KA
KEYSTONE
ASSOCIATES
ARCHITECTS, ENGINEERS AND SURVEYORS, LLC
Also Doing Business As (DBA):
HAWK
ENGINEERING

TRANSMITTAL

To: Town of Cortlandville Planning & Zoning
The Raymond G. Thorpe Municipal Building
3577 Terrace Road
Cortland, New York 13045

Attn: Mr. Bruce Weber

Project: Lime Hollow Solar

Project #: 2850.24418.5

Date: February 12, 2019

Quantity	Date	Description
5	12/18/18	Original Submittal Package with 11x17 drawings
2	2/12/19	Full Size Submittal drawings
10	2/12/19	11x17 Size submittal drawings
1	2/12/19	SWPPP

This is transmitted as checked below:

x For approval
___ For your use
___ For review & comment
___ As requested
___ No Exception Taken
___ Furnish as Corrected
___ Revise and Resubmit
___ For immediate action
___ Reviewed
___ Rejected
___ Submit Specified Item
___ Prints returned after loan to us

Remarks:

As discussed, please find the above listed documents for sketch plan consideration at the February 19, 2019 meeting.

Thank you.

Copy To: file

Signed: Paul T. Woodward, Senior Designer

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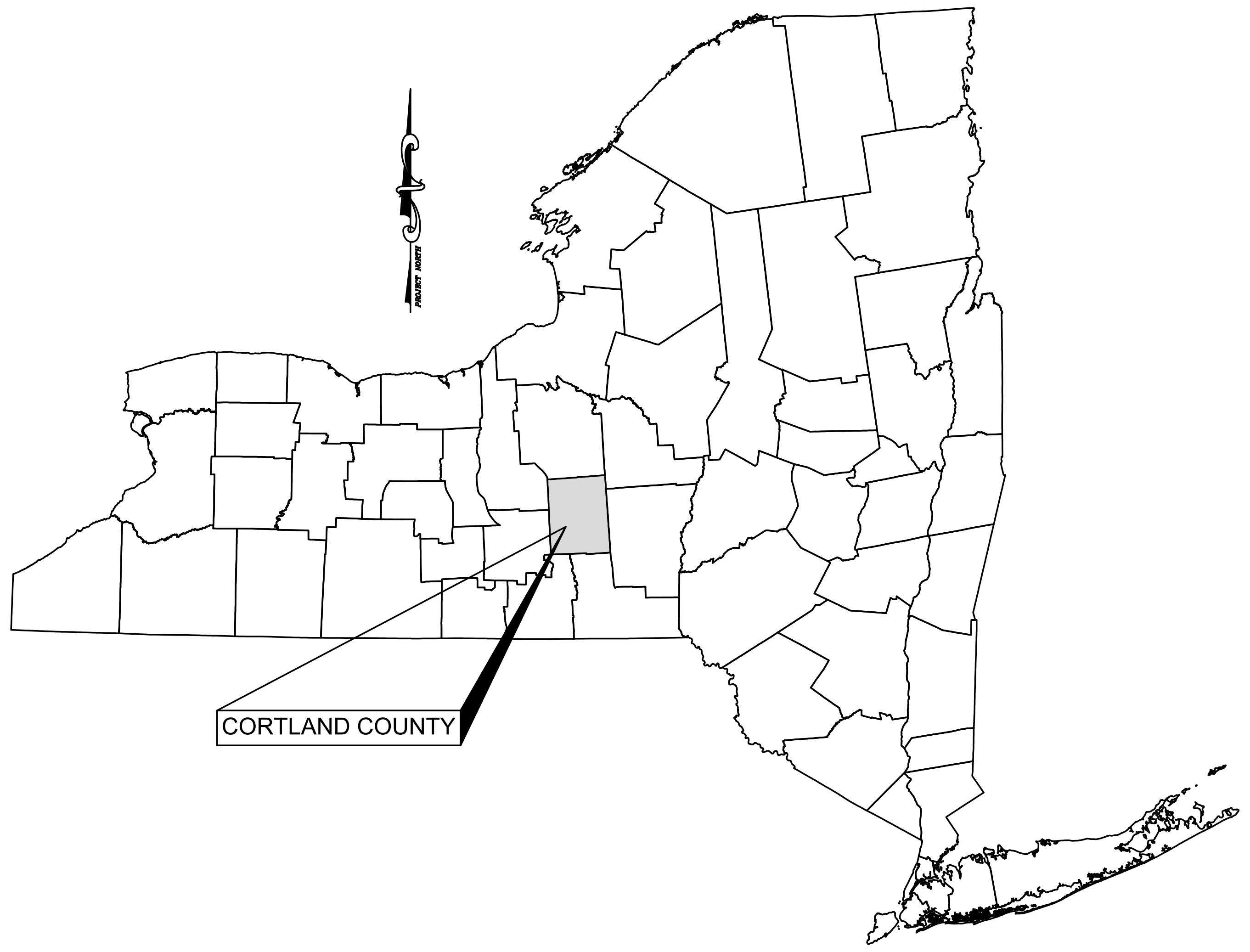
E-mail: info@keyscomp.com • Web: www.keyscomp.com



SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD

TOWN OF CORTLANDVILLE

COUNTY OF CORTLAND
STATE OF NEW YORK

APPLICANT/DEVELOPER:

LIME HOLLOW SOLAR, LLC
55 5TH AVENUE, FLOOR 13
NEW YORK, NEW YORK 10003

INDEX OF DRAWINGS

LOCATION MAP
SCALE 1" = 2000'

DRAWINGS PREPARED BY

KEYSTONE
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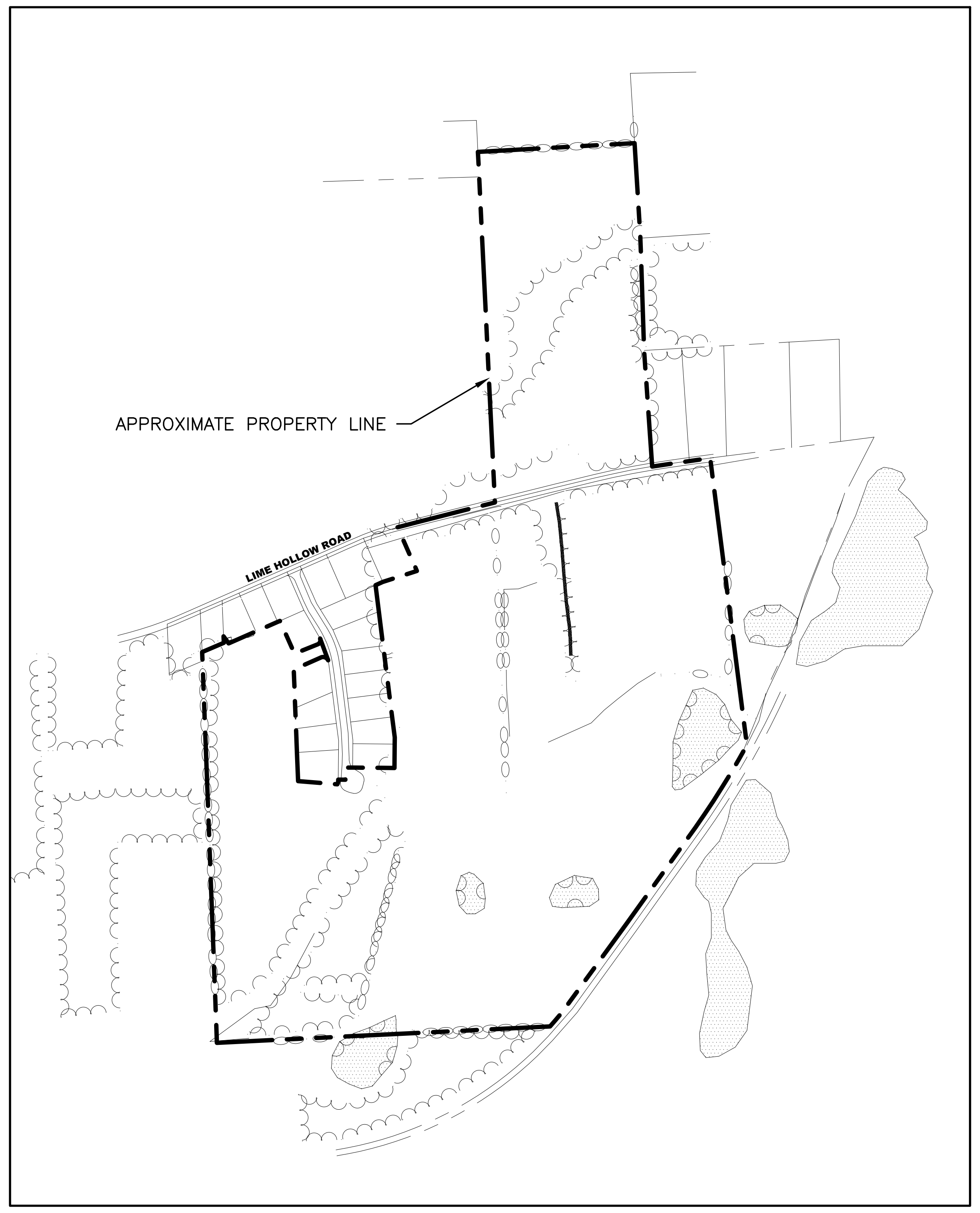
PROJECT NO. 2850.24418.5
DECEMBER 18, 2018
REVISED: FEBRUARY 12, 2019

MARK W. PARKER, P.E. LIC. No. 093972
ALTERATIONS NOT CONFORMING TO SECTION 7209, SUBDIVISION 2, NEW YORK STATE EDUCATION LAW ARE PROHIBITED BY LAW.



OVERALL PROPERTY MAP

1" = 500'

TRUE NORTH
76°35' MERIDIAN
WEST LONGITUDE

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

⊕	BENCHMARK (NAVD 88)
⊙	MONUMENT FOUND AND NOTED
N/F	NOW OR FORMERLY
TM#	TAX MAP NUMBER
━ ━ ━	PROPERTY LINE
– – –	TAX MAP LINES
⌐○	UTILITY POLE WITH LIGHT
-○-	UTILITY POLE
—— OHW ——	OVERHEAD UTILITIES
🄲	CABLE PEDESTAL
□	CATCH BASIN
HYD	FIRE HYDRANT
	SPOT ELEVATION

NOTES

1. FIELD SURVEY WAS COMPLETED ON DECEMBER 11, 2018.
2. HORIZONTAL DATUM IS REFERENCED TO NEW YORK STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83.
3. VERTICAL DATUM IS REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988.
4. AT THE TIME OF THE SURVEY THERE WAS APPROXIMATELY 5 INCHES OF SNOW ON THE GROUND.

ALL UNDERGROUND UTILITIES ARE APPROXIMATE.

UNDERGROUND UTILITY LOCATIONS MARKED BY UTILITY OWNERS PER A "DESIGN TICKET" CALLED IN TO "DIG SAFELY NEW YORK" PRIOR TO FIELD SURVEY HAVE BEEN SHOWN.

THE USER OF THIS MAP IS CAUTIONED THAT THE UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED, NOR IS THERE ANY GUARANTEE THAT ALL EXISTING UTILITIES WHETHER FUNCTIONAL OR ABANDONED WITHIN THE PROJECT AREA ARE SHOWN ON THIS DRAWING.

THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES BEFORE STARTING WORK & SHALL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM HIS WORK. CONTRACTOR SHALL NOTIFY DIG SAFELY NY (FORMERLY UFPO) 1-800-962-7962 IN ACCORDANCE WITH 16 NYCRR PART 753.

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WARNING:
It is a violation of Section 7209, Subdivision 2, of the New York State Education Law for any person unless acting under the direction of a Licensed Professional Architect, Engineer , or Surveyor to alter In any way; any plans, specifications, plats or reports to which the seal of a Professional Architect, Engineer or Surveyor has been applied.

NO.	REVISIONS AND DESCRIPTIONS	DATE:
1	SOLAR ARRAY PANEL PLAN	2/12/19

SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY

EXISTING SITE CONDITIONS

SHEET NO.
C010

PROJECT NO.
2850.24418.5

DATE: 12/18/18

CAD FILE NO.: 285024418_5_Site.dwg

LEGEND

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◉	MONUMENT FOUND AND NOTED
N/F	NOW OR FORMERLY
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⊙	UTILITY POLE WITH LIGHT
⊙	UTILITY POLE
—OHW—	OVERHEAD UTILITIES
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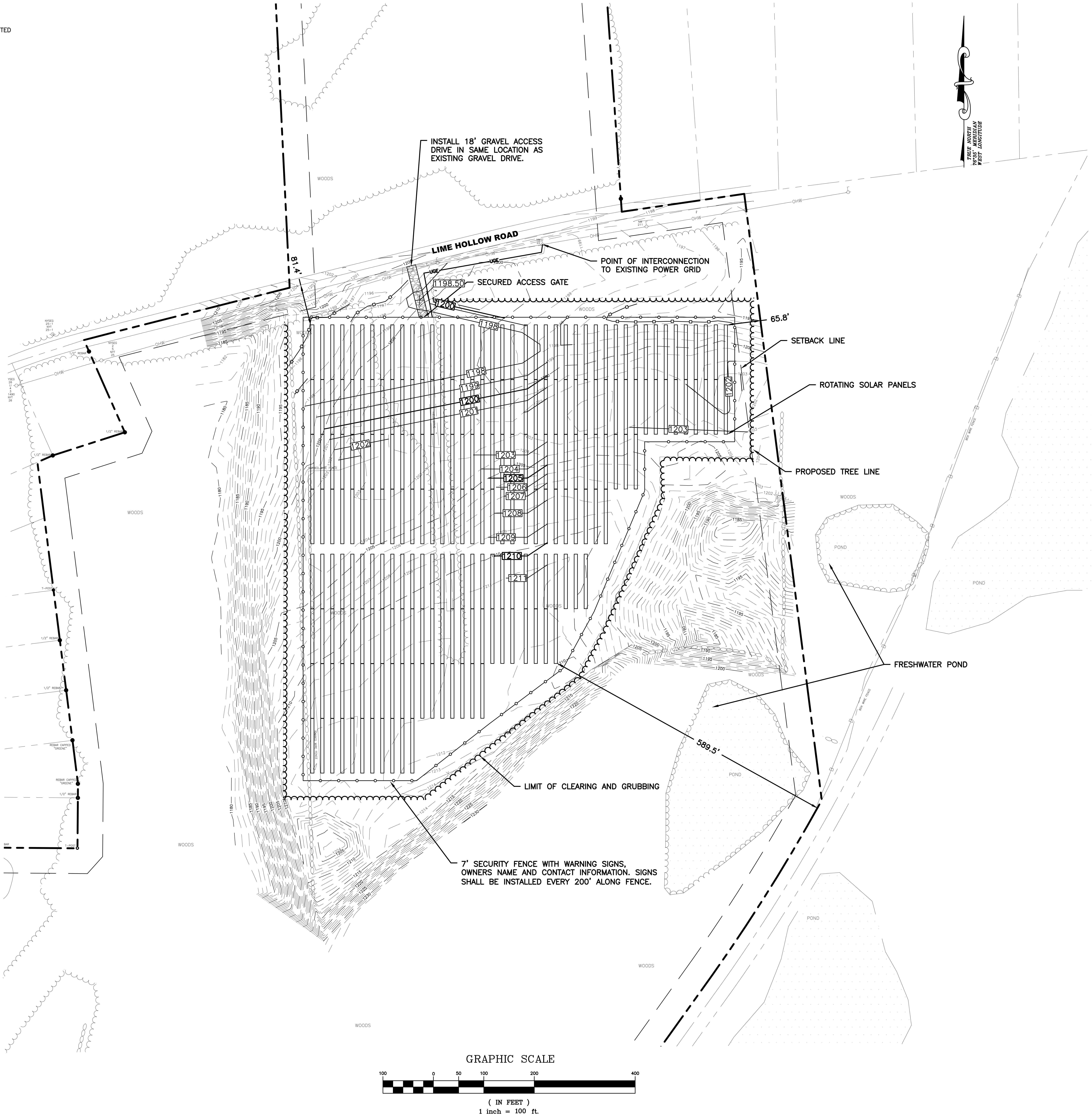
HYD	FIRE HYDRANT
	SPOT ELEVATION



ZONING NOTES

ZONING DISTRICT: I-1
USE: GROUND-MOUNTED LARGE-SCALE SOLAR ENERGY SYSTEM

	ZONING REQUIRED	SOLAR REQUIRED	ACTUAL
MINIMUM LOT SIZE:	NONE	NONE	106.3 AC
MINIMUM LOT FRONTAGE:	50 LF	50 LF	1341.0 LF
MAXIMUM LOT COVERAGE:	70%	70%	12.36%
MINIMUM YARD DIMENSIONS:			
PRINCIPAL:			
FRONT	50 LF	N/A	N/A
REAR	40 LF	N/A	N/A
SIDE	12 LF	N/A	N/A
ACCESSORY:			
FRONT	N/A	50 LF	81.4 LF
REAR	N/A	50 LF	589.5 LF
TO PRINCIPAL	N/A	N/A	N/A
SIDE	N/A	50 LF	65.8 LF
MAXIMUM STRUCTURE HEIGHT:	NONE	20 FT	12 FT

TOTAL ACREAGE OF PROJECT:	± 15.77 ACRES
TOTAL ACREAGE TO BE DISTURBED:	± 15.77 ACRES

GENERAL NOTES

1) CONTRACTOR SHALL NOT PROCEED WITH ANY CONSTRUCTION WORK PRIOR TO FINAL APPROVAL OF ALL PLANS AND SECURING OF ALL PERMITS.

2) CONTRACTOR SHALL PROVIDE CONSTRUCTION/PROTECTIVE FENCING OR OTHER MEANS NECESSARY TO PROTECT WORK AND TO ENSURE THE SAFETY OF PEDESTRIAN AND VEHICULAR TRAFFIC DURING CONSTRUCTION.

3) CONTRACTOR TO COMPLY WITH ALL O.S.H.A. AND OTHER STATE AND LOCAL SAFETY REQUIREMENTS DURING CONSTRUCTION. (PROPER SHORING, ETC.)

4) THE CONTRACTOR SHALL PROTECT AND SUSTAIN IN NORMAL SERVICE ALL EXISTING UTILITIES, STRUCTURES, EQUIPMENT, ROADWAYS AND DRIVEWAYS.

5) ELECTRIC AND GAS INSTALLATION AND CONNECTIONS TO BE IN ACCORDANCE WITH UTILITY COMPANY REGULATIONS AND REQUIREMENTS.

6) THE CONTRACTOR SHALL FILL IN, AND THEN RE-EXCAVATE AS NECESSARY TO RESUME WORK, ANY EXCAVATIONS OR TRENCHES AT LOCATIONS AND AS OFTEN AS MAY BE REQUIRED TO ENSURE PROTECTION OF THE WORK, ANY ADJACENT EXISTING FACILITIES, OR THE PUBLIC.

7) THE CONTRACTOR SHALL CLEAN UP THE JOB SITE ON A DAILY BASIS BEFORE LEAVING THE JOB. ALL RUBBISH MUST BE CLEANED UP AND CONSTRUCTION EQUIPMENT MUST BE PROPERLY TAKEN CARE OF AND STORED AT THE END OF THE DAY.

8) CONTRACTOR SHALL RESTORE ALL LAWNS, DRIVEWAYS, WALKS, WALL, CURBS, FENCES, ETC. DISTURBED BY CONSTRUCTION. LAWN SHALL BE FINE GRADED, SEEDED, FERTILIZED AND MULCHED PER ACCEPTABLE LANDSCAPE PRACTICES.

9) CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION STAKEOUT. WHERE APPLICABLE STAKEOUT SHALL BE COMPLETED BY A LICENSED LAND SURVEYOR.

10) UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED, NOR IS THERE ANY GUARANTEE THAT ALL EXISTING UTILITIES WHETHER FUNCTIONAL OR ABANDONED WITHIN THE PROJECT AREA ARE SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES BEFORE STARTING WORK & SHALL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM HIS WORK. CONTRACTORS SHALL NOTIFY DIG SAFELY NY (FORMERLY UFPO) 1-800-962-7962 IN ACCORDANCE WITH 16 NYCRR PART 753.

11) ALL SITE WORK SHALL BE SMOOTHLY AND EVENLY BLENDED INTO EXISTING CONDITIONS.

12) ALL BOUNDARY AND/OR TOPOGRAPHIC INFORMATION OBTAINED FROM SURVEY PREPARED BY KEYSTONE ASSOCIATES ARCHITECTS, ENGINEERS AND SURVEYORS, LLC. IT IS THE BASE INFORMATION USED TO PREPARE THE WORK INDICATED ON THE DRAWINGS. BY INCLUSION OF THIS SURVEY INFORMATION IN THIS SET OF DOCUMENTS, KEYSTONE ASSOCIATES ARCHITECTS, ENGINEERS AND SURVEYORS, LLC DOES NOT ASSUME RESPONSIBILITY FOR INTERPRETATIONS OR CONCLUSIONS DRAWN THEREFROM BY THE CONTRACTOR.

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KEYSTONE ASSOCIATES
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NO.	REVISIONS AND DESCRIPTIONS	DATE:
1	SOLAR ARRAY PANEL PLAN	2/12/19

SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY

SITE PLAN

SHEET NO.
C100

PROJECT NO.
2850.24418.5

DATE: 12/18/18

CAD FILE NO.: 285024418_5_Site.dwg

LEGEND

⊕	BENCHMARK (NAVD 88)
◉	MONUMENT FOUND AND NOTED
N/F	NOW OR FORMERLY
TM#	TAX MAP NUMBER
━ ━ ━	PROPERTY LINE
— — —	TAX MAP LINES
⊙	UTILITY POLE WITH LIGHT
⊙	UTILITY POLE
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C	CABLE PEDESTAL
☐	CATCH BASIN
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GRAPHIC SCALE

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(IN FEET)
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TOTAL ACREAGE TO BE DISTURBED: ± 15.77 ACRES

NOT FOR CONSTRUCTION

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WARNING:
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SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY

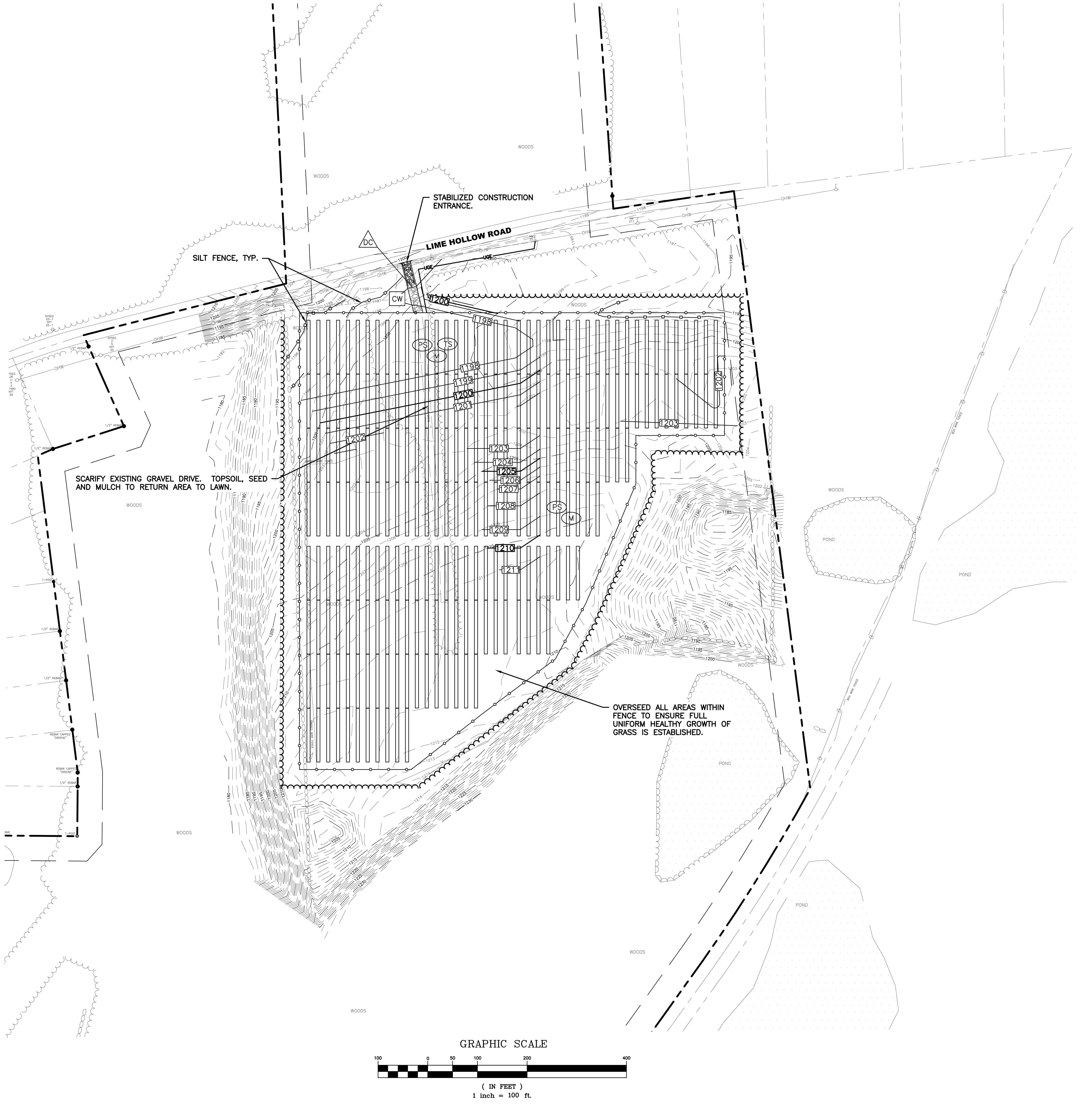
SITE PLAN WITH AERIAL PHOTO

SHEET NO.
C105

PROJECT NO.
2850.24418.5

DATE: 12/18/18

CAD FILE NO.: 285024418_5_Site.dwg

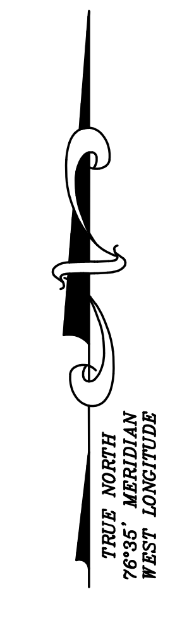


STABILIZED CONSTRUCTION ENTRANCE.

SILT FENCE, TYP.

SCARIFY EXISTING GRAVEL DRIVE. TOPSOIL, SEED AND MULCH TO RETURN AREA TO LAWN.

OVERSEED ALL AREAS WITHIN FENCE TO ENSURE FULL UNIFORM HEALTHY GROWTH OF GRASS IS ESTABLISHED.



NOTES:

1. SOLAR ARRAY SUPPORTS AND CHAIN LINK FENCE POST SHALL BE DRIVEN OR DIRECT AUGERED, THEREFORE THEY DO NOT MEET THE NYSDEC DEFINITION FOR LAND DISTURBANCE.
2. CONTRACTOR SHALL BACKFILL ALL TRENCHES ON THE SAME DAY AS THEY ARE EXCAVATED. SEEDING AND MULCHING SHALL OCCUR IMMEDIATELY AFTER TRENCHING HAS BEEN COMPLETED.
3. IF THE E&SC MEASURES THAT ARE SHOWN DO NOT PROVE TO BE EFFECTIVE, THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE ENGINEER OF RECORD FOR RECOMMENDATIONS OF ADDITIONAL MEASURES TO INSTALL.
4. CONTRACTOR SHALL NOT EXCAVATE FOR ROAD OR UNDERGROUND UTILITIES MORE THAN THEY CAN BACKFILL IN THE SAME DAY.

CONCRETE WASHOUT	CW
DUST CONTROL	DC
TOPSOILING	TS
PERMANENT SEEDING	PS
MULCHING	M
STABILIZED CONSTRUCTION ENTRANCE	▨
SILT FENCE	—□—□—□—
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STANDARD SYMBOLS

CONSTRUCTION SEQUENCE

1. INSTALL STABILIZED CONSTRUCTION ENTRANCE.
2. CLEAR AND GRUB SITE TO LIMITS SHOWN.
3. INSTALL SILT FENCE.
4. INSTALL GRAVEL ACCESS DRIVE.
5. GRADE SITE AS SHOWN.
6. INSTALL SOLAR BASE SUPPORTS AND SOLAR ARRAYS.
7. INSTALL UNDERGROUND UTILITIES AND UTILITY POLES.
8. INSTALL CHAIN LINK FENCE AND OTHER AMENITIES.
9. INSTALL SEED AND MULCH TO ALL DISTURBED AREAS.
10. REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES AFTER SITE HAS MET THE REQUIREMENTS OF FINAL STABILIZATION.

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SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY

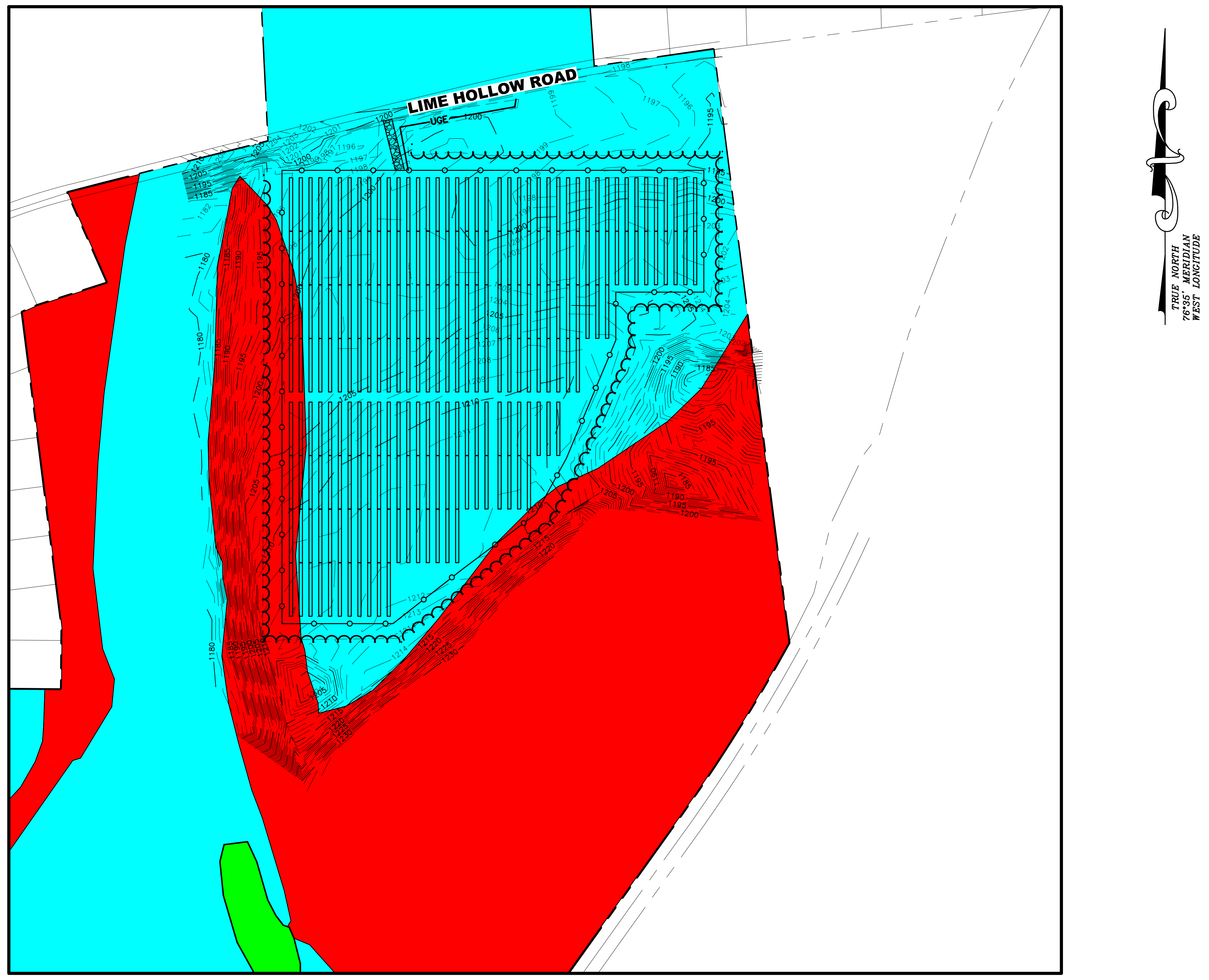
EROSION AND SEDIMENT CONTROL PLAN

SHEET NO.
C110

PROJECT NO.
2850.24418.5

DATE: 12/18/18

CAD FILE NO.: 285024418_5_Site.dwg

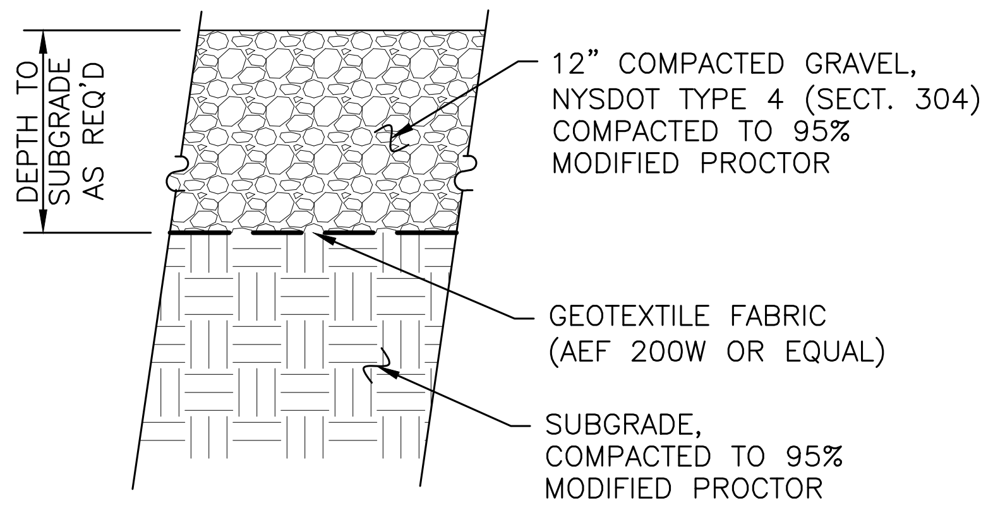


🟦 PRIME FARMLAND

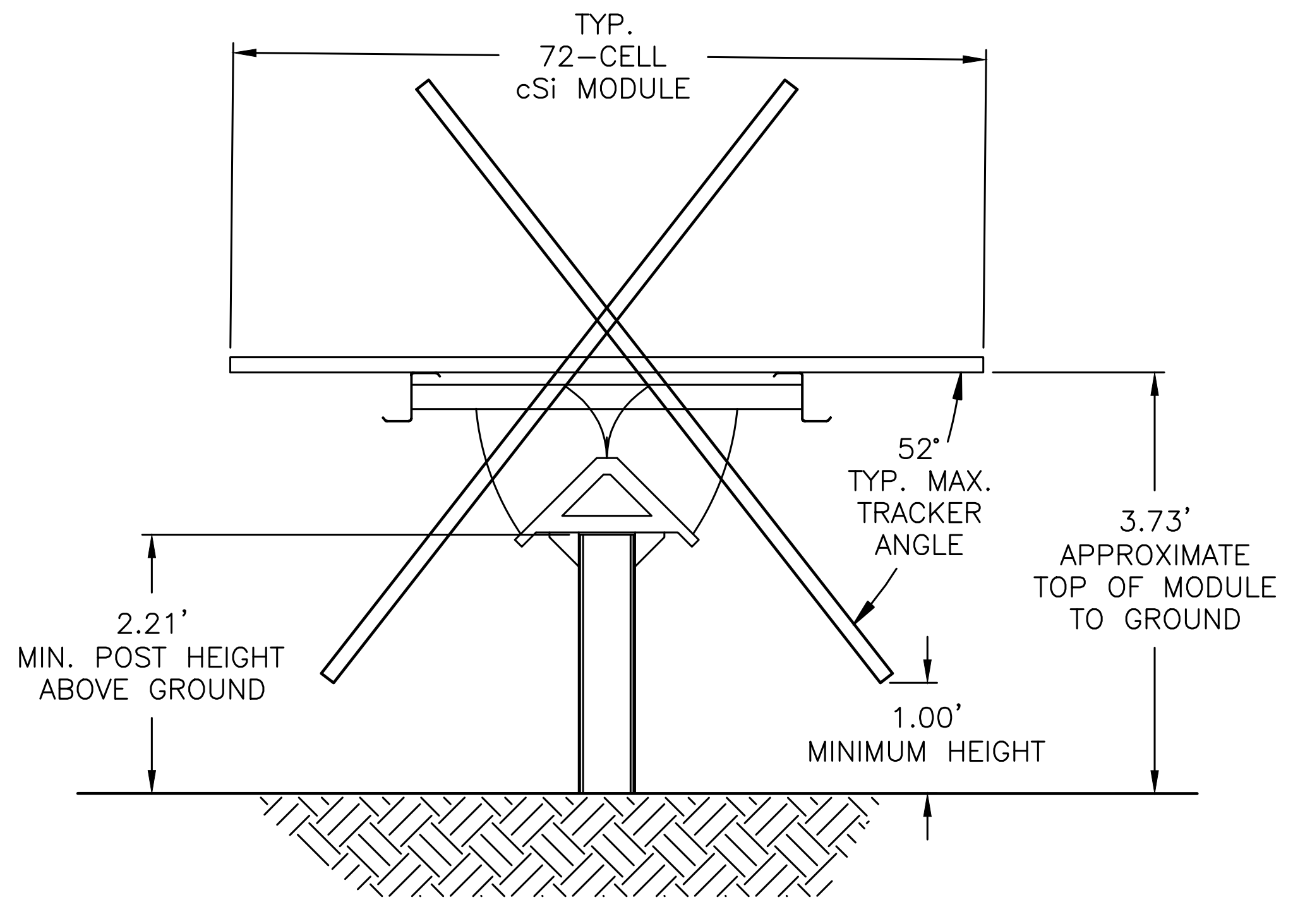
🟥 NOT PRIME FARMLAND

🟩 FARMLAND OF STATEWIDE IMPORTANCE

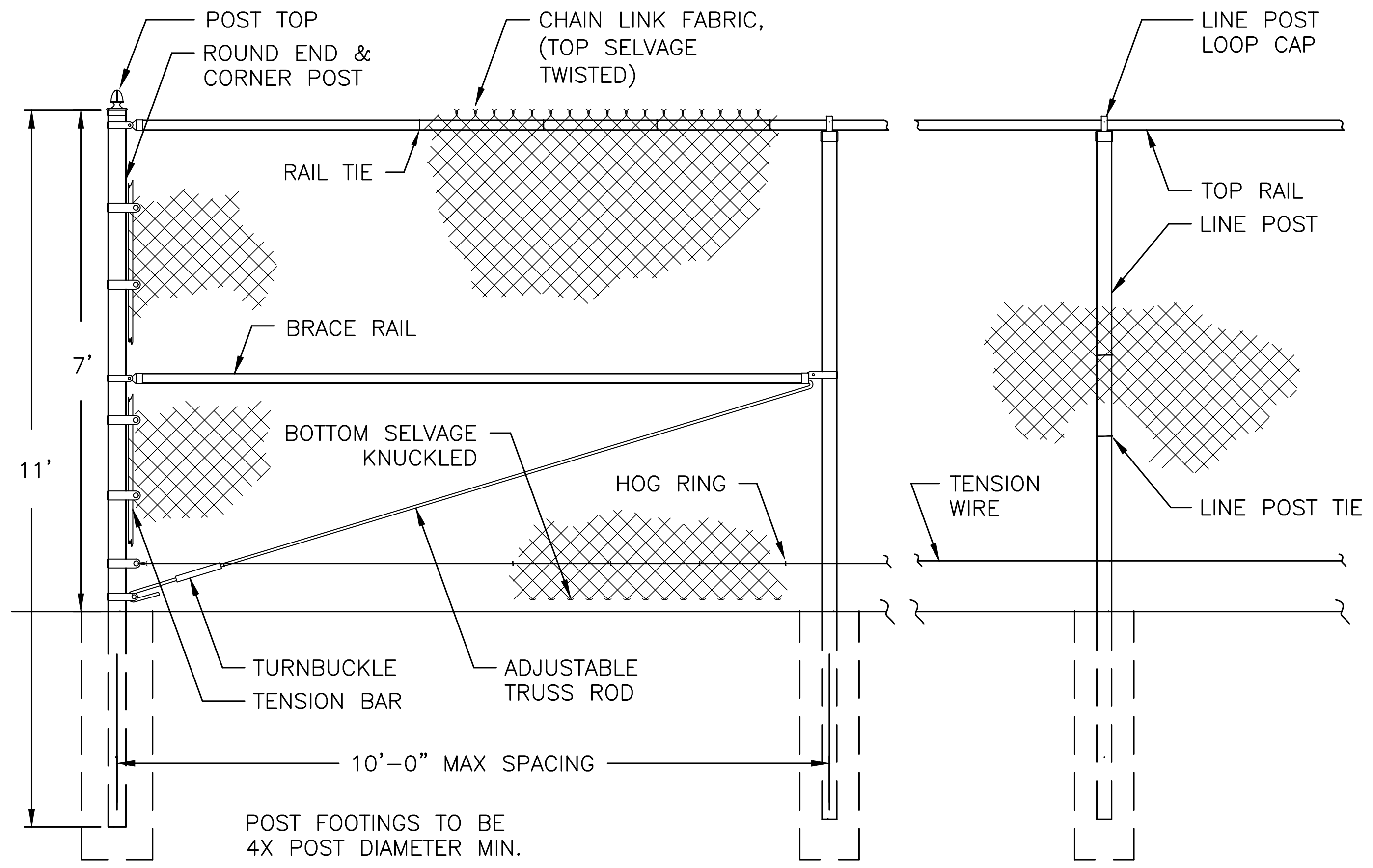
1 C200 FARMLAND SOILS MAP
1"=200'



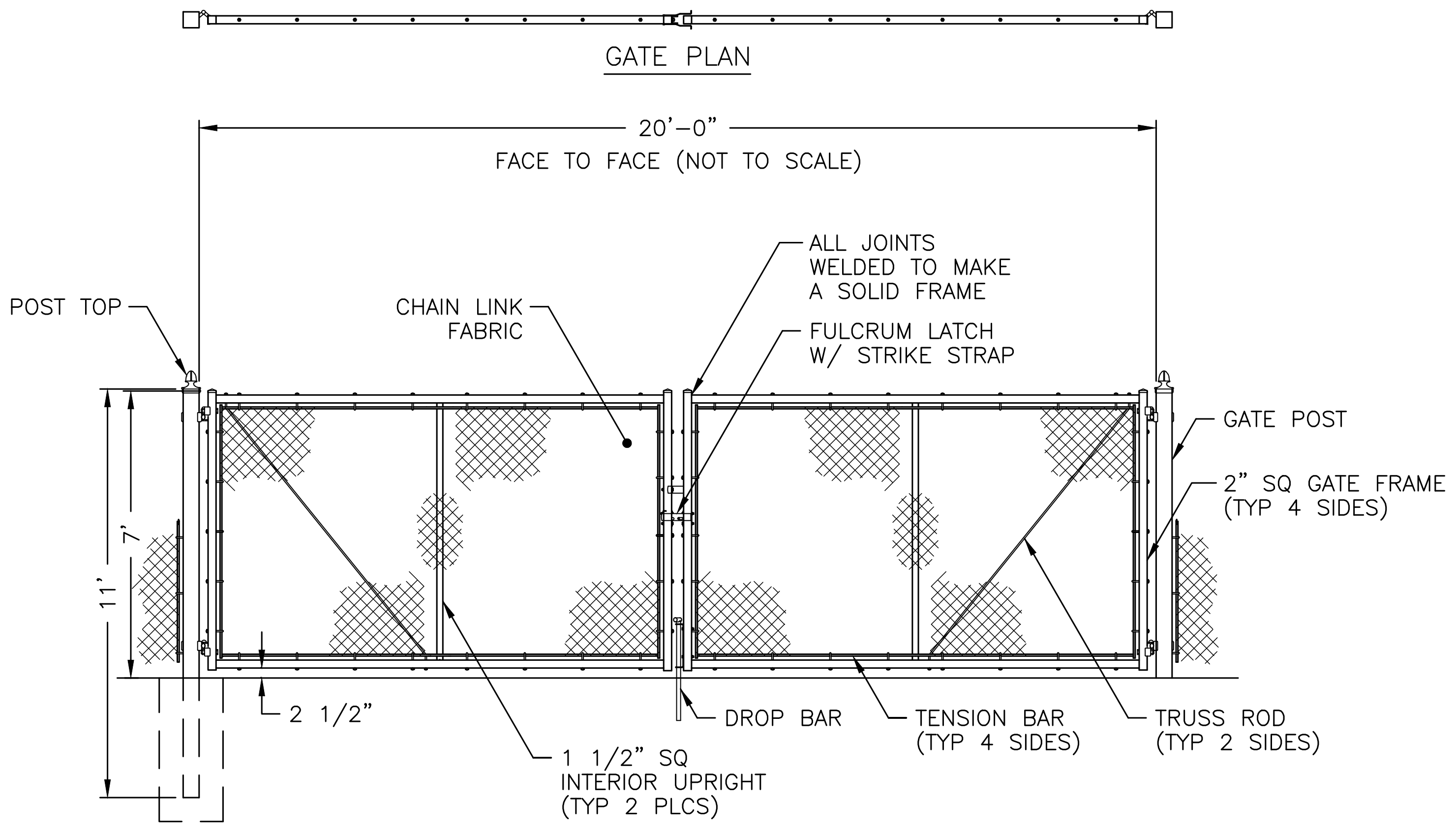
2 C200 GRAVEL DRIVE DETAIL
N.T.S.



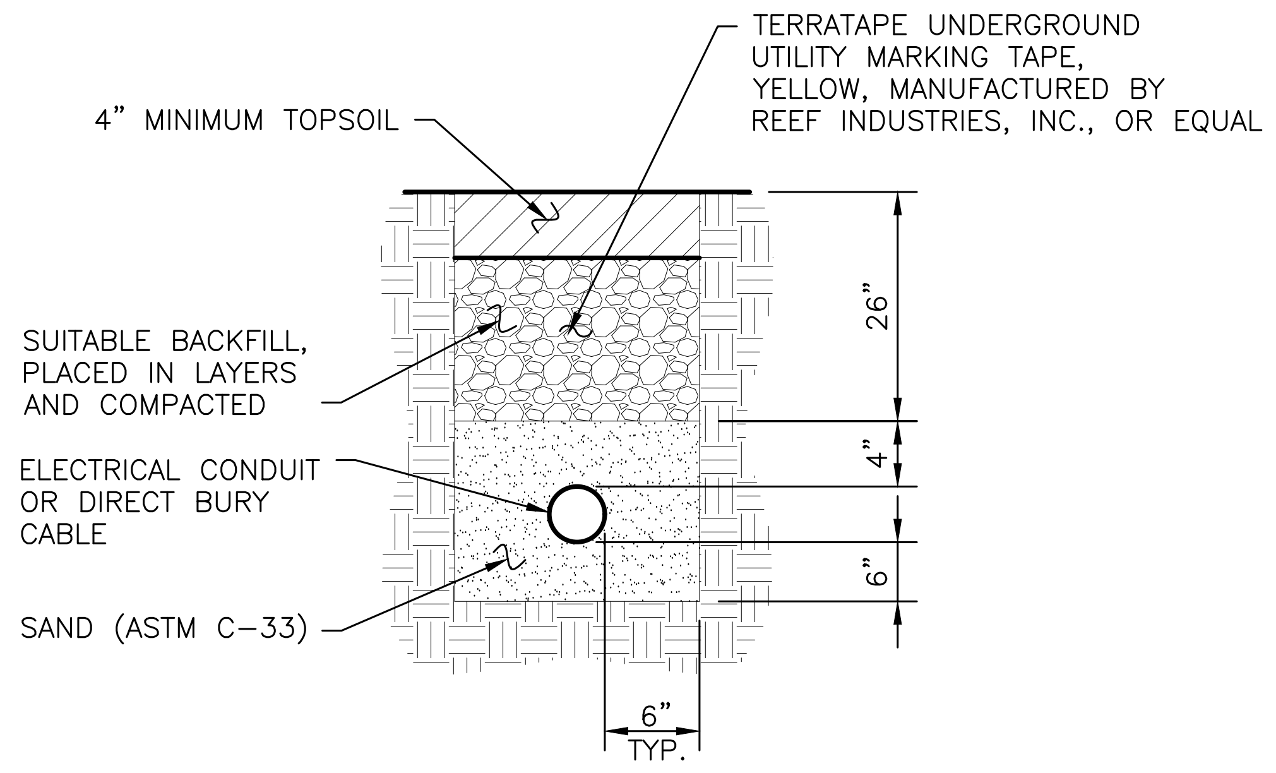
3 C200 SOLAR ARRAY SIDE VIEW
N.T.S.



4 C200 CHAIN LINK FENCE DETAIL
N.T.S.



5 C200 CHAIN LINK SWING GATE
N.T.S.



6 C200 ELECTRICAL TRENCH DETAIL
N.T.S.

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FARMLAND SOILS AND DETAILS

SHEET NO.
C200

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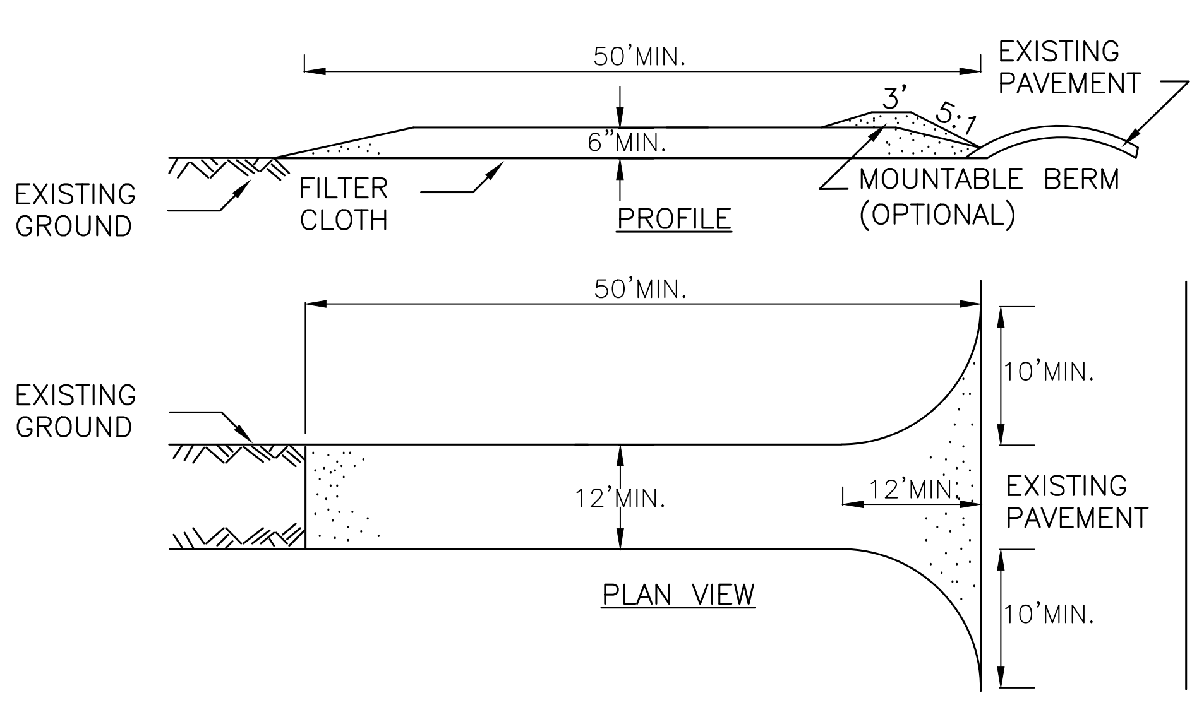


SYMBOL

CONSTRUCTION SPECIFICATIONS

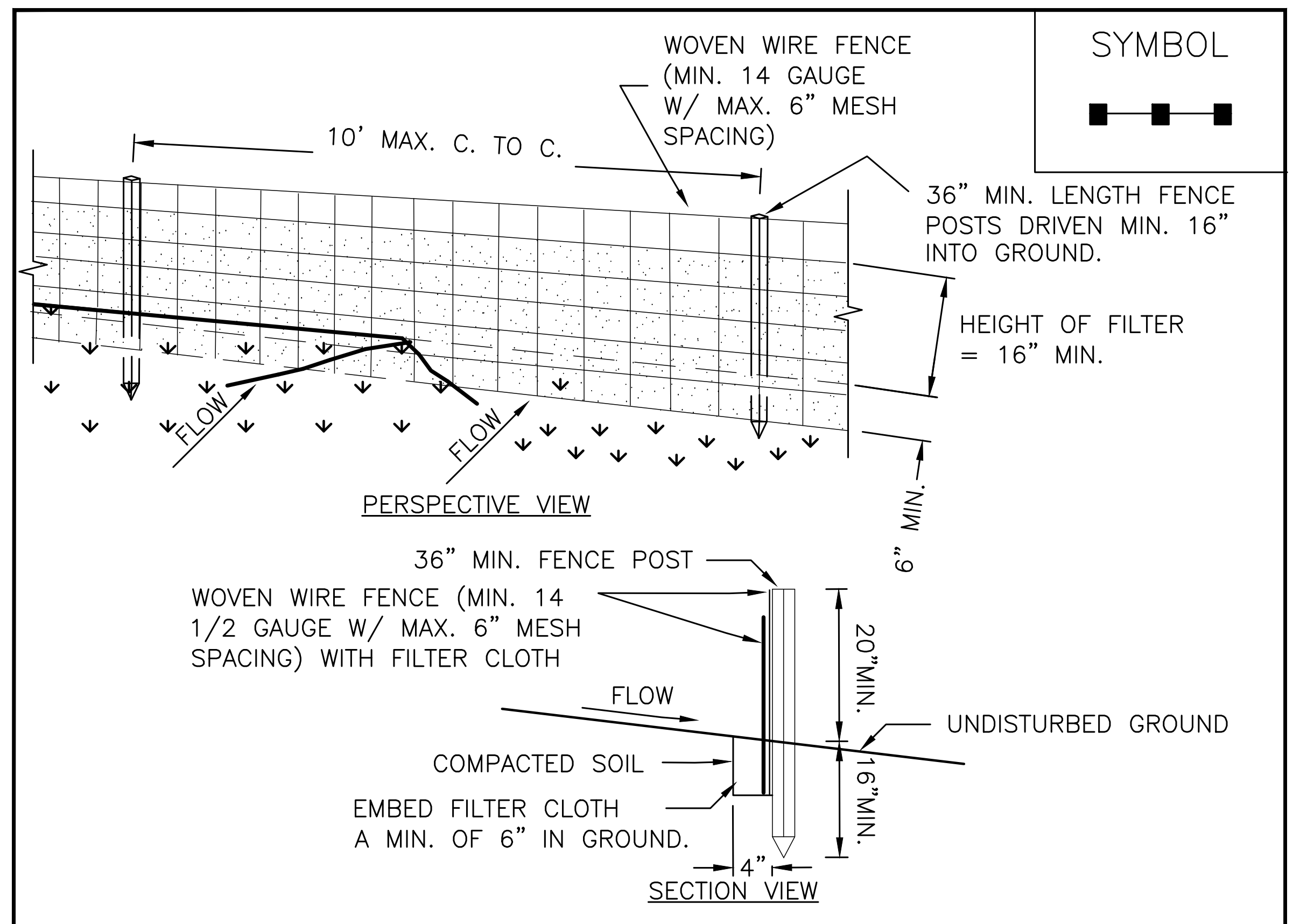
1. STONE SIZE – USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ACCESS SHALL BE PIPED BENEATH 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 A 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.

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

STABILIZED CONSTRUCTION ACCESS

1 C210 STABILIZED CONSTRUCTION ACCESS

N.T.S.



