES GENERAL PERMIT GP-0-20-001

Regulations enacted by the New York State Department of Environmental Conservation require permitting for the discharge of stormwater from construction activities on sites where an area of one acre or more of soil disturbance is proposed. To comply with these regulations, the developer of the site must request coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-20-001). In order to obtain coverage under the General Permit a Stormwater Pollution Prevention Plan (SWPPP) for the site must be prepared following the requirements of the New York State Stormwater Management Design Manual and the New York State Standards and Specifications for Erosion and Sediment Control.

The NOI, the SWPPP, and any amendments to the SWPPP, as well as any reports required by the SPDES General Permit for Stormwater Discharges from Construction Activity, must also be submitted concurrently to the local governing body and any other authorized agency having jurisdiction or regulatory control over the construction project.

C. RESPONSIBILITIES OF THE OWNER

The owner/operator shall identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP. The owner/operator shall identify the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The owner/operator shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. The owner/operator shall ensure that at least one trained contractor is on site on a daily basis when soil disturbance activities are being performed. The owner/operator shall have a qualified inspector conduct site inspections.

D. RESPONSIBILITIES OF THE CONTRACTOR

The contractor shall manage the discharge of stormwater from the site in accordance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity. The owner shall be responsible for conducting the stormwater management practices in accordance with the permit. The contractor shall be responsible for providing qualified inspectors to conduct the inspections required by the SWPPP. The contractor shall be responsible for any enforcement action taken or imposed by federal, state, or local agencies, including the cost of fines, construction delays, and remedial actions resulting from the contractor's failure to comply with the permit provisions. It shall be the responsibility of the contractor to make any changes to the SWPPP necessary when the contractor or any of his subcontractors elects to use borrow or fill or material storage sites, either contiguous to or remote from the construction

site, when such sites are used solely for this construction site. Such sites are considered to be part of the construction site covered by the permit and this SWPPP. Off-site borrow, fill, or material storage sites which are used for multiple construction projects are not subject to this requirement, unless specifically required by state or local jurisdictional entity regulations. The contractor should consider this requirement in negotiating with earthwork subcontractors, since the choice of an off-site borrow, fill, or material storage site may impact their duty to implement, make changes to, and perform inspections required by the SWPPP for the site.

The SWPPP shall provide forms for both the general contractor and subcontractor(s) identifying the company name, business address and telephone number along with the responsible person for the contractor and all subcontractors' who will implement the measures identified in the SWPPP. **The general contractor shall sign the "General Contractor's Certification" and all subcontractors shall sign the "Subcontractor's Certification",** verifying they have been instructed on how to comply with and fully understand the requirements of the NYSDEC and SWPPP. **This certification must be signed, by a fully qualified individual on behalf of each entity, prior to the beginning of any construction activities and shall be filed in the projects SWPPP.**

The SWPPP is meant to be a working document that shall be maintained at the site of the construction activities at all times throughout the project, shall be readily available upon request by the operator's personnel or NYSDEC or any other agency with regulatory authority over storm water issues, and shall be kept on-site until the site complies with the Final Stabilization section of this document. **A sign or other notice must be posted near the main entrance of the construction site which contains a completed NOI, the location of the SWPPP and the name and phone number of a contact person responsible for scheduling SWPPP viewing times, and any other state specific requirements.**

E. NOTICE OF INTENT

The operator has petitioned the NYSDEC for the stormwater discharges during construction at this site to be covered by the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity. A **Notice of Intent** (NOI) to be covered under this permit has been filed by the operator. The signatory on the NOI must sign all documents (i.e., inspection reports) associated with the SWPPP. If the signatory chooses not to sign all documents, he/she must designate a duly authorized representative to sign all relevant documents. This designation must be made in writing and be included in the SWPPP. The duly authorized representative may be either a named individual or any individual occupying a named position. Additionally, the written designation must be submitted to the NYSDEC.

F. STORMWATER INSPECTIONS

1. Inspection Procedures

Inspections of the erosion control practices are required every seven days by a qualified professional. All inspections will continue until the site complies with the final stabilization section of this document. **Weekly Inspections must be conducted by a "Qualified Professional". "Qualified Professional" means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a licensed Professional Engineer (PE), Certified Professional in Erosion and Sediment Control (CPESC), or soil scientist.** Each inspection must be followed up by a report documenting the inspector's findings and request the required maintenance and/or repair for the erosion and sedimentation control measures. It is imperative that the contractor documents the inspection and maintenance of all erosion and sedimentation control measures as soon as possible after the inspection and/or maintenance have been completed. These records are used to prove that the required inspection and maintenance were performed. The records shall be placed in the SWPPP. In addition to inspection and maintenance reports, records should be kept of the construction activities that occur on the site. The operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

2. Record Keeping

The operator shall also prepare a written summary of its status with respect to compliance with this

general permit at a minimum frequency of every three months during which coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity exists. The summary should address the status of achieving each component of the SWPPP. The reports shall be signed by the signatory of the NOI or a duly-authorized person and be retained at the construction site.
The contractor shall retain copies of the SWPPP, all reports and data for a minimum of five (5) years after the project. The following list identifies the required inspection and maintenance documentation that must be maintained by the contractor under this SWPPP.

- Inspection Report
- Stabilization Schedule
- Implementation Schedule
- Status Report

G. SWPPP MODIFICATIONS

The inspection report should also identify if any revisions to the SWPPP are warranted due to unexpected conditions. The SWPPP is meant to be a dynamic working guide that is to be kept current and amended whenever:

- The NYSDEC provides notification that the SWPPP does not comply with the minimum permit requirements.
- The design, construction, operation, or maintenance of the site changes in a way which significantly affects the potential for the discharge of pollutants or when the plan proves to be ineffective in eliminating or significantly minimizing pollutant discharges
- Within seven (7) calendar days of knowledge of a reportable release.

Any such changes to the SWPPP must be made in writing within seven (7) days of the date such modification or amendment is made. The contractor's failure to monitor or report deficiencies to the operator will result in the contractor being liable for fines and construction delays resulting from any federal, state, or local agency enforcement action.

H. FINAL STABILIZATION AND TERMINATION OF PERMIT COVERAGE

A site can be considered stabilized when all soil disturbing activities have been completed and a uniform perennial vegetative cover with a density of 80% over the unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures have been established and the facility no longer discharges stormwater associated with construction activities, and a **Notice of Termination** (NOT) form has been filed by the operator(s) with the NYSDEC. Prior to filing of the Notice of Termination, the operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fence) not needed for long-term erosion control have been removed. The filing of the NOT terminates coverage under the General Permit and terminates the contractor's responsibility to implement the SWPPP, but the requirements of the SWPPP, including periodic inspections, must be continued until the NOT is filed. Upon achieving this milestone, the contractor shall also submit "Final Stabilization Certification/Termination Checklist". Final payment and/or the release of any retainer will be withheld until all provisions of the SWPPP have been submitted, completed and accepted by the operator.

Section II. SITE DESCRIPTION

A. PROJECT NAME AND LOCATION

Harrington Homes, Inc
Brandywine Estates, Phase 2
Henneberry Road
Town of Manlius
Onondaga County, New York

UTM Coordinates from NYSDEC Interactive Map: E: 417962; N: 4759972
NYSDEC Region 7

The ±54 acre property is located on the west side of Henneberry Road in the Town of Manlius, Onondaga County, NY. Figure 1 shows the project location on a street map and Figure 2 shows an aerial image of the proposed site in its existing condition.

B. OWNER/OPERATOR NAME AND ADDRESS

Harrington Homes, Inc
3848 Henneberry Road
Jamesville, NY 10378

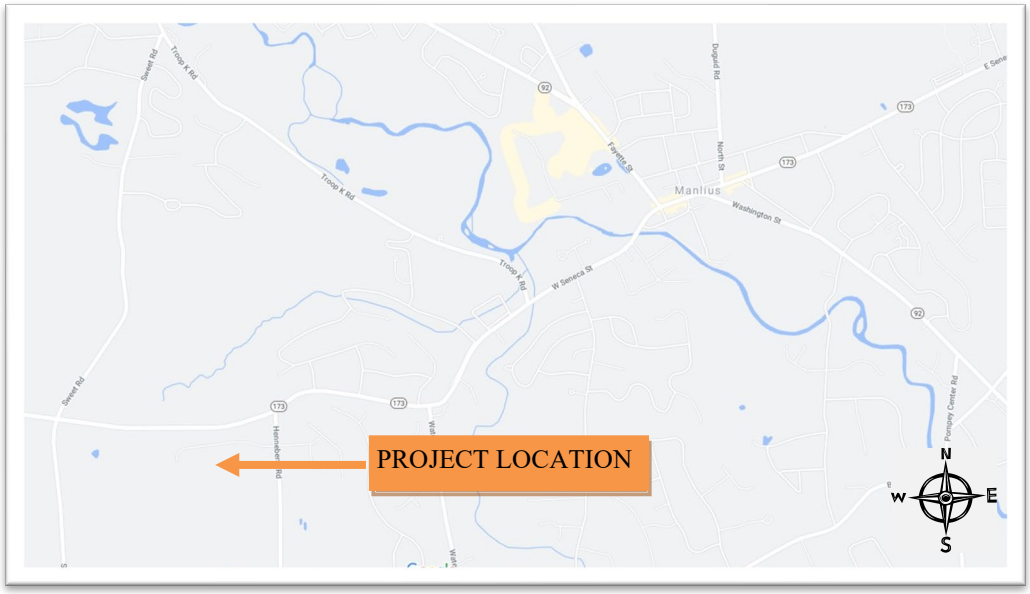


Figure 1: Site Location Map

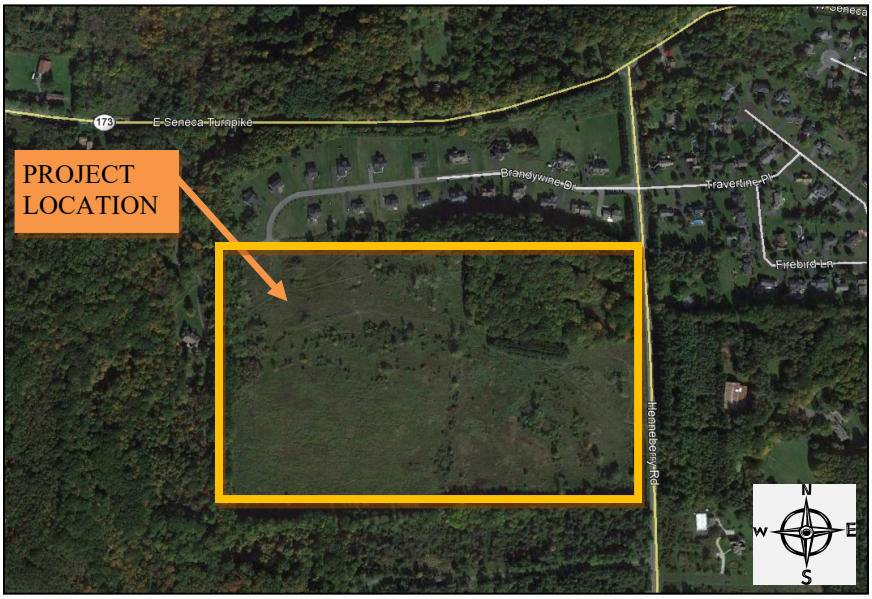


Figure 2: Proposed Site Aerial Image - Google Earth

C. PROJECT DESCRIPTION

The ±54 acre property is located on the west side of Henneberry Road in the Town of Manlius, Onondaga County, NY. This project consists of the subdivision and development of 34 single family homes. The development will also include necessary amenities such as public street(s), public/private utility extensions/connections, and applicable stormwater management facilities.

D. RECEIVING WATERS

Runoff from the site generally flows to the north toward Limestone Creek. This site is within a regulated MS4 (municipal separate storm sewer system). Figure 3 shows the project site location in relation to certain environmental boundaries using the NYSDEC Environmental Resource Mapper. The NYSDEC Environmental Resource Mapper shows that no regulated wetlands are within the vicinity of the project.

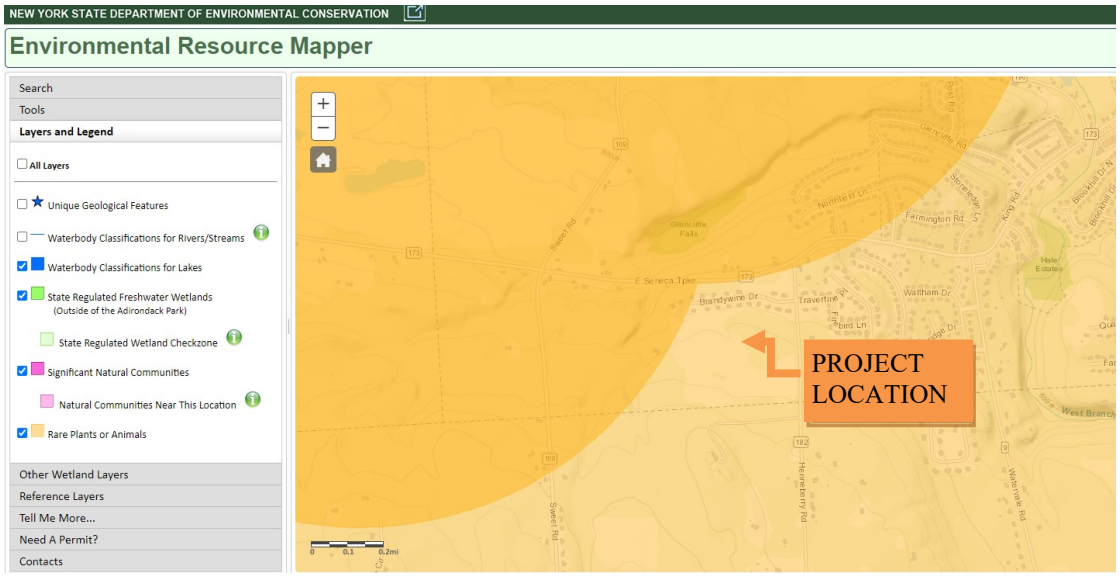


Figure 3: NYS DEC Environmental Resource Mapper

E. ENDANGERED OR THREATENED SPECIES

The NYS DEC Environmental Resource Mapper does not identify the site as containing any rare significant natural communities but is within the check zone for rare plants or animals. We have received a letter from the DEC which states that hibernacula of the Indiana Bat and the Northern Long-Eared Bat exist within 2.5 miles of the site. Due to this, there is a seasonal restriction on tree clearing: trees can only be cut down between October 15 and March 31 in order to protect potential roosting trees.

F. FEDERAL AND STATE HISTORIC PRESERVATION

The SPDES (State Pollutant Discharge Elimination System) GP-0-20-001 requires that the discharge from construction activities shall not influence properties listed as or eligible for listing on the State or National Register of Historic Places. Figure 4 shows the SHPO (State Historic Preservation) map which indicates the project is within an archeological check zone. The project will be further investigated accordingly.

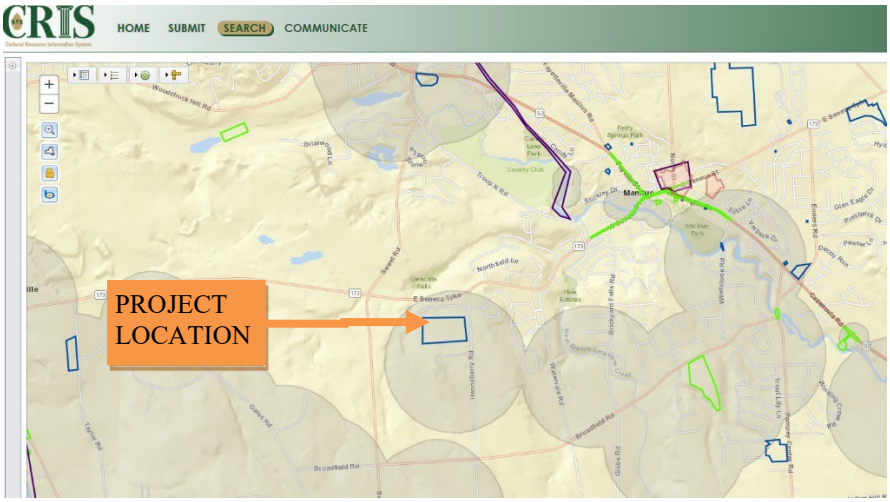


Figure 4: State Historic Preservation Office Map

G. FEMA

Based on local GIS mapping, there are no floodplain/floodway boundaries on this property, as shown on Figure 5 below. This is also confirmed on the site survey by Ianuzi and Romans Land Surveying, P.C., noting the project is in Zone X.

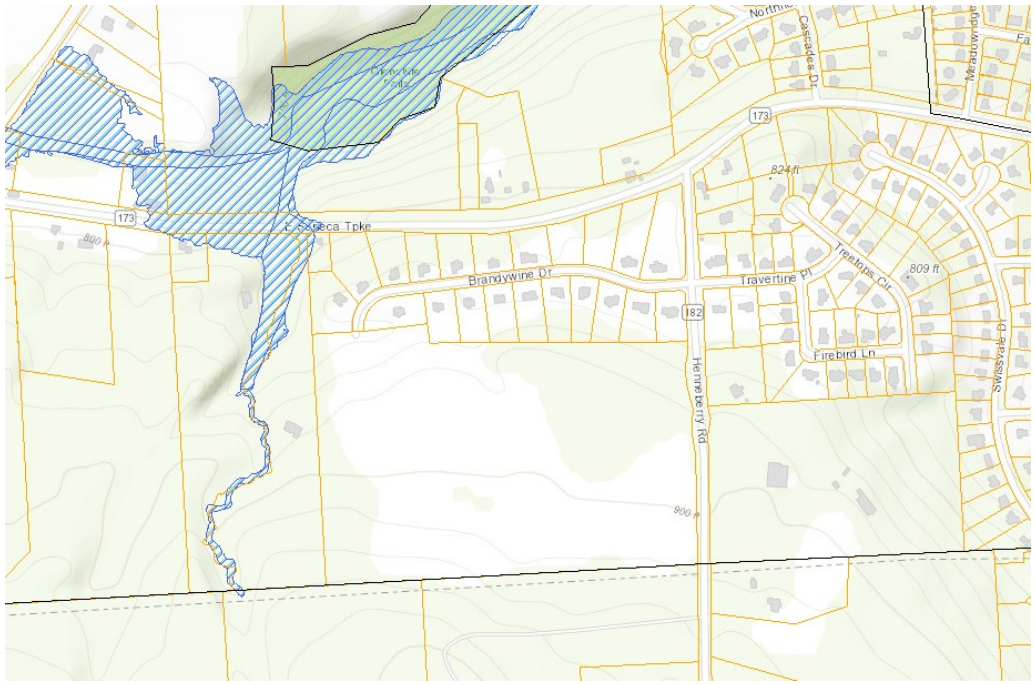


Figure 5: Onondaga County GIS Mapping

Section III. STORMWATER MANAGEMENT

A. METHODOLOGY

1. Hydrologic Conditions

The peak runoff rates for the site were calculated for the existing and proposed hydrologic conditions using HydroCAD software. The HydroCAD program uses the standard SCS TR-55 Curve Number Method for calculation of the time of concentration, composite curve number, and peak runoff rates for the drainage area(s) based on input by the user. The input data was taken from soil maps, detailed topographic and utility survey information, rainfall distribution maps, and aerial images. The required Water Quality Volume (WQ_v) was calculated in accordance with the New York State Stormwater Management Design Manual. The Channel Protection Volume (Cp_v) was calculated based on the release of the 1-year storm runoff volume over a 24-hour period. The hydrologic conditions are used to assess the impacts to the runoff characteristics and to design appropriate measures to mitigate these impacts. The NYS SPDES General Permit for Stormwater Discharges from Construction Activity requires that a stormwater mitigation system meet the following five design criteria.

a. Water Quality Volume: The system must capture and treat 90% of the average annual runoff volume.
b. Runoff Reduction Volume: The system must apply green infrastructure techniques and Stormwater Management Practices to replicate pre-development hydrology.
c. Provide 24-hour extended detention of the runoff from the one-year, 24-hour rainfall event.
d. Attenuation of the post-development 10-year, 24-hour peak discharge rate to predevelopment levels.
e. Attenuation of the post-development 100-year, 24-hour peak discharge rate to predevelopment levels.

2. Rainfall Information

The following table shows the rainfall values used in the design of the stormwater mitigation basin. These values are taken from rainfall distribution maps provided by the Northeast Regional Climate Center and the New York State Stormwater Management Design Manual, which can be seen on the following page. These values are applied to a Type II 24-hour rainfall distribution in the modeling of the watersheds using the HydroCAD program.

Table 1: Rainfall Information

Precipitation Event	Rainfall in inches
90% Rainfall (WQ_v)	1.0
1-Yr, 24-Hr (Cp_v)	2.04
10-Yr, 24-Hr (Q_p)	3.43
50-Yr, 24-Hr	4.94
100-Yr, 24-Hr (Q_f)	5.78

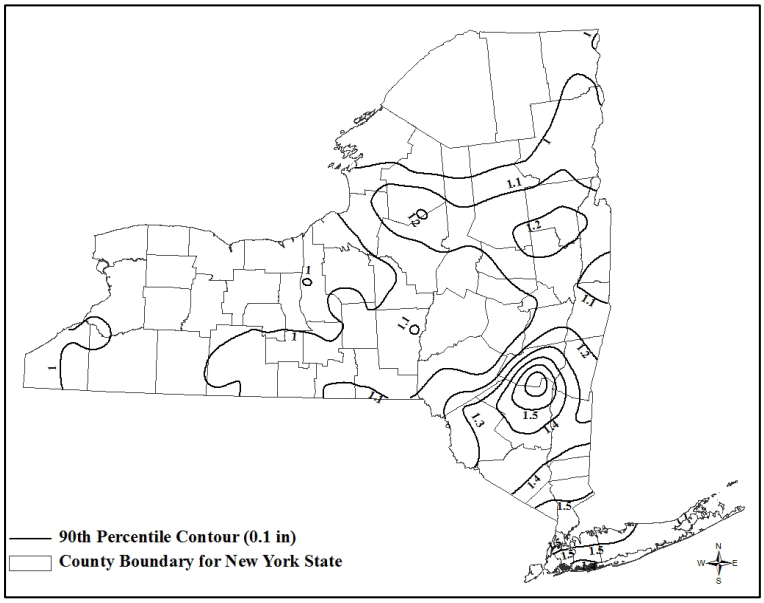


Figure 6: New York State 90% Rainfall Map

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New York
Location	
Longitude	76.007 degrees West
Latitude	42.988 degrees North
Elevation	0 feet
Date/Time	Thu, 20 Aug 2020 10:25:27 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr
1yr	0.28	0.43	0.53	0.69	0.86	1.06	**1yr**	0.75	0.96	1.21	1.45	1.73	2.04	2.29
2yr	0.33	0.50	0.63	0.82	1.04	1.28	**2yr**	0.89	1.16	1.44	1.73	2.04	2.39	2.68
5yr	0.39	0.61	0.76	1.02	1.31	1.61	**5yr**	1.13	1.44	1.83	2.17	2.54	2.93	3.31
10yr	0.44	0.70	0.88	1.20	1.55	1.93	**10yr**	1.34	1.69	2.19	2.59	3.00	3.43	3.88
25yr	0.53	0.84	1.07	1.48	1.96	2.44	**25yr**	1.69	2.10	2.76	3.25	3.73	4.22	4.80
50yr	0.60	0.97	1.24	1.74	2.34	2.93	**50yr**	2.02	2.48	3.32	3.88	4.41	4.94	5.63
100yr	0.70	1.13	1.46	2.06	2.80	3.51	**100yr**	2.42	2.94	3.96	4.60	5.21	5.78	6.62
200yr	0.80	1.31	1.69	2.43	3.35	4.20	**200yr**	2.89	3.47	4.74	5.48	6.15	6.77	7.78
500yr	0.98	1.61	2.09	3.04	4.25	5.33	**500yr**	3.67	4.35	5.99	6.88	7.65	8.35	9.65

Figure 7: Northeast Regional Climate Center Design Storms

3. Soil Information

The majority of the soils within the project site area consist of Aurora silt loam and Angola-Darien silt loams which are classified as Hydrologic Soil Group D. This indicates that the site should have low transmissive soils if undeveloped. The NRCS Soil Survey Map is shown in Figure 8 below and the soil descriptions can be reviewed in Appendix C.

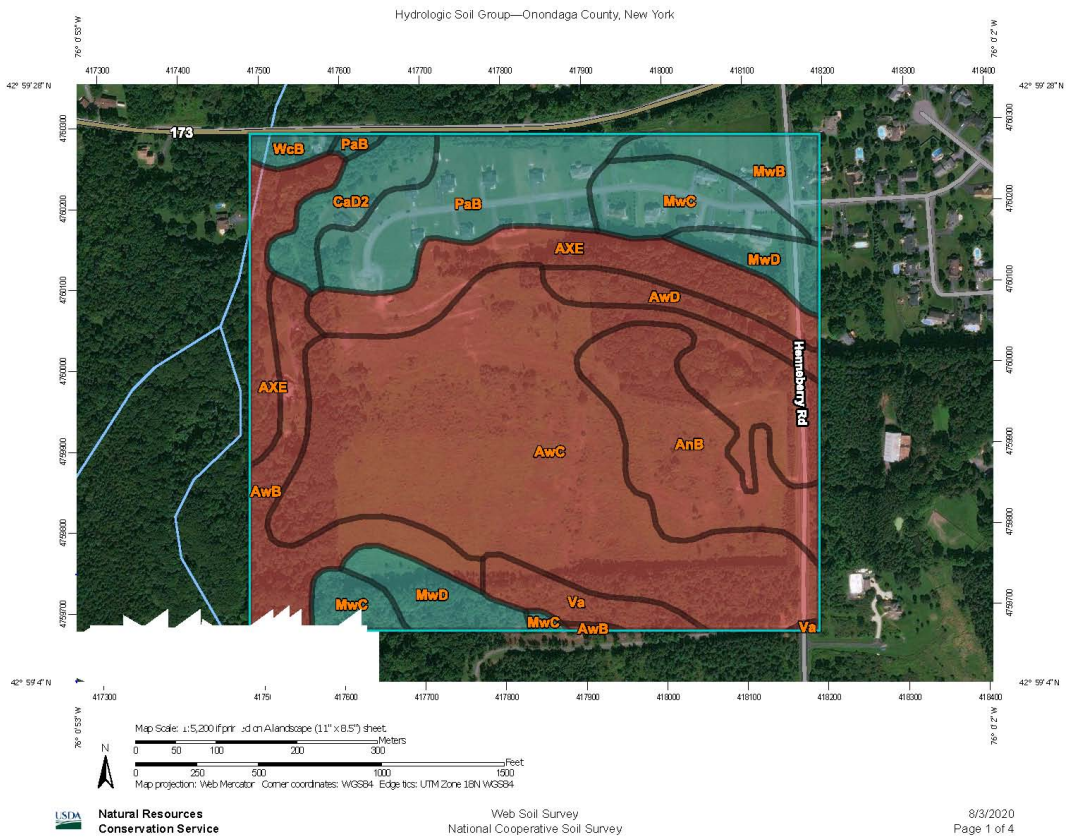


Figure 8: Project Site NRCS Soil Survey Map

B. EXISTING CONDITIONS

The existing project area consists of mixed woods, brush, and grass area located on the west side of Henneberry Road and to the south of the existing Brandywine Drive subdivision. The overall drainage area has three main points of study at which the peak runoff rates for pre and post-development conditions were analyzed. Drainage Area 1 (DA-1) is tributary to point of study #1, which is located within a small creek to the northwest of the subject site. This creek flows to the north under Route 173 and is ultimately tributary to Limestone Creek. Drainage Area 2 (DA-2) is tributary to point of study #2, located within a drainage ditch on the south side of the existing Brandywine subdivision. Drainage area 3 (DA-3) is tributary to point of study #3, located within the drainage ditch on the west side of the Henneberry Road right-of-way. The only existing impervious area is the hammerhead at the end of Brandywine Drive and is located in the northwest portion of DA-1. The entirety of the subject site slopes generally towards the north at grades varying between ±3% and 13%. An existing drainage ditch cuts across the entirety of the site from east to west and conveys stormwater runoff from the site towards point of study #1.

DA-1 includes a significant amount of off-site wooded area to the south and west of the project site. This area sheet flows to the existing grass area on-site before being channelized in a drainage ditch that flows from east to west across the width of the project site. This ditch discharges to an offsite creek to the west of the subject site before reaching point of study #1.

Table 2: Existing Drainage Area 1 Curve Number Calculation

Area (ac)	CN	Description
21.210	77	Woods, Good, HSG D
35.420	80	>75% Grass cover, Good, HSG D
56.630	79	Weighted Average
56.630		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.39"
4.6	410	0.0900	1.50		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
6.7	840	0.0900	2.10		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.3	1,405	0.0750	17.78	213.31	**Channel Flow, Swale** Area= 12.0 sf Perim= 8.0' r= 1.50' n= 0.030 Earth, clean & winding
28.6	2,755	Total			

DA-2 includes wooded, grass, and brush area that drain to the north towards point of study #2. There is a series of existing drainage swales that channelize flow towards this point of study. This area is located to the north of the existing drainage ditch that cuts through the site.

Table 3: Existing Drainage Area 2 Curve Number Calculation

Area (ac)	CN	Description
3.330	77	Woods, Good, HSG D
2.740	80	>75% Grass cover, Good, HSG D
6.070	78	Weighted Average
6.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
14.2	555	0.0170	0.65		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
1.5	281	0.0360	3.05		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.2	280	0.1210	20.51	205.13	**Channel Flow, Swale** Area= 10.0 sf Perim= 5.0' r= 2.00' n= 0.040 Earth, dense weeds
28.4	1,216	Total			

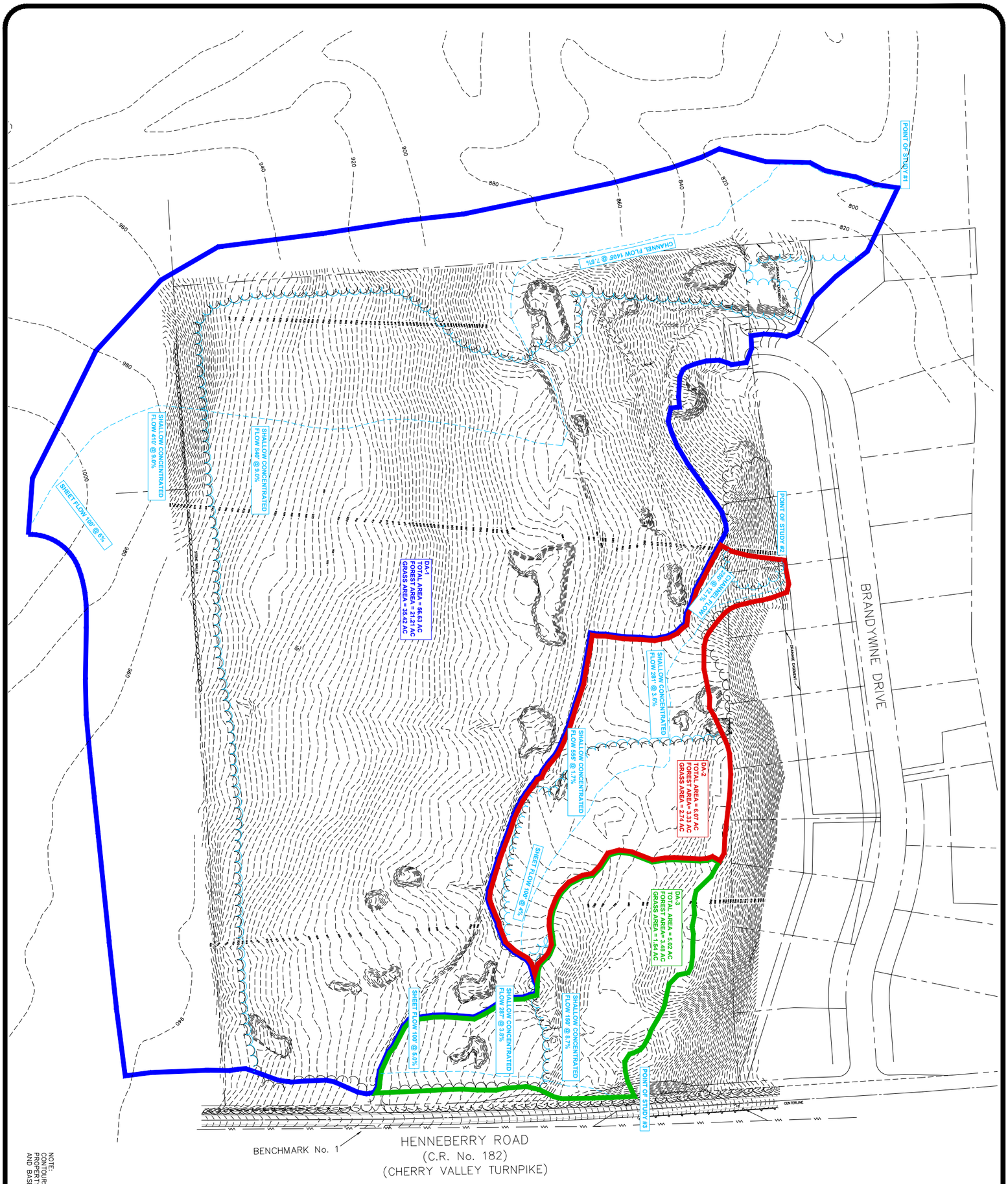
DA-3 consists of wooded and shrub area in the northeast corner of the subject site and is tributary to point of study # 3 which is located within the Henneberry Road right-of-way.

Table 4: Existing Drainage Area 3 Curve Number Calculation

Area (ac)	CN	Description
3.480	77	Woods, Good, HSG D
1.540	80	>75% Grass cover, Good, HSG D
5.020	78	Weighted Average
5.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
1.5	287	0.0380	3.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
1.7	150	0.0870	1.47		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.6	537	Total			

Figure 9 on the following page summarizes the hydrology of the existing condition watershed.



NOTE:
CONTOURS OUTSIDE OF THE SUBJECT PROPERTY BOUNDARY IS APPROXIMATE, AND BASED ON USGS TOPOGRAPHY MAPS.

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PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

GRAPHIC SCALE
0 100' 200'
(IN FEET)
1 inch = 100 ft

SHEET	PROJECT NO.	PREPARED BY:		SHEET TITLE:	PROJECT TITLE:
FIG-1	20-1906	NAPIERALA CONSULTING PROFESSIONAL ENGINEER, P.C. SITE • DESIGN • ENGINEERING 110 FAYETTE STREET MANLIUS, NEW YORK 13104 email: MNAP@NAPCON.COM PH: (315) 682-5580 FAX: (315) 682-5544		EXISTING DRAINAGE AREA	BRANDYWINE ESTATES PHASE 2 HENNEBERRY ROAD
	DATE 29 NOV 2021				TOWN OF MANLIUS ONONDAGA COUNTY, NY
	SCALE 1" = 100'				PREPARED FOR: HARRINGTON HOMES 3848 HENNEBERRY ROAD JAMESVILLE, NY 13078

NO.	REVISION/ISSUE	DATE

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C. PROPOSED CONDITIONS

This project consists of the construction of a 34-lot subdivision of single-family homes. The impervious area on each lot will consist of rooftop area, which will be properly disconnected via gutter discharge to grass buffer strips, and asphalt driveway area, which is assumed to be approximately 1,800 square-feet (about 0.04 acres) for each individual lot. The development will also include necessary amenities such as public street(s), public/private utility extensions/connections, and applicable stormwater management facilities. The stormwater mitigation area will collect and treat runoff in order to meet the objectives of the SPDES General Permit for Stormwater Discharges from Construction Activity and local regulations.

The stormwater management system includes several management practices to capture, treat and control the release of runoff from the site. Runoff from the impervious areas, both rooftop and asphalt, will be directed to practices to provide infiltration/runoff reduction, water quality treatment and water quantity storage. The following stormwater management practices will be constructed:

- Bioretention Areas: Bioretention filters are considered a standard stormwater management practice with runoff reduction capacity to decrease stormwater quantity and improve water quality (NYSDEC Stormwater Management Design Manual, p. 5-97)[1]. The filters collect runoff from rainfall events, temporarily store it, and filter it through the root structure of the plants and the planting soil media. Through the plants' uptake of runoff and the filtering through the soil media, the amount of runoff the site generates is reduced and the remaining runoff from these frequent, but less intense, rainfall events is treated to remove pollutants such as suspended solids and phosphorus. The runoff in excess of the water quality event (the 90th-percentile rain event) will discharge to the downstream detention basin.
- Detention Basin: The detention basin will collect runoff from the more intense but less frequent rainfall events and temporarily store and released in a controlled manner such that the peak rates of runoff to the downstream design points will not be adversely impacted.

DA-1A includes a large off-site, upland wooded area and a majority of the proposed development on the subject property. This area is collected via conveyance systems in the roadway and is ultimately tributary to Bioretention Area #1 and Detention Basin #1.

Table 5: Proposed Drainage Area 1A Curve Number Calculations

Area (ac)	CN	Description
2.050	98	Paved parking, HSG D
1.940	98	Unconnected roofs, HSG D
22.870	80	>75% Grass cover, Good, HSG D
8.960	77	Woods, Good, HSG D
35.820	81	Weighted Average
31.830		88.86% Pervious Area
3.990		11.14% Impervious Area
1.940		48.62% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	100	0.0600	0.06		**Sheet Flow, SHEET FLOW** Woods: Dense underbrush n= 0.800 P2= 2.39"
4.8	370	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.9	200	0.0650	1.78		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	295	0.0300	19.80	79.19	**Channel Flow, curb and gutter flow** Area= 4.0 sf Perim= 4.0' r= 1.00' n= 0.013 Asphalt, smooth
1.7	1,100	0.0345	11.04	19.51	**Pipe Channel, Pipe Flow** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
3.8	955	0.0050	4.20	50.44	**Channel Flow,** Area= 12.0 sf Perim= 12.0' r= 1.00' n= 0.025 Earth, grassed & winding
40.3	3,020	Total			

[1] The "biogeochemical process" in terms of stormwater management is the pathway by which water is recycled through plant material where the plant can consume it or return it to the atmosphere through evapotranspiration.

DA-1B includes the western portion of the proposed development and a section of wooded area upland and to the south of the subject property. This area is ultimately tributary to Bioretention Area #2 and Detention Basin #1.

Table 6: Proposed Drainage Area 1B Curve Number Calculations

Area (ac)	CN	Description
0.710	98	Paved parking, HSG D
0.340	98	Unconnected roofs, HSG D
7.820	80	>75% Grass cover, Good, HSG D
2.040	77	Woods, Good, HSG D
10.910	81	Weighted Average
9.860		90.38% Pervious Area
1.050		9.62% Impervious Area
0.340		32.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
4.6	410	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
5.6	710	0.0920	2.12		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.3	170	0.0200	9.55	76.42	**Channel Flow, swale flow** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
21.1	1,390	Total			

DA-1C consists of the grassy area within the detention basin and is not tributary to a bioretention area.

Table 7: Proposed Drainage Area 1C Curve Number Calculations

Area (ac)	CN	Description
0.960	80	>75% Grass cover, Good, HSG D
0.120	77	Woods, Good, HSG D
1.080	80	Weighted Average
1.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min TR 55 Value**

DA-1D consists largely of wooded area and lawn area that is located on the western part of the subject site and just off-site to the west. This drainage area is not tributary to any on-site stormwater management practices and is directly tributary to point of study #1.

Table 8: Proposed Drainage Area 1D Curve Number Calculations

Area (ac)	CN	Description
5.930	80	>75% Grass cover, Good, HSG D
8.910	77	Woods, Good, HSG D
0.160	98	Paved parking, HSG D
15.000	78	Weighted Average
14.840		98.93% Pervious Area
0.160		1.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	100	0.0600	0.06		**Sheet Flow, SHEET FLOW** Woods: Dense underbrush n= 0.800 P2= 2.39"
5.4	485	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
4.1	517	0.0900	2.10		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
1.2	1,155	0.0750	16.28	260.45	**Channel Flow, SWALE** Area= 16.0 sf Perim= 16.0' r= 1.00' n= 0.025 Earth, clean & winding
38.6	2,257	Total			

DA-2 consists of the small amount of wooded and lawn area that is still tributary to point of study #2 to the north of the subject site.

Table 9: Proposed Drainage Area 2 Curve Number Calculations

Area (ac)	CN	Description
0.690	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
0.830	79	Weighted Average
0.830		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1500	0.23		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.7	104	0.1300	2.52		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
8.1	204	Total			

DA-3A includes a small amount of off-site wooded area and the southeastern-most proposed house within the development. The runoff from this area is collected by the loop road conveyance system, discharges into the drainage ditch within the right-of-way, and is ultimately tributary to point of study #3.

Table 10: Proposed Drainage Area 3A Curve Number Calculations

Area (ac)	CN	Adj	Description
0.920	80		>75% Grass cover, Good, HSG D
0.180	98		Paved parking, HSG D
0.070	98		Unconnected roofs, HSG D
1.030	77		Woods, Good, HSG D
2.200	81	80	Weighted Average, UI Adjusted
1.950			88.64% Pervious Area
0.250			11.36% Impervious Area
0.070			28.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0450	0.14		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
2.5	188	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.9	202	0.0650	1.78		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	232	0.0220	16.95	50.86	**Channel Flow, curb flow** Area= 3.0 sf Perim= 3.0' r= 1.00' n= 0.013 Asphalt, smooth
16.5	722	Total			

DA-3B includes a small portion of the northeastern portion of the proposed development. This area is directly tributary to point of study #3 within the right-of-way.

Table 11: Proposed Drainage Area 3B Curve Number Calculations

Area (ac)	CN	Adj	Description
2.230	80		>75% Grass cover, Good, HSG D
0.230	98		Paved parking, HSG D
0.140	98		Unconnected roofs, HSG D
2.600	83	82	Weighted Average, UI Adjusted
2.230			85.77% Pervious Area
0.370			14.23% Impervious Area
0.140			37.84% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
5.1	475	0.0500	1.57		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0200	6.42	5.04	**Pipe Channel, pipe flow** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
16.7	657	Total			

Figure 10 on the following page summarizes the hydrology of the proposed condition watershed.

NOTE:
CONTOURS OUTSIDE OF THE SUBJECT PROPERTY BOUNDARY IS APPROXIMATE AND BASED ON USGS TOPOGRAPHY MAPS.

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
PROPOSED DRAINAGE AREA

NO.	REVISION/ISSUE	DATE

PREPARED BY:
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, NEW YORK 13104
e-mail: MNAPIERALA@TWC.COM
PH: (315) 682-5589 FAX: (315) 682-5544

PLAN REVIEW BY:
NEAL H. ZUBKOWITZER, JR., P.E.
NYS REGISTRATION # 087251

PROJECT NO. 20-1906
DATE 29 NOV 2021
SCALE 1" = 100'

SHEET **FIG-2**

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IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LANDSCAPE ARCHITECT OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE SEAL OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, LANDSCAPE ARCHITECT OR LAND SURVEYOR SHALL AFFIX TO THE ITEM THE ADDITIONAL LEGEND "ALTERED BY" FOLLOWED BY THEIR SIGNATURE AND SPECIFIC DESCRIPTION OF THE ALTERATION.

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D. RUNOFF REDUCTION VOLUME (RRV)

The NYSDEC implemented regulations effective March 1, 2011 that requires all construction projects that disturb greater than one acre of land to provide runoff reduction through the implementation of green infrastructure practices. The goal of the runoff reduction volume criteria is to implement stormwater management practices and green infrastructure techniques to replicate pre-development hydrology. The NYS Stormwater Management Design Manual provides the acceptable green planning techniques and green infrastructure techniques to meet the runoff reduction volume criteria. The following narrative and calculations detail the implementation of the planning and infrastructure techniques on the site to achieve the minimum runoff reduction volume. The narrative follows the Design Manual, Chapter 5.

PLANNING

1. Plan to preserve, avoid, and minimize:

	Applicable	Not Applicable
a. Preserve undisturbed, natural buffer, and critical environmental areas.	☐	☒
b. Employ open space, conservation, and clustering site design techniques.	☒	☐
c. Avoid developing in environmentally sensitive areas: floodplain, steep slopes, habitat, ecosystems, bedrock, wetlands, shorelines, shallow groundwater, impervious soils and unstable soils.	☒	☐
d. Minimize impervious surfaces: building footprints, parking, roads, sidewalks, and driveways.	☒	☐
e. Minimize clearing and grading	☒	☐

Discussion:

a. The project does not have any critical environmental areas.

b. Open space is used in projects on tracts of land where the development can be concentrated in a portion of the site while maintaining large portions of undisturbed land. Open space design was taking into consideration when planning the subdivision of the property. Town code requires lot sizes to be a minimum of 40,000 square feet and this plan proposes lots between 43,000 sf and 100,000 sf.

c. The project does not have any critical environmental areas with the exception of steep slopes. Development in steep slopes will be minimized as much as possible and is limited to areas of the individual homes.

d. The NYS Stormwater Design Manual discusses building footprint reduction in terms of building multiple floors to achieve the same, or comparable, square footage as a single-floor footprint. The majority of these house are expected to be two-story homes to reduce the footprint and achieve more square foot area of the house.

e. The proposed grading plan for the project minimizes the amount of grading to the maximum extent practicable. Grade requirements for a functional site, including slopes to meet the buildable lots, were taken into account during the design phase. The off-grading was designed to catch up to the existing grade in the shortest distance possible (i.e., minimize off-grading) while still meeting acceptable standards for slope stabilization and erosion control.

Disconnection of Rooftop Runoff

All direct runoff from residential rooftop areas has been designed to be distributed to surrounding pervious areas to promote overland vegetative filtering and infiltration. As such, all rooftop impervious area is treated as pervious lawn area when calculating the required water quality volume and runoff reduction volume. The rooftop impervious area is not deducted when calculating the water quantity mitigation in the detention basin.

E. WATER QUALITY VOLUME (WQ_v) REQUIRED:

1. **Calculate the required water quality volume for new impervious area within drainage areas DA-1A.**

$$WQ_v = \frac{PR_vA}{12}$$

90-th Percentile Rainfall (P) = 1.0 inch

Drainage Area (A) = 35.82 acres

Impervious Area (A_I) = 2.26 acres

$$R_v = 0.05 + 0.9\left(\frac{A_I}{A}\right)$$

$$R_v = 0.05 + 0.9(0.063)$$

$R_v = 0.107$

therefore:

$$WQ_v = \frac{1.0*0.107*35.82}{12}$$

Total WQ_v Required= 0.319 ac·ft (13,890 cf)

2. **Minimum RR_v requirements**

Calculate minimum required Runoff Reduction Volume (RR_v) for DA-1A, 1B, & 1C using:

$$RR_v = \frac{P \cdot Rv \cdot S \cdot A_I}{12}$$

A_I = total impervious area

S = 0.55 (A Soils), 0.40 (B Soils), 0.30 (C Soils), 0.20 (D Soils), or weighted HSG average in drainage area

$$RR_v = \frac{1.0(0.95)(0.20)(2.26)}{12}$$

Total Minimum RR_v required = 0.036 ac·ft (1,560 cf)

1. **Calculate the required water quality volume for the remaining new impervious area within drainage areas DA-1B, DA-3A, & DA-3B. The impervious area within DA-3 cannot feasibly be captured and treated due to steep slopes, therefore the bioretention area collecting runoff from DA-1B will be oversized to compensate for the required water quality treatment volume of DA-3.**

$$WQ_v = \frac{PR_vA}{12}$$

90-th Percentile Rainfall (P) = 1.0 inch

Drainage Area (A) = 15.71 acres

Impervious Area (A_I) = 1.12 acres (Total from DA-1B and DA-3)

$$R_v = 0.05 + 0.9\left(\frac{A_I}{A}\right)$$

$$R_v = 0.05 + 0.9(0.071)$$

$R_v = 0.114$

therefore:

$$WQ_v = \frac{1.0*0.114*15.71}{12}$$

Total WQ_v Required= 0.150 ac·ft (6,510 cf)

2. **Minimum RR_v requirements**

Calculate minimum required Runoff Reduction Volume (RR_v) for DA-1A, 1B, & 1C using:

$$RR_v = \frac{P \cdot Rv \cdot S \cdot A_I}{12}$$

A_I = total impervious area

S = 0.55 (A Soils), 0.40 (B Soils), 0.30 (C Soils), 0.20 (D Soils), or weighted HSG average in drainage area

$$RR_v = \frac{1.0(0.95)(0.20)(1.12)}{12}$$

Total Minimum RR_v required = 0.018 ac·ft (775 cf)

F. WATER QUALITY VOLUME (WQV) PROVIDED

Water quality treatment for the runoff from proposed impervious surfaces will be provided by a combination of two bioretention areas. Rooftop area is assumed to be properly disconnected from nearby impervious surfaces and is therefore treated as pervious area in analysis.

Bioretention Basin #1 (DA-1A)

$$A_f = \frac{(WQ_v)(d_f)}{(k)(h_f + d_f)(t_f)}$$

Where,

A_f	=	Area of the filter (ft^2)
WQ_v	=	Water Quality Volume (ft^3)
d_f	=	depth of the bioretention soil media (2.5 ft as required in NYS Design Manual)
k	=	coefficient of permeability (0.5 ft/day per NYS Design Manual)
h_f	=	average height of water above the filter bed (0.125 ft)
t_f	=	design filter bed drain time (2 days per NYS Design Manual)

$$A_f = \frac{(13{,}890\ ft^3)(2.5\ ft)}{\left(0.5\ \frac{ft}{day}\right)(0.25\ ft + 2.5\ ft)(2\ days)}$$

Total A_f = 12,630 ft^2 *required*

Total A_f provided = 12,800 ft^2

Therefore,

WQv = 13,890 ft^3 (0.319 ac·ft) *Provided*

The RR_v provided is calculated as follows:

Bioretention areas in C and D soils have a RRv factor of 0.4*WQv.

$RR_v = 0.4 * 13{,}890\ ft^3$

RR_v provided = 5,555 ft^3 = 0.128 ac·ft

Bioretention Basin #2 (DA-1B, 3A, & 3B)

$$A_f = \frac{(WQ_v)(d_f)}{(k)(h_f + d_f)(t_f)}$$

Where,

A_f	=	Area of the filter (ft^2)
WQ_v	=	Water Quality Volume (ft^3)
d_f	=	depth of the bioretention soil media (2.5 ft as required in NYS Design Manual)
k	=	coefficient of permeability (0.5 ft/day per NYS Design Manual)
h_f	=	average height of water above the filter bed (0.125 ft)
t_f	=	design filter bed drain time (2 days per NYS Design Manual)

$$A_f = \frac{(6{,}510\ ft^3)(2.5\ ft)}{\left(0.5\ \frac{ft}{day}\right)(0.25\ ft + 2.5\ ft)(2\ days)}$$

Total $A_f = 5{,}920\ ft^2$ *required*

Total A_f provided = 6,200 ft^2

Therefore,

WQv = 6,510 ft^3 (0.150 ac·ft) *Provided*

The RR_v provided is calculated as follows:

Bioretention areas in C and D soils have a RRv factor of 0.4*WQv.

$RR_v = 0.4 * 6{,}510\ ft^3$

RR_v provided = 2,605 ft^3 = 0.060 ac·ft

G. CHANNEL PROTECTION VOLUME (CP_V)

The proposed project must provide sufficient storage of the channel protection volume (CPv), which is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event, remained from runoff reduction. The NYS Stormwater Design Manual methodology for determining the storage volume was used (Appendix B.1) and is discussed below. Below is a summary of the calculations for DA-1.

Proposed Detention Basin 1

Tributary Area = 47.70 acres, CN = 81, & t_c = 35 minutes

I_a = 0.469, P = 1.0"

$$\frac{I_a}{P} = 0.469$$

Using I_a/P and T_c, q_u = 260 csm/in (TR-55, Exhibit 4-II)

Using q_u and T = 24 hr, q_o/q_i = 0.07 (Design Manual, Figure B.1)

Using formula 2.1.16 (Design Manual, Appendix B.1), calculate V_s/V_r

$$\frac{V_s}{V_r} = 0.590$$

Using formula 2.1.17 (Design Manual, Appendix B.1), calculate V_s

$$V_s = \frac{\left(\frac{V_s}{V_r}\right) Q_d A}{12}$$

$V_s = (0.59)2.268\ \text{ac} \cdot \text{ft}$ (total tributary from HydroCAD)

$V_s = 1.33\ \text{ac} \cdot \text{ft}$ (57,930 cf)

CPv required = CPv - RR_V Provided

CPv required = 57,930 ft^3 – 8,160 ft^3 = **49,770 ft^3 required**

CPv Provided in Bioretention #1 = 5,250 ft^3

CPv Provided in Bioretention #2 = 11,675 ft^3

CPv Provided in Detention #1 = 33,240 ft^3

Total* CPv = 50,165 ft^3 *Provided

H. PEAK FLOW MITIGATION (Q_{p10} and Q_{p100})

The remaining two requirements of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity are that the stormwater system cannot discharge runoff from the site during the 10-year and 100-year, 24-hour rainfall events at rates higher than the existing condition peak rates of runoff during the correlating rainfall events. To meet these requirements, the underground stormwater chamber system will act as a detention basin that capture the runoff, temporarily store it, and release the runoff in a controlled manner to the existing drainage ditch such that the proposed project will not adversely impact the downstream areas. The following tables summarize the HydroCAD results for the 10-year and 100-year rainfall events.

Table 12: Peak Flow Rates for 10-Year & 100-Year Rainfall Events

	Existing Peak Runoff Rate (cfs)			**Proposed Peak Runoff Rate (cfs)**		
Point of Study	Pt. 1	Pt. 2	Pt. 3	Pt. 1	Pt. 2	Pt. 3
10-Year Storm	75.01	7.68	9.35	45.27	2.07	9.31
100-Year Storm	175.87	18.46	22.06	86.52	4.70	21.06

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
861.80	1,260	0	0
862.00	2,891	415	415
863.00	6,366	4,629	5,044
864.00	11,515	8,941	13,984
865.00	16,570	14,043	28,027
866.00	18,777	17,674	45,700
867.00	21,040	19,909	65,609
868.00	23,360	22,200	87,809
869.00	25,736	24,548	112,357
870.00	28,169	26,953	139,309
871.00	30,658	29,414	168,723
872.00	33,204	31,931	200,654
873.00	35,805	34,505	235,158

Device	Routing	Invert	Outlet Devices
#1	Secondary	872.00'	**30.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Primary	861.80'	**30.0" Round Culvert** L= 98.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 861.80' / 857.00' S= 0.0490 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#3	Device 2	861.80'	**4.0" Vert. Orifice1** C= 0.600 Limited to weir flow at low heads
#4	Device 2	864.60'	**30.0" W x 30.0" H Vert. Orifice2** C= 0.600 Limited to weir flow at low heads
#5	Device 2	869.00'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Figure 11: Proposed Detention Basin #1 Summary

Section IV. CONTROLS

A. EROSION AND SEDIMENT CONTROLS

Prior to the commencement of construction, the operator will identify the contractor(s) and subcontractor(s) that will implement each erosion and sediment control measure identified in this SWPPP. All contractors and subcontractors identified in the SWPPP must sign a copy of the certification statement in Part III.E. of the NYS DEC SPDES General Permit for Stormwater Discharges from Construction Activities in accordance with Part V.H. of the SPDES General Permit.

1. Stabilization Practices (Permanent)
   Permanent stabilization practices for this site include:
   a. Land clearing activities shall be done only in areas where earthwork will be performed and shall progress as earthwork is needed.
   b. Permanent seeding and planting of all unpaved areas.

2. Stabilization Practices (Temporary) Temporary stabilization practices for this site include:
   a. Temporary seeding and planting of all unpaved areas when construction activity has ceased, or will cease, in an area for 14 days. Seeding mixtures and application rates are listed in the erosion and sediment control notes on the plans.
   b. Mulching exposed areas. Mulching rates are listed in the erosion and sediment control notes on the plan sheet C-15.
   c. Frequent watering to minimize wind erosion during construction.

3. Structural Practices (Permanent)Permanent structural practices for this site include:
   a. Bioretention Areas. Bioretention filters are considered a standard stormwater management practice with runoff reduction capacity to decrease stormwater quantity and improve water quality.
   b. Land grading. Land grading is the reshaping of the existing land surface in accordance with a plan as determined by the engineering survey and layout. The purpose of a land grading specification is to provide erosion control and vegetative establishment on areas where the existing land is to be reshaped according to the plan.

4. Structural Practices (Temporary)
   Temporary structural practices for this site include:
   a. Silt fence. Silt fence is a temporary barrier of geotextile fabric installed on the contours across from a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil. The purpose of silt fence is to reduce runoff velocity and effect deposition of transported sediment load.
   b. Stabilized construction entrance/exit. A stabilized construction entrance/exit is a stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area. The purpose of the stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets
      1. Aggregate size: Use a matrix of one to four-inch stone, or reclaimed or recycled equivalent
      2. Thickness: Not less than six inches
      3. Width: 24-foot minimum
      4. Length: As required, but not less than 50 feet
      5. Geotextile: To be placed over the entire area to be covered with aggregate. Piping of surface water under entrance shall be provided as necessary.

c. Sediment trap. The detention basins will be used as a sediment trap during construction. The sediment basin will have a riprap outlet sediment trap in place of the emergency spillway. Upon completion of construction, the sediment basin will be cleaned of all sediment buildup and the basin shall be finalized per plans.
d. Concrete washout area. A temporary excavated or above ground lined constructed pit where concrete truck mixers and equipment can be washed after their loads have been discharged to prevent highly alkaline runoff from entering storm drainage systems or leaching into the soil.
    1. The washout facility is sized to contain solids, wash water and rainfall. The maximum size shall be eight feet by eight feet at the bottom and two feet deep. If excavated, then the side slopes shall be 2:1 (horizontal to vertical).
    2. The facility shall be located a minimum of 100 feet from drainage swales, storm drain inlets, wetlands, streams, and other surface waters. Surface waters shall be prevented from entering the structure except got the access road. Appropriate access shall be provided with a gravel access road sloped down to the structure. Signs shall be placed to direct drivers to the facility after their load is discharged.
    3. All washout facilities will be lined to prevent leaching of liquids into the ground. The liner shall be plastic sheeting with a minimum thickness of 10 mils with no holes or tears, and anchored beyond the top of the pit with an earthen berm, sand bags, stone, or other structural appurtenance except at the access point.

5. Sequence of Major Activities
The contractor will be responsible for implementing the above listed erosion and sediment control practices. The contractor may designate these tasks to certain subcontractors as is seen fit, but the ultimate responsibility for implementing these controls and ensuring their proper function remains with the contractor. The order of activities shall be as follows:

a. Conduct a preconstruction meeting with all involved parties
b. Delineate boundaries of disturbance as per the layout and grading plans
c. Construct construction entrance at the location shown on the erosion and sediment control plan
d. Install silt fence in locations shown on the layout and grading plans
e. Establish staging areas on the project site
f. Construct sediment trap(s) and overflow spillways for use during construction
g. Excavate detention basin and install overflow spillway
h. Remove topsoil, stockpile and stabilize
i. Rough grade site including swales and provide temporary stabilization when idle for more than 7 days
j. Building foundation excavation
k. Install underground stormwater management system
l. Compact gravel along driveways and parking areas
m. Utility installations.
n. Install concrete washout, complete concrete site work.
o. Complete final grading of the site
p. Restore all compacted soils in accordance with section 5.1.6 of the NYS Stormwater Design Manual
q. Provide final stabilization and landscaping of new area
r. Site Paving
s. Provide final stabilization of disturbed areas via seeding mulching.
t. Construct bioretention basins and outlet controls upon upstream stabilization
u. Remove all temporary stabilization control practices

Disturbed areas of the site where construction activity has ceased for more than seven (7) days shall be temporarily seeded and mulched. The Erosion & Sediment Control plan is shown in Appendix F.

B. INSPECTION AND MAINTENANCE REQUIREMENTS

Best management practices, both construction and operational, must be inspected and maintained on a routine basis to ensure continued compliance with the NYS SPDES General Permit for Stormwater Discharges from Construction Activity. The contractor is responsible for inspecting the erosion and sediment control practices, the operator/owner is responsible for providing a qualified professional, as defined in the SPDES General Permit, to perform the required weekly inspections of the construction site from the time earth-disturbing activities begin until final stabilization is achieved and the Notice of Termination is filed. The contractor will obtain copies of all local and state regulations that are applicable to stormwater management, erosion control, and pollution minimization at this job site and will comply fully with such regulations. The contractor will submit written evidence of such compliance if requested by the operator or any agent of a regulatory body. The contractor will comply with all conditions of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity, including the conditions related to maintaining the SWPPP and evidence of compliance with the SWPPP at the job site and allowing regulatory personnel access to the job site and to records to determine compliance.

C. CONSTRUCTION MAINTENANCE/INSPECTION PROCEDURES

The operator shall maintain a record of all inspection reports in a site logbook. The logbook shall be maintained on site and be made available to the permitting authority upon request. Prior to the commencement of construction, the operator shall certify in the site logbook that the SWPPP, prepared in accordance with Part III.D. of the NYS DEC SPDES General Permit for Discharges from Construction Activities, meets all Federal, State and local erosion and sediment control requirements. The operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities monthly. The following inspection and maintenance practices will be used to maintain erosion and sediment controls and stabilization measures.

1. Inspection and Maintenance Practices
    a. Inspections shall occur once every seven calendar days.
    b. At a minimum, the qualified inspector shall inspect all erosion and sediment control practices to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved final stabilization, all points of discharge to natural surface waterbodies located within or immediately adjacent to the property boundaries of the construction site, and all points of discharge from the construction site.
    c. The qualified inspector shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:
        i. Date and time of inspection;
        ii. Name and title of person(s) performing inspection;
        iii. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;
        iv. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;
        v. A description of the condition of all natural surface water bodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface water body;
        vi. Identification of all erosion and sediment control practices that need repair or maintenance;
        vii. Identification of all erosion and sediment control practices that were not installed or are not functioning as designed and need to be reinstalled or replaced;
        viii. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporarily and/or final) since the last inspection;

ix. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

x. Corrective action(s) that must be taken to install, repair, replace, or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s); and

xi. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The qualified inspector shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

d. Within one business day of the completion of an inspection, the qualified inspector shall notify the owner or operator and appropriate contractor or subcontractor of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

e. All inspection reports shall be signed by the qualified inspector. The inspection reports shall be maintained on the site.

f. Erosion and Sediment Control Inspection/Maintenance

i. Silt Fence: Silt fence shall be inspected for depth of sediment, tears, etc., to see if the fabric is securely attached to the fence posts, and to see that the fence posts are securely in the ground. Built up sediment will be removed from silt fence when it has reached one-third the height of the fence.

ii. Stabilized Construction Entrance/Exit: The entrance shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately. When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or water courses.

iii. Seeding: Temporary and permanent seeding and all other stabilization measures will be inspected for bare spots, washouts, and healthy growth.

2. Inspection and Maintenance Report Forms

- Once installation of any required or optional erosion control device or measure has been implemented, at least twice every seven calendar days a Qualified Professional shall inspect each practice. The inspector shall use the forms found in this SWPPP to inventory and report the condition of each measure to assist in maintaining the erosion and sediment control measures in good working order.
- These report forms shall become an integral part of the SWPPP and shall be made readily accessible to governmental inspection officials, the operator's engineer, and the operator for review upon request during visits to the project site. In addition, copies of the reports shall be provided to any of these persons upon requires, via mail or facsimile transmission. Inspection and maintenance report forms are to be maintained by the permittee for three years following the final stabilization of the site.
- The operator shall also prepare a written summary of its status with respect to compliance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity at a minimum frequency of every three months during which coverage under the SPDES General Permit exists. The summary should address the status of achieving each

component of the SWPPP. The reports shall be signed by the signatory of the NOI or a duly authorized person and be retained at the construction site.

1. Other Record Keeping Requirements

   The contractor shall keep the following records related to construction activities at the site:
   - Dates when major grading activities occur and the areas which were graded.
   - Dates and details concerning the installation of structural controls.
   - Dates when construction activities cease in an area.
   - Dates when an area is stabilized, either temporarily or permanently.
   - Dates of rainfall and the amount of rainfall.
   - Dates and descriptions of the character and amount of any spills of hazardous materials.
   - Records of reports filed with regulatory agencies if reportable quantities of hazardous materials are spilled.

D. OPERATION MAINTENANCE AND INSPECTION PROCEDURES

Long-term maintenance of the stormwater mitigation basins and swales will be the responsibility of the owner and/or the tenant. Maintenance and inspection check lists have been included in Appendix D.

1. Embankments and emergency spillways will be inspected annually and after major storm events. Items to be inspected include:
   a. Vegetation and ground cover is adequate to prevent erosion.
   b. No embankment erosion has occurred.
   c. No animal burrows into embankments.
   d. No unauthorized planting.
   e. No cracking, bulging or sliding of dam.
   f. Emergency spillway is in good condition, free of silt buildup and debris.
   g. No leaks or seepage is occurring on downstream face.
   h. All slope protection and riprap is intact and no failure has occurred.

2. Bioretention basins will be inspected monthly and after major storm events. Items to be inspected include:
   a. Debris and undesirable vegetative growth shall be removed.
   b. Sediment depth shall be noted. Sediment shall be removed prior to reaching 50% of the design depth.
   c. No visible pollution within basins.

3. Grass lined swales shall be inspected and maintained as follows:
   a. All channels are free of debris on monthly basis.
   b. No visible evidence of erosion.
   c. Mowing shall be performed as needed. Inspect to ensure minimum mowing depth has not been exceeded.
   d. Dewatering of swales between storms. Inspect monthly or as necessary.
   e. Inspect swales for sediment deposition annually and clean as necessary.

Section V. MATERIALS MANAGEMENT PLAN

A. MATERIALS COVERED

The following materials or substances are expected to be present onsite during construction:

Concrete/Additives/Wastes	Cleaning Solvents
Detergents	Petroleum Based Products
Paints/Solvents	Pesticides
Acids	Solid and Construction Wastes
Sanitary Wastes	Soil Stabilization Additives

B. MATERIAL MANAGEMENT PRACTICES

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff. The job site superintendent will be responsible for ensuring that these procedures are followed.

1. Good Housekeeping
   The following good housekeeping practices will be followed onsite during the construction project.
   a. An effort will be made to store only enough products required to do the job.
   b. All materials stored onsite will be stored in a neat, orderly manner and, if possible, under a roof or in a containment area. At a minimum, all containers will be stored with their lids on when not in use. Drip pans shall be provided under all dispensers.
   c. Products will be kept in their original containers with the original manufacturer's label in legible condition.
   d. Substances will not be mixed with one another unless recommended by the manufacturer.
   e. Whenever possible, all of a product will be used up before disposing of the container.
   f. Manufacturer's recommendations for proper use and disposal will be followed.
   g. The job site superintendent will be responsible for daily inspections to ensure proper use and disposal of materials.

2. Hazardous Products
   These practices will be used to reduce the risks associated with hazardous materials. Material Safety Data Sheets (MSDS's) for each substance with hazardous properties that is used on the job site will be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of each MSDS will be maintained in the SWPPP file at the job site construction trailer office. Each employee who must handle a substance with hazardous properties will be instructed on the use of MSDS sheets and the specific information in the applicable MSDS for the product he/she is using, particularly regarding spill control techniques.
   a. Products will be kept in original containers with the original labels in legible condition.
   b. Original labels and material safety data sheets (MSDS's) will be procured and used for each material.
   c. If surplus product must be disposed of, manufacturer's or local/state/federal recommended methods for proper disposal will be followed.

3. Hazardous Waste
   All hazardous waste materials will be disposed of by the contractor in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products. Site personnel will be instructed in these practices by the job site superintendent, who will also be responsible for seeing that these practices are followed.

4. Product Specific Practices
   The following product specific practices will be followed on the job site.

   a. Petroleum Products
      All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled. Any petroleum storage tanks used onsite will have a dike or berm containment structure constructed around it to contain any spills, which may occur. Drip pans shall be provided for all dispensers. Any asphalt substances used onsite will be applied per the manufacturer's recommendations.

   b. Fertilizers
      Due to the onsite public water supply that will be constructed as part of this project, the use of fertilizers is not allowed without the written authorization of the operator. Authorization will be based on the specific product's possible contaminants and impacts to the groundwater.

   c. Paints, Paint Solvents, and Cleaning Solvents
      All containers will be tightly sealed and stored when not in use. Excess paint and solvents will not be discharged to the storm sewer system but will be properly disposed of per manufacturer's instructions or state and federal regulations.

5. Concrete Wastes
   Concrete trucks will be allowed to wash out or discharge surplus concrete or drum wash water on the site, but only in either (1) specifically designated area which has been prepared to prevent contact between the concrete and/or washout and stormwater which will be discharged from the site or (2) in locations where waste concrete can be poured into forms to make riprap or other useful concrete products.

   The hardened residue from the concrete washout areas will be disposed of in the same manner as other non-hazardous construction waste materials or may be broken up and used on site as deemed appropriate by the contractor. The job site superintendent will be responsible for seeing that these procedures are followed.

   All concrete washout areas will be in an area where the likelihood of the area contributing to storm water discharges is negligible. If required, additional BMPs must be implemented to prevent concrete wastes from contributing to storm water discharges.

6. Solid and Construction Wastes
   All waste materials will be collected and stored in a securely lidded metal dumpster rented from a local waste management company which must be a solid waste management company licensed to do business in New York State. The dumpster will comply with all local and state solid waste management regulations.

   All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied a minimum of twice per week or more often if necessary, and the trash will be hauled to a landfill approved by New York State. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal.

   All waste dumpsters and roll-off containers will be in an area where the likelihood of the containers contributing to storm water discharges is negligible. If required, additional BMPs must be implemented, such as sandbags around the base, to prevent wastes from contributing to storm water discharges.

7. Sanitary Wastes
   All sanitary waste will be collected from the portable units a minimum of three times per week by a licensed portable facility provider in complete compliance with local and state regulation.

   All sanitary waste units will be in an area where the likelihood of the unit contributing to storm water discharges is negligible. If required, additional BMPs must be implemented, such as sandbags around the base, to prevent wastes from contributing to storm water discharges.

Section VI. SPILL PREVENTION AND RESPONSE PROCEDURES

The contractor will train all personnel in the proper handling and cleanup of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with storm water discharges. If such contact occurs, the storm water discharge will be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated storm water. It shall be the responsibility of the job site superintendent to properly train all personnel in spill prevention and clean up procedures.

In order to minimize the potential for a spill of hazardous materials to come into contact with storm water, the following steps will be implemented:

1. All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, cleaning solvents, additives for soil stabilization, concrete curing compounds and additives, etc.) will be stored in a secure location, with their lids on, preferably under cover, when not in use.
2. The minimum practical quantity of all such materials will be kept on the job site.
3. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided at the storage site.
4. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

In the event of a spill, the following procedures should be followed

1. All spills will be cleaned up immediately after discovery.
2. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with the hazardous substances.
3. The project manager and the Engineer of Record will be notified immediately.

   Spills of toxic or hazardous materials will be reported to the appropriate federal, state, and/or local government agency, regardless of the size of the spill. Spills of amounts that exceed Reportable Quantities of certain substances specifically mentioned in federal regulations (40 CFR 110, 40 CFR 117, and 40 CFR 302) must be immediately reported to the NYSDEC 24-Hour Spill Hotline at **1-800-457-7362.**

4. If the spill exceeds a Reportable Quantity, the SWPPP must be modified within seven (7) calendar days of knowledge of the discharge to provide a description of the release, the circumstances leading to the release, and the date of the release. The plans must identify measures to prevent the recurrence of such releases and to respond to such releases.

The job site superintendent will be the spill prevention and response coordinator. He will designate the individuals who will receive spill prevention and response training. These individuals will each become responsible for a particular phase of prevention and response. The names of these personnel will be posted in the material storage area and in the office trailer onsite.

Section VII. CONTROL OF NON-STORMWATER DISCHARGES

Certain types of discharges are allowable under the NYS-DEC SPDES General Permit for Stormwater Discharges from Construction Activity, and it is the intent of this SWPPP to allow such discharges. These types of discharges will be allowed under the conditions that no pollutants will be allowed to come in contact with the water prior to or after its discharge. The control measures, which have been outlined previously in this SWPPP, will be strictly followed to ensure that no contamination of these non-stormwater discharges takes place. The following non-storm water discharges are allowed by the NYS-DEC and may occur at the job site:

1. Discharges from firefighting activities
2. Fire hydrant flushing
3. Waters to which cleansers or other components have not been added that are used to wash vehicles or control dust
4. Routine external building wash down which does not use detergents
5. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
6. Air conditioning condensate
7. Springs
8. Foundation or footing drains where flows are not contaminated with process materials such as solvents.

Section VIII. CERTIFICATION AND NOTIFICATION

The New York State Department of Environmental Conservation requires that the operator and the contractor make certifications of knowledge of the contents of this SWPPP and agreement to follow the SWPPP. The terms of the General Permit also require that each contractor sign the SWPPP plan, thereby making them co-permittees and acknowledging their responsibility for certain operational aspects of the plan. These certifications should be signed before the contractor begins activities and should be filed with the site's SWPPP at the jobsite.