SYMBOL

CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
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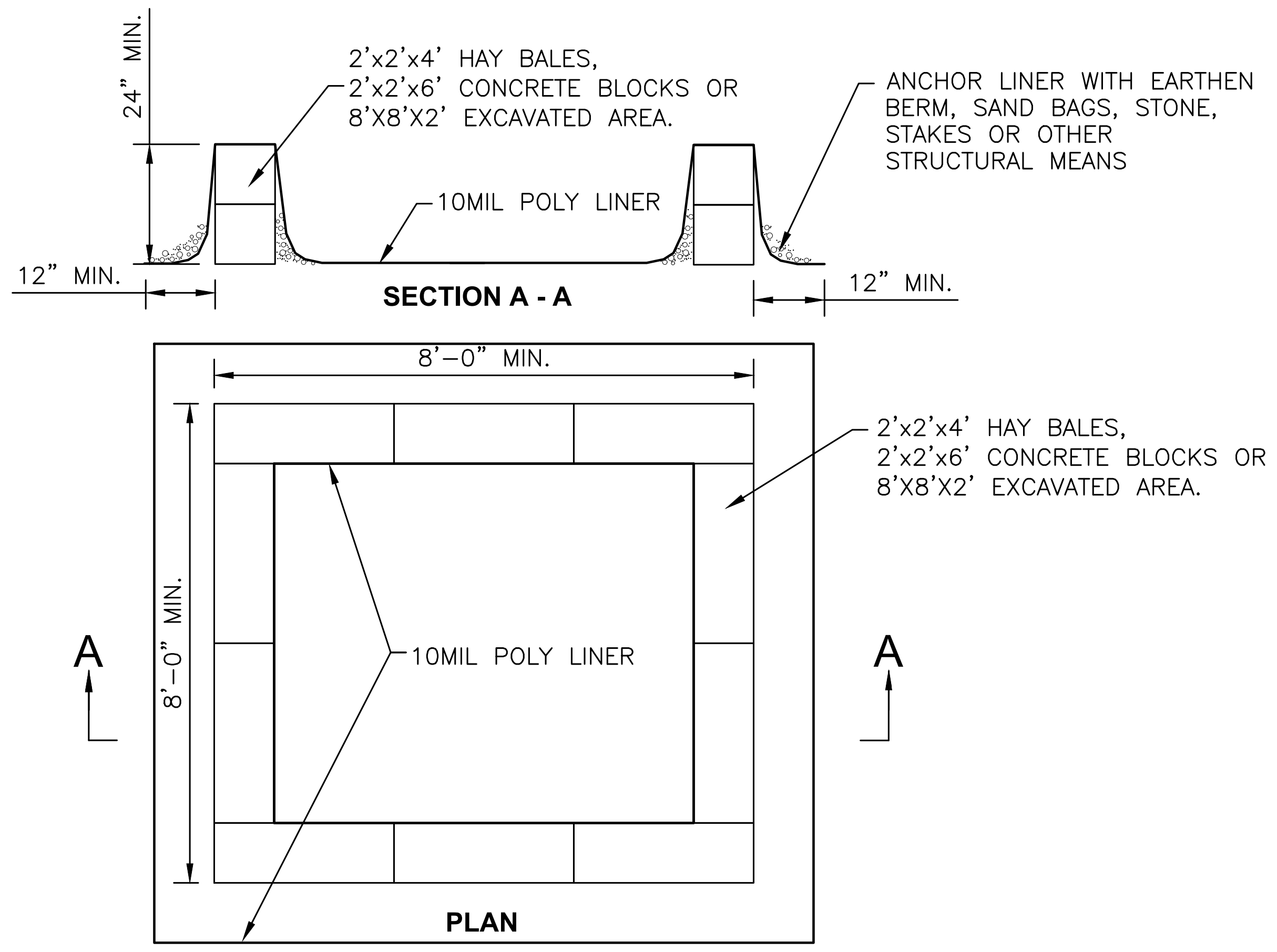
SILT FENCE

2 C210 SILT FENCE

N.T.S.



NOTES:

1. ACTUAL ABOVE GROUND OR EXCAVATED LAYOUT DETERMINED IN FIELD.
2. LOCATE THE FACILITY A MINIMUM OF 100' FROM DRAINAGE SWALES, STORM DRAIN INLETS, WETLANDS, STREAMS AND OTHER SURFACE WATERS. WASH WATER SHALL NOT BE ALLOWED TO INFILTRATE INTO SOIL OR ENTER SURFACE WATERS. EXCESS RAINWATER SHALL BE PUMPED TO A STABILIZED AREA SUCH AS A GRASSED FILTER STRIP.
3. EXCAVATED WASHOUT STRUCTURES SHALL BE A MINIMUM OF 2' DEEP WITH SIDE SLOPES OF 2:1.
4. PROVIDE APPROPRIATE ACCESS TO THE STRUCTURE.
5. SIGNS SHALL BE INSTALLED TO DIRECT DRIVERS TO THE CONCRETE WASHOUT LOCATION.
6. ALL WASHOUT FACILITIES WILL BE LINED. THE LINER SHALL BE PLASTIC SHEETING WITH A MINIMUM THICKNESS OF 10 MILS WITH NO HOLES OR TEARS. LINER SHALL BE REPLACED WITH EACH CLEANING OF STRUCTURE.
7. ALL CONCRETE WASHOUT FACILITIES SHALL BE INSPECTED DAILY. DAMAGED OR LEAKING STRUCTURES SHALL BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY.
8. ACCUMULATED HARDENED MATERIAL SHALL BE REMOVED WHEN 75% OF STORAGE CAPACITY OF THE STRUCTURE IS FILLED. THE MATERIAL SHALL BE DISPOSED OF IN A LEGAL MANNER.
9. INSPECT THE PROJECT SITE FREQUENTLY TO ENSURE THAT NO CONCRETE DISCHARGES ARE TAKING PLACE IN NON-DESIGNATED AREAS.

4 C210 CONCRETE WASHOUT STRUCTURE

N.T.S.

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SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY

DETAILS

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Engineering Report

STORMWATER MANAGEMENT AND POLLUTION PREVENTION PLAN

LIME HOLLOW SOLAR, LLC
NEW YORK COMMUNITY SOLAR LIME HOLLOW PROJECT
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE
COUNTY OF CORTLAND
STATE OF NEW YORK

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1.0 BACKGROUND INFORMATION

1.1. Project Background.

Keystone Associates Architects, Engineers and Surveyors, LLC (Keystone) was retained by the C2 Energy Capital to complete a Stormwater Management and Pollution Prevention Plan (SWPPP) to summarize the stormwater management and sediment and erosion control activities associated with the site development of a ground mounted solar energy system located on the property westerly adjacent to 664 Lime Hollow Road in the Town of Cortlandville, Cortland County, New York (refer to Figure No. 1 - Location Map, Figure No. 2 – USGS Vicinity Map, and Figure No. 3 – Aerial Photo). The ground mounted solar system will be located on a portion of the existing 106.3-acre parcel (Tax Parcel ID# 95.00-06-04.1) owned by Farm East, LLC.

1.2. Purpose of Stormwater Plan Report.

The purpose of this SWPPP is to quantify pre-development and post-development stormwater runoff characteristics (hydrologic and hydraulic conditions), to reduce peak stormwater discharge rates to pre-development rates, and to delineate the stormwater control practices required to prevent, minimize, or mitigate potential water quality and quantity impacts associated with stormwater disposal for the proposed facility. These impacts include but are not limited to increases in suspended solids, colloidal and settleable solids, residuals from oil and floating substances, and other potential pollutants.

The SWPPP includes the following:

1. Description of the existing site conditions including existing land use of the site, soil types, and location of surface waters.
2. Description of proposed site conditions including the site layout, addition of impervious surfaces, and changes to existing cover types.
3. Identification of discharge points and breakout of associated drainage areas.
4. Description of construction stormwater management controls and calculations necessary to reduce erosion, sediment and pollutants in stormwater discharge.
5. Description of post-construction stormwater management practices for runoff quality and quantity control, including the use of green infrastructure techniques.
6. Description of maintenance requirements.

In addition, this report identifies the submittals and signatures required to meet the regulatory requirements for a New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges for Construction Activities (refer to Appendix A - Stormwater Discharge Permit Information). Appendix A contains a Notice of Intent Form (NOI), a sample Contractor Certification Statement Form, and permit signatory requirements. The NOI form should be finalized, executed, and submitted to NYSDEC as required. The contractor's and subcontractor's certification statements should be executed and submitted with any contract agreement. This binds the contractor to the SWPPP and all associated requirements.

1.3. Regulatory and Permit Requirements.

The Federal Water Pollution Control Act of 1972 (with amendments), also referred to as the Clean Water Act (CWA), provides that stormwater discharges associated with industrial activity from a point source (including discharges through a municipal separate storm sewer system) to waters of the United States are unlawful, unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit. In New York, which is a NPDES-delegated state, this is accomplished through the administration of the SPDES program administered by the NYSDEC.

A discharge that is subject to the NPDES regulations may be eligible to obtain coverage under a general permit by submitting an NOI to the administrator of the program, the NYSDEC. The NOI's are to be submitted to their Albany, New York office. Except when in compliance with the General Permit, or with a duly authorized permit from NYSDEC, discharge of stormwater associated with industrial activity by any person shall be unlawful.

The General Permit (Permit No. GP-0-15-002, effective January 29, 2015) (refer to Appendix A – Stormwater Discharge Permit Information) may authorize all discharges of stormwater associated with construction activity (those sites or common plans of development or sale that will result in the disturbance of one or more acres total land area) and where stormwater discharges from a point source to waters of the United States including wetlands.

This project is not within a regulated Municipal Separate Storm Sewer System (MS4) designated area.

1.4. Project and Site Description.

This project involves the construction of a ground mounted solar energy system located westerly adjacent to 664 Lime Hollow Road in the Town of Cortlandville, New York. The system is comprised of silicon Photovoltaic panels mounted to an aluminum or steel racking system supported by driven posts or helical piles. The racks have a maximum height of 12.0 feet, therefore the panels will be elevated above the ground surface. Electrical equipment will be mounted on the racks and electrical wirings from the racks will be routed in conduit via an underground trench for connection to the existing National Grid distribution system. This site will utilize rotating panels which will follow the track of the sun throughout the day.

The property consists of dense woodlands and several freshwater ponds. The solar system will be constructed on the south side of Lime Hollow Road near the northeastern corner of the property. The solar system will be protected by a 7.0 foot high chain link fence with access paths running north to south and east to west within the center of the solar energy system. The ground surface below the panels will be a well-established vegetative cover. An

18-foot-wide gravel access drive is planned to be constructed using an existing gravel entrance from Lime Hollow Road to the northern end of the solar energy system.

1.4.1. Drainage, Stormwater Disposal and Natural Resources.

The site drains in multiple directions with two (2) of the six (6) drainage areas discharging from the site to freshwater ponds located east of the solar energy system. Minor grading will be necessary for the gravel access drive and diversion of stormwater runoff within the solar energy system layout.

The NYSDEC Protection of Waters Program states that certain waters of the state are protected on the basis of their stream classification. Streams and small water bodies located in the course of a stream with a classification of AA, A or B, or with a classification of C with a standard of (T) for trout waters or (TS) for trout spawning waters are collectively referred to as "protected streams" and are subject to the stream protection provisions of the Protection of Waters regulations. Two (2) unnamed lakes, one (1) located approximately 600 feet east and the other located approximately 2,500 feet northeast of the site are classified as "Class C" waterbodies. Otter Creek is approximately 4,800 feet east of the site and is also classified as a "Class C" stream. Stormwater runoff does not discharge to any of these protected areas. Refer to Figure No. 4 – NYSDEC Environmental Resource Map. As such, applicable Protection of Waters regulations have been incorporated throughout preparation of the SWPPP.

A review of available data indicates that the property is not located within the radius of mapped rare plants and rare animals (refer to Figure No. 4 – NYSDEC Environmental Resource Map). Other mapped New York State regulated freshwater wetlands and other significant natural communities were identified in the vicinity of the project's drainage area, however, none were identified within the limits of the project area. It should be noted that the site has been recently used for silviculture practices and there has been no significant tree growth within the solar energy system layout until 2011, therefore we believe that critical habitats or significant communities are not anticipated to be affected by the proposed construction. Based on this information, written permission to proceed from the NYSDEC Natural Heritage Program was not deemed warranted by Keystone Associates and was therefore not requested.

According to the NYS Stormwater Interactive Mapper, the site is not located within a watershed improvement strategy area (refer to Figure No. 5 – NYS Stormwater Interactive Map).

1.4.2. Historic Places.

In accordance with Part I(F)(8) of the SPDES General Permit, construction activities that have the potential to adversely affect a property that is listed or is eligible for listing on the State or National Register of Historic Places (including Archaeological sites) are ineligible for coverage under this permit, unless there are written agreements in place with the New York State Division for Historic Preservation of the Office of Parks, Recreation and Historic Preservation (OPRHP) or other governmental agencies to mitigate the effects, or there are local land use approvals evidencing the same. As such, a review of the New York State Cultural Resource Information System (CRIS) mapping was performed (refer to Figure No. 6 – NYS Cultural Resource Information Map).

A Short Environmental Assessment and Phase I Environmental Site Assessment were completed by Keystone. According to both assessments, the property is located within a mapped archaeologically sensitive area, however, the limits of the project area are not. The site is not located on, or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places. In accordance with OPRHP standards, Phase 1B archaeological testing is not recommended for panel arrays, perimeter fencing and utility poles if their associated posts are driven or drilled into the ground. Since the posts will either be driven or drilled, no Phase 1B archaeological testing is required.

In accordance with Part I(F)(8) of the General Permit, between 5 to 20 acres of disturbance is proposed and there are no new permanent building(s) to be constructed within 50 feet or less of a building/object that is more than 50 years old. Therefore, in accordance with the NYSDEC's Cultural Resource Screening Process Flow Chart, written authorization to proceed is not required.

1.4.3. Wetlands/Floodplains.

Based on the United States Fish & Wildlife Service National Wetland Inventory online wetland mapping resource, freshwater ponds were identified near the site (refer to Figure No. 7 – National Wetland Inventory Map). A State regulated wetland has been identified approximately 650 feet southwest from the site, however, these wetlands are not within the project drainage areas, so they will not be affected by the project (refer to Figure No. 4 – NYSDEC Environmental Resource Map). Since the proposed solar energy system is planned to be supported by driven or drilled posts, no future impervious area is proposed on the site that will pose a negative impact the onsite freshwater ponds. Additionally, only two (2) of the six (6) drainage areas discharge from the property (Drainage Areas 1 and 3). Based on our hydrology calculations, neither of these post development conditions will increase the peak discharge rate. Three (3) of the remaining four (4) areas (Drainage Areas 2, 5, and 6) indicate an increase in the post development peak discharge rate, however all runoff from these drainage areas remains onsite and the increased peak stormwater runoff rates and volumes will not cause the existing onsite freshwater ponds to overflow and impact any offsite properties.

According to the Federal Emergency Management Agency (FEMA) Map Number 36023C0228D, dated March 2, 2010, Town of Cortlandville, Cortland County, New York, there are no mapped flood hazard zones (100-yr. or 500-yr.) inside the project limits (refer to Figure No. 8 – Flood Zone Map). The nearest mapped flood zones are located northeast of the site along the Otter Creek tributary, which is outside the project limits.

1.4.4. Soils.

According to the United States Department of Agriculture Natural Resource Conservation Service's online web soil survey, the soils at the site are classified as Halsey mucky silt loam (Ha), Valois and Howard gravelly loam (Va), Palmyra gravelly silt loam (Pb), Phelps gravelly silt loam (Ph), and Howard gravelly loam (Hd) (refer to Figure No. 9 – Soils Map). The soils within the project area consist generally of Palmyra gravelly silt loam The Palmyra series are formed in deep and well drained gravelly outwash derived from siltstone, sandstone, shale, and dark gray limestone. Other properties of these soils are summarized in Table No. 1 - 1 Soil Types and are described and detailed in Appendix B – Soils Information. The Cortland County Soil Survey dated May 1961 was also referenced, which shows the Halsey mucky silt loam soils mapped as Atherton silt loam (Ad) which have comparable properties.

Table No. 1-1 Soil Types

Symbol	Name	% Slopes	SG	Depth To: GW	BR	Perm. In/hr
Ha	Halsey mucky silt loam	0-3	D	0"	>80"	0.20-2.00
Va	Valois and howard gravelly loam	25-40	B	>80"	>80"	0.60-20.00
Pb	Palmyra gravelly silt loam	0-25	A	>80"	>80"	0.60-6.00
Hd	Howard gravelly loam	0-25	A	>80"	>80"	0.60-6.00
Ph	Phelps gravelly silt loam	0-3	B	18-24"	>80"	0.60-2.00

<u>Legend/Definitions</u>

BR = Bedrock
GW = Groundwater
Perm. = Permeability (based on upper soil horizons). Based on Cortland County soils data.
SG = Soil Group

1.5. Existing (Pre-Development) Conditions.

The project area is in a woodland which has been previously used for civil cultural resource practices. The solar energy system area is approximately 15.77 acres located on the northeastern end of the property and just south of Lime Hollow Road. The site generally drains west, east, and south from the solar farm system area. The area to the south and southwest are also woodland and a residential area with a cul-de-sac is located to the west of the project area. The project area was divided into six (6) separate drainage areas. Four (4) of the drainage areas are completely contained onsite as they discharge to low-lying areas or freshwater ponds within the property boundary, however, two (2) of these drainage areas both discharge to freshwater ponds directly east of the site. Refer to Figure No. 10 – Pre-development Drainage Area Map. A description for each of the pre-development drainage areas is provided below.

Drainage Area No. 1 (DA-1) is 9.61 acres located on the northeastern side of the site and includes woodlands, grass, a gravel access drive, and asphalt pavement. Runoff generally drains from the south towards the northeastern corner of the drainage area. This is one (1) of the drainage areas that discharges offsite to a freshwater pond.

Drainage Area No. 2 (DA-2) is 62.62 acres located from the western end of the project area towards the western property line. This drainage area includes asphalt pavement, residential houses, woodlands, gravel areas, water surface, and grass area. Runoff generally drains west and then south to a low-lying area and to a freshwater pond. This drainage area does not discharge from the site.

Drainage Area No. 3 (DA-3) is 0.50 acres located south of the DA-1 design point which is completely woodlands. Runoff generally drains from west to east towards the eastern property line. This drainage area discharges offsite to a freshwater pond.

Drainage Area No. 4 (DA-4) is 1.22 acres located south of DA-3 and southeast of DA-1 which is completely woodlands. Runoff generally drains from west to east towards a low-lying area near the eastern property line. This drainage area does not discharge from the site.

Drainage Area No. 5 (DA-5) is 13.55 acres located south of DA-4 and southeast of DA-1 and includes woodlands, a gravel area, and water surface. Runoff generally drains to the freshwater pond near the center of the drainage area. This drainage area does not discharge from the site.

Drainage Area No. 6 (DA-6) is 1.62 acres located east of DA-2 and southwest of DA-2 which is completely woodlands. Runoff generally drains from south to north towards a low-lying area near the northern end of the drainage area. This drainage area does not discharge from the site.

1.6. Proposed Future (Post-Development) Conditions.

The proposed construction consists of a ground mounted solar energy system consisting of racks supporting photovoltaic panels and mounted on drive posts or helical piles. The ground surface will be a vegetated cover since the panels are planned to be elevated above the ground. The rows of panels will be spaced equally apart, and a chain link fence will be constructed surrounding the system. Within the project area the existing gravel access roads will be removed and all trees must be removed 30 feet from the solar panels to prevent interference with sunlight due to shadows being cast from the trees. An 18-foot-wide gravel road will be constructed using the existing gravel access road from Lime Hollow Road. Total disturbance for the project is approximately 15.77 acres.

Post-development drainage areas were designed to be similar to the pre-development drainage areas. The woodlands within the project area will be changed to grass which increased the overall weighted curve number between pre and post conditions of the drainage areas except for DA-2 and DA-4 which did not change. Minor grading within the project area was designed to divert a portion of the runoff that would be included in DA-1 to DA-2 and from DA-3 to DA-1 to ensure that there were no impacts to downstream properties. Refer to Figure No. 11 – Post-development Drainage Area Map.

2.0 STORMWATER MANAGEMENT PLANNING AND GREEN INFRASTRUCUTRE PRACTICES

2.1. Stormwater Management Planning.

To mitigate the overall hydrological impact to the surrounding area due to the proposed development, a green infrastructure approach for stormwater management was taken through the implementation of site planning techniques and runoff reduction techniques. The goal of this approach is to maintain, as much as possible, the pre-development hydrological conditions such as pre-construction infiltration, peak runoff flow and discharge volume as well as minimizing the concentrated flow in order to address treatment in a distributed manner prior to reaching the collection system. In so doing, the overall runoff produced will be minimized as will the need for collection, storage and treatment. In order to address this approach, the following five-step process that is presented in the New York State Stormwater Management Design Manual was utilized.

1. Site planning to preserve natural features and reduce impervious cover,
2. Calculation of the water quality volume for the site,
3. Incorporation of green infrastructure techniques and standard Stormwater Management Practices (SMPs) with Runoff Reduction Volume (RRv) capacity,
4. Use of standard SMPs, where applicable, to treat the portion of water quality volume not addressed by green infrastructure techniques and standard SMPs with RRv capacity, and
5. Design of volume and peak rate control practices where required.

A summary of the Green Infrastructure (GI) planning tools found in the Stormwater Management Design Manual and an explanation as to how each was either implemented or found to be non-applicable are included in Sections 2.3 (Green Infrastructure Planning and Practices) and 2.4 (Green Infrastructure Techniques and Practices for Runoff Reduction). NOTE: These sections only provide a general overview of each practice; reference the NYS Stormwater Management Design Manual for complete standards, details, specifications, and design variations.

2.2. Runoff Reduction Volume (RRv) / Water Quality Volume (WQv).

For new construction projects, Runoff Reduction Volume (RRv) must be achieved through implementation of available green infrastructure techniques which promote infiltration, groundwater recharge, reuse, recycling, evaporation/evapotranspiration of 100 percent of the post-development Water Quality Volume (WQv). This is required to replicate pre-development hydrology by maintaining pre-construction infiltration, peak runoff flow, discharge volume, as well as minimizing concentrated flow before runoff reaches the collection system. The Water Quality Volume is the runoff during the initial stage of a storm event that contains most runoff-related contaminants (salt, sand, etc.) transported from land (particularly impervious surfaces). For new construction projects, if one hundred percent of the WQv cannot be treated, documentation must be provided justifying the evaluation of each of the green infrastructure planning and reduction techniques and identifying the specific limitations of the site and explaining why each of the techniques that are not used are technically infeasible. Projects that do not achieve one hundred percent runoff reduction must, at a minimum, reduce a percentage of the runoff from the proposed impervious areas on-site specified by the Specific Reduction Factor which is based on the hydrologic soil group present on the site and treat the remaining WQv using standard stormwater management practices. However, this project involves the "re-development" of a 15.77-acre portion of the site formerly utilized for civil cultural resource practices and is therefore subject to criteria identified in Chapter 9 of the New York State Stormwater Management Design Manual (Redevelopment Projects).

Redevelopment of previously developed sites is encouraged from a watershed protection standpoint because it often provides an opportunity to conserve natural resources in less impacted areas by targeting development to areas with existing services and infrastructure. Redevelopment also provides an opportunity to correct existing problems and reduce pollutant discharges from older developed areas that were constructed without effective stormwater pollution controls. Because the technical standards contained elsewhere in the Manual were primarily intended for new development projects, compliance with the sizing criteria in full may present a challenge on projects that include redevelopment activities (i.e. size constraints, the need to tie in to the existing drainage infrastructure which may be at an elevation that does not provide enough head for certain stormwater management practices etc.). Although encouraged, meeting the RRv sizing criteria is not required for the redevelopment activity portion of a project. As detailed in Chapter 9, the use of standard and/or alternative stormwater management practices is allowed and associated sizing criteria is defined.

In accordance with Section 9.2.1 of the Manual, WQv treatment objectives for this project will be achieved by Option No. 1. In general, this requires a reduction of existing impervious cover by a minimum of 25% of the total disturbed, impervious area. The existing 0.30 acres of gravel access drives on the site are planned to be reduced to 0.04 acres which results in a reduction in impervious cover by approximately 86.7%. This reduction in impervious area will reduce the volume of stormwater runoff, thereby achieving, at least in part, stormwater criteria for both water quality and quantity. All previous impervious areas will be restored to vegetative cover by scarifying the existing gravel, topsoil, seeding, and mulching.

2.3. Green Infrastructure Planning Practices.

2.3.1 Preservation of Natural Resources.

2.3.1.1 Preservation of Undisturbed Areas:

Delineate and place into permanent conservation undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain. The preservation of undisturbed areas for the project was accomplished, however they have not been placed into permanent conservation. The layout of the solar energy system was designed to minimize disturbance to the previously cleared woodland area.

2.3.1.2 Preservation of Buffers:

Define, delineate and preserve naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands. The preservation of buffers for the project is not applicable. There are no naturally vegetated buffers along perennial streams, rivers, shorelines or wetlands on the site that can be delineated or placed into a permanent conservation easement.

2.3.1.3 Reduction of Clearing and Grading:

Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities. Reduction of clearing and grading measures are an acceptable practice for this project. Clearing and grading of the site will be limited to the minimum amount needed for the work and within the previously cleared area. The layout of the solar energy system was designed to minimize the amount of clearing of the existing woodland area. Tree removal is limited to approximately 30 feet from the chain link fence line to prevent interference with sunlight due to shadows being cast from the trees. Minor grading is required to divert runoff between drainage areas from pre to post conditions. The ground surface is planned to be restored as vegetative cover.

2.3.1.4 Locating Development in Less Sensitive Areas:

Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the least impact. Locating development in less sensitive areas is an applicable for this project. The development of the solar energy system has been located on a site that does not directly impact any floodplains, steep slopes, erodible soils, wetlands, mature forests or critical habitats on the site. Due to the panels being supported by posts either driven or drilled into the ground and the ground surface being restored as vegetative cover, the planned construction will not create a significant impact to the site.

2.3.1.5 Open Space Design:

Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources. The site was strategically designed to use clustering in order to limit disturbance to sensitive areas, reduce clearing and grading requirements, and limit the need for new impervious surfaces.

2.3.1.6 Soil Restoration:

Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of post-construction practices. The ground surface within the project area is planned to be restored as vegetative cover using topsoil, seed and mulch.

2.3.2 Reduction of Impervious Cover.

2.3.2.1 Roadway Reduction:

Minimize roadway widths and lengths to reduce site impervious area. No roadways are planned to be constructed for this project. Therefore, roadway reduction is not applicable.

2.3.2.2 Sidewalk Reduction:

Minimize sidewalk widths and lengths to reduce site impervious area. Sidewalks are not planned to be constructed for this project. Therefore, sidewalk reduction is not applicable.

2.3.2.3 Driveway Reduction:

Minimize driveway widths and lengths to reduce site impervious area. The project has been designed to reduce the existing gravel access drive by 86.7%. This access drive will also not be paved with asphalt.

2.3.2.4 Cul-de-sac Reduction:

Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious area. No cul-de-sac construction or reconstruction work is planned for this project. Therefore, cul-de-sac reduction is not an applicable practice.

2.3.2.5 Building Footprint Reduction:

Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio. New buildings are not planned to be constructed for this project. Therefore, building footprint reduction is not applicable.

2.3.2.6 Parking Reduction:

Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, minimizing stall dimensions, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate. Parking areas are not required for this project. Therefore, parking reduction is not applicable.

2.4. Green Infrastructure Techniques and Standard Practices for Runoff Reduction.

2.4.1 Area Reduction Techniques.

2.4.1.1 Conservation of natural areas:

Retain the pre-development hydrologic and water quality characteristics of undisturbed natural areas, stream and wetland buffers by restoring and/or permanently conserving these areas on a site. The conservation of natural areas for the project is not applicable. There are no undisturbed natural areas, streams or wetland buffers on the site that can be restored or placed into a permanent conservation easement.

2.4.1.2 Riparian Buffers / Filter Strips:

Undisturbed natural areas such as forested conservation areas and stream buffers or vegetated filter strips and riparian buffers can be used to treat and control stormwater runoff from some areas of a development project. The use of vegetated buffers for the project is not applicable. There are no forested conservation areas, stream buffers, vegetated filter strips or riparian buffers immediately adjacent to the area being redeveloped.

2.4.1.3 Tree planting / tree box:

Plant or conserve trees to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Trees can be used for applications such as landscaping, stormwater management practice areas, conservation areas and erosion and sediment control. The layout of the solar energy system was designed to minimize the amount of tree clearing on the site. Tree removal is required within the project area and approximately 30 feet offset from the chain link fence to prevent interference with sunlight due to shadows being cast from the trees. The ground surface is planned to be restored as vegetative cover.

2.4.1.4 Disconnection of rooftop runoff:

Direct runoff from residential rooftop areas and upland overland runoff flow to designated pervious areas to reduce runoff volumes and rates. Disconnection of rooftop runoff is not applicable for this project since buildings are not planned to be constructed for this project.

2.4.2 Volume Reduction Techniques.

2.4.2.1 Vegetated Swale:

Natural drainage paths, or properly designed vegetated channels, can be used instead of constructing underground storm sewers or concrete open channels to increase time of concentration, reduce the peak discharge, and provide infiltration. This project is considered a redevelopment activity in accordance with Chapter 9 of the NYS Stormwater Management Design Manual, in which the design incorporates an 86.7% reduction of the existing gravel access drive. Therefore, water quantity and quality criteria have been achieved and the use of vegetated swales is not required.

2.4.2.2 Rain Garden:

Manage and treat small volumes of stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression. This project is considered a redevelopment activity in accordance with Chapter 9 of the NYS Stormwater Management Design Manual, in which the design incorporates an 86.7% reduction of the existing gravel access drive. Therefore, water quantity and quality criteria have been achieved and the use of rain gardens is not required.

2.4.2.3 Stormwater Planter:

Small landscaped stormwater treatment devices that can be designed as infiltration or filtering practices. Stormwater planters use soil infiltration and biogeochemical processes to decrease stormwater quantity and improve water quality. This project is considered a redevelopment activity in accordance with Chapter 9 of the NYS Stormwater Management Design Manual, in which the design incorporates an 86.7% reduction of the existing gravel access drive. Therefore, water quantity and quality criteria have been achieved and the use of stormwater planters is not required.

2.4.2.4 Rain Tank / Cistern:

Capture and store stormwater runoff to be used for irrigation systems or filtered and reused for non-contact activities. This project is considered a redevelopment activity in accordance with Chapter 9 of the NYS Stormwater Management Design Manual, in which the design incorporates an 86.7% reduction of the existing gravel access drive. Therefore, water quantity and quality criteria have been achieved and the use of rain tanks or cisterns is not required.

2.4.2.5 Porous Pavement:

Pervious types of pavements that provide an alternative to conventional paved surfaces, designed to infiltrate rainfall through the surface, thereby reducing stormwater runoff from a site and providing some pollutant uptake in the underlying soils. This project is considered a redevelopment activity in accordance with Chapter 9 of the NYS Stormwater Management Design Manual, in which the design incorporates an 86.7% reduction of the existing gravel access drive. Therefore, water quantity and quality criteria have been achieved and the use of porous pavement is not required nor is it applicable for this project.

2.4.2.6 Green Roof:

Capture runoff by a layer of vegetation and soil installed on top of a conventional flat or sloped roof. The rooftop vegetation allows evaporation and evapotranspiration processes to reduce volume and discharge rate of runoff entering conveyance system. This project is considered a redevelopment activity in accordance with Chapter 9 of the NYS Stormwater Management Design Manual, in which the design incorporates an 86.7% reduction of the existing gravel access drive. Therefore, water quantity and quality criteria have been achieved and the use of green roofs is not required nor is it applicable for this project.

2.4.2.7 Infiltration Basin / Trench:

Infiltration basins and trenches are shallow excavations that are lined with filter fabric and filled with stone to create underground reservoirs for stormwater runoff. This project is considered a redevelopment activity in accordance with Chapter 9 of the NYS Stormwater Management Design Manual, in which the design incorporates an 86.7% reduction of the existing gravel access drive. Therefore, water quantity and quality criteria have been achieved and the use of infiltration basins or trenches is not required.

2.4.2.8 Drywell:

Underground structures that are lined with filter fabric and back filled with stone to create reservoirs for stormwater runoff and allow infiltration into the surrounding soils from the bottom and sides. This project is considered a redevelopment activity in accordance with Chapter 9 of the NYS Stormwater Management Design Manual, in which the design incorporates an 86.7% reduction of the existing gravel access drive. Therefore, water quantity and quality criteria have been achieved and the use of drywells is not required.

2.4.2.9 Bioretention:

Filtering systems that capture and temporarily store the WQv and pass it through a filter bed of sand, organic matter, or soil. Filtered runoff may be collected and returned to the conveyance system, or allowed to partially exfiltrate into the soil. This project is considered a redevelopment activity in accordance with Chapter 9 of the NYS Stormwater Management Design Manual, in which the design incorporates an 86.7% reduction of the existing gravel access drive. Therefore, water quantity and quality criteria have been achieved and the use of bioretention areas is not required.

2.4.2.10 Dry / Wet Swale:

Vegetated open channels that are explicitly designed to capture and treat the full WQv within dry or wet cells formed by check dams or other means. This project is considered a redevelopment activity in accordance with Chapter 9 of the NYS Stormwater Management Design Manual, in which the design incorporates an 86.7% reduction of the existing gravel access drive. Therefore, water quantity and quality criteria have been achieved and the use of dry or wet swales is not required.

3.0 COMPARISON OF PRE-DEVELOPMENT TO POST-DEVELOPMENT RUNOFF

3.1. Approach and Concept.

As shown in Table 3-1, the impact of the proposed re-development project on the surrounding environment and adjacent properties is considered negligible. The reduction in impervious area of the existing gravel access drive within the project area will reduce the volume of stormwater runoff therefore achieving stormwater criteria for both water quality and quantity. Also, the change in surface cover types does not significantly increase the drainage area's curve number, which results in less than a 5% increase in the post-development peak stormwater runoff rates and volumes from the pre-development peak runoff rates and volumes for the 1, 2, 10, 25, 50 and 100-year storm events for the modeled drainage areas.

As previously discussed, only two (2) of the six (6) drainage areas discharge from the property (Drainage Areas 1 and 3). Based on our hydrology calculations, neither of these post development conditions will increase the peak discharge rate. Three (3) of the remaining four (4) areas (Drainage Areas 2, 5, and 6) indicate an increase in the post development peak discharge rate, however all runoff from these drainage areas remains onsite and the increased peak stormwater runoff rates and volumes will not cause the existing onsite freshwater ponds to overflow and impact any offsite properties. Therefore, it is our opinion that the intent of NYSDEC requirements are met.

3.2. Methodologies.

Stormwater runoff calculations were performed using AutoCAD Civil-3D 2018 and HydroCAD Version 10.0 software (SCS TR-55 method) to determine pre- and post-development peak flows and/or stormwater management practices. Under the SCS TR-55 method, 1, 2, 10, 25, 50, and 100-year storm events were modeled for both the pre and post-development conditions based on the amount of rain anticipated during varying storm frequencies and routing through the existing and proposed drainage areas to a common discharge location(s). It should be noted that only the 1 year storm (Stream Channel Protection), 10 year storm (Overbank Protection) and the 100 year storm (Extreme Flood) are required to be modeled and accounted for in the Notice of Intent (NOI).

Storm frequencies are defined as the average frequency of occurrence of events having a given volume and duration. The storm frequencies used as a basis for computing peak rate of discharge with a duration of 24-hours is provided below in Table No. 3-1 Summary of Stormwater Hydrology. Values utilized are those provided National Oceanic and Atmospheric Administration (NOAA) for this project location as allowed in Chapter 4 of the NYS Stormwater Management Design Manual. Site specific data is presented in Appendix C.

Pre and Post-Development hydrology boundaries, design points, and time of concentration paths are similar with the intent to limit the amount the peak stormwater runoff discharges. The outflows from each drainage area between pre and post-development conditions are either equal or have been designed to reduce post-development peak flows to no greater than 5% of the pre-development conditions.

3.3. Calculations.

The pre and post-development drainage areas are determined and divided into subareas based on topography and conveyance facilities. Peak runoff rates are calculated based on times of concentration, soil conditions, surface cover types, and routing calculations for the existing and developed conditions. The total pre and post-development area is the same. For the hydrologic and hydraulic assumptions used and results calculated for pre- and post-development peak flows, refer to Appendix C - Hydrologic and Hydraulic Computations. Appendix C includes the input data, time of concentration (Tc), calculation of runoff curve number (CN), peak flows for each design storm event, pre-development and post-development hydrologic and hydraulic computations, and results for existing and proposed drainage areas for the proposed development for 1, 2, 10, 25, 50, and 100 year storm events. The pre-development and post-development drainage flows for the project are summarized in Table No. 3-1 Summary of Stormwater Hydrology.

The times of concentration (Tc) have been estimated to determine the time of the longest hydraulic route within each subarea being analyzed. These routes may include overland flow (sheet flow), shallow-concentrated flow, and/or channel or pipe flows (concentrated flow). Curve Numbers (Cn) are determined based on soils and cover conditions. Refer to Table No. 3-1 and Appendix C for determined values.

Runoff rate management for the proposed project is accomplished by providing stormwater detention facilities. The proposed detention basins have been designed to provide for peak rate reduction and water quality treatment, thereby mitigating the potential impacts associated with the post-construction changes in stormwater quality and the developed condition rate of stormwater runoff relative to the existing condition rate. Since a Soil Reduction Factor was utilized, the detention pond(s) was used to treat remaining required Water Quality Volume (WQv). Below is a summary of the Pre and Post Condition Stormwater Hydrology:

Table 3-1 Summary of Stormwater Hydrology

Drainage Area 1 - Discharges Offsite				**Storm Event/Peak Flow (cfs)**					
Description	Area	CN	Tc	1-Yr.	2-Yr.	10-Yr.	25-Yr.	50-Yr.	100-Yr.
Rainfall (inches)	NA	NA	NA	1.97	2.35	3.34	4.09	4.76	5.55
Pre 1	9.6	38	97.2	0	0	0	0.04	0.13	0.38
Post 1	5.43	39	70.7	0	0	0	0.03	0.1	0.3
Difference: Post Treated - Pre	-4.17	1	-26.5	0	0	0	-0.01	-0.03	-0.08
Percent (%) Increase in Peak Flow				0.00%	0.00%	0.00%	-33.33%	-30.00%	-26.67%
Is Post Peak Runoff in compliance?				Yes	Yes	Yes	Yes	Yes	Yes
Drainage Area 2 - Discharge Remains Onsite				**Storm Event/Peak Flow (cfs)**					
Description	Area	CN	Tc	1-Yr.	2-Yr.	10-Yr.	25-Yr.	50-Yr.	100-Yr.
Pre 2	62.62	48	396.8	0	0	0.58	1.61	2.98	5.09
Post 2	66.96	48	396.8	0	0	0.62	1.72	3.19	5.44
Difference: Post Treated - Pre	4.34	0	0	0	0	0.04	0.11	0.21	0.35
Percent (%) Increase in Peak Flow				0.00%	0.00%	6.45%	6.40%	6.58%	6.43%
Is Post Peak Runoff in compliance?				Yes	Yes	Yes	Yes	Yes	Yes
Drainage Area 3 - Discharges Offsite				**Storm Event/Peak Flow (cfs)**					
Description	Area	CN	Tc	1-Yr.	2-Yr.	10-Yr.	25-Yr.	50-Yr.	100-Yr.
Pre 3	0.5	36	37.6	0	0	0	0	0	0.01
Post 3	0.34	37	30.7	0	0	0	0	0	0.01
Difference: Post Treated - Pre	-0.16	1	-6.9	0	0	0	0	0	0
Percent (%) Increase in Peak Flow				0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Is Post Peak Runoff in compliance?				Yes	Yes	Yes	Yes	Yes	Yes
Drainage Area 4 - Discharge Remains Onsite				**Storm Event/Peak Flow (cfs)**					
Description	Area	CN	Tc	1-Yr.	2-Yr.	10-Yr.	25-Yr.	50-Yr.	100-Yr.
Pre 4	1.22	36	39.5	0	0	0	0	0.01	0.03
Post 4	1.22	36	39.5	0	0	0	0	0.01	0.03
Difference: Post Treated - Pre	0	0	0	0	0	0	0	0	0
Percent (%) Increase in Peak Flow				0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Is Post Peak Runoff in compliance?				Yes	Yes	Yes	Yes	Yes	Yes
Drainage Area 5 - Discharge Remains Onsite				**Storm Event/Peak Flow (cfs)**					
Description	Area	CN	Tc	1-Yr.	2-Yr.	10-Yr.	25-Yr.	50-Yr.	100-Yr.
Pre 5	13.55	61	88.6	0.11	0.35	1.87	3.7	5.69	8.38
Post 5 w/ Treatment	13.55	62	86.7	0.14	0.44	2.1	4.04	6.14	8.97
Difference: Post Treated - Pre	0	1	-1.9	0.03	0.09	0.23	0.34	0.45	0.59
Percent (%) Increase in Peak Flow				21.43%	20.45%	10.95%	8.42%	7.33%	6.58%
Is Post Peak Runoff in compliance?				Yes	Yes	Yes	Yes	Yes	Yes

Drainage Area 6 - Discharge Remains Onsite				**Storm Event/Peak Flow (cfs)**					
Description	Area	CN	Tc	1-Yr.	2-Yr.	10-Yr.	25-Yr.	50-Yr.	100-Yr.
Pre 6	1.62	47	78.9	0	0	0.02	0.07	0.17	0.34
Post 6 w/ Treatment	1.62	48	78.9	0	0	0.02	0.09	0.2	0.38
Difference: Post Treated - Pre	0	1	0	0	0	0	0.02	0.03	0.04
Percent (%) Increase in Peak Flow				0.00%	0.00%	0.00%	22.22%	15.00%	10.53%
Is Post Peak Runoff in compliance?				Yes	Yes	Yes	Yes	Yes	Yes
Peak runoff compliance is based upon the post-development flows not leaving the property and being no greater than 5% more than pre-development peak flows as allowed by NYSDEC General Permit.									
Legend: cfs = Cubic Feet per Second CN = Runoff Curve Number Tc = Time of Concentration Area measured in Acres Tc measured in hours NA = Not Applicable									

3.4. Channel Protection Volume (CPv).

Stream Channel Protection Volume Requirements (CPv) are designed to protect stream channels from erosion. In New York State this goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event, remained from runoff reduction. Trout waters may be exempted from the 24-hour extended detention requirement, with only 12 hours of extended detention required to meet this criterion. Also, the CPv requirement does not apply in certain conditions including the following: reduction of the entire CPv is achieved at a site through green infrastructure or infiltration systems or the site discharges directly to tidal waters or fifth order or larger streams.

According to Chapter 9 (part 9.2.1.A.II) Channel protection for redevelopment activities is not required if there are no changes to hydrology that increase the discharge rate from the project site. Chapter 9 also states that if the hydrology and hydraulic analysis for the project shows that the post-construction 1-year 24 hour discharge rate and velocity are less than or equal to the pre-construction discharge rate, providing 24-hour detention of the 1-year storm to meet the channel protection volume is not required.

As shown in Table No. 3-1 Summary of Stormwater Hydrology, the hydrology and hydraulic analysis for the project shows that the post-construction 1-year 24 hour discharge rate and velocity are equal to the pre-construction discharge rate and velocity for all drainage areas except for drainage area DA-5. However, discharge from DA-5 remains onsite and flows to an existing onsite freshwater pond. This freshwater pond was analyzed to determine whether the change in peak stormwater runoff rates and volumes from pre to post-development conditions would increase the surface water elevation potentially causing an impact to offsite properties. Based on our hydrology calculations, the increased peak stormwater runoff rates and volumes will not cause the existing onsite freshwater pond to overflow and impact any offsite properties. Therefore, channel protection volume criteria are not required.

3.5. Assumptions.

The assumptions used in assessing pre-development and post-development drainage conditions include:

1. Pre-development runoff curve numbers were based on cover conditions prior to any development.
2. Pre-development cover conditions were estimated based on a current orthographic photograph downloaded from the New York State Geographic Information Clearinghouse website. These cover conditions were confirmed by subsequent site inspections by Keystone Associates.
3. The woods and other vegetative cover curve numbers were based on "good" cover conditions, as defined in the runoff curve Table No's.
4. Cover conditions for post-development were based on the areas of the proposed gravel access drives and grass lawns, as well as the wooded areas to remain.
5. The Time-of-Concentration (Tc) was either longer or the same for post-development conditions than it was for pre-development conditions since the longest Tc line intersected the project area which involved removing an area of the woodland and replacing it with a vegetative surface; therefore resulting in equal to or greater peak flow rates with an increase in runoff curve number (CN).

3.6. Summary of Permit Requirements.

As stated above in Section 3.1 and shown in Table 3-1, the impact of the proposed re-development project on the surrounding environment and adjacent properties is considered negligible. The reduction in impervious area of the existing gravel access drive within the project area will reduce the volume of stormwater runoff therefore achieving stormwater criteria for both water quality and quantity. Also, the post-development peak stormwater runoff rates and volumes are less than 5% of the pre-development peak runoff rates and volumes for the 1, 2, 10, 25, 50 and 100-year storm events for the modeled drainage area. Drainage areas that do not meet this requirement discharge directly to a freshwater pond onsite with no adverse impacts to the natural condition of the waterbody or to offsite properties.

4.0 STORMWATER MANAGEMENT

4.1. Stormwater Management Facilities.

Plans and specifications for the Stormwater management and erosion and sediment control systems are included in Appendix D - Stormwater Management Plans, Details, and Specifications. A description of Post-Construction Stormwater Management Practices requiring long term maintenance and deed restrictions are discussed in Section 6.4, 6.5 and 6.6.

Temporary erosion and sediment control facilities are required during construction such as a construction entrance, temporary seed and mulching, dust control, etc. Permanent stormwater control facilities such as the dry swales, check dams, topsoil, and permanent seeding are required after construction.

Construction activities are anticipated to be conducted in sequential order. The stabilized construction entrance and gravel access drive will first be installed. Topsoil must be stripped from within the layout of the gravel access drive and stockpiled onsite to be reused during final stabilization. The subgrade within the gravel access drive will be excavated and stockpiled in a single location on site to be used as fill material. Any soil stockpile that has been left inactive must be stabilized with vegetation and a silt fence installed around the toe of the slope. Fabric will be placed over the excavated subgrade and trucks will deposit NYSDOT Type 4 structural fill material directly onto the fabric. A bulldozer will spread the material to the proper grade and a roller will compact the subbase. The compacted gravel material is considered by NYSDEC to be an acceptable stabilized surface. Any stockpiled fill material from the gravel access drive will be used in other fill areas or more fill material will need to be imported to the site. Excess material shall be removed from the site and disposed of in a legal manner. Topsoil and permanent seeding must be installed on all disturbed areas following any grading and construction of the dry swales.

The solar energy system will then be constructed by either drilling or driving the support posts and installing the racking system. The underground electrical utilities will then be installed from Lime Hollow Road to the solar energy system. Some material from the utility trenching will be stockpiled immediately adjacent to the trench to be used as backfill, but the contractor will backfill all trenches on the same day as they are excavated. Topsoil and permanent seeding shall occur immediately after trenching has been completed.

5.0 EROSION AND SEDIMENT CONTROL

5.1. Erosion and Sediment Control Plan.

A key component of the SWPPP is the Erosion and Sediment Control Plan (E&SC Plan) included in Appendix D, which sets forth the measures to be implemented before the start of construction, and throughout the entire construction phase. The implementation of these measures must be monitored and maintained during construction in accordance with the SPDES regulations. Stabilization of the site shall also comply with the conditions and requirements set forth therein and further established by the local municipality, if any. Refer to Appendix A for a copy of the SPDES Permit No. GP-0-15-002.

The purpose of the E&SC Plan is to minimize the erosion of disturbed soil and to prevent the migration of sediment into surface waters and off-site properties during construction and until the site has received final stabilization. The E&SC plan accomplished that purpose through reducing runoff velocities, limiting the area of disturbed soils at any one time, and rapidly stabilizing disturbed soils. This plan contains specifications for erosion controls and associated construction details designed to mitigate potential impacts associated with erosion and sedimentation.

E&SC measures should be discussed following a pre-construction conference with appropriate agency and project staff. In addition, the Applicant must engage a qualified professional to oversee implementation of the SWPPP, including the specific E&SC Plan component. Implementation of the E&SC Plan would be based on New York State's Standards and Specifications for Erosion and Sediment Control, latest addition.

During construction, areas of active disturbance must be limited to less than five (5) acres unless otherwise approved by the NYSDEC.

5.2. Temporary Erosion and Sediment Control Facilities.

Temporary erosion and sediment control facilities to be used during construction by the construction contractor are provided in Appendix D – Stormwater Management Plans, Details, and Specifications. In general, the temporary erosion and sediment control facilities to be used at the site during construction may include, but are not necessarily limited to:

1. Stabilized construction entrance
2. Silt fence
3. Grading
4. Dust control
5. See and Mulch

Use of appropriate E&SC practices should be closely monitored during construction duration inspection activities and applied as determined necessary.

5.3. Permanent Erosion and Sediment Control Facilities.

Permanent erosion and sediment control facilities are provided in Appendix D – Stormwater Management Plans, Details, and Specifications. In general, the permanent erosion and sediment control facilities may include, but are not necessarily limited to:

1. Land grading

5.4. Site Inspections / Winter Site Stabilization.

Site inspections and winter site stabilization must be conducted in accordance with the SPDES General Permit provided in Appendix A. The guidance below has been incorporated into the SWPPP to address such requirements. In general, once weekly inspections are required for sites which disturb less than five (5) acres at any one time. Twice weekly inspections are required for sites which have been authorized to disturb greater than five (5) acres at any one time. Specific E&S requirements are identified in the permit and must be followed. Winter shutdown is not anticipated due to the proposed dates of construction.

6.0 IMPLEMENTATION SCHEDULE AND MAINTENANCE

6.1. Implementation Schedule (Sequence of Operations).

The following schedule (sequence of operations) for erosion and sediment control facilities shall be implemented: (Note that no more than 5-acres will be disturbed at any one time).

1. Obtain plan approval and building permit from municipal and regulatory agencies for project as required.
2. Submit Notice of Intent (NO1) for Stormwater Discharges Associated with Construction Activity Under the SPDES General Permit.
3. Hold Pre-construction Conference.
4. Contractors shall sign Contractor's Certification Statement prepared for the project.
5. Install on-site mail box (combination lock preferred) to hold NOI, Permit Notice, SWPPP, and Inspection Reports. A sign providing SWPPP contact names and phone numbers is preferred.
6. Install Stabilized Construction Entrance.
7. Install Silt Fence.
8. Install Filter Sock Check Dams.
9. Install Gravel Access Drive.
10. Install Solar Base Supports and Solar Arrays.
11. Install Underground Utilities and Utility Poles.
12. Install Chain Link Fence and other amenities.
13. Install Seed and Mulch to all disturbed areas.
14. Remove all temporary erosion and sediment control measures after site has met the requirements of Final Stabilization.
15. Submit Notice of Termination (NOT) form for Stormwater Discharges Associated with Construction Activity under the SPDES General Permit.

The site owner/operator(s), developer(s), and contractor(s) shall be responsible for development and implementation of appropriate temporary and permanent erosion and sediment control features on the parcel in compliance with all applicable rules, regulations, permits, project plans and specifications, and the Stormwater Management and Pollution Prevention Plan during construction. Following construction, the parcel owner/operator is responsible for permanent erosion and sediment control features. Documentation of installation of stormwater management and erosion and sediment control practices should be accordance with the Stormwater Construction-site Logbook (Appendix E) prepared for the project.

The Construction-site Logbook including signed NOI, NOI acknowledgement letter (permit notification), MS4 SWPPP acceptance form, contractor's certification statements, Stormwater Management and Pollution Prevention Plan, and weekly SWPPP inspections shall be kept on-site and up to date at all times during construction. The Stormwater Construction-site Logbook shall be placed in an on-site mailbox accessible to authorities at all times.

All litter shall be cleaned up by the end of each working day and properly disposed of. All debris shall be stored neatly until it can be removed and properly disposed of. All chemicals shall be properly applied according to directions and properly stored in appropriate containers when not in use.

6.2. Record Keeping During Construction.

The stormwater record keeping requirements and report forms are included in Appendix E – Stormwater Construction-site Logbook. According to the permit, the owner or operator shall retain a copy of the NOI, NOI acknowledgment letter, SWPPP, and any inspection reports that were prepared in conjunction with the permit for a period of five years from the date that the site achieves final stabilization. Also, the contractor and subcontractors engaged in work affecting stormwater drainage at the site shall sign a contractor certification statement prior to undertaking any construction activity at the site, binding them to terms and conditions of the SWPPP. Blank copies of the contractor certification statements are provided in Appendix E – Stormwater Construction-site Logbook documentation. Signed copies should be retained on-site within a Stormwater Construction-site Logbook, provided separately. The logbook should also be maintained to address record keeping such as contractor's "trained individual(s)" designations, final inspection reporting and notice of termination documentation. Properly completing the forms contained in the logbook will meet the inspection requirements for the NYSDEC SPDES General Permit for Construction Activities. The logbook and completed forms and this SWPPP shall be kept on-site at all times during construction and made available to authorities upon request.

6.3. Construction and Waste Materials and Spill Controls.

Construction materials expected to be temporarily stored on-site while the site is under construction include concrete, wood, metal, and plastics, and other miscellaneous materials. They shall be covered by water resistant coverings to prevent contact with rainwater and they shall be stored off the ground (on pallets for example) to prevent contact with stormwater runoff. Soil materials such as fill and topsoil stockpiles shall be surrounded with silt fence for erosion control.

Waste materials expected to be temporarily stored on the site during the construction of the driveways may include wood and brush from clearing operations, soil from driveway grading operations, trimmings from geotextile soil stabilization materials, and other miscellaneous waste materials such as wood, metal and plastic trimmings, etc. associated with construction.

Temporary excess soil material stockpiles shall have silt fence installed at the toe of slope for erosion control. Wood, stumps and brush shall be removed from the site and disposed of in a legal manner and must not be buried on-site unless approved by proper authority. Excess soils shall be removed from the site and disposed of in a legal manner unless fill location is provided by owner. Miscellaneous waste materials shall be stored in waste containers such as dumpsters or other appropriate containers which are periodically emptied by certified waste haulers or taken to an approved landfill or disposal site.

Excess concrete shall be dumped in a pre-determined location where materials are contained and cannot leach into waterways or storm sewer systems. Materials shall then be disposed in a legal manner unless approved fill location is provided by owner.

All petroleum spills that occur within New York State (NYS) must be reported to the NYS Spill Hotline (1-800-457-7362) within two (2) hours of discovery, except spills which meet all of the following criteria:

1. The quantity is known to be less than five (5) gallons; and
2. The spill is contained and under the control of the spiller; and
3. The spill has not and will not reach the State's water or any land; and
4. The spill is cleaned up within two (2) hours of discovery.

A spill is considered to have not impacted land if it occurs and is contained on a paved surface such as asphalt or concrete. A spill in a soil or gravel parking lot that is considered to have impacted land and is a reportable release.

6.4 Short Term Maintenance

Short term maintenance shall occur during construction and for a post-construction period of one (1) year, to be followed by long term maintenance activities. All maintenance of any vegetation, constructed cuts, fills, and/or stormwater management practices is the responsibility of the owner/operator identified within the filed Notice of Intent (refer to Appendix A – Stormwater Discharge Permit Information). Maintenance scheduling is provided in Table No. 6-1.

Also, the contractor and subcontractors engaged in work affecting stormwater drainage at the site shall sign a contractor certification statement prior to undertaking any construction activity at the site, binding them to terms and conditions of the SWPPP. Blank copies of the contractor certification statements are provided in Appendix E – Stormwater Construction-site Logbook documentation. Signed copies should be retained on-site within a Stormwater Construction-site Logbook, provided separately.

6.5. Long Term Maintenance.

The owner/operator will be responsible for maintaining those facilities located within its property boundaries and designated easements, if any. Long term maintenance shall occur monthly following construction for a post-construction period of three (3) months following construction. The municipality shall be responsible for maintaining the stormwater systems within their existing highway right-of-ways and/or designated easements, if any.

6.6. Maintenance Schedule.

A broad schedule for maintaining the stormwater control facilities is summarized in Table No. 6-1 Maintenance Schedule. More frequent inspections and/or maintenance may be required as detailed above in Section 6.4.

Table No. 6-1 Maintenance Schedule

	Construction Period		Short Term (1-Year)		Long Term	
Stormwater Practice	Inspect Sched.	Mow or Clean	Inspect Sched.	Mow or Clean	Inspect Sched.	Mow or Clean
Vegetated Areas	weekly	4” to 6”	Monthly	4” to 6”	Annually	4” to 6”

6.7. Identification of Post-construction Stormwater Practices.

No post-construction stormwater practices are planned for this project since both the quantity and quality criteria in Chapter 9 of the NYS Stormwater Management Design Manual have been achieved. Please note that Question 10 of the Notice of Termination requires a Declaration of Restrictive Covenant regarding Maintenance of “Post-Construction Stormwater Management Practices.”

REFERENCES

Keystone Associates Architects, Engineers and Surveyors, LLC, 58 Exchange Street, Binghamton New York 13901. Solar Array Plan Lime Hollow Solar Project Plans, Town of Cortlandville, Cortland County, New York, 2019.

New York State Department of Environmental Conservation. January 29, 2015. New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activity, Permit No. GP-0-15-002 (effective date January 29, 2015; expiration date January 28, 2020).

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New York State Department of Environmental Conservation. November 2016. New York State Standards and Specifications for Erosion and Sediment Control. Empire State Chapter, Soil and Water Conservation Society, Albany, New York.

New York State (NYS) Geographic Information System (GIS): www.nysgis.state.ny.us.