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APPENDIX A: HYDRO CAD – EXISTING CONDITIONS

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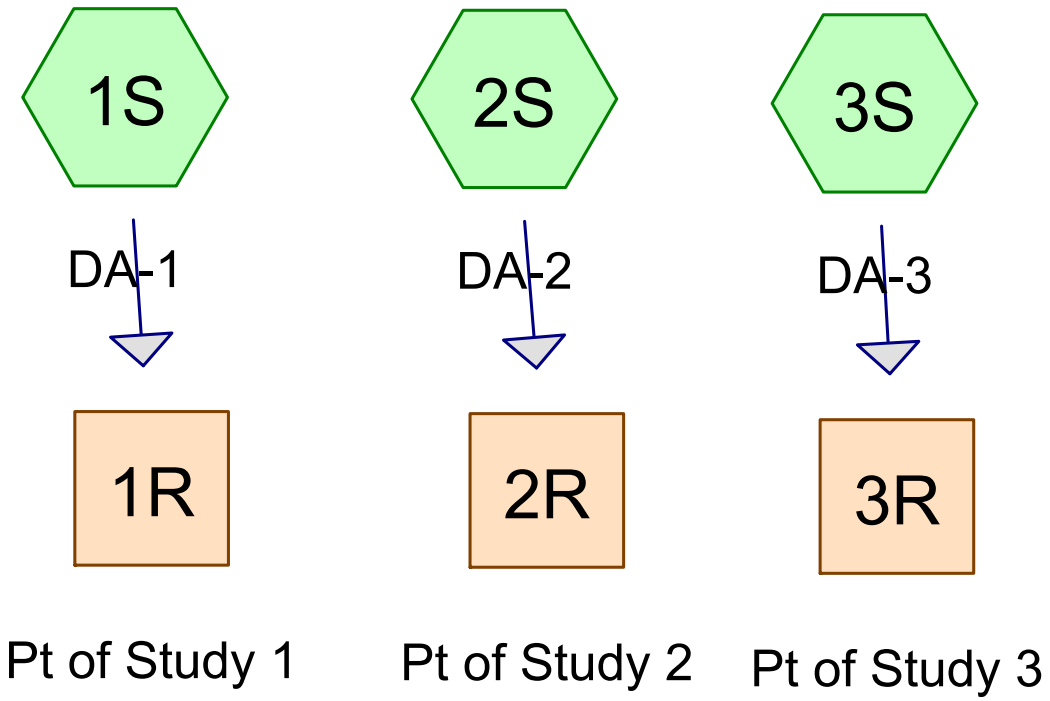
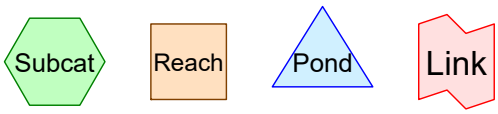




Routing Diagram for Existing Drainage Areas
Prepared by Napierala Consulting, P.C., Printed 12/1/2021
HydroCAD® 10.10-6a s/n 01332 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	2.04	2
2	10-yr	Type II 24-hr		Default	24.00	1	3.43	2
3	100-yr	Type II 24-hr		Default	24.00	1	5.78	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
39.700	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S)
28.020	77	Woods, Good, HSG D (1S, 2S, 3S)
67.720	**79**	**TOTAL AREA**

Summary for Subcatchment 1S: DA-1

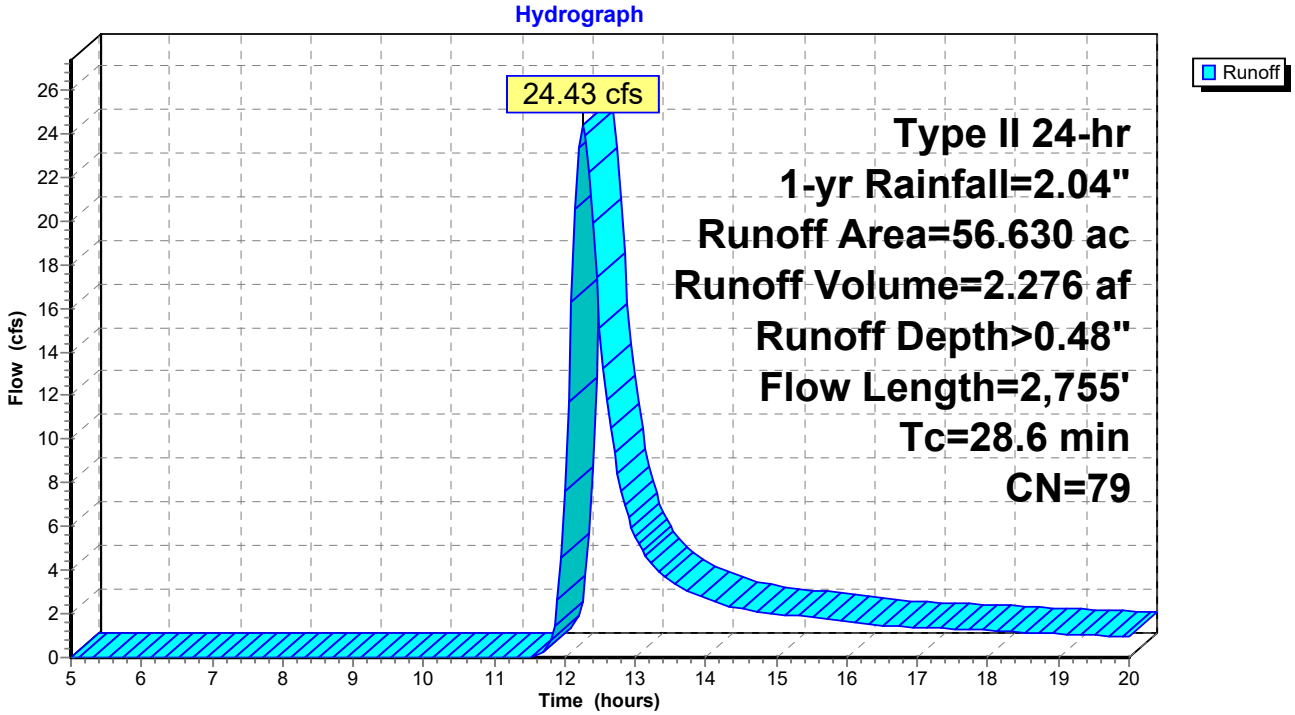
Runoff = 24.43 cfs @ 12.26 hrs, Volume= 2.276 af, Depth> 0.48"
Routed to Reach 1R : Pt of Study 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
21.210	77	Woods, Good, HSG D
35.420	80	>75% Grass cover, Good, HSG D
56.630	79	Weighted Average
56.630		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.39"
4.6	410	0.0900	1.50		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
6.7	840	0.0900	2.10		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.3	1,405	0.0750	17.78	213.31	**Channel Flow, Swale** Area= 12.0 sf Perim= 8.0' r= 1.50' n= 0.030 Earth, clean & winding
28.6	2,755	Total			

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

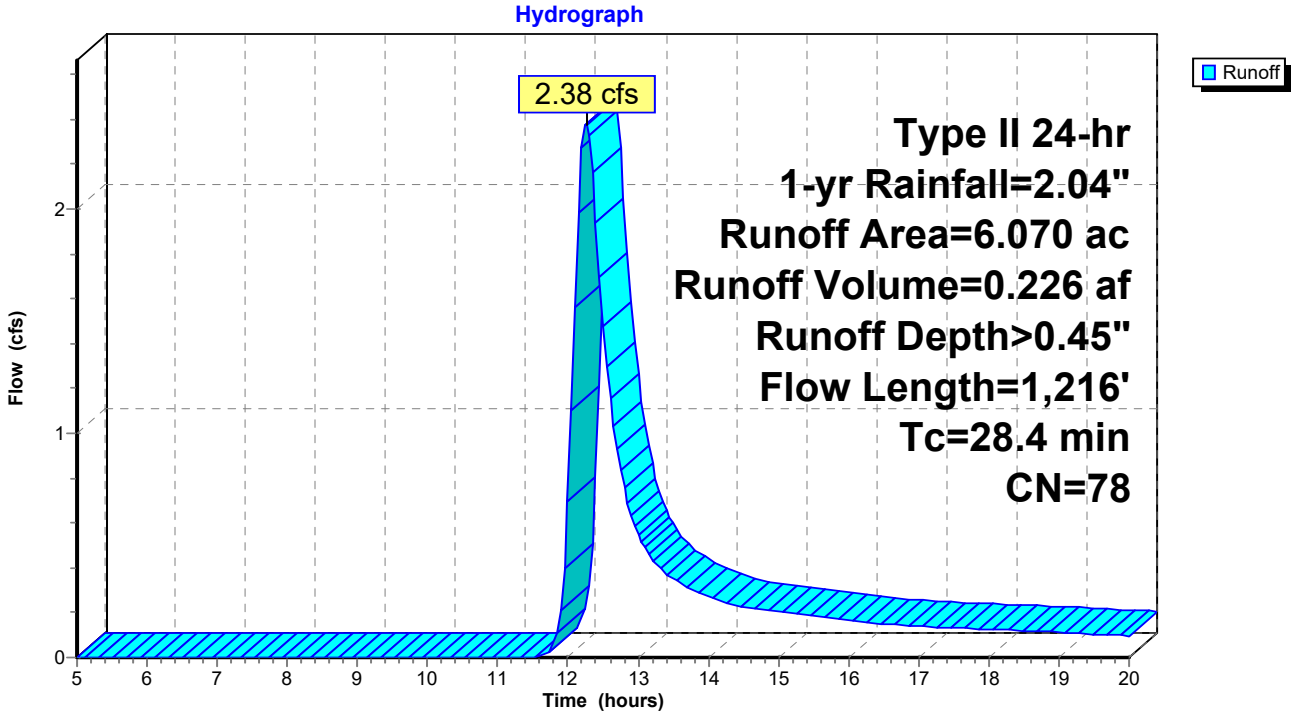
Runoff = 2.38 cfs @ 12.26 hrs, Volume= 0.226 af, Depth> 0.45"
Routed to Reach 2R : Pt of Study 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
3.330	77	Woods, Good, HSG D
2.740	80	>75% Grass cover, Good, HSG D
6.070	78	Weighted Average
6.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
14.2	555	0.0170	0.65		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
1.5	281	0.0360	3.05		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.2	280	0.1210	20.51	205.13	**Channel Flow, Swale** Area= 10.0 sf Perim= 5.0' r= 2.00' n= 0.040 Earth, dense weeds
28.4	1,216	Total			

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

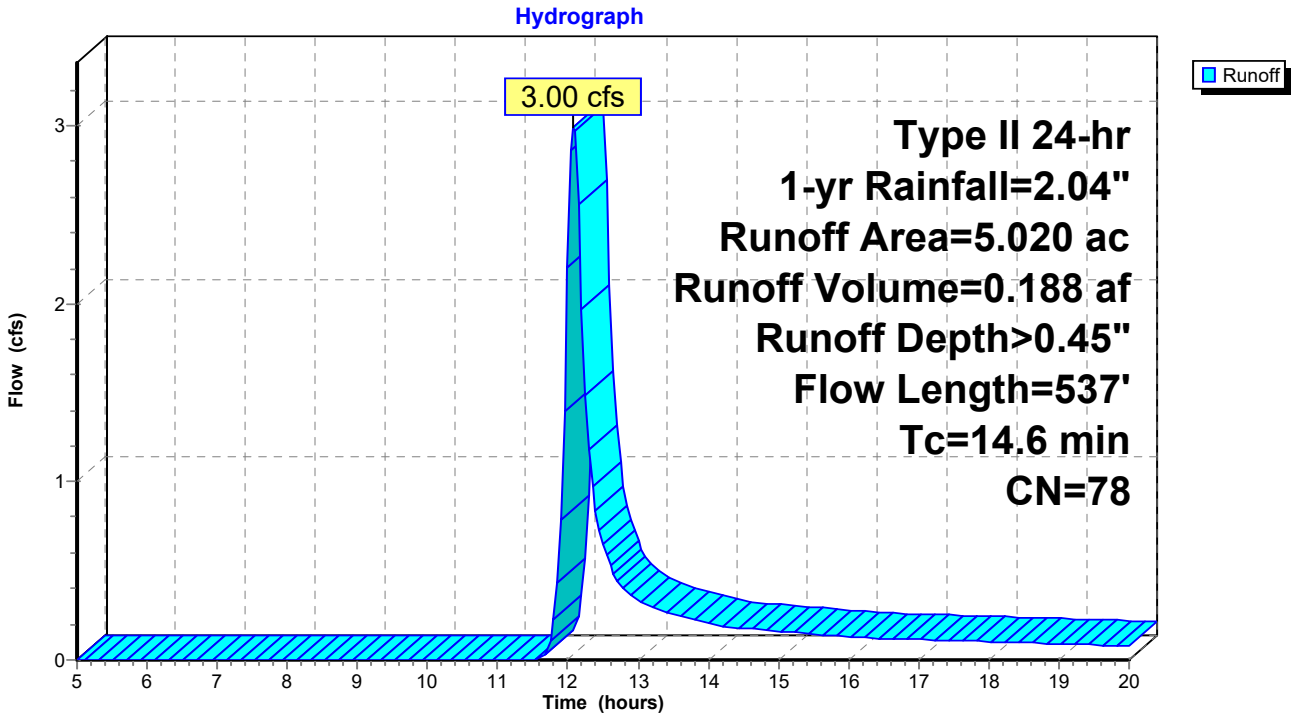
Runoff = 3.00 cfs @ 12.09 hrs, Volume= 0.188 af, Depth> 0.45"
Routed to Reach 3R : Pt of Study 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
3.480	77	Woods, Good, HSG D
1.540	80	>75% Grass cover, Good, HSG D
5.020	78	Weighted Average
5.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
1.5	287	0.0380	3.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
1.7	150	0.0870	1.47		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.6	537	Total			

Subcatchment 3S: DA-3

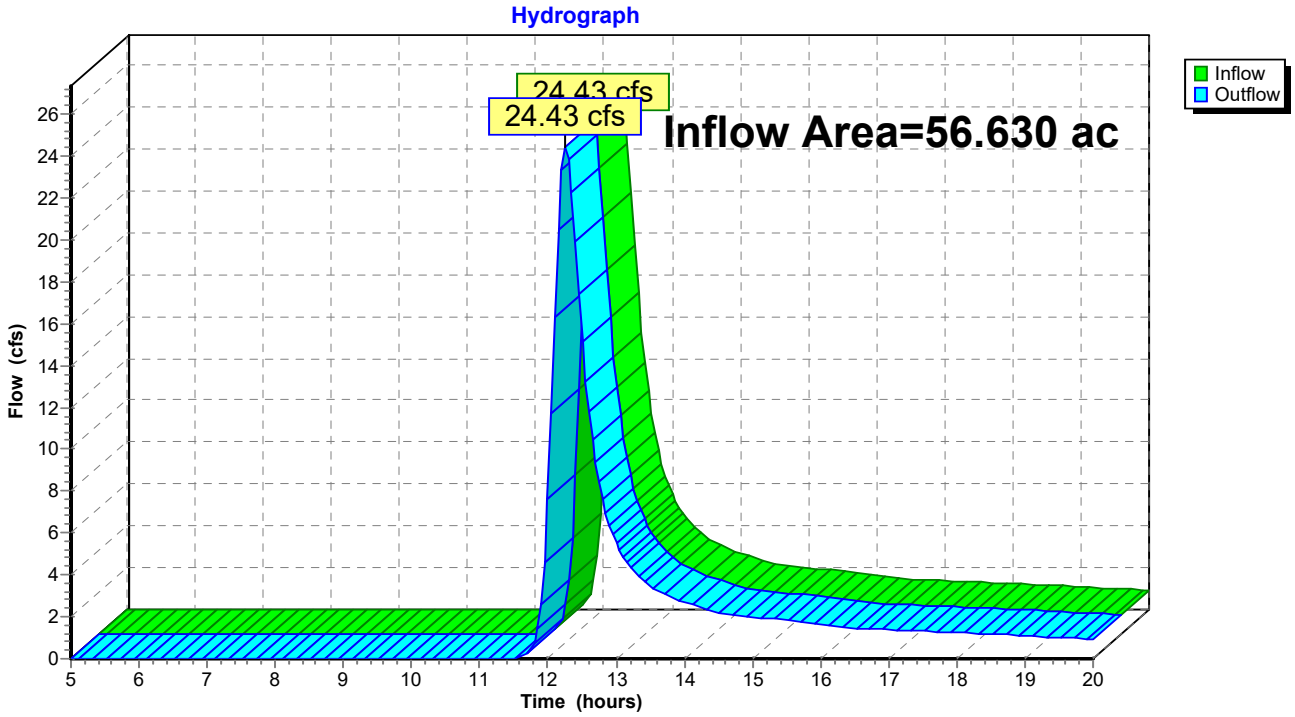


Summary for Reach 1R: Pt of Study 1

Inflow Area = 56.630 ac, 0.00% Impervious, Inflow Depth > 0.48" for 1-yr event
Inflow = 24.43 cfs @ 12.26 hrs, Volume= 2.276 af
Outflow = 24.43 cfs @ 12.26 hrs, Volume= 2.276 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Pt of Study 1

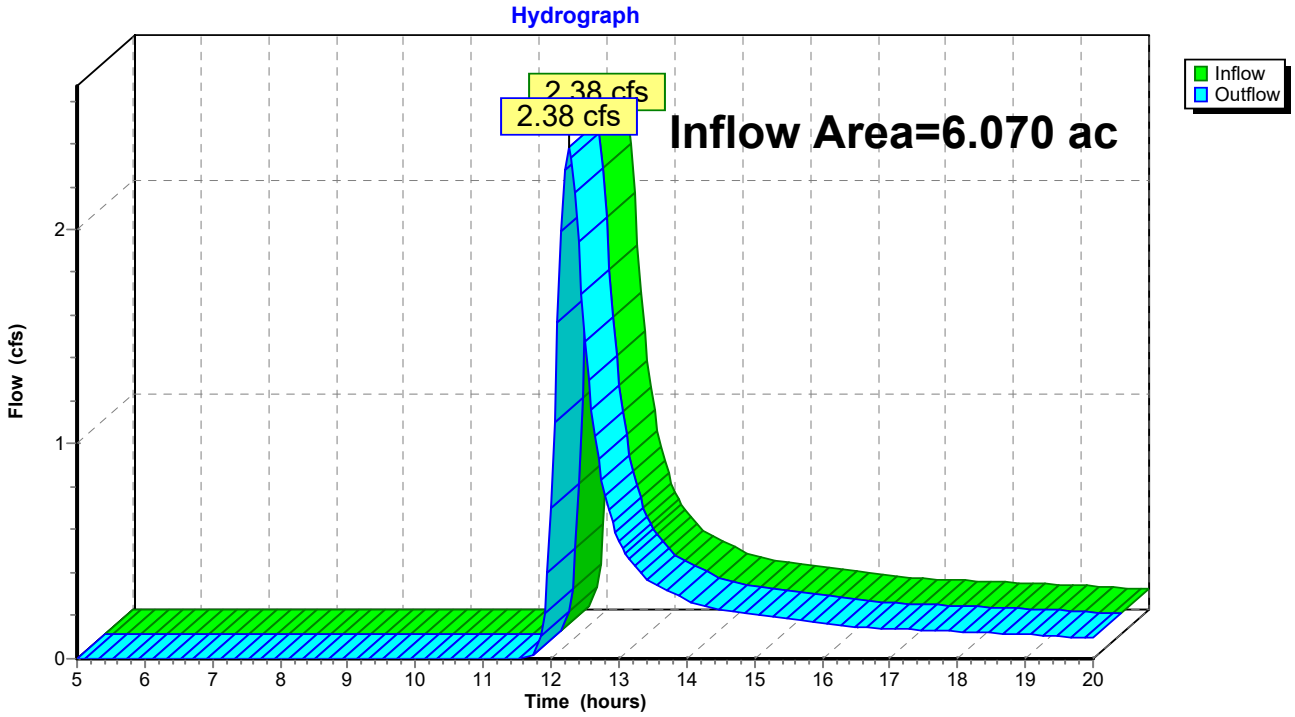


Summary for Reach 2R: Pt of Study 2

Inflow Area = 6.070 ac, 0.00% Impervious, Inflow Depth > 0.45" for 1-yr event
Inflow = 2.38 cfs @ 12.26 hrs, Volume= 0.226 af
Outflow = 2.38 cfs @ 12.26 hrs, Volume= 0.226 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: Pt of Study 2

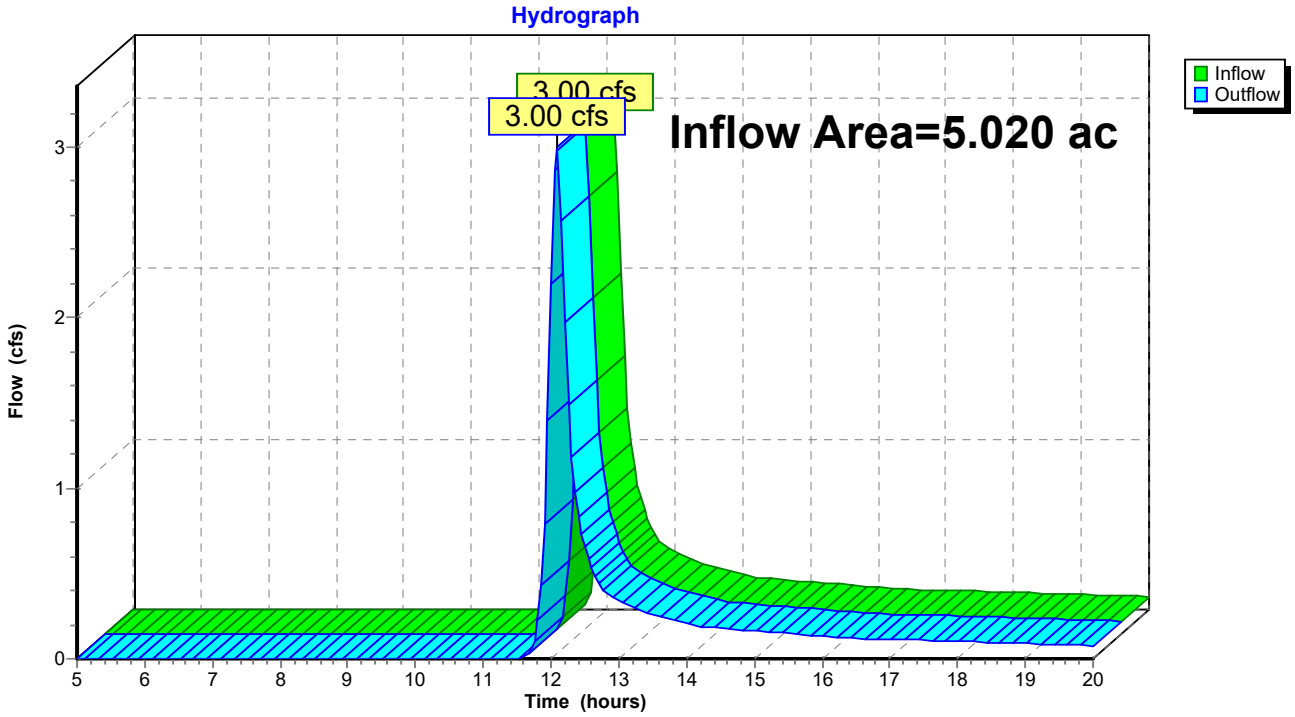


Summary for Reach 3R: Pt of Study 3

Inflow Area = 5.020 ac, 0.00% Impervious, Inflow Depth > 0.45" for 1-yr event
Inflow = 3.00 cfs @ 12.09 hrs, Volume= 0.188 af
Outflow = 3.00 cfs @ 12.09 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: Pt of Study 3



Summary for Subcatchment 1S: DA-1

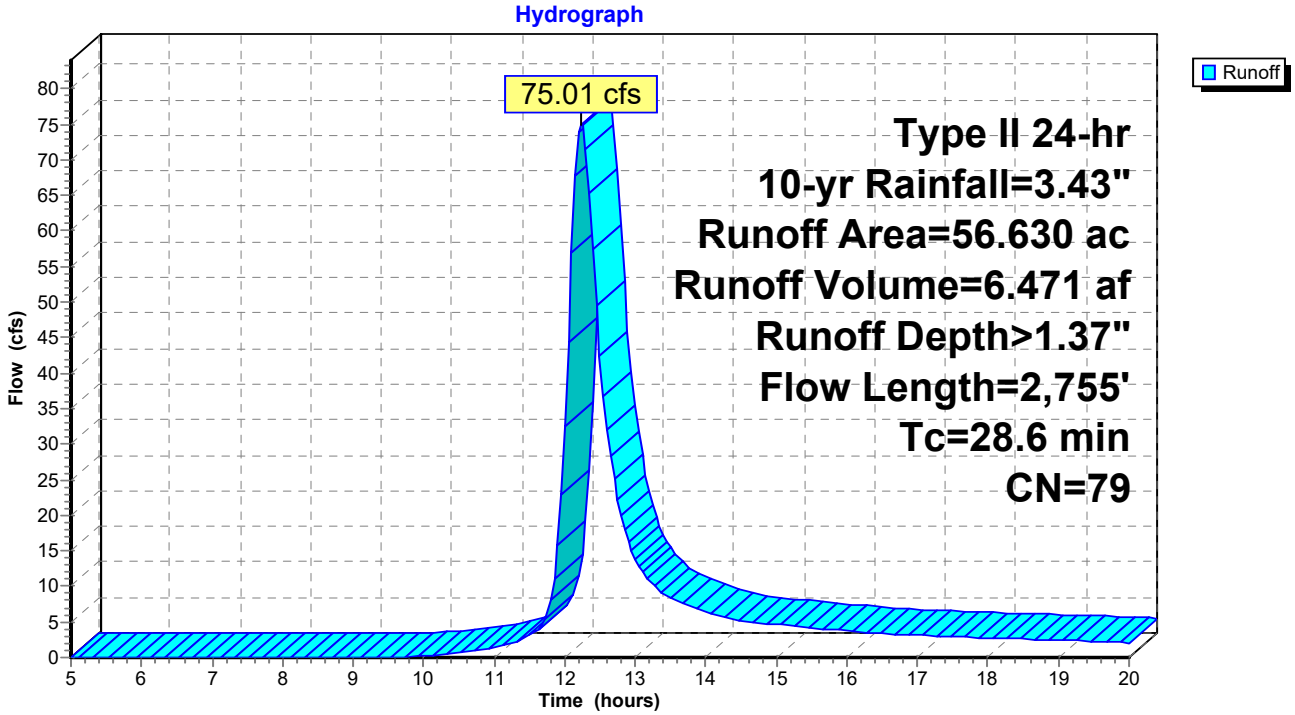
Runoff = 75.01 cfs @ 12.24 hrs, Volume= 6.471 af, Depth> 1.37"
Routed to Reach 1R : Pt of Study 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
21.210	77	Woods, Good, HSG D
35.420	80	>75% Grass cover, Good, HSG D
56.630	79	Weighted Average
56.630		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.39"
4.6	410	0.0900	1.50		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
6.7	840	0.0900	2.10		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.3	1,405	0.0750	17.78	213.31	**Channel Flow, Swale** Area= 12.0 sf Perim= 8.0' r= 1.50' n= 0.030 Earth, clean & winding
28.6	2,755	Total			

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

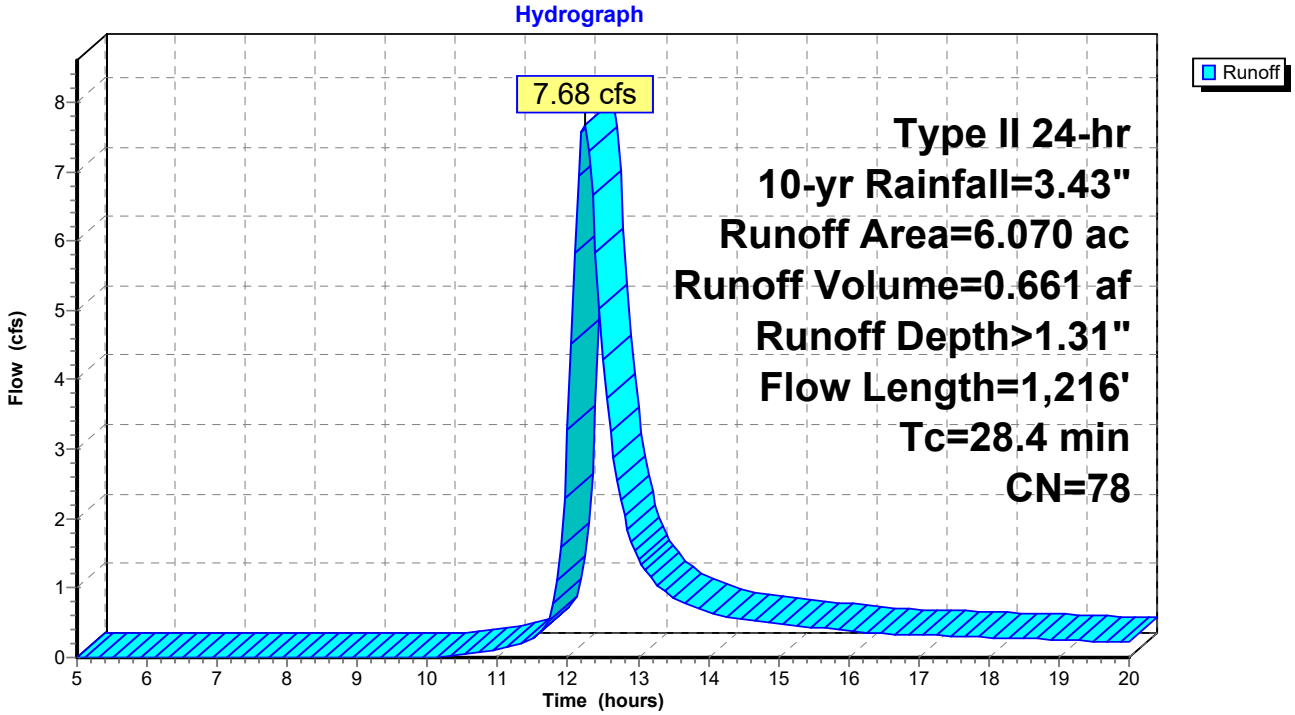
Runoff = 7.68 cfs @ 12.23 hrs, Volume= 0.661 af, Depth> 1.31"
Routed to Reach 2R : Pt of Study 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
3.330	77	Woods, Good, HSG D
2.740	80	>75% Grass cover, Good, HSG D
6.070	78	Weighted Average
6.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
14.2	555	0.0170	0.65		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
1.5	281	0.0360	3.05		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.2	280	0.1210	20.51	205.13	**Channel Flow, Swale** Area= 10.0 sf Perim= 5.0' r= 2.00' n= 0.040 Earth, dense weeds
28.4	1,216	Total			

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

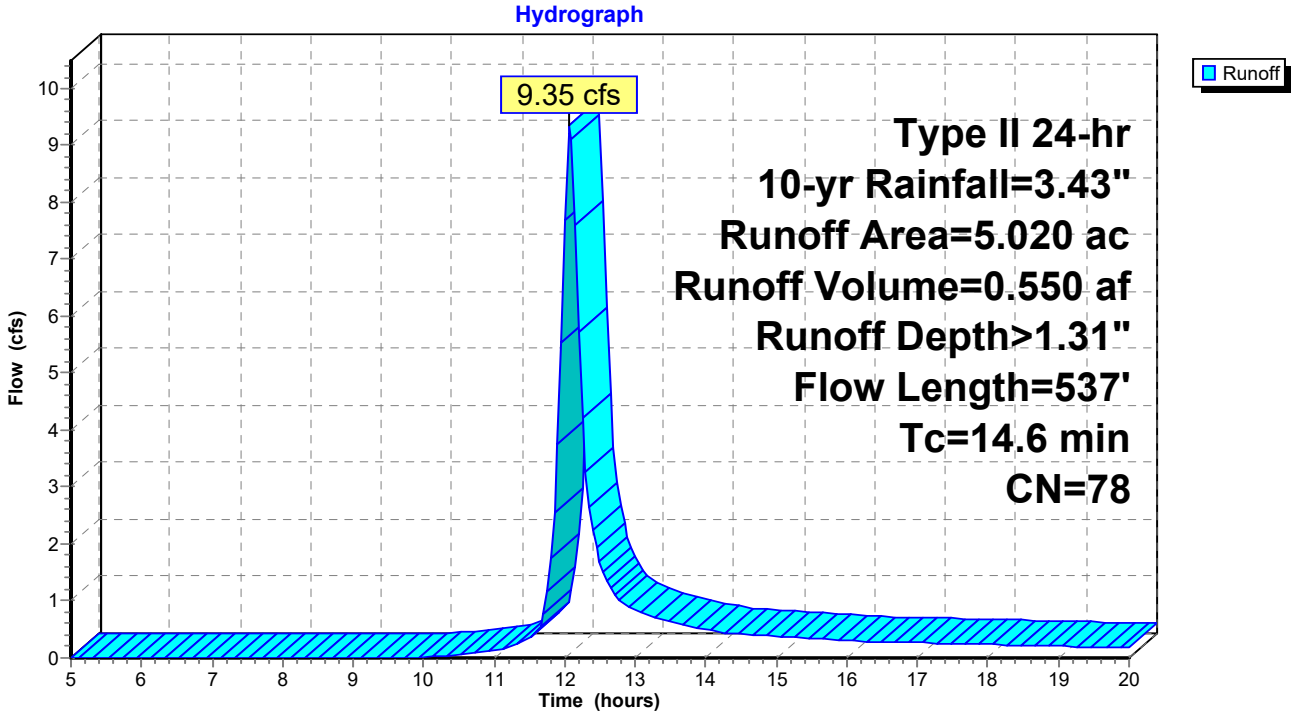
Runoff = 9.35 cfs @ 12.07 hrs, Volume= 0.550 af, Depth> 1.31"
Routed to Reach 3R : Pt of Study 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
3.480	77	Woods, Good, HSG D
1.540	80	>75% Grass cover, Good, HSG D
5.020	78	Weighted Average
5.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
1.5	287	0.0380	3.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
1.7	150	0.0870	1.47		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.6	537	Total			

Subcatchment 3S: DA-3

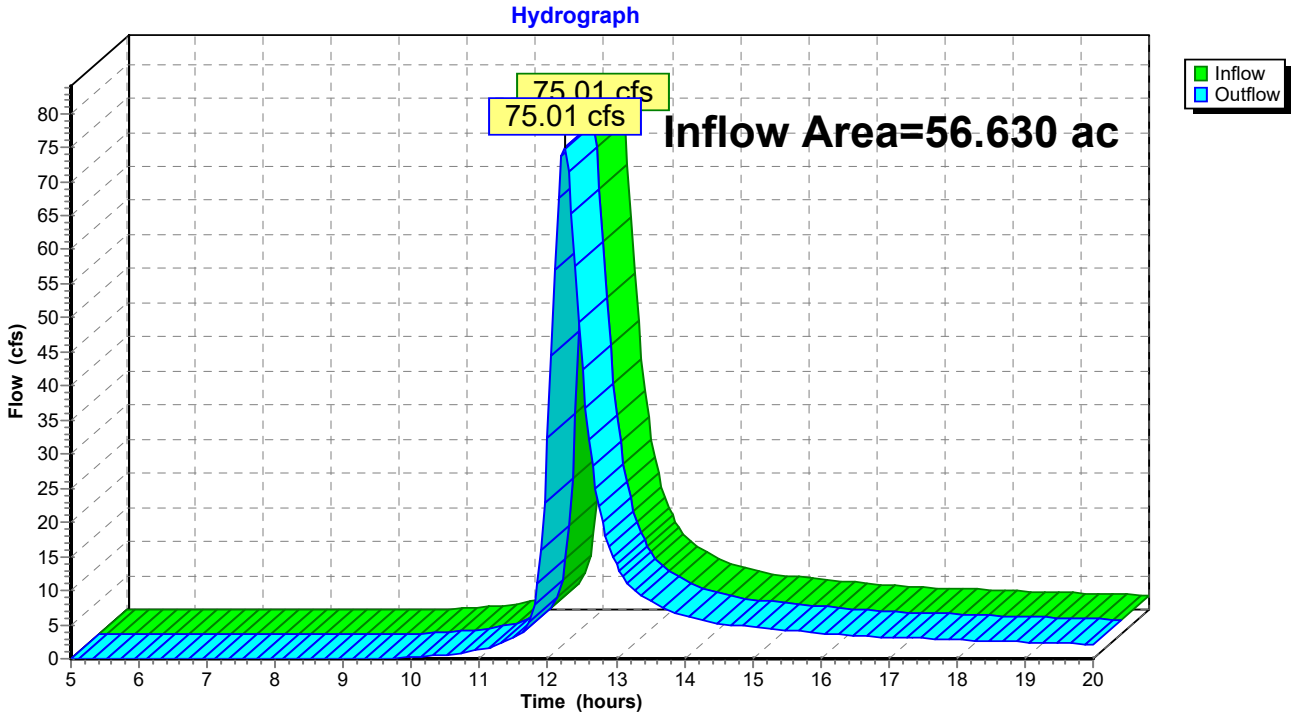


Summary for Reach 1R: Pt of Study 1

Inflow Area = 56.630 ac, 0.00% Impervious, Inflow Depth > 1.37" for 10-yr event
Inflow = 75.01 cfs @ 12.24 hrs, Volume= 6.471 af
Outflow = 75.01 cfs @ 12.24 hrs, Volume= 6.471 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Pt of Study 1

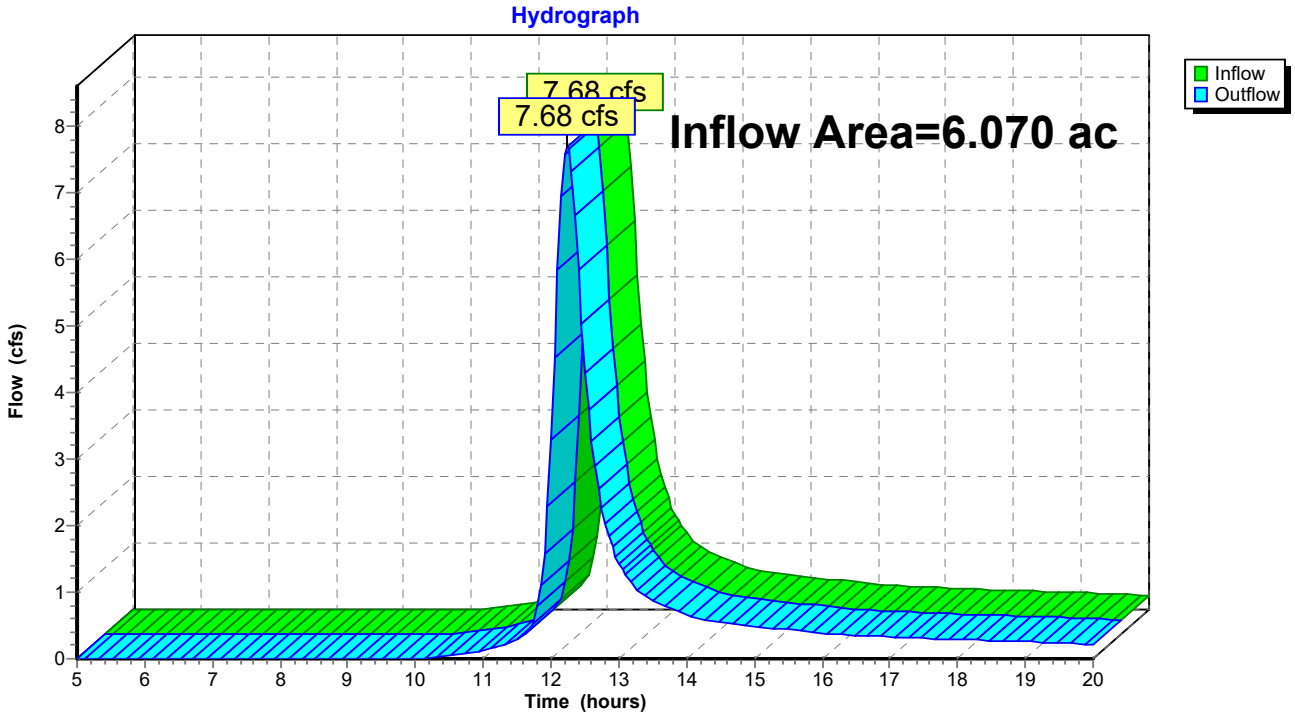


Summary for Reach 2R: Pt of Study 2

Inflow Area = 6.070 ac, 0.00% Impervious, Inflow Depth > 1.31" for 10-yr event
Inflow = 7.68 cfs @ 12.23 hrs, Volume= 0.661 af
Outflow = 7.68 cfs @ 12.23 hrs, Volume= 0.661 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: Pt of Study 2

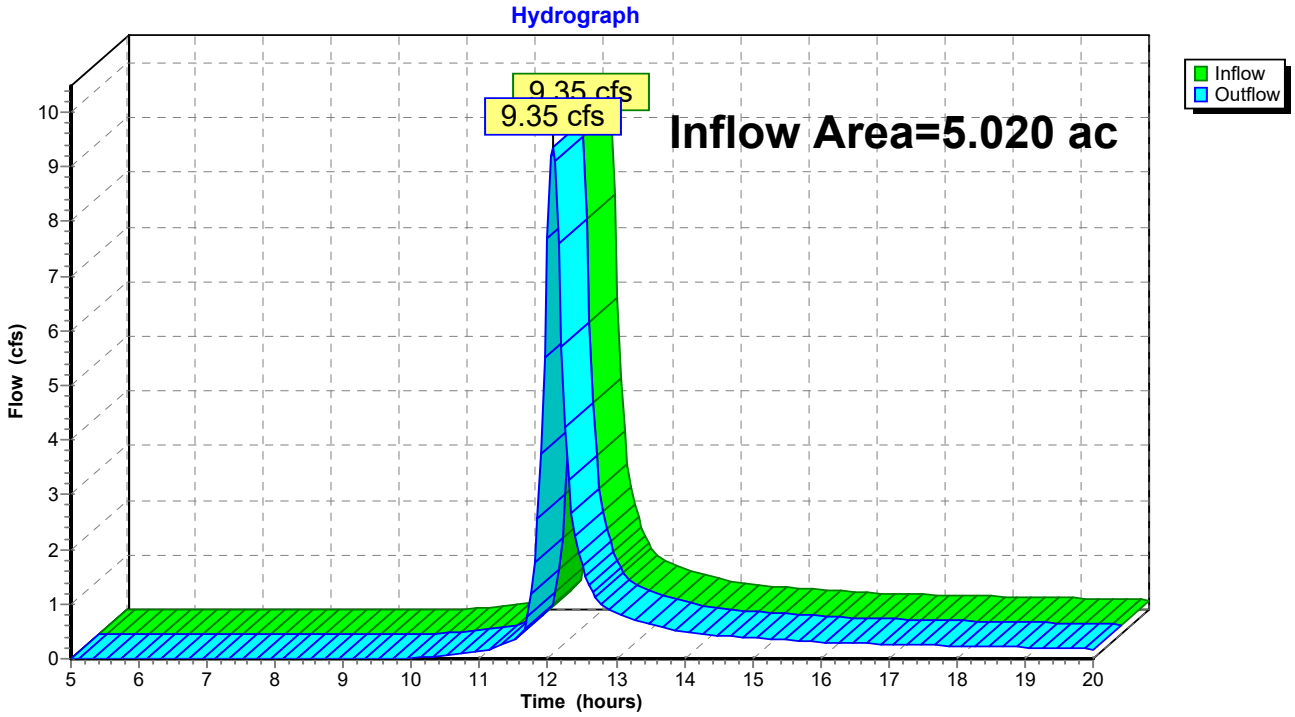


Summary for Reach 3R: Pt of Study 3

Inflow Area = 5.020 ac, 0.00% Impervious, Inflow Depth > 1.31" for 10-yr event
Inflow = 9.35 cfs @ 12.07 hrs, Volume= 0.550 af
Outflow = 9.35 cfs @ 12.07 hrs, Volume= 0.550 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: Pt of Study 3



Summary for Subcatchment 1S: DA-1

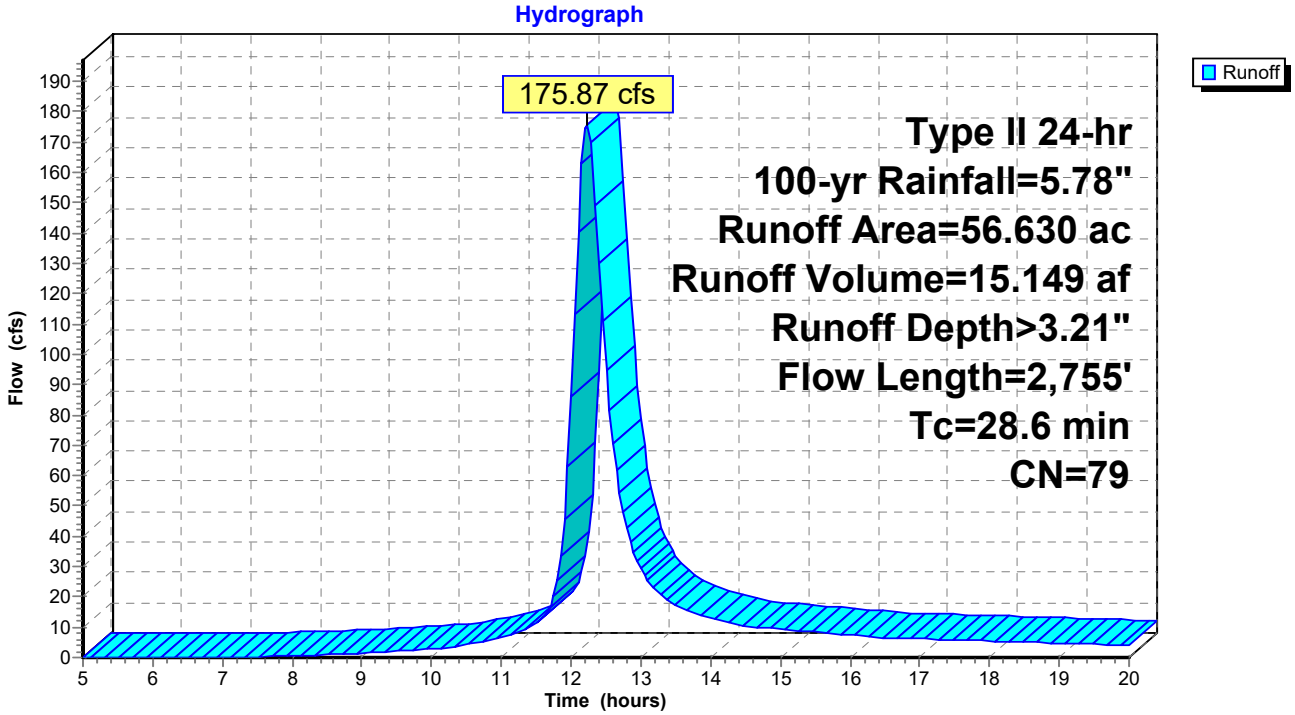
Runoff = 175.87 cfs @ 12.23 hrs, Volume= 15.149 af, Depth> 3.21"
Routed to Reach 1R : Pt of Study 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
21.210	77	Woods, Good, HSG D
35.420	80	>75% Grass cover, Good, HSG D
56.630	79	Weighted Average
56.630		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.39"
4.6	410	0.0900	1.50		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
6.7	840	0.0900	2.10		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.3	1,405	0.0750	17.78	213.31	**Channel Flow, Swale** Area= 12.0 sf Perim= 8.0' r= 1.50' n= 0.030 Earth, clean & winding
28.6	2,755	Total			

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

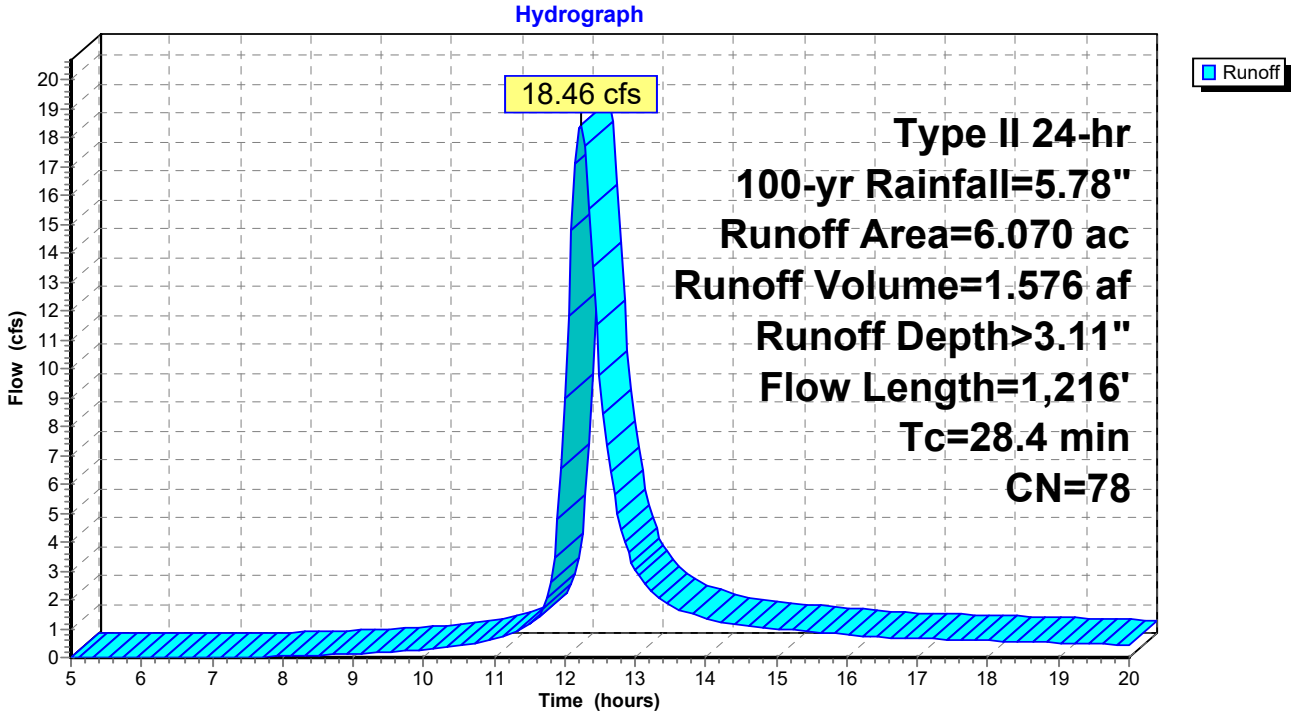
Runoff = 18.46 cfs @ 12.22 hrs, Volume= 1.576 af, Depth> 3.11"
Routed to Reach 2R : Pt of Study 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
3.330	77	Woods, Good, HSG D
2.740	80	>75% Grass cover, Good, HSG D
6.070	78	Weighted Average
6.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.13		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
14.2	555	0.0170	0.65		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
1.5	281	0.0360	3.05		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
0.2	280	0.1210	20.51	205.13	**Channel Flow, Swale** Area= 10.0 sf Perim= 5.0' r= 2.00' n= 0.040 Earth, dense weeds
28.4	1,216	Total			

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

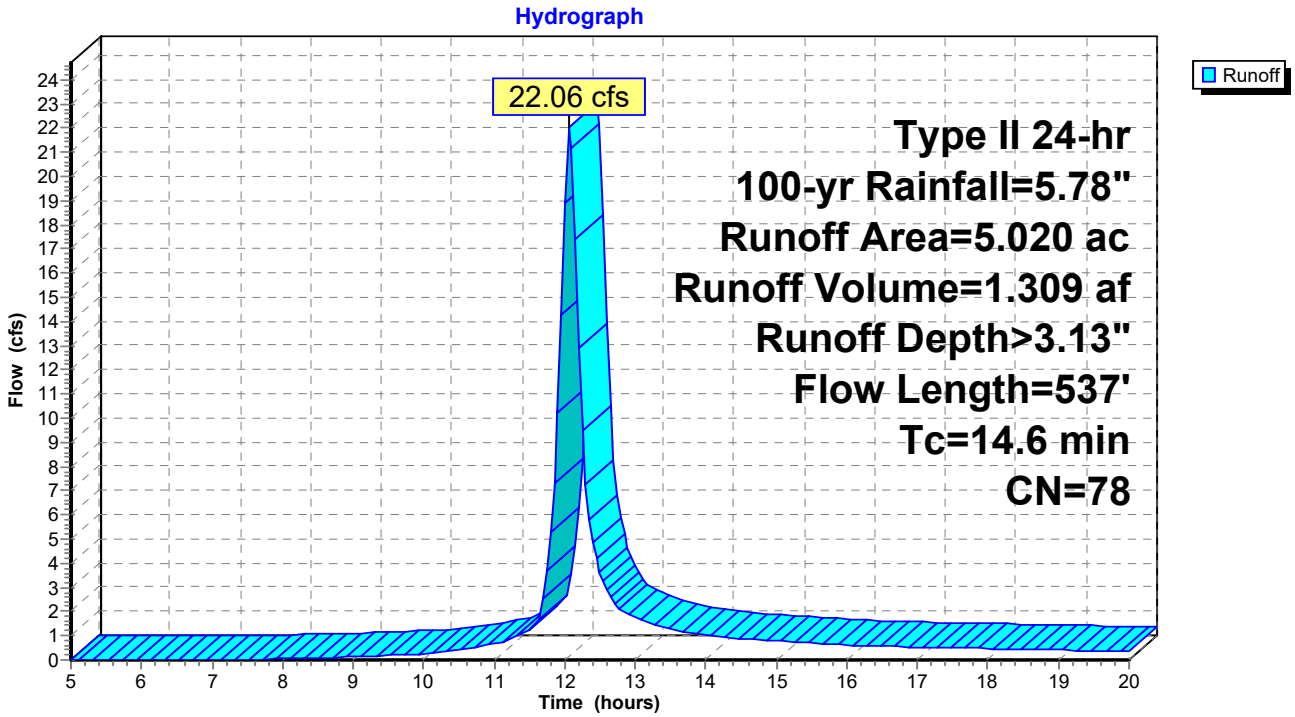
Runoff = 22.06 cfs @ 12.07 hrs, Volume= 1.309 af, Depth> 3.13"
Routed to Reach 3R : Pt of Study 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
3.480	77	Woods, Good, HSG D
1.540	80	>75% Grass cover, Good, HSG D
5.020	78	Weighted Average
5.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, Sheet Flow** Grass: Dense n= 0.240 P2= 2.39"
1.5	287	0.0380	3.14		**Shallow Concentrated Flow, Shallow** Unpaved Kv= 16.1 fps
1.7	150	0.0870	1.47		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.6	537	Total			

Subcatchment 3S: DA-3

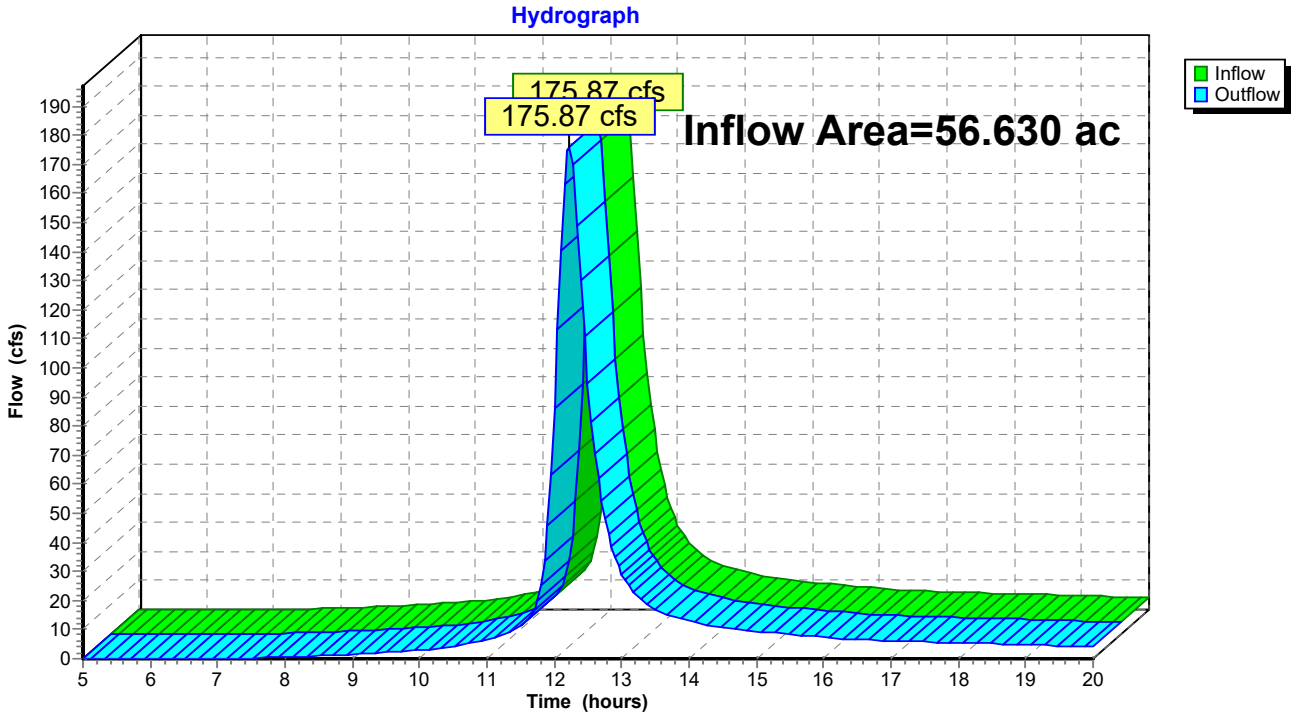


Summary for Reach 1R: Pt of Study 1

Inflow Area = 56.630 ac, 0.00% Impervious, Inflow Depth > 3.21" for 100-yr event
Inflow = 175.87 cfs @ 12.23 hrs, Volume= 15.149 af
Outflow = 175.87 cfs @ 12.23 hrs, Volume= 15.149 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Pt of Study 1

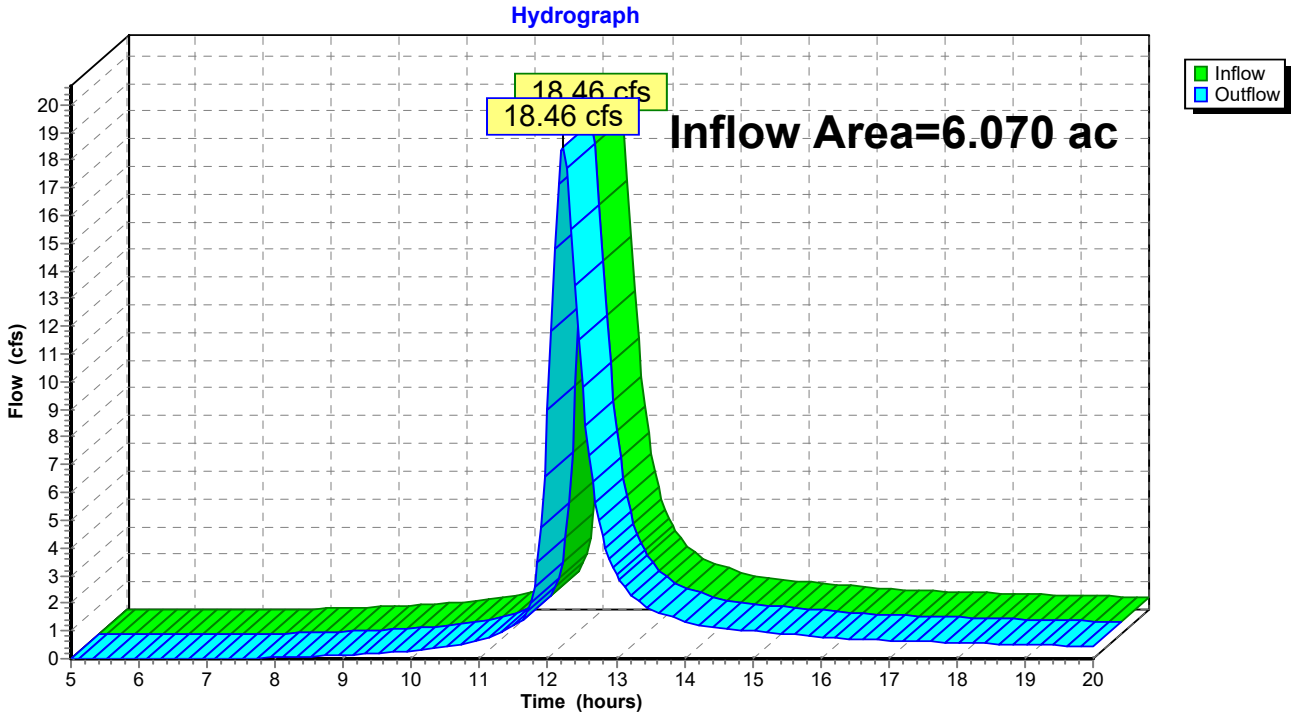


Summary for Reach 2R: Pt of Study 2

Inflow Area = 6.070 ac, 0.00% Impervious, Inflow Depth > 3.11" for 100-yr event
Inflow = 18.46 cfs @ 12.22 hrs, Volume= 1.576 af
Outflow = 18.46 cfs @ 12.22 hrs, Volume= 1.576 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: Pt of Study 2

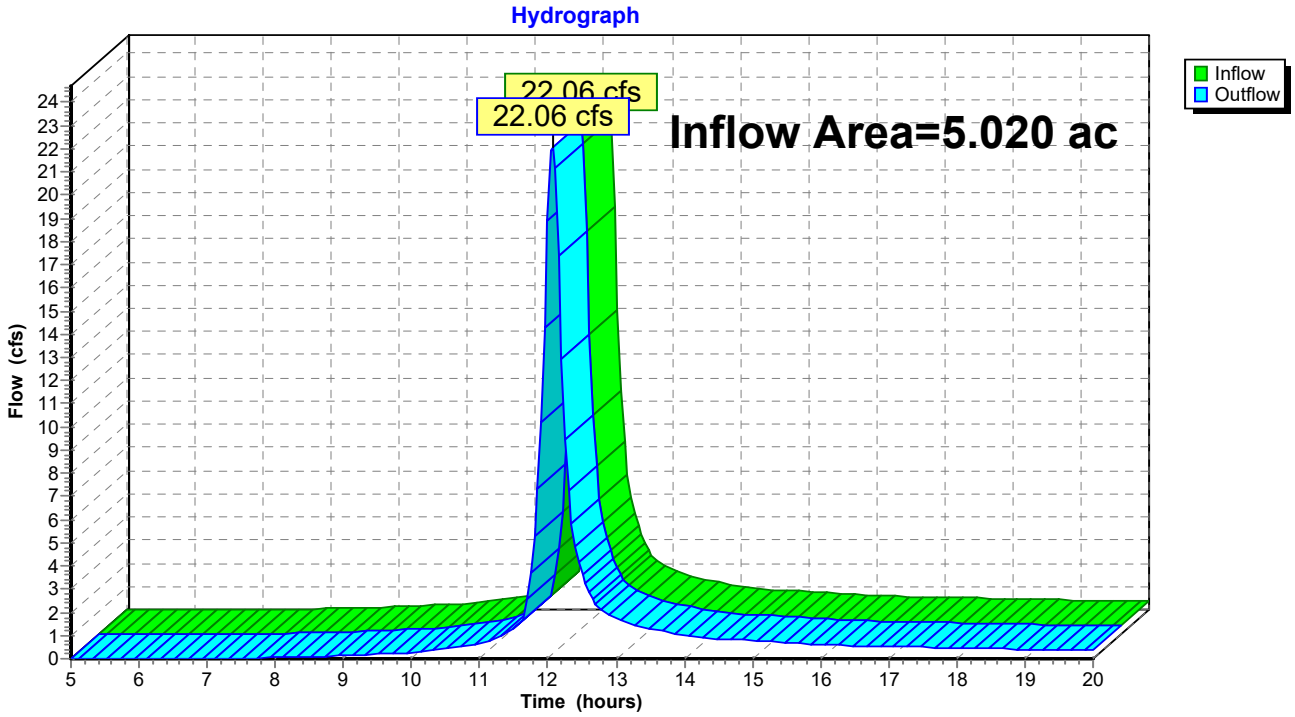


Summary for Reach 3R: Pt of Study 3

Inflow Area = 5.020 ac, 0.00% Impervious, Inflow Depth > 3.13" for 100-yr event
Inflow = 22.06 cfs @ 12.07 hrs, Volume= 1.309 af
Outflow = 22.06 cfs @ 12.07 hrs, Volume= 1.309 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: Pt of Study 3



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APPENDIX B: HYDRO CAD – PROPOSED CONDITIONS

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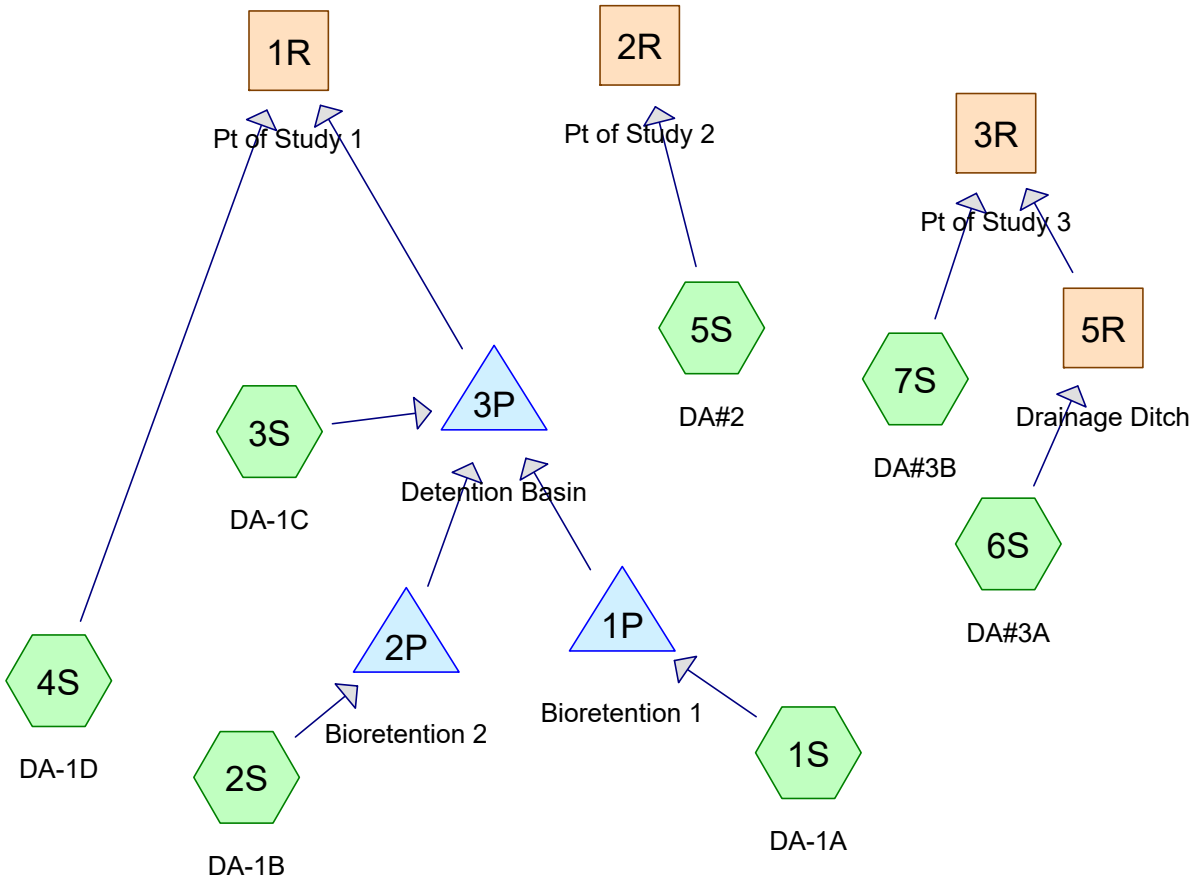
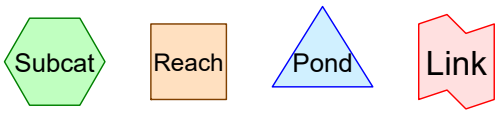




Routing Diagram for Proposed Drainage Areas
Prepared by Napierala Consulting, P.C., Printed 12/1/2021
HydroCAD® 10.10-6a s/n 01332 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	2.04	2
2	10-yr	Type II 24-hr		Default	24.00	1	3.43	2
3	100-yr	Type II 24-hr		Default	24.00	1	5.78	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
41.420	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S)
3.330	98	Paved parking, HSG D (1S, 2S, 4S, 6S, 7S)
2.490	98	Unconnected roofs, HSG D (1S, 2S, 6S, 7S)
21.200	77	Woods, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S)
68.440	**81**	**TOTAL AREA**

Summary for Subcatchment 1S: DA-1A

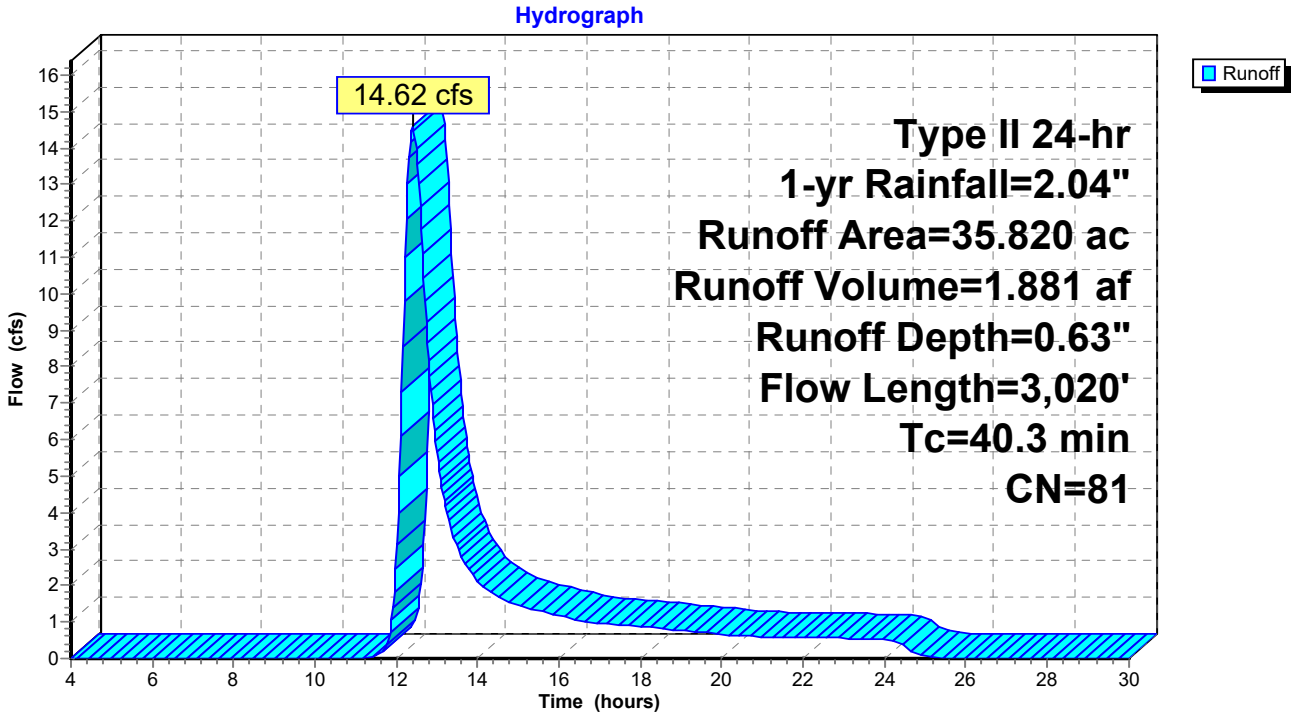
Runoff = 14.62 cfs @ 12.40 hrs, Volume= 1.881 af, Depth= 0.63"
Routed to Pond 1P : Bioretention 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
2.050	98	Paved parking, HSG D
1.940	98	Unconnected roofs, HSG D
22.870	80	>75% Grass cover, Good, HSG D
8.960	77	Woods, Good, HSG D
35.820	81	Weighted Average
31.830		88.86% Pervious Area
3.990		11.14% Impervious Area
1.940		48.62% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	100	0.0600	0.06		**Sheet Flow, SHEET FLOW** Woods: Dense underbrush n= 0.800 P2= 2.39"
4.8	370	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.9	200	0.0650	1.78		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	295	0.0300	19.80	79.19	**Channel Flow, curb and gutter flow** Area= 4.0 sf Perim= 4.0' r= 1.00' n= 0.013 Asphalt, smooth
1.7	1,100	0.0345	11.04	19.51	**Pipe Channel, Pipe Flow** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
3.8	955	0.0050	4.20	50.44	**Channel Flow,** Area= 12.0 sf Perim= 12.0' r= 1.00' n= 0.025 Earth, grassed & winding
40.3	3,020	Total			

Subcatchment 1S: DA-1A



Summary for Subcatchment 2S: DA-1B

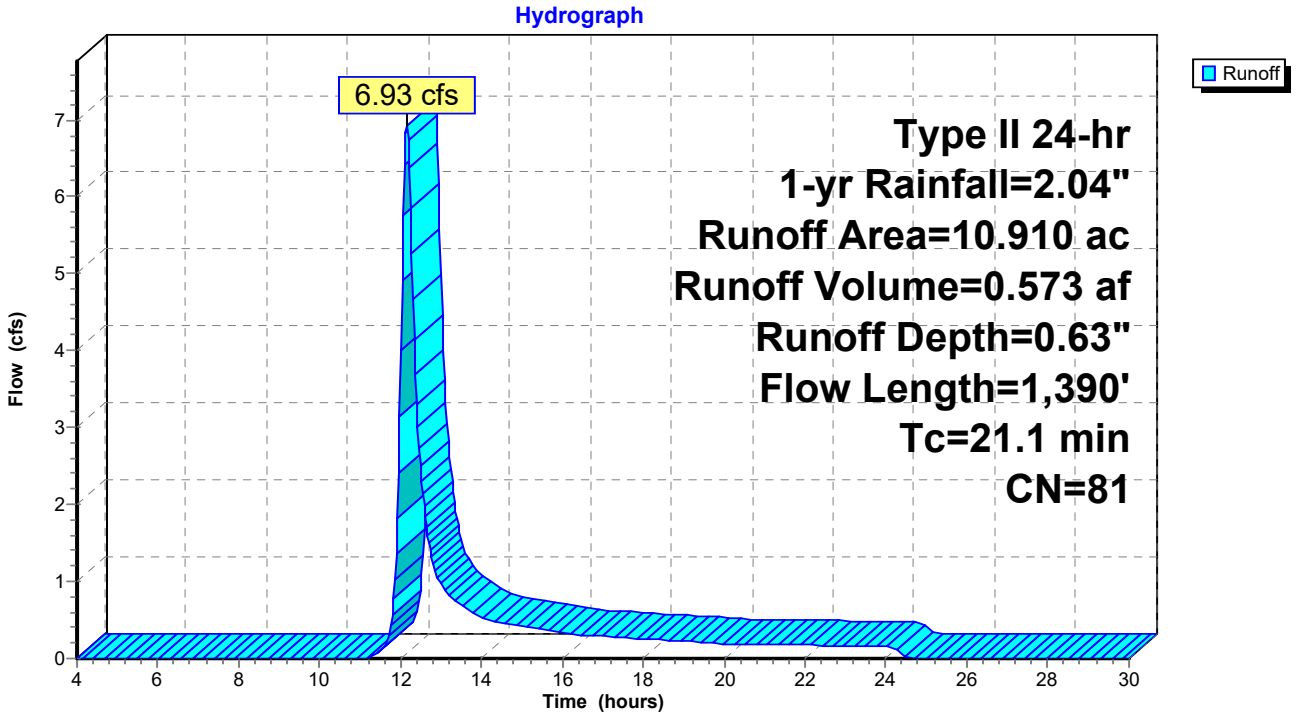
Runoff = 6.93 cfs @ 12.16 hrs, Volume= 0.573 af, Depth= 0.63"
Routed to Pond 2P : Bioretention 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.710	98	Paved parking, HSG D
0.340	98	Unconnected roofs, HSG D
7.820	80	>75% Grass cover, Good, HSG D
2.040	77	Woods, Good, HSG D
10.910	81	Weighted Average
9.860		90.38% Pervious Area
1.050		9.62% Impervious Area
0.340		32.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
4.6	410	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
5.6	710	0.0920	2.12		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.3	170	0.0200	9.55	76.42	**Channel Flow, swale flow** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
21.1	1,390	Total			

Subcatchment 2S: DA-1B



Summary for Subcatchment 3S: DA-1C

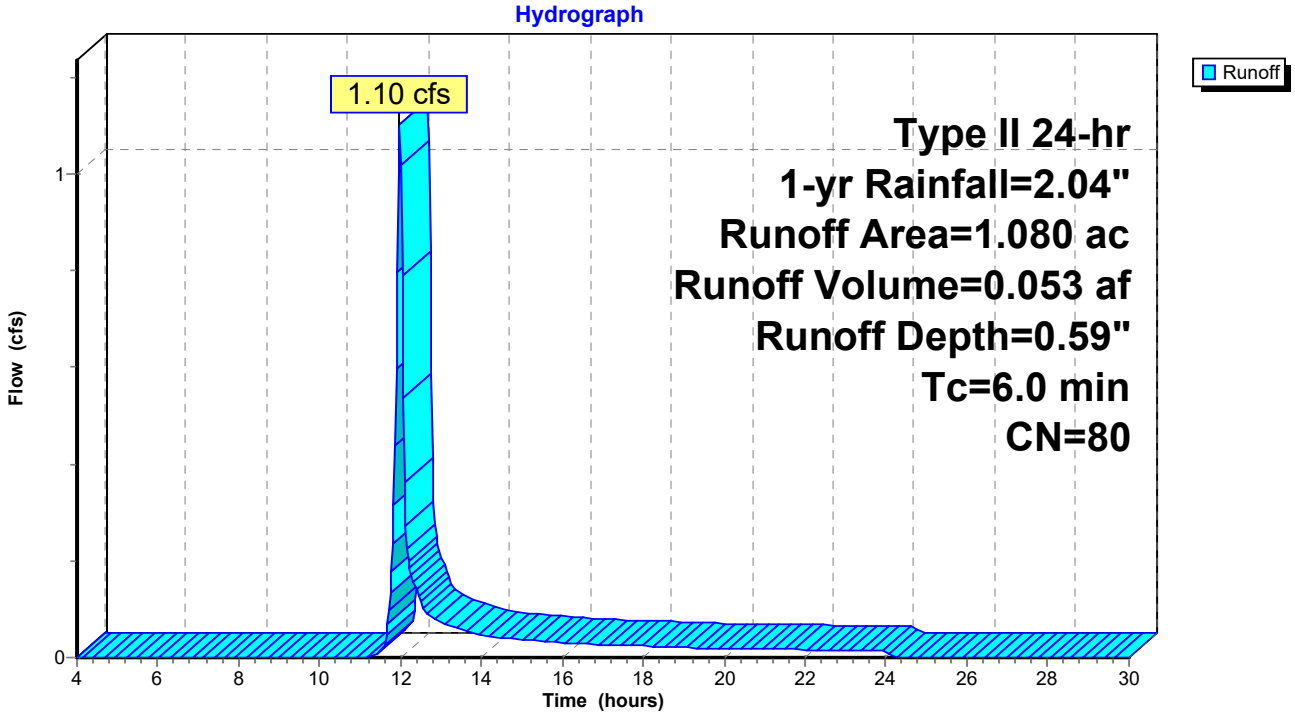
Runoff = 1.10 cfs @ 11.98 hrs, Volume= 0.053 af, Depth= 0.59"
Routed to Pond 3P : Detention Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.960	80	>75% Grass cover, Good, HSG D
0.120	77	Woods, Good, HSG D
1.080	80	Weighted Average
1.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min TR 55 Value**

Subcatchment 3S: DA-1C



Summary for Subcatchment 4S: DA-1D

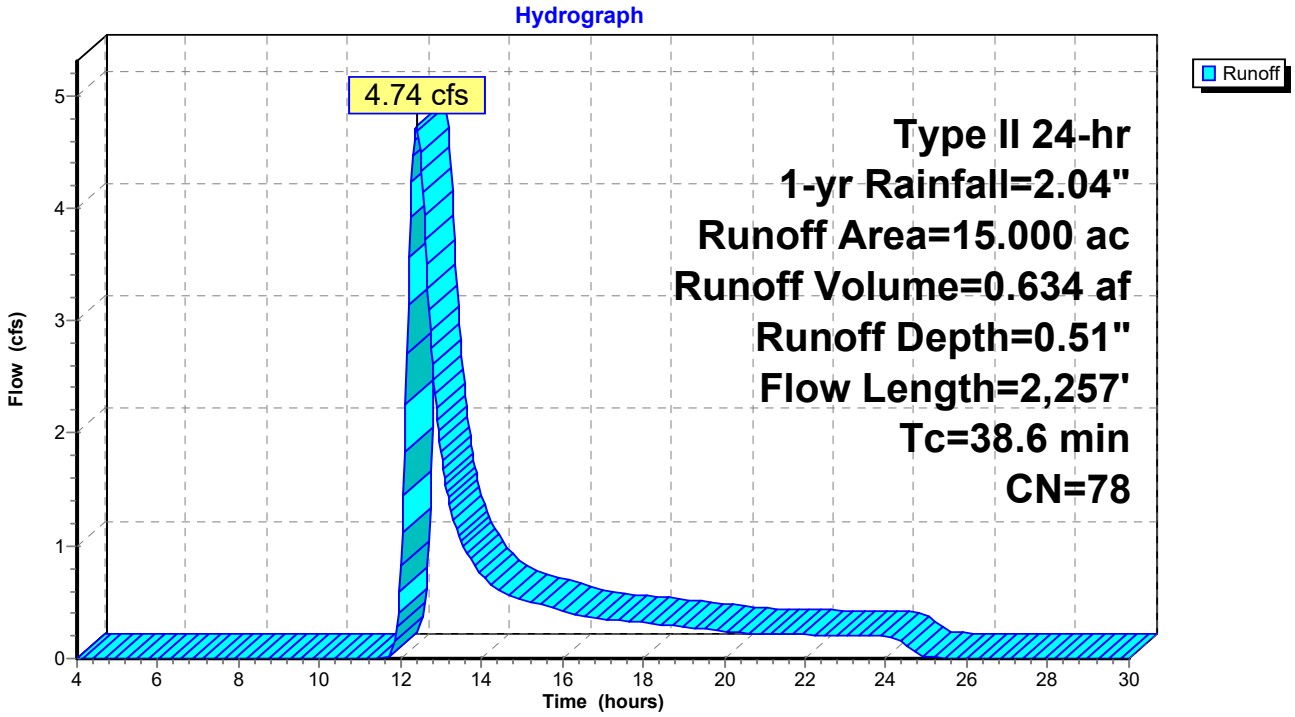
Runoff = 4.74 cfs @ 12.40 hrs, Volume= 0.634 af, Depth= 0.51"
Routed to Reach 1R : Pt of Study 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
5.930	80	>75% Grass cover, Good, HSG D
8.910	77	Woods, Good, HSG D
0.160	98	Paved parking, HSG D
15.000	78	Weighted Average
14.840		98.93% Pervious Area
0.160		1.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	100	0.0600	0.06		**Sheet Flow, SHEET FLOW** Woods: Dense underbrush n= 0.800 P2= 2.39"
5.4	485	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
4.1	517	0.0900	2.10		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
1.2	1,155	0.0750	16.28	260.45	**Channel Flow, SWALE** Area= 16.0 sf Perim= 16.0' r= 1.00' n= 0.025 Earth, clean & winding
38.6	2,257	Total			

Subcatchment 4S: DA-1D



Summary for Subcatchment 5S: DA#2

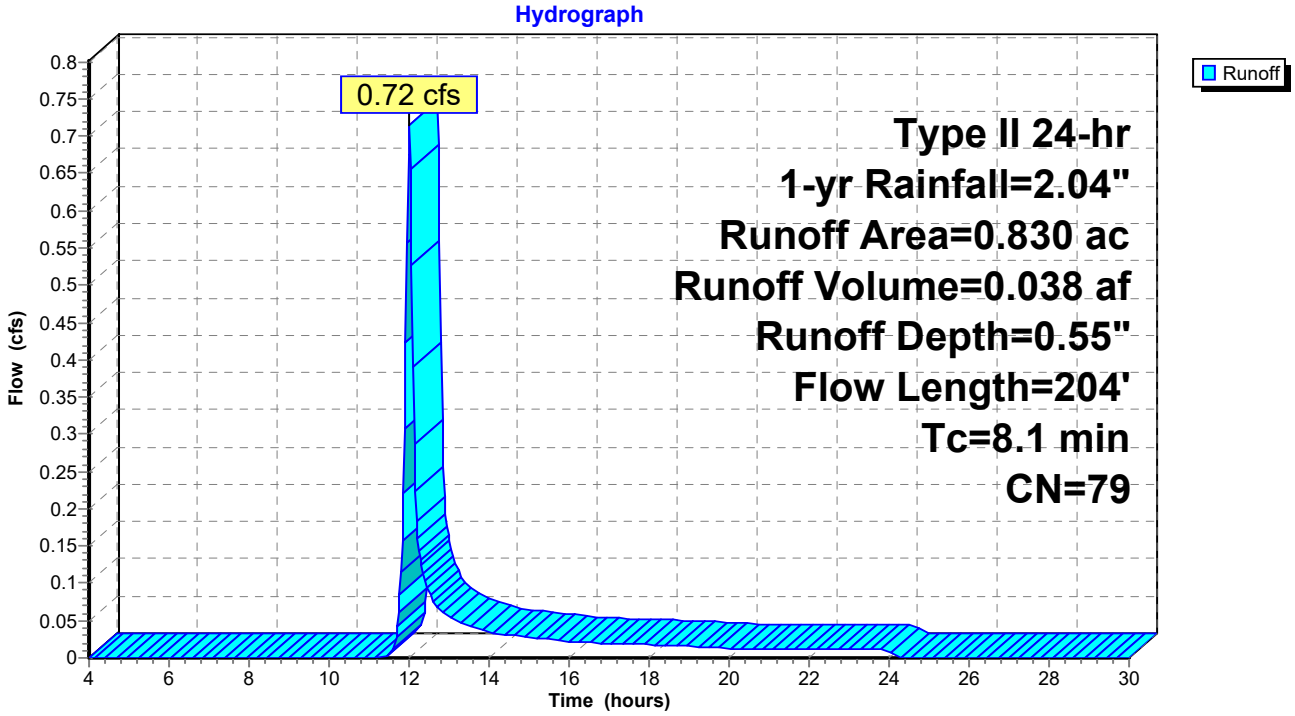
Runoff = 0.72 cfs @ 12.01 hrs, Volume= 0.038 af, Depth= 0.55"
Routed to Reach 2R : Pt of Study 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Description
0.690	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
0.830	79	Weighted Average
0.830		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1500	0.23		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.7	104	0.1300	2.52		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
8.1	204	Total			

Subcatchment 5S: DA#2



Summary for Subcatchment 6S: DA#3A

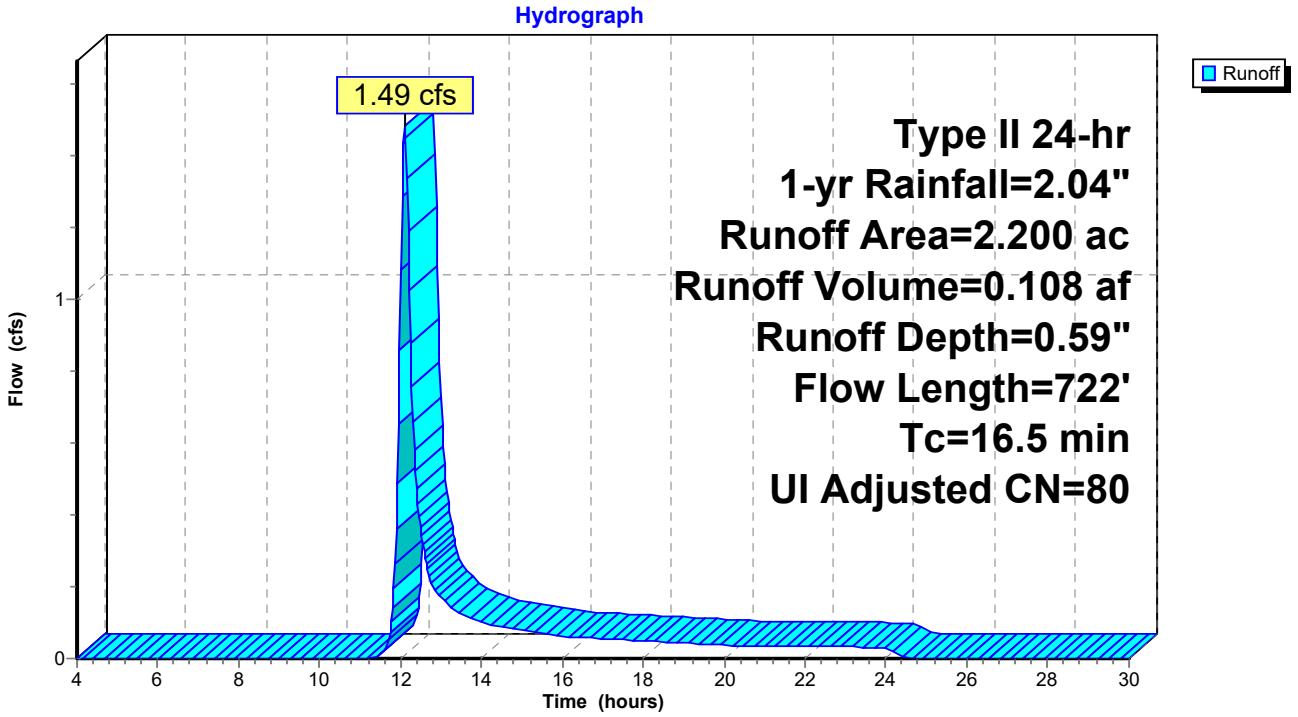
Runoff = 1.49 cfs @ 12.10 hrs, Volume= 0.108 af, Depth= 0.59"
Routed to Reach 5R : Drainage Ditch

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Adj	Description
0.920	80		>75% Grass cover, Good, HSG D
0.180	98		Paved parking, HSG D
0.070	98		Unconnected roofs, HSG D
1.030	77		Woods, Good, HSG D
2.200	81	80	Weighted Average, UI Adjusted
1.950			88.64% Pervious Area
0.250			11.36% Impervious Area
0.070			28.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0450	0.14		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
2.5	188	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.9	202	0.0650	1.78		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	232	0.0220	16.95	50.86	**Channel Flow, curb flow** Area= 3.0 sf Perim= 3.0' r= 1.00' n= 0.013 Asphalt, smooth
16.5	722	Total			

Subcatchment 6S: DA#3A



Summary for Subcatchment 7S: DA#3B

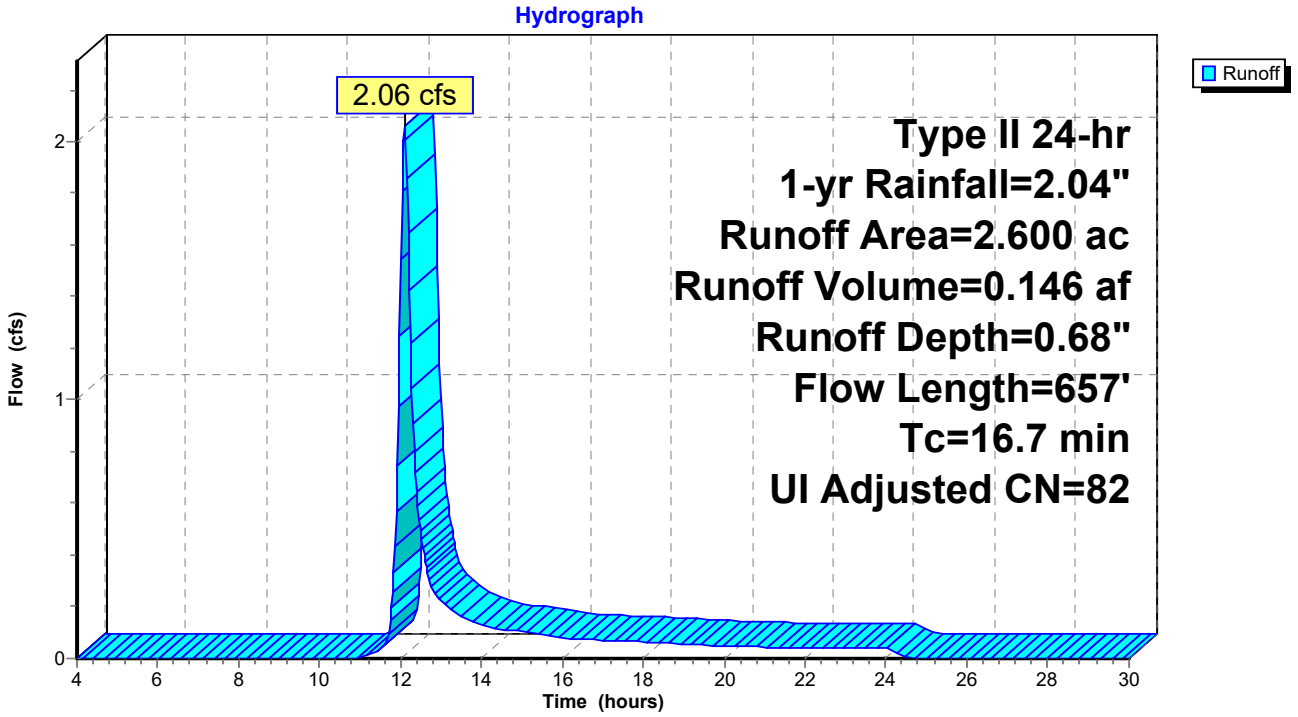
Runoff = 2.06 cfs @ 12.10 hrs, Volume= 0.146 af, Depth= 0.68"
Routed to Reach 3R : Pt of Study 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.04"

Area (ac)	CN	Adj	Description
2.230	80		>75% Grass cover, Good, HSG D
0.230	98		Paved parking, HSG D
0.140	98		Unconnected roofs, HSG D
2.600	83	82	Weighted Average, UI Adjusted
2.230			85.77% Pervious Area
0.370			14.23% Impervious Area
0.140			37.84% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
5.1	475	0.0500	1.57		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0200	6.42	5.04	**Pipe Channel, pipe flow** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
16.7	657	Total			