NYS Environmental Resource Mapper service: www.dec.ny.gov/imsmaps/erm/viewer.htm

NYS Stormwater Interactive Mapper service: www.dec.ny.gov/imsmaps/stormwater/viewer.htm

United States Department of Agriculture Natural Resources Conservation Service's Web Soil Survey. www.websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

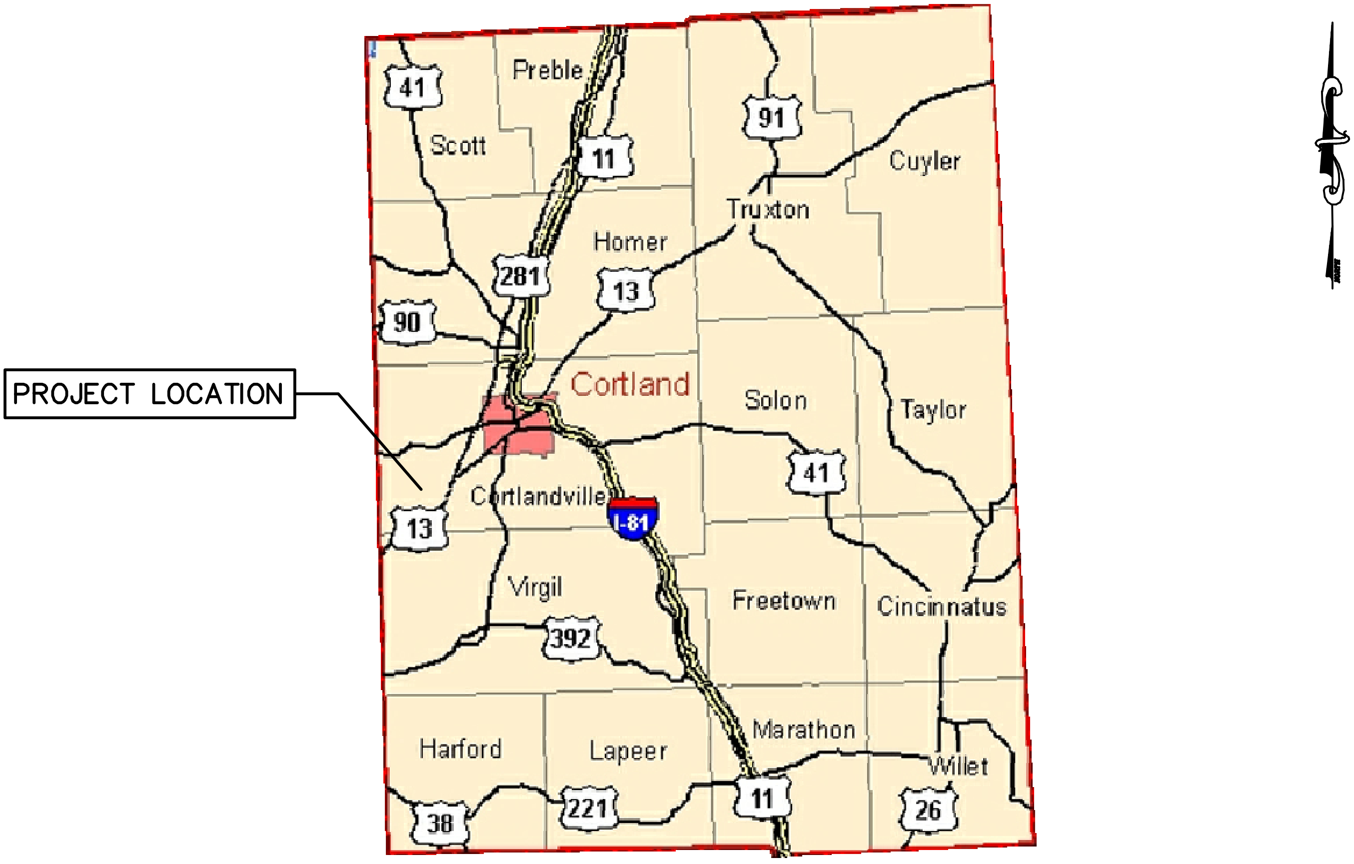
Cortland County Geographic Information Systems Data Viewer: www.cortland-co.org

Soil Survey Cortland County New York. 1961. USDA/Cornell University. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

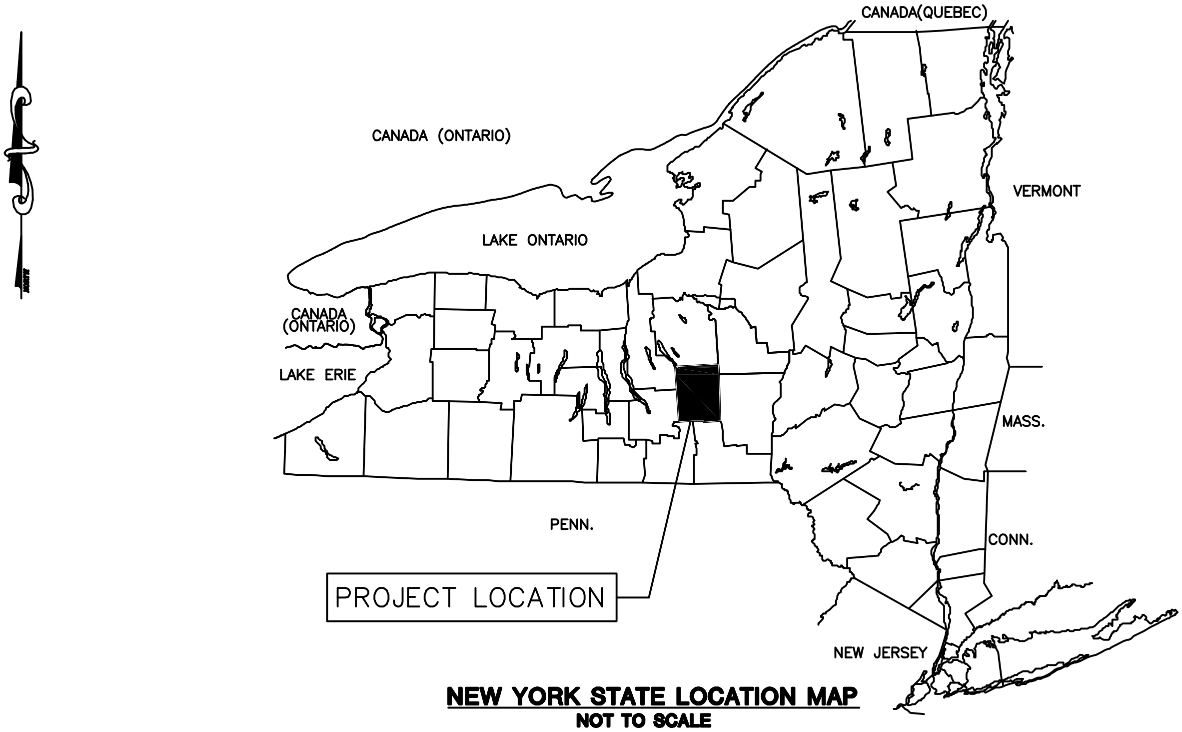
Federal Emergency Management Service (FEMA) online map service center. www.msc.fema.gov

United States Fish and Wildlife Service (USF&W) National Wetlands Inventory (NWI) – Wetlands online mapper service: www.wetlandsfws.er.usgs.gov

FIGURES



CORTLAND COUNTY LOCATION MAP
NOT TO SCALE



NEW YORK STATE LOCATION MAP
NOT TO SCALE

KEYSTONE ASSOCIATES
ARCHITECTS, ENGINEERS AND SURVEYORS, LLC

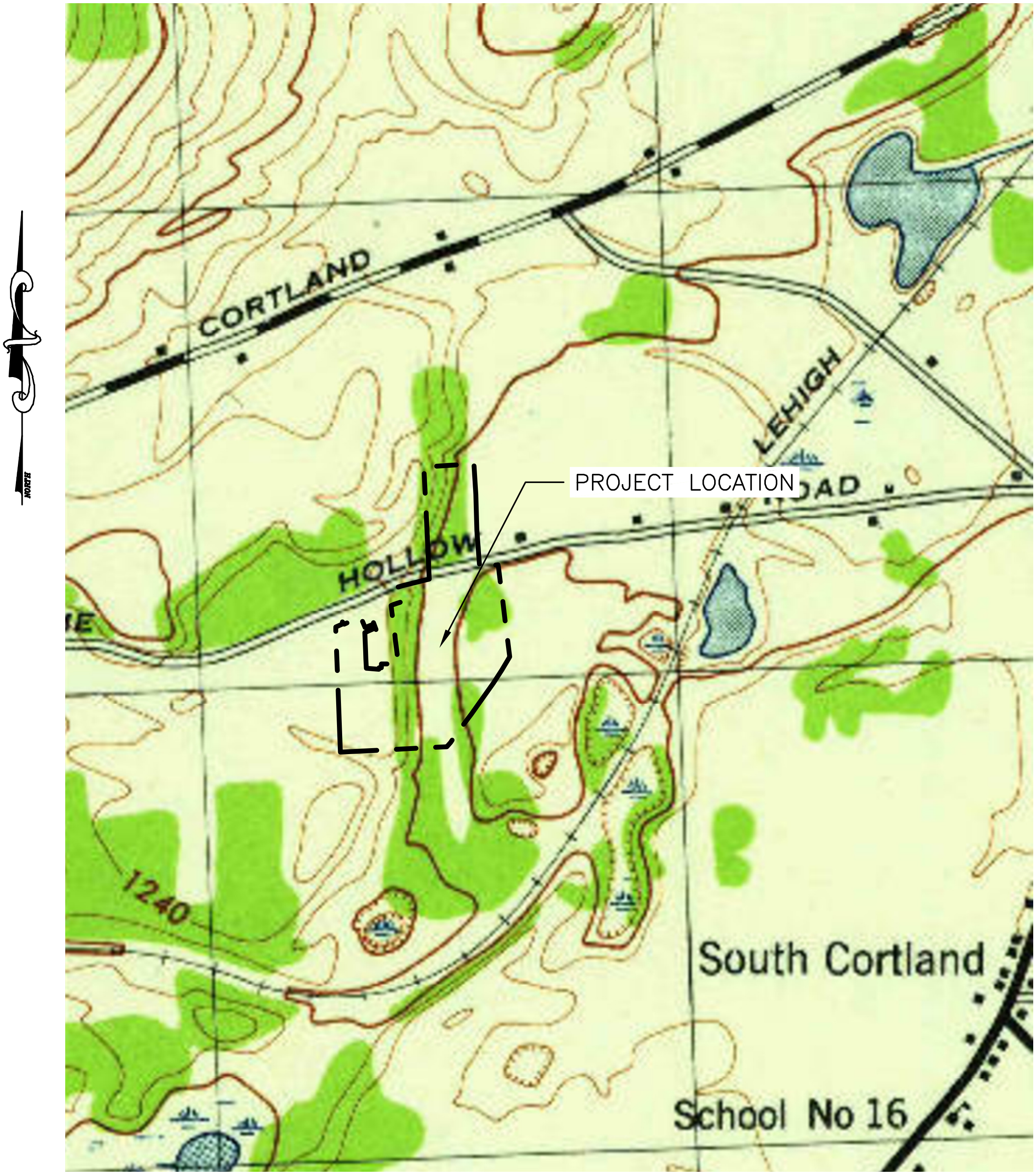
LIME HOLLOW SOLAR LLC
LIME HOLLOW ROAD

TOWN OF CORTLANDVILLE
CORTLAND COUNTY NEW YORK STATE

KEYSTONE PROJECT #2850.24418.5

FIGURE NO. 1

LOCATION MAP



SCALE: 1" = 2,000'

QUAD NAME:
CORTLAND, NY
1944

KEYSTONE ASSOCIATES
ARCHITECTS, ENGINEERS AND SURVEYORS, LLC

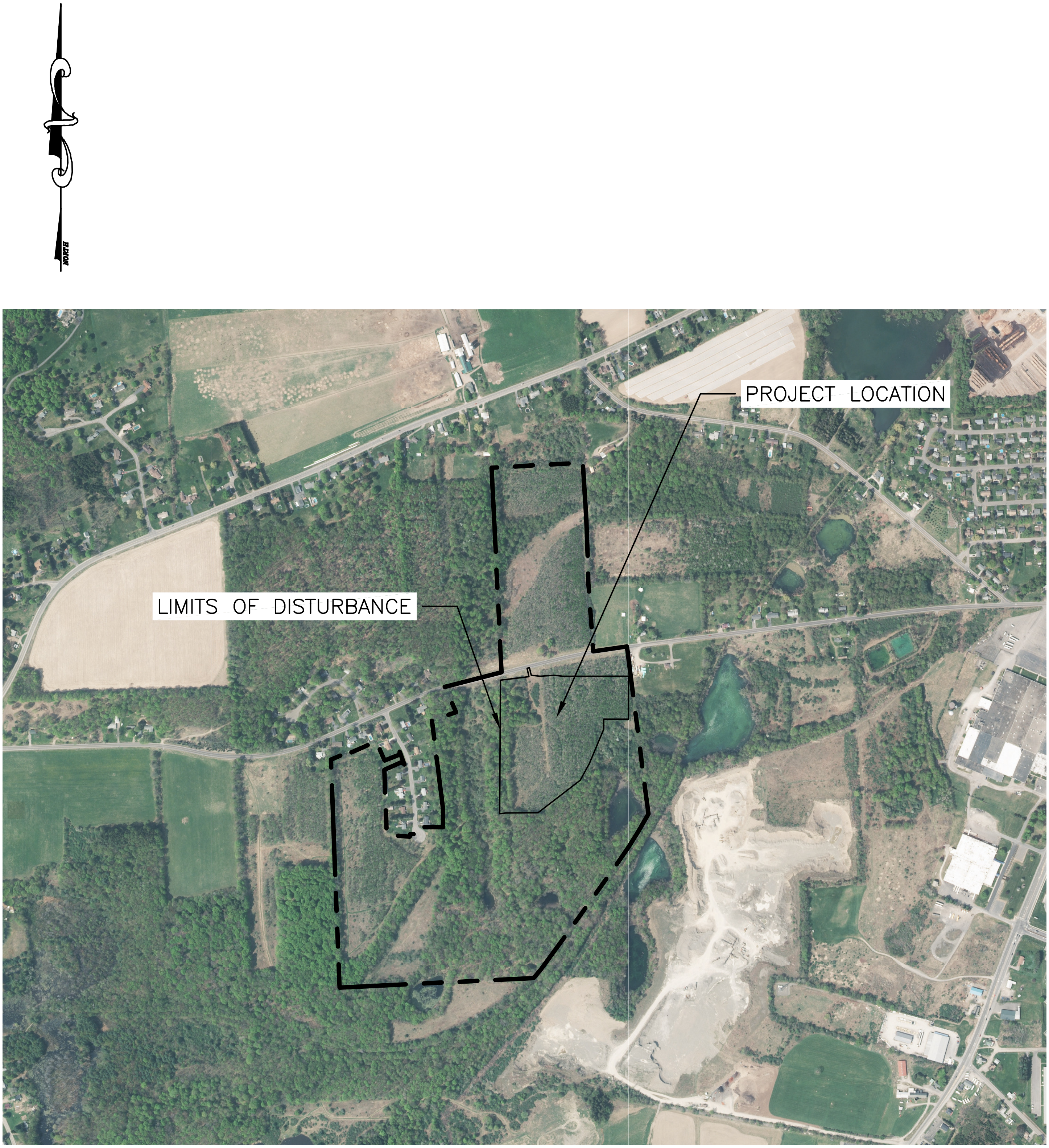
LIME HOLLOW SOLAR LLC
LIME HOLLOW ROAD

TOWN OF CORTLANDVILLE
CORTLAND COUNTY NEW YORK STATE

KEYSTONE PROJECT #2850.24418.5

FIGURE NO. 2

USGS VICINITY MAP



SCALE: 1" = 1,000'

KEYSTONE ASSOCIATES
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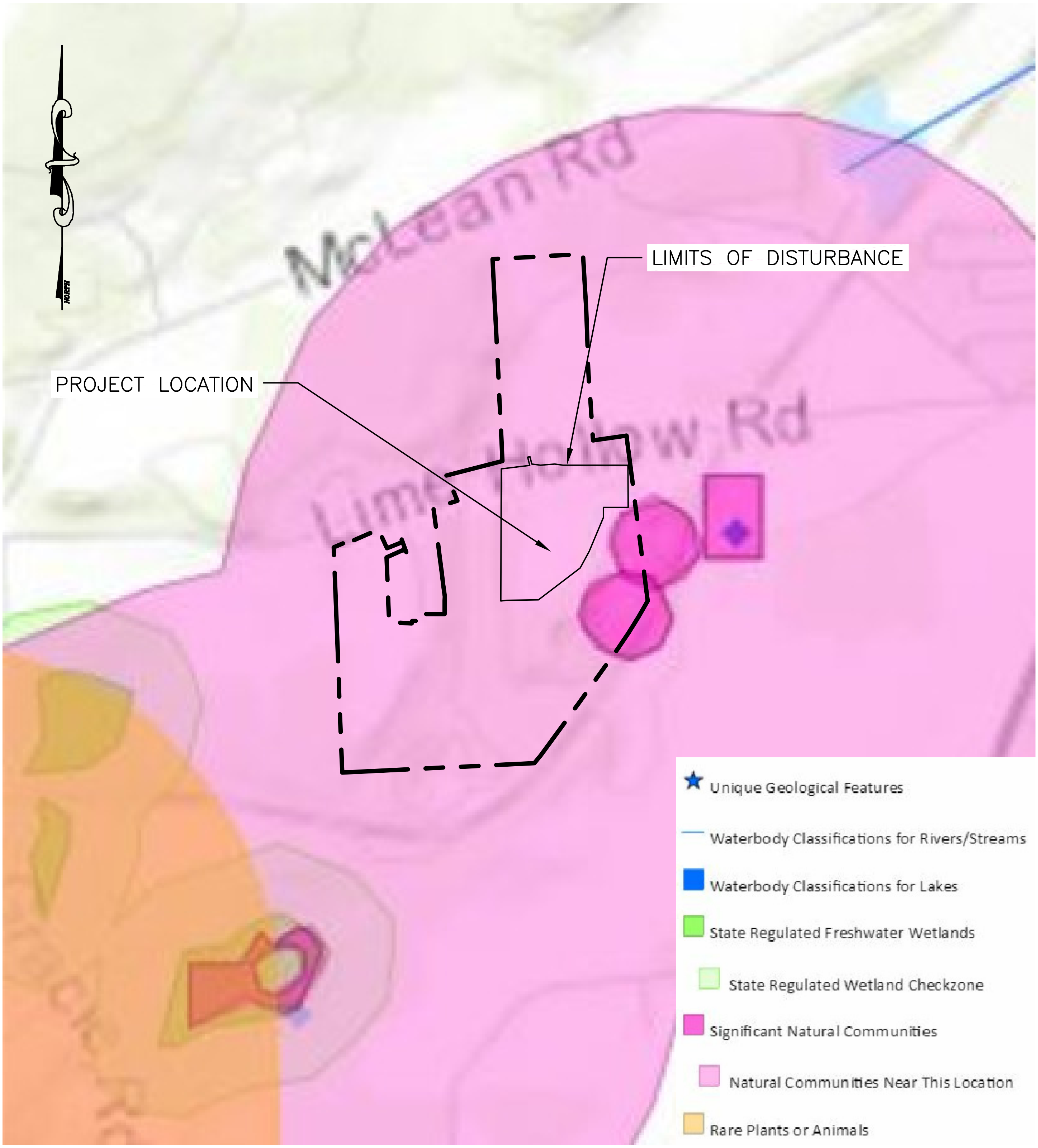
LIME HOLLOW SOLAR LLC
LIME HOLLOW ROAD

TOWN OF CORTLANDVILLE
CORTLAND COUNTY NEW YORK STATE

KEYSTONE PROJECT #2850.24418.5

FIGURE NO. 3

AERIAL PHOTO



SCALE: 1" = 1,000'

KEYSTONE ASSOCIATES
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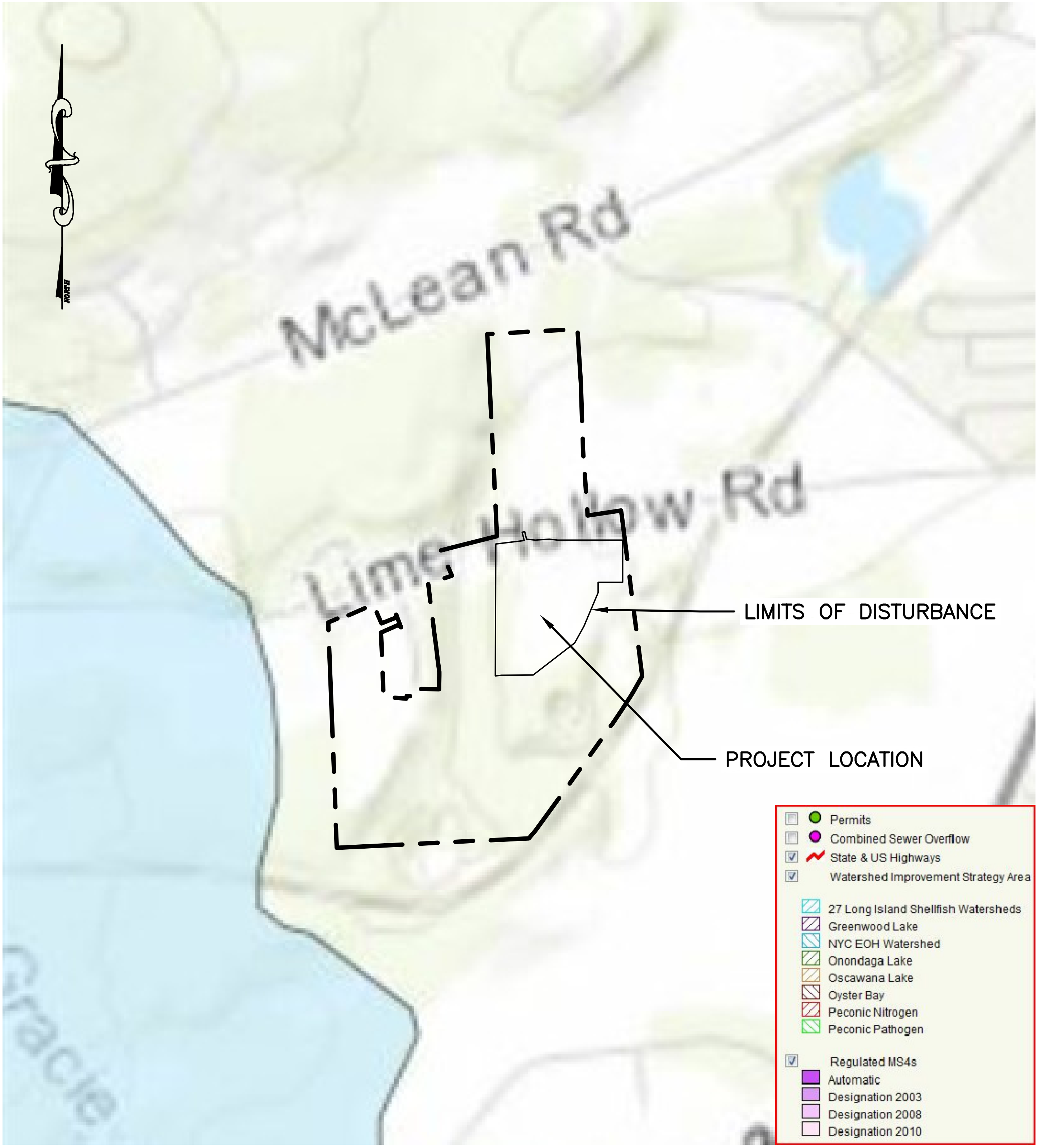
LIME HOLLOW SOLAR LLC
LIME HOLLOW ROAD

TOWN OF CORTLANDVILLE
CORTLAND COUNTY NEW YORK STATE
KEYSTONE PROJECT #2850.24418.5

FIGURE NO. 4

NYSDEC
ENVIRONMENTAL
RESOURCE MAP



SCALE: 1" = 1,000'

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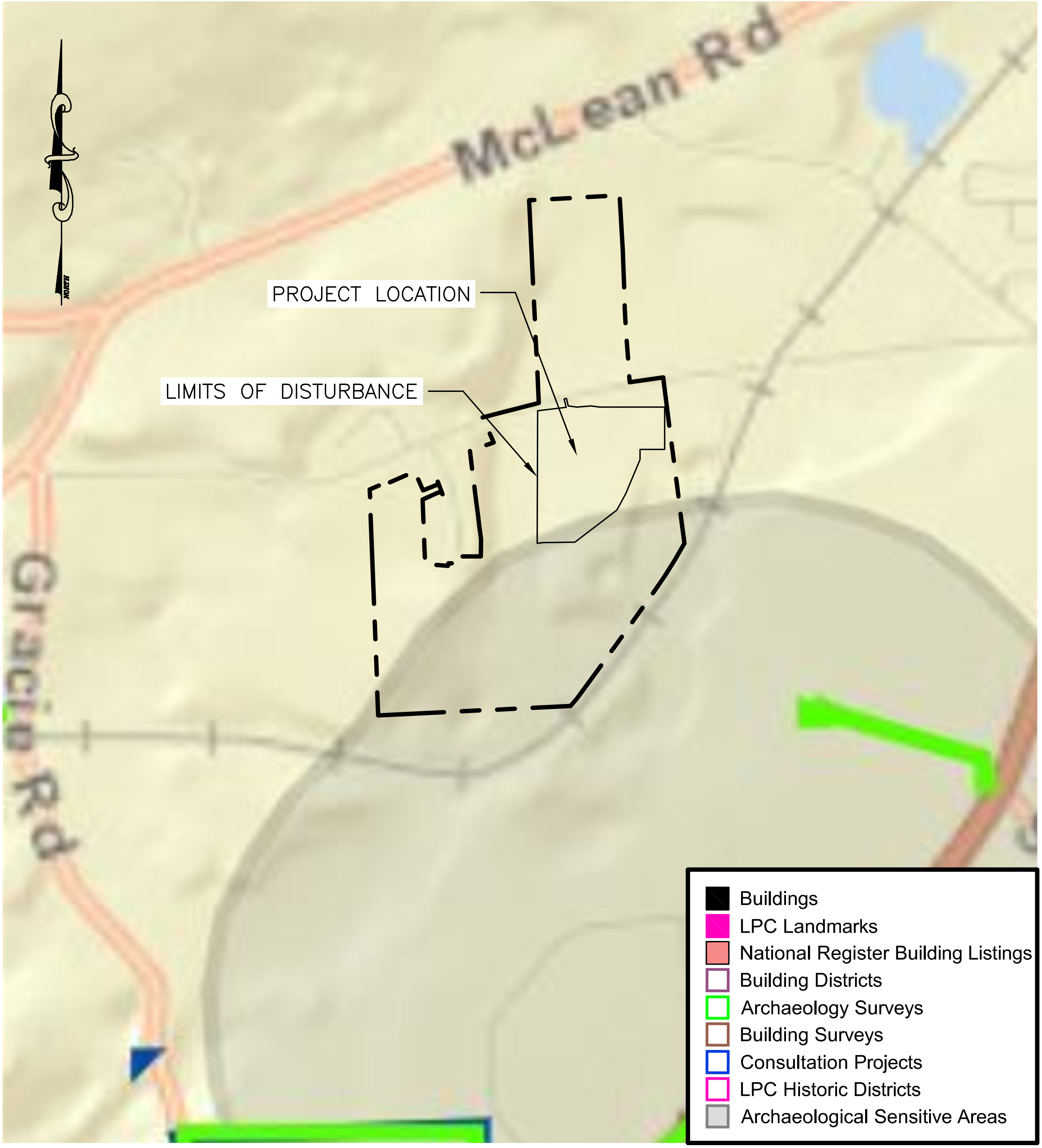
TOWN OF CORTLANDVILLE
CORTLAND COUNTY NEW YORK STATE
KEYSTONE PROJECT #2850.24418.5

FIGURE NO. 5

NYSDEC STORMWATER
INTERACTIVE MAP



SCALE: 1" = 500'

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CORTLAND COUNTY NEW YORK STATE

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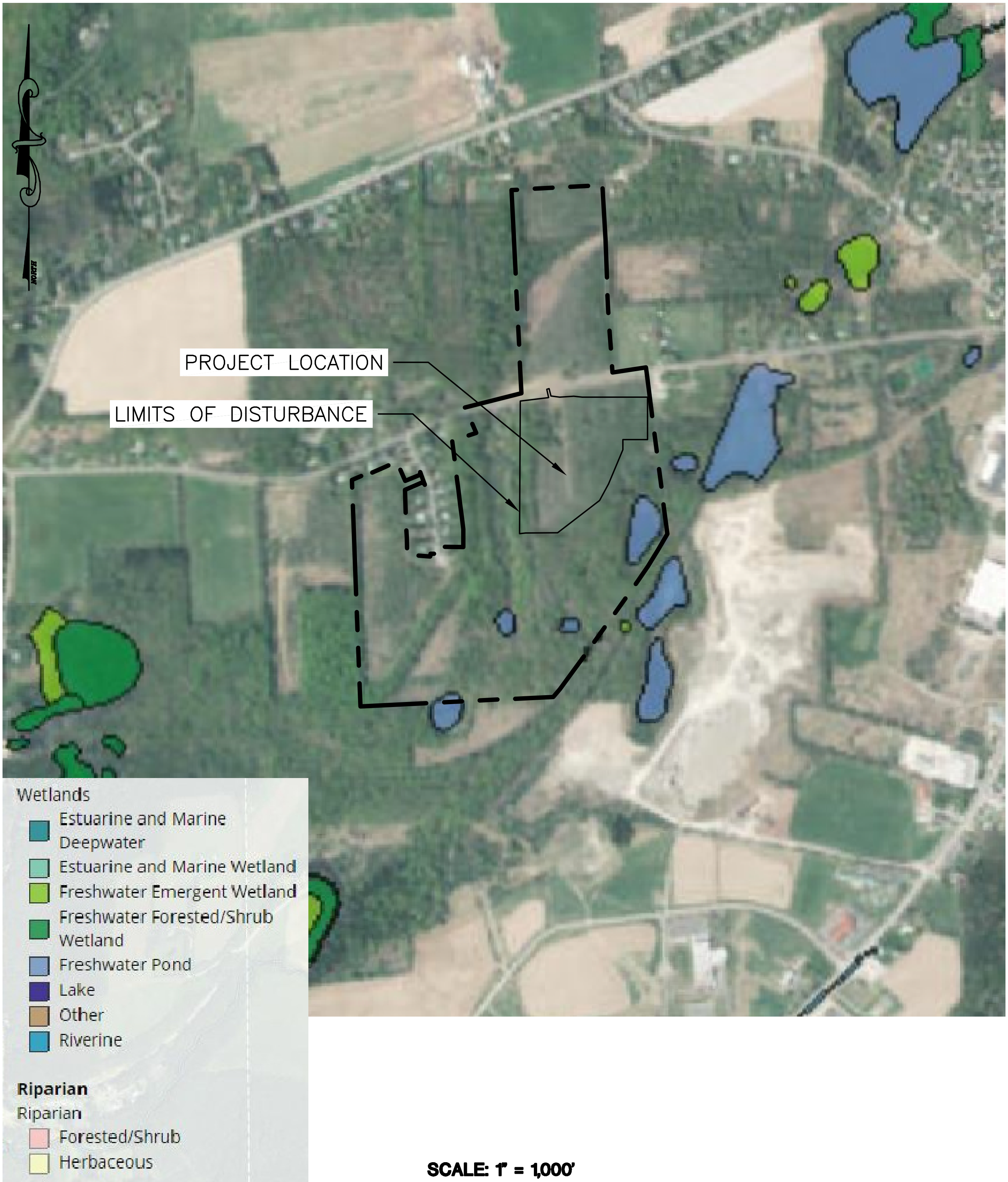
FIGURE NO. 6

NYS
CULTURAL RESOURCE
INFORMATION MAP



SCALE: 1" = 1,000'

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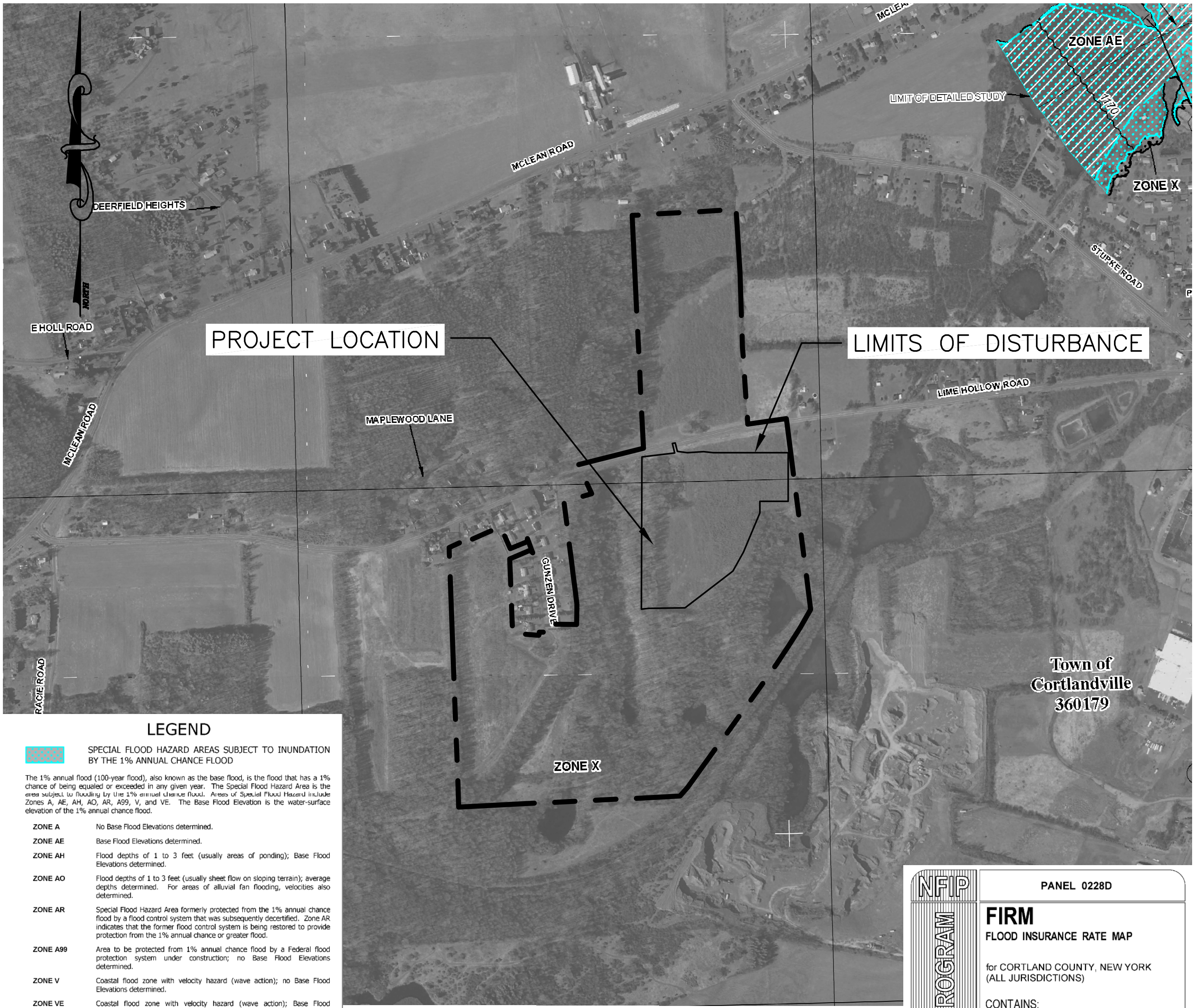
FIGURE NO. 7

NATIONAL WETLAND
INVENTORY MAP



LEGEND

▨ SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

▨ FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

▒ OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

☐ OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

▧ COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

▧ OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

———	1% annual chance floodplain boundary
———	0.2% annual chance floodplain boundary
— — —	Floodway boundary
— — —	Zone D boundary
•••••••••••••••	CBRS and OPA boundary
▨ ←	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

SCALE: 1" = 1,000'

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0228D

FIRM

FLOOD INSURANCE RATE MAP

for CORTLAND COUNTY, NEW YORK
(ALL JURISDICTIONS)

CONTAINS:

COMMUNITY	NUMBER
CORTLANDVILLE, TOWN OF	360179

PANEL 228 OF 440
MAP SUFFIX: D
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

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

MAP NUMBER
36023C0228D

EFFECTIVE DATE
MARCH 2, 2010

Federal Emergency Management Agency

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ASSOCIATES
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CORTLAND COUNTY NEW YORK STATE

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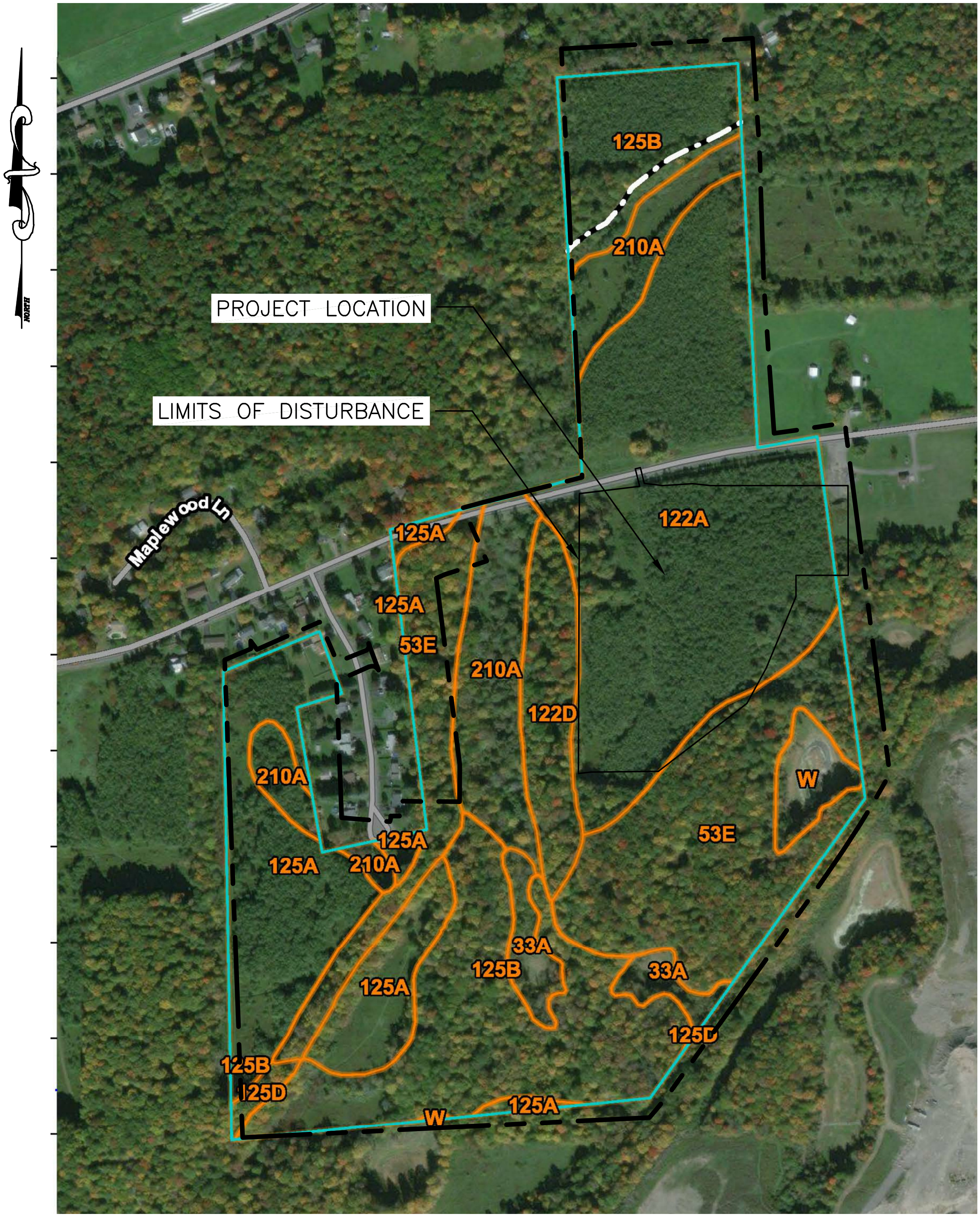
FIGURE NO. 8

FLOOD ZONE MAP



SCALE: 1" = 500'

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TOWN OF CORTLANDVILLE
CORTLAND COUNTY NEW YORK STATE

KEYSTONE PROJECT #2850.24418.5

FIGURE NO. 9

SOILS MAP

PRE DRAINAGE AREA 1
WOODLAND – A SOILS (CN=36) = 8.97 ACRES
GRASS – A SOILS (CN=49) = 0.34 ACRES
GRAVEL – A SOILS (CN=72) = 0.20 ACRES
ASPHALT – A SOILS (CN=98) = 0.10 ACRES
TOTAL AREA (SITE) = 9.61 ACRES
Tc pre (SITE) = 97.2 MINS
CN pre (SITE) = 38
FLOW DIRECTION = ⟶

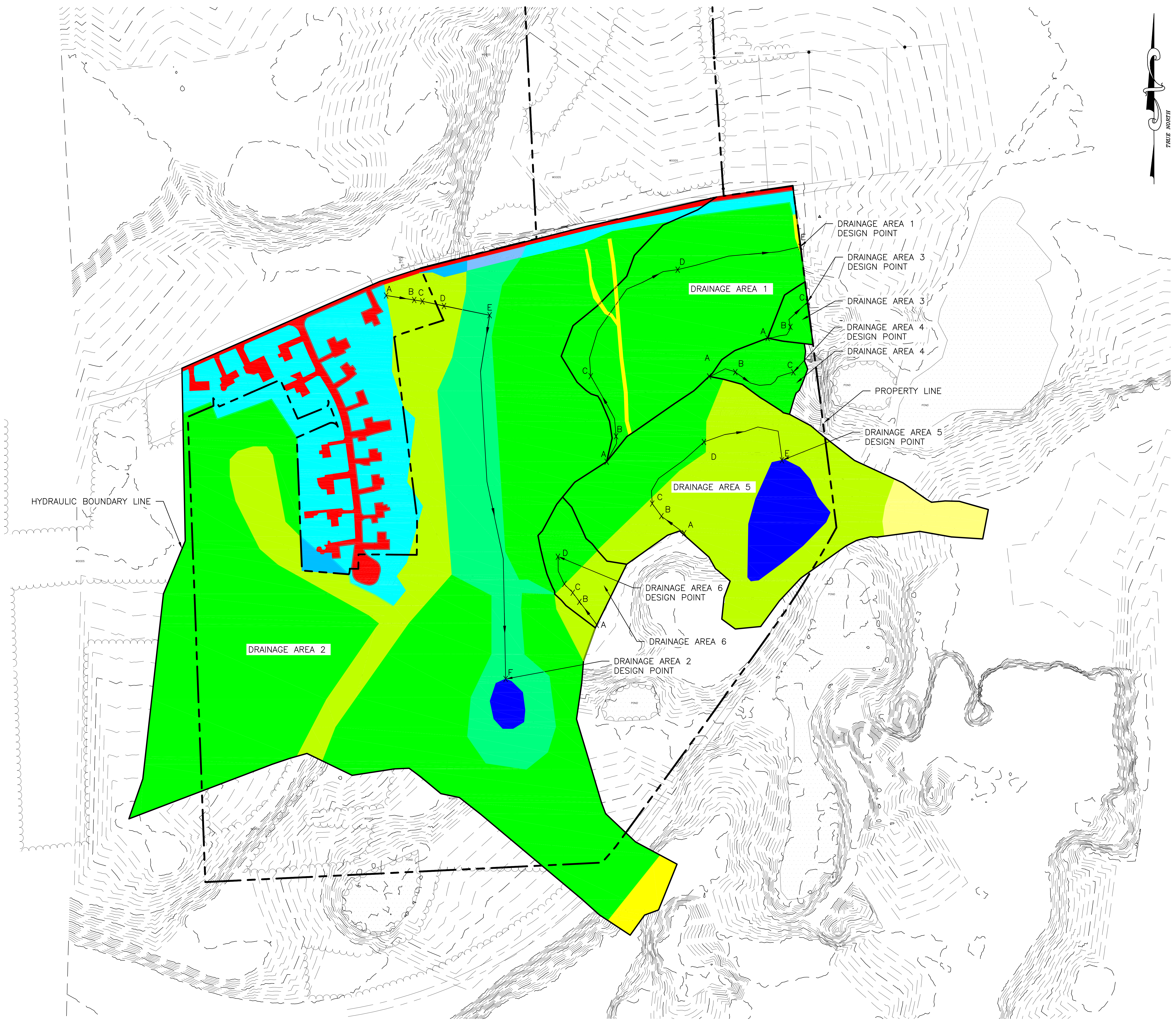
PRE DRAINAGE AREA 2
ASPHALT – A SOILS (CN=98) = 1.95 ACRES
WOODLAND – A SOILS (CN=36) = 34.74 ACRES
WOODLAND – B SOILS (CN=60) = 7.79 ACRES
WOODLAND – D SOILS (CN=79) = 7.13 ACRES
GRAVEL – A SOILS (CN=76) = 0.73 ACRES
ROOFS – A SOILS (CN=98) = 1.20 ACRES
WATER – A SOILS (CN=98) = 0.38 ACRES
GRASS – A SOILS (CN=39) = 8.21 ACRES
GRASS – B SOILS (CN=61) = 0.33 ACRES
GRASS – D SOILS (CN=80) = 0.16 ACRES
TOTAL AREA (SITE) = 62.62 ACRES
Tc pre (SITE) = 396.8 MINS
CN pre (SITE) = 48
FLOW DIRECTION = ⟶

PRE DRAINAGE AREA 3
WOODLAND – A SOILS (CN=36) = 0.50 ACRES
TOTAL AREA (SITE) = 0.50 ACRES
Tc pre (SITE) = 37.6 MINS
CN pre (SITE) = 36
FLOW DIRECTION = ⟶

PRE DRAINAGE AREA 4
WOODLAND – A SOILS (CN=36) = 1.22 ACRES
TOTAL AREA (SITE) = 1.22 ACRES
Tc pre (SITE) = 39.5 MINS
CN pre (SITE) = 36
FLOW DIRECTION = ⟶

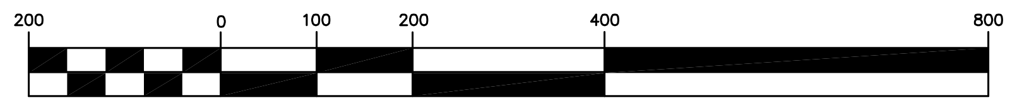
PRE DRAINAGE AREA 5
WOODLAND – A SOILS (CN=36) = 2.94 ACRES
WOODLAND – B SOILS (CN=60) = 7.79 ACRES
GRAVEL – B SOILS (CN=82) = 1.10 ACRES
WATER – B SOILS (CN=98) = 1.72 ACRES
TOTAL AREA (SITE) = 13.55 ACRES
Tc pre (SITE) = 88.6 MINS
CN pre (SITE) = 61
FLOW DIRECTION = ⟶

PRE DRAINAGE AREA 6
WOODLAND – A SOILS (CN=36) = 0.85 ACRES
WOODLAND – B SOILS (CN=60) = 0.77 ACRES
TOTAL AREA (SITE) = 1.62 ACRES
Tc pre (SITE) = 78.9 MINS
CN pre (SITE) = 47
FLOW DIRECTION = ⟶



WOODLAND – A SOILS = 🟩
WOODLAND – B SOILS = 🟩
WOODLAND – D SOILS = 🟩
ROOFS AND ASPHALT = 🟥
GRASS – A SOILS = 🟦
GRASS – B SOILS = 🟦
GRASS – D SOILS = 🟦
WATER = 🟦
GRAVEL – A SOILS = 🟨
GRAVEL – B SOILS = 🟨

GRAPHIC SCALE



(IN FEET)
1 inch = 200 ft.

KEYSTONE ASSOCIATES
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Phone: 607.722.1100
Fax: 607.722.2515
Email: info@keyscomp.com
www.keyscomp.com

NO.	REVISIONS AND DESCRIPTIONS	DATE:

WARNING:
It is a violation of Section 7209, Subdivision 2, of the New York State Education Law for any person unless acting under the direction of a Licensed Professional Architect, Engineer , or Surveyor to alter in any way; any plans, specifications, plats or reports to which the seal of a Professional Architect, Engineer or Surveyor has been applied.

LIME HOLLOW SOLAR LLC
LIME HOLLOW ROAD

TOWN OF CORTLANDVILLE
CORTLAND COUNTY, NY

PRE-DEVELOPMENT DRAINAGE AREA MAP

SHEET NO.
FIGURE NO. 10

PROJECT NO.
2850.24418.5

DATE: 12/21/18

CAD FILE NO.: 285024418_5_SWPPP Figures.dwg

POST DRAINAGE AREA 1
WOODLAND – A SOILS (CN=36) = 1.49 ACRES
GRASS – A SOILS (CN=49) = 3.81 ACRES
GRAVEL – A SOILS (CN=72) = 0.04 ACRES
ASPHALT – A SOILS (CN=98) = 0.10 ACRES
TOTAL AREA (SITE) = 5.44 ACRES
Tc post (SITE) = 70.7 MINS
CN post (SITE) = 39
FLOW DIRECTION = →

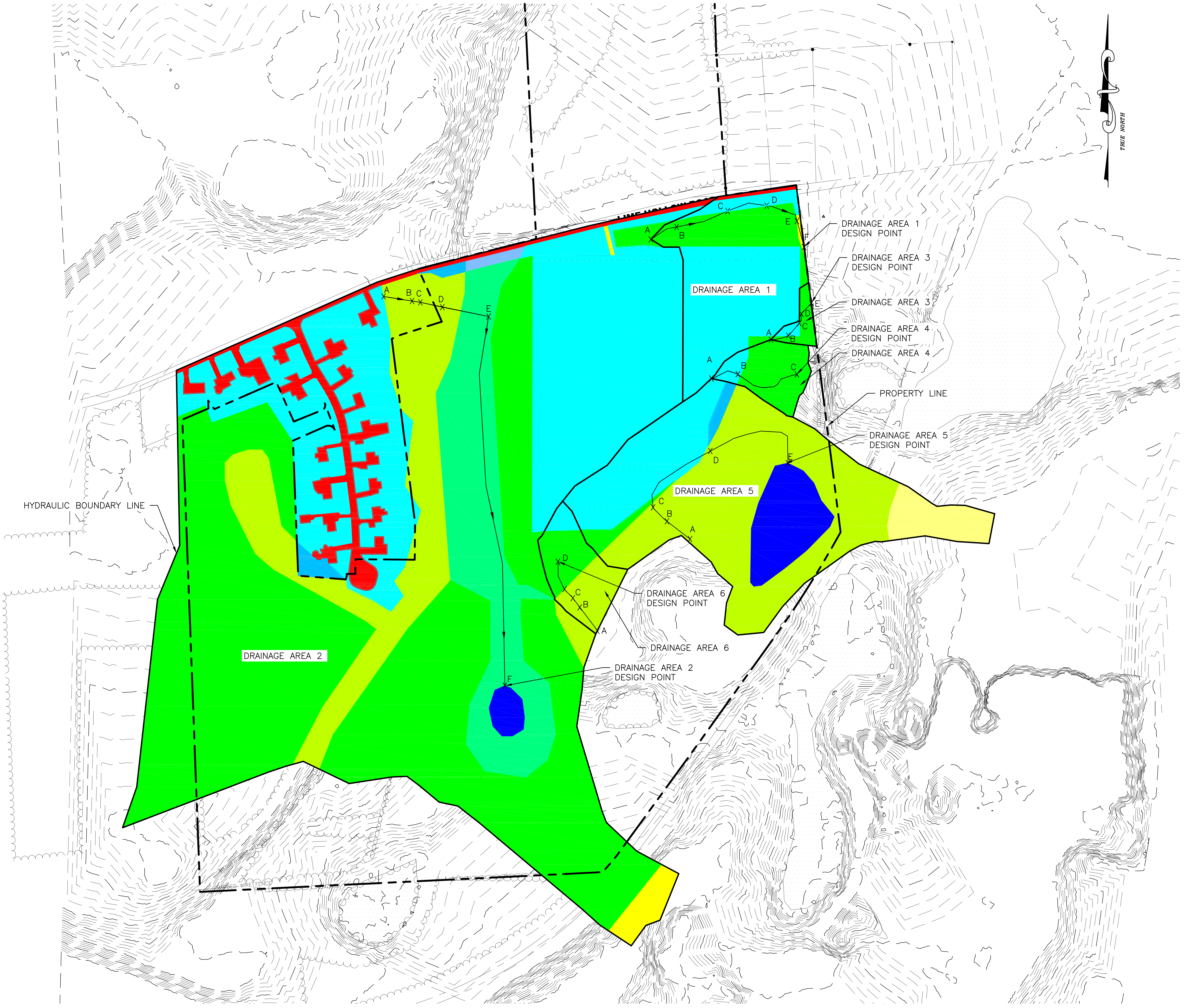
POST DRAINAGE AREA 2
ASPHALT – A SOILS (CN=98) = 1.95 ACRES
WOODLAND – A SOILS (CN=36) = 30.21 ACRES
WOODLAND – B SOILS (CN=60) = 7.79 ACRES
WOODLAND – D SOILS (CN=79) = 7.13 ACRES
GRAVEL – A SOILS (CN=76) = 0.67 ACRES
ROOFS – A SOILS (CN=98) = 1.20 ACRES
WATER – A SOILS (CN=98) = 0.38 ACRES
GRASS – A SOILS (CN=39) = 17.16 ACRES
GRASS – B SOILS (CN=61) = 0.33 ACRES
GRASS – D SOILS (CN=80) = 0.16 ACRES
TOTAL AREA (SITE) = 66.98 ACRES
Tc post (SITE) = 396.8 MINS
CN post (SITE) = 48
FLOW DIRECTION = →

POST DRAINAGE AREA 3
WOODLAND – A SOILS (CN=36) = 0.27 ACRES
GRASS – A SOILS (CN=36) = 0.06 ACRES
TOTAL AREA (SITE) = 0.33 ACRES
Tc post (SITE) = 30.7 MINS
CN post (SITE) = 37
FLOW DIRECTION = →

POST DRAINAGE AREA 4
WOODLAND – A SOILS (CN=36) = 1.04 ACRES
GRASS – A SOILS (CN=39) = 0.18 ACRES
TOTAL AREA (SITE) = 1.22 ACRES
Tc post (SITE) = 39.5 MINS
CN post (SITE) = 36
FLOW DIRECTION = →

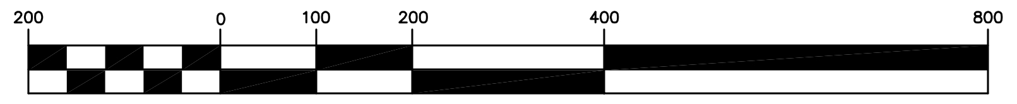
POST DRAINAGE AREA 5
WOODLAND – A SOILS (CN=36) = 0.25 ACRES
WOODLAND – B SOILS (CN=60) = 7.63 ACRES
GRASS – A SOILS (CN=39) = 2.69 ACRES
GRASS – B SOILS (CN=61) = 0.16 ACRES
GRAVEL – B SOILS (CN=82) = 1.10 ACRES
WATER – B SOILS (CN=98) = 1.72 ACRES
TOTAL AREA (SITE) = 13.55 ACRES
Tc post (SITE) = 86.7 MINS
CN post (SITE) = 62
FLOW DIRECTION = →

POST DRAINAGE AREA 6
WOODLAND – A SOILS (CN=36) = 0.69 ACRES
WOODLAND – B SOILS (CN=60) = 0.77 ACRES
GRASS – A SOILS (CN=39) = 0.16 ACRES
TOTAL AREA (SITE) = 1.62 ACRES
Tc post (SITE) = 78.9 MINS
CN post (SITE) = 48
FLOW DIRECTION = →



WOODLAND – A SOILS =	🟩	GRASS – A SOILS =	🟦	GRAVEL – A SOILS =	🟨
WOODLAND – B SOILS =	🟩	GRASS – B SOILS =	🟦	GRAVEL – B SOILS =	🟨
WOODLAND – D SOILS =	🟩	GRASS – D SOILS =	🟦		
ROOFS AND ASPHALT =	🟥	WATER =	🟦		

GRAPHIC SCALE



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NO.	REVISIONS AND DESCRIPTIONS	DATE:

LIME HOLLOW SOLAR LLC
LIME HOLLOW ROAD

TOWN OF CORTLANDVILLE
CORTLAND COUNTY, NY

POST-DEVELOPMENT DRAINAGE AREA MAP

SHEET NO.
FIGURE NO. 11

PROJECT NO.
2850.24418.5

DATE: 12/21/18

CAD FILE NO.: 285024418_5_SWPPP Figures.dwg

APPENDIX A
STORMWATER DISCHARGE PERMIT INFORMATION

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2015 Expiration Date: January 28, 2020

John J. Ferguson
Chief Permit Administrator

1 / 12 / 15

Authorized Signature Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act (“CWA”), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System (“NPDES”)* permit or by a state permit program. New York’s *State Pollutant Discharge Elimination System (“SPDES”)* is a NPDES-approved program with permits issued in accordance with the *Environmental Conservation Law (“ECL”).*

This general permit (“permit”) is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation (“the Department”) regional office (see Appendix G).They are also available on the Department’s website at:
http://www.dec.ny.gov/

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of “*construction activity*”, as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a point source and therefore, pursuant to Article 17-0505 of the ECL, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. They cannot wait until there is an actual *discharge* from the construction site to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES
FROM CONSTRUCTION ACTIVITIES

Part I. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the Stormwater Pollution Prevention Plan ("SWPPP") the reason(s) for the deviation or alternative design and provide information

which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

- (i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharges*;
- (ii) Control stormwater *discharges* to *minimize* channel and streambank erosion and scour in the immediate vicinity of the *discharge* points;
- (iii) *Minimize* the amount of soil exposed during *construction activity*;
- (iv) *Minimize* the disturbance of *steep slopes*;
- (v) *Minimize* sediment *discharges* from the site;
- (vi) Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharges*, unless *infeasible*;
- (vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted; and
- (viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharges* from dewatering activities, including *discharges* from dewatering of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

   (i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

   (ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

   (iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharges*.** The following *discharge*s are prohibited:

   (i) Wastewater from washout of concrete;

   (ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

   (iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

   (iv) Soaps or solvents used in vehicle and equipment washing; and

   (v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

a. *Sizing Criteria* for *New Development*

(i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (“Cpv”): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria (“Qp”): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria (“Qf”): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

b. ***Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed**

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

  (1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

  (2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

  (1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
  (2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

  (1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
  (2) A downstream analysis reveals that overbank control is not required.

c. ***Sizing Criteria* for *Redevelopment Activity***

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or
(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or
(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or
(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) Overbank Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

d. ***Sizing Criteria*** **for Combination of** ***Redevelopment Activity*** **and** ***New Development***

Construction projects that include both *New Development* and *Redevelopment Activity* shall provide post-construction stormwater management controls that meet the *sizing criteria* calculated as an aggregate of the *Sizing Criteria* in Part I.C.2.a. or b. of this permit for the *New Development* portion of the project and Part I.C.2.c of this permit for *Redevelopment Activity* portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater *discharges* may be authorized by this permit: *discharge*s from firefighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters 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; air conditioning condensate; uncontaminated *groundwater* or spring water; uncontaminated *discharge*s from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who *discharge* as noted in this paragraph, and with the exception of flows from firefighting activities, these *discharge*s must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **<u>not</u>** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an endangered or threatened species unless the *owner or operator* has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.C.2 of this permit.

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb one or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture (“USDA”) Soil Survey for the County where the disturbance will occur.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb two or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the USDA Soil Survey for the County where the disturbance will occur.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.C.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the construction site within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the construction site within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP’s agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:
      (i) No Affect
      (ii) No Adverse Affect

(iii) Executed Memorandum of Agreement, or

d. Documentation that:
  (i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharge*s from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

II. Part II. OBTAINING PERMIT COVERAGE

A. Notice of Intent (NOI) Submittal

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the Department in order to be authorized to *discharge* under this permit. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address.

NOTICE OF INTENT
NYS DEC, Bureau of Water Permits
625 Broadway, 4th Floor
Albany, New York 12233-3505

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the "MS4 SWPPP Acceptance" form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI.

   The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the address in Part II.A.1.

The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4*.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

B. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621) have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

   c. the final SWPPP has been prepared, and

   d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.B.2 above

will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

a. For *construction activities* that are not subject to the requirements of a *regulated, traditional land use control MS4*:

   (i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

   (ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has not been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

   (iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

   (i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

   (ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. The Department may suspend or deny an *owner's or operator's* coverage

under this permit if the Department determines that the SWPPP does not meet the permit requirements. In accordance with statute, regulation, and the terms and conditions of this permit, the Department may deny coverage under this permit and require submittal of an application for an individual SPDES permit based on a review of the NOI or other information pursuant to Part II.

5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.B. of this permit.

C. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination (“NOT”) has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-15-002), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, and all documentation necessary to demonstrate eligibility with this permit at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:
   a. The *owner or operator* shall

have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

5. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the *regulated, traditional land use control MS4* in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice

D. Permit Coverage for Discharges Authorized Under GP-0-10-001

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-10-001), an *owner or operator* of *a construction activity* with coverage under GP-0-10-001, as of the effective date of GP-0-15-002, shall be authorized to *discharge* in accordance with GP-0-15-002, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-15-002.

E. Change of *Owner or Operator*

2. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.A.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

III. Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP:

   a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

   b. whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the *discharge* of *pollutants*; and

   c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority.

5. The Department may notify the *owner or operator* at any time that the

SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.C.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must 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; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or 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. This person shall be known as the *trained contractor.* The *owner or 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 or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

> "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

   a. Background information about the scope of the project, including the location, type and size of project;

   b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

   c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

   d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the construction site; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

The post-construction stormwater management practice component of the SWPPP shall include the following:

a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

c. A Stormwater Modeling and Analysis Report that includes:

    (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

    (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

    (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

    (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

(v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, <u>with the exception of</u>:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

   b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

   c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

   d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

   a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

   b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* and all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.A.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures 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.

4. 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:

   a. Date and time of inspection;

   b. Name and title of person(s) performing inspection;

   c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

   d. 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;

   e. A description of the condition of all natural surface waterbodies 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 waterbody;

   f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

   g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

   h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

i. 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;

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

k. Identification and status of all corrective actions that were required by previous inspection; and

l. 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.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit 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.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.C.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

V. Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.A.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

   b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

   c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.E. of this permit.

   d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

    a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

    b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

    c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism 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,

    d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

VI. Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.A.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

VII. Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

   a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

      (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any *discharge*r authorized by a general permit to apply for an individual SPDES permit, it shall notify the *discharge*r in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to

discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a construction site which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with *construction activity* covered by this permit, the *owner or operator* of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

VIII. APPENDIX A

Definitions

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both “sewage” and “stormwater”.

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for “*Construction Activity(ies)*” also.

***Construction Activity*(ies) -** means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a construction site by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a construction site to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or point source.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State
or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term “plan” in “larger common plan of development or sale” is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters,

ditches, man-made
channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

New Development – means any land disturbance that does meet the definition of Redevelopment Activity included in this appendix.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York..

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Stream bank restoration projects (does not include the placement of spoil material),
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that makes the transition between the road shoulder and the ditch or embankment,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or embankment,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), Overbank Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture (“USDA”) Soil Survey for the County where the disturbance will occur.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part

621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

IX. APPENDIX B

Required SWPPP Components by Project Type

Table 1

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E
- Construction of a barn or other agricultural building, silo, stock yard or pen.

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects
- Bike paths and trails
- Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project
- Slope stabilization projects
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics
- Spoil areas that will be covered with vegetation
- Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State”, excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area

The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

- All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State” that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional, includes hospitals, prisons, schools and colleges
- Industrial facilities, includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW’s and water treatment plants
- Office complexes
- Sports complexes
- Racetracks, includes racetracks with earthen (dirt) surface
- Road construction or reconstruction
- Parking lot construction or reconstruction
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project , wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

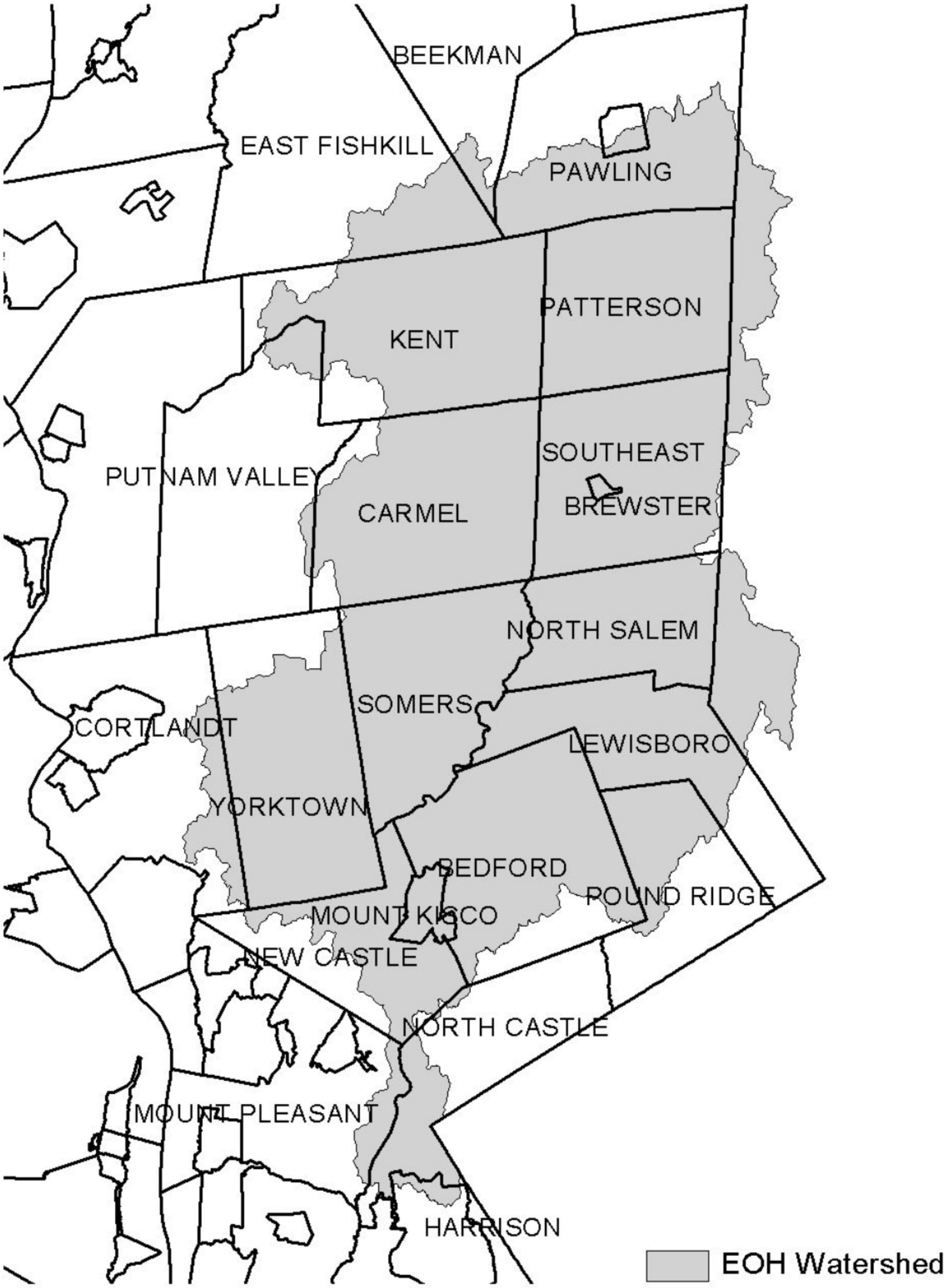
X. APPENDIX C

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River **-** Figure 1
- Onondaga Lake Watershed **-** Figure 2
- Greenwood Lake Watershed **-**Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson



<u>Figure 2 - Onondaga Lake Watershed</u>

Figure 3 - Greenwood Lake Watershed

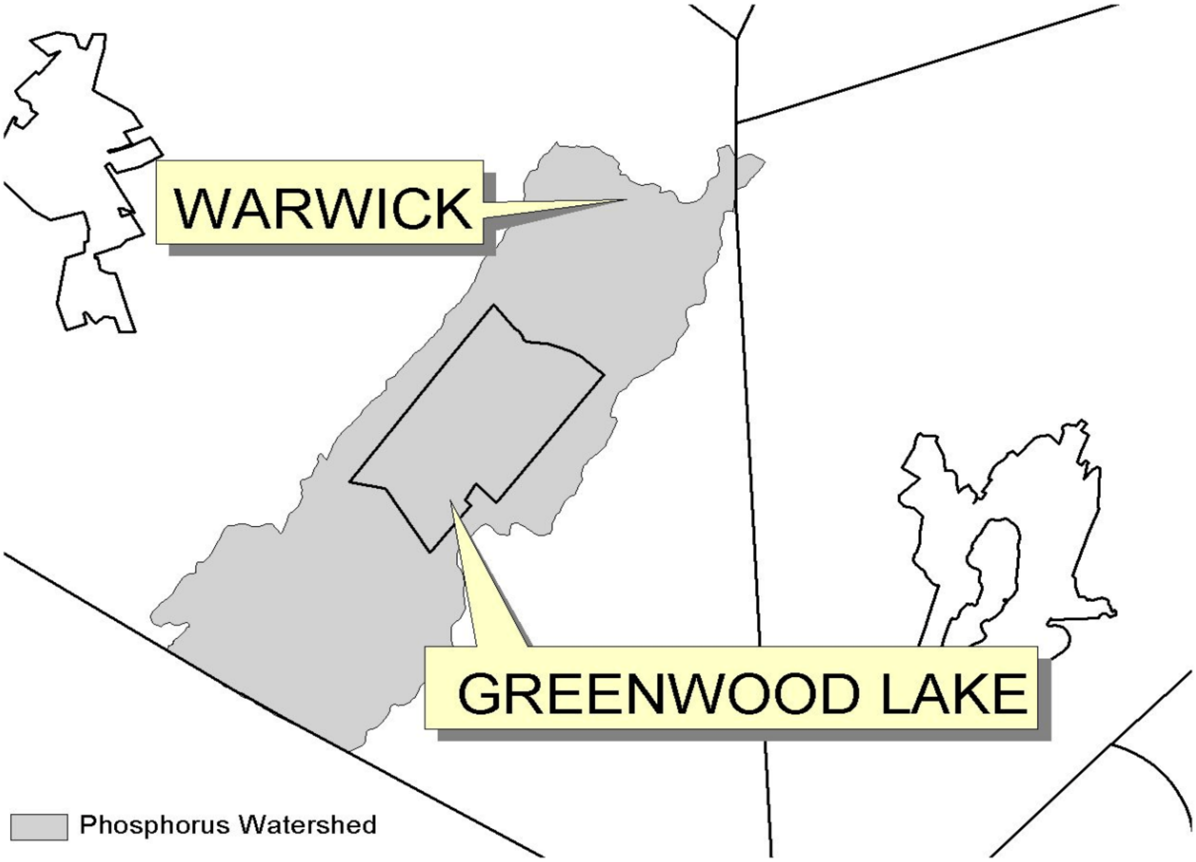


Figure 4 - Oscawana Lake Watershed

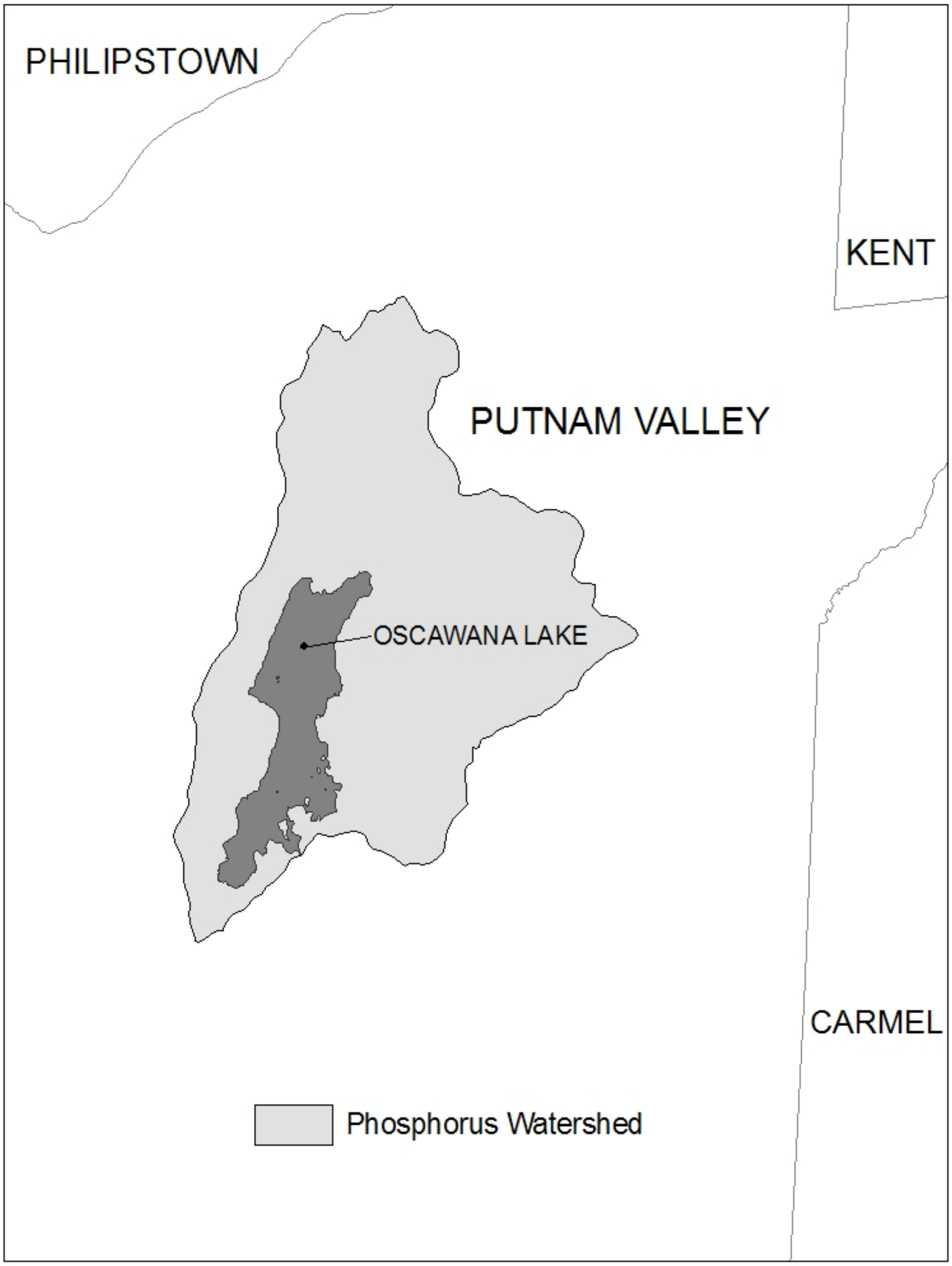
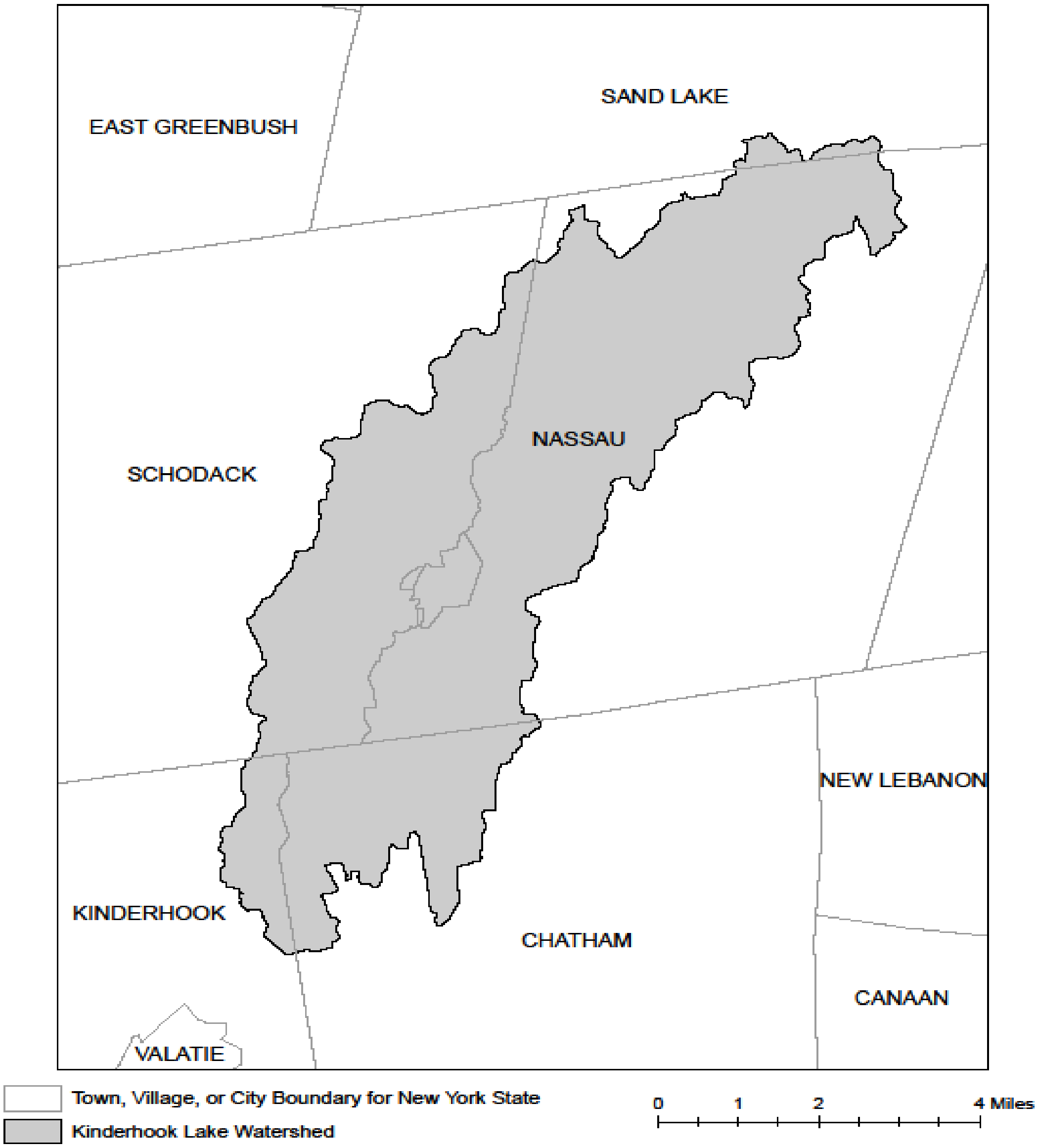


Figure 5: Kinderhook Lake Watershed



XI. APPENDIX D

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River **-** See Figure 1 in Appendix C

XII. APPENDIX E

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY	WATERBODY
Albany	Ann Lee (Shakers) Pond, Stump Pond
Albany	Basic Creek Reservoir
Allegheny	Amity Lake, Saunders Pond
Bronx	Van Cortlandt Lake
Broome	Whitney Point Lake/Reservoir
Broome	Fly Pond, Deer Lake
Broome	Minor Tribs to Lower Susquehanna (north)
Cattaraugus	Allegheny River/Reservoir
Cattaraugus	Case Lake
Cattaraugus	Linlyco/Club Pond
Cayuga	Duck Lake
Chautauqua	Chautauqua Lake, North
Chautauqua	Chautauqua Lake, South
Chautauqua	Bear Lake
Chautauqua	Chadakoin River and tribs
Chautauqua	Lower Cassadaga Lake
Chautauqua	Middle Cassadaga Lake
Chautauqua	Findley Lake
Clinton	Great Chazy River, Lower, Main Stem
Columbia	Kinderhook Lake
Columbia	Robinson Pond
Dutchess	Hillside Lake
Dutchess	Wappinger Lakes
Dutchess	Fall Kill and tribs
Erie	Green Lake
Erie	Scajaquada Creek, Lower, and tribs
Erie	Scajaquada Creek, Middle, and tribs
Erie	Scajaquada Creek, Upper, and tribs
Erie	Rush Creek and tribs
Erie	Ellicott Creek, Lower, and tribs
Erie	Beeman Creek and tribs
Erie	Murder Creek, Lower, and tribs
Erie	South Branch Smoke Cr, Lower, and tribs
Erie	Little Sister Creek, Lower, and tribs
Essex	Lake George (primary county: Warren)
Genesee	Black Creek, Upper, and minor tribs
Genesee	Tonawanda Creek, Middle, Main Stem
Genesee	Oak Orchard Creek, Upper, and tribs
Genesee	Bowen Brook and tribs
Genesee	Bigelow Creek and tribs
Genesee	Black Creek, Middle, and minor tribs
Genesee	LeRoy Reservoir
Greene	Schoharie Reservoir
Greene	Sleepy Hollow Lake
Herkimer	Steele Creek tribs
Kings	Hendrix Creek
Lewis	Mill Creek/South Branch and tribs
Livingston	Conesus Lake
Livingston	Jaycox Creek and tribs
Livingston	Mill Creek and minor tribs
Livingston	Bradner Creek and tribs
Livingston	Christie Creek and tribs
Monroe	Lake Ontario Shoreline, Western
Monroe	Mill Creek/Blue Pond Outlet and tribs
Monroe	Rochester Embayment - East
Monroe	Rochester Embayment - West
Monroe	Unnamed Trib to Honeoye Creek
Monroe	Genesee River, Lower, Main Stem
Monroe	Genesee River, Middle, Main Stem
Monroe	Black Creek, Lower, and minor tribs
Monroe	Buck Pond
Monroe	Long Pond
Monroe	Cranberry Pond
Monroe	Mill Creek and tribs
Monroe	Shipbuilders Creek and tribs
Monroe	Minor tribs to Irondequoit Bay
Monroe	Thomas Creek/White Brook and tribs
Nassau	Glen Cove Creek, Lower, and tribs
Nassau	LI Tribs (fresh) to East Bay
Nassau	East Meadow Brook, Upper, and tribs
Nassau	Hempstead Bay
Nassau	Hempstead Lake
Nassau	Grant Park Pond
Nassau	Beaver Lake
Nassau	Camaans Pond
Nassau	Halls Pond
Nassau	LI Tidal Tribs to Hempstead Bay
Nassau	Massapequa Creek and tribs
Nassau	Reynolds Channel, east
Nassau	Reynolds Channel, west
Nassau	Silver Lake, Lofts Pond
Nassau	Woodmere Channel
Niagara	Hyde Park Lake
Niagara	Lake Ontario Shoreline, Western
Niagara	Bergholtz Creek and tribs
Oneida	Ballou, Nail Creeks
Onondaga	Ley Creek and tribs
Onondaga	Onondaga Creek, Lower and tribs

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity, cont'd.

COUNTY	WATERBODY
Onondaga	Onondaga Creek, Middle and tribs
Onondaga	Onondaga Creek, Upp, and minor tribs
Onondaga	Harbor Brook, Lower, and tribs
Onondaga	Ninemile Creek, Lower, and tribs
Onondaga	Minor tribs to Onondaga Lake
Onondaga	Onondaga Creek, Lower, and tribs
Ontario	Honeoye Lake
Ontario	Hemlock Lake Outlet and minor tribs
Ontario	Great Brook and minor tribs
Orange	Monhagen Brook and tribs
Orange	Orange Lake
Orleans	Lake Ontario Shoreline, Western
Oswego	Pleasant Lake
Oswego	Lake Neatahwanta
Putnam	Oscawana Lake
Putnam	Palmer Lake
Putnam	Lake Carmel
Queens	Jamaica Bay, Eastern, and tribs (Queens)
Queens	Bergen Basin
Queens	Shellbank Basin
Rensselaer	Nassau Lake
Rensselaer	Snyders Lake
Richmond	Grasmere, Arbutus and Wolfes Lakes
Rockland	Congers Lake, Swartout Lake
Rockland	Rockland Lake
Saratoga	Ballston Lake
Saratoga	Round Lake
Saratoga	Dwaas Kill and tribs
Saratoga	Tribs to Lake Lonely
Saratoga	Lake Lonely
Schenectady	Collins Lake
Schenectady	Duane Lake
Schenectady	Mariaville Lake
Schoharie	Engleville Pond
Schoharie	Summit Lake
Schuyler	Cayuta Lake
St. Lawrence	Fish Creek and minor tribs
St. Lawrence	Black Lake Outlet/Black Lake
Steuben	Lake Salubria
Steuben	Smith Pond
Suffolk	Millers Pond
Suffolk	Mattituck (Marratooka) Pond
Suffolk	Tidal tribs to West Moriches Bay
Suffolk	Canaan Lake
Suffolk	Lake Ronkonkoma
Suffolk	Beaverdam Creek and tribs
Suffolk	Big/Little Fresh Ponds
Suffolk	Fresh Pond
Suffolk	Great South Bay, East
Suffolk	Great South Bay, Middle
Suffolk	Great South Bay, West
Suffolk	Mill and Seven Ponds
Suffolk	Moriches Bay, East
Suffolk	Moriches Bay, West
Suffolk	Quantuck Bay
Suffolk	Shinnecock Bay (and Inlet)
Sullivan	Bodine, Montgomery Lakes
Sullivan	Davies Lake
Sullivan	Pleasure Lake
Sullivan	Swan Lake
Tompkins	Cayuga Lake, Southern End
Tompkins	Owasco Inlet, Upper, and tribs
Ulster	Ashokan Reservoir
Ulster	Esopus Creek, Upper, and minor tribs
Ulster	Esopus Creek, Lower, Main Stem
Ulster	Esopus Creek, Middle, and minor tribs
Warren	Lake George
Warren	Tribs to L.George, Village of L George
Warren	Huddle/Finkle Brooks and tribs
Warren	Indian Brook and tribs
Warren	Hague Brook and tribs
Washington	Tribs to L.George, East Shr Lk George
Washington	Cossayuna Lake
Washington	Wood Cr/Champlain Canal, minor tribs
Wayne	Port Bay
Wayne	Marbletown Creek and tribs
Westchester	Lake Katonah
Westchester	Lake Mohegan
Westchester	Lake Shenorock
Westchester	Reservoir No.1 (Lake Isle)
Westchester	Saw Mill River, Middle, and tribs
Westchester	Silver Lake
Westchester	Teatown Lake
Westchester	Truesdale Lake
Westchester	Wallace Pond
Westchester	Peach Lake
Westchester	Mamaroneck River, Lower
Westchester	Mamaroneck River, Upp, and tribs
Westchester	Sheldrake River and tribs
Westchester	Blind Brook, Lower
Westchester	Blind Brook, Upper, and tribs
Westchester	Lake Lincolndale
Westchester	Lake Meahaugh
Wyoming	Java Lake
Wyoming	Silver Lake

Note: The list above identifies those waters from the final New York State "2014 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated January 2015, that are impaired by silt, sediment or nutrients.

XIII. APPENDIX F

List of NYS DEC Regional Offices

Region	Covering the following counties:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) Permit Administrators	DIVISION OF WATER (DOW) Water (SPDES) Program
1	Nassau and Suffolk	50 Circle Road Stony Brook, Ny 11790 Tel. (631) 444-0365	50 Circle Road Stony Brook, Ny 11790-3409 Tel. (631) 444-0405
2	Bronx, Kings, New York, Queens and Richmond	1 Hunters Point Plaza, 47-40 21st St. Long Island City, Ny 11101-5407 Tel. (718) 482-4997	1 Hunters Point Plaza, 47-40 21st St. Long Island City, Ny 11101-5407 Tel. (718) 482-4933
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester	21 South Putt Corners Road New Paltz, Ny 12561-1696 Tel. (845) 256-3059	100 Hillside Avenue, Suite 1w White Plains, Ny 10603 Tel. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1150 North Westcott Road Schenectady, Ny 12306-2014 Tel. (518) 357-2069	1130 North Westcott Road Schenectady, Ny 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	1115 State Route 86, Po Box 296 Ray Brook, Ny 12977-0296 Tel. (518) 897-1234	232 Golf Course Road Warrensburg, Ny 12885-1172 Tel. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROAD AVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVE. BUFFALO, NY 14203-2999 TEL. (716) 851-7070

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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-0-15-002

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 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)**

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
○ 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

Number of Lots

***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-0-15-002? ○ **Yes** ○ **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ○ **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-0-15-002. 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)

RR Techniques (Area Reduction)	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
○ 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	**CPv Provided**
☐☐☐.☐☐☐ **acre-feet**	☐☐☐.☐☐☐ **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	**Post-development**
☐☐☐.☐☐☐ **CFS**	☐☐☐.☐☐☐ **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development	**Post-development**
☐☐☐.☐☐☐ **CFS**	☐☐☐.☐☐☐ **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 ☐☐☐☐☐☐☐☐☐
- ○ 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. ☐☐☐☐☐☐☐☐☐

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

/ /

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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CONTRACTOR’S CERTIFICATION STATEMENT
FOR
COMPLIANCE WITH STORMWATER MANAGEMENT AND POLLUTION PREVENTION PLAN

The Contractor and Subcontractors engaged in work affecting storm water drainage at the subject site shall sign a copy of the following certification statement and return a signed copy of this statement to the Operator before undertaking any construction activity at the subject site and keep a copy of the signed statement at the site during construction.

- Subject Site:
  New York Community Solar Portfolio Project
  693-553 Lime Hollow Road
  Town of Cortlandville, Cortland County, New York

- Operator:
  Mr. Elisha Schecter
  C2 Energy Capital
  55 5th Avenue, Floor 13
  New York City, New York

- Site Plan:
  Solar Array Plan, Lime Hollow Solar
  Lime Hollow Road, Town of Cortlandville, Cortland County, New York
  Prepared by: Keystone Associates, Architects, Engineers, and Surveyors, LLC., 58 Exchange Street, Binghamton, New York 13901. 2019.

- Storm Water Management and Pollution Prevention Plan:
  Lime Hollow, LLC
  New York Community Solar Portfolio Project
  Prepared by: Keystone Associates, Architects, Engineers, and Surveyors, LLC., 58 Exchange Street, Binghamton, New York 13901. 2019.

Under the provision of the New York State Department of Environmental Conservation, State Pollutant Discharge Elimination System, (SPDES) General Permit for Storm Water Discharges from Construction Activities, Permit No. GP-0-15-002 issued pursuant to Article 17, Titles 7, 8, and 70 of the Environmental Conservation Law,

“I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System (“SPDES”) general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations.”

Contract Description: ____

Company: ______________________________
____
____
Phone: ________________________
Fax: ________________________

______________________________ ______________
Authorized Signature Date

______________________________ ______________
Printed Name Title

______________________________ ______________
Printed Name(s) of “Trained Individual(s)” Title

APPENDIX B
SOILS INFORMATION

United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Cortland County, New York

January 22, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:6,570 if printed on A portrait (8.5" x 11") sheet.

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 Map Unit Polygons
- 〰 Soil Map Unit Lines
- ■ Soil Map Unit Points

Special Point Features
- ☉ Blowout
- ☒ Borrow Pit
- ✱ Clay Spot
- ◇ Closed Depression
- ✕ Gravel Pit
- ∴ Gravelly Spot
- ● Landfill
- Λ Lava Flow
- ⫫ Marsh or swamp
- ⚒ Mine or Quarry
- ◎ Miscellaneous Water
- ◎ Perennial Water
- ∨ Rock Outcrop
- + Saline Spot
- ⁙ Sandy Spot
- ⊜ Severely Eroded Spot
- ◇ Sinkhole
- ≫ Slide or Slip
- ø Sodic Spot
- ≡ Spoil Area
- ◊ Stony Spot
- ∞ Very Stony Spot
- ♆ Wet Spot
- △ Other
- ▪ Special Line Features

Water Features
- 〰 Streams and Canals

Transportation
- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background
- ▩ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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: Cortland County, New York
Survey Area Data: Version 17, Sep 2, 2018

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
33A	Halsey mucky silt loam, 0 to 3 percent slopes	2.5	2.4%
53E	Valois and Howard gravelly loams, 25 to 40 percent slopes	20.3	19.4%
122A	Palmyra gravelly silt loam, 0 to 3 percent slopes	29.2	27.9%
122D	Palmyra gravelly silt loam, 15 to 25 percent slopes	4.5	4.3%
125A	Howard gravelly loam, 0 to 3 percent slopes	14.4	13.7%
125B	Howard gravelly loam, 3 to 8 percent slopes	20.9	19.9%
125D	Howard gravelly loam, 15 to 25 percent slopes	0.5	0.5%
210A	Phelps gravelly silt loam, 0 to 3 percent slopes	10.5	10.1%
W	Water	1.9	1.8%
Totals for Area of Interest		**104.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Cortland County, New York

33A—Halsey mucky silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2srgz
Elevation: 160 to 1,970 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Halsey and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Halsey

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Glaciolacustrine deposits comprised mainly of silt and very fine sand

Typical profile

Oe - 0 to 3 inches: moderately decomposed plant material
Oa - 3 to 5 inches: highly decomposed plant material
A - 5 to 10 inches: mucky silt loam
Eg - 10 to 11 inches: loam
Bw - 11 to 14 inches: loam
Bg - 14 to 20 inches: gravelly fine sandy loam
2Cg - 20 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Fredon

Percent of map unit: 10 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave, linear
Hydric soil rating: Yes

53E—Valois and Howard gravelly loams, 25 to 40 percent slopes

Map Unit Setting

National map unit symbol: 2rwcv
Elevation: 160 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Valois and similar soils: 50 percent
Howard and similar soils: 45 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valois

Setting

Landform: End moraines, valley sides, lateral moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 4 inches: gravelly silt loam
BA - 4 to 7 inches: gravelly silt loam
Bw1 - 7 to 18 inches: gravelly silt loam
Bw2 - 18 to 33 inches: gravelly loam
C - 33 to 60 inches: very gravelly loam

Properties and qualities

Slope: 25 to 40 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.60 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Howard

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Riser, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, containing significant amounts of limestone

Typical profile

Ap - 0 to 9 inches: gravelly loam
E/B - 9 to 24 inches: very gravelly loam
Bt - 24 to 45 inches: very gravelly loam
C - 45 to 72 inches: stratified extremely gravelly sand

Properties and qualities

Slope: 25 to 40 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Bath

Percent of map unit: 5 percent
Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, concave
Across-slope shape: Convex, linear

Hydric soil rating: No

122A—Palmyra gravelly silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2rwc8
Elevation: 160 to 1,970 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Palmyra and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Palmyra

Setting

Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loamy over sandy and gravelly glaciofluvial deposits, derived mainly from limestone and other sedimentary rocks

Typical profile

Ap - 0 to 6 inches: gravelly silt loam
E - 6 to 11 inches: gravelly loam
Bt/E - 11 to 17 inches: gravelly loam
Bt1 - 17 to 26 inches: very gravelly loam
Bt2 - 26 to 38 inches: very gravelly loam
2C - 38 to 72 inches: very gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Howard

Percent of map unit: 10 percent
Landform: Terraces, valley trains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Phelps

Percent of map unit: 3 percent
Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Red hook

Percent of map unit: 2 percent
Landform: Terraces, valley trains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

122D—Palmyra gravelly silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2rwcb
Elevation: 160 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Palmyra and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Palmyra

Setting

Landform: Terraces, deltas, outwash plains
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Riser, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loamy over sandy and gravelly glaciofluvial deposits, derived mainly from limestone and other sedimentary rocks

Typical profile

Ap - 0 to 6 inches: gravelly silt loam
E - 6 to 11 inches: gravelly loam
Bt/E - 11 to 17 inches: gravelly loam
Bt1 - 17 to 26 inches: very gravelly loam
Bt2 - 26 to 38 inches: very gravelly loam
2C - 38 to 72 inches: very gravelly coarse sand

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Howard

Percent of map unit: 10 percent
Landform: Valley trains, terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Riser, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Valois

Percent of map unit: 5 percent
Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

125A—Howard gravelly loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2rwbk
Elevation: 160 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Howard and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Howard

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, containing significant amounts of limestone

Typical profile

Ap - 0 to 9 inches: gravelly loam
E/B - 9 to 24 inches: very gravelly loam
Bt - 24 to 45 inches: very gravelly loam
C - 45 to 72 inches: stratified extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Phelps

Percent of map unit: 5 percent
Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Lansing

Percent of map unit: 5 percent
Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, concave
Across-slope shape: Convex, linear
Hydric soil rating: No

125B—Howard gravelly loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2rwbl
Elevation: 160 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Howard and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Howard

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, containing significant amounts of limestone

Typical profile

Ap - 0 to 9 inches: gravelly loam
E/B - 9 to 24 inches: very gravelly loam
Bt - 24 to 45 inches: very gravelly loam

C - 45 to 72 inches: stratified extremely gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Phelps

Percent of map unit: 5 percent
Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Lansing

Percent of map unit: 5 percent
Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, concave
Across-slope shape: Convex, linear
Hydric soil rating: No

125D—Howard gravelly loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2rwbj
Elevation: 160 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Howard and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Howard

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Riser, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, containing significant amounts of limestone

Typical profile

Ap - 0 to 9 inches: gravelly loam
E/B - 9 to 24 inches: very gravelly loam
Bt - 24 to 45 inches: very gravelly loam
C - 45 to 72 inches: stratified extremely gravelly sand

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Valois

Percent of map unit: 5 percent
Landform: Till plains, drumlinoid ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Lansing

Percent of map unit: 5 percent
Landform: Hills, till plains, drumlinoid ridges
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope

Down-slope shape: Convex, concave
Across-slope shape: Convex, linear
Hydric soil rating: No

210A—Phelps gravelly silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2rwcf
Elevation: 160 to 1,970 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Phelps and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Phelps

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Convex, linear
Parent material: Loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, containing significant amounts of limestone

Typical profile

Ap - 0 to 10 inches: gravelly silt loam
Bt - 10 to 30 inches: gravelly clay loam
2C - 30 to 60 inches: stratified sand to very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D

Hydric soil rating: No

Minor Components

Howard

Percent of map unit: 5 percent
Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Palmyra

Percent of map unit: 5 percent
Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Red hook

Percent of map unit: 5 percent
Landform: Valley trains, terraces
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 1nz0z
Mean annual precipitation: 38 to 42 inches
Mean annual air temperature: 43 to 48 degrees F
Frost-free period: 110 to 180 days

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area [2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

---

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2c Runoff curve numbers for other agricultural lands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4]	48	65	73
Woods—grass combination (orchard or tree farm). [5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

[1] Average runoff condition, and $I_a = 0.2S$.

[2] *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

[3] *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

[4] Actual curve number is less than 30; use CN = 30 for runoff computations.

[5] CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

[6] *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

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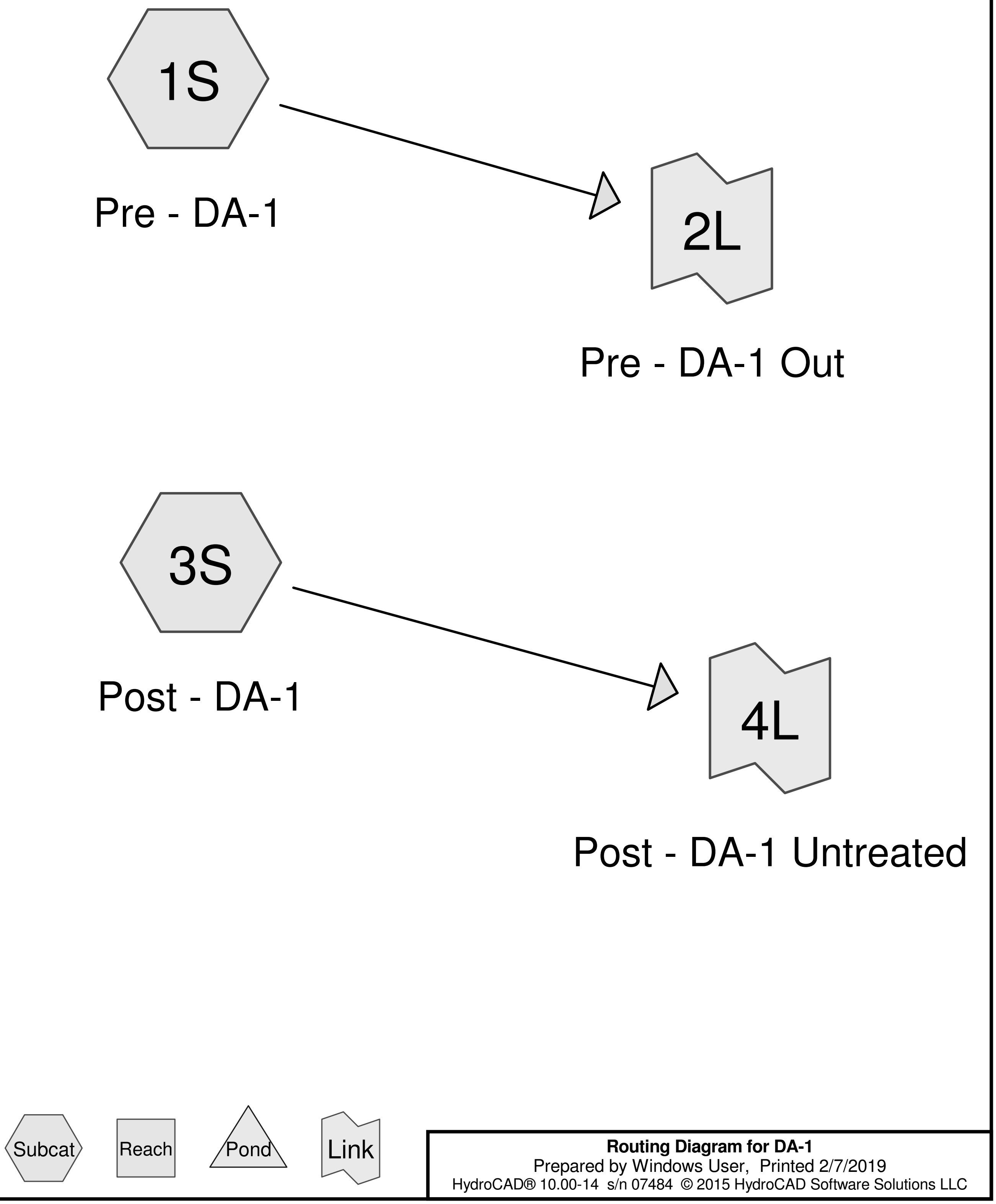


Routing Diagram for DA-1
Prepared by Windows User, Printed 2/7/2019
HydroCAD® 10.00-14 s/n 07484 © 2015 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-1	Runoff Area=9.607 ac 1.03% Impervious Runoff Depth=0.00" Flow Length=1,309' Tc=97.2 min CN=38 Runoff=0.00 cfs 0.000 af
Subcatchment 3S: Post - DA-1	Runoff Area=5.429 ac 1.82% Impervious Runoff Depth=0.00" Flow Length=647' Tc=70.7 min CN=39 Runoff=0.00 cfs 0.000 af
Link 2L: Pre - DA-1 Out	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af
Link 4L: Post - DA-1 Untreated	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Total Runoff Area = 15.036 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
98.68% Pervious = 14.838 ac 1.32% Impervious = 0.198 ac

Summary for Subcatchment 1S: Pre - DA-1

```
Runoff      =        0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Depth=  0.00"
```

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-Year Rainfall=1.97"

```
   Area (ac)   CN   Description
     8.973     36   Woods, Fair, HSG A
     0.336     49   50-75% Grass cover, Fair, HSG A
     0.199     72   Dirt roads, HSG A
*    0.099     98   Paved roads, HSG A
     9.607     38   Weighted Average
     9.508          98.97% Pervious Area
     0.099          1.03% Impervious Area

    Tc   Length    Slope  Velocity  Capacity  Description
  (min)  (feet)   (ft/ft)  (ft/sec)     (cfs)
   76.0     100   0.0050      0.02            Sheet Flow, Woods
                                              Woods: Dense underbrush   n= 0.800   P2= 2.35"
    4.2     233   0.0343      0.93            Shallow Concentrated Flow, Woods Slope
                                              Woodland   Kv= 5.0 fps
   16.9     536   0.0112      0.53            Shallow Concentrated Flow, Woodland Slope to Natural Swale
                                              Woodland   Kv= 5.0 fps
    0.1     440   0.9100     66.26  6,096.18  Channel Flow, Natural Swale
                                              Area= 92.0 sf  Perim= 55.4'  r= 1.66'
                                              n= 0.030  Earth, grassed & winding
   97.2   1,309   Total
```

Summary for Subcatchment 3S: Post - DA-1

```
Runoff      =        0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Depth=  0.00"
```

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-Year Rainfall=1.97"

```
   Area (ac)   CN   Description
     1.489     36   Woods, Fair, HSG A
     3.805     39   >75% Grass cover, Good, HSG A
     0.036     72   Dirt roads, HSG A
*    0.099     98   Paved roads, HSG A
     5.429     39   Weighted Average
     5.330          98.18% Pervious Area
     0.099          1.82% Impervious Area
```

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.5	100	0.0120	0.03		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
6.5	186	0.0091	0.48		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
3.1	141	0.0120	0.77		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
6.7	127	0.0040	0.32		**Shallow Concentrated Flow, Woods to Gravel** Woodland Kv= 5.0 fps
0.9	93	0.0107	1.67		**Shallow Concentrated Flow, Gravel Area** Unpaved Kv= 16.1 fps
70.7	647	Total			

Summary for Link 2L: Pre - DA-1 Out

```
Inflow Area =     9.607 ac,   1.03% Impervious,  Inflow Depth =  0.00"   for  1-Year event
Inflow      =    0.00 cfs @   5.00 hrs,  Volume=          0.000 af
Primary     =    0.00 cfs @   5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-1 Untreated

```
Inflow Area =     5.429 ac,   1.82% Impervious,  Inflow Depth =  0.00"   for  1-Year event
Inflow      =    0.00 cfs @   5.00 hrs,  Volume=          0.000 af
Primary     =    0.00 cfs @   5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-1 Runoff Area=9.607 ac 1.03% Impervious Runoff Depth=0.00"
Flow Length=1,309' Tc=97.2 min CN=38 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Post - DA-1 Runoff Area=5.429 ac 1.82% Impervious Runoff Depth=0.00"
Flow Length=647' Tc=70.7 min CN=39 Runoff=0.00 cfs 0.000 af

Link 2L: Pre - DA-1 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-1 Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 15.036 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
98.68% Pervious = 14.838 ac 1.32% Impervious = 0.198 ac

Summary for Subcatchment 1S: Pre - DA-1

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 2-Year Rainfall=2.35"

	Area (ac)	CN	Description
	8.973	36	Woods, Fair, HSG A
	0.336	49	50-75% Grass cover, Fair, HSG A
	0.199	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	9.607	38	Weighted Average
	9.508		98.97% Pervious Area
	0.099		1.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
4.2	233	0.0343	0.93		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
16.9	536	0.0112	0.53		**Shallow Concentrated Flow, Woodland Slope to Natural Swale** Woodland Kv= 5.0 fps
0.1	440	0.9100	66.26	6,096.18	**Channel Flow, Natural Swale** Area= 92.0 sf Perim= 55.4' r= 1.66' n= 0.030 Earth, grassed & winding
97.2	1,309	Total			

Summary for Subcatchment 3S: Post - DA-1

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 2-Year Rainfall=2.35"

	Area (ac)	CN	Description
	1.489	36	Woods, Fair, HSG A
	3.805	39	>75% Grass cover, Good, HSG A
	0.036	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	5.429	39	Weighted Average
	5.330		98.18% Pervious Area
	0.099		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.5	100	0.0120	0.03		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
6.5	186	0.0091	0.48		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
3.1	141	0.0120	0.77		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
6.7	127	0.0040	0.32		**Shallow Concentrated Flow, Woods to Gravel** Woodland Kv= 5.0 fps
0.9	93	0.0107	1.67		**Shallow Concentrated Flow, Gravel Area** Unpaved Kv= 16.1 fps
70.7	647	Total			

Summary for Link 2L: Pre - DA-1 Out

```
Inflow Area =      9.607 ac,   1.03% Impervious,  Inflow Depth =   0.00"    for  2-Year event
Inflow      =     0.00 cfs @    5.00 hrs,  Volume=           0.000 af
Primary     =     0.00 cfs @    5.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-1 Untreated

```
Inflow Area =      5.429 ac,   1.82% Impervious,  Inflow Depth =   0.00"    for  2-Year event
Inflow      =     0.00 cfs @    5.00 hrs,  Volume=           0.000 af
Primary     =     0.00 cfs @    5.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-1 Runoff Area=9.607 ac 1.03% Impervious Runoff Depth=0.00"
Flow Length=1,309' Tc=97.2 min CN=38 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Post - DA-1 Runoff Area=5.429 ac 1.82% Impervious Runoff Depth=0.00"
Flow Length=647' Tc=70.7 min CN=39 Runoff=0.00 cfs 0.000 af

Link 2L: Pre - DA-1 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-1 Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 15.036 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
98.68% Pervious = 14.838 ac 1.32% Impervious = 0.198 ac

Summary for Subcatchment 1S: Pre - DA-1

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 5-Year Rainfall=2.87"

	Area (ac)	CN	Description
	8.973	36	Woods, Fair, HSG A
	0.336	49	50-75% Grass cover, Fair, HSG A
	0.199	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	9.607	38	Weighted Average
	9.508		98.97% Pervious Area
	0.099		1.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
4.2	233	0.0343	0.93		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
16.9	536	0.0112	0.53		**Shallow Concentrated Flow, Woodland Slope to Natural Swale** Woodland Kv= 5.0 fps
0.1	440	0.9100	66.26	6,096.18	**Channel Flow, Natural Swale** Area= 92.0 sf Perim= 55.4' r= 1.66' n= 0.030 Earth, grassed & winding
97.2	1,309	Total			

Summary for Subcatchment 3S: Post - DA-1

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 5-Year Rainfall=2.87"

	Area (ac)	CN	Description
	1.489	36	Woods, Fair, HSG A
	3.805	39	>75% Grass cover, Good, HSG A
	0.036	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	5.429	39	Weighted Average
	5.330		98.18% Pervious Area
	0.099		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.5	100	0.0120	0.03		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
6.5	186	0.0091	0.48		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
3.1	141	0.0120	0.77		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
6.7	127	0.0040	0.32		**Shallow Concentrated Flow, Woods to Gravel** Woodland Kv= 5.0 fps
0.9	93	0.0107	1.67		**Shallow Concentrated Flow, Gravel Area** Unpaved Kv= 16.1 fps
70.7	647	Total			

Summary for Link 2L: Pre - DA-1 Out

```
Inflow Area =       9.607 ac,   1.03% Impervious,  Inflow Depth =   0.00"    for  5-Year event
Inflow      =      0.00 cfs @    5.00 hrs,  Volume=          0.000 af
Primary     =      0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-1 Untreated

```
Inflow Area =       5.429 ac,   1.82% Impervious,  Inflow Depth =   0.00"    for  5-Year event
Inflow      =      0.00 cfs @    5.00 hrs,  Volume=          0.000 af
Primary     =      0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-1 Runoff Area=9.607 ac 1.03% Impervious Runoff Depth=0.00"
Flow Length=1,309' Tc=97.2 min CN=38 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Post - DA-1 Runoff Area=5.429 ac 1.82% Impervious Runoff Depth>0.00"
Flow Length=647' Tc=70.7 min CN=39 Runoff=0.00 cfs 0.000 af

Link 2L: Pre - DA-1 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-1 Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 15.036 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
98.68% Pervious = 14.838 ac 1.32% Impervious = 0.198 ac

Summary for Subcatchment 1S: Pre - DA-1

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=3.34"

	Area (ac)	CN	Description
	8.973	36	Woods, Fair, HSG A
	0.336	49	50-75% Grass cover, Fair, HSG A
	0.199	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	9.607	38	Weighted Average
	9.508		98.97% Pervious Area
	0.099		1.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
4.2	233	0.0343	0.93		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
16.9	536	0.0112	0.53		**Shallow Concentrated Flow, Woodland Slope to Natural Swale** Woodland Kv= 5.0 fps
0.1	440	0.9100	66.26	6,096.18	**Channel Flow, Natural Swale** Area= 92.0 sf Perim= 55.4' r= 1.66' n= 0.030 Earth, grassed & winding
97.2	1,309	Total			

Summary for Subcatchment 3S: Post - DA-1

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.00"

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-Year Rainfall=3.34"

	Area (ac)	CN	Description
	1.489	36	Woods, Fair, HSG A
	3.805	39	>75% Grass cover, Good, HSG A
	0.036	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	5.429	39	Weighted Average
	5.330		98.18% Pervious Area
	0.099		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.5	100	0.0120	0.03		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
6.5	186	0.0091	0.48		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
3.1	141	0.0120	0.77		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
6.7	127	0.0040	0.32		**Shallow Concentrated Flow, Woods to Gravel** Woodland Kv= 5.0 fps
0.9	93	0.0107	1.67		**Shallow Concentrated Flow, Gravel Area** Unpaved Kv= 16.1 fps
70.7	647	Total			

Summary for Link 2L: Pre - DA-1 Out

```
Inflow Area =      9.607 ac,   1.03% Impervious,  Inflow Depth =   0.00"    for  10-Year event
Inflow      =      0.00 cfs @    5.00 hrs,  Volume=          0.000 af
Primary     =      0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-1 Untreated