Subcatchment 7S: DA#3B

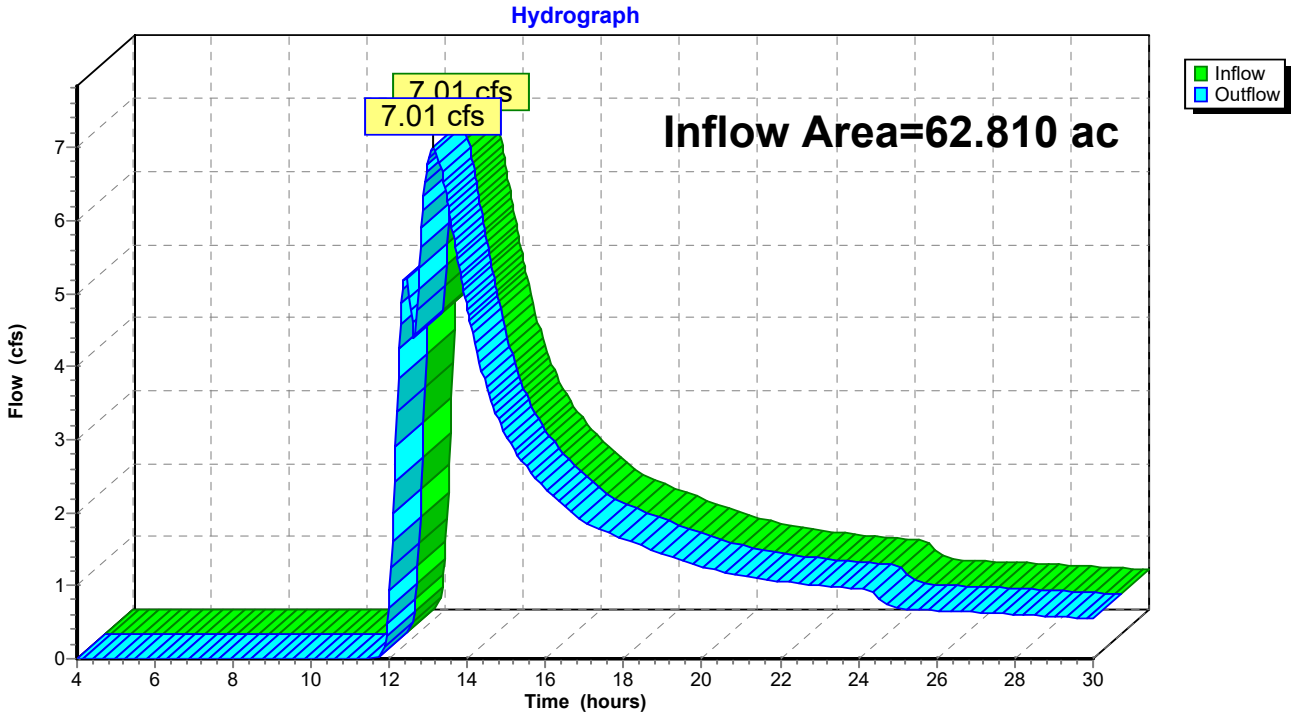


Summary for Reach 1R: Pt of Study 1

Inflow Area = 62.810 ac, 8.28% Impervious, Inflow Depth > 0.51" for 1-yr event
Inflow = 7.01 cfs @ 13.12 hrs, Volume= 2.658 af
Outflow = 7.01 cfs @ 13.12 hrs, Volume= 2.658 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs

Reach 1R: Pt of Study 1

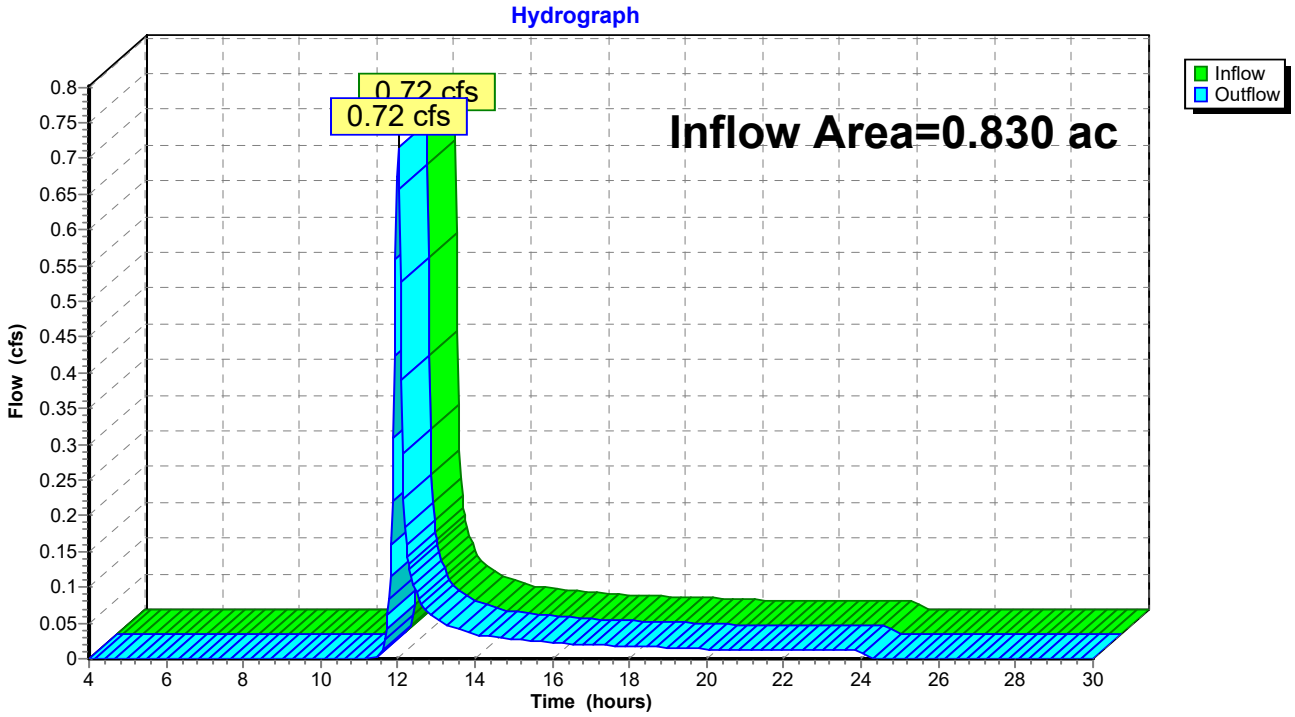


Summary for Reach 2R: Pt of Study 2

Inflow Area = 0.830 ac, 0.00% Impervious, Inflow Depth = 0.55" for 1-yr event
Inflow = 0.72 cfs @ 12.01 hrs, Volume= 0.038 af
Outflow = 0.72 cfs @ 12.01 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs

Reach 2R: Pt of Study 2

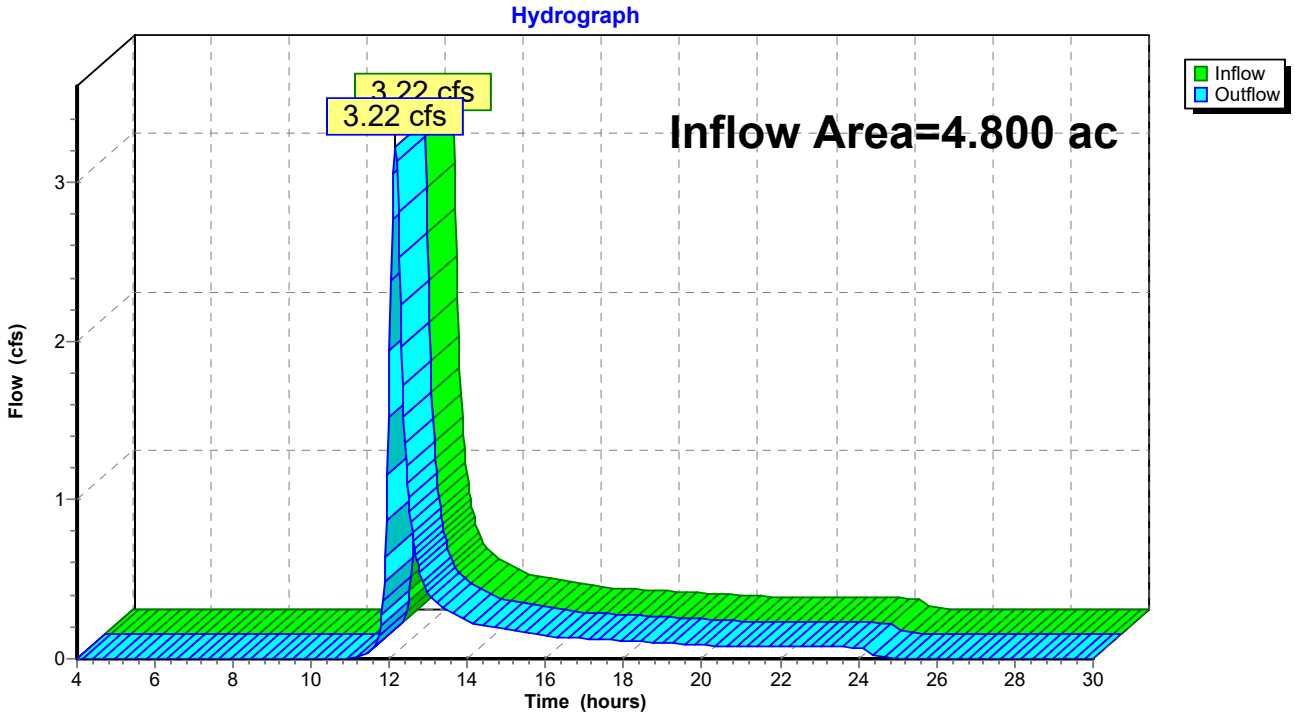


Summary for Reach 3R: Pt of Study 3

Inflow Area = 4.800 ac, 12.92% Impervious, Inflow Depth = 0.63" for 1-yr event
Inflow = 3.22 cfs @ 12.14 hrs, Volume= 0.254 af
Outflow = 3.22 cfs @ 12.14 hrs, Volume= 0.254 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs

Reach 3R: Pt of Study 3



Summary for Reach 5R: Drainage Ditch

Inflow Area = 2.200 ac, 11.36% Impervious, Inflow Depth = 0.59" for 1-yr event
Inflow = 1.49 cfs @ 12.10 hrs, Volume= 0.108 af
Outflow = 1.42 cfs @ 12.20 hrs, Volume= 0.108 af, Atten= 5%, Lag= 5.8 min
Routed to Reach 3R : Pt of Study 3

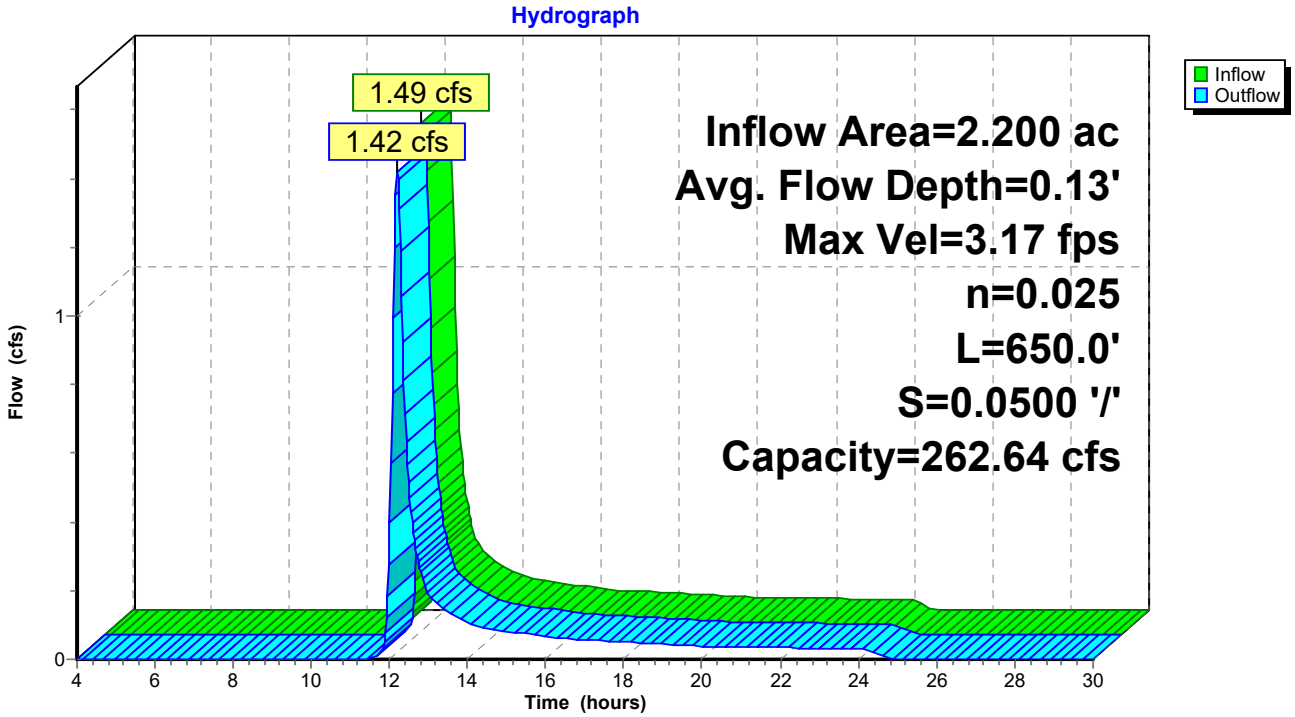
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Max. Velocity= 3.17 fps, Min. Travel Time= 3.4 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 9.7 min

Peak Storage= 290 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 3.79'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 262.64 cfs

3.00' x 2.00' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 15.00'
Length= 650.0' Slope= 0.0500 '/'
Inlet Invert= 0.00', Outlet Invert= -32.50'

‡

Reach 5R: Drainage Ditch



Summary for Pond 1P: Bioretention 1

Inflow Area = 35.820 ac, 11.14% Impervious, Inflow Depth = 0.63" for 1-yr event
Inflow = 14.62 cfs @ 12.40 hrs, Volume= 1.881 af
Outflow = 13.89 cfs @ 12.50 hrs, Volume= 1.725 af, Atten= 5%, Lag= 5.8 min
Primary = 13.89 cfs @ 12.50 hrs, Volume= 1.725 af
Routed to Pond 3P : Detention Basin

Routing by Stor-Ind method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Peak Elev= 872.80' @ 12.50 hrs Surf.Area= 15,752 sf Storage= 11,294 cf

Plug-Flow detention time= 68.4 min calculated for 1.725 af (92% of inflow)
Center-of-Mass det. time= 24.9 min (918.4 - 893.5)

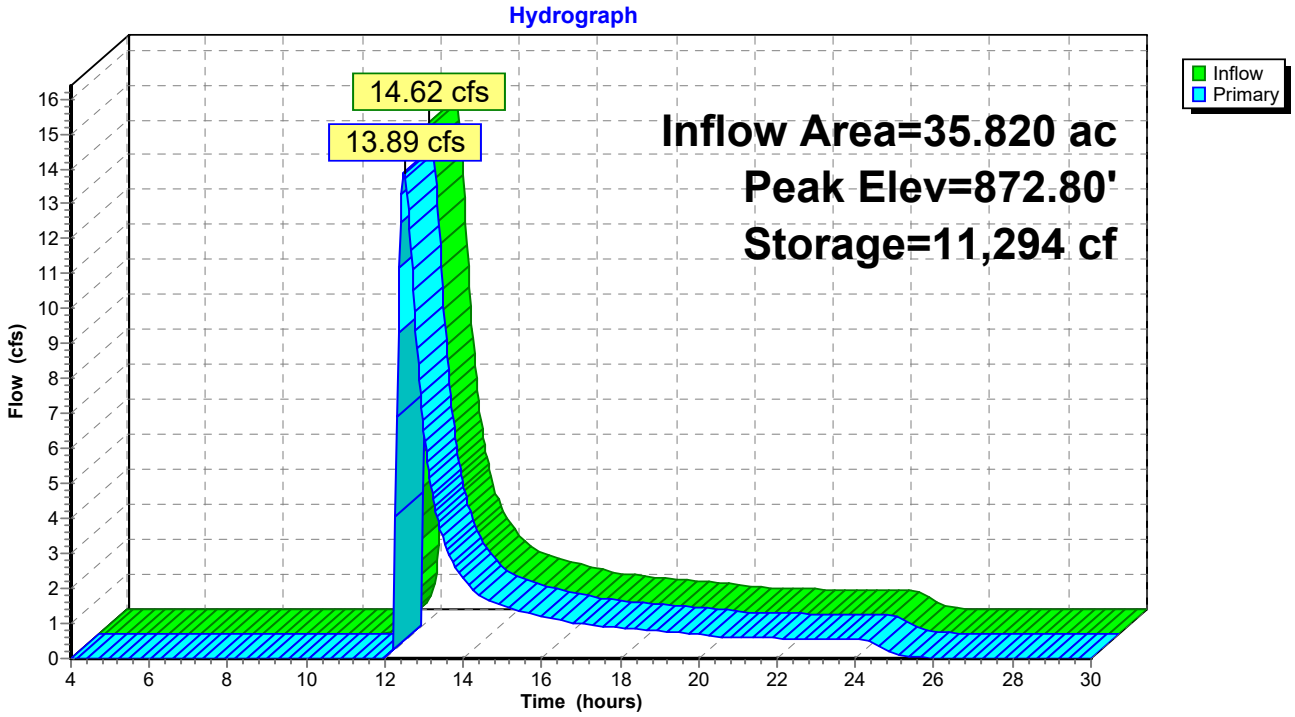
Volume	Invert	Avail.Storage	Storage Description
#1	872.00'	14,540 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
872.00	12,800	0	0
872.50	14,330	6,783	6,783
873.00	16,700	7,758	14,540

Device	Routing	Invert	Outlet Devices
#1	Primary	872.50'	**15.0' long + 3.0 '/' SideZ x 15.0' breadth Broad-Crested Rectangular Weir X 2**
			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=13.87 cfs @ 12.50 hrs HW=872.80' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 13.87 cfs @ 1.46 fps)

Pond 1P: Bioretention 1



Summary for Pond 2P: Bioretention 2

Inflow Area = 10.910 ac, 9.62% Impervious, Inflow Depth = 0.63" for 1-yr event
Inflow = 6.93 cfs @ 12.16 hrs, Volume= 0.573 af
Outflow = 5.70 cfs @ 12.26 hrs, Volume= 0.487 af, Atten= 18%, Lag= 6.3 min
Primary = 5.70 cfs @ 12.26 hrs, Volume= 0.487 af
Routed to Pond 3P : Detention Basin

Routing by Stor-Ind method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Peak Elev= 882.67' @ 12.26 hrs Surf.Area= 9,262 sf Storage= 5,249 cf

Plug-Flow detention time= 107.4 min calculated for 0.487 af (85% of inflow)
Center-of-Mass det. time= 36.4 min (912.1 - 875.7)

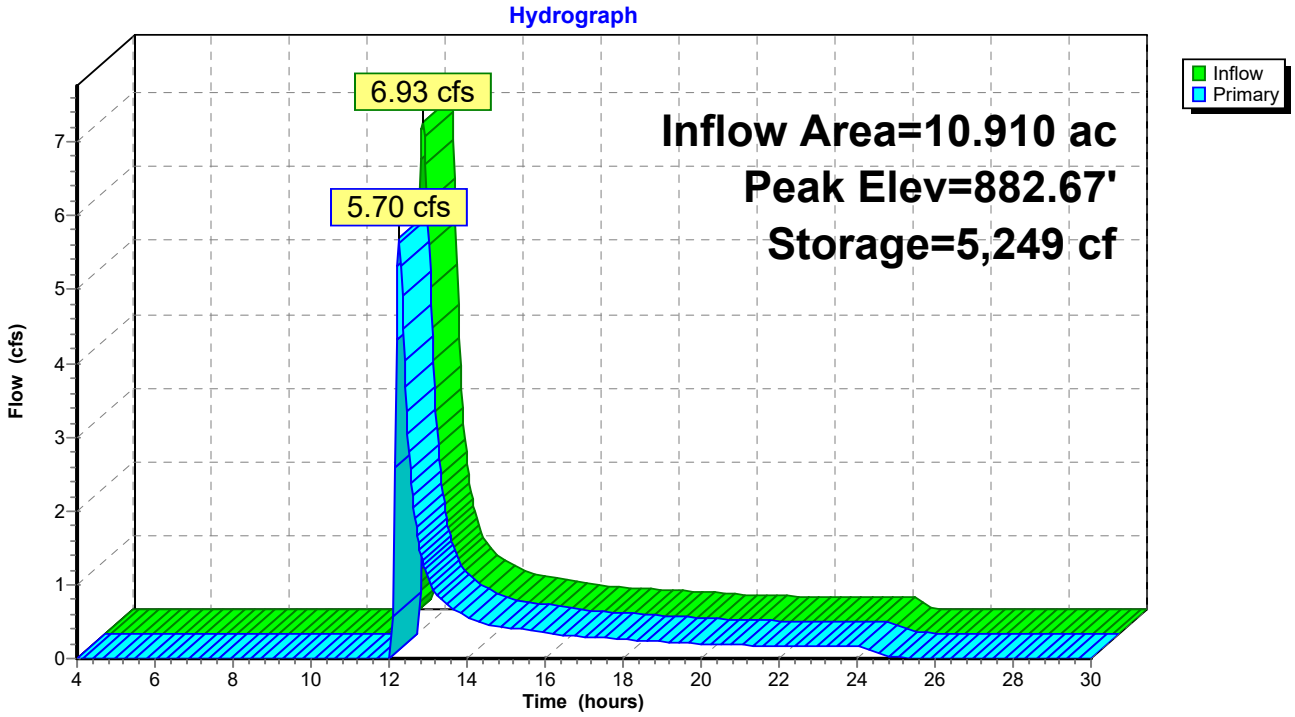
Volume	Invert	Avail.Storage	Storage Description
#1	882.00'	8,493 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	6,200	0	0
882.50	8,735	3,734	3,734
883.00	10,300	4,759	8,493

Device	Routing	Invert	Outlet Devices
#1	Primary	882.50'	**15.0' long + 3.0 '/' SideZ x 15.0' breadth Broad-Crested Rectangular Weir X 2**
			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=5.65 cfs @ 12.26 hrs HW=882.67' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 5.65 cfs @ 1.09 fps)

Pond 2P: Bioretention 2



Summary for Pond 3P: Detention Basin

Inflow Area = 47.810 ac, 10.54% Impervious, Inflow Depth = 0.57" for 1-yr event
Inflow = 17.18 cfs @ 12.46 hrs, Volume= 2.265 af
Outflow = 5.56 cfs @ 13.23 hrs, Volume= 2.025 af, Atten= 68%, Lag= 46.0 min
Primary = 5.56 cfs @ 13.23 hrs, Volume= 2.025 af
Routed to Reach 1R : Pt of Study 1
Secondary = 0.00 cfs @ 4.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Peak Elev= 865.31' @ 13.23 hrs Surf.Area= 17,251 sf Storage= 33,243 cf

Plug-Flow detention time= 216.7 min calculated for 2.025 af (89% of inflow)
Center-of-Mass det. time= 162.9 min (1,078.8 - 915.8)

Volume	Invert	Avail.Storage	Storage Description
#1	861.80'	235,158 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

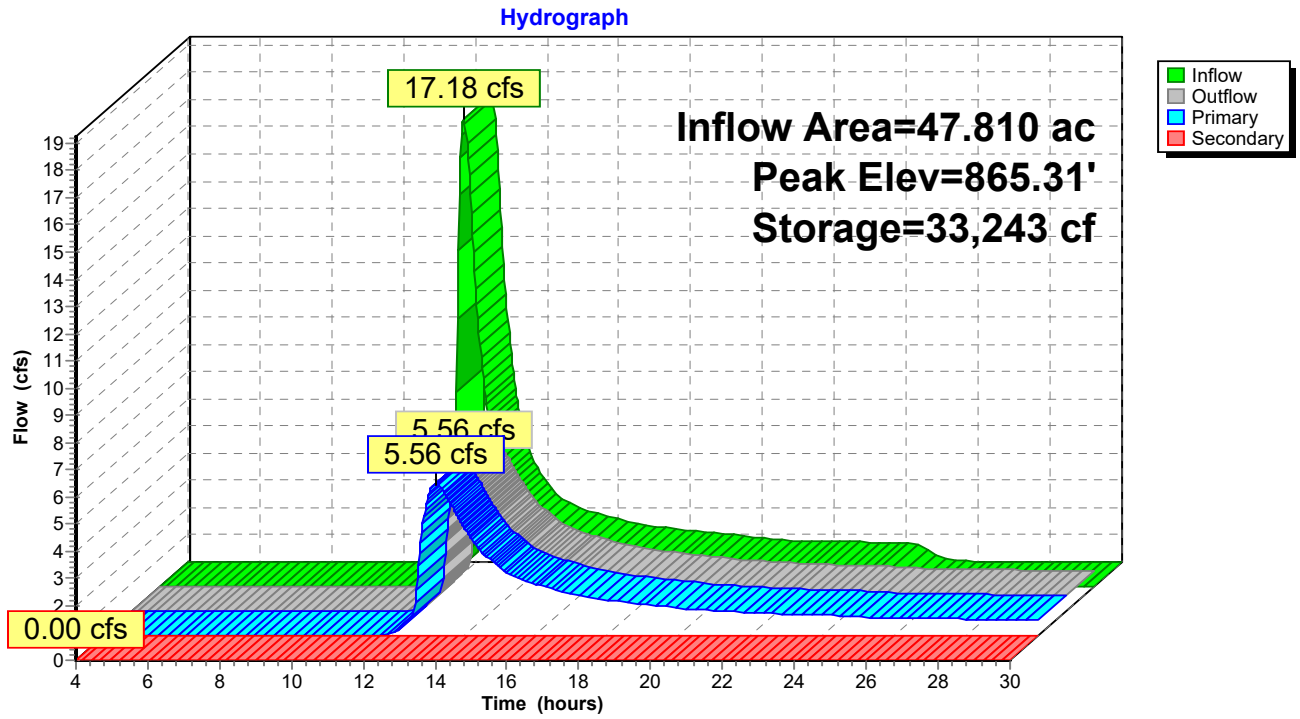
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
861.80	1,260	0	0
862.00	2,891	415	415
863.00	6,366	4,629	5,044
864.00	11,515	8,941	13,984
865.00	16,570	14,043	28,027
866.00	18,777	17,674	45,700
867.00	21,040	19,909	65,609
868.00	23,360	22,200	87,809
869.00	25,736	24,548	112,357
870.00	28,169	26,953	139,309
871.00	30,658	29,414	168,723
872.00	33,204	31,931	200,654
873.00	35,805	34,505	235,158

Device	Routing	Invert	Outlet Devices
#1	Secondary	872.00'	**30.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Primary	861.80'	**30.0" Round Culvert** L= 98.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 861.80' / 857.00' S= 0.0490 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#3	Device 2	861.80'	**4.0" Vert. Orifice1** C= 0.600 Limited to weir flow at low heads
#4	Device 2	864.60'	**30.0" W x 30.0" H Vert. Orifice2** C= 0.600 Limited to weir flow at low heads
#5	Device 2	869.00'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.55 cfs @ 13.23 hrs HW=865.31' (Free Discharge)
└─**2=Culvert** (Passes 5.55 cfs of 28.04 cfs potential flow)
  ├─**3=Orifice1** (Orifice Controls 0.77 cfs @ 8.80 fps)
  ├─**4=Orifice2** (Orifice Controls 4.78 cfs @ 2.70 fps)
  └─**5=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 4.00 hrs HW=861.80' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention Basin



Summary for Subcatchment 1S: DA-1A

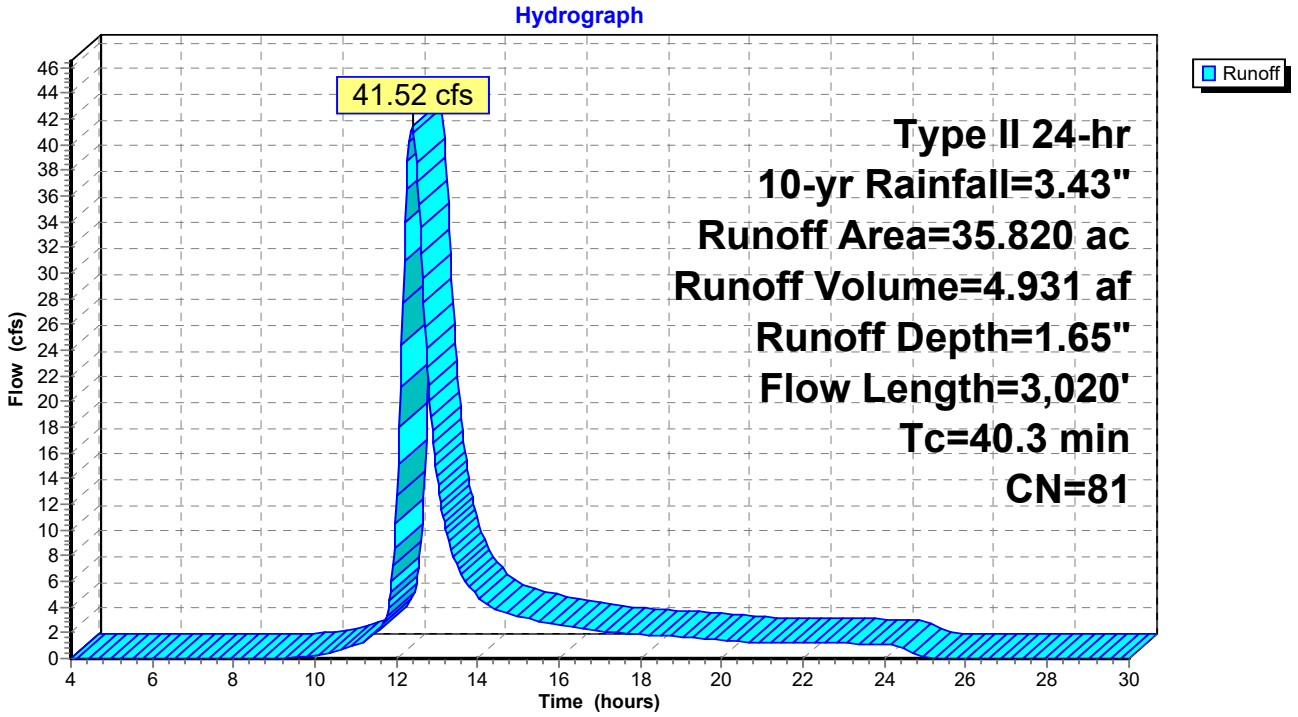
Runoff = 41.52 cfs @ 12.38 hrs, Volume= 4.931 af, Depth= 1.65"
Routed to Pond 1P : Bioretention 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
2.050	98	Paved parking, HSG D
1.940	98	Unconnected roofs, HSG D
22.870	80	>75% Grass cover, Good, HSG D
8.960	77	Woods, Good, HSG D
35.820	81	Weighted Average
31.830		88.86% Pervious Area
3.990		11.14% Impervious Area
1.940		48.62% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	100	0.0600	0.06		**Sheet Flow, SHEET FLOW** Woods: Dense underbrush n= 0.800 P2= 2.39"
4.8	370	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.9	200	0.0650	1.78		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	295	0.0300	19.80	79.19	**Channel Flow, curb and gutter flow** Area= 4.0 sf Perim= 4.0' r= 1.00' n= 0.013 Asphalt, smooth
1.7	1,100	0.0345	11.04	19.51	**Pipe Channel, Pipe Flow** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
3.8	955	0.0050	4.20	50.44	**Channel Flow,** Area= 12.0 sf Perim= 12.0' r= 1.00' n= 0.025 Earth, grassed & winding
40.3	3,020	Total			

Subcatchment 1S: DA-1A



Summary for Subcatchment 2S: DA-1B

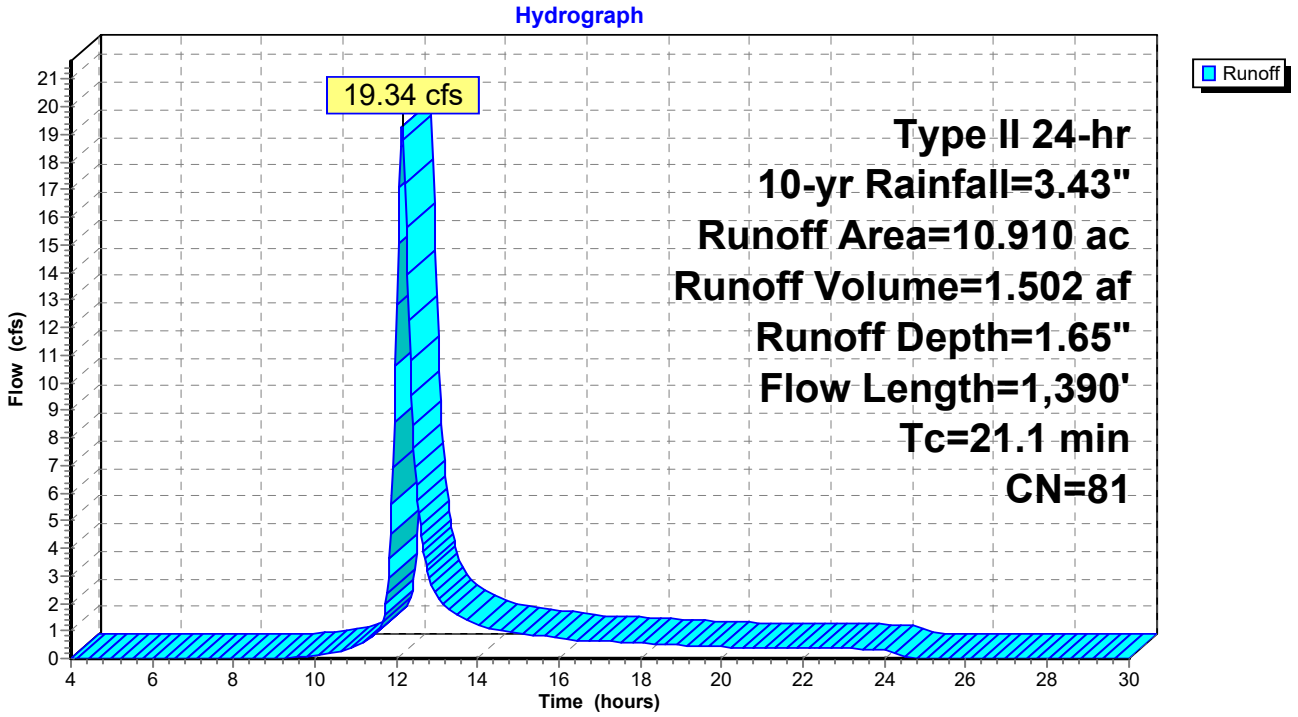
Runoff = 19.34 cfs @ 12.14 hrs, Volume= 1.502 af, Depth= 1.65"
Routed to Pond 2P : Bioretention 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.710	98	Paved parking, HSG D
0.340	98	Unconnected roofs, HSG D
7.820	80	>75% Grass cover, Good, HSG D
2.040	77	Woods, Good, HSG D
10.910	81	Weighted Average
9.860		90.38% Pervious Area
1.050		9.62% Impervious Area
0.340		32.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
4.6	410	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
5.6	710	0.0920	2.12		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.3	170	0.0200	9.55	76.42	**Channel Flow, swale flow** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
21.1	1,390	Total			

Subcatchment 2S: DA-1B



Summary for Subcatchment 3S: DA-1C

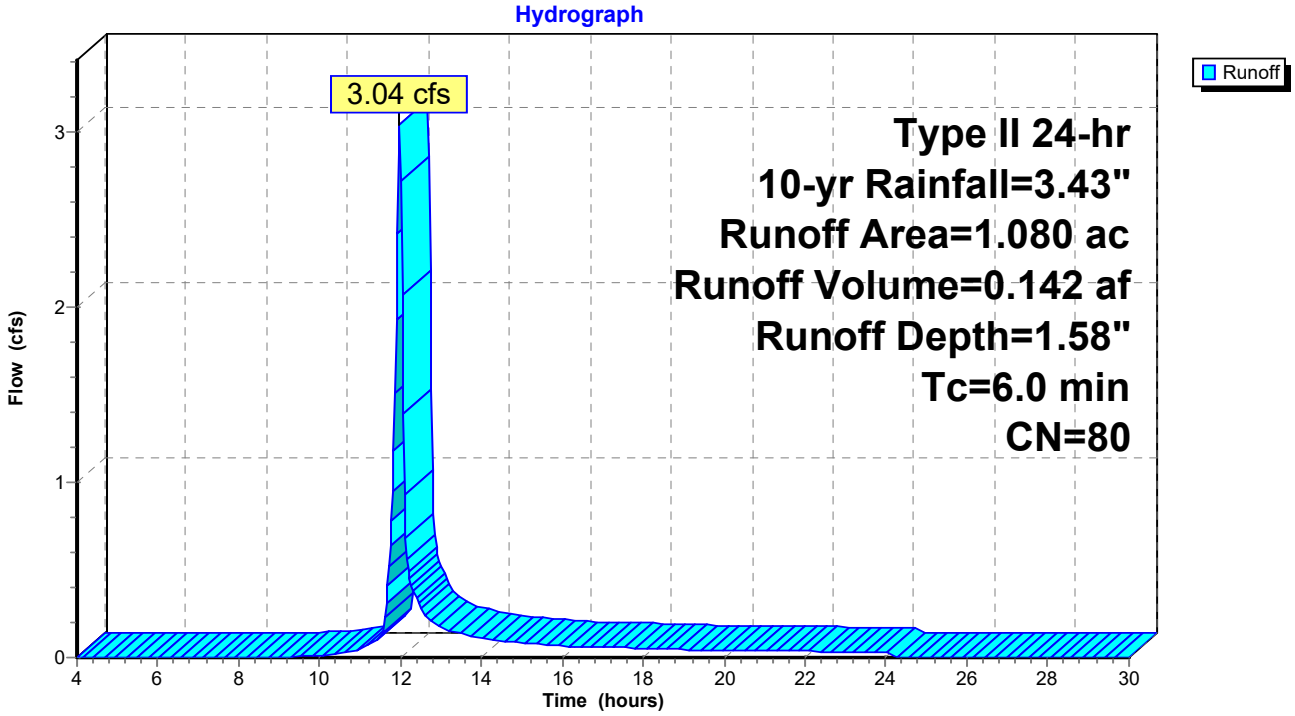
Runoff = 3.04 cfs @ 11.97 hrs, Volume= 0.142 af, Depth= 1.58"
Routed to Pond 3P : Detention Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.960	80	>75% Grass cover, Good, HSG D
0.120	77	Woods, Good, HSG D
1.080	80	Weighted Average
1.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min TR 55 Value**

Subcatchment 3S: DA-1C



Summary for Subcatchment 4S: DA-1D

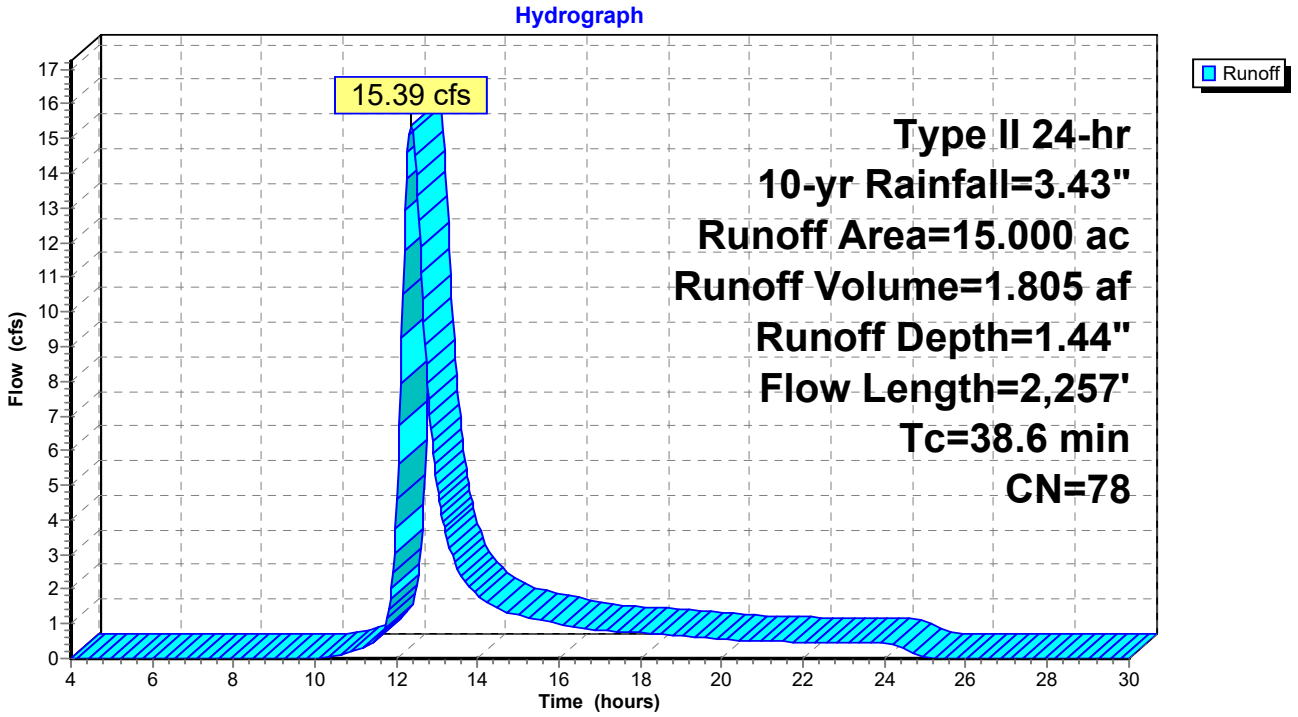
Runoff = 15.39 cfs @ 12.37 hrs, Volume= 1.805 af, Depth= 1.44"
Routed to Reach 1R : Pt of Study 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
5.930	80	>75% Grass cover, Good, HSG D
8.910	77	Woods, Good, HSG D
0.160	98	Paved parking, HSG D
15.000	78	Weighted Average
14.840		98.93% Pervious Area
0.160		1.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	100	0.0600	0.06		**Sheet Flow, SHEET FLOW** Woods: Dense underbrush n= 0.800 P2= 2.39"
5.4	485	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
4.1	517	0.0900	2.10		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
1.2	1,155	0.0750	16.28	260.45	**Channel Flow, SWALE** Area= 16.0 sf Perim= 16.0' r= 1.00' n= 0.025 Earth, clean & winding
38.6	2,257	Total			

Subcatchment 4S: DA-1D



Summary for Subcatchment 5S: DA#2

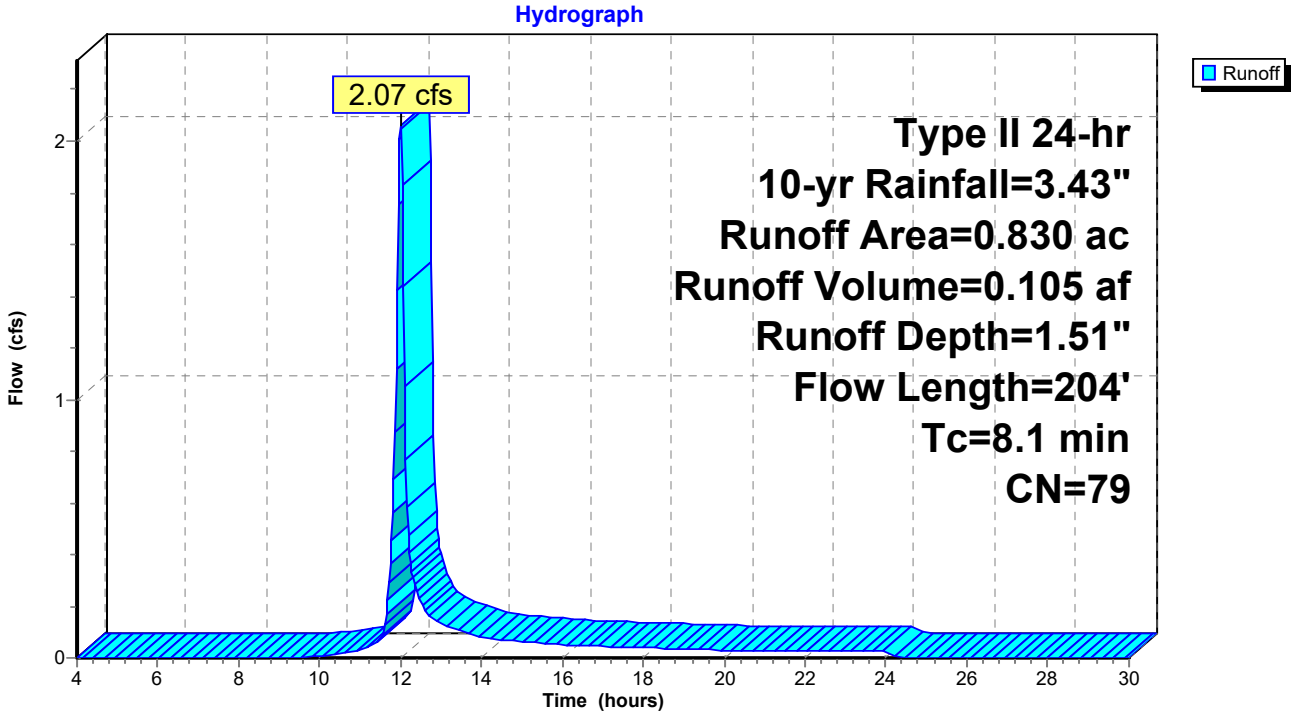
Runoff = 2.07 cfs @ 12.00 hrs, Volume= 0.105 af, Depth= 1.51"
Routed to Reach 2R : Pt of Study 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Description
0.690	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
0.830	79	Weighted Average
0.830		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1500	0.23		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.7	104	0.1300	2.52		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
8.1	204	Total			

Subcatchment 5S: DA#2



Summary for Subcatchment 6S: DA#3A

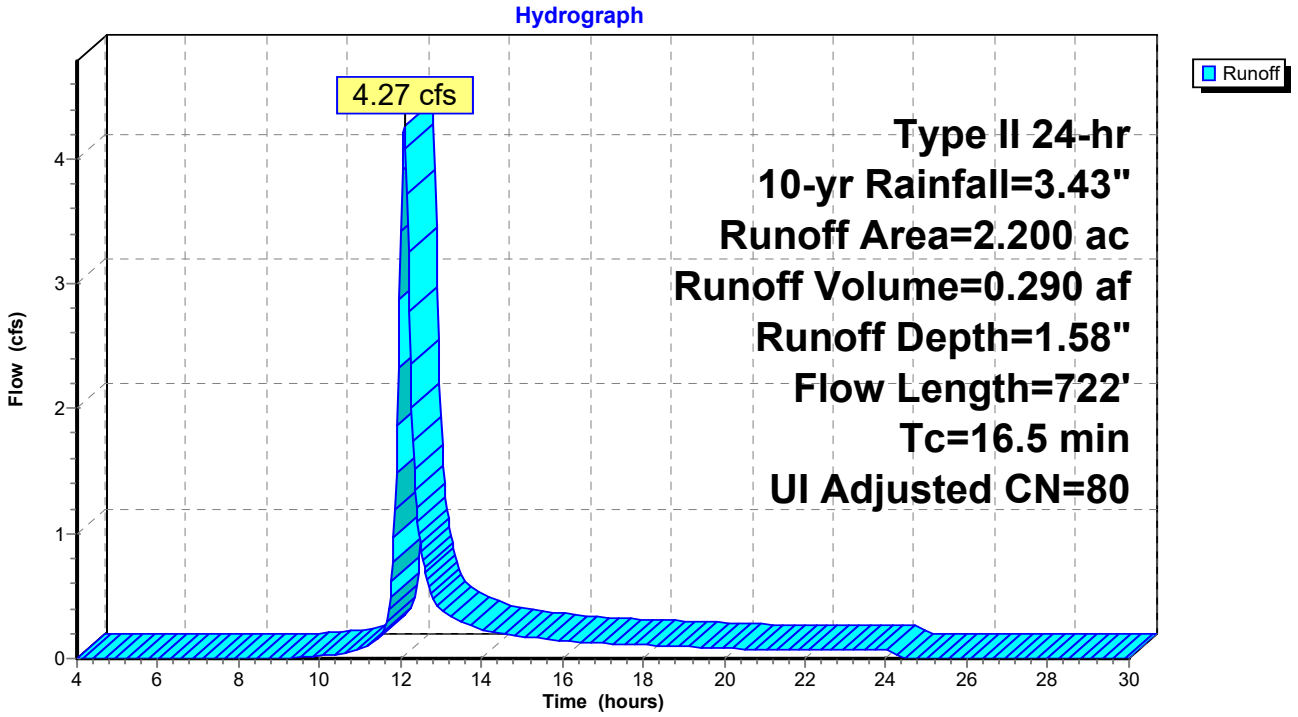
Runoff = 4.27 cfs @ 12.09 hrs, Volume= 0.290 af, Depth= 1.58"
Routed to Reach 5R : Drainage Ditch

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Adj	Description
0.920	80		>75% Grass cover, Good, HSG D
0.180	98		Paved parking, HSG D
0.070	98		Unconnected roofs, HSG D
1.030	77		Woods, Good, HSG D
2.200	81	80	Weighted Average, UI Adjusted
1.950			88.64% Pervious Area
0.250			11.36% Impervious Area
0.070			28.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0450	0.14		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
2.5	188	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.9	202	0.0650	1.78		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	232	0.0220	16.95	50.86	**Channel Flow, curb flow** Area= 3.0 sf Perim= 3.0' r= 1.00' n= 0.013 Asphalt, smooth
16.5	722	Total			

Subcatchment 6S: DA#3A



Summary for Subcatchment 7S: DA#3B

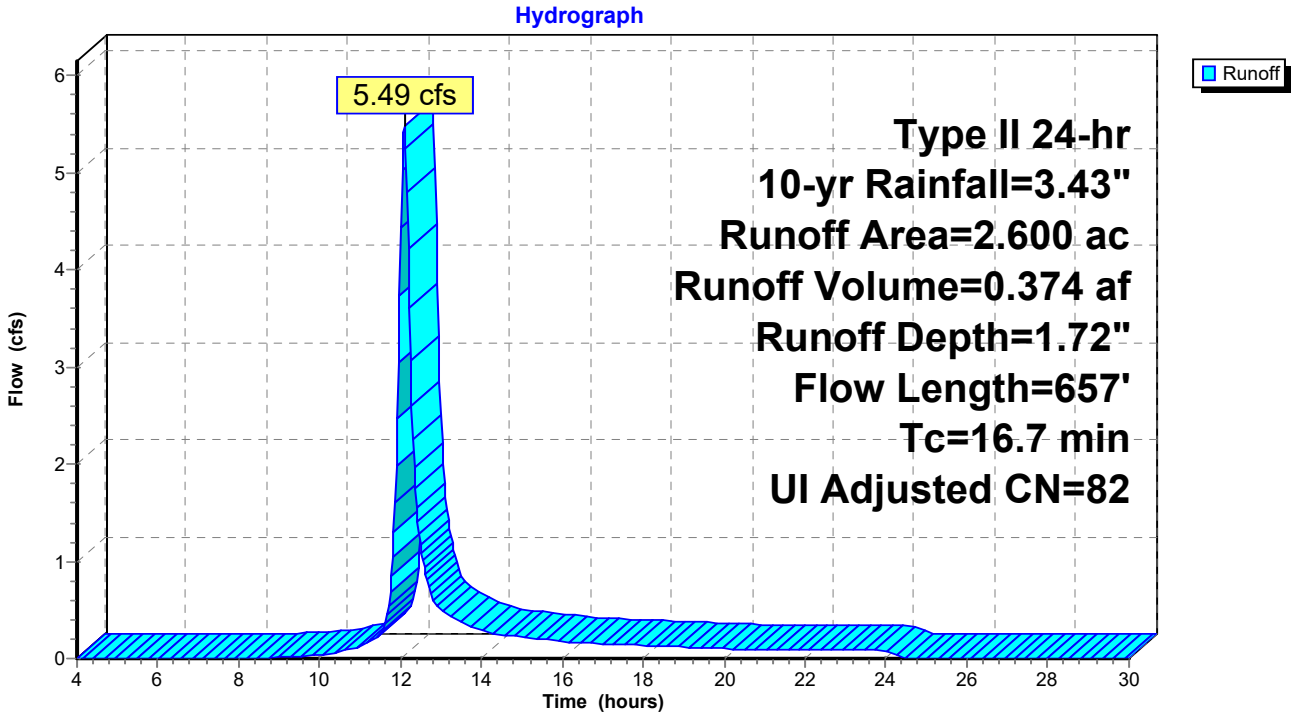
Runoff = 5.49 cfs @ 12.09 hrs, Volume= 0.374 af, Depth= 1.72"
Routed to Reach 3R : Pt of Study 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=3.43"

Area (ac)	CN	Adj	Description
2.230	80		>75% Grass cover, Good, HSG D
0.230	98		Paved parking, HSG D
0.140	98		Unconnected roofs, HSG D
2.600	83	82	Weighted Average, UI Adjusted
2.230			85.77% Pervious Area
0.370			14.23% Impervious Area
0.140			37.84% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
5.1	475	0.0500	1.57		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0200	6.42	5.04	**Pipe Channel, pipe flow** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
16.7	657	Total			

Subcatchment 7S: DA#3B

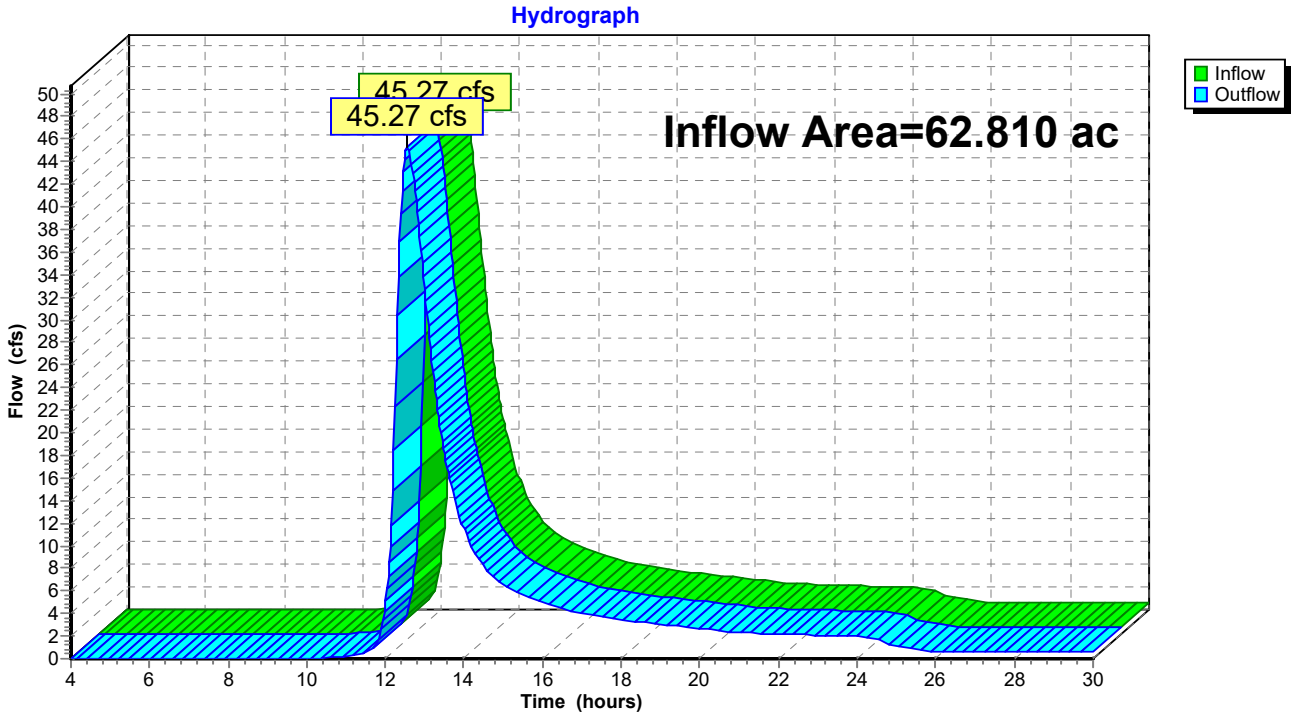


Summary for Reach 1R: Pt of Study 1

Inflow Area = 62.810 ac, 8.28% Impervious, Inflow Depth > 1.50" for 10-yr event
Inflow = 45.27 cfs @ 12.56 hrs, Volume= 7.862 af
Outflow = 45.27 cfs @ 12.56 hrs, Volume= 7.862 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs

Reach 1R: Pt of Study 1

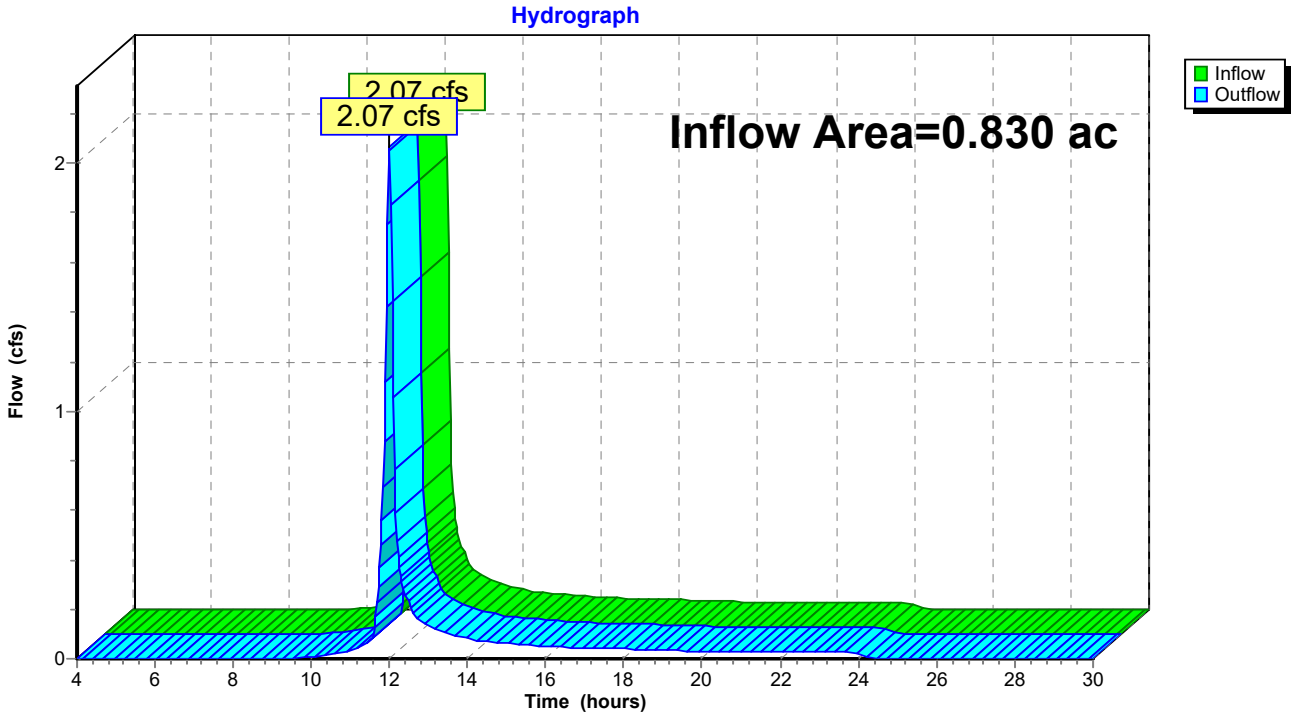


Summary for Reach 2R: Pt of Study 2

Inflow Area = 0.830 ac, 0.00% Impervious, Inflow Depth = 1.51" for 10-yr event
Inflow = 2.07 cfs @ 12.00 hrs, Volume= 0.105 af
Outflow = 2.07 cfs @ 12.00 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs

Reach 2R: Pt of Study 2

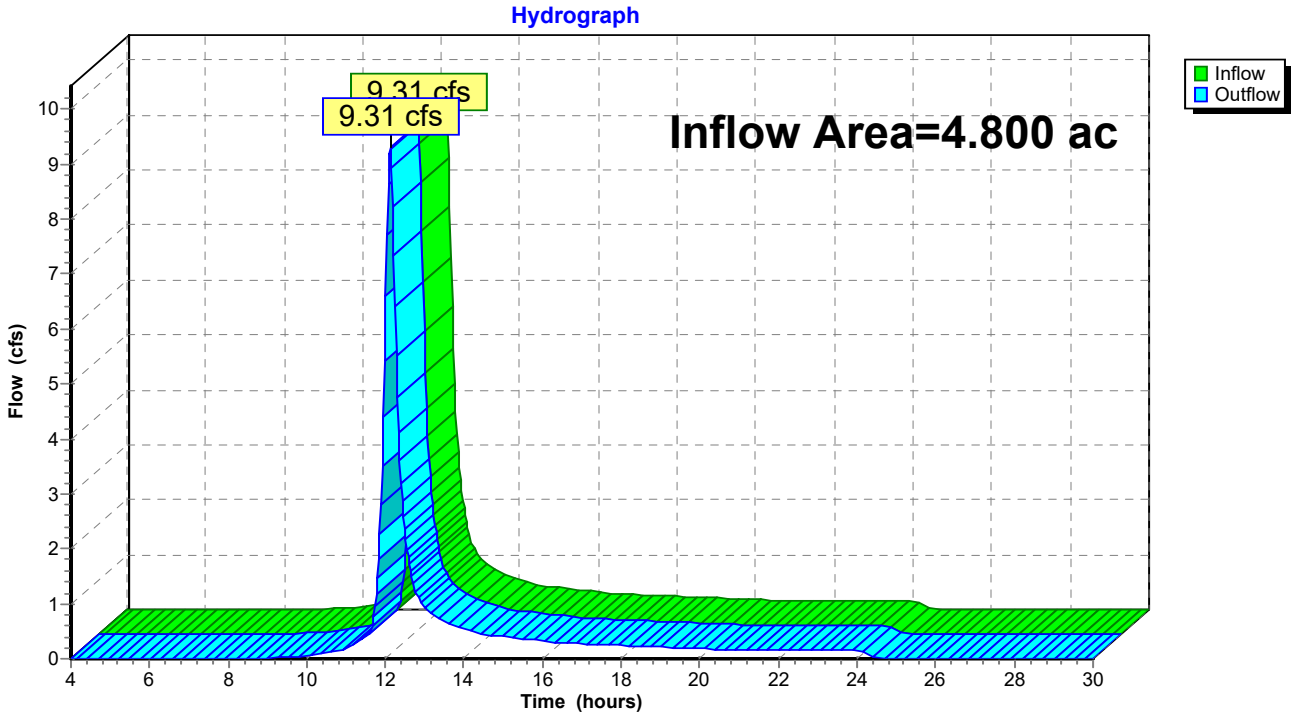


Summary for Reach 3R: Pt of Study 3

Inflow Area = 4.800 ac, 12.92% Impervious, Inflow Depth = 1.66" for 10-yr event
Inflow = 9.31 cfs @ 12.12 hrs, Volume= 0.664 af
Outflow = 9.31 cfs @ 12.12 hrs, Volume= 0.664 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs

Reach 3R: Pt of Study 3



Summary for Reach 5R: Drainage Ditch

Inflow Area = 2.200 ac, 11.36% Impervious, Inflow Depth = 1.58" for 10-yr event
Inflow = 4.27 cfs @ 12.09 hrs, Volume= 0.290 af
Outflow = 4.15 cfs @ 12.16 hrs, Volume= 0.290 af, Atten= 3%, Lag= 4.1 min
Routed to Reach 3R : Pt of Study 3

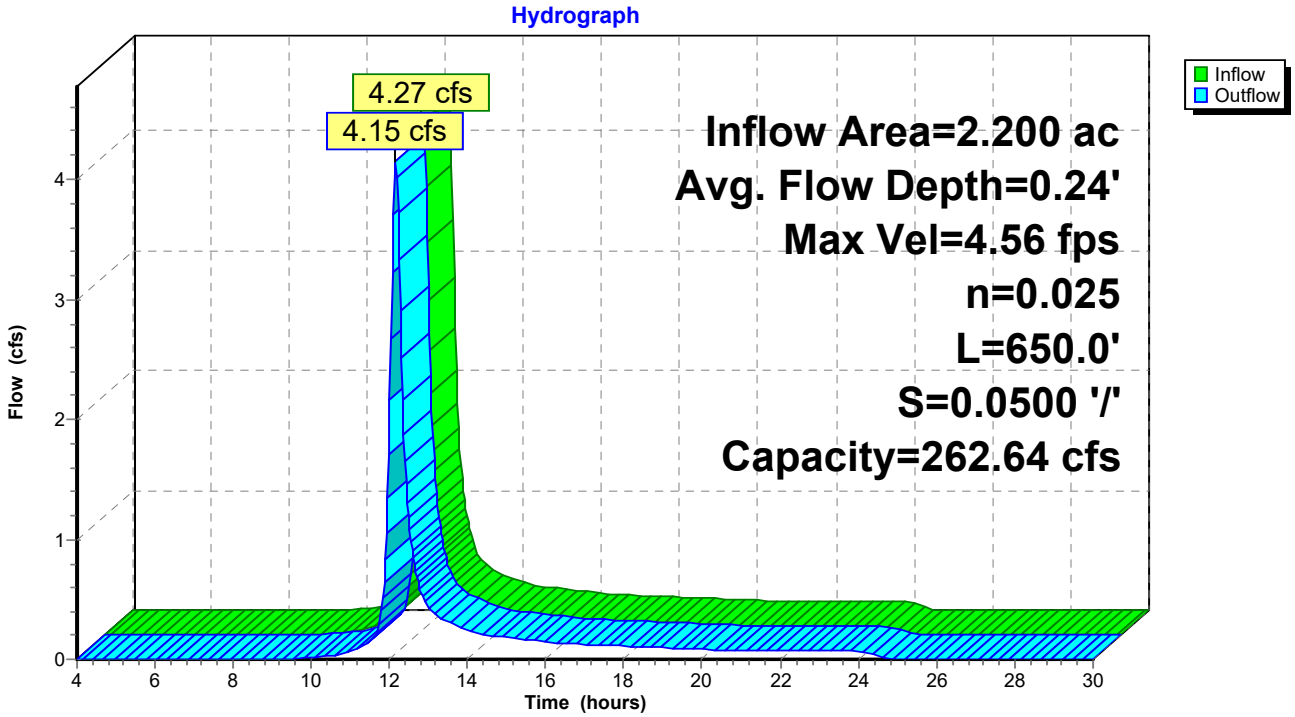
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Max. Velocity= 4.56 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.36 fps, Avg. Travel Time= 8.0 min

Peak Storage= 594 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.24' , Surface Width= 4.47'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 262.64 cfs

3.00' x 2.00' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 15.00'
Length= 650.0' Slope= 0.0500 '/'
Inlet Invert= 0.00', Outlet Invert= -32.50'

‡

Reach 5R: Drainage Ditch



Summary for Pond 1P: Bioretention 1

Inflow Area = 35.820 ac, 11.14% Impervious, Inflow Depth = 1.65" for 10-yr event
Inflow = 41.52 cfs @ 12.38 hrs, Volume= 4.931 af
Outflow = 43.71 cfs @ 12.40 hrs, Volume= 4.776 af, Atten= 0%, Lag= 0.9 min
Primary = 43.71 cfs @ 12.40 hrs, Volume= 4.776 af
Routed to Pond 3P : Detention Basin

Routing by Stor-Ind method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Peak Elev= 873.12' @ 12.40 hrs Surf.Area= 16,700 sf Storage= 14,540 cf

Plug-Flow detention time= 31.3 min calculated for 4.770 af (97% of inflow)
Center-of-Mass det. time= 13.2 min (877.8 - 864.7)

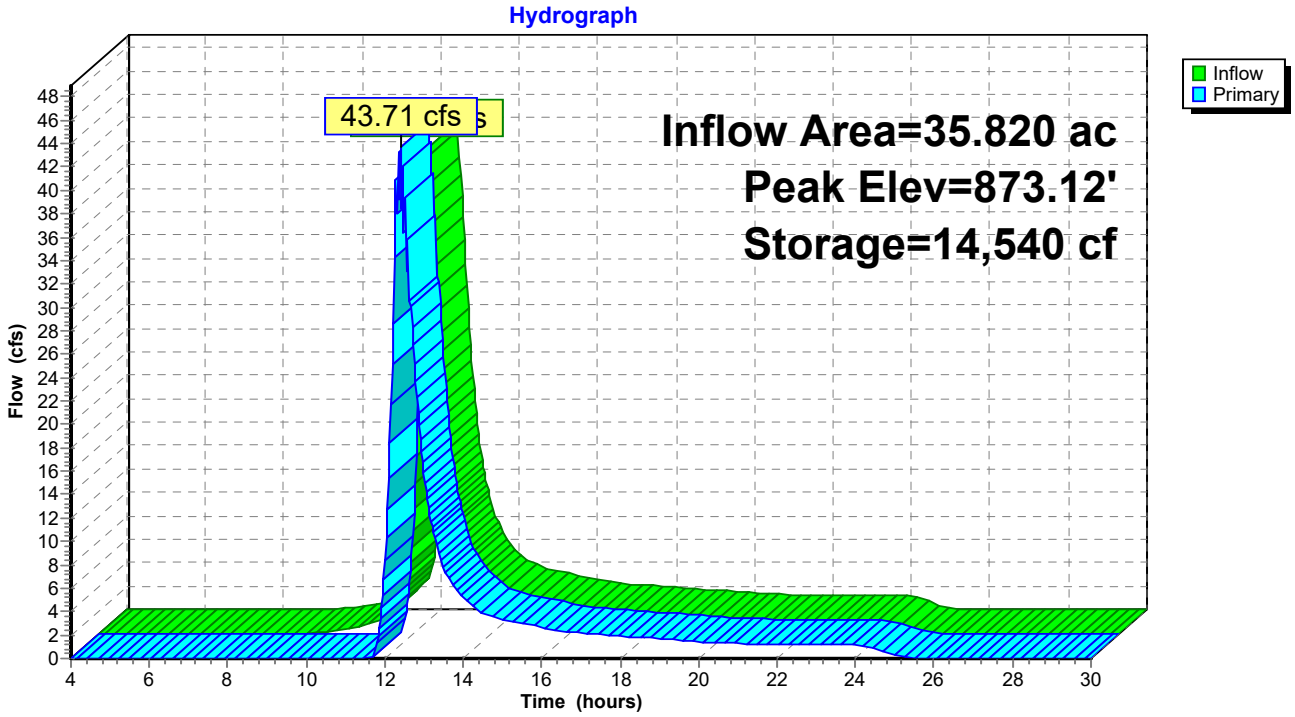
Volume	Invert	Avail.Storage	Storage Description
#1	872.00'	14,540 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
872.00	12,800	0	0
872.50	14,330	6,783	6,783
873.00	16,700	7,758	14,540

Device	Routing	Invert	Outlet Devices
#1	Primary	872.50'	**15.0' long + 3.0 '/' SideZ x 15.0' breadth Broad-Crested Rectangular Weir X 2** 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=43.54 cfs @ 12.40 hrs HW=873.12' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 43.54 cfs @ 2.08 fps)

Pond 1P: Bioretention 1



Summary for Pond 2P: Bioretention 2

Inflow Area = 10.910 ac, 9.62% Impervious, Inflow Depth = 1.65" for 10-yr event
Inflow = 19.34 cfs @ 12.14 hrs, Volume= 1.502 af
Outflow = 18.83 cfs @ 12.18 hrs, Volume= 1.416 af, Atten= 3%, Lag= 2.1 min
Primary = 18.83 cfs @ 12.18 hrs, Volume= 1.416 af
Routed to Pond 3P : Detention Basin

Routing by Stor-Ind method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Peak Elev= 882.86' @ 12.18 hrs Surf.Area= 9,875 sf Storage= 7,124 cf

Plug-Flow detention time= 48.3 min calculated for 1.416 af (94% of inflow)
Center-of-Mass det. time= 16.5 min (863.4 - 846.9)

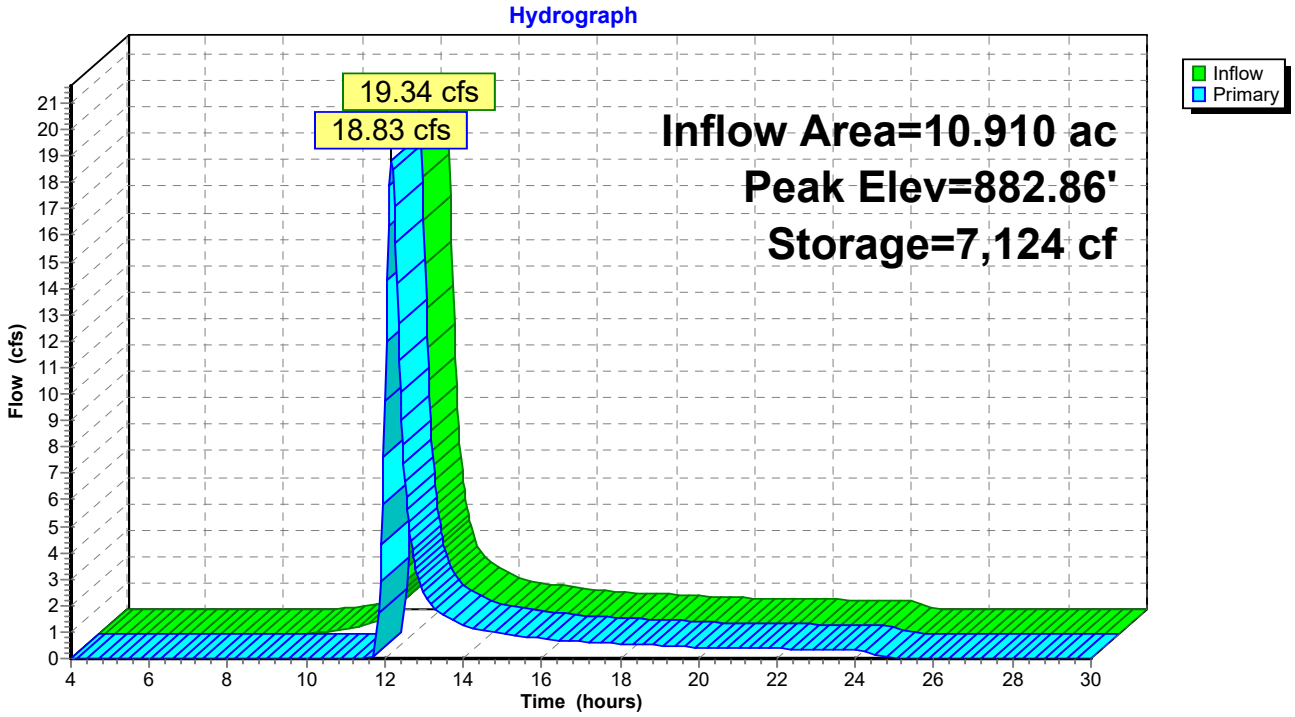
Volume	Invert	Avail.Storage	Storage Description
#1	882.00'	8,493 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	6,200	0	0
882.50	8,735	3,734	3,734
883.00	10,300	4,759	8,493

Device	Routing	Invert	Outlet Devices
#1	Primary	882.50'	**15.0' long + 3.0 '/' SideZ x 15.0' breadth Broad-Crested Rectangular Weir X 2**
			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=18.75 cfs @ 12.18 hrs HW=882.86' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 18.75 cfs @ 1.60 fps)

Pond 2P: Bioretention 2



Summary for Pond 3P: Detention Basin

Inflow Area = 47.810 ac, 10.54% Impervious, Inflow Depth = 1.59" for 10-yr event
Inflow = 57.03 cfs @ 12.28 hrs, Volume= 6.334 af
Outflow = 34.02 cfs @ 12.67 hrs, Volume= 6.056 af, Atten= 40%, Lag= 23.6 min
Primary = 34.02 cfs @ 12.67 hrs, Volume= 6.056 af
Routed to Reach 1R : Pt of Study 1
Secondary = 0.00 cfs @ 4.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Peak Elev= 867.18' @ 12.67 hrs Surf.Area= 21,457 sf Storage= 69,424 cf

Plug-Flow detention time= 95.6 min calculated for 6.056 af (96% of inflow)
Center-of-Mass det. time= 70.6 min (944.3 - 873.7)

Volume	Invert	Avail.Storage	Storage Description
#1	861.80'	235,158 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

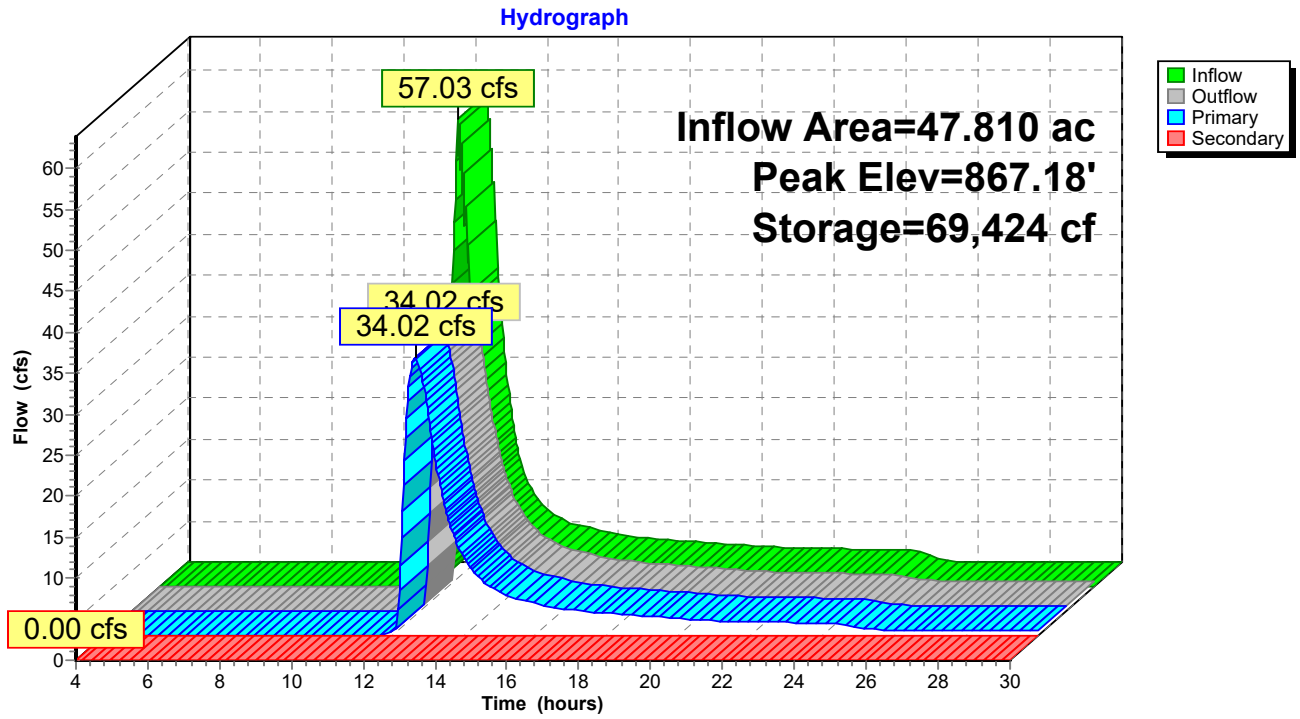
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
861.80	1,260	0	0
862.00	2,891	415	415
863.00	6,366	4,629	5,044
864.00	11,515	8,941	13,984
865.00	16,570	14,043	28,027
866.00	18,777	17,674	45,700
867.00	21,040	19,909	65,609
868.00	23,360	22,200	87,809
869.00	25,736	24,548	112,357
870.00	28,169	26,953	139,309
871.00	30,658	29,414	168,723
872.00	33,204	31,931	200,654
873.00	35,805	34,505	235,158

Device	Routing	Invert	Outlet Devices
#1	Secondary	872.00'	**30.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Primary	861.80'	**30.0" Round Culvert** L= 98.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 861.80' / 857.00' S= 0.0490 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#3	Device 2	861.80'	**4.0" Vert. Orifice1** C= 0.600 Limited to weir flow at low heads
#4	Device 2	864.60'	**30.0" W x 30.0" H Vert. Orifice2** C= 0.600 Limited to weir flow at low heads
#5	Device 2	869.00'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=34.02 cfs @ 12.67 hrs HW=867.18' (Free Discharge)
└─**2=Culvert** (Passes 34.02 cfs of 37.92 cfs potential flow)
  ├─**3=Orifice1** (Orifice Controls 0.96 cfs @ 10.99 fps)
  ├─**4=Orifice2** (Orifice Controls 33.06 cfs @ 5.29 fps)
  └─**5=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 4.00 hrs HW=861.80' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention Basin



Summary for Subcatchment 1S: DA-1A

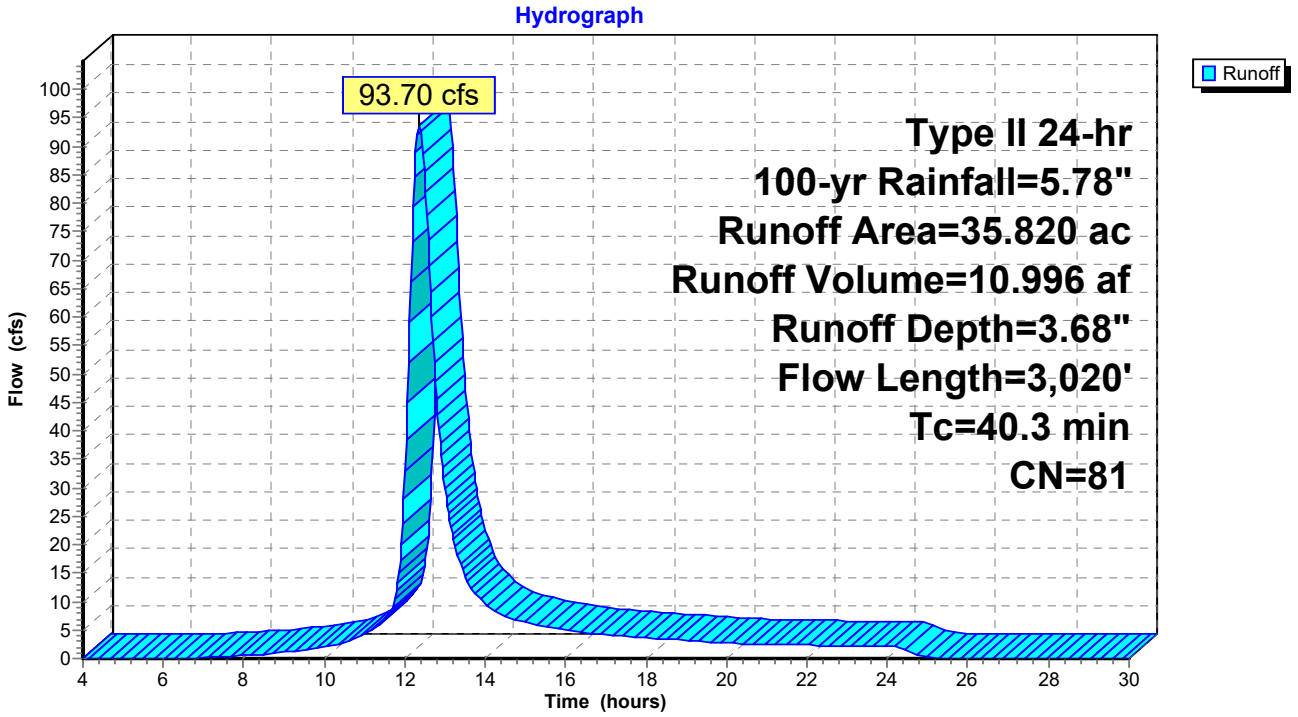
Runoff = 93.70 cfs @ 12.37 hrs, Volume= 10.996 af, Depth= 3.68"
Routed to Pond 1P : Bioretention 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
2.050	98	Paved parking, HSG D
1.940	98	Unconnected roofs, HSG D
22.870	80	>75% Grass cover, Good, HSG D
8.960	77	Woods, Good, HSG D
35.820	81	Weighted Average
31.830		88.86% Pervious Area
3.990		11.14% Impervious Area
1.940		48.62% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	100	0.0600	0.06		**Sheet Flow, SHEET FLOW** Woods: Dense underbrush n= 0.800 P2= 2.39"
4.8	370	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.9	200	0.0650	1.78		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	295	0.0300	19.80	79.19	**Channel Flow, curb and gutter flow** Area= 4.0 sf Perim= 4.0' r= 1.00' n= 0.013 Asphalt, smooth
1.7	1,100	0.0345	11.04	19.51	**Pipe Channel, Pipe Flow** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
3.8	955	0.0050	4.20	50.44	**Channel Flow,** Area= 12.0 sf Perim= 12.0' r= 1.00' n= 0.025 Earth, grassed & winding
40.3	3,020	Total			