```
Inflow Area =      5.429 ac,   1.82% Impervious,  Inflow Depth >   0.00"    for  10-Year event
Inflow      =      0.00 cfs @   20.00 hrs,  Volume=          0.000 af
Primary     =      0.00 cfs @   20.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

```
                      Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
                    Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
            Reach routing by Stor-Ind+Trans method  -  Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-1                  Runoff Area=9.607 ac   1.03% Impervious   Runoff Depth>0.02"
                                     Flow Length=1,309'   Tc=97.2 min   CN=38   Runoff=0.04 cfs  0.014 af

Subcatchment 3S: Post - DA-1                 Runoff Area=5.429 ac   1.82% Impervious   Runoff Depth>0.03"
                                       Flow Length=647'   Tc=70.7 min   CN=39   Runoff=0.03 cfs  0.014 af

Link 2L: Pre - DA-1 Out                                                            Inflow=0.04 cfs  0.014 af
                                                                                  Primary=0.04 cfs  0.014 af

Link 4L: Post - DA-1 Untreated                                                     Inflow=0.03 cfs  0.014 af
                                                                                  Primary=0.03 cfs  0.014 af

            Total Runoff Area = 15.036 ac   Runoff Volume = 0.028 af   Average Runoff Depth = 0.02"
                                             98.68% Pervious = 14.838 ac     1.32% Impervious = 0.198 ac
```

Summary for Subcatchment 1S: Pre - DA-1

Runoff = 0.04 cfs @ 19.55 hrs, Volume= 0.014 af, Depth> 0.02"

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 25-Year Rainfall=4.09"

	Area (ac)	CN	Description
	8.973	36	Woods, Fair, HSG A
	0.336	49	50-75% Grass cover, Fair, HSG A
	0.199	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	9.607	38	Weighted Average
	9.508		98.97% Pervious Area
	0.099		1.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
4.2	233	0.0343	0.93		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
16.9	536	0.0112	0.53		**Shallow Concentrated Flow, Woodland Slope to Natural Swale** Woodland Kv= 5.0 fps
0.1	440	0.9100	66.26	6,096.18	**Channel Flow, Natural Swale** Area= 92.0 sf Perim= 55.4' r= 1.66' n= 0.030 Earth, grassed & winding
97.2	1,309	Total			

Summary for Subcatchment 3S: Post - DA-1

Runoff = 0.03 cfs @ 18.46 hrs, Volume= 0.014 af, Depth> 0.03"

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 25-Year Rainfall=4.09"

	Area (ac)	CN	Description
	1.489	36	Woods, Fair, HSG A
	3.805	39	>75% Grass cover, Good, HSG A
	0.036	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	5.429	39	Weighted Average
	5.330		98.18% Pervious Area
	0.099		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.5	100	0.0120	0.03		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
6.5	186	0.0091	0.48		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
3.1	141	0.0120	0.77		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
6.7	127	0.0040	0.32		**Shallow Concentrated Flow, Woods to Gravel** Woodland Kv= 5.0 fps
0.9	93	0.0107	1.67		**Shallow Concentrated Flow, Gravel Area** Unpaved Kv= 16.1 fps
70.7	647	Total			

Summary for Link 2L: Pre - DA-1 Out

```
Inflow Area =      9.607 ac,   1.03% Impervious,  Inflow Depth >  0.02"   for  25-Year event
Inflow      =     0.04 cfs @  19.55 hrs,  Volume=        0.014 af
Primary     =     0.04 cfs @  19.55 hrs,  Volume=        0.014 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-1 Untreated

```
Inflow Area =      5.429 ac,   1.82% Impervious,  Inflow Depth >  0.03"   for  25-Year event
Inflow      =     0.03 cfs @  18.46 hrs,  Volume=        0.014 af
Primary     =     0.03 cfs @  18.46 hrs,  Volume=        0.014 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-1 Runoff Area=9.607 ac 1.03% Impervious Runoff Depth>0.08"
Flow Length=1,309' Tc=97.2 min CN=38 Runoff=0.13 cfs 0.062 af

Subcatchment 3S: Post - DA-1 Runoff Area=5.429 ac 1.82% Impervious Runoff Depth>0.10"
Flow Length=647' Tc=70.7 min CN=39 Runoff=0.10 cfs 0.047 af

Link 2L: Pre - DA-1 Out Inflow=0.13 cfs 0.062 af
Primary=0.13 cfs 0.062 af

Link 4L: Post - DA-1 Untreated Inflow=0.10 cfs 0.047 af
Primary=0.10 cfs 0.047 af

Total Runoff Area = 15.036 ac Runoff Volume = 0.109 af Average Runoff Depth = 0.09"
98.68% Pervious = 14.838 ac 1.32% Impervious = 0.198 ac

Summary for Subcatchment 1S: Pre - DA-1

Runoff = 0.13 cfs @ 15.66 hrs, Volume= 0.062 af, Depth> 0.08"

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 50-Year Rainfall=4.76"

	Area (ac)	CN	Description
	8.973	36	Woods, Fair, HSG A
	0.336	49	50-75% Grass cover, Fair, HSG A
	0.199	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	9.607	38	Weighted Average
	9.508		98.97% Pervious Area
	0.099		1.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
4.2	233	0.0343	0.93		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
16.9	536	0.0112	0.53		**Shallow Concentrated Flow, Woodland Slope to Natural Swale** Woodland Kv= 5.0 fps
0.1	440	0.9100	66.26	6,096.18	**Channel Flow, Natural Swale** Area= 92.0 sf Perim= 55.4' r= 1.66' n= 0.030 Earth, grassed & winding
97.2	1,309	Total			

Summary for Subcatchment 3S: Post - DA-1

Runoff = 0.10 cfs @ 14.20 hrs, Volume= 0.047 af, Depth> 0.10"

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 50-Year Rainfall=4.76"

	Area (ac)	CN	Description
	1.489	36	Woods, Fair, HSG A
	3.805	39	>75% Grass cover, Good, HSG A
	0.036	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	5.429	39	Weighted Average
	5.330		98.18% Pervious Area
	0.099		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.5	100	0.0120	0.03		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
6.5	186	0.0091	0.48		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
3.1	141	0.0120	0.77		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
6.7	127	0.0040	0.32		**Shallow Concentrated Flow, Woods to Gravel** Woodland Kv= 5.0 fps
0.9	93	0.0107	1.67		**Shallow Concentrated Flow, Gravel Area** Unpaved Kv= 16.1 fps
70.7	647	Total			

Summary for Link 2L: Pre - DA-1 Out

```
Inflow Area =      9.607 ac,   1.03% Impervious,  Inflow Depth >  0.08"   for  50-Year event
Inflow      =      0.13 cfs @  15.66 hrs,  Volume=         0.062 af
Primary     =      0.13 cfs @  15.66 hrs,  Volume=         0.062 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-1 Untreated

```
Inflow Area =      5.429 ac,   1.82% Impervious,  Inflow Depth >  0.10"   for  50-Year event
Inflow      =      0.10 cfs @  14.20 hrs,  Volume=         0.047 af
Primary     =      0.10 cfs @  14.20 hrs,  Volume=         0.047 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-1 Runoff Area=9.607 ac 1.03% Impervious Runoff Depth>0.20"
Flow Length=1,309' Tc=97.2 min CN=38 Runoff=0.38 cfs 0.158 af

Subcatchment 3S: Post - DA-1 Runoff Area=5.429 ac 1.82% Impervious Runoff Depth>0.24"
Flow Length=647' Tc=70.7 min CN=39 Runoff=0.30 cfs 0.109 af

Link 2L: Pre - DA-1 Out Inflow=0.38 cfs 0.158 af
Primary=0.38 cfs 0.158 af

Link 4L: Post - DA-1 Untreated Inflow=0.30 cfs 0.109 af
Primary=0.30 cfs 0.109 af

Total Runoff Area = 15.036 ac Runoff Volume = 0.267 af Average Runoff Depth = 0.21"
98.68% Pervious = 14.838 ac 1.32% Impervious = 0.198 ac

Summary for Subcatchment 1S: Pre - DA-1

Runoff = 0.38 cfs @ 13.93 hrs, Volume= 0.158 af, Depth> 0.20"

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-Year Rainfall=5.55"

	Area (ac)	CN	Description
	8.973	36	Woods, Fair, HSG A
	0.336	49	50-75% Grass cover, Fair, HSG A
	0.199	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	9.607	38	Weighted Average
	9.508		98.97% Pervious Area
	0.099		1.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
4.2	233	0.0343	0.93		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
16.9	536	0.0112	0.53		**Shallow Concentrated Flow, Woodland Slope to Natural Swale** Woodland Kv= 5.0 fps
0.1	440	0.9100	66.26	6,096.18	**Channel Flow, Natural Swale** Area= 92.0 sf Perim= 55.4' r= 1.66' n= 0.030 Earth, grassed & winding
97.2	1,309	Total			

Summary for Subcatchment 3S: Post - DA-1

Runoff = 0.30 cfs @ 13.27 hrs, Volume= 0.109 af, Depth> 0.24"

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-Year Rainfall=5.55"

	Area (ac)	CN	Description
	1.489	36	Woods, Fair, HSG A
	3.805	39	>75% Grass cover, Good, HSG A
	0.036	72	Dirt roads, HSG A
*	0.099	98	Paved roads, HSG A
	5.429	39	Weighted Average
	5.330		98.18% Pervious Area
	0.099		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.5	100	0.0120	0.03		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
6.5	186	0.0091	0.48		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
3.1	141	0.0120	0.77		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
6.7	127	0.0040	0.32		**Shallow Concentrated Flow, Woods to Gravel** Woodland Kv= 5.0 fps
0.9	93	0.0107	1.67		**Shallow Concentrated Flow, Gravel Area** Unpaved Kv= 16.1 fps
70.7	647	Total			

Summary for Link 2L: Pre - DA-1 Out

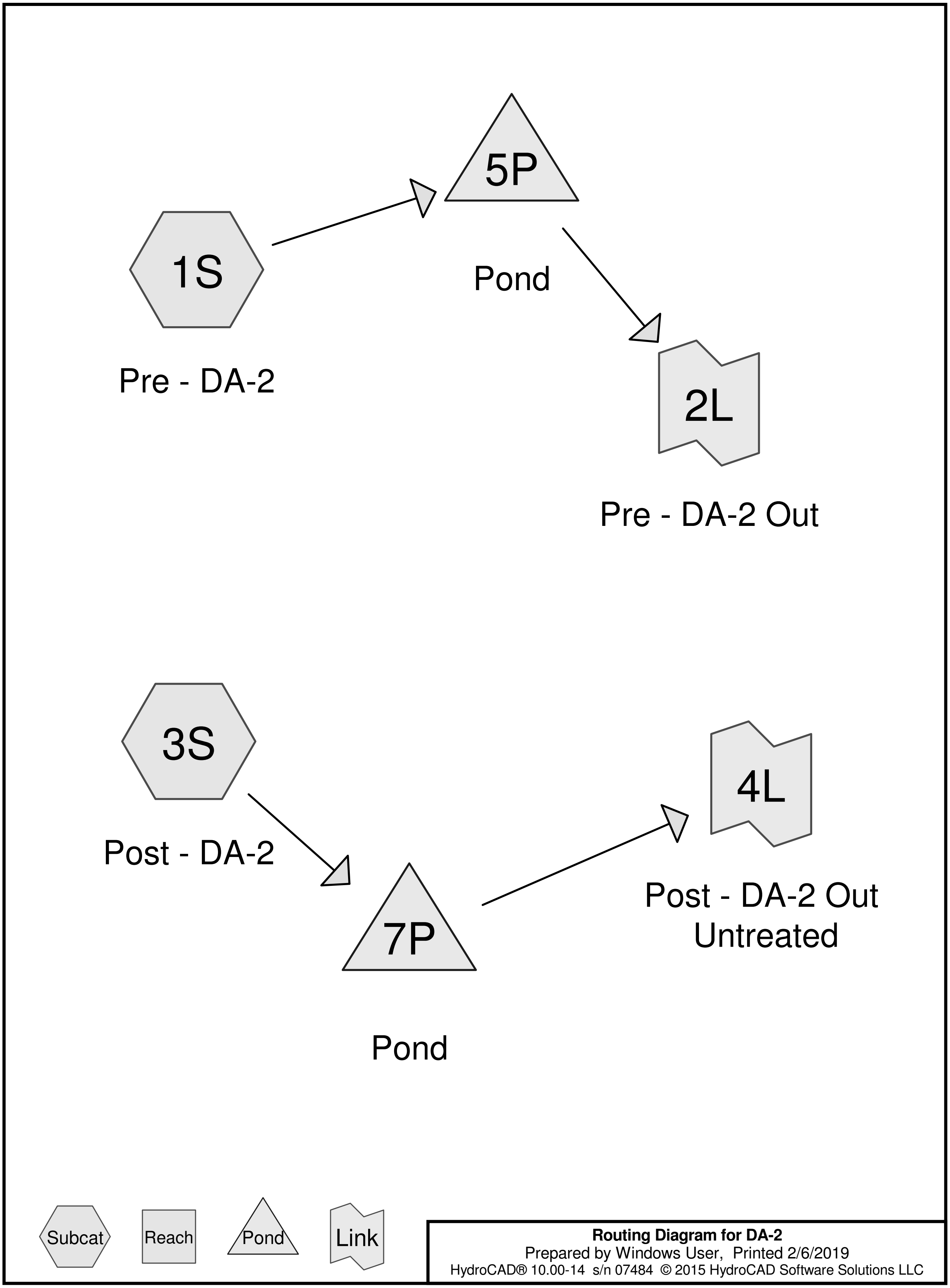
```
Inflow Area =      9.607 ac,   1.03% Impervious,  Inflow Depth >   0.20"    for  100-Year event
Inflow      =      0.38 cfs @   13.93 hrs,  Volume=          0.158 af
Primary     =      0.38 cfs @   13.93 hrs,  Volume=          0.158 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-1 Untreated

```
Inflow Area =      5.429 ac,   1.82% Impervious,  Inflow Depth >   0.24"    for  100-Year event
Inflow      =      0.30 cfs @   13.27 hrs,  Volume=          0.109 af
Primary     =      0.30 cfs @   13.27 hrs,  Volume=          0.109 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Routing Diagram for DA-2
Prepared by Windows User, Printed 2/6/2019
HydroCAD® 10.00-14 s/n 07484 © 2015 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-2 Runoff Area=62.619 ac 5.63% Impervious Runoff Depth=0.00"
Flow Length=1,747' Tc=396.8 min CN=48 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Post - DA-2 Runoff Area=66.964 ac 5.26% Impervious Runoff Depth=0.00"
Flow Length=1,747' Tc=396.8 min CN=48 Runoff=0.00 cfs 0.000 af

Pond 5P: Pond Peak Elev=1,180.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 7P: Pond Peak Elev=1,180.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Link 2L: Pre - DA-2 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-2 Out Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 129.583 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
94.56% Pervious = 122.533 ac 5.44% Impervious = 7.050 ac

Summary for Subcatchment 1S: Pre - DA-2

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=1.97"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	34.741	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.731	76	Gravel roads, HSG A
	1.203	98	Roofs, HSG A
	0.375	98	Water Surface, HSG A
	8.214	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	62.619	48	Weighted Average
	59.094		94.37% Pervious Area
	3.525		5.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2227	2.36		**Shallow Concentrated Flow, Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Subcatchment 3S: Post - DA-2

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=1.97"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	30.206	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.670	76	Gravel roads, HSG A
	1.203	98	Unconnected roofs, HSG A
	0.375	98	Water Surface, HSG A
	17.155	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	66.964	48	Weighted Average
	63.439		94.74% Pervious Area
	3.525		5.26% Impervious Area
	1.203		34.13% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2270	2.38		**Shallow Concentrated Flow, Wood Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Pond 5P: Pond

Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.00' @ 5.00 hrs Surf.Area= 0.375 ac Storage= 0.000 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: Pond

```
Inflow Area =        66.964 ac,    5.26% Impervious,  Inflow Depth =   0.00"    for  1-Year event
Inflow      =         0.00 cfs @    5.00 hrs,  Volume=           0.000 af
Outflow     =         0.00 cfs @    5.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
Primary     =         0.00 cfs @    5.00 hrs,  Volume=           0.000 af
```

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.00' @ 5.00 hrs Surf.Area= 0.375 ac Storage= 0.000 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-2 Out

```
Inflow Area =        62.619 ac,    5.63% Impervious,  Inflow Depth =   0.00"    for  1-Year event
Inflow      =         0.00 cfs @    5.00 hrs,  Volume=           0.000 af
Primary     =         0.00 cfs @    5.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-2 Out Untreated

```
Inflow Area =        66.964 ac,    5.26% Impervious,  Inflow Depth =   0.00"    for  1-Year event
Inflow      =          0.00 cfs @    5.00 hrs,  Volume=           0.000 af
Primary     =          0.00 cfs @    5.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
```

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-2 Runoff Area=62.619 ac 5.63% Impervious Runoff Depth>0.00"
Flow Length=1,747' Tc=396.8 min CN=48 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Post - DA-2 Runoff Area=66.964 ac 5.26% Impervious Runoff Depth>0.00"
Flow Length=1,747' Tc=396.8 min CN=48 Runoff=0.00 cfs 0.000 af

Pond 5P: Pond Peak Elev=1,180.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 7P: Pond Peak Elev=1,180.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Link 2L: Pre - DA-2 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-2 Out Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 129.583 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
94.56% Pervious = 122.533 ac 5.44% Impervious = 7.050 ac

Summary for Subcatchment 1S: Pre - DA-2

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.00"

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 2-Year Rainfall=2.35"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	34.741	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.731	76	Gravel roads, HSG A
	1.203	98	Roofs, HSG A
	0.375	98	Water Surface, HSG A
	8.214	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	62.619	48	Weighted Average
	59.094		94.37% Pervious Area
	3.525		5.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2227	2.36		**Shallow Concentrated Flow, Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Subcatchment 3S: Post - DA-2

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.00"

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 2-Year Rainfall=2.35"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	30.206	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.670	76	Gravel roads, HSG A
	1.203	98	Unconnected roofs, HSG A
	0.375	98	Water Surface, HSG A
	17.155	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	66.964	48	Weighted Average
	63.439		94.74% Pervious Area
	3.525		5.26% Impervious Area
	1.203		34.13% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2270	2.38		**Shallow Concentrated Flow, Wood Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Pond 5P: Pond

Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth > 0.00" for 2-Year event
Inflow = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.00' @ 20.00 hrs Surf.Area= 0.375 ac Storage= 0.000 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↳**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: Pond

Inflow Area = 66.964 ac, 5.26% Impervious, Inflow Depth > 0.00" for 2-Year event
Inflow = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.00' @ 20.00 hrs Surf.Area= 0.375 ac Storage= 0.000 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↳**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-2 Out

Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-2 Out Untreated

```
Inflow Area =        66.964 ac,    5.26% Impervious,  Inflow Depth =   0.00"    for  2-Year event
Inflow       =          0.00 cfs @     5.00 hrs,  Volume=              0.000 af
Primary      =          0.00 cfs @     5.00 hrs,  Volume=              0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-2 Runoff Area=62.619 ac 5.63% Impervious Runoff Depth>0.01"
Flow Length=1,747' Tc=396.8 min CN=48 Runoff=0.18 cfs 0.033 af

Subcatchment 3S: Post - DA-2 Runoff Area=66.964 ac 5.26% Impervious Runoff Depth>0.01"
Flow Length=1,747' Tc=396.8 min CN=48 Runoff=0.19 cfs 0.036 af

Pond 5P: Pond Peak Elev=1,180.08' Storage=0.033 af Inflow=0.18 cfs 0.033 af
Outflow=0.00 cfs 0.000 af

Pond 7P: Pond Peak Elev=1,180.09' Storage=0.035 af Inflow=0.19 cfs 0.036 af
Outflow=0.00 cfs 0.000 af

Link 2L: Pre - DA-2 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-2 Out Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 129.583 ac Runoff Volume = 0.069 af Average Runoff Depth = 0.01"
94.56% Pervious = 122.533 ac 5.44% Impervious = 7.050 ac

Summary for Subcatchment 1S: Pre - DA-2

Runoff = 0.18 cfs @ 20.00 hrs, Volume= 0.033 af, Depth> 0.01"

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 5-Year Rainfall=2.87"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	34.741	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.731	76	Gravel roads, HSG A
	1.203	98	Roofs, HSG A
	0.375	98	Water Surface, HSG A
	8.214	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	62.619	48	Weighted Average
	59.094		94.37% Pervious Area
	3.525		5.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2227	2.36		**Shallow Concentrated Flow, Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Subcatchment 3S: Post - DA-2

Runoff = 0.19 cfs @ 20.00 hrs, Volume= 0.036 af, Depth> 0.01"

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 5-Year Rainfall=2.87"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	30.206	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.670	76	Gravel roads, HSG A
	1.203	98	Unconnected roofs, HSG A
	0.375	98	Water Surface, HSG A
	17.155	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	66.964	48	Weighted Average
	63.439		94.74% Pervious Area
	3.525		5.26% Impervious Area
	1.203		34.13% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2270	2.38		**Shallow Concentrated Flow, Wood Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Pond 5P: Pond

```
Inflow Area =      62.619 ac,   5.63% Impervious,  Inflow Depth >  0.01"   for  5-Year event
Inflow      =       0.18 cfs @  20.00 hrs,  Volume=          0.033 af
Outflow     =       0.00 cfs @   5.00 hrs,  Volume=          0.000 af,  Atten= 100%,  Lag= 0.0 min
Primary     =       0.00 cfs @   5.00 hrs,  Volume=          0.000 af
```

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.08' @ 20.00 hrs Surf.Area= 0.444 ac Storage= 0.033 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: Pond

Inflow Area = 66.964 ac, 5.26% Impervious, Inflow Depth > 0.01" for 5-Year event
Inflow = 0.19 cfs @ 20.00 hrs, Volume= 0.036 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.09' @ 20.00 hrs Surf.Area= 0.448 ac Storage= 0.035 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-2 Out

Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth = 0.00" for 5-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-2 Out Untreated

Inflow Area = 66.964 ac, 5.26% Impervious, Inflow Depth = 0.00" for 5-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

```
                    Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
                  Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
       Reach routing by Stor-Ind+Trans method  -  Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-2          Runoff Area=62.619 ac  5.63% Impervious  Runoff Depth>0.03"
                               Flow Length=1,747'  Tc=396.8 min  CN=48  Runoff=0.58 cfs  0.165 af

Subcatchment 3S: Post - DA-2         Runoff Area=66.964 ac  5.26% Impervious  Runoff Depth>0.03"
                               Flow Length=1,747'  Tc=396.8 min  CN=48  Runoff=0.62 cfs  0.176 af

Pond 5P: Pond                        Peak Elev=1,180.32'  Storage=0.164 af  Inflow=0.58 cfs  0.165 af
                                                                       Outflow=0.00 cfs  0.000 af

Pond 7P: Pond                        Peak Elev=1,180.34'  Storage=0.175 af  Inflow=0.62 cfs  0.176 af
                                                                       Outflow=0.00 cfs  0.000 af

Link 2L: Pre - DA-2 Out                                                 Inflow=0.00 cfs  0.000 af
                                                                       Primary=0.00 cfs  0.000 af

Link 4L: Post - DA-2 Out Untreated                                      Inflow=0.00 cfs  0.000 af
                                                                       Primary=0.00 cfs  0.000 af

        Total Runoff Area = 129.583 ac   Runoff Volume = 0.341 af   Average Runoff Depth = 0.03"
                                  94.56% Pervious = 122.533 ac    5.44% Impervious = 7.050 ac
```

Summary for Subcatchment 1S: Pre - DA-2

Runoff = 0.58 cfs @ 20.00 hrs, Volume= 0.165 af, Depth> 0.03"

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-Year Rainfall=3.34"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	34.741	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.731	76	Gravel roads, HSG A
	1.203	98	Roofs, HSG A
	0.375	98	Water Surface, HSG A
	8.214	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	62.619	48	Weighted Average
	59.094		94.37% Pervious Area
	3.525		5.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2227	2.36		**Shallow Concentrated Flow, Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Subcatchment 3S: Post - DA-2

Runoff = 0.62 cfs @ 20.00 hrs, Volume= 0.176 af, Depth> 0.03"

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-Year Rainfall=3.34"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	30.206	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.670	76	Gravel roads, HSG A
	1.203	98	Unconnected roofs, HSG A
	0.375	98	Water Surface, HSG A
	17.155	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	66.964	48	Weighted Average
	63.439		94.74% Pervious Area
	3.525		5.26% Impervious Area
	1.203		34.13% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2270	2.38		**Shallow Concentrated Flow, Wood Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Pond 5P: Pond

```
Inflow Area =        62.619 ac,    5.63% Impervious,  Inflow Depth >   0.03"    for  10-Year event
Inflow      =         0.58 cfs @   20.00 hrs,  Volume=            0.165 af
Outflow     =         0.00 cfs @    5.00 hrs,  Volume=            0.000 af,  Atten= 100%,  Lag= 0.0 min
Primary     =         0.00 cfs @    5.00 hrs,  Volume=            0.000 af
```

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.32' @ 20.00 hrs Surf.Area= 0.648 ac Storage= 0.164 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↳**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: Pond

Inflow Area = 66.964 ac, 5.26% Impervious, Inflow Depth > 0.03" for 10-Year event
Inflow = 0.62 cfs @ 20.00 hrs, Volume= 0.176 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.34' @ 20.00 hrs Surf.Area= 0.663 ac Storage= 0.175 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↳**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-2 Out

Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-2 Out Untreated

```
Inflow Area =        66.964 ac,    5.26% Impervious,  Inflow Depth =   0.00"    for  10-Year event
Inflow       =          0.00 cfs @     5.00 hrs,  Volume=              0.000 af
Primary      =          0.00 cfs @     5.00 hrs,  Volume=              0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

```
Subcatchment 1S: Pre - DA-2          Runoff Area=62.619 ac   5.63% Impervious   Runoff Depth>0.11"
                               Flow Length=1,747'   Tc=396.8 min   CN=48   Runoff=1.61 cfs  0.581 af

Subcatchment 3S: Post - DA-2         Runoff Area=66.964 ac   5.26% Impervious   Runoff Depth>0.11"
                               Flow Length=1,747'   Tc=396.8 min   CN=48   Runoff=1.72 cfs  0.622 af

Pond 5P: Pond                    Peak Elev=1,180.80'  Storage=0.578 af   Inflow=1.61 cfs  0.581 af
                                                                        Outflow=0.00 cfs  0.000 af

Pond 7P: Pond                    Peak Elev=1,180.84'  Storage=0.618 af   Inflow=1.72 cfs  0.622 af
                                                                        Outflow=0.00 cfs  0.000 af

Link 2L: Pre - DA-2 Out                                                  Inflow=0.00 cfs  0.000 af
                                                                        Primary=0.00 cfs  0.000 af

Link 4L: Post - DA-2 Out Untreated                                       Inflow=0.00 cfs  0.000 af
                                                                        Primary=0.00 cfs  0.000 af

         Total Runoff Area = 129.583 ac   Runoff Volume = 1.203 af   Average Runoff Depth = 0.11"
                                   94.56% Pervious = 122.533 ac     5.44% Impervious = 7.050 ac
```

Summary for Subcatchment 1S: Pre - DA-2

Runoff = 1.61 cfs @ 18.95 hrs, Volume= 0.581 af, Depth> 0.11"

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 25-Year Rainfall=4.09"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	34.741	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.731	76	Gravel roads, HSG A
	1.203	98	Roofs, HSG A
	0.375	98	Water Surface, HSG A
	8.214	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	62.619	48	Weighted Average
	59.094		94.37% Pervious Area
	3.525		5.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2227	2.36		**Shallow Concentrated Flow, Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Subcatchment 3S: Post - DA-2

Runoff = 1.72 cfs @ 18.95 hrs, Volume= 0.622 af, Depth> 0.11"

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 25-Year Rainfall=4.09"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	30.206	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.670	76	Gravel roads, HSG A
	1.203	98	Unconnected roofs, HSG A
	0.375	98	Water Surface, HSG A
	17.155	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	66.964	48	Weighted Average
	63.439		94.74% Pervious Area
	3.525		5.26% Impervious Area
	1.203		34.13% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2270	2.38		**Shallow Concentrated Flow, Wood Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Pond 5P: Pond

Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth > 0.11" for 25-Year event
Inflow = 1.61 cfs @ 18.95 hrs, Volume= 0.581 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.80' @ 20.00 hrs Surf.Area= 1.062 ac Storage= 0.578 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: Pond

Inflow Area = 66.964 ac, 5.26% Impervious, Inflow Depth > 0.11" for 25-Year event
Inflow = 1.72 cfs @ 18.95 hrs, Volume= 0.622 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.84' @ 20.00 hrs Surf.Area= 1.094 ac Storage= 0.618 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-2 Out

Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth = 0.00" for 25-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-2 Out Untreated

```
Inflow Area =        66.964 ac,    5.26% Impervious,  Inflow Depth =   0.00"    for  25-Year event
Inflow      =          0.00 cfs @    5.00 hrs,  Volume=            0.000 af
Primary     =          0.00 cfs @    5.00 hrs,  Volume=            0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

```
                          Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
                          Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
                 Reach routing by Stor-Ind+Trans method  -  Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-2             Runoff Area=62.619 ac   5.63% Impervious   Runoff Depth>0.22"
                                    Flow Length=1,747'   Tc=396.8 min   CN=48   Runoff=2.98 cfs  1.142 af

Subcatchment 3S: Post - DA-2            Runoff Area=66.964 ac   5.26% Impervious   Runoff Depth>0.22"
                                    Flow Length=1,747'   Tc=396.8 min   CN=48   Runoff=3.19 cfs  1.221 af

Pond 5P: Pond                          Peak Elev=1,180.97'  Storage=0.767 af   Inflow=2.98 cfs  1.142 af
                                                                              Outflow=2.96 cfs  0.376 af

Pond 7P: Pond                          Peak Elev=1,180.97'  Storage=0.768 af   Inflow=3.19 cfs  1.221 af
                                                                              Outflow=3.18 cfs  0.454 af

Link 2L: Pre - DA-2 Out                                                        Inflow=2.96 cfs  0.376 af
                                                                              Primary=2.96 cfs  0.376 af

Link 4L: Post - DA-2 Out Untreated                                             Inflow=3.18 cfs  0.454 af
                                                                              Primary=3.18 cfs  0.454 af

             Total Runoff Area = 129.583 ac   Runoff Volume = 2.363 af   Average Runoff Depth = 0.22"
                                      94.56% Pervious = 122.533 ac     5.44% Impervious = 7.050 ac
```

Summary for Subcatchment 1S: Pre - DA-2

Runoff = 2.98 cfs @ 18.49 hrs, Volume= 1.142 af, Depth> 0.22"

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 50-Year Rainfall=4.76"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	34.741	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.731	76	Gravel roads, HSG A
	1.203	98	Roofs, HSG A
	0.375	98	Water Surface, HSG A
	8.214	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	62.619	48	Weighted Average
	59.094		94.37% Pervious Area
	3.525		5.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2227	2.36		**Shallow Concentrated Flow, Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Subcatchment 3S: Post - DA-2

Runoff = 3.19 cfs @ 18.49 hrs, Volume= 1.221 af, Depth> 0.22"

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 50-Year Rainfall=4.76"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	30.206	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.670	76	Gravel roads, HSG A
	1.203	98	Unconnected roofs, HSG A
	0.375	98	Water Surface, HSG A
	17.155	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	66.964	48	Weighted Average
	63.439		94.74% Pervious Area
	3.525		5.26% Impervious Area
	1.203		34.13% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2270	2.38		**Shallow Concentrated Flow, Wood Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Pond 5P: Pond

Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth > 0.22" for 50-Year event
Inflow = 2.98 cfs @ 18.49 hrs, Volume= 1.142 af
Outflow = 2.96 cfs @ 18.81 hrs, Volume= 0.376 af, Atten= 1%, Lag= 19.1 min
Primary = 2.96 cfs @ 18.81 hrs, Volume= 0.376 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.97' @ 18.81 hrs Surf.Area= 1.205 ac Storage= 0.767 af

Plug-Flow detention time= 216.2 min calculated for 0.375 af (33% of inflow)
Center-of-Mass det. time= 104.0 min (1,153.0 - 1,049.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=2.93 cfs @ 18.81 hrs HW=1,180.97' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 2.93 cfs @ 0.34 fps)

Summary for Pond 7P: Pond

Inflow Area = 66.964 ac, 5.26% Impervious, Inflow Depth > 0.22" for 50-Year event
Inflow = 3.19 cfs @ 18.49 hrs, Volume= 1.221 af
Outflow = 3.18 cfs @ 18.62 hrs, Volume= 0.454 af, Atten= 0%, Lag= 7.8 min
Primary = 3.18 cfs @ 18.62 hrs, Volume= 0.454 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.97' @ 18.62 hrs Surf.Area= 1.205 ac Storage= 0.768 af

Plug-Flow detention time= 201.4 min calculated for 0.453 af (37% of inflow)
Center-of-Mass det. time= 97.9 min (1,147.0 - 1,049.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=3.14 cfs @ 18.62 hrs HW=1,180.97' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 3.14 cfs @ 0.35 fps)

Summary for Link 2L: Pre - DA-2 Out

Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth > 0.07" for 50-Year event
Inflow = 2.96 cfs @ 18.81 hrs, Volume= 0.376 af
Primary = 2.96 cfs @ 18.81 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-2 Out Untreated

```
Inflow Area =        66.964 ac,    5.26% Impervious,  Inflow Depth >   0.08"    for  50-Year event
Inflow       =         3.18 cfs @   18.62 hrs,  Volume=            0.454 af
Primary      =         3.18 cfs @   18.62 hrs,  Volume=            0.454 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

```
                 Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
                 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
    Reach routing by Stor-Ind+Trans method  -  Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-2          Runoff Area=62.619 ac  5.63% Impervious  Runoff Depth>0.38"
                              Flow Length=1,747'  Tc=396.8 min  CN=48  Runoff=5.09 cfs  1.999 af

Subcatchment 3S: Post - DA-2         Runoff Area=66.964 ac  5.26% Impervious  Runoff Depth>0.38"
                              Flow Length=1,747'  Tc=396.8 min  CN=48  Runoff=5.44 cfs  2.137 af

Pond 5P: Pond                      Peak Elev=1,180.98'  Storage=0.779 af  Inflow=5.09 cfs  1.999 af
                                                                        Outflow=5.08 cfs  1.224 af

Pond 7P: Pond                      Peak Elev=1,180.98'  Storage=0.780 af  Inflow=5.44 cfs  2.137 af
                                                                        Outflow=5.44 cfs  1.361 af

Link 2L: Pre - DA-2 Out                                                  Inflow=5.08 cfs  1.224 af
                                                                        Primary=5.08 cfs  1.224 af

Link 4L: Post - DA-2 Out Untreated                                       Inflow=5.44 cfs  1.361 af
                                                                        Primary=5.44 cfs  1.361 af

        Total Runoff Area = 129.583 ac   Runoff Volume = 4.136 af   Average Runoff Depth = 0.38"
                                   94.56% Pervious = 122.533 ac     5.44% Impervious = 7.050 ac
```

Summary for Subcatchment 1S: Pre - DA-2

Runoff = 5.09 cfs @ 18.08 hrs, Volume= 1.999 af, Depth> 0.38"

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 100-Year Rainfall=5.55"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	34.741	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.731	76	Gravel roads, HSG A
	1.203	98	Roofs, HSG A
	0.375	98	Water Surface, HSG A
	8.214	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	62.619	48	Weighted Average
	59.094		94.37% Pervious Area
	3.525		5.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2227	2.36		**Shallow Concentrated Flow, Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Subcatchment 3S: Post - DA-2

Runoff = 5.44 cfs @ 18.08 hrs, Volume= 2.137 af, Depth> 0.38"

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 100-Year Rainfall=5.55"

	Area (ac)	CN	Description
*	1.947	98	Asphalt, HSG A
	30.206	36	Woods, Fair, HSG A
	7.788	60	Woods, Fair, HSG B
	7.129	79	Woods, Fair, HSG D
	0.670	76	Gravel roads, HSG A
	1.203	98	Unconnected roofs, HSG A
	0.375	98	Water Surface, HSG A
	17.155	39	>75% Grass cover, Good, HSG A
	0.327	61	>75% Grass cover, Good, HSG B
	0.164	80	>75% Grass cover, Good, HSG D
	66.964	48	Weighted Average
	63.439		94.74% Pervious Area
	3.525		5.26% Impervious Area
	1.203		34.13% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.9	54	0.0092	0.48		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.6	88	0.2270	2.38		**Shallow Concentrated Flow, Wood Slope** Woodland Kv= 5.0 fps
2.2	164	0.0610	1.23		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
316.1	1,341	0.0002	0.07		**Shallow Concentrated Flow, Slope to Pond** Woodland Kv= 5.0 fps
396.8	1,747	Total			

Summary for Pond 5P: Pond

Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth > 0.38" for 100-Year event
Inflow = 5.09 cfs @ 18.08 hrs, Volume= 1.999 af
Outflow = 5.08 cfs @ 18.13 hrs, Volume= 1.224 af, Atten= 0%, Lag= 3.0 min
Primary = 5.08 cfs @ 18.13 hrs, Volume= 1.224 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.98' @ 18.13 hrs Surf.Area= 1.213 ac Storage= 0.779 af

Plug-Flow detention time= 125.7 min calculated for 1.224 af (61% of inflow)
Center-of-Mass det. time= 64.7 min (1,108.6 - 1,043.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=5.07 cfs @ 18.13 hrs HW=1,180.98' (Free Discharge)
↰**1=Broad-Crested Rectangular Weir** (Weir Controls 5.07 cfs @ 0.41 fps)

Summary for Pond 7P: Pond

Inflow Area = 66.964 ac, 5.26% Impervious, Inflow Depth > 0.38" for 100-Year event
Inflow = 5.44 cfs @ 18.08 hrs, Volume= 2.137 af
Outflow = 5.44 cfs @ 18.13 hrs, Volume= 1.361 af, Atten= 0%, Lag= 3.0 min
Primary = 5.44 cfs @ 18.13 hrs, Volume= 1.361 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.98' @ 18.13 hrs Surf.Area= 1.214 ac Storage= 0.780 af

Plug-Flow detention time= 118.1 min calculated for 1.356 af (63% of inflow)
Center-of-Mass det. time= 61.1 min (1,105.0 - 1,043.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	0.802 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	0.375	0.000	0.000
1,181.00	1.229	0.802	0.802

Device	Routing	Invert	Outlet Devices
#1	Primary	1,180.95'	**400.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=5.40 cfs @ 18.13 hrs HW=1,180.98' (Free Discharge)
↰**1=Broad-Crested Rectangular Weir** (Weir Controls 5.40 cfs @ 0.42 fps)

Summary for Link 2L: Pre - DA-2 Out

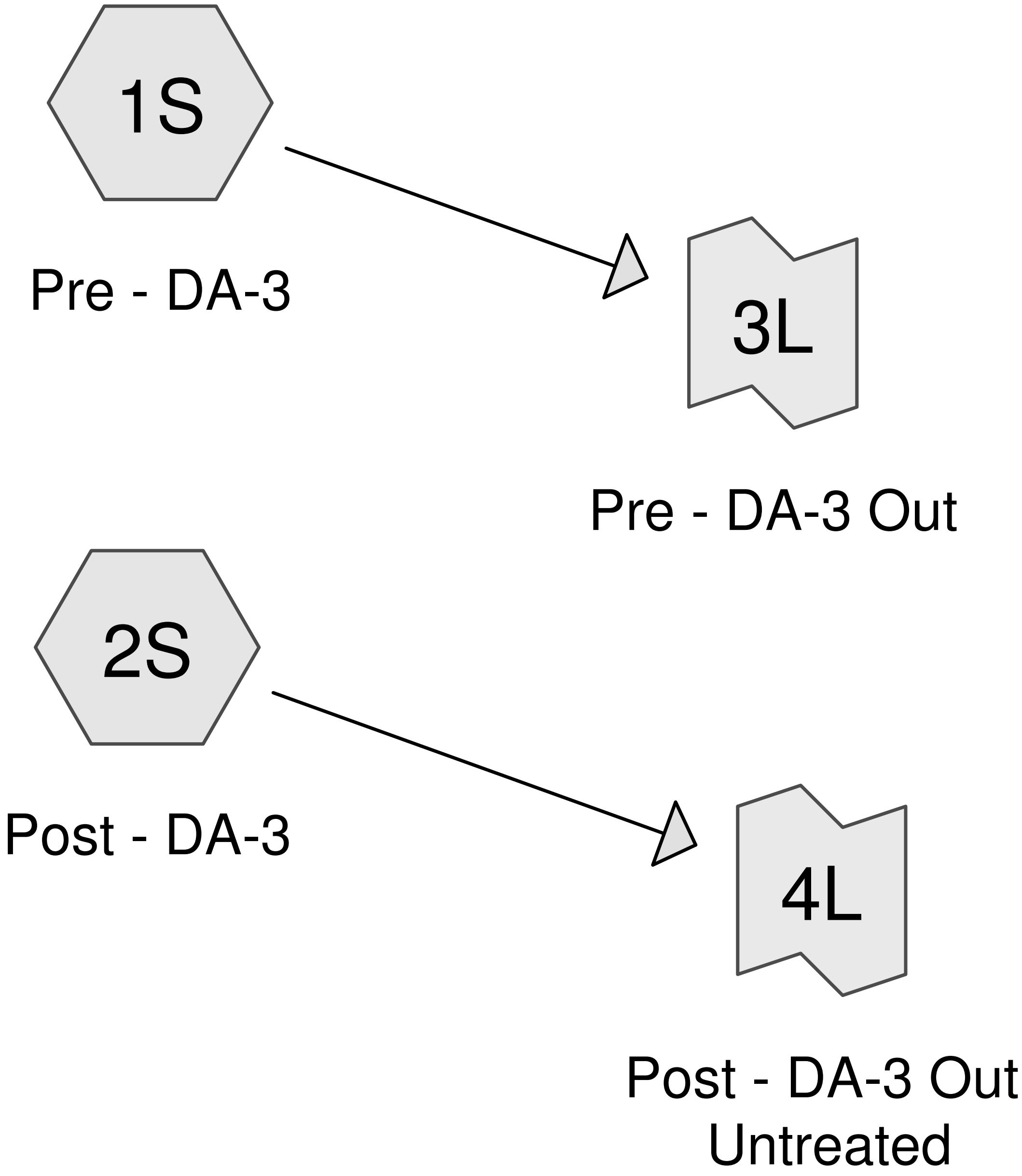
Inflow Area = 62.619 ac, 5.63% Impervious, Inflow Depth > 0.23" for 100-Year event
Inflow = 5.08 cfs @ 18.13 hrs, Volume= 1.224 af
Primary = 5.08 cfs @ 18.13 hrs, Volume= 1.224 af, Atten= 0%, Lag= 0.0 min

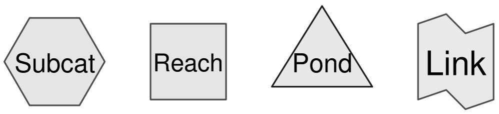
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-2 Out Untreated

```
Inflow Area =      66.964 ac,    5.26% Impervious,  Inflow Depth >   0.24"    for  100-Year event
Inflow      =        5.44 cfs @   18.13 hrs,  Volume=          1.361 af
Primary     =        5.44 cfs @   18.13 hrs,  Volume=          1.361 af,  Atten= 0%,  Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
```





Routing Diagram for DA-3
Prepared by Windows User, Printed 2/7/2019

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-3
Runoff Area=0.498 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=217' Tc=37.6 min CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: Post - DA-3
Runoff Area=0.337 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=195' Tc=30.7 min CN=37 Runoff=0.00 cfs 0.000 af

Link 3L: Pre - DA-3 Out
Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-3 Out Untreated
Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 0.835 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 0.835 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-3

```
Runoff      =         0.00 cfs @     5.00 hrs,  Volume=           0.000 af,  Depth=  0.00"
```

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-Year Rainfall=1.97"

Area (ac)	CN	Description
0.498	36	Woods, Fair, HSG A
0.498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods to Natural Swale** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	117	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
37.6	217	Total			

Summary for Subcatchment 2S: Post - DA-3

```
Runoff      =         0.00 cfs @     5.00 hrs,  Volume=           0.000 af,  Depth=  0.00"
```

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-Year Rainfall=1.97"

Area (ac)	CN	Description
0.273	36	Woods, Fair, HSG A
0.064	39	>75% Grass cover, Good, HSG A
0.337	37	Weighted Average
0.337		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	66	0.0378	0.05		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
5.6	44	0.0227	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 2.35"
0.6	33	0.0303	0.87		**Shallow Concentrated Flow, Woods to Swale** Woodland Kv= 5.0 fps
0.2	52	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
30.7	195	Total			

Summary for Link 3L: Pre - DA-3 Out

```
Inflow Area =         0.498 ac,    0.00% Impervious,  Inflow Depth =   0.00"    for  1-Year event
Inflow      =         0.00 cfs @    5.00 hrs,  Volume=            0.000 af
Primary     =         0.00 cfs @    5.00 hrs,  Volume=            0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-3 Out Untreated

```
Inflow Area =         0.337 ac,    0.00% Impervious,  Inflow Depth =   0.00"    for  1-Year event
Inflow      =         0.00 cfs @    5.00 hrs,  Volume=            0.000 af
Primary     =         0.00 cfs @    5.00 hrs,  Volume=            0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-3 Runoff Area=0.498 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=217' Tc=37.6 min CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: Post - DA-3 Runoff Area=0.337 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=195' Tc=30.7 min CN=37 Runoff=0.00 cfs 0.000 af

Link 3L: Pre - DA-3 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-3 Out Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 0.835 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 0.835 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-3

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 2-Year Rainfall=2.35"

Area (ac)	CN	Description
0.498	36	Woods, Fair, HSG A
0.498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods to Natural Swale** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	117	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
37.6	217	Total			

Summary for Subcatchment 2S: Post - DA-3

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 2-Year Rainfall=2.35"

Area (ac)	CN	Description
0.273	36	Woods, Fair, HSG A
0.064	39	>75% Grass cover, Good, HSG A
0.337	37	Weighted Average
0.337		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	66	0.0378	0.05		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
5.6	44	0.0227	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 2.35"
0.6	33	0.0303	0.87		**Shallow Concentrated Flow, Woods to Swale** Woodland Kv= 5.0 fps
0.2	52	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
30.7	195	Total			

Summary for Link 3L: Pre - DA-3 Out

```
Inflow Area =       0.498 ac,   0.00% Impervious,  Inflow Depth =   0.00"    for  2-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=         0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=         0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-3 Out Untreated

```
Inflow Area =       0.337 ac,   0.00% Impervious,  Inflow Depth =   0.00"    for  2-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=         0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=         0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-3 Runoff Area=0.498 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=217' Tc=37.6 min CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: Post - DA-3 Runoff Area=0.337 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=195' Tc=30.7 min CN=37 Runoff=0.00 cfs 0.000 af

Link 3L: Pre - DA-3 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-3 Out Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 0.835 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 0.835 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-3

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 5-Year Rainfall=2.87"

Area (ac)	CN	Description
0.498	36	Woods, Fair, HSG A
0.498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods to Natural Swale** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	117	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
37.6	217	Total			

Summary for Subcatchment 2S: Post - DA-3

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 5-Year Rainfall=2.87"

Area (ac)	CN	Description
0.273	36	Woods, Fair, HSG A
0.064	39	>75% Grass cover, Good, HSG A
0.337	37	Weighted Average
0.337		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	66	0.0378	0.05		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
5.6	44	0.0227	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 2.35"
0.6	33	0.0303	0.87		**Shallow Concentrated Flow, Woods to Swale** Woodland Kv= 5.0 fps
0.2	52	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
30.7	195	Total			

Summary for Link 3L: Pre - DA-3 Out

```
Inflow Area =       0.498 ac,   0.00% Impervious,  Inflow Depth =   0.00"    for  5-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=           0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
```

```
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
```

Summary for Link 4L: Post - DA-3 Out Untreated

```
Inflow Area =       0.337 ac,   0.00% Impervious,  Inflow Depth =   0.00"    for  5-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=           0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
```

```
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
```

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-3 Runoff Area=0.498 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=217' Tc=37.6 min CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: Post - DA-3 Runoff Area=0.337 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=195' Tc=30.7 min CN=37 Runoff=0.00 cfs 0.000 af

Link 3L: Pre - DA-3 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-3 Out Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 0.835 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 0.835 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-3

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=3.34"

Area (ac)	CN	Description
0.498	36	Woods, Fair, HSG A
0.498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods to Natural Swale** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	117	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
37.6	217	Total			

Summary for Subcatchment 2S: Post - DA-3

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=3.34"

Area (ac)	CN	Description
0.273	36	Woods, Fair, HSG A
0.064	39	>75% Grass cover, Good, HSG A
0.337	37	Weighted Average
0.337		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	66	0.0378	0.05		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
5.6	44	0.0227	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 2.35"
0.6	33	0.0303	0.87		**Shallow Concentrated Flow, Woods to Swale** Woodland Kv= 5.0 fps
0.2	52	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
30.7	195	Total			

Summary for Link 3L: Pre - DA-3 Out

```
Inflow Area =       0.498 ac,   0.00% Impervious,  Inflow Depth =  0.00"    for  10-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-3 Out Untreated

```
Inflow Area =       0.337 ac,   0.00% Impervious,  Inflow Depth =  0.00"    for  10-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-3 Runoff Area=0.498 ac 0.00% Impervious Runoff Depth>0.01"
Flow Length=217' Tc=37.6 min CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: Post - DA-3 Runoff Area=0.337 ac 0.00% Impervious Runoff Depth>0.01"
Flow Length=195' Tc=30.7 min CN=37 Runoff=0.00 cfs 0.000 af

Link 3L: Pre - DA-3 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-3 Out Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 0.835 ac Runoff Volume = 0.001 af Average Runoff Depth = 0.01"
100.00% Pervious = 0.835 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-3

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.01"

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 25-Year Rainfall=4.09"

Area (ac)	CN	Description
0.498	36	Woods, Fair, HSG A
0.498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods to Natural Swale** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	117	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
37.6	217	Total			

Summary for Subcatchment 2S: Post - DA-3

Runoff = 0.00 cfs @ 19.20 hrs, Volume= 0.000 af, Depth> 0.01"

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 25-Year Rainfall=4.09"

Area (ac)	CN	Description
0.273	36	Woods, Fair, HSG A
0.064	39	>75% Grass cover, Good, HSG A
0.337	37	Weighted Average
0.337		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	66	0.0378	0.05		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
5.6	44	0.0227	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 2.35"
0.6	33	0.0303	0.87		**Shallow Concentrated Flow, Woods to Swale** Woodland Kv= 5.0 fps
0.2	52	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
30.7	195	Total			

Summary for Link 3L: Pre - DA-3 Out

```
Inflow Area =      0.498 ac,    0.00% Impervious,  Inflow Depth >   0.01"    for  25-Year event
Inflow      =      0.00 cfs @   20.00 hrs,  Volume=           0.000 af
Primary     =      0.00 cfs @   20.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-3 Out Untreated

```
Inflow Area =      0.337 ac,    0.00% Impervious,  Inflow Depth >   0.01"    for  25-Year event
Inflow      =      0.00 cfs @   19.20 hrs,  Volume=           0.000 af
Primary     =      0.00 cfs @   19.20 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-3 Runoff Area=0.498 ac 0.00% Impervious Runoff Depth>0.05"
Flow Length=217' Tc=37.6 min CN=36 Runoff=0.00 cfs 0.002 af

Subcatchment 2S: Post - DA-3 Runoff Area=0.337 ac 0.00% Impervious Runoff Depth>0.07"
Flow Length=195' Tc=30.7 min CN=37 Runoff=0.00 cfs 0.002 af

Link 3L: Pre - DA-3 Out Inflow=0.00 cfs 0.002 af
Primary=0.00 cfs 0.002 af

Link 4L: Post - DA-3 Out Untreated Inflow=0.00 cfs 0.002 af
Primary=0.00 cfs 0.002 af

Total Runoff Area = 0.835 ac Runoff Volume = 0.004 af Average Runoff Depth = 0.05"
100.00% Pervious = 0.835 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-3

Runoff = 0.00 cfs @ 15.76 hrs, Volume= 0.002 af, Depth> 0.05"

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 50-Year Rainfall=4.76"

Area (ac)	CN	Description
0.498	36	Woods, Fair, HSG A
0.498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods to Natural Swale** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	117	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
37.6	217	Total			

Summary for Subcatchment 2S: Post - DA-3

Runoff = 0.00 cfs @ 15.27 hrs, Volume= 0.002 af, Depth> 0.07"

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 50-Year Rainfall=4.76"

Area (ac)	CN	Description
0.273	36	Woods, Fair, HSG A
0.064	39	>75% Grass cover, Good, HSG A
0.337	37	Weighted Average
0.337		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	66	0.0378	0.05		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
5.6	44	0.0227	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 2.35"
0.6	33	0.0303	0.87		**Shallow Concentrated Flow, Woods to Swale** Woodland Kv= 5.0 fps
0.2	52	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
30.7	195	Total			

Summary for Link 3L: Pre - DA-3 Out

```
Inflow Area =         0.498 ac,    0.00% Impervious,  Inflow Depth >   0.05"    for  50-Year event
Inflow       =        0.00 cfs @   15.76 hrs,  Volume=            0.002 af
Primary      =        0.00 cfs @   15.76 hrs,  Volume=            0.002 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-3 Out Untreated

```
Inflow Area =         0.337 ac,    0.00% Impervious,  Inflow Depth >   0.07"    for  50-Year event
Inflow       =        0.00 cfs @   15.27 hrs,  Volume=            0.002 af
Primary      =        0.00 cfs @   15.27 hrs,  Volume=            0.002 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-3 Runoff Area=0.498 ac 0.00% Impervious Runoff Depth>0.15"
Flow Length=217' Tc=37.6 min CN=36 Runoff=0.01 cfs 0.006 af

Subcatchment 2S: Post - DA-3 Runoff Area=0.337 ac 0.00% Impervious Runoff Depth>0.18"
Flow Length=195' Tc=30.7 min CN=37 Runoff=0.01 cfs 0.005 af

Link 3L: Pre - DA-3 Out Inflow=0.01 cfs 0.006 af
Primary=0.01 cfs 0.006 af

Link 4L: Post - DA-3 Out Untreated Inflow=0.01 cfs 0.005 af
Primary=0.01 cfs 0.005 af

Total Runoff Area = 0.835 ac Runoff Volume = 0.011 af Average Runoff Depth = 0.16"
100.00% Pervious = 0.835 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-3

Runoff = 0.01 cfs @ 13.23 hrs, Volume= 0.006 af, Depth> 0.15"

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-Year Rainfall=5.55"

Area (ac)	CN	Description
0.498	36	Woods, Fair, HSG A
0.498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods to Natural Swale** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	117	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
37.6	217	Total			

Summary for Subcatchment 2S: Post - DA-3

Runoff = 0.01 cfs @ 12.74 hrs, Volume= 0.005 af, Depth> 0.18"

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-Year Rainfall=5.55"

Area (ac)	CN	Description
0.273	36	Woods, Fair, HSG A
0.064	39	>75% Grass cover, Good, HSG A
0.337	37	Weighted Average
0.337		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	66	0.0378	0.05		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
5.6	44	0.0227	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 2.35"
0.6	33	0.0303	0.87		**Shallow Concentrated Flow, Woods to Swale** Woodland Kv= 5.0 fps
0.2	52	0.0170	4.31	18.51	**Channel Flow, Natural Swale** Area= 4.3 sf Perim= 7.9' r= 0.54' n= 0.030 Earth, grassed & winding
30.7	195	Total			

Summary for Link 3L: Pre - DA-3 Out

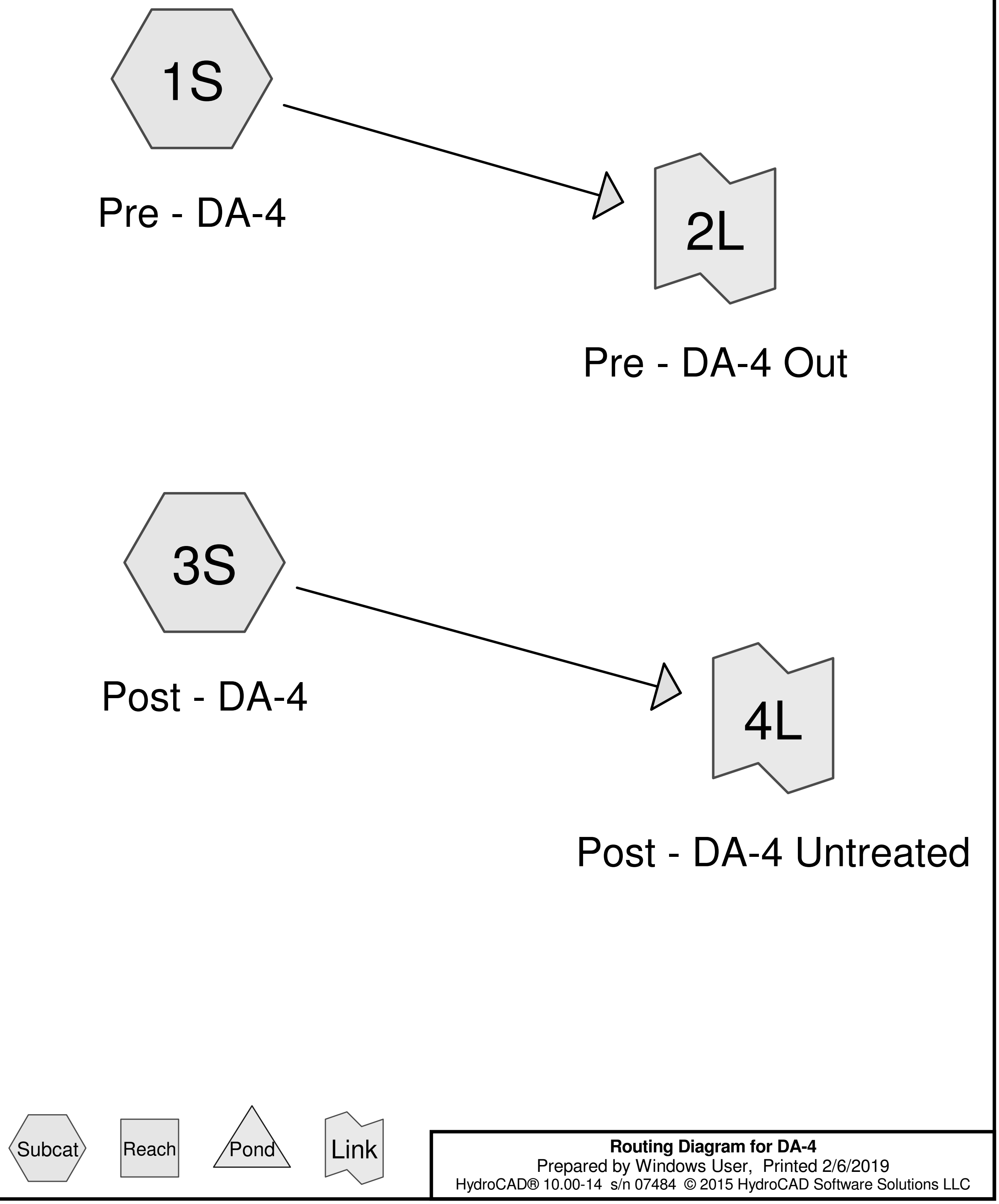
```
Inflow Area =        0.498 ac,   0.00% Impervious,  Inflow Depth >   0.15"    for  100-Year event
Inflow      =        0.01 cfs @   13.23 hrs,  Volume=            0.006 af
Primary     =        0.01 cfs @   13.23 hrs,  Volume=            0.006 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-3 Out Untreated

```
Inflow Area =        0.337 ac,   0.00% Impervious,  Inflow Depth >   0.18"    for  100-Year event
Inflow      =        0.01 cfs @   12.74 hrs,  Volume=            0.005 af
Primary     =        0.01 cfs @   12.74 hrs,  Volume=            0.005 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Routing Diagram for DA-4
Prepared by Windows User, Printed 2/6/2019
HydroCAD® 10.00-14 s/n 07484 © 2015 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Post - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.00 cfs 0.000 af

Link 2L: Pre - DA-4 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-4 Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.438 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 2.438 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-4

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=1.97"

Area (ac)	CN	Description
1.219	36	Woods, Fair, HSG A
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Subcatchment 3S: Post - DA-4

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=1.97"

Area (ac)	CN	Description
1.038	36	Woods, Fair, HSG A
0.181	39	>75% Grass cover, Good, HSG A
1.219	36	Weighted Average
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Link 2L: Pre - DA-4 Out

Inflow Area = 1.219 ac, 0.00% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-4 Untreated

```
Inflow Area =         1.219 ac,    0.00% Impervious,  Inflow Depth =   0.00"    for  1-Year event
Inflow       =         0.00 cfs @     5.00 hrs,  Volume=            0.000 af
Primary      =         0.00 cfs @     5.00 hrs,  Volume=            0.000 af,  Atten= 0%,  Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
```

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Post - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.00 cfs 0.000 af

Link 2L: Pre - DA-4 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-4 Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.438 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 2.438 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-4

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 2-Year Rainfall=2.35"

Area (ac)	CN	Description
1.219	36	Woods, Fair, HSG A
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Subcatchment 3S: Post - DA-4

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 2-Year Rainfall=2.35"

Area (ac)	CN	Description
1.038	36	Woods, Fair, HSG A
0.181	39	>75% Grass cover, Good, HSG A
1.219	36	Weighted Average
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Link 2L: Pre - DA-4 Out

Inflow Area = 1.219 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-4 Untreated

```
Inflow Area =         1.219 ac,    0.00% Impervious,  Inflow Depth =   0.00"    for  2-Year event
Inflow      =        0.00 cfs @    5.00 hrs,  Volume=            0.000 af
Primary     =        0.00 cfs @    5.00 hrs,  Volume=            0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-4	Runoff Area=1.219 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=333' Tc=39.5 min CN=36 Runoff=0.00 cfs 0.000 af
Subcatchment 3S: Post - DA-4	Runoff Area=1.219 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=333' Tc=39.5 min CN=36 Runoff=0.00 cfs 0.000 af
Link 2L: Pre - DA-4 Out	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af
Link 4L: Post - DA-4 Untreated	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.438 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 2.438 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-4

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 5-Year Rainfall=2.87"

Area (ac)	CN	Description
1.219	36	Woods, Fair, HSG A
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Subcatchment 3S: Post - DA-4

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 5-Year Rainfall=2.87"

Area (ac)	CN	Description
1.038	36	Woods, Fair, HSG A
0.181	39	>75% Grass cover, Good, HSG A
1.219	36	Weighted Average
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Link 2L: Pre - DA-4 Out

Inflow Area = 1.219 ac, 0.00% Impervious, Inflow Depth = 0.00" for 5-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-4 Untreated

```
Inflow Area =        1.219 ac,    0.00% Impervious,  Inflow Depth =   0.00"    for  5-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=           0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Post - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.00 cfs 0.000 af

Link 2L: Pre - DA-4 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-4 Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.438 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 2.438 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-4

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=3.34"

Area (ac)	CN	Description
1.219	36	Woods, Fair, HSG A
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Subcatchment 3S: Post - DA-4

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=3.34"

Area (ac)	CN	Description
1.038	36	Woods, Fair, HSG A
0.181	39	>75% Grass cover, Good, HSG A
1.219	36	Weighted Average
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Link 2L: Pre - DA-4 Out

Inflow Area = 1.219 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-4 Untreated

```
Inflow Area =        1.219 ac,   0.00% Impervious,  Inflow Depth =   0.00"    for  10-Year event
Inflow      =        0.00 cfs @    5.00 hrs,  Volume=          0.000 af
Primary     =        0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth>0.01"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.00 cfs 0.001 af

Subcatchment 3S: Post - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth>0.01"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.00 cfs 0.001 af

Link 2L: Pre - DA-4 Out Inflow=0.00 cfs 0.001 af
Primary=0.00 cfs 0.001 af

Link 4L: Post - DA-4 Untreated Inflow=0.00 cfs 0.001 af
Primary=0.00 cfs 0.001 af

Total Runoff Area = 2.438 ac Runoff Volume = 0.001 af Average Runoff Depth = 0.01"
100.00% Pervious = 2.438 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-4

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.001 af, Depth> 0.01"

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 25-Year Rainfall=4.09"

Area (ac)	CN	Description
1.219	36	Woods, Fair, HSG A
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Subcatchment 3S: Post - DA-4

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.001 af, Depth> 0.01"

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 25-Year Rainfall=4.09"

Area (ac)	CN	Description
1.038	36	Woods, Fair, HSG A
0.181	39	>75% Grass cover, Good, HSG A
1.219	36	Weighted Average
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Link 2L: Pre - DA-4 Out

Inflow Area = 1.219 ac, 0.00% Impervious, Inflow Depth > 0.01" for 25-Year event
Inflow = 0.00 cfs @ 20.00 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 20.00 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-4 Untreated

```
Inflow Area =        1.219 ac,    0.00% Impervious,  Inflow Depth >   0.01"    for  25-Year event
Inflow      =        0.00 cfs @   20.00 hrs,  Volume=          0.001 af
Primary     =        0.00 cfs @   20.00 hrs,  Volume=          0.001 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth>0.05"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.01 cfs 0.005 af

Subcatchment 3S: Post - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth>0.05"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.01 cfs 0.005 af

Link 2L: Pre - DA-4 Out Inflow=0.01 cfs 0.005 af
Primary=0.01 cfs 0.005 af

Link 4L: Post - DA-4 Untreated Inflow=0.01 cfs 0.005 af
Primary=0.01 cfs 0.005 af

Total Runoff Area = 2.438 ac Runoff Volume = 0.010 af Average Runoff Depth = 0.05"
100.00% Pervious = 2.438 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-4

Runoff = 0.01 cfs @ 15.84 hrs, Volume= 0.005 af, Depth> 0.05"

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 50-Year Rainfall=4.76"

Area (ac)	CN	Description
1.219	36	Woods, Fair, HSG A
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Subcatchment 3S: Post - DA-4

Runoff = 0.01 cfs @ 15.84 hrs, Volume= 0.005 af, Depth> 0.05"

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 50-Year Rainfall=4.76"

Area (ac)	CN	Description
1.038	36	Woods, Fair, HSG A
0.181	39	>75% Grass cover, Good, HSG A
1.219	36	Weighted Average
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Link 2L: Pre - DA-4 Out

Inflow Area = 1.219 ac, 0.00% Impervious, Inflow Depth > 0.05" for 50-Year event
Inflow = 0.01 cfs @ 15.84 hrs, Volume= 0.005 af
Primary = 0.01 cfs @ 15.84 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-4 Untreated

```
Inflow Area =        1.219 ac,    0.00% Impervious,  Inflow Depth >   0.05"    for  50-Year event
Inflow       =        0.01 cfs @   15.84 hrs,  Volume=           0.005 af
Primary      =        0.01 cfs @   15.84 hrs,  Volume=           0.005 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth>0.15"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.03 cfs 0.015 af

Subcatchment 3S: Post - DA-4 Runoff Area=1.219 ac 0.00% Impervious Runoff Depth>0.15"
Flow Length=333' Tc=39.5 min CN=36 Runoff=0.03 cfs 0.015 af

Link 2L: Pre - DA-4 Out Inflow=0.03 cfs 0.015 af
Primary=0.03 cfs 0.015 af

Link 4L: Post - DA-4 Untreated Inflow=0.03 cfs 0.015 af
Primary=0.03 cfs 0.015 af

Total Runoff Area = 2.438 ac Runoff Volume = 0.030 af Average Runoff Depth = 0.15"
100.00% Pervious = 2.438 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-4

Runoff = 0.03 cfs @ 13.28 hrs, Volume= 0.015 af, Depth> 0.15"

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-Year Rainfall=5.55"

Area (ac)	CN	Description
1.219	36	Woods, Fair, HSG A
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Subcatchment 3S: Post - DA-4

Runoff = 0.03 cfs @ 13.28 hrs, Volume= 0.015 af, Depth> 0.15"

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-Year Rainfall=5.55"

Area (ac)	CN	Description
1.038	36	Woods, Fair, HSG A
0.181	39	>75% Grass cover, Good, HSG A
1.219	36	Weighted Average
1.219		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.1	100	0.0300	0.04		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
2.4	233	0.1030	1.60		**Shallow Concentrated Flow, Woods** Woodland Kv= 5.0 fps
39.5	333	Total			

Summary for Link 2L: Pre - DA-4 Out

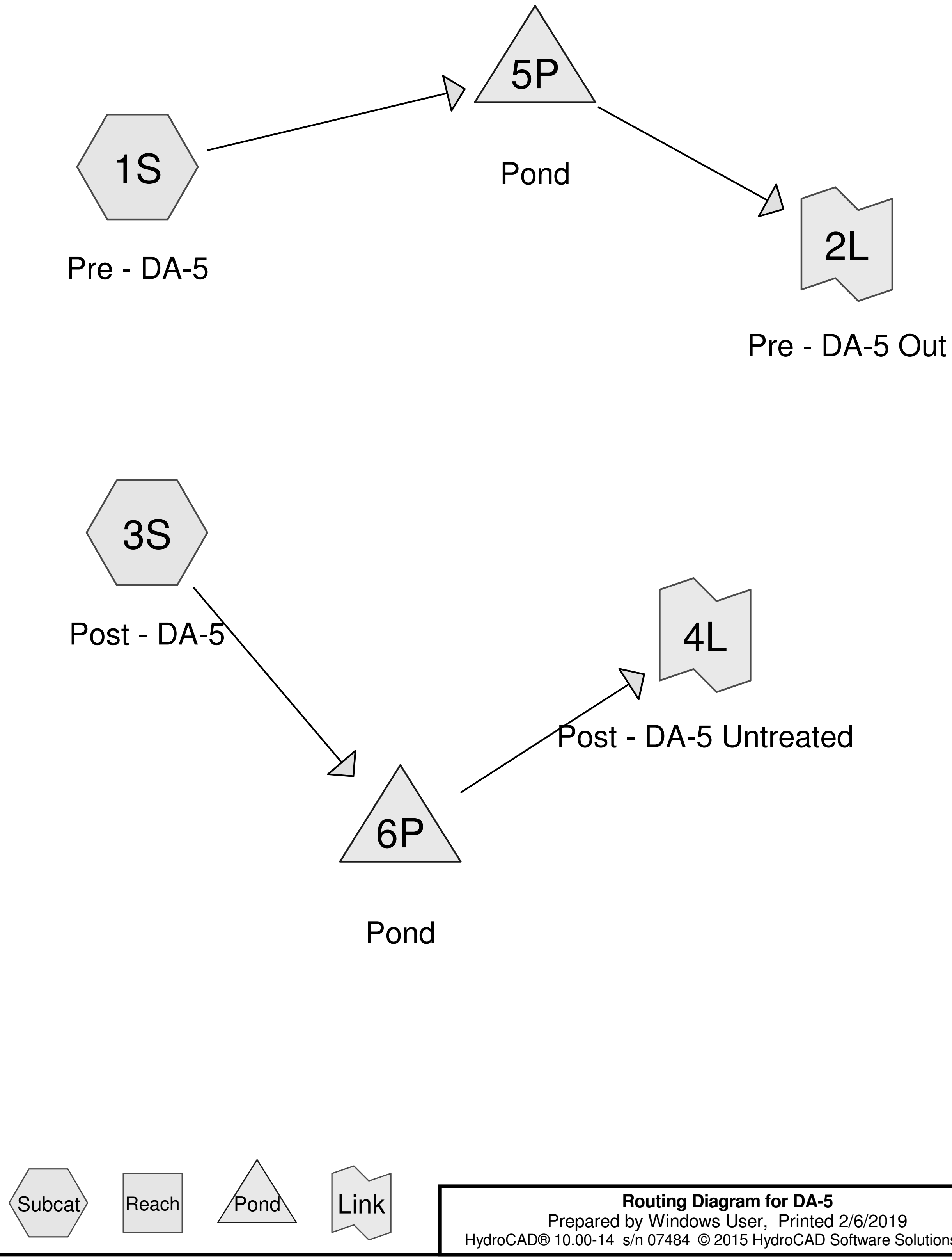
Inflow Area = 1.219 ac, 0.00% Impervious, Inflow Depth > 0.15" for 100-Year event
Inflow = 0.03 cfs @ 13.28 hrs, Volume= 0.015 af
Primary = 0.03 cfs @ 13.28 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-4 Untreated

```
Inflow Area =         1.219 ac,    0.00% Impervious,  Inflow Depth >   0.15"    for  100-Year event
Inflow      =        0.03 cfs @   13.28 hrs,  Volume=            0.015 af
Primary     =        0.03 cfs @   13.28 hrs,  Volume=            0.015 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Routing Diagram for DA-5
Prepared by Windows User, Printed 2/6/2019
HydroCAD® 10.00-14 s/n 07484 © 2015 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-5	Runoff Area=13.554 ac 12.72% Impervious Runoff Depth>0.04" Flow Length=829' Tc=88.6 min CN=61 Runoff=0.11 cfs 0.050 af
Subcatchment 3S: Post - DA-5	Runoff Area=13.553 ac 12.72% Impervious Runoff Depth>0.06" Flow Length=849' Tc=86.7 min CN=62 Runoff=0.14 cfs 0.063 af
Pond 5P: Pond	Peak Elev=1,180.03' Storage=0.050 af Inflow=0.11 cfs 0.050 af Outflow=0.00 cfs 0.000 af
Pond 6P: Pond	Peak Elev=1,180.04' Storage=0.062 af Inflow=0.14 cfs 0.063 af Outflow=0.00 cfs 0.000 af
Link 2L: Pre - DA-5 Out	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af
Link 4L: Post - DA-5 Untreated	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Total Runoff Area = 27.107 ac Runoff Volume = 0.113 af Average Runoff Depth = 0.05"
87.28% Pervious = 23.659 ac 12.72% Impervious = 3.448 ac

Summary for Subcatchment 1S: Pre - DA-5

Runoff = 0.11 cfs @ 14.45 hrs, Volume= 0.050 af, Depth> 0.04"

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-Year Rainfall=1.97"

Area (ac)	CN	Description
2.942	36	Woods, Fair, HSG A
7.786	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.554	61	Weighted Average
11.830		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods to Slope** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.4	55	0.2727	2.61		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
7.8	301	0.0166	0.64		**Shallow Concentrated Flow, Woods to Second Slope** Woodland Kv= 5.0 fps
4.4	373	0.0804	1.42		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
88.6	829	Total			

Summary for Subcatchment 3S: Post - DA-5

Runoff = 0.14 cfs @ 14.09 hrs, Volume= 0.063 af, Depth> 0.06"

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-Year Rainfall=1.97"

Area (ac)	CN	Description
2.686	39	>75% Grass cover, Good, HSG A
0.162	61	>75% Grass cover, Good, HSG B
0.250	36	Woods, Fair, HSG A
7.629	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.553	62	Weighted Average
11.829		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	66	0.2270	2.38		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
5.7	304	0.0164	0.90		**Shallow Concentrated Flow, Grass to Second Slope** Short Grass Pasture Kv= 7.0 fps
4.5	379	0.0791	1.41		**Shallow Concentrated Flow, Wood Slope to Pond** Woodland Kv= 5.0 fps
86.7	849	Total			

Summary for Pond 5P: Pond

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth > 0.04" for 1-Year event
Inflow = 0.11 cfs @ 14.45 hrs, Volume= 0.050 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.03' @ 20.00 hrs Surf.Area= 1.730 ac Storage= 0.050 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Pond

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth > 0.06" for 1-Year event
Inflow = 0.14 cfs @ 14.09 hrs, Volume= 0.063 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

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

```
Peak Elev= 1,180.04' @ 20.00 hrs   Surf.Area= 1.733 ac   Storage= 0.062 af

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

Volume        Invert    Avail.Storage   Storage Description
  #1       1,180.00'         4.160 af   Custom Stage Data (Prismatic) Listed below (Recalc)

 Elevation      Surf.Area         Inc.Store        Cum.Store
    (feet)        (acres)       (acre-feet)      (acre-feet)
  1,180.00          1.720             0.000            0.000
  1,182.00          2.440             4.160            4.160

Device  Routing          Invert   Outlet Devices
  #1    Primary        1,181.95'  200.0' long  x 5.0' breadth Broad-Crested Rectangular Weir
                                  Head (feet)  0.20  0.40  0.60  0.80  1.00  1.20  1.40  1.60  1.80  2.00
                                  2.50  3.00  3.50  4.00  4.50  5.00  5.50
                                  Coef. (English)  2.34  2.50  2.70  2.68  2.68  2.66  2.65  2.65  2.65
                                  2.65  2.67  2.66  2.68  2.70  2.74  2.79  2.88

Primary OutFlow  Max=0.00 cfs @ 5.00 hrs  HW=1,180.00'   (Free Discharge)
⮤—1=Broad-Crested Rectangular Weir  ( Controls 0.00 cfs)
```

Summary for Link 2L: Pre - DA-5 Out

```
Inflow Area =      13.554 ac,  12.72% Impervious,  Inflow Depth =   0.00"    for  1-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
```

Summary for Link 4L: Post - DA-5 Untreated

```
Inflow Area =      13.553 ac,  12.72% Impervious,  Inflow Depth =   0.00"    for  1-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
```

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-5 Runoff Area=13.554 ac 12.72% Impervious Runoff Depth>0.11"
Flow Length=829' Tc=88.6 min CN=61 Runoff=0.35 cfs 0.128 af

Subcatchment 3S: Post - DA-5 Runoff Area=13.553 ac 12.72% Impervious Runoff Depth>0.13"
Flow Length=849' Tc=86.7 min CN=62 Runoff=0.44 cfs 0.148 af

Pond 5P: Pond Peak Elev=1,180.07' Storage=0.128 af Inflow=0.35 cfs 0.128 af
Outflow=0.00 cfs 0.000 af

Pond 6P: Pond Peak Elev=1,180.09' Storage=0.148 af Inflow=0.44 cfs 0.148 af
Outflow=0.00 cfs 0.000 af

Link 2L: Pre - DA-5 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-5 Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 27.107 ac Runoff Volume = 0.277 af Average Runoff Depth = 0.12"
87.28% Pervious = 23.659 ac 12.72% Impervious = 3.448 ac

Summary for Subcatchment 1S: Pre - DA-5

Runoff = 0.35 cfs @ 13.50 hrs, Volume= 0.128 af, Depth> 0.11"

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 2-Year Rainfall=2.35"

Area (ac)	CN	Description
2.942	36	Woods, Fair, HSG A
7.786	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.554	61	Weighted Average
11.830		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods to Slope** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.4	55	0.2727	2.61		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
7.8	301	0.0166	0.64		**Shallow Concentrated Flow, Woods to Second Slope** Woodland Kv= 5.0 fps
4.4	373	0.0804	1.42		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
88.6	829	Total			

Summary for Subcatchment 3S: Post - DA-5

Runoff = 0.44 cfs @ 13.41 hrs, Volume= 0.148 af, Depth> 0.13"

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 2-Year Rainfall=2.35"

Area (ac)	CN	Description
2.686	39	>75% Grass cover, Good, HSG A
0.162	61	>75% Grass cover, Good, HSG B
0.250	36	Woods, Fair, HSG A
7.629	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.553	62	Weighted Average
11.829		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	66	0.2270	2.38		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
5.7	304	0.0164	0.90		**Shallow Concentrated Flow, Grass to Second Slope** Short Grass Pasture Kv= 7.0 fps
4.5	379	0.0791	1.41		**Shallow Concentrated Flow, Wood Slope to Pond** Woodland Kv= 5.0 fps
86.7	849	Total			

Summary for Pond 5P: Pond

```
Inflow Area =       13.554 ac, 12.72% Impervious, Inflow Depth >  0.11"   for 2-Year event
Inflow      =        0.35 cfs @  13.50 hrs, Volume=          0.128 af
Outflow     =        0.00 cfs @   5.00 hrs, Volume=          0.000 af, Atten= 100%, Lag= 0.0 min
Primary     =        0.00 cfs @   5.00 hrs, Volume=          0.000 af
```

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.07' @ 20.00 hrs Surf.Area= 1.747 ac Storage= 0.128 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Pond

```
Inflow Area =       13.553 ac, 12.72% Impervious, Inflow Depth >  0.13"   for 2-Year event
Inflow      =        0.44 cfs @  13.41 hrs, Volume=          0.148 af
Outflow     =        0.00 cfs @   5.00 hrs, Volume=          0.000 af, Atten= 100%, Lag= 0.0 min
Primary     =        0.00 cfs @   5.00 hrs, Volume=          0.000 af
```

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

Peak Elev= 1,180.09' @ 20.00 hrs Surf.Area= 1.751 ac Storage= 0.148 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-5 Out

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-5 Untreated

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-5	Runoff Area=13.554 ac 12.72% Impervious Runoff Depth>0.25" Flow Length=829' Tc=88.6 min CN=61 Runoff=1.01 cfs 0.282 af
Subcatchment 3S: Post - DA-5	Runoff Area=13.553 ac 12.72% Impervious Runoff Depth>0.28" Flow Length=849' Tc=86.7 min CN=62 Runoff=1.17 cfs 0.313 af
Pond 5P: Pond	Peak Elev=1,180.16' Storage=0.282 af Inflow=1.01 cfs 0.282 af Outflow=0.00 cfs 0.000 af
Pond 6P: Pond	Peak Elev=1,180.18' Storage=0.313 af Inflow=1.17 cfs 0.313 af Outflow=0.00 cfs 0.000 af
Link 2L: Pre - DA-5 Out	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af
Link 4L: Post - DA-5 Untreated	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Total Runoff Area = 27.107 ac Runoff Volume = 0.596 af Average Runoff Depth = 0.26"
87.28% Pervious = 23.659 ac 12.72% Impervious = 3.448 ac

Summary for Subcatchment 1S: Pre - DA-5

Runoff = 1.01 cfs @ 13.30 hrs, Volume= 0.282 af, Depth> 0.25"

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 5-Year Rainfall=2.87"

Area (ac)	CN	Description
2.942	36	Woods, Fair, HSG A
7.786	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.554	61	Weighted Average
11.830		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods to Slope** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.4	55	0.2727	2.61		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
7.8	301	0.0166	0.64		**Shallow Concentrated Flow, Woods to Second Slope** Woodland Kv= 5.0 fps
4.4	373	0.0804	1.42		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
88.6	829	Total			

Summary for Subcatchment 3S: Post - DA-5

Runoff = 1.17 cfs @ 13.22 hrs, Volume= 0.313 af, Depth> 0.28"

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 5-Year Rainfall=2.87"

Area (ac)	CN	Description
2.686	39	>75% Grass cover, Good, HSG A
0.162	61	>75% Grass cover, Good, HSG B
0.250	36	Woods, Fair, HSG A
7.629	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.553	62	Weighted Average
11.829		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	66	0.2270	2.38		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
5.7	304	0.0164	0.90		**Shallow Concentrated Flow, Grass to Second Slope** Short Grass Pasture Kv= 7.0 fps
4.5	379	0.0791	1.41		**Shallow Concentrated Flow, Wood Slope to Pond** Woodland Kv= 5.0 fps
86.7	849	Total			

Summary for Pond 5P: Pond

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth > 0.25" for 5-Year event
Inflow = 1.01 cfs @ 13.30 hrs, Volume= 0.282 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.16' @ 20.00 hrs Surf.Area= 1.778 ac Storage= 0.282 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Pond

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth > 0.28" for 5-Year event
Inflow = 1.17 cfs @ 13.22 hrs, Volume= 0.313 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

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

Peak Elev= 1,180.18' @ 20.00 hrs Surf.Area= 1.784 ac Storage= 0.313 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↰**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-5 Out

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth = 0.00" for 5-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-5 Untreated

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth = 0.00" for 5-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-5	Runoff Area=13.554 ac 12.72% Impervious Runoff Depth>0.41" Flow Length=829' Tc=88.6 min CN=61 Runoff=1.87 cfs 0.462 af
Subcatchment 3S: Post - DA-5	Runoff Area=13.553 ac 12.72% Impervious Runoff Depth>0.44" Flow Length=849' Tc=86.7 min CN=62 Runoff=2.10 cfs 0.502 af
Pond 5P: Pond	Peak Elev=1,180.26' Storage=0.461 af Inflow=1.87 cfs 0.462 af Outflow=0.00 cfs 0.000 af
Pond 6P: Pond	Peak Elev=1,180.28' Storage=0.502 af Inflow=2.10 cfs 0.502 af Outflow=0.00 cfs 0.000 af
Link 2L: Pre - DA-5 Out	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af
Link 4L: Post - DA-5 Untreated	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Total Runoff Area = 27.107 ac Runoff Volume = 0.964 af Average Runoff Depth = 0.43"
87.28% Pervious = 23.659 ac 12.72% Impervious = 3.448 ac

Summary for Subcatchment 1S: Pre - DA-5

Runoff = 1.87 cfs @ 13.20 hrs, Volume= 0.462 af, Depth> 0.41"

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-Year Rainfall=3.34"

Area (ac)	CN	Description
2.942	36	Woods, Fair, HSG A
7.786	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.554	61	Weighted Average
11.830		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods to Slope** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.4	55	0.2727	2.61		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
7.8	301	0.0166	0.64		**Shallow Concentrated Flow, Woods to Second Slope** Woodland Kv= 5.0 fps
4.4	373	0.0804	1.42		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
88.6	829	Total			

Summary for Subcatchment 3S: Post - DA-5

Runoff = 2.10 cfs @ 13.18 hrs, Volume= 0.502 af, Depth> 0.44"

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-Year Rainfall=3.34"

Area (ac)	CN	Description
2.686	39	>75% Grass cover, Good, HSG A
0.162	61	>75% Grass cover, Good, HSG B
0.250	36	Woods, Fair, HSG A
7.629	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.553	62	Weighted Average
11.829		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	66	0.2270	2.38		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
5.7	304	0.0164	0.90		**Shallow Concentrated Flow, Grass to Second Slope** Short Grass Pasture Kv= 7.0 fps
4.5	379	0.0791	1.41		**Shallow Concentrated Flow, Wood Slope to Pond** Woodland Kv= 5.0 fps
86.7	849	Total			

Summary for Pond 5P: Pond

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth > 0.41" for 10-Year event
Inflow = 1.87 cfs @ 13.20 hrs, Volume= 0.462 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.26' @ 20.00 hrs Surf.Area= 1.814 ac Storage= 0.461 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Pond

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth > 0.44" for 10-Year event
Inflow = 2.10 cfs @ 13.18 hrs, Volume= 0.502 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

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

Peak Elev= 1,180.28' @ 20.00 hrs Surf.Area= 1.822 ac Storage= 0.502 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-5 Out

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-5 Untreated

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-5 Runoff Area=13.554 ac 12.72% Impervious Runoff Depth>0.72"
Flow Length=829' Tc=88.6 min CN=61 Runoff=3.70 cfs 0.811 af

Subcatchment 3S: Post - DA-5 Runoff Area=13.553 ac 12.72% Impervious Runoff Depth>0.77"
Flow Length=849' Tc=86.7 min CN=62 Runoff=4.04 cfs 0.867 af

Pond 5P: Pond Peak Elev=1,180.45' Storage=0.811 af Inflow=3.70 cfs 0.811 af
Outflow=0.00 cfs 0.000 af

Pond 6P: Pond Peak Elev=1,180.48' Storage=0.866 af Inflow=4.04 cfs 0.867 af
Outflow=0.00 cfs 0.000 af

Link 2L: Pre - DA-5 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-5 Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 27.107 ac Runoff Volume = 1.679 af Average Runoff Depth = 0.74"
87.28% Pervious = 23.659 ac 12.72% Impervious = 3.448 ac

Summary for Subcatchment 1S: Pre - DA-5

Runoff = 3.70 cfs @ 13.12 hrs, Volume= 0.811 af, Depth> 0.72"

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 25-Year Rainfall=4.09"

Area (ac)	CN	Description
2.942	36	Woods, Fair, HSG A
7.786	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.554	61	Weighted Average
11.830		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods to Slope** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.4	55	0.2727	2.61		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
7.8	301	0.0166	0.64		**Shallow Concentrated Flow, Woods to Second Slope** Woodland Kv= 5.0 fps
4.4	373	0.0804	1.42		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
88.6	829	Total			

Summary for Subcatchment 3S: Post - DA-5

Runoff = 4.04 cfs @ 13.09 hrs, Volume= 0.867 af, Depth> 0.77"

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 25-Year Rainfall=4.09"

Area (ac)	CN	Description
2.686	39	>75% Grass cover, Good, HSG A
0.162	61	>75% Grass cover, Good, HSG B
0.250	36	Woods, Fair, HSG A
7.629	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.553	62	Weighted Average
11.829		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	66	0.2270	2.38		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
5.7	304	0.0164	0.90		**Shallow Concentrated Flow, Grass to Second Slope** Short Grass Pasture Kv= 7.0 fps
4.5	379	0.0791	1.41		**Shallow Concentrated Flow, Wood Slope to Pond** Woodland Kv= 5.0 fps
86.7	849	Total			

Summary for Pond 5P: Pond

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth > 0.72" for 25-Year event
Inflow = 3.70 cfs @ 13.12 hrs, Volume= 0.811 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.45' @ 20.00 hrs Surf.Area= 1.882 ac Storage= 0.811 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Pond

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth > 0.77" for 25-Year event
Inflow = 4.04 cfs @ 13.09 hrs, Volume= 0.867 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

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

Peak Elev= 1,180.48' @ 20.00 hrs Surf.Area= 1.893 ac Storage= 0.866 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-5 Out

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth = 0.00" for 25-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-5 Untreated

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth = 0.00" for 25-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-5	Runoff Area=13.554 ac 12.72% Impervious Runoff Depth>1.04" Flow Length=829' Tc=88.6 min CN=61 Runoff=5.69 cfs 1.178 af
Subcatchment 3S: Post - DA-5	Runoff Area=13.553 ac 12.72% Impervious Runoff Depth>1.10" Flow Length=849' Tc=86.7 min CN=62 Runoff=6.14 cfs 1.247 af
Pond 5P: Pond	Peak Elev=1,180.64' Storage=1.177 af Inflow=5.69 cfs 1.178 af Outflow=0.00 cfs 0.000 af
Pond 6P: Pond	Peak Elev=1,180.68' Storage=1.246 af Inflow=6.14 cfs 1.247 af Outflow=0.00 cfs 0.000 af
Link 2L: Pre - DA-5 Out	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af
Link 4L: Post - DA-5 Untreated	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Total Runoff Area = 27.107 ac Runoff Volume = 2.426 af Average Runoff Depth = 1.07"
87.28% Pervious = 23.659 ac 12.72% Impervious = 3.448 ac

Summary for Subcatchment 1S: Pre - DA-5

Runoff = 5.69 cfs @ 13.10 hrs, Volume= 1.178 af, Depth> 1.04"

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 50-Year Rainfall=4.76"

Area (ac)	CN	Description
2.942	36	Woods, Fair, HSG A
7.786	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.554	61	Weighted Average
11.830		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods to Slope** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.4	55	0.2727	2.61		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
7.8	301	0.0166	0.64		**Shallow Concentrated Flow, Woods to Second Slope** Woodland Kv= 5.0 fps
4.4	373	0.0804	1.42		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
88.6	829	Total			

Summary for Subcatchment 3S: Post - DA-5

Runoff = 6.14 cfs @ 13.04 hrs, Volume= 1.247 af, Depth> 1.10"

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 50-Year Rainfall=4.76"

Area (ac)	CN	Description
2.686	39	>75% Grass cover, Good, HSG A
0.162	61	>75% Grass cover, Good, HSG B
0.250	36	Woods, Fair, HSG A
7.629	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.553	62	Weighted Average
11.829		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	66	0.2270	2.38		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
5.7	304	0.0164	0.90		**Shallow Concentrated Flow, Grass to Second Slope** Short Grass Pasture Kv= 7.0 fps
4.5	379	0.0791	1.41		**Shallow Concentrated Flow, Wood Slope to Pond** Woodland Kv= 5.0 fps
86.7	849	Total			

Summary for Pond 5P: Pond

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth > 1.04" for 50-Year event
Inflow = 5.69 cfs @ 13.10 hrs, Volume= 1.178 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.64' @ 20.00 hrs Surf.Area= 1.951 ac Storage= 1.177 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Pond

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth > 1.10" for 50-Year event
Inflow = 6.14 cfs @ 13.04 hrs, Volume= 1.247 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

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

Peak Elev= 1,180.68' @ 20.00 hrs Surf.Area= 1.964 ac Storage= 1.246 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-5 Out

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth = 0.00" for 50-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-5 Untreated

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth = 0.00" for 50-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-5 Runoff Area=13.554 ac 12.72% Impervious Runoff Depth>1.47"
Flow Length=829' Tc=88.6 min CN=61 Runoff=8.38 cfs 1.664 af

Subcatchment 3S: Post - DA-5 Runoff Area=13.553 ac 12.72% Impervious Runoff Depth>1.55"
Flow Length=849' Tc=86.7 min CN=62 Runoff=8.97 cfs 1.747 af

Pond 5P: Pond Peak Elev=1,180.88' Storage=1.662 af Inflow=8.38 cfs 1.664 af
Outflow=0.00 cfs 0.000 af

Pond 6P: Pond Peak Elev=1,180.93' Storage=1.746 af Inflow=8.97 cfs 1.747 af
Outflow=0.00 cfs 0.000 af

Link 2L: Pre - DA-5 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-5 Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 27.107 ac Runoff Volume = 3.411 af Average Runoff Depth = 1.51"
87.28% Pervious = 23.659 ac 12.72% Impervious = 3.448 ac

Summary for Subcatchment 1S: Pre - DA-5

Runoff = 8.38 cfs @ 13.09 hrs, Volume= 1.664 af, Depth> 1.47"

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-Year Rainfall=5.55"

Area (ac)	CN	Description
2.942	36	Woods, Fair, HSG A
7.786	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.554	61	Weighted Average
11.830		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods to Slope** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.4	55	0.2727	2.61		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
7.8	301	0.0166	0.64		**Shallow Concentrated Flow, Woods to Second Slope** Woodland Kv= 5.0 fps
4.4	373	0.0804	1.42		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
88.6	829	Total			

Summary for Subcatchment 3S: Post - DA-5

Runoff = 8.97 cfs @ 13.02 hrs, Volume= 1.747 af, Depth> 1.55"

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-Year Rainfall=5.55"

Area (ac)	CN	Description
2.686	39	>75% Grass cover, Good, HSG A
0.162	61	>75% Grass cover, Good, HSG B
0.250	36	Woods, Fair, HSG A
7.629	60	Woods, Fair, HSG B
1.102	82	Dirt roads, HSG B
1.724	98	Water Surface, HSG B
13.553	62	Weighted Average
11.829		87.28% Pervious Area
1.724		12.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
0.5	66	0.2270	2.38		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
5.7	304	0.0164	0.90		**Shallow Concentrated Flow, Grass to Second Slope** Short Grass Pasture Kv= 7.0 fps
4.5	379	0.0791	1.41		**Shallow Concentrated Flow, Wood Slope to Pond** Woodland Kv= 5.0 fps
86.7	849	Total			

Summary for Pond 5P: Pond

Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth > 1.47" for 100-Year event
Inflow = 8.38 cfs @ 13.09 hrs, Volume= 1.664 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,180.88' @ 20.00 hrs Surf.Area= 2.038 ac Storage= 1.662 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Pond

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth > 1.55" for 100-Year event
Inflow = 8.97 cfs @ 13.02 hrs, Volume= 1.747 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

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

Peak Elev= 1,180.93' @ 20.00 hrs Surf.Area= 2.053 ac Storage= 1.746 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,180.00'	4.160 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,180.00	1.720	0.000	0.000
1,182.00	2.440	4.160	4.160

Device	Routing	Invert	Outlet Devices
#1	Primary	1,181.95'	**200.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,180.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-5 Out

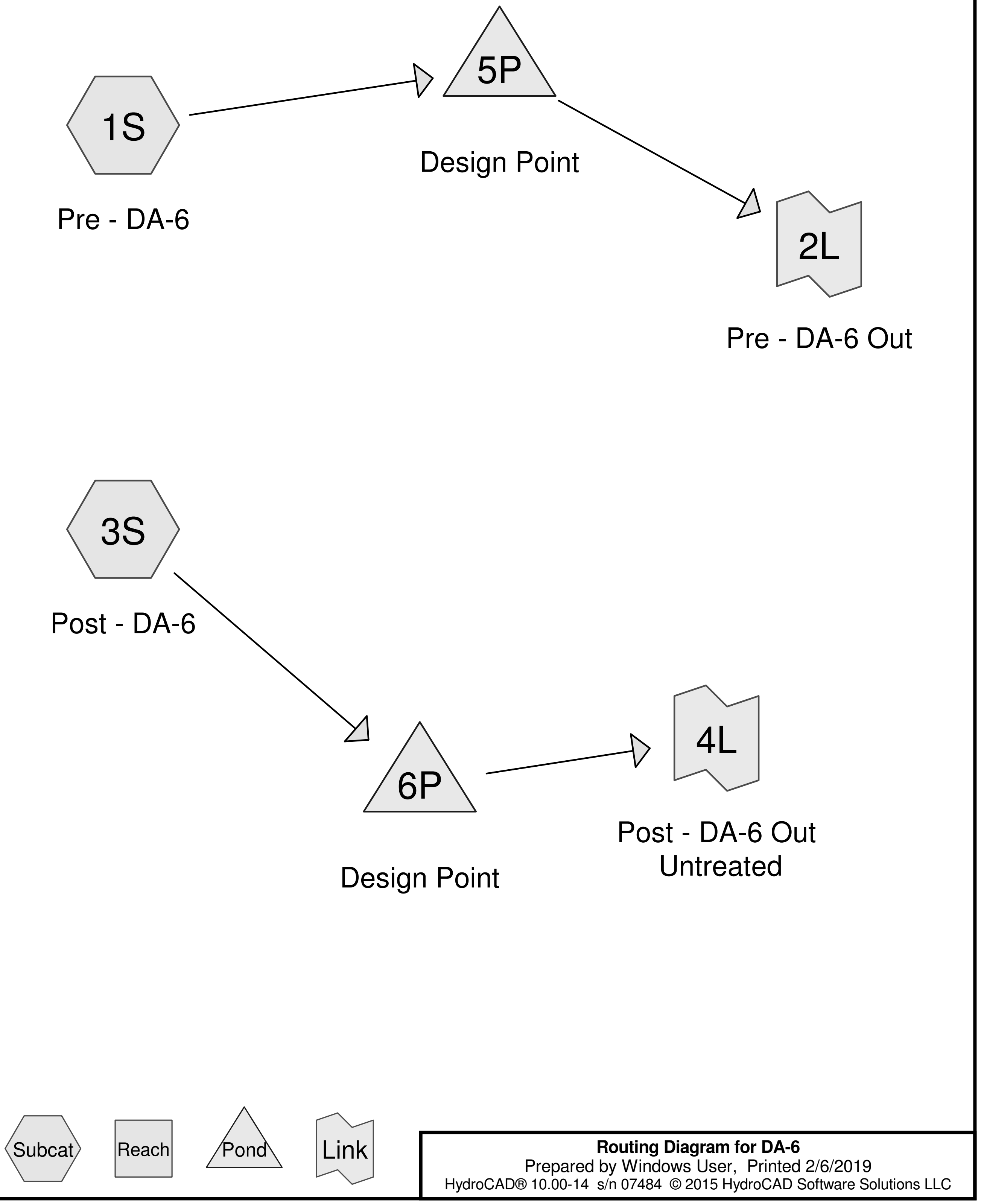
Inflow Area = 13.554 ac, 12.72% Impervious, Inflow Depth = 0.00" for 100-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-5 Untreated

Inflow Area = 13.553 ac, 12.72% Impervious, Inflow Depth = 0.00" for 100-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Routing Diagram for DA-6
Prepared by Windows User, Printed 2/6/2019
HydroCAD® 10.00-14 s/n 07484 © 2015 HydroCAD Software Solutions LLC

```
                    Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
                    Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
           Reach routing by Stor-Ind+Trans method  -  Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-6             Runoff Area=1.617 ac   0.00% Impervious   Runoff Depth=0.00"
                                  Flow Length=283'   Tc=78.9 min   CN=47   Runoff=0.00 cfs  0.000 af

Subcatchment 3S: Post - DA-6            Runoff Area=1.617 ac   0.00% Impervious   Runoff Depth=0.00"
                                  Flow Length=283'   Tc=78.9 min   CN=48   Runoff=0.00 cfs  0.000 af

Pond 5P: Design Point                  Peak Elev=1,204.00'  Storage=0.000 af   Inflow=0.00 cfs  0.000 af
                                                                              Outflow=0.00 cfs  0.000 af

Pond 6P: Design Point                  Peak Elev=1,204.00'  Storage=0.000 af   Inflow=0.00 cfs  0.000 af
                                                                              Outflow=0.00 cfs  0.000 af

Link 2L: Pre - DA-6 Out                                                        Inflow=0.00 cfs  0.000 af
                                                                              Primary=0.00 cfs  0.000 af

Link 4L: Post - DA-6 Out Untreated                                             Inflow=0.00 cfs  0.000 af
                                                                              Primary=0.00 cfs  0.000 af

          Total Runoff Area = 3.234 ac   Runoff Volume = 0.000 af   Average Runoff Depth = 0.00"
                                     100.00% Pervious = 3.234 ac     0.00% Impervious = 0.000 ac
```

Summary for Subcatchment 1S: Pre - DA-6

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=1.97"

Area (ac)	CN	Description
0.849	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
1.617	47	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Woods Slope to Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Subcatchment 3S: Post - DA-6

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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-Year Rainfall=1.97"

Area (ac)	CN	Description
0.689	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
0.160	39	>75% Grass cover, Good, HSG A
1.617	48	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Pond 5P: Design Point

Inflow Area =	1.617 ac,	0.00% Impervious,	Inflow Depth = 0.00"	for 1-Year event	
Inflow =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	
Outflow =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.00' @ 5.00 hrs Surf.Area= 0.018 ac Storage= 0.000 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,204.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Design Point

Inflow Area =	1.617 ac,	0.00% Impervious,	Inflow Depth = 0.00"	for 1-Year event	
Inflow =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	
Outflow =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.00' @ 5.00 hrs Surf.Area= 0.018 ac Storage= 0.000 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,204.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-6 Out

```
Inflow Area =     1.617 ac,  0.00% Impervious,  Inflow Depth =  0.00"   for  1-Year event
Inflow      =     0.00 cfs @   5.00 hrs,  Volume=        0.000 af
Primary     =     0.00 cfs @   5.00 hrs,  Volume=        0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-6 Out Untreated

```
Inflow Area =     1.617 ac,  0.00% Impervious,  Inflow Depth =  0.00"   for  1-Year event
Inflow      =     0.00 cfs @   5.00 hrs,  Volume=        0.000 af
Primary     =     0.00 cfs @   5.00 hrs,  Volume=        0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-6	Runoff Area=1.617 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=283' Tc=78.9 min CN=47 Runoff=0.00 cfs 0.000 af
Subcatchment 3S: Post - DA-6	Runoff Area=1.617 ac 0.00% Impervious Runoff Depth>0.00" Flow Length=283' Tc=78.9 min CN=48 Runoff=0.00 cfs 0.000 af
Pond 5P: Design Point	Peak Elev=1,204.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond 6P: Design Point	Peak Elev=1,204.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Link 2L: Pre - DA-6 Out	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af
Link 4L: Post - DA-6 Out Untreated	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Total Runoff Area = 3.234 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 3.234 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-6

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

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 2-Year Rainfall=2.35"

Area (ac)	CN	Description
0.849	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
1.617	47	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Woods Slope to Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Subcatchment 3S: Post - DA-6

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.00"

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 2-Year Rainfall=2.35"

Area (ac)	CN	Description
0.689	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
0.160	39	>75% Grass cover, Good, HSG A
1.617	48	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Pond 5P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.00' @ 5.00 hrs Surf.Area= 0.018 ac Storage= 0.000 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,204.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.00" for 2-Year event
Inflow = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.00' @ 20.00 hrs Surf.Area= 0.018 ac Storage= 0.000 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,204.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-6 Out

```
Inflow Area =        1.617 ac,   0.00% Impervious,  Inflow Depth =   0.00"    for  2-Year event
Inflow      =        0.00 cfs @    5.00 hrs,  Volume=           0.000 af
Primary     =        0.00 cfs @    5.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-6 Out Untreated

```
Inflow Area =        1.617 ac,   0.00% Impervious,  Inflow Depth =   0.00"    for  2-Year event
Inflow      =        0.00 cfs @    5.00 hrs,  Volume=           0.000 af
Primary     =        0.00 cfs @    5.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

```
                 Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
                  Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
        Reach routing by Stor-Ind+Trans method  -  Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-6            Runoff Area=1.617 ac  0.00% Impervious  Runoff Depth>0.02"
                                    Flow Length=283'  Tc=78.9 min  CN=47  Runoff=0.01 cfs  0.002 af

Subcatchment 3S: Post - DA-6           Runoff Area=1.617 ac  0.00% Impervious  Runoff Depth>0.02"
                                    Flow Length=283'  Tc=78.9 min  CN=48  Runoff=0.01 cfs  0.003 af

Pond 5P: Design Point                Peak Elev=1,204.11'  Storage=0.002 af  Inflow=0.01 cfs  0.002 af
                                                                           Outflow=0.00 cfs  0.000 af

Pond 6P: Design Point                Peak Elev=1,204.15'  Storage=0.003 af  Inflow=0.01 cfs  0.003 af
                                                                           Outflow=0.00 cfs  0.000 af

Link 2L: Pre - DA-6 Out                                                     Inflow=0.00 cfs  0.000 af
                                                                           Primary=0.00 cfs  0.000 af

Link 4L: Post - DA-6 Out Untreated                                          Inflow=0.00 cfs  0.000 af
                                                                           Primary=0.00 cfs  0.000 af

           Total Runoff Area = 3.234 ac  Runoff Volume = 0.005 af  Average Runoff Depth = 0.02"
                                     100.00% Pervious = 3.234 ac   0.00% Impervious = 0.000 ac
```

Summary for Subcatchment 1S: Pre - DA-6

Runoff = 0.01 cfs @ 19.02 hrs, Volume= 0.002 af, Depth> 0.02"

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 5-Year Rainfall=2.87"

Area (ac)	CN	Description
0.849	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
1.617	47	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Woods Slope to Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Subcatchment 3S: Post - DA-6

Runoff = 0.01 cfs @ 18.32 hrs, Volume= 0.003 af, Depth> 0.02"

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 5-Year Rainfall=2.87"

Area (ac)	CN	Description
0.689	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
0.160	39	>75% Grass cover, Good, HSG A
1.617	48	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Pond 5P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.02" for 5-Year event
Inflow = 0.01 cfs @ 19.02 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.11' @ 20.00 hrs Surf.Area= 0.022 ac Storage= 0.002 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,204.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.02" for 5-Year event
Inflow = 0.01 cfs @ 18.32 hrs, Volume= 0.003 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.15' @ 20.00 hrs Surf.Area= 0.023 ac Storage= 0.003 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,204.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-6 Out

```
Inflow Area =       1.617 ac,    0.00% Impervious,  Inflow Depth =   0.00"    for  5-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-6 Out Untreated

```
Inflow Area =       1.617 ac,    0.00% Impervious,  Inflow Depth =   0.00"    for  5-Year event
Inflow      =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af
Primary     =       0.00 cfs @    5.00 hrs,  Volume=          0.000 af,  Atten= 0%,  Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-6 Runoff Area=1.617 ac 0.00% Impervious Runoff Depth>0.06"
Flow Length=283' Tc=78.9 min CN=47 Runoff=0.02 cfs 0.008 af

Subcatchment 3S: Post - DA-6 Runoff Area=1.617 ac 0.00% Impervious Runoff Depth>0.08"
Flow Length=283' Tc=78.9 min CN=48 Runoff=0.02 cfs 0.010 af

Pond 5P: Design Point Peak Elev=1,204.35' Storage=0.008 af Inflow=0.02 cfs 0.008 af
Outflow=0.00 cfs 0.000 af

Pond 6P: Design Point Peak Elev=1,204.41' Storage=0.010 af Inflow=0.02 cfs 0.010 af
Outflow=0.00 cfs 0.000 af

Link 2L: Pre - DA-6 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-6 Out Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 3.234 ac Runoff Volume = 0.019 af Average Runoff Depth = 0.07"
100.00% Pervious = 3.234 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-6

Runoff = 0.02 cfs @ 14.64 hrs, Volume= 0.008 af, Depth> 0.06"

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-Year Rainfall=3.34"

Area (ac)	CN	Description
0.849	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
1.617	47	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Woods Slope to Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Subcatchment 3S: Post - DA-6

Runoff = 0.02 cfs @ 14.27 hrs, Volume= 0.010 af, Depth> 0.08"

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-Year Rainfall=3.34"

Area (ac)	CN	Description
0.689	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
0.160	39	>75% Grass cover, Good, HSG A
1.617	48	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Pond 5P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.06" for 10-Year event
Inflow = 0.02 cfs @ 14.64 hrs, Volume= 0.008 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.35' @ 20.00 hrs Surf.Area= 0.030 ac Storage= 0.008 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,204.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.08" for 10-Year event
Inflow = 0.02 cfs @ 14.27 hrs, Volume= 0.010 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.41' @ 20.00 hrs Surf.Area= 0.032 ac Storage= 0.010 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,204.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-6 Out

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-6 Out Untreated

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-6 Runoff Area=1.617 ac 0.00% Impervious Runoff Depth>0.19"
Flow Length=283' Tc=78.9 min CN=47 Runoff=0.07 cfs 0.026 af

Subcatchment 3S: Post - DA-6 Runoff Area=1.617 ac 0.00% Impervious Runoff Depth>0.22"
Flow Length=283' Tc=78.9 min CN=48 Runoff=0.09 cfs 0.030 af

Pond 5P: Design Point Peak Elev=1,204.81' Storage=0.026 af Inflow=0.07 cfs 0.026 af
Outflow=0.00 cfs 0.000 af

Pond 6P: Design Point Peak Elev=1,204.89' Storage=0.029 af Inflow=0.09 cfs 0.030 af
Outflow=0.00 cfs 0.000 af

Link 2L: Pre - DA-6 Out Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 4L: Post - DA-6 Out Untreated Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 3.234 ac Runoff Volume = 0.055 af Average Runoff Depth = 0.21"
100.00% Pervious = 3.234 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-6

Runoff = 0.07 cfs @ 13.38 hrs, Volume= 0.026 af, Depth> 0.19"

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 25-Year Rainfall=4.09"

Area (ac)	CN	Description
0.849	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
1.617	47	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Woods Slope to Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Subcatchment 3S: Post - DA-6

Runoff = 0.09 cfs @ 13.30 hrs, Volume= 0.030 af, Depth> 0.22"

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 25-Year Rainfall=4.09"

Area (ac)	CN	Description
0.689	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
0.160	39	>75% Grass cover, Good, HSG A
1.617	48	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Pond 5P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.19" for 25-Year event
Inflow = 0.07 cfs @ 13.38 hrs, Volume= 0.026 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.81' @ 20.00 hrs Surf.Area= 0.046 ac Storage= 0.026 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,204.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.22" for 25-Year event
Inflow = 0.09 cfs @ 13.30 hrs, Volume= 0.030 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.89' @ 20.00 hrs Surf.Area= 0.048 ac Storage= 0.029 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,204.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 2L: Pre - DA-6 Out

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth = 0.00" for 25-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-6 Out Untreated

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth = 0.00" for 25-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

```
                     Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
                     Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
          Reach routing by Stor-Ind+Trans method  -  Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-6            Runoff Area=1.617 ac   0.00% Impervious   Runoff Depth>0.36"
                                 Flow Length=283'   Tc=78.9 min   CN=47   Runoff=0.17 cfs  0.048 af

Subcatchment 3S: Post - DA-6           Runoff Area=1.617 ac   0.00% Impervious   Runoff Depth>0.40"
                                 Flow Length=283'   Tc=78.9 min   CN=48   Runoff=0.20 cfs  0.053 af

Pond 5P: Design Point                  Peak Elev=1,204.96'  Storage=0.033 af   Inflow=0.17 cfs  0.048 af
                                                                             Outflow=0.06 cfs  0.015 af

Pond 6P: Design Point                  Peak Elev=1,204.96'  Storage=0.033 af   Inflow=0.20 cfs  0.053 af
                                                                             Outflow=0.07 cfs  0.021 af

Link 2L: Pre - DA-6 Out                                                       Inflow=0.06 cfs  0.015 af
                                                                             Primary=0.06 cfs  0.015 af

Link 4L: Post - DA-6 Out Untreated                                            Inflow=0.07 cfs  0.021 af
                                                                             Primary=0.07 cfs  0.021 af