Subcatchment 1S: DA-1A



Summary for Subcatchment 2S: DA-1B

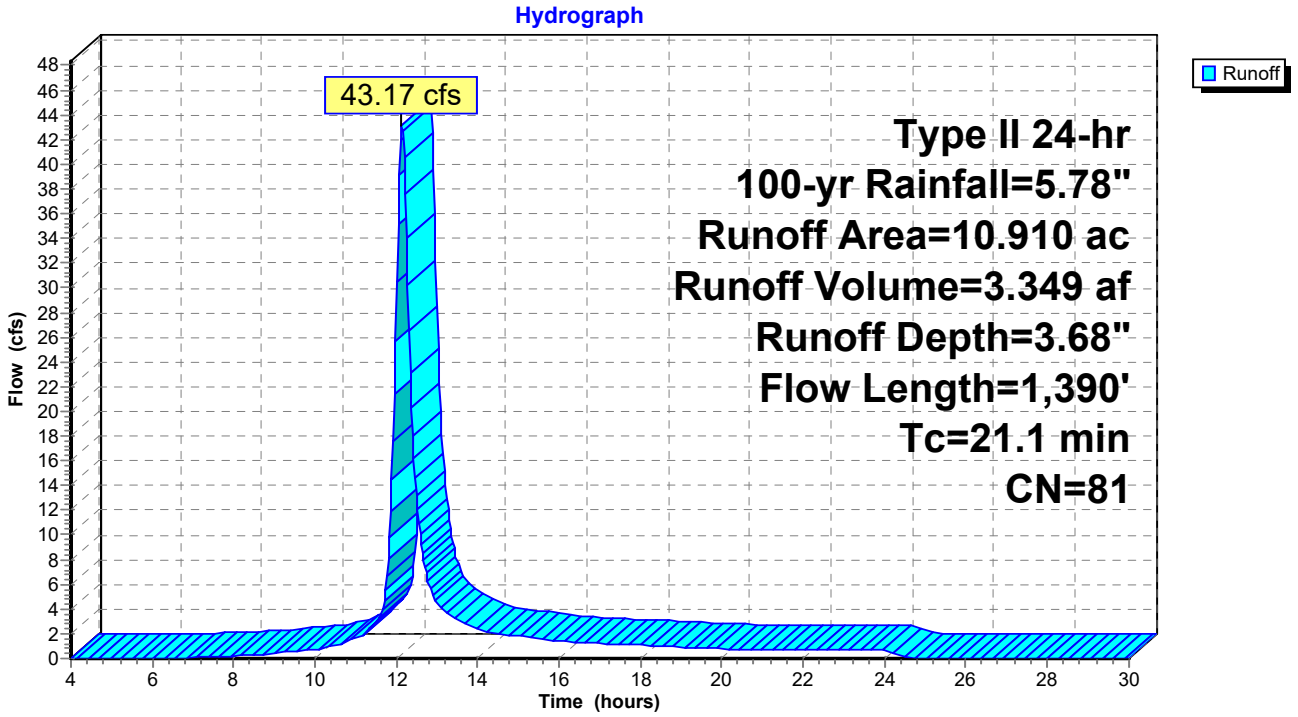
Runoff = 43.17 cfs @ 12.14 hrs, Volume= 3.349 af, Depth= 3.68"
Routed to Pond 2P : Bioretention 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.710	98	Paved parking, HSG D
0.340	98	Unconnected roofs, HSG D
7.820	80	>75% Grass cover, Good, HSG D
2.040	77	Woods, Good, HSG D
10.910	81	Weighted Average
9.860		90.38% Pervious Area
1.050		9.62% Impervious Area
0.340		32.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0600	0.16		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
4.6	410	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
5.6	710	0.0920	2.12		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.3	170	0.0200	9.55	76.42	**Channel Flow, swale flow** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.022 Earth, clean & straight
21.1	1,390	Total			

Subcatchment 2S: DA-1B



Summary for Subcatchment 3S: DA-1C

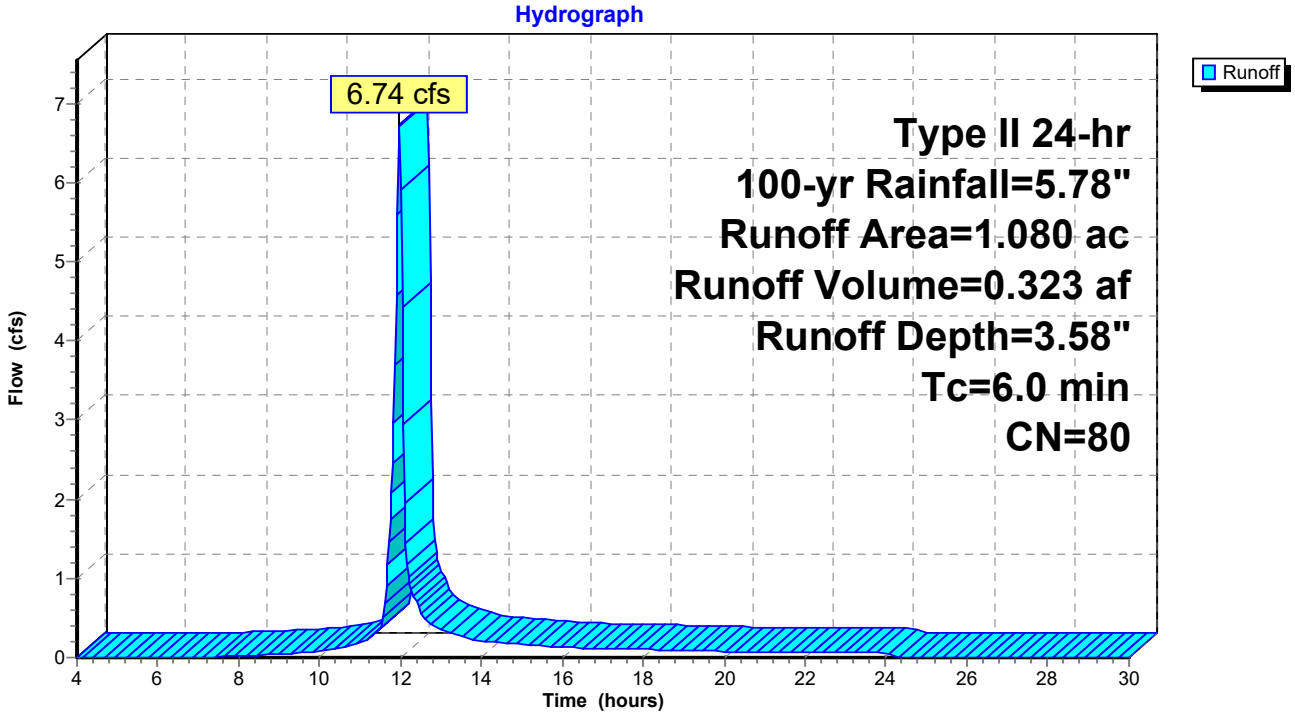
Runoff = 6.74 cfs @ 11.97 hrs, Volume= 0.323 af, Depth= 3.58"
Routed to Pond 3P : Detention Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.960	80	>75% Grass cover, Good, HSG D
0.120	77	Woods, Good, HSG D
1.080	80	Weighted Average
1.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min TR 55 Value**

Subcatchment 3S: DA-1C



Summary for Subcatchment 4S: DA-1D

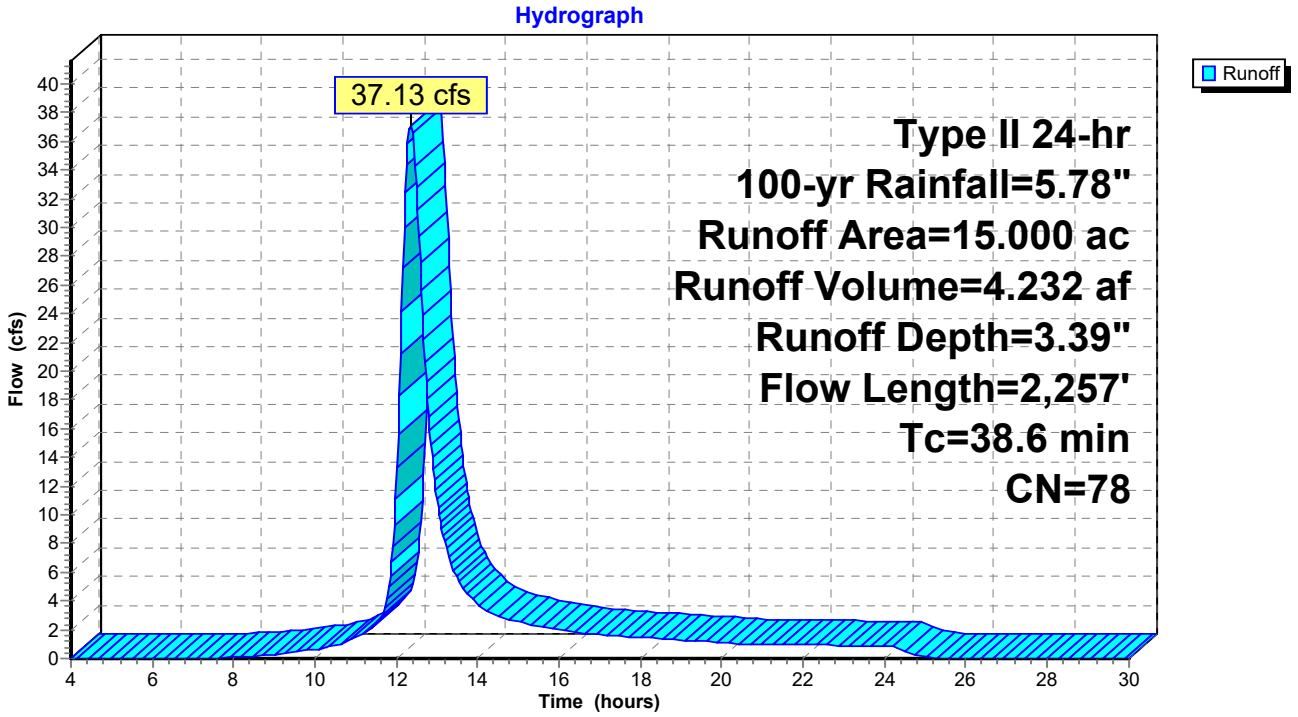
Runoff = 37.13 cfs @ 12.35 hrs, Volume= 4.232 af, Depth= 3.39"
Routed to Reach 1R : Pt of Study 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
5.930	80	>75% Grass cover, Good, HSG D
8.910	77	Woods, Good, HSG D
0.160	98	Paved parking, HSG D
15.000	78	Weighted Average
14.840		98.93% Pervious Area
0.160		1.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	100	0.0600	0.06		**Sheet Flow, SHEET FLOW** Woods: Dense underbrush n= 0.800 P2= 2.39"
5.4	485	0.0900	1.50		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
4.1	517	0.0900	2.10		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
1.2	1,155	0.0750	16.28	260.45	**Channel Flow, SWALE** Area= 16.0 sf Perim= 16.0' r= 1.00' n= 0.025 Earth, clean & winding
38.6	2,257	Total			

Subcatchment 4S: DA-1D



Summary for Subcatchment 5S: DA#2

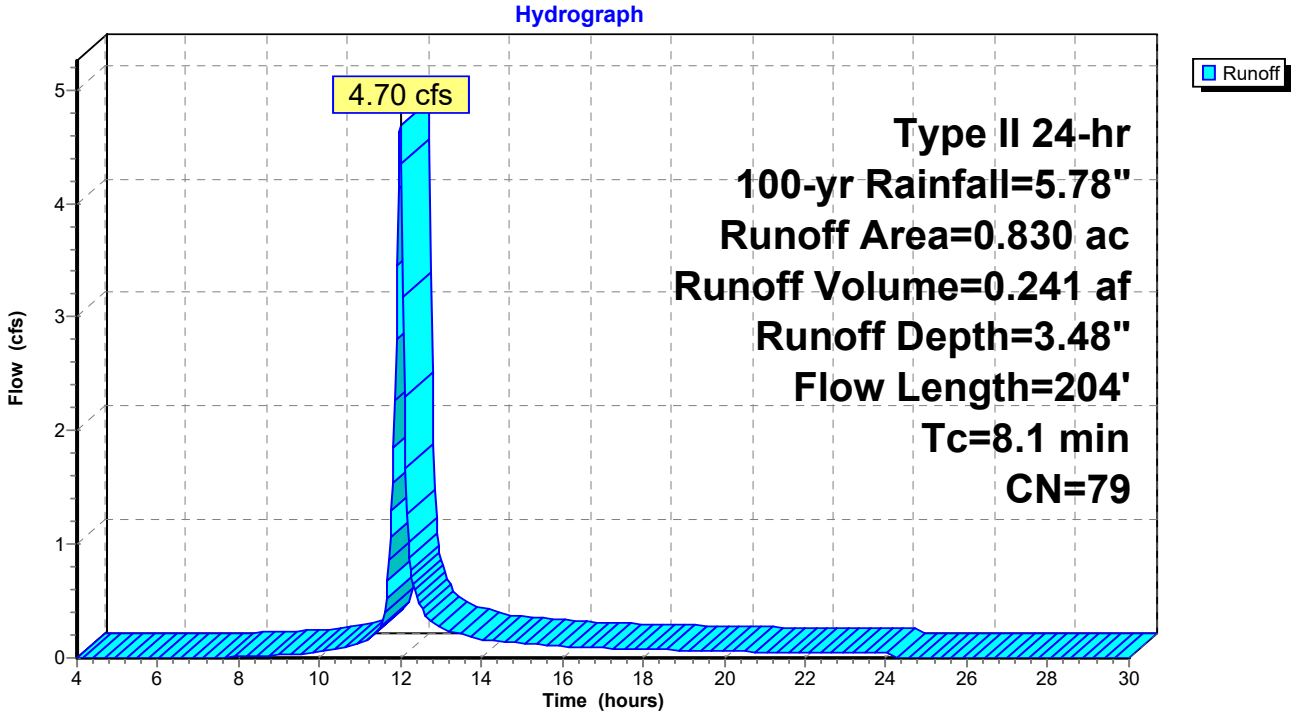
Runoff = 4.70 cfs @ 12.00 hrs, Volume= 0.241 af, Depth= 3.48"
Routed to Reach 2R : Pt of Study 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Description
0.690	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
0.830	79	Weighted Average
0.830		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1500	0.23		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
0.7	104	0.1300	2.52		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
8.1	204	Total			

Subcatchment 5S: DA#2



Summary for Subcatchment 6S: DA#3A

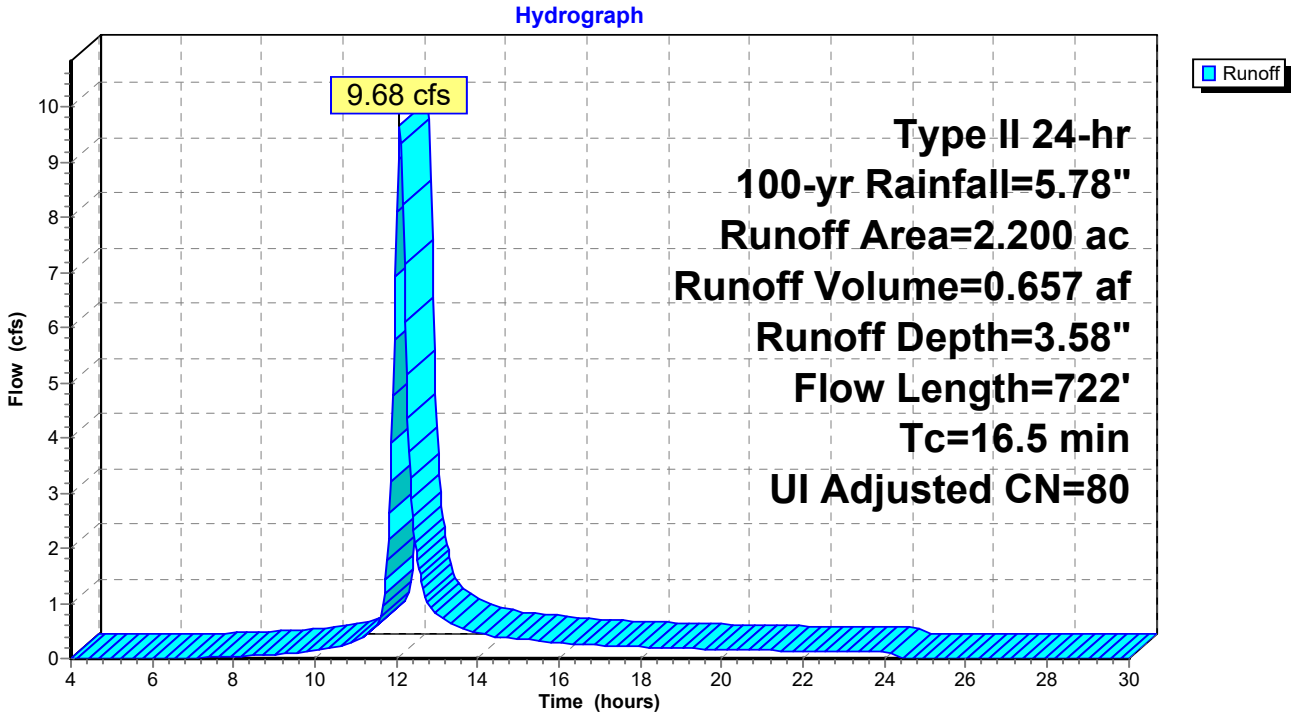
Runoff = 9.68 cfs @ 12.08 hrs, Volume= 0.657 af, Depth= 3.58"
Routed to Reach 5R : Drainage Ditch

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Adj	Description
0.920	80		>75% Grass cover, Good, HSG D
0.180	98		Paved parking, HSG D
0.070	98		Unconnected roofs, HSG D
1.030	77		Woods, Good, HSG D
2.200	81	80	Weighted Average, UI Adjusted
1.950			88.64% Pervious Area
0.250			11.36% Impervious Area
0.070			28.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0450	0.14		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
2.5	188	0.0650	1.27		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.9	202	0.0650	1.78		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	232	0.0220	16.95	50.86	**Channel Flow, curb flow** Area= 3.0 sf Perim= 3.0' r= 1.00' n= 0.013 Asphalt, smooth
16.5	722	Total			

Subcatchment 6S: DA#3A



Summary for Subcatchment 7S: DA#3B

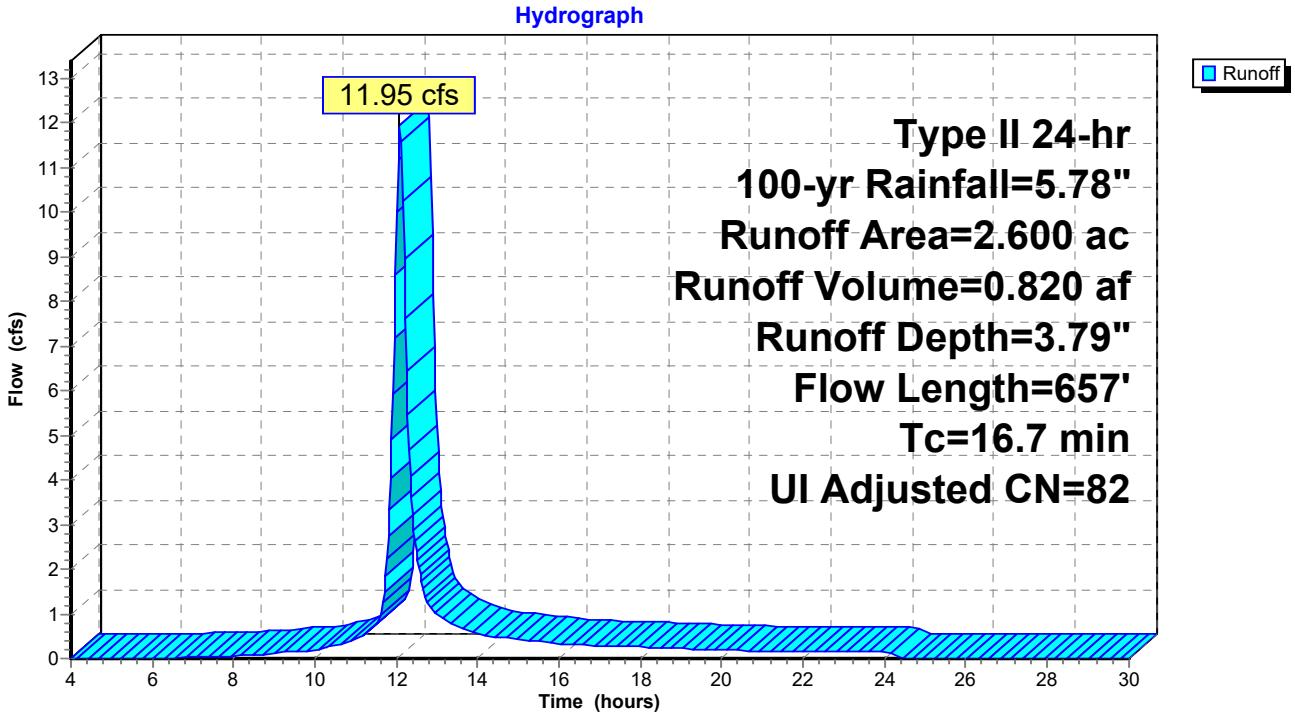
Runoff = 11.95 cfs @ 12.09 hrs, Volume= 0.820 af, Depth= 3.79"
Routed to Reach 3R : Pt of Study 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=5.78"

Area (ac)	CN	Adj	Description
2.230	80		>75% Grass cover, Good, HSG D
0.230	98		Paved parking, HSG D
0.140	98		Unconnected roofs, HSG D
2.600	83	82	Weighted Average, UI Adjusted
2.230			85.77% Pervious Area
0.370			14.23% Impervious Area
0.140			37.84% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.15		**Sheet Flow, SHEET FLOW** Grass: Dense n= 0.240 P2= 2.39"
5.1	475	0.0500	1.57		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0200	6.42	5.04	**Pipe Channel, pipe flow** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
16.7	657	Total			

Subcatchment 7S: DA#3B

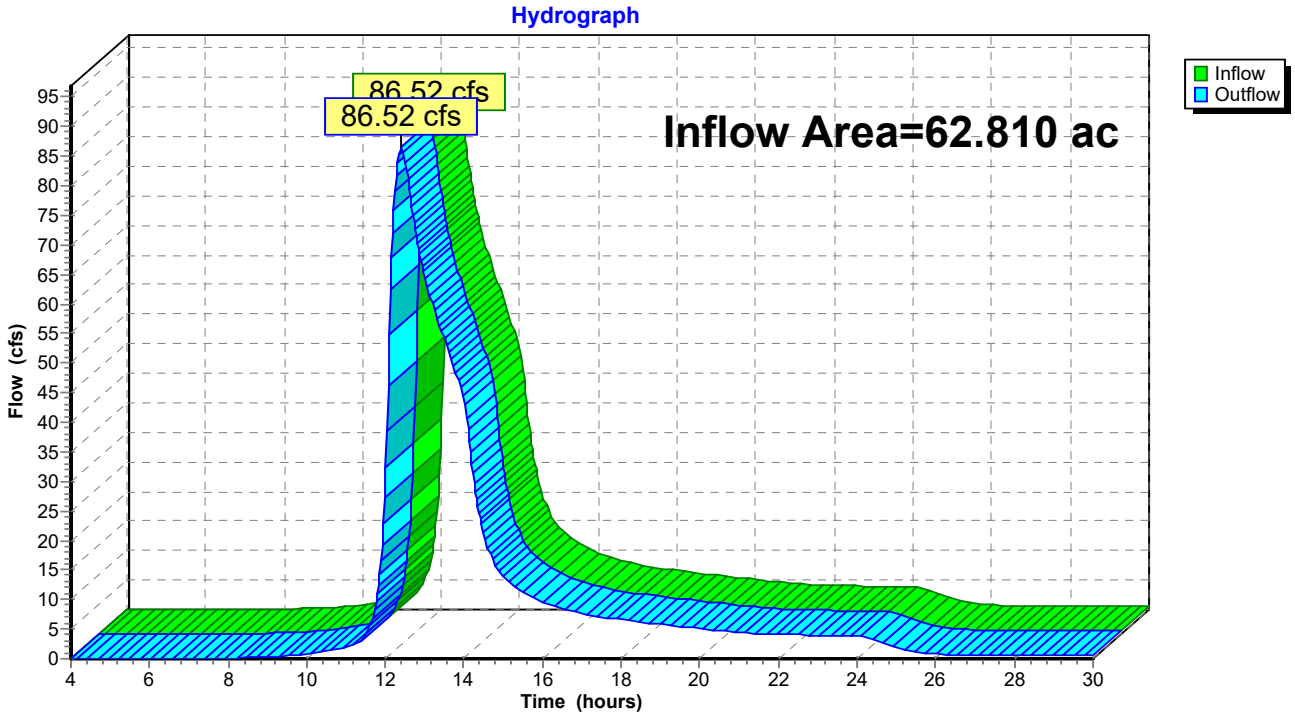


Summary for Reach 1R: Pt of Study 1

Inflow Area = 62.810 ac, 8.28% Impervious, Inflow Depth > 3.51" for 100-yr event
Inflow = 86.52 cfs @ 12.40 hrs, Volume= 18.359 af
Outflow = 86.52 cfs @ 12.40 hrs, Volume= 18.359 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs

Reach 1R: Pt of Study 1

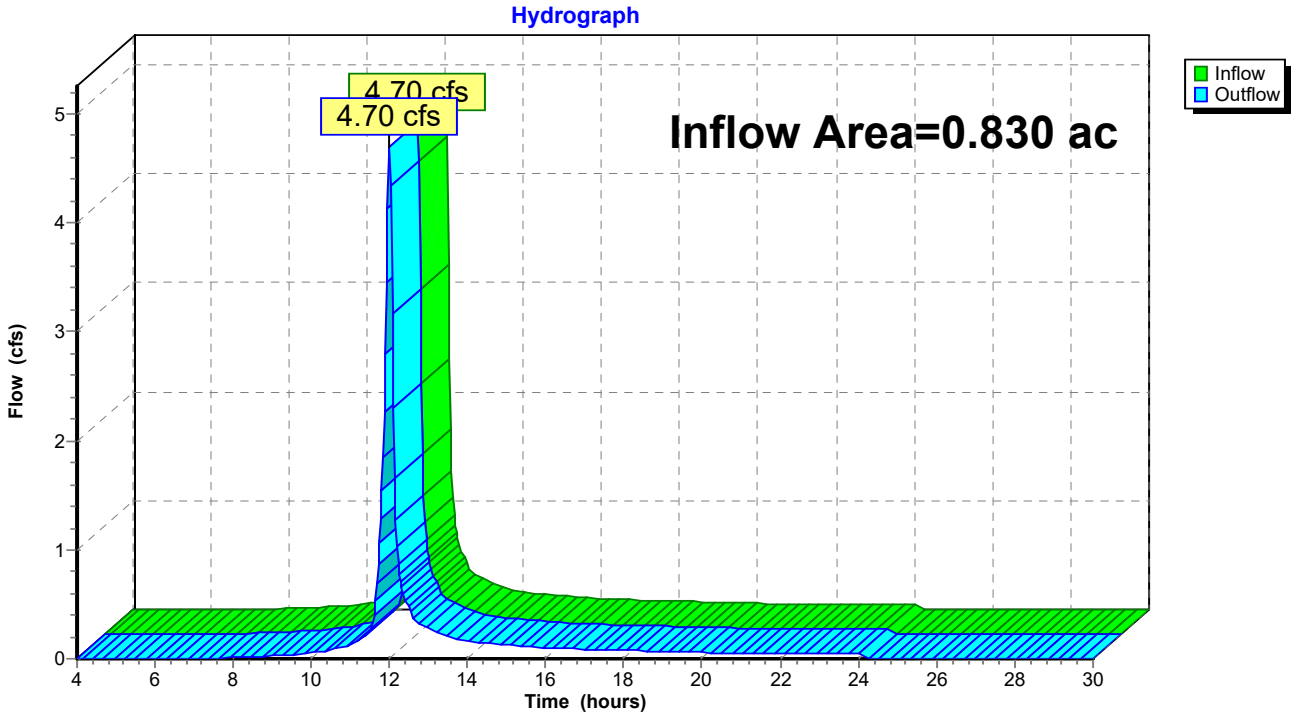


Summary for Reach 2R: Pt of Study 2

Inflow Area = 0.830 ac, 0.00% Impervious, Inflow Depth = 3.48" for 100-yr event
Inflow = 4.70 cfs @ 12.00 hrs, Volume= 0.241 af
Outflow = 4.70 cfs @ 12.00 hrs, Volume= 0.241 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs

Reach 2R: Pt of Study 2

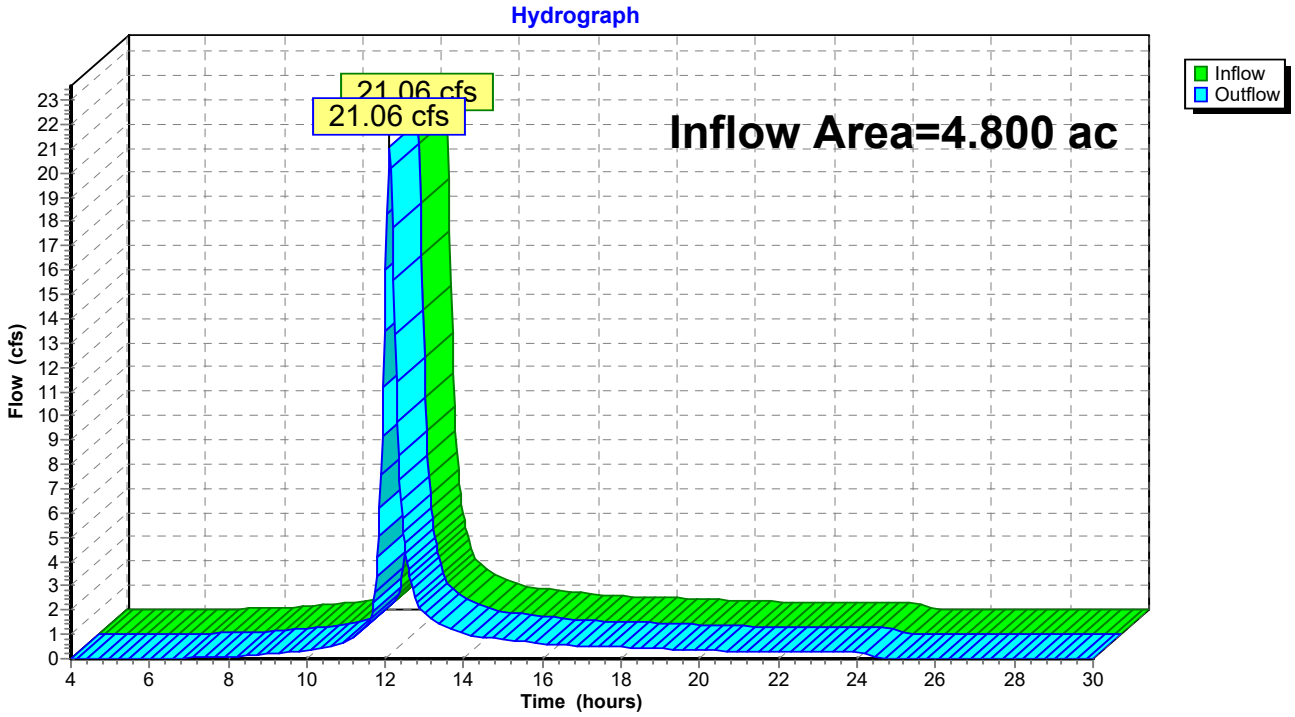


Summary for Reach 3R: Pt of Study 3

Inflow Area = 4.800 ac, 12.92% Impervious, Inflow Depth = 3.69" for 100-yr event
Inflow = 21.06 cfs @ 12.11 hrs, Volume= 1.477 af
Outflow = 21.06 cfs @ 12.11 hrs, Volume= 1.477 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs

Reach 3R: Pt of Study 3



Summary for Reach 5R: Drainage Ditch

Inflow Area = 2.200 ac, 11.36% Impervious, Inflow Depth = 3.58" for 100-yr event
Inflow = 9.68 cfs @ 12.08 hrs, Volume= 0.657 af
Outflow = 9.54 cfs @ 12.14 hrs, Volume= 0.657 af, Atten= 1%, Lag= 3.2 min
Routed to Reach 3R : Pt of Study 3

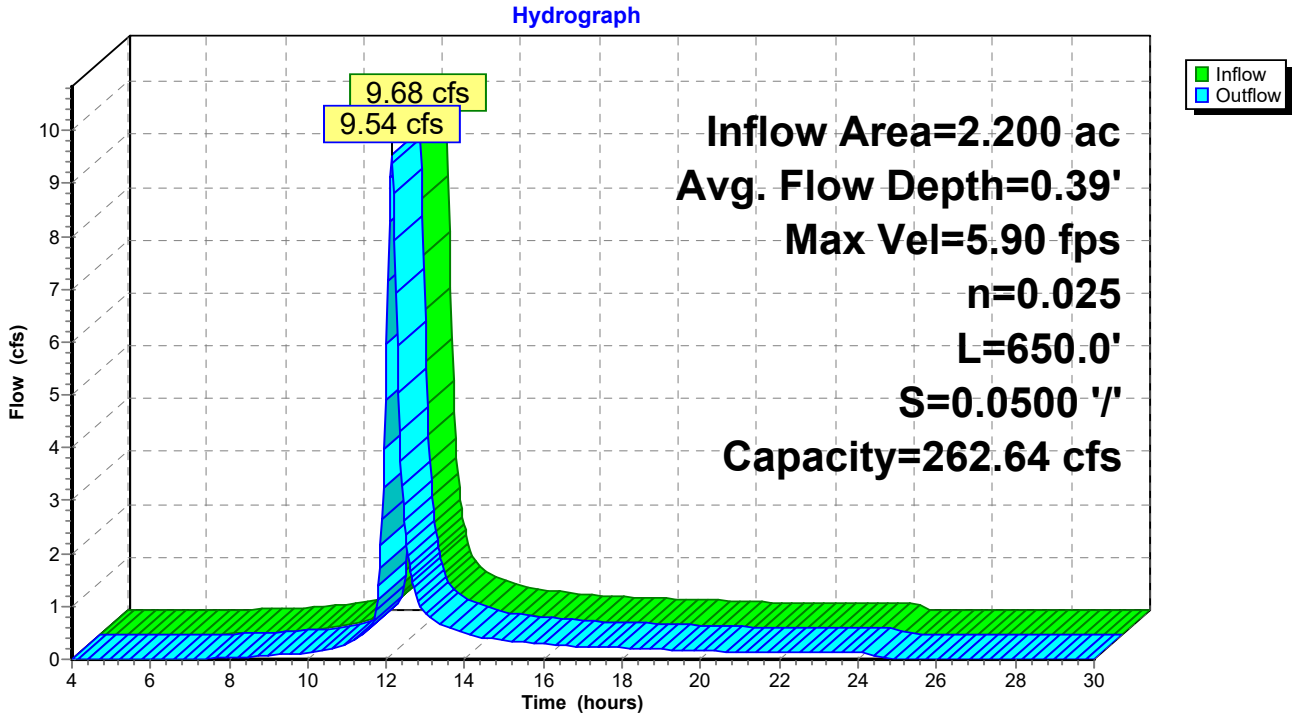
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Max. Velocity= 5.90 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.66 fps, Avg. Travel Time= 6.5 min

Peak Storage= 1,050 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 5.33'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 262.64 cfs

3.00' x 2.00' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 15.00'
Length= 650.0' Slope= 0.0500 '/'
Inlet Invert= 0.00', Outlet Invert= -32.50'

‡

Reach 5R: Drainage Ditch



Summary for Pond 1P: Bioretention 1

Inflow Area = 35.820 ac, 11.14% Impervious, Inflow Depth = 3.68" for 100-yr event
Inflow = 93.70 cfs @ 12.37 hrs, Volume= 10.996 af
Outflow = 100.01 cfs @ 12.37 hrs, Volume= 10.840 af, Atten= 0%, Lag= 0.2 min
Primary = 100.01 cfs @ 12.37 hrs, Volume= 10.840 af
Routed to Pond 3P : Detention Basin

Routing by Stor-Ind method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Peak Elev= 873.55' @ 12.37 hrs Surf.Area= 16,700 sf Storage= 14,540 cf

Plug-Flow detention time= 17.9 min calculated for 10.828 af (98% of inflow)
Center-of-Mass det. time= 9.4 min (851.1 - 841.8)

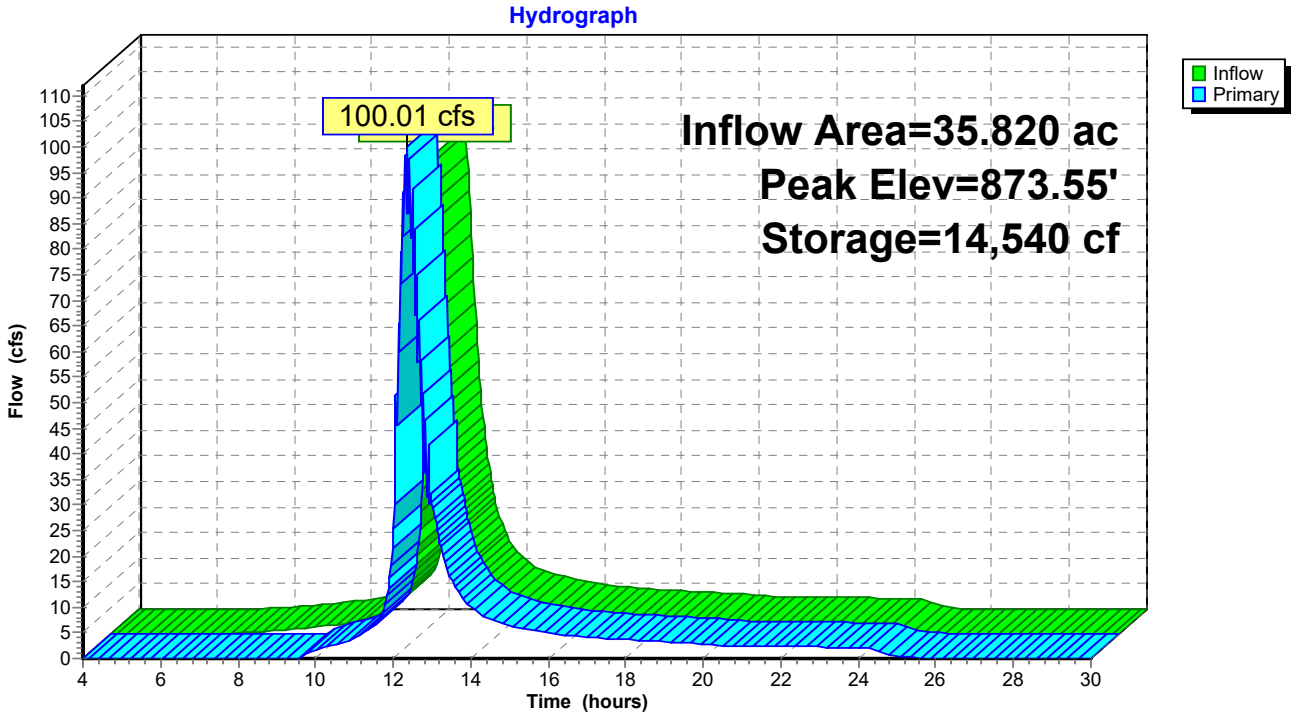
Volume	Invert	Avail.Storage	Storage Description
#1	872.00'	14,540 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
872.00	12,800	0	0
872.50	14,330	6,783	6,783
873.00	16,700	7,758	14,540

Device	Routing	Invert	Outlet Devices
#1	Primary	872.50'	**15.0' long + 3.0 '/' SideZ x 15.0' breadth Broad-Crested Rectangular Weir X 2**
			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=99.97 cfs @ 12.37 hrs HW=873.55' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 99.97 cfs @ 2.61 fps)

Pond 1P: Bioretention 1



Summary for Pond 2P: Bioretention 2

Inflow Area = 10.910 ac, 9.62% Impervious, Inflow Depth = 3.68" for 100-yr event
Inflow = 43.17 cfs @ 12.14 hrs, Volume= 3.349 af
Outflow = 46.72 cfs @ 12.13 hrs, Volume= 3.263 af, Atten= 0%, Lag= 0.0 min
Primary = 46.72 cfs @ 12.13 hrs, Volume= 3.263 af
Routed to Pond 3P : Detention Basin

Routing by Stor-Ind method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Peak Elev= 883.15' @ 12.13 hrs Surf.Area= 10,300 sf Storage= 8,493 cf

Plug-Flow detention time= 27.3 min calculated for 3.260 af (97% of inflow)
Center-of-Mass det. time= 12.1 min (836.1 - 824.0)

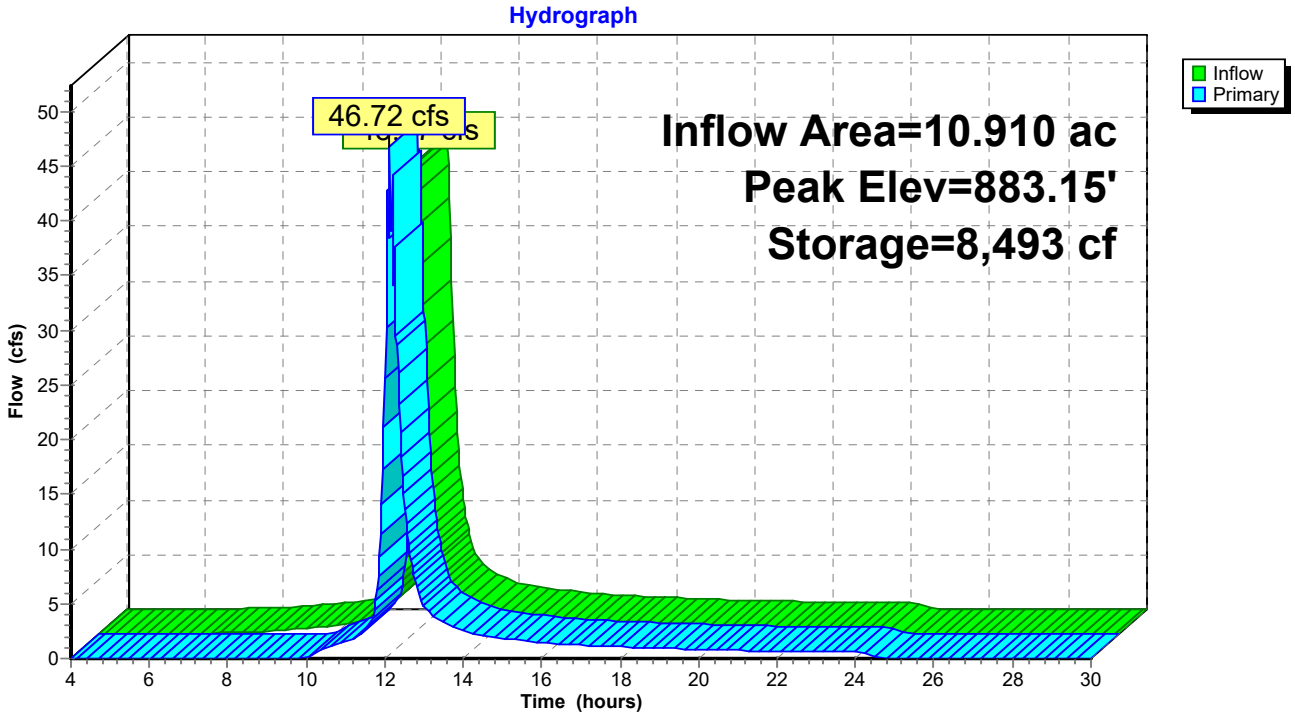
Volume	Invert	Avail.Storage	Storage Description
#1	882.00'	8,493 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	6,200	0	0
882.50	8,735	3,734	3,734
883.00	10,300	4,759	8,493

Device	Routing	Invert	Outlet Devices
#1	Primary	882.50'	**15.0' long + 3.0 '/' SideZ x 15.0' breadth Broad-Crested Rectangular Weir X 2**
			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=46.55 cfs @ 12.13 hrs HW=883.15' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 46.55 cfs @ 2.11 fps)

Pond 2P: Bioretention 2



Summary for Pond 3P: Detention Basin

Inflow Area = 47.810 ac, 10.54% Impervious, Inflow Depth = 3.62" for 100-yr event
Inflow = 129.58 cfs @ 12.25 hrs, Volume= 14.426 af
Outflow = 54.55 cfs @ 12.77 hrs, Volume= 14.128 af, Atten= 58%, Lag= 31.3 min
Primary = 54.55 cfs @ 12.77 hrs, Volume= 14.128 af
Routed to Reach 1R : Pt of Study 1
Secondary = 0.00 cfs @ 4.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 4.00-30.01 hrs, dt= 0.03 hrs
Peak Elev= 871.60' @ 12.77 hrs Surf.Area= 32,177 sf Storage= 187,465 cf

Plug-Flow detention time= 67.5 min calculated for 14.111 af (98% of inflow)
Center-of-Mass det. time= 55.2 min (902.1 - 846.9)

Volume	Invert	Avail.Storage	Storage Description
#1	861.80'	235,158 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

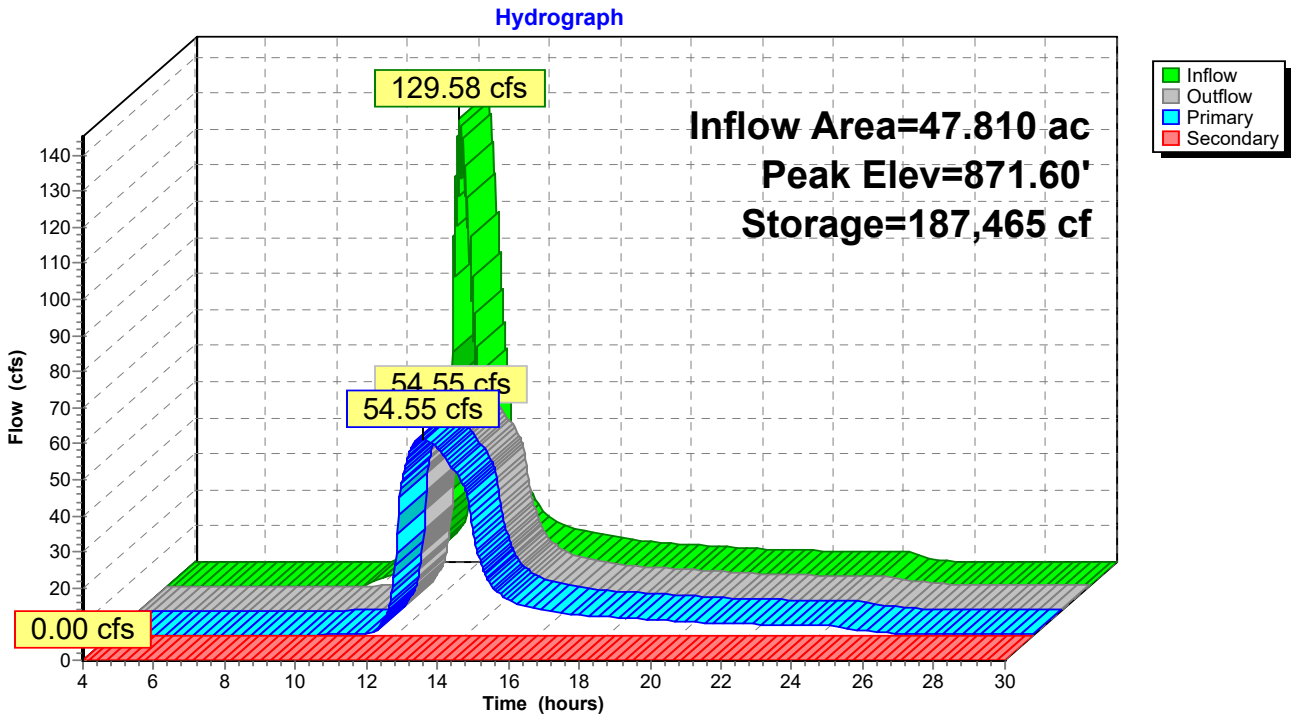
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
861.80	1,260	0	0
862.00	2,891	415	415
863.00	6,366	4,629	5,044
864.00	11,515	8,941	13,984
865.00	16,570	14,043	28,027
866.00	18,777	17,674	45,700
867.00	21,040	19,909	65,609
868.00	23,360	22,200	87,809
869.00	25,736	24,548	112,357
870.00	28,169	26,953	139,309
871.00	30,658	29,414	168,723
872.00	33,204	31,931	200,654
873.00	35,805	34,505	235,158

Device	Routing	Invert	Outlet Devices
#1	Secondary	872.00'	**30.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Primary	861.80'	**30.0" Round Culvert** L= 98.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 861.80' / 857.00' S= 0.0490 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#3	Device 2	861.80'	**4.0" Vert. Orifice1** C= 0.600 Limited to weir flow at low heads
#4	Device 2	864.60'	**30.0" W x 30.0" H Vert. Orifice2** C= 0.600 Limited to weir flow at low heads
#5	Device 2	869.00'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=54.55 cfs @ 12.77 hrs HW=871.59' (Free Discharge)
└─**2=Culvert** (Inlet Controls 54.55 cfs @ 11.11 fps)
  ├─**3=Orifice1** (Passes < 1.30 cfs potential flow)
  ├─**4=Orifice2** (Passes < 71.99 cfs potential flow)
  └─**5=Grate** (Passes < 69.81 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 4.00 hrs HW=861.80' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention Basin



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APPENDIX C: SOIL DESCRIPTIONS

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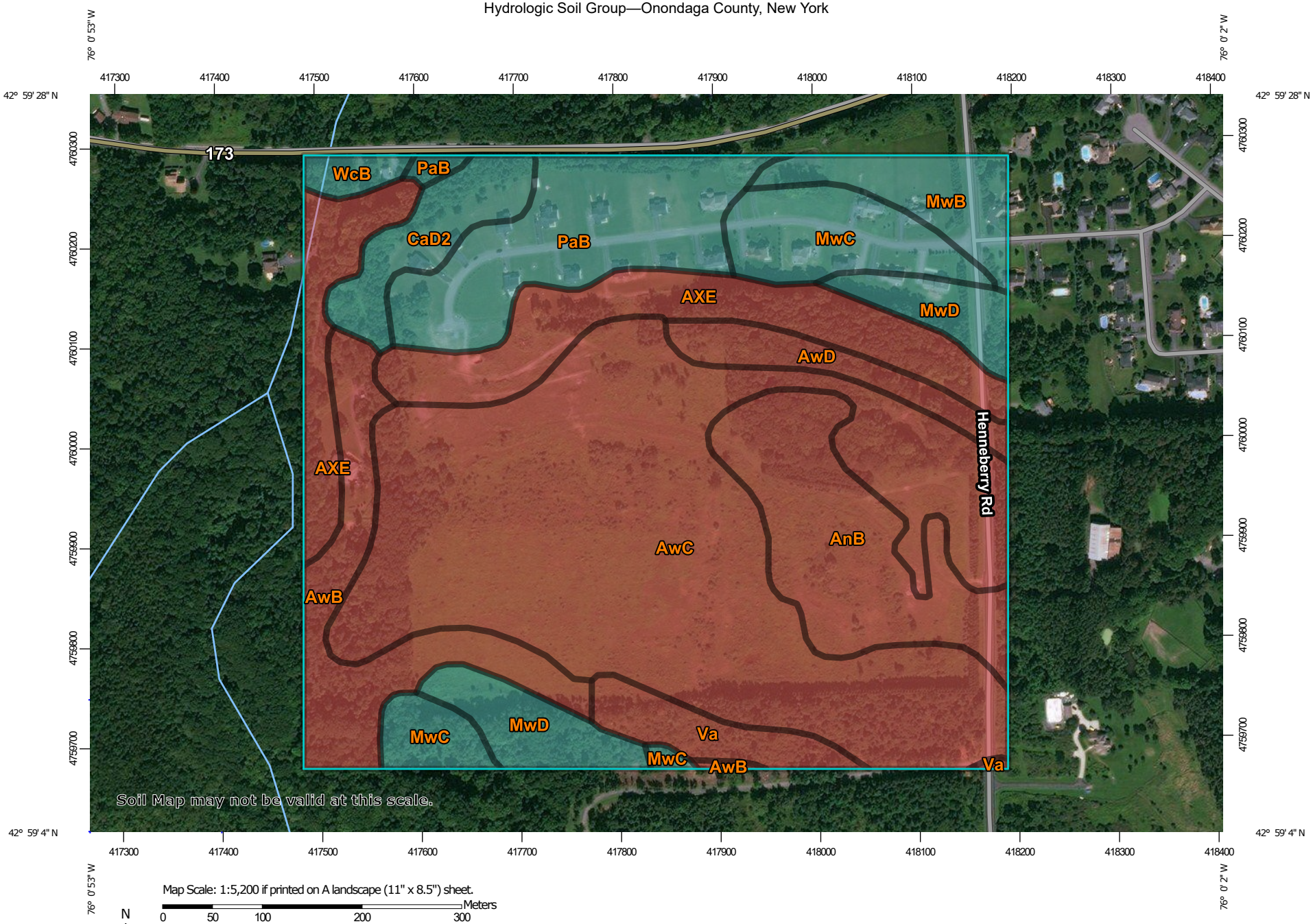
Hydrologic Soil Group—Onondaga County, New York



Map Scale: 1:5,200 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

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

Background

Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Onondaga County, New York
Survey Area Data: Version 15, Jun 11, 2020

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

Date(s) aerial images were photographed: Jun 18, 2011—Oct 10, 2016

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AnB	Angola-Darien silt loams, 0 to 6 percent slopes	D	10.0	9.3%
AwB	Aurora silt loam, 0 to 6 percent slopes	D	7.7	7.1%
AwC	Aurora silt loam, 6 to 12 percent slopes	D	41.7	38.7%
AwD	Aurora silt loam, 12 to 18 percent slopes	D	2.9	2.7%
AXE	Aurora-Farmington-Rock outcrop association, steep	D	12.5	11.6%
CaD2	Camillus silt loam, 12 to 18 percent slopes eroded	C	3.7	3.4%
MwB	Mohawk silt loam, 2 to 8 percent slopes	C	3.7	3.4%
MwC	Mohawk silt loam, 8 to 15 percent slopes	C	6.6	6.1%
MwD	Mohawk silt loam, 15 to 25 percent slopes	C	5.3	4.9%
PaB	Palatine shaly silt loam, 2 to 6 percent slopes	C	9.9	9.2%
Va	Varick silt loam	D	2.9	2.6%
WcB	Wassaic silt loam, 0 to 8 percent slopes	C	0.9	0.9%
Totals for Area of Interest			**107.8**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX D: BIORETENTION BASIN CONSTRUCTION AND MAINTENANCE

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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Bioretention Stormwater Management Practices
Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

BR Drainage Area

Look for areas that are uphill from the Bioretention cell.

Problem (Check if Present)	**Follow-Up Actions**
 ☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and mulch areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and seed and straw to establish vegetation. ☐ If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ Other:

BR Drainage Area

Look for areas that are uphill from the Bioretention cell.

Problem (Check if Present)	Follow-Up Actions
	☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Other:
☐ Open containers of oil, grease, paint, or other substances	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. ☐ Other:

BR Inlets

Stand in the Bioretention cell itself and look for all the places where water flows in. Often there will be multiple points of inflow to the practice.

Problem (Check if Present)	Follow-Up Actions
 ☐ Inlets collect grit and debris or grass/weeds. Some water may not be getting into the Bioretention cell. The objective is to have a clear pathway for water to flow into the cell.	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that will accumulate at these spots. ☐ Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in. ☐ Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets. ☐ For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Bioretention cell. ☐ Dispose of all material properly where it will not re-enter the Bioretention cell. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the Bioretention cell.
 ☐ Some or all of the inlets are eroding so that rills, gullies, and other erosion is present, or there is bare dirt that is washing into the Bioretention cell.	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. ☐ In some cases, reseeding and applying erosion-control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets, and it looks like there is too much water that is concentrating at these points. The inlet design may have to be modified.

BR Ponding Area

Examine the entire Bioretention surface and side slopes

Problem (Check if Present)	Follow-Up Actions
 ☐ Mulch (if used) needs to be replaced or replenished. The mulch layer had decomposed or is less than 1-inch thick.	☐ Add new mulch to a total depth (including any existing mulch that is left) of 2 to 3 inches. The mulch should be shredded hardwood mulch that is less likely to float away during rainstorms. ☐ Avoid adding too much mulch so that inlets are obstructed or certain areas become higher than the rest of the Bioretention surface. ☐ Other:
 ☐ Minor areas of sediment, grit, trash, or other debris are accumulating on the bottom.	☐ Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the Bioretention cell . ☐ If removing the material creates a hole or low area, fill with soil mix that matches original mix and cover with mulch so that the Bioretention surface area is as flat as possible. ☐ Remove trash, vegetative debris, and other undesirable materials. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 2-inches deep and covers 25% or more of the Bioretention surface. ☐ Kick-Out to Level 2 Inspection: The Bioretention cell is too densely vegetated to assess sediment accumulation or ponding; see BR-4, Vegetation.

BR Ponding Area

Examine the entire Bioretention surface and side slopes

Problem (Check if Present)	Follow-Up Actions
 ☐ There is erosion in the bottom or on the side slopes. Water seems to be carving out rills as it flows across the Bioretention surface or on the slopes, or sinkholes are forming in certain areas. ☐ Source: Stormwater Maintenance, LLC.	☐ Try filling the eroded areas with clean topsoil or sand, and cover with mulch. ☐ If the problem recurs, you may have to use stone (e.g., river cobble) to fill in problem areas. ☐ If the erosion is on a side slope, fill with clay that can be compacted and seed and mulch the area. ☐ Other: ☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3-inches deep and seems to be an issue with how water enters and moves through the Bioretention cell. ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water, but a collapse or sinking of the surface (e.g., “sinkhole”) due to some underground problem.
 ☐ The bottom of the Bioretention cell is not flat, and the water pools at one end, along an edge, or in certain pockets. The whole bottom is not uniformly covered with water. See design plan to verify that bioretention surface is intended to be flat. Check during or immediately after a rainstorm.	☐ If the problem is minor (just small, isolated areas are not covered with water), try raking the surface OR adding mulch to low spots to create a more level surface. You may need to remove and replace plantings in order to properly even off the surface. ☐ Check the surface with a string and bubble level to get the surface as flat as possible. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Ponding water is isolated to less than half of the Bioretention surface area, and there seem to be elevation differences of more than a couple of inches across the surface.

BR Ponding Area

Examine the entire Bioretention surface and side slopes

Problem (Check if Present)	Follow-Up Actions
 ☐ Water stands on the surface more than 72 hours after a rainstorm and /or wetland-type vegetation is present. The Bioretention cell does not appear to be draining properly.	☐ Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.

BR Vegetation

Examine all Bioretention cell vegetation.

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation requires regular maintenance—pulling weeds, removing dead and diseased plants, replacing mulch around plants, adding plants to fill in areas that are not well vegetated, etc.	☐ If you can identify which plants are weeds or not intended to be part of the planting plan, eliminate these, preferably by hand pulling. ☐ If weeds are widespread, check with the local stormwater authority and/or Extension Office about proper use of herbicides for areas connected with the flow of water. ☐ Even vegetation that is intended to be present can become large, overgrown, and/or crowd out surrounding plants. Prune and thin accordingly. ☐ If weeds or invasive plants have overtaken the whole Bioretention cell , bush-hog the entire area before seedheads form in the spring. It will be necessary to remove the root mat manually or with appropriate herbicides, as noted above. ☐ Re-plant with species that are aesthetically pleasing and seem to be doing well in the Bioretention cell. ☐ Other: ☐ Kick-Out to Level 2 Inspection: You are unsure of the original planting design, or the vegetation maintenance task is beyond your capabilities of time, expertise, or resources. If you are unsure of the health of the vegetation (e.g. salt damage, invasives, which plants are undesirable) or the appropriate season to conduct vegetation management, consult a landscape professional before undertaking any cutting, pruning, mowing, or brush hogging.

BR Vegetation

Examine all Bioretention cell vegetation.

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation is too thin, is not healthy, and there are many spots that are not well vegetated.	☐ The original plants are likely not suited for the actual conditions within the Bioretention cell . If you are knowledgeable about plants, select and plant more appropriate vegetation (preferably native plants) so that almost the entire surface area will be covered by the end of the second growing season. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: For all but small practices (e.g., rain gardens), this task will likely require a landscape design professional or horticulturalist.

BR Outlets

Examine outlets that release water out of the Bioretention cell.

Problem (Check if Present)	Follow-Up Actions
☐ Erosion at outlet	☐ Add stone to reduce the impact from the water flowing out of the outlet pipe or weir during storms. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Rills have formed and erosion problem becomes more severe.
 ☐ Outlet obstructed with mulch, sediment, debris, trash, etc.	☐ Remove the debris and dispose of it where it cannot re-enter the Bioretention cell . ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Outlet is completely clogged or obstructed; there is too much material to remove by hand or with simple hand tools.

Additional Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Bioretention Stormwater Management Practices
Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

Level 2 Inspection: BIORETENTION
NOTE: Key Source for this Information *(CSN, 2013)*

Recommended Repairs	Triggers for Level 3 Inspection
Observed Condition: Water Stands on Surface for More than 72 Hours after Storm	
☐ Condition 1: Small pockets of standing water Use a soil probe or auger to examine the soil profile. If isolated areas have accumulated grit, fines, or vegetative debris or have bad soil media, try scraping off top 3 inches of media and replacing with clean material. Also check to see that surface is level and water is not ponding selectively in certain areas. ☐ Condition 2: Standing water is widespread or covers entire surface Requires diagnosis and resolution of problem: • Clogged underdrain? • Filter fabric between soil media and underdrain stone? • Need to install underdrain if not present? • Too much sediment/grit washing in from drainage area? • Too much ponding depth? • Improper soil media?	• Soil media is clogged and problem is not evident from Level 2 inspection. • Level 2 inspection identifies problem, but it cannot be resolved easily or is associated with the original design of the practice. ☐ Level 3 inspection necessary
Observed Condition: Vegetation is sparse or out of control	
☐ Condition 1: Original design planting plan seems good but has not been maintained, so there are many invasives and/or dead plants Will require some horticultural experience to restore vegetation to intended condition by weeding, pruning, removing plants, and adding new plants. ☐ Condition 2: Original design planting plan is unknown or cannot be actualized A landscape architect or horticulturalist will be needed to redo the planting plan. Will likely require analysis of soil pH, moisture, organic content, sun/shade, and other conditions to make sure plants match conditions. Plan should include invasive plant management and maintenance plan to include mulching, watering, disease intervention, periodic thinning/pruning, etc.	• Vegetation deviates significantly from original planting plan; Bioretention has been neglected and suffered from deferred maintenance. • Owner/responsible party does not know how to maintain the practice. ☐ Level 3 inspection necessary
Observed Condition: Bioretention does not conform to original design plan in surface area or storage	
☐ Condition 1: Level 2 Inspection reveals that practice is too small based on design dimension, does not have adequate storage (e.g., ponding depth) based on the plan, and/or does not treat the drainage area runoff as indicated on the plan Small areas of deviation can be corrected by the property owner or responsible party, but it is likely that a Qualified Professional will have to revisit the design and attempt a redesign that meets original objectives or that can be resubmitted to the municipality for approval.	• More than a 25% departure from the approved plan in surface area, storage, or drainage area; sometimes less than this threshold at the discretion of the Level 2 inspector. ☐ Level 3 inspection necessary

Level 2 Inspection: BIORETENTION
NOTE: Key Source for this Information *(CSN, 2013)*

Recommended Repairs	Triggers for Level 3 Inspection
Observed Condition: Severe erosion of filter bed, inlets, or around outlets	
☐ Condition 1: Erosion at inlets The lining (e.g., grass, matting, stone, rock) may not be adequate for the actual flow velocities coming through the inlets. First line of defense is to try a more non-erosive lining and/or to extend the lining further down to where inlet slopes meet the Bioretention surface. If problem persists, analysis by a Qualified Professional is warranted. ☐ Condition 2: Erosion of Bioretention filter bed This is often caused by "preferential flow paths" through and along the Bioretention surface. The source of flow should be analyzed and methods employed to dissipate energy and disperse the flow (e.g., check dams, rock splash pads). ☐ Condition 3: Erosion on side slopes Again, the issue is likely linked with unanticipated flow paths down the side slopes (probably overland flow that concentrates as it hits the edge of the slope). For small or isolated areas, try filling, compacting, and re-establishing healthy ground cover vegetation. If the problem is more widespread, further analysis is required to determine how to redirect the flow.	• Erosion (rills, gullies) is more than 12 inches deep at inlets or the filter bed or more than 3 inches deep on side slopes. • If the issue is not caused by moving water but some sort of subsurface defect. This may manifest as a sinkhole or linear depression and be associated with problems with the underdrain stone or pipe or underlying soil. ☐ Level 3 inspection necessary
Observed Condition: Significant sediment accumulation, indicating an uncontrolled source of sediment	
☐ Condition 1: Isolated areas of sediment accumulation, generally less than 3-inches deep Sediment source may be from a one-time or isolated event. Remove accumulated sediment and top 2 to 3 inches of Bioretention soil media; replace with clean material. Check drainage area for any ongoing sources of sediment. ☐ Condition 2: Majority of the surface is caked with "hard pan" (thin layer of clogging material) or accumulated sediment that is 3-inches deep or more This can be caused by an improper construction sequence (drainage area not fully stabilized prior to installation of Bioretention soil media) or another chronic source of sediment in the drainage area. Augering several holes down through the media can indicate how severe the problem is; often the damage is confined to the first several inches of soil media. Removing and replacing this top layer (or to the depth where sediment incursion is seen in auger holes) can be adequate, as long as the problem does not recur.	• More than 2 inches of accumulated sediment cover 25% or more of the Bioretention surface area. • "Hard pan" of thin, crusty layer covers majority of Bioretention surface area and seems to be impeding flow of water down through the soil media. • New sources of sediment seem to be accumulating with each significant rainfall event. ☐ Level 3 inspection necessary

Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Pond and Wetland Stormwater Management Practices Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

PW Drainage Area

Look for areas that are uphill from the pond.

Problem (Check if Present)	**Follow-Up Actions**
☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and straw areas of bare soil to establish vegetation. ☐ Fill in eroded areas with soil, compact, seed and mulch with straw to establish vegetation. ☐ Other:

☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Kick-Out to Level 2 Inspection: If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ If large areas of soil have been eroded or larger channels are forming, this may require rerouting of flow paths or use of an erosion-control seed mat or blanket to reestablish acceptable ground cover or anchor sod where it is practical.
☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Remove excessive vegetation or woody debris that can block drainage systems. ☐ Other:
☐ Open containers of oil, grease, paint, or other substances exposed to rain in the drainage area	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. ☐ Other:

Pond Inlets

Look for all areas where water flows into the pond during storms. Note that there may be multiple points of inflow and types of structures (e.g., pipes, open ditches, etc.).

Problem (Check if Present)	Follow-Up Actions
☐ Inlets are buried, covered or filled with silt, debris, or trash, or blocked by excessive vegetation.	☐ If the problem can be remedied with hand tools and done in a safe manner, remove vegetation, trash, woody debris, etc. from blocking inlet structures. ☐ Other:
	☐ Kick-Out to Level 2 or 3 Inspection: If the amount of material is too large to handle OR there are ANY safety concerns about working in standing water, soft sediment, etc., the work will likely have to be performed by a qualified contractor.

Pond Inlets

Look for all areas where water flows into the pond during storms. Note that there may be multiple points of inflow and types of structures (e.g., pipes, open ditches, etc.).

Problem (Check if Present)		Follow-Up Actions
	☐ Inlets are buried, covered or filled with silt, debris, or trash, or blocked by excessive vegetation.	☐ Kick-Out to Level 2 or 3 Inspection: If the amount of material is too large to handle OR there are ANY safety concerns about working in standing water, soft sediment, etc., the work will likely have to be performed by a qualified contractor.
	☐ Inlets are broken, and, with pieces of pipe or concrete falling into the pond, there is erosion around the inlet, there is open space under the pipe, or there is erosion where the inlet meets the pond	☐ Kick-Out to Level 2 Inspection: These types of structural or erosion problems are more serious and will require a qualified contractor to repair.

PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions
	☐ The pretreatment area(s) or forebay(s) are filled with sediment, trash, vegetation, or other debris.	☐ If the problem can be remedied with hand tools and done in a safe manner, use a flat shovel or other equipment to remove small amounts of sediment. ☐ Remove trash and excessive vegetation from forebays if this can be done in a safe manner. ☐ Other:

PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions
	☐ The pretreatment area(s) or forebay(s) are filled with sediment, trash, vegetation, or other debris.	☐ Kick-Out to Level 2 Inspection: Large amounts of sediment or debris will have to be removed by a qualified contractor. ANY condition that poses a safety concern for working in standing water or soft sediments should be referred to a Level 2 Inspection or qualified contractor.
	☐ The pond area itself has accumulated sediment, trash, debris, or excessive vegetation that is choking the flow of the water, OR the pond area is covered with algae or aquatic plants.	☐ Level 1 includes handling only small amounts of material that can be removed by hand, or with rakes or other hand tools. Do not attempt any repair that poses a safety issue. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Most cases will call for a Level 2 Inspection and/or a qualified contractor. ☐ You are not sure what type and amount of vegetation is supposed to be in the pond. ☐ The algae or aquatic plants should be identified so that proper control techniques can be applied.
	☐ The side slopes of the pond are unstable, eroding, and have areas of bare dirt.	☐ If there are only minor areas, try filling in small rills or gullies with topsoil, compacting, and seeding and mulching all bare dirt areas with an appropriate seed. Alternatively, try using herbaceous plugs to get vegetation established in tricky areas, such as steep slopes. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Erosion and many bare dirt areas on steep side slopes will require a Level 2 Inspection and repair by a qualified contractor.

PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions
	☐ The riser structure is clogged with trash, debris, sediment, vegetation, etc., OR is open, unlocked, or has a steep drop and poses a safety concern. The pond level may have dropped below its "normal" level.	☐ If you can safely access the riser on foot or with a small boat, clear minor amounts of debris and remove it from the pond area for safe disposal. ☐ Other: ☐ Kick-Out to Level 2 Inspection: The riser cannot be accessed safely, the amount of debris is substantial, or the riser seems to be completely clogged and the water level has risen too high. ☐ There are safety issues with the riser and concern about access to pipes, drops, or any other life safety concern. ☐ The riser is leaning, broken, settling or slumping, corroded, eroded or any other structural problem.
	☐ The dam/embankment is slumping, sinking, settling, eroding, or has medium or large trees growing on it.	☐ If there are small isolated areas, try to fix them by adding clean material (clay and topsoil) and seeding and mulching. ☐ Periodically mow embankments to enable inspection of the banks and to minimize establishment of woody vegetation. ☐ Remove any woody vegetation that has already established on embankments. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Most of these situations will require a Level 2 Inspection or evaluation and repair by a qualified contractor. Seepage through the dam or problems with the pipe through the dam can be a serious issue that should be addressed to avoid possible dam failure.

PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions
	☐ The emergency spillway or outfall (if it exists) has ☐ Erosion, settlement, or loss of material. Rock-lined spillways have excessive debris or vegetation.	☐ Clear light debris and vegetation. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Displacement of rock lining, excessive vegetation and erosion/settlement may warrant review and decision by Level 2 Inspector to check against original plan. ☐ Any uncertainty about the integrity of the emergency spillway should be referred to a Level 2 Inspector. ☐ Erosion or settlement such that design has been compromised should be reviewed by an engineer.

PW Pond Outlet

Examine the outlet of the pipe on the downstream side of the dam/embankment where it empties into a stream, channel, or drainage system.

Problem (Check if Present)	Follow-Up Actions
 ☐ The pond outlet is clogged with sediment, trash, debris, vegetation, or is eroding, caving in, slumping, or falling apart.	☐ If there is a minor blockage, remove the debris or vegetation to allow free flow of water. ☐ Remove any accumulated trash at the outlet. ☐ Outlet: ☐ Kick-Out to Level 2 Inspection: ☐ If the area at the outlet cannot be easily accessed or if the blockage is substantial, a Level 2 Inspection is warranted. ☐ Erosion at and downstream of the outfall should be evaluated by a qualified professional. ☐ Any structural problems, such as broken pipes, structures falling into the stream, or holes or tunnels around the outfall pipe, should be evaluated by a Level 2 Inspector and will require repair by a qualified contractor. ☐ The pool of water at the outlet pipe is discolored, has an odor, or has excessive algae or vegetative growth.

Additional Notes:

Inspector:_____ Date: _____

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Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Pond and Wetland Stormwater Management Practices Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

Level 2 Inspection: PONDS and WETLANDS

Recommended Repairs and Required Skills	Triggers for Level 3 Inspection
Observed Condition: Bare Soil or Erosion in the Drainage Area	
☐ Condition 1: Extensive problem spots, but no channels or rills forming Reseed problem areas. If problem persists or grass does not take, consider hiring a landscape contractor. ☐ Condition 2: Problem is extensive, and rills/channels are beginning to form May be necessary to divert or redirect water that is causing the erosion problem. If it appears that simple regrading—such as installing a berm or leveling a low spot–will fix the problem, make repairs and ensure that the problem is repaired after the next storm.	• Large rills or gullies are forming in the drainage area. • An attempt to regrade the drainage area has been unsuccessful. • Fixing the problem would require major regrading (i.e., redirecting more than a 100-square-foot area. • It is not clear why the problem is occurring. ☐ Level 3 inspection necessary
Observed Condition: Manholes or Inlet Pipe Buried or Covered with Vegetation	
☐ Condition 1: Nearest manhole and inlet pipe not found Consult as-built drawings to get to closest suspected location and use metal detector to search for metal manhole cover. If unsuccessful, identify nearest drain inlets and approximate pipe direction to locate next manhole. ☐ Condition 2: Manhole located and inspected Never enter a manhole, except by following confined-space entry protocols. If outlet pipe is not visible or greater than 25% full of sediment/debris or trash, it will typically require a qualified contractor to flush, clean and clear blockages. ☐ Condition 3: Inlet pipe not found at pond Clear vegetation and brush that may be covering the inlet pipe. Buried inlet pipes may be found through use of a metal probe. ☐ Condition 4: Inlet pipe buried in sediment or blocked by vegetation Once located, the pipe path can be cleared of vegetation with brush hook or other brush tools. Light digging may clear sediment from the end of the pipe.	• To locate buried manholes and lost storm lines, it is sometimes necessary to hire a pipeline inspection contractor with televising equipment or ground-penetrating radar and enter at the closest upstream access point. • Locating a buried inlet pipe may require wading in the edge of the pond and using a metal probe and brush axe to find and expose the pipe. • If other than light digging is necessary to remove accumulated sediment, a contractor with heavy equipment may be required. ☐ Level 3 inspection necessary

Level 2 Inspection: PONDS and WETLANDS	
Recommended Repairs and Required Skills	**Triggers for Level 3 Inspection**
Observed Condition: Pipe or Headwall Settlement, Erosion, Corrosion or Failure	
☐ Condition 1: Pipe or headwall settlement or failure Severe sinkholes, settlement or corrosion should be kicked out to Level 3 Inspection. ☐ Condition 2: Flow not confined to pipe and visible outside pipe wall With flashlight, observe the inside of the pipe and note its condition. Take photographs. Look for sinkholes developing that indicate pipe failure beneath the surface. Kick out to Level 3 inspection.	• Where blockages are visible, a decision is needed on whether to clear them or leave in place. If a third of the pipe is full of sediment, it should be removed by a contractor with pipe-cleaning equipment. • Corrosion of inlet pipes that allows flow around the pipe exterior is a structural concern because it can lead to settlement, sinkholes and undermining pond embankment. Evidence of this type of failure may require specialized pipe-inspection equipment and investigation by an engineer. ☐ Level 3 inspection necessary
Observed Condition: Pond Conditions	
☐ Condition 1: Pond pre-treatment zone is full of sediment or not constructed as shown on as-built drawings. ☐ Condition 2: Excessive buildup of sediment or overgrowth If the pre-treatment area or pond pool is overgrown or filled with sediment so that the original design is compromised, corrective measures are required. If plants have died, then replanting is necessary. If none of the original design exists due to alteration or sediment, kick out to Level 3 inspection.	• It may require inspection by an engineer to determine next steps for clearing, replanting or reconstruction. • Erosion or settlement such that design has been compromised should be reviewed by an engineer. Recurring erosion may require redesign and/or regrading to direct flow away from eroding area. • If sediment has filled more than 50% of the pond's capacity, dredging is likely needed and should be evaluated by a qualified contractor. • Removal or control of excessive algae or aquatic plants can be assessed by a qualified pond maintenance company. ☐ Level 3 inspection necessary

Notes:

Inspector:_____ Date: _____

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Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Swale Stormwater Management Practices
Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

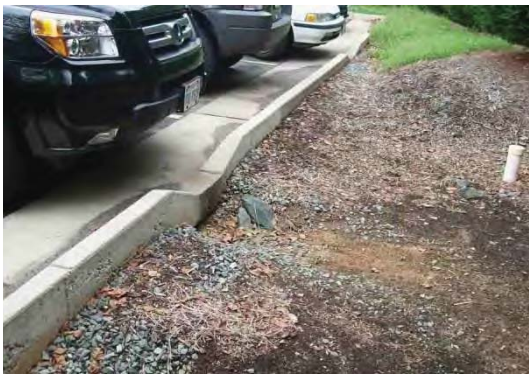
SW Drainage Area

Look at areas that are uphill from the swale.

Problem (Check if Present)	Follow-Up Actions
☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and mulch or sod areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and add seed and straw to establish vegetation. ☐ If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths
☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Other:
☐ Open containers of oil, grease, paint, or other substances	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous.
☐ Grass dying at edge of road	☐ Seed and mulch; add topsoil or compost if needed. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Grass on edge of pavement continues to die off for unknown reasons. Swale edge may need to be replaced with other materials (e.g., stone diaphragm).

SW Inlets

Stand in the swale and look for all the places where water flows in.

Problem (Check if Present)	Follow-Up Actions
☐ Inlets or the swale edge are collecting grit, grass clippings, or debris or have grass/weeds growing. Some water may not be getting into the swale. The objective is to have a clear pathway for water to flow into the swale.	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or opening). Parking lots will generate fine grit that will accumulate at these spots. ☐ Pull out clumps of growing grass or weeds, and scoop out the soil or grit that the plants are growing in. ☐ Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets or along the edge of the swale where water is supposed to enter. ☐ For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the swale. ☐ Dispose of all material properly in an area where it will not re-enter the swale. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the swale.
 ☐ Some or all of the inlets are eroding so that rills, gullies, and other erosion are present, or there is bare dirt that is washing into the swale.	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. ☐ In some cases, reseeding and applying an erosion control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. ☐ Other:
	☐ Level 2 Inspection: Erosion is occurring at most of the inlets or along much of the swale edge. The inlet design may have to be modified.

SW Surface Area

Examine the entire swale surface and side slopes.

Problem (Check if Present)	Follow-Up Actions
☐ Minor areas of sediment, grit, trash, or other debris are accumulating in the swale.	☐ Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the swale. ☐ If removing the material creates a hole or low area, fill with good topsoil and add seed and straw to re-vegetate. ☐ Remove trash, vegetative debris, and other undesirable materials. ☐ If the swale is densely vegetated, it may be difficult to do the maintenance; check for excessive ponding or other issues described in this section to see if the accumulated material is causing a problem. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 3 inches deep and covers 25% or more of the swale surface. ☐ The source of sediment is unknown or cannot be controlled with simple measures.
 ☐ There is erosion in the bottom or on the side slopes. Water seems to be carving out rills as it flows through the swale or on the slopes.	☐ Try filling the eroded areas with clean topsoil, and then seed and mulch to establish vegetation. ☐ If the problem recurs, you may have to use some type of matting, stone (e.g., river cobble), or other material to fill in eroded areas. ☐ If the erosion is on a side slope, fill with soil and cover with erosion-control matting or at least straw mulch after re-seeding.
	☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3 inches deep and seems to be an issue with how water enters and moves through the swale. ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water, but a collapse or sinking of the surface (e.g., “sinkhole”) due to some underground problem.
☐ Water does not flow evenly down the length of the swale, but ponds in certain areas for long periods of time (e.g., 72 hours after a storm). The swale does not seem to have “positive drainage.” Check during or immediately after a rain storm.	☐ If the problem is minor (just small, isolated areas), try using a metal rake or other tools to create a more even flow path; remove excessive vegetative growth, sediment, or other debris that may be blocking the flow. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Water ponds in more than 25% of the swale for three days or more after a storm. The issue may be with the underlying soil or the grade of the swale. ☐ Water ponds behind check dams for three days or more after a storm. Check dams may be clogged or not functioning properly.

SW Surface Area

Examine the entire swale surface and side slopes.

Problem (Check if Present)	Follow-Up Actions
 ☐ Check dams (if present): water is flowing around the edges of check dams, creating erosion or sinkholes on the uphill or downhill side, or the check dams are breaking apart or breaching .	☐ If the problem is isolated to just a few check dams, try simple repairs. ☐ It is very important for the center of each check dam (where most of the water flows) to be lower (by at least several inches) than the edges of the check dams where they meet the side slopes. Also, the check dams should be keyed into side slopes so water does not flow between the check dam and side slope. ☐ Use a level to check the right check-dam configuration, as noted above. Repair by moving around stone, filling and compacting soil, or adding new material so that water will be directed to the center of the check dam instead of the edges. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Many check dams are impacted and/or the problem seems to be a design issue with height, spacing, shape, or materials used to construct them.

SW Vegetation

Assess the swale vegetation.

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation is too overgrown to access swale for maintenance activities	☐ Mow or bush-hog the path. ☐ Other:

SW Vegetation

Assess the swale vegetation.

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation requires regular maintenance: pulling weeds, removing dead and diseased plants, adding plants to fill in areas that are not well vegetated, etc.	☐ If you can identify which plants are weeds or not intended to be part of the planting plan, eliminate these, preferably by hand pulling. ☐ If weeds are widespread, check with the local stormwater authority and/or Extension Office about proper use of herbicides for areas connected with the flow of water. ☐ Even vegetation that is intended to be present can become large, overgrown, block flow, and/or crowd out surrounding plants. Prune and thin accordingly. ☐ If weeds or invasive plants have overtaken the whole swale, bush-hog the entire area before seed heads form in the spring. It will be necessary to remove the root mat manually or with appropriate herbicides, as noted above. ☐ Replant with species that are aesthetically pleasing and seem to be doing well in the swale. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: You are unsure of the original planting design or the vegetation maintenance task is beyond your capabilities of time, expertise, or resources. If you are unsure of the health of the vegetation (e.g. salt damage, invasives, which plants are undesirable) or the appropriate season to conduct vegetation management, consult a landscape professional before undertaking any cutting, pruning, mowing, or brush hogging.
☐ Vegetation is too thin, is not healthy, and there are many spots that are not well vegetated.	☐ The original plants are likely not suited for the actual conditions within the swale. If you are knowledgeable about plants, select and plant more appropriate vegetation (preferably native plants) so that almost the entire surface area will be covered by the end of the second growing season. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: For all but small practices (e.g., in residential yards), this task will likely require a landscape design professional or horticulturalist.

SW Outlets

Examine outlets that release water out of the swale.

Problem (Check if Present)	Follow-Up Actions
☐ Outlet is obstructed with mulch, sediment, debris, trash, etc.	☐ Remove the debris and dispose of it where it cannot re-enter the swale. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Outlet is completely clogged or obstructed; there is too much material to remove by hand or with simple hand tools.

Additional Notes:

Inspector:_____ Date: _____

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

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Inspector/Operator: _____ Date: _____

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Swale Stormwater Management Practices
Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other _____	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

Level 2 Inspection: SWALE	
Recommended Repairs	**Triggers for Level 3 Inspection**
Observed Condition: Water Stands on Surface for More than 72 Hours after Storm	
☐ Condition 1: Small pockets of standing water Use a soil probe or auger to examine the soil profile. If isolated areas have accumulated grit, fines, or vegetative debris or have compacted soil, try scraping off top 3 to 6 inches of soil and replacing with clean material. Also check to see that surface is level and water is not ponding selectively in certain areas. ☐ Condition 2: Standing water is widespread or covers entire surface Requires diagnosis and resolution of problem: • Bad or compacted soil • Filter fabric on the swale bottom • Too much sediment/grit washing in from drainage area? • Too much ponding depth? • Longitudinal slope is too flat?	• Soil is overly compacted or clogged and problem is not evident from Level 2 inspection. • Level 2 inspection identifies problem, but it cannot be resolved easily or is associated with the original design of the practice (e.g., not enough slope down through the swale). ☐ Level 3 inspection necessary
Observed Condition: Vegetation is predominantly weeds and invasive species	
For a small area, weed and dig up invasive plants. Replant with natives or plants from original planting plan. If longer than 100 feet, develop a new planting plan and have it professionally reviewed.	• Vegetation deviates significantly from original planting plan; swale has been neglected and suffered from deferred maintenance. • Owner/responsible party does not know how to maintain the practice. • For large area, hire a professional to develop a grading plan and develop a planting plan. ☐ Level 3 inspection necessary

Notes:

Inspector:_____ Date: _____

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Inspector/Operator: _____ Date: _____

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APPENDIX E: SWPPP FORMS

Notice of Intent

Notice of Termination

Contractor Forms

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NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR ☐☐☐☐☐☐
(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-20-001

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-

RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Owner/Operator Contact Person First Name

Owner/Operator Mailing Address

City

State

Zip -

Phone (Owner/Operator) - -

Fax (Owner/Operator) - -

Email (Owner/Operator)

FED TAX ID - (not required for individuals)

Project Site Information

Project/Site Name

Street Address (NOT P.O. BOX)

Side of Street

○ **North** ○ **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)

State N Y

Zip -

County

DEC Region

Name of Nearest Cross Street

Distance to Nearest Cross Street (Feet)

Project In Relation to Cross Street

○ **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)

Y Coordinates (Northing)

4

2. What is the nature of this construction project?

○ **New Construction**

○ **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***Note**: for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	Total Area To Be Disturbed	Existing Impervious Area To Be Disturbed	Future Impervious Area Within Disturbed Area
____.__	____.__	____.__	____.__

5. Do you plan to disturb more than 5 acres of soil at any one time? ○ **Yes** ○ **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
___ %	___ %	___ %	___ %

7. Is this a phased project? ○ **Yes** ○ **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date __ / __ / ____ – **End Date** __ / __ / ____

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

9a. Type of waterbody identified in Question 9?

- ○ Wetland / State Jurisdiction On Site (Answer 9b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001? ○ **Yes** ○ **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-20-001? ○ **Yes** ○ **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ○ **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

.

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ○ **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ○ **Yes** ○ **No** ○ **Unknown**

16. What is the name of the municipality/entity that owns the separate storm sewer system?

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ **Yes** ○ **No** ○ **Unknown**

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ **Yes** ○ **No**

19. Is this property owned by a state authority, state agency, federal government or local government? ○ **Yes** ○ **No**

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ○ **Yes** ○ **No**

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ○ **Yes** ○ **No**

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ○ **Yes** ○ **No**
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ○ **Yes** ○ **No**

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ○ **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer

Contact Name (Last, Space, First)

Mailing Address

City

State Zip -

Phone - -

Fax - -

Email

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name **MI**

Last Name

Signature

Date / /

25. Has a construction sequence schedule for the planned management practices been prepared? ○ **Yes** ○ **No**

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ **Check Dams**
- ○ **Construction Road Stabilization**
- ○ **Dust Control**
- ○ **Earth Dike**
- ○ **Level Spreader**
- ○ **Perimeter Dike/Swale**
- ○ **Pipe Slope Drain**
- ○ **Portable Sediment Tank**
- ○ **Rock Dam**
- ○ **Sediment Basin**
- ○ **Sediment Traps**
- ○ **Silt Fence**
- ○ **Stabilized Construction Entrance**
- ○ **Storm Drain Inlet Protection**
- ○ **Straw/Hay Bale Dike**
- ○ **Temporary Access Waterway Crossing**
- ○ **Temporary Stormdrain Diversion**
- ○ **Temporary Swale**
- ○ **Turbidity Curtain**
- ○ **Water bars**

Biotechnical

- ○ **Brush Matting**
- ○ **Wattling**

Vegetative Measures

- ○ **Brush Matting**
- ○ **Dune Stabilization**
- ○ **Grassed Waterway**
- ○ **Mulching**
- ○ **Protecting Vegetation**
- ○ **Recreation Area Improvement**
- ○ **Seeding**
- ○ **Sodding**
- ○ **Straw/Hay Bale Dike**
- ○ **Streambank Protection**
- ○ **Temporary Swale**
- ○ **Topsoiling**
- ○ **Vegetating Waterways**

Permanent Structural

- ○ **Debris Basin**
- ○ **Diversion**
- ○ **Grade Stabilization Structure**
- ○ **Land Grading**
- ○ **Lined Waterway (Rock)**
- ○ **Paved Channel (Concrete)**
- ○ **Paved Flume**
- ○ **Retaining Wall**
- ○ **Riprap Slope Protection**
- ○ **Rock Outlet Protection**
- ○ **Streambank Protection**

Other

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ○ **Preservation of Undisturbed Areas**
- ○ **Preservation of Buffers**
- ○ **Reduction of Clearing and Grading**
- ○ **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ○ **Sidewalk Reduction**
- ○ **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ○ **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- ○ All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

☐☐☐.☐☐☐ **acre-feet**

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area (acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1) ...	___.___	and/or	___.___
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)	___.___	and/or	___.___
○ Tree Planting/Tree Pit (RR-3)	___.___	and/or	___.___
○ Disconnection of Rooftop Runoff (RR-4) ..	___.___	and/or	___.___
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			___.___
○ Rain Garden (RR-6)			___.___
○ Stormwater Planter (RR-7)			___.___
○ Rain Barrel/Cistern (RR-8)			___.___
○ Porous Pavement (RR-9)			___.___
○ Green Roof (RR-10)			___.___
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			___.___
○ Infiltration Basin (I-2)			___.___
○ Dry Well (I-3)			___.___
○ Underground Infiltration System (I-4)			___.___
○ Bioretention (F-5)			___.___
○ Dry Swale (O-1)			___.___
Standard SMPs			
○ Micropool Extended Detention (P-1)			___.___
○ Wet Pond (P-2)			___.___
○ Wet Extended Detention (P-3)			___.___
○ Multiple Pond System (P-4)			___.___
○ Pocket Pond (P-5)			___.___
○ Surface Sand Filter (F-1)			___.___
○ Underground Sand Filter (F-2)			___.___
○ Perimeter Sand Filter (F-3)			___.___
○ Organic Filter (F-4)			___.___
○ Shallow Wetland (W-1)			___.___
○ Extended Detention Wetland (W-2)			___.___
○ Pond/Wetland System (W-3)			___.___
○ Pocket Wetland (W-4)			___.___
○ Wet Swale (O-2)			___.___

Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	Total Contributing Impervious Area (acres)
○ **Hydrodynamic**	___ . ___
○ **Wet Vault**	___ . ___
○ **Media Filter**	___ . ___
○ **Other** _____	___ . ___

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name _____

Manufacturer _____

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

___ . ___ **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

○ **Yes** ○ **No**

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

___ . ___ **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

○ **Yes** ○ **No**

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

☐☐☐.☐☐☐ **acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a). ☐☐☐.☐☐☐

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ○ **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required

☐☐☐.☐☐☐ **acre-feet**

CPv Provided

☐☐☐.☐☐☐ **acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development

☐☐☐.☐☐☐ **CFS**

Post-development

☐☐☐.☐☐☐ **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

☐☐☐.☐☐☐ **CFS**

Post-development

☐☐☐.☐☐☐ **CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ○ **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP N Y R
- ○ Other
- ○ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ○ **Yes** ○ **No**
If Yes, Indicate Size of Impact. .

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ **Yes** ○ **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ **Yes** ○ **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. N Y R

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name

MI

Print Last Name

Owner/Operator Signature

Date

/ /

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4:
12. MS4 SPDES Permit Identification Number: NYR20A
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505
(NOTE: Submit completed form to address above)

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person:	4a.Telephone:

4b. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

9a. □ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP. ***Date final stabilization completed** (month/year): _____

9b. □ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ___ ___ ___ ___ ___ ___
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? □ yes □ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed? □ yes □ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

_____

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? □ yes □ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

□ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.

□ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).

□ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.

□ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? _____ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? □ yes □ no

(If Yes, complete section VI - "MS4 Acceptance" statement

V. Additional Information/Explanation:

(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:

Title/Position:

Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued	
VII. Qualified Inspector Certification - Final Stabilization:	
I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):	
I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
IX. Owner or Operator Certification	
I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2015)

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APPENDIX F: EROSION & SEDIMENT CONTROL DETAILS AND STORMWATER MANAGEMENT PLAN

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SITE CRITERIA CHECKLIST		
PROJECT SITE INFORMATION		
ADDRESS	HENNEBERRY ROAD (COUNTY ROUTE 182)	
TAX MAP ID NO.	109.-02-07.1	
BOUNDARY SURVEY	PROPERTY LINE INFORMATION TAKEN FROM SURVEY BY IANUZI AND ROMANS	
TOTAL SITE AREA	54.746 ACRES	
LAND USE	SINGLE FAMILY RESIDENTIAL – 34 LOTS	
ZONING INFORMATION		
ZONING DISTRICT	R-1, RESIDENTIAL DISTRICT	
	REQUIRED	PROVIDED
MIN. LOT FRONTAGE	150'	150' MIN.
MIN. LOT AREA	40,000 SF	40,000 SF MIN.
MINIMUM FRONT YARD	40'	40' MIN.
MINIMUM REAR YARD	40'	40' MIN.
MINIMUM SIDE YARD	20'	20' MIN.

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS — ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
OVERALL GRADING PLAN

NO.	REVISION/ISSUE	DATE
1	GENERAL REVISIONS	12/01/2021

GRAPHIC SCALE
0 80' 160'
(IN FEET)
1 inch = 80 ft

PREPARED BY:
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, NEW YORK 13104
email: NNAPIERALA@CNY.COM
PH: (315) 682-5500 FAX: (315) 682-5544

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED BY:
NEAL H. JENNETTER, JR., P.E.
NYS REGISTRATION # 087211

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE 1" = 80'

SHEET C-2

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PROFESSIONAL ENGINEER, PC
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR, TO ALTER ANY ITEM ON THIS DOCUMENT IN ANY WAY.
ANY LICENSED SPECIALISTS THAT ALTER THIS DOCUMENT SHALL ADD TO IT THEIR SEAL AND THE DESIGNATION OF THE SPECIALIST WHO MADE THE ALTERATION.

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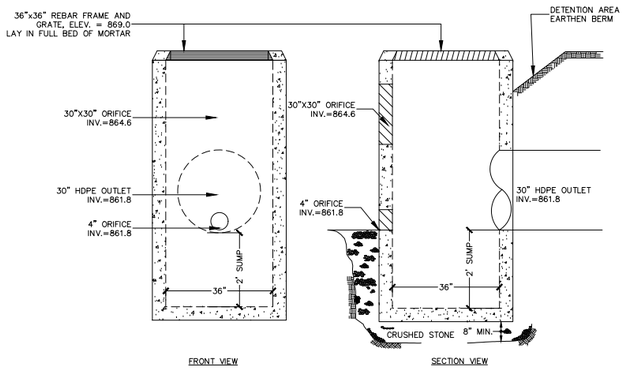
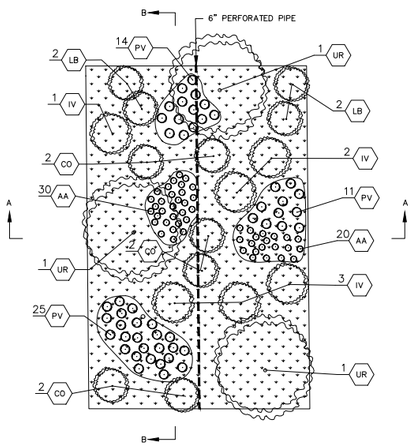


DETENTION BASIN #1 PRECAST CONCRETE OUTLET STRUCTURE

1 / C-7.1 SCALE: NTS



*PLANTING QUANTITIES SHOWN IN THE GRAPHIC ABOVE ARE FOR A TYPICAL 1,000 SF BIORETENTION AREA. SPECIFIC QUANTITIES FOR THE BIORETENTION AREA ARE PROVIDED IN THE CORRESPONDING LANDSCAPING TABLE.

BIORETENTION AREA #1 (±12,800 SF) – LANDSCAPE TABLE

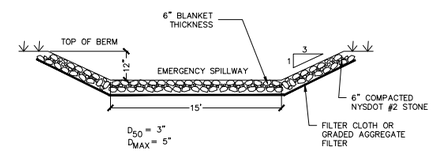
KEY	QUANTITY*	LATIN NAME	COMMON NAME	CALIPER	HEIGHT
TREES					
UR	16	ULMUS RUBRA	SLIPPERY ELM	6'–8'	B&B
SHRUBS					
LB	45	LINDERA BENZOIN	COMMON SPICE	18"–24"	B&B
IV	65	ILEX VERTICILLATA	WINTER BERRY	2'–3'	B&B
CO	65	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	18"–24"	B&B
HERBACEOUS PLANTS					
PV	600	PANICUM VIRGATUM	SWITCH GRASS		
AA	600	AGROSTIS ALBA	REDTOP		

BIORETENTION AREA #2 (±6,200 SF) – LANDSCAPE TABLE

KEY	QUANTITY*	LATIN NAME	COMMON NAME	CALIPER	HEIGHT
TREES					
UR	8	ULMUS RUBRA	SLIPPERY ELM	6'–8'	B&B
SHRUBS					
LB	25	LINDERA BENZOIN	COMMON SPICE	18"–24"	B&B
IV	35	ILEX VERTICILLATA	WINTER BERRY	2'–3'	B&B
CO	30	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	18"–24"	B&B
HERBACEOUS PLANTS					
PV	300	PANICUM VIRGATUM	SWITCH GRASS		
AA	300	AGROSTIS ALBA	REDTOP		

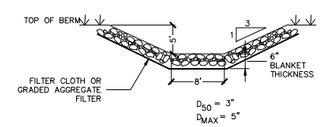
BIORETENTION FILTER SPECIES

2 / C-7.1 SCALE: NTS



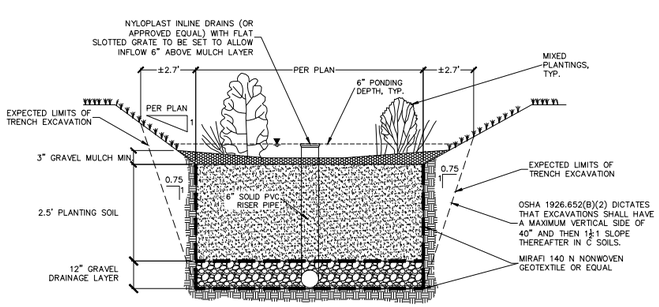
RIP RAP EMERGENCY SPILLWAY

3 / C-7.1 SCALE: NTS

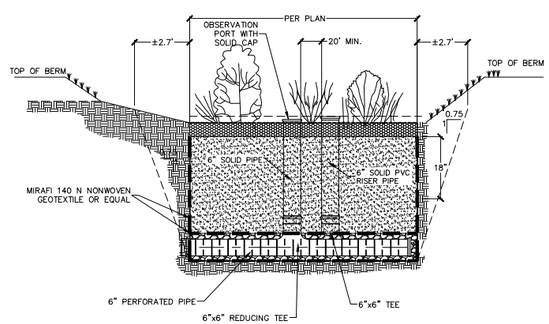


RIP RAP BIORETENTION SPILLWAY

4 / C-7.1 SCALE: NTS



PROFILE VIEW SECTION A–A



PROFILE VIEW SECTION B–B

BIORETENTION FILTER CROSS SECTIONS

5 / C-7.1 SCALE: NTS

BIORETENTION NOTES:

1. PLANTING SOIL MEDIA SHALL BE:
   A.) 85% TO 88% COARSE TO MEDIUM SAND
   B.) 12%–15% LEAF COMPOST OR TOPSOIL
2. PEA GRAVEL MULCH CONFORMING TO ASTM D 448 No. 6.
3. UNDERDRAIN GRAVEL TO BE AASHTO M–43 No. 67, 0.25" TO 0.75".
4. GEOTEXTILE FILTER FABRIC (SEPARATION LAYER):
   ASTM D–751 (PUNCTURE STRENGTH – 125 LB)
   ASTM D–1117 (MULLEN BURST STRENGTH – 400 PSI)
   ASTM D–1682 (TENSILE STRENGTH – 300 LB)
   SIZE – 0.08" THICK; EQUIVALENT OPENING SIZE OF #80 SIEVE
5. COMPACT WITH WATER–FILLED HAND ROLLER. COMPACTION TO BE FIRM BUT EASY (UTILIZE PENCIL TEST).
6. ENGINEER TO TEST IN PLACE COMPACTION AND INFILTRATION OF PLANTING SOIL.
7. ENGINEER TO PERFORM INSPECTION OF BIORETENTION PLANTING SOIL IMMEDIATELY FOLLOWING PLACEMENT AND PERFORM AN IN PLACE PERCOLATION TEST TO CONFIRM THAT THE IN PLACE MATERIAL PERCOLATES AT A RATE FASTER THAN 10 MIN/INCH.

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2
HENNEBERRY ROAD
TOWN OF MANLIUS ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
SITE DETAILS

NO.	REVISION/ISSUE	DATE
1	GENERAL REVISIONS	12/01/2021

PREPARED BY:
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, New York 13104
email: MNAPIER@NPCONS.COM
PH.: (315) 682-5580 FAX: (315) 682-5544

PRELIMINARY
NOT FOR CONSTRUCTION

PE-SEAL BY:
NEAL F. ZIMMERMYER, JR. P.E.
NYS REGISTRATION # 087211

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE AS SHOWN

SHEET C-7.1

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IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR SHALL AFFIX TO THE ITEM THE STAMP OF THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR AND A DESCRIPTION OF THE ALTERATION.

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EROSION CONTROL NOTES

EROSION AND SEDIMENT CONTROLS

1. STABILIZATION PRACTICES (TEMPORARY)
   a) TEMPORARY SEEDING AND PLANTING OF ALL UNPAVED AREAS WHEN CONSTRUCTION ACTIVITY HAS CEASED, OR WILL CEASE, IN AN AREA FOR 14 DAYS. SEEDING MIXTURES AND APPLICATION RATES ARE LISTED ON SHEET C–2.
   b) MULCHING EXPOSED AREAS.
   c) FREQUENT WATERING TO MINIMIZE WIND EROSION DURING CONSTRUCTION.

2. STABILIZATION PRACTICES (PERMANENT)
   a) LAND CLEARING ACTIVITIES SHALL BE DONE ONLY IN AREAS WHERE EARTHWORK WILL BE PERFORMED AND SHALL PROGRESS AS EARTHWORK IS NEEDED.
   b) PERMANENT SEEDING AND PLANTING OF ALL UNPAVED AREAS.

3. STRUCTURAL MEASURES TEMPORARY
   a. STABILIZED CONSTRUCTION ENTRANCE: AT THE ENTRANCE TO THE ALL DISTURBED AREAS FROM AN EXISTING ROADWAY A STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROVIDED. THE PURPOSE OF THE STABILIZED CONSTRUCTION ENTRANCE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO THE PUBLIC RIGHT–OF–WAY.
   b. SILT FENCE: SILT FENCE SHALL BE INSTALLED AS SHOWN ON THE EROSION CONTROL PLAN . THE FABRIC SHALL MEET THE SPECIFICATIONS NOTED ON THE DETAILS UNLESS OTHERWISE APPROVED BY THE APPROPRIATE EROSION AND SEDIMENT CONTROL PLAN APPROVAL AUTHORITY. SUCH APPROVAL SHALL NOT CONSTITUTE STATEWIDE ACCEPTANCE.
   c. DUST CONTROL: DUST CONTROL IS THE CONTROL OF DUST RESULTING FROM LAND–DISTURBING ACTIVITIES. THE PURPOSE IS TO PREVENT SURFACE AND AIR MOVEMENT OF DUST FROM DISTURBED SOIL SURFACES THAT MAY CAUSE OFF–SITE DAMAGE, HEALTH HAZARDS, AND TRAFFIC SAFETY PROBLEMS.
   d. SEDIMENT TRAP: SEDIMENT TRAP TO BE INSTALLED IN DETENTION BASIN AREA FOR USE DURING CONSTRUCTION. STONE OUTLET SEDIMENT TRAP TO BE INSTALLED AS PER DETAIL TO ELIMINATE SEDIMENT DISCHARGE TO DOWNSTREAM AREAS DURING CONSTRUCTION PHASE.

4. STRUCTURAL PRACTICES (PERMANENT)
   a. ROCK OUTLET PROTECTION: ROCK OUTLET PROTECTION IS A SECTION OF ROCK PROTECTION PLACED AT THE OUTLET END OF CULVERTS, CONDUITS, OR CHANNELS. THE PURPOSE OF THE ROCK OUTLET PROTECTION IS TO REDUCE THE DEPTH, VELOCITY, AND ENERGY OF WATER, SUCH THAT THE FLOW WILL NOT ERODE THE RECEIVING DOWNSTREAM REACH.
   b. REINFORCED SLOPE PROTECTION: A TEMPORARY PROTECTIVE COVERING PLACED ON A PREPARED PLANTING AREA THAT IS ANCHORED IN PLACE BY STAPLES OR OTHER MEANS TO AID IN CONTROLLING EROSION BY ABSORBING RAIN SPLASH ENERGY AND WITHSTAND OVERLAND FLOW AS WELL AS PROVIDE A MICROCLIMATE TO PROTECT AND PROMOTE SEED ESTABLISHMENT.
   c. LAND GRADING: PERMANENT RESHAPING OF THE EXISTING LAND SURFACE BY GRADING IN ACCORDANCE WITH AN ENGINEERING TOPOGRAPHIC PLAN AND SPECIFICATION TO PROVIDE EROSION CONTROL AND VEGETATIVE ESTABLISHMENT ON DISTURBED, RESHAPED AREAS.

5. SEQUENCE OF MAJOR ACTIVITIES
   THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING THE ABOVE LISTED EROSION AND SEDIMENT CONTROL PRACTICES. THE CONTRACTOR MAY DESIGNATE THESE TASKS TO CERTAIN SUBCONTRACTORS AS IS SEEN FIT, BUT THE ULTIMATE RESPONSIBILITY FOR IMPLEMENTING THESE CONTROLS AND ENSURING THEIR PROPER FUNCTION REMAINS WITH THE CONTRACTOR. THE ORDER OF ACTIVITIES WILL BE AS FOLLOWS:
   a) CONDUCT PRECONSTRUCTION MEETING
   b) CONSTRUCT TEMPORARY CONSTRUCTION ENTRANCE/EXIT AT THE LOCATION SHOWN ON THE PLAN.
   c) INSTALL PERIMETER SILT FENCE AND SECURITY CONSTRUCTION FENCE IN THE LOCATIONS SHOWN ON THE PLAN.
   d) ESTABLISH STAGING AREA ON PROJECT SITE
   e) CONSTRUCT TEMPORARY SEDIMENT TRAP
   f) REMOVE TOPSOIL, STOCKPILE AND STABILIZE
   g) SITE GRADING. IMPORT OF FILL MATERIAL TO RAISE SITE TO PROPOSED GRADE (OR SUB–GRADE, AS APPROPRIATE).
   h) BUILDING FOUNDATION EXCAVATION (BUILDING CONSTRUCTION TO CONTINUE CONCURRENTLY WITH REMAINING SITE WORK).
   i) DISTURBED AREAS OF THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED FOR MORE THAN 14 DAYS SHALL BE TEMPORARILY SEEDED AND WATERED.
   j) UNDERGROUND UTILITY INSTALLATIONS.
   k) INSTALL FILTER FABRIC DROP INLET PROTECTION AT ALL STORM INLETS.
   l) COMPACT GRAVEL ALONG ALL DRIVE AISLES AND PARKING AREAS
   m) SITE CONCRETE CONSTRUCTION.
   n) FINALIZE PAVEMENT SUBGRADE PREPARATION.
   o) REMOVE INLET PROTECTION NO MORE THAN 24 HOURS PRIOR TO PLACING ASPHALT PAVEMENT.
   p) PAVE AREAS NOTED ON PLAN.
   q) DEEP RIPPING OF NON–PAVED AREAS AS REQUIRED (NON–PAVED AREAS THAT HAVE BEEN COMPACTED DURING CONSTRUCTION VIA CONSTRUCTION TRAFFIC).
   r) FINAL GRADING, SEEDING, AND PLANTING.
   s) CONSTRUCT BIORETENTION BASINS AND OUTLET CONTROLS UPON UPSTREAM STABILIZATION OF SITE
   t) REMOVE SEDIMENT TRAP AND FINALIZE GRADING OF DETENTION BASIN
   u) REMOVE SILT FENCE ONLY AFTER ALL PAVING IS COMPLETE AND EXPOSED SURFACES ARE STABILIZED.

MAINTENANCE/INSPECTION PROCEDURES

THE FOLLOWING INSPECTION AND MAINTENANCE PRACTICES WILL BE USED TO MAINTAIN EROSION AND SEDIMENT CONTROLS AND STABILIZATION MEASURES.

1. ALL CONTROL MEASURES WILL BE INSPECTED AT LEAST TWICE EVERY SEVEN (7) CALENDAR DAYS
2. ALL MEASURES WILL BE MAINTAINED IN GOOD WORKING ORDER; IF REPAIRS OR OTHER EROSION CONTROL MEASURES ARE FOUND TO BE NECESSARY, THEY WILL BE INITIATED WITHIN 24 HOURS OF REPORT.
3. BUILT UP SEDIMENT WILL BE REMOVED FROM SILT FENCE WHEN IT HAS REACHED ONE–THIRD THE HEIGHT OF THE FENCE.
4. SILT FENCES WILL BE INSPECTED FOR DEPTH OF SEDIMENT, TEARS, ETC., TO SEE IF THE FABRIC IS SECURELY ATTACHED TO THE FENCE POSTS, AND TO SEE THAT THE FENCE POSTS ARE SECURELY IN THE GROUND.
5. TEMPORARY AND PERMANENT SEEDING AND ALL OTHER STABILIZATION MEASURES WILL BE INSPECTED FOR BARE SPOTS, WASHOUTS, AND HEALTHY GROWTH.
6. A MAINTENANCE INSPECTION REPORT WILL BE MADE AFTER EACH INSPECTION. COPIES OF THE REPORT FORMS TO BE COMPLETED BY THE INSPECTOR ARE INCLUDED IN THIS SWPPP.
7. THE OPERATOR SHALL HAVE A "QUALIFIED PROFESSIONAL" CONDUCT SITE INSPECTIONS FOLLOWING THE COMMENCEMENT OF CONSTRUCTION. A "QUALIFIED PROFESSIONAL" IS A PERSON KNOWLEDGEABLE IN THE PRINCIPLES AND PRACTICE OF EROSION AND SEDIMENT CONTROLS, SUCH AS A LICENSED PROFESSIONAL ENGINEER, CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC), OR SOIL SCIENTIST.
8. DISTURBED AREAS AND MATERIALS STORAGE AREAS WILL BE INSPECTED FOR EVIDENCE OF OR POTENTIAL FOR POLLUTANTS ENTERING STORMWATER SYSTEMS.
9. REPORT TO NYS DEC WITHIN 24 HOURS ANY NONCOMPLIANCE WITH THE SWPPP THAT WILL ENDANGER PUBLIC HEALTH OR THE ENVIRONMENT. FOLLOW UP WITH A WRITTEN REPORT WITHIN 5 DAYS OF THE NONCOMPLIANCE EVENT. THE FOLLOWING EVENTS REQUIRE 24 HOUR REPORTING: A) ANY UNANTICIPATED BYPASS WHICH EXCEEDS ANY EFFLUENT LIMITATION IN THE PERMIT, B) ANY UPSET WHICH EXCEEDS ANY EFFLUENT LIMITATION IN THE PERMIT, AND C) A VIOLATION OF A MAXIMUM DAILY DISCHARGE LIMITATION FOR ANY OF THE POLLUTANTS LISTED BY THE EPA IN THE PERMIT TO BE REPORTED WITHIN 24 HOURS. THE WRITTEN SUBMISSION MUST CONTAIN A DESCRIPTION OF THE NON–COMPLIANCE AND ITS CAUSE; THE PERIOD OF NON–COMPLIANCE, INCLUDING EXACT DATES AND TIMES, AND IF THE NON–COMPLIANCE HAS NOT BEEN CORRECTED, THE ANTICIPATED TIME IT IS EXPECTED TO CONTINUE; AND STEPS TAKEN OR PLANNED TO REDUCE, ELIMINATE, AND PREVENT RECURRENCE OF THE NON–COMPLIANCE.
10. RELEASES OF HAZARDOUS SUBSTANCES OR OIL IN EXCESS OF REPORTABLE QUANTITIES (AS ESTABLISHED UNDER 40 CFR 110, 40 CFR 117 OR 40 CFR 302) MUST BE REPORTED. FORM G–1 PROVIDES FURTHER DETAILS ON THE NOTIFICATION AND REPORTING PROCESS.

INSPECTION AND MAINTENANCE REPORT FORMS

ONCE INSTALLATION OF ANY REQUIRED OR OPTIONAL EROSION CONTROL DEVICE OR MEASURE HAS BEEN IMPLEMENTED, AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND SHALL BE PERFORMED BY A QUALIFIED PROFESSIONAL. THE FORMS FOUND IN THIS SWPPP SHALL BE USED BY THE INSPECTORS TO INVENTORY AND REPORT THE CONDITION OF EACH MEASURE TO ASSIST IN MAINTAINING THE EROSION AND SEDIMENT CONTROL MEASURES IN GOOD WORKING ORDER.

THESE REPORT FORMS SHALL BECOME AN INTEGRAL PART OF THE SWPPP AND SHALL BE MADE READILY ACCESSIBLE TO GOVERNMENTAL INSPECTION OFFICIALS, THE OPERATOR'S ENGINEER, AND THE OPERATOR FOR REVIEW UPON REQUEST DURING VISITS TO THE PROJECT SITE. IN ADDITION, COPIES OF THE REPORTS SHALL BE PROVIDED TO ANY OF THESE PERSONS, UPON REQUEST, VIA MAIL OR FACSIMILE TRANSMISSION. INSPECTION AND MAINTENANCE REPORT FORMS ARE TO BE MAINTAINED BY THE PERMITTEE FOR FIVE YEARS FOLLOWING THE FINAL STABILIZATION OF THE SITE.

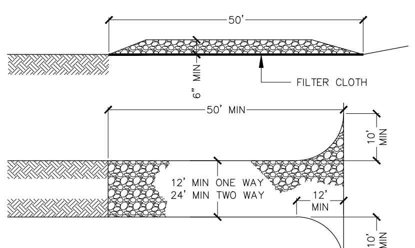
OTHER RECORD–KEEPING REQUIREMENTS

THE CONTRACTOR SHALL KEEP THE FOLLOWING RECORDS RELATED TO CONSTRUCTION ACTIVITIES AT THE SITE:

– DATES WHEN MAJOR GRADING ACTIVITIES OCCUR AND THE AREAS WHICH WERE GRADED
– DATES AND DETAILS CONCERNING THE INSTALLATION OF STRUCTURAL CONTROLS
– DATES WHEN CONSTRUCTION ACTIVITIES CEASE IN AN AREA
– DATES WHEN AN AREAS IS STABILIZED, EITHER TEMPORARILY OR PERMANENTLY
– DATES OF RAINFALL AND THE AMOUNT OF RAINFALL
– DATES AND DESCRIPTIONS OF THE CHARACTER AND AMOUNT OF ANY SPILLS OF HAZARDOUS MATERIALS
– RECORDS OF REPORTS FILED WITH REGULATORY AGENCIES IF REPORTABLE QUANTITIES OF HAZARDOUS MATERIALS SPILLED

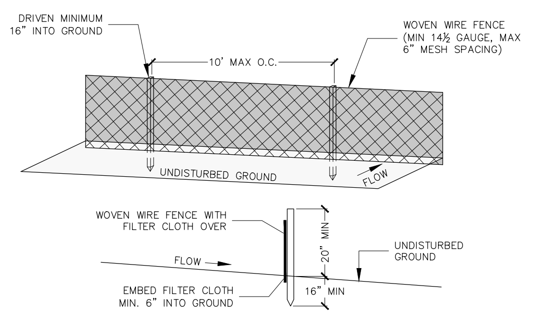
EROSION CONTROL NOTES

1. LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY GOVERNING AUTHORITIES. THE GENERAL CONTRACTOR SHALL STRICTLY ADHERE TO THE APPROVED SWPPP DRAWINGS DURING CONSTRUCTION OPERATIONS.
2. NO LAND CLEARING OR GRADING SHALL BEGIN UNTIL THE APPROPRIATE EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
3. ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 7 DAYS OF FINAL GRADING.
4. SHOULD CONSTRUCTION STOP FOR LONGER THAN 14 DAYS, THE SITE SHALL BE SEEDED AS SPECIFIED.
5. MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN AND AT LEAST ONCE A WEEK.
6. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
7. GENERAL CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
8. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON SITE INSPECTION.
9. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
11. ALL WORK TO BE DONE IN STRICT ACCORDANCE WITH THE NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.



1. STONE SIZE – USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – NOT LESS THAN 50 FEET.
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – 24 FEET MINIMUM.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

1 CONSTRUCTION ENTRANCE
C–7.2 SCALE: NTS



POSTS: STEEL, EITHER "T" OR "U" TYPE OR 2" HARDWOOD

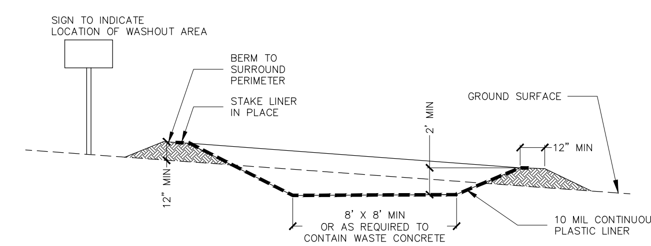
FENCE: WOVEN WIRE, 14 1/2 GAUGE, 6" MAX. MESH OPENING

FILTER CLOTH: FILTER X., MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL

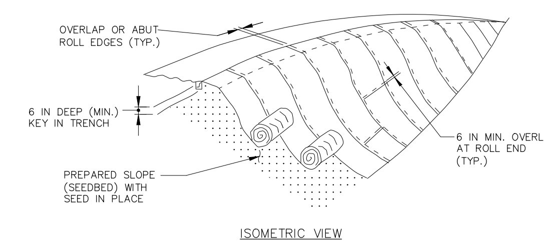
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

2 SILT FENCE
C–7.2 SCALE: NTS



NOTES:
1. CONCRETE WAHSOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.
2. CONCRETE WASHOUT OUT AREA SHALL BE LINED WITH A 10 MIL IMPERMEABLE LINER AND STAKED IN PLACE.
3. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE LOCATION OF CONCRETE WASHOUT AREA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
4. THE CONCRETE WAHSOUT AREA SHALL BE REPAIRED AND ENLARGED OR CLEANED OUT AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
5. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM SITE AND DISPOSED OF AT AN ACCEPTED WASTE SITE.
6. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, THE DISTURBED AREA SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED.

3 CONCRETE WASHOUT AREA
C–7.2 SCALE: NTS

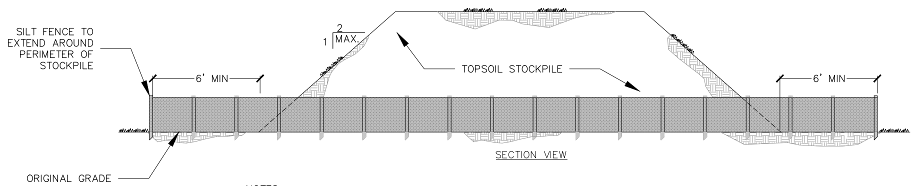


ISOMETRIC VIEW

CONSTRUCTION SPECIFICATIONS

1. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN–MADE FIBERS (MOSTLY ORGANIC).
2. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION & SEDIMENT CONTROL PLAN.
3. OVERLAP OR ABUT ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSLOPE MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.

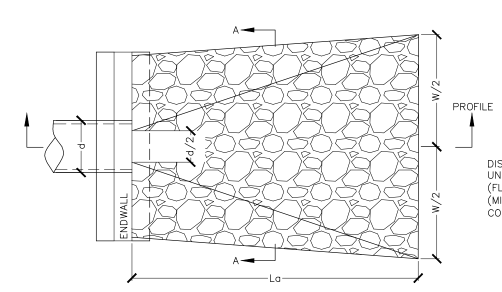
4 SLOPE STABILIZATION MATTING
C–7.2 SCALE: NTS



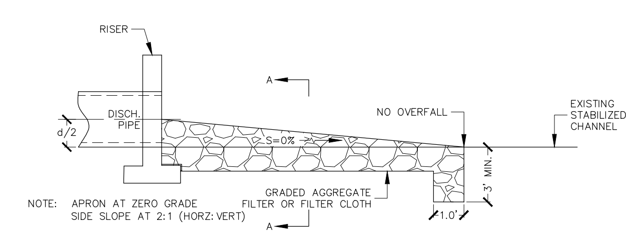
SECTION VIEW

NOTES:
1. SEE EROSION CONTROL PLAN FOR LOCATION OF STOCKPILE
2. REFER TO SILT FENCE DETAIL FOR INSTALLATION OF SILT FENCE
3. IF THE STOCKPILE IS TO REMAIN FOR MORE THAN 14 DAYS IT SHALL BE TEMPORARILY SEEDED FOR STABILIZATION
4. SILT FENCES TO BE MAINTAINED IN PLACE UNTIL TOPSOIL STOCKPILE HAS BEEN REMOVED

5 TYPICAL TOPSOIL STOCKPILE
C–7.2 SCALE: NTS

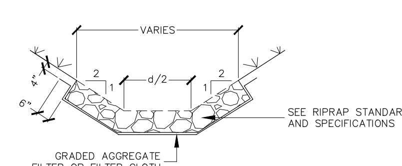


PLAN VIEW



NOTE: APRON AT ZERO GRADE SIDE SLOPE AT 2:1 (HORZ: VERT)

PROFILE VIEW



CROSS SECTION A–A

6 ROCK RIPRAP OUTLET PROTECTION UNCONFINED DOWNSTREAM SECTION
C–7.2 SCALE: NTS

PROJECT TITLE:
BRANDYWINE ESTATES PHASE 2 HENNEBERRY ROAD
TOWN OF MANLIUS ONONDAGA COUNTY, NY

PREPARED FOR:
HARRINGTON HOMES
3848 HENNEBERRY ROAD
JAMESVILLE, NY 13078

SHEET TITLE:
SITE DETAILS

NO.	REVISION/ISSUE	DATE
1	GENERAL REVISIONS	12/01/2021

PREPARED BY:
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, P.C.
SITE • DESIGN • ENGINEERING
110 FAYETTE STREET
MANLIUS, NEW YORK 13104
email: MNAP@NAPCON.COM
PH: (315) 682-5580 FAX: (315) 682-5544

PRELIMINARY
NOT FOR CONSTRUCTION

PLAN SEAL BY:
NEAL H. ZINSMEYER, JR., P.E.
NYS REGISTRATION # 087211

COPYRIGHT © 2020
NAPIERALA CONSULTING
PROFESSIONAL ENGINEER, PC

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ARCHITECT, PROFESSIONAL ENGINEER, LANDSCAPE ARCHITECT, OR LAND SURVEYOR TO ALTER ANY ITEM ON THIS DOCUMENT IN ANY WAY.

ANY LICENSEE WHO ALTERS THIS DOCUMENT IS REQUIRED BY LAW TO AFFIX HIS OR HER SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS OR HER SIGNATURE AND SPECIFIC DESCRIPTION OF THE ALTERATIONS.

PROJECT NO. 20-1906
DATE 17 SEP 2020
SCALE AS SHOWN
SHEET C-7.2

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APPENDIX G: SHPO AND NYSDEC LETTERS

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
P: (518) 402-8935 | F: (518) 402-8925
www.dec.ny.gov

September 1, 2020

Neal Zinsmeyer
Napierala Consulting
110 Fayette Street
Manlius, NY 13104

Re: Brandywine Phase 2
County: Onondaga Town/City: Manlius

Dear Mr. Zinsmeyer:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

We have no records of rare or state-listed animals or plants, or significant natural communities at the project site.

Within 2.5 miles of the project site is a documented winter hibernaculum of **Indiana Bat** (*Myotis sodalis*, state and federally listed as Endangered) and **Northern long-eared Bat** (*Myotis septentrionalis*, state and federally listed as Threatened). These bat species may travel 2.5 miles or more from documented locations. The main impact of concern for bats is the removal of potential roost trees. For information about any permit considerations for your project, please contact the Permits staff at the NYSDEC Region 7 Office, Division of Environmental Permits, at dep.r7@dec.ny.gov, 315-426-7438.

For most sites, comprehensive field surveys have not been conducted. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other resources may be required to fully assess impacts on biological resources.

For information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the Permits staff at the NYSDEC Region 7 Office as described above.

Sincerely,

Nicholas Conrad
Information Resources Coordinator
New York Natural Heritage Program

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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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NEW YORK STATE OF OPPORTUNITY. | Parks, Recreation and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

ARCHAEOLOGY COMMENTS

Phase IA/IB Archaeological Survey Recommendation
Project: Harrington Homes Residential Subdivision
PR#: 20PR05587
Date: 9/18/2020

Your project is in an archaeologically sensitive location. Therefore, the State Historic Preservation Office/Office of Parks, Recreation and Historic Preservation (SHPO/OPRHP) recommends a Phase IA/IB archaeological survey for components of the project that will involve ground disturbance, unless substantial prior ground disturbance can be documented. A Phase IA/IB survey is designed to determine the presence or absence of archaeological sites or other cultural resources in the project's Area of Potential Effects (APE).

If you consider the entire project area to be disturbed, documentation of the disturbance will need to be reviewed by SHPO/OPRHP. Examples of disturbance include mining activities and multiple episodes of building construction and demolition. Documentation of ground disturbance typically consists of soil bore logs, photos, or previous project plans. Agricultural activity is not considered to be substantial ground disturbance.

Please note that in areas with alluvial soils or fill archaeological deposits may exist below the depth of superficial disturbances such as pavement or even deeper disturbances, depending on the thickness of the alluvium or fill. Evaluation of the possible impact of prior disturbance on archaeological sites must consider the depth of potentially culture-bearing deposits and the depth of planned disturbance by the proposed project.

Our office does not conduct archaeological surveys. A 36 CFR 61 qualified archaeologist should be retained to conduct the Phase IA/IB survey.

Please also be aware that a Section 233 permit from the New York State Education Department (SED) may be necessary before archaeological fieldwork is conducted on State-owned land. If any portion of the project includes the lands of New York State, you should contact the SED before initiating survey activities. The SED contact is Christina Rieth and she can be reached at (518) 402-5975 or christina.rieth@nysed.gov. Section 233 permits are not required for projects on private land.

If you have any questions concerning archaeology, please contact Tim Lloyd at Timothy.Lloyd@parks.ny.gov

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ABUNDANT Solar Power Inc.
700 West Metro Park, Ground Level
Rochester, New York
14623-2678
Tel: 202 818 9194

ABUNDANT Solar Energy Inc.
Suite 900, 2235 Sheppard Ave E.
Toronto, ON M2J 5B5
Tel: 1 416 494 9559
www.abundantsolarenergy.com

Chairman Joe Lupia
Town of Manlius Planning Board
301 Brooklea Drive, Fayetteville,
NY 13066

Thursday Dec 16th, 2021

Dear Chairman Lupia

Please find enclosed an updated preliminary site plan for the Town of Manlius Closed Landfill Solar project at 5701 Bowman Road, Manlius NY, known as Abundant Solar Power (M1) LLC. In our last presentation to the planning board a number of issues were raised for clarification. We believe that in the intervening weeks we have provided responses and or updates to all the identified issues raised.

Our re- submission consists of the following documents:

1. Updated site plan, stamped by Barton & Loguidice
    a. Identifying recently surveyed vent positions on the landfill cap
    b. Reflecting 10 ft setbacks on all sides at vent positions to allow for testing access
    c. Newly defined access pathways around the perimeter of the cap to facilitate testing per Town requirements
2. No conflict letter sent to the Town Supervisor November 24, 2021.
3. Legal description forwarded to the Town Board attorney Tim Frateschi for appending to the lease document as previously discussed and committed to at the Town Board. Other lease related issues raised by the planning board were also discussed with Tim Frateschi. No changes are being brought forward at this time.
4. Decommissioning Bond language sample shared with the Planning board and Town attorney Tim Frateschi. Please also note that we believe ourselves to be in compliance with the Town code regarding the same as outlined below.

    155-27.2 Solar photovoltaic energy systems

    155-27.2(D)(3)(b)[16]

    Reclamation bond. A reclamation bond, for a term and in an amount to be determined during special use permit review, shall be filed with the Town Clerk to cover the costs of reclamation of the site. The amount shall be commensurate with the DRP (decommissioning and removal plan) submitted by the applicant.

5. Site Operations and Maintenance Plan prepared for the array.
6. Proof of coordination with the local utility, National Grid, for the project.
7. Equipment cut sheets for the solar voltaic panels, inverters, and racking equipment proposed for the array.

Please note that all the site plan changes have been designed by Barton and Loguidice based on further discussions with the Town's designated engineer, Doug Miller and reflect the solution to his concerns regarding continued site accessibility for site monitoring.

ABUNDANT Solar Power Inc.
700 West Metro Park, Ground Level
Rochester, New York
14623-2678
Tel: 202 818 9194

ABUNDANT Solar Energy Inc.
Suite 900, 2235 Sheppard Ave E.
Toronto, ON M2J 5B5
Tel: 1 416 494 9559
www.abundantsolarenergy.com

Please let me know if there are any other requirements or questions that you might have.

Sincerely,

M. Clark

Melissa Clark
VP Business Development
Abundant Solar Power

Mobile: 416 917 5667
Melissa.clark@abundantsolarenergy.com

The following Table of Contents can be inserted into the previous submission package for ease of review. The full sized drawing replaces the drawing in Exhibit A. All other documents can be inserted into Exhibit I

Manlius Closed Landfill Solar Array Project
Abundant Solar Power (M1) LLC
Special Permit Application

Table of Contents

Exhibit A – Detailed Site Plan

Exhibit B – Survey Map

Exhibit C – Legal Description

Exhibit D – SWPPP (Intentionally Left Blank)

Exhibit E – SEQRA Type 2 Action Explanation and EAF

Exhibit F – Freshwater Wetlands Permit

Exhibit G – Professional Fees Reimbursement Agreement

Exhibit H – Disclosure Affidavit

Exhibit I – Additional Project Information

i. Decommissioning Plan
ii. No Conflict Letter from Barton & Loguidice
iii. Legal Description for Lease Agreement
iv. Decommissioning Bond Language Sample
v. Site Operations and Maintenance Plan
vi. Proof of Coordination with Local Utility
vii. Equipment Cut Sheets for the Project

LEGEND

- PROPERTY BOUNDARY
- LIMITS OF DELINEATED WETLANDS
- 100 FOOT WETLAND OFFSET
- OPEN WETLAND BOUNDARY
- MAJOR CONTOUR
- MINOR CONTOUR
- EXISTING GAS VENT 10 FOOT BUFFER
- MONITORING WELL
- MANHOLE
- PROPOSED SOLAR PANEL
- PROPOSED BALLAST FENCE
- OHE — PROPOSED OVERHEAD ELECTRIC
- UGE — PROPOSED UNDERGROUND ELECTRIC
- PROPOSED EQUIPMENT PAD

N

TRUE OR CALLED NORTH

SURVEY NOTE

1. BASE MAPPING COMPILED FROM NYSGIS CLEARING HOUSE PARCEL DATA, ORTHO IMAGERY, AND 2017 LIDAR DATASETS. INFORMATION FOR REFERENCE ONLY AND SHOULD BE CONSIDERED APPROXIMATE.

NOTES

1. SOLAR ARRAY LOCATION SHOWN SHOULD BE CONSIDERED APPROXIMATE AND SHALL BE CONFIRMED BY FIELD CONDITIONS.
2. EXISTING GROUNDCOVER SHALL BE MAINTAINED/REPLACED IN BETWEEN SOLAR PANELS TO MAINTAIN THE LANDFILL CAPPING SYSTEM INTEGRITY.
3. SOLAR ARRAY SHALL BE SET BACK 40 FEET FROM ROAD AND NOT EXCEED 20 FEET HEIGHT AS PER ZONING DISTRICT REQUIREMENTS.
4. LOT SIZE = 17.5 ACRES
5. SYSTEM SIZE = 5,435/4,350 (DC/AC) kW

TOWN OF MANLIUS CODE REQUIREMENTS

REQUIREMENT	CODE VALUE(MIN OR MAX)	PLAN VALUE
FRONT YARD SETBACK	50 Ft	235 Ft
SIDE YARD SETBACK	50 Ft	105 Ft
REAR YARD SETBACK	50 Ft	120 Ft
MAXIMUM HEIGHT OF ARRAY	20FT	9Ft

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION".

REVISIONS

1	GENERAL REVISIONS 12/01/21

ABUNDANT SOLAR POWER
TOWN OF MANLIUS LANDFILL SOLAR ARRAY

PROPOSED SOLAR LAYOUT

TOWN OF MANLIUS — ONONDAGA COUNTY, NEW YORK

Barton & Loguidice

STATE OF NEW YORK — CHAD W. HUFFMAN — 082071 — LICENSED PROFESSIONAL ENGINEER

Date: NOVEMBER 2021

Scale: 1" = 120'

Sheet Number: FIGURE 1

File Number: 2271.004.001

Checked by: GWH Drawn by: TSC Designed by: ZTP In charge of: CJM

Plotted: Dec 16, 2021 – 10:22AM SYR By: JGS
Z:\BL-Vault\D2\18217A02-1C71-4823-8927-9995C4D54147\D\2216000-2216999\2216434\L\L\2271.004.001 Manlius Solar Array Proposed Plan (ID 2216434).dwg

Barton & Loguidice

November 24, 2021

Edmond J. Theobald
Manlius Town Supervisor
301 Brooklea Drive
Fayetteville, New York 13066

Re: Abundant Solar Energy, Inc. Community Solar Project
File: 2271.004.001

Dear Mr. Theobald:

As you are aware, Barton & Loguidice, D.P.C. (B&L), has been retained by Abundant Solar Energy, Inc. (Abundant) to provide engineering assistance for a proposed community solar project at the closed Town of Manlius Landfill. B&L has also been retained by the Town of Manlius to perform unrelated consulting services in the past and is currently retained by the Town for assistance with the Comprehensive Plan and a water district planning project.

We are writing to inform the Town, as a past and current client, of our involvement in the project on behalf of Abundant. We understand that the Town has a term services agreement with an engineering consultant outside of B&L to review, on the Town's behalf, any documents generated in support of this project. We also acknowledge that if the Town should require additional engineering consulting services related to their review and approval of the proposed project, B&L would recuse ourselves from consideration to perform these services.

Although our role in the project is not on behalf of the Town, our objective is to apply our knowledge of the Town of Manlius landfill site as well as our overall landfill expertise to ensure that the project design is protective of the existing landfill capping system, which we believe is a benefit to the Town as well as Abundant.

Should you have any questions or comments regarding our involvement in the above referenced project, please do not hesitate to contact me at 315-457-5200.

Sincerely,

BARTON & LOGUIDICE, D.P.C.

Timothy Bolan, P.E.
Vice President

JMB2/jms
cc: Tim Frateschi, Attorney for the Town of Manlius
Joseph Lupia, Chairman – Town of Manlius Planning Board
Jamie Sutphen, Esq. – Attorney for the Town of Manlius Planning Board
Melissa Clark – Abundant Solar Energy, Inc.

ABUNDANT SOLAR
PROPOSED LEASE PARCEL DESCRIPTION

All that tract or parcel of land situate in part of part of Military Lot 53, Town of Manlius, County of Onondaga, State of New York, all as shown on a map entitled "Abundant Solar Energy, Inc Lease Parcel within lands owned by the Town of Manlius, being 5701 Bowman Road Alta/Nsps Land Title Survey"", prepared by Costich Engineering, D.P.C., having drawing number 8175 VT100, dated 09/27/2021, and being more particularly bounded and described as follows:

Commencing at a point being the northeast corner of lands now or formerly owned by Steven Sturick having T.A. # 74.00-01-05 and the northwest corner of lands now or formerly owned by the Town of Manlius having T.A. # 74.00-01-06.1, said point also being a point on the south right-of-way line of Bowman Road (Width Varies); thence

A. S13°01'59"E, along a tie line and through said lands now or formerly owned by the Town of Manlius a distance of 375.18 feet to the point and place of beginning; thence

1. S80°26'49"E, a distance of 96.58 feet to a point; thence
2. S43°47'56"E, a distance of 330.60 feet to a point; thence
3. S86°10'25"E, a distance of 332.66 feet to a point; thence
4. S46°02'15"E, a distance of 70.49 feet to a point; thence
5. S71°54'07"E, a distance of 215.55 feet to a point; thence
6. S02°39'52"E, a distance of 50.41 feet to a point; thence
7. S24°54'42"W, a distance of 116.86 feet to a point; thence
8. S15°09'07"W, a distance of 184.62 feet to a point; thence
9. S09°27'04"W, a distance of 252.12 feet to a point; thence
10. S01°46'27"E, a distance of 336.27 feet to a point; thence
11. N88°15'35"W, a distance of 722.34 feet to a point; thence
12. N03°36'31"E, a distance of 191.37 feet to a point; thence
13. N27°30'50"W, a distance of 244.21 feet to a point; thence
14. N41°19'20"W, a distance of 206.22 feet to a point; thence
15. N07°11'21"W, a distance of 323.59 feet to a point; thence
16. N14°02'46"E, a distance of 143.30 feet to a point; thence

17. N29°16'35"E, a distance of 133.51 feet to a point; thence

18. N20°38'46"E, a distance of 57.57 feet to a point; thence

19. N58°26'49"E, a distance of 79.59 feet to a point; thence

20. N24°50'27"E, a distance of 61.33 feet to the point and place of beginning. Containing 23.06 acres of land, more or less.

h:/jobs/8175/documents/descriptions/parcel/lease.doc

PERFORMANCE BOND
Annual - Cancellable Form

Aspen American Insurance Company
175 Capital Boulevard
Rocky Hill, CT 06067

Bond No. _____

KNOW ALL BY THESE PRESENTS, That we _____ _____, as Principal, and Aspen American Insurance Company, of Texas, authorized to do business in the State of New York , as Surety, are held and firmly bound unto County of Cayuga as Obligee, in the maximum penal sum of __one hundred and fifty thousand Dollars ($150,000), lawful money of the United States of America, for which payment well and truly to be made we bind ourselves, our heirs, executors and assigns, jointly and severally, firmly by this Surety Bond.

WHEREAS, the Principal has entered, or is about to enter, into a written agreement with the Obligee to perform in accordance with the following:

1. Tenant's obligations to remove a solar energy facility from the property of the Obligee and restore the Project Site pursuant to the Decommissioning Plan, signed by Robert J. Steehler, PE on September 2, 2020 and annexed to the Amended And Restated Solar PV Lease And Easement Agreement (the "Lease") as Exhibit "F" and

2. Power Provider's obligation to indemnify the Obligee under Article 12 of the Community Distributed Generation Subscriber Agreement (the "Subscriber Agreement") and Section 6(e), and 11 of the Lease (but only to the extent that Power Provider's obligations under Section 11 of the Lease relate to Section 6(e) of the Lease and Section 12 of the Subscriber Agreement);

;(hereinafter collectively referred to as the Contract), said Contract is hereby referred to and made a part hereof;

NOW, THEREFORE, the condition of this obligation is such that if the above named Principal, its successors and assigns, shall well and truly perform its obligations as set forth in the above mentioned Contract, then this Bond shall be void; otherwise to remain in full force and effect pursuant to its terms. Notwithstanding anything to the contrary in the Contract, the Bond is subject to the following express conditions:

1. Whereas, the Obligee has agreed to accept this Bond, this Bond shall be effective for the definite period of April 1, 2021 to March 31, 2026. The Bond may be extended, at the sole option of the Surety, by continuation certificate for additional periods from the expiry date hereof. However, neither (a) Surety's decision not to issue a continuation certificate, nor (b) the failure or inability of the Principal to file a replacement bond or other security in the event the Surety exercises its right to not renew or cancel this Bond (pursuant to paragraph 2 below), shall itself constitute a loss to the Obligee recoverable under this Bond or any extension thereof.

2. This Bond may be canceled at any time upon ninety (90) days advance written notice from the Surety to the Obligee.

3. The above referenced Contract has a term ending Sept 4th, 2060. Regardless of the number of years this Bond is in force or the number of continuation certificates issued, this Bond shall have the final and definite expiration date of March 31, 2026, unless earlier nonrenewed or canceled pursuant to paragraph 1 or 2 above.

4. No claim, action, suit or proceeding, except as hereinafter set forth, shall be had or maintained against the Surety on this instrument unless such claim, action, suit or proceeding is brought or instituted upon the Surety within one year from termination or expiration of the bond term.

5. Regardless of the number of years this Bond is in force or the number of continuation certificates issued, the liability of the Surety shall not be cumulative in amounts from period to period and shall in no event exceed the amount set forth above, or as amended by rider.

6. Any notice, demand, certification or request for payment, made under this Bond shall be made in writing to the Surety at the address specified below. Any demand or request for payment must be made prior to the expiry date of this Bond. Surety Address:
Aspen American Insurance Company
175 Capital Boulevard
Rocky Hill, CT 06067
Attn: _____

7. If any conflict or inconsistency exists between the Surety's obligations or undertakings as described in this Bond and as described in the underlying Contract, then the terms of this Bond shall prevail.

SIGNED, SEALED AND DATED this _____ day of _____, _____.

By:_____
Principal

SAMPLE

Aspen American Insurance Company

By:_____

, Attorney-in-Fact

SAMPLE

Abundant Solar Power

Manlius Landfill Solar Array (M1)

Operations and Maintenance Plan

During the Term of the lease Abundant Solar Power (ASP) shall perform the following services on the System:

Monitoring System

The System will be installed with an internet-based Data Acquisition System (DAS) and System Monitoring System. This system will have the capability to send production data and general system performance in addition to alarms identifying problems, failures, and underperformance of the System to remote locations.

Maintenance Items

Description of Work	Frequency
Remote System Monitoring maintenance and operation	As necessary
On-Call System Service Technician	As necessary
Preventive Maintenance as per planned maintenance activities schedule	One time per year or as required
Corrective Maintenance	As necessary
Snow removal, Grass cutting and Vegetation control	As necessary

1. Remote System Monitoring

   a. ASP will be actively monitoring the System operations via the System Monitoring System and will dispatch a Subcontractor to respond to any problems within two (2) Business Days.

2. On-Call System Service Technician

   a. In order to respond to System alarms, power outages, System failures, or other production shortcomings a service technician will be required to visit the Site to troubleshoot, and resolve, any System issue within two (2) Business Days of the notification of such problem.

3. Preventive Maintenance

   a. ASP will annually visit the Site to inspect and ensure the System is operated within manufacturer's guidelines and consistent with best industry practices, the annual visit scope of work is as follows:

	Planned Maintenance Activities	Maintenance frequency

1. Modules

1.1	High level of inspection (debris, crack, holes, damages, ...)	Annually
1.2	No cracks and other defects/damage on PV modules	Annually
1.3	No shading issues from surrounding objects	Annually
1.4	No signs of components abnormal wear or excessive corrosion/rust	Annually
1.5	Frames and clamps are in place and appropriate	Annually
1.6	PV wiring is not pinched, damaged or otherwise interfering with module installation	Annually
1.7	There are no unsecured or loose conductors hanging down or touching the ground	Annually
1.8	Inspection of PV cabling for insulation issues, mechanical protection, stress, strain, connector issues, etc.	Annually
1.9	Inspect array bonding/grounding	Annually

2. RBI Racking & Tracker

2.1	Visual Inspection for signs of surface rust	Annually
2.2	Posts - Visual inspection of post settling (10%)	Annually
2.3	Purlin - Visual inspection on bent purlins, attachment lo pivot arm (10%)	Annuallv
2.4	Pivot Arm Assembly - Visual inspection of pivot arm to gearbox (10%)	Annually
2.5	Gearbox - Visual check on to confirm not binding (10%)	Annually
2.6	Modules - Visual check of bolt/nut, torque check (10%)	Annually
2.7	Drive Shaft - Visual check on drive shaft connection (10%)	Annually
2.8	Fasteners - Inspected annually - retorqued if necessary	Annually
2.9	Modules - Inspect for cracked or broken modules, properly secured, replace modules and missing fasteners	Annually
2.10	Wiring - Inspect for loose or damaged wiring	Annually
2.11	Racking - Inspect for bent or deformed structural members	Annually
2.12	Drivetrain - Inspect for bent/damaged components/excessive wear, emphasis on pivot arm	Annually
2.13	Control System - Inspect for physical damage/moisture	Annually

3. Sun track Network Control Unit & Tracker Control Unit

3.1	Check mechanical connections, tighten if necessary	1 Year After Installation, Subsequently every 3 Years
3.2	Check for corrosion/deterioration	
3.3	Simulate Abnormal behavior (Wind, Axis Blockage, etc..) to ensure all alarms are generated and system responds correctly	
3.4	Battery Check: Cut power and wait 10 minutes, plug in again and check monitoring	Annually

4. Panel Washing

4.1	Panels Washed	Annually

5. Conduits, Cable Trays and Homeruns

5.1	Visual inspection of home-run cables to inverters, CB's, RCB's & disconnects	Annually
5.2	Visual inspections of conduit & cable trays	Annually
5.3	Wire insulation in good conditions (not scuffed or broken)	Annually

6. Combiner & Recombiner boxes:

6.1	Visual internal and external inspection for labelling, moisture entry, rodents & overall cleanliness	Annually
6.2	Verify Fuses, breakers and Surge suppression are in good conditions	Annually
6.3	Inspection of disconnect sealing, Lubrification Hinges	Annually

7. DG Disconnects at Equipment Pad

7.1	Verify Breakers/Fuses and Surge suppression are in good conditions	Annually
7.2	Inspection of disconnect sealing, Lubrification Hinges	Annually

8. Inverters

8.1	Visual internal and external inspection of labelling, heat sinks, moisture entry, rodents & overall cleanliness	Annually
8.2	Check for Alerts/Alarms on inverter screens	Annually
8.3	Enclosure is free from damage, all weather seals are intact, doors and latches operate properly	Annually
8.4	Inverter AFCI (Arc Fault Circuit Interrupter) Status	Annually
8.5	Inspection of internal switch cabinet-cleaning as required & insulation measurements	Annually
8.6	Inspect and if necessary clean heating elements & heat exchangers	Annually
8.7	Check all electrical terminals and fuses	Annually
8.8	Verify all communications and electrical connections	Annually
8.9	IVCT (I-V Curve Tracing) 33% of strings	Remotely /Annually

9. SCADA

9.1	Inspection of SCADA & Monitoring System Equipment	Annually
9.2	Inspect Weather Station	Annually
9.3	Ensure sensors are oriented correctly & cleaned	Annually
9.4	Ensure monitoring data is calibrated with portal and communicating effectively (Smart logger, ECO Portal etc..)	Annually

10. Switchboard

10.1	Cleaning - Remove dust/debris from busbars, connections, supports & enclosure surfaces	Annually
10.2	Bus & Cable Connections - Inspect for visible damage, broken wire strands, damaged insulation on cable connections	Annually
10.3	Insulation - Busbars, Bus Supports, Bus Shields, Insulating Barriers visually checked for damage	Annually
10.4	Circuit Breakers - Inspect for signs of discoloration, overheating, damage. Exercise operating mechanism.	Annually
10.5	Fusible Overcurrent Devices - Visually inspect switching mechanism and fuse connections	Annually
10.6	Meters & Controllers - Remove dust & dirt from exterior	Annually
10.7	Secondary Wiring - check wiring connections for damaged insulation, and for proper connection	Annually
10.8	Ventilation - Check grills/ventilation ports for obstructions/dirt accumulation and clean	Annually
10.9	Physical Damage - Inspect exterior enclosure plus interior components for damage	Annually

11. Transformer

11.1	General - Inspect area for stored tools/materials/debris. Listen for steady hum and no abnormal noises.	Annually
11.2	Exterior Surfaces - Inspect for tampering, battered metal, gouges, damages	Annually
11.3	Paint/Protective Coatings - Inspect for scratches or weathering, touch ups required	Annually
11.4	Tank Leaks - Inspect exterior/base for signs of leakage	Annually
11.5	Pad - Verify pad is not damaged and has not tilted	Annually
11.6	Nameplates - Inspect for proper nameplates and abnormal/unexpected fading	Annually
11.7	Unusual Odors - Inspect for smell of fluid or burning	Annually
11.8	Gauges & Controls - Check for proper operation	1 Year After Installation, subsequently every three years

11.9	Equipment Leaks - Inspect drain cocks, plugs, fuse mounting, and switches for insulating liquid leakage.	1 Year After Installation, subsequently every three years
11.10	Dialectic Fluid Level - Check Dielectric fluid level gauge	
11.11	Fusing - Inspect fuses	
11.12	Bushings - Check condition of HV & LV bushings for dirt, breakage	
11.13	Pressure Relief Valve - Check for dirt, debris, operation	
11.14	Lightning Arrestors - Check for damage/breakage and tight ground connections	
11.15	Dissolved Gas Analysis - Take Oil Sample to check dissolved gas levels (third party testing)	
11.16	Insulation Resistance Test	
11.17	Turns Ration Test (TRT)	
11.18	Power Factor Test (Overall, Arrestors, Bushing, Windings)	
11.19	Excitation-Current Tests	
11.20	Winding Resistance Test	

12. Thermal Imaging

12.1	Thermal Images of Transformer	Annually
12.2	Thermal Images of Inverters	Annually
12.3	Thermal Images of AC Panelboard	Annually
12.4	Thermal Images of main breakers, disconnects, bus & Cable connections	Annually
12.5	Provide a report outlining Thermal and torquing Anomalies detected thanks to thermal imaging & corrective action taken	Annually

13. Medium Voltage

13.1	Inspect medium voltage overhead lines	Annually
13.2	Check the integrity of guy-wires	Annually
13.3	Inspect integrity of the poles	Annually
13.4	Inspect overhead lines for tree clearance	Annually

14. General Site Maintenance

14.1	Grass Cutting and vegetation control as required, to maintain a maximum height of 18 inches	As Required
14.2	Access road clear of debris & in good condition	Annually
14.3	Snow Removal will be performed on an as needed basis. Plowing snow to the side of the access roads is permitted	As Required
14.4	Confirm proper system signage and labelling on equipment	Annually
14.5	Shading management, visual screening maintenance & fence integrity assessment - maintenance if needed	Annually
14.6	Check the integrity of access gate pad-lock	Annually
14.7	Provide Site photos in Maintenance Report/Reports to supplied in digital format	Annually
14.8	Provide annual preventive maintenance & operational report (digital format)	Annually

nationalgrid | Distributed Generation

Switch to Electric Connections

Switch to Electric Vehicle

New Feature! Infrastructure List View Guide (/servlet/servlet.FileDownload?file=0150W00000FKqNQ)

All Functionality of the this page may not be available if you are using Internet Explorer. Please use Chrome, Firefox or Safari while using the nCAP Portal.
Also, for most recent updates, please clear your cache settings before viewing documents.

If you need assistance, please use the "Help" Tab above or contact National Grid by using the "Contact Us" button on either the Help or Home Tab

Case
00326621

Status	Step
Agreement	Construction Quote

Case Details

Case Number
00326621

Case Record Type
New York DG - Complex Application

Status
Agreement

Step
Construction Quote

Date/Time Closed

Power Supply Area

Feeder 1
36_11_25555 (/s/infrastructure/a0x0W000005JOmbQAG/361125555)

Size of Generator(kW)
5,000.000 Down Sized to 4,350.00 kW per utility feeback

Feeder 2

Substation 1

BUTTERNUT 255 (/s/infrastructure/a0x0W000005JO6WQAW/butternut-255)

Substation 2

Substation Transformer 1

BUTTERNUT 255, Substation Transformer 1 (/s/infrastructure/a0x0W000005JOLMQA4/butternut-255-substation-transformer-1)

Substation Transformer 2

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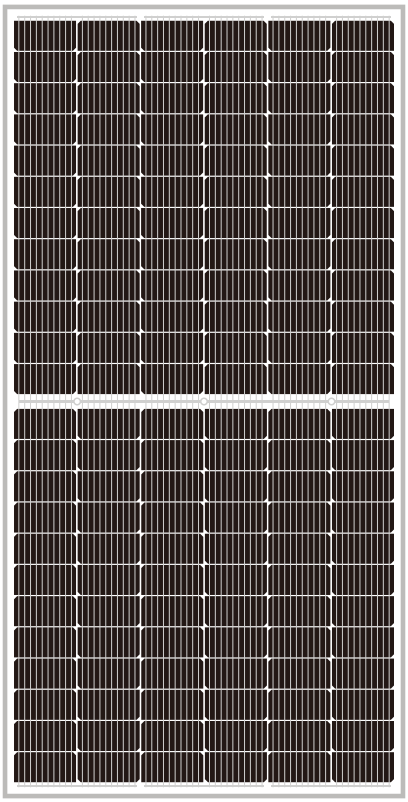
ZXM7-SPLDD144 Series

ZNSHINESOLAR

Znshinesolar 10BB HALF-CELL Bifacial Light-Weight Double Glass Monocrystalline PERC PV Module

520W | 525W | 530W | 535W | 540W | 545W



Excellent cells efficiency

MBB technology decreases the distance between bus bars and finger grid line which is benefit to power increase.

Better Weak Illumination Response

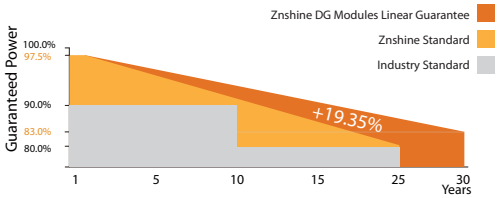
More power output in weak light condition, such as haze, cloudy, and morning

Anti PID

Limited power degradation caused by PID effect is guaranteed under strict testing condition for mass production

High wind and snow resistance

- 5400 Pa snow load
- 2400 Pa wind load



30 years power warranty

After 30 years our solar panel keeps at least 80% of its initial power output

12 years product guarantee
30 years output guarantee

0.5% annual degradation over 30 years

Bifacial technology

Enables additional energy harvesting from rear side(up to 25%)

Founded in 1988, ZNShine solar is a world's leading high-tech PV module manufacturer. With the state-of-the-art production lines, the company boasts module capacity of 6GW. Bloomberg has listed ZNShine as a global Tier 1 PV module maker. Today Znshine has distributed its sales to more than 60 countries around the globe.

www.znshinesolar.com

ZXM7-SPLDD144 Series | Znshinesolar 10BB HALF-CELL Bifacial Light-Weight Double Glass Monocrystalline PERC PV Module

ZNSHINESOLAR

ELECTRICAL CHARACTERISTICS | STC*

Nominal Power Watt Pmax(W)*	520	525	530	535	540	545
Power Output Tolerance Pmax(%)	0~+3	0~+3	0~+3	0~+3	0~+3	0~+3
Maximum Power Voltage Vmp(V)	40.70	40.90	41.10	41.30	41.50	41.70
Maximum Power Current Imp(A)	12.79	12.85	12.91	12.96	13.02	13.07
Open Circuit Voltage Voc(V)	49.00	49.20	49.40	49.60	49.80	50.00
Short Circuit Current Isc(A)	13.53	13.59	13.65	13.71	13.77	13.83
Module Efficiency (%)	20.34	20.54	20.74	20.93	21.13	21.32

*STC (Standard Test Condition): Irradiance 1000W/m², Module Temperature 25℃, AM 1.5
*Measuring tolerance: ±3%

ELECTRICAL CHARACTERISTICS | NMOT*

Maximum Power Pmax(Wp)	388.80	392.70	396.40	399.90	403.60	406.80
Maximum Power Voltage Vmpp(V)	37.90	38.00	38.20	38.40	38.50	38.80
Maximum Power Current Impp(A)	10.26	10.33	10.38	10.42	10.47	10.49
Open Circuit Voltage Voc(V)	45.80	46.00	46.20	46.30	46.50	46.70
Short Circuit Current Isc(A)	10.93	10.98	11.02	11.07	11.12	11.17

*NMOT(Nominal module operating temperature):Irradiance 800W/m²,Ambient Temperature 20℃,AM 1.5,Wind Speed 1m/s

ELECTRICAL CHARACTERISTICS WITH 25% REAR SIDE POWER GAIN

Front power Pmax/W	520	525	530	535	540	545
Total power Pmax/W	650	656	663	669	675	681
Vmp/V(Total)	40.80	41.00	41.20	41.40	41.60	41.80
Imp/A(Total)	15.93	16.01	16.08	16.15	16.23	16.30
Voc/V(Total)	49.10	49.30	49.50	49.70	49.90	50.10
Isc/A(Total)	16.87	16.95	17.02	17.10	17.17	17.25

MECHANICAL DATA

Solar cells	Mono PERC
Cells orientation	144（6×24）
Module dimension	2256×1133×35 mm(With Frame)
Weight	33.5 kg
Glass	2.0 mm+2.0mm, High Transmission, AR Coated Heat Strengthened Glass
Junction box	IP 68，3 diodes
Cables	4 mm² ,350 mm
Connectors	MC4-compatible

TEMPERATURE RATINGS

NMOT	44℃ ±2℃
Temperature coefficient of Pmax	-0.35%/℃
Temperature coefficient of Voc	-0.29%/℃
Temperature coefficient of Isc	0.05%/℃
Refer.Bifacial Factor	70±5%

WORKING CONDITIONS

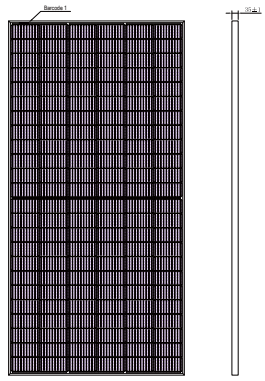
Maximum system voltage	1500 V DC
Operating temperature	-40℃~+85℃
Maximum series fuse	30 A
Maximum load(snow/wind)	5400 Pa / 2400 Pa

*Do not connect Fuse in Combiner Box with two or more strings in parallel connection
*Remark:Electrical data in this catalog do not refer to a single module and they are not part of the offer.They only serve for comparison among different module types.

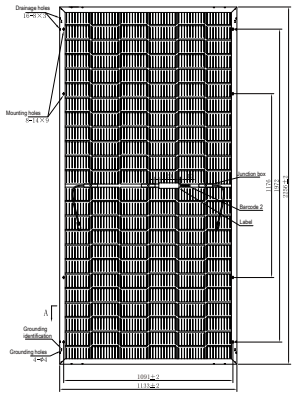
PACKAGING CONFIGURATION

Piece/Box	30
Piece/Container(40'HQ)	600
Piece/Container(with additional small package)	/

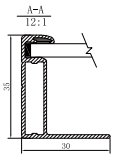
DIMENSIONS(MM)



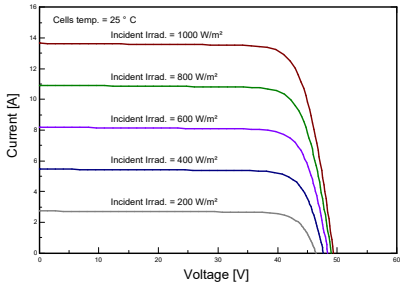
Front View



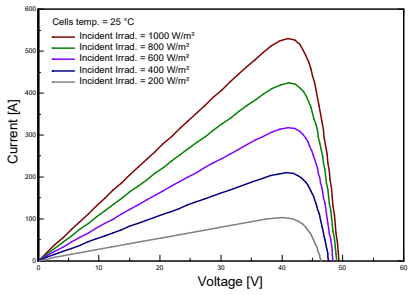
Back View



I-V CURVES OF PV MODULE(530W)



P-V CURVES OF PV MODULE(530W)



Add : 1#, Zhixi Industrial Zone，JintanJiangsu 213251，P.R. China Tel: +86 519 6822 0233 E-mail: info@znshinesolar.com

Note: please read safety and installation instructions before using this product | Subject to change without prior notice © ZNSHINE SOLAR 2020 | Version: ZXM7-SPLDD144 2012.E

SG250HX-US New

Multi-MPPT String Inverter for 1500 Vdc System

SUNGROW
Clean power for all

HIGH YIELD

- 12 MPPTs with max. efficiency 99%
- Compatible with bifacial module
- Built-in Anti-PID and PID recovery function

SMART O&M

- Touch free commissioning and remote firmware upgrade
- Online IV curve scan and diagnosis*
- Fuse free design with smart string current monitoring

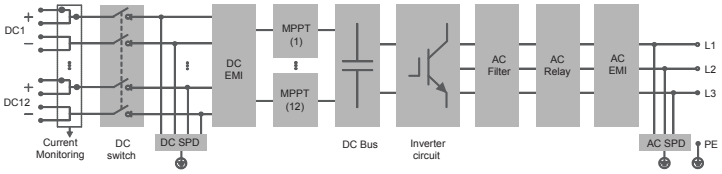
LOW COST

- Compatible with Al and Cu AC cables
- DC 2 in 1 connection enabled
- Power line communication (PLC)
- Reactive power at night function

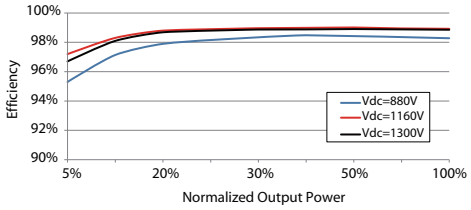
PROVEN SAFETY

- Integrated Arc fault circuit protection
- NEMA 4X protection and C5 anti-corrosion grade
- Type II SPD for both DC and AC

CIRCUIT DIAGRAM



EFFICIENCY CURVE



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Type designation	SG250HX-US
Input (DC)	
Max. PV input voltage	1500 V
Min. PV input voltage / Startup input voltage	600 V / 600 V
Nominal PV input voltage	1080 V
MPP voltage range	600 V – 1500 V
MPP voltage range for nominal power	860 V – 1300 V
No. of independent MPP inputs	12
Max. PV input current	26 A * 12
Max. DC short-circuit current	50 A * 12
Output (AC)	
AC output power	250 kVA @ 30 ℃ / 225 kVA @ 40 ℃ / 200 KVA @ 50 ℃
Max. AC output current	180.5 A
Nominal AC voltage	3 / PE, 800 V
AC voltage range	680 – 880V
Nominal grid frequency / Grid frequency range	50 Hz / 45 – 55 Hz, 60 Hz / 57 – 63 Hz
THD	< 3 % (at nominal power)
DC current injection	< 0.5 % In
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 leading – 0.8 lagging
Feed-in phases / connection phases	3 / 3
Efficiency	
Max. efficiency	99.0 %
CEC efficiency	98.5 %
Protection	
DC reverse connection protection	Yes
AC short circuit protection	Yes
Leakage current protection	Yes
Grid monitoring	Yes
Ground fault monitoring	Yes
DC switch	Yes
AC switch	No
Arc fault circuit interrupter (AFCI)	Yes
PV String current monitoring	Yes
Reactive powe at night function	Yes
PID protection	Anti-PID or PID recovery
Overvoltage protection	DC Type II and AC Type II
General Data	
Dimensions (W*H*D)	1051 * 660 * 363 mm (41.4'' * 26'' * 14.3'')
Weight	99 kg (218.25 lbs)
Isolation method	Transformerless
Ingress protection rating	NEMA 4X
Night power consumption	< 2 W
Operating ambient temperature range	-30 to 60 ℃ ('-22 to 140 ℉)
Allowable relative humidity range (non-condensing)	0 – 100 %
Cooling method	Smart forced air cooling
Max. operating altitude	4000 m (> 3000 m derating) 13123 ft (> 9843 ft derating)
Display	LED, Bluetooth+APP
Communication	RS485 / PLC
DC connection type	MC4-Evo2 (Max. 10AWG)
AC connection type	OT / DT terminal (Max. 300 mm² 600 Kcmil)
Compliance	UL1741, UL1741SA, IEEE1547, IEEE1547.1, CSA C22.2 107.1-01-2001, FCC Part15 Sub-part B Class A Limits, California Rule 21,UL 1699B
Grid Support	Reactive power at night function, LVRT, HVRT,active & reactive power control and power ramp rate control, Volt/Watt, Frequency/Watt

*: Only compatible with Sungrow logger and iSolarCloud

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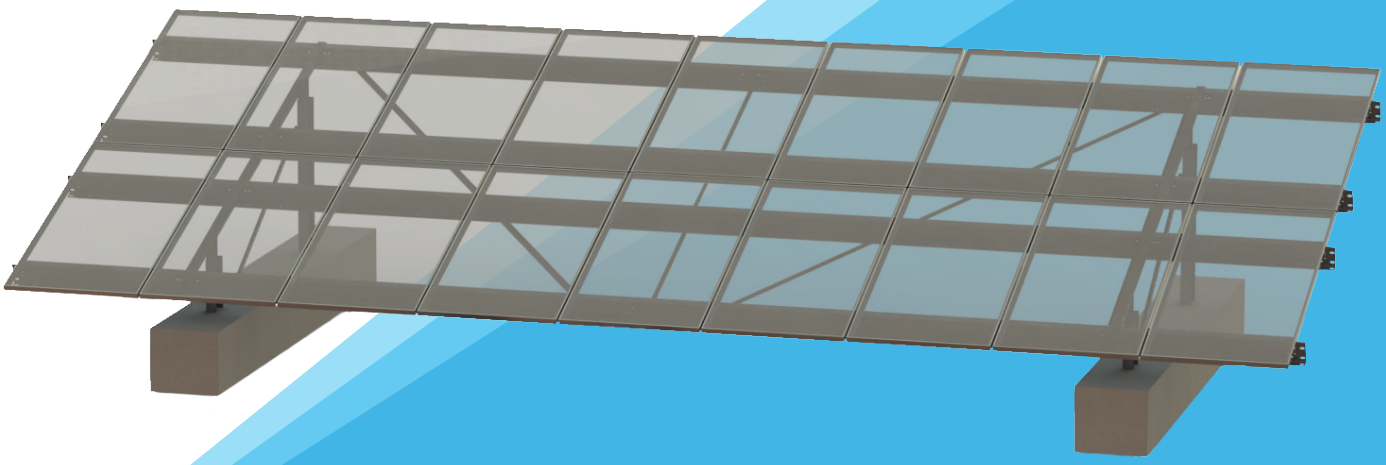
GAMECHANGE SOLAR
REPOWERING THE PLANET

OVER 12 GW SOLD
Global Leader for Fixed Tilt Structures & Trackers

TECHNICAL DATASHEET

PRECAST™
BALLASTED GROUND SYSTEM
FAST INSTALLING SOLAR MOUNTING SYSTEM FOR LANDFILL SITES



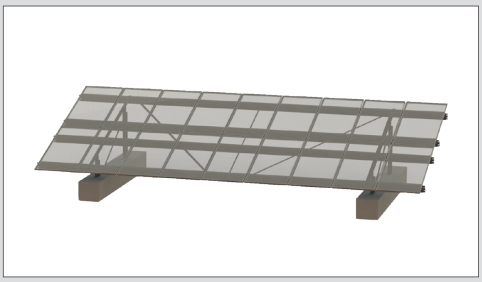
LANDFILL AND BROWNFIELD LEADER

- 8" [20.3 cm] Vertical Adjustment
- Integrated grounding & wire management
- Industry's longest spans and fewest foundations: As few as 190 per MW
- Supports all poly and thin film panels for all vendors
- Integrated grounding and wire management
- Foundations may be precast at site or nearest precast location
- Full layout and engineering analysis for every project

GAMECHANGE SOLAR
REPOWERING THE PLANET

OVER 12 GW SOLD

Global Leader for Fixed Tilt Structures & Trackers



Fast installing solar mounting system for landfill sites

Articulating purlin connections to navigate up to 15% terrain slopes

Slots enable vertical adjustability

Galvanized purlins with large wire management tray

FEATURES

- Up to 4 ft. [1.2 m] high ground clearance to allow for snow and vegetation
- 5 to 35° tilt with multiple inter-row spacing options
- Full layout and engineering analysis for every project
- 51% overall lower cost than competitors
- Integrated grounding and wire management
- Up to 8" [20 cm] total vertical adjustability using post extender option including use of integrated slots
- Articulating purlin connections to navigate up to 15% terrain slopes

TEST & CERTIFICATION

- Wind tunnel tested by industry leader CPP and rated for 175 mph [78 m/s] wind speed
- Independent assessment by Black & Veatch
- Rated up to 90 psf [4,300 Pa] snow load
- ETL / UL 2703 tested (similar to the relevant sections of IEC 61215 & 61730)
- Meets IBC and ASCE standards for structural loading
- Warranty 20 years - Designed and Engineered in USA

CALCULATIONS

- PE Stamped Drawings - Design loads according to local building codes: ASCE 7, NBC, Eurocode, AS1170, GB 50009
- 100% code compliant designs for any jurisdiction
- Available 2 or 3 up in portrait and 4 or 6 up in landscape poly as well as multiple glass on glass module configurations including First Solar Series 4™ & First Solar Series 6™

MATERIAL

- Rail support structure components and module mounting rails: G90+ [20 μm] galvanized steel. Standard up to G180 [40 μm] special order.
- Magnicoat bolts and serrated flange nuts for structural member connections
- Module mounting hardware - Top mount: module mounting clips & serrated flange nuts: magnicoat. Bottom mount: hex bolts, serrated flange nuts, star washers: magnicoat
- Integrated grounding with star bolts or teethed module clamps included - both approved under ETL / UL 2703, (similar to the relevant sections of IEC 61215 & 61730)
- Proprietary Integrated Hardware™: For faster structure assembly, module mounting and reduced O&M cost. Oversized Serrated Flange Nyloc Nut and Oversized Flange Star Bolt with integrated star washer eliminates the need for washers and star washers.

GameChange Solar

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Fax: +1 (646) 607-2223
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ASIA OFFICES
Wuxi, China
Mumbai, India
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SERVICE SUPERCENTERS
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Mesa, AZ, USA

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Rev. 5-12-2021

Expected Fee: _____

TOWN OF MANLIUS
PLANNING DEPARTMENT
INITIAL APPEARANCE APPLICATION

DATE: _____

Name of Project: Abundant Solar Power (MI) LLC

Applicant must submit 12 copies of all site plans, surveys, and supporting data with the final application before a planning board meeting can be scheduled.

Location of Project: 5701 Bowman Rd, Manlius, NY 13057

Type of Project:

○ Division of Land ○ Subdivision ○ Accessory Use ○ Zone Change ○ Site Review ☑ Other Solar array

Developer: Abundant Solar Power Phone: 416 917 5667

Address: 700 W. Metro Park, Rochester Zip: NY 14623

Tax Map Number(#)/s: 074.-01-06.1

Present Zoning: RA Desired Zoning: _____

Total Acreage: 17.5 acres Total Number of Lots: _____

Property Owner/s: Town of Manlius Phone: _____

Address: 301 Brooklea Drive, Fayetteville Zip: NY 13066

Tax Map#(s): _____ Owner's Signature: _____

Printed Name: _____

Lessee
Property Owner/s: Abundant Solar Power (MI) LLC Phone: 416 264 3880

Address: 700 W. Metro park, Rochester Zip: NY 14623

Tax Map#(s): _____ Owner's Signature: [signature]

Printed Name: Richard Lu.

Use next page for additional known property owners' information

Planning Board Meeting Date Assignment: _____

Fee: _____ Paid: _____ Per: ○ Credit/Debit Card ○ Check ○ Cash

Planning Board - Initial

TOWN OF MANLIUS

DISCLOSURE AFFIDAVIT

This affidavit is a part of and must be completed and attached to every application, petition, request submitted for a *site plan, variance, amendment, change of zoning, approval of a plat, exemption from a plat or official map, license* or *permit.*

Province of Ontario)
) SS:
)

I. Richard Lu., being duly sworn, deposes and says that (s) he is:

Director, Abundant Solar Power (MI) LLC
(applicant, petitioner, corporation officer, property owner, *etc.)*

II. That deponent has read and is familiar with the provisions of the General NY Municipal Law, Section 809 which states:

A Every application, petition or request submitted for a site plan, variance, amendment, change of zoning, approval of a plat, exemption from a plat or official map, license or permit, pursuant to the provisions or any ordinance, local law, rule or regulation constituting the zoning and planning regulations of a municipality shall state the name, residence and the nature and extent of the interest of any state officer or any officer or employee of such municipality is a part, in the person, partnership or association making such application, petition or request (hereinafter called the applicant) to the extent known to such applicant.

B. For the purpose of this action an officer or employee shall be deemed to have an interest in the applicant when (s)he, his/her spouse, or their brothers, sisters, parents, children, grandchildren, or the spouse of any of them:

1) is the applicant, or
2) is an officer, director, partner or employee of the applicant, or
3) legally or beneficially owns or controls stock of a corporate applicant or is a member of a partnership or association applicant, or
4) is a party to an agreement with such an applicant, express or implied, whereby (s) he may receive any payment or other benefit, whether or not for services rendered, or contingent upon the favorable approval of such application, petition or request.

C. Ownership of less than five percent (5%) of the stock of a corporation whose stock is listed on the New York or American Stock Exchanges shall not constitute an interest for the purposes of this section.

D. A person who knowingly and intentionally violates this section shall be guilty of a misdemeanor.

III. That no Town of Manlius officer, employee or a relative of either, as defined in Section 809 General Municipal Law has any interest in this application.

-OR-

If a Town of Manlius officer, employee or relative of either as defined in Section 809 General Municipal law has any interest in this application, the full particulars are provided on an attached sheet.

Date: November 30, 2020

Richard Lu	
(Print Name)	(Print Name)
(Signature)	(Signah1re)
Abundant Solar Power (m1) LLC	
(Entity Name)	(Entity Name)
Director	
By (Officer) (Title)	By (Officer) (Title)
700 West Metro Park, Rochester NY 13066	
(Mailing Address of Applicant)	(Mailing Address of Applicant)
416 264 3880	
(Telephone Number)	(Telephone Number)

D: _____, W___

ACKNOWLEDGEMENTS

Province of Ontario)
) SS:
)

On this 30th day of November in the year 2020, before me, the undersigned, a notary public in and for said province, personally appeared _____, _____., and _____ personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within Petition and acknowledged to me the he/she/they executed the same in his/her/their capacity, and that by his/her/their signature(s) on the Petition, the individual or the persons upon behalf of which the individual acted executed the instrument.

46936I

Notary Public

CORPORATE ACKNOWLEDGEMENT

Province of Ontario)
) SS:
)

Richard Lu, being duly sworn, deposes and says the s(he) is the Director of Abundant Solar Power (M1) LLC corporation named in the within Application/Petition, that s(he) has read the foregoing affidavit and knows the contents thereof; that the same is true of s(he) own knowledge, except as to those matters therein stated to be alleged upon information and belief, and as to those matters s(he) believes it to be true.

Applicant Signature

Subscribed to me before this 30th day
Of November, 2020

Macar 46936I
Notary Public

06/29/16 LB

ABUNDANT Solar Power Inc.
700 West Metro Park, Ground Level
Rochester, New York
14623-2678
Tel: 202 818 9194

ABUNDANT Solar Energy Inc.
Suite 900, 2235 Sheppard Ave E.
Toronto, ON M2J 5B5
Tel: 1 416 494 9559
www.abundantsolarenergy.com

ABUNDANT
Solar Energy Inc.

RECEIVED
DEC 16 2020
By

Chairman Joe Lupia
Town of Manlius Planning Board
301 Brooklea Drive, Fayetteville,
NY 13066

Friday Dec 11th, 2020

Dear Chairman Lupia

I am reaching out to you today in order to submit our application for Planning board review and approval of the Town of Manlius Closed Landfill Solar project at 5701 Bowman Road, Manlius NY, 13057. The project will be known as Abundant Solar Power (M1) LLC.
I represent Abundant Solar Power and we have leased approximately 20 acres at the closed land fill, property tax id 074.-01-06.1, for the purpose of building and operating a 5MWac solar array. The power generated will be fed into the local distribution grid infrastructure and power local homes and businesses with green, clean, renewable power.
Our submission consists of the following documents:

1. Application Form and affidavit signed and notarized
2. Letter concerning SEQR and Type II status
3. SEAF for information only
4. Preliminary site plan
5. Wetland delineation
6. Slope Image

We have not included a survey at this time, as we are still in submission to the Utility for confirmation of capacity and interconnection. As the result of the Cesir could reduce the scale approved, we do not typically do the survey before we have this certainty. We have, however, had our local engineering partners at Barton & Laguidice conduct a Wetland delineation assessment in the last 60 days in order to gain clarity around Wetland presence and impact on setbacks. This has been included. We are happy to share the Survey when available. The Alta survey is also required for our Title insurance which is a condition of financing.

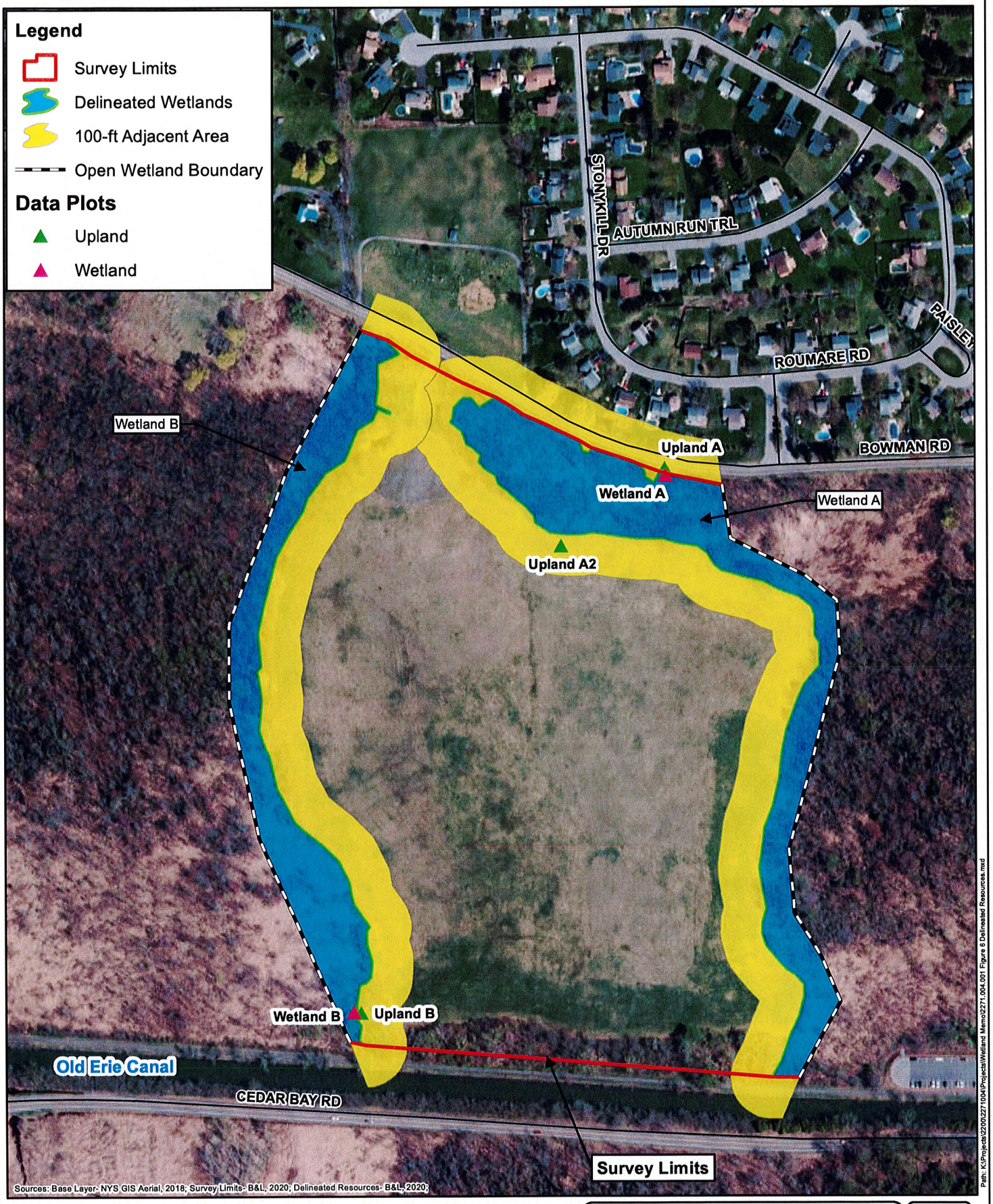
Should you require it, we are also happy to provide you with a decommissioning plan and associated bond / contribution schedule.
Please let me know if there are any other requirements or questions that you might have.

Sincerely,

M. Clark

Melissa Clark
VP Business Development
Abundant Solar Power

Mobile: 416 917 5667
Melissa.clark@abundantsolarenergy.com



Barton & Loguidice

N W E S

0 150 300 600 Feet

Abundant Solar Power, Inc.
Manlius Landfill Photovoltaic Array

Delineated Resources

Onondaga County November 2020 New York

Figure 6

Project No. 2271.004

N

TRUE OR CALLED NORTH

LEGEND

- EXISTING LIMITS OF WETLAND
- REQUIRED 100 FOOT WETLAND BUFFER
- EXISTING PROPERTY BOUNDARY
- EXISTING MAJOR CONTOUR (SEE SURVEY NOTE)
- EXISTING MINOR CONTOUR (SEE SURVEY NOTE)
- 0-12% SLOPES
- 12-15% SLOPES
- 15% + SLOPES

150' 0 150' 300'
1"=150'

SURVEY NOTE

1. BASE MAPPING COMPILED FROM NYSGIS CLEARING HOUSE PARCEL DATA, ORTHO IMAGERY, AND 2017 LIDAR DATASETS. INFORMATION FOR REFERENCE ONLY AND SHOULD BE CONSIDERED APPROXIMATE.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION".

REVISIONS

ABUNDANT SOLAR POWER
TOWN OF MANLIUS LANDFILL SOLAR ARRAY

SITE CONDITIONS PLAN

TOWN OF MANLIUS

ONONDAGA COUNTY, NEW YORK

Barton & Loguidice

Date	DECEMBER, 2020
Scale	1" = 150'
Sheet Number	01
File Number	2271.004.001

Printed: Dec 11, 2020 - 8:57AM STYR By: tsc
Z:\JB-Vol1\FS\18217422-1071-4823-8927-99050404141F\0\2271000-2171997\2171457\U\2271.004.001-Manlius LF Solar-SLOPE ANALYSIS (0 2171457).dwg

Checked by _____ Drawn by TSC Designed by ZTP In charge of CJM

ABUNDANT Solar Energy Inc.
Suite 900, 2235 Sheppard Ave E,
Toronto, ON M2J 5B5
Tel: 1 416 494 9559
www.abuandantsolarenergy.com

Chairman Joe Lupia
Town of Manlius Planning Board
301 Brooklea Drive, Fayetteville
NY13066

Re: Town of Manlius Landfill Solar project

Monday November 23, 2020

Dear Chairman Lupia

We are writing in reference to the solar array development proposed by Abundant Solar Power, Inc. (ASP) at the closed landfill in the Town of Manlius, New York. As you are likely aware, ASP is progressing with the environmental review, site planning, and permitting process for development of the solar array. We have already assisted the Town of Manlius Board with respect to their review of the project in compliance with the State Environmental Quality Review Act (SEQR) and had identified the project as a "Type II action" under SEQRA in accordance with the current regulations.

As you may or may not be aware, on January 1, 2019, amendments to the SEQR regulations became effective. In the opinion of our Engineers at B & L, these amendments have resulted in the proposed solar array development falling under the definition of a Type II Action. The relevant excerpts from NYCRR Part 617 are outlined below. § 617.5 Type II Actions (a) Actions or classes of actions identified in subdivision (c) of this section are not subject to review under this Part, except as otherwise provided in this section. These actions have been determined not to have a significant impact on the environment or are otherwise precluded from environmental review under Environmental Conservation Law, article 8.

The actions identified in subdivision (c) of this section apply to all agencies. (c) The following actions are not subject to review under this Part: …(14) installation of solar energy arrays where such installation involves 25 acres or less of physical alteration on the following sites: (i) closed landfills;…

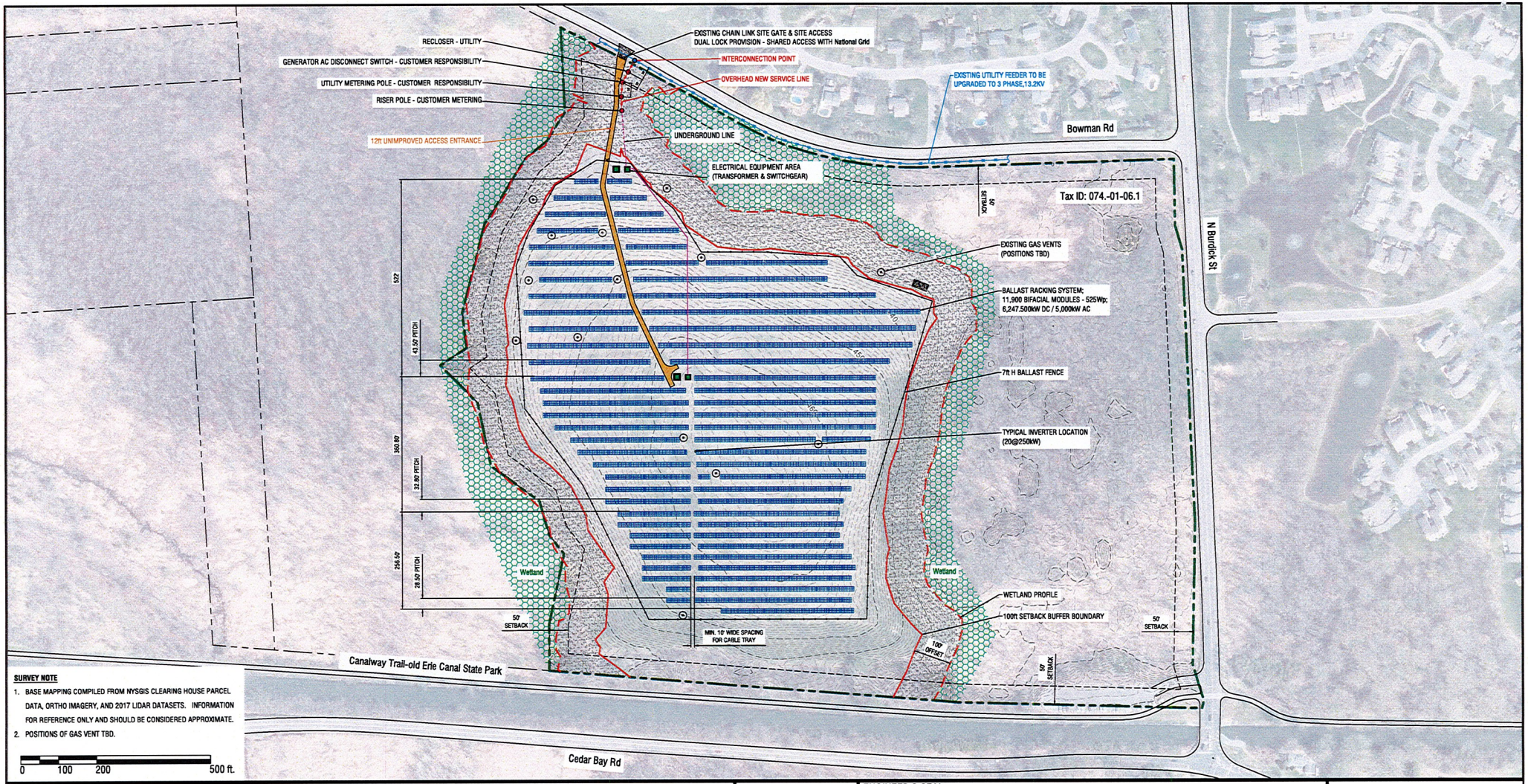
According to the New York State Department of Environmental Conservation (NYSDEC), "Any action or class of actions listed as Type II in 617.5 requires no further processing under SEQR. There is no documentation requirement for these actions, although it is recommended that a note be added to the Planning boards project file indicating that the project was considered under SEQR and met the requirement for a Type II action."

We would, therefore, respectfully suggest that it would be acceptable for the Town of Manlius to acknowledge the project classification as a Type II Action. Please contact me at 416-917 5667 should you have any questions or would like to discuss this any further.

Sincerely,
Melissa Clark

M. Clark

VP Business Development
Abundant Solar Energy Inc.
Melissa.clark@abundantsolarenergy.com



5701 Bowman Rd.,Town of Manlius, NY 13057

ABUNDANT SOLAR

PROJECT NAME: East Syracuse Landfill Solar Farm

SYSTEM SIZE: 6,247.500kW DC / 5,000kW AC

DATE: November 24, 2020

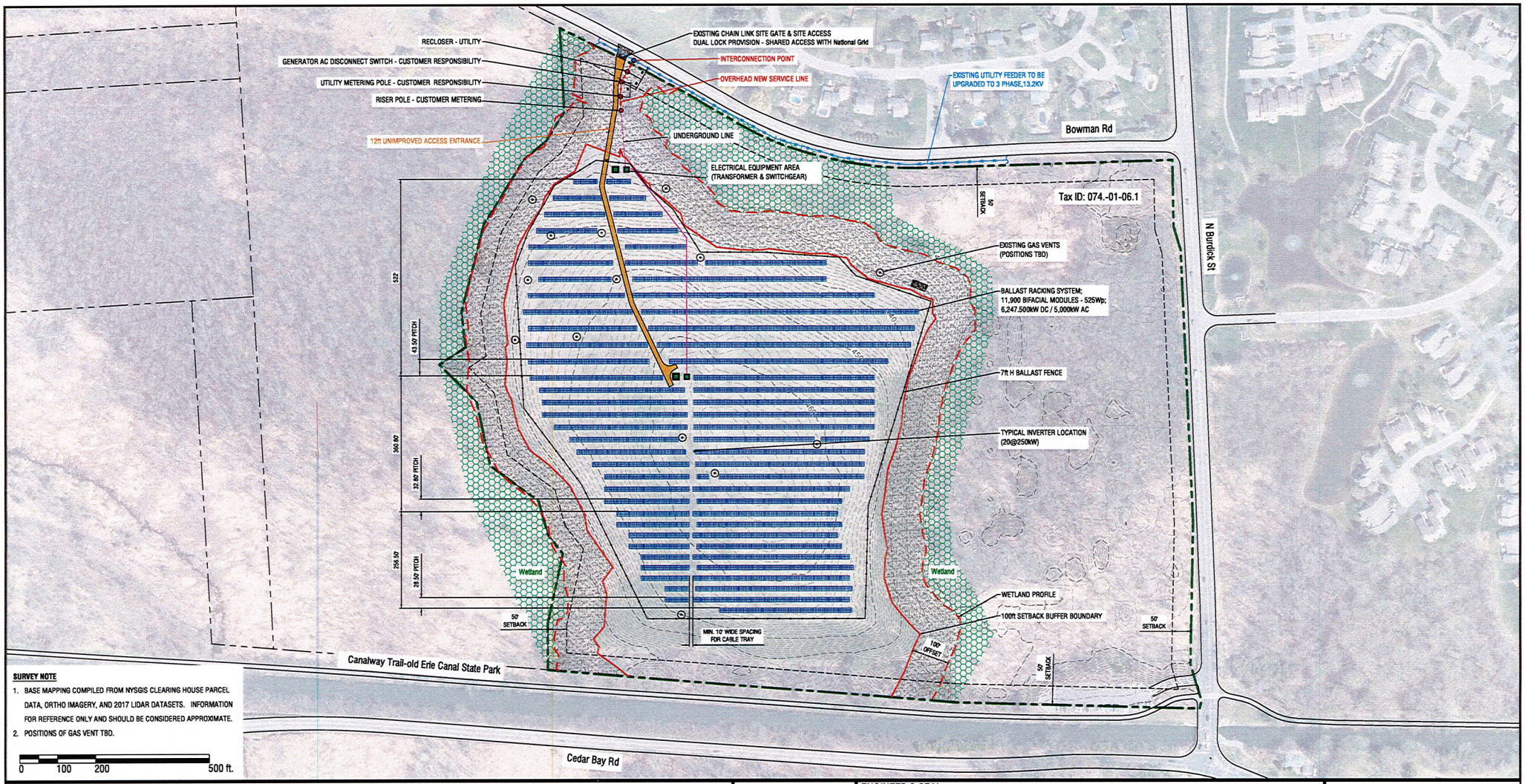
GPS LOCATION: 43.045908, -76.026251

THIS DRAWING IS AN INSTRUMENT OF SERVICE, IS PROVIDED BY AND IS THE PROPERTY OF ABUNDANT SOLAR ENERGY INC.
THIS DRAWING CANNOT BE MODIFIED AND / OR REPRODUCED WITHOUT THE CONSENT OF THIS OFFICE

ENGINEER'S SEAL

ABUNDANT
Solar Power Inc.

700 WEST METRO PARK
ROCHESTER, NY 14623
T: 416 494 9559
www.abundantsolarenergy.com



SURVEY NOTE

1. BASE MAPPING COMPILED FROM NYSGIS CLEARING HOUSE PARCEL DATA, ORTHO IMAGERY, AND 2017 LIDAR DATASETS. INFORMATION FOR REFERENCE ONLY AND SHOULD BE CONSIDERED APPROXIMATE.
2. POSITIONS OF GAS VENT TBD.

0 100 200 500 ft.

5701 Bowman Rd.,Town of Manlius, NY 13057

ABUNDANT SOLAR

PROJECT NAME: East Syracuse Landfill Solar Farm

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ENGINEER'S SEAL

ABUNDANT
Solar Power Inc.

700 WEST METRO PARK
ROCHESTER, NY 14623
T: 416 494 9559
www.abundantsolarenergy.com

Short Environmental Assessment Form
Part 1 - Project Information

Instructions for Completing

Part 1 – Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 – Project and Sponsor Information

Name of Action or Project:
Solar Project Manlius - M1

Project Location (describe, and attach a location map):
5701 Bowman Rd, Manlius, NY 13057, USA

Brief Description of Proposed Action:
Abundant Solar Power, Inc. is developing plans for a 6.25 MW DC/ 5 MW AC solar power photo-voltaic plant which will cover 17.5 -acres (tax parcel 074.-01-06.1). The project will generate clean renewable energy for the local community and surrounding areas. The plant will consist of approximately 660 tables with between 30 to 32 panels per table. This project will yield a panel count approximately 11,900. The solar table modules will be free-standing structures utilizing a ballast system as to not penetrate the land fill cap. To operate the plant, one transformer pad and one main switch gear pad will be installed on concrete pads. The maximum extent of ground disturbance will be approximately 0.5 acre.

Name of Applicant or Sponsor:	Telephone: 1-416-494-9559 ext.104
Abundant Solar Power (M1) LLC	E-Mail: elissa.clark@abundantsolarenergy.com

Address:
700 West Metro Park

City/PO:	State:	Zip Code:
Rochester	New York	14623

	NO	YES
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.	☑	☐
2. Does the proposed action require a permit, approval or funding from any other government Agency? If Yes, list agency(s) name and permit or approval: Town Board - Land Lease & Power Purchase Agreements; Town Planning Board - Site Plan Approval; Town Code Enfrocement Officer - Building Permi; NYSERDA - Funding approval;	☐	☑

3. a. Total acreage of the site of the proposed action? +/- 17.5 acres
   b. Total acreage to be physically disturbed? +/- 0.5 acres
   c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 0 acres

4. Check all land uses that occur on, are adjoining or near the proposed action:

5. ☐ Urban ☐ Rural (non-agriculture) ☐ Industrial ☑ Commercial ☑ Residential (suburban)
   ☑ Forest ☐ Agriculture ☐ Aquatic ☐ Other(Specify):
   ☐ Parkland

	NO	YES	N/A
5. Is the proposed action,			
a. A permitted use under the zoning regulations?	☐	☑	☐
b. Consistent with the adopted comprehensive plan?	☐	☐	☑

	NO	YES
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape? This is a Town project and is supported by the municipality.	☐	☑
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: _____	☑	☐
	NO	YES
8. a. Will the proposed action result in a substantial increase in traffic above present levels?	☑	☐
b. Are public transportation services available at or near the site of the proposed action?	☑	☐
c. Are any pedestrian accommodations or bicycle routes available on or near the site of the proposed action?	☑	☐
9. Does the proposed action meet or exceed the state energy code requirements? If the proposed action will exceed requirements, describe design features and technologies: _____	☐	☑
10. Will the proposed action connect to an existing public/private water supply? If No, describe method for providing potable water: _____	☑	☐
11. Will the proposed action connect to existing wastewater utilities? If No, describe method for providing wastewater treatment: _____	☑	☐
12. a. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places?	☑	☐
b. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	☐	☑
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency?	☐	☑
b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody? If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres: _____	☑	☐

14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply:

☐ Shoreline ☑ Forest ☐ Agricultural/grasslands ☐ Early mid-successional

☑ Wetland ☐ Urban ☑ Suburban

	NO	YES
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered? Northern Long-eared Bat, In...	☐	☑
16. Is the project site located in the 100-year flood plan? Floodplain is located on the same tax parcel but located outside of the project area (see attached floodplain map)	☐	☑
17. Will the proposed action create storm water discharge, either from point or non-point sources? If Yes,	☐	☑
a. Will storm water discharges flow to adjacent properties?	☐	☑
b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)? If Yes, briefly describe: The storm water will be directed to adjacent wetlands and the Towns storm drains. Grass cover will mostly remain undisturbed.	☐	☑
18. Does the proposed action include construction or other activities that would result in the impoundment of water or other liquids (e.g., retention pond, waste lagoon, dam)? If Yes, explain the purpose and size of the impoundment:	☑	☐
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe: The parcel is a closed landfill owned by the Town of Manlius	☐	☑
20. Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste? If Yes, describe:	☑	☐

I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE

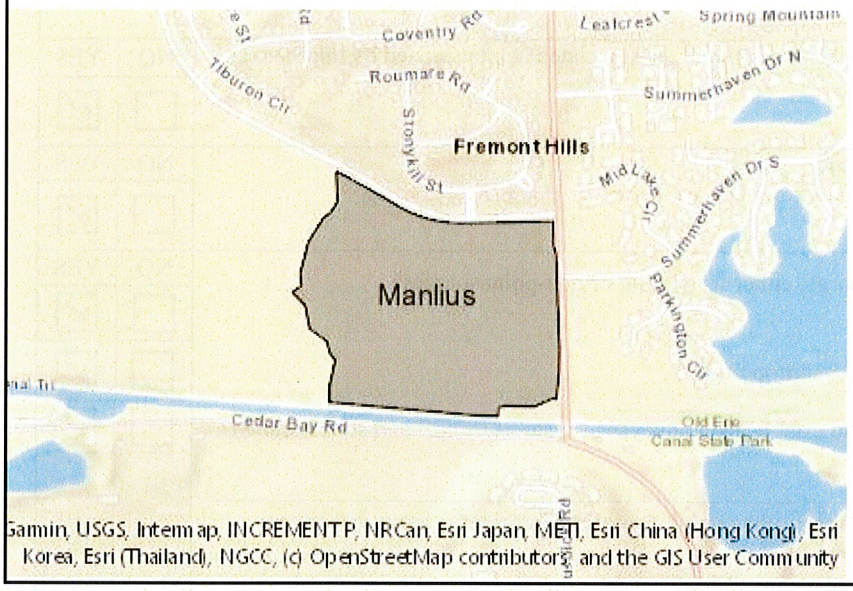
Applicant/sponsor/name: Abundant Solar Power (M1) LLC Date: 11/23/2020

Signature: _____ Title: President

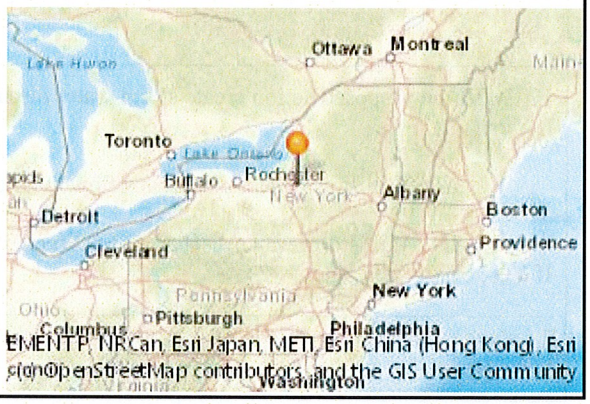
PRINT FORM

EAF Mapper Summary Report

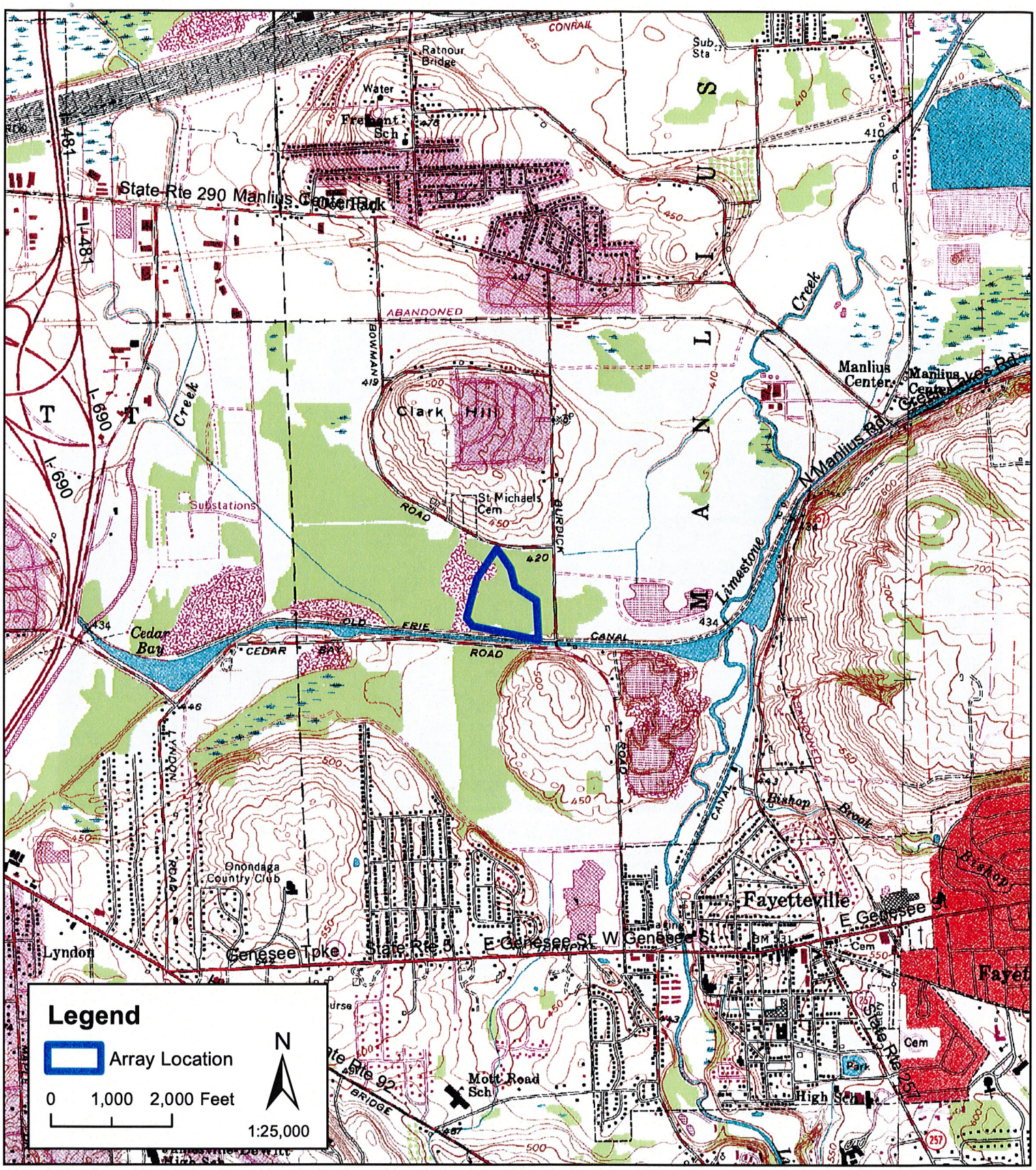
Monday, November 23, 2020 10:18 AM



Disclaimer: The EAF Mapper is a screening tool intended to assist project sponsors and reviewing agencies in preparing an environmental assessment form (EAF). Not all questions asked in the EAF are answered by the EAF Mapper. Additional information on any EAF question can be obtained by consulting the EAF Workbooks. Although the EAF Mapper provides the most up-to-date digital data available to DEC, you may also need to contact local or other data sources in order to obtain data not provided by the Mapper. Digital data is not a substitute for agency determinations.



Part 1 / Question 7 [Critical Environmental Area]	No
Part 1 / Question 12a [National or State Register of Historic Places or State Eligible Sites]	No
Part 1 / Question 12b [Archeological Sites]	Yes
Part 1 / Question 13a [Wetlands or Other Regulated Waterbodies]	Yes - Digital mapping information on local and federal wetlands and waterbodies is known to be incomplete. Refer to EAF Workbook.
Part 1 / Question 15 [Threatened or Endangered Animal]	Yes
Part 1 / Question 15 [Threatened or Endangered Animal - Name]	Northern Long-eared Bat, Indiana Bat
Part 1 / Question 16 [100 Year Flood Plain]	Yes
Part 1 / Question 20 [Remediation Site]	No



Data Sources:
1. USGS Quads: CUGIR
2. Roads: TIGER 2017

Prepared
11/23/2020 by:
Abundant Solar Power Inc.
Contact: 416-494-9559
www.abundantsolarenergy.com
Justin Lam, GIS Analyst

Abundant Solar Power Inc.

M1
Town of Manlius
Onondaga County

USGS Map
Onondaga
QUAD
Figure 1

PIN
- Approximate location based on user input and does not represent an authoritative property location

MAP PANELS
- Selected FloodMap Boundary
- Digital Data Available
- No Digital Data Available
- Unmapped

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D
- Otherwise Protected Area
- Coastal Barrier Resource System Area

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth
- Regulatory Floodway Zone AE, AO, AH, VE, AR

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

SOLAR LEASE AGREEMENT

This Solar Lease Agreement (this "Lease") is entered into on this ___ day of _____, 2020, (the "Commencement Date"), by and between the **Town of Manlius,** a New York municipal corporation ("Landlord" or the "Town"), and [**Abundant Solar Power (__)) LLC]** ("Tenant"), and together with Landlord, each a "Party" and collectively, the "Parties".

Recitals

[WHEREAS, the Town expressed interest to the CNY Regional Planning and Development Board (RPDB) to participate in the Municipal Collaborative Solar Procurement Project (aka Solarize NY Initiative) that was funded through NYSERDA PON 2672; and

WHEREAS, the purpose of the Solarize CNY Initiative is to provide technical support to the Town in evaluating the feasibility of installing solar energy systems for municipal buildings, facilities, and to leverage economies of scale through the collective purchasing power of multiple municipalities in CNY in order to reduce project costs; and][1]

WHEREAS, the Town owns certain real property located at 5701 Bowman Road in Town of Manlius, County of Onondaga, Tax Parcel No. 074.-01-06.1 (the "Property"), as described in **Exhibit "A"** attached hereto, which Property is approximately 59 acres and contains a closed surface landfill; and

WHEREAS, the Town has negotiated with Abundant Solar Power Inc., the direct owner of the Tenant and the developer selected by the CNY RPDB, to develop a mutually beneficial agreement to locate a 4 MWac community solar array on a portion of the Property containing approximately 13.6 acres.

NOW, THEREFORE, in consideration of the foregoing and the mutual covenants and agreements contained herein, and intending to be legally bound hereby, Tenant and Landlord hereby agree as follows:

1. Premises.

1.1 The Premises. Landlord, for and in consideration of the covenants and agreements on the part of Tenant contained in this Lease, does hereby lease unto Tenant, and Tenant does hereby take from Landlord, upon and subject to the conditions hereinafter expressed, a certain portion of the Property referred to as the "Lease Area," as more particularly described in **Exhibit "A"** and preliminarily depicted in Exhibit **"A-1"**, each attached hereto and incorporated herein, for the sole and exclusive purpose of conducting due diligence activities, designing, financing, constructing, installing, owning, operating, maintaining, repairing, replacing and removing the System (as defined in Section 2 hereof). In addition to the foregoing, Landlord hereby grants Tenant a license across the Property to the proposed interconnection point with the regulated electric local distribution company (the "LDC") that provides electric

[1] NTD: Please confirm whether these should be removed or if they are still applicable.

distribution service to the Town. Tenant shall provide Landlord notice of the LDC's grant of an Interconnection Permit (defined in Section 3.3) when the exact location for installation of cable necessary to support the System is known. Landlord hereby grants to Tenant a non-exclusive easement or easements on, over, across, under and through the Property as necessary to allow Tenant to install and maintain its cables and related equipment as required by the Interconnection Permit and any other utility easements reasonably required in connection with the Permitted Uses (defined below) (the "Easement Areas"). Upon Tenant providing notice to Landlord of the final Easement Areas, the Parties shall execute a separate stand-alone non-exclusive easement or easements reflecting the final Easement Areas and otherwise being satisfactory to Tenant (the "Easements"), at which time the license provided above shall terminate. The Lease Area and the area subject to the license or the subsequent Easement Areas are referred to herein, collectively, as the "Premises." The Parties agree to amend **Exhibit "A"** upon Landlord's grant of the easements referenced above, which revised **Exhibit "A"** shall replace the initial Exhibit A attached to this Lease as of the Commencement Date and be incorporated into this Lease. With respect to each Easement, (a) the term shall not exceed the Term of this Lease, (b) to the extent permitted by applicable federal, state and local laws, such Easement shall be appurtenant to the Lease Area and shall run with and benefit the Lease Area and inure to the benefit of and be binding upon Landlord and Tenant and their respective successors and assigns, (c) no act or failure to act on the part of Tenant shall be deemed to constitute an abandonment, surrender or termination thereof, except (i) upon recordation by Tenant of a quitclaim deed specifically conveying the Easement back to Landlord or (ii) the termination of this Lease pursuant to its terms, (d) non-use of the Easement shall not prevent the future use of the entire scope thereof, and (e) no use of or improvement to the Lease Area or any lands benefited by the Easement, and no assignment or sublease hereof or thereof, shall, separately or in the aggregate, constitute an overburdening of the Easement.

1.2 Right of Access. Landlord further grants to Tenant, during the period commencing on the Commencement Date of this Lease and ending upon the Termination Date or such additional time as required to remove the System and restore the Premises, as set forth in Section 16:

(a) A non-exclusive right of access to the Lease Area across or through the surrounding or adjacent area owned or leased by Landlord which is necessary or convenient to gain access to the System;

(b) The exclusive use of, and right to develop, design, install and operate, the System within the Lease Area, and the exclusive right to maintain, repair and replace the System throughout the Term of this Lease;

(c) A right of access for the installation, operation and maintenance of electric lines necessary to interconnect the System to the LDC's system, whether through the area subject to the aforesaid license or the Easement Area; and

(d) The exclusive right to receive sunlight ("Insolation") at the Lease Area (the "Solar Easement") during every hour of each day that sunlight could be received by the System, under which Tenant shall have the right to capture, use and convert the unobstructed solar resources on the Premises which shall extend horizontally

three hundred sixty degrees (360°) across the entire Property, together extending vertically through all space located above the surface of the Property, that is one hundred eighty degrees (180°) or such greater numbers of degrees as may be necessary to extend from each point on and along a line drawn along the surface of the ground and from each point along the exterior boundary of the Property. Landlord shall not permit any vegetation, structures or other objects on the Property to obstruct the passage of sunlight on or to the Lease Area. To the extent that it has the authority to do so, Landlord shall not permit any abutter to the Property, including other lands owned by Landlord, from constructing or obstructing the passage of sunlight on or to the Lease Area. This grant of Solar Easement shall run with the terms of this Lease and is not terminable by Landlord or its successor-in-interest so long as this Lease is in effect.

The preliminary locations of such access areas are set forth on Exhibit "A-1" attached hereto and such exhibit will be supplemented prior to the start of construction of the System.

1.3 Condition of Premises/Leased Area. Landlord represents to Tenant that, to the best of Landlord's knowledge, there are no covenants, restrictions, rights of way, easements or other encumbrances on the Premises or Leased Area which will prevent the Tenant's right of access and use of the Premises or Leased Area for the purposes described herein. Given that the Premises consist, all or in part, of land associated with a former landfill (the "Landfill Area"), Landlord further represents that at the time of the commencement of construction of the System the Landfill Area will be in compliance with all applicable federal, state and local laws, regulations, bylaws, codes and other legal requirements applicable to the Landfill Area and Landlord shall provide documentation of same which it has in its possession as reasonably requested by Tenant. During the Due Diligence Period (defined below) Tenant will review the condition of Landlord's title to the Premises, including any recorded rights of way and easements, and investigate the status of any existing permits that are associated with the Landfill Area. In the event that there exist other uses or covenants, conditions or restrictions affecting the Premises that prevent Tenant from its right of access and use of the Premises, or in the event that there are any violations or evidence of non-compliance with any applicable governmental permits or licenses for the Landfill Area, Tenant may terminate this Lease in accordance with the Early Termination provisions of Section 3.3. Tenant shall not be liable for any conditions on the Premises arising from or related to acts or omissions occurring prior to the Commencement Date, including conditions related to any Hazardous Materials.

1.4 Utilities. Tenant shall be solely responsible for providing, and paying for, all electrical and other utilities of sufficient capacity to serve Tenant's use of the Premises, which shall be installed in accordance with the reasonable requirements of Landlord and in a manner that avoids unnecessary interference to other activities on the Easement Premises in the reasonable judgment of Landlord.

1.5 Remaining Property. The Property, excepting the Lease Area, is referred to as the "Remaining Property."

2. Permitted Uses. Tenant shall use the Premises solely for the purpose of testing, designing, financing, constructing, installing, owning, operating, maintaining, repairing, replacing and removing a solar photovoltaic system with a nameplate capacity of 4.0 MW ac on

the Premises, together with any and all solar arrays and all necessary associated inverters, wiring, metering, and other equipment and appurtenances related thereto (the "System") as Tenant deems necessary for the design, installation, operation and maintenance of the System or as required by any county, state or federal agency or department for the operation of a photovoltaic generation system (the "Permitted Uses"). The Permitted Uses shall also include the right to test, survey and check title on the Property and perform any other acts necessary to the successful and secure operation of the System, as determined by Tenant in its sole discretion. Tenant's use of the Premises shall at all times conform to all applicable federal, state and local laws, regulations, bylaws, codes and other legal requirements (the "Governmental Requirements"). Absent written approval by the Landlord, Tenant shall not use the Premises for any use other than as set forth herein.

3. Term.

3.1 Initial Term. The initial term of this Lease ("Initial Term") shall commence upon execution of this Agreement, which shall be deemed the Commencement Date hereof and, unless terminated pursuant to the Early Termination provisions of Section 3.3 or as otherwise allowed by this Lease, shall terminate on the last day of the month after the twenty-fifth (25th) annual anniversary of the commencement of Commercial Operation of the System (the "Termination Date"). Commercial Operation is defined as the date upon which a power purchasing utility or other entity first receives and purchases power produced by the System, excluding electric energy delivered to the electric grid in connection with testing, start-up or commissioning of the System. Tenant shall promptly provide Landlord written notice of the date Commercial Operation is achieved (the "Commercial Operation Date").

3.2 Extension Term. Tenant shall have the right, to be exercised at least sixty (60) days prior to the expiration of the Initial Term, to extend the term of this Lease for two additional (5) year periods (the "Extension Term"), on the same terms and conditions set forth herein. The Initial Term, and the Extension Terms, if permitted and exercised, shall be referred to, together, as the "Term." The term "Lease Year" means a period of one (1) year commencing on the Commercial Operation Date (or the anniversary thereof) and ending on each subsequent annual anniversary date thereof.

3.3 Early Termination. The Parties hereby acknowledge and agree that Tenant's obligations under this Lease are contingent on Tenant 1) completing, to Tenant's satisfaction, certain due diligence as to title, survey, topographical, environmental, wetlands delineations and surveying, soil conditions and availability of utilities, sewer use and water supply, the overall regulatory framework governing the Premises and the System, including zoning and any other land use requirements; 2) obtaining, in Tenant's sole discretion, any and all required financing for the design, construction, installation, operation and management of the System including but not limited to financing that may be associated with certain tax credits and financial incentives contained in either state or federal law; 3) obtaining any and all required permits, including, without limitation, (a) a permit from the LDC to connect the System to the LDC (the "Interconnection Permit"), (b) obtaining, with Landlord's cooperation, all approvals from the New York State Department of Environmental Conservation ("DEC") necessary to authorize construction of the System on the landfill, including, if necessary, amendments to the Post-Closure Plan and/or Site

Management Plan for the landfill, and (c) any other federal, state, or local permits or approvals necessary to construct and operate the System on the Premises (all such permits and approvals being referred to as the "Governmental Approvals"), and on Tenant inspecting the Premises to determine if they are suitable for the Permitted Uses, in Tenant's sole discretion; and 4) purchasing the necessary equipment required for the System from a manufacturer of solar photovoltaic systems and equipment. Tenant shall have a period commencing on the Commencement Date through and including the Commercial Operation Date, or as otherwise agreed to by the Landlord and Tenant in writing (the "Due Diligence Period") to conduct its continued due diligence as described herein, obtain the financing Tenant reasonably determines is required for the System, obtain such Governmental Approvals and conduct all inspections of the Premises, and to purchase the necessary equipment required for the System, provided that Tenant shall have procured the insurance required under Section 12 prior to entering the Property. If Tenant is unable to obtain sufficient financing (as described above), obtain the Governmental Approvals, or purchase the necessary equipment despite its diligent efforts, or reasonably determines that the Premises are not suitable for Tenant's intended use, or reasonably determines that the Premises, or the Tenant's use of the Premises for the System, are not in conformance with any of the Governmental Requirements, or reasonably determines that any of the Governmental Requirements will cause the Project to be no longer economically viable, Tenant may terminate this Lease, without recourse to the Parties, by delivering written notice to Landlord, in which event this Lease shall terminate and be null and void, except for those provisions that are stated to survive the expiration or earlier termination of this Lease.

3.4 Holdover. If Tenant or any party claiming by, through or under Tenant, retains possession of the Premises or any part thereof after the expiration or earlier termination of this Lease, then Landlord may, at its option, serve written notice upon Tenant that such holding over constitutes (i) an Event of Default under the Lease, or (ii) a month-to-month tenancy, upon the terms and conditions set forth in this Lease, or (iii) the creation of a tenancy-at-sufferance, in any case upon the terms and conditions set forth in this Lease. Tenant shall also pay to Landlord all damages sustained by Landlord resulting from retention of possession by Tenant. The provisions of this Section 3.4 shall not constitute a waiver by Landlord of any right of re-entry as set forth in this Lease; nor shall receipt of any Rent or any other act in apparent affirmance of the tenancy operate as a waiver of Landlord's right to terminate this Lease for a breach of any of the terms, covenants, or obligations herein on Tenant's part to be performed.

4. Rent.

4.1 Rent. Beginning on the Commercial Operation Date, Tenant shall pay Landlord without notice or demand therefore and without any deduction or set-off whatsoever, except as expressly otherwise provided herein, Base Rent and taxes as such terms are defined below, in yearly installments.

4.2 Base Rent and Taxes.

(a) Tenant shall pay a base rent for each Lease Year in the amount set forth for such Lease Year on Exhibit B (the "Base Rent"). Base Rent shall be paid in quarterly installments, with the first payment due and payable on the Commercial Operation Date.

(b) The Parties acknowledge that Landlord, as a municipal corporation of New York State, or not-for-profit organization validly organized under New York State law, is exempt from the assessment of, and obligation to pay real property taxes, ad valorem levies or special assessments ("Property Taxes") for property owned by such municipal corporation or not-for-profit corporation and used for public or not-for-profit purposes, respectively. To the extent that the installation of the System on the Premises results in any Property Taxes being assessed against the Premises or the System, or the requirement of payments in lieu of real property taxes to one or more taxing jurisdictions or other authority in accordance with a payment in lieu of taxes agreement ("PILOT"), Tenant shall solely be responsible for the payment of all such Property Taxes, whether as a direct payment to the relevant taxing jurisdiction(s) or as a reimbursement to Landlord, provided, however, that in the event Tenant must pay such Property Taxes, the Base Rent due to Landlord shall be reduced by an amount necessary to ensure that the total amount Tenant pays in Base Rent, Property Taxes and under any PILOT in any Lease Year does not exceed the Maximum Payment for such Lease Year set forth on Exhibit B. If Tenant fails to pay such Property Taxes when same become due and payable, then, in addition to the Landlord's other rights and remedies, the Landlord shall have the right to pay such Taxes, and Seller shall indemnify and reimburse Landlord for the cost thereof within thirty (30) days of receipt of written demand from Landlord with respect to such payment.

4.3 Governmental Charges. Tenant shall pay or cause to be paid all of the following, if applicable: utilities of every kind or nature provided to the Lease Area, or reasonably attributable to Tenant's use of the Easement Premises. Landlord shall cause to be paid all charges, excises, levies, license and permit fees and all other governmental charges of any kind and nature which during the Term may be assessed, levied, imposed upon or become due with respect to, or become a lien on, the Premises or the leasehold, or any part thereof, or any appurtenance thereto ("Governmental Charges").

4.4 General Rent Provisions. All Rent and other payments required to be made by Tenant to Landlord under this Lease shall be paid by check made payable to "Town of Manlius" and delivered to Landlord at the address set forth below, or at such other place as Landlord may from time to time direct by written notice to Tenant.

4.5 Interest. All payments becoming due under this Lease and not paid within ten (10) days of the date due or upon written demand as required herein shall bear interest from the applicable due date until received by Landlord at an annual rate equal to the prime rate of interest charged by Bank of America or its successor or similar entity, as published in the Wall Street Journal for the applicable due date, plus two percent (2%).

5. System Construction, Installation and Operation.

5.1 Installation Work. Landlord hereby consents to the construction of the System by Tenant on the Premises ("Installation Work") in accordance with this Lease, including, without limitation, grading and required leveling, pouring foundations and other substructure as required for the Installation Work, the installation of solar panels, mounting substrates or supports, wiring and connections, power inverters, service equipment, metering equipment, utility interconnections, storage buildings, security offices, electrical equipment shelters and security fencing. Landlord acknowledges that the installation of all or a portion of the System will require physically mounting and adhering the System to the ground and consents to such mounting or adhering, as applicable, consistent with all applicable Governmental Requirements.

5.2 Appurtenant Rights. Tenant shall also have the right from time to time during the term hereof in connection with this Lease, to: (a) maintain, clean, repair, replace and dispose of part or all of the System; to add to or remove (if this Lease has terminated or as otherwise allowed by this Lease or required under applicable Governmental Requirements) the System or any part thereof; and (c) perform (or cause to be performed) all tasks necessary or appropriate, as reasonably determined by Tenant, to use the Premises for the Permitted Uses or carry out the activities set forth in this Section 5, including but not limited to, trimming or clearing brush, limbs, branches or foliage on the Lease Area or Property.

5.3 Access to and Use of Leased Premises. Tenant shall have access to the Premises twenty-four (24) hours, seven (7) days a week for the purpose of performing the Installation Work, providing utilities to the Premises, and using the Premises for the Permitted Uses and any other uses incidental thereto. To the extent requested by Tenant and reasonably necessary for the performance of the Installation Work, Landlord shall provide necessary space for the temporary storage of parts and supplies on the Premises or portions of the Property adjacent thereto, as reasonably agreed to by the Parties. Tenant shall perform the Installation Work and ongoing repair and maintenance in a manner that minimizes inconvenience to Landlord's use of the Remaining Property to the extent commercially practical. Tenant shall inform Landlord of Tenant's construction schedule at least five (5) business days prior to commencement of Installation Work.

5.4 Site Restoration. Tenant may make such modifications to the Premises as reasonably required or convenient to perform the Installation Work or ongoing maintenance, including, without limitation, running wires and conduits from the System to the electrical panels and other areas on the Premises, provided that Tenant shall maintain the Premises in good condition and repair and shall restore the Premises to substantially the same condition as existed immediately prior to such modifications (other than the improvements and modifications made in connection with the System).

5.5 As-Built Plans. Subsequent to the completion of the Installation Work, Tenant shall provide Landlord with "as-built" drawings setting forth in detail the location of all components of the System ("As-Built Plans"). All repairs or replacements to the System shall meet all applicable Governmental Requirements.

5.6 Construction Schedule. Within three (3) months of the execution of this Agreement, Tenant shall provide a schedule for construction including when Tenant shall commence construction of the System. The parties expressly agree that construction shall be complete and that the Commercial Operation Date of the System shall be no longer than four (4) years after execution of this Agreement, provided, however, that such time period shall be extended as a result of any *force majeure* event or any other delay caused by circumstances outside of the Tenant's control. In the event that construction is not completed within four (4) years of execution of this Agreement (as such time period may be extended as described in this Section 5.6), this Agreement shall be deemed terminated and null and void by the Town.

5.7 Construction Standards. Any and all improvements to be constructed, erected or maintained on or at the Premises shall be constructed, erected and maintained in good and workmanlike manner, and in accordance with local building permits. Tenant's construction, operation, use and maintenance of the System and any and all other improvements on or at the Premises shall at all times comply with all applicable Governmental Requirements. Tenant will be responsible for obtaining and maintaining, at its sole cost and expense, all approvals, and permits necessary for the construction of the System and any and all other improvements on or at the Premises.

5.8 Construction Costs. Tenant will pay all costs and expenses incurred in connection with the construction, maintenance and operation of the System and any and all related improvements on or at the Premises, including utility connections and the cost of electricity and other utilities the Tenant consumes in its construction, maintenance and operational activities at the rate charged by the servicing utility company, for which Tenant will make payments directly to said company. Tenant shall repair, at its sole cost and expense, any damage caused to the Property as a result of any act or omission of Tenant or its employees, agents, contractors, or invitees.

5.9 Mechanics Liens. Tenant shall use commercially reasonable efforts to not permit any mechanics' liens, or similar liens, to remain upon the Premises for labor and material furnished to Tenant or claimed to have been furnished to Tenant in connection with work of any character performed or claimed to have been performed at the direction of Tenant, and shall cause any such lien to be released of record without cost to the Landlord within forty-five (45) days after Tenant receives notice of filing of same. In connection with the foregoing, Tenant agrees to indemnify, save, defend, and hold harmless the Landlord against, of and from all costs, liabilities, suits, penalties, claims and demands, including reasonable counsel fees, resulting therefrom.

5.10 Insurance for Tenant's Work. During the performance of the Installation Work or other work done on or to the Premises, Tenant shall have and maintain in force public liability and property insurance, builder's risk insurance covering Landlord, and workmen's compensation insurance affording applicable statutory coverage and containing statutory limits, all in compliance with the provisions of Section 12.

5.11 Removal Bond/Security. Tenant shall be responsible for removal of the System and other improvements made to or structures placed on the Premises by or on behalf of Tenant; provided, however, that Tenant shall have no obligation to remove any road, utility

installations, or building foundations installed upon the Premises. Before Tenant commences the Installation Work, Tenant shall provide Landlord with an estimate from an independent third party engineer reasonably approved by Landlord and Tenant (and paid for by Tenant) establishing the cost required to remove the System from the Premises and to repair any damage caused to the Premises from such removal. No later than the Commercial Operation Date, Tenant shall provide Landlord with a bond in the amount established by the engineer in favor of Landlord from a bond company authorized to issue such bonds in the State of New York and reasonably satisfactory to Landlord (the "Removal Bond") to secure the removal of the System at the expiration or earlier termination of the Lease, to pay for any costs for repairs to the Premises caused as a result of such removal, and to restore the Premises to the condition in which they are required to be maintained if Tenant fails to do the same. The Removal Bond shall be maintained during the Term of this Lease, and the amount of said bond shall be recalculated by Tenant at least every five (5) years and adjusted accordingly based upon the updated costs of removal of the System. Tenant shall provide such calculations to Landlord for its review. The Removal Bond shall not be cancelled, materially changed, or reduced without first giving written notice to Landlord and Tenant at least thirty (30) days in advance and obtaining Landlord's prior written consent.

5.12 Safety. During construction of the System or any parts thereof or other improvements to the Premises, Tenant shall install such commercially reasonable safety devices as may be necessary to ensure the safety of Landlord's personnel on the Property, persons on the Premises, the Remaining Property, adjacent property owners and their property, and the general public with respect to their activities at the Property.

6. System and Output Ownership.

6.1 Ownership of System. Landlord acknowledges and agrees that Tenant or one of its affiliates with the financial and technical expertise capable of fulfilling this Lease is the exclusive owner and operator of the System, that all alterations, additions, improvements, installations or equipment used in connection with the installation, operation or maintenance of the System or comprising the System is, and shall remain, the personal property of Tenant and shall not become fixtures, notwithstanding the manner in which such System is or may be affixed to any real property of Landlord and neither Landlord nor any affiliate, lender or successor in- interest of Landlord shall have any right, title or interest in the System or any component thereof, notwithstanding that the System may be physically mounted or adhered to the Premises or structures, buildings and fixtures on the Premises. Landlord shall have no development or other interest in the System or other equipment or personal property of Tenant installed on the Premises (regardless whether such personal property is affixed to any real property), and Tenant may remove all or any portion of the System at any time and from time to time in Tenant's sole discretion. Without limiting the generality of the foregoing, Landlord hereby waives any statutory or common law lien that it might otherwise have in or to the System or any portion thereof.

6.2 Ownership of Output. Landlord acknowledges that Tenant is the exclusive owner of electric energy generated by the System and owner of all environmental attributes, tax attributes and environmental incentives and other governmental benefit or incentive programs attributable to the System.

6.3 Security Interests in System. Except as otherwise provided herein and in the Lease, Landlord acknowledges and agrees that Tenant may grant or cause to be granted to a lender or other project financing party, together with any Tax Investor (defined below), security or collateral agent, indenture trustee, loan trustee or participating or syndicated lender and their respective representatives, purchasers, transferees, successors and assigns (any of the foregoing, a "Financing Party") a security interest in the System and Tenant's interest in this Lease, and Landlord expressly disclaims and waives any rights in the System at law or in equity pursuant to this Lease. Any security interest granted to a Financing Party shall be subordinate to the interest of the Landlord in the Premises and subject to the terms and conditions of this Lease.

(a) Rights & Obligations. A Financing Party may enforce its lien or other rights and acquire title to the System or Tenant's interest in this Lease (collectively, the "System Estate") in any lawful way, pending foreclosure of such lien or exercise of such other rights, any Financing Party may take possession of and operate the System Estate. Upon foreclosure of such lien by power of sale, judicial foreclosure or acquisition of the System Estate by deed in lieu of foreclosure, a Financing Party may, upon notice to Landlord, sell and assign the System Estate to a third party. No Financing Party shall have any obligation or liability under this Agreement prior to the time that such Financing Party or its designee succeeds to absolute title to Tenant's interest in this Agreement. Following and only following the acquisition of the System Estate by a Financing Party or its designee as set forth above, the Financing Party or other person acquiring title to the System Estate shall (i) within twenty (20) days of acquiring the System Estate, cure all defaults by Tenant hereunder that are capable of being cured; provided, however, if such defaults cannot be cured within the said twenty (20) day period, the cure period shall be extended for a reasonable period of time for the Financing Party or other person to cure such default as long as Financing Party or other person has commenced cure and is diligently pursuing the same; and (ii) assume and commence performance of all of Tenant's obligations under this Lease thereafter arising. Landlord agrees that no Financing Party shall be obligated to perform any obligation or be deemed to incur any liability or obligation provided in this Lease on the part of Tenant or shall have any obligation or liability to Landlord with respect to this Lease except to the extent any Financing Party has expressly assumed the obligations of Tenant hereunder pursuant to this Section 6.3.

(b) Notice. Tenant shall notify Landlord in writing of the name, address, and telephone and facsimile numbers of any such Financing Parties. When giving notice to Tenant of any default by Tenant under this Lease, Landlord shall also serve a copy of such notice upon each Financing Party at the same time.

(c) Right to Cure. Each Financing Party shall have the right (but not the obligation) to cure any default by Tenant (i) within thirty (30) days (or twenty (20) days in the case of payment default) after the later of the receipt of the notice referenced above or the expiration of Tenant's applicable cure period as provided herein or (ii) for a default other than a payment default, within such longer period as may reasonably be necessary to cure such default, if such default is not reasonably

curable within 30 days after the expiration of Tenant's applicable cure period, provided that the cure is commenced within such 30-day period and thereafter diligently continued to completion. Landlord shall accept such cure and performance as though the same had been done or performed by Tenant so long as such cure and performance is provided by such Financing Party or any agent on its behalf. Any Financing Party shall have the right to do any act or thing required to be performed by Tenant or any assignee under this Lease, and such act or thing performed by a Financing Party shall be effective to prevent a default under this Lease as if done by Tenant or the assignee itself. The time available to a Financing Party to cure any default by Tenant shall be extended by (i) such number of days as may be necessary for such Financing Party to obtain a receiver, or to initiate and complete foreclosure proceedings, if possession of the System is necessary to cure such default, and (ii) the number of days of delay occasioned by bankruptcy stay or other judicial restriction against such remedies or occasioned by other circumstances beyond such Financing Party's reasonable control.

(d) New Lease to Financing Party. If the Lease is rejected, disaffirmed or terminated as a result of any insolvency proceeding involving the Tenant, Landlord shall give prompt written notice thereof to each Financing Party. A Financing Party, its nominee or their purchaser, assignee or transferee, as the case may be, may, within thirty (30) days after the receipt of such written notice, certify in writing that it intends to perform the obligations of the Tenant arising after the date of such certification upon the terms and conditions of the Lease and to enter into a new lease. In such event, Landlord shall within thirty (30) days of receiving written request from a Financing Party, execute and deliver a new lease to such Financing Party, its nominee or to their purchaser, assignee or transferee, as the case may be, which new lease shall be effective as of the date of such rejection, disaffirmation, or termination, shall be for a term equal to or greater than the remainder of the Term of this Lease and shall be upon the same terms, covenants, conditions and agreements as contained in this Lease; and, until such time as such new lease is executed and delivered, such Financing Party may enter, use and enjoy the Property and conduct operations thereon as if this Lease were still in effect. This paragraph shall survive the rejection, disaffirmation or other termination of the Lease and shall continue in full force and effect thereafter to the same extent as if this paragraph were a separate and independent contract made by Landlord, Tenant and each Financing Party; provided that the relevant Financing Party shall cure all defaults of Tenant capable of being cured hereunder, simultaneously with the delivery of such new lease.

(e) Upon the receipt of a written request from Tenant or any Financing Party, Landlord shall, at Tenant's or such Financing Party's expense, execute or arrange for the delivery of such certificates, consents, estoppels, opinions, and other documents as may be reasonably necessary for Tenant to consummate any financing or refinancing and will enter into reasonable agreements with such Financing Party that provide that Landlord recognizes the rights of such Financing Party upon foreclosure or other exercise of rights by the Financing Party and such other provisions as may be reasonably requested by any such Financing Party.

7. Representations and Warranties, Covenants of Landlord.

7.1 Authorization; Enforceability. The execution and delivery by Landlord of, and the performance of its obligations under, this Lease have been duly authorized by all necessary action, do not and will not require any further consent or approval of any other person, and do not contravene any provision of, or constitute a default under, any indenture, mortgage or other material agreement binding on Landlord or any valid order of any court, or regulatory agency or other body having authority or jurisdiction to which Landlord is subject. This Lease constitutes a legal and valid obligation of Landlord, enforceable against Landlord in accordance with its terms, except as may be limited by bankruptcy, reorganization, insolvency, bank moratorium or laws relating to or affecting creditors' rights generally and general principles of equity whether such enforceability is considered in a proceeding in equity or at law.

7.2 Landlord's Title to Leased Premises. Landlord shall not sell, assign or otherwise alienate or encumber the Premises unless Landlord shall have given Tenant at least ninety (90) days' prior written notice thereof, which notice shall identify the transferee, the Premises to be so transferred and the proposed date of transfer. Landlord agrees that this Lease, Tenant's easement rights in the Easement Area and the Solar Easement shall run with the Premises and survive any transfer of any of the Premises. In furtherance of the foregoing, Landlord agrees that it shall cause any purchaser, tenant, assignee, mortgagee, pledgee or party to whom a lien has been granted to execute and deliver to Tenant a document pursuant to which such party acknowledges and consents to Tenant's rights in the Premises as set forth herein including, without limitation, an acknowledgement by the transferee that it has no interest in the System and shall not gain any interest in the System by virtue of Landlord's transfer.

7.3 No Interference With and Protection of System. Landlord will not conduct activities on, in or about the Premises that have a reasonable likelihood of causing damage to, or impairment of the System, or otherwise adversely affecting the System or the operation thereof. Landlord shall not enter into any agreements, leases (including any renewals thereof), easement, or any other arrangements for rights to the Property that could affect the operations of the System or the Premises including the energy output of the System, without express written consent of Tenant. Tenant, at Tenant's sole expense, shall be solely responsible for implementing and maintaining reasonable and appropriate security measures to prevent unauthorized parties from accessing the Lease Area or the System, and to prevent any theft, vandalism or other actions that have a reasonable likelihood of causing damage to, or impairment of the System, or otherwise adversely affecting the System. Landlord covenants that it will cause any third party who now has or may in the future obtain an interest in the Premises including any lenders to Landlord, to execute and deliver a Subordination, Non-Disturbance, and Attornment Agreement (an "SNDA") with Tenant, providing that each such lien or interest is subordinate to this Lease, does not and shall not encumber the System or other interests of Tenant in the Premises under this Lease or any amendments thereto and extensions thereof, with the effect that in the event of any foreclosure, trustee's sale or conveyance in lieu of foreclosure or trustee's sale of such mortgagee's lien, (a) Tenant shall not be named as a defendant therein unless required to be named by applicable law, (b) Tenant's rights and interests under this Lease shall not be affected or impaired thereby, (c) this Lease shall continue in effect during the Term, and (d) Tenant shall recognize any acquirer of title to the Premises by any such process as Landlord hereunder so long as the transferee continues to hold such title.

~~7.4~~ Insolation. Landlord acknowledges and agrees that the Solar Easement granted pursuant to this Lease is essential to the value of the interest granted herein and is a material inducement to Tenant in entering into this Lease. Accordingly, Landlord shall not permit any interference with Insolation on and at the Lease Area. Without limiting the foregoing, Landlord shall not construct or permit to be constructed any structure on the Premises, the Remaining Property or any adjacent or nearby property that could adversely affect Insolation levels, permit the growth of foliage that could adversely affect Insolation levels, or emit or permit the emission of suspended particulate matter, smoke, fog or steam or other air borne impediments to Insolation. If Landlord becomes aware of any potential development or other activity on adjacent or nearby properties that has a reasonable likelihood of diminishing the Insolation to the Lease Area, Landlord shall cooperate with Tenant's efforts to prevent interference with Insolation on or at the Lease Area including but not limited to efforts to obtain, at Tenant's sole expense, solar easement agreements from adjacent property owners.

7.5 Leased Premises Conditions. Landlord represents and warrants to Tenant that Landlord is unaware of any site conditions, restrictions, title defects, rights of way, easements or other encumbrances on the Premises, or construction requirements or restrictions associated with any Governmental Requirements (i) that would materially increase the cost of installing the System at the planned locations on the Lease Area or would materially increase the cost of maintaining the System at the Lease Area over the cost that would be typical or customary for solar photovoltaic systems substantially similar to the System installed on former landfill sites in the state of New York or (ii) that would adversely affect the ability and efficiency of the System as designed to produce electricity once installed. Tenant acknowledges that Landlord is not in the business of either constructing or using solar photovoltaic systems, that Landlord has acquired no specialized knowledge concerning such systems, and that Landlord has not and is not required to undertake any investigation to determine if the Lease Area is suitable for Tenant's purposes. Landlord represents and warrants that, except as to the existence of the Landfill Area, as of the Commencement Date there are no Environmental Claims (as defined in Section 10.5(c) below) in connection with the Premises and that there have been no Environmental Claims in connection with the Premises that have not been fully remediated.

7.6 RPTL Exemption. Landlord represents and warrants that neither the Landlord nor any other governmental authority with taxing authority at the Property has "opted out" of the exemption from taxation of solar or wind energy systems pursuant to N.Y. Real Property Tax Law Section 487 ("RPTL Exemption").

8. Representations and Warranties, Covenants of Tenant.

8.1 Authorization: Enforceability. The execution and delivery by Tenant of, and the performance of its obligations under, this Lease have been duly authorized by all necessary action, do not and will not require any further consent or approval of any other person, and do not contravene any provision of, or constitute a default under, any indenture, mortgage or other material agreement binding on Tenant or any valid order of any court, or regulatory agency or other body having authority to which Tenant is subject. This Lease constitutes a legal and valid obligation of Tenant, enforceable against Tenant in accordance

with its terms, except as may be limited by bankruptcy, reorganization, insolvency, bank moratorium or laws relating to or affecting creditors' rights generally and general principles of equity whether such enforceability is considered in a proceeding in equity or at law.

9. Maintenance.

9.1 Maintenance of Premises. Tenant acknowledges that Landlord shall have no obligation to maintain the Premises or the System except as otherwise required of the Landlord by any Governmental Requirements related to the Landlord's obligations associated with the Landfill Area. Tenant shall, at its sole cost and expense, keep the Premises in good and safe order and condition, reasonable wear and tear and damage by fire or other casualty excepted, and shall not commit or permit its agents, employees, representatives or invitees to commit waste to the Premises. If Tenant or its agents, employees, representatives or invitees (including subtenants) damage the Property or any property of Landlord or any other tenant on the Property, Tenant shall, at its sole cost and expense, promptly repair and restore the Property and/or any property of Landlord or of other tenants. Tenant shall be responsible for the removal of all of its trash and waste and for reasonably removing snow and ice from the Premises, if required by Landlord.

9.2 Maintenance of System. Tenant shall maintain and repair the System in good order and condition, reasonable wear and tear and damage by casualty excepted, and shall maintain the System and related equipment so as to keep it safe, sanitary, and in good working order and condition, all at its sole cost and expense.

9.3 Landlord's Cure Rights. If repairs are required to be made to the Premises or Property, specifically excluding the System, by Tenant pursuant to the terms hereof, Landlord may demand that Tenant make the same forthwith, and, if Tenant refuses or neglects to commence and diligently pursue the completion of such repairs within thirty (30) days after such written demand, or forthwith in the case of emergency repairs, Landlord may (but shall not be required to) make or cause such repairs to be made. Except in the case of emergency repairs, such repairs made or caused to be made by Landlord shall not unreasonably interfere with Tenant's use of the Premises. If Landlord makes or causes such repairs to be made, Tenant agrees that Tenant shall forthwith, within thirty (30) days after such written demand with reasonable written evidence of payment, pay to Landlord the costs thereof and, if Tenant shall default in such payment, Landlord shall have the remedies provided herein as it does for the failure to pay Rent.

10. Hazardous Materials.

10.1 "Environmental Laws" shall mean and include all Governmental Requirements interpreting, relating to, regulating or imposing liability (including, but not limited to, response, removal, remediation and damage costs) or standards of conduct or performance relating to industrial hygiene, landfill land use plans, occupational health and/or safety conditions, environmental conditions, or exposure to, contamination by, or clean-up of, any and all Hazardous Materials, including without limitation, all federal or state super lien or environmental clean-up statutes.

10.2 "Hazardous Materials" shall mean any and all (a) substances, products, by-products, waste, or other materials of any nature or kind whatsoever which is or becomes listed, regulated or addressed under any Environmental Laws, and (b) any materials, substances, products, by-products, waste, or other materials of any nature or kind whatsoever whose presence in and of itself or in combination with other materials, substances, products, by-products, or waste may give rise to liability under any Environmental Law or any statutory or common law theory based on negligence, trespass, intentional tort, nuisance, strict or absolute liability or under any reported decisions of any state or federal court; and (c) any substance, product, by-product, waste or any other material which may be hazardous or harmful to the air, water, soil, environment or affect industrial hygiene, occupational health, safety and/or general welfare conditions, including without limitation, petroleum and/or asbestos materials, products, and by-products.

10.3 Tenant Covenants.

(a) Tenant acknowledges that the Premises is located, either wholly or partially, on a former landfill site, which is subject to particular requirements under Environmental Laws as well as particular work plans, closure plans, operating and maintenance plans or other permits, approvals, directives or orders from or agreements with applicable Governmental Authorities (the "Applicable Landfill Documents"), including but not limited to the New York State Department of Environmental Conservation. Tenant further acknowledges that below the surface of the Landfill Area on the Premises there are capped or covered soils possibly encapsulating Hazardous Substances, which cap or cover must be safeguarded and cannot be punctured, degraded or compromised in any way by Tenant or Tenant's activities on the Premises, and that any protection, containment, monitoring or environmental control system installed in connection with the Landfill Area, or closure thereof, must not be disturbed or interfered with in any way. Tenant agrees and acknowledges that it shall have the opportunity during the Due Diligence Period to conduct all necessary due diligence and site investigations and assessments with respect to the Premises and the Landfill Area and to make a reasonable request for, and review, any and all Applicable Landfill Documents within Landlord's possession or from applicable Governmental Authorities. Prior to conducting any site investigations or assessments, Tenant shall provide advance notification to the Landlord such that Landlord, or its representative, can be present during such investigation or assessment.

(b) Tenant recognizes that the Landlord has certain on-going obligations to maintain and/or monitor the Landfill Area in accordance with Applicable Law and the Applicable Landfill Documents. Tenant covenants that it will not interfere with the proper maintenance and protection of the Landfill Area, or any cap or cover or other protection, containment, monitoring or environmental control system installed in connection with the Landfill Area or closure thereof. Notwithstanding anything to the contrary contained herein, Tenant agrees and covenants that it shall not do any excavation, trenching, digging or soil borings on the Premises or the Property without the prior written consent of the Landlord, and if necessary, applicable Governmental Authorities. As necessary, Tenant will take all necessary actions and precautions in order to construct and operate the System in compliance with all Governmental Requirements

and the Applicable Landfill Documents and to avoid interference with the proper maintenance and protection of the Landfill Area and its cap or cover and any other protection, containment, monitoring or environmental control system installed in connection with the Landfill Area or closure thereof, including but not limited to, surface placement of conduit and foundations rather than subsurface placement, a design that accommodates settling, if needed, use of low ground pressure construction/maintenance vehicles, ensuring properly designed access roads to allow for storm water drainage, ensuring access roads do not cause rutting or erosion of cover soils, the location of inverters/transformers off-cover if practicable, proper separation between solar panels and vents from any monitoring and environmental control system (gas vents/collection wells) and ensuring the maintenance of healthy cover vegetation. Tenant shall provide the Landlord with copies of all its design documents and work plans for review and approval by Landlord.

10.4 Tenant Indemnity. Tenant will defend, indemnify, and hold harmless the Landlord and its agents, contractors, and employees (collectively, "Landlord Parties") from and against any and all claims, liabilities, or losses (collectively, "Losses") to the extent such Losses arise or result from, or are based on: (i) the failure of the Tenant to comply with any Environmental Laws or Applicable Landfill Documents; (ii) the installation, operation and maintenance of the System within the Landfill Area in violation of such Environmental Laws or Applicable Landfill Documents; (iii) Tenant's interference with the Landfill Area, any cap or cover on the Landfill Area and any monitoring or environmental control system in connection with the Landfill Area, or the closure thereof; and (iv) the presence, release or discharge of any Hazardous Materials in, on, or within the Landfill Area or the Premises, to the extent reasonably attributable to the actions or inactions of Tenant or its agents, contractors, or employees.

10.5 Landlord Representations and Warranties; Covenants.

(a) The Landlord agrees that it has provided a true, complete and correct copy of the Applicable Landfill Documents that are in Landlord's possession or control, to Tenant.

(b) The Landlord acknowledges and agrees that, solely by virtue of its entry upon the Premises or Property and the taking of actions authorized by, permitted under or consistent with this Lease, neither the Tenant nor any of Tenant's agents, representatives, contractors, consultants, engineers, materialmen, investors, potential investors, invitees, employees, officers, and directors (collectively, "Tenant Parties") shall have, or shall be deemed to have in any way participated in the operation of the Landfill Area or its closure, and so long as Tenant and the Tenant Parties comply with all Environmental Laws and Applicable Landfill Documents in developing, constructing, installing, operating, repairing, maintaining and decommissioning the System and neither Tenant nor any of the Tenant Parties interferes with the Landfill Area, its cap or cover, or other protection, containment, or monitoring or environmental control system installed in connection with the Landfill Area in violation of the Environmental Laws or Applicable Landfill Documents, then neither Tenant nor any of the Tenant Parties shall have assumed any liability or obligation associated with materials of any type or description

(including Hazardous Materials) deposited, stored, or received on or within the Landfill Area by the Landlord or any predecessor owner or operator.

(c) Landlord represents and warrants that, except as to the existence of the Landfill Area, as of the Commencement Date, no claims, suits, penalties, damages, losses, liabilities, payments, costs and expenses (including without limitation reasonable legal fees) arising out of or related to any spill, discharge, leakage, contamination or storage of any Hazardous Materials at the Property, whether or not such an event or condition required remediation, corrective or other action in order to comply with any Environmental Laws (collectively, "Environmental Claims") have arisen that have not been fully paid or remediated.

10.6 Landlord Indemnity. The Landlord will defend, indemnify, and hold harmless the Tenant and the Tenant Parties from and against any Losses to the extent such Losses result or arise from, or are based on: (i) the presence, discharge or release of any Hazardous Materials in, on, or within the Landfill Area or the Premises, except to the extent that the presence, discharge or release of such Hazardous Materials is attributable to the actions or inactions of Tenant or Tenant's agents, contractors, and employees from and after the Commencement Date; (ii) the failure of the Landfill Area or Landlord to comply with any applicable Environmental Laws or Applicable Landfill Documents. The Landlord will not defend, indemnify, or hold harmless the Tenant or Tenant Parties for any Losses resulting from the failure of the Tenant to comply with any applicable Environmental Laws or Applicable Landfill Documents regarding non-interference with the Landfill Area, any cap or cover of the Landfill Area and any monitoring or environmental control system in connection with the Landfill Area, or the closure thereof, or resulting from the installation, operation and maintenance of the System within the Landfill Area.

10.7 Costs. The indemnifications of this Section 10 specifically include reasonable and actual costs, expenses and fees incurred in connection with any investigation of Premises conditions or any clean-up, remedial, removal or restoration work required by any governmental authority.

10.8 Survival. The provisions of this Section 10 will survive the expiration or termination of this Lease.

11. Indemnification; Release.

11.1 Tenant Indemnity. In addition to Tenant's obligations under Section 10, Tenant shall indemnify, hold harmless, release and defend Landlord and the Landlord Parties from and against all Claims (a) arising directly or indirectly from the failure of any of the Tenant Parties to comply with the terms of this Lease or with any applicable Governmental Requirements; and (b) caused by or arising, directly or indirectly, from the act, omission, or negligence on the part of the Tenant Parties. However, in no event shall Tenant be obligated to indemnify Landlord or any Landlord Parties to the extent such claim, expense, or liability results from the act, omission, negligence or willful misconduct of Landlord or any of the Landlord Parties.

11.2 Release. To the maximum extent permissible by law, Tenant agrees to use and occupy the Premises at Tenant's own risk, and Landlord shall have no responsibility or liability for any loss or damage to the System or other personal property of Tenant unless caused by Landlord's failure to comply with any obligation of Landlord set forth in this Lease, or by the negligence or willful misconduct of any of the Landlord Parties.

11.3 Landlord Indemnity. To the extent permitted by law, Landlord shall indemnify, hold harmless, release and defend Tenant and the Tenant Parties from and against any and all Claims, (a) arising directly or indirectly from the failure of any of the Landlord Parties to comply with the terms of this Lease or with any Governmental Requirements; and (b) caused by or arising, directly or indirectly, from the act, omission, or negligence on the part of the Landlord Parties, or the breach of any provision of this Lease, except to the extent attributable to the act, omission, negligence or willful misconduct of any of the Tenant Parties.

11.4 Limitation on Liability. Notwithstanding anything to the contrary in this Lease, neither the Landlord nor the Tenant shall in any event be liable for any punitive or special damages and both the Landlord and Tenant hereby waive any claims either Party may have with respect to the foregoing.

11.5 No Personal Liability. To the fullest extent permitted by law, no official, employee, agent or representative of Landlord shall be individually or personally liable for any obligation or liability of Landlord under this Lease.

11.6 Survival. The provisions of this Section shall survive the termination or expiration of this Lease.

12. Insurance.

12.1 Required Insurance. Tenant shall maintain, during the Term of this Lease and for so long as Tenant or the System continues to be on the Premises, the following insurance:

(a) General comprehensive liability insurance, written on an occurrence basis, with a combined single limit of not less than One Million Dollars ($1,000,000.00) for injury to or death of any one person, for injury to or death of any number of persons in one occurrence, and for damage to property, insuring against any and all liability of Landlord (as additional insured) and Tenant, including, without limitation, coverage for contractual liability and broad form property damage, with respect to the Premises, the System, or arising out of the maintenance, use, or occupancy of the Premises and/or the System; and (ii) excess liability (so-called umbrella) coverage having a limit of Five Million Dollars ($5,000,000.00) written on an occurrence basis;

(b) All-risk property damage insurance for replacement of the System and Tenant's other personal property. Said insurance shall include coverage for all natural disasters, including earthquakes, hurricanes, tornadoes and floods; and

(c) During the performance of the Installation Work, Tenant shall also require the construction manager and/or general contractor to maintain (i) for the benefit

of Tenant and Landlord, as additional insured, commercial general liability insurance, including products and completed operations coverage, against any claims for bodily injury, death and property damage occurring upon, in or about the Premises and on, in and about the adjoining sidewalks and passageways during the construction of the System for at least Three Million Dollars $3,000,000 combined single limit; (ii) worker's compensation in amounts required by statute; (iii) employer's liability insurance with limits of not less than One Million Dollars ($1,000,000), and (iv) automobile liability insurance, including the ownership, maintenance and operation of any automotive equipment, owned, hired or non-owned, in an amount not less than One Million Dollars ($1,000,000) combined single limit;

12.2 General Requirements. The following conditions shall apply to the insurance policies required herein:

(a) Tenant shall provide certificates to Landlord evidencing the insurance coverage required to be carried hereunder on the Commencement Date and on each anniversary thereof, or at Landlord's reasonable request. All the liability insurance required under this Section 12 shall name Landlord as additional insured, and all insurance policies and certificates shall include a provision requiring thirty (30) day's written notice to Landlord by certified mail of any cancellation, material change, or reduction in coverage.

(b) All insurance of Tenant shall be primary with respect to any insurance maintained by Landlord and shall not call on Landlord's insurance for contributions.

(c) All insurance shall be issued through valid and enforceable policies issued by insurers authorized to transact insurance business in the state of New York and having an A+ or better financial rating from a recognized insurance accreditation institution (such as A.M. Best Company).

(d) The coverage amounts set forth above may be met by a combination of underlying and umbrella policies so long as the limits in combination equal or exceed those required herein.

(e) Tenant's failure to obtain, procure or maintain the required insurance shall constitute a material breach of this Lease.

(f) Tenant's obligation to hold harmless and indemnify Landlord shall not be limited by the requirement for, or existence of, insurance coverage.

(g) Landlord shall have the right to require Tenant to increase such limits when, during the term of this Lease, minimum limits of liability insurance commonly and customarily carried on properties comparable to the Premises by responsible owners or tenants are more or less generally increased, it being the intention of this sentence to require Tenant to take account of inflation in establishing minimum limits of liability insurance maintained from time to time on the Premises.

12.3 Landlord's Cure Rights. In the event of Tenant's failure, in whole or in part, at any time during the Term of this Lease or thereafter, to obtain insurance required to be carried by Tenant under the provisions hereof or to provide such evidence thereof in timely fashion, Landlord shall have the right (but shall not be obligated) to procure such insurance and Tenant shall pay to Landlord the costs and expenses thereof as additional rent.

13. Default.

13.1 Default by Tenant.

(a) It shall be an event of default ("Event of Default") under this Lease by Tenant if:

(i) Tenant fails to pay Rent or comply with any provision curable by the payment of money (including, without limitation, Tenant's obligation to maintain the insurance required under this Lease) when due hereunder and such failure continues for twenty (20) days after written notice from Landlord that the same is due;

(ii) Tenant fails to perform or observe any other material term or condition contained in this Lease and such failure is not cured within thirty (30) days after receipt of written notice from Landlord specifying such failure, provided, however, that if such failure is of such a nature that Tenant cannot reasonably remedy the same within such thirty (30) day period, no such failure will be deemed to exist if Tenant commences to cure the default within such thirty (30) day period and thereafter prosecutes the same to completion with reasonable diligence (but in no event later than one hundred twenty (120) days from the date of the notice from Landlord unless otherwise agreed upon in writing); or

(iii) Tenant shall be bankrupt or insolvent according to law, or, if any assignment shall be made of Tenant's property for the benefit of creditors, or a receiver or trustee is appointed to take over and conduct the business of Tenant, whether in receivership, reorganization, bankruptcy or other action or proceeding, and such bankruptcy or insolvency proceeding, receivership or trusteeship shall not have been vacated for more than ninety (90) days after such declaration, election or appointment, unless (i) such debtor in possession, receiver or trustee, within said ninety (90) days, shall have remedied all defaults under this Lease; or (ii) such debtor in possession, receiver or trustee shall have, within said ninety (90) days, executed an agreement, duly approved by Landlord, whereby such debtor in possession, receiver or trustee shall assume and agree to be bound by each and every material term, provision and limitation of this Lease, and if in bankruptcy Tenant, for itself, for the debtor in possession, the receiver or trustee waives its ability to request an extension of the period to assume or reject this Lease in excess of ninety (90) days from the Court's Order for Relief.

(b) Upon the occurrence of an Event of Default, Landlord shall have the right, upon prior written notice, while such default continues, to re-enter and take complete possession of the Premises, to declare the Term of this Lease ended and cause Tenant to remove the System and other property on the Premises, without prejudice to any remedies which might otherwise be available to Landlord.

(c) Tenant agrees to reimburse Landlord for all actual and reasonable costs associated with the enforcement of this Lease, or any and all provisions therein, including but not limited to all legal and court costs. Without limiting any of Landlord's rights and remedies hereunder, and in addition to all other amounts Tenant is otherwise obligated to pay, it is expressly agreed that the Landlord shall be entitled to recover from Tenant all actual and reasonable costs and expenses, including reasonable attorneys' fees, incurred by Landlord in enforcing this Lease from and after Tenant's default.

(d) The provisions of this Section 13.1 shall survive the expiration or earlier termination of this Lease.

13.2 Default by Landlord.

(a) It shall be an event of default under this Lease if Landlord fails to perform any material term or condition under this Lease within thirty (30) days after receipt of written notice from Tenant specifying the failure, provided, however, that if such failure is of such a nature that Landlord cannot reasonably remedy the same within such thirty (30) day period, no such failure will be deemed to exist if Landlord commences to cure the default within such thirty (30) day period and thereafter prosecutes the same to completion with reasonable diligence (but in no event later than sixty (60) days from the date the notice is received form Tenant unless otherwise agreed upon in writing). In the event that Tenant terminates this Lease because of Landlord's default hereunder, Tenant's obligation to pay any further Rent and other obligations hereunder (other than those expressly survive termination) shall cease as of the date of written notice of default to Landlord, and Tenant shall have the right to pursue any and all remedies available to it at law and/or equity.

(b) Landlord agrees to reimburse Tenant for all actual and reasonable costs associated with the enforcement of Tenant's rights under this Lease, or any and all provisions therein, including but not limited to all legal and court costs. Without limiting any of Tenant's rights and remedies hereunder, and in addition to all other amounts Landlord is otherwise obligated to pay, it is expressly agreed that Tenant shall be entitled to recover from Landlord all actual and reasonable costs and expenses, including reasonable attorneys' fees, incurred by Tenant in enforcing this Lease from and after Landlord's default.

14. Termination and Expiration of this Lease.

14.1 Right to Terminate. This Lease shall terminate upon the expiration of the Term, unless earlier terminated pursuant to its terms. In addition to the Parties' termination rights provided elsewhere in this Lease, Landlord and Tenant shall each have the right to terminate this Lease in the event that the other fails to cure a default within the cure period set forth in Section 13, subject to Section 6.3(c), immediately upon written notice to the defaulting Party.

14.2 Change in Law. In the event that, at any time after the Effective Date of this Agreement, there is a Change in Law that is applicable to the construction, repair, maintenance or operation of the System, the sale of energy produced by the System, or any other obligation of the Tenant with respect to the System or the output of the System, and compliance

with the Change in Law results in a material increase in Tenant's costs to construct, repair, operate and/or maintain the System or otherwise operate its business relating to the System, Tenant will have the right to terminate this Lease upon thirty days' written notice to Landlord. For purposes of this paragraph, "Change in Law" shall mean any circumstance in which any constitutional provision, rule, regulation, ordinance, treaty, order, decree, judgment, decision, certificate, holding, injunction, registration, license, franchise, permit, authorization, award, determination, guideline, approval, LDC tariff, consent or requirement of any governmental authority or LDC having jurisdiction over the Landlord, the Property or Tenant (collectively, "Applicable Law") is enacted, amended, modified, interpreted, nullified, suspended, repealed, found unconstitutional or unlawful, or changed or affected in any material respect. For the avoidance of doubt, Change in Law shall also include (a) the imposition of and/or increase in the amount of any import tariff or similar charges on the physical equipment to be used in the construction of the System, (b) any decision by any governmental authority after the Effective Date to either "opt-out" of the RPTL Exemption, or require a payment in lieu of taxes in connection with the System of the Premises, and (c) any change to Applicable Law that prevents, conditions or impedes the Tenant from operating the System as a "community distributed generation facility" under Applicable Law.

15. Fire or Other Casualty; Condemnation.

15.1 Casualty. If the System is substantially damaged or destroyed by fire or other casualty, or an occurrence of a *force majeure* event such that Tenant reasonably determines that the continued operation, replacement or repair of the System will not be economic and feasible, then Tenant may elect to terminate this Lease without any further obligation to pay Rent by giving Landlord at least thirty (30) days' prior notice thereof, and on the date so specified, this Lease shall expire as fully as if such date were the date set forth above for the expiration of this Lease, and this Lease shall be null and void, without recourse to the Parties, other than Tenant's obligation to remove its property as herein provided and such other provisions that are stated herein to survive said termination. In no event shall Landlord be required to repair, replace or restore the System or any parts thereof, or any other improvements made by or on behalf of Tenant on the Premises except to the extent that such damage was due to Landlord's gross negligent, willful acts or intentional omission.

15.2 Condemnation. If a condemning authority takes all of the Premises, this Lease shall terminate as of the date title vests with the condemning authority. If a substantial portion of the Premises are taken and the taking, in Tenant's reasonable determination, renders the Remaining Property substantially unsuitable for Tenant's intended use of the Premises described hereunder, Tenant may terminate this Lease, without any further obligation to pay Rent, by written notice thereof to Landlord within thirty (30) days of such taking; provided that the effective termination date of the Lease shall be the same date title vests with the condemning authority and any obligations of Tenant hereunder shall terminate as of that date. The parties will be entitled to share in the condemnation proceeds in proportion to the values of their respective interests in the Premises, which for Tenant will include, where applicable, the unamortized value of the System, moving expenses of its property on the Premises and business dislocation and relocation expenses.

16. **Surrender**. Within six (6) months from the expiration or termination of this Lease, Tenant shall, to the extent required by Section 5.11 hereof, remove the System and all other improvements installed by Tenant on the Premises in compliance with all applicable legal requirements. In connection with such removal, Landlord shall continue to provide Tenant with access to the Premises without payment of further rent or consideration. Any improvements not removed from the Premises within the foregoing six (6) month period shall be deemed abandoned and shall become the sole property of Landlord. In such case, Landlord shall have the right to use the removal bond to pay for the removal of the system, any costs associated with repairing any damage caused to the System, any costs associated with repairing any damage caused to the Premises for the removal of the System and/or to make such repairs or improvements to the Premises to restore the premises to the condition in which they were required to be maintained under this Lease. The provisions of this Section shall survive expiration or earlier termination of this Lease.

17. **Assignment**. The Tenant shall not assign this Lease or sublet the Premises or any portion thereof absent the written approval of Landlord, which consent may not be unreasonably conditioned, withheld or delayed, provided, that Tenant may assign this Lease without the written approval of Landlord to an affiliate of Tenant or any successor to Tenant by merger or consolidation or to any entity that acquires a substantial portion of all of the assets, stock or equity of Tenant. Provided that such assignee expressly assumes in writing the obligations of Tenant hereunder, and provided that such assignee has sufficient expertise and experience in the ownership or operation of electric generating facilities comparable to the System to be reasonably capable of performing the obligations of Tenant under this Lease in accordance with good utility practice, Tenant shall be automatically released from all further liability under this Lease from and after the date of such assignment. Notwithstanding the foregoing, Landlord acknowledges that Tenant's obligations under any financing that Tenant obtains for the purchase and installation of the System through a loan, lease or partnership from or with one or more Financing Parties may be secured by, among other collateral, a pledge or collateral assignment of this Lease. In order to facilitate any such transaction, Landlord consents (a) to the collateral or full assignment by Tenant to the lender of the Tenant's right, title and interest in and to this Lease, any mortgage of Tenant's interest in this Lease and the System, or any sublease of Tenant's interest in this Lease in connection with such financing and such assignment shall not be subject to any conditions or restrictions set forth in this paragraph, and (b) agrees to take any actions and provide any documentation reasonably requested by Tenant or any Financing Party in connection with such a transaction, all at Tenant's sole cost and expense. In addition, a transfer of any ownership interests in Tenant to an investor for purposes of allowing such investor to claim certain tax benefits (a "Tax Investor") pursuant to which such Tax Investor shall not have ordinary control over the management and operations of Tenant (and further transfers of such ownership interests by such Tax Investors) shall not be treated as an assignment of this Lease and no consent of Landlord shall be required in connection therewith.

18. **Miscellaneous**.

18.1 Landlord's Access. Landlord or Landlord's agents may, at reasonable times, and after reasonable advance notice to Tenant, except in case of emergency when no such notice shall be necessary, enter upon any and all portions of the Premises for the purpose of carrying out Landlord's obligations with respect to maintenance and monitoring of the Landfill

Area. Landlord and Landlord's representatives shall at all times comply with all reasonable safety and other operating procedures established by Tenant, and with all applicable Governmental Requirements.

18.2 Preference to Town of Manlius Residents. Tenant agrees to exclusively offer subscriptions to its services to the individuals and entities that own property in the Town for a period of ninety (90) days from the date that subscriptions are first available and offered in the load zone that is impacted by the System. During the ninety (90) day window, Tenant agrees to provide notice and information to Town residents for its subscription services by way of public meetings, mailing notifications, and notification on the Town's website and social media pages.

18.3 Quiet Enjoyment.

(a) Landlord covenants that so long as no Event of Default has occurred and is continuing, Tenant shall quietly have and enjoy the Lease Area during the Term.

(b) So long as the use by Landlord and other occupants of the Remaining Property is not inconsistent with the rights granted to Tenant herein to use the Lease Area for the Permitted Use, Tenant shall operate, maintain and repair the System in a manner that will not obstruct or interfere with Landlord's use of the license area, the Easement Area, or the Remaining Property or the rights of any other occupants in and to such areas. Tenant will use its best efforts to maintain its System in a manner that does not interfere with the Remaining Property. Landlord may construct, reconstruct, modify or make alterations to the license area, the Easement Area, and the Remaining Property so long as such activities do not materially interfere (including shading) with the operation of the System.

18.4 No Limitation of Regulatory Authority. The Parties acknowledge that nothing in this Lease shall be deemed to be an agreement by Landlord to issue or cause the issuance of any approval or permit, or to limit or otherwise affect the ability of Landlord or any regulatory authority of Landlord to fulfill its regulatory mandate or execute its regulatory powers consistent with all applicable legal requirements. Without limiting the foregoing, Landlord agrees to take all reasonable measures with respect to which it has legal capacity to facilitate and expedite the review of all local permits, if any, and approvals necessary for the design, construction, engineering, operations, maintenance and deconstruction of the System and to act at all times during such review within its legal capacity.

18.5 Further Leases; Easements and Rights of Way. Landlord reserves the right to grant additional leases, easements, leases or rights of way of the Remaining Property, whether recorded or unrecorded, as may be necessary, which do not unreasonably interfere (including shading) with Tenant's use of the Premises and the operation of the System.

18.6 Amendments. This Lease may be amended only in writing signed by Tenant and Landlord or their respective successors in interest; provided, however, Landlord and Tenant agree that so long as there exists unpaid financing from a Financing Party or a loan or other financing held by a lender that is secured by Tenant's grant of security interest in this Lease and/or the System, this Lease shall not be terminated, modified or amended, and Landlord shall not accept a surrender of all or any part of the Leased Area or a cancellation or release of this Lease from Tenant, prior to the expiration of the Term without the prior written consent of such Financing Party or lender.

18.7 Notices. Any notice required or permitted to be given in writing under this Lease shall be (a) mailed by certified mail, postage prepaid, return receipt requested, (b) sent by overnight air courier service, (c) personally delivered to a representative of the receiving Party, or (d) sent by facsimile or email with confirmation of receipt (provided an identical notice is also sent simultaneously by mail, overnight courier, or personal delivery as otherwise provided in this Section 18.7). All such communications shall be mailed, sent or delivered, addressed to the Party for whom it is intended, at its address set forth below:

If to Landlord:

With a copy to:

If to Tenant:

Abundant Solar Power (___) LLC
c/o Abundant Solar Power, Inc.
700 W. Metro Park
Rochester, New York 14623
Attn: Richard Lu, President

With a copy to:

_____
_____
_____

18.8 Waiver. Failure of either Party to complain of any act or omission on the part of the other Party, no matter how long the same may continue, shall not be deemed to be a waiver by said party of any of its rights hereunder. No waiver by either Party at any time, express or implied, of any breach of any provision of this Lease shall be deemed a waiver of a breach of any other provision of this Lease or a consent to any subsequent breach of the same or any other provision. If any action by either Party shall require the consent or approval of the other Party, the other Party's consent to or approval of such

action on any one occasion shall not be deemed a consent to or approval of said action on any subsequent occasion or a consent to or approval of any other action on any subsequent occasion.

18.9 Remedies Cumulative. No remedy herein conferred upon or reserved to Tenant or Landlord shall exclude any other remedy herein or by law provided, but each shall be cumulative and in addition to every other remedy given hereunder or now or hereafter existing at law or in equity or by statute.

18.10 No Third Party Beneficiaries. This Lease is solely for the benefit of the Parties hereto and no right or cause of action shall accrue by reason hereof for the benefit of any third Party not a Party hereto, other than any lender or other secured parties.

18.11 Captions. The captions and headings throughout this Lease are for convenience of reference only and the words contained therein shall in no way be held or deemed to define, limit, explain, modify, amplify or add to the interpretation, construction or meaning of any provisions of, or the scope or intent of this Lease, nor in any way affect this Lease, and shall have no legal effect.

18.12 Prevailing Party. In any litigation between the parties arising out of this Lease, or in connection with any other actions taken or notices delivered in relation to a default by any party to this Lease, the non-prevailing party shall pay to the prevailing party the prevailing party's reasonable attorneys' fees and costs incurred in connection with the enforcement of the terms of this Lease.

18.13 Estoppel. Either Party will, at any time upon thirty (30) days prior written notice from the other, execute, acknowledge and deliver to the other a statement in writing (i) certifying that this Lease is unmodified and in full force and effect (or, if modified, stating the nature of such modification and certifying this Lease, as so modified, is in full force and effect) and the date to which the Rent and other charges are paid in advance, if any, and (ii) acknowledging that there are not, to such Party's knowledge, any uncured defaults on the part of the other Party hereunder, or specifying such defaults if any are claimed. Any such statement may be conclusively relied upon by any prospective purchaser or lender.

18.14 Severability. If any term or provision of this Lease or the application thereof to any person or circumstances shall, to any extent, be invalid or unenforceable, the remainder of this Lease, or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby, and each term and provision of this Lease shall be valid and be enforced to the fullest extent permitted by law.

18.15 Choice of Law. This Lease shall be construed in accordance with the laws of the State of New York.

18.16 Binding Effect. This Lease and its rights, privileges, duties and obligations shall inure to the benefit of and be binding upon each of the Parties hereto, together with their respective successors and permitted assigns.

18.17 Counterparts. This Lease may be executed in counterparts, which shall together constitute one and the same agreement. Facsimile or ".pdf" signatures shall have the same effect as original signatures and each Party consents to the admission in evidence of a facsimile or photocopy of this Lease in any court or arbitration proceedings between the parties.

18.18 Entire Agreement. This Lease represents the full and complete agreement between the Parties with respect to the subject matter contained herein and supersedes all prior written or oral agreements between said Parties with respect to said subject matter.

18.19 Further Assurances. Upon the receipt of a written request from the other Party, each Party shall execute such additional documents, instruments and assurances and take such additional actions as are reasonably necessary to carry out the terms and intent hereof. Neither Party shall unreasonably withhold, condition or delay its compliance with any reasonable request made pursuant to this section.

18.20 Notice of Lease. Landlord and Tenant mutually agree to execute herewith, in triplicate, a Notice of Lease in recordable form with respect to this Lease, which shall be recorded forthwith with the County Clerk's office, and agree to execute, upon termination of this Lease for whatever cause, a Notice of Termination of Lease in recordable form.

[signature page to follow]

IN WITNESS WHEREOF, the Parties have executed this Lease on the day and year first above written.

LANDLORD:

TOWN OF MANLIUS

By: _____
Name:
Title:

TENANT:

ABUNDANT SOLAR POWER (Man1) LLC

By: Abundant Solar Power Inc., its Sole Member

By: _____
Name: Richard Lu
Title: President

EXHIBIT A

DESCRIPTION OF PROPERTY

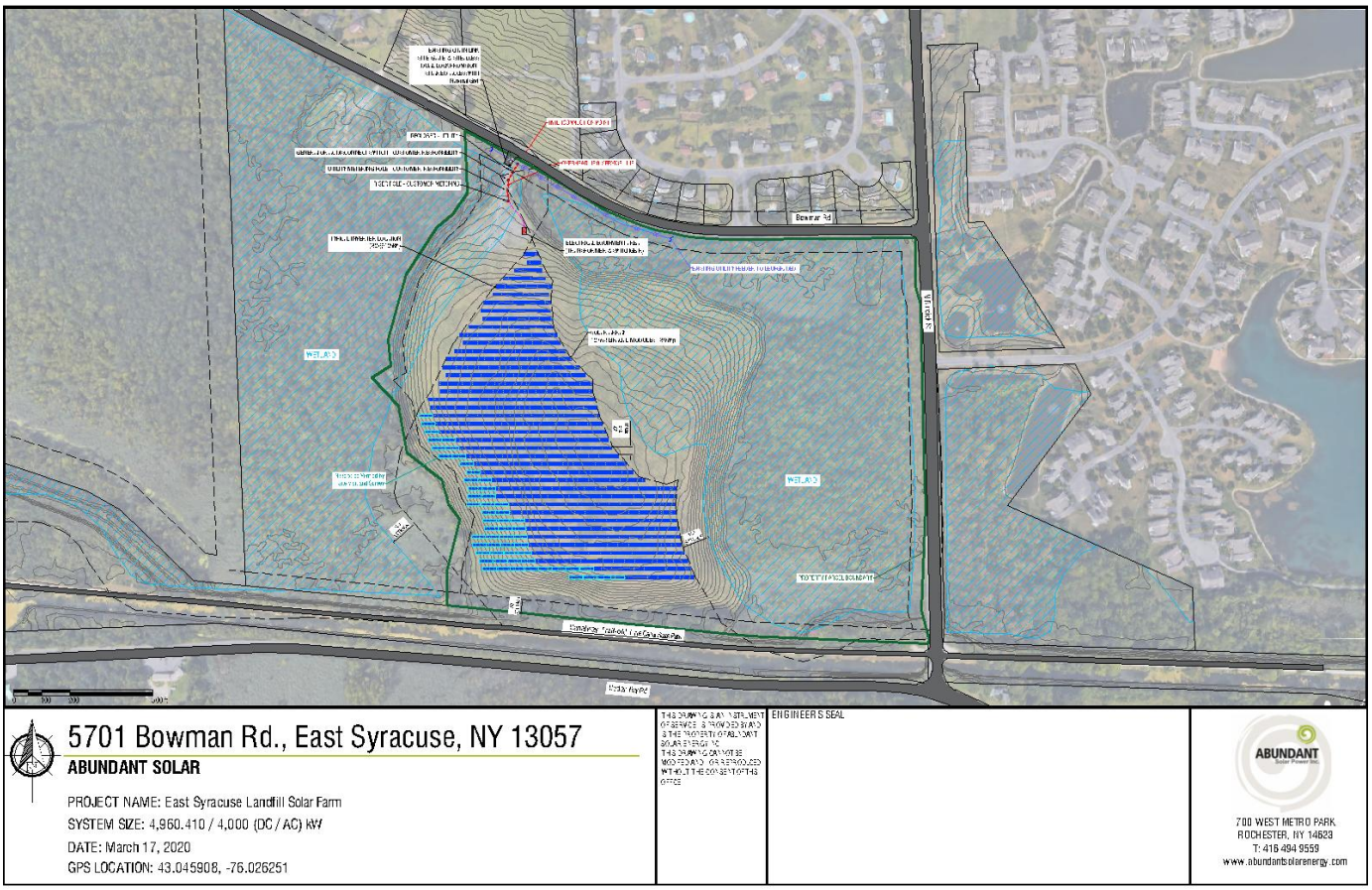
5701 Bowman Road
Town of Manlius
County of Onondaga
Tax Parcel No. 074.-01-06.1

[Metes and bounds description to be inserted, if available]

DESCRIPTION OF PREMISES

[To be inserted upon receipt of metes and bound description]

EXHIBIT A-1



Preliminary Depiction of Lease Area

EXHIBIT B

Base Rent

Lease Payment to Manlius w/ 2% annual escalator

Year	Payment
1	16,000
2	16,320
3	16,646
4	16,979
5	17,319
6	17,665
7	18,019
8	18,379
9	18,747
10	19,121
11	19,504
12	19,894
13	20,292
14	20,698
15	21,112
16	21,534
17	21,965
18	22,404
19	22,852
20	23,309
21	23,775
22	24,251
23	24,736

24	25,230
25	25,735
Total	512,485

Manlius Closed Landfill Solar Array Project
Abundant Solar Power (M1) LLC

Town of Manlius, Onondaga County, New York

Special Permit Application

October 2021

ABUNDANT Solar Power Inc.
700 West Metro Park, Ground Level
Rochester, New York
14623-2678
Tel: 202 818 9194

ABUNDANT Solar Energy Inc.
Suite 900, 2235 Sheppard Ave E.
Toronto, ON M2J 5B5
Tel: 1 416 494 9559
www.abundantsolarenergy.com

Chairman Joe Lupia
Town of Manlius Planning Board
301 Brooklea Drive, Fayetteville,
NY 13066

Friday Oct 1st, 2021

Dear Chairman Lupia

I am reaching out to you today in order to submit our application for Planning board review and approval of the Town of Manlius Closed Landfill Solar project at 5701 Bowman Road, Manlius NY, 13057. The project will be known as Abundant Solar Power (M1) LLC.
I represent Abundant Solar Power and we have leased approximately 20 acres at the closed land fill, property tax id 074.-01-06.1, for the purpose of building and operating a 4.3MWac solar array. The power generated will be fed into the local distribution grid infrastructure and power local homes and businesses with green, clean, renewable power.
Our submission consists of the following documents:

1. Application Form and Disclosure affidavit signed and notarized where required
2. Professional fees agreement
3. Letter concerning SEQR and Type II status
4. SEAF for information only
5. Detailed site plan, stamped by Barton & Loguidice
6. Wetland delineation
7. Site Conditions plan
8. Survey preliminary as Title search is ongoing
9. Legal description
10. DEC Wetland Permit letter
11. Decommissioning plan

Please let me know if there are any other requirements or questions that you might have.

Sincerely,

Melissa Clark

Melissa Clark
VP Business Development
Abundant Solar Power

Mobile: 416 917 5667
Melissa.clark@abundantsolarenergy.com

TOWN OF MANLIUS
SPECIAL PERMIT APPLICATION
(Original or Renewal)

DATE: Oct 1, 2021 Tax Map # 074-01-06.1

I Richard Lu as applicant relative to property located at 5701 Bowman Rd, Manlius, NY hereby request/apply for issuance/renewal (CIRCLE ONE) of a **SPECIAL PERMIT** from the Town of Manlius Town Board as required by the Town of Manlius Code, submit the following application and documentary evidence and/or information, including comprising the Exhibits in support of this request and certify that it is correct, true and accurate to the best of my/our knowledge and after reasonable due diligence and investigation. I further knowledge and agree that should any such evidence or information be later determined as false or not credible in any material respect, any special permit issued/renewed based thereon may be determined by the Town Board as void from the start or revocable.

Applicant's Signature

A 1. Owner(s) of property: Town of Manlius

A 2. Status (Owner, Lessee) of each applicant: Lessee: Abundant Solar Power (MI) LLC

A 3. Present Zoning of Property: RA

A.4. Present Use of Property (describe in detail as best as reasonably possible- add additional pages as needed): Closed Landfill

A5Describe property condition at present: Unused, rough grass slope

B 1. Proposed use of property: PV solar generation array

B 2. Anticipated number of employees, guests, customers on property:

Minimal ongoing maintenance, grass cutting, electrical servicing ≈ 6 site visits annually

B 3. Hours of Proposed Operation: 24/7 365 days a year

dd/2017

4

B 4. Anticipated Automobile Parking: None

B 5. Parking Area Buffer/Screening: None

B 6. Anticipated Vehicle Traffic Volume/Flow: Minimal for site maintenance

B 7. Proposed Site Lighting: None

B 8. Anticipated noise sources, known decibel levels: String inverters will be used at an immediate db of approx 33 db. No noise will be evident @ the fence line.

B 9. Landscape:

a) Existing landscaping: None

b) Proposed landscaping: None.

B 10. Proposed Signage: Danger high Voltage + contact information signage, Utility Pole signage.

B 11. Level of municipal and other services required to support the proposed activity (i.e., water supply sanitary sewage facilities): Interconnection with utility grid, National Grid.

B 12. Specific Requirements:

	Town Code (District) Requirement;	Proposal:
Parking Spaces		Ø
Lot Coverage		22.66 acres / 80%
Front Yard Setback		50 ft
Side Yard Setback		50 ft
Rear Yard Setback		50 ft
Maximum Height of Building		approx 10 ft

dd/2017

5

Exhibit A

LEGEND

- PROPERTY BOUNDARY
- LIMITS OF DELINEATED WETLANDS
- 100 FOOT WETLAND OFFSET
- OPEN WETLAND BOUNDARY
- MAJOR CONTOUR
- MINOR CONTOUR
- APPROXIMATE LOCATION OF GAS VENTING RISER
- MONITORING WELL
- MANHOLE
- PROPOSED SOLAR PANEL
- PROPOSED BALLAST FENCE
- OHE — PROPOSED OVERHEAD ELECTRIC
- UGE — PROPOSED UNDERGROUND ELECTRIC
- PROPOSED EQUIPMENT PAD

N

TRUE OR CALLED NORTH

SURVEY NOTE

1. BASE MAPPING COMPILED FROM NYSGIS CLEARING HOUSE PARCEL DATA, ORTHO IMAGERY, AND 2017 LIDAR DATASETS. INFORMATION FOR REFERENCE ONLY AND SHOULD BE CONSIDERED APPROXIMATE.

NOTES

1. SOLAR ARRAY LOCATION SHOWN SHOULD BE CONSIDERED APPROXIMATE AND SHALL BE CONFIRMED BY FIELD CONDITIONS.
2. EXISTING GROUNDCOVER SHALL BE MAINTAINED/REPLACED IN BETWEEN SOLAR PANELS TO MAINTAIN THE LANDFILL CAPPING SYSTEM INTEGRITY.
3. SOLAR ARRAY SHALL BE SET BACK 40 FEET FROM ROAD AND NOT EXCEED 20 FEET HEIGHT AS PER ZONING DISTRICT REQUIREMENTS.
4. LOT SIZE = 17.5 ACRES
5. SYSTEM SIZE = 5,435/4,350 (DC/AC) kW

TOWN OF MANLIUS CODE REQUIREMENTS

REQUIREMENT	CODE VALUE(MIN OR MAX)	PLAN VALUE
FRONT YARD SETBACK	50 Ft	235 Ft
SIDE YARD SETBACK	50 Ft	105 Ft
REAR YARD SETBACK	50 Ft	120 Ft
MAXIMUM HEIGHT OF ARRAY	20FT	9Ft

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION".

REVISIONS

ABUNDANT SOLAR POWER
TOWN OF MANLIUS LANDFILL SOLAR ARRAY

PROPOSED SOLAR LAYOUT

TOWN OF MANLIUS — ONONDAGA COUNTY, NEW YORK

Barton & Loguidice

STATE OF NEW YORK — CHAD W. HUTCHINSON — 082007 — LICENSED PROFESSIONAL ENGINEER

Date: OCTOBER 2021

Scale: 1" = 120'

Sheet Number: FIGURE 1

File Number: 2271.004.001

Checked by: GWH Drawn by: TSC Designed by: ZTP In charge of: CJM

Plotted: Oct 14, 2021 – 8:21AM SYR By: WBO
Z:\BL-Vault\D2\18217AD2-1C71-4823-8927-99B5C4D54147\D\2216000-2216999\2216434\L\L\2271.004.001 Manlius Solar Array Proposed Plan (ID 2216434).dwg

N

TRUE OR CALLED NORTH

LEGEND

- EXISTING LIMITS OF WETLAND
- REQUIRED 100 FOOT WETLAND BUFFER
- EXISTING PROPERTY BOUNDARY
- EXISTING MAJOR CONTOUR (SEE SURVEY NOTE)
- EXISTING MINOR CONTOUR (SEE SURVEY NOTE)
- 0–12% SLOPES
- 12–15% SLOPES
- 15% + SLOPES

SURVEY NOTE

1. BASE MAPPING COMPILED FROM NYSGIS CLEARING HOUSE PARCEL DATA, ORTHO IMAGERY, AND 2017 LIDAR DATASETS. INFORMATION FOR REFERENCE ONLY AND SHOULD BE CONSIDERED APPROXIMATE.

150' 0 150' 300'
1"=150'

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION".

REVISIONS

ABUNDANT SOLAR POWER
TOWN OF MANLIUS LANDFILL SOLAR ARRAY

SITE CONDITIONS PLAN

TOWN OF MANLIUS
ONONDAGA COUNTY, NEW YORK

Barton & Loguidice

Date: DECEMBER, 2020
Scale: 1" = 150'
Sheet Number: 01
File Number: 2271.004.001

Plotted: Dec 11, 2020 – 8:57AM SYR By: tsc
Z:\BL-Vault\D2\18217A02-1C71-4823-8927-99D5C4054147\0\2171000-2171999\2171457\L\L\2271.004.001-Manlius LF Solar-SLOPE ANALYSIS (ID 2171457).dwg

Checked by ____ Drawn by TSC Designed by ZTP In charge of CJM

Exhibit B

PROPOSED ABUNDANT SOLAR LEASE PARCEL DESCRIPTION

ALL THAT TRACT OR PARCEL OF LAND SITUATE IN PART OF PART OF MILITARY LOT 53, TOWN OF MANLIUS, COUNTY OF ONONDAGA, STATE OF NEW YORK, ALL AS SHOWN ON A MAP ENTITLED "ABUNDANT SOLAR ENERGY, INC LEASE PARCEL WITHIN LANDS OWNED BY THE TOWN OF MANLIUS, BEING 5701 BOWMAN ROAD ALTA/NSPS LAND TITLE SURVEY", PREPARED BY COSTICH ENGINEERING, D.P.C., HAVING DRAWING NUMBER 8175 VT100 , DATED 09/27/2021, AND BEING MORE PARTICULARLY BOUNDED AND DESCRIBED AS FOLLOWS:

COMMENCING AT A POINT BEING THE NORTHEAST CORNER OF LANDS NOW OR FORMERLY OWNED BY STEVEN STURICK HAVING T.A. # 74.00-01-05 AND THE NORTHWEST CORNER OF LANDS NOW OR FORMERLY OWNED BY THE TOWN OF MANLIUS HAVING T.A. # 74.00-01-06.1, SAID POINT ALSO BEING A POINT ON THE SOUTH RIGHT-OF-WAY LINE OF BOWMAN ROAD (WIDTH VARIES); THENCE

A. S13°01'59"E, ALONG A TIE LINE AND THROUGH SAID LANDS NOW OR FORMERLY OWNED BY THE TOWN OF MANLIUS A DISTANCE OF 375.18 FEET TO THE POINT AND PLACE OF BEGINNING; THENCE

1. S80°26'49"E, A DISTANCE OF 96.58 FEET TO A POINT; THENCE
2. S43°47'56"E, A DISTANCE OF 330.60 FEET TO A POINT; THENCE
3. S86°10'25"E, A DISTANCE OF 332.66 FEET TO A POINT; THENCE
4. S46°02'15"E, A DISTANCE OF 70.49 FEET TO A POINT; THENCE
5. S71°54'07"E, A DISTANCE OF 215.55 FEET TO A POINT; THENCE
6. S02°39'52"E, A DISTANCE OF 50.41 FEET TO A POINT; THENCE
7. S24°54'42"W, A DISTANCE OF 116.86 FEET TO A POINT; THENCE
8. S15°09'07"W, A DISTANCE OF 184.62 FEET TO A POINT; THENCE
9. S09°27'04"W, A DISTANCE OF 252.12 FEET TO A POINT; THENCE
10. S01°46'27"E, A DISTANCE OF 336.27 FEET TO A POINT; THENCE
11. N88°15'35"W, A DISTANCE OF 722.34 FEET TO A POINT; THENCE
12. N03°36'31"E, A DISTANCE OF 191.37 FEET TO A POINT; THENCE
13. N27°30'50"W, A DISTANCE OF 244.21 FEET TO A POINT; THENCE
14. N41°19'20"W, A DISTANCE OF 206.22 FEET TO A POINT; THENCE
15. N07°11'21"W, A DISTANCE OF 323.59 FEET TO A POINT; THENCE
16. N14°02'46"E, A DISTANCE OF 143.30 FEET TO A POINT; THENCE
17. N29°16'35"E, A DISTANCE OF 133.51 FEET TO A POINT; THENCE
18. N20°38'46"E, A DISTANCE OF 57.57 FEET TO A POINT; THENCE
19. N58°26'49"E, A DISTANCE OF 79.59 FEET TO A POINT; THENCE
20. N24°50'27"E, A DISTANCE OF 61.33 FEET TO THE POINT AND PLACE OF BEGINNING. CONTAINING 23.06 ACRES OF LAND, MORE OR LESS.

PROPOSED ABUNDANT SOLAR ACCESS EASEMENT DESCRIPTION

ALL THAT TRACT OR PARCEL OF LAND SITUATE IN PART OF PART OF MILITARY LOT 53, TOWN OF MANLIUS, COUNTY OF ONONDAGA, STATE OF NEW YORK, ALL AS SHOWN ON A MAP ENTITLED "ABUNDANT SOLAR ENERGY, INC LEASE PARCEL WITHIN LANDS OWNED BY THE TOWN OF MANLIUS, BEING 5701 BOWMAN ROAD ALTA/NSPS LAND TITLE SURVEY", PREPARED BY COSTICH ENGINEERING, D.P.C., HAVING DRAWING NUMBER 8175 VT100 , DATED 09/27/2021, AND BEING MORE PARTICULARLY BOUNDED AND DESCRIBED AS FOLLOWS:

COMMENCING AT A POINT BEING THE NORTHEAST CORNER OF LANDS NOW OR FORMERLY OWNED BY STEVEN STURICK HAVING T.A. # 74.00-01-05 AND THE NORTHWEST CORNER OF LANDS NOW OR FORMERLY OWNED BY THE TOWN OF MANLIUS HAVING T.A. # 74.00-01-06.1, SAID POINT ALSO BEING A POINT ON THE SOUTH RIGHT-OF-WAY LINE OF BOWMAN ROAD (WIDTH VARIES); THENCE

A. S63°55'01"E, ALONG A TIE LINE AND THROUGH SAID LANDS NOW OR FORMERLY OWNED BY THE TOWN OF MANLIUS A DISTANCE OF 202.24 FEET TO THE POINT AND PLACE OF BEGINNING; THENCE

1. S60°43'11"E, A DISTANCE OF 25.26 FEET TO A POINT; THENCE
2. S21°07'25"W, A DISTANCE OF 82.28 FEET TO A POINT; THENCE
3. S04°02'43"W, A DISTANCE OF 60.92 FEET TO A POINT; THENCE
4. S08°03'24"W, A DISTANCE OF 139.13 FEET TO A POINT; THENCE
5. N80°26'49"W, A DISTANCE OF 25.01 FEET TO A POINT; THENCE
6. N08°03'24"E, A DISTANCE OF 137.61 FEET TO A POINT; THENCE
7. N04°02'43"E, A DISTANCE OF 63.80 FEET TO A POINT; THENCE
8. N21°07'25"E, A DISTANCE OF 89.62 FEET TO A POINT; THENCE, SAID POINT BEING THE POINT AND PLACE OF BEGINNING.

PROPOSED ACCESS EASEMENT LINE TABLE		
TAG NO.	BEARING	DISTANCE
T1	S63°55'01"E	202.24
L1	S60°43'11"E	25.26
L2	S21°07'25"W	82.28
L3	S04°02'43"W	60.92
L4	S08°03'24"W	139.13
L5	N80°26'49"W	25.01
L6	N08°03'24"E	137.61
L7	N04°02'43"E	63.80
L8	N21°07'25"E	89.62

SURVEY NOTES

1. LOCATIONS SHOWN FROM A FIELD SURVEY BY COSTICH ENGINEERING ON 09/17/2021 HORIZONTAL AND VERTICAL DATA OBTAINED THROUGH NYSDOT CORS NETWORK REFERENCED TO THE FOLLOWING MONUMENT

NORTH SYRACUSE CORS STATION
-LATITUDE: 43-07-07.74858 (N) } NAD 83 (CORS)
-LONGITUDE: 076-08-29.77296 (W) } NAD 83 (CORS)
-ELLIP HEIGHT: 98.589 METERS } NAVD 88 (CORS)

UTILITY INFORMATION

UTILITY INFORMATION PER UFPO DESIGN TICKET # 09141-001-009-00 DATED SEPTEMBER 21, 2021

ONONDAGA COUNTY WATER AUTHORITY	315-455-7061 x 3122 NO RESPONSE
CHARTER COMMUNICATIONS	317-575-7800 X2 NO RESPONSE
NATIONAL GRID GAS	315-428-5284 CLEAR
NATIONAL GRID ELECTRIC	315-428-6319 UTILITY PLOTTED
TOWN OF MANLIUS	315-656-3090 NO RESPONSE
VERIZON SYRACUSE	315-937-2515 NO RESPONSE

GENERAL NOTES

1. AT THE TIME OF SURVEY THERE WAS NO EVIDENCE OF EARTHWORK, BUILDING CONSTRUCTION OR ADDITIONS.
2. AT THE TIME OF SURVEY THERE WAS NO SIDEWALK CONSTRUCTION OR EVIDENCE OF STREET WIDENING.
3. THIS SITE WAS USED AS A SOLID WASTE DUMP OR SANITARY LANDFILL BUT HAS SINCE BEEN CLOSED.
4. AT THE TIME OF SURVEY THERE WAS NO EVIDENCE OF CEMETERIES OR GRAVE SITES ON THE SUBJECT PROPERTY.
5. PER ONONDAGA COUNTY GIS WEBSITE THERE ARE D.E.C. WETLANDS IN THE PROJECT LEASE AREA AND ALSO THE PARENT PARCEL.
6. PER ONONDAGA COUNTY GIS WEBSITE THERE ARE FEDERAL WETLANDS IN THE PROJECT LEASE AREA AND ALSO THE PARENT PARCEL.

SITE DATA

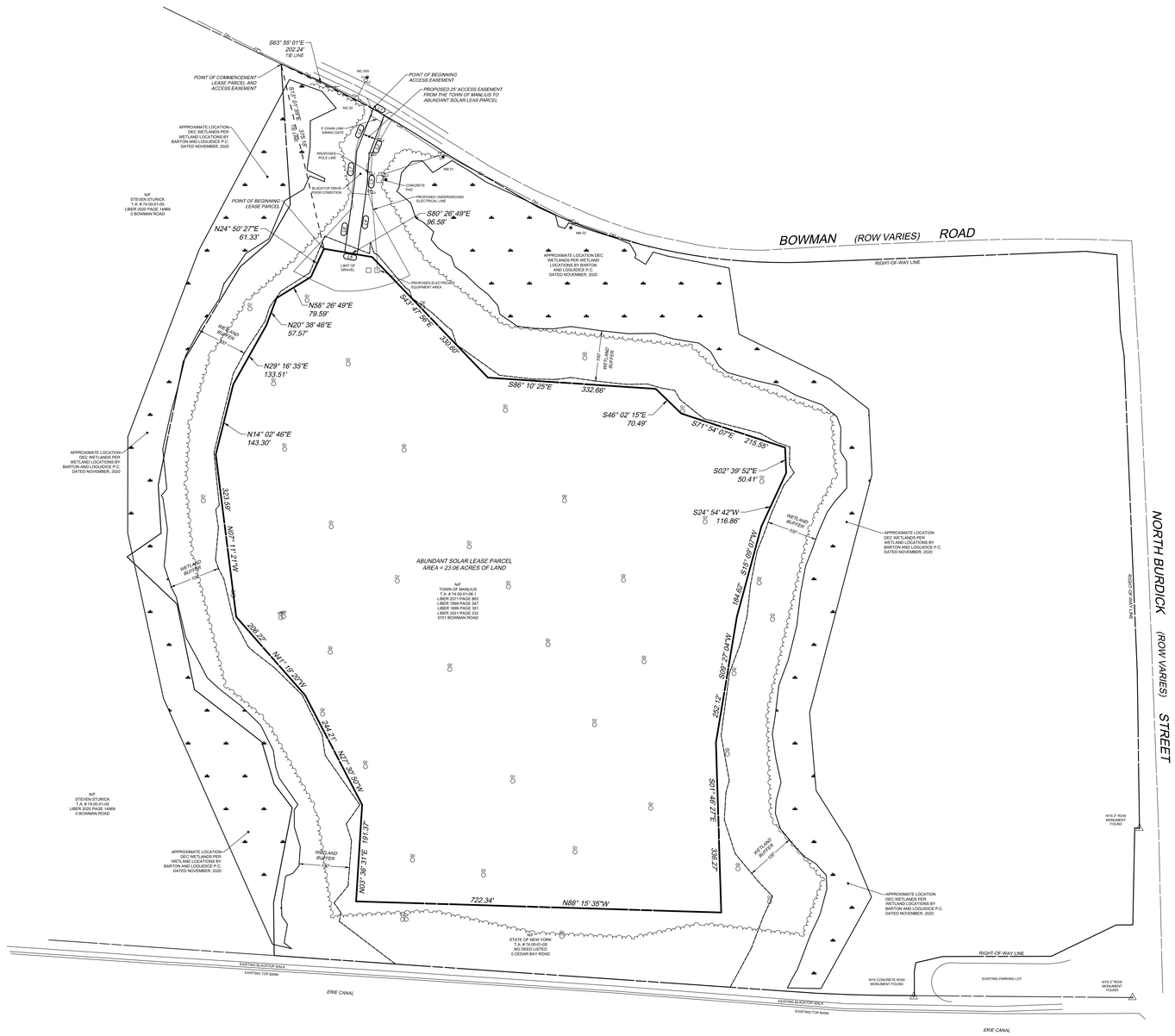
1. EXISTING ZONING: RA (RESTRICTED AGRICULTURE DISTRICT)
2. BULK REQUIREMENTS:

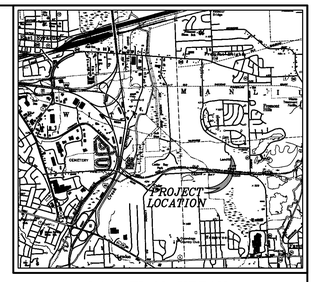
	REQUIRED
MIN. LOT AREA (SF)	40,000 WITH SEWER
MIN. LOT AREA (SF)	100,000 WITH SEPTIC
MIN. LOT WIDTH (FT)	150 WITH SEWER
MIN. LOT WIDTH (FT)	200 WITH SEPTIC
MIN. FRONT YARD SETBACK (FT)	40
MIN. SIDE YARD SETBACK (FT)	20
MIN. REAR YARD SETBACK (FT)	40

FLOOD NOTE:
By graphic plotting only, the lease area of this property is in Zone X, of the Flood Insurance Rate Map No. 36067C0243F, Community Panel No. 360584, Town of Manlius, which bears an effective date of 11/04/2016. No field surveying was performed to determine this zone and an elevation certificate may be needed to verify this determination or apply for a variance from the Federal Emergency Management Agency.

SCHEDULE B II ITEMS

SCHEDULE A PARCEL DESCRIPTION





LOCATION SKETCH

NOT TO SCALE

SYMBOL LEGEND

	DRAINAGE MANHOLE		ELECTRIC MANHOLE
	INLET DRAINAGE MANHOLE		ELECTRIC METER
	CATCH BASIN		TELEPHONE MANHOLE
	END SECTION		TELEPHONE PEDESTAL
	END OF PIPE	PB	PHONE BOOTH
	MANHOLE		PEDESTRIAN POLE
	SANITARY MANHOLE	TRAFF. CONT. CAB.	TRAFFIC CONTROL CABINET
C.O.	CLEAN OUT		LAMP POST
	GAS VENT		LIGHT POLE
	GAS SERVICE		UTILITY POLE WITH LIGHT
	GAS METER	FLAG POLE	FLAG POLE
	SPRINKLER VALVE	MB	MAILBOX
	SPRINKLER HEAD		BOLLARD
	WATER VALVE		POST
	WATER SERVICE		SIGN
	HYDRANT		SIGN
	WATER METER		SIGN
	WELL		TURNING ARROW
MW	MONITOR WELL		HANDICAP
	BORE	STOP	STOP BAR
CTV	CABLE TV PEDESTAL		TREE DECIDUOUS
	SIGNAL POLE		TREE CONIFEROUS
	UTILITY POLE		BUSH
	GUY WIRE		AIR CONDITIONING UNIT
	PULL BOX	SAN	SANITARY UTILITY LATH
	ELECTRIC PULL BOX	ELEC.	GAS UTILITY LATH
	TELEPHONE PULL BOX	TELE.	WATER UTILITY LATH
	TRAFFIC PULL BOX		TELEPHONE UTILITY LATH
	TRANSFORMER		ELECTRIC UTILITY LATH
			CABLE UTILITY LATH

LINE LEGEND

	SECTION/PARCEL BOUNDARY
	MIN. BUILDING SETBACK
	CENTER LINE
	EXIST. EASEMENT LINE
	EXIST. RIGHT-OF-WAY LINE
	EXIST. EDGE OF PAVEMENT
W	EXISTING WATER MAIN, VALVE, & HYDRANT.
S	EXISTING SANITARY SEWER, & MANHOLE.
	EXISTING DRAINAGE SEWER, FIELD INLET, INLET MANHOLE, MANHOLE, & END SECTION.
OH	EXISTING OVERHEAD UTILITIES
T	EXISTING TELEPHONE
UG	EXISTING UNDERGROUND UTILITIES
G	EXISTING GAS
E	EXISTING ELECTRIC
	EXISTING GUARD RAIL
	TREE,HEDGE,EDGE OF WOODS
	EXISTING SWALE
X O	BARBED WIRE,STOCKADE,CHAIN LINKED FENCE
410	EXISTING CONTOUR
x 420.4	EXISTING SPOT ELEVATION @ X
	CONCRETE PAD/ CONCRETE SIDEWALK

REFERENCES

1. MAP ENTITLED "TOWN OF MANLIUS SANITARY LANDFILL" PREPARED BY C. WILLIAM DUNN P.E. DATED AUGUST 7, 1980 HAVING JOB # 315.002
2. CANAL MAPPING " MAP OF A PORTION OF ERIE CANAL LANDS BELONGING TO THE STATE MADE PURSUANT TO CHAPTER 199, MAP 392 AND MAP 393.
3. THE DEEDS AS SHOWN ON FILE IN THE ONONDAGA COUNTY CLERK'S OFFICE.
4. MAP ENTITLED "FINAL PLAN SECTION E FREEMONT HILLS SUBDIVISION" PREPARED BY JACK W. COTTRELL DATED APRIL 2, 1976 AND IS FILED IN THE ONONDAGA COUNTY CLERK'S OFFICE AS MAP # 5580.
5. MAP ENTITLED "FINAL PLAN SECTION F FREEMONT HILLS SUBDIVISION" PREPARED BY JACK W. COTTRELL DATED APRIL 2, 1976 AND IS FILED IN THE ONONDAGA COUNTY CLERK'S OFFICE AS MAP # 5581.
6. NEW YORK STATE APPROPRIATION MAPPING FOR NORTH BURDICK STREET ROUTE 94. MAP 20 PARCEL 20, MAP 22 PARCEL 22.

CERTIFICATION

WE, COSTICH ENGINEERING, D.P.C., HEREBY CERTIFY TO:

THIS IS TO CERTIFIY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1,2,3,4,6a,6b,7a,7b,7c,8,9,11,13,16,17,18,19 AND 20 OF TABLE A THEREOF.

THIS MAP WAS PREPARED FROM NOTES OF AN INSTRUMENT SURVEY COMPLETED ON SEPTEMBER 17, 2021 AND FROM THE REFERENCE(S) LISTED HEREON. NO SEARCH OF RECORDS, OTHER THAN THOSE REFERENCED, WAS MADE FOR EASEMENTS OR ENCUMBRANCES AFFECTING THIS PARCEL.

By: PRELIMINARY Date:
Daniel T. Hickok, N.Y.S. L.S., No. 050449

EXISTING UTILITIES (LOCATION, SIZES AND INVERTS) SHOWN ON THE PLANS ARE APPROXIMATE AND ARE NOT CERTIFIED AS TO THE ACCURACY OF THEIR LOCATION OR COMPLETENESS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS AND DEPTHS OF ALL UTILITIES AND STRUCTURES IN THE PATH OF, OR CLOSELY PARALLEL TO, OR UNDER, THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES OCCURRING AS A RESULT OF INCORRECTLY LOCATED UTILITIES. IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE VARIOUS UTILITY OWNERS IN AMPLE TIME FOR THEM TO LOCATE AND MARK THEIR FACILITIES. THE CONTRACTOR SHALL ALSO NOTIFY UNDERGROUND UTILITY LOCATION SERVICE AT LEAST 48 HOURS IN ADVANCE OF COMMENCING ANY WORK.

GRAPHIC SCALE
80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

NO.	DATE	REVISION	BY	CHKD.	APV'LS.

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COSTICH ENGINEERING, D.P.C.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR, ARCHITECT OR LANDSCAPE ARCHITECT, TO ALTER ANY ITEM ON THIS DOCUMENT. IN ANY WAY. ANY LICENSEE WHO ALTERS THIS DOCUMENT SHALL AFFIX TO THE DOCUMENT HIS/HER SEAL AND THE NOTATION "ALTERED BY", FOLLOWED BY HIS/HER SIGNATURE AND SPECIFIC DESCRIPTION OF THE ALTERATION, TO THE DOCUMENT.

STATE OF NEW YORK · DANIEL T. HICKOK · NO. 050449 · LICENSED LAND SURVEYOR

PROJECT ENGINEER: C.J.C.
DRAWN BY: D.T.H.
BOUNDARY: D.T.H.
TOPOGRAPHY: G.L.R.
DATE: 09/27/2021
SCALE: 1"=80'

COSTICH ENGINEERING
217 LAKE AVENUE
ROCHESTER, NY 14608
(585) 458-3020

• CIVIL ENGINEERING
• LAND SURVEYING
• LANDSCAPE ARCHITECTURE

TITLE OF PROJECT: ABUNDANT SOLAR ENERGY, INC LEASE PARCEL WITHIN LANDS OWNED BY THE TOWN OF MANLIUS, BEING 5701 BOWMAN ROAD ALTA/NSPS LAND TITLE SURVEY

LOCATION OF PROJECT: TAX PARCEL NO. 29.00-02-20.1
PART OF MILITARY LOT 53, TOWN OF MANLIUS
COUNTY OF ONONDAGA, STATE OF NEW YORK

CLIENT: ABUNDANT SOLAR ENERGY, INC.
2235 SHEPPARD AVE E, SUITE 900
TORONTO, CANADA M2J5B5

DWG. # 8175 VT100
SHEET 1 OF 1

Exhibit C

ABUNDANT SOLAR
PROPOSED LEASE PARCEL DESCRIPTION

All that tract or parcel of land situate in part of part of Military Lot 53, Town of Manlius, County of Onondaga, State of New York, all as shown on a map entitled "Abundant Solar Energy, Inc Lease Parcel within lands owned by the Town of Manlius, being 5701 Bowman Road Alta/Nsps Land Title Survey"", prepared by Costich Engineering, D.P.C., having drawing number 8175 VT100, dated 09/27/2021, and being more particularly bounded and described as follows:

Commencing at a point being the northeast corner of lands now or formerly owned by Steven Sturick having T.A. # 74.00-01-05 and the northwest corner of lands now or formerly owned by the Town of Manlius having T.A. # 74.00-01-06.1, said point also being a point on the south right-of-way line of Bowman Road (Width Varies); thence

A. S13°01'59"E, along a tie line and through said lands now or formerly owned by the Town of Manlius a distance of 375.18 feet to the point and place of beginning; thence

1. S80°26'49"E, a distance of 96.58 feet to a point; thence
2. S43°47'56"E, a distance of 330.60 feet to a point; thence
3. S86°10'25"E, a distance of 332.66 feet to a point; thence
4. S46°02'15"E, a distance of 70.49 feet to a point; thence
5. S71°54'07"E, a distance of 215.55 feet to a point; thence
6. S02°39'52"E, a distance of 50.41 feet to a point; thence
7. S24°54'42"W, a distance of 116.86 feet to a point; thence
8. S15°09'07"W, a distance of 184.62 feet to a point; thence
9. S09°27'04"W, a distance of 252.12 feet to a point; thence
10. S01°46'27"E, a distance of 336.27 feet to a point; thence
11. N88°15'35"W, a distance of 722.34 feet to a point; thence
12. N03°36'31"E, a distance of 191.37 feet to a point; thence
13. N27°30'50"W, a distance of 244.21 feet to a point; thence
14. N41°19'20"W, a distance of 206.22 feet to a point; thence
15. N07°11'21"W, a distance of 323.59 feet to a point; thence
16. N14°02'46"E, a distance of 143.30 feet to a point; thence

17. N29°16'35"E, a distance of 133.51 feet to a point; thence

18. N20°38'46"E, a distance of 57.57 feet to a point; thence

19. N58°26'49"E, a distance of 79.59 feet to a point; thence

20. N24°50'27"E, a distance of 61.33 feet to the point and place of beginning. Containing 23.06 acres of land, more or less.

h:/jobs/8175/documents/descriptions/parcel/lease.doc

ABUNDANT SOLAR PROPOSED ACCESS EASEMENT DESCRIPTION

All that tract or parcel of land situate in part of part of Military Lot 53, Town of Manlius, County of Onondaga, State of New York, all as shown on a map entitled "Abundant Solar Energy, Inc Lease Parcel within lands owned by the Town of Manlius, being 5701 Bowman Road Alta/Nsps Land Title Survey"", prepared by Costich Engineering, D.P.C., having drawing number 8175 VT100, dated 09/27/2021, and being more particularly bounded and described as follows:

Commencing at a point being the northeast corner of lands now or formerly owned by Steven Sturick having T.A. # 74.00-01-05 and the northwest corner of lands now or formerly owned by the Town of Manlius having T.A. # 74.00-01-06.1, said point also being a point on the south right-of-way line of Bowman Road (Width Varies); thence

A. S63°55'01"E, along a tie line and through said lands now or formerly owned by the Town of Manlius a distance of 202.24 feet to the point and place of beginning; thence

1. S60°43'11"E, a distance of 25.26 feet to a point; thence
2. S21°07'25"W, a distance of 82.28 feet to a point; thence
3. S04°02'43"W, a distance of 60.92 feet to a point; thence
4. S08°03'24"W, a distance of 139.13 feet to a point; thence
5. N80°26'49"W, a distance of 25.01 feet to a point; thence
6. N08°03'24"E, a distance of 137.61 feet to a point; thence
7. N04°02'43"E, a distance of 63.80 feet to a point; thence
8. N21°07'25"E, a distance of 89.62 feet to a point; thence, said point being the point and place of beginning.

Exhibit D

Not required.

Exhibit E

ABUNDANT Solar Energy Inc.
Suite 900, 2235 Sheppard Ave E,
Toronto, ON M2J 5B5
Tel: 1 416 494 9559
www.abuandantsolarenergy.com

Chairman Joe Lupia
Town of Manlius Planning Board
301 Brooklea Drive, Fayetteville
NY13066

Re: Town of Manlius Landfill Solar project

Friday, October 1st, 2021

Dear Chairman Lupia

We are writing in reference to the solar array development proposed by Abundant Solar Power, Inc. (ASP) at the closed landfill in the Town of Manlius, New York. As you are likely aware, ASP is progressing with the environmental review, site planning, and permitting process for development of the solar array. We have already assisted the Town of Manlius Board with respect to their review of the project in compliance with the State Environmental Quality Review Act (SEQR) and had identified the project as a "Type II action" under SEQRA in accordance with the current regulations.

As you may or may not be aware, on January 1, 2019, amendments to the SEQR regulations became effective. In the opinion of our Engineers at B & L, these amendments have resulted in the proposed solar array development falling under the definition of a Type II Action. The relevant excerpts from NYCRR Part 617 are outlined below. § 617.5 Type II Actions (a) Actions or classes of actions identified in subdivision (c) of this section are not subject to review under this Part, except as otherwise provided in this section. These actions have been determined not to have a significant impact on the environment or are otherwise precluded from environmental review under Environmental Conservation Law, article 8.

The actions identified in subdivision (c) of this section apply to all agencies. (c) The following actions are not subject to review under this Part: …(14) installation of solar energy arrays where such installation involves 25 acres or less of physical alteration on the following sites: (i) closed landfills;…

According to the New York State Department of Environmental Conservation (NYSDEC), "Any action or class of actions listed as Type II in 617.5 requires no further processing under SEQR. There is no documentation requirement for these actions, although it is recommended that a note be added to the Planning boards project file indicating that the project was considered under SEQR and met the requirement for a Type II action."

We would, therefore, respectfully suggest that it would be acceptable for the Town of Manlius to acknowledge the project classification as a Type II Action. Please contact me at 416-917 5667 should you have any questions or would like to discuss this any further.

Sincerely,
Melissa Clark

Melissa Clark

VP Business Development
Abundant Solar Energy Inc.
Melissa.clark@abundantsolarenergy.com

Short Environmental Assessment Form
Part 1 - Project Information

Instructions for Completing

Part 1 – Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 – Project and Sponsor Information

Name of Action or Project:

Solar Project Manlius - M1

Project Location (describe, and attach a location map):

5701 Bowman Rd, Manlius, NY 13057, USA

Brief Description of Proposed Action:

Abundant Solar Power, Inc. is developing plans for a 6 MW DC/ 4.35 MW AC solar power photo-voltaic plant which will cover 17.5 -acres (tax parcel 074.-01-06.1). The project will generate clean renewable energy for the local community and surrounding areas. The plant will consist of approximately 423 tables with between 30 to 32 panels per table. This project will yield a panel count approximately 13,546. The solar table modules will be free-standing structures utilizing a ballast system as to not penetrate the land fill cap. To operate the plant, one transformer pad and one main switch gear pad will be installed on concrete pads. The maximum extent of ground disturbance will be approximately 0.5 acre.

Name of Applicant or Sponsor:	Telephone: 1-416-494-9559 ext.104
Abundant Solar Power (M1) LLC	E-Mail: Melissa.clark@abundantsolarenergy.com

Address:

700 West Metro Park

City/PO:	State:	Zip Code:
Rochester	New York	14623

	NO	YES
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.	☑	☐
2. Does the proposed action require a permit, approval or funding from any other government Agency? If Yes, list agency(s) name and permit or approval: Town Board - Land Lease & Power Purchase Agreements; Town Planning Board - Site Plan Approval; Town Code Enfrocement Officer - Building Permi; NYSERDA - Funding approval;	☐	☑

3. a. Total acreage of the site of the proposed action? +/- 17.5 acres
   b. Total acreage to be physically disturbed? +/- 0.5 acres
   c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 0 acres

4. Check all land uses that occur on, are adjoining or near the proposed action:

5. ☐ Urban ☐ Rural (non-agriculture) ☐ Industrial ☑ Commercial ☑ Residential (suburban)
   ☑ Forest ☐ Agriculture ☐ Aquatic ☐ Other(Specify):
   ☐ Parkland

	NO	YES	N/A
5. Is the proposed action,			
a. A permitted use under the zoning regulations?	☐	☑	☐
b. Consistent with the adopted comprehensive plan?	☐	☐	☑

	NO	YES
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape? This is a Town project and is supported by the municipality.	☐	☑
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: _____	☑	☐
	NO	YES
8. a. Will the proposed action result in a substantial increase in traffic above present levels?	☑	☐
b. Are public transportation services available at or near the site of the proposed action?	☑	☐
c. Are any pedestrian accommodations or bicycle routes available on or near the site of the proposed action?	☑	☐
9. Does the proposed action meet or exceed the state energy code requirements? If the proposed action will exceed requirements, describe design features and technologies: _____ _____	☐	☑
10. Will the proposed action connect to an existing public/private water supply? If No, describe method for providing potable water: _____ _____	☑	☐
11. Will the proposed action connect to existing wastewater utilities? If No, describe method for providing wastewater treatment: _____ _____	☑	☐
12. a. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places?	☑	☐
b. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	☐	☑
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency?	☐	☑
b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody?	☑	☐
If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres: _____ _____ _____		

14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply:

☐ Shoreline ☑ Forest ☐ Agricultural/grasslands ☐ Early mid-successional

☑ Wetland ☐ Urban ☑ Suburban

	NO	YES
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered? Northern Long-eared Bat, In...	☐	☑
16. Is the project site located in the 100-year flood plan? Floodplain is located on the same tax parcel but located outside of the project area (see attached floodplain map)	☐	☑
17. Will the proposed action create storm water discharge, either from point or non-point sources? If Yes,	☐	☑
a. Will storm water discharges flow to adjacent properties?	☐	☑
b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)?	☐	☑
If Yes, briefly describe: The storm water will be directed to adjacent wetlands and the Towns storm drains. Grass cover will mostly remain undisturbed.		
18. Does the proposed action include construction or other activities that would result in the impoundment of water or other liquids (e.g., retention pond, waste lagoon, dam)? If Yes, explain the purpose and size of the impoundment:	☑	☐
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe: The parcel is a closed landfill owned by the Town of Manlius	☐	☑
20. Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste? If Yes, describe:	☑	☐

I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE

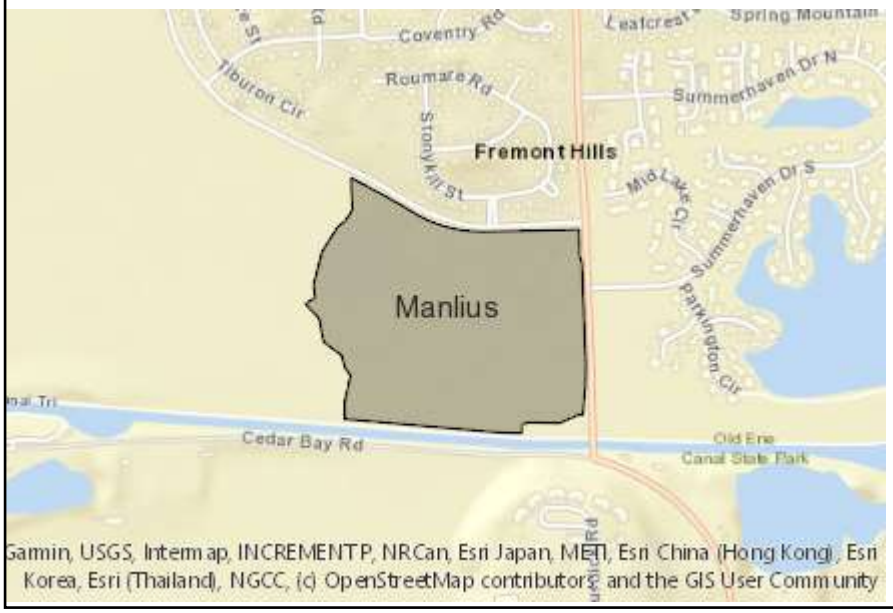
Applicant/sponsor/name: Abundant Solar Power (M1) LLC Date: 9/30/2021

Signature: _____ Title: President

PRINT FORM

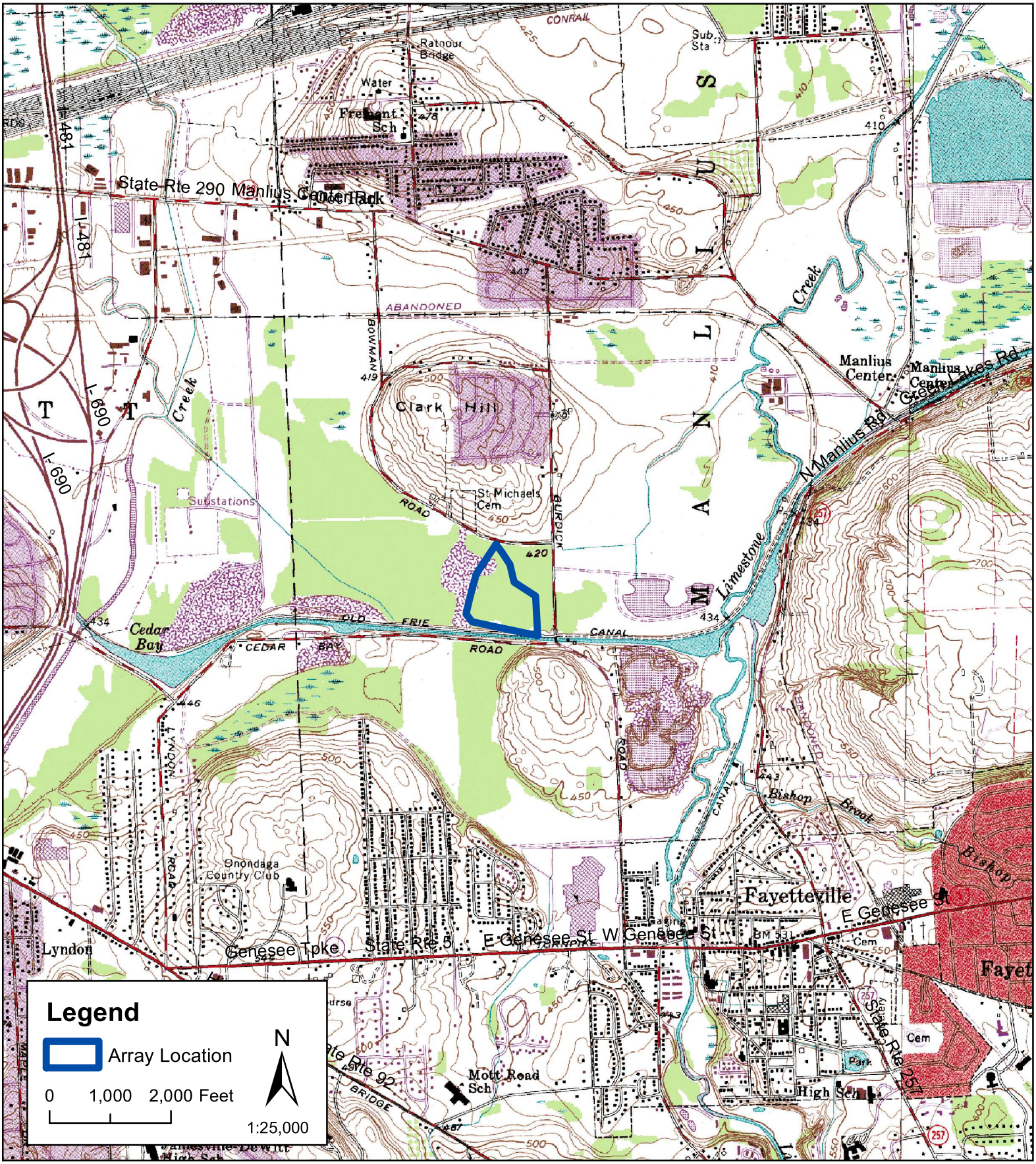
EAF Mapper Summary Report

Monday, November 23, 2020 10:18 AM



Disclaimer: The EAF Mapper is a screening tool intended to assist project sponsors and reviewing agencies in preparing an environmental assessment form (EAF). Not all questions asked in the EAF are answered by the EAF Mapper. Additional information on any EAF question can be obtained by consulting the EAF Workbooks. Although the EAF Mapper provides the most up-to-date digital data available to DEC, you may also need to contact local or other data sources in order to obtain data not provided by the Mapper. Digital data is not a substitute for agency determinations.

Part 1 / Question 7 [Critical Environmental Area]	No
Part 1 / Question 12a [National or State Register of Historic Places or State Eligible Sites]	No
Part 1 / Question 12b [Archeological Sites]	Yes
Part 1 / Question 13a [Wetlands or Other Regulated Waterbodies]	Yes - Digital mapping information on local and federal wetlands and waterbodies is known to be incomplete. Refer to EAF Workbook.
Part 1 / Question 15 [Threatened or Endangered Animal]	Yes
Part 1 / Question 15 [Threatened or Endangered Animal - Name]	Northern Long-eared Bat, Indiana Bat
Part 1 / Question 16 [100 Year Flood Plain]	Yes
Part 1 / Question 20 [Remediation Site]	No



Data Sources:
1. USGS Quads: CUGIR
2. Roads: TIGER 2017

Prepared
11/23/2020 by:
Abundant Solar Power Inc.
Contact: 416-494-9559
www.abundantsolarenergy.com
Justin Lam, GIS Analyst

Abundant Solar Power Inc.

M1
Town of Manlius
Onondaga County

USGS Map
Onondaga
QUAD
Figure 1

PIN
- Approximate location based on user input and does not represent an authoritative property location

MAP PANELS
- Selected FloodMap Boundary
- Digital Data Available
- No Digital Data Available
- Unmapped

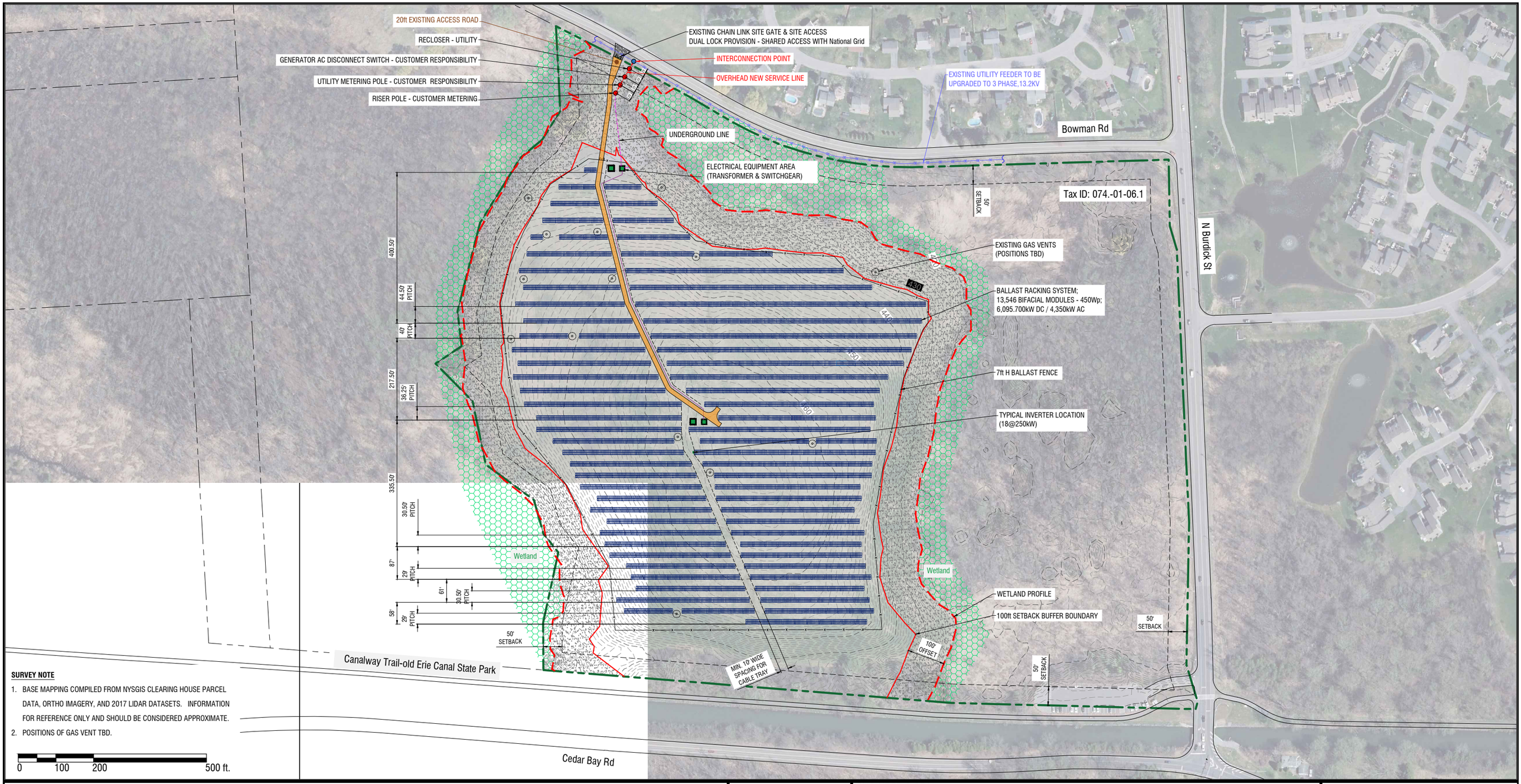
OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*
- Otherwise Protected Area
- Coastal Barrier Resource System Area

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth
- Regulatory Floodway *Zone AE, AO, AH, VE, AR*

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER FEATURES
- E 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall



SURVEY NOTE

1. BASE MAPPING COMPILED FROM NYSGIS CLEARING HOUSE PARCEL DATA, ORTHO IMAGERY, AND 2017 LIDAR DATASETS. INFORMATION FOR REFERENCE ONLY AND SHOULD BE CONSIDERED APPROXIMATE.
2. POSITIONS OF GAS VENT TBD.

5701 Bowman Rd.,Town of Manlius, NY 13057

ABUNDANT SOLAR

PROJECT NAME: East Syracuse Landfill Solar Farm

SYSTEM SIZE: 6,095.700kW DC / 4,350kW AC

DATE: August 10, 2020

GPS LOCATION: 43.045908, -76.026251

THIS DRAWING IS AN INSTRUMENT OF SERVICE, IS PROVIDED BY AND IS THE PROPERTY OF ABUNDANT SOLAR ENERGY INC.
THIS DRAWING CANNOT BE MODIFIED AND / OR REPRODUCED WITHOUT THE CONSENT OF THIS OFFICE

ENGINEER'S SEAL

ABUNDANT Solar Power Inc.
700 WEST METRO PARK
ROCHESTER, NY 14623
T: 416 494 9559
www.abundantsolarenergy.com

Agricultural Data Statement

AGRICULTURAL DATA STATEMENT

1. Name and address of applicant:

   Abundant Solar Power

   700 W. Metro Park,

   Rochester, NY 14623

2. Location of the proposed action:

   5701Bowman Rd., Manlius NY 13057, USA

3. Description of the proposed action to include: (1) Size of parcel or acreage to be acquired and tax map identification number of tax parcel(s) involved; (2) The type of action proposed (e.g., single-family dwelling or subdivision, multi-family development, apartment complex, commercial or industrial facility, school, community or public service facility, airport, etc.) and (3) project density.
   [Please provide this information on the reverse side of this application and attach additional description as necessary.]

4. Name, address, telephone number and type of farm of owner(s) of land within the agricultural district which land contains farm operation(s) and upon which the project is proposed or which is located within 500 feet of the boundary of the property upon which the project is proposed:

   A. Name:_____
      Address & Telephone #:_____
      Type of farm:_____

   B. Name:_____
      Address & Telephone #: _____
      Type of farm:_____

   C. Name:_____
      Address & Telephone #:_____
      Type of farm:_____

   D. Name:_____
      Address & Telephone #:_____
      Type of farm:_____

5. Tax map or other map showing the site of the proposed project relative to the location of farm operations identified in the ADS.

NYS Town Law

§ 283-a. Coordination with agricultural districts program.

1. Policy of local governments. Local governments shall exercise their powers to enact local laws, ordinances, rules or regulations that apply to farm operations in an agricultural district in a manner which does not unreasonably restrict or regulate farm structures or farming practices in contravention of the purposes of article twenty-five-AA of the agriculture and markets law, unless such restrictions or regulations bear a direct relationship to the maintenance of public health or safety.

2. Agricultural data statement; submission, evaluation. Any application for a special use permit, site plan approval, use variance, or subdivision approval requiring municipal review and approval by the town board, planning board, or zoning board of appeals pursuant to this article, that would occur on property within an agricultural district containing a farm operation or on property with boundaries within five hundred feet of a farm operation located in an agricultural district, shall include an agricultural data statement. The town board, planning board, or zoning board of appeals shall evaluate and consider the agricultural data statement in its review of the possible impacts of the proposed project upon the functioning of farm operations within such agricultural district. The information required by an agricultural data statement may be included as part of any other application form required by local law, ordinance or regulation.

3. Agricultural data statement; notice provision. Upon the receipt of such application by the planning board, zoning board of appeals, or town board, the clerk of such board shall mail written notice of such application to the owners of land as identified by the applicant in the agricultural data statement. Such notice shall include a description of the proposed project and its location, and may be sent in conjunction with any other notice required by state or local law, ordinance, rule or regulation for the said project. The cost of mailing said notice shall be borne by the applicant.

4. Agricultural data statement; content. An agricultural data statement shall include the following information: the name and address of the applicant; a description of the proposed project and its location; the name and address of any owner of land within the agricultural district, which land contains farm operations and is located within five hundred feet of the boundary of the property upon which the project is proposed; and a tax map or other map showing the site of the proposed project relative to the location of farm operations identified in the agricultural data statement.

5. Notice to county planning board or agency or regional planning council. The clerk of the town board, planning board, or zoning board of appeals shall refer all applications requiring an agricultural data statement to the county planning board or agency or regional planning council as required by sections two hundred thirty- nine-m and two hundred thirty-nine-n of the general municipal law.

Agriculture and Markets Law
Article 25 AA – Agricultural Districts

305-a. Coordination of local planning and land use decision-making with the agricultural districts program

1. Policy of local governments.

   a. Local governments, when exercising their powers to enact and administer comprehensive plans and local laws, ordinances, rules or regulations, shall exercise these powers in such manner as may realize the policy and goals set forth in this article, and shall not unreasonably restrict or regulate farm operations within agricultural districts in contravention of the purposes of this article unless it can be shown that the public health or safety is threatened.

   b. The commissioner, upon his or her own initiative or upon the receipt of a complaint from a person within an agricultural district, may bring an action to enforce the provisions of this subdivision.

2. Agricultural data statement; submission, evaluation. Any application for a special use permit, site plan approval, use variance, or subdivision approval requiring municipal review and approval by a planning board, zoning board of appeals, town board, or village board of trustees pursuant to article sixteen of the town law or article seven of the village law, that would occur on property within an agricultural district containing a farm operation or on property with boundaries within five hundred feet of a farm operation located in an agricultural district, shall include an agricultural data statement. The planning board, zoning board of appeals, town board, or village board of trustees shall evaluate and consider the agricultural data statement in its review of the possible impacts of the proposed project upon the functioning of farm operations within such agricultural district. The information required by an agricultural data statement may be included as part of any other application form required by local law, ordinance or regulation.

3. Agricultural data statement; notice provision. Upon the receipt of such application by the planning board, zoning board of appeals, town board or village board of trustees, the clerk of such board shall mail written notice of such application to the owners of land as identified by the applicant in the agricultural data statement. Such notice shall include a description of the proposed project and its location, and may be sent in conjunction with any other notice required by state or local law, ordinance, rule or regulation for the said project. The cost of mailing said notice shall be borne by the applicant.

4. Agricultural data statement; content. An agricultural data statement shall include the following information: the name and address of the applicant; a description of the proposed project and its location; the name and address of any owner of land within the agricultural district, which land contains farm operations and is located within five hundred feet of the boundary of the property upon which the project is proposed; and a tax map or other map showing the site of the proposed project relative to the location of farm operations identified in the agricultural data statement.

TOWN VILLAGE CITY OF Manlius
(circle one)

Application #_____

Agricultural Data Statement

Date _____

Instructions: This form must be completed for any application for a special use permit, site plan approval, use variance or a subdivision approval requiring municipal review that would occur on property within 500 feet of a farm operation located in a NYS Dept. of Ag & Markets certified Agricultural District.

Applicant	Owner if Different from Applicant
Name: Abundant Solar Power Address: 700 W. Metro Park, Rochester, NY 14623	Name: Town of Manlius Address:

1. Type of Application: ☑ Special Use Permit; ☐ Site Plan Approval ; ☐ Use Variance;
   (circle one or more) ☐ Subdivision Approval

2. Description of proposed project: Abundant Solar Power plans to install a 5 MW-AC solar farm on the eastern portion of the approximately 17.0 closed landfill.

3. Location of project: Address: 5701Bowman Rd., Manlius NY 13057, USA
   Tax Map Number (TMP) 074.-01-06.1

4. Is this parcel within an Agricultural District? ☑ NO ☐ YES (Check with your local assessor if you do not know)
5. If YES, Agricultural District Number_____
6. Is this parcel actively farmed? ☑ NO ☐ YES
7. List all farm operations within 500 feet of your parcel. Attach additional sheets if necessary.

Name: _____ Address: _____ Is this parcel actively farmed? ☐ NO ☐ YES	Name: _____ Address: _____ Is this parcel actively farmed? ☐ NO ☐ YES
Name: _____ Address: _____ Is this parcel actively farmed? ☐ NO ☐ YES	Name: _____ Address: _____ Is this parcel actively farmed? ☐ NO ☐ YES

for ASP

Signature of Applicant

Signature of Owner (if other than applicant)

Reviewed by: _____ _____

Signature of Municipal Official Date

NOTE TO REFERRAL AGENCY: County Planning Board review is required. A copy of the Agricultural Data Statement must be submitted along with the referral to the County Planning Department.

Threatened and Endangered

Species Documentation

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
Phone: (607) 753-9334 Fax: (607) 753-9699
http://www.fws.gov/northeast/nyfo/es/section7.htm

In Reply Refer To: January 12, 2021
Consultation Code: 05E1NY00-2021-SLI-0979
Event Code: 05E1NY00-2021-E-03072
Project Name: Closed Manlius Landfill Solar Array Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). This list can also be used to determine whether listed species may be present for projects without federal agency involvement. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list.

Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC site at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list. If listed, proposed, or candidate species were identified as potentially occurring in the project area, coordination with our office is encouraged. Information on the steps involved with assessing potential impacts from projects can be found at: http://www.fws.gov/northeast/nyfo/es/section7.htm

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the Services wind

energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the ESA. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
(607) 753-9334

Project Summary

Consultation Code: 05E1NY00-2021-SLI-0979
Event Code: 05E1NY00-2021-E-03072
Project Name: Closed Manlius Landfill Solar Array Project
Project Type: DEVELOPMENT
Project Description: The project is proposing to install a ground mounted Solar Photovoltaic (PV) Array on the cap of the closed Manlius Landfill.
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.0459388,-76.02610165474046,14z

Counties: Onondaga County, New York

Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Eastern Massasauga (=rattlesnake) *Sistrurus catenatus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2202	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
P: (518) 402-8935 | F: (518) 402-8925
www.dec.ny.gov

February 11, 2021

Nicholas Radford
Barton and Loguidice, D.P.C.
11 Centre Park, Suite 203
Rochester, NY 14614

Re: Closed Manlius Landfill Solar Array Project
County: Onondaga Town/City: Manlius

Dear Nicholas Radford:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur in the vicinity of the project site.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 7 Office, Division of Environmental Permits, at dep.r7@dec.ny.gov.

Sincerely,

Heidi Krahling
Environmental Review Specialist
New York Natural Heritage Program

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

The following state-listed animals have been documented in the vicinity of the project site.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed.

For information about any permit considerations for your project, please contact the Permits staff at the NYSDEC Region 7 Office at dep.r7@dec.ny.gov, 315-426-7438.

The following species has been documented within 2.5 miles of the project site. Individual animals may travel 2.5 miles from documented locations. The main impact of concern is the cutting or removal of potential roost trees.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Mammals				
Indiana Bat *Maternity colony*	*Myotis sodalis*	Endangered	Endangered	12157

The following species has been documented within 3 miles of the project site. Individual animals may travel 5 miles from documented locations. The main impact of concern is the cutting or removal of potential roost trees.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Mammals				
Northern Long-eared Bat *Hibernaculum*	*Myotis septentrionalis*	Threatened	Threatened	14190

This report only includes records from the NY Natural Heritage database.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

Species Conclusions Table Project Name: Manlius Closed Landfill Solar Array Project Date: January 27, 2020					
Species Name/ Significant Natural Community	**Suitable Habitat Present?**	**Species Present?**	**Critical Habitat Present?**	**Determination**	**Notes/Documentation Summary (include full rationale in your report)**
Bald eagle (*Haliaeetus leucocephalus*)	No	No current survey conducted	No	No effect/ No BGEPA Permit required/Take not likely	Suitable nesting or foraging habitat for the bald eagle was not observed within the Project Site. No bald eagles or stick nests were identified within the vicinity of the Project, and no documented bald eagle nesting occurrences were reported within 660 feet of the Project Site.
Eastern massasauga (*Sistrurus catenatus*)	No	No current survey conducted	No	No effect/Take not likely	Suitable habitat for the eastern massasauga is primarily contained to Cicero Swamp, approximately 5.5 miles north of the Project Site. No suitable wetland habitat to support eastern massasauga populations was observed in the Project Site during the site visit.
Indiana bat *(Myotis sodalis)* and Northern long-eared bat *(Myotis septentrionalis)*	Yes	No current survey conducted	No	No effect/Take not likely	Suitable roosting habitat for the Indiana and northern long-eared bat was identified within the Project Site, but such habitat is located outside of the project's disturbance limits. No tree removal is proposed for this project.

Archaeological, Cultural and Historic Resource Documentation

NEW YORK STATE OF OPPORTUNITY. | Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

February 12, 2021

Aisha Lewis
700 W. Metro Park
Rochester, NY 14623

Re: NYSERDA
M1 Solar Facility/5 MW/18 Acres
5701 Bowman Road, Manlius, Onondaga County, NY
21PR00760

Dear Aisha Lewis:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the project in accordance with the New York State Historic Preservation Act of 1980 (Section 14.09 of the New York Parks, Recreation and Historic Preservation Law). These comments are those of the OPRHP and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8) and its implementing regulations (6 NYCRR Part 617).

Based upon this review, it is the opinion of OPRHP that no properties, including archaeological and/or historic resources, listed in or eligible for the New York State and National Registers of Historic Places will be impacted by this project.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

R. Daniel Mackay

Deputy Commissioner for Historic Preservation
Division for Historic Preservation

Exhibit F

Barton & Loguidice, D.P.C.

Memo To:	Project File	**Date:**	November 5, 2020
From:	Nicholas Radford & Grete Day Environmental Scientists	**Project No.:**	2271.004.001
Subject:	Wetland and Water Resource Delineation Memorandum Manlius Landfill Abundant Solar Power, Inc. Town of Manlius, Onondaga County, New York		

Introduction

This memorandum summarizes the results of a wetland identification and boundary delineation performed by Barton & Loguidice, D.P.C. (B&L), for the Town of Manlius Landfill Photovoltaic (PV) Array Project located in the Town of Manlius, Onondaga County, New York. Abundant Solar Power, Inc. (ASP) is proposing to install ballast mounted PV arrays on the existing closed landfill cap. The Survey Limits for the wetland delineation and the closed landfill location are shown on Figures 1 and 2 with topographic and aerial basemaps, respectively.

Background Information Review

Prior to undertaking the field wetland delineation, United States Geological Survey (USGS) topographic mapping, aerial imagery, soils information from the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping, and New York State Department of Environmental Conservation (NYSDEC) freshwater wetland and stream mapping resources were reviewed. The results of this desktop survey are summarized below.

Topographic Mapping

Topographic mapping for the Survey Limits is provided in Figure 1. The Survey Limits are located on the USGS 1:24,000 scale Syracuse East, NY topographic quadrangle map. This map shows the Survey Limits positioned south of Clark Hill and North of the Old Erie Canal. The USGS Syracuse East quadrangle map shows that the elevation within the Survey Limits ranges from 420 feet above mean sea level (amsl) to 460 feet amsl. In general, the lands surrounding the Survey Limits are flat to the east and west, and hilly to the north and south. The general decrease in elevation near the Survey Limits continues north toward Oneida Lake, located 9.65 miles to the north of the Survey Limits. The Old Erie Canal is mapped as a perennial waterbody and is visible south of the Survey Limits running from east to west. According to the USGS Topographic Map Symbols document, the capped landfill area is mapped as a disturbed surface, and the remainder of the Survey Limits is depicted as woodland.

Aerial Mapping

Aerial imagery (2018) of the Survey Limits is provided on Figure 2. Aerial imagery shows the primary vegetative cover-type of the lands surrounding the Survey Limits as deciduous forest, with portions of emergent/scrub-shrub cover. Residential properties are visible north of the Survey Limits in a

subdivision north of Bowman Road. Lands within the Survey Limits consist of deciduous forest surrounding the landfill, mowed and maintained herbaceous vegetation on the landfill cap, and the paved access driveway to the landfill. The Old Erie Canal and the Erie Canalway Trail are visible just south of the Survey Limits, parallel to Cedar Bay Road.

Soils

The USDA NRCS Web Soil Survey (2019) mapping for the Survey Limits was reviewed to evaluate the presence of mapped hydric soils (one of the required wetland determination criteria). Four mapped soil units are present within the Survey Limits, and are summarized in Table 1, below. Two hydric soil units (Carlisle muck and Palms muck) are mapped within the Survey Limits. Carlisle muck is mapped in the middle and southwest areas of the Survey Limits, and Palms muck is mapped in the northern portion of the Survey Limits. Soil mapping for the Survey Limits is shown on Figure 3. It should be noted that the soil units mapped are the native site soils and that other materials and fill were added to the capped landfill area during the active use of that landfill site and ultimate site closure.

Table 1 – Mapped Soil Units within Survey Limits

Symbol	Soil Unit Name	Drainage Class	Hydric Rating (%)	Hydric Description
CaC2	Camillus silt loam, 6 to 12 percent slopes, eroded	Well drained	0	Non-hydric
Ce	Carlisle muck	Very poorly drained	100	Hydric
ML	Made land	Somewhat excessively drained	10	Predominantly non-hydric
Pb	Palms muck	Very poorly drained	100	Hydric

National Wetlands Inventory Mapping

NWI maps are prepared by the USFWS to inventory waterfowl habitat and provide an indication of the potential presence of federally-regulated wetlands. This resource shows wetland polygons by type in accordance with the Cowardin Classification System (Cowardin, 1979). NWI mapping (USFWS, 2018) for the Survey Limits is shown in Figure 4. Two PFO1E systems (Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated) are partially mapped within the Survey Limits; one along the western border and the other following along the eastern and northern borders of the Survey Limits. The Old Erie Canal is located just south of the Survey Limits and is mapped as an R2UBHx system (Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Excavated) as well as a R5UBH system (Riverine, Unknown Perennial, Unconsolidated Bottom, Permanently Flooded).

New York State Department of Environmental Conservation Freshwater Wetland and Stream Mapping

The NYSDEC maps the boundaries of wetlands that are regulated under Article 24 of the Environmental Conservation Law. In addition to the wetland itself, NYSDEC regulates the 100-foot adjacent area surrounding Article 24-jurisdictional wetlands. No NYSDEC-mapped streams are located within the Survey Limits. However, the Old Erie Canal (6 NYCRR Part 899.4; Item No. 296) is mapped directly adjacent to the southern border of the Survey Limits. Two polygons comprising NYSDEC Wetland SYE-22 are mapped within the western, eastern, and northern portions of the Survey Limits (Figure 5). Figure 5 also shows the 100-foot Adjacent Area for the mapped limits of Wetland SYE-22.

Wetland Delineation Methodology

Due to the presence of mapped wetlands and hydric soils within the Survey Limits, a field-based wetland assessment and boundary delineation was performed on site to evaluate these desktop findings. The field delineation of wetland boundaries was performed by B&L wetland biologists on October 21, 2020, in accordance with the methodologies set forth in the Routine Wetlands Determination Method with Onsite Inspection presented in the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the USACE's *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0* (USACE, 2011). These methodologies were used to identify federal wetlands located within the Survey Limits that may be subject to jurisdiction by the USACE. Additionally, due to the presence of state mapped wetlands within the Survey Limits, the methodologies detailed in the New York State *Freshwater Wetlands Delineation Manual* (Browne et al., 1995) were also considered and applied during the on-site delineation. Consistent with these methodologies, field indicators related to vegetative communities, soils, and hydrology were evaluated to determine the wetland boundary in the field.

Wetland Delineation Results

Two wetlands (Wetland A and Wetland B) were identified within the Survey Limits, and are shown on Figure 6. Photographs showing the general characteristics of the Survey Limits and delineated resources are included in Appendix A. Information regarding hydrology, vegetation, and soil characteristics observed in each plot location is included on the field datasheets provided in Appendix B. Brief descriptions of the identified resources are provided below.

Wetland A

Wetland A is a deciduous forested wetland located along the eastern and northern sides of the Survey Limits (Figure 6). The eastern boundary of Wetland A was left open because the wetland extended outside of the Survey Limits to the east. Wetland A overlaps NYSDEC-mapped Wetland SYE-22. Wetland A is located within the mapped soil unit Palms muck (Pb), a hydric soil. The vegetation observed in Wetland A passed the dominance test for hydrophytic vegetation with 85.7%. Dominant species observed in this wetland included American elm (*Ulmus americana*) and basswood (*Tilia americana*) in the tree stratum, European buckthorn (*Rhamnus cathartica*) and green ash (*Fraxinus pennsylvanica*) in the shrub stratum, common reed (*Phragmites australis*) and calico aster (*Symphyotrichum lateriflorum*) in the herb stratum, and riverbank grape (*Vitis riparia*) in the woody vine stratum. Wetland hydrology indicators observed included geomorphic position (D2) and the FAC-Neutral Test (D5). Soil characteristics observed in Wetland A met the redox dark surface (F6) hydric soil indicator. According to the National Integrated Drought Information System, the climatic conditions were not typical, as Onondaga County was experiencing a moderate drought (D1) at the time of the site inspection.

Wetland B

Wetland B is a deciduous forested wetland located along the western border of the Survey Limits (Figure 6). The western boundary of Wetland B was left open because it continued outside of the Survey Limits to the west. Wetland B overlaps NYSDEC-mapped Wetland SYE-22. Wetland B is located within the mapped soil unit Carlisle muck (Ce), a hydric soil. The vegetation observed in Wetland B passed the dominance test for hydrophytic vegetation with 100%. Dominant species in this wetland included black willow (*Salix nigra*) and red maple (*Acer rubrum*) in the tree stratum, European buckthorn in the shrub stratum, common reed in the herb stratum, and riverbank grape and poison ivy (*Toxicodendron radicans*) in the woody vine stratum. Wetland hydrology indicators observed included geomorphic position (D2) and the FAC-Neutral Test (D5). Soil characteristics observed in Wetland B met the redox dark surface (F6) hydric soil indicator.

According to the National Integrated Drought Information System, the climatic conditions were not typical, as Onondaga County was experiencing a moderate drought (D1) at the time of the site inspection.

Findings and Preliminary Jurisdiction

Two wetlands were identified within the Survey Limits during the wetland investigation at the Manlius Landfill. Both the NYSDEC and USACE freshwater wetland delineation methodologies were applied during the field investigation, and resulted in the same boundaries for both wetlands.

Wetlands A and B correspond with NYSDEC-mapped Wetland SYE-22 and are therefore anticipated to be regulated by the NYSDEC under Article 24 of the Environmental Conservation Law. Any disturbances within either wetland or their regulated 100-foot Adjacent Areas will require an Article 24 Freshwater Wetland permit from the NYSDEC. The 100-foot Adjacent Area for the delineated wetland boundaries was applied and is shown on Figure 6. Additionally, Wetlands A and B are part of a larger wetland complex that is adjacent to Tributary 3a of Butternut Creek, a perennial stream. Tributary 3a discharges into Butternut Creek, which drains to Oneida Lake approximately 9.7 miles north of the Survey Limits. Oneida Lake is a federally navigable water regulated by the USACE under Section 10 of the Rivers and Harbors Act. Therefore, both Wetland A and Wetland B are assumed to be federally jurisdictional in accordance with the Navigable Water Protection Rule and would be regulated by the USACE under Section 404 of the Clean Water Act. Any discharges of fill or placement of structures into either wetland will require a Section 404 permit from the USACE as well as a Section 401 Water Quality Certification and Article 24 Freshwater Wetlands permit from the NYSDEC. It is noted that final jurisdictional determinations must be made by the NYSDEC and USACE, and are provided upon request.

References

Browne, S., S. Crocoll, D. Goetke, N. Heaslip, T. Kerpez, K. Kogut, S. Sanford, and D. Spada. 1995. New York State Freshwater Wetlands Delineation Manual. New York State Department of Environmental Conservation. Albany, NY.

Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 131pp.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual.* Technical Report Y-87. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS.

U.S. Army Corps of Engineers (USACE). 2011. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeastern Region (Version 2.0)*, ed. J.S. Wakeley, R. W. Lichvar, C.V. Noble, and J.F. Berkowitz. ERDC/EL TR 12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

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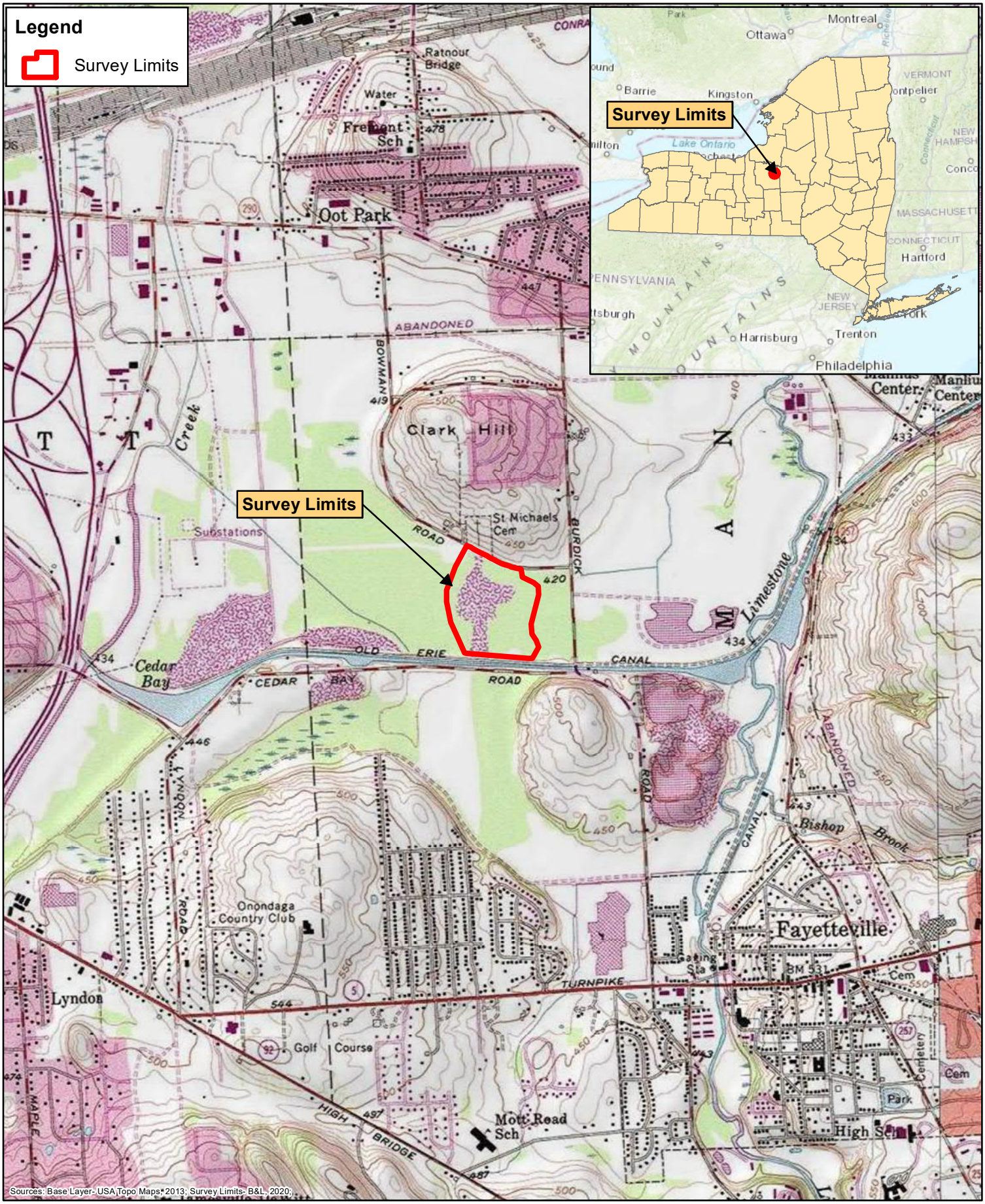
NPR/GLD/jms

Attachments

Figures

Figure 1	**Topographic Project Location Map**
Figure 2	**Aerial Project Location Map**
Figure 3	**Mapped Soil Units**
Figure 4	**NWI-Mapped Resources**
Figure 5	**NYSDEC-Mapped Resources**
Figure 6	**Delineated Resources**



Barton & Loguidice

0 1,000 2,000 4,000 Feet

Abundant Solar Power, Inc.
Manlius Landfill Photovoltaic Array

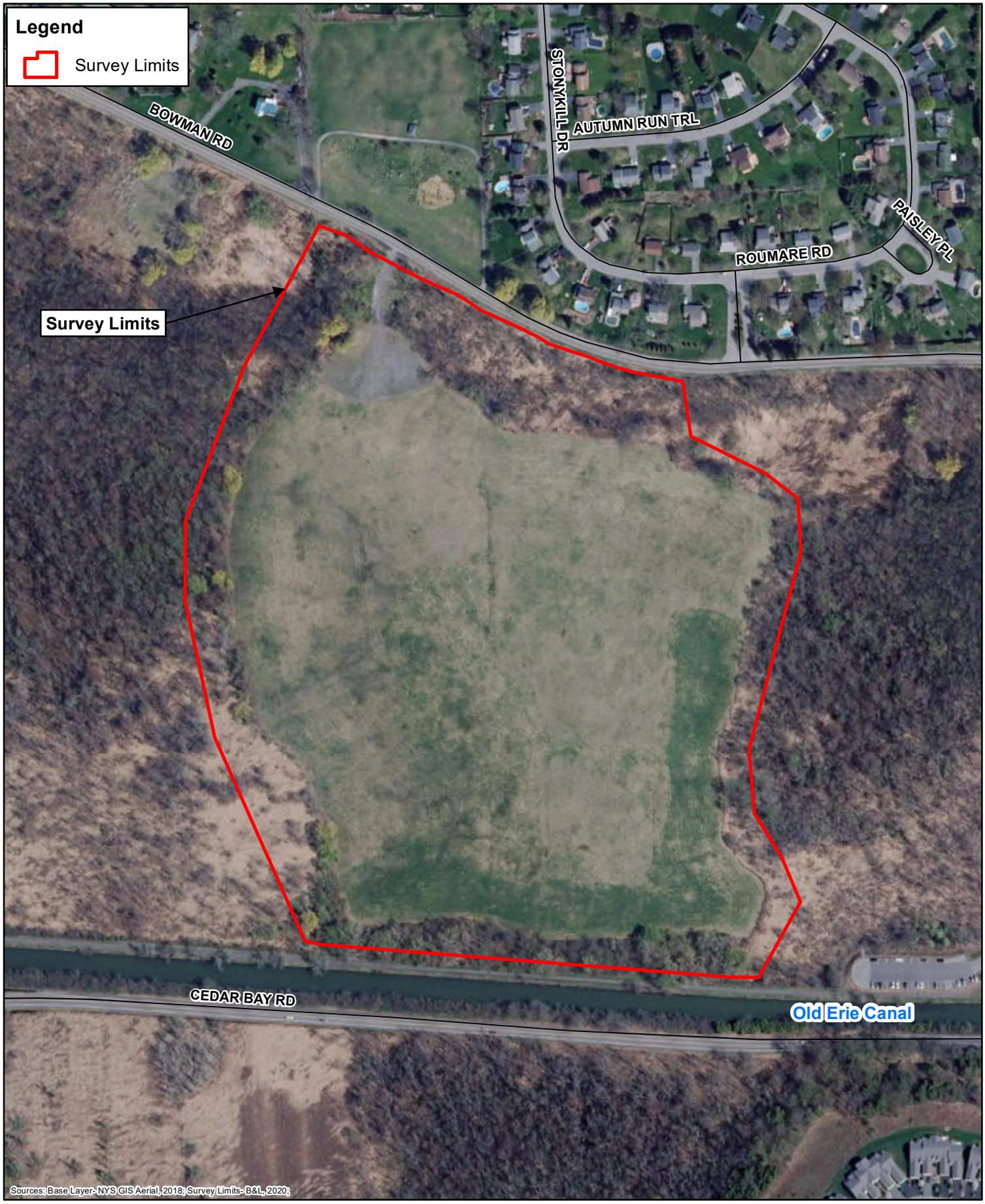
Topographic Project Location Map

Onondaga County November 2020 New York

Figure 1

Project No. 2271.004

Path: K:\Projects\2200\2271\04\Projects\Wetland Memo\2271.004.001 Figure 1 Topo.mxd



Path: K:\Projects\2200\2271\04\Projects\Wetland Memo\2271.004.001 Figure 2 Aerial.mxd

Barton & Loguidice

N W E S

0 150 300 600 Feet

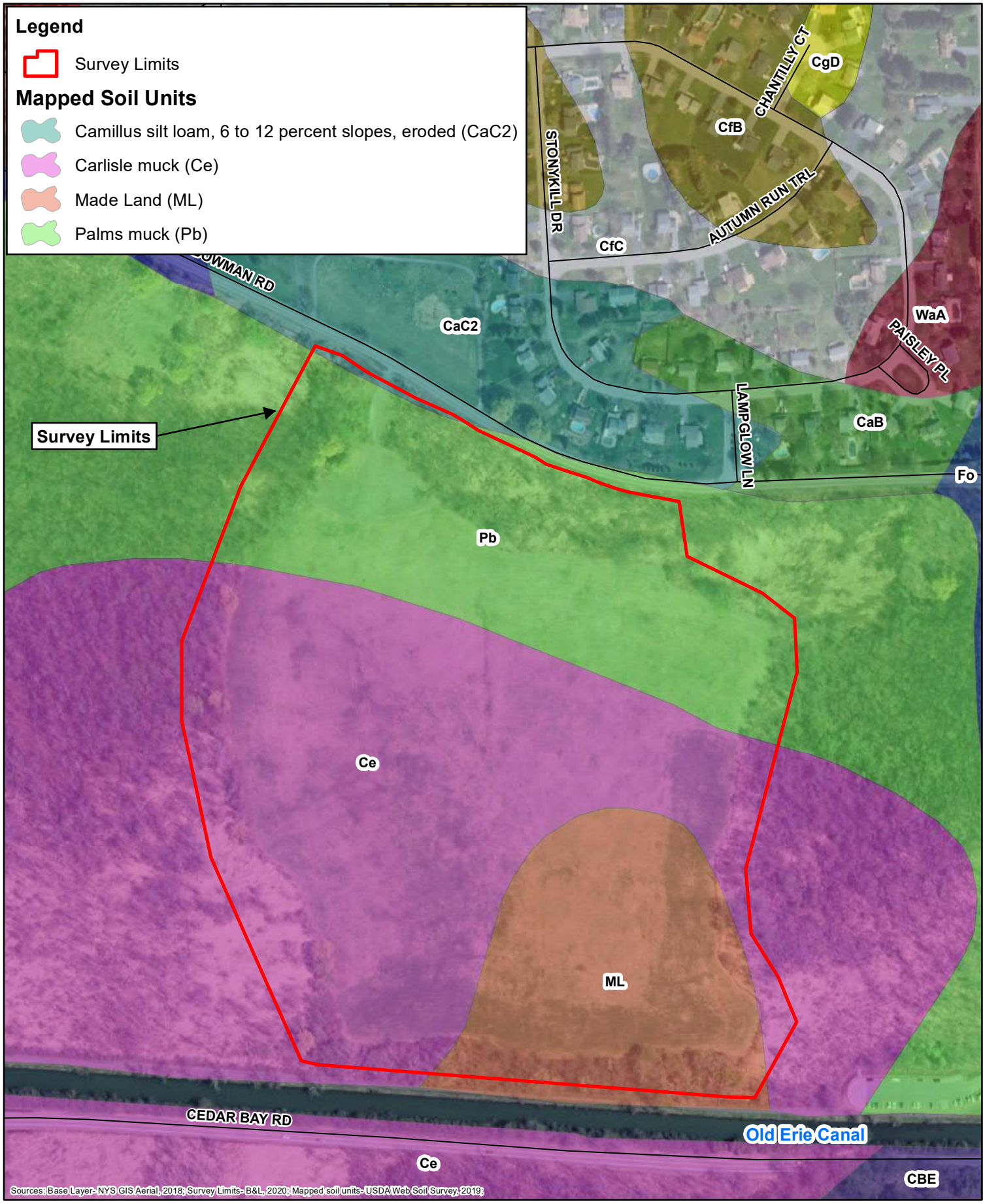
Abundant Solar Power, Inc.
Manlius Landfill Photovoltaic Array

Aerial Project Location Map

Onondaga County November 2020 New York

Figure 2

Project No. 2271.004



Path: K:\Projects\2200\2271\04\Projects\Wetland Memo\2271.004.001 Figure 3 Soils.mxd

Barton & Loguidice

N W E S

0 150 300 600 Feet

Abundant Solar Power, Inc.
Manlius Landfill Photovoltaic Array

Mapped Soil Units

Onondaga County November 2020 New York

Figure 3

Project No. 2271.004

Barton & Loguidice

N W E S

0 150 300 600 Feet

Abundant Solar Power, Inc.
Manlius Landfill Photovoltaic Array

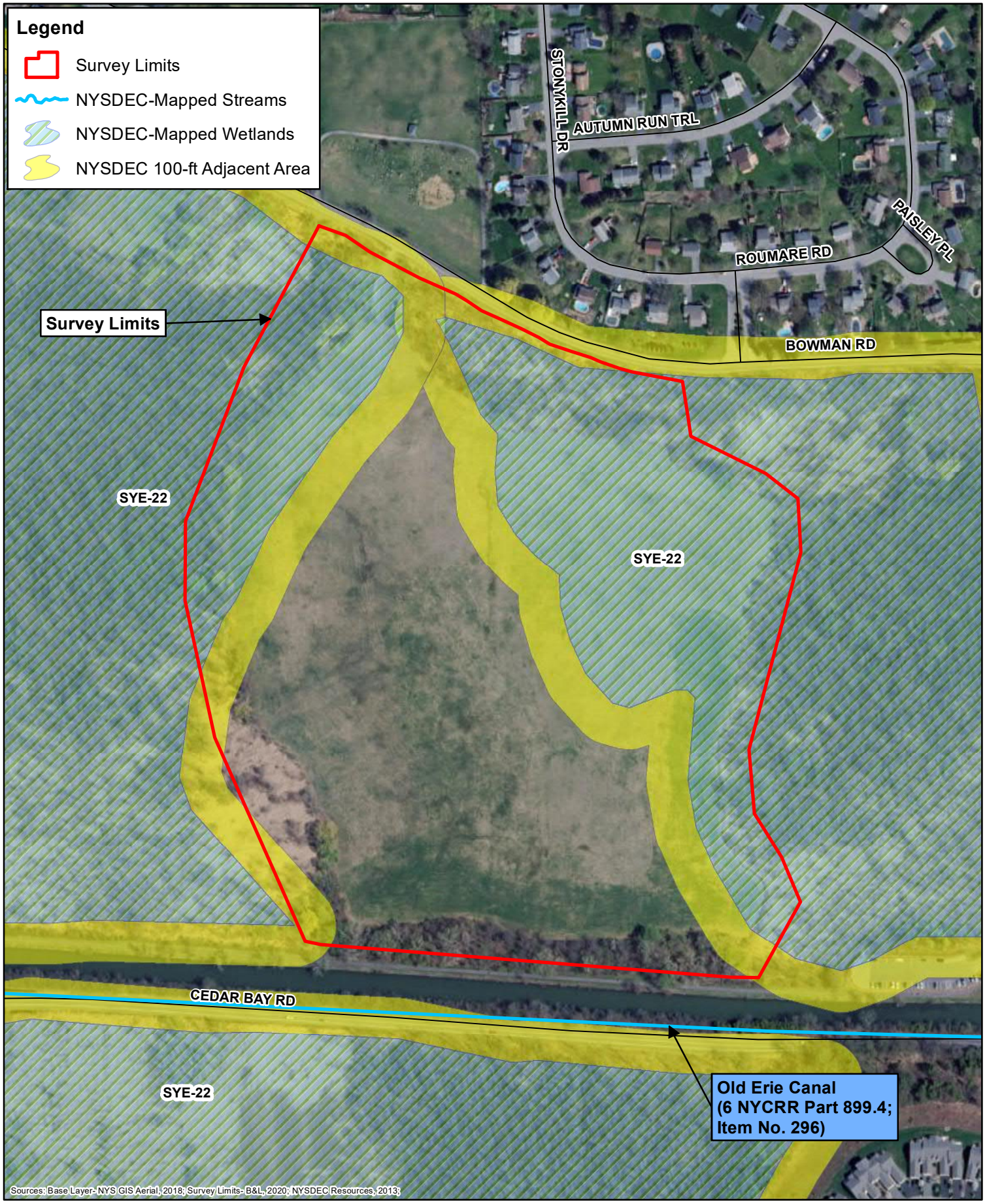
NWI-Mapped Resources

Onondaga County November 2020 New York

Figure 4

Project No. 2271.004

Path: K:\Projects\2200\2271\04\Projects\Wetland Memo\2271.004.001 Figure 4 NWI Resources.mxd



Path: K:\Projects\2200\2271\04\Projects\Wetland Memo\2271.004.001 Figure 5 NYSDEC Resources.mxd

Barton & Loguidice

0 150 300 600 Feet

Abundant Solar Power, Inc.
Manlius Landfill Photovoltaic Array

NYSDEC-Mapped Resources

Onondaga County November 2020 New York

Figure 5

Project No. 2271.004

Path: K:\Projects\2200\2271\04\Projects\Wetland Memo\2271.004.001 Figure 6 Delineated Resources.mxd

Barton & Loguidice

N W E S

0 150 300 600 Feet

Abundant Solar Power, Inc.
Manlius Landfill Photovoltaic Array

Delineated Resources

Onondaga County November 2020 New York

Figure 6

Project No. 2271.004

Appendix A

Site Photographs

Photograph 1: Representative view of landfill cap, photograph looking north.

Photograph 2: Transition from landfill cap to Wetland B, photograph looking west.

Photograph 3: Wetland A, photograph looking east.

Photograph 4: Wetland A plot location adjacent to roadside, photograph looking south.

Photograph 5: Wetland B, photograph looking west.

Photograph 6: Wetland B plot location, photograph looking west.

Photograph 7: Upland area of landfill cap within NYSDEC Wetland SYE-22, photograph looking north.

Photograph 8: Bowman Road maintained roadside adjacent to Wetland A, photograph looking east.

Photograph 9: Paved access driveway to landfill, photograph looking south.

Photograph 10: Paved access driveway to landfill, photograph looking north.

Appendix B

Delineation Datasheets

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Town of Manlius Landfill PV Array City/County: Onondaga County Sampling Date: 10/21/2020

Applicant/Owner: Abundant Solar Power, Inc. State: NY Sampling Point: Wet A

Investigator(s): Grete Day, Nicholas Radford Section, Township, Range: Town of Manlius

Landform (hillside, terrace, etc.): Toe of slope Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.047488 Long: -76.024871 Datum: NAD 83

Soil Map Unit Name: Palms muck (Pb) NWI classification: PFO1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland A
Wetland Hydrology Present?	Yes X	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)
Wetland A is a deciduous forest wetland located at the northern and eastern ends of the Survey Limits. GPS boundary points were collected in the field (A1-A86). The eastern boundary of Wetland A was not flagged because it was outside of the Survey Limits. The wetland continues east outside of the Survey Limits. The National Integrated Drought Information System reported that the Survey Limits were within a D1-Moderate Drought at the time of the site inspection.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Hydrology indicators in Wetland A included: geomorphic position (D2), as Wetland A is located within a low spot in the local topography, and the FAC-Neutral test (D5).

VEGETATION – Use scientific names of plants.

Sampling Point: Wet A

Tree Stratum (Plot size: 30 Ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	15	Yes	FACW
2. *Tilia americana*	15	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	30	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 Ft.)			
1. *Rhus typhina*	5	No	UPL
2. *Fraxinus pennsylvanica*	15	Yes	FACW
3. *Rhamnus cathartica*	10	Yes	FAC
4.			
5.			
6.			
7.			
	30	=Total Cover	
Herb Stratum (Plot size: 5 Ft.)			
1. *Phragmites australis*	10	Yes	FACW
2. *Solidago altissima*	5	No	FACU
3. *Symphyotrichum lateriflorum*	20	Yes	FAC
4. *Lythrum salicaria*	5	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	=Total Cover	
Woody Vine Stratum (Plot size: 30 Ft.)			
1. *Vitis riparia*	15	Yes	FAC
2.			
3.			
4.			
	15	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	40	x 2 =	80
FAC species	45	x 3 =	135
FACU species	20	x 4 =	80
UPL species	5	x 5 =	25
Column Totals:	115 (A)		325 (B)

Prevalence Index = B/A = 2.83

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Dominant species observed at the Wetland A data plot included American elm and basswood in the tree stratum, European buckthorn, and green ash in the shrub stratum, common reed and calico aster in the herb stratum, and riverbank grape of the woody vine stratum. The vegetation in Wetland A passed the dominance test for hydrophytic vegetation with 85.7%.

SOIL

Sampling Point: Wet A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/2	95	10YR 3/6	5	C	M	Loamy/Clayey	
8-16	10YR 3/1	90	10YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations
			10YR 4/1	5	C	M		Faint redox concentrations
16-20	10YR 2/1	65	10YR 6/6	15	C	M	Loamy/Clayey	Prominent redox concentrations
			10YR 6/1	20	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soil indicators were found in the plot. The indicator redox dark surface (F6) was met when 8" within the upper 12" of soil profile exhibited a 10YR 2/2 matrix value with 5% redox concentrations.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Town of Manlius Landfill PV Array City/County: Onondaga County Sampling Date: 10/21/2020

Applicant/Owner: Abundant Solar Power, Inc. State: NY Sampling Point: Wet B

Investigator(s): Grete Day, Nicholas Radford Section, Township, Range: Town of Manlius

Landform (hillside, terrace, etc.): Toe of slope Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.043921 Long: -76.027723 Datum: NAD 83

Soil Map Unit Name: Carlisle muck (Ce) NWI classification: PFO1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland B
Wetland Hydrology Present?	Yes X	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)
Wetland B is a deciduous forest wetland located along the western end of the Survey Limits. GPS boundary points were collected in the field (B1-B53). The western boundary of Wetland B was not flagged because it was outside of the Survey Limits. The wetland continues west outside of the Survey Limits. The National Integrated Drought Information System reported that the Survey Limits were within a D1-Moderate Drought at the time of the site inspection.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 16

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Hydrology indicators in Wetland B included: geomorphic position (D2), as Wetland B is located within a low spot in the local topography, and the FAC-Neutral test (D5).

VEGETATION – Use scientific names of plants.

Sampling Point: Wet B

Tree Stratum (Plot size: 30 Ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	20	Yes	OBL
2. *Acer rubrum*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 Ft.)			
1. *Fraxinus pennsylvanica*	5	No	FACW
2. *Rhamnus cathartica*	30	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	35	=Total Cover	
Herb Stratum (Plot size: 5 Ft.)			
1. *Phragmites australis*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	=Total Cover	
Woody Vine Stratum (Plot size: 30 Ft.)			
1. *Vitis riparia*	15	Yes	FAC
2. *Toxicodendron radicans*	5	Yes	FAC
3.			
4.			
	20	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	25	x 2 =	50
FAC species	55	x 3 =	165
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		235 (B)

Prevalence Index = B/A = 2.35

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Dominant species observed at the Wetland B data plot included black willow and red maple in the tree stratum, European buckthorn in the shrub stratum, common reed in the herb stratum, and riverbank grape and poison ivy in the woody vine stratum. The vegetation in Wetland B passed the dominance test for hydrophytic vegetation with 100%.

SOIL

Sampling Point: Wet B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					Loamy/Clayey	
4-16	10YR 3/1	95	10YR 3/6	5	C	M	Loamy/Clayey	Prominent redox concentrations
16-20	10YR 4/1	100					Loamy/Clayey	Gravelly

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soil indicators were found in the plot. The indicator redox dark surface (F6) was met when 8" within the upper 12" of soil profile exhibited a 10YR 3/1 matrix value with 5% redox concentrations.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Town of Manlius Landfill PV Array City/County: Onondaga County Sampling Date: 10/21/2020

Applicant/Owner: Abundant Solar Power, Inc. State: NY Sampling Point: Up A

Investigator(s): Grete Day, Nicholas Radford Section, Township, Range: Town of Manlius

Landform (hillside, terrace, etc.): Upslope Local relief (concave, convex, none): convex Slope (%): 0-2

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.047489 Long: -76.024871 Datum: NAD 83

Soil Map Unit Name: Palms muck (Pb) NWI classification: Not Mapped by NWI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes ____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)
The upland plot for Wetland A was located upslope of the wetland in a mowed, maintained portion of Bowman Road. The National Integrated Drought Information System reported that the Survey Limits were within a D1-Moderate Drought at the time of the site inspection.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology indicators were found.

VEGETATION – Use scientific names of plants.

Sampling Point: Up A

Tree Stratum (Plot size: 30 Ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 Ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 5 Ft.)			
1. *Allium canadense*	10	No	FACU
2. *Glechoma hederacea*	70	Yes	FACU
3. *Cirsium discolor*	5	No	UPL
4. *Ranunculus repens*	15	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	=Total Cover	
Woody Vine Stratum (Plot size: 30 Ft.)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	80	x 4 =	320
UPL species	5	x 5 =	25
Column Totals:	100 (A)		390 (B)

Prevalence Index = B/A = 3.90

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Dominant species observed at the Upland A data plot included narrow-leaf plantain and bird's foot trefoil in the herb stratum.

SOIL

Sampling Point: Up A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: rock

Depth (inches): 6

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No hydric soil indicators were found in the plot.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Town of Manlius Landfill PV Array City/County: Onondaga County Sampling Date: 10/21/2020

Applicant/Owner: Abundant Solar Power, Inc. State: NY Sampling Point: Up A2

Investigator(s): Grete Day, Nicholas Radford Section, Township, Range: Town of Manlius

Landform (hillside, terrace, etc.): Upslope Local relief (concave, convex, none): convex Slope (%): 0-2

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.046979 Long: -76.025818 Datum: NAD 83

Soil Map Unit Name: Palms muck (Pb) NWI classification: Not Mapped by NWI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation X, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No 0	If yes, optional Wetland Site ID: ___
Wetland Hydrology Present?	Yes ___	No X	

Remarks: (Explain alternative procedures here or in a separate report.)
The upland plot for Wetland A was located upslope of the wetland on the mowed, maintained portion of the landfill cap. This upland area is located within the mapped boundary of NYSDEC Wetland SYE-22. The National Integrated Drought Information System reported that the Survey Limits were within a D1-Moderate Drought at the time of the site inspection.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology indicators were found.

VEGETATION – Use scientific names of plants. Sampling Point: Up A2

Tree Stratum (Plot size: 30 Ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 Ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 5 Ft.)			
1. *Galium mollugo*	10	No	FACU
2. *Glechoma hederacea*	11	No	FACU
3. *Taraxacum officinale*	2	No	FACU
4. *Plantago lanceolata*	2	No	FACU
5. unknown grass	75	Yes	
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	=Total Cover	
Woody Vine Stratum (Plot size: 30 Ft.)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____	(A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)
Dominant species observed at the Upland A2 data plot included an unknown grass in the herb stratum. Grass was not able to be identified because all vegetation was mowed and no flowering structures were visible. Therefore, the presence of hydrophytic vegetation could not be determined for this plot.

SOIL

Sampling Point: Up A2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** _____

Remarks:

No soil samples were taken because plot was on the landfill cap and contained non-native fill material.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Town of Manlius Landfill PV Array City/County: Onondaga County Sampling Date: 10/21/2020

Applicant/Owner: Abundant Solar Power, Inc. State: NY Sampling Point: Up B

Investigator(s): Grete Day, Nicholas Radford Section, Township, Range: Town of Manlius

Landform (hillside, terrace, etc.): Upslope Local relief (concave, convex, none): convex Slope (%): 0-2

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.043914 Long: -76.027658 Datum: NAD 83

Soil Map Unit Name: Carlisle muck (Pb) NWI classification: Not Mapped by NWI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes ____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)
The upland plot for Wetland B was located upslope of the wetland in scrub-shrub upland area. The National Integrated Drought Information System reported that the Survey Limits were within a D1-Moderate Drought at the time of the site inspection.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology indicators were found.

VEGETATION – Use scientific names of plants.

Sampling Point: Up B

Tree Stratum (Plot size: 30 Ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 Ft.)			
1. *Lonicera morrowii*	20	Yes	FACU
2. *Rhamnus cathartica*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	30	=Total Cover	
Herb Stratum (Plot size: 5 Ft.)			
1. *Symphyotrichum lateriflorum*	5	No	FAC
2. *Solidago altissima*	20	Yes	FACU
3. *Doellingeria umbellata*	5	No	FACW
4. *Solanum dulcamara*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	=Total Cover	
Woody Vine Stratum (Plot size: 30 Ft.)			
1. *Vitis riparia*	10	Yes	FAC
2. *Toxicodendron radicans*	20	Yes	FAC
3.			
4.			
	30	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	50	x 3 =	150
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	95 (A)		320 (B)

Prevalence Index = B/A = 3.37

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Dominant species observed at the Upland B data plot included honeysuckle and European buckthorn in the shrub stratum, tall goldenrod in the herb stratum, and riverbank grape and poison ivy in the vine stratum. Upland B passed the dominance test for hydrophytic vegetation with 60%.

SOIL

Sampling Point: Up B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					Loamy/Clayey	
6-18	10YR 4/1	75	10YR 3/6	25	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soil indicator depleted matrix (F3) was found in the plot.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Permits, Region 7
615 Erie Boulevard West, Syracuse, NY 13204-2400
P: (315) 426-7438 | F: (315) 426-7425
www.dec.ny.gov

Abundant Solar Power (M1) LLC
700 W Metro Park
Rochester, NY 14623

RE: Manlius Closed Landfill Solar Array

INSTRUCTIONS TO ALL PERMITEES

Enclosed is your NYSDEC permit as requested. Please take some time to review the permit and note:

1. The permit is valid for only that activity specifically represented in your permit application and authorized in writing in the permit itself. Any deviation from the activity authorized in the permit or described in your application may require additional approval(s) or corrective action;

2. Review the General and Special Conditions carefully. If you are unsure of your obligations under the permit, please bring your questions to our attention;

3. If, for any reason, you believe you will be unable to comply or remain in compliance with the terms of your permit, please contact us;

4. Please check the expiration date and any requirements for renewal or modification of your permit;

5. Please keep the permit in a safe place for reference and a copy at the work site and have your contractor read and abide by its conditions;

6. The identification numbers help us communicate with you. Please reference them in any subsequent communications;

7. **Caution: Your project may be subject to the jurisdiction of the US Army Corps of Engineers, and need additional permitting. Contact them in the Auburn Field Office at 315-255-8090 with any questions.**

8. Be advised, the Uniform Procedures Regulations (6NYCRR Part 621) provide that an applicant may request a public hearing if a permit is denied or contains conditions which are unacceptable to them. Any such request must be made in writing within 30 calendar days of the date of permit issuance and must be addressed to the Regional Permit Administrator at the letterhead address.

If you have any questions, please contact me at 315-426-7445. Thank you.

Sincerely,

Trendon Choe
Environmental Analyst

Enc. Permit 7-3138-00301
cc: Tiffany Toukatly, DEC BEH
Johanna Duffy, Grete Day – B & L
US Army Corps of Engineers
Town Supervisor
File

PERMIT

Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:
ABUNDANT SOLAR POWER (M1) LLC

700 W METRO PARK

ROCHESTER, NY 14623
(202) 818-9194

Facility:
MANLIUS CLOSED LANDFILL SOLAR ARRAY
BOWMAN RD - S SIDE|0.28 MI W OF N BURDICK ST, OLD ERIE CANAL RUNS E TO W, S OF THE PROJECT SITE
MANLIUS, NY 13104

Facility Location: in MANLIUS in ONONDAGA COUNTY
Facility Principal Reference Point: NYTM-E: 416.429 NYTM-N: 4766.382
Latitude: 43°02'43.9" Longitude: 76°01'33.8"
Authorized Activity: Installation of associated electrical distribution lines, specifically the installation of four utility poles within the adjacent area of regulated NYS Class 2 Freshwater Wetland, SYE-22, in support of a solar PV array, all in accordance with approved plans and permit conditions herein.

Permit Authorizations

Freshwater Wetlands - Under Article 24
Permit ID 7-3138-00301/00001 (Freshwater Wetland ID SYE-22)
New Permit Effective Date: 5/11/2021 Expiration Date: 5/10/2026

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: KEVIN M BALDUZZI, Deputy Regional Permit Administrator
Address: NYSDEC Region 7 Headquarters
615 Erie Boulevard W
Syracuse, NY 13204 -2400

Authorized Signature: Kevin Balduzzi Date 05 / 11 / 2021

Permit Components

NATURAL RESOURCE PERMIT CONDITIONS

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

NATURAL RESOURCE PERMIT CONDITIONS - Apply to the Following Permits: FRESHWATER WETLANDS

1. **Conformance With Plans** All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or applicant's agent as part of the permit application. Such approved plans were prepared by Barton & Loguidice (Received 3/2/21).

2. **Failure to Meet Permit Conditions** Failure of the permittee to meet all the conditions of this permit is a violation of this permit and grounds for an order to immediately cease the permitted activity at the project site.

3. **Prior Approval of Changes** If the Permittee desires to make any changes in construction techniques, species to be planted, the site plan, any mitigation plan, scheduling or staging of construction, or any other aspect of this project, the Permittee shall submit a written request to the Regional Permit Administrator to make such proposed changes and shall not make such changes unless authorized in writing by the Department.

4. **Notify DEC 48 Hrs Prior to Work** The permittee or a representative must contact by telephone Tiffany Toukatly at (607) 753-3095 x 206 least 48 hours prior to the commencement of the project authorized herein.

5. **Invasive Species (Non-native Vegetation)** To prevent the unintentional introduction or spread of invasive species, the permittee must ensure that all construction equipment be cleaned of mud, seeds, vegetation and other debris before entering and leaving any approved construction areas within the state regulated freshwater wetland or its 100 foot adjacent area.

6. **Minimize Adverse Impacts to Wetlands, Wildlife, Water** All work must be performed in a manner which minimizes adverse impacts to wetlands, wildlife, water quality and natural resources.

7. **No Wetland Disturbance** There shall be no wetland disturbance while project is being developed and conducted.

8. **Timing of Wetland Work** Work shall occur in wetland and regulated adjacent areas when soils are dry enough to support equipment without forming ruts. Low ground pressure equipment is preferred. No equipment crossing or operating in standing water. If access is absolutely needed during/after a rain event or through softer soils where rutting is anticipated, wetland matting must be used.

9. **Install Erosion Controls** Before any soil is disturbed on the subject site, the permittee shall install erosion and sedimentation controls (such as silt fencing, sediment traps or settling basins) which are adequate to prevent erosion and sedimentation on and off-site. Such controls shall be maintained until no erosion is apparent and the vegetation cover adequately (80% or more) will prevent erosion and sedimentation on and off such site. Once the site is adequately stabilized, the erosion controls must be taken out. Before such controls are removed, the permittee shall remove all sediment that has accumulated at such controls.

10. **Fueling Equipment** All equipment, including pumps, must be fueled in a location at least 100 feet from the wetland. If any pump is operated closer than 100 feet from the wetland, it must be on an impervious surface with absorbents capable of containing any leakage of petroleum products. Any reportable leakage must be reported as per regulations. A spill kit must be on site to contain and clean up any leaks that may occur during work. Follow NYSDEC spills reporting procedure by contacting the NYS Spill Hotline: 1-800-457-7362. Any leakage not meeting reportable threshold must be immediately cleaned up and disposed of properly.

11. **Equipment and Materials Storage** Equipment must be stored in a location and manner that will prevent any leakage of deleterious substances from reaching the wetland. Erodible materials, if not used in the same day as delivery, will be contained by properly installed silt fence or strawbales.

12. **Seed and Mulch** All areas of disturbed soils shall be seeded and mulched with an appropriate conservation mix within two days of project completion, within two days of final grading, or by the expiration of the permit, whichever is first. If weather conditions are not favorable for successful plant growth, soil may be stabilized with straw mulch, an erosion control blanket or similar effective practice and seeding can take place as soon as weather conditions are favorable. Woody and native herbaceous vegetation will be planted to prevent erosion, according to plans submitted.

13. **Temporary Storage of Materials On Site** Excavated materials and/or fill materials if stockpiled shall be a sufficient distance from the wetland so that materials and or runoff may not re-enter the wetland. Stockpiles of erodible materials left on site longer than 48 hours shall be covered and contained by straw bales, silt fencing or by other effective method. Fill removed from the site must be effectively stabilized and disposed of in a manner that prevents it from directly or indirectly entering any water body, stream, or wetland area.

14. **No Material in Wetland or Adjacent Area** Any debris, fill, excavated material, brush or excess material from construction of this project shall not be disposed of in any wetland and adjacent area. Once the project is complete, all extra material must be removed from the site.

15. **Precautions Against Contamination of Waters** All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.

16. **State Not Liable for Damage** The State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.

17. **State May Order Removal or Alteration of Work** If future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or flood flows or endanger the health, safety or welfare of the people of the State, or cause loss or destruction of the natural resources of the State, the owner may be ordered by the Department to remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State, and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners, shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable and flood capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

18. **State May Require Site Restoration** If upon the expiration or revocation of this permit, the project hereby authorized has not been completed, the applicant shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may lawfully require, remove all or any portion of the uncompleted structure or fill and restore the site to its former condition. No claim shall be made against the State of New York on account of any such removal or alteration.

GENERAL CONDITIONS - Apply to ALL Authorized Permits:

1. **Facility Inspection by The Department** The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71- 0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

2. **Relationship of this Permit to Other Department Orders and Determinations** Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

3. **Applications For Permit Renewals, Modifications or Transfers** The permittee must submit a separate written application to the Department for permit renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing. Submission of applications for permit renewal, modification or transfer are to be submitted to:

Regional Permit Administrator
NYSDEC Region 7 Headquarters
615 Erie Boulevard W
Syracuse, NY13204 -2400

4. **Submission of Renewal Application** The permittee must submit a renewal application at least 30 days before permit expiration for the following permit authorizations: Freshwater Wetlands.

5. **Permit Modifications, Suspensions and Revocations by the Department** The Department reserves the right to exercise all available authority to modify, suspend or revoke this permit. The grounds for modification, suspension or revocation include:

a. materially false or inaccurate statements in the permit application or supporting papers;

b. failure by the permittee to comply with any terms or conditions of the permit;

c. exceeding the scope of the project as described in the permit application;

d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;

e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

6. **Permit Transfer** Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification
The permittee, excepting state or federal agencies, expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under Article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit
The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits
The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

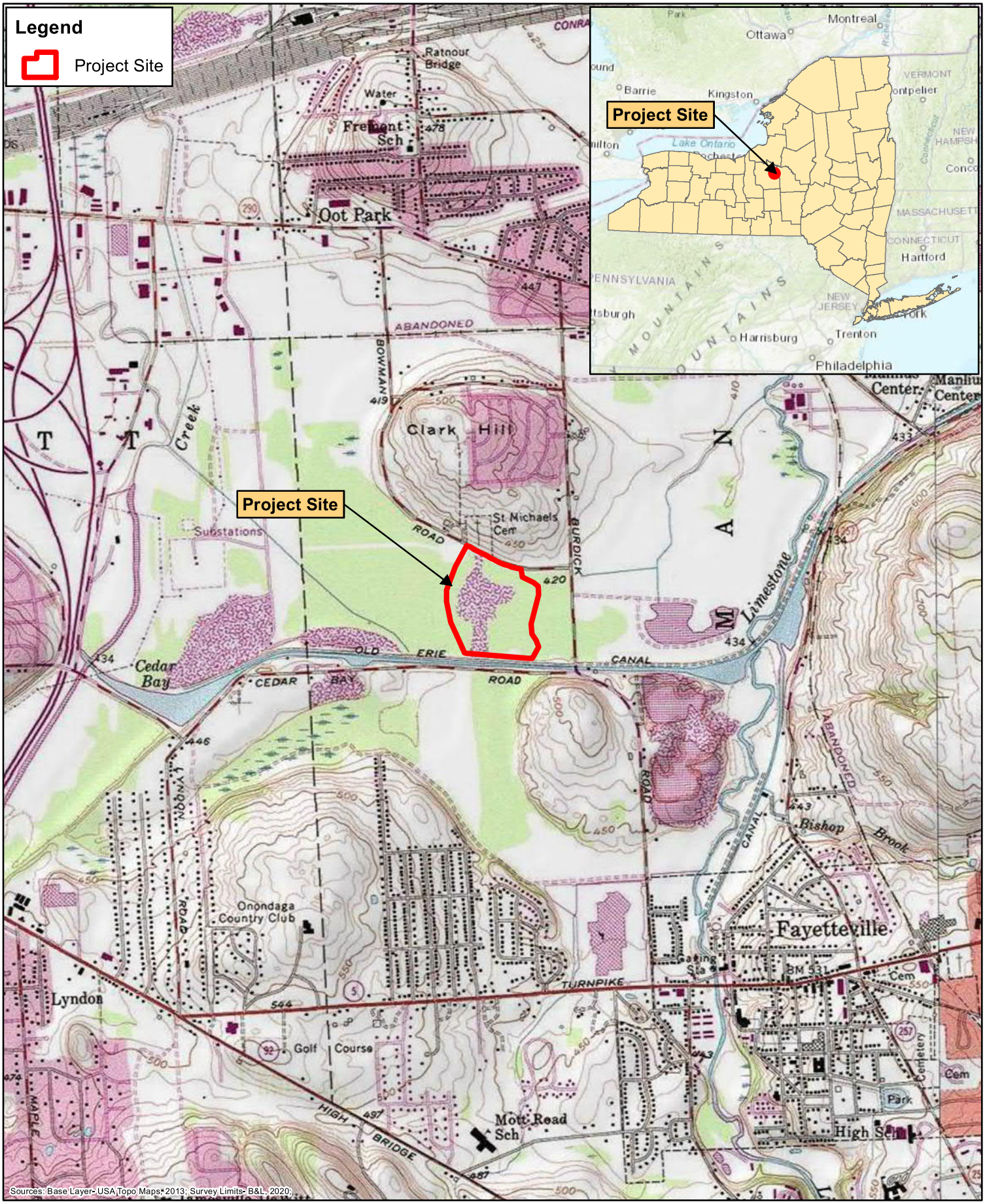
Item D: No Right to Trespass or Interfere with Riparian Rights
This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

Photograph 7: Upland area of landfill cap within NYSDEC Wetland SYE-22, photograph looking north.

Photograph 8: Bowman Road maintained roadside adjacent to Wetland A, photograph looking east.

Photograph 9: Paved access driveway to landfill, photograph looking south.

Photograph 10: Paved access driveway to landfill, photograph looking north.



Barton & Loguidice

0 1,000 2,000 4,000 Feet

Abundant Solar Power
Manlius Landfill Photovoltaic Array

Topographic Project Location Map

Onondaga County January 2021 New York

Figure 1

Project No. 2271.004

Path: K:\Projects\2200\2271\004\Projects\AP\2271.004_01 Figure 1 Topo.mxd

LEGEND

- PROPERTY BOUNDARY
- LIMITS OF DELINEATED WETLANDS
- 100 FOOT WETLAND OFFSET
- OPEN WETLAND BOUNDARY
- MAJOR CONTOUR
- MINOR CONTOUR
- GAS VENTING RISER
- MONITORING WELL
- MANHOLE
- PROPOSED SOLAR PANEL
- PROPOSED BALLAST FENCE
- PROPOSED OVERHEAD ELECTRIC
- PROPOSED UNDERGROUND ELECTRIC
- PROPOSED EQUIPMENT PAD

N

TRUE OR CALLED NORTH

SURVEY NOTE

1. BASE MAPPING COMPILED FROM NYSGIS CLEARING HOUSE PARCEL DATA, ORTHO IMAGERY, AND 2017 LIDAR DATASETS. INFORMATION FOR REFERENCE ONLY AND SHOULD BE CONSIDERED APPROXIMATE.

NOTES

1. EXISTING GROUNDCOVER SHALL BE MAINTAINED/REPLACED IN BETWEEN SOLAR PANELS TO MAINTAIN THE LANDFILL CAPPING SYSTEM INTEGRITY.
2. SOLAR ARRAY SHALL BE SET BACK 50 FEET FROM ROAD AND NOT EXCEED 20 FEET HEIGHT AS PER ZONING DISTRICT REQUIREMENTS.
3. LOT SIZE = 17.5 ACRES
4. SYSTEM SIZE = 6,247.5/5,000 (DC/AC) kW

TOWN OF MANLIUS CODE REQUIREMENTS

REQUIREMENT	CODE VALUE(MIN OR MAX)	PLAN VALUE
FRONT YARD SETBACK	50 Ft	235 Ft
SIDE YARD SETBACK	50 Ft	105 Ft
REAR YARD SETBACK	50 Ft	159 Ft
MAXIMUM HEIGHT OF ARRAY	20FT	9Ft

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, AND LAND SURVEYOR SHOULD STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION".

REVISIONS

ABUNDANT SOLAR POWER
TOWN OF MANLIUS LANDFILL SOLAR ARRAY

PROPOSED SOLAR LAYOUT

ONONDAGA COUNTY, NEW YORK

TOWN OF MANLIUS

Barton & Loguidice

STATE OF NEW YORK
DAVID W. HUTCHINS
080201
PROFESSIONAL ENGINEER

Date: DECEMBER 2020

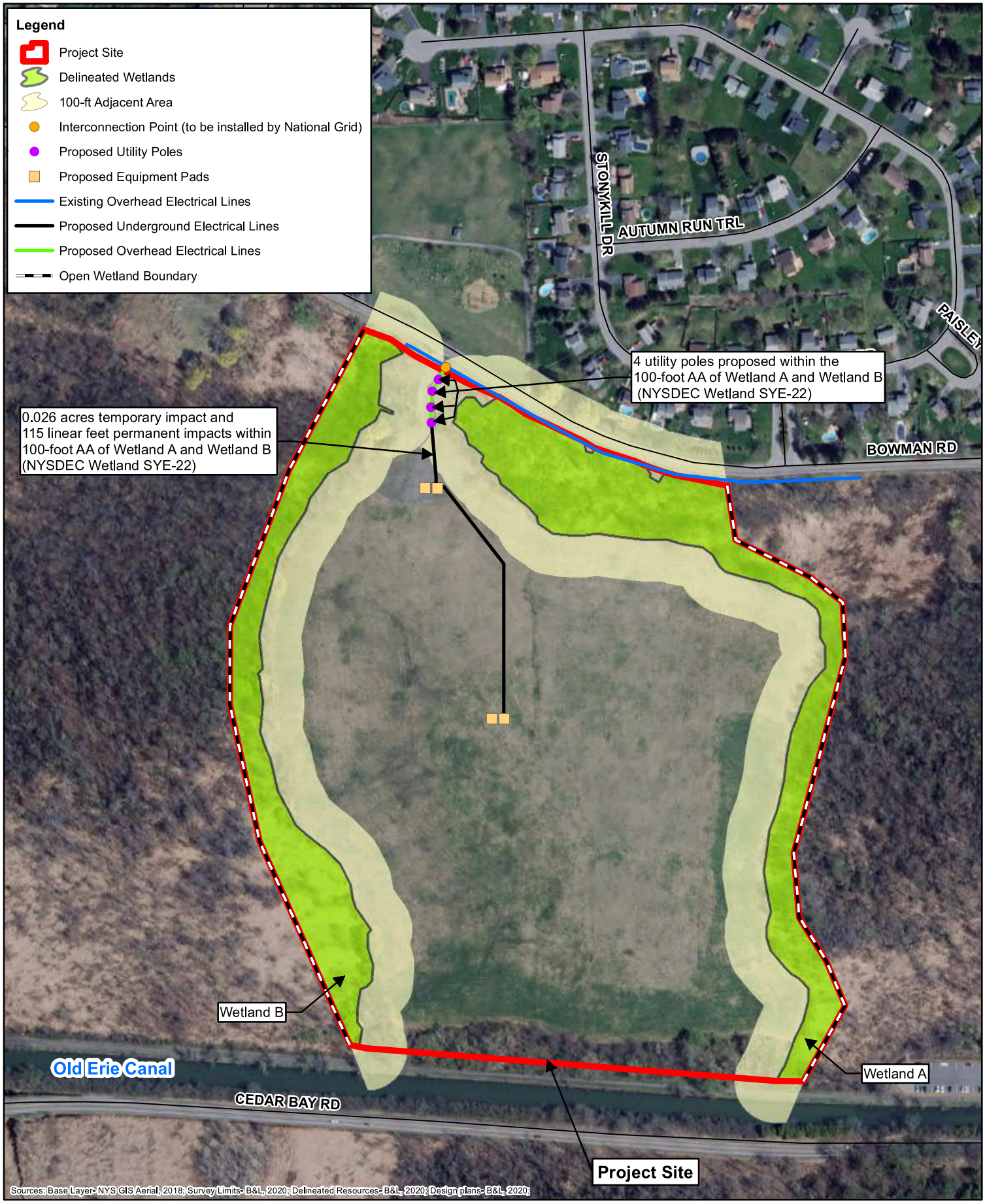
Scale: 1" = 120'

Sheet Number: **FIGURE 2**

File Number: 2271.004.001

Checked by CWH Drawn by TSC Designed by ZTP In charge of CJM

Plotted: Dec 22, 2020 – 2:38PM SYR By: JDS
Z:\JB-Vol\D2\18271422-1C71-4823-8927-9B25C4D54147\U\2216000-2216999\2216434\U\L\2271.004.001 Manlius Solar Array Proposed Plan (03 2216434).dwg



Barton & Loguidice

N W E S

0 150 300 600 Feet

Abundant Solar Power
Manlius Landfill Photovoltaic Array

Proposed Impacts

Onondaga County January 2021 New York

Figure 3

Project No. 2271.004

Exhibit G

TOWN OF MANLIUS

SPECIAL PERMIT APPLICATION – EXHIBIT "G"

PROFESSIONAL FEES REIMBURSEMENT AGREEMENT

As a condition of the application(s) to the Town of Manlius, its Zoning Board of Appeals, Planning Board, codes administration/planning office, and/or Town Board (the "Town") for various zoning, land use, construction and related reviews, approvals, certificates, permits and related consideration(s) (including for any local governmental assisted funding) related to the request of Abundant Solar Power (MI) LLC : (the "Application"), _____ [name], 700 West Metro Park Rochester NY 14623 [legal address] ("Applicant") relative to proposed development at 5701 Bowman Rd [project address], Tax Parcel # 074.-01-06.1, Manlius, New York, and related matters (the "Project") agrees as follows:

The Application and Project may or will likely entail that the Town incur legal, engineering, architectural, administrative and related expense(s) including, without limitation, for both on staff and third party consultants involved in the consideration of the Application and Project, and including, without limitation, attendance at Zoning Board of Appeals, Planning Board, and Town Board meetings, consultation with the Applicant, its or the Town's engineer, architect, attorney, and/or other Town officers and employees, or consultants or professional service providers, incidental to the Application from the earlier of the filing of the Application for and/or first presentation of the Project to Town, and through final completion and issuance of all Town and other governmental permits, certifications and approvals.

In connection with and consideration of the foregoing, Applicant agrees to bear all cost and expense for such administrative, legal, engineering, architect and other professional and consulting assistance to the Town incidental to the Application and Project, and including that expense incurred by the Town for Town employees and officers performing reasonable and necessary work on behalf of the Town incident to the Application or Project.

In connection with the foregoing, Applicant shall reimburse the Town for time spent by outside consultants and professionals at the usual rate charged by them to private clientele, or if none, then the usual rate charged to municipalities. Reimbursement for the cost of Town employees and officers shall be based upon the cost to Town for the services of such persons, including salary and fringe benefits, reduced to an hourly rate and including overtime where directly attributable to the Application or Project.

Should the Town determine, in its sole discretion, that additional services are required to represent, supervise, inspect, evaluate and/or consult, including in order to protect the rights and/or interests of the Town such as relative to an enforcement or violation proceeding, the Applicant shall likewise bear all costs associated with such services.

This Agreement shall be effective as of Oct 1st, 2021 The Applicant shall deposit an initial sum of $_____, and such other amounts as from time to time the Town may determine, payable to and deposited with the Town and which sum or sums shall be applied against those sums reimbursable to the Town pursuant to the terms of this Agreement (the "Deposit"). Upon completion or discontinuance of the Application and Project and payment of all fees incurred, any unused Deposit shall be returned to the Applicant.

The Applicant shall receive periodically, one or more statements detailing charges for which reimbursement has been made against the Deposit, detailing unpaid amounts, if any, and setting forth any additional Deposit required by the Town. Failure to pay any amounts due the Town of Manlius within twenty (20) days of the date of statement may result in the termination of work/services by Town relative to the Application, the non-issuance suspension or revocation of any certificates, permits or approvals, and/or denial of applications, the Town's commencement of collection efforts, and/or the exercise of any other rights or remedies available to Town hereunder or pursuant to applicable law, including under the Town Code. No certificates, approvals or permits, including, without limitation, Certificates of Occupancy/Compliance, may be issued until all fees due hereunder are paid or sufficient Deposit for same made.

Notwithstanding any provision hereof to the contrary or otherwise, the intent of this Agreement is to subject all of those subject matter areas under applicable provisions of Federal, State, and County laws, rules and regulations whatsoever, the Town Code including as any of same may be amended from time to time, and without limitation, those provisions under Chapters 59, 63, 72, 83, 95, 96, 104, 119, 123, 125, 126, 127, 131, 147, and 155 of the Town Code to the provisions hereof; in addition any financing or funding applications incidental to the Application or Project and requiring sponsorship or support of Town, and review under the State Environmental Quality Review Act or other State or Federal environmental, historical or related laws, rules or regulations shall likewise be subject to the provisions hereof.

In addition, and notwithstanding any provisions hereof to the contrary or otherwise, any provisions of the Town Code or other laws, rules or regulations providing rights more favorable to and protective of Town shall be deemed incorporated herein by reference, and shall not be deemed superseded by less protective provisions herein.

In the event of a breach or default by Applicant, Town shall be entitled to pursue any and all legal rights and remedies pursuant to applicable law including, without limitation, the Town Code and shall be entitled to recover, in addition to any sums due, reasonable attorney's fees, costs and disbursements incurred in any such efforts.

If any part of this Agreement or the application thereof to any person or entity or circumstance is adjudged invalid, illegal or unconstitutional by any court of competent jurisdiction, such order or judgment shall be confined in its operation to the part of this law or in its application directly involved in the controversy in which such judgment shall have been rendered and shall not affect or impair the validity of the remainder of this Agreement or the application thereof to other persons, entities or circumstances. Further, in adjudging such invalid, illegal or unconstitutional provision or part thereof, the court shall attempt to modify same to a provision or part which is not illegal, invalid or unconstitutional and which best achieves the intent of such illegal, invalid or unconstitutional provision or part thereof.

The Town Supervisor has executed this agreement pursuant to a blanket Resolution adopted by the Town Board at a meeting thereof held on _____, 20__, and is duly authorized and empowered to execute this instrument and enter into this Agreement on behalf of the Town of Manlius.

In the event Applicant is a closely held corporation, partnership or limited liability company, its three (3) largest principals shall be signatories to this Agreement, as joint and severable parties with Applicant and Town.

This instrument shall be executed in triplicate. At least one original shall be permanently filed, after execution thereof, in the office of the Town Clerk and one in the Code Enforcement Office.

Dated: Oct 1 '21 Abundant Solar Power (MI) LLC

Print Applicant Name **Applicant's Authorized Signature/Title**

Applicant Address: 700 West Metro Park
Rochester, NY 14623-2678

Richard Lu

Print Applicant (Principal) Name **Applicant's Principal Signature**

Print Applicant (Principal) Name **Applicant's Principal Signature**

Print Applicant (Principal) Name **Applicant's Principal Signature**

TOWN OF MANLIUS

By: _____

Name: _____

Title: _____

dd/2017

Exhibit H

TOWN OF MANLIUS

DISCLOSURE AFFIDAVIT

This affidavit is a part of and must be completed and attached to every application, petition, request submitted for a *site plan, variance, amendment, change of zoning, approval of a plat, exemption from a plat or official map, license* or *permit.*

STATE OF NEW YORK)
) SS:
COUNTY OF ONONDAGA)

I. Richard Lu, being duly sworn, deposes and says that (s) he is:

the applicant
(applicant, petitioner, corporation officer, property owner, *etc.)*

II. That deponent has read and is familiar with the provisions of the General Municipal Law, Section 809 which states:

A. Every application, petition or request submitted for a site plan, variance, amendment, change of zoning, approval of a plat, exemption from a plat or official map, license or permit, pursuant to the provisions or any ordinance, local law, rule or regulation constituting the zoning and planning regulations of a municipality shall state the name, residence and the nature and extent of the interest of any state officer or any officer or employee of such municipality is a part, in the person, partnership or association making such application, petition or request (hereinafter called the applicant) to the extent known to such applicant.

B. For the purpose of this action an officer or employee shall be deemed to have an interest in the applicant when (s)he, his/her spouse, or their brothers, sisters, parents, children, grandchildren, or the spouse of any of them:

1) is the applicant, or
2) is an officer, director, partner or employee of the applicant, or
3) legally or beneficially owns or controls stock of a corporate applicant or is a member of a partnership or association applicant, or
4) is a party to an agreement with such an applicant, express or implied, whereby (s) he may receive any payment or other benefit, whether or not for services rendered, or contingent upon the favorable approval of such application, petition or request.

C. Ownership of less than five percent (5%) of the stock of a corporation whose stock is listed on the New York or American Stock Exchanges shall not constitute an interest for the purposes of this section.

D. A person who knowingly and intentionally violates this section shall be guilty of a misdemeanor.

III. That no Town of Manlius officer, employee or a relative of either, as defined in Section 809 General Municipal Law has any interest in this application.

-OR-

If a Town of Manlius officer, employee or relative of either as defined in Section 809 General Municipal law has any interest in this application, the full particulars are provided on an attached sheet.

Date: Oct 5th, 2021.

Richard Lu
(Print Name)

(Signature)

Abundant Solar Power (MI) LLC
(Entity Name)

By (Officer) (Title)

700 W. Metrowalk, Rochester, NY
(Mailing Address of Applicant)

416 264-3880
(Telephone Number)

Date: _____, 20____.

(Print Name)

(Signature)

(Entity Name)

By (Officer) (Title)

(Mailing Address of Applicant)

(Telephone Number)

ACKNOWLEDGEMENTS

Province of Ontario
~~STATE OF NEW YORK~~)
City of Mississauga) SS:
COUNTY OF ONONDAGA)

On this 5th day of October in the year 2021, before me, the undersigned, a notary public in and for said state, personally appeared _____, and Richard Lu personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within Petition and acknowledged to me the he/she/they executed the same in his/her/their capacity, and that by his/her/their signature(s) on the Petition, the individual or the persons upon behalf of which the individual acted executed the instrument.

Macaw
Notary Public 46936I

CORPORATE ACKNOWLEDGEMENT

STATE OF NEW YORK)
) SS:
COUNTY OF ONONDAGA)

Richard Lu, being duly sworn, deposes and says the s(he) is the Director of Abundant Solar Power (MI) LLC corporation named in the within Application/Petition, that s(he) has read the foregoing affidavit and knows the contents thereof; that the same is true of s(he) own knowledge, except as to those matters therein stated to be alleged upon information and belief, and as to those matters s(he) believes it to be true.

Applicant Signature

Subscribed to me before this 5th day
Of October, 2021

Notary Public 46936I

06/29/16 LB

Exhibit I

Barton & Loguidice

October 4, 2021

Town of Manlius Planning Board
301 Brooklea Drive
Fayetteville, New York 13066

Subj: Town of Manlius Landfill

Re: Photovoltaic Array

File: 2271.004.001

Dear Planning Board Members:

Abundant Solar Power, a division of Abundant Solar Energy, is proposing the construction of a 4.35 MW (AC) Photovoltaic Array on the existing closed Town of Manlius Landfill, located approximately 1,525 feet west of the Bowman Road – North Burdick Street intersection. Abundant Solar Power is required to provide a decommissioning plan to be implemented upon cessation of activity as defined in the narrative, or in conjunction with the removal of the facility.

Abundant Solar Power proposes the attached Decommissioning narrative and figure (Figure 1) for review by the Planning Board. A decommissioning quote for the decommissioning phase has been provided as Attachment A of this document.

We look forward to the opportunity to discuss the proposed decommissioning plan with the Town and answer any questions that the Planning Board may have.

If you have any questions or require any additional information, please do not hesitate to contact me.

Sincerely,

BARTON & LOGUIDICE, D.P.C

Jillian M. Blake, P.E.
Senior Managing Engineer

JMB2/
Attachments

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Decommissioning Narrative

Decommissioning of the solar array at the Manlius Landfill shall occur when any of the following conditions arise:

- Construction of the array system is not completed within 18 months after receiving the final site plan approval, unless an extension is approved by the Town.
- Cessation of activity of the constructed facility for a total period of one year.
- The solar array is determined inoperable and will not be repaired or replaced.

The operator of the facility shall perform the following tasks, at a minimum, in order to decommission the solar array.

Pre-Demolition:

- Obtain a demolition permit from the Town of Manlius.

Phase 1:

- Remove and dispose of the main switch gear and transformer.
- Disconnect, remove and salvage solar modules, remove and dispose of solar table and foundations as directed by the owner.
- Remove and Dispose of double swing chain link security gate with facility ID sign.
- If needed, remove and dispose of gravel access drive.
- If landscaping is existing, it shall remain existing.

Phase 2:

- Perform a cap study/inspection to ensure that no damage has occurred to the cap during decommissioning.
- Restore the site surface grades and soils after removal of equipment, to the extent possible, to the condition which existed prior to the installation of the Solar Array.
    - Seed mix for reseeding shall conform to New York State Standards and Specifications for Erosion and Sediment Control, Table 4.4.

The operator shall adhere to the following schedule, to implement the decommissioning of the Solar Array system.

- If the solar array does not generate electrical energy for a period of 12 months, the facility operator has 30 days to do one of the following:
    - Restore the Solar Array to an operational status, equal to a minimum of 80% capacity.
    - Implement the decommissioning plan.
- Failure to fully implement the decommissioning plan within the 30 day timeframe with result in the following:
    - The Town of Manlius will, at its discretion, provide for the restoration of the site in accordance with the approved decommissioning plan.
    - The Town of Manlius shall recover all expenses incurred for decommissioning activities from the Owner/Operator of the Solar Array as described below.

Financial Assurance

As financial assurance of the decommissioning costs of the facility, the owner/operator of the facility shall obtain a payment surety bond in the amount of $130,955, which is representative of the current decommissioning cost estimate. This cost estimate shall be reevaluated every five (5) years and the surety amount adjusted accordingly, if necessary. Under the terms of the bond, the surety will become liable on the bond obligation if the owner/operator fails to perform as described above.

Figure 1

LEGEND

- PROPERTY BOUNDARY
- LIMITS OF DELINEATED WETLANDS
- 100 FOOT WETLAND OFFSET
- OPEN WETLAND BOUNDARY
- MAJOR CONTOUR
- MINOR CONTOUR
- APPROXIMATE LOCATION OF GAS VENTING RISER
- MONITORING WELL
- MANHOLE
- PROPOSED SOLAR PANEL
- PROPOSED BALLAST FENCE
- OHE — PROPOSED OVERHEAD ELECTRIC
- UGE — PROPOSED UNDERGROUND ELECTRIC
- PROPOSED EQUIPMENT PAD

N

TRUE OR CALLED NORTH

SURVEY NOTE

1. BASE MAPPING COMPILED FROM NYSGIS CLEARING HOUSE PARCEL DATA, ORTHO IMAGERY, AND 2017 LIDAR DATASETS. INFORMATION FOR REFERENCE ONLY AND SHOULD BE CONSIDERED APPROXIMATE.

NOTES

1. SOLAR ARRAY LOCATION SHOWN SHOULD BE CONSIDERED APPROXIMATE AND SHALL BE CONFIRMED BY FIELD CONDITIONS.
2. EXISTING GROUNDCOVER SHALL BE MAINTAINED/REPLACED IN BETWEEN SOLAR PANELS TO MAINTAIN THE LANDFILL CAPPING SYSTEM INTEGRITY.
3. SOLAR ARRAY SHALL BE SET BACK 40 FEET FROM ROAD AND NOT EXCEED 20 FEET HEIGHT AS PER ZONING DISTRICT REQUIREMENTS.
4. LOT SIZE = 17.5 ACRES
5. SYSTEM SIZE = 5,435/4,350 (DC/AC) kW

TOWN OF MANLIUS CODE REQUIREMENTS

REQUIREMENT	CODE VALUE(MIN OR MAX)	PLAN VALUE
FRONT YARD SETBACK	50 Ft	235 Ft
SIDE YARD SETBACK	50 Ft	105 Ft
REAR YARD SETBACK	50 Ft	120 Ft
MAXIMUM HEIGHT OF ARRAY	20FT	9Ft

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION".

REVISIONS

ABUNDANT SOLAR POWER
TOWN OF MANLIUS LANDFILL SOLAR ARRAY

PROPOSED SOLAR LAYOUT

ONONDAGA COUNTY, NEW YORK

TOWN OF MANLIUS

Barton & Loguidice

Date: OCTOBER 2021

Scale: 1" = 120'

Sheet Number: FIGURE 1

File Number: 2271.004.001

Checked by: CWH Drawn by: TSC Designed by: ZTP In charge of: CJM

Figure 2

LEGEND

- PROPERTY BOUNDARY
- LIMITS OF DELINEATED WETLANDS
- 100 FOOT WETLAND OFFSET
- OPEN WETLAND BOUNDARY
- MAJOR CONTOUR
- MINOR CONTOUR
- APPROXIMATE LOCATION OF GAS VENTING RISER
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NOTES

1. SOLAR ARRAY LOCATION SHOWN SHOULD BE CONSIDERED APPROXIMATE AND SHALL BE CONFIRMED BY FIELD CONDITIONS.
2. ANY EXISTING LANDSCAPING SHALL REMAIN.
3. FOLLOWING REMOVAL OF SOLAR ARRAY, A CAP STUDY/INVESTIGATION SHALL BE PERFORMED TO IDENTIFY ANY LEAKS OR PIERCINGS WITHIN THE CAPPING SYSTEM THAT MAY HAVE AROSE DURING DECOMMISSIONING.
4. THE SITE SHALL BE GRADED AND SEEDED BACK TO THE CONDITIONS PRIOR TO INSTALLATION.

1"=120' 120' 0 120' 240'

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REVISIONS

ABUNDANT SOLAR POWER
TOWN OF MANLIUS LANDFILL SOLAR ARRAY

PROPOSED SOLAR DECOMMISSIONING PLAN

TOWN OF MANLIUS — ONONDAGA COUNTY, NEW YORK

Barton & Loguidice

Date	OCTOBER 2021
Scale	1" = 120'
Sheet Number	FIGURE 2
File Number	2271.004.001

Plotted: Oct 01, 2021 – 2:13PM SYR By: gmeyerson
Z:\BL-Vault\02\18217A02-1C71-4823-8927-99050405414F\0\2217000-2217999\2217086\L\L\2271.004.001 Manlius Solar Array DecommissioningPlan (ID 2217086).dwg

Checked by _____ Drawn by TSC Designed by ZTP In charge of CJM

Attachment A

Manlius Landfill Solar Array Decommissioning Cost Estimate	
Task*	**NYSERDA (4.35 MW)**
Remove Rack Wiring	$ 5,348.33
Remove Panels	$ 5,328.75
Dismantle Racks	$ 26,861.25
Remove Electrical Equipment	$ 4,023.75
Breakup and Remove Concrete Pads or Ballasts	$ 3,262.50
Remove Racks	$ 16,965.00
Remove Cable	$ 14,137.50
Remove Ground Screws and Power Poles	$ 30,123.75
Remove Fence	$ 10,766.25
Grading	$ 8,700.00
Seed Distributed Areas	$ 543.75
Truck to Recycling Center	$ 4,893.75
Current Total	**$ 130,954.58**
Total After 20 Years (2.5% Inflation)	**$ 209,350.56**

*= Tasks and costs are taken from the NYSERDA guide for "Decommissioning Solar Panel Systems"

Decommissioning Fund		
Time Frame (year)	Bond Value Increase	Minimum Cumulative Bond Value
1	$130,954.58	$130,954.58
2	$3,273.86	$134,228.44
3	$3,355.71	$137,584.15
4	$3,439.60	$141,023.75
5	$3,525.59	$144,549.35
6	$3,613.73	$148,163.08
7	$3,704.08	$151,867.16
8	$3,796.68	$155,663.84
9	$3,891.60	$159,555.43
10	$3,988.89	$163,544.32
11	$4,088.61	$167,632.93
12	$4,190.82	$171,823.75
13	$4,295.59	$176,119.34
14	$4,402.98	$180,522.33
15	$4,513.06	$185,035.39
16	$4,625.88	$189,661.27
17	$4,741.53	$194,402.80
18	$4,860.07	$199,262.87
19	$4,981.57	$204,244.44
20	$5,106.11	$209,350.56
21	$5,233.76	$214,584.32
22	$5,364.61	$219,948.93
23	$5,498.72	$225,447.65
24	$5,636.19	$231,083.84
25	$5,777.10	$236,860.94
26	$5,921.52	$242,782.46
27	$6,069.56	$248,852.02
28	$6,221.30	$255,073.32
29	$6,376.83	$261,450.16
30	$6,536.25	$267,986.41