              Total Runoff Area = 3.234 ac   Runoff Volume = 0.102 af   Average Runoff Depth = 0.38"
                                   100.00% Pervious = 3.234 ac     0.00% Impervious = 0.000 ac
```

Summary for Subcatchment 1S: Pre - DA-6

Runoff = 0.17 cfs @ 13.18 hrs, Volume= 0.048 af, Depth> 0.36"

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 50-Year Rainfall=4.76"

Area (ac)	CN	Description
0.849	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
1.617	47	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Woods Slope to Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Subcatchment 3S: Post - DA-6

Runoff = 0.20 cfs @ 13.15 hrs, Volume= 0.053 af, Depth> 0.40"

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 50-Year Rainfall=4.76"

Area (ac)	CN	Description
0.689	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
0.160	39	>75% Grass cover, Good, HSG A
1.617	48	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Pond 5P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.36" for 50-Year event
Inflow = 0.17 cfs @ 13.18 hrs, Volume= 0.048 af
Outflow = 0.06 cfs @ 16.41 hrs, Volume= 0.015 af, Atten= 66%, Lag= 193.6 min
Primary = 0.06 cfs @ 16.41 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.96' @ 16.41 hrs Surf.Area= 0.051 ac Storage= 0.033 af

Plug-Flow detention time= 289.5 min calculated for 0.015 af (32% of inflow)
Center-of-Mass det. time= 162.4 min (1,075.6 - 913.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.06 cfs @ 16.41 hrs HW=1,204.96' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.06 cfs @ 0.25 fps)

Summary for Pond 6P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.40" for 50-Year event
Inflow = 0.20 cfs @ 13.15 hrs, Volume= 0.053 af
Outflow = 0.07 cfs @ 15.66 hrs, Volume= 0.021 af, Atten= 63%, Lag= 150.6 min
Primary = 0.07 cfs @ 15.66 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.96' @ 15.66 hrs Surf.Area= 0.051 ac Storage= 0.033 af

Plug-Flow detention time= 257.1 min calculated for 0.021 af (38% of inflow)
Center-of-Mass det. time= 139.6 min (1,048.1 - 908.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.07 cfs @ 15.66 hrs HW=1,204.96' (Free Discharge)
↑**—1=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.27 fps)

Summary for Link 2L: Pre - DA-6 Out

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.11" for 50-Year event
Inflow = 0.06 cfs @ 16.41 hrs, Volume= 0.015 af
Primary = 0.06 cfs @ 16.41 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-6 Out Untreated

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.15" for 50-Year event
Inflow = 0.07 cfs @ 15.66 hrs, Volume= 0.021 af
Primary = 0.07 cfs @ 15.66 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre - DA-6 Runoff Area=1.617 ac 0.00% Impervious Runoff Depth>0.60"
Flow Length=283' Tc=78.9 min CN=47 Runoff=0.34 cfs 0.081 af

Subcatchment 3S: Post - DA-6 Runoff Area=1.617 ac 0.00% Impervious Runoff Depth>0.66"
Flow Length=283' Tc=78.9 min CN=48 Runoff=0.38 cfs 0.089 af

Pond 5P: Design Point Peak Elev=1,204.98' Storage=0.034 af Inflow=0.34 cfs 0.081 af
Outflow=0.20 cfs 0.048 af

Pond 6P: Design Point Peak Elev=1,204.98' Storage=0.034 af Inflow=0.38 cfs 0.089 af
Outflow=0.25 cfs 0.056 af

Link 2L: Pre - DA-6 Out Inflow=0.20 cfs 0.048 af
Primary=0.20 cfs 0.048 af

Link 4L: Post - DA-6 Out Untreated Inflow=0.25 cfs 0.056 af
Primary=0.25 cfs 0.056 af

Total Runoff Area = 3.234 ac Runoff Volume = 0.170 af Average Runoff Depth = 0.63"
100.00% Pervious = 3.234 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Pre - DA-6

Runoff = 0.34 cfs @ 13.08 hrs, Volume= 0.081 af, Depth> 0.60"

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-Year Rainfall=5.55"

Area (ac)	CN	Description
0.849	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
1.617	47	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Woods Slope to Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Subcatchment 3S: Post - DA-6

Runoff = 0.38 cfs @ 13.07 hrs, Volume= 0.089 af, Depth> 0.66"

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-Year Rainfall=5.55"

Area (ac)	CN	Description
0.689	36	Woods, Fair, HSG A
0.768	60	Woods, Fair, HSG B
0.160	39	>75% Grass cover, Good, HSG A
1.617	48	Weighted Average
1.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
76.0	100	0.0050	0.02		**Sheet Flow, Woods** Woods: Dense underbrush n= 0.800 P2= 2.35"
1.8	39	0.0050	0.35		**Shallow Concentrated Flow, Woods to Slope** Woodland Kv= 5.0 fps
0.2	42	0.3330	2.89		**Shallow Concentrated Flow, Woods Slope** Woodland Kv= 5.0 fps
0.9	102	0.1373	1.85		**Shallow Concentrated Flow, Second Slope** Woodland Kv= 5.0 fps
78.9	283	Total			

Summary for Pond 5P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.60" for 100-Year event
Inflow = 0.34 cfs @ 13.08 hrs, Volume= 0.081 af
Outflow = 0.20 cfs @ 14.01 hrs, Volume= 0.048 af, Atten= 39%, Lag= 55.5 min
Primary = 0.20 cfs @ 14.01 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.98' @ 14.01 hrs Surf.Area= 0.051 ac Storage= 0.034 af

Plug-Flow detention time= 164.9 min calculated for 0.048 af (59% of inflow)
Center-of-Mass det. time= 77.5 min (974.7 - 897.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.20 cfs @ 14.01 hrs HW=1,204.98' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.20 cfs @ 0.38 fps)

Summary for Pond 6P: Design Point

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.66" for 100-Year event
Inflow = 0.38 cfs @ 13.07 hrs, Volume= 0.089 af
Outflow = 0.25 cfs @ 13.81 hrs, Volume= 0.056 af, Atten= 34%, Lag= 44.5 min
Primary = 0.25 cfs @ 13.81 hrs, Volume= 0.056 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,204.98' @ 13.81 hrs Surf.Area= 0.051 ac Storage= 0.034 af

Plug-Flow detention time= 151.4 min calculated for 0.056 af (63% of inflow)
Center-of-Mass det. time= 68.8 min (962.7 - 893.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,204.00'	0.035 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,204.00	0.018	0.000	0.000
1,205.00	0.052	0.035	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,204.95'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.25 cfs @ 13.81 hrs HW=1,204.98' (Free Discharge)
⮤**1=Broad-Crested Rectangular Weir** (Weir Controls 0.25 cfs @ 0.41 fps)

Summary for Link 2L: Pre - DA-6 Out

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.36" for 100-Year event
Inflow = 0.20 cfs @ 14.01 hrs, Volume= 0.048 af
Primary = 0.20 cfs @ 14.01 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min

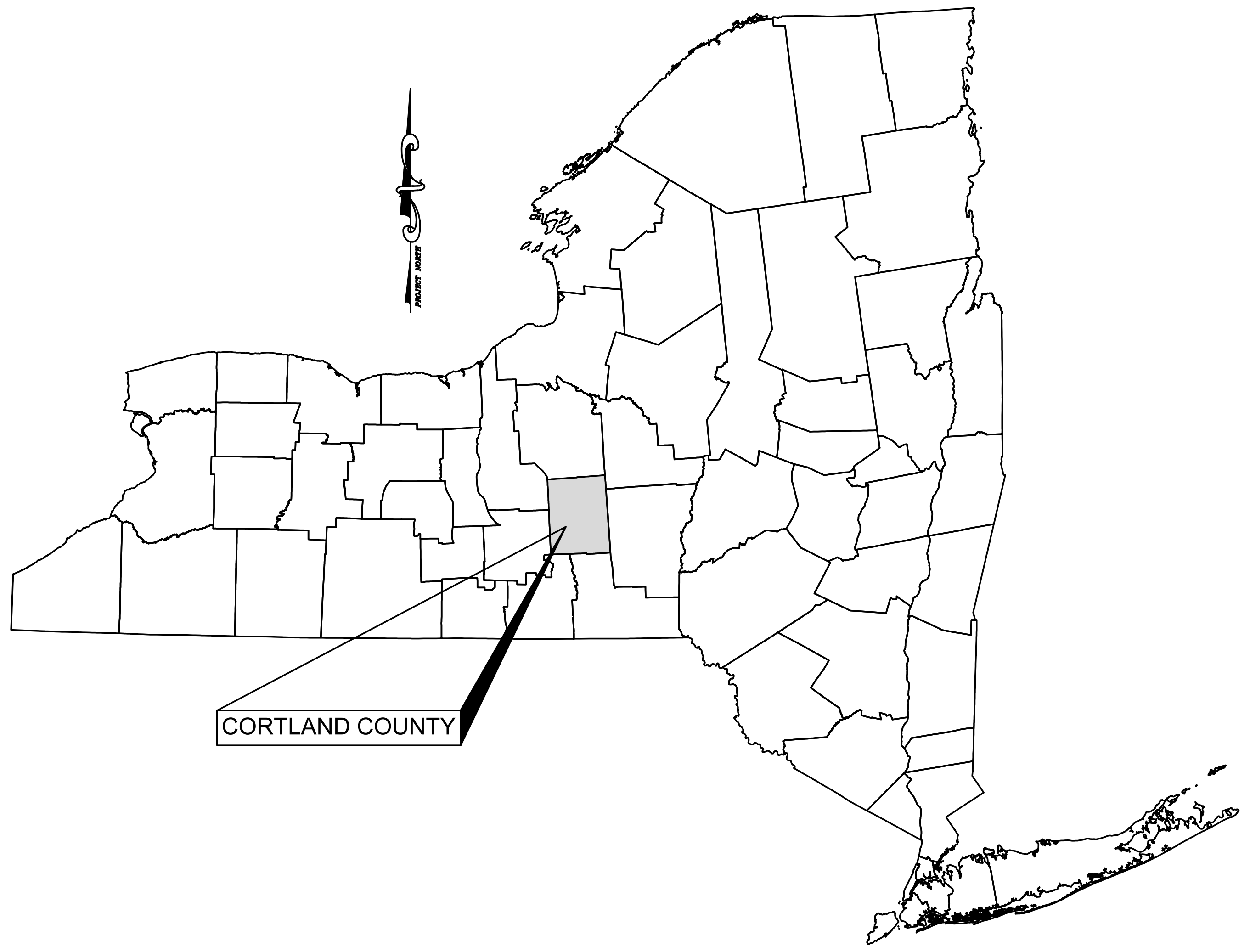
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link 4L: Post - DA-6 Out Untreated

Inflow Area = 1.617 ac, 0.00% Impervious, Inflow Depth > 0.41" for 100-Year event
Inflow = 0.25 cfs @ 13.81 hrs, Volume= 0.056 af
Primary = 0.25 cfs @ 13.81 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

APPENDIX D
STORMWATER MANAGEMENT PLANS, DETAILS AND SPECIFICATIONS



SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD

TOWN OF CORTLANDVILLE

COUNTY OF CORTLAND
STATE OF NEW YORK

APPLICANT/DEVELOPER:

LIME HOLLOW SOLAR, LLC
55 5TH AVENUE, FLOOR 13
NEW YORK, NEW YORK 10003

INDEX OF DRAWINGS

SHEET	TITLE
C010	EXISTING SITE CONDITIONS
C100	SITE PLAN
C105	SITE PLAN WITH AERIAL PHOTO
C110	EROSION AND SEDIMENT CONTROL PLAN
C200	FARMLAND SOILS AND DETAILS
C210	DETAILS

LOCATION MAP
SCALE 1" = 2000'

DRAWINGS PREPARED BY

KEYSTONE ASSOCIATES
ARCHITECTS, ENGINEERS AND SURVEYORS, LLC
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Binghamton, New York 13901
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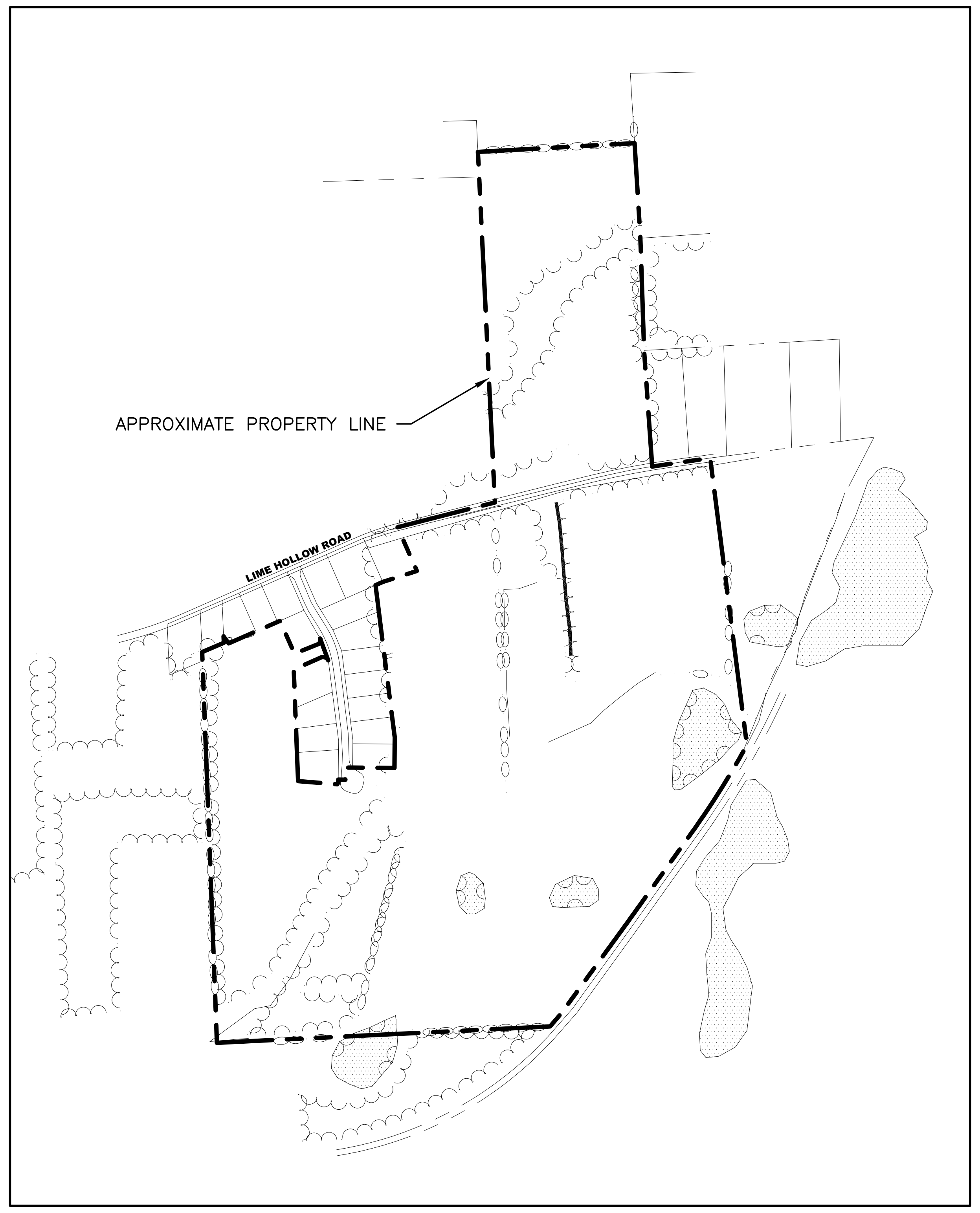
Fax: 607.722.2515
Email: info@keyscomp.com
www.keyscomp.com

PROJECT NO. 2850.24418.5

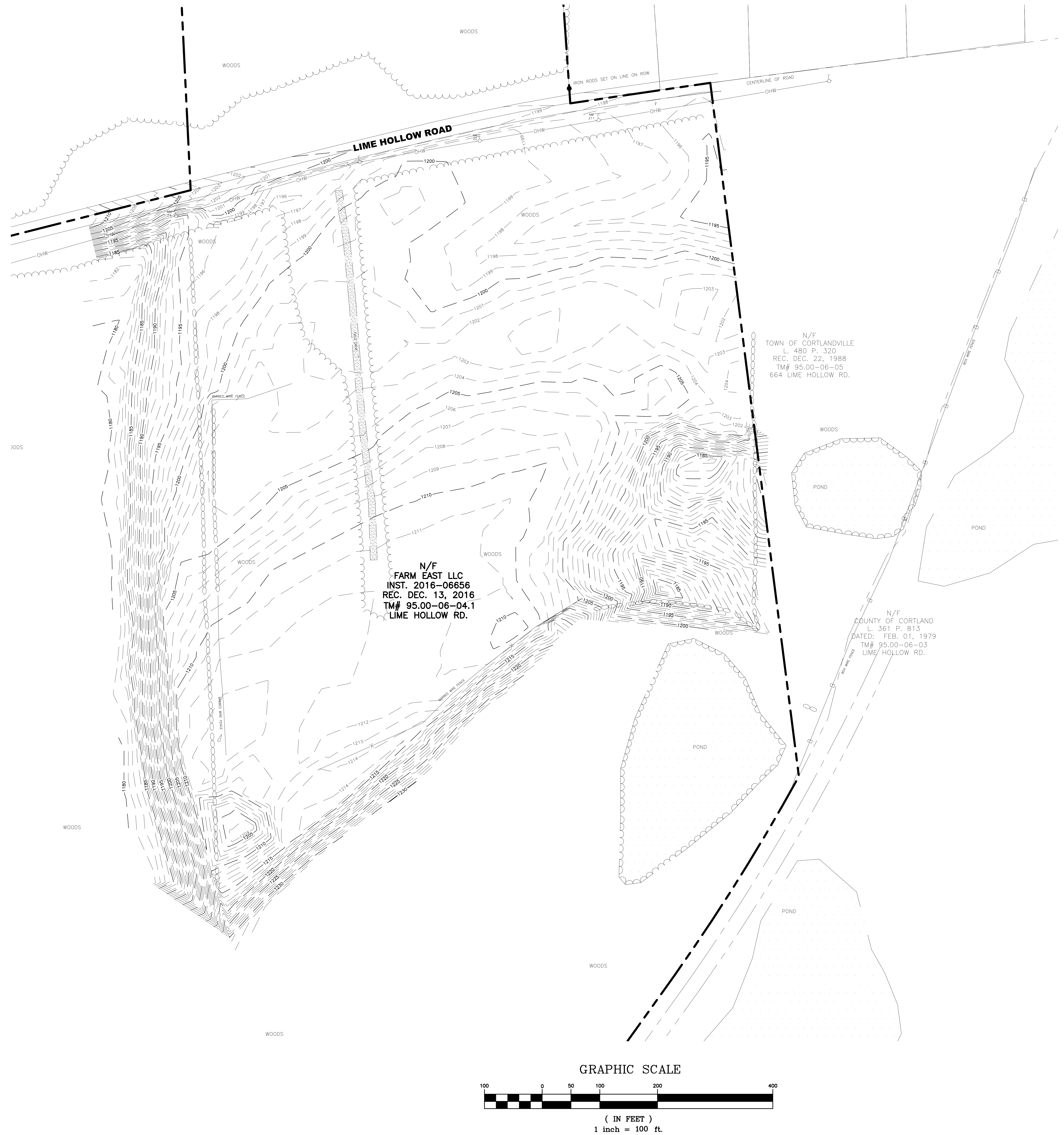
DECEMBER 18, 2018
REVISED: FEBRUARY 12, 2019

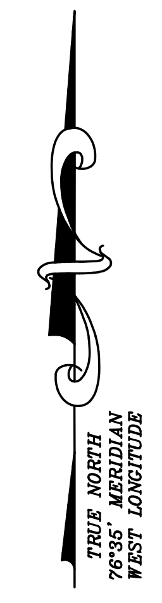
MARK W. PARKER, P.E. LIC. No. 093972
ALTERATIONS NOT CONFORMING TO SECTION 7209, SUBDIVISION 2, NEW YORK STATE EDUCATION LAW ARE PROHIBITED BY LAW.



OVERALL PROPERTY MAP

1" = 500'





LEGEND

⊕	BENCHMARK (NAVD 88)
⊙	MONUMENT FOUND AND NOTED
N/F	NOW OR FORMERLY
TM#	TAX MAP NUMBER
━ ━ ━	PROPERTY LINE
— — —	TAX MAP LINES
└○	UTILITY POLE WITH LIGHT
-○-	UTILITY POLE
—— OHW ——	OVERHEAD UTILITIES
C	CABLE PEDESTAL
□	CATCH BASIN
HYD	FIRE HYDRANT
	SPOT ELEVATION

NOTES

1. FIELD SURVEY WAS COMPLETED ON DECEMBER 11, 2018.
2. HORIZONTAL DATUM IS REFERENCED TO NEW YORK STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83.
3. VERTICAL DATUM IS REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988.
4. AT THE TIME OF THE SURVEY THERE WAS APPROXIMATELY 5 INCHES OF SNOW ON THE GROUND.

ALL UNDERGROUND UTILITIES ARE APPROXIMATE.

UNDERGROUND UTILITY LOCATIONS MARKED BY UTILITY OWNERS PER A "DESIGN TICKET" CALLED IN TO "DIG SAFELY NEW YORK" PRIOR TO FIELD SURVEY HAVE BEEN SHOWN.

THE USER OF THIS MAP IS CAUTIONED THAT THE UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED, NOR IS THERE ANY GUARANTEE THAT ALL EXISTING UTILITIES WHETHER FUNCTIONAL OR ABANDONED WITHIN THE PROJECT AREA ARE SHOWN ON THIS DRAWING.

THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES BEFORE STARTING WORK & SHALL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM HIS WORK. CONTRACTOR SHALL NOTIFY DIG SAFELY NY (FORMERLY UFPO) 1-800-962-7962 IN ACCORDANCE WITH 16 NYCRR PART 753.

KEYSTONE
ASSOCIATES
ARCHITECTS, ENGINEERS AND SURVEYORS, LLC

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Email: info@keyscomp.com
www.keyscomp.com

WARNING:
It is a violation of Section 7209, Subdivision 2, of the New York State Education Law for any person unless acting under the direction of a Licensed Professional Architect, Engineer , or Surveyor to alter In any way; any plans, specifications, plats or reports to which the seal of a Professional Architect, Engineer or Surveyor has been applied.

NO.	REVISIONS AND DESCRIPTIONS	DATE:
1	SOLAR ARRAY PANEL PLAN	2/12/19

SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY

EXISTING SITE CONDITIONS

SHEET NO.
C010

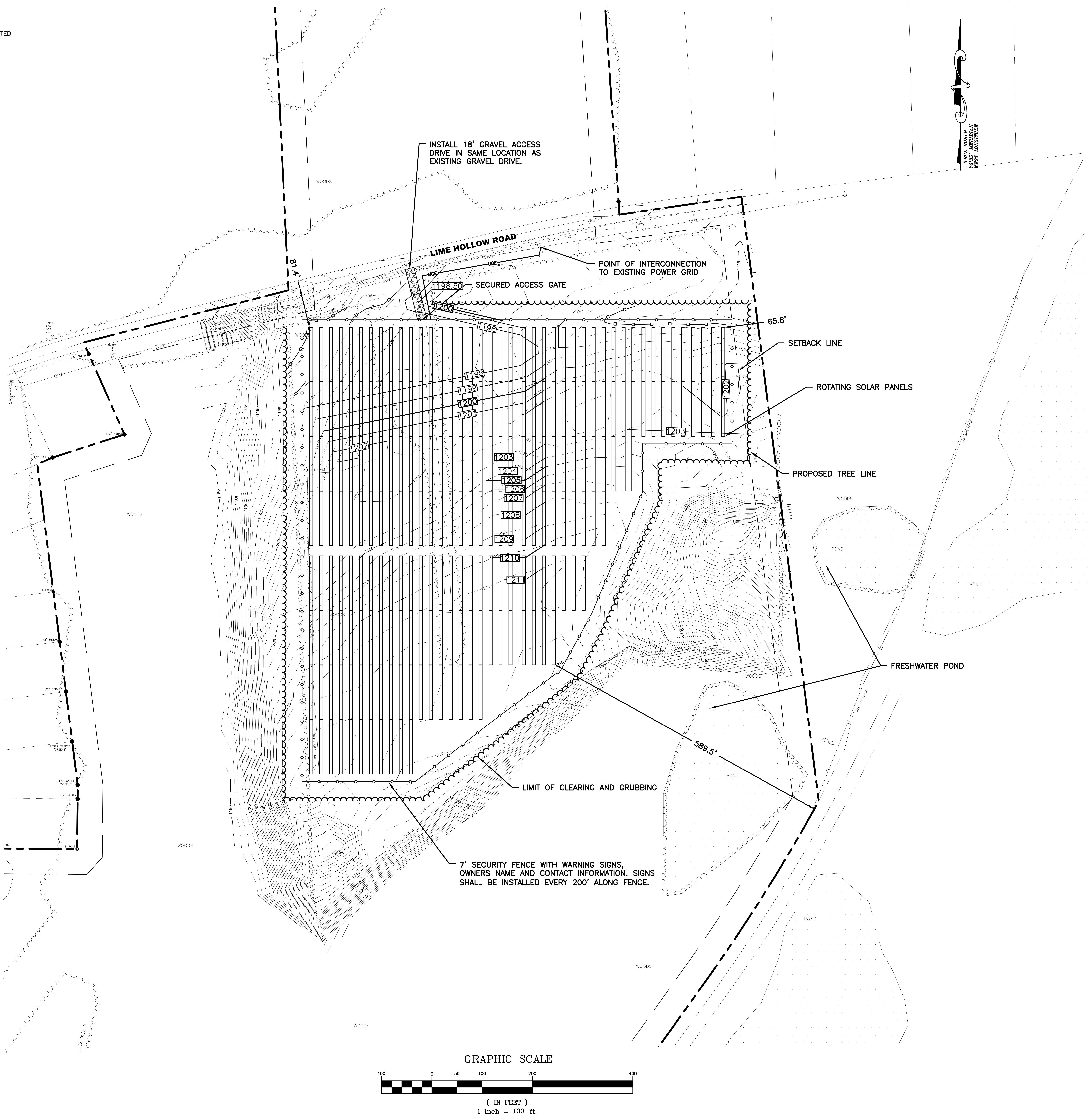
PROJECT NO.
2850.24418.5

DATE: 12/18/18

CAD FILE NO.: 285024418_5_Site.dwg

LEGEND

- ● BENCHMARK (NAVD 88)
- ● MONUMENT FOUND AND NOTED
- N/F NOW OR FORMERLY
- TM# TAX MAP NUMBER
- — · — PROPERTY LINE
- — — — TAX MAP LINES
- UTILITY POLE WITH LIGHT
- UTILITY POLE
- —OHW— OVERHEAD UTILITIES
- ▣ CABLE PEDESTAL
- □ CATCH BASIN
- FIRE HYDRANT
- SPOT ELEVATION



NOT FOR CONSTRUCTION

ZONING NOTES

ZONING DISTRICT: I-1
USE: GROUND-MOUNTED LARGE-SCALE SOLAR ENERGY SYSTEM

	ZONING REQUIRED	SOLAR REQUIRED	ACTUAL
MINIMUM LOT SIZE:	NONE	NONE	106.3 AC
MINIMUM LOT FRONTAGE:	50 LF	50 LF	1341.0 LF
MAXIMUM LOT COVERAGE:	70%	70%	12.36%
MINIMUM YARD DIMENSIONS:			
PRINCIPAL:			
FRONT	50 LF	N/A	N/A
REAR	40 LF	N/A	N/A
SIDE	12 LF	N/A	N/A
ACCESSORY:			
FRONT	N/A	50 LF	81.4 LF
REAR	N/A	50 LF	589.5 LF
TO PRINCIPAL	N/A	N/A	N/A
SIDE	N/A	50 LF	65.8 LF
MAXIMUM STRUCTURE HEIGHT:	NONE	20 FT	12 FT

TOTAL ACREAGE OF PROJECT:	± 15.77 ACRES
TOTAL ACREAGE TO BE DISTURBED:	± 15.77 ACRES

GENERAL NOTES

1) CONTRACTOR SHALL NOT PROCEED WITH ANY CONSTRUCTION WORK PRIOR TO FINAL APPROVAL OF ALL PLANS AND SECURING OF ALL PERMITS.

2) CONTRACTOR SHALL PROVIDE CONSTRUCTION/PROTECTIVE FENCING OR OTHER MEANS NECESSARY TO PROTECT WORK AND TO ENSURE THE SAFETY OF PEDESTRIAN AND VEHICULAR TRAFFIC DURING CONSTRUCTION.

3) CONTRACTOR TO COMPLY WITH ALL O.S.H.A. AND OTHER STATE AND LOCAL SAFETY REQUIREMENTS DURING CONSTRUCTION. (PROPER SHORING, ETC.)

4) THE CONTRACTOR SHALL PROTECT AND SUSTAIN IN NORMAL SERVICE ALL EXISTING UTILITIES, STRUCTURES, EQUIPMENT, ROADWAYS AND DRIVEWAYS.

5) ELECTRIC AND GAS INSTALLATION AND CONNECTIONS TO BE IN ACCORDANCE WITH UTILITY COMPANY REGULATIONS AND REQUIREMENTS.

6) THE CONTRACTOR SHALL FILL IN, AND THEN RE-EXCAVATE AS NECESSARY TO RESUME WORK, ANY EXCAVATIONS OR TRENCHES AT LOCATIONS AND AS OFTEN AS MAY BE REQUIRED TO ENSURE PROTECTION OF THE WORK, ANY ADJACENT EXISTING FACILITIES, OR THE PUBLIC.

7) THE CONTRACTOR SHALL CLEAN UP THE JOB SITE ON A DAILY BASIS BEFORE LEAVING THE JOB. ALL RUBBISH MUST BE CLEANED UP AND CONSTRUCTION EQUIPMENT MUST BE PROPERLY TAKEN CARE OF AND STORED AT THE END OF THE DAY.

8) CONTRACTOR SHALL RESTORE ALL LAWNS, DRIVEWAYS, WALKS, WALL, CURBS, FENCES, ETC. DISTURBED BY CONSTRUCTION. LAWN SHALL BE FINE GRADED, SEEDED, FERTILIZED AND MULCHED PER ACCEPTABLE LANDSCAPE PRACTICES.

9) CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION STAKEOUT. WHERE APPLICABLE STAKEOUT SHALL BE COMPLETED BY A LICENSED LAND SURVEYOR.

10) UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED, NOR IS THERE ANY GUARANTEE THAT ALL EXISTING UTILITIES WHETHER FUNCTIONAL OR ABANDONED WITHIN THE PROJECT AREA ARE SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES BEFORE STARTING WORK & SHALL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM HIS WORK. CONTRACTORS SHALL NOTIFY DIG SAFELY NY (FORMERLY UFPO) 1-800-962-7962 IN ACCORDANCE WITH 16 NYCRR PART 753.

11) ALL SITE WORK SHALL BE SMOOTHLY AND EVENLY BLENDED INTO EXISTING CONDITIONS.

12) ALL BOUNDARY AND/OR TOPOGRAPHIC INFORMATION OBTAINED FROM SURVEY PREPARED BY KEYSTONE ASSOCIATES ARCHITECTS, ENGINEERS AND SURVEYORS, LLC. IT IS THE BASE INFORMATION USED TO PREPARE THE WORK INDICATED ON THE DRAWINGS. BY INCLUSION OF THIS SURVEY INFORMATION IN THIS SET OF DOCUMENTS, KEYSTONE ASSOCIATES ARCHITECTS, ENGINEERS AND SURVEYORS, LLC DOES NOT ASSUME RESPONSIBILITY FOR INTERPRETATIONS OR CONCLUSIONS DRAWN THEREFROM BY THE CONTRACTOR.

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Email: info@keyscomp.com
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KEYSTONE
ASSOCIATES
ARCHITECTS, ENGINEERS AND SURVEYORS, LLC

NO.	REVISIONS AND DESCRIPTIONS	DATE:
1	SOLAR ARRAY PANEL PLAN	2/12/19

WARNING:
It is a violation of Section 7209, Subdivision 2, of the New York State Education Law for any person unless acting under the direction of a Licensed Professional Architect, Engineer , or Surveyor to alter In any way; any plans, specifications, plats or reports to which the seal of a Professional Architect, Engineer or Surveyor has been applied.

SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY

SITE PLAN

SHEET NO.
C100

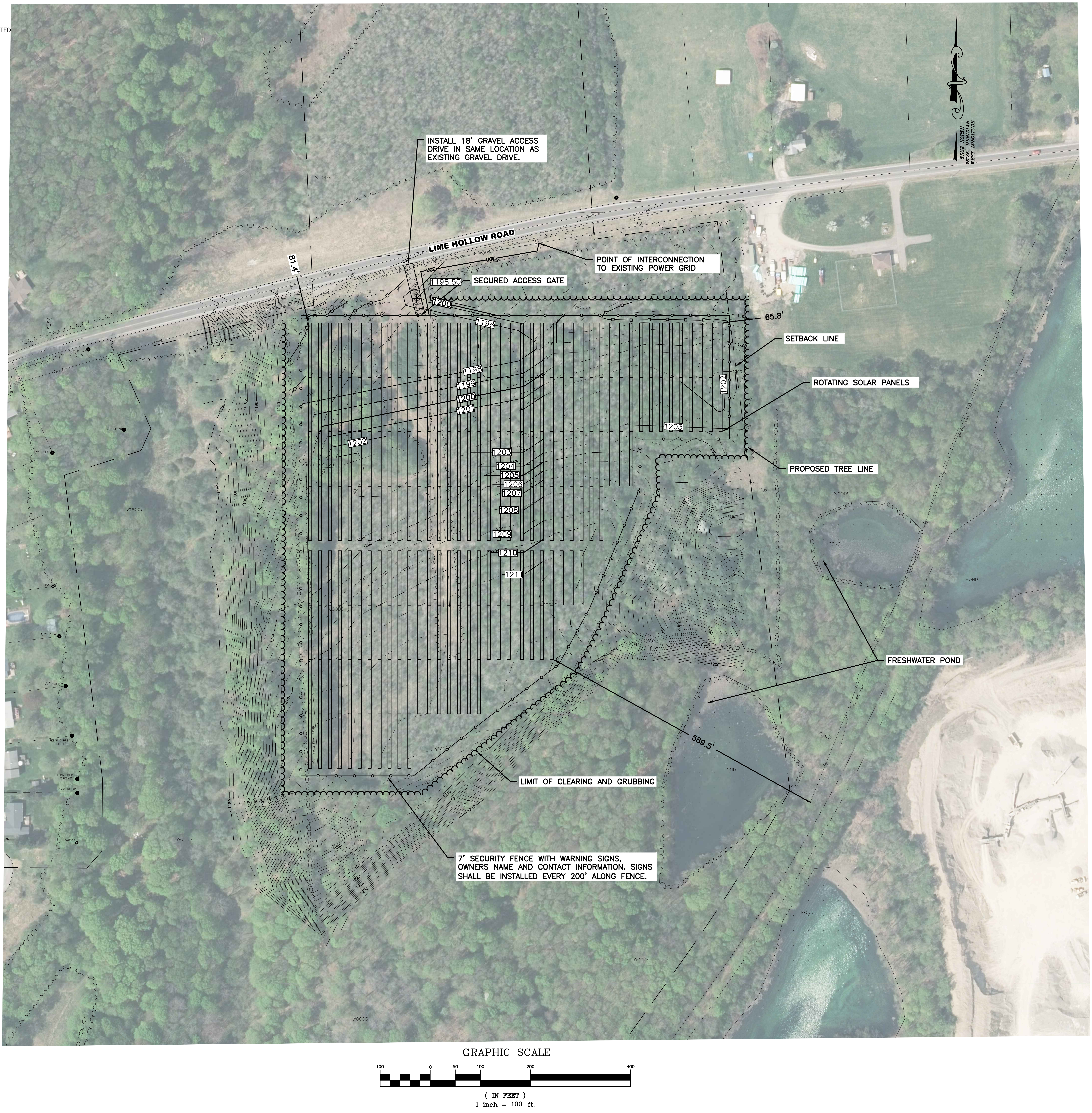
PROJECT NO.
2850.24418.5

DATE: 12/18/18

CAD FILE NO.: 285024418_5_Site.dwg

LEGEND

⊕	BENCHMARK (NAVD 88)
◉	MONUMENT FOUND AND NOTED
N/F	NOW OR FORMERLY
TM#	TAX MAP NUMBER
━ ━ ━	PROPERTY LINE
— — —	TAX MAP LINES
⊸	UTILITY POLE WITH LIGHT
⊙	UTILITY POLE
—OHW—	OVERHEAD UTILITIES
C	CABLE PEDESTAL
□	CATCH BASIN
HYD	FIRE HYDRANT
	SPOT ELEVATION



ZONING NOTES

ZONING DISTRICT: I–1
USE: GROUND–MOUNTED LARGE–SCALE SOLAR ENERGY SYSTEM

	ZONING REQUIRED	SOLAR REQUIRED	ACTUAL
MINIMUM LOT SIZE:	NONE	NONE	106.3 AC
MINIMUM LOT FRONTAGE:	50 LF	50 LF	1341.0 LF
MAXIMUM LOT COVERAGE:	70%	70%	12.36%
MINIMUM YARD DIMENSIONS:			
PRINCIPAL:			
FRONT	50 LF	N/A	N/A
REAR	40 LF	N/A	N/A
SIDE	12 LF	N/A	N/A
ACCESSORY:			
FRONT	N/A	50 LF	81.4 LF
REAR	N/A	50 LF	589.5 LF
TO PRINCIPAL	N/A	N/A	N/A
SIDE	N/A	50 LF	65.8 LF
MAXIMUM STRUCTURE HEIGHT:	NONE	20 FT	12 FT

TOTAL ACREAGE OF PROJECT:	± 15.77 ACRES
TOTAL ACREAGE TO BE DISTURBED:	± 15.77 ACRES

GENERAL NOTES

1) CONTRACTOR SHALL NOT PROCEED WITH ANY CONSTRUCTION WORK PRIOR TO FINAL APPROVAL OF ALL PLANS AND SECURING OF ALL PERMITS.

2) CONTRACTOR SHALL PROVIDE CONSTRUCTION/PROTECTIVE FENCING OR OTHER MEANS NECESSARY TO PROTECT WORK AND TO ENSURE THE SAFETY OF PEDESTRIAN AND VEHICULAR TRAFFIC DURING CONSTRUCTION.

3) CONTRACTOR TO COMPLY WITH ALL O.S.H.A. AND OTHER STATE AND LOCAL SAFETY REQUIREMENTS DURING CONSTRUCTION. (PROPER SHORING, ETC.)

4) THE CONTRACTOR SHALL PROTECT AND SUSTAIN IN NORMAL SERVICE ALL EXISTING UTILITIES, STRUCTURES, EQUIPMENT, ROADWAYS AND DRIVEWAYS.

5) ELECTRIC AND GAS INSTALLATION AND CONNECTIONS TO BE IN ACCORDANCE WITH UTILITY COMPANY REGULATIONS AND REQUIREMENTS.

6) THE CONTRACTOR SHALL FILL IN, AND THEN RE–EXCAVATE AS NECESSARY TO RESUME WORK, ANY EXCAVATIONS OR TRENCHES AT LOCATIONS AND AS OFTEN AS MAY BE REQUIRED TO ENSURE PROTECTION OF THE WORK, ANY ADJACENT EXISTING FACILITIES, OR THE PUBLIC.

7) THE CONTRACTOR SHALL CLEAN UP THE JOB SITE ON A DAILY BASIS BEFORE LEAVING THE JOB. ALL RUBBISH MUST BE CLEANED UP AND CONSTRUCTION EQUIPMENT MUST BE PROPERLY TAKEN CARE OF AND STORED AT THE END OF THE DAY.

8) CONTRACTOR SHALL RESTORE ALL LAWNS, DRIVEWAYS, WALKS, WALL, CURBS, FENCES, ETC. DISTURBED BY CONSTRUCTION. LAWN SHALL BE FINE GRADED, SEEDED, FERTILIZED AND MULCHED PER ACCEPTABLE LANDSCAPE PRACTICES.

9) CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION STAKEOUT. WHERE APPLICABLE STAKEOUT SHALL BE COMPLETED BY A LICENSED LAND SURVEYOR.

10) UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED, NOR IS THERE ANY GUARANTEE THAT ALL EXISTING UTILITIES WHETHER FUNCTIONAL OR ABANDONED WITHIN THE PROJECT AREA ARE SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES BEFORE STARTING WORK & SHALL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM HIS WORK. CONTRACTORS SHALL NOTIFY DIG SAFELY NY (FORMERLY UFPO) 1–800–962–7962 IN ACCORDANCE WITH 16 NYCRR PART 753.

11) ALL SITE WORK SHALL BE SMOOTHLY AND EVENLY BLENDED INTO EXISTING CONDITIONS.

12) ALL BOUNDARY AND/OR TOPOGRAPHIC INFORMATION OBTAINED FROM SURVEY PREPARED BY KEYSTONE ASSOCIATES ARCHITECTS, ENGINEERS AND SURVEYORS, LLC. IT IS THE BASE INFORMATION USED TO PREPARE THE WORK INDICATED ON THE DRAWINGS. BY INCLUSION OF THIS SURVEY INFORMATION IN THIS SET OF DOCUMENTS, KEYSTONE ASSOCIATES ARCHITECTS, ENGINEERS AND SURVEYORS, LLC DOES NOT ASSUME RESPONSIBILITY FOR INTERPRETATIONS OR CONCLUSIONS DRAWN THEREFROM BY THE CONTRACTOR.

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www.keyscomp.com

NO.	REVISIONS AND DESCRIPTIONS	DATE:
1	SOLAR ARRAY PANEL PLAN	2/12/19

SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY

SITE PLAN WITH AERIAL PHOTO

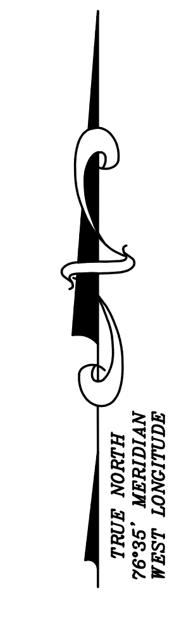
SHEET NO.
C100
PROJECT NO.
2850.24418.5
DATE: 12/18/18
CAD FILE NO.: 285024418_5_Site.dwg

STABILIZED CONSTRUCTION ENTRANCE.

SILT FENCE, TYP.

SCARIFY EXISTING GRAVEL DRIVE. TOPSOIL, SEED AND MULCH TO RETURN AREA TO LAWN.

OVERSEED ALL AREAS WITHIN FENCE TO ENSURE FULL UNIFORM HEALTHY GROWTH OF GRASS IS ESTABLISHED.



NOT FOR CONSTRUCTION

NOTES:

1. SOLAR ARRAY SUPPORTS AND CHAIN LINK FENCE POST SHALL BE DRIVEN OR DIRECT AUGERED, THEREFORE THEY DO NOT MEET THE NYSDEC DEFINITION FOR LAND DISTURBANCE.
2. CONTRACTOR SHALL BACKFILL ALL TRENCHES ON THE SAME DAY AS THEY ARE EXCAVATED. SEEDING AND MULCHING SHALL OCCUR IMMEDIATELY AFTER TRENCHING HAS BEEN COMPLETED.
3. IF THE E&SC MEASURES THAT ARE SHOWN DO NOT PROVE TO BE EFFECTIVE, THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE ENGINEER OF RECORD FOR RECOMMENDATIONS OF ADDITIONAL MEASURES TO INSTALL.
4. CONTRACTOR SHALL NOT EXCAVATE FOR ROAD OR UNDERGROUND UTILITIES MORE THAN THEY CAN BACKFILL IN THE SAME DAY.

CONCRETE WASHOUT	CW
DUST CONTROL	DC
TOPSOILING	TS
PERMANENT SEEDING	PS
MULCHING	M
STABILIZED CONSTRUCTION ENTRANCE	▨
SILT FENCE	—o—o—
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STANDARD SYMBOLS

CONSTRUCTION SEQUENCE

1. INSTALL STABILIZED CONSTRUCTION ENTRANCE.
2. CLEAR AND GRUB SITE TO LIMITS SHOWN.
3. INSTALL SILT FENCE.
4. INSTALL GRAVEL ACCESS DRIVE.
5. GRADE SITE AS SHOWN.
6. INSTALL SOLAR BASE SUPPORTS AND SOLAR ARRAYS.
7. INSTALL UNDERGROUND UTILITIES AND UTILITY POLES.
8. INSTALL CHAIN LINK FENCE AND OTHER AMENITIES.
9. INSTALL SEED AND MULCH TO ALL DISTURBED AREAS.
10. REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES AFTER SITE HAS MET THE REQUIREMENTS OF FINAL STABILIZATION.

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NO.	REVISIONS AND DESCRIPTIONS	DATE:
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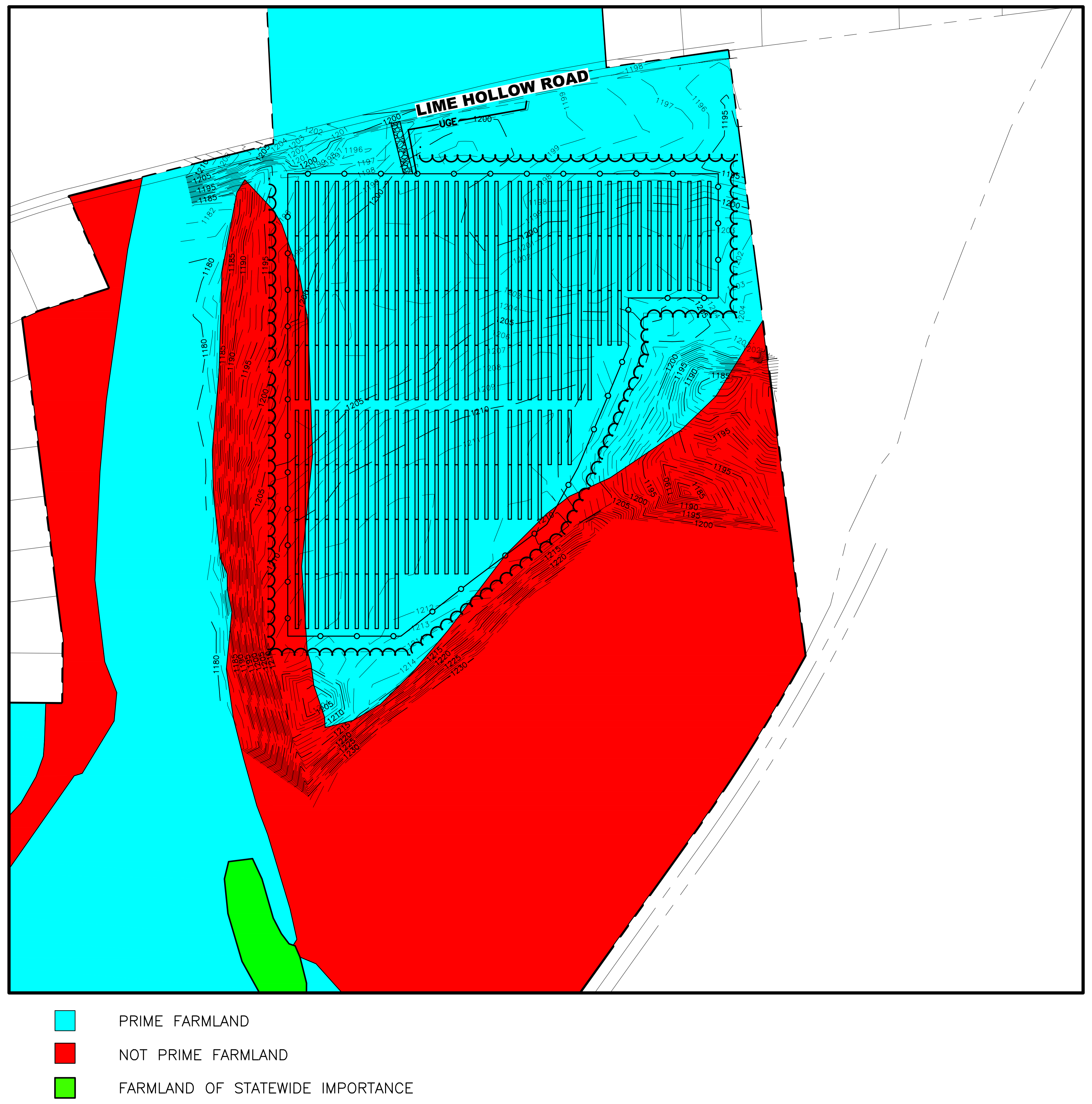
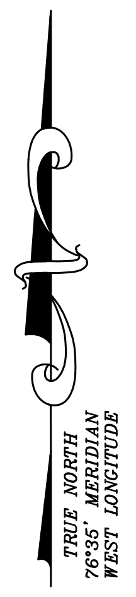
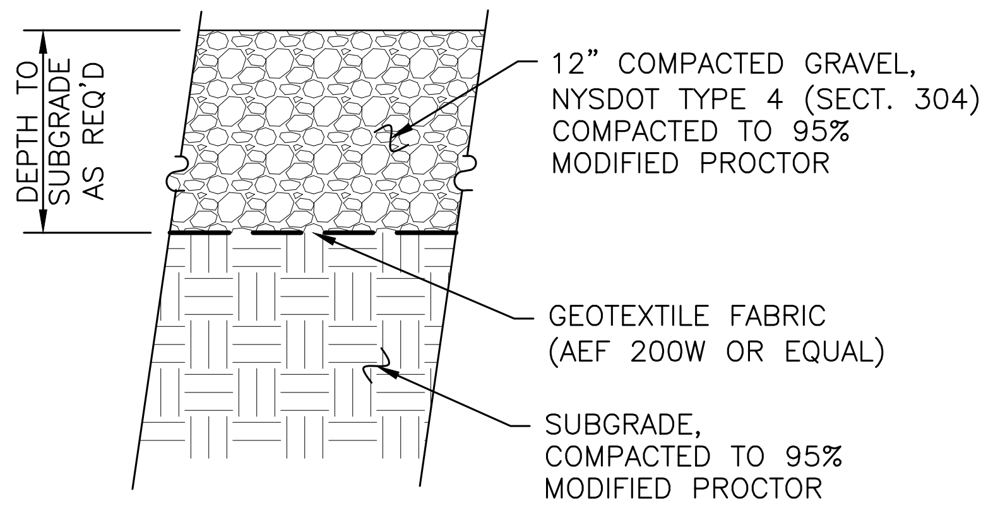
SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY
EROSION AND SEDIMENT CONTROL PLAN

SHEET NO.
C110
PROJECT NO.
2850.24418.5
DATE: 12/18/18
CAD FILE NO: 285024418_5_Site.dwg

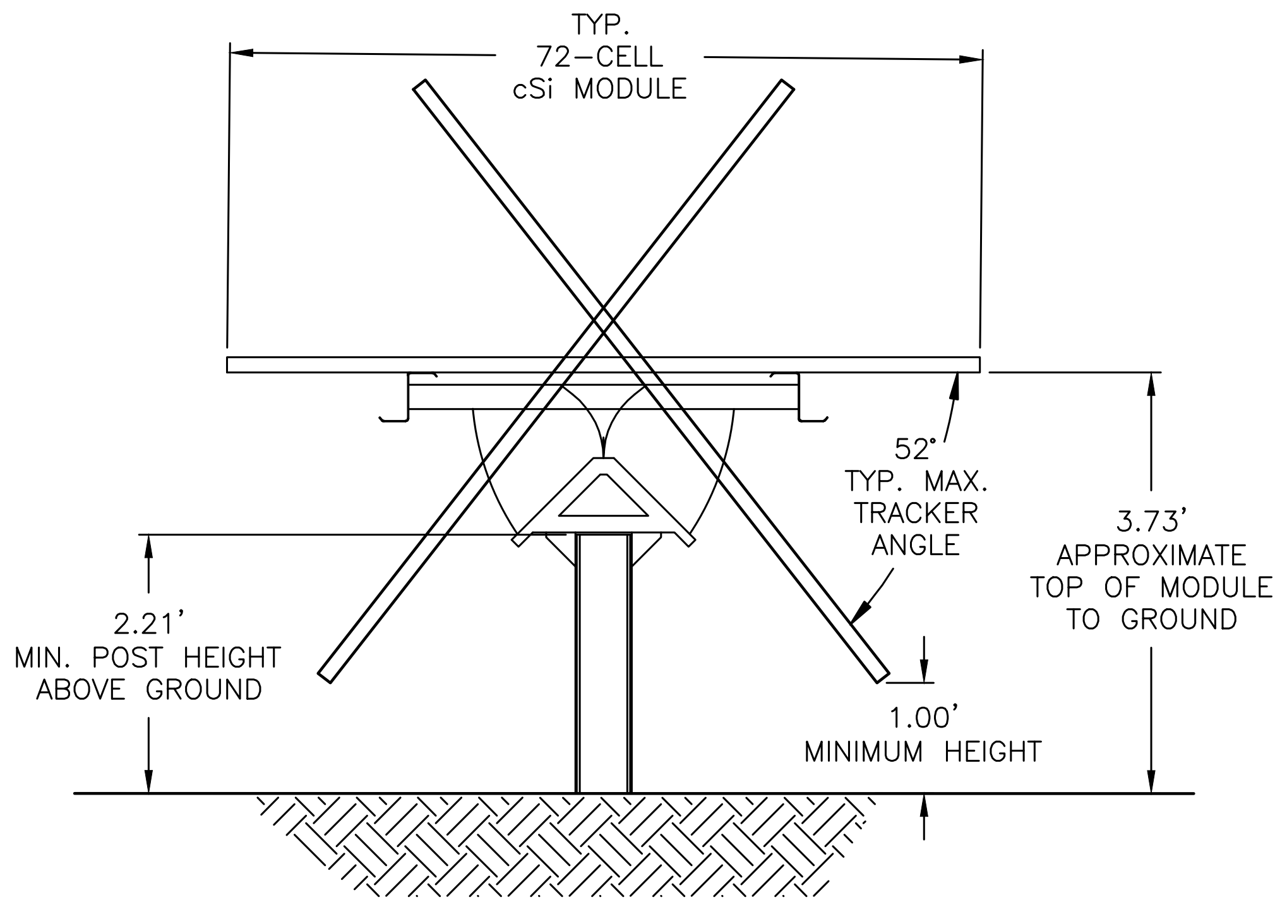


1 C200 FARMLAND SOILS MAP
1"=200'

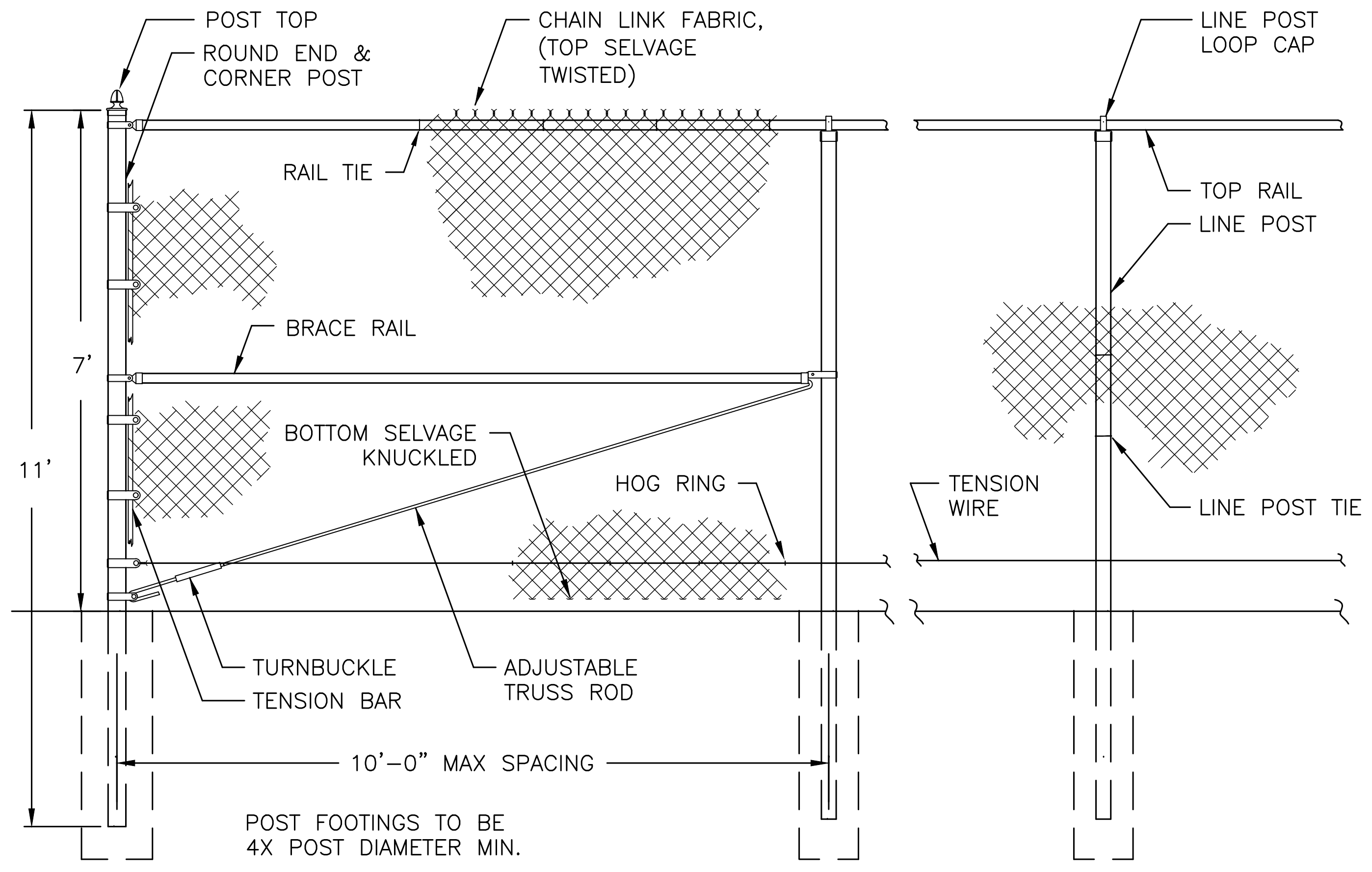




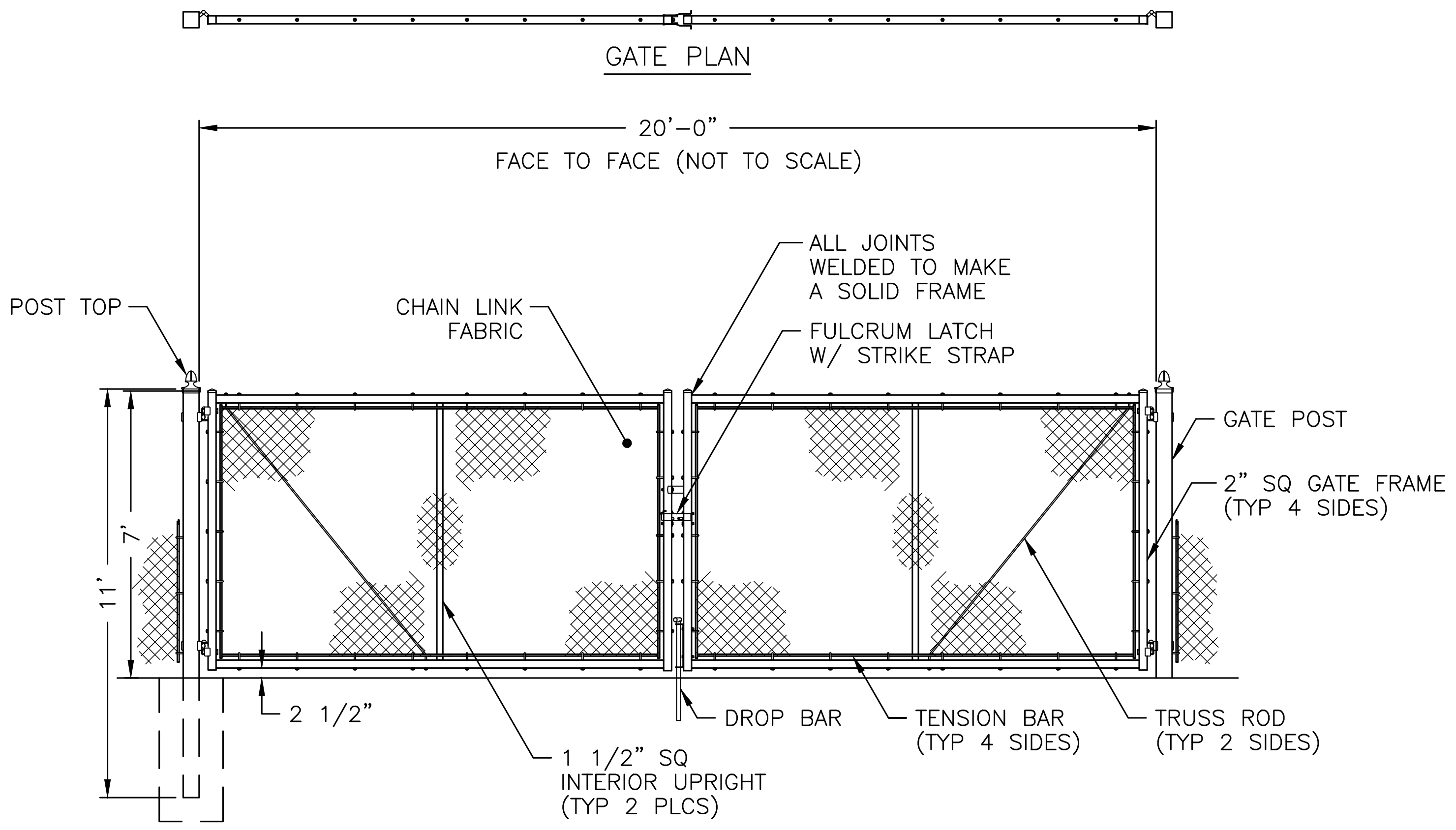
2 C200 GRAVEL DRIVE DETAIL
N.T.S.



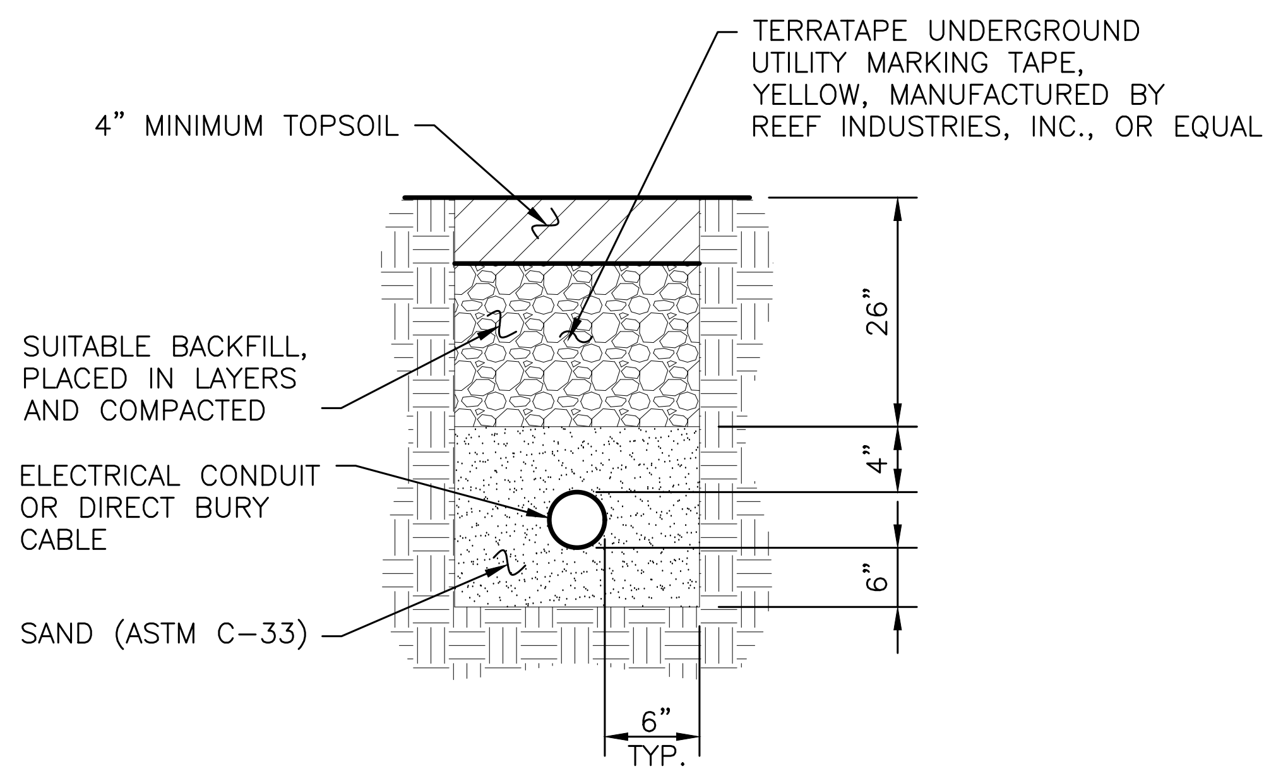
3 C200 SOLAR ARRAY SIDE VIEW
N.T.S.



4 C200 CHAIN LINK FENCE DETAIL
N.T.S.



5 C200 CHAIN LINK SWING GATE
N.T.S.



6 C200 ELECTRICAL TRENCH DETAIL
N.T.S.

NOT FOR CONSTRUCTION

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WARNING:
It is a violation of Section 7209, Subdivision 2, of the New York State Education Law for any person unless acting under the direction of a Licensed Professional Architect, Engineer, or Surveyor to alter in any way; any plans, specifications, plats or reports to which the seal of a Professional Architect, Engineer or Surveyor has been applied.

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SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY

FARMLAND SOILS AND DETAILS

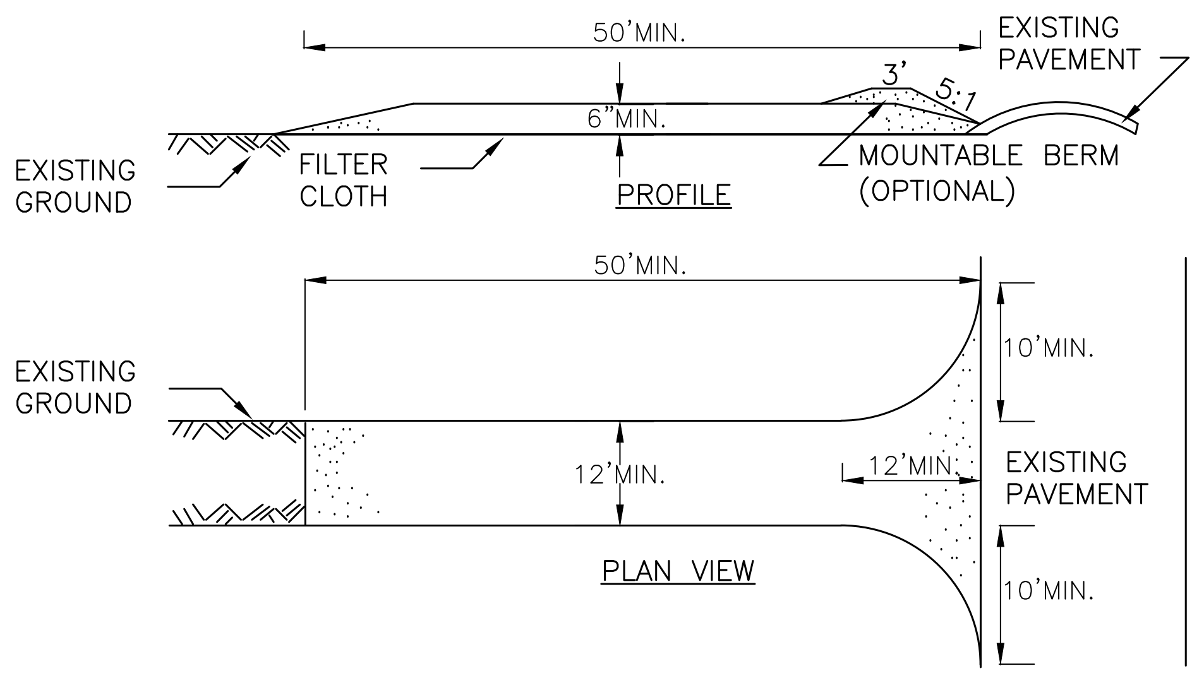
SHEET NO.
C200

PROJECT NO.
2850.24418.5

DATE: 12/18/18

CAD FILE NO.: 285024418_5_Site.dwg

SYMBOL



CONSTRUCTION SPECIFICATIONS

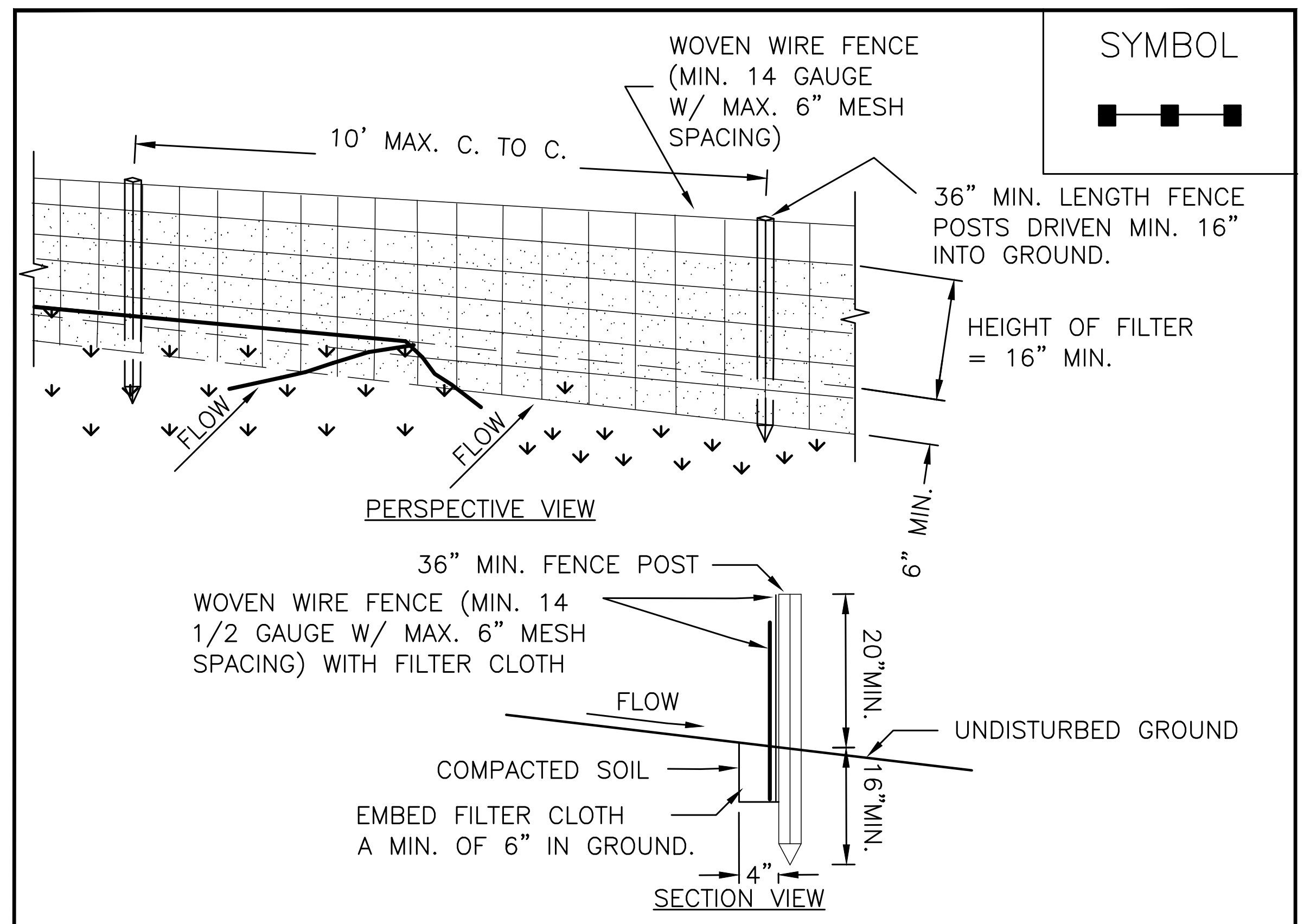
1. STONE SIZE – USE 1–4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ACCESS SHALL BE PIPED BENEATH 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 A 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.

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STABILIZED CONSTRUCTION ACCESS

1 C210 STABILIZED CONSTRUCTION ACCESS

N.T.S.

SYMBOL



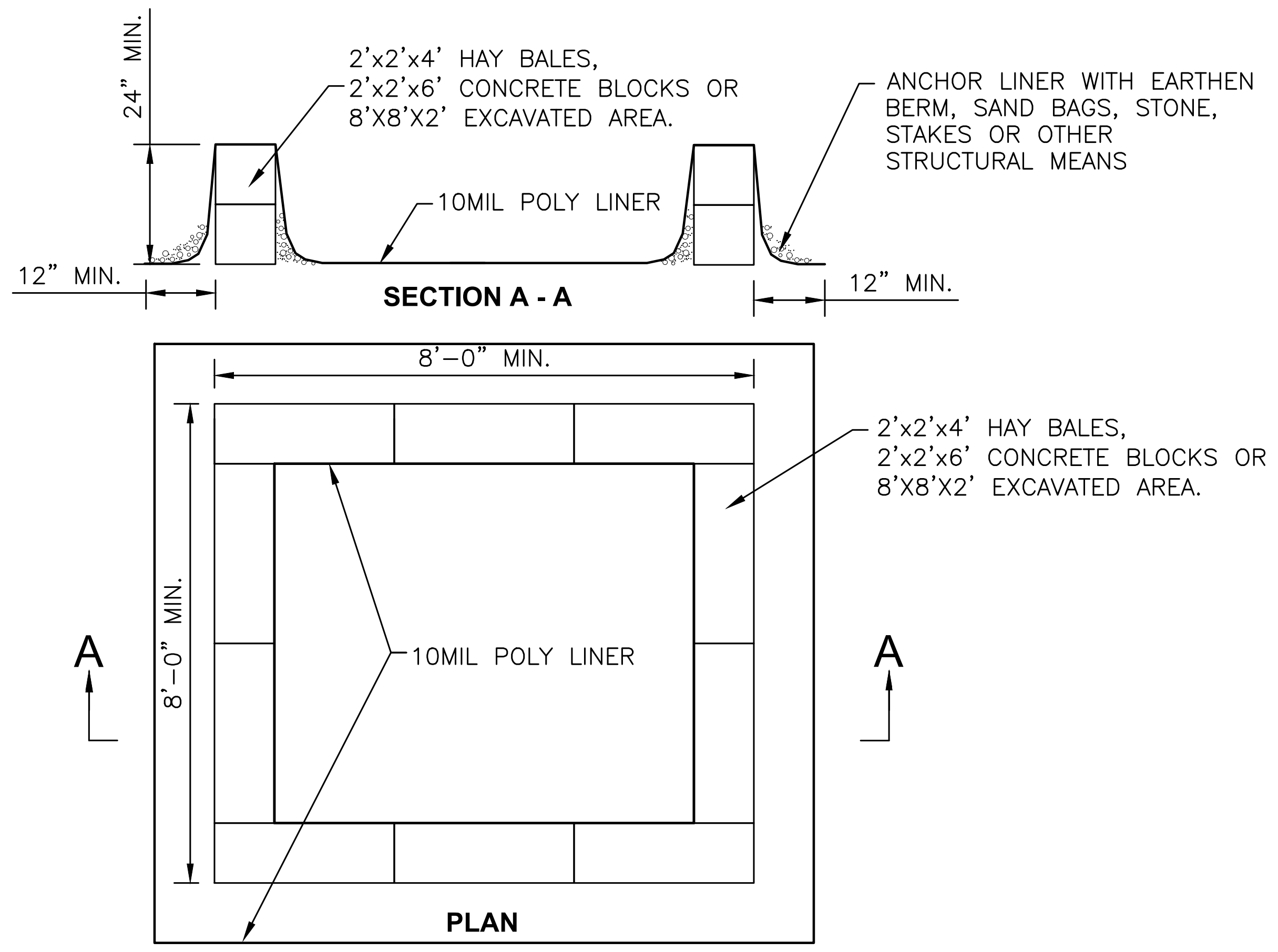
CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	SILT FENCE

2 C210 SILT FENCE

N.T.S.



NOTES:

1. ACTUAL ABOVE GROUND OR EXCAVATED LAYOUT DETERMINED IN FIELD.
2. LOCATE THE FACILITY A MINIMUM OF 100' FROM DRAINAGE SWALES, STORM DRAIN INLETS, WETLANDS, STREAMS AND OTHER SURFACE WATERS. WASH WATER SHALL NOT BE ALLOWED TO INFILTRATE INTO SOIL OR ENTER SURFACE WATERS. EXCESS RAINWATER SHALL BE PUMPED TO A STABILIZED AREA SUCH AS A GRASSED FILTER STRIP.
3. EXCAVATED WASHOUT STRUCTURES SHALL BE A MINIMUM OF 2' DEEP WITH SIDE SLOPES OF 2:1.
4. PROVIDE APPROPRIATE ACCESS TO THE STRUCTURE.
5. SIGNS SHALL BE INSTALLED TO DIRECT DRIVERS TO THE CONCRETE WASHOUT LOCATION.
6. ALL WASHOUT FACILITIES WILL BE LINED. THE LINER SHALL BE PLASTIC SHEETING WITH A MINIMUM THICKNESS OF 10 MILS WITH NO HOLES OR TEARS. LINER SHALL BE REPLACED WITH EACH CLEANING OF STRUCTURE.
7. ALL CONCRETE WASHOUT FACILITIES SHALL BE INSPECTED DAILY. DAMAGED OR LEAKING STRUCTURES SHALL BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY.
8. ACCUMULATED HARDENED MATERIAL SHALL BE REMOVED WHEN 75% OF STORAGE CAPACITY OF THE STRUCTURE IS FILLED. THE MATERIAL SHALL BE DISPOSED OF IN A LEGAL MANNER.
9. INSPECT THE PROJECT SITE FREQUENTLY TO ENSURE THAT NO CONCRETE DISCHARGES ARE TAKING PLACE IN NON-DESIGNATED AREAS.

4 C210 CONCRETE WASHOUT STRUCTURE

N.T.S.

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NO.	REVISIONS AND DESCRIPTIONS	DATE:
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SOLAR ARRAY PLAN
LIME HOLLOW SOLAR
LIME HOLLOW ROAD
TOWN OF CORTLANDVILLE CORTLAND COUNTY, NY

DETAILS

SHEET NO.
C210
PROJECT NO.
2850.24418.5
DATE: 12/18/18
CAD FILE NO.: 285024418_5_Site.dwg

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STANDARD AND SPECIFICATIONS FOR DUST CONTROL

Definition & Scope

The control of dust resulting from land-disturbing activities, to prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the NYSDEC.

No polymer application shall take place without written approval from the NYSDEC.

Construction Specifications

A. **Non-driving Areas** – These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

Vegetative Cover – For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer’s recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

B. **Driving Areas** – These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling – The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access route to provide short term limited dust control.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer’s recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

Barriers – Woven geo-textiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ACCESS

Definition & Scope

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 stabilized construction access is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction access shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 2.1 on page 2.31 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile: The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Burst Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 Modified
Equivalent	40-80	40-80	US Std Sieve
Opening Size			CW-02215
Aggregate Depth	6	10	-

[1] Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2] Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

[3] Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

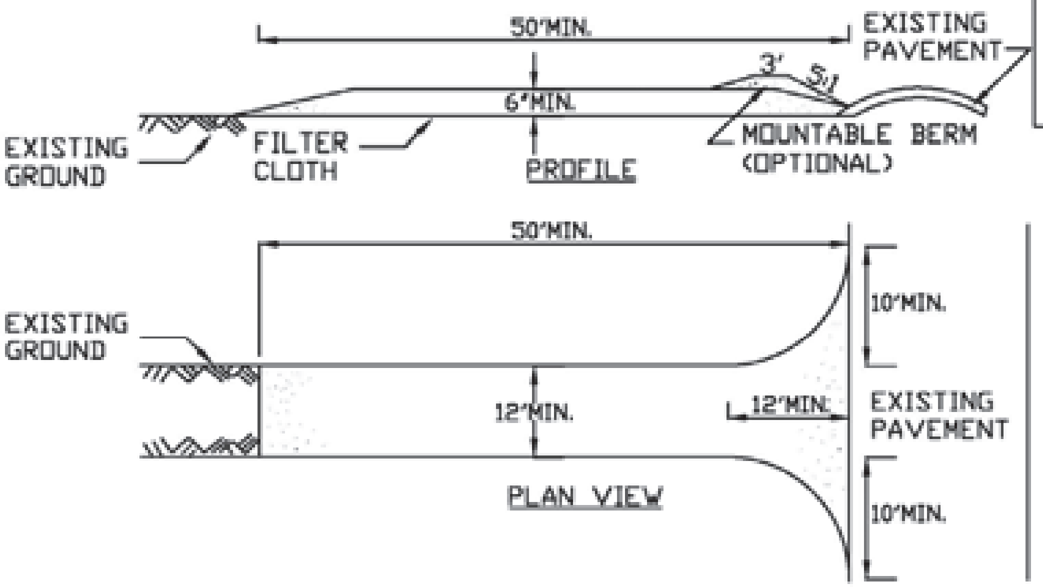
Maintenance

The access shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. 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 watercourses.

Figure 2.1
Stabilized Construction Access

SYMBOL



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
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4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ACCESS SHALL BE PIPED BENEATH 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 A 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.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

STABILIZED
CONSTRUCTION
ACCESS

STANDARD AND SPECIFICATIONS FOR LANDGRADING

Definition & Scope

Permanent reshaping of the existing land surface by grading in accordance with an engineering topographic plan and specification to provide for erosion control and vegetative establishment on disturbed, reshaped areas.

Design Criteria

The grading plan should be based upon the incorporation of building designs and street layouts that fit and utilize existing topography and desirable natural surrounding to avoid extreme grade modifications. Information submitted must provide sufficient topographic surveys and soil investigations to determine limitations that must be imposed on the grading operation related to slope stability, effect on adjacent properties and drainage patterns, measures for drainage and water removal, and vegetative treatment, etc.

Many municipalities and counties have regulations and design procedures already established for land grading and cut and fill slopes. Where these requirements exist, they shall be followed.

The plan must show existing and proposed contours of the area(s) to be graded. The plan shall also include practices for erosion control, slope stabilization, safe disposal of runoff water and drainage, such as waterways, lined ditches, reverse slope benches (include grade and cross section), grade stabilization structures, retaining walls, and surface and subsurface drains. The plan shall also include phasing of these practices. The following shall be incorporated into the plan:

1. Provisions shall be made to safely convey surface runoff to storm drains, protected outlets, or to stable water courses to ensure that surface runoff will not damage slopes or other graded areas; see standards and specifications for Grassed Waterway, Diversion, or Grade Stabilization Structure.
2. Cut and fill slopes that are to be stabilized with grasses shall not be steeper than 2:1. When slopes exceed 2:1, special design and stabilization consideration are required and shall be adequately shown on the plans. (Note: Where the slope is to be mowed, the slope should be no steeper than 3:1, although 4:1 is preferred because of safety factors related to mowing steep slopes.)
3. Reverse slope benches or diversion shall be provided whenever the vertical interval (height) of any 2:1 slope exceeds 20 feet; for 3:1 slope it shall be increased to 30 feet and for 4:1 to 40 feet. Benches shall be located to divide the slope face as equally as possible and shall convey the water to a stable outlet. Soils, seeps, rock outcrops, etc., shall also be taken into consideration when designing benches.
    A. Benches shall be a minimum of six feet wide to provide for ease of maintenance.
    B. Benches shall be designed with a reverse slope of 6:1 or flatter to the toe of the upper slope and with a minimum of one foot in depth. Bench gradient to the outlet shall be between 2 percent and 3 percent, unless accompanied by appropriate design and computations.
    C. The flow length within a bench shall not exceed 800 feet unless accompanied by appropriate design and computations; see Standard and Specifications for Diversion on page 3.9
4. Surface water shall be diverted from the face of all cut and/or fill slopes by the use of diversions, ditches and swales or conveyed downslope by the use of a designed structure, except where:
    A. The face of the slope is or shall be stabilized and the face of all graded slopes shall be protected from surface runoff until they are stabilized.
    B. The face of the slope shall not be subject to any concentrated flows of surface water such as from natural drainage ways, graded ditches, downspouts, etc.
    C. The face of the slope will be protected by anchored stabilization matting, sod, gravel, riprap, or other stabilization method.

5. Cut slopes occurring in ripable rock shall be serrated as shown in Figure 4.9 on page 4.26. The serrations shall be made with conventional equipment as the excavation is made. Each step or serration shall be constructed on the contour and will have steps cut at nominal two-foot intervals with nominal three-foot horizontal shelves. These steps will vary depending on the slope ratio or the cut slope. The nominal slope line is 1 ½: 1. These steps will weather and act to hold moisture, lime, fertilizer, and seed thus producing a much quicker and longer-lived vegetative cover and better slope stabilization. Overland flow shall be diverted from the top of all serrated cut slopes and carried to a suitable outlet.

6. Subsurface drainage shall be provided where necessary to intercept seepage that would otherwise adversely affect slope stability or create excessively wet site conditions.

7. Slopes shall not be created so close to property lines as to endanger adjoining properties without adequately protecting such properties against sedimentation, erosion, slippage, settlement, subsidence, or other related damages.

8. Fill material shall be free of brush, rubbish, rocks, logs, stumps, building debris, and other objectionable material. It should be free of stones over two (2) inches in diameter where compacted by hand or mechanical tampers or over eight (8) inches in diameter where compacted by rollers or other equipment. Frozen material shall not be placed in the fill nor shall the fill material be placed on a frozen foundation.

9. Stockpiles, borrow areas, and spoil shall be shown on the plans and shall be subject to the provisions of this Standard and Specifications.

10. All disturbed areas shall be stabilized structurally or vegetatively in compliance with the Permanent Construction Area Planting Standard on page 4.42.

Construction Specifications

See Figures 4.9 and 4.10 for details.

1. All graded or disturbed areas, including slopes, shall be protected during clearing and construction in accordance with the erosion and sediment control plan until they are adequately stabilized.

2. All erosion and sediment control practices and measures shall be constructed, applied and maintained in accordance with the erosion and sediment control plan and these standards.

3. Topsoil required for the establishment of vegetation shall be stockpiled in amount necessary to complete finished grading of all exposed areas.

4. Areas to be filled shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material.

5. Areas that are to be topsoiled shall be scarified to a minimum depth of four inches prior to placement of topsoil.

6. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence, or other related problems. Fill intended to support buildings, structures, and conduits, etc., shall be compacted in accordance with local requirements or codes.

7. All fill shall be placed and compacted in layers not to exceed 9 inches in thickness.

8. Except for approved landfills or nonstructural fills, fill material shall be free of frozen particles, brush, roots, sod, or other foreign objectionable materials that would interfere with, or prevent, construction of satisfactory fills.

9. Frozen material or soft, mucky or highly compressible materials shall not be incorporated into fill slopes or structural fills.

10. Fill shall not be placed on saturated or frozen surfaces.

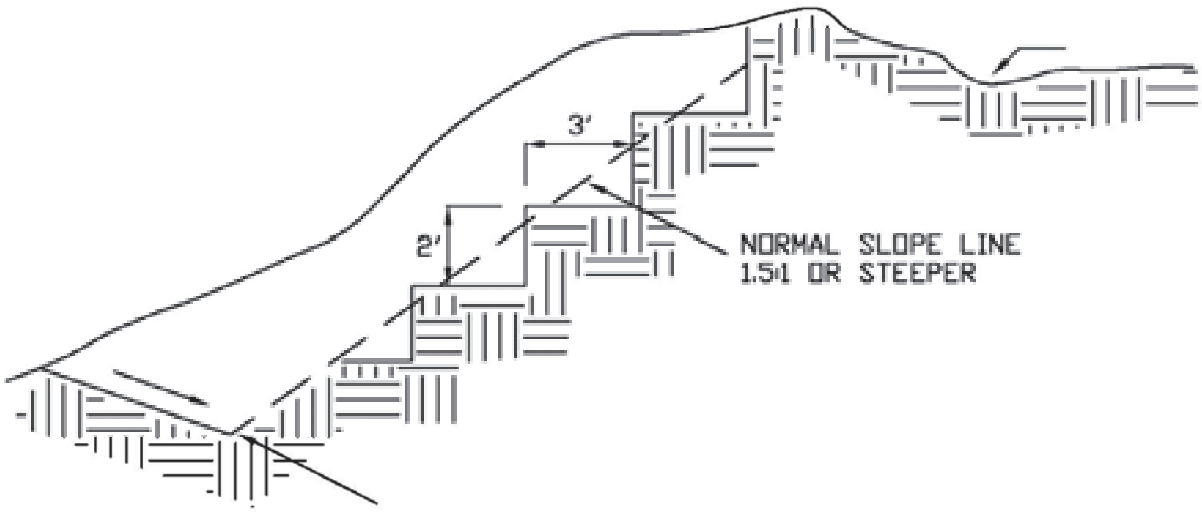
11. All benches shall be kept free of sediment during all phases of development.

12. Seeps or springs encountered during construction shall be handled in accordance with the Standard and Specification for Subsurface Drain on page 3.48 or other approved methods.

13. All graded areas shall be permanently stabilized immediately following finished grading.

14. Stockpiles, borrow areas, and spoil areas shall be shown on the plans and shall be subject to the provisions of this Standard and Specifications.

Figure 4.9
Typical Section of Serrated Cut Slope



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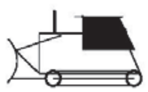
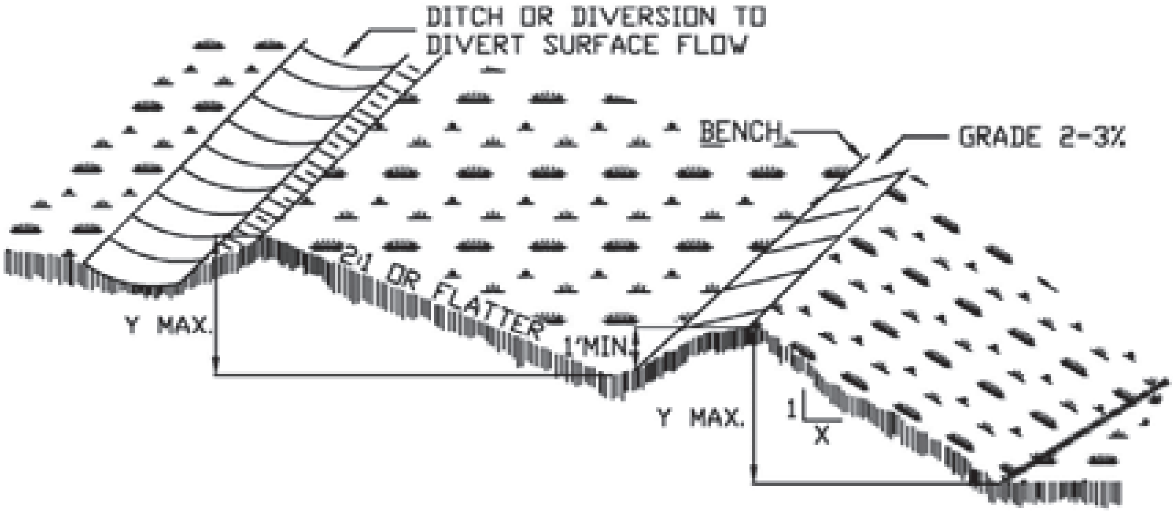
TYPICAL SECTION OF SERRATED CUT SLOPE

Figure 4.10
Landgrading

SYMBOL





X	Y(MAX)
2	20'
3	30'
4	40'

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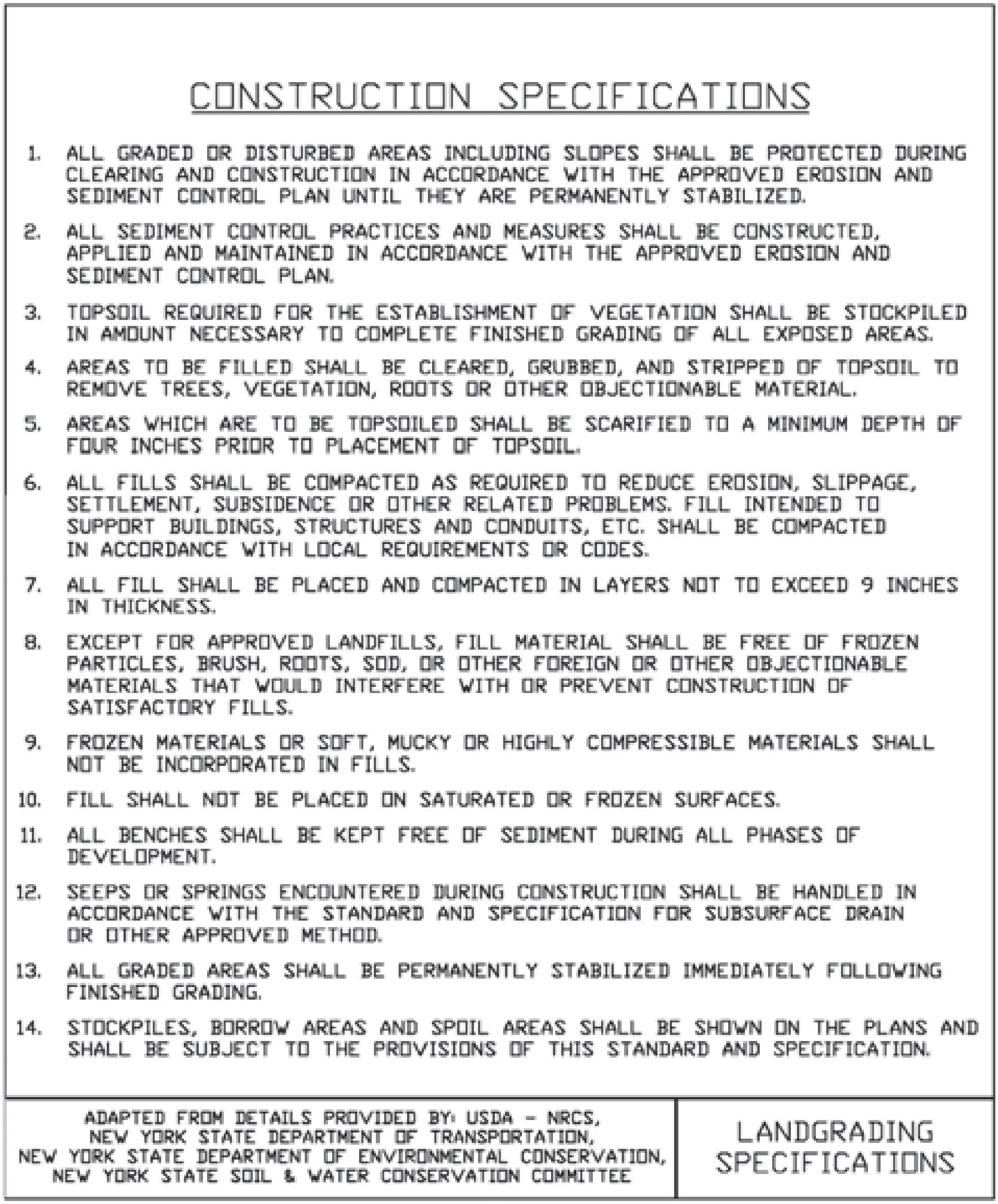
LANDGRADING
DETAIL

Figure 4.11
Landgrading - Construction Specifications



CONSTRUCTION SPECIFICATIONS

1. ALL GRADED OR DISTURBED AREAS INCLUDING SLOPES SHALL BE PROTECTED DURING CLEARING AND CONSTRUCTION IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN UNTIL THEY ARE PERMANENTLY STABILIZED.
2. ALL SEDIMENT CONTROL PRACTICES AND MEASURES SHALL BE CONSTRUCTED, APPLIED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
3. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED IN AMOUNT NECESSARY TO COMPLETE FINISHED GRADING OF ALL EXPOSED AREAS.
4. AREAS TO BE FILLED SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL.
5. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF FOUR INCHES PRIOR TO PLACEMENT OF TOPSOIL.
6. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
7. ALL FILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
8. EXCEPT FOR APPROVED LANDFILLS, FILL MATERIAL SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OTHER OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
9. FROZEN MATERIALS OR SOFT, MUCKY OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED IN FILLS.
10. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
11. ALL BENCHES SHALL BE KEPT FREE OF SEDIMENT DURING ALL PHASES OF DEVELOPMENT.
12. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
13. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY FOLLOWING FINISHED GRADING.
14. STOCKPILES, BORROW AREAS AND SPOIL AREAS SHALL BE SHOWN ON THE PLANS AND SHALL BE SUBJECT TO THE PROVISIONS OF THIS STANDARD AND SPECIFICATION.

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LANDGRADING
SPECIFICATIONS

STANDARD AND SPECIFICATIONS FOR CONCRETE TRUCK WASHOUT

Definition & Scope

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 soil.

Conditions Where Practice Applies

Washout facilities shall be provided for every project where concrete will be poured or otherwise formed on the site. This facility will receive highly alkaline wash water from the cleaning of chutes, mixers, hoppers, vibrators, placing equipment, trowels, and screeds. Under no circumstances will wash water from these operations be allowed to infiltrate into the soil or enter surface waters.

Design Criteria

Capacity: The washout facility should be sized to contain solids, wash water, and rainfall and sized to allow for the evaporation of the wash water and rainfall. Wash water shall be estimated at 7 gallons per chute and 50 gallons per hopper of the concrete pump truck and/or discharging drum. The minimum size shall be 8 feet by 8 feet at the bottom and 2 feet deep. If excavated, the side slopes shall be 2 horizontal to 1 vertical.

Location: Locate the facility a minimum of 100 feet from drainage swales, storm drain inlets, wetlands, streams and other surface waters. Prevent surface water from entering the structure except for the access road. Provide appropriate access 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.

Liner: 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.

If pre-fabricated washouts are used they must ensure the capture and containment of the concrete wash and be sized based on the expected frequency of concrete pours. They shall be sited as noted in the location criteria.

Maintenance

- All concrete washout facilities shall be inspected daily. Damaged or leaking facilities shall be deactivated and repaired or replaced immediately. Excess rainwater that has accumulated over hardened concrete should be pumped to a stabilized area, such as a grass filter strip.
- Accumulated hardened material shall be removed when 75% of the storage capacity of the structure is filled. Any excess wash water shall be pumped into a containment vessel and properly disposed of off site.
- Dispose of the hardened material off-site in a construction/demolition landfill. On-site disposal may be allowed if this has been approved and accepted as part of the projects SWPPP. In that case, the material should be recycled as specified, or buried and covered with a minimum of 2 feet of clean compacted earthfill that is permanently stabilized to prevent erosion.
- The plastic liner shall be replaced with each cleaning of the washout facility.
- Inspect the project site frequently to ensure that no concrete discharges are taking place in non-designated areas.

STANDARD AND SPECIFICATIONS FOR RECREATION AREA SEEDING

Definition & Scope

Establishing **permanent** grasses, legumes, vines, shrubs, trees, or other plants, or selectively reducing stand density and trimming woody plants, to improve an area for recreation. To increase the attractiveness and usefulness of recreation areas and to protect the soil and plant resources.

Conditions Where Practice Applies

On any area planned for recreation use, lawns, and areas that will be maintained in a closely mowed condition.

Specifications

ESTABLISHING GRASSES (Turfgrass)

The following applies for playgrounds, parks, athletic fields, camping areas, picnic areas, passive recreation areas such as lawns, and similar areas.

1. Time of Planting

Fall planting is preferred. Seed after August 15. In the spring, plant until May 15.

If seeding is done between May 15 and August 15, irrigation may be necessary to ensure a successful seeding.

2. Site Preparation

   A. Install needed water and erosion control measures and bring area to be seeded to desired grades. A minimum of 4 in. topsoil is required.

   B. Prepare seedbed by loosening soil to a depth of 4-6 inches and decompacting required areas per Soil Restoration Standard.

   C. See Standard and Specification of Topsoiling.

   D. Lime to a pH of 6.5. See Lime Application Standard.

   E. **Fertilize as per soil test** or, if soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 850 pounds of 5-5-10 or equivalent per acre (20 lbs/1,000 sq. ft.). See Fertilizer Application Standard.

   F. Incorporate lime and fertilizer in top 2-4 inches of topsoil.

   G. Smooth. Remove sticks, foreign matter, and stones over 1 inch in diameter, from the surface. Firm the seedbed.

3. Planting

Use a cultipacker type seeder if possible. Seed to a depth of 1/8 to 1/4 inch. If seed is to be broadcast, cultipack or roll after seeding. If hyroseeded, lime and fertilizer may be applied through the seeder, and rolling is not practical.

4. Mulching

Mulch all seedings in accordance with Standard and Specifications for Mulching. Small grain straw is the best material.

5. Seed Mixtures

Select seed mixture for site conditions and intended use from Table 4.5.

6. Contact Cornell Cooperative Extension Turf Specialist for suitable varieties.

Turf-type tall fescues have replaced the old KY31 tall fescues. New varieties have finer leaves and are the most resistant grass to foot traffic. Do not mix it with fine textured grasses such as bluegrass and red fescue.

Common ryegrass and redtop, which are relatively short lived species, provide quick green cover. Improved lawn cultivars of perennial ryegrass provide excellent quality turf, but continue to lack winter hardiness.

Common white clover can be added to mixtures at the rate of 1-2 lbs/acre to help maintain green color during the dry summer period; however, they will not withstand heavy traffic. Avoid using around swimming areas as flowers attract bees which can be easily stepped on.

Table 4.5
Recreation Turfgrass Seed Mixture

Site - Use	Species (% by weight)	lbs/1.000 ft^2 (PLS)	lbs/acre (PLS)
Sunny Sites (well, moderately well, and somewhat poorly drained soils)	***Athletic fields and similar areas***		
	80% Hard fescue	2.4-3.2	105-138
	20% Perennial ryegrass	0.6-0.8	25-37
		3.0-4.0	130-175
	OR, for southern and eastern, NY 50% Hard fescue	1.5-2.0	65-88
	50% perennial ryegrass	1.5-2.0	65-87
		3.0-4.0	130-175
	OR, 100% Creeping Red Fescue	3.4-4.6	150-200
	General recreation areas and lawns (Medium to high maintenance)		
	65% Creeping red fescue	2.0-2.6	85-114
	20% Perennial ryegrass	0.6-0.8	26-35
	15% Fine fescue	0.4-0.6	19-26
		3.0-4.0	130-175
	OR, 100% Creeping red fescue	3.4-4.6	150-200
Sunny Droughty Sites (general recreation areas and lawns, low maintenance) (somewhat excessively to excessively drained soils, excluding Long Island)	65% Fine fescue	2.6-3.3	114-143
	15% Perennial ryegrass	0.6-0.7	26-33
	20% Creeping red fescue	0.8-1.0	35-44
		4.0-5.0	175-220
	OR, 100% Creeping red fescue	3.4-4.6	150-200
Shady Dry Sites (well to somewhat poorly drained soils)	65% fine fescue	2.6-3.3	114-143
	15% perennial ryegrass	0.6-0.7	26-33
	20% Creeping red fescue	0.8-1.0	35-44
	OR	4.0-5.0	174-220
	80% blend of shade-tolerant Ceral rye	2.4-3.2	105-138
	20% perennial ryegrass	0.6-0.8	25-37
	OR	3.0-4.0	130-175
	100% Creeping red fescue	3.4-4.6	150-200
Shady Wet Sites (somewhat poor to poorly drained soils)	70% Creeping red fescue	1.4-2.1	60-91
	30% blend of shade-tolerant Hard fescue	0.6-0.9	25-39
	OR	2.0-3.0	85-130
	100% Chewings fescue	3.4-4.6	150-200

For varieties suitable for specific locations, contact Cornell Cooperative Extension Turf Specialist.

Reference: Thurn, M.C., N.W. Hummel, and A.M. Petrovic. Cornell Extension Pub. Info. Bulletin 185 Revised. HomeLawns Establishment and Maintenance. 1994.

7. Fertilizing—First Year

Apply fertilizer as indicated by the soil test three to four weeks after germination (spring seedlings). If test results have not been obtained, apply 1 pound nitrogen/1,000 square feet using a complete fertilizer with a 2-1-1 or 4-1-3 ratio. Summer and early fall seedings, apply as above unless air temperatures are above 85ºF for an extended period. Wait for cooler temperatures to fertilize. Late fall/ winter seedings, fertilize in spring.

8. Restrict Use

New seedlings should be protected from use for one full year or a spring and fall growth cycle where possible to allow development of a dense sod with good root structure.

MAINTAINING GRASSES

1. Maintain a pH of 6.0 - 7.0.

2. Fertilize in late May to early June as follows with 5-5-10 analysis fertilizer at the rate of 5 lbs./1,000 sq. ft. and repeat in late August if sod density is not adequate. Avoid fertilizing when heat is greater than 85ºF. Top dress weak sod annually in the spring, but at least once every 2 to 3 years. **Fertilize in accordance with soil test analysis**, after determining adequate topsoil depth exists.

3. Aerate compacted or heavily used areas, like athletic fields, annually as soon as soil moisture conditions permit. Aerate area six to eight times using a spoon or hollow tine type aerator. Do not use solid spike equipment.

4. Reseed bare and thin areas annually with original seed mix.

STANDARD AND SPECIFICATIONS FOR MULCHING

Definition and Scope

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch can also be used alone for temporary stabilization in non-growing months. Use of stone as a mulch could be more permanent and should not be limited to non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Hay mulch shall not be used in wetlands or in areas of permanent seeding. Clean straw mulch is preferred alternative in wetland application. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 4.2
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7”	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2”	9 cu. yds.	405 cu. yds.	3”	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/yd. 60-90 lbs./roll	48” x 50 yds. or 48” x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	4’ x 112.5’ or 8’ x 112.5’.	—	—	Use without additional mulch. Excellent for seeding establishment. Anchor as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 4.3
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR TOPSOILING

Definition & Scope

Spreading a specified quality and quantity of topsoil materials on graded or constructed subsoil areas to provide acceptable plant cover growing conditions, thereby reducing erosion; to reduce irrigation water needs; and to reduce the need for nitrogen fertilizer application.

Conditions Where Practice Applies

Topsoil is applied to subsoils that are droughty (low available moisture for plants), stony, slowly permeable, salty or extremely acid. It is also used to backfill around shrub and tree transplants. This standard does not apply to wetland soils.

Design Criteria

1. Preserve existing topsoil in place where possible, thereby reducing the need for added topsoil.
2. Conserve by stockpiling topsoil and friable fine textured subsoils that must be stripped from the excavated site and applied after final grading where vegetation will be established. Topsoil stockpiles must be stabilized. Stockpile surfaces can be stabilized by vegetation, geotextile or plastic covers. This can be aided by orientating the stockpile lengthwise into prevailing winds.
3. Refer to USDA Natural Resource Conservation Service soil surveys or soil interpretation record sheets for further soil texture information for selecting appropriate design topsoil depths.

Site Preparation

1. As needed, install erosion and sediment control practices such as diversions, channels, sediment traps, and stabilizing measures, or maintain if already installed.
2. Complete rough grading and final grade, allowing for depth of topsoil to be added.
3. 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. Areas that have been overly compacted shall be decompacted in accordance with the Soil Restoration Standard.
4. Remove refuse, woody plant parts, stones over 3 inches in diameter, and other litter.

Topsoil Materials

1. Topsoil shall have at least 6 percent by weight of fine textured stable organic material, and no greater than 20 percent. Muck soil shall not be considered topsoil.
2. Topsoil shall have not less than 20 percent fine textured material (passing the NO. 200 sieve) and not more than 15 percent clay.
3. Topsoil treated with soil sterilants or herbicides shall be so identified to the purchaser.
4. Topsoil shall be relatively free of stones over 1 1/2 inches in diameter, trash, noxious weeds such as nut sedge and quackgrass, and will have less than 10 percent gravel.
5. Topsoil containing soluble salts greater than 500 parts per million shall not be used.
6. Topsoil may be manufactured as a mixture of a mineral component and organic material such as compost.

Application and Grading

1. 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.
2. Topsoil placed and graded on slopes steeper than 5 percent shall be promptly fertilized, seeded, mulched, and stabilized by “tracking” with suitable equipment.
3. Apply topsoil in the amounts shown in Table 4.7 below:

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.
3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

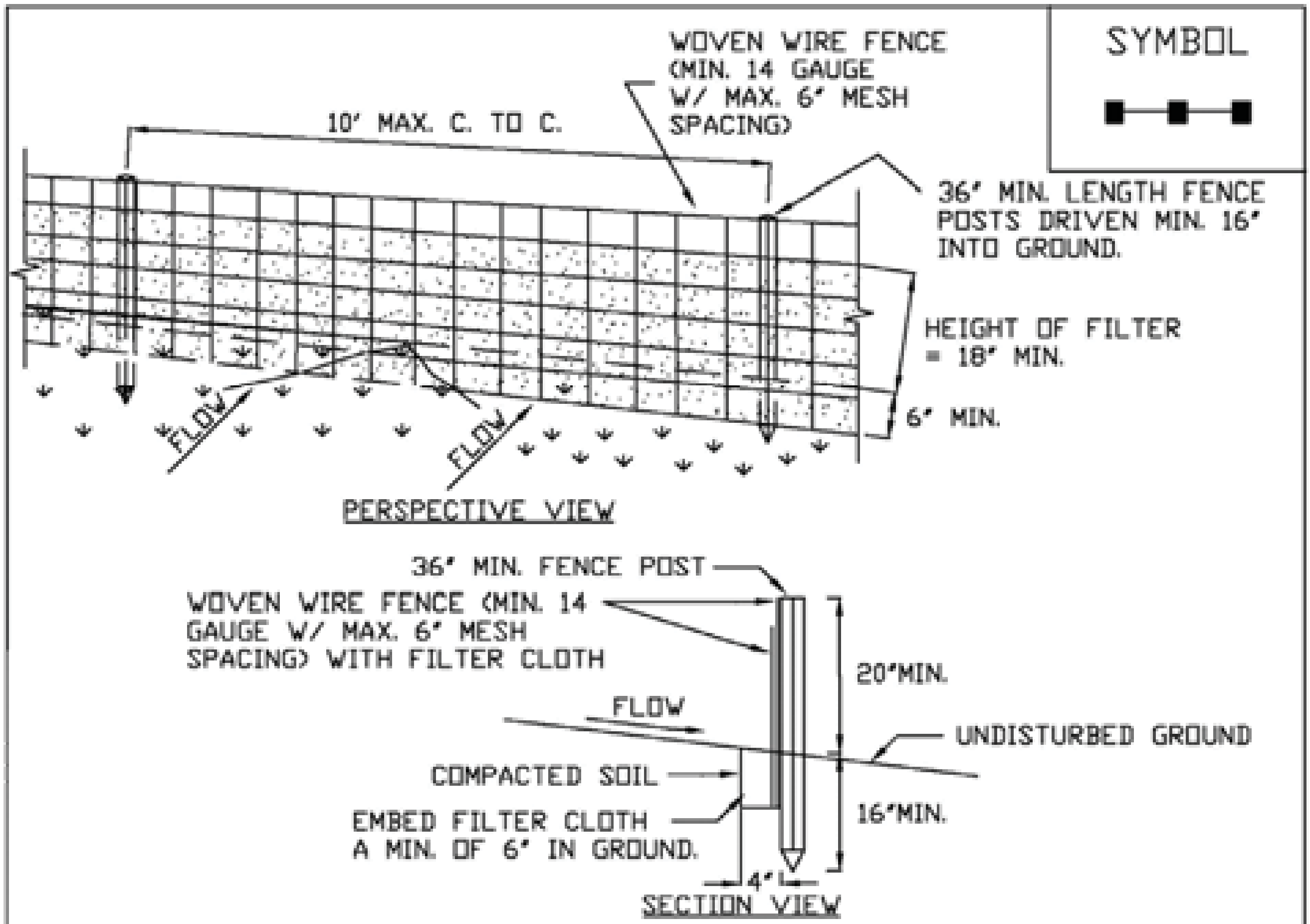
3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

<u>Reinforced Silt Fence</u>

<u>Super Silt Fence</u>

Figure 5.30
Reinforced Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER 'T' OR 'U' TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24' AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6' MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL MEET THE MINIMUM REQUIREMENTS SHOWN.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN 'BULGES' DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	REINFORCED SILT FENCE

APPENDIX E
STORMWATER CONSTRUCTION SITE LOGBOOK

Stormwater Construction Site Logbook

Lime Hollow Solar, LLC
New York Community Solar Portfolio Project
Lime Hollow Road
Town of Cortlandville
County of Cortland
State of New York

Prepared For:
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Also Doing Business As (DBA):

HAWK ENGINEERING

Project No.: 2850.24418.5 February 12, 2019

APPENDIX F
CONSTRUCTION SITE INSPECTION AND MAINTENANCE LOG BOOK

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

SAMPLE CONSTRUCTION SITE LOG BOOK

Table of Contents

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name ____

Permit No. ______________________________ **Date of Authorization** ____________

Name of Operator ____

Prime Contractor ____

a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified inspector[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements. A preconstruction meeting should be held to review all of the SWPPP requirements with construction personnel.

When construction starts, site inspections shall be conducted by the qualified inspector at least every 7 calendar days. The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified inspector perform a final site inspection. The qualified inspector shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

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[1] Refer to "Qualified Inspector" inspection requirements in the current SPDES General Permit for Stormwater Discharges from Construction Activity for complete list of inspection requirements.

[2] "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

[3] "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Pre-construction Site Assessment Checklist
(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA
[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?_______________________________
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_______________
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?_______________
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA
[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA
[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Access

Yes No NA
[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Sediment Controls

Yes No NA
[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA
[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page ______
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? ___________________

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

CONSTRUCTION DURATION INSPECTIONS **Page 1 of ______**

SITE PLAN/SKETCH

Inspector (print name) **Date of Inspection**

Qualified Inspector (print name) **Qualified Inspector Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA
[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions at the outfalls?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease at the outfalls?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes No NA
[ ] [ ] [ ] Is construction site litter, debris and spoils appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing

Yes No NA
[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

3. Stabilized Construction Access

Yes No NA
[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

Runoff Control Practices

1. Excavation Dewatering

Yes No NA
[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

Runoff Control Practices (continued)

2. Flow Spreader
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales
Yes No NA
[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

4. Stone Check Dam
Yes No NA
[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles
Yes No NA
[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation
Yes No NA
[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Silt Fence and Linear Barriers
Yes No NA
[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

CONSTRUCTION DURATION INSPECTIONS Page 4 of ______

Sediment Control Practices (continued)

2. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated; Filter Sock or Manufactured practices)

Yes No NA
[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2” x 4” frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
[ ] [ ] [ ] Manufactured insert fabric is free of tears and punctures.
[ ] [ ] [ ] Filter Sock is not torn or flattened and fill material is contained within the mesh sock.
Sediment accumulation ___% of design capacity.

3. Temporary Sediment Trap

Yes No NA
[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.
[ ] [ ] [ ] Sediment trap slopes and disturbed areas are stabilized.
Sediment accumulation is ___% of design capacity.

4. Temporary Sediment Basin

Yes No NA
[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
[ ] [ ] [ ] Sediment basin dewatering pool is dewatering at appropriate rate.
Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design. All practices shall be maintained in accordance with their respective standards.

Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason: