Stormwater Pollution Control Plan (SWPCP)

Benz Solar Project

31 Benz Street

Ansonia, Connecticut

Permittee Name:	Benz Solar LLC
Project Owner:	Benz Solar LLC
DEEP APPLICATION ID #:	202080118

Prepared: 12/28/2020

Updated: 6/16/2021

Table of Contents

List of Tables:

ATTACHMENTS

Attachment A: USGS Quad Map and Vicinity Map

Attachment B: Documentation Related to Coastal Consistency Review (Not applicable)

Attachment C: Threatened and Endangered Species Form & NDDB Documentation

Attachment D: Conservation or Preservation Restriction Information (SHPO Response)

Attachment E: Vernal Pool Management plan & Wetland Delineation Report

Attachment F: Stormwater Pollution Control Plans (Plan Set)

Attachment G: General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities: DEEP-WPED-GP-015(General Permit)

Attachment H: Permitting Documentation (NOI, Permit Authorization)

Attachment I: Soil Maps

Attachment J: Hydrology Report &Drainage Maps

Attachment K: SWPCP Plan Checklist

Attachment L: Training Documentation

Attachment M: Inspection and Maintenance Forms

1.0 INTRODUCTION AND PURPOSE

This SWPCP is prepared to conform to the required elements of the National Pollutant Discharge Elimination System (NPDES) General Permit for General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities: DEEP-WPED-GP-015, State of Connecticut Department of Energy and Environmental Protection, dated: August 21, 2013 (Expiration date: December 30, 2020). The General Permit provides the framework of requirements for compliance to discharge stormwater from a construction site. This SWPCP is for implementation by the owner and/or operator (Registrant), as listed in Section 4.0 of this SWPCP, at the Benz Solar site, with the project location as defined in Section 5.1 of this SWPCP. This report shall be on the site at all times during construction.

The following are outlined in this site specific SWPCP:

- Control measures for stormwater pollution prevention during each phase of construction;
- Installation of control measures for stormwater pollution prevention after construction;
- Sources of stormwater and non-stormwater pollution; and
- Inspection and maintenance procedures.

2.0 REGISTRANT AND DESIGN PROFESSIONAL CERTIFICATION STATEMENT AND SIGNATURE

Registrant (Permittee):

"I hereby certify that I am making this certification in connection with a registration under such general permit, submitted to the commissioner by Benz Solar, LLC for an activity located at 31 Benz Street Ansonia, CT 06401, and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify that I have made an affirmative determination in accordance with Section 3(b)(8)(B) of this general permit. I understand that the registration filed in connection with such general permit is submitted in accordance with and shall comply with the requirements of Section 22a-430b of Connecticut General Statutes. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

	Owner / Sr. Project Manager	6/16/2021
SIGNATURE	TITLE	DATE
Steve Broyer	612-326-1500	Benz Solar LLC
PRINTED NAME	CONTACT NUMBER	COMPANY

Design Professional:

"I hereby certify that I am a professional engineer licensed in the State of Connecticut. I am making this certification in connection with a registration under such general permit, submitted to the commissioner by Benz Solar, LLC for an activity located at 31 Benz Street Ansonia, CT 06401. I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the project or activity covered by this certification. I further certify, based on such review and on the standard of care for such projects, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, the Stormwater Quality Manual, as amended, and the conditions of the general permit, and that the controls required for such Plan are appropriate for the site. I further certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I also understand that knowingly making any false statement in this certification may subject me to sanction by the Department and/or be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

	Sr. Project Manager	6/16/2021
SIGNATURE	TITLE	DATE
Kyle Hauber, PE	860-866-1966	CLA Engineers Inc.
PRINTED NAME	CONTACT NUMBER	COMPANY

SWPCP Plan Preparer:

"I hereby certify that I am a qualified professional engineer or qualified soil erosion and sediment control professional, or both, as defined in the General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and as further specified in sections 3(b)(11)(A) and (B) of such general permit. I am making this certification in connection with a registration under such general permit, submitted to the commissioner by Benz Solar, LLC for an activity located at 31 Benz Street Ansonia, CT 06401. I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(11)(C) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I further certify that I have made the affirmative determination in accordance with Sections 3(b)(11)(D)(i) and (ii) of this general permit. I understand that this certification is part of a registration submitted in accordance with Section 22a-430b of Connecticut General Statutes and is subject to the requirements and responsibilities for a qualified professional in such statute. I also understand that knowingly making any false statement in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

	Sr. Project Manager	6/16/2021
SIGNATURE	TITLE	DATE
Ellen Bartlett, PE	860-866-1966	CLA Engineers Inc.
PRINTED NAME	CONTACT NUMBER	COMPANY

3.0 SWPCP AMENDMENTS

This SWPCP shall be amended within seven (7) days:

Whenever there is a plan failure to prevent pollution or fail to otherwise comply with any other provision of the general permit;

Whenever there is a change in contractors or subcontractors at the site;

Whenever there is a change in design, construction, operation or maintenance at the site which has the potential for the discharge of pollutants to the waters of the state and which has not otherwise been addressed in the plan;

If any condition of the General Permit is violated or the general objective of reducing or eliminating pollutants in stormwater discharges has not been achieved; and

When deemed necessary by the commissioner, developer, permittee, or qualified inspector. Within seven days of such notice by the commissioner, the permittee shall make the required changes to the plan and perform all actions required by such revised plan. Within 15 days of such notice (or other time frame specified by the commissioner) the permittee shall submit to the commissioner a written certification that the requested changes have been made and implemented and such other information as the commissioner requires.

The following items will be included in each amendment:

- Who requested the amendment;
- The location of proposed change;
- The reason for change;
- The original Best Management Practices (BMP) proposed, if any;
- The new BMP proposed; and
- Design Professional Certification

3.1 SWPCP Amendment Log

The following table should be completed as necessary during construction to document changes and amendments to this document. Place the Amendment Number next to all application changes, redlines and information in the document to reference back to the changes summarized below. If an additional sheet is necessary, attach the additional sheet to the SWPCP.

Table 1: Amendment Log

Amendment #	Date	Description	Requested By	Prepared By

3.2 SWPCP Amendment Design Professional Certification

"I hereby certify that I am a qualified professional engineer or qualified soil erosion and sediment control professional, or both, as defined in the General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and as further specified in sections 3(b)(11)(A) and (B) of such general permit. I am making this certification in connection with a registration under such general permit, submitted to the commissioner by Benz Solar, LLC for an activity located at 31 Benz Street Ansonia, CT 06401. I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(11)(C) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I further certify that I have made the affirmative determination in accordance with Sections 3(b)(11)(D)(i) and (ii) of this general permit. I understand that this certification is part of a registration submitted in accordance with Section 22a-430b of Connecticut General Statutes and is subject to the requirements and responsibilities for a qualified professional in such statute. I also understand that knowingly making any false statement in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

Amendment #: ____

_____	_____	_____
SIGNATURE	TITLE	DATE
_____	_____	_____
PRINTED NAME	CONTACT NUMBER	COMPANY

4.0 REGISTRATION TYPE AND REGISTRANT AND CONTACT INFORMATION

4.1 Registration Type

The site registration type is:

Locally Approvable: ___ Locally Exempt: _X_ Re-registration: ___ New Registration: _X_

4.2 Registrant and Contact Information

Table 2: Registrant and Primary Contacts

Registrant Information	Primary Contact Person
Benz Solar LLC	Steve Broyer
222 South 9th St Suite 1600 Minneapolis, MN 55402	222 South 9th St Suite 1600 Minneapolis, MN 55402
612-326-1500 Steve.broyer@ecosrenewable.com	612-326-1500 Steve.broyer@ecosrenewable.com

Table 3: Developer and Contractor Contacts

Developer Information	General Contractor Contact Information
Benz Solar, LLC	TBD
222 South 9th St Suite 1600 Minneapolis, MN 55402	TBD
612-326-1500 Steve.broyer@ecosrenewable.com	TBD

4.3 Project Contacts and Chain of Responsibility

Table 4: Project Contacts

Responsibility	Company	Contact Person	Contact Number	Contact E-mail
Developer	Benz Solar, LLC	Steve Broyer	612-326-1500	Steve.broyer@ecosrenewable.com
Operator	Benz Solar, LLC	Steve Broyer	612-326-1500	Steve.broyer@ecosrenewable.com
Project Engineer	CLA Engineers, Inc	Kyle Hauber	860-886-1699	Khauber@claengineers.com
SWPCP Plan Preparer	CLA Engineers, Inc	Ellen Bartlett	860-886-1699	ebartlett@claengineers.com
SWPCP Inspector	CLA Engineers, Inc	Bob Russo	860-886-1699	brusso@claengineers.com
Grading Contractor	TBD			
BMP Installer	TBD			

5.0 SITE INFORMATION

5.1 Site Name and Location

The Bens Solar site is located approximately 1.0 mile east of the town of Ansonia in New Haven County, Connecticut. The nearest intersection is Prindle Ave and Benz St. The site address is: 31 Benz Street, Ansonia CT 06401. The site vicinity map is included in *Attachment A*.

Table 5: Project Location

Latitude and Longitude Points (Decimal)	
Latitude:	41°20'36.76"N
Longitude:	73° 3'39.46"W

5.2 Duration of Construction Activities

Table 6: Project Schedule and Normal Working Hours

Work Days	Normal Start Time	Normal End Time
Monday thru Saturday	7:00 AM	6:00 PM
Activity	Start Date	End Date
Overall Project	8/2/2021	6/15/2022
Site Clearing / Install Erosion Control	8/2/2021	8/20/2021
Stormwater Basin Grading, array Grading and Swales	8/23/2021	9/16/2021
Roadway and Perimeter Fence Install	8/23/2021	9/16/2021
Ensure Applicable Establishment of Vegetation prior to Solar Construction*	10/15/2021	10/15/2021
PV Array Foundation Installation	10/18/2021	11/12/2021
PV Array & Electrical Construction Vegetation Maintenance	10/18/2021	6/15/2022
PV Array Racking and Module Install	11/1/2021	11/23/2021
PV Electrical Construction	11/1/2021	12/17/2021
Project Energization and Commissioning	12/26/2021	12/28/2021
Additional Site Seeding / Restoration	3/1/2022	6/15/2022

* If Vegetation establishment is not sufficient for PV construction, then electrical construction schedule will be modified.

6.0 ENDANGERED SPECIES AND HISTORICAL PROPERTIES

6.1 Endangered or Threatened Species

A determination on endangered and threatened species for the Benz Solar site was made by the Natural Diversity Data Base (NDDB) dated 01/24/19. The report states that they do not anticipate any negative impacts to State-listed species (RCSA Sec. 26-306) resulting from the proposed activity at this site. The review results do not preclude the possibility that listed species may be encountered on site and that additional action may be necessary to remain compliant with certain state permits. See *Attachment C* for applicable documentation.

6.2 Historical Property Preservation

The site has undergone the Historic Preservation Review Process in Connecticut for Cultural Resource Review under the Nation al Historic Preservation Act – Section 106. The Connecticut State Historic Preservation Office ("SHPO") assessed the property to determine whether or not it is listed or eligible for listing in the Connecticut State or National Registers of Historic Places. On February 7th, 2019 SHPO issued a determination stating "…no historic properties will be affected by the construction of the Facility." See *Attachment D*: Conservation or Preservation Restriction Information.

7.0 SITE DESCRIPTION

7.1 Nature of Construction Activities

The proposed Benz Solar Project consists of one (1) 0.99MW and one (1) 1MW solar generating facilities. In total, the site will include the installation of approximately 5,300 solar panels and corresponding electrical equipment for power generation. Each solar panel will be supported by a south-facing fixed 25-degree tilt racking system. Electrical equipment for the site will include inverters and step-up voltage transformers mounted on concrete pads, which will ultimately be connected underground to an interconnection pole and tie into the existing overhead electric distribution along Benz Street.

7.2 Proposed Conditions and Land Use

Non-vegetative Cover

Post-construction, added impervious cover will include aggregate access roads, transformers and electrical equipment on concrete pads, perimeter security fence, and solar foundations. The solar panels will cover most of the project area but will allow for vegetative undergrowth.

Vegetative Cover

Post-construction, the proposed vegetative cover will consist of native grass that will provide ground cover beneath the solar panels and around all non-vegetative cover mentioned above.

Land Use

The proposed land use of the site will be a solar facility. The solar facility will consist of solar modules mounted above grade on a racking system, gravel access roads, transformers, associated electrical equipment, and a perimeter security fence. The solar modules are located above the ground, and the finished ground conditions will be completely pervious by seeding with a low-maintenance native grass seed mix.

7.3 Pre and Post Project Estimates

Table 7: Project Area Estimates

Total Project Acreage	Disturbed Acreage	Pre Construction Runoff Coefficient	Post Construction Runoff Coefficient
12.7	10.6	0.20	0.25

7.4 Receiving Waters

Stormwater runoff from the site drainage consists of 2 watersheds, with watershed 1 draining to the wetland to the northwest and watershed 2 draining to Benz street to the south. Receiving waters from those 2 watersheds are to the Beaver Brook, which ultimately drains to the Naugatuck River. Any discharges from the project will not adversely affect human health or the environment. Nor will they cause a public nuisance or contain pollutants in quantities that threaten to cause pollution. The project will comply with local and regional water quality objectives to ensure water quality standards. Refer to *Attachment J* for drainage maps.

Table 8: Receiving Waters

Waterbody	Immediate/ Ultimate	Type Wetland, Lake Stream, Ditch	Impaired	Approved TMDL
Beaver Brook	I	Stream	N	N
Naugatuck River	U	River	Y	Y

7.5 Other Permits or Plans Required

Table 9: Permits / Plans Summary

Name of Permit or Plan	Date of Plan	Plans Set Name	Notes

7.6 Identified Extent of Wetlands

Wetlands were delineated on site on January 16, 2019 by Davison Environmental There are 0.39 acres of wetlands on the parcel. The acreage is determined from the surveyed delineated wetlands within the site boundary. The delineated area is a seasonally flooded, forested wetland located along the west property boundary and extending off-site to the west. Wetland hydrology appears to be driven primarily by groundwater discharge/seeps originating from extremely stony uplands adjacent to the wetland. The wetlands also illustrate potential vernal pool habitat within the boundary and an appropriate vernal pool management plan was prepared for the site. No disturbances to the wetlands or vernal pool habitat is proposed. See *Attachment E*: Vernal Pool Management Plan & Wetland Delineation Report for additional information.

Table 10: Wetland Area Summary

Wetland Location (Lat / Lon)	Wetland Area (Acre)	Inland Wetland	Tidal Wetland	Fresh-Tidal Wetland
41°20'40.37"N / 73° 3'40.53"W	0.39 AC	X		

7.7 Existing Conditions

The existing site includes a single family residence located on approximately 12.7 acres. Outside of the residence, the remaining land is undeveloped primarily wooded with grass areas along Benz Street. The site drainage consists of 2 watersheds, with watershed 1 draining to the wetland to the north and watershed 2 draining to Benz street to the south.

7.7.1 Non-vegetative Cover

Prior to construction, the existing non-vegetative cover consists of exposed rock walls on site. No other permanent structures, roads, or improvements were observed on-site.

7.7.2 Vegetative Cover

Prior to construction, the existing vegetative cover consists of dense forest consisting of trees and brush

throughout the site.

7.7.3 Land Use

Prior to construction the site area was primarily unoccupied, unused, and undeveloped woodlands. A Phase 1 Environmental Site Assessment was conducted by Rincon Consultant, Inc. with a report dated 12/21/2015. In the report there were not any recognized environmental conditions found.

8.0 SITE MAP(S)

Attachment F of this plan contains the site maps which include, but not limited to:

- Existing and planned drainage patterns;

- Existing and planned elevation and slopes;
- Location of structural and non-structural controls;
- Limits of soil disturbance;
- Existing vegetation;
- Locations of E&S controls;
- Location of stabilization practices;
- Provisions for impaired waters;
- Location of post construction re-vegetation;
- Location of utilities, roads and structures;
- Locations and provisions for waste disposal;
- Locations and provision for washout areas;
- CT stream encroachment lines;

Attachment J of this plan contains the drainage maps which include, but not limited to:

- Existing and planned drainage patterns;
- Location of outfall(s) proposed for monitoring;
- Location of surface waters, impaired water, waters with TMDLs;
- Location of surface water, including inland wetlands, fresh-tidal wetlands and tidal wetlands (as applicable);
- Locations of discharges to surface waters (pre, during and post construction);
- Locations for impaired waters;
- Limits of FEMA floodplains and floodways;
- CT coastal resource limits (if applicable);
- Location of any public drinking water supply areas or watersheds.

Attachment I of this plan contains the soil maps which include, but not limited to:

- Description of existing soils,
- Erosivity information for the soils,
- RUSLE attributes of the soils, and
- Map of the soils within the site area.

8.1 Soil Descriptions

The soils present on the Benz Solar project includes gravelly fine sandy loam, fine sandy loam, gravelly sandy loam soils. The soils belong to hydrologic soil group B. Soils belonging to group B have slight to moderate runoff potential when wet, depending on slopes. Soil information summarized in the tables below is from the USDA Natural Resources Conservation Service Web Soils Survey (Accessed 12/22/2020). Additional soils information can be found in *Attachment I*.

http://websoilsurvey.nrcs.usda.gov/app/

Table 11: Soil K Factors and Erosivity Hazards

Soil Name / Type	K Factor	Erosivity Hazard				Reason(s) for Erosivity Rating
		Slight	Moderate	Severe	Very Severe	
73C -Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	0.28	X				
73E - Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	0.43		X			Slope Erodibility (0.50)
260B - Charlton-Urban land complex, 3 to 8 percent slopes	0.24	X				

273C - Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes	.28	X				

Table 12: Soil Particle Sizes

Soil Type	% Sand	% Silt	% Clay	% Site Area
73C -Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	57.6	33.4	9.1	68.4%
73E - Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	65.0	30.0	5.0	24.6%
260B - Charlton-Urban land complex, 3 to 8 percent slopes	57.9	32.8	9.3	1.4%
273C - Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes	67.5	20.0	12.5	5.5%

9.0 CONSTRUCTION SEQUENCING

9.1 Project Phasing

The contractor will limit the exposed area of stabilized soils and disturbance per the construction sequence provided in this plan. In the areas of solar panel installation, there are several activities (site grading, footing installation, panel installation, and electrical trench work) that will disturb soil.

General Phasing Notes:

The contractor shall have clearing and grading limits, sensitive areas, and wetlands identified prior to construction.

Throughout the duration of construction, the project owner shall provide inspection reports to town and CTDEEP.

Any dewatering throughout the duration of construction shall be monitored by a qualified environmental professional to maintain suitable quality of discharge from the dewatering and to ensure removal of accumulated sediments at appropriate intervals. Sediments will be disposed of at an appropriate on-site location.

Throughout the grading operation, any disturbed area left idle for more than 14 days shall be stabilized.

Construction Sequence:

1. PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY AT THE SITE, APPLICANT BENZ SOLAR LLC SHALL
    a. PROVIDE DEEP WITH A SIGNED LETTER FROM THE CITY OF ANSONIA AUTHORIZING THE CONNECTION OF BASIN NUMBER 2 (STORMWATER TREATMENT BASIN #2 OUTLET RISER DETAIL, PAGE 11 OF 11 OF THE CONSTRUCTION DOCUMENTS) WITH THE CITY OF ANSONIA'S STORMWATER SYSTEM
    b. CONTRACT WITH THE APPROPRIATE CONSERVATION DISTRICT TO PROVIDE INSPECTION SERVICES AT THE SITE PURSUANT TO APPENDIX F OF THE GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER AND DEWATERING WASTEWATERS FROM CONSTRUCTION ACTIVITIES
    c. CONTACT CALL BEFORE YOU DIG (811 OR 1-800-922- 4455) TO MARK UTILITIES.
2. NOTIFY THE TOWN OF ANSONIA ZONING AND INLAND WETLANDS AGENTS OF START OF CONSTRUCTION A MINIMUM OF 48 HOURS IN ADVANCE.
3. HAVE CT LICENSED LAND SURVEYOR STAKE OUT THE CLEARING LIMITS AND PERIMETER EROSION CONTROL.
4. CUT TREES BUT DO NOT GRUB.
5. INSTALL CONSTRUCTION ENTRANCE.
6. INSTALL PERIMETER EROSION AND SEDIMENTATION CONTROLS (HAY BALES AND WOODCHIP MULCH) AND HAVE INSPECTED BY SITE INSPECTOR PRIOR TO GRUBBING OR GRADING ACTIVITIES.
7. EXCAVATE AND STABILIZE BASIN #1, IF DEWATERING IS NECESSARY FOR EXCAVATION PLEASE COORDINATE DEWATERING PLAN WITH QUALIFIED ENVIRONMENTAL PROFESSIONAL. INSTALL BASIN DRAIN OUTLET PIPING AND CAP PIPE IN THE BOTTOM OF THE BASIN. PROVIDE A STAKE MARKING THE CAP LOCATION. DO NOT INSTALL PERFORATED BASIN DRAIN AND CRUSHED STONE. BASIN #1 SHALL BE USED AS A TEMPORARY SEDIMENTATION BASIN DURING CONSTRUCTION. UPON COMPLETION OF THE BASIN #1 GRADING THE CONTRACTOR SHALL HAVE THE STABILIZED BASIN INSPECTED BY SITE INSPECTOR.
8. GRUB WATERSHED 1 SITE AREA AND PERFORM SITE GRADING AND STABILIZATION WITHIN WATERSHED 1 WORK AREA AS IDENTIFIED ON THE PLANS.
9. GRADE AND STABILIZE WESTERN SWALE TO BASIN #1.
10. PRIOR TO THE CONSTRUCTION TRANSITION TO WATERSHED #2, THE CONTRACTOR SHALL HAVE THE WATERSHED #1 GRADING AND STABILIZATION REVIEWED BY THE SITE INSPECTOR TO ENSURE APPROPRIATE STABILIZATION.
11. EXCAVATE AND STABILIZE BASIN #2, IF DEWATERING IS NECESSARY FOR EXCAVATION PLEASE COORDINATE DEWATERING PLAN WITH QUALIFIED ENVIRONMENTAL PROFESSIONAL. BASIN #2 SHALL BE USED AS A TEMPORARY SEDIMENTATION BASIN DURING CONSTRUCTION. UPON COMPLETION OF THE BASIN #2 GRADING THE CONTRACTOR SHALL HAVE THE STABILIZED BASIN INSPECTED BY SITE INSPECTOR.
12. GRADE AND STABILIZE EASTERN SWALE TO BASIN #2 AND INSTALL DRIVEWAY CULVERT.
13. GRUB WATERSHED 2 SITE AREA AND PERFORM ADDITIONAL SITE GRADING WITHIN WATERSHED 2 WORK AREA AS IDENTIFIED ON THE PLANS.
14. INSTALL ACCESS DRIVEWAY.
15. INSTALL PERIMETER CHAIN LINK FENCE AROUND ENTIRE SITE.
16. INSTALL THE BASIN DRAIN PERFORATED PIPE AND CRUSHED STONE WITHIN BASIN #1.

17. AFTER THE INITIAL GRADING WORK IS COMPLETE THE BASINS, SWALES, AND ALL DISTURBED AREAS SHALL BE LEFT FOR A MINIMUM OF ONE GROWING SEASON (APRIL 1ST THROUGH JUNE 15TH OR AUGUST 15TH THROUGH OCTOBER 15TH). THE SITE SHALL BE LEFT UNDISTURBED TO ALLOW NEW VEGETATION TO ESTABLISH. ROUTINE INSPECTIONS SHALL BE PERFORMED AND ANY ERODED AREAS OR BARE AREAS RESTORED. ANY WORK ASSOCIATED WITH THE INSTALLATION / RACKING OF THE SOLAR ARRAY WILL NOT COMMENCE UNTIL THE PERIMETER CONTROLS, INCLUDING, BUT NOT LIMITED TO, ALL SWALES AND BASINS, HAVE BEEN VEGETATIVELY STABILIZED.
18. INSTALL SOLAR RACKING FOUNDATIONS, AND RACKING, AND SOLAR MODULES. HYDROSEED OR SEED AND MULCH ANY EXPOSED SOIL AT THE END OF EACH WEEK AND BEFORE EVERY RAINFALL PREDICTED FOR 0.5 INCHES OR MORE.
19. TRENCH FOR AND INSTALL ELECTRIC LINES AND AT THE END OF EACH WEEK HYDROSEED OR MULCH AND SEED ANY EXPOSED SOIL AT THE END OF EACH WEEK AND BEFORE EVERY RAINFALL PREDICTED FOR 0.5 INCHES OR MORE.
20. INSTALL REMAINING ELECTRIC INFRASTRUCTURE AND AT THE END OF EACH WEEK HYDROSEED OR MULCH AND SEED ANY EXPOSED SOIL AT THE END OF EACH WEEK AND BEFORE EVERY RAINFALL PREDICTED FOR 0.5 INCHES OR MORE.
21. OVERSEED DISTURBED SOILS WHEN ALL SOLAR PANEL INSTALLATION AND ELECTRICAL TRENCHING IS COMPLETE.
22. CLEAN SEDIMENTS BASINS AND GRADE AND RE-SEED FOR USE AS STORMWATER BASINS WHEN SITE INSPECTOR DEEMS SOILS ARE STABILIZED.
23. INSTALL PERIMETER SCREENING PLANTINGS

Table 13: Construction Activity / Phase Sequencing and Duration

Activity/Phase	Start Date	End Date	# Days
Overall Project	8/2/2021	6/15/2022	317
Site Clearing / Install Erosion Control	8/2/2021	8/20/2021	18
Stormwater Basin Grading, array Grading and Swales	8/23/2021	9/17/2021	25
Roadway and Perimeter Fence Install	8/23/2021	9/17/2021	25
Ensure Applicable Establishment of Vegetation prior to Solar Construction*	10/15/2021	10/15/2021	1
PV Array Foundation Installation	10/18/2021	11/12/2021	25
PV Array & Electrical Construction Vegetation Maintenance	10/18/2021	6/15/2022	240
PV Array Racking and Module Install	11/1/2021	11/23/2021	23
PV Electrical Construction	11/1/2021	12/17/2021	46
Project Energization and Commissioning	12/26/2021	12/28/2021	3
Additional Site Seeding / Restoration	3/1/2022	6/15/2022	106

* If Vegetation establishment is not sufficient for PV construction, then electrical construction schedule will be modified.

9.2 Limits of Disturbance for Each Phase

The plan sheets within the erosion and sediment control plans found in *Attachment F* show the limits of disturbance for the construction activities. The table below summarizes the acreage associated with each activity. Where possible, the disturbance will be minimized to five acres at one time.

Table 14: Limits of Disturbance

Activity/Phase	Limits of Disturbance
Total Site Clearing	9.97 AC
Solar Array Fence Limits	8.59 AC
Solar Array Envelope	5.77 AC
Grading Outside of Fence Limits	0.0 AC

Grading Inside of Fence Limits	3.75 AC
Access Roadway Grading	0.25 AC
Restoration Area	9.97 AC

10.0 CONTROL MEASURES

10.1 Checklist

The completed SWPCP Plan Checklist as established by Connecticut DEEP is found in *Attachment J*.

10.2 BMP Application

The Erosion, Sedimentation and Pollution Control Plan shall include, as a minimum, best management practices, including sound conservation and engineering practices to prevent and minimize erosion and resultant sedimentation, which are consistent with, and no less stringent than, those practices contained in the "Guidelines, the Stormwater Quality Manual or the DOT Qualified Products List" (CTDEEP, 2004).

10.3 Soil Management

After clearing and grubbing, the grading contractor shall strip and stockpile topsoil material for reapplication on all future permanent pervious surface areas. A 4- to 6-inch stripping depth is common; however, the depth may vary dependent upon the site specific soils. After placement of perimeter sediment BMPs and during development, grading, and utility construction, the subsoils will be compacted as necessary for construction using typical excavation techniques. During final grade, reapplication of topsoil will be done by a wide-pad dozer and/or other equipment to minimize compaction of the topsoil material.

10.4 Soil Stockpile Management

Stockpiled topsoil stripped from the site shall not obstruct natural site drainage and shall not result in off-site sediment damage. Stockpiles shall be located to maximize distance from wetlands or watercourses. The side slopes of the stockpiles shall not exceed 2:1, and perimeter sediment controls should be installed along the downgradient site to trap sediment eroded from the stockpile. Temporary stabilization of the stockpile is necessary if the stockpiles are to remain inactive within the permit time frames listed below.

10.5 Stabilization Timing for Disturbed Areas and Moderate Slopes

Each Friday and also on the day before any rain forecast of 0.5 inches or more, the contractor shall hay mulch all exposed soil. Any erosion which occurs within the disturbed areas shall be immediately repaired and stabilized. During the construction phase, intercepted sediment shall be returned to the site. Post seeding, intercepted sediment, if any, shall be disposed of in a manner approved by the town and engineer. Temporary erosion control practices should be initiated immediately after construction activity disturbing soil in an area is temporarily or permanently ceased for a period of seven days. The application of temporary erosion control management practices should be completed prior to the seventh day of temporarily or permanently ceasing construction activity in an area of the project. For areas of the site not anticipated to be active again within thirty days the application of temporary seed is necessary along with the temporary stabilization measures applied. If the areas are to be active again within thirty days in a portion of the site; the area anticipated to be active do not have to be temporarily seeded but still need the temporary stabilization BMPs (such as but not limited to: mulching, blanket applications or hydromulch / soil stabilizers) with seven days of temporary or permanently ceasing activity. Once areas of final grade area achieved, the application of temporary stabilization with permanent seeding or vegetative BMPs must be applied within seven calendar days.

When feasible, temporary seeding of disturbed areas that have not been fully graded shall be completed prior to October 15. If final seeding of disturbed areas is not completed before October 15, the contractor shall provide temporary mulching (dormant seeding may be attempted as well) to protect the site and delay permanent seeding.

10.6 Steep Slope Stabilization

Steep slopes which are defined as gradients of steeper than 3:1 exceeding 15 feet vertically must be temporarily or permanently (depending upon timing) stabilized and have a reverse slope bench installed for stabilization.

Sufficient erosion control materials will be maintained on-site to allow implementation in conformance with General Permit requirements and described in this SWPCP. This includes implementation requirements for active areas and non-active areas that require deployment before the onset of anticipated rain events.

10.7 Erosion Control Practices

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in stormwater runoff. Erosion control BMPs protect the soil surface by covering and/or binding soil particles. This project will incorporate erosion control measures required by the contract documents and other measures elected by the Developer and SWPCP Plan Preparer. This project will implement the following practices for effective temporary and final erosion control during construction:

- Preserve existing vegetation where required and when feasible;
- Apply temporary erosion control to remaining active and non-active areas. Reapply as necessary to maintain effectiveness;
- Implement temporary erosion control measures at regular intervals throughout construction to achieve and maintain the contract's disturbed soil area requirements;
- Stabilize non-active areas as soon as feasible after the cessation of construction activities;
- Control erosion in concentrated flow paths by applying erosion control blankets, erosion control seeding, and lining swales as required in the contract documents;
- Seed will be applied to areas deemed substantially complete during the construction or to areas which will not be actively worked for extended periods of time (i.e. longer than thirty calendar days); and
- At completion of construction, apply permanent erosion control to all remaining disturbed soil areas.

The following controls are anticipated to minimize soil loss from the construction site area. The controls should help to minimize soil from being transported from water and wind as well as aid in the establishment of temporary and permanent vegetation. Prior to grading and during clearing and grubbing, the areas of vegetation preservation, buffers and other areas of no-disturbance should be flagged, staked or otherwise delineated.

Table 15: Erosion Controls

BMPs	Construction Activity								Application Notes
	Site Clearing and Grubbing	Stormwater Basin Grading	Fence Install	Access Road/Array Grading	PV Racking Foundation Install	PV Racking/Module Install	PV Electrical Construction	Restoration	
Preserve / Conserve Topsoil (TO)	X	X		X		X		X	Section 10.3
Tree Protection (TP)	X	X		X					Use of flagging, temporary fencing or other demarcation to provide limits of tree protection should be implemented.
Slope Roughing (SR)	X	X		X					Use tracked equipment perpendicular to contour on steep slopes for temp/short term erosion control.
Straw / Hay Mulch (TSP / MS)	X	X		X				X	Apply at Two Tons per Acre, Disc anchor to soil. Weed free mulch shall be used.
Blanket (ECB)		X		X				X	North American Green S-150 or Approved Equivalent
Hydroseed (TSP / MS)		X	X	X	X	X		X	Apply at a minimum of 1,800 pounds per acre from 2 directions to prevent shadowing
Riprap (RR)		X							Per plans.
Temporary Seeding (TS)		X	X	X	X	X	X		Section 10.7.1
Permanent Seeding (PS)								X	Section 10.7.2

10.7.1 Temporary Seeding:

Figure TS-2 Temporary Seeding Rates and Dates

Species[4]	Seeding Rates (pounds) /Acre	Seeding Rates (pounds) /1000 sq. ft.	Optimum Seed Depth[2] (inches)	Optimum Seeding Dates[1] 3/1 – 10/15	Plant Characteristics
Annual ryegrass Lolium multiflorum	40	1.0	0.5		May be added in mixes. Will mow out of most stands
Perennial ryegrass Lolium perenne	40	1.0	0.5		Use for winter cover. Tolerates cold and low moisture.
Winter Rye Secale cereale	120	3.0	1.0		Quick germination and heavy spring growth. Dies back in June with little regrowth.
Oats Avena sativa	86	2.0	1.0		In northern CT, will winter kill with the first killing frost and may through-out the state in severe winters.
Winter Wheat Triticum aestivum	120	3.0	1.0		Quick germination with moderate growth. Dies back in June with no regrowth.
Millet Echinochloa crusgalli	20	0.5	1.0		Warm season small grain. Dies with frost in September.
Sudangrass Sorghum sudanense	30	0.7	1.0		Tolerates warm temperatures and droughty conditions.
Buckwheat Fagopyrum esculentum	15	0.4	1.0		Hardy plant that will reseed itself and is good as a green manure crop.
Weeping lovegrass Eragostis curbula	5	0.2	0.25		Warm-season perennial. May bunch. Tolerates hot, dry slopes, acid infertile soils. Excellent nurse crop. Usually winter kills.
DOT All Purpose Mix[3]	150	3.4	0.5		Suitable for all conditions.

[1] May be planted throughout summer if soil moisture is adequate or can be irrigated. Fall seeding may be extended 15 days in the coastal towns.

[2] Seed at twice the indicated depth for sandy soils.

[3] See Permanent Seeding **Figure PS-3** for seeding mixture requirements.

[4] Listed species may be used in combinations to obtain a broader time spectrum. If used in combinations, reduce each species planting rate by 20% of that listed.

Source: USDA–NRCS

10.7.2 Permeant Seeding:

Figure PS-3 Seed Mixtures for Permanent Seeding

No.	Seed Mixture (Variety) [4]	Lbs/Acre	Lbs/1,000 Sq. Ft.
1[5]	Kentucky Bluegrass Creeping Red Fescue (Pennlawn, Wintergreen) Perennial Ryegrass (Norlea, Manhatten)	20 20 5 Total 45	.45 .45 .10 1.00
2[5]	Creeping Red Fescue (Pennlawn, Wintergreen) Redtop (Streeker, Common) Tall Fescue (Kentucky 31) or Smooth Bromegrass (Saratoga, Lincoln)	20 2 20 Total 42	.45 .05 .45 .95
3[5]	Creeping Red Fescue (Pennlawn, Wintergreen) Bird's-foot Trefoil (Empire, Viking) with inoculant[1] Tall Fescue (Kentucky 31) or Smooth Bromegrass (Saratoga, Lincoln)	20 8 20 Total 48	.45 .20 .45 1.10
4[5]	Creeping Red Fescue (Pennlawn, Wintergreen) or Tall Fescue (Kentucky 31) Redtop (Streeker, Common) Bird's-foot Trefoil (Empire, Viking) with inoculant[1]	20 2 8 Total 30	.45 .05 .20 .70
5[5]	White Clover Perennial Rye Grass	10 2 Total 12	.25 .05 .30

Figure PS-2 Selecting Seed Mix to Match Need

Area To Be Seeded	Mixture Number[1]	
	Mowing Desired	Mowing Not Required
BORROW AREAS, ROADSIDES, DIKES, LEVEES, POND BANKS AND OTHER SLOPES AND BANKS		
A) Well or excessively drained soil[2]	1,2,3,4,5 or 8	5, 6, 7, 8, 9, 10, 11, 12, 16, ***22***
B) Somewhat poorly drained soils[2]	2	5, 6
C) Variable drainage soils[2]	2	5, 6, 11

[1] Use proper inoculant for legume seeds, use four times recommended rate when hydroseeding.

[2] Use Pure Live Seed (PLS) = $\frac{\%\ \text{Germination X}\ \%\ \text{Purity}}{100}$

EXAMPLE: Common Bermuda seed with 70% germination and 80% purity=

$\frac{70 \times 80}{100}$ or $\frac{56}{100}$ or 56%

$\frac{10\ \text{lbs PLS/acre}}{56\%}$ = 17.9 lbs/acre of bagged seed

[3] DOT All purpose mix

[4] Wild flower mix containing New England Aster, Baby's Breath, Black Eye Susan, Catchfly, Dwarf Columbine, Purple Coneflower, Lance-leaved Coreopsis, Cornflower, Ox-eye Daisy, Scarlet Flax, Foxglove, Gayfeather, Rocky Larkspur, Spanish Larkspur, Corn Poppy, Spurred Snapdragon, Wallflower and/or Yarrow may be added to any seed mix given. Most seed suppliers carry a wild flower mixture that is suitable for the Northeast and contains a variety of both annual and perennial flowers. Seeding rates for the specific mixtures should be followed.

[5] Considered to be a cool season mix.

[6] Considered to be a warm season mix.

10.8 Sediment Control Practices

The following controls are anticipated to minimize sediment discharge, capture sediment in suspension and minimize sedimentation off site.

Table 16: Sediment Controls

BMPs	Construction Activity								Application Notes
	Site Clearing and Grubbing	Stormwater Basin Grading	Fence Install	Access Road/Array Grading	PV Racking Foundation Install	PV Racking/Module Install	PV Electrical Construction	Restoration	
Geotextile Silt Fence (SF)	X	X	X	X	X			X	Machine Sliced install w/ wooden or steel posts at 6' spacing. Install prior to grubbing or grading
Haybale Backed Geotextile Silt Fence (SF)		X	X					X	Machine Sliced install w/ wooden or steel posts at 6' spacing. Install prior to grubbing or grading
Wood Chip Berm (WC)	X	X	X	X	X			X	2.5' High, 1'Berm top, 3:1 Side Slopes

10.9 Run-on and Runoff Controls

The following controls are anticipated to minimize scour, transport water across or down steep slopes or critical areas, divert clean water, and/or provide temporary or permanent conveyances to maintain drainage.

Table 17: Run-on and Runoff Controls

BMPs	Construction Activity								Application Notes
	Site Clearing and Grubbing	Stormwater Basin Grading	Fence Install	Access Road/ Array Grading	PV Racking Foundation Install	PV Racking/Module Install	PV Electrical Construction	Restoration	
Outlet Protection (OP) / Hay Bale	X	X	X	X	X	X			See detail in plans. Install within twenty-four hours of connection to surface waters.
Level Spreader (LS)		X	X	X				X	See detail in plans.
Temporary Wood Chip Berm	X	X	X	X				X	See detail, use temp erosion control to stabilize berm. Install prior to disturbing downgradient areas.
Temporary Sediment Basin		X	X	X					See Section 13.0 of this SWPCP
Temporary Sediment Trap		X	X	X					See Section 13.0 of this SWPCP
Permanent Water Quality Basin		X	X	X				X	See Section 13.0 of this SWPCP
Vegetated Waterway / Swale		X	X	X				X	See detail in plans. Install within twenty-four hours of connection to surface waters.
Temporary Low Water Crossing		X	X	X					See detail, use temp erosion control to stabilize berm. Install prior to disturbing downgradient areas.

See detail, use temp erosion control to stabilize berm.

Install prior to disturbing downgradient areas.

10.10 Temporary Practices

There are 2 proposed sediment traps and one proposed sediment basin for the construction of the Benz Solar Project. Please refer to the Drainage Calculations, Hydraulics Report completed by CLA Engineers, Inc, dated September 17, 2020 for sediment trap and sediment basin calculations. See *Attachment J* for the calculations.

10.10.1 Calculations

Table 18: Temporary Sediment Basin Calculations

Basin #	Total Storage Volume	
	Needed	Provided
1	14,637 CF	42,057 CF
2	8973 CF	12909 CF

10.11 Tracking Controls

The following controls are anticipated to minimize or prevent sediment track-out and generation of dust from construction site exits to paved surfaces or to retrieve material tracked onto paved surfaces to minimize or prevent the material from being washed into surface waters or stormwater inlets. The contractors shall construct or direct construction of stabilized construction entrances / exits for the project site as shown on the Erosion and Sediment Control Plans in *Attachment F*. Stabilized constructed roadways will be implemented as necessary to minimize potential of dust and erosion of exposed soils during construction.

Table 19: Tracking Controls

BMPs	Construction Activity								Application Notes
	Site Clearing and Grubbing	Stormwater Basin Grading	Fence Install	Access Road/ Array Grading	PV Racking Foundation Install	PV Racking/Module Install	PV Electrical Construction	Restoration	
Construction Entrance (CE)	X	X	X	X	X	X			See detail in plans. Install prior to Grubbing or Grading.
Gravel or Aggregate Road Base				X	X	X	X	X	See detail and notes in plans.
Wet Dust Suppression	X	X	X	X	X	X	X	X	Minimize water volume used to prevent runoff from occurring.
Street Scraping	X	X	X	X					Scrape large clumps/amounts of material with soft tracked or wheeled equipment prior to sweeping.
Street Sweeping	X	X	X	X	X	X	X	X	Sweep paved surfaces within twenty-four hours of discovery.

10.12 Dewatering and Basin Draining Practices

If dewatering is necessary during any time of construction one of the following methods should be employed, A clear water discharge shall be provided as shown in the hay-bale barrier dewatering detail. Dewatering of turbid water (water that is visibly cloudy or brown in color) should be discharged via pump and hose or overland flow (via temporary ditch or grade cuts) to a temporary sediment basin for pretreatment the use of riprap apron (energy dissipation) should be used for the discharge location. If riprap is not used, an alternative form of energy dissipation should be used to prevent scour and re-suspension of soil at the discharge point of the hose. If discharge to a temporary sediment basin is not feasible, the use of pumping settling basins, portable sediment tanks, dewatering bags or approved method shall be utilized. The use of rock checks, erosion control

blanket and sumps or traps shall be considered for overland flow dewatering. After the use of BMPs, the water could be discharged through a vegetated buffer and energy dissipation. The discharge of water from the site should be visibly clear in appearance.

An alternate method proposed by the contractor and approved by the engineer may be employed if the above methods are not feasible.

The discharge of accumulated water should not:

- Contain oil, grease, a sheen, odor, visible foaming, or concrete washout wastewater;
- Adversely impact adjacent properties with water or sediment;
- Adversely impact waters of the state;
- Cause erosion of slopes and channels;
- Cause nuisance conditions;
- Contribute to inundation of wetlands which negatively impact the wetlands.

Table 20: Dewatering Controls and BMPs

BMPs	Construction Activity								Application Notes
	Site Clearing and Grubbing	Stormwater Basin Grading	Fence Install	PV Grading Maintenance	PV Racking/Module Install	PV Electrical Construction	Project Energization	Restoration	
Pump Intake and Outlet Protection	X	X	X	X	X	X	X	X	

11.0 OTHER MEASURES (GOOD HOUSEKEEPING)

Potential pollutant sources including construction and waste materials that are used or stored at the site are described below. Upon proper implementation of the BMPs potential pollutant sources are not reasonably expected to affect the stormwater discharges from the site. Construction materials and chemicals used or stored on-site should be kept in small quantities whenever possible. Materials shall only be stored in non-sensitive areas and not in close proximity to watercourses, wetlands or floodplains.

A spill prevention, control and countermeasure plan (SPCC) will be needed if materials or tanks present on site contain more than, or have the ability to contain more than, 1,320 gallons of petroleum products. When not in use, petroleum products should be stored in sealed containers and out of contact with the elements to prevent direct contact with stormwater. Inadvertent spills should be cleaned up immediately upon discovery and the materials should be disposed of in accordance with local, state and federal requirements. Contractors should have spill kits available on site for rapid deployment to contain and cleanup spills.

Table 21: Potential Pollutants List

Potential Pollutant	Location	Control Measure
Antifreeze	Vehicle/Equipment	S.C. / Drip Pan
Diesel Fuel	Vehicle/Equipment/Fuel Tanks	S.C. / Drip Pan
Gasoline	Vehicle/Equipment/Fuel Tanks	S.C. / Drip Pan
Hydraulic Oils/Fluids	Vehicle/Equipment	S.C. / Drip Pan

Grease	Vehicle/Equipment	S.C. / Drip Pan
Sanitary Waste Restrooms	Portable	Service provider to secure units from tipping
Trash & Construction Debris	Various	Dumpster
Paints	Contractor	S.C. and Secure/ Covered Storage
Glue/Adhesives/Curing Compounds	Contractor	S.C. and Secure/ Covered Storage
Soil Amendments	Various	S.C. and Secure/ Covered Storage
Landscaping Materials/Fertilizer	Various	S.C. and Secure/ Covered Storage
Concrete	Contractor	S.C. / Washout Area
Bentonite	Directional Boring/ Utility Contractor	S.C. / Sump Area
Sediment	Exposed soils/ Disturbed Areas	Sediment, Erosion, Tracking, and Runoff Controls

*S.C. =. Secondary Containment unit or area

11.1 Storage, Handling and Disposal of Construction Materials

11.1.1 Storage and Handling

- All products shall be kept in their original container, with original labels still attached, unless the container is not re-sealable.
- All chemicals and petroleum products containers stored on site shall be provided with impermeable containment. The containment must be sized to hold 110 percent of the volume of the largest container or 10 percent of the total volume of all containers in the areas (whichever is larger) without overflow of the containment areas.
- Hazardous materials shall be returned to the hazardous material storage area at the end of each day. All chemicals and containers shall be stored under a roofed area except for those chemicals stored in containers of 100 gallon capacity or more. Double walled tanks satisfy this requirement.
- An effort should be made to store only enough products to do the required job.
- The contractor shall provide tanks or barrels to collect liquid byproducts that pose a pollution hazard.
- The pollutants shall be removed from the site on a weekly basis and disposed of in accordance with federal, state and local regulations.
- All spills shall be cleaned up immediately after discovery, in accordance with the manufacture's recommended methods.
- Hazardous materials shall be properly stored to prevent vandalism or unauthorized access.
- Containment units shall be installed in accordance with federal, state, and local regulations.
- No hazardous material shall be stored within 200 feet of an identified critical area.
- If building materials, chemicals, or general refuse is being used, stored, disposed of, or otherwise managed inappropriately, the contractor shall correct such defects within twenty-four hours of detection or notification.

11.1.2 Disposal (Dumpsters)

- Locate dumpsters away from watercourses, streams, creeks and other surface waters or conveyances.
- Site inspector shall regularly observe for and report excess litter and solid waste and request pickup and retrieval of wastes.
- Wastes, litter, debris shall be deposited into dumpsters in a central location and / or in various satellite locations where work is active.
- Dumpsters should be supplied by and regularly maintained, emptied and removed by a waste management company.

11.2 Fueling and Maintenance of Equipment and Vehicles; Spill Response

- Routine maintenance of vehicles shall occur in staging areas only if necessary;
- Maintenance of equipment and vehicles should be avoided and done off site where feasible;
- If fueling is done by mobile tank and dispenser, the transfer of fuel should be done under close supervision and there should be drip pans and spill containment and cleanup materials readily available;
- If fueling is done via temporary tank, the tank should be stored within a bermed area and away from surface waters;

- Spill Kits with absorbent materials shall be available on site for use in cleaning up small spills.
- Where a release containing a hazardous substance in an amount equal to or in excess of a reporting quantity established under CT DEEP Emergency Response and Spill Prevention the permittee is required to notify DEEP at 860-424-3338 or 866-337-7745 and the National Response Center (NRC) at (800) 424-8802 in accordance with the requirements of The DEEP Emergency Response Unit. Refer to the following website for more information on reporting: http://www.ct.gov/deep/cwp/view.asp?a=2692&q=322572&deepNav_GID=1648;
- Immediately after the spill you are required to report facts such as:
    - the location;
    - the quantity and type of substance, material or waste;
    - the date and the cause of the incident;
    - the name and address of the owner; and
    - the name and address of the person making the report and his relationship to the owner.
    - Note: Unless specifically requested, the DEEP does not require a written submission when
    - reporting a spill;

If the hazardous condition involves the release of an EPA regulated material or an oil as defined by the EPA, the release may also need to be reported to the National Response Center. Federal Reporting is required within 15 minutes of event occurrence or discovery. Contact the National Response Center at (800) 424-8802. The NRC is staffed twenty-four hours a day. For more information reference the following website: https://www.epa.gov/emergency-response/when-are-you-required-report-oil-spill-and-hazardous-substance-release.

The table below is a summary of petroleum based spills; refer to federal reportable quantities for additional information.

Table 22: Reportable Spill Quantities

Material	Where Discharged	Reportable Spill Quantities
Petroleum Material	Land	Unknown amount or amounts exceeding federal reportable quantity
Petroleum Material	Water	Enough to create a sheen on water

11.3 Vehicle and Equipment Washing

If necessary, the contractor shall develop a designated wash area with basin containment to prevent the untreated water from discharging from the site to surface waters. BMPs include; temporary basins, inspecting the vehicles and equipment for leaks prior to washing, and prohibiting washing activity until discovered leaks are repaired and maintenance is completed of the equipment or vehicle. The area shall be shown on the site plans and shall be conducted outside of any buffers and at least fifty feet from any stream, wetland or sensitive resource or must be conducted in an entirely self-contained washout system. The water shall be contained and pumped from the site into a truck for proper disposal at a wastewater facility. No overflows can occur during rainfall or snowmelt from the designated areas. No engine degreasing shall be done on site.

11.4 Concrete Washout and Other Washout

The direct discharge of concrete truck washout water to surface waters in the state, including storm sewers and other stormwater treatment facilities shall not occur. The following categories provide potential BMPs for the operator(s) to implement to avoid washout waters from impacting receiving waters.

Mobile Concrete or Mortar Mixers

The following BMPs should be considered with the use of mortar or concrete mixers:

- Store bags of concrete and mortar in dry storage;
- Position mixers fifty feet from the nearest watercourse or conveyance;
- If mixers must be positioned closer than fifty feet from a conveyance and temporary berm shall be installed to prevent runoff from the mixer from flowing into the conveyance;
- Use tarp or plastic sheeting as a liner to prevent concrete or mortar from contacting the soil;
- Use buckets to contain washout / rinse water when cleaning the mobile mixer; and

- Dump buckets of washout water in a designated concrete washout area.

Concrete Washout

The following BMPs and considerations should be implemented for concrete washout areas:

- Washout water from the tools, equipment and the chutes of concrete trucks, mobile mixers or other containers with concrete material must be contained and not allowed to be discharged into waters of the state or drain onto adjacent properties;
- The washout area should be a defined area with signage notifying the contactors of the location and use;
- The washout area should be a sufficient size to contain the expected washout material. 10'x10'x3' area should suffice for most activities;
- Multiple washout areas may be needed. Locations of the washouts should be shown on the construction plans by the contractor;
- When noting the location of the concrete washout areas, include the date of install, date of last maintenance and date of removal;
- The use of thick poly sheeting should be used to prevent contamination of the soil and prevent infiltration of the washout material; and
- The area shall be described on the site plans and shall be conducted outside of any buffers and at least fifty feet from any stream, wetland or sensitive resource or must be conducted in an entirely self-contained washout system.

Once the material is hardened it can be disposed of in a dumpster. If the material is water or not hardened, the material should be vacuumed and hauled off site to be properly disposed of or recycled at a facility. Some sites will not need the separate washout area if a truck chute washout is available from the concrete supplier.

Truck Chute Washout

Where available, all trucks with self-contained washout and water recycle systems must be used for every truck chute, tool and equipment rinse and washout. The truck should be positioned in a flat area away from inlets and surface waters where feasible. The washout of trucks during rain events should be minimized.

11.5 Portable Sanitary Facilities

- All temporary portable sanitary facilities should be managed and maintained with at least the following items considered:
- Locate facilities away from watercourses, streams, creeks and other surface waters or conveyances;
- Facilities should be placed upgradient from perimeter sediment controls and not on paved or other impervious surfaces;
- Secure facilities to the soil with stakes or tether to other non-movable structure to prevent tipping from wind or other factors; and
- Schedule routine and regular cleanout and maintenance of facility from a reliable company.

11.6 Potential Non-stormwater Pollutant Sources and BMPs

Non-stormwater discharges shall be eliminated or reduced to the extent feasible, with the exception of those necessary for the completion of certain construction activities. A list of allowable non-stormwater discharges include the items below.

Table 23: Non-stormwater Discharges and Potential BMPs

Type of Allowable Non-Stormwater Discharge	Likely Site Presence	
	Yes	No

Discharges from emergency firefighting activities		X
Fire hydrant flushing (uncontaminated and not hyper-chlorinated)		X
Waters used to wash vehicles, buildings, structures and pavement (detergents and soaps are not allowed) to remove mud, dirt or dust.	X	
Water used to control dust	X	
Potable water including uncontaminated waterline flushing (not hyper-chlorinated)		X
Uncontaminated air conditioning or compressor condensate		X
Uncontaminated, non-turbid discharges of groundwater, spring water or foundation or footing drains	X	
Landscape Irrigation		X
Pavement wash waters (o spills or leaks or detergent use)	X	
Uncontaminated flows from excavation dewatering activities if operational and structural controls are used		X

These authorized non-stormwater discharges should be conducted in accordance with the requirements of the Construction General Permit (CGP), and every effort should be made to minimize non-stormwater runoff from these site activities.

The operators are responsible to implement the following BMPs and management for non-stormwater discharges.

Waters Used to Wash Vehicles, Buildings, Structures and Pavement (without detergents): Should washing be necessary to remove soil, mud, dirt and / or dust, high powered sprayers with water could be used to clean off accumulated soil and earth materials. The washing should take place within a defined area. Existing BMPs and infiltration will likely control associated water and runoff due to the washing activity. If existing BMPs are overloaded or not functional maintenance or additional perimeter controls (such as silt fence) may be needed at the discretion of the inspector.

Water used for Dust Control: Continuous dust control using water or approved equal shall be provided for all earth stockpiles, earth piled along excavations, surfaces of backfilled trenches and graveled roadway surfaces. THE USE OF CALCIUM CHLORIDE FOR DUST CONTROL SHALL NOT BE ALLOWED During the dry times when dust control is needed the minimal amount of water is anticipated to be absorbed into the soil. If any runoff does occur, the standard BMPs (such as silt fence, mulch and erosion control blanket, inlet controls and stormwater traps) should adequately control the runoff from reaching off-site surface waters.

Uncontaminated Excavation Dewatering: Clean water should be discharged to a vegetated area, ditches or other conveyance via hose. Energy dissipation should be applied to the discharge location to minimize scour. Alternatively, uncontaminated water could be discharged to receiving waters as allowed by local permits and regulations or as long as positive drainage is provided, the water could be discharged into the surrounding areas and allowed to infiltrate or drain along existing drainage patterns provided that the water does not cause flooding, prolonged or damaging inundation, or vegetation damage.

Pavement wash waters (no spills or leaks or detergent use): The use of pavement wash waters should not contribute to sediment discharge, transport or contain runoff contaminated by leaks or spills of hazardous materials. Wash water should be used sparingly and minimize amount used which would result in runoff occurring. Should runoff occur, the typical sediment and erosion control BMPs should be employed to prevent the water from leaving the site, as feasible.

Uncontaminated flows from excavation dewatering activities if operational and structural controls are used: See SWPCP section 10.12 for BMPs and dewatering methods.

11.7 Construction Site Inspection and Maintenance Program

The owner will employ a certified soil scientist to perform weekly erosion and sediment control inspections. Routine repairs or modifications shall be completed by the contractor within 48 hours after direction by the inspector. Emergency repairs shall be completed immediately upon direction by the inspector. Construction activity and all support activities must be routinely inspected (using the inspection form found in Attachment L or an alternative form) within the parameters of the scope and schedule below. The inspector shall be a qualified SWPCP Inspector familiar with the requirements of this SWPCP Plan and the General Permit. This person is delegated by the Permittee and listed in Section 4.3. All inspection scopes outlined below shall be inspected for evidence of, or the potential for, pollutants entering the drainage system and impacts to the receiving waters. Additionally, the inspection shall evaluate the effectiveness of erosion and sediment controls.

Scope of inspections* should include:

- Inspection date;
- Weather information with estimate of beginning of storm event, duration of event, time elapsed since last storm and approximate total rainfall amounts;
- Inspect all disturbed areas;
- Soil stockpile areas;
- Areas used for storage of materials;
- Inspect all structural control measures;
- Description of inadequate BMPs;
- Describe phase of construction;
- Washout areas;
- Locations where vehicles enter or exit the site for evidence of off-site sediment tracking;
- Description of stormwater discharges from the site;
- Water quality monitoring performed during the inspection;
- Rain gauge reading**;
- Maintenance required or corrective actions required including any changes to the SWPCP and implementation dates for such actions; and
- Inspectors name, qualifications, title and signature with certification statement.

**All inspections should be documented and include a statement in the judgment of the inspector conducting the inspection, that the site is either in compliance or out of compliance with the plan and permit. If the site is out of compliance, the report shall include a summary of the remedial actions required to bring the site back into compliance*

***Rainfall amounts should be taken from an onsite rain gauge. The rain gauge should be measured and maintained every twenty-four hours except any non-working Saturday, non-working Sunday and non-working federal holiday.*

11.8 Inspection Personnel Qualifications

The table below summarizes the personnel involved with the project and the related qualifications

commensurate with their tasks.

Table 24: Training Summary

Project Role / Task	Name	Qualifications or Certifications	Expiration Date of Certifications (if applicable)
ESPC Inspector	Ellen Bartlett	PE, CPSWQ	3/18/2021
Delegated/Alternate Inspector	Robert Russo /		

11.9 Inspection Schedule

Table 25: Inspection Schedule

Inspection Type	Scope of Inspection
Initial Plan Implementation Inspection	Within thirty days following commencement of construction activity on site, the permittee shall contact one of the following: (1) appropriate district; or (2) qualified soil erosion and sediment control professional (CPESC) or CT Registered Professional Engineer (PE) to inspect the site at least once and no more than three (3) times during the first 90 days to confirm compliance with the general permit and proper initial implementation or all controls designated in the plan for the initial phase of construction. *See notes below if district personnel is not used for the initial inspection.
Routine Weekly Inspection	Full site inspection with scope as listed above in section 11.7.
Post Storm Event	For storms that end on a weekend, holiday or other time after which normal working hours will not commence within twenty-four hours, an inspection is required within twenty-four hours only for

	storms that equal or exceed 0.5 inches. For storms of less than 0.5 inches, an inspection shall occur immediately upon the start of the subsequent normal working hours.
Reduced Inspection Frequency post temporary or Permanent stabilization	Sites which have been temporary or final stabilized shall be conducted at least once every month for a period of three (3) months

**For sites less than 15 acres, the inspector may not be an employee of the registrant and have no ownership interest of any kind in the project for which the registration is being submitted.*

**For sites greater than 15 acres the inspector may not be an employee of the registrant; a person whom has not engaged in any activities associated with the preparation, planning, designing or engineering of such plan for soil erosion and sediment control or plans for engineered stormwater management systems on behalf of such registrant; and is not under the same employ as any person who engaged in any activities associated with the preparation, planning, designing or engineering of such plans and specification for soil erosion and sediment control or plans and specifications for engineered stormwater management systems on behalf of such registrant; and has no ownership interest of any kind in the project for which the registration is being submitted.*

11.10 Maintenance Schedule

All BMPs should be maintained as soon as feasible but within the time frames listed below unless local regulations dictate more stringent time frames. The BMPs shall be maintained in good and effective operating conditions.

Table 26: Maintenance Schedule

BMP	Observed Condition for Maintenance	Maintenance Interval
All non-functional BMPs	Sediment overtopping, under water, scoured ends, undermined, destroyed, non- functional as designed. etc.	Non-engineered maintenance or replacement items should be completed within twenty-four hours. Engineered maintenance or replacement items should be completed within seven days.
Perimeter Sediment Control	½ full of sediment, flattened to ½ height, driven over, undermined, scoured, moved for access etc.	Non-engineered maintenance or replacement items should be completed within twenty-four hours. Engineered maintenance or replacement items should be completed within seven days.
Inlet or culvert protection BMPs, conveyances, surface waters	Sediment deposition, sediment deltas and accumulation of sediment material.	Non-engineered maintenance or replacement items should be completed within twenty-four hours. Engineered maintenance or replacement items should be completed within seven days.
Temp sed basins and traps; permanent sediment basins	Sediment deposition and accumulation to ½ of the storage volume.	Non-engineered maintenance or replacement items should be completed within twenty-four hours. Engineered maintenance or replacement items should be completed within seven days.
Site exit locations, rock exit pads, other anti-tracking practices	Accumulated sediment in rock or other anti-tracking BMP, tracking of sediment from the site onto paved surfaces	Non-engineered maintenance or replacement items should be completed within twenty-four hours. Engineered maintenance or replacement items should be completed within seven days.
Paved surfaces; adjacent streets	Tracked sediment and soil material from the site hauling or access	Non-engineered maintenance or replacement items should be completed within twenty-four hours. Engineered maintenance or replacement items should be completed within seven days.

11.11 List of Contractors and Subcontractors

All contractors and subcontractors will be notified of the requirement for stormwater management measures during the project. A list of contractors / subcontractors will be maintained. If subcontractors change during the project, the list will be updated accordingly.

Table 27: Contractors and Subcontractors

Company	Name	Contact Number	E-Mail

12.0 IMPAIRED AND TMDL WATERS

12.1 Discharges to Impaired Waters

There are no impaired waterbodies which receiving direct stormwater discharge from the site disturbed area

according to the following website: (Accessed 12/23/2020).

https://portal.ct.gov/DEEP/Water/TMDL/Total-Maximum-Daily-Load

12.2 Additional Control Measures for Impaired Waters

- In lieu of the provisions of "Construction Sequencing" (Section 5(b)(1)(B)(iii)), no more than 5 acres may be disturbed at any one time. For those areas for which construction activity will be temporarily suspended for a period of greater than fourteen days, temporary stabilization measures shall be implemented within 3 days of such suspension of activity. For all areas, permanent stabilization shall be implemented within thirty days of disturbance; or
- There will be no discharge to the impaired water from rain events up to a 2-year, 24-hour rain event while construction activity is occurring.

12.3 Discharges to impaired waters with an established TMDL

There is an approved Total Maximum Daily Load (TMDL) plan for the ultimate receiving waterbody (Naugatuck River Regional Basin E.coli TMDL CT6900-00_06) and impairment according to the following website (accessed 12/23/2020):

https://portal.ct.gov/-/media/DEEP/water/tmdl/CTFinalTMDL/CTTMDLs.pdf

13.0 POST-CONSTRUCTION STORMWATER CONTROLS

13.1 Post Construction Map(s)

- The post construction BMPs are shown on the plans found in Attachment E contain the following information:
- Indicated retention standards for other development (as applicable);
- Drainage patterns and slopes after grading;
- Locations of runoff reduction measures (and if applicable LID BMPs);
- Location of other structural sedimentation / floatable treatment measures;
- Location of velocity dissipation; and
- Drawings and specifications for each stormwater measure.

13.2 Permanent Practices

Post-construction, the ground cover beneath the solar array will be restored to native grass conditions.

13.2.1 Calculations

Refer to the hydrological report competed by CLA Engineers, Inc., dated March 2019. Additionally refer to the "Stormwater Management and Treatment Practices" worksheet in Attachment J of this binder. Each permanent BMP measure has been documented separately using the worksheet.

13.3 Long Term Maintenance Plan

Long term operation and maintenance of the permanent stormwater facilities may include, but not limited to; trash pickup, mowing, vegetation management, and/or intervals of sediment cleanout. The following person, company or entity is responsible for the long term operation and maintenance of the permanent stormwater facilities for the project. The following is a contact person/organization for the long term maintenance of the permanent stormwater facilities on site:

Entity or Organization: Benz Solar, LLC

Contact Name: Steve Broyer

Street address: 222 South 9th Street, Suite 1600

City, state, zip: Minneapolis, MN 55402

Phone number: 612-326-1500

14.0 STORMWATER MONITORING REQUIREMENTS

This permit requires monthly monitoring of nephelometric turbidity in receiving water(s) or outfalls in accordance with this permit for all sites disturbing 5 acres or more. The following procedures constitute guidelines for sampling turbidity.

14.1 Sampling Frequency

- Sampling shall be conducted at least once every month, when there is a discharge of stormwater from the site while construction activity is ongoing, until final stabilization of the drainage area associated with each outfall is achieved.
- Samples are only required during normal working hours as defined in Section 2 of the construction general permit. If sampling is discontinued due to the end of normal working hours, sampling shall resume the following morning or the morning of the next working day following a weekend or holiday, as long as the discharge continues.
- Sampling may be temporarily suspended any time conditions exist that may reasonably pose a threat to the safety of the person taking the sample. Such conditions may include high winds, lightning, impinging wave or tidal activity, intense rainfall or other hazardous condition. Once the unsafe condition is no longer present, sampling shall resume.
- If there is no stormwater discharge during a month, sampling is not required.

14.2 Sample Collection

- All samples shall be collected from discharges resulting from a storm event that occurs at least twenty-four hours after any previous storm event generating a stormwater discharge. Any sample containing snow or ice melt must be identified on the Stormwater Monitoring Report form. Sampling of snow or ice melt in the absence of a storm event is not a valid sample.
- Samples shall be grab samples taken at least three separate times during a storm event and shall be representative of the flow and characteristics of the discharge(s). Samples may be taken manually or by an in-situ turbidity probe or other automatic sampling device equipped to take individual turbidity readings (i.e. not composite). The first sample shall be taken within the first hour of stormwater discharge from the site. In cases where samples are collected manually and the discharge begins outside of normal working hours, the first sample shall be taken at the start of normal working hours.

14.3 Sample Locations

- Sampling is required of all point source discharges of stormwater from disturbed areas except as may be modified for linear projects under subparagraph (ii) below. Where there are two or more discharge points that discharge substantially identical runoff, based on similarities of the exposed soils, slope, and type of stormwater controls used, a sample may be taken from just one of the discharge points. In such case, the permittee shall report that the results also apply to the substantially identical discharge point(s). No more than 5 substantially identical outfalls may be identified for one representative discharge. If such project is planned to continue for more than one year, the permittee shall rotate twice per year the location where samples are taken so that a different discharge point is sampled every six months. The Plan must identify each outfall authorized by this permit and describe the rationale for any substantially identical outfall determinations.
- For a linear project, as defined in Section 2, the protocols of subparagraph (i), above, shall apply except that up to 10 substantially identical outfalls may be identified for one representative discharge.
- All sampling point(s) shall be identified in the Plan and be clearly marked in the field with a flag, stake, or other visible marker.

14.4 Turbidity Values

The stormwater discharge turbidity value for each sampling point shall be determined by taking the average of the turbidity values of all samples taken at that sampling point during a given storm.

14.5 Stormwater Monitoring Reports

Within thirty (30) days following the end of each month, permittees shall enter the stormwater sampling result(s) on the Stormwater Monitoring Report (SMR) form (found in Attachment L) and submit it in accordance with the NetDMR provisions below.

- If there was no discharge during any given monitoring period, the permittee shall submit the form as required with the words “no discharge” entered in place of the monitoring results.

- If the permittee monitors any discharge more frequently than required by this general permit, the results of this monitoring shall be included in additional SMRs for the month in which the samples were collected.
- If sampling protocols are modified due to the limitations of normal working hours or unsafe conditions in accordance with Section 5(c)(1)(A)(ii) or (iii) above, a description of and reason for the modifications shall be included with the SMR.
- If the permittee samples a discharge that is representative of two or more substantially identical discharge points, the permittee shall include the names or locations of the other discharge points.

14.6 NetDMR Reporting Requirements

Unless otherwise approved by the commissioner, the Permittee and/or the Signatory Authority shall electronically submit SMRs required under this permit to the Department using NetDMR in satisfaction of the SMR submission requirements of Sections 5(c)(2)(A) of the construction general permit.

SMRs shall be submitted electronically to the Department no later than the 30th day of the month following the completed reporting period. Any additional monitoring conducted in accordance with 40 CFR 136 shall be submitted to the Department as an electronic attachment to the SMR in NetDMR. NetDMR is accessed from: www.epa.gov/netdmr.

15.0 FINAL STABILIZATION

Final stabilization is achieved for the project when permanent erosion control BMPs are applied to the site. The permanent erosion control BMPs may be a combination of vegetative and no vegetative cover types. Additional requirements to achieving final stabilization include:

- All soil disturbing activity is completed;
- Permanent stormwater treatment system (if required) is constructed and accumulated sediment has been removed from construction activity;
- All temporary, synthetic BMPs have been removed from the site;
- There is no active erosion or sediment present and no disturbed areas remain exposed on site for all phases; and
- The "final stabilization inspection" has been completed (see Section 16.0 below).

16.0 NOTICE OF TERMINATION

Notice of Termination must be filed with the commissioner. This project shall be considered complete after all post construction measures are installed, cleaned, and functioning. The site must also be stabilized for at least three months following the cessation of construction activities. Stabilization for the purposes of the Notice of Termination means there is no active erosion or sedimentation present and no disturbed areas remain exposed for all phases of the project. After the post construction and final stabilization inspections (detailed below) the permittee shall complete the Termination Form (found in Attachment G) and submit to the DEEP.

16.1 Post Construction Inspection

For locally approvable projects, once all post construction stormwater measures have been installed and cleaned of any construction sediment or debris the registrant shall contact the appropriate conservation district or a qualified Soil Erosion and Sediment Control Professional (CPESC) and/or a qualified professional engineer who will inspect the site to confirm compliance with these post construction stormwater measures.

16.2 Final Stabilization Inspection

After three (3) months of stabilized condition, the registrant shall have the site inspected by a qualified inspector to confirm final stabilization is met. The registrant shall indicate compliance with this section in the Notice of Termination Form.

17.0 RECORD RETENTION

During construction: This report, amendments and attachments, inspections, and maintenance records should be kept on site during normal business hours. The records should be kept by the Permittee listed on the Notice of Intent. The records should be in a mailbox, in a vehicle or in an on-site office trailer.

Post construction:

The permittee shall retain copies of the plan and all reports required for complying with the construction general permit. Additionally, all data used to complete the registration for this general permit must be retained for at least a period of five (5) years after the authorization of the Notice of Termination. Records required for retention include but are not limited to:

- SWPCP Narrative;
- Plan sets;
- Inspection and monitoring reports;
- Permitting documentation;
- Maintenance records; and
- Agency correspondences.

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

ANSONIA QUADRANGLE
CONNECTICUT
7.5-MINUTE SERIES

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 18T

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, July 2016 - September 2016
Roads.....U.S. Census Bureau, 2016
Names.....GNIS, 1979 - 2017
Hydrography.....National Hydrography Dataset, 2004 - 2016
Contours.....National Elevation Dataset, 2012
Boundaries.....Multiple sources; see metadata file 2016 - 2017

Wetlands.....FWS National Wetlands Inventory 2010

UTM GRID AND 2017 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
XL
Grid Zone Designation
18T

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

CONNECTICUT
QUADRANGLE LOCATION

1 Southbury
2 Naugatuck
3 Mount Carmel
4 Long Hill
5 New Haven
6 Bridgeport
7 Milford
8 Woodmont
ADJOINING QUADRANGLES

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

ANSONIA, CT
2018

NSN 7643011636009
NGA REF NO. USGSX24K1098

Attachment B

Documentation Related to Coastal Consistency Review (Not applicable)

Attachment C:

Threatened and Endangered Species Form & NDDB Documentation

Connecticut Department of
Energy & Environmental Protection
Bureau of Natural Resources
Wildlife Division

CPPU USE ONLY
App #:_____
Doc #:_____
Check #: No fee required
Program: Natural Diversity Database Endangered Species
Hardcopy _____ Electronic _____

Request for Natural Diversity Data Base (NDDB) State Listed Species Review

Please complete this form in accordance with the instructions (DEEP-INST-007) to ensure proper handling of your request.
There are no fees associated with NDDB Reviews.

Part I: Preliminary Screening & Request Type

Before submitting this request, you must review the most current Natural Diversity Data Base State and Federal Listed Species and Significant Natural Communities Maps found on the DEEP website. These maps are updated twice a year, usually in June and December.

Does your site, including all affected areas, fall in an NDDB Area according to the map instructions?

☐ Yes ☒ No **Enter the date** of the map reviewed for pre-screening: December 2018

This form is being submitted for a:

☒ *New* NDDB request ☐ *Renewal/Extension* of a NDDB Request, ***without*** *modifications and within* ***two years*** *of issued NDDB determination* (no attachments required) *CPPU Use Only - NDDB-Listed Species Determination* 1736	☐ *New* **Safe Harbor Determination** (optional) must be associated with an application for a GP for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities ☐ *Renewal/Extension* of an existing Safe Harbor Determination ☐ With modifications ☐ Without modifications (no attachments required) *CPPU Use Only - NDDB-Safe Harbor Determination* 1736
Enter NDDB Determination Number for Renewal/Extension	Enter Safe Harbor Determination Number for Renewal/Extension

Part II: Requester Information

If the requester is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of State. If applicable, the name shall be stated **exactly as it is registered with the Secretary of State. Please note, for those entities registered with the Secretary of State, the registered name will be the name used by DEEP. This information can be accessed at the Secretary of the State's database CONCORD.* (www.concord-sots.ct.gov/CONCORD/index.jsp)

If the requester is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).

If there are any changes or corrections to your company/facility or individual mailing or billing address or contact information, please complete and submit the Request to Change company/Individual Information to the address indicated on the form.

1. Requester*

Company Name: Windham Solar LLC

Contact Name: Blake Nicholson

Address: 222 South Ninth St., Suite 1600

City/Town: Minneapolis State: MN Zip Code: 55402

Business Phone: (612) 655-9737 ext.

E-mail: blake.nicholson@ecosrenewable.com

By providing this email address you are agreeing to receive official correspondence from the department, at this electronic address, concerning this request. Please remember to check your security settings to be sure you can receive emails from .ct.gov addresses. Also, please notify the department if your e-mail address changes

a) Requester can best be described as:

☐ Individual ☐ Federal Agency ☐ State agency ☐ Municipality ☐ Tribal

☒ business entity (if a business entity complete i through iii)

i) Check type ☐ corporation ☒ limited liability company ☐ limited partnership ☐ limited liability partnership ☐ statutory trust ☐ Other

ii) Provide Secretary of the State Business ID: 1158009 This information can be accessed at the Secretary of the State's database (CONCORD). (www.concord-sots.ct.gov/CONCORD/index.jsp)

iii) ☐ Check here if your business is **NOT** registered with the Secretary of State's office.

b) Acting as (Affiliation), pick one:

☐ Property owner ☐ Consultant ☐ Engineer ☐ Facility owner ☒ Applicant

☐ Biologist ☐ Pesticide Applicator ☐ Other representative

2. List Primary Contact to receive Natural Diversity Data Base correspondence and inquiries, if different from requester.

Company Name:

Contact Person: Title:

Mailing Address:

City/Town: State: Zip Code:

Business Phone: ext.

E-mail:

Part III: Site Information

This request can only be completed for one site. A separate request must be filed for each additional site.

1. SITE NAME AND LOCATION

Site Name or Project Name: Benz Solar

Town(s): Ansonia

Street Address or Location Description:

Size in acres, or site dimensions: 11.75 acres

Latitude and longitude of the center of the site in decimal degrees (e.g., 41.23456 -71.68574):

Latitude: 41.3436 Longitude: -73.0607

Method of coordinate determination (check one):

☐ GPS ☐ Photo interpolation using CTECO map viewer ☒ Other (specify): Google earth

2a. Describe the current land use and land cover of the site.
There is one house on the property, the remainder of the site is forested.

b. Check all that apply and enter the size in acres or % of area in the space after each checked category.

☐ Industrial/Commercial _____	☒ Residential 0.5	☒ Forest 10.25
☐ Wetland _____	☒ Field/grassland 1	☐ Agricultural _____
☐ Water _____	☐ Utility Right-of-way _____	
☐ Transportation Right-of-way _____	☐ Other (specify): _____	

Part IV: Project Information

1. PROJECT TYPE:

Choose Project Type: Choose Type From Dropdown List , If other describe: Solar Energy Facility

2. Is the subject activity limited to the maintenance, repair, or improvement of an existing structure within the existing footprint: ☐ Yes ☒ No If yes, explain.

Part IV: Project Information (continued)

3. Give a detailed description of the activity which is the subject of this request and describe the methods and equipment that will be used. Include a description of steps that will be taken to minimize impacts to any known listed species.

   Site preparation for the solar energy project will include clearing of vegetation within the project area, in addition to minimal surface grading required to install the access road and for stormwater management. Other site preparation activites include survey/staking, stabilization, installation of perimiter security fence, and trenching for underground conduit. Construction of the solar energy facility will involve driving steel h-beams into the ground to support the racking system. The solar photovoltaic panels will be mounted upon the racking system. Underground electric cabling and wiring will be laid in order to collect energy from the modules and deliver it to the electrical grid. Protective devices such as fuses, switches, and breakers will also be installed. Following construction of the facility, final landscaping and ground cover stabilization will be performed. If water is required for dust control, that water will be applied regularly by water trucks. Once operational, the project will require minimal maintenance consisting of 2-3 site visits per month by a single truck crew to perform equipment and landscaping maintenance.

   The project site does not fall within an NDDB area as indicated by the map.

4. If this is a renewal or extension of an existing Safe Harbor request *with* modifications, explain what about the project has changed.

5. Provide a contact for questions about the project details if different from Part II primary contact.

   Name

   Phone

   E-mail

Part V: Request Requirements and Associated Application Types

Check *one* box from either Group 1, Group 2 *or* Group 3, indicating the appropriate category for this request.

Group 1. If you check one of these boxes, complete Parts I – VII of this form and submit the required attachments A and B.

- ☐ Preliminary screening was negative but an NDDB review is still requested
- ☐ Request regards a municipally regulated or unregulated activity (no state permit/certificate needed)
- ☐ Request regards a preliminary site assessment or project feasibility study
- ☐ Request relates to land acquisition or protection
- ☐ Request is associated with a *renewal* of an existing permit or authorization, with no modifications

Group 2. If you check one of these boxes, complete Parts I – VII of this form and submit required attachments A, B, *and* C.

- ☒ Request is associated with a *new* state or federal permit or authorization application or registration
- ☐ Request is associated with modification of an existing permit or other authorization
- ☐ Request is associated with a permit enforcement action
- ☐ Request regards site management or planning, requiring detailed species recommendations
- ☐ Request regards a state funded project, state agency activity, or CEPA request

☐ **Group 3.** If you are requesting a **Safe Harbor Determination**, complete Parts I-VII and submit required attachments A, B, and D. Safe Harbor determinations can only be requested if you are applying for a GP for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

If you are filing this request as part of a state or federal permit application(s) enter the application information below.

Permitting Agency and Application Name(s):
Connecticut Siting Council - Benz Solar Project

Related State DEEP Permit Number(s), if applicable: _____

State DEEP Enforcement Action Number, if applicable: _____

State DEEP Permit Analyst(s)/Engineer(s), if known: _____

Is this request related to a previously submitted NDDB request? ☐ Yes ☒ No

If yes, provide the previous NDDB Determination Number(s), if known: _____

Part VI: Supporting Documents

Check each attachment submitted as verification that *all* applicable attachments have been supplied with this request form. Label each attachment as indicated in this part (e.g., Attachment A, etc.) and be sure to include the requester's name, site name and the date. **Please note that Attachments A and B are required for all new requests and Safe Harbor renewals/extensions with modifications.** Renewals/Extensions with no modifications do not need to submit any attachments. Attachments C and D are supplied at the end of this form.

☒ Attachment A	**Overview Map:** an 8 1/2 X 11 print/copy of the relevant portion of a USGS Topographic Quadrangle Map clearly indicating the exact location of the site.
☒ Attachment B	**Detailed Site Map:** fine scaled map showing site boundary and area of work details on aerial imagery with relevant landmarks labeled. (Site and work boundaries in GIS ESRI ArcView shapefile, in NAD83, State Plane, feet format can be substituted for detailed maps, see instruction document)
☒ Attachment C	**Supplemental Information, Group 2 requirement (attached, DEEP-APP-007C)** ☐ Section i Supplemental Site Information and supporting documents ☐ Section ii Supplemental Project Information and supporting documents
☐ Attachment D	**Safe Harbor Report Requirements, Group 3 (attached, DEEP-APP-007D)**

Part VII: Requester Certification

The requester *and* the individual(s) responsible for actually preparing the request must sign this part. A request will be considered incomplete unless all required signatures are provided.

I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of the individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief.

Blake Nicholson	January 9, 2019
Signature of Requester (a typed name will substitute for a handwritten signature)	Date
Blake Nicholson	Analyst
Name of Requester (print or type)	Title (if applicable)
Signature of Preparer (if different than above)	Date
Name of Preparer (print or type)	Title (if applicable)

Note Please submit the completed Request Form and all Supporting Documents to

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENERGY ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Or email request to **deep.nddbrequest@ct.gov**

Attachment C: Supplemental Information, Group 2 requirement

Section i: Supplemental Site Information

1. Existing Conditions

Describe all natural and man-made features including wetlands, watercourses, fish and wildlife habitat, floodplains and any existing structures potentially affected by the subject activity. Such features should be depicted and labeled on the site plan that must be submitted. Photographs of current site conditions may be helpful to reviewers.

☐ **Site Photographs (optional) attached**

☒ **Site Plan/sketch of existing conditions attached**

2. Biological Surveys

Has a biologist visited the site and conducted a biological survey to determine the presence of any endangered, threatened or special concern species ☐ Yes ☒ No

If yes, complete the following questions and submit any reports of biological surveys, documentation of the biologist's qualifications, and any NDDB survey forms.

Biologist(s) name: _____

Habitat and/or species targeted by survey: _____

Dates when surveys were conducted: _____

☐ **Reports of biological surveys attached**

☐ **Documentation of biologist's qualifications attached**

☐ **NDDB Survey forms for any listed species observations attached**

Section ii: Supplemental Project Information

1. Provide a schedule for all phases of the project including the year, the month and/or season that the proposed activity will be initiated and the duration of the activity.

   Site preparation activities (reference Part IV Project Information) would last one month. Construction of the Project will take approximately two months, and systems testing an additional month. Site preparation will commence in April 2020 and systems testing will conclude July 2020.

2. Describe and quantify the proposed changes to existing conditions and describe any on-site or off-site impacts. In addition, provide an annotated site plan detailing the areas of impact and proposed changes to existing conditions.

   The Project will consist of two (2) 1.0MW AC solar photovoltaic facilities, with each facility requiring an area slightly less than four acres. Please reference the annotated site plan for areas of impact of and proposed changes of existing conditions.

☒ **Annotated Site Plan attached**

Attachment D: Safe Harbor Report Requirements

Submit a report, as Attachment D, that synthesizes and analyzes the information listed below. Those providing synthesis and analysis need appropriate qualifications and experience. A request for a safe harbor determination shall include:

1. **Habitat Description and Map(s), including GIS mapping overlays, of a scale appropriate for the site, identifying:**

   - wetlands, including wetland cover types;
   - plant community types;
   - topography;
   - soils;
   - bedrock geology;
   - floodplains, if any;
   - land use history; and
   - water quality classifications/criteria.

2. **Photographs** - The report should include photographs of the site taken from the ground and also all reasonably available aerial or satellite photographs and an analysis of such photographs.

3. **Inspection** - A visual inspection(s) of the site should be conducted, preferably when the ground is visible, and described in the report. This inspection can be helpful in confirming or further evaluating the items noted above.

4. **Biological Surveys** - The report should include all biological surveys of the site where construction activity will take place that are reasonably available to a registrant. A registrant shall notify the Department's Wildlife Division of biological studies of the site where construction activity will take place that a registrant is aware of but are not reasonably available to the registrant.

5. **Based on items #1 through 4 above, the report shall include a Natural Resources Inventory of the site of the construction activity.** This inventory should also include a review of reasonably available scientific literature and any recommendations for minimizing adverse impacts from the proposed construction activity on listed species or their associated habitat.

6. **In addition, to the extent the following is available at the time a safe harbor determination is requested, a request for a safe harbor determination shall include and assess:**

   - Information on Site Disturbance Estimates/Site Alteration information
   - Vehicular Use
   - Construction Activity Phasing Schedules, if any; and
   - Alteration of Drainage Patterns

Natural Diversity Data Base Areas

ANSONIA, CT

December 2018

State and Federal Listed Species & Significant Natural Communities

Town Boundary

NOTE: This map shows general locations of State and Federal Listed Species and Significant Natural Communities. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDB) from a number of data sources . Exact locations of species have been buffered to produce the general locations. Exact locations of species and communities occur somewhere in the shaded areas, not necessarily in the center. A new mapping format is being employed that more accurately models important riparian and aquatic areas and eliminates the need for the upstream/downstream searches required in previous versions.

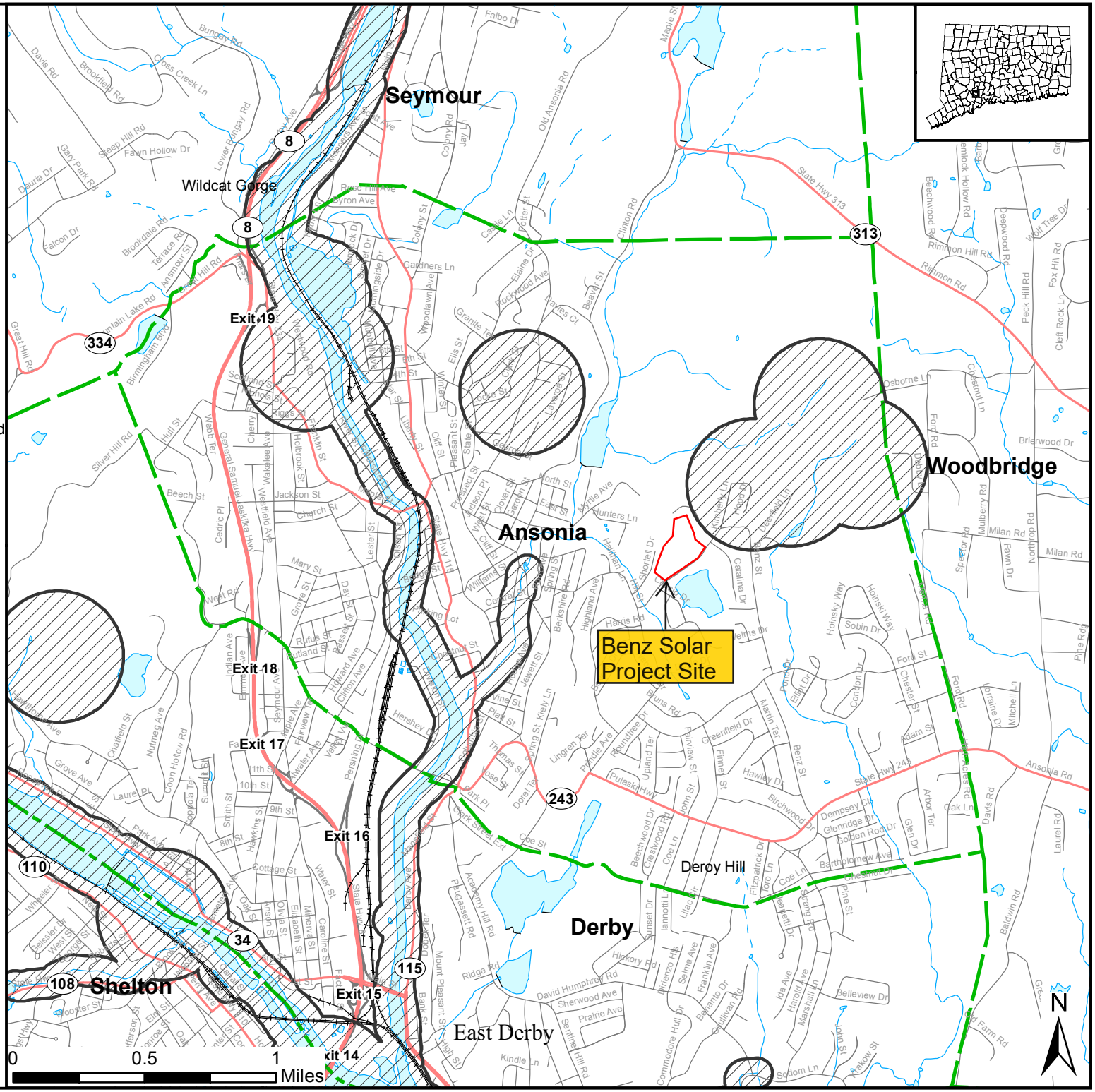
This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas. If the project is within a shaded area there may be a potential conflict with a listed species. For more information, complete a Request for Natural Diversity Data Base State Listed Species Review form (DEP-APP-007), and submit it to the NDDB along with the required maps and information. More detailed instructions are provided with the request form on our website.

www.ct.gov/deep/nddbrequest

Use the CTECO Interactive Map Viewers at www.cteco.uconn.edu to more precisely search for and locate a site and to view aerial imagery with NDDB Areas.

QUESTIONS: Department of Energy and Environmental Protection (DEEP)
79 Elm St., Hartford CT 06106
Phone (860) 424-3011

Connecticut Department of Energy & Environmental Protection
Bureau of Natural Resources
Wildlife Division



Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

May 17, 2021

Blake Nicholson
Windam Solar LLC
222 S 9th St, Suite 1600
Minneapolis, MN 55402
blake.nicholson@ecosrenewable.com

NDDB DETERMINATION NUMBER: 202105024

Project: Benz Solar - Solar Energy Facility -31 Benz St., Ansonia, CT

Expiration: May 17, 2023

I have reviewed Natural Diversity Data Base (NDDB) maps and files regarding this project. According to our records, there are State-listed species (RCSA Sec. 26-306) documented nearby the proposed project area.

- **Eastern box turtle (*Terrapene carolina carolina*)- State Special Concern**

In Connecticut, these turtles are found in well-drained forest bottomlands and a matrix of open deciduous forests, early successional habitat, fields, gravel pits, and or powerlines. Turtles are dormant between November 1 and April 1 and hibernate in only a few inches from the surface in forested habitat.

The greatest threat to this species is habitat loss, fragmentation, and degradation due to development. This species is very sensitive to adult mortality because of late maturity (10 years old) and long life span (50-100years). Vehicular traffic, heavy equipment used for farming, and ATV use in natural areas are implicated specifically in adult mortality through collisions. Illegal collection by the pet trade and unknowing public for home pets exacerbates mortality rates and removes important individuals from the population. Predation rates are also unnaturally high because of increased predator populations (e.g. skunks, foxes, raccoons, and crows) that surround developed areas.

Construction protection measures:
Land disturbance activities that will crush active turtles or unearth/or crush hibernating turtles or nests need to consider local habitat features and apply fencing and/or time of year restrictions as appropriate. We recommend you consult with a herpetologist familiar with preferred habitats to assist you with proper techniques to ensure the best protection strategies are employed for your site.

If land disturbance will occur in open fields, early successional habitat, sandy open patches nearby wetland features, and sandy roads and roadsides or other potential nesting areas designated by a qualified herpetologist you will need to take precautions to prevent female turtles from entering work area and setting up nests. This fencing would need to be in place before May 15.

If land disturbance will occur in forested habitat you will need to take precautions to avoid crushing hibernating adults.

- Restrict your land disturbance activities in forested habitat to the turtle active season (conduct land disturbance activities between April 1- November 1).

When working in the upland between April 1- November 1:

- Exclusionary practices will be required to prevent any turtle access into construction areas. These measures will need to be installed at the limits of disturbance as shown on the plans.
- Exclusionary fencing be at least 20 inches tall and must be secured to and remain in contact with the ground and be regularly maintained (at least bi-weekly and after major weather events) to secure any gaps or openings at ground level that may let animal pass through.
- Prior to construction, all turtles occurring within fencing work area will be relocated to suitable habitat outside disturbance area. This should be performed by a qualified professional familiar with habitat requirements and behavior of the species.
- The Contractor must search the work area each morning prior to any work being done.
- All construction personnel working within the turtle habitat must be apprised of the species description and the possible presence of a listed species.
- Any turtles encountered within the immediate work area shall be carefully moved to an adjacent area outside of the excluded area and fencing should be inspected to identify and remove access point. These animals are protected by law and no turtles should be relocated from the site.
- In areas where silt fence is used for exclusion, it shall be removed as soon as the area is stable to allow for reptile and amphibian passage to resume.
- No heavy machinery or vehicles may be parked in any turtle habitat.
- Special precautions must be taken to avoid degradation of wetland habitats including any wet meadows and seasonal vernal pools.

Site Management protection measures:

Mowing is major source of human induced adult turtle mortality.

- Avoid mowing or vehicular traffic during peak use by this species (May 15-Sept 15)

Use these additional techniques to minimize impact, especially if you need to mow during peak use times:

- Mowing style: Avoid flail mower heads with guide bars that ride along the ground. Sickle bar mowers will have the least impact if mowing every 1-5 years. In areas with more woody vegetation >1-2" diameter Brontosaurus-style mower will likely have the least impact on turtles.
- Mowing height: If mowing during active season, retention of mowing stubble to 7-12 inches will reduce mortality, reduce blade wear, and will leave important cover for animals.
- Directionality - If mowing during the active season is necessary, start mowing from the center of the field and use a back-and-forth approach, or large circular pattern, to avoid concentrating fleeing animals where they may be killed or stranded. In addition, leave an unmowed 30 ft strip around the perimeter of the field and mow this area last. Most turtles are found in these areas and this provides time for them to react to the mowing activity and move out of the area.
    - If field is near stream: start mowing the side furthest from stream and work towards stream.
    - If field is bordered by woodland: start mowing side furthest from woodland and work towards woodland.
    - If field is bordered by road, start mowing next to the road and work your way across field.
- Mower Speed – Mowing in low gear or at slow speeds will allow turtles to react and move out of the field.
- Unmowed Edge - Leaving an unmowed field edge in high turtle use areas until after September 15th.

Site Design Recommendations:
If planned properly, you can increase the value of the habitat for wildlife and state listed species with your development.

- **Create a site management plan to promote native vegetation growth in the area under the solar panels.** Restoring native vegetation will attract pollinators and avoid the need for constant mowing. Reduced need for mowing will reduce the risk for turtles.
- Provide habitat for wildlife and allow for connectivity for wildlife movement. Use wildlife-friendly fencing to allow movement through the solar development.

This is determination is valid for two years.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Bureau of Natural Resources and cooperating units of DEEP, independent conservation groups, and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the NDDB should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated in the NDDB as it becomes available.

Please contact me if you have any questions (shannon.kearney@ct.gov). Thank you for consulting with the Natural Diversity Data Base and continuing to work with us to protect State-listed species.

Sincerely,

/s/ Shannon B. Kearney
Wildlife Biologist

Attachment D

Conservation or Preservation

Restriction Information (SHPO Response)

Submit by Email | Print Form

Department of Economic and Community Development | Connecticut still revolutionary

State Historic Preservation Office

One Constitution Plaza | Hartford, CT 06103 | 860.256.2800 | Cultureandtourism.org

PROJECT REVIEW COVER FORM

1. This information relates to a previously submitted project. ☐

You do not need to complete the rest of the form if you have been previously issued a SHPO Project Number. Please attach information to this form and submit.

SHPO Project Number _____
(Not all previously submitted projects will have project numbers)

Project Address _____
(Street Address and City or Town)

2. This is a new Project. ☒

If you have checked this box, it is necessary to complete ALL entries on this form .

Project Name Benz Solar

Project Location 31 Benz St
Include street number, street name, and or Route Number. If no street address exists give closest intersection.

City or Town Ansonia
In addition to the village or hamlet name (if appropriate), the municipality must be included here.

County New Haven
If the undertaking includes multiple addresses, please attach a list to this form.

Date of Construction (for existing structures)_____

PROJECT DESCRIPTION SUMMARY (include full description in attachment):

The Benz Solar project is a 2.0MW (AC) solar photovoltaic facility utilizing a ground mount, fixed-tilt array. The Project will convert solar radiation into electricity. The solar modules will be ground-mounted upon a steel and aluminum racking structure, which will be in a fixed position. The Project will include a gravel access drive and metering equipment necessary to interconnect the Project to the electrical grid. Please reference the Site Plan for further details.

TYPE OF REVIEW REQUESTED

a. Does this undertaking involve funding or permit approval from a State or Federal Agency?

☒ Yes ☐ No

Agency Name/Contact	Type of Permit/Approval	State	Federal
Connecticut Siting Council	Petition for Declaratory Ruling	☒	☐
		☐	☐
		☐	☐

	Yes	No
b. Have you consulted the SHPO and UCONN Dodd Center files to determine the presence or absence of previously identified cultural resources within or adjacent to the project area?	☐	☒
If yes: Was the project site wholly or partially located within an identified archeologically sensitive area?	☐	☐
Does the project site involve or is it substantially contiguous to a property listed or recommended for listing in the CT State or National Registers of Historic Places?	☐	☐
Does the project involve the rehabilitation, renovation, relocation, demolition or addition to any building or structure that is 50 years old or older?	☐	☐

Department of Economic and Community Development
Connecticut still revolutionary

State Historic Preservation Office

One Constitution Plaza | Hartford, CT 06103 | 860.256.2800 | Cultureandtourism.org

PROJECT REVIEW COVER FORM

The Historic Preservation Review Process in Connecticut Cultural Resource Review under the National Historic Preservation Act – Section 106 http://www.achp.gov/106summary.html involves providing technical guidance and professional advice on the potential impact of publicly funded, assisted, licensed or permitted projects on the state's historic, architectural and archaeological resources. This responsibility of the State Historic Preservation Office (SHPO) is discharged in two steps: (1) identification of significant historic, architectural and archaeological resources; and (2) advisory assistance to promote compatibility between new development and preservation of the state's cultural heritage.

Project review is conducted in two stages. First, the SHPO assesses affected properties to determine whether or not they are listed or eligible for listing in the Connecticut State or National Registers of Historic Places. If so, it is deemed "historic" and worthy of protection and the second stage of review is undertaken. The project is reviewed to evaluate its impact on the properties significant materials and character. Where adverse effects are identified, alternatives are explored to avoid, or reduce project impacts; where this is unsuccessful, mitigation measures are developed and formal agreement documents are prepared stipulating these measures. For more information and guidance, please see our website at: http://www.cultureandtourism.org/cct/cwp/view.asp?a=3933&q=293820

ALL PROJECTS SUBMITTED FOR REVIEW MUST INCLUDE THE FOLLOWING MATERIALS*:

☒ **PROJECT DESCRIPTION** Please attach a full description of the work that will be undertaken as a result of this project. Portions of environmental statements or project applications may be included. The project boundary of the project should be clearly defined**

☒ **PROJECT MAP** This should include the precise location of the project – preferably a clear color image showing the nearest streets or roadways as well as all portions of the project. Tax maps, Sanborn maps and USGS quadrangle maps are all acceptable, but Bing and Google Earth are also accepted if the information provided is clear and well labeled. The project boundary should be clearly defined on the map and affected legal parcels should be identified.

☒ **PHOTOGRAPHS** Clear, current images of the property should be submitted. Black and white photocopies will not be accepted. Include images of the areas where the proposed work will take place. May require: exterior elevations, detailed photos of elements to be repaired/replaced (windows, doors, porches, etc.) All photos should be clearly labeled.

For Existing Structures	Yes	N/A	Comments
Property Card	☐	☒	
For New Construction	**Yes**	**N/A**	**Comments**
Project plans or limits of construction (if available)	☒	☐	
If project is located in a Historic District include renderings or elevation drawings of the proposed structure	☐	☒	
Soils Maps http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm	☒	☐	
Historic Maps http://magic.lib.uconn.edu/	☒	☐	
For non-building-related projects (dams, culverts, bridge repair, etc)	**Yes**	**N/S**	**Comments**
Property Card	☐	☐	
Soils Map (see above)	☐	☐	
Historic Maps (see above)	☐	☐	

	Above	Date	Below	Date
Indicate date of Review and Initials of Reviewer				

PROJECT CONTACT

Name Blake Nicholson Title Analyst
Firm/Agency Ecos Energy
Address 222 South Ninth St, Suite 1600
City Minneapolis State MN Zip 55402
Phone (612) 655-9737 Cell (612) 655-9737 Fax
Email blake.nicholson@ecosrenewable.com

*Note that he SHPO's ability to complete a timely project review depends largely on the quality of the materials submitted.
** Please be sure to include the project name and location on *each page* of your submission.

Department of Economic and Community Development

Connecticut
still revolutionary

State Historic Preservation Office

One Constitution Plaza | Hartford, CT 06103 | 860.256.2800 | Cultureandtourism.org

PROJECT REVIEW COVER FORM

SHPO USE ONLY

Based on our review of the information provided to the State Historic Preservation Office, it is our opinion that:

☐ No historic properties will be affected by this project. No further review is requested.

☐ This project will cause no adverse effects to the following historic properties. No further review is requested:

☐ This project will cause no adverse effects to the following historic properties, conditional upon the stipulations included in the attached letter:

☐ Additional information is required to complete our review of this project. Please see the attached letter with our requests and recommendations.

☐ This project will adversely affect historic properties as it is currently designed or proposed. Please see the attached letter for further details and guidance.

Daniel T. Forrest — Date
Deputy State Historic Preservation Officer

Connecticut
still revolutionary

Department of Economic and Community Development

State Historic Preservation Office

February 7, 2019

Mr. Blake Nicholson
Analyst
Ecos Energy
222 South Ninth Street, Suite 1600
Minneapolis, MN 55402

Subject: Benz Solar
31 Benz
Ansonia, CT
ENV-19-0230

Dear Mr. Nicholson:

The State Historic Preservation Office (SHPO) has reviewed your request for information concerning the potential effects to historic properties associated with the referenced project. SHPO understands that the proposed solar facility will consist of post mounded fixed-tilt solar panels, along with ancillary equipment, encompassing an approximately 13.5 acre parcel, located at 31 Benz Street, Ansonia, Connecticut. The proposed activities are subject to review by this office pursuant to the Connecticut Environmental Policy Act (CEPA).

No properties listed or determined eligible for listing in the National Register of Historic Places are located within 0.5 miles of the project area. One previously identified archaeological site is within 0.5 miles of the project area; however, it will not be impacted by the proposed undertaking.

Soil types in the area of the proposed facility indicate rocky soils removed from fresh water sources. As such, the area possesses a low potential to contain intact archaeological resources.

Based on the information provided to our office, SHPO concurs that no historic properties will be affected by the construction of the facility.

This office appreciates the opportunity to review and comment upon this project. These comments are provided in accordance with the Connecticut Environmental Policy Act. For additional information, please contact Marena Wisniewski, Environmental Reviewer, at (860) 500-2357 or marena.wisniewski@ct.gov.

Sincerely,

Catherine Labadia
Deputy State Historic Preservation Officer

Attachment E

Vernal Pool Management Plan &

Wetland Delineation Report

CLA Engineers, Inc.
Civil • Structural • Survey

317 MAIN STREET • NORWICH, CT 06360 • (860) 886-1966 • (860) 886-9165 FAX

September 16, 2020

Steve Broyer
ECOS Energy
222 S. 9th Street
Minneapolis, MN 55402

RE: Vernal Pool Management Plan
CLA #6340

Dear Steve:

This document is intended to supplement the Wetland Report previously provided by Davison Environmental and to provide recommendations to avoid, minimize and mitigate potential impacts to a potential Vernal Pool located on the Benz Solar site in Ansonia CT . The Davison report is appended to this document to provide descriptive information regarding the nature of the wetland and on-site soils.

POTENTIAL VERNAL POOL HABITAT

It should be noted that Vernal Pool Assessments have not been conducted on this site. Neither Davison Environmental nor CLA Engineers was on-site during the spring months when direct evidence (breeding amphibians or egg masses) would be present. However, based on the photographs in the attached Davison report and CLA's field reconnaissance conducted in September of 2020, the following indicators of potential vernal pool habitat were noted:

1. The Davison report shows standing water on the site in January of 2019. Based on CLA's subsequent field investigation of staining on trees on rocks, this water reaches a seasonal depth of approximately 18-20 inches.
2. During CLA's field investigation there was no standing water and no perennial inlet or outlet.
3. A distinct depression existing within the delineated wetland system. This depression is shown on attached Figure 1.
4. The soils within the depression (As of September 2020) were organic rich and support only herbaceous species that are tolerant of long term wetness, or those that grow later in the summer when standing water is absent.
5. There is adequate wooded upland and wetland on and off the site to support vernal pool breeding species such as spotted salamander and wood frog.

6. Also noted during the investigation was an eastern box turtle in the wetland near flag # 27. This document includes consideration of protection for that species.

In summary, CLA believes that due to the hydrology and habitat present, there is a high likelihood that the delineated depression supports breeding of vernal pool obligate species and it should be treated as such.

Note that during the field investigation CLA was able to use wet season photographs from the Davison Report to correlate to the stains on the trees and rocks to accurately determine the edge of the potential vernal pool.

POTENTIAL VERNAL POOL IMPACTS

This information is based on the attached Figure 1.

VERNAL POOL DEPRESSION #2

As designed no activity is proposed with the Vernal Pool depression.

VERNAL POOL ENVELOPE (VPE)

Vernal Pool Envelope: 1.7 acres
Developed 0.0 ac., 0.0% of VPE (Wooded upland and wetland)

As designed there is no activity proposed within the VPE.

VERNAL POOL CRITICAL TERRRESTRIAL HABITAT (CTH)

Existing Critical Terrestrial Habitat: 46.9 acres
Wooded 31.7 ac., 67.6% of CTH
Developed area: 15.2ac 34.2% of CTH
(Impervious 4.7 ac., 10.0% of CTH)
Proposed Critical Terrestrial Habitat (Post Development): 46.9 acres
Wooded/Wetland: 22.4 ac., 47.8 % of CTH
Developed area: 24.5 ac., 52.2 % of CTH
(Impervious: 5.0 ac., 10.7% of CTH)[1]

[1] As cited in the literature, less than 25 to 30% development within the CTH is desired to avoid diminution of amphibian populations. Alterations to surface and near surface hydrology are not anticipated due to the lack of grading or other soil disturbances that may impact the direction or quantities or runoff.

Best Management Practices and Recommendations

As proposed, no solar panels or development, are within 100 feet of the Vernal Pool.

The CTH is being reduced by the placement of the solar panels**.** However, the CTH for the vernal pool currently exceeds the threshold of less than 25% of the CTH being developed, per the Calhoun and Klemens (2002) assessment methodology**.** Therefore it is possible that the vernal pool function may already be diminished. Note that much of the areas to be occupied by solar panels is currently m own as lawn as shown on Figure 1.

It should be noted that the reduction of CTH is based on considering solar panel array areas as "developed" land, which is unsuitable for amphibians. However, these areas will not be maintained as a typical lawn, which is excluded by the BDP as suitable habitat. They will be seeded to low, grasses suitable for grazing. Therefore, these areas will not prohibit movement of vernal pool amphibians as they move between habitats or disperse, as would a manicured lawn.

Erosion and Sedimentation Control

Seasonal restrictions will be required on the project to protect and accommodate migrating amphibians and box turtles. An Environmental Monitor be used to implement and monitor the project with specific goals of protection of amphibian and box turtle populations. The Environmental Monitor will inspect the site once per week during the period March 1 Through May 15th during construction to ensure that the proper measures for amphibian protection are in place and functioning as intended The Environmental Monitor will be responsible for the managing following aspects of erosion and sedimentation control measures.

a. Erosion control mattings have been specified for slopes greater than three to one and within swales. Plastic netting can trap and entangle wildlife, and erosion control blankets should be limited to those products that have biodegradable or woven fibers or mechanically bound fibers that do not include plastic nettings. The specified matting is a biodegradable product manufactured by North American Green (S150BN) which meets this criteria.

b. The Environmental Monitor will inspect all E&S measures to ensure that they comply with the plans and modify as necessary to accommodate concerns for amphibian passage.

c. Silt fencing is a barrier to herptile movements and will be used where exclusion of amphibian species is desired. As a result, the project plans employ silt fence for the perimeter of the site that faces the potential vernal

pool. Silt fencing willbe used to deflect migrating amphibians and box turtles from active work zones. In particular, per the Environmental Monitor, silt fence will be installed around the sediment traps/storm water basins during the amphibian migratory period in order to exclude them.

d. Signs will be posted along the inside silt fence barrier requiring that working move any turtles found to the outside of the barrier and report to the Environmental Monitor.

e. During March 1 to May 15, on mornings after a rainfall, the Environmental Monitor will perform sweeps of hard barriers and relocate any herpetofauna.

f. No vehicles or construction activities are to occur outside of barriers. The monitor will conduct weekly inspections to ensure this.

g. The monitor will also inspect to confirm that no Petroleum and Hazardous Materials storage occurs on site.

h. The monitor will provide weekly reports to ECOS during the period from March 1 to May 15.

If you have any questions, or require additional information, please call me at (860) 886-1966.

Very truly yours,

Robert C Russo

Robert C. Russo.
Soil Scientist

APPENDIX

DAVISON ENVIRONMENTAL

Biodiversity Studies • Wetland Delineation & Assessment • Habitat Management • GIS Mapping • Permitting • Forestry

January 17, 2019

Godfrey, Hoffman, Hodge, LLC
Attention: Adam Hoffman
26 Broadway
North Haven, CT 06473

RE: Wetland Delineation, 31 Benz Street, Ansonia

Mr. Hoffman,

At your request, I conducted an inspection on the above-referenced property on January 16, 2019. The purpose of the inspection was to delineate Connecticut jurisdictional wetlands and watercourses. The inspection was conducted by a soil scientist according to the requirements of the Connecticut Inland Wetlands and Watercourses Act (P.A. 155). Wetlands are defined as areas of poorly drained, very poorly drained, floodplain, and alluvial soils, as delineated by a soil scientist.

Wetlands were delineated by examining the upper 20" of the soil profile with a spade and auger. Those areas meeting the requirements noted above were marked with pink flagging tape and wire stake flags and numbered with the following sequence: WF 1 – 39. A wetland delineation sketch map is attached for reference.

The delineated area is a seasonally flooded, forested wetland located along the west property boundary and extending off-site to the west. Wetland hydrology appears to be driven primarily by groundwater discharge/seeps originating from extremely stony uplands adjacent to the wetland. Representative photos of the delineated wetland are attached for reference.

Digitally available updated soil survey information was obtained from the Natural Resources Conservation Service (attached for reference). The following is a description of wetland and upland soil types.

Wetland Soil Types

Wetland soils are comprised of Ridgebury, Leicester, and Whitman soils (Map Unit 3 – not shown). The Ridgebury series consists of very deep, somewhat poorly and poorly drained soils formed in glacial till derived mainly from granite, gneiss and schist. They are nearly level to gently sloping soils in low areas in uplands. This series includes phases that are poorly drained and the wetter part of somewhat poorly drained. A perched, fluctuating water table above the dense till saturates the solum to or near the surface for 7 to 9 months of the year.

The Leicester series consists of very deep, poorly drained loamy soils formed in friable till. They are nearly level or gently sloping soils in drainageways and low-lying positions on hills. Depth to bedrock is commonly more than 6 feet. Rock fragments range from 5 to 35 percent by volume to a depth of 40 inches and up to 50 percent below 40 inches. Leicester soils have a water table at or near the surface much of the year.

The Whitman series consists of very deep, very poorly drained soils formed in glacial till derived mainly from granite, gneiss, and schist. They are nearly level or gently sloping soils in depressions and drainageways on uplands. Depth to dense till is 12 to 30 inches. Some pedons have organic horizons overlying the A horizon. They are fibric hemic or sapric material, and are up to 5 inches thick. Whitman soils are found on nearly level and gently sloping soils in depressions and in drainage ways of glacial uplands. Slopes are typically 0 to 2 percent but range up to 8 percent where wetness is due to seepage water. This soil is very poorly drained. A perched water table, or excess seepage water, is at or near the surface for about 9 months of the year.

Upland Soil Types

The non-wetland soils were not examined in detail, except as was necessary to identify the wetland boundary. They generally consist of Charlton and Chatfield soils. The Charlton series is a very deep, well drained loamy soil formed in friable till. They are nearly level to very steep soils on till plains and hills. Depth to bedrock and the seasonal high water table is commonly more than 6 feet.

The Chatfield series consists of moderately deep, well drained, and somewhat excessively drained soils formed in till. They are nearly level to very steep soils on glaciated plains, hills, and ridges. Slope ranges from 0 to 70 percent. Crystalline bedrock is at depths of 20 to 40 inches. The soils formed in a moderately thick mantle of glacial till overlying granite, gneiss, or schist bedrock. Rock outcrops are rare to common and are limited to the more resistant bedrock.

If you have any questions regarding these findings, please feel free to contact me.

Respectfully submitted,

Matthew Davison, PWS, PSS, CPESC, CT Forester

Enclosures: Wetland Photographs
Wetland Delineation Sketch Map
NRCS Soil Mapping

Photo 1: View of delineated wetland facing north

Photo 2: View of delineated wetland facing southeast where groundwater seeps drain to the wetland


White Oak Rd
Shortell Dr
WF 1
WF 39 CLOSE
THERE ARE A FEW AREAS OF GROUNDWATER DISCHARGE UPGRADIENT OF WETLAND, MODERATELY-WELL DRAINED SOILS NOT WET
WETLAND DELINEATION
SKETCH MAP
MATTHEW DAVISON, PSS
1/16/2019

Soil Map—State of Connecticut
(31 Benz Street, Ansonia)

Map Scale: 1:3,180 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

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
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 19, Sep 13, 2019

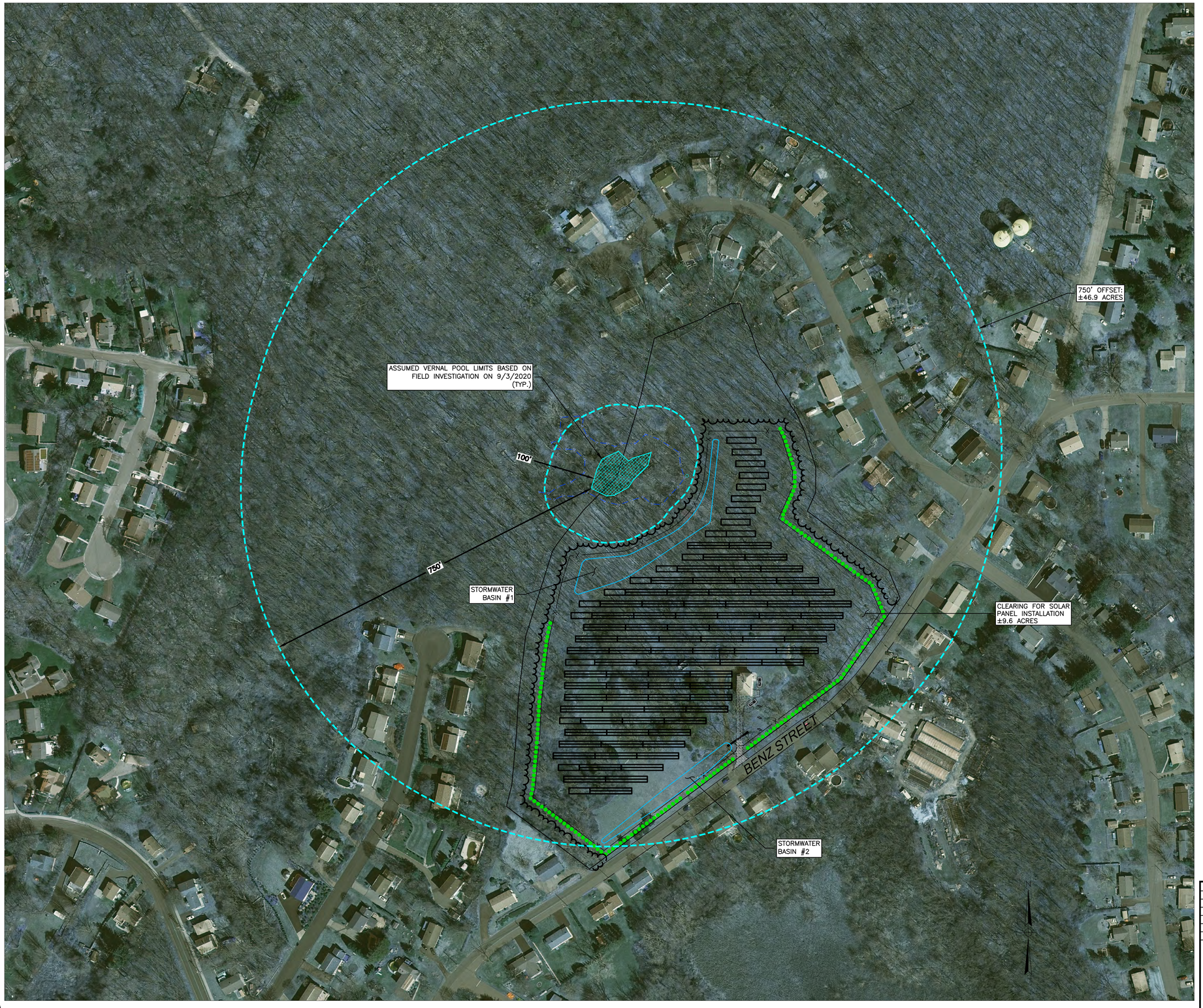
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 28, 2011—Jul 22, 2014

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
4	Leicester fine sandy loam	2.3	5.1%
18	Catden and Freetown soils, 0 to 2 percent slopes	1.0	2.3%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	15.8	35.4%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	14.6	32.8%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	0.1	0.1%
260B	Charlton-Urban land complex, 3 to 8 percent slopes	4.1	9.3%
273C	Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes	5.2	11.6%
275E	Urban land-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	1.5	3.4%
Totals for Area of Interest		**44.7**	**100.0%**



100' 0 100' 200'

SCALE: 1"=100'

CLA

Areas within the Critical Terrestrial Habitat

	Developed		Undeveloped		Impervious	
	Area (Ac.)	% of Total Area	Area (Ac.)	% of Total Area	Area (Ac.)	% of Total Area
Existing	15.2	32.4%	31.7	67.6%	4.7	10.0%
Post Development	24.5	52.2%	22.4	47.8%	5.0	10.7%

750' Critical Terrestrial Habitat Area (Ac.) :	46.9
100' Vernal Pool Envelope (Ac.) :	1.7

No.	DATE	REVISION

CLA Engineers, Inc.
CIVIL • STRUCTURAL • SURVEYING
317 Main Street Norwich, CT 06360
(860) 886-1966 Fax (860) 886-9165

31 Benz Street
Ansonia, Connecticut 06401

BENZ STREET SOLAR

Vernal Pool
Critical Terrestrial Habitat

Project No. CLA-6430
Proj. Engineer K.J.H.
Date: 9/17/2020
Figure No. 1

Attachment F

Stormwater Pollution Control Plans (Plan Set)

BENZ STREET SOLAR
CONNECTICUT SITING COUNCIL DOCUMENTS

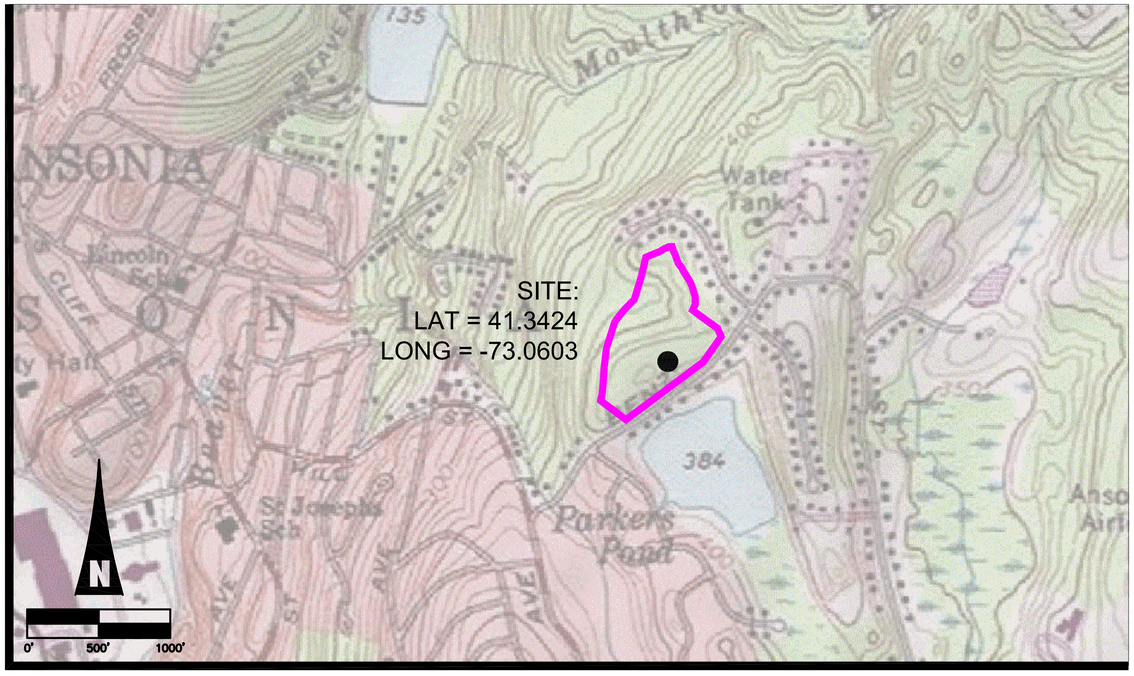
FOR

Site/Electrical Layout, Grading/Drainage/Erosion Control/Landscaping

IN

ANSONIA, CONNECTICUT

LOCATION MAP



SHEET INDEX

●	8	5/24/2021	1	COVER SHEET
●	-	2/04/2019	2	ALTA SURVEY (BY GODFREY HOFFMAN HODGE, LLC)
●	8	5/24/2021	3	SITE PLAN
●	8	5/24/2021	4	GRADING AND EROSION CONTROL PLAN
●	8	5/24/2021	5	SITE GRADING PLAN: BASIN #1
●	8	5/24/2021	6	SITE GRADING PLAN: BASIN #2
●	8	5/24/2021	7	LANDSCAPE PLAN
●	8	5/24/2021	8	KEY OBSERVATION POINTS
●	8	5/24/2021	9	PROJECT CROSS SECTION
●	8	5/24/2021	10	CIVIL NOTES
●	8	5/24/2021	11	CIVIL DETAILS

DRAWING INDEX LEGEND

FILLED CIRCLE INDICATES DRAWING INCLUDED WITHIN THIS ISSUE
MOST RECENT REVISION NUMBER
MOST RECENT ISSUE OR REVISION DATE

○	-	X/XX/202X	X	SHEET TITLE

CONTACT INFO:

RECORD LANDOWNER:
PLH, LLC
77 WATER STREET
8TH FLOOR
NEW YORK, NY 10005

OWNER/DEVELOPER:
ECOS ENERGY
222 SOUTH 9TH STREET
SUITE 1600
MINNEAPOLIS, MN 55402

CIVIL ENGINEER:
CLA ENGINEERS, INC.
317 MAIN STREET
NORWICH, CT 06360
TEL: 860-886-1966

SURVEYOR & WETLANDS DELINEATION:
GODFREY HOFFMAN HODGE, LLC
26 BROADWAY
NORTH HAVEN, CT 06085
TEL: 203-239-4217

No.	Date	Revision
8	5/24/2021	MISC. UPDATES AND REVISIONS
7	4/15/2021	MISC. UPDATES AND REVISIONS
6	3/22/2021	MISC. UPDATES AND REVISIONS
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/22/20	2 MW CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	2/11/20	CSC SUBMISSION

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, Connecticut
(860) 886-1966 Fax (860) 886-9165

STATE OF CONNECTICUT · KYLE L. RAUBERT · No. 24328 · LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

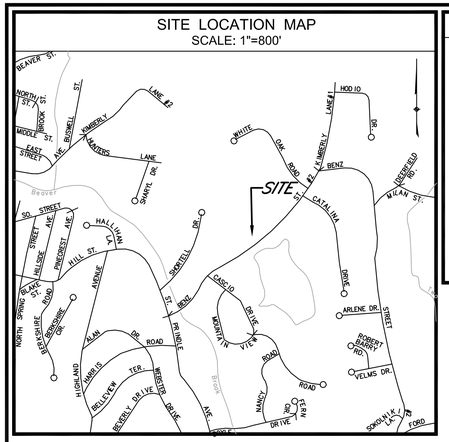
COVER SHEET

Project No. CLA-6430
Proj. Engineer E.M.B.
Date: 2/11/2020
Sheet No. 1

CLA

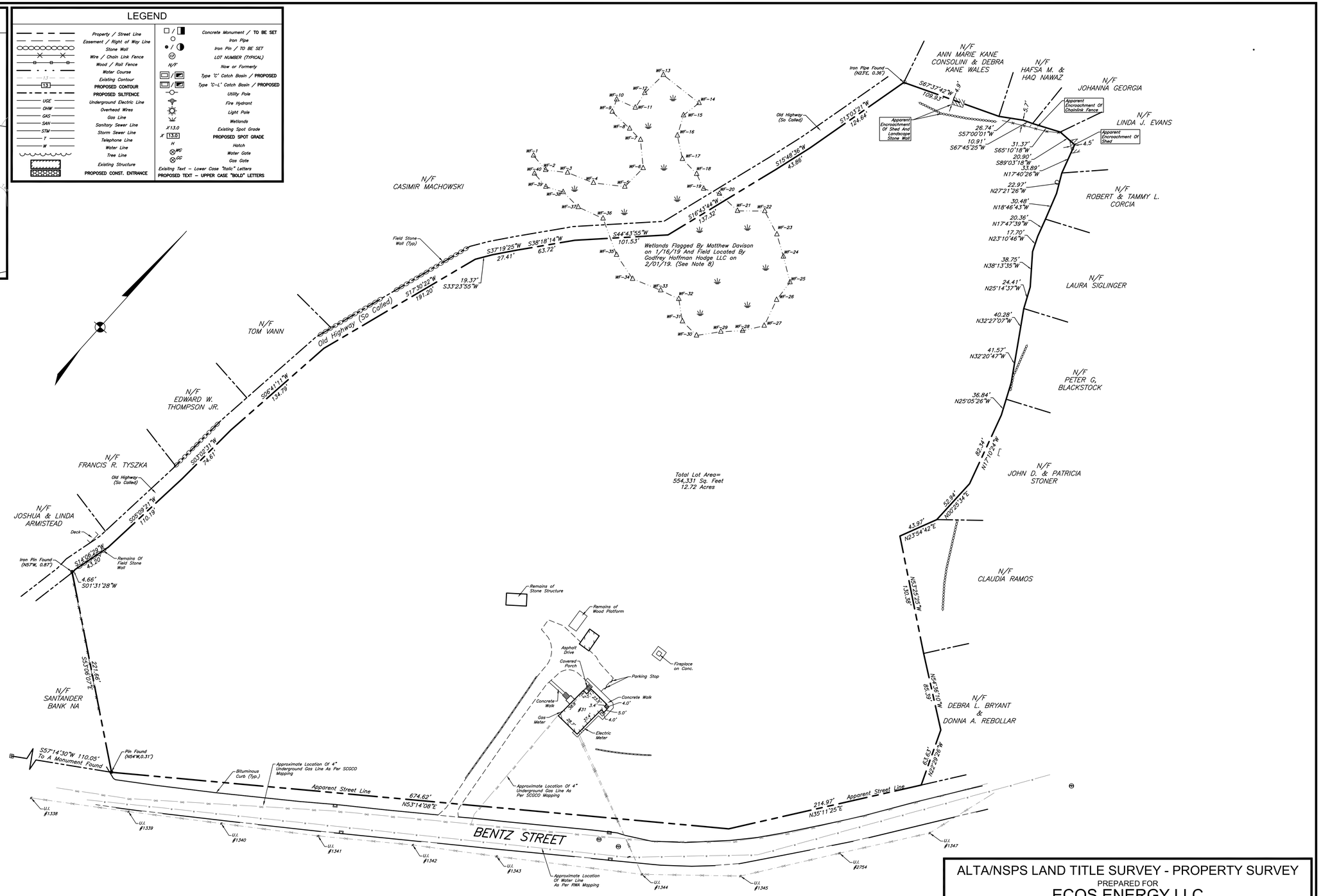
M:\6000\6400\6430 Benz Street Solar\Drawings\+Current\01 COVER SHEET-BENZ.dwg

SITE LOCATION MAP
SCALE: 1"=800'



LEGEND

Property / Street Line	Concrete Monument / TO BE SET
Easement / Right of Way Line	Iron Pipe
Stone Wall	Iron Pin / TO BE SET
Wire / Chain Link Fence	LOT NUMBER (TYPICAL)
Wood / Rail Fence	N/F Now or Formerly
Water Course	Type "C" Catch Basin / PROPOSED
Existing Contour	Type "C-L" Catch Basin / PROPOSED
PROPOSED CONTOUR	Utility Pole
PROPOSED SILTFENCE	Fire Hydrant
UGE Underground Electric Line	Light Pole
OHW Overhead Wires	Wetlands
GAS Gas Line	Existing Spot Grade
SAN Sanitary Sewer Line	PROPOSED SPOT GRADE
STM Storm Sewer Line	Hatch
T Telephone Line	Water Gate
W Water Line	Gas Gate
Tree Line	Existing Text – Lower Case "Italic" Letters
Existing Structure	PROPOSED TEXT – UPPER CASE "BOLD" LETTERS
PROPOSED CONST. ENTRANCE	



NOTES:

1. THIS MAP AND SURVEY HAVE BEEN PREPARED IN ACCORDANCE WITH THE REGULATIONS OF CONNECTICUT STATE AGENCIES, SECTIONS 20-300B-1 THRU 20-300B-20, THE MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT EFFECTIVE JUNE 21, 1996, AMENDED OCTOBER 26, 2018.
A) THE HORIZONTAL ACCURACY CONFORMS TO CLASS "A-2".
B) THE BOUNDARY DETERMINATION CATEGORY IS A "FIRST SURVEY".
C) THE TYPE OF SURVEY IS A "PROPERTY SURVEY".

2. ALL MONUMENTATION FOUND OR SET IS DEPICTED ON THIS MAP.

3. THE NORTH ARROW, BEARINGS, AND COORDINATES ARE BASED UPON THE CONNECTICUT STATE PLANE COORDINATE SYSTEM, NAD 83 UTILIZING THE STATE OF CONNECTICUT ACORN GPS NETWORK.

4. REFERENCE MAP(S):
A. MAP OF TWO LOTS PROPERTY OF JOSEPH DAVIDSON BENZ ST ANSONIA, CONN.
BY, DANIEL B. GUION
DATED, MAY. 16, 1985
B. ANTHONY & ELAINE DEFAZIO LOT 12 ANSONIA, CONN.
BY, JOSEPH WYSOWSKI
DATED, AUGUST 14, 1969
C. MAP SHOWING HOUSE LOCATION ON LOT #14 WHITE OAK RIDGE ANSONIA, CONN.
BY, CLARKE AND PEARSON
DATED, OCTOBER 2, 1962
D. MAP SHOWING HOUSE LOCATION ON LOT #2 WHITE OAK RIDGE ANSONIA, CONN.
BY, CLARKE AND PEARSON
DATED, SEPTEMBER 6, 1961
E. MAP SHOWING HOUSE LOCATION ON LOT #6 WHITE OAK RIDGE ANSONIA, CONN.
BY, CLARKE AND PEARSON
DATED, OCTOBER 25, 1961
F. WHITE OAK RIDGE DEVELOPMENT BY FOREST HEIGHTS INC. ANSONIA, CONN.
BY, CLARKE AND PEARSON
DATED, MAY 1961, REVISED TO JUNE 9, 1961
G. MAP OF BUILDING LOTS OWNED BY ANDREW WEISZ, THOMAS WEISZ, & JOSEPH DIGIORGI SECTION 1 ANSONIA, CONN.
BY, CLARKE AND PEARSON
DATED, AUGUST 19, 1959
H. MOUNTAIN VIEW ESTATES SECTION 1 ANSONIA – CONN.
BY, FREDERICK HAHN
DATED, FEBRUARY 10, 1959
I. MOUNTAIN VIEW ESTATES SECTION 3 ANSONIA – CONN.
BY, FREDERICK HAHN
DATED, MARCH 5, 1959
J. LOT #1 MOUNTAIN VIEW ESTATES ANSONIA CONN
BY, FREDERICK HAHN
DATED, FEBRUARY 10, 1959
K. LOT #2 MOUNTAIN VIEW ESTATES ANSONIA – CONN.
BY, FREDERICK HAHN
DATED, DECEMBER 26, 1958
L. LOT #3 MOUNTAIN VIEW ESTATES ANSONIA – CONN.
BY, FREDERICK HAHN
DATED, DECEMBER 26, 1958
M. LOT #4 MOUNTAIN VIEW ESTATES ANSONIA CONN
BY, FREDERICK HAHN
DATED, FEBRUARY 10, 1959
N. LOT #5 MOUNTAIN VIEW ESTATES ANSONIA CONN
BY, FREDERICK HAHN
DATED, FEBRUARY 10, 1959

5. PROPERTY IS SUBJECT TO AND TOGETHER WITH THE FOLLOWING:
A. SUBJECT TO AN AGREEMENT IN FAVOR OF THE CITY OF ANSONIA AS PER VOLUME 121 PAGE 208 OF THE ANSONIA LAND RECORDS.
B. RIGHTS, RESTRICTIONS, ENCUMBRANCES, COVENANTS, EASEMENTS, ETC. AS PER THE RECORD MAY APPEAR.

6. THE SUBJECT PROPERTY IS DESIGNATED AS MAP 87, BLOCK 00, LOT 01 ON THE ANSONIA ASSESSOR'S RECORDS.

7. PROPERTY IS LOCATED IN FLOOD ZONE(S): "X" (AREAS DETERMINED TO BE OUTSIDE THE 500 YEAR FLOOD PLAIN) AS DEPICTED ON F.I.R.M. COMMUNITY NO. 09009C0408J DATED MAY 16, 2017 AND 09009C0406H DATED DECEMBER 17, 2010.

8. UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS DEPICTED AND NOTED HEREON MAY HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING SUPPLIED BY THE RESPECTIVE UTILITY COMPANIES OR GOVERNMENTAL AGENCIES; FROM PAROLE TESTIMONY AND FROM OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE. THE LOCATIONS OF WHICH ARE UNKNOWN TO GODFREY–HOFFMAN HODGE, LLC. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. CALL BEFORE YOU DIG 1-800-922-4455.

TO CONNECTICUT ATTORNEYS TITLE INSURANCE COMPANY,
THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 6, 7(A), 8, 9, 10 , 11, 12, 13, 14, 16, 17, 18, 19 AND 20 OF TABLE A THEREOF. THE FIELDWORK WAS COMPLETED ON FEBRUARY 1, 2019.

TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

ADAM HOFFMAN, L.S. #15168

NOT VALID WITHOUT LIVE SIGNATURE AND SEAL.

STATE OF CONNECTICUT ADAM HOFFMAN No.15168 LICENSED LAND SURVEYOR

NO.	DATE	DESCRIPTION

REVISIONS

ALTA/NSPS LAND TITLE SURVEY - PROPERTY SURVEY

PREPARED FOR

ECOS ENERGY LLC

31 BENZ STREET
ANSONIA, CONNECTICUT

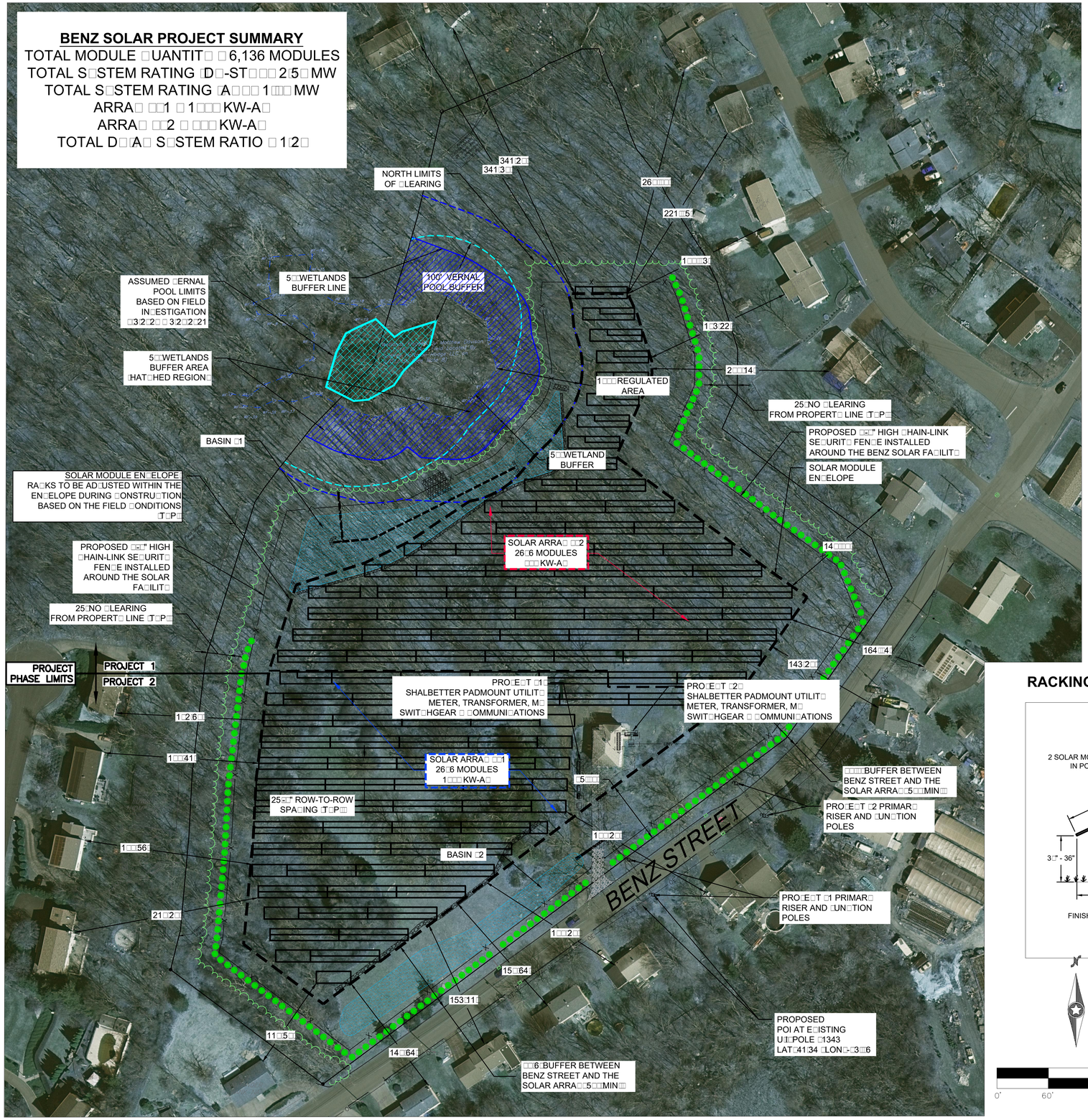
0 25 50 75 100 125

GODFREY HOFFMAN HODGE, LLC
PROFESSIONAL LAND SURVEYORS & CIVIL ENGINEERS
26 BROADWAY NORTH HAVEN, CT 06473; TEL: 203.239.4217 - WWW.GODFREYHOFFMAN.COM
1783 FARMINGTON AVENUE, UNIONVILLE, CT 06085; TEL: 860.673.0444 - WWW.HODGELLC.COM

DRAWN BY:	KMA
CHECKED BY:	CSW
DATE:	02-04-2019
SCALE:	1"=50'
PROJECT:	19-006
DRAWING:	1 of 1

BENZ SOLAR PROJECT SUMMARY

TOTAL MODULE □UANTIT□ □6,136 MODULES
TOTAL S□STEM RATING □D□-ST□□□ 2□5□ MW
TOTAL S□STEM RATING □A□□□ 1□□□ MW
ARRA□ □□1 □1□□□ KW-A□
ARRA□ □□2 □ □□□ KW-A□
TOTAL D□□A□ S□STEM RATIO □1□2□



LEGEND:

- E□ISTING PROPERT□ LINE
- PROPOSED PRO□E□T FEN□E
- PROPOSED GRA□EL A□□ESS ROAD
- UMV — PROPOSED A□ DISTRIBUTION
- OE — PROPOSED O□ERHEAD ELE□TRI□
- ARBOR□ITAE S□REENING TREES
- BASIN OUTLET
- 5□□WETLAND BUFFER AREA
- WETLAND DELINEATION LINE
- 24 □2 SOLAR MODULE BO□K
- 1□ □2 SOLAR MODULE BO□K
- 6 □2 □ 12 □2 SOLAR MODULE BO□K

PROJECT INFORMATION:

E□ISTING ZONING □R
PROPOSED USE □ SPE□IAL □OMMER□IAL

SPE□IFI□ SITE NOTES:□
1□ NO LIGHTING PROPOSED WITH THE PRO□E□T
2□ NO AUDIBLE NOISE GREATER THAN THE SITES E□ISTING AMBIENT NOISE LE□EL SHALL BE DETE□TABLE AT OR BE□OND THE PROPERT□ LINE OF THE PRO□E□T
3□ EMERGEN□□ □EHI□ULAR □ SITE A□□ESS TO BE PRO□IDED TO ALL LO□AL RESPONDERS □POLI□E, FIRE, ET□□□□

PROJECT AREAS & IMPACTS:

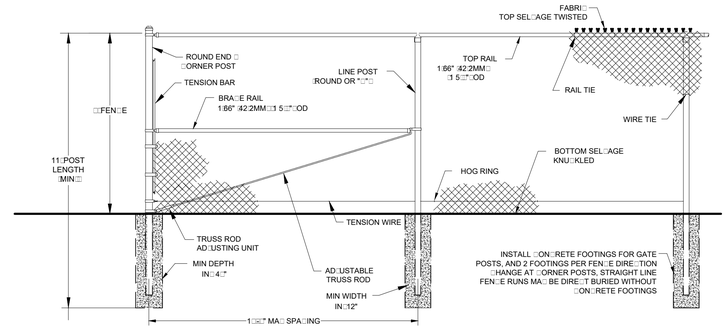
TOTAL SITE AREA □ 12□□2 A□RES

TOTAL SITE CLEARING = ±9.0 ACRES

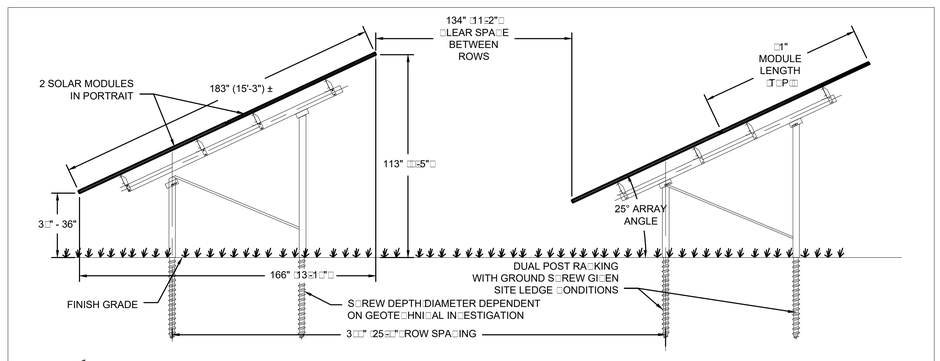
TOTAL ARRA□ FOOTPRINT □FEN□E LIMITS□□ □3□ A□RES

TOTAL PROPOSED IMPER□IOUS□
GRA□EL A□□ESS ROAD, STRU□TURAL POSTS □
E□UIPMENT PADS □ □12 A□RES
SOLAR MODULES EFFE□TI□E IMPER□IOUS □ □65 A□RES

PERIMETER FENCE DETAIL:



RACKING PROFILE DETAIL:



0' 60' 120' 180'

No.	Date	Revision
8	5/24/2021	MISC. UPDATES AND REVISIONS
7	4/16/2021	MISC. UPDATES AND REVISIONS
6	3/22/2021	MISC. UPDATES AND REVISIONS
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/22/20	2 MW CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	3/11/20	CSC SUBMISSION

CLA Engineers, Inc.
CIVIL • STRUCTURAL • SURVEYING
317 Main Street Norwich, Connecticut
(860) 886-1966 Fax (860) 886-9165

STATE OF CONNECTICUT · PETER J. MAHER · No. 24329 · LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

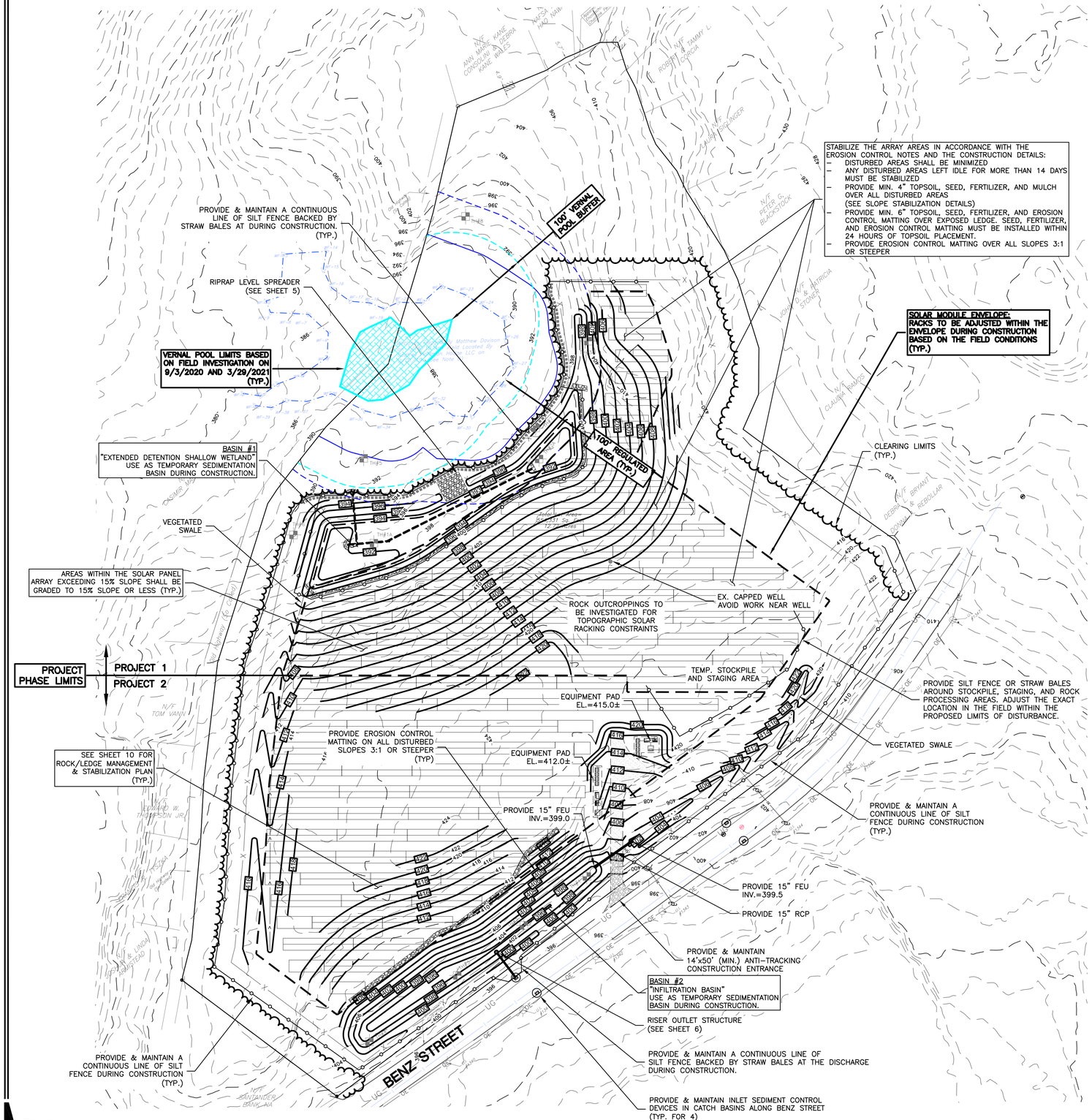
BENZ STREET SOLAR

SITE PLAN

Project No. CLA-6430
Proj. Engineer E.M.B.
Date: 2/11/2020
Sheet No. 3

CLA

M:\6000\6400\6430 Benz Street Solar\Drawings\+Current\03 SITE PLAN-BENZ.dwg



LEGEND:

- EXISTING PROPERTY LINE
- PROPOSED FENCE
- PROPOSED GRAVEL ACCESS ROAD
- PROPOSED UNDERGROUND MV CABLE
- PROPOSED OVERHEAD ELECTRIC
- EXISTING CONTOUR
- PROPOSED CONTOUR
- 26 x 2 SOLAR MODULE BOCK
- 13 x 2 SOLAR MODULE BOCK
- 100' WETLAND REGULATED AREA LIMIT
- 50' WETLAND BUFFER
- WETLAND DELINEATION LINE & AREA
- RIP-RAP BASIN OUTLET

TEST HOLE DATA:

TH–1
TD=72"
No bedrock
No water
No mottles

0–9" Topsoil, Brown fine sandy loam with boulders
9–52" Yellow brown fine sandy loam with boulders
52–72" Gray loamy sand with boulders

TH–2
TD=72"
No bedrock
No water
No mottles

0–10" Topsoil, Brown fine sandy loam with boulders
10–3" Yellow brown fine sandy loam with boulders
38–72" Gray loamy sand with boulders, dense at 65 inches

TH–3
TD=84"
No bedrock
No water
No mottles

0–12" Topsoil, Brown fine sandy loam with boulders
12–28" Yellow brown fine sandy loam with boulders
28–84" Gray loamy sand with boulders, dense at 63"

TH–4
TD=74"
No bedrock
No water
No mottles

0–10" Topsoil, Brown fine sandy loam
10–40" Yellow brown fine sandy loam
40–74" Gray loamy sand with angular boulders and stones and mica

TH–5
TD=76"
No bedrock
Wet at 44"
Mottles 24"

0–8" Topsoil, Dark Brown fine sandy loam
8–24" Red brown fine sandy loam
24–76" Red brown sandy loam with gray brown mottles

TH–6
TD=70"
No bedrock
Wet at 50"
Mottles 30"

0–7" Topsoil, Dark Brown fine sandy loam
7–32" Red brown fine sandy loam with gray brown mottles
32–70" Gray loamy sand with boulders

TH–7
TD=70"
No bedrock
Wet at 36"
Mottles 32"

0–16" Topsoil, Dark Brown fine sandy loam
16–32" Red brown fine sandy loam with gray brown mottles
32–70" Red brown fine sandy loam with boulders and gray brown mottles

TH–8 (done with shovel and auger)
TD=37"
No bedrock
No water
Mottles 34"

0–8" Topsoil, Dark Brown fine sandy loam
8–34" Red brown fine sandy loam
37+" Red brown loamy sand with boulders and gray brown mottles

Additional Test pits performed on April 30, 2021
R.Russo CLA Engineers, R. Galton ECOS,
Douglas Construction excavator

TP–1A
TD=98"
No water
Mottles 46"
No bedrock

0–10" Topsoil, dark brown sandy loam
10–28" subsoil strong brown fine sandy loam
28–46" subsoil brown fine sandy loam
46–98" gray brown fine sandy loam with stones DENSE
Samples at 46–98"

TP–2A
TD=118"
Seeping 54"
Mottles 54"
No bedrock

0–14" Topsoil, dark brown sandy loam
14–43" subsoil yellow brown fine sandy loam
43–54" subsoil brown fine sandy loam
54–118" gray brown fine sandy loam with stones and cobbles DENSE

TP–3A
TD=32"
Water 28"
Mottles 28"
Bedrock 32"

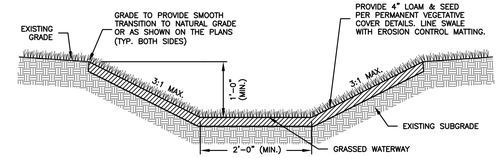
0–9" Topsoil, dark brown sandy loam
9–32" subsoil yellow brown fine sandy loam with boulders
Note: Surface ledge 15 feet to the east.

CONSTRUCTION NOTES:

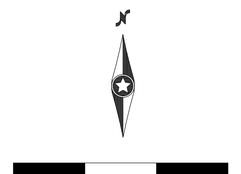
1. THE CONTRACTOR SHALL PERFORM ALL TREE REMOVAL ACTIVITIES ON SITE TO ALLOW FOR SEDIMENT TRAP INSTALLATION, NO GRUBBING IS TO OCCUR DURING TREE REMOVAL, PRIOR TO SEDIMENT TRAP INSTALLATION.
2. ALL SEDIMENT TRAP'S IDENTIFIED ON THE PLAN SHALL BE STAKED BY A REGISTERED SURVEYOR AND INSTALLED PER PLANS PRIOR TO ANY CONSTRUCTION ACTIVITY.
3. AS-BUILT DRAWINGS SHALL BE MAINTAINED BY THE CONTRACTOR THROUGHOUT THE CONSTRUCTION OF THE PROJECT.

EROSION CONTROL NOTES:

1. DEVELOPER/CONTRACTOR TO OBTAIN A DEEP GENERAL STORMWATER PERMIT PRIOR TO BEGINNING CONSTRUCTION.
2. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED BEFORE ANY SOIL DISTURBANCE.
3. THE AREA OF DISTURBANCE SHALL BE KEPT TO A MINIMUM. DISTURBED AREAS REMAINING IDLE FOR MORE THAN 14 DAYS SHALL BE STABILIZED.
4. MEASURES SHALL BE TAKEN TO CONTROL EROSION WITHIN THE PROJECT AREA. SEDIMENT IN RUNOFF WATER SHALL BE TRAPPED AND RETAINED WITHIN THE PROJECT AREA USING APPROVED MEASURES.
5. WETLAND AREAS AND SURFACE AREAS SHALL BE PROTECTED FROM SEDIMENT. OFF-SITE SURFACE WATER AND RUNOFF FROM UNDISTURBED AREAS SHALL BE DIVERTED AWAY FROM DISTURBED AREAS WHERE FEASIBLE OR CARRIED THROUGH THE PROJECT AREA WITHOUT CAUSING EROSION. INTEGRITY OF DOWNSTREAM DRAINAGE SYSTEMS SHALL BE MAINTAINED.
6. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE REMOVED AFTER FINAL SITE STABILIZATION. STABILIZATION MEASURES SUCH AS HYDRO-SEEDING OR APPLICATION OF HAY/MULCH OR SOIL NETTING SHALL BE APPLIED PRIOR TO REMOVAL OF TEMPORARY EROSION MEASURES AND INSPECTED WEEKLY UNTIL STABILIZATION IS COMPLETE. TEMPORARY EROSION CONTROL MEASURES MAY BE REMOVED ONCE STABILIZATION OF ALL SITE SOILS HAS BEEN ACHIEVED AND WRITTEN AUTHORIZATION TO DO SO HAS BEEN PROVIDED BY THE STORM-WATER AUTHORITY. TRAPPED SEDIMENT SHALL BE REMOVED IMMEDIATELY WITH TEMPORARY EROSION CONTROL METHODS AND LAWFULLY DISPOSED OF OFF-SITE. OTHER DISTURBED SOIL AREAS RESULTING FROM THE REMOVAL OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED WITHIN THIRTY DAYS.



VEGETATED SWALE DETAIL
NOT TO SCALE



No.	Date	Revision
8	5/24/2021	MISC. UPDATES AND REVISIONS
7	4/15/2021	MISC. UPDATES AND REVISIONS
6	3/22/2021	MISC. UPDATES AND REVISIONS
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/22/20	2 WK CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	2/11/20	CSC SUBMISSION

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, Connecticut
(860) 886–1966 Fax (860) 886–9165

STATE OF CONNECTICUT · RITA J. MAHER · No. 24328 · LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

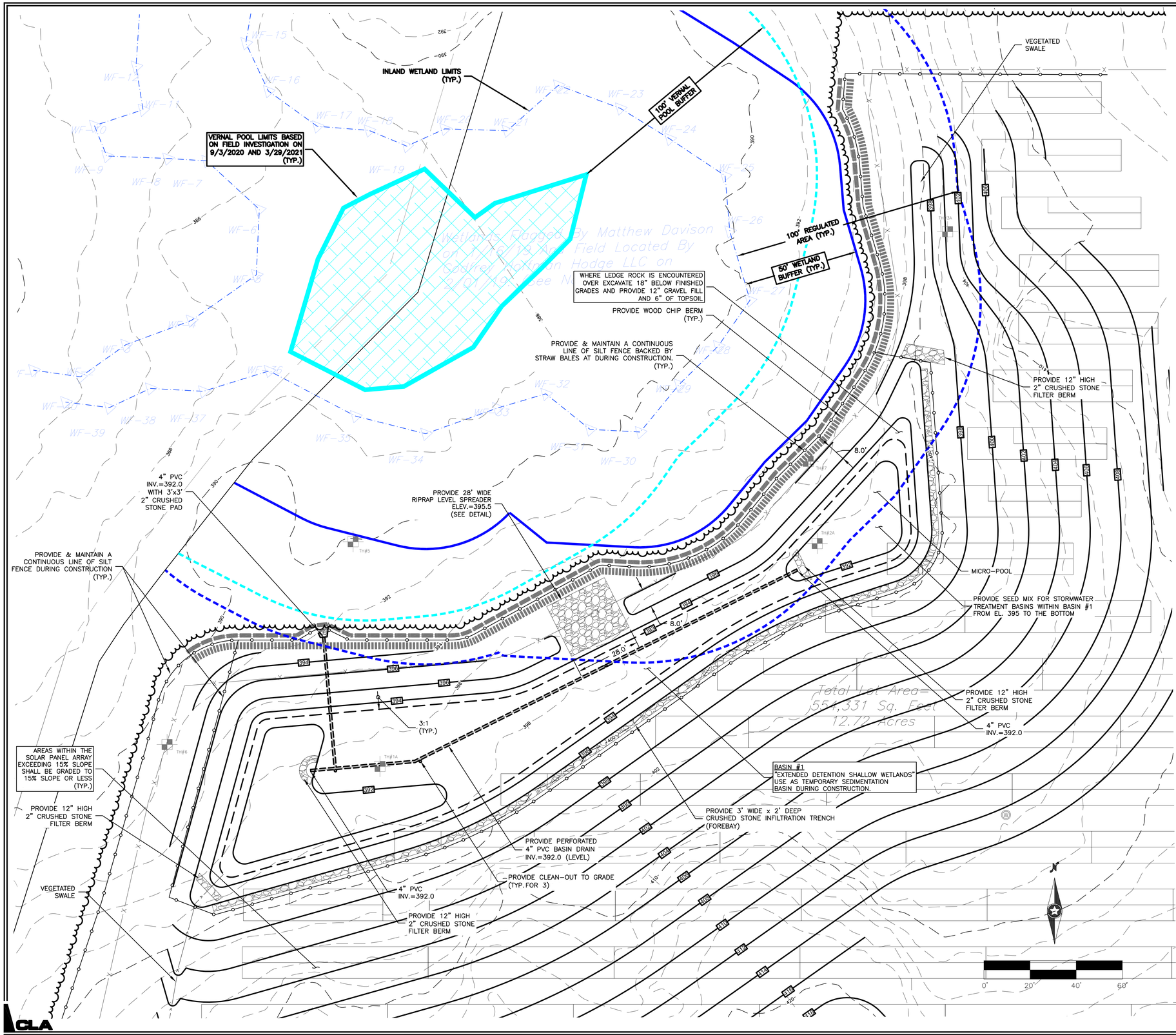
BENZ STREET SOLAR

GRADING AND EROSION CONTROL PLAN

Project No. CLA-6430
Proj. Engineer E.M.B.
Date: 2/11/2020
Sheet No. 4

M:\6000\6400\6430 Benz Street Solar\Drawings\+Current\04-06 SITE GRADING PLAN-BENZ.dwg

CLA



LEGEND:

- EXISTING PROPERTY LINE
- PROPOSED FENCE
- PROPOSED GRAVEL ACCESS ROAD
- PROPOSED UNDERGROUND MV CABLE
- PROPOSED OVERHEAD ELECTRIC
- EXISTING CONTOUR
- PROPOSED CONTOUR
- 26 x 2 SOLAR MODULE BOCK
- 13 x 2 SOLAR MODULE BOCK
- 100' WETLAND REGULATED AREA LIMIT
- 50' WETLAND BUFFER
- WETLAND DELINEATION LINE & AREA
- RIP-RAP BASIN OUTLET

SEED MIX FOR STORMWATER TREATMENT BASIN

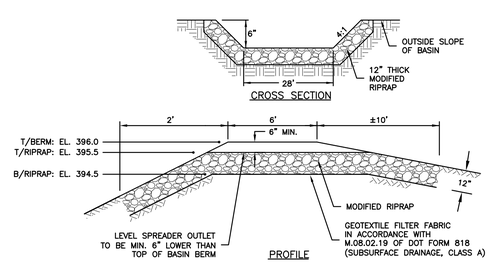
SEE SHEET 7 – LANDSCAPE PLAN FOR SEED MIX SPECIFICATIONS

PERVIOUS TOPSOIL MIX FOR STORMWATER TREATMENT BASINS

THE FOLLOWING PERVIOUS TOPSOIL MIX SHALL BE USED IN THE STORMWATER TREATMENT BASINS. THE MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF ARTICLE M.13.01.1 OF DOT FORM 817 WITH THE FOLLOWING GRADATION:

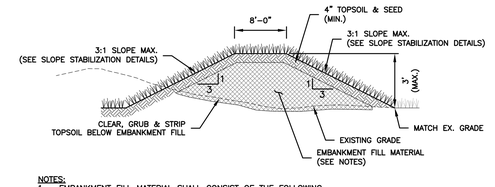
SIEVE	% PASSING
#10	100%
#40	60-80%
#80	5%
#200	0%

DO NOT COMPACT MATERIAL DURING INSTALLATION



STORMWATER TREATMENT BASIN #1 OUTLET DETAIL

NOT TO SCALE



NOTES:

1. EMBANKMENT FILL MATERIAL SHALL CONSIST OF THE FOLLOWING
   - A. CLEAN MINERAL SOIL, FREE OF ROOTS, WOODY VEGETATION, STUMPS, SOD, OVERSIZED STONES, ROCKS, OR OTHER ORGANIC UNSUITABLE MATERIAL.
   - B. SHALL BE A NON-FREE DRAINING GLACIAL TILL
   - C. MATERIAL SHALL CONTAIN AT LEAST 15% PASSING THE #200 SIEVE AND NOT MORE THAN 50% PASSING THE #200 SIEVE.
   - D. NO STONES LARGER THAN 6" SHALL BE ALLOWED WITHIN THE EMBANKMENT.
   - E. NO STONES LARGER THAN 3" SHALL BE ALLOWED WITHIN 2 FEET OF STRUCTURES.
2. EMBANKMENT FILL SHALL BE PLACED IN MAXIMUM 9" LIFTS. THE EXISTING GRADE AND THE SURFACE OF EACH LIFT SHALL BE SCARIFIED PRIOR TO THE PLACEMENT OF THE NEXT LIFT.
3. EMBANKMENT FILL SHALL BE COMPACTED TO 90%-95% STANDARD PROCTOR COMPACTION

STORMWATER TREATMENT BASIN EMBANKMENT FILL SECTION DETAIL

NOT TO SCALE

No.	Date	Revision
8	5/24/2021	MISC. UPDATES AND REVISIONS
7	4/16/2021	MISC. UPDATES AND REVISIONS
6	3/22/2021	MISC. UPDATES AND REVISIONS
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/28/20	2 MW CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	3/11/20	CSC SUBMISSION

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, Connecticut
(860) 886-1966 Fax (860) 886-9165

STATE OF CONNECTICUT · KYLE J. HAUBERT · No. 24328 · LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

GRADING PLAN : BASIN #1

Project No.	CLA-6430
Proj. Engineer	E.M.B.
Date:	2/11/2020
Sheet No.	5

VEGETATED SWALE (SEE SHEET 4)

PROVIDE 5' WIDE x 2' DEEP CRUSHED STONE INFILTRATION TRENCH (FOREBAY)

AREAS WITHIN THE SOLAR PANEL ARRAY EXCEEDING 15% SLOPE SHALL BE GRADED TO 15% SLOPE OR LESS (TYP.)

WHERE LEDGE ROCK IS ENCOUNTERED OVER EXCAVATE 18" BELOW FINISHED GRADES AND PROVIDE 12" GRAVEL FILL AND 6" OF TOPSOIL

SEE STORMWATER TREATMENT BASIN #2 – SECTION A–A

PROVIDE 4' DIA. CONCRETE RISER OUTLET STRUCTURE T/RISER=399.0 WEIR EL.=398.5 INV.OUT=395.5 (12" PVC)

14.0'

R=35'

10% (TYP.)

PITCH ACCESS DRIVE (TYP.)

VEGETATED SWALE (SEE SHEET 4)

PROVIDE 15" RCP

PROVIDE 15" FEU INV.=399.0

PROVIDE 15" FEU INV.=399.5

3:1 (TYP.)

BENZ STREET

BASIN #2
PERMANENT WATER QUALITY BASIN. USE AS TEMPORARY SEDIMENTATION TRAP DURING CONSTRUCTION.

PROVIDE 12" PVC

PROVIDE 10' WIDE GRASS LINED EMERGENCY OVERFLOW LEVEL SPREADER ELEV.=399.5

PROVIDE & MAINTAIN A CONTINUOUS LINE OF SILT-FENCE BACKED BY STRAW BALES AT THE EMERGENCY OVERFLOW DURING CONSTRUCTION.

PROVIDE & MAINTAIN INLET SEDIMENT CONTROL DEVICES IN CATCH BASINS ALONG BENZ STREET (TYP. FOR 4)

CONNECT TO EXISTING CATCH BASIN. PROVIDE BRICK AND MORTAR PARGING FOR WATER TIGHT CONNECTION. INV.=392.0

PROVIDE & MAINTAIN A CONTINUOUS LINE OF SILT FENCE DURING CONSTRUCTION (TYP.)

75.0'

10'

Bituminous Curb (Typ.)

U.L. #1342

U.L. #1341

U.L. #1340

U.L. #1343

0' 20' 40' 60'

LEGEND:

- EXISTING PROPERTY LINE
- PROPOSED FENCE
- PROPOSED GRAVEL ACCESS ROAD
- PROPOSED UNDERGROUND MV CABLE
- PROPOSED OVERHEAD ELECTRIC
- EXISTING CONTOUR
- PROPOSED CONTOUR
- 26 x 2 SOLAR MODULE BOCK
- 13 x 2 SOLAR MODULE BOCK
- 100' WETLAND REGULATED AREA LIMIT
- 50' WETLAND BUFFER
- WETLAND DELINEATION LINE & AREA
- RIP-RAP BASIN OUTLET

SEED MIX FOR STORMWATER TREATMENT BASIN

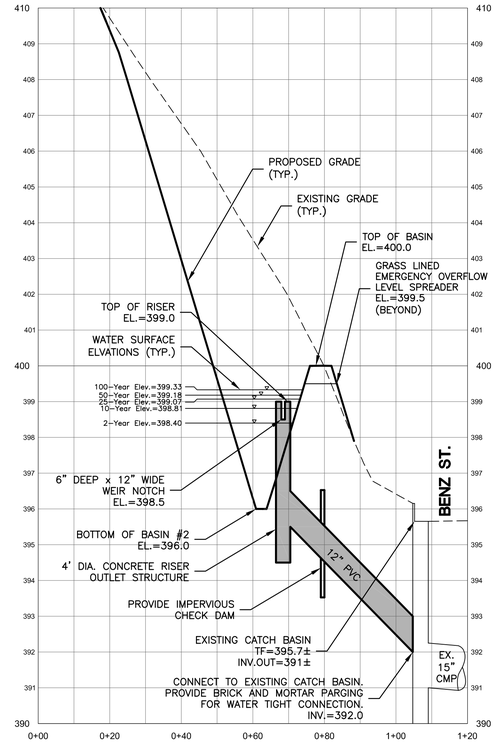
SEE SHEET 7 – LANDSCAPE PLAN FOR SEED MIX SPECIFICATIONS

PERVIOUS TOPSOIL MIX FOR STORMWATER TREATMENT BASINS

THE FOLLOWING PERVIOUS TOPSOIL MIX SHALL BE USED IN THE STORMWATER TREATMENT BASINS. THE MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF ARTICLE M.13.01.1 OF DOT FORM 817 WITH THE FOLLOWING GRADATION:

SIEVE	% PASSING
#10	100%
#40	60–80%
#80	5%
#200	0%

DO NOT COMPACT MATERIAL DURING INSTALLATION



STORMWATER TREATMENT BASIN #2 - SECTION A-A

SCALE: HORIZ: 1"=20'
VERT: 1"=2'

No.	Date	Revision
8	5/24/2021	MISC. UPDATES AND REVISIONS
7	4/19/2021	MISC. UPDATES AND REVISIONS
6	3/22/2021	MISC. UPDATES AND REVISIONS
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/22/20	2 MW CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	3/11/20	CSC SUBMISSION

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, Connecticut
(860) 886–1966 Fax (860) 886–9165

STATE OF CONNECTICUT · STEVEN J. HAUSER · No. 24329 · LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

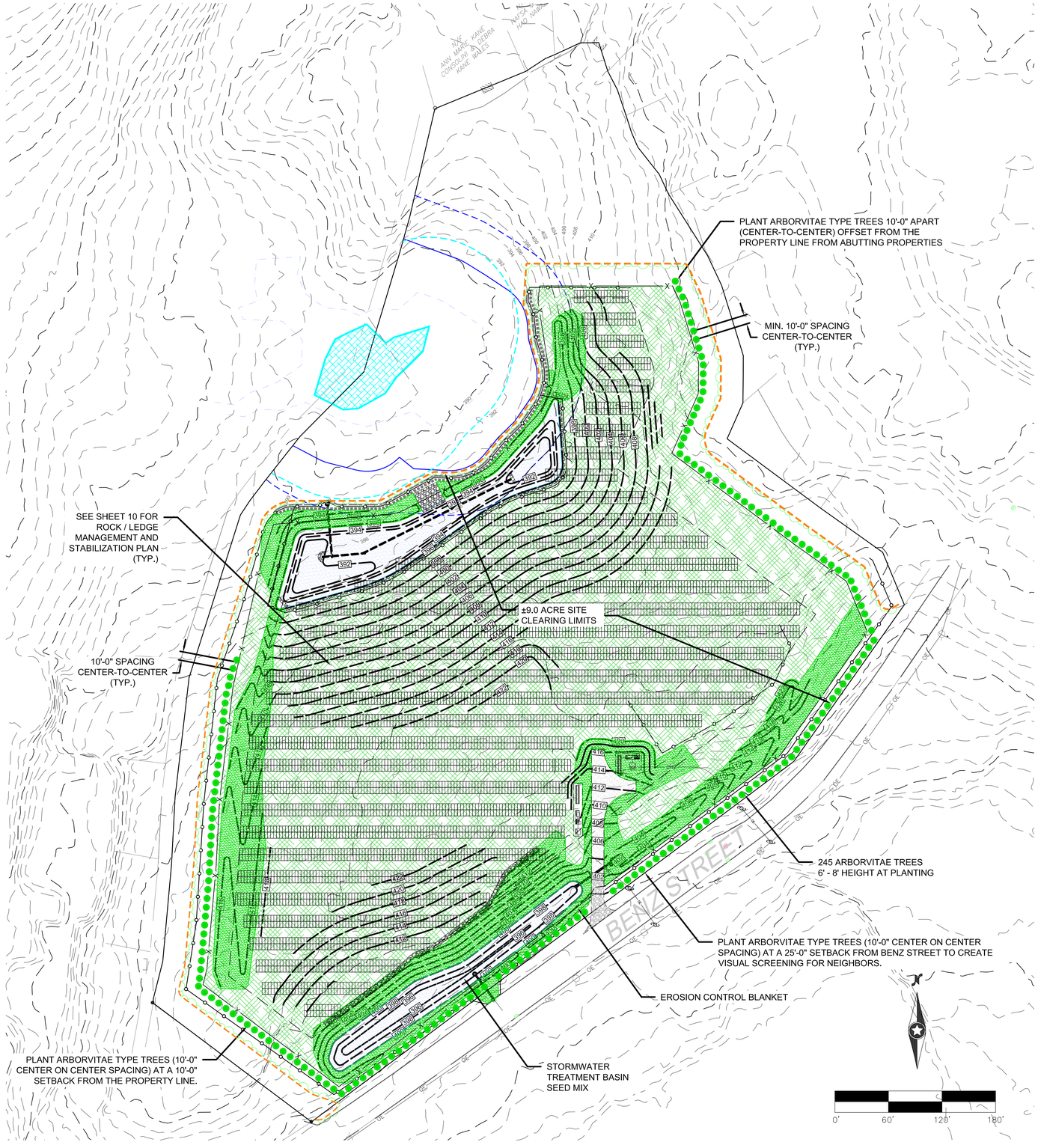
BENZ STREET SOLAR

GRADING PLAN : BASIN #2

Project No. CLA-6430
Proj. Engineer E.M.B.
Date: 2/11/2020
Sheet No. 6

CLA

M:\6000\6400\6430 Benz Street Solar\Drawings\+ Current\04-05 SITE GRADING PLAN-BENZ.dwg



LEGEND:

- EXISTING PROPERTY LINE
- PROPOSED FENCE
- PROPOSED GRAVEL ACCESS ROAD
- PROPOSED UNDERGROUND MV CABLE
- PROPOSED OVERHEAD ELECTRIC
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED CLEARING LIMITS
- 26 x 2 SOLAR MODULE BOCK
- 13 x 2 SOLAR MODULE BOCK
- 100' WETLAND REGULATED AREA LIMIT
- WETLAND DELINEATION LINE & AREA
- RIP-RAP BASIN OUTLET

SEED LEGEND:

- STORMWATER BASIN SEED MIX (AREA = 0.45 AC)
- EROSION CONTROL BLANKET WITH SEED (AREA = 1.65 AC)
- SOLAR ARRAY SEEDING / HAY MULCH EROSION CONTROL (AREA = 7.9 AC)

SEED MIX FOR STORMWATER TREATMENT BASINS:

THE NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES CONTAINS A SELECTION OF NATIVE GRASSES AND WILDFLOWERS DESIGNED TO COLONIZE RECENTLY DISTURBED SITES WHERE QUICK GROWTH OF VEGETATION IS DESIRED TO STABILIZE THE SOIL SURFACE. IT IS AN EXCELLENT SEED MIX FOR ECOLOGICALLY APPROPRIATE RESTORATIONS ON MOIST SITES THAT REQUIRE QUICK STABILIZATION AS WELL AS LONG-TERM ESTABLISHMENT OF NATIVE VEGETATION. THIS MIX IS PARTICULARLY APPROPRIATE FOR DETENTION BASIS THAT DO NOT NORMALLY HOLD STANDING WATER. SOME PLANTS IN THIS MIX CAN TOLERATE INFREQUENT INUNDATION, BUT NOT CONSTANT FLOODING.

SEEDING: THE MIX MAY BE APPLIED BY HYDROSEEDING, BY MECHANICAL SPREADER, BY HYDRO-SEEDING OR ON SMALL SITES IT CAN BE SPREAD BY HAND. WHEN APPLYING ON BARE SOIL, RAKE THE SOIL TO CREATE GROOVES, APPLY SEED, THEN LIGHTLY RAKE OVER. IN NEW ENGLAND, THE BEST RESULTS ARE OBTAINED WITH A SPRING OR EARLY FALL SEEDING. SUMMER AND LATE FALL SEEDING WILL BENEFIT WITH A LIGHT MULCHING OF WEED-FREE STRAW TO CONSERVE MOISTURE. LATE FALL AND WINTER DORMANT SEEDING REQUIRE A SLIGHT INCREASE IN THE SEEDING RATE. FERTILIZATION IS NOT REQUIRED UNLESS THE SOILS ARE PARTICULARLY INFERTILE.

APPLICATION RATE: 35 LBS/ACRE (1250 SQ. FT./LB.)

SPECIES *: SWITCHGRASS (PANICUM VIRGATUM), VIRGINIA WILD RYE (ELYMUS VIRGINICUS), CREEPING RED FESCUE (FESTUCA RUBRA), FOX SEDGE (CAREX VULPINOIDEA), CREEPING BENTGRASS (AGROSTIS STOLONIFERA), SOFT RUSH (JUNCUS EFFUSUS), NEW ENGLAND ASTER (ASTER NOVAE-ANGLIAE), GRASS-LEAVED GOLDENROD (EUTHAMIA GRAMINIFOLIA), GREEN BULRUSH (SCIRPUS ATROVIRENS), BONESET (EUPATORIUM PERFOLIATUM), BLUE VERVAIN (VERBENA HASTATA) UPLAND BENTGRASS (AGROSTIS PERENNANS), BIG BLUESTEM, NIAGRA (ANDROPOGON GERARDII), SENSITIVE FERN (ONOCLEA SENSIBILIS), LITTLE BLUESTEM (SCHIZACHYRIUM SCOPARIUM), WOOLGRASS (SCIRPUS CYPERINUS).

SEEDING NOTES:

1. THE CONTRACTOR SHALL SEED ALL DISTURBED AREAS ASSOCIATED WITH TREE AND ROCK REMOVAL AND SITE CLEARING. CONTRACTOR SHALL A INSTALL A 50% / 50% CLOVER / FESCUE MIX OR ENGINEER APPROVED ALTERNATE SEED MIXTURE.
2. ALL SEDIMENT TRAP SIDE SLOPES ARE 3:1 AND SHALL BE SEEDED AND BLANKETED

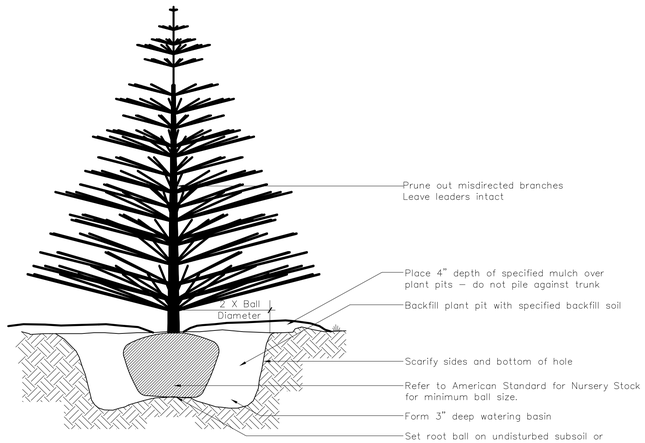
PERVIOUS TOPSOIL MIX FOR STORMWATER TREATMENT BASINS:

THE FOLLOWING PERVIOUS TOPSOIL MIX SHALL BE USED IN THE STORMWATER TREATMENT BASINS. THE MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF ARTICLE M.13.01.1 OF DOT FORM 817 WITH THE FOLLOWING GRADATION:

SIEVE	% PASSING
#10	100%
#40	60-80%
#80	5%
#200	0%

DO NOT COMPACT MATERIAL DURING INSTALLATION

ARBORVITAE TREE DETAIL:



No.	Date	Revision
8	5/24/2021	MISC. UPDATES AND REVISIONS
7	4/16/2021	MISC. UPDATES AND REVISIONS
6	3/22/2021	MISC. UPDATES AND REVISIONS
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/22/20	2 MW CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	2/11/20	CSC SUBMISSION

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, Connecticut
(860) 886-1966 Fax (860) 886-9165

STATE OF CONNECTICUT · KYLE L. MACBRIEN · No. 24228 · LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

LANDSCAPE PLAN

Project No.	CLA-6430
Proj. Engineer	E.M.B.
Date:	2/11/2020
Sheet No.	7

M:\6000\6400\6430 Benz Street Solar\Drawings\+Current\07 LANDSCAPE PLAN-BENZ.dwg

KOP 4 - MIDDLE OF SITE LOOKING EAST

KOP 5 - EASTERN MIDDLE OF SITE LOOKING SOUTH

KOP 6 - SOUTH WEST OF SITE LOOKING EAST

KOP 3 - NORTHERN SITE, LOOKING SOUTH-EAST

KOP 2 - BENZ STREET LOOKING NORTH

KOP 1 - SOUTH OF BENZ STREET LOOKING NORTH-WEST

No.	Date	Revision
8	5/24/2021	MISC. UPDATES AND REVISIONS
7	4/16/2021	MISC. UPDATES AND REVISIONS
6	3/22/2021	MISC. UPDATES AND REVISIONS
5	3/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/22/20	2 MW CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	2/11/20	CSC SUBMISSION

CLA Engineers, Inc.
CIVIL • STRUCTURAL • SURVEYING
317 Main Street Norwich, Connecticut
(860) 886-1966 Fax (860) 886-9165

STATE OF CONNECTICUT
ERIC J. HAUBENSTOCK
No. 24328
LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

KEY OBSERVATION POINTS

Project No. CLA-6430
Proj. Engineer E.M.B.
Date: 2/11/2020
Sheet No. 8

CLA

M:\6000\6400\6430 Benz Street Solar\Drawings\+Current\08 KOP PLAN-BENZ.dwg

EXHIBIT A: PROJECT CROSS SECTION (NORTHERN SITE VIEW)

(SCALE: 1" = 80')

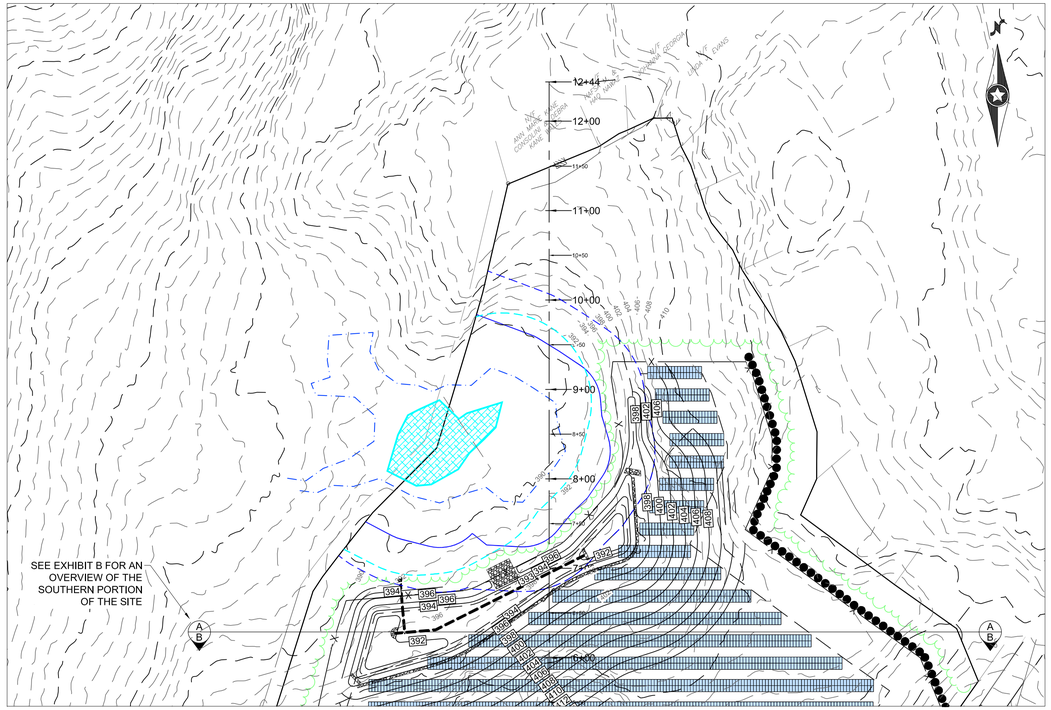
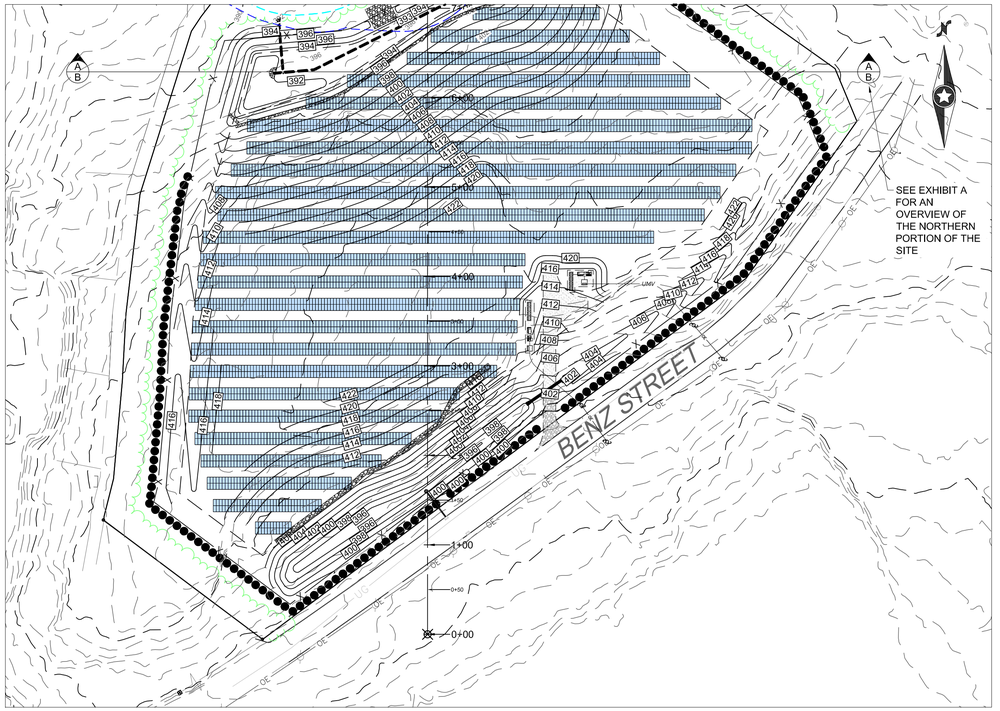
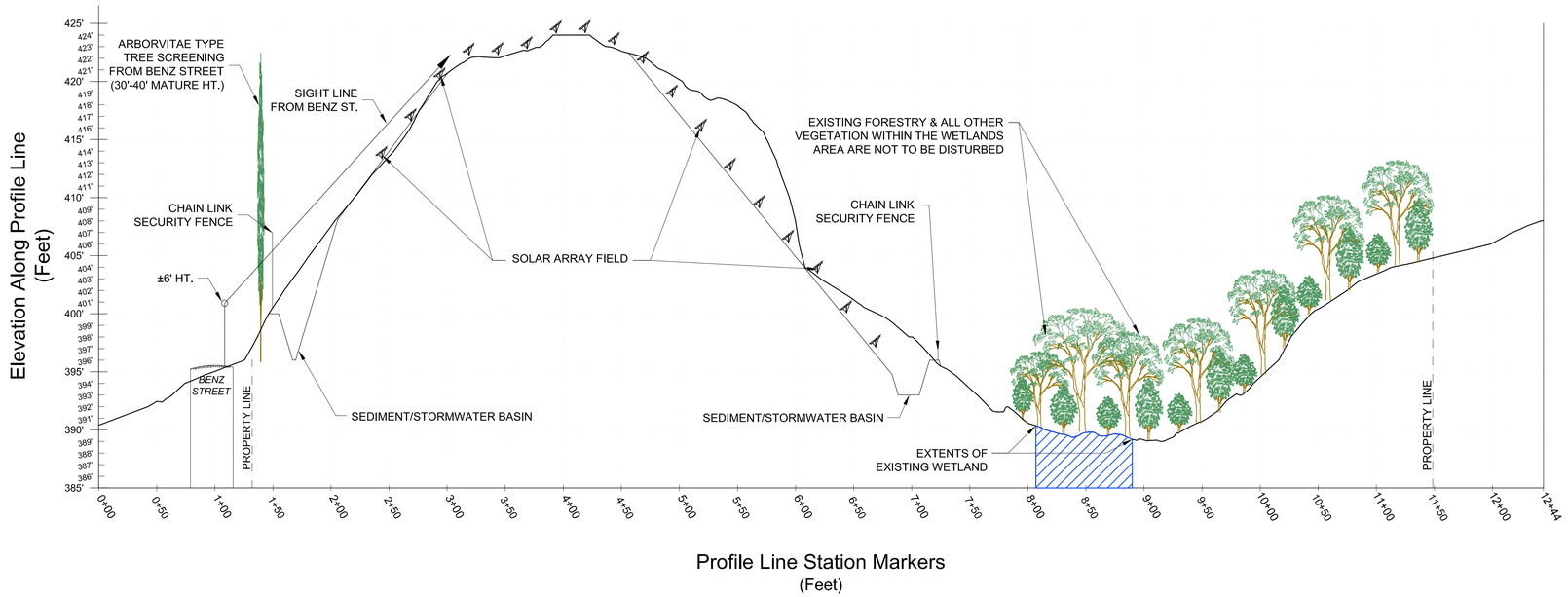


EXHIBIT B: PROJECT CROSS SECTION (SOUTHERN SITE VIEW)

(SCALE: 1" = 80')



PROJECT PROFILE:



No.	Date	Revision
8	5/24/2021	MISC. UPDATES AND REVISIONS
7	4/16/2021	MISC. UPDATES AND REVISIONS
6	3/22/2021	MISC. UPDATES AND REVISIONS
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/22/20	2 MW CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	2/11/20	CSC SUBMISSION

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, Connecticut
(860) 886-1966 Fax (860) 886-9165

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

PROJECT CROSS SECTION

Project No.	CLA-6430
Proj. Engineer	E.M.B.
Date:	2/11/2020
Sheet No.	9

ROAD DESIGN PARAMETERS

1. ROAD MAINTENANCE CAN BE EXPECTED OVER THE LIFE OF THE PERMANENT FACILITY.

SPECIAL PROVISIONS FOR GRADING AND EROSION CONTROL

THE CONTRACTOR SHALL PROVIDE EROSION CONTROL MEASURES AS PLANNED AND SPECIFIED FOLLOWING BEST MANAGEMENT PRACTICES AS OUTLINED BY THE STATE OF CONNECTICUT AND BEING IN CONFORMANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL STORMWATER PERMIT. SEE THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR EROSION CONTROL AND RESTORATION SPECIFICATIONS. UNLESS OTHERWISE NOTED OR MODIFIED HEREIN, ALL SECTIONS OF THE GENERAL CONDITIONS SHALL APPLY.

EXECUTION

1. CLEARING AND GRUBBING
   A. THE CONTRACTOR SHALL BE REQUIRED TO REMOVE ALL TREES, STUMPS, BRUSH, AND DEBRIS WITHIN THE GRADING LIMITS SHOWN ON THE PLANS. THE CONTRACTOR IS TO REMOVE ONLY THOSE TREES WHICH ARE DESIGNATED BY THE OWNER'S REPRESENTATIVE FOR REMOVAL, AND SHALL EXERCISE EXTREME CARE AROUND EXISTING TREES TO BE SAVED.
2. TOPSOIL STRIPPING
   A. TOPSOIL SHALL BE STRIPPED FROM ALL ROADWAY AREAS THROUGH THE ROOT ZONE. TOPSOIL SHALL NOT BE STRIPPED OUTSIDE OF THE DESIGNATED DISTURBANCE AREAS.
   B. ANY TOPSOIL, THAT HAS BEEN STRIPPED, SHALL BE RE-SPREAD OR STOCKPILED WITHIN GRADING AREAS AND/OR USED AS FILL OUTSIDE OF THE DISTURBANCE AREAS, AS DIRECTED BY THE ENGINEER.
3. EMBANKMENT CONSTRUCTION.
   A. EMBANKMENT CONSTRUCTION SHALL CONSIST OF THE PLACING OF SUITABLE FILL MATERIAL, AFTER TOPSOIL STRIPPING, ABOVE THE EXISTING GRADE. GENERALLY, EMBANKMENTS SHALL HAVE COMPACTED SUPPORT SLOPES OF TWO AND A HALF FEET HORIZONTAL TO ONE FOOT VERTICAL. THE MATERIAL FOR EMBANKMENT CONSTRUCTION SHALL BE OBTAINED FROM THE ACCESS ROAD EXCAVATION (SEE GEOTECHNICAL REPORT FOR RESTRICTIONS), OR ANY SUITABLE, APPROVED SOIL OBTAINED OFFSITE BY CONTRACTOR, AS DIRECTED OR APPROVED BY THE ENGINEER. THIS MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED 9".
   B. SIDE SLOPES GREATER THAN 2.5:1 WILL NOT BE PERMITTED, UNLESS OTHERWISE NOTED ON THE PLAN.

TESTING REQUIREMENTS:

1. TESTING SHALL BE PERFORMED BY A DESIGNATED INDEPENDENT TESTING AGENCY.
2. SUBMIT TESTING AND INSPECTION RECORDS SPECIFIED TO THE CIVIL ENGINEER OF RECORD FOR REVIEW.
   A. THE ENGINEER WILL REVIEW THE TESTING AND INSPECTION RECORDS TO CHECK CONFORMANCE WITH THE DRAWINGS AND SPECIFICATIONS. THE ENGINEER'S REVIEW DOES NOT RELIEVE THE CONSTRUCTION CONTRACTOR FROM THE RESPONSIBILITY FOR CORRECTING DEFECTIVE WORK.
3. PROOF ROLLING:
   A. PROOF-ROLLING SHALL BE PERFORMED IN THE PRESENCE OF THE GEOTECHNICAL ENGINEER OR QUALIFIED GEOTECHNICAL REPRESENTATIVE USING A FULLY LOADED TANDEM AXLE DUMP TRUCK WITH A MINIMUM GROSS WEIGHT OF 25 TONS OR A FULLY LOADED WATER TRUCK WITH AN EQUIVALENT AXLE LOADING. PROOF-ROLLING ACCEPTANCE STANDARDS INCLUDE NO RUTTING GREATER THAN 1.5 INCHES, AND NO "PUMPING" OF THE SOIL BEHIND THE LOADED TRUCK.
4. SIEVE ANALYSIS:
   A. SIEVE ANALYSIS SHALL BE CONDUCTED IN ACCORDANCE WITH AASHTO T27
5. PROCTOR:
   A. PROCTORS SHALL BE DETERMINED IN ACCORDANCE WITH ASTM D-1557
6. ATTERBERG LIMITS:
   A. ATTERBERG LIMITS SHALL BE DETERMINED IN ACCORDANCE WITH AASHTO T89 AND T90
7. MOISTURE DENSITY (NUCLEAR DENSITY):
   A. MOISTURE DENSITY TESTING SHALL BE DONE IN ACCORDANCE WITH AASHTO T310

SUBGRADE COMPACTION, TEST ROLLING AND AGGREGATE BASE COMPACTION:

1. FILL MATERIAL:
   A. SOILS USED AS FILL MATERIAL SHALL BE TESTED FOR GRAIN SIZE ANALYSIS, MOISTURE CONTENT, ATTERBERG LIMITS ON FINES CONTENT, AND PROCTOR TESTS (MODIFIED DRY MAXIMUM DENSITY).
      a. FOR PLACED & COMPACTED FILLS, PROVIDE ONE COMPACTION TEST PER LIFT FOR EVERY 1000 FT OF ROAD LENGTH. INCLUDE THE LOCATION, DRY DENSITY, MOISTURE CONTENT, AND COMPACTION PERCENT BASED ON MODIFIED PROCTOR MAXIMUM DRY DENSITY.
   B. IN ROADWAY CUT AREAS, OR WHERE EMBANKMENT CONSTRUCTION REQUIRES LESS THAN 12 INCHES OF FILL PLACEMENT, COMPACT TO A MINIMUM OF 95 PERCENT OF THE MATERIAL'S MODIFIED PROCTOR MAXIMUM DRY DENSITY.
2. COMPACTED SUBGRADE:
   A. THE ENTIRE SUBGRADE SHALL BE PROOF-ROLLED PRIOR TO THE PLACEMENT OF THE AGGREGATE BASE TO IDENTIFY AREAS OF UNSTABLE SUBGRADE.
   B. IF PROOF ROLLING DETERMINES THAT THE SUBGRADE STABILIZATION CANNOT BE ACHIEVED, THE FOLLOWING ALTERNATIVES WILL BE IMPLEMENTED:
      a. REMOVE UNSUITABLE MATERIAL AND REPLACE WITH SUITABLE EMBANKMENT.
      b. SCARIFY, DRY, AND RECOMPACT SUBGRADE AND PERFORM ADDITIONAL PROOF ROLL.
      c. INCREASE ROAD BASE THICKNESS.
   C. PROVIDE 1 MOISTURE DENSITY COMPACTION TESTS FOR EVERY 1000 L.F. OF ROAD LENGTH. COMPACTED SUBGRADE MUST BE COMPACTED TO A MINIMUM OF 95% MODIFIED PROCTOR MAXIMUM DRY DENSITY AT ±3% OF OPTIMUM MOISTURE CONTENT FOR GRANULAR SOILS AND AT -1 TO +3% OF OPTIMUM MOISTURE CONTENT FOR COHESIVE SOILS.
3. AGGREGATE BASE:
   A. AGGREGATE BASE SHALL BE PROOF-ROLLED OVER THE ENTIRE LENGTH. PROVIDE 1 SIEVE ANALYSIS PER 2500 CY OF ROAD BASE PLACED.
      a. IF PROOF ROLLING DETERMINES THAT THE ROAD IS UNSTABLE, ADDITIONAL AGGREGATE SHALL BE ADDED UNTIL THE UNSTABLE SECTION IS ABLE TO PASS A PROOF ROLL.

TABLE 1: TESTING SCHEDULE SUMMARY

LOCATION	TEST	FREQUENCY
STRUCTURAL FILL	GRAIN SIZE ANALYSIS, MOISTURE CONTENT, ATTERBERG LIMITS ON FINES CONTENT, AND PROCTOR	1 PER MAJOR SOIL TYPE
	MOISTURE DENSITY	1 PER 2,000 CY OR MIN. 1 PER LIFT
COMPACTED SUBGRADE	PROOF-ROLL	ENTIRE LENGTH
	MOISTURE DENSITY TEST (NUCLEAR DENSITY)	1 PER 1,000 FT OR MIN. 5 FOR THE SITE
AGGREGATE BASE	PROOF-ROLL	ENTIRE LENGTH
	SIEVE ANALYSIS	1 PER 2,500 CY

GENERAL NOTES:

1. THE PLANIMETRIC FEATURES, GROUND SURFACE CONTOURS ON A LIDAR SURFACE PROVIDED NOAA.
2. NO GRADING OR SOIL DISTURBANCE IS PERMITTED OUTSIDE OF THE GRADING LIMITS IDENTIFIED ON THE PLANS.
3. GRADE ALL PROPOSED ROADS TO THE SLOPES PROPOSED ON THE PLANS.
4. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING DRAINAGE THROUGHOUT THE CONSTRUCTION OF THIS PROJECT. CONSTRUCTION ACTIVITIES SHALL NOT BLOCK THE NATURAL OR MANMADE CREEKS OR DRAINAGE SWALES CAUSING RAINWATER TO POND. ADDITIONAL CULVERTS IN EXCESS OF THOSE ON THE PLANS MAY BE REQUIRED AS APPROVED BY THE ENGINEER.
5. THE CONTRACTOR SHALL NOTIFY DIGSAFE AT LEAST 48 HOURS BEFORE EXCAVATION ACTIVITIES COMMENCE.
6. WETLAND INFORMATION SHOWN ON THE PLAN WAS PROVIDED BY GODFREY, HOFFMAN, AND LODGE, LLC AND FLAGGED BY MATHEW DAVISON. THE GENERAL CONTRACTOR SHALL VERIFY THAT ALL WETLAND PERMITS HAVE BEEN SUBMITTED AND APPROVED PRIOR TO CONSTRUCTION COMMENCING.
7. ELECTRICAL COLLECTION SYSTEM SHOWN ON THE PLAN SHALL BE CONSIDERED PRELIMINARY. CONTRACTOR SHALL REFER TO FINAL ELECTRICAL DESIGN PLANS FOR ACTUAL DESIGN LOCATIONS.

STORMWATER POLLUTION PREVENTION PLAN (SWPCP):

1. REFER TO THE SWPPP BOOKLET FOR SEDIMENT AND EROSION CONTROL PROCEDURES, LOCATIONS OF BMPs, DETAILS, AND INSPECTION INFORMATION.
2. ALL AREAS DISTURBED DURING CONSTRUCTION ACTIVITIES AND NOT COVERED BY ROAD SURFACING MATERIALS, SHALL BE SEEDED IN ACCORDANCE WITH THE SWPPP PLAN.
3. TEMPORARY EROSION CONTROL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE TEMPORARY EROSION CONTROL PLAN SHALL BE IN ACCORDANCE WITH STATE OF CONNETICUT, THE EPA, AND THE SWPCP ON FILE.

SLOPE STABILIZATION:

ALL AREAS DESIGNATED ON THE PLAN FOR SLOPE STABILIZATION SHALL BE GRADED AND COMPACTED, SMOOTH AND CLEAN TO THE FINISH CONTOURS SHOWN ON THE PLAN, WITH A MINIMUM OF 4 INCHES OF TOPSOIL PLACED ON THE AREA. STABILIZATION SHALL BE ACHIEVED IN ONE OF TWO MANNERS:

EITHER: 1) HAND-PLACED RIPRAP
OR:
2) SEED WITH EROSION CONTROL AND REVEGITATION MAT (ECRM)

1. PLACEMENT OF RIP-RAP

RIPRAP HAND PLACED. HAND-PLACED RIPRAP SHALL CONSIST OF ROUGH UNHEWN QUARRY STONES, APPROXIMATELY RECTANGULAR, PLACED DIRECTLY ON THE SPECIFIED SLOPES OR SURFACES. IT SHALL BE SO LAID THAT THE WEIGHT OF THE LARGE STONES IS CARRIED BY THE SOIL RATHER THAN BY ADJACENT STONES. STONES SHALL WEIGH BETWEEN 50 AND 150 LB. EACH AND AT LEAST 60 % OF THEM SHALL WEIGH MORE THAN 100 LB. EACH WHEN USED ON EMBANKMENT CONSTRUCTION. RIP RAP FOR BMPS SHALL BE 6"-8" DIA. PREPARATION FOR HAND-PLACED RIP RAP. BEFORE ANY RIP RAP IS PLACED, THE SURFACE TO BE COVERED SHALL BE FULLY COMPACTED AND GRADED TO THE REQUIRED SLOPE. PLACE MIRAFITM8 OR APPROVED EQUAL GEOTEXTILE ON SLOPE. RIP RAP ON SLOPES SHALL COMMENCE COMMENCE IN A TRENCH BELOW THE TOW OF THE SLOPE AND SHALL PROGRESS UPWARD, EACH STONE BEING LAID BY HAND PERPENDICULAR TO THE SLOPE WITH THE LONG DIMENSION VERTICAL, FIRMLY BEDDED AGAINST THE SLOPE AND AGAINST THE ADJOINING STONE, WITH ENDS IN CONTACT, AND WITH WELL-BROKEN JOINTS. SIMILAR METHODS SHALL BE USED WHEN LAYING RIPRAP ON STREAM BEDS, IN DITCHES, AND ON LEVEL SURFACES.

THE FINISHED SURFACE OF THE RIPRAP SHALL PRESENT AN EVEN, TIGHT SURFACE, NOT LESS THAN 12 INCHES THICK, MEASURED PERPENDICULAR TO THE SLOPE.

THE STONES WEIGHING MORE THAN 100 LB. SHALL BE WELL DISPERSED THROUGHOUT THE AREA WITH THE 50-100 LB. STONES LAID BETWEEN THEM IN SUCH A MANNER THAT ALL STONES WILL BE IN CLOSE CONTACT, THE REMAINING VOIDS SHALL BE FILLED WITH SPALLS OF SUITABLE SIZE AND WELL TAMPED TO PRODUCE A FIRM AND COMPACT REVETMENT.

2. STABILIZATION WITH EROSION CONTROL AND REVEGITATION MAT (ECRM)
   1) AREA MUST BE GRADED SMOOTH AND CLEAN TO FINISH GRADES, AND COMPACTED.

   2) SEED AND MULCH AREA. USE SEED MIX APPROVED BY THE ENGINEER.

   3) INSTALL ECRM PER MANUFACTURER'S INSTRUCTIONS, HOWEVER THESE MUST INCLUDE THE FOLLOWING MINIMUM REQUIREMENTS:

      A) GRADE GROUND TO FINISH CONTOURS. REMOVE ALL ROCKS, DIRT CLODS, STUMPS, ROOTS, TRASH, AND OTHER OBSTRUCTIONS LYING IN DIRECT CONTACT WITH THE SOIL SURFACE.

      B) DIG MAT ANCHOR TRENCHES (MINIMUM 12"DEEP, 6" WIDE) AT TERMINAL ENDS AND PERIMETER SIDES WHERE MAT IS TO BE INSTALLED.

      C) INSTALL MAT BY ROLLING UPHILL PARALLEL TO WATER FLOW, STARTING AT TRENCH. OVERLAP ROLLS BY MINIMUM OF 3". FASTEN TO GROUND WITH 18" PINS AND 1 1/2" WASHERS, OR EQUIVALENT. PIN MAT AT ENDS, AND EVERY 3' TO 5' ALONG OVERLAPS. DO NO STRETCH MAT. SPLICING ROLLS SHOULD BE DONE IN A CHECK SLOT. BACKFILL TO COVER ENDS AND FASTENERS, ROLLING MAT ACROSS BACKFILL AND PIN AGAIN.

   FOR MAT USE MIRAFI MIRAMAT TM8 OR EQUIVALENT.

INVASIVE SPECIES:

1. ALL EQUIPMENT SHALL BE INSPECTED UPON ARRIVAL. EQUIPMENT ARRIVING WITH OBSERVABLE SOIL OR PLANT FRAGMENTS WILL BE REMOVED AND CLEANED.
2. STRAW BALES ARE NOT BE USED ON SITE; ONLY WEED-FREE STRAW BALES ARE APPROVED.
3. OFF-SITE TOPSOIL MUST BE FREE OF INVASIVE SPECIES. THE ENGINEER SHALL BE NOTIFIED OF THE TOPSOIL SOURCE 6 WEEKS BEFORE DELIVERY.

SEDIMENTATION AND EROSION CONTROL PLAN

CONTACT:
STEVE BROYER
ECOS ENERGY
222 SOUTH 9TH STREET
SUITE 1600
MINNEAPOLIS MN 55402

THE PURPOSE OF THIS PROJECT IS TO INSTALL APPROXIMATELY 6136 SOLAR MODULES AND ASSCOCIATED ELECTICAL EQUIPMENT FOR POWER GENERATION.

THE TOTAL AREA OF THE PROJECT SITE IS APPROXIMATELY 12.7 ACRES AND THE TOTAL AREA OF THE SITE THAT IS EXPECTED TO BE DISTURBED BY CONSTRUCTION ACTIVITIES IS 10.7 ACRES.

THE EROSION & SEDIMENTATION CONTROL PLAN AND DETAILS HAVE BEEN DEVELOPED AS A STRATEGY TO CONTROL SOIL EROSION AND SEDIMENTATION DURING AND AFTER CONSTRUCTION. THIS PLAN IS BASED ON THE "2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL" BY THE CONNECTICUT COUNCIL ON SOIL AND WATER CONSERVATION IN COOPERATION WITH THE CONNECTICUT DEEP.

IN THE AREAS OF SOLAR PANEL INSTALLATION, THERE ARE SEVERAL ACTIVITIES (SITE GRADING, FOOTING INSTALLATION, PANEL INSTALLATION, AND ELECTRICAL TRENCH WORK) THAT WILL DISTURB SOIL. SOIL MUST BE PROMPTLY STABILIZED AFTER EACH ACTIVITY.

THIS PROJECT WILL NOT BE PHASED. THE DEVELOPMENT WILL FOLLOW THE CONSTRUCTION SEQUENCE PROVIDED ON THIS PLAN.

THE PROPOSED LOCATIONS OF SILTATION AND EROSION CONTROL MEASURES ARE SHOWN ON THE PLANS. THE CONTRACTOR SHALL PROVIDE SILT FENCE, HAY BALES, EROSION MAT, STONE CHECK DAMS, A CONSTRUCTION ENTRANCE, AND/OR OTHER EROSION CONTROL MEASURES AS NEEDED OR DIRECTED BY THE ENGINEER OR TOWN STAFF TO ADEQUATELY PREVENT SEDIMENT TRANSPORT.

EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO SITE DISTURBANCE.

THE CONTRACTOR SHALL INSPECT, REPAIR AND/OR REPLACE EROSION CONTROL MEASURES EVERY 7 DAYS AND IMMEDIATELY FOLLOWING ANY SIGNIFICANT RAINFALL OR SNOW MELT. SEDIMENT DEPOSITS MUST BE REMOVED BEFORE DEPOSITS REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER. SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL AREAS UPSLOPE ARE PERMANENTLY STABILIZED.

STAKED HAY BALE SILT BARRIERS OR SILT FENCE SHALL BE INSTALLED AROUND ANY TEMPORARYSTOCKPILE AREAS. TEMPORARY VEGETATIVE COVER MAY BE REQUIRED (SEE NOTE).

CONTINUOUS DUST CONTROL USING WATER OR APPROVED EQUAL SHALL BE PROVIDED FOR ALL EARTH STOCKPILES, EARTH PILED ALONG EXCAVATIONS, SURFACES OF BACKFILLED TRENCHES AND GRAVELED ROADWAY SURFACES. THE USE OF CALCIUM CHLORIDE FOR DUST CONTROL SHALL NOT BE ALLOWED.

IF DEWATERING IS NECESSARY DURING ANY TIME OF CONSTRUCTION A CLEAR WATER DISCHARGE SHALL BE PROVIDED AS SHOWN IN THE HAY-BALE BARRIER DEWATERING DETAIL OR ALTERNATE METHOD PROPOSED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

ALL DISTURBED AREAS SHALL BE RESTORED PER THE SLOPE STABILIZATION AND PERMANENT VEGETATION DETAILS. ALL DISTURBED AREAS THAT ARE SLOPED LESS THAN THREE HORIZONTAL TO ONE VERTICAL (3:1) SLOPE SHALL BE LOAMED, SEEDED, FERTILIZED AND MULCHED PER THE PERMANENT VEGETATIVE COVER SPECIFICATIONS. EROSION CONTROL MATTING SHALL BE PROVIDED ON ALL DISTURBED AREAS THAT ARE SLOPED MORE THAN THREE HORIZONTAL TO ONE VERTICAL (3:1).

IF FINAL SEEDING OF DISTURBED AREAS IS NOT TO BE COMPLETED BEFORE OCTOBER 15, THE CONTRACTOR SHALL PROVIDE TEMPORARY MULCHING (DORMANT SEEDING MAY BE ATTEMPTED AS WELL) TO PROTECT THE SITE AND DELAY PERMANENT SEEDING.

WHEN FEASIBLE, TEMPORARY SEEDING OF DISTURBED AREAS THAT HAVE NOT BEEN FINISHED GRADED SHALL BE COMPLETED PRIOR TO OCTOBER 15.

ON EACH FRIDAY AND ALSO ON THE DAY BEFORE ANY RAIN FORECAST OF 0.5 INCHES OR MORE, THE CONTRACTOR SHALL HAY MULCH ALL EXPOSED SOIL.

ANY EROSION WHICH OCCURS WITHIN THE DISTURBED AREAS SHALL BE IMMEDIATELY REPAIRED AND STABILIZED. DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT SHALL BE RETURNED TO THE SITE. POST SEEDING, INTERCEPTED SEDIMENT, IF ANY, SHALL BE DISPOSED OF IN A MANNER APPROVED BY THE TOWN AND ENGINEER.

EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN IN PLACE UNTIL VEGETATION IS RE-ESTABLISHED OR SLOPES ARE STABILIZED AND REMOVAL IS APPROVED BY THE ENGINEER.

UNFORESEEN PROBLEMS WHICH ARE ENCOUNTERED IN THE FIELD SHALL BE SOLVED ACCORDING TO THE "2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL" BY THE CONNECTICUT COUNCIL ON SOIL AND WATER CONSERVATION IN COOPERATION WITH THE CONNECTICUT DEEP.

THE CONTRACTOR SHALL PROVIDE THE NAME AND EMERGENCY CONTACT INFORMATION FOR THE PROJECT PERSONNEL RESPONSIBLE FOR EROSION AND SEDIMENTATION CONTROLS PRIOR TO THE START OF CONSTRUCTION.

THE OWNER WILL EMPLOY A CERTIFIED SOIL SCIENTIST TO PERFORM WEEKLY EROSION & SEDIMENTATION CONTROL INSPECTION.
A. ROUTINE REPAIRS OR MODIFICATIONS SHALL BE COMPLETED BY THE CONTRACTOR WITHIN 48 HOURS AFTER DIRECTION BY THE INSPECTOR.
B. EMERGENCY REPAIRS SHALL BE COMPLETED IMMEDIATELY UPON DIRECTION BY THE INSPECTOR.

THE WETLANDS ENFORCEMENT OFFICER SHALL BE NOTIFIED AT LEAST 2 BUSINESS DAYS PRIOR TO CONSTRUCTION TO INSPECT EROSION CONTROLS.

STATE AND FEDERAL PERMITS REQUIRED: THIS PROJECT REQUIRES A PERMIT FROM THE STATE OF CONNECTICUT SITING COUNCIL.

THE FOLLOWING DOCUMENTS ARE CONSIDERED TO BE PART OF THIS EROSION AND SEDIMENTATION CONTROL PLAN: THE COMPLETE SITE PLANS, THE DRAINAGE NARRATIVE PREPARED BY CLA ENGINEERS, AND THE CTDEEP 2002 MANUAL.

CONSTRUCTION SEQUENCE

1. PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY AT THE SITE, APPLICANT BENZ SOLAR LLC SHALL
   a. PROVIDE DEEP WITH A SIGNED LETTER FROM THE CITY OF ANSONIA AUTHORIZING THE CONNECTION OF BASIN NUMBER 2 (STORMWATER TREATMENT BASIN #2 OUTLET RISER DETAIL, PAGE 11 OF 11 OF THE CONSTRUCTION DOCUMENTS) WITH THE CITY OF ANSONIA'S STORMWATER SYSTEM
   b. CONTRACT WITH THE APPROPRIATE CONSERVATION DISTRICT TO PROVIDE INSPECTION SERVICES AT THE SITE PURSUANT TO APPENDIX F OF THE GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER AND DEWATERING WASTEWATERS FROM CONSTRUCTION ACTIVITIES
   c. CONTACT CALL BEFORE YOU DIG (811 OR 1-800-922- 4455) TO MARK UTILITIES.
2. NOTIFY THE TOWN OF ANSONIA ZONING AND INLAND WETLANDS AGENTS OF START OF CONSTRUCTION A MINIMUM OF 48 HOURS IN ADVANCE.
3. HAVE CT LICENSED LAND SURVEYOR STAKE OUT THE CLEARING LIMITS AND PERIMETER EROSION CONTROL.
4. CUT TREES BUT DO NOT GRUB.
5. INSTALL CONSTRUCTION ENTRANCE.
6. INSTALL PERIMETER EROSION AND SEDIMENTATION CONTROLS (HAY BALES AND WOODCHIP MULCH) AND HAVE INSPECTED BY SITE INSPECTOR PRIOR TO GRUBBING OR GRADING ACTIVITIES.
7. EXCAVATE AND STABILIZE BASIN #1, IF DEWATERING IS NECESSARY FOR EXCAVATION PLEASE COORDINATE DEWATERING PLAN WITH QUALIFIED ENVIRONMENTAL PROFESSIONAL. INSTALL BASIN DRAIN OUTLET PIPING AND CAP PIPE IN THE BOTTOM OF THE BASIN. PROVIDE A STAKE MARKING THE CAP LOCATION. DO NOT INSTALL PERFORATED BASIN DRAIN AND CRUSHED STONE. BASIN #1 SHALL BE USED AS A TEMPORARY SEDIMENTATION BASIN DURING CONSTRUCTION. UPON COMPLETION OF THE BASIN #1 GRADING THE CONTRACTOR SHALL HAVE THE STABILIZED BASIN INSPECTED BY SITE INSPECTOR.
8. GRUB WATERSHED 1 SITE AREA AND PERFORM SITE GRADING AND STABILIZATION WITHIN WATERSHED 1 WORK AREA AS IDENTIFIED ON THE PLANS.
9. GRADE AND STABILIZE WESTERN SWALE TO BASIN #1.
10. PRIOR TO THE CONSTRUCTION TRANSITION TO WATERSHED #2, THE CONTRACTOR SHALL HAVE THE WATERSHED #1 GRADING AND STABILIZATION REVIEWED BY THE SITE INSPECTOR TO ENSURE APPROPRIATE STABILIZATION.
11. EXCAVATE AND STABILIZE BASIN #2, IF DEWATERING IS NECESSARY FOR EXCAVATION PLEASE COORDINATE DEWATERING PLAN WITH QUALIFIED ENVIRONMENTAL PROFESSIONAL. BASIN #2 SHALL BE USED AS A TEMPORARY SEDIMENTATION BASIN DURING CONSTRUCTION. UPON COMPLETION OF THE BASIN #2 GRADING THE CONTRACTOR SHALL HAVE THE STABILIZED BASIN INSPECTED BY SITE INSPECTOR.
12. GRADE AND STABILIZE EASTERN SWALE TO BASIN #2 AND INSTALL DRIVEWAY CULVERT.
13. GRUB WATERSHED 2 SITE AREA AND PERFORM ADDITIONAL SITE GRADING WITHIN WATERSHED 2 WORK AREA AS IDENTIFIED ON THE PLANS.
14. INSTALL ACCESS DRIVEWAY.
15. INSTALL PERIMETER CHAIN LINK FENCE AROUND ENTIRE SITE.
16. INSTALL THE BASIN DRAIN PERFORATED PIPE AND CRUSHED STONE WITHIN BASIN #1.
17. AFTER THE INITIAL GRADING WORK IS COMPLETE THE BASINS, SWALES, AND ALL DISTURBED AREAS SHALL BE LEFT FOR A MINIMUM OF ONE GROWING SEASON (APRIL 1ST THROUGH JUNE 15TH OR AUGUST 15TH THROUGH OCTOBER 15TH). THE SITE SHALL BE LEFT UNDISTURBED TO ALLOW NEW VEGETATION TO ESTABLISH. ROUTINE INSPECTIONS SHALL BE PERFORMED AND ANY ERODED AREAS OR BARE AREAS RESTORED. ANY WORK ASSOCIATED WITH THE INSTALLATION / RACKING OF THE SOLAR ARRAY WILL NOT COMMENCE UNTIL THE PERIMETER CONTROLS, INCLUDING, BUT NOT LIMITED TO, ALL SWALES AND BASINS, HAVE BEEN VEGETATIVELY STABILIZED.
18. INSTALL SOLAR RACKING FOUNDATIONS, AND RACKING, AND SOLAR MODULES. HYDROSEED OR SEED AND MULCH ANY EXPOSED SOIL AT THE END OF EACH WEEK AND BEFORE EVERY RAINFALL PREDICTED FOR 0.5 INCHES OR MORE.
19. TRENCH FOR AND INSTALL ELECTRIC LINES AND AT THE END OF EACH WEEK HYDROSEED OR MULCH AND SEED ANY EXPOSED SOIL AT THE END OF EACH WEEK AND BEFORE EVERY RAINFALL PREDICTED FOR 0.5 INCHES OR MORE.
20. INSTALL REMAINING ELECTRIC INFRASTRUCTURE AND AT THE END OF EACH WEEK HYDROSEED OR MULCH AND SEED ANY EXPOSED SOIL AT THE END OF EACH WEEK AND BEFORE EVERY RAINFALL PREDICTED FOR 0.5 INCHES OR MORE.
21. OVERSEED DISTURBED SOILS WHEN ALL SOLAR PANEL INSTALLATION AND ELECTRICAL TRENCHING IS COMPLETE.
22. CLEAN SEDIMENTS BASINS AND GRADE AND RE-SEED FOR USE AS STORMWATER BASINS WHEN SITE INSPECTOR DEEMS SOILS ARE STABILIZED.
23. INSTALL PERIMETER SCREENING PLANTINGS

ROCK / LEDGE MANAGEMENT & STABILIZATION PLAN

WITHIN STORMWATER BASINS

1. BOULDERS AND LOOSE ROCK, IF ENCOUNTERED, WITHIN THE STORMWATER BASINS SHALL BE REMOVED FROM THE BASIN LIMITS BY EXCAVATOR OR MECHANICAL MEANS ONLY. ANY VOIDS LEFT BY THE BOULDERS OR LOOSE ROCK SHALL BE BACKFILLED WITH GRAVEL FILL. PROVIDE TOPSOIL AND SEED MIX AS SPECIFIED ON THE PROJECT PLANS.
2. LEDGE, IF ENCOUNTERED, SHALL BE REMOVED BY MECHANICAL MEANS ONLY, BLASTING SHALL NOT BE PERMITTED AT THE SITE. LEDGE SHALL BE REMOVED TO A MINIMUM OF 18" BELOW FINISHED GRADE ELEVATION. 12" OF GRAVEL FILL AND 6" OF TOPSOIL SHALL BE INSTALLED OVER LEDGE. PROVIDE SEED MIX AS SPECIFIED ON THE PROJECT PLANS.

ROCK THROUGHOUT THE SITE

1. LEDGE, BOULDERS, OR LOOSE ROCK WHEN ENCOUNTERED THROUGHOUT THE REMAINING PORTIONS OF THE SITE SHALL BE REMOVED AS NEEDED TO PERFORM THE WORK. REMOVAL SHALL BE BY EXCAVATOR, OR BY MECHANICAL MEANS ONLY. BLASTING SHALL NOT BE PERMITTED AT THE SITE.
2. WHEN BOULDERS OR LOOSE ROCK IS EXCAVATED AS PART OF THE WORK, ANY VOIDS LEFT BEHIND SHALL BE BACKFILLED WITH GRAVEL FILL.
3. WHEN LEDGE IS ENCOUNTERED AT THE GROUND SURFACE WITHIN THE WORK AREA A MINIMUM OF 6" OF TOPSOIL, SEED, FERTILIZER, AND EROSION CONTROL MATTING SHALL BE INSTALLED OVER THE LEDGE AS CALLED FOR ON THE PROJECT PLANS. SEED, FERTILIZER, AND EROSION CONTROL MATTING MUST BE INSTALLED WITHIN 24 HOURS OF TOPSOIL PLACEMENT.
4. EXCAVATED ROCK MAY BE TEMPORARILY STORED ON SITE AND THE CONTRACTOR SHALL MANAGE THE MATERIAL IN EITHER OF THE FOLLOWING MANNERS, AT THEIR DISCRETION:
   A. ROCK MAY BE REMOVED FROM THE SITE VIA TRUCKS AND/OR TRAILERS AND LEGALLY DISPOSED OF OR PROCESSED OFFSITE.
   B. ROCK MAY BE CRUSHED ONSITE, PROCESSED, AND USED AS TRENCH BACKFILL OR AS GENERAL FILL ONSITE. PORTABLE CRUSHING EQUIPMENT, PROCESSING EQUIPMENT, AND STOCKPILES SHALL BE SURROUNDED BY SILT FENCE OR STRAW BALE BARRIERS.
   C. BOULDERS MAY BE PLACED AROUND THE SITE PERIMETER TO BE USED AS SCREENING FEATURES. LOCATIONS SHALL BE COORDINATED WITH THE SITE OWNER.
5. PROCESSED ROCK PLACED ON THE SITE AS GENERAL FILL SHALL MAINTAIN THE STORMWATER DRAINAGE PATTERNS AS SHOWN ON THE PROJECT PLANS.

No.	Date	Revision
9	8/16/2021	CONSTRUCTION SEQUENCE UPDATED
8	5/24/2021	MISC. UPDATES AND REVISIONS
7	4/16/2021	MISC. UPDATES AND REVISIONS
6	3/22/2021	MISC. UPDATES AND REVISIONS
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/22/20	2 MW CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	2/11/20	CSC SUBMISSION

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, Connecticut
(860) 886-1966 Fax (860) 886-9165

RICHARD J. MAUER
No. 24328
LICENSED PROFESSIONAL ENGINEER
STATE OF CONNECTICUT

31 BENZ STREET
ANSONIA, CT 06401

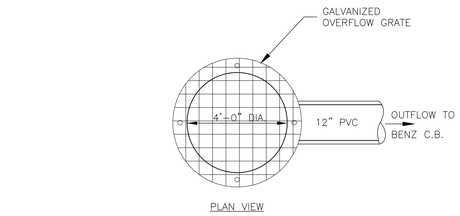
BENZ STREET SOLAR

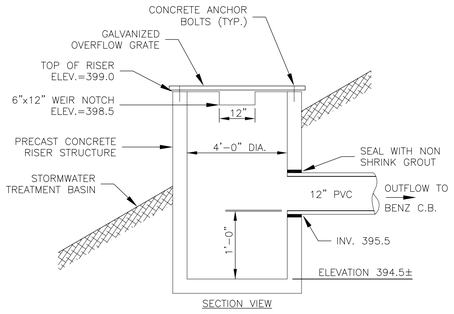
CIVIL NOTES

Project No. CLA-6430
Proj. Engineer E.M.B.
Date: 2/11/2020
Sheet No. 10

CLA

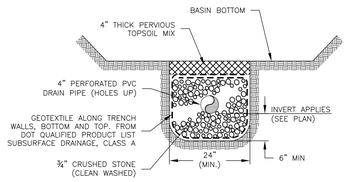
M:\6000\6400\6430 Benz Street Solar\Drawings\+ Current\ 10 DETAILS & NOTES-BENZ.dwg





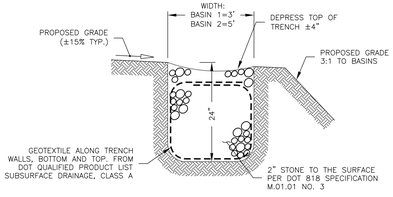
STORMWATER TREATMENT BASIN #2 OUTLET RISER STRUCTURE DETAIL

NOT TO SCALE



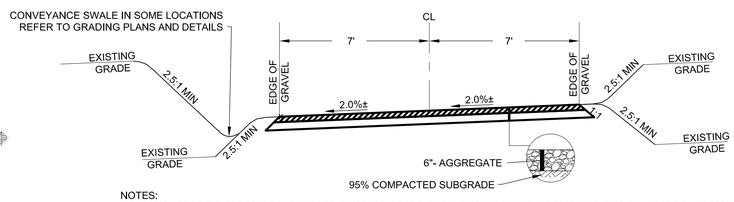
BASIN DRAIN DETAIL

NOT TO SCALE



STONE INFILTRATION TRENCH DETAIL

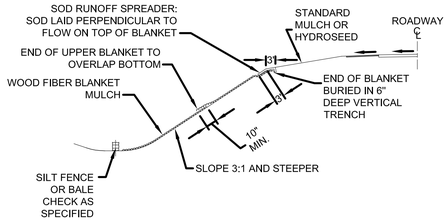
NOT TO SCALE



NOTES:
1. CONTRACTOR TO SUBCUT ROADWAY TO EXISTING GRADE ELEVATION TO MAINTAIN EXISTING SITE DRAINAGE PATTERNS WHEREVER POSSIBLE.
2. IN FILL LOCATIONS CONTRACTOR TO GRADE TOE OF SLOPE TO EXISTING GRADE, AND MAINTAIN NATURAL DRAINAGE PATTERNS.
3. IN CUT LOCATIONS CONTRACTOR TO CREATE SWALE ON DOWNSTREAM SIDE, REFER TO GRADING PLANS FOR DETAILS.
4. CONTRACTOR TO COMPACT AGGREGATE TO 95% MAXIMUM DRY DENSITY.
5. REFER TO GEOTECHNICAL RECOMMENDATIONS FOR ADDITIONAL ROADWAY SECTION DESIGN INFORMATION.

ACCESS ROAD DETAIL

NOT TO SCALE



EROSION CONTROL BLANKET INSTALLATION ON AN INSLOPE
(WHEN REQUIRED)

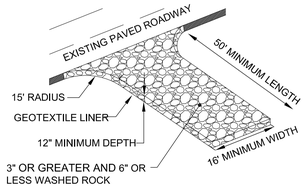
CATEGORY	SLOPE	VELOCITY
1	FLAT	-
2	3:1	< 5.0 fps
3	3:1	< 6.5 fps
4	2:1	< 7.0 fps

CATEGORY	ACCEPTABLE TYPES
1	STRAW RD 1S, WOOD FIBER RD 1S
2	STRAW 1S, WOOD FIBER 1S
3	STRAW 2S, WOOD FIBER 2S
4	STRAW/COCONUT 2S, WOOD FIBER HV 2S

THE LETTERING DESIGNATION SHALL BE DEFINED AS FOLLOWS:
1S - NETTING ON ONE SIDE
RD - RAPIDLY DEGRADABLE
2S - NETTING ON TWO SIDES
HV - HIGH VELOCITY

EROSION CONTROL BLANKET

NOT TO SCALE

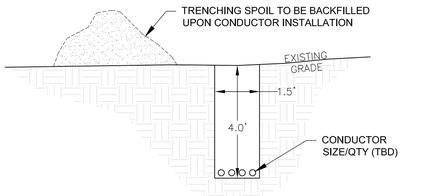


NOTE:

ROCK CONSTRUCTION ENTRANCE SHOULD BE A MINIMUM THICKNESS OF 1.0' AND CONTAIN MAXIMUM SIDE SLOPES OF 4:1. ROCK ENTRANCE SHOULD BE INSPECTED AND MAINTAINED REGULARLY. ROCK ENTRANCE LENGTH MAY NEED TO BE EXTENDED IN CLAY SOILS.

ROCK CONSTRUCTION ENTRANCE

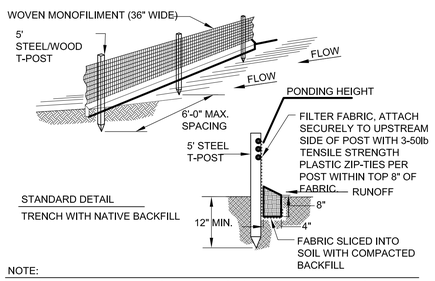
NOT TO SCALE



NOTES:
1. CONDUCTOR CLEARANCES DEPENDENT ON GEOTECHNICAL PARAMETERS AND ELECTRICAL DESIGN
2. CONDUCTOR SIZING AND QUANTITIES PER TRENCH DEPENDENT ON FINAL ELECTRICAL DESIGN TRENCH DIMENSIONS FOR EARTHWORK QUANTITIES ARE CONSERVATIVE.

TRENCHING DETAIL

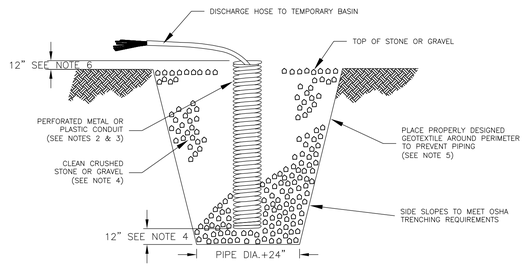
NOT TO SCALE



NOTE:
1. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN ACCUMULATED TO 1/3 THE HEIGHT OF THE FABRIC OR MORE.
2. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
4. ALL ENDS OF THE SILT FENCE SHALL BE WRAPPED UPSLOPE SO THE ELEVATION OF THE BOTTOM OF FABRIC IS HIGHER THAN "PONDING HEIGHT".

SILT FENCE

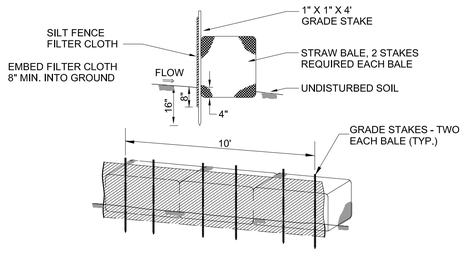
NOT TO SCALE



NOTES:
1. OVERALL SUMP PIT DIMENSIONS SHALL BE COMPATIBLE WITH ANTICIPATED SEEPAGE RATES AND PUMP SIZE TO BE USED.
2. THE STANDPIPE DIAMETER AND NUMBER OF PERFORATIONS SHALL BE COMPATIBLE THE PUMP SIZE BEING USED.
3. PERFORATIONS IN THE STANDPIPE SHALL BE EITHER CIRCULAR OR SLOTS. PERFORATION SIZE SHALL NOT EXCEED ¼" DIAMETER.
4. CRUSHED STONE OR GRAVEL SHALL BE NO SMALLER THAN CT. DOT #67 SIZE NOR LARGER THAN CT. DOT #3 SIZE. CRUSHED STONE SHALL EXTEND A MINIMUM OF 12" BELOW THE BOTTOM OF THE STANDPIPE.
5. IF EXCESSIVE MOVEMENT OF FINE SOIL PARTICLES FROM THE SURROUNDING EXISTING SOILS IS ANTICIPATED, A PROPERLY DESIGNED GEOTEXTILE SHALL BE PLACED BETWEEN THE EXISTING SOILS AND THE CRUSHED STONE OR GRAVEL BACKFILL.
6. THE STANDPIPE SHALL EXTEND A MINIMUM OF 12" ABOVE THE SURROUNDING GROUND.

TYPICAL PUMP PIT DEWATERING DETAIL

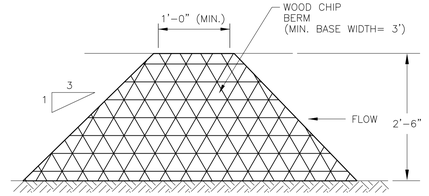
NOT TO SCALE



STRAW-BALE / SILT FENCE EROSION PROTECTION

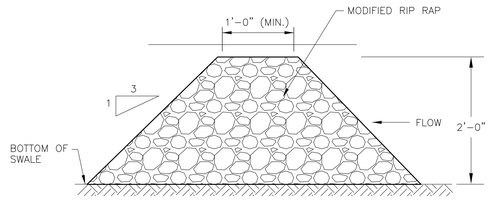
NOT TO SCALE

CONSTRUCTION NOTES:
1. SILT FENCE FILTER CLOTH TO BE SECURELY FASTENED TO GRADE STAKE WITH STAPLES, 6" ON CENTER.
2. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN ONE ANOTHER THEY SHALL OVERLAP BY 6" AND BE FOLDED.
3. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.



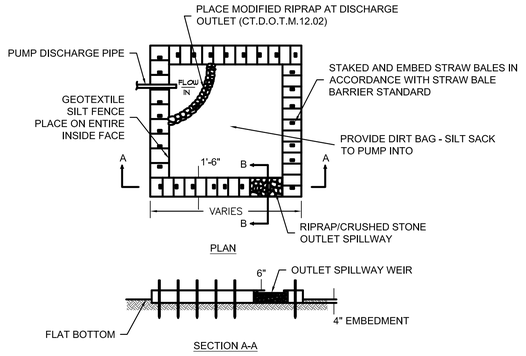
WOOD CHIP BERM

NOT TO SCALE

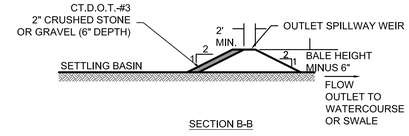


RIP-RAP CHECK DAM

NOT TO SCALE



NOTE: DIMENSIONS VARY ACCORDING TO PUMPING RATES. MINIMUM REQUIRED STORAGE IS CALCULATED FROM CREST OF SPILLWAY WEIR.



DEWATERING SETTLING BASIN DETAIL

NOT TO SCALE

DEWATERING PLAN

IF DEWATERING IS NECESSARY DURING CONSTRUCTION A CLEAR WATER DISCHARGE SHALL BE PROVIDED AS FOLLOWS:

A. THE PUMP INLET WILL BE WRAPPED IN FILTER FABRIC AND PLACED IN CRUSHED STONE WITHIN THE TRENCH.

B. THE PUMP OUTLET WILL DISCHARGE TO THE DEWATERING ENCLOSURE PER THE DETAIL FOR DEWATERING SETTLING BASIN TO BE LOCATED OUTSIDE OF THE 100' UPLAND REVIEW ZONE.

C. THE DISCHARGE FROM THE DEWATERING ENCLOSURE WILL BE MONITORED AND ADDITIONAL MEASURES EMPLOYED IF NECESSARY.

No.	Date	Revision
8	5/24/2021	MISC. UPDATES AND REVISIONS
7	4/16/2021	MISC. UPDATES AND REVISIONS
6	3/25/2021	MISC. UPDATES AND REVISIONS
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/22/20	2 MW CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	2/11/20	CSC SUBMISSION

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, Connecticut
(860) 886-1966 Fax (860) 886-9165

STATE OF CONNECTICUT
KYLE J. MATHEWS
No. 24320
REGISTERED
PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

CIVIL DETAILS

Project No. CLA-6430
Proj. Engineer E.M.B.
Date: 2/11/2020
Sheet No. 11

Attachment H

Permitting Documentation

(NOI, Permit Authorization)

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Notice of Termination Form

Please complete and submit this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your termination. Print or type unless otherwise noted.

Note: Ensure that for commercial and industrial facilities, registrations under the *General Permit for the Discharge of Stormwater Associated with Industrial Activity* (DEP-PED-GP-014) or the *General Permit for the Discharge of Stormwater from Commercial Activities* (DEP-PED-GP-004) have been filed where applicable. For questions about the applicability of these general permits, please call the Department at 860-424-3018.

Part I: Registrant Information

1. Permit number: ***GSN***
2. Fill in the name of the registrant(s) as indicated on the registration certificate:

   Registrant:
3. Site Address:

   City/Town: State: Zip Code:
4. Date all storm drainage structures were cleaned of construction sediment:

   Date of Completion of Construction:

   Date of Last Inspection (must be at least three months after final stabilization pursuant to Section 6(b)(6)(D) of the general permit):
5. Check the post-construction activities at the site (check all that apply):

   ☐ Industrial ☐ Residential ☐ Commercial ☐ Capped Landfill

   ☐ Other (describe):

Part II: Certification

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Signature of Permittee	Date
Name of Permittee (print or type)	Title (if applicable)

Note: Please submit this Notice of Termination Form to:

STORMWATER PERMIT COORDINATOR
BUREAU OF WATER MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Attachment I

NRCS Soil Maps & Report

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 State of Connecticut

Benz Solar

December 28, 2020

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

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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.

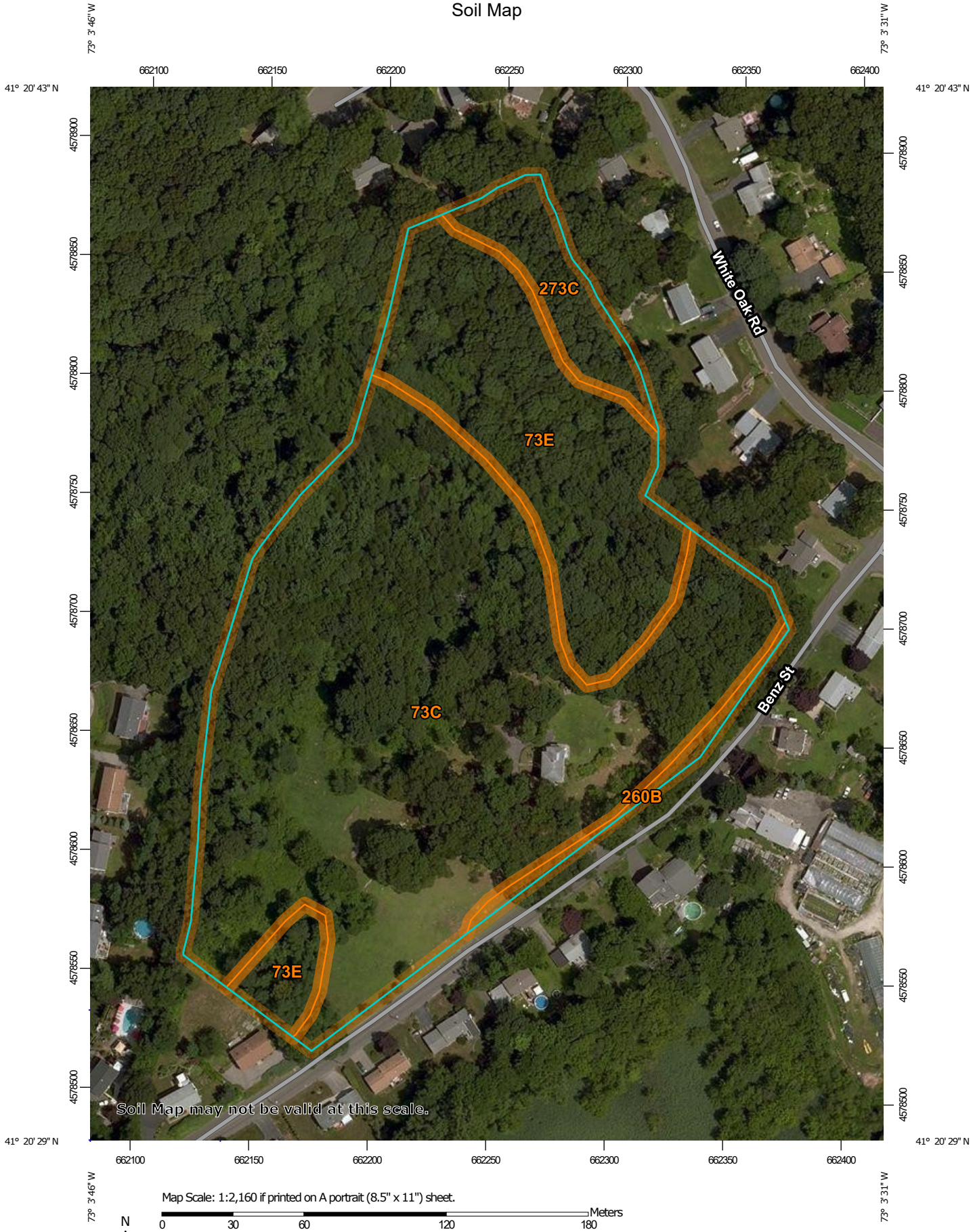
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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.

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

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
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 27, 2014—Jul 22, 2014

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
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	8.7	68.4%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	3.1	24.6%
260B	Charlton-Urban land complex, 3 to 8 percent slopes	0.2	1.4%
273C	Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes	0.7	5.5%
Totals for Area of Interest		**12.7**	**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.

State of Connecticut

73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2w698
Elevation: 0 to 1,550 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton, very stony, and similar soils: 50 percent
Chatfield, very stony, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Very Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Chatfield, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Sutton, very stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

Hollis, very stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, very stony

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

73E—Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 9lql
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 45 percent
Chatfield and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 7 inches: fine sandy loam
Bw2 - 7 to 19 inches: fine sandy loam
Bw3 - 19 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Chatfield

Setting

Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Sutton

Percent of map unit: 5 percent

Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Hollis

Percent of map unit: 3 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, sandy subsoil

Percent of map unit: 1 percent
Hydric soil rating: No

Unnamed, red parent material

Percent of map unit: 1 percent
Hydric soil rating: No

260B—Charlton-Urban land complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2xff7
Elevation: 0 to 1,020 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 40 percent
Urban land: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Ridges, hills, ground moraines
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex

Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile
Ap - 0 to 7 inches: fine sandy loam
Bw - 7 to 22 inches: gravelly fine sandy loam
C - 22 to 65 inches: gravelly fine sandy loam

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Moderate (about 6.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Urban Land

Typical profile
M - 0 to 10 inches: cemented material

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water capacity: Very low (about 0.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Chatfield
Percent of map unit: 10 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Hills, depressions, drainageways, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton

Percent of map unit: 5 percent
Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Udorthents

Percent of map unit: 5 percent
Landform: Ridges
Landform position (three-dimensional): Tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

273C—Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9llm
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 35 percent
Charlton and similar soils: 25 percent
Chatfield and similar soils: 15 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Ridges, hills

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 7 inches: fine sandy loam
Bw2 - 7 to 19 inches: fine sandy loam
Bw3 - 19 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Chatfield

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam

Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Hollis

Percent of map unit: 8 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Udorthents

Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Sutton

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Erosion

This folder contains a collection of tabular reports that present soil erosion factors and groupings. The reports (tables) include all selected map units and components for each map unit. Soil erosion factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

RUSLE2 Related Attributes (Benz Solar)

This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. Soil property data for each map unit component include the hydrologic soil group, erosion factor Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the mineral surface horizon. Missing surface data may indicate the presence of an organic layer.

Report—RUSLE2 Related Attributes (Benz Solar)

Soil properties and interpretations for erosion runoff calculations. The surface mineral horizon properties are displayed or the first mineral horizon below an organic surface horizon. Organic horizons are not displayed.

RUSLE2 Related Attributes–State of Connecticut								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky								
Charlton, very stony	50	125	B	.24	5	57.0	34.0	9.0
Chatfield, very stony	30	125	B	.28	2	58.0	33.0	9.0
73E—Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky								
Charlton	45	125	B	.28	5	64.5	30.0	5.5
Chatfield	30	125	B	.15	2	67.5	20.0	12.5
260B—Charlton-Urban land complex, 3 to 8 percent slopes								
Charlton	40	151	B	.24	5	57.0	34.0	9.0
273C—Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes								
Charlton	25	125	B	.28	5	64.5	30.0	5.5
Chatfield	15	125	B	.15	2	67.5	20.0	12.5

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Particle Size and Coarse Fragments (Benz Solar)

This table shows estimates of particle size distribution and coarse fragment content of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is

given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Total fragments is the content of fragments of rock and other materials larger than 2 millimeters in diameter on volumetric basis of the whole soil.

Fragments 2-74 mm refers to the content of coarse fragments in the 2 to 74 millimeter size fraction.

Fragments 75-249 mm refers to the content of coarse fragments in teh 75 to 249 millimeter size fraction.

Fragments 250-599 mm refers to the content of coarse fragments in the 250 to 599 millimeter size fraction.

Fragments >=600 mm refers to the content of coarse fragments in the greater than or equal to 600 millimeter size fraction.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Particle Size and Coarse Fragments–State of Connecticut										
Map symbol and soil name	**Horizon**	**Depth**	**Sand**	**Silt**	**Clay**	**Total fragments**	**Fragments 2-74 mm**	**Fragments 75-249 mm**	**Fragments 250-599 mm**	**Fragments >=600 mm**
		In	*L-RV-H Pct*	*L-RV-H Pct*	*L-RV-H Pct*	*RV Pct*	*RV Pct*	*RV Pct*	*RV Pct*	*RV Pct*
73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky										
Charlton, very stony	Oe	0-2	—	—	—	—	—	—	—	—
	A	2-4	39-57- 68	23-34- 50	2- 9- 15	5	5	0	0	—
	Bw	4-27	34-56- 71	23-36- 50	3- 8- 18	15	13	2	0	—
	C	27-65	45-59- 72	24-31- 50	4-10- 11	25	20	5	0	—
Chatfield, very stony	Oi	0-1	—	—	—	—	—	—	—	—
	A	1-2	35-58- 68	23-33- 53	2- 9- 15	5	5	0	0	—
	Bw	2-30	34-56- 71	25-36- 57	0- 8- 18	20	15	5	0	—
	2R	30-40	—	—	—	—	—	—	—	—
73E—Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky										
Charlton	Ap	0-4	57-65- 72	20-30- 40	3- 6- 8	11	10	1	0	—
	Bw1	4-7	57-65- 72	20-30- 40	3- 6- 8	12	10	2	0	—
	Bw2	7-19	57-65- 72	20-30- 40	3- 6- 8	13	10	2	1	—
	Bw3	19-27	57-65- 72	20-30- 40	3- 6- 8	29	25	2	2	—
	C	27-65	57-66- 72	20-30- 40	1- 5- 8	29	25	2	2	—
Chatfield	Oa	0-1	0- 0- 0	0- 0- 0	0- 0- 0	—	—	—	—	—
	A	1-6	52-68- 83	10-20- 30	7-13- 18	27	25	1	1	—
	Bw1	6-15	37-62- 83	10-26- 45	7-13- 18	27	25	1	1	—
	Bw2	15-29	50-68- 83	10-20- 28	7-13- 18	27	25	1	1	—
	2R	29-80	—	—	—	—	—	—	—	—

Particle Size and Coarse Fragments–State of Connecticut										
Map symbol and soil name	**Horizon**	**Depth**	**Sand**	**Silt**	**Clay**	**Total fragments**	**Fragments 2-74 mm**	**Fragments 75-249 mm**	**Fragments 250-599 mm**	**Fragments >=600 mm**
		In	*L-RV-H Pct*	*L-RV-H Pct*	*L-RV-H Pct*	*RV Pct*	*RV Pct*	*RV Pct*	*RV Pct*	*RV Pct*
260B—Charlton-Urban land complex, 3 to 8 percent slopes										
Charlton	Ap	0-7	39-57- 68	23-34- 50	2- 9- 15	10	10	0	0	—
	Bw	7-22	34-56- 71	23-36- 50	3- 8- 18	20	19	1	0	—
	C	22-65	45-59- 72	24-31- 50	4-10- 11	30	25	5	0	—
Urban land	M	0-10	—	—	—	—	—	—	—	—
273C—Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes										
Urban land	H	0-6	—	—	0- 0- 0	—	—	—	—	—
Charlton	Ap	0-4	57-65- 72	20-30- 40	3- 6- 8	11	10	1	0	—
	Bw1	4-7	57-65- 72	20-30- 40	3- 6- 8	12	10	2	0	—
	Bw2	7-19	57-65- 72	20-30- 40	3- 6- 8	13	10	2	1	—
	Bw3	19-27	57-65- 72	20-30- 40	3- 6- 8	29	25	2	2	—
	C	27-65	57-66- 72	20-30- 40	1- 5- 8	29	25	2	2	—
Chatfield	Oa	0-1	0- 0- 0	0- 0- 0	0- 0- 0	—	—	—	—	—
	A	1-6	52-68- 83	10-20- 30	7-13- 18	27	25	1	1	—
	Bw1	6-15	37-62- 83	10-26- 45	7-13- 18	27	25	1	1	—
	Bw2	15-29	50-68- 83	10-20- 28	7-13- 18	27	25	1	1	—
	2R	29-80	—	—	—	—	—	—	—	—

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Attachment J

Hydrology Report & Drainage Maps

DRAINAGE REPORT

Benz Street Solar

31 Benz Street
Ansonia, Connecticut

Prepared For:
ECOS Energy
222 South 9th Street
Suite 1600
Minneapolis, Minnesota 55402

Revised: May 24, 2021
Revised: April 16, 2021
Revised: March 22, 2021
Revised: September 17, 2020
July 24, 2020

Prepared By:
CLA Engineers, Inc.
Consulting Engineers
317 Main Street
Norwich, CT 06360
Ph: 860-886-1966 F: 860-886-9165
www.claengineers.com

Kyle Haubert, P.E.

BENZ STREET SOLAR SITE
31 BENZ STREET
ANSONIA, CT

EXECUTIVE SUMMARY

The existing site located at 31 Benz Street in Ansonia, CT includes a single family residence located on approximately 12.7 acres. The residence, outbuildings and driveway occupy about 0.2 aces of the site. The remaining land is undeveloped primarily wooded with grass areas along Benz Street. The site is proposed to be developed as a solar facility. The facility will include solar array panels, a new gravel access drive, and pad mounted equipment. CLA Engineers is providing the design and calculations for the stabilization, water quality, and peak stormwater runoff mitigation of the site.

- The stormwater treatment basins and site grading have been located and designed to maintain a 50-foot undisturbed buffer to the inland wetlands onsite in accordance with DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, Appendix I, I, Section (2).

- Stormwater treatment basins have been sized in accordance with The 2004 Connecticut Stormwater Quality Manual guidelines, and the DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, Appendix I, I, Section (1).

  Stormwater Treatment Basin #1 provides more than three times the total sediment storage volume required during construction and more than three times the total water quality volume required post construction.

  Stormwater Treatment Basin #2 provides more than two times the total sediment storage volume required during construction and more than two times the total water quality volume required post construction.

- The requirements of the DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, Appendix I, II, Section (3)(c) have been followed.

- Peak stormwater flow rates from both watersheds onsite have been reduced in comparison to the existing conditions.

PROPOSED HYDOLOGY & HYDRAULICS

The attached Figures 1 and 2 show the existing conditions and the post development site conditions for the project. The site is comprised of two watersheds. The Figures depict the watershed limits and stormwater travel paths. The proposed solar development includes stormwater treatment basins at the low points of each watershed to mitigate the peak stormwater runoff rates from the site, improve stormwater quality for the site, and function as temporary sediment traps/basins during construction. Sequencing for the construction of the basins and the work on the site is included on the project plans.

RUNOFF CURVE NUMBERS

The Coefficient of Runoff values were determined based on the USDA TR-55 Urban Hydrology for Small Watershed Manual. Weighted curve numbers were determined based on the existing and post development land cover. The weighted runoff coefficients are included in the calculations and were based on the following:

Existing Conditions

The USDA TR-55 manual, Table 2-2 outlines runoff curve numbers based on the ground cover type and hydrologic soil group. The existing site soil in the development area is generally comprised of the Charlton-Chatfield Complex that is hydrologic soil group B. The existing ground cover types, and corresponding curve numbers for the existing conditions are listed below:

Cover Type	Curve Number
Impervious (roofs, pavement, etc.)	98
Open Space (lawns, etc.) – Good Condition, HSG B	61
Woods – Fair Condition, HSG B	60

Post Development Conditions

The post development impervious area for each watershed was determined based in the area of gravel drives, equipment pads, and the effective impervious area of the solar panel arrays. The effective impervious area for the solar panel arrays is determined by the solar panel width and the clear spacing between the panels (disconnection width). As shown on Figure 2, the panel width is 13’-10” and the clear spacing between the panels is 11’-2”. Therefore the effective impervious area from the solar panel arrays 13’-10” - 11’-2” = 2’-8” effective impervious per LF.

The effective impervious area for each watershed is as follows:

Watershed #1: 7,100 LF of panels x 2'-8" effective imp. = 0.43 Acres
There are no access drives of pads within this watershed

Watershed #2: 3,641 LF of panels x 2'-8" effective imp. = 0.22 Acres
Access Drive & Pads = 5,039 SF = 0.12 Acres

The post development land cover surrounding and below the solar panels will be grass. Picture 1 is a similar solar project that was completed on 2019 that reflects the typical vegetation surrounding the solar panels. After the construction the grass is typically mowed/trimmed 3 times per year.

Picture 1 - Typical ground cover around solar arrays (Windham Solar 2019)

The USDA TR-55 manual, Table 2-2 outlines runoff curve numbers based on the ground cover type and hydrologic soil group. The existing site soil in the development area is generally comprised of the Charlton-Chatfield Complex that is hydrologic soil group B. The hydrologic soil groups have been adjusted as noted in the table below and as required under the DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, Appendix I, II. The post development ground cover types, and corresponding curve numbers for the existing conditions are listed below and composite curve numbers are included in the calculations:

Cover Type	Curve Number
Impervious (roofs, pavement, etc.)	98
Open Space (lawns, etc.) – Good Condition, HSG B (Outside of Work Area)	61
Open Space (lawns, etc.) – Good Condition, HSG B/C[1] (Within the Work Area)	65
Open Space (lawns, etc.) – Good Condition, HSG C[2] (Within the Work Area)	74
Woods – Fair Condition, HSG B	60

[1] Curve number used is ½ the difference between HSG B and HSG C

[2] Curve number used is increased to HSG C for areas of fill that exceed 2 FT

PEAK FLOW RATE

The peak stormwater runoff rates for the existing conditions and post development conditions for the site at each watershed has been analyzed for the 2-year, 10-year, 25-year, 50-year and 100-year design storms utilizing the TR-55 method for the 24-hour rainfall event. The calculations for each storm are attached.

As a conservative measure in the calculations infiltration into the surrounding soil within the stormwater treatment basins was not deducted. Permeability samples were taken for each of the basins. The permeability was found to be 3.13 ft/day in basin #1 and 2.32 ft/day in basin #2, reports are included in Appendix A. The rates indicate that the receiving soils will allow the basins to drain between storms.

The following Table 1 summarizes the peak flow rates for the design storms for each watershed. The calculations show that there will be a reduction in the peak run-off rate leaving the site at each watershed boundary for all storm events.

The discharge from stormwater treatment basin #2 within watershed #2 will connect directly to a catch basin located within Benz Street. Stormwater from the site currently flows to this catch basin. As outlined above and shown in Table 1, the proposed development will reduce the peak stormwater flow rate from this site to the catch basin and the drainage system, improving the flow conditions of the existing system.

Table 1

	Peak Flow Rate (CFS)				
Watershed #1	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Condition (Hyd #1) :	3.422	11.160	16.970	21.590	26.840
Post Development (Hyd #3) :	0.000	1.601	7.229	15.770	24.950
Change :	-3.422	-9.559	-9.741	-5.820	-1.890

	Peak Flow Rate (CFS)				
Watershed #2	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Cond. (Hyd #5) :	1.242	3.889	5.861	7.412	9.146
Post Development (Hyd #7) :	0.000	0.566	2.319	5.141	6.811
Change :	-1.242	-3.323	-3.542	-2.271	-2.335

WATERSHED #1

The development work within watershed #1 has been designed to primarily allow stormwater to flow via sheet flow over the vegetated ground surface to Basin #1. A portion of the western side of the site will flow through a vegetated swale to the basin. The post development site characteristics have a low potential for sediment and pollutant loading to the basin. There are no parking areas, paved areas, or roadways that may have deicing material, sands, or other typical roadway and parking area sediment or pollutants. Additionally, the flow over the vegetated land will provide stormwater cleansing prior to entering the basin.

Basin #1 has been designed as an "extended detention shallow wetlands". Test pits have been performed within the proposed basin and the logs are included on the project plans. The bottom of the basin will intercept the groundwater table. Micro-pools have been proposed in the basin bottom with pond drains as recommended in Figure 11-P2-2 of the Water Quality Manual. The micro-pools will also store more that 10% of the WQC as recommended in the manual.

A stone infiltration trench has been proposed upgrade of the basin that will function as a forebay. A construction detail for the infiltration trench is included on the project plans. A majority of the stone within the trench will be surrounded with geotextile fabric to prevent fine soils from spoiling the stone. The surface will be top dressed with stone to allow excavation, removal, and replacement if sediment is encountered. The infiltration trench will store more than 10% of the WQV as recommended in the Water Quality Manual.

Required WQV = 8,841 CF
Min. 10% for forebay = 884.1 CF
Stone Infiltration Trench = 432 LF x 3 FT wide x 2 FT deep = 2,592 CF
40% voids in 2" stone = 2,592 CF x 40% = 1,036 CF of Storage Provided

New England Erosion Control Restoration Mix for Detention Basins and Moist Sites has been proposed within the basin. The seed mix species are outlined on the project plans. This seed mix includes native species that provide a variety of vegetation that will tolerate intermittent flooding.

CT GUIDELINES FOR SOIL EROSION & SEDIMENTATION CONTROL

The 2002 CT Guidelines for Soil Erosion & Sedimentation Control applies to the construction phase of the project. A detailed erosion and sediment control plan has been provided in the site development plans. Within Watershed #1 the proposed stormwater quality basin #1 has been designed to function as a

temporary sediment basin during construction, and then as a water quality basin to provide permanent water quality treatment for the life of the facility.

Watershed #1 is larger than 5 acres, therefore the calculations for a temporary sediment basin in apply. The first calculation required by the Guidelines is for the sediment storage volume (SSV). The sediment storage volume is the calculation for one year of predicted sediment load. The calculations for a Temporary Sediment Basin show that the sediment storage volume required is:

$$SSV = \frac{(DA)(A)(DR)(TE)(2{,}000\ LB/TON)}{SD(43{,}560)}$$

DA = 8.1 acres
A = 50 ton/acre/year (CONSTRUCTION SITE)
DR = 60% (see Figure SB-12 attached with support documents)
TE = 80%
SD = 80 (estimate sediment density)
Sediment Storage Volume = 0.112 Ac-Ft = 4,879 CF

Dry sediment storage is located in the basin above elevation 394.5, the bottom of the riprap level spreader. The minimum volume is the same as the sediment storage volume, 4,879 CF. The available dry storage volume in Basin #1 is 25,133 CF which exceeds the required minimum dry storage volume.

The second calculation required by the Guidelines is for wet storage volume (WSV). The wet storage volume is the volume in the basin that is located below the invert of the lowest outlet structure for the basin. The volume of the wet storage is required to be 2 times the sediment storage volume. The required wet storage volume is 2 x 4,879 CF = 9,758 CF. The invert of the lowest outlet structure for main section of stormwater treatment basin #1 is elevation 394.5 at the bottom of the riprap level spreader, there is 26,717 CF of storage below this elevation which exceeds the required minimum wet storage volume.

The total storage volume required is the dry sediment storage volume plus the wet storage volume, which is a total of 14,637 CF. The total storage volume provided in stormwater treatment basin #1, is 51,850 CF which exceeds the required total storage volume.

CONNECTICUT STORMWATER QUALITY MANUAL

The 2004 Connecticut Stormwater Quality Manual guidelines applies to the post construction phase, and for the operation of the facility. Within Watershed #1 the proposed stormwater quality basin #1 has been designed to function as a temporary sediment basin during construction, and then as a water quality

basin to provide permanent water quality treatment for the life of the facility. Basin #1 meets all the criteria of the Connecticut Stormwater Quality Manual for a Water Quality Basin.

For the purposes of the Water Quality Volume (WQV) calculation the entire solar array panels have been considered impervious area in accordance with the CTDEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, Appendix I, I, Section (1). There are 7,100 LF of 13'-10" wide panels in the watershed. This equates to 2.25 acres of impervious area.

The Water Quality Volume (WQV) calculation is as follows:

Water Quality Basin Sizing - Basin #1		
Sizing in Accordance with Chapter 7.4 of the DEP 2004 Storm Water Quality Manual Water Quality Volume (WQV) = (1")(R)(A) / 12 R = 0.05 + 0.009(I) I = percent of impervious cover A = watershed area		
Total Watershed Area (Ac.) :	8.10	
Watershed Impervious Area (Ac.) :	2.25	
I =	27.8%	
R =	0.300	
Required WQV =	0.203	Ac.-Ft
	8,821	CF
WQV Provided :	**26,717**	CF

The invert of the lowest outlet structure for main section of stormwater treatment basin #1 is elevation 394.5 at the bottom of the riprap level spreader, there is 26,717CF of volume below this elevation which exceeds the required Water Quality Volume.

SUMMARY OF STORMWATER TREATMENT BASIN #1 VOLUMES

During Construction	Required	Provided
Wet Storage Volume	9,758 CF	26,717 CF
Dry Storage Volume	4,879 CF	25,133 CF
Total Storage Volume	14,637 CF	51,850 CF

Post Construction	Required	Provided
Water Quality Volume	8,821 CF	26,717 CF

WATERSHED #2

The development work within watershed #2 has been designed to allow stormwater to flow via sheet flow over the vegetated ground surface to Basin #2. A portion of the southeastern side of the site will flow through a vegetated swale to the basin. The post development site characteristics have a low potential for sediment and pollutant loading to the basin. There are no parking areas, paved areas, or roadways that may have deicing material, sands, or other typical roadway and parking area sediment or pollutants. The access drive has been proposed with a gravel surface. Additionally, the flow over the vegetated land will provide stormwater cleansing prior to entering the basin.

Basin #2 has been designed as an "infiltration basin". Test pits have been performed within the proposed basin and the logs are included on the project plans. The Water Quality Manual recommends a minimum permeability of 0.6 ft/day (0.3 in/hr). As previously noted, the soils in Basin #2 have a measured permeability rate of 2.32 ft/day.

A stone infiltration trench has been proposed upgrade of the basin that will function as a forebay. A construction detail for the infiltration trench is included on the project plans. A majority of the stone within the trench will be surrounded with geotextile fabric to prevent fine soils from spoiling the stone. The surface will be top dressed with stone to allow excavation, removal, and replacement if sediment is encountered. The infiltration trench will store more than 25% of the WQV as recommended in the Water Quality Manual.

Required WQV = 4,631.9 CF
Min. 25% for forebay = 1,158 CF
Stone Infiltration Trench = 314 LF x 5 FT wide x 2 FT deep = 3,140 CF
40% voids in 2" stone = 3,140 CF x 40% = 1,256 CF of Storage Provided

New England Erosion Control Restoration Mix for Detention Basins and Moist Sites has been proposed within the basin. The seed mix species are outlined on the project plans. This seed mix includes native species that provide a variety of vegetation that will tolerate intermittent flooding.

CT GUIDELINES FOR SOIL EROSION & SEDIMENTATION CONTROL

The 2002 CT Guidelines for Soil Erosion & Sedimentation Control applies to the construction phase of the project. A detailed erosion and sediment control plan has been provided in the site development plans. Within Watershed #2 the proposed stormwater quality basin #2 has been designed to function as a

temporary sediment trap during construction, and then as a water quality basin to provide permanent water quality treatment for the life of the facility.

Watershed #2 is less than 5 acres, therefore the calculations for a temporary sediment trap apply. The first calculation required by the Guidelines is for the sediment storage volume (SSV). The sediment storage volume is the calculation for one year of predicted sediment load. The calculations for a Temporary Sediment Basin show that the total sediment storage volume is:

SSV = (A)(134 CY/Acre)
A = 2.48 ACRES
SSV = 332.3 CY = 8,973 CF

The required dry storage volume is located above the invert elevation of the 12"x6" weir notch of the riser structure. This volume will be accounted for in the basin above elevation 398.5. The volume of the dry storage is required to be half of the required SSV. The required dry storage volume is 8,973 CF / 2 = 4,486.5 CF. There is 12,830 CF of dry storage available in the basin which exceeds the minimum required storage volume.

The wet storage volume is the volume in the basin that is located below invert elevation of the 12"x6" weir notch of the riser structure outlet of the basin. This volume will be accounted for in the basin below elevation 398.5. The volume of the wet storage is required to be half of the required SSV. The required wet storage volume is 8,973 CF / 2 = 4,486.5 CF. There is 10,999 CF of storage available below the basin discharge which exceeds the minimum required storage volume.

CONNECTICUT STORMWATER QUALITY MANUAL

The 2004 Connecticut Stormwater Quality Manual guidelines applies to the post construction phase, and for the operation of the facility. Within Watershed #2 the proposed stormwater quality basin #2 has been designed to function as a temporary sediment trap during construction, and then as a water quality basin to provide permanent water quality treatment for the life of the facility. Basin #2 meets all the criteria of the Connecticut Stormwater Quality Manual for a Water Quality Basin.

For the purposes of the Water Quality Volume (WQV) calculation the entire solar array panels have been considered impervious area in accordance with the CTDEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, Appendix I, I, Section (1). There are 3,641 LF of 13'-10" wide panels in the watershed. This equates to 1.16 acres of impervious area plus 0.12 acres of drive and pads.

The Water Quality Volume (WQV) calculation is as follows:

Water Quality Basin Sizing - Basin #2		
Sizing in Accordance with Chapter 7.4 of the DEP 2004 Storm Water Quality Manual Water Quality Volume (WQV) = (1")(R)(A) / 12 R = 0.05 + 0.009(I) I = percent of impervious cover A = watershed area		
Total Watershed Area (Ac.) :	2.48	
Watershed Impervious Area (Ac.) :	1.28	
I =	51.6%	
R =	0.515	
Required WQV =	0.106	Ac.-Ft
	4,631.9	CF
WQV Provided :	**10,999**	CF

The invert of the lowest outlet structure for stormwater treatment basin #2 is elevation 398.5 at the invert elevation of the 12"x6" weir notch of the riser structure. The storage volume below this elevation is 10,999 CF which exceeds the required Water Quality Volume.

SUMMARY OF STORMWATER TREATMENT BASIN #2 VOLUMES

During Construction	Required	Provided
Wet Storage Volume	4,486.5 CF	10,999 CF
Dry Storage Volume	4,486.5 CF	12,830 CF
Total Storage Volume	8,973 CF	23,829 CF

Post Construction	Required	Provided
Water Quality Volume	4,632 CF	10,999 CF

FIGURES

0' 60' 120' 180'

No.	DATE	REVISION
4	5/24/2021	Misc. Updates & Revisions
3	4/16/2021	Misc. Updates & Revisions
2	3/22/2021	Misc. Updates & Revisions
1	9/17/2020	Misc. Updates & Revisions

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, CT 06360
(860) 886-1966 Fax (860) 886-9165

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

WATERSHEDS:
EXISTING CONDITIONS

Project No. CLA-6430
Proj. Engineer K.J.H.
Date: 7/24/2020
Figure No. 1

CLA

M:\6000\6400\6430 Benz Street Solar\Drawings\xx HYDROLOGY-BENZ.dwg

BASIN #1

BASIN #1 DISCHARGE

25.0' ROW TO ROW SPACING

TRAVEL PATH (TYP.)

WATERSHED #1
POST DEV.
AREA=8.1 AC.

WATERSHED #2
POST DEV.
AREA=2.48 AC.

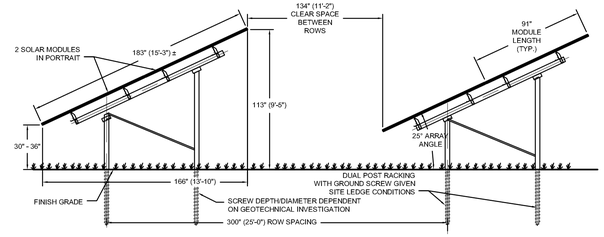
BENZ STREET

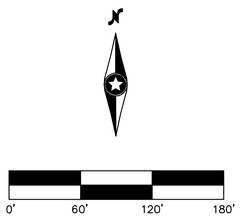
BASIN #2

BASIN #2 DISCHARGE

EXISTING CATCH BASIN

RACKING PROFILE DETAIL:





No.	DATE	REVISION
4	5/24/2021	Misc. Updates & Revisions
3	4/16/2021	Misc. Updates & Revisions
2	3/22/2021	Misc. Updates & Revisions
1	9/17/2020	Misc. Updates & Revisions

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, CT 06360
(860) 886-1966 Fax (860) 886-9165

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

WATERSHEDS:
POST DEVELOPMENT CONDITIONS

Project No. CLA-6430
Proj. Engineer K.J.H.
Date: 7/24/2020
Figure No. 2

CLA

M:\6000\6400\6430 Benz Street Solar\Drawings\xx HYDROLOGY-BENZ.dwg

CALCULATIONS:

Hydrograph Reports
2, 10, 25, 50, and 100-Year Frequencies

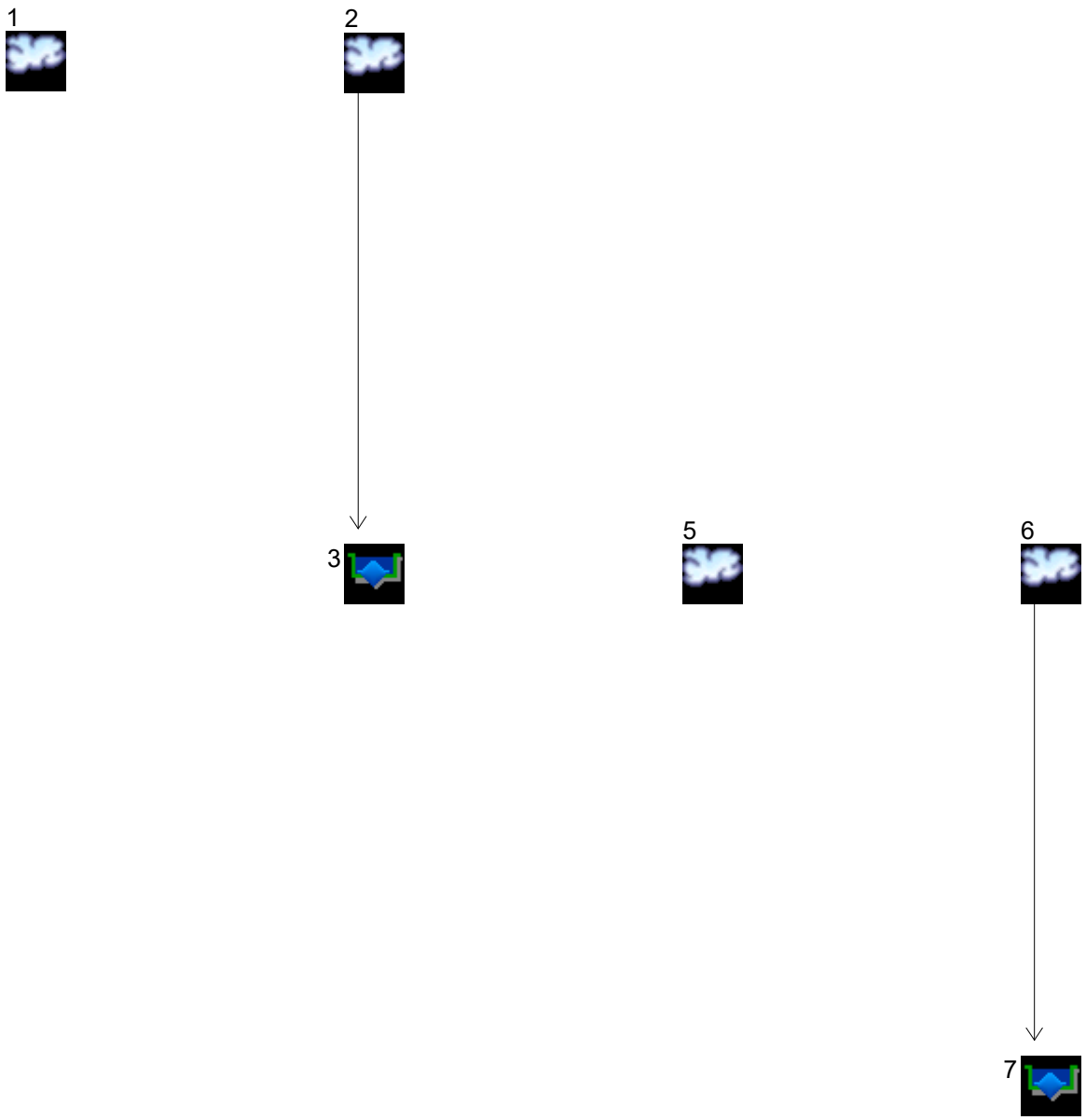
Hydraflow Table of Contents

6430 Benz REV4.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, May 25, 2021

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066



Legend

Hyd.	Origin	Description
1	SCS Runoff	Watershed #1 - Ex. Condition
2	SCS Runoff	Watershed #1 - Post Dev.
3	Reservoir	Basin #1 Discharge
5	SCS Runoff	Watershed #2 - Ex. Condition
6	SCS Runoff	Watershed #2 - Post Dev.
7	Reservoir	Basin #2 Discharge

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	------	-------	3.422	-------	-------	11.16	16.97	21.59	26.84	Watershed #1 - Ex. Condition
2	SCS Runoff	------	-------	6.144	-------	-------	15.47	22.03	27.09	32.71	Watershed #1 - Post Dev.
3	Reservoir	2	-------	0.000	-------	-------	1.601	7.229	15.77	24.95	Basin #1 Discharge
5	SCS Runoff	------	-------	1.242	-------	-------	3.889	5.861	7.412	9.164	Watershed #2 - Ex. Condition
6	SCS Runoff	------	-------	2.321	-------	-------	5.543	7.762	9.465	11.36	Watershed #2 - Post Dev.
7	Reservoir	6	-------	0.000	-------	-------	0.566	2.319	5.141	6.811	Basin #2 Discharge

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	3.422	1	739	19,417	------	------	------	Watershed #1 - Ex. Condition
2	SCS Runoff	6.144	1	736	29,803	------	------	------	Watershed #1 - Post Dev.
3	Reservoir	0.000	1	n/a	0	2	394.70	29,803	Basin #1 Discharge
5	SCS Runoff	1.242	1	735	6,441	------	------	------	Watershed #2 - Ex. Condition
6	SCS Runoff	2.321	1	733	10,276	------	------	------	Watershed #2 - Post Dev.
7	Reservoir	0.000	1	n/a	0	6	398.39	10,276	Basin #2 Discharge

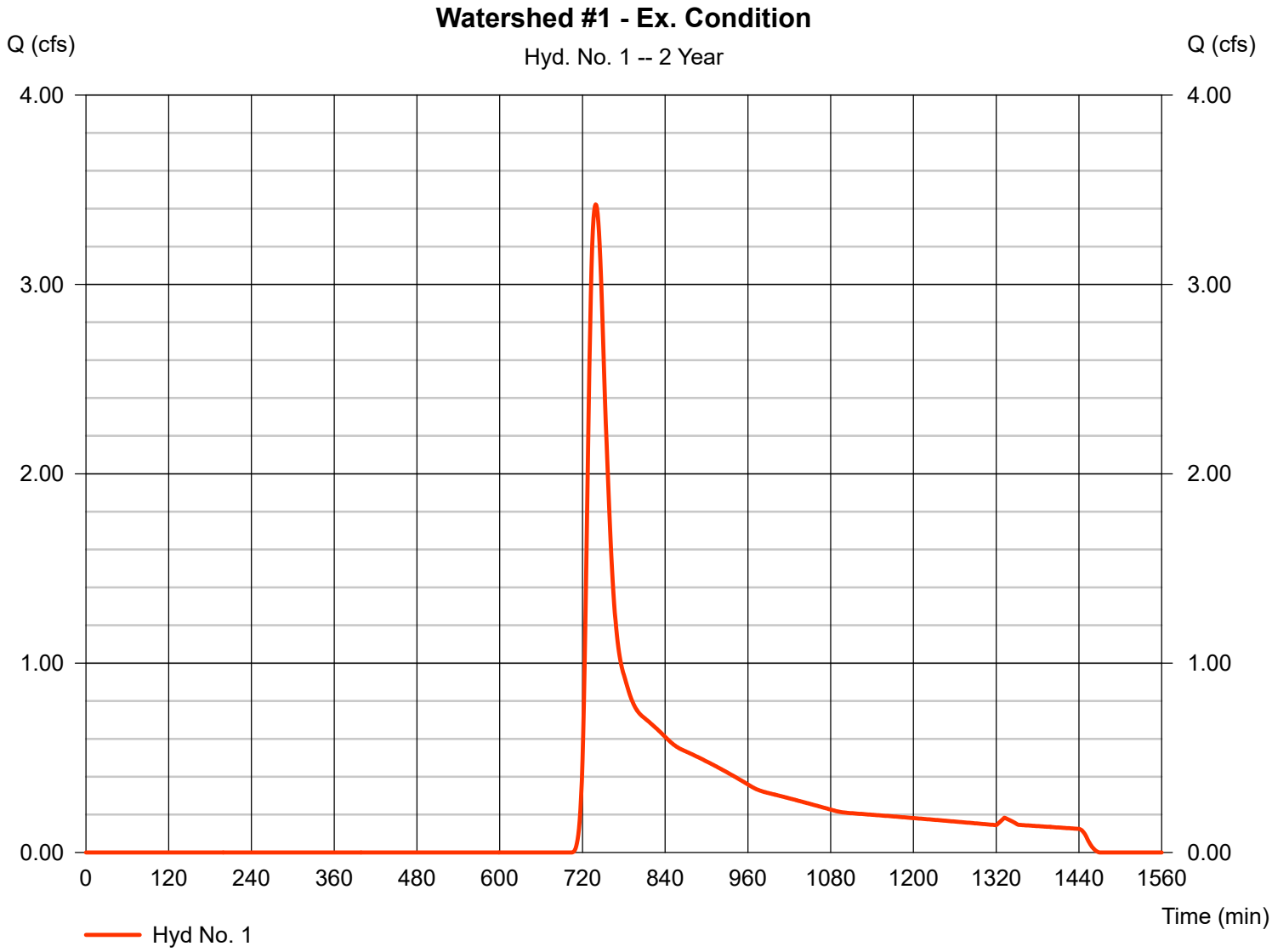
Hydrograph Report

Hyd. No. 1

Watershed #1 - Ex. Condition

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.422 cfs
Storm frequency	=	2 yrs	Time to peak	=	739 min
Time interval	=	1 min	Hyd. volume	=	19,417 cuft
Drainage area	=	8.100 ac	Curve number	=	61*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.50 min
Total precip.	=	3.69 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.180 x 98) + (0.960 x 61) + (6.960 x 60)] / 8.100



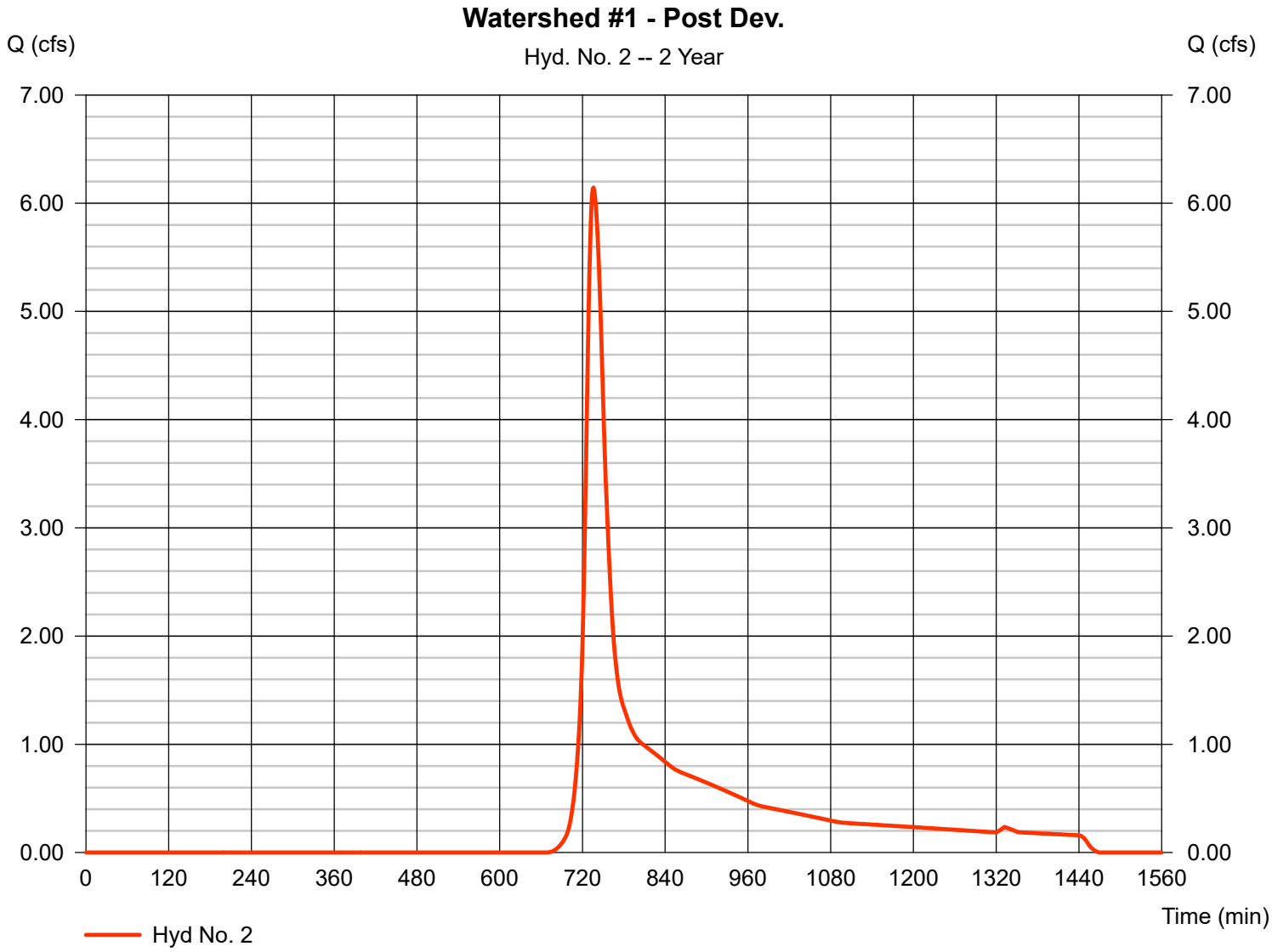
Hydrograph Report

Hyd. No. 2

Watershed #1 - Post Dev.

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.144 cfs
Storm frequency	=	2 yrs	Time to peak	=	736 min
Time interval	=	1 min	Hyd. volume	=	29,803 cuft
Drainage area	=	8.100 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.50 min
Total precip.	=	3.69 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.610 x 98) + (1.600 x 74) + (4.430 x 65) + (0.730 x 61) + (0.730 x 60)] / 8.100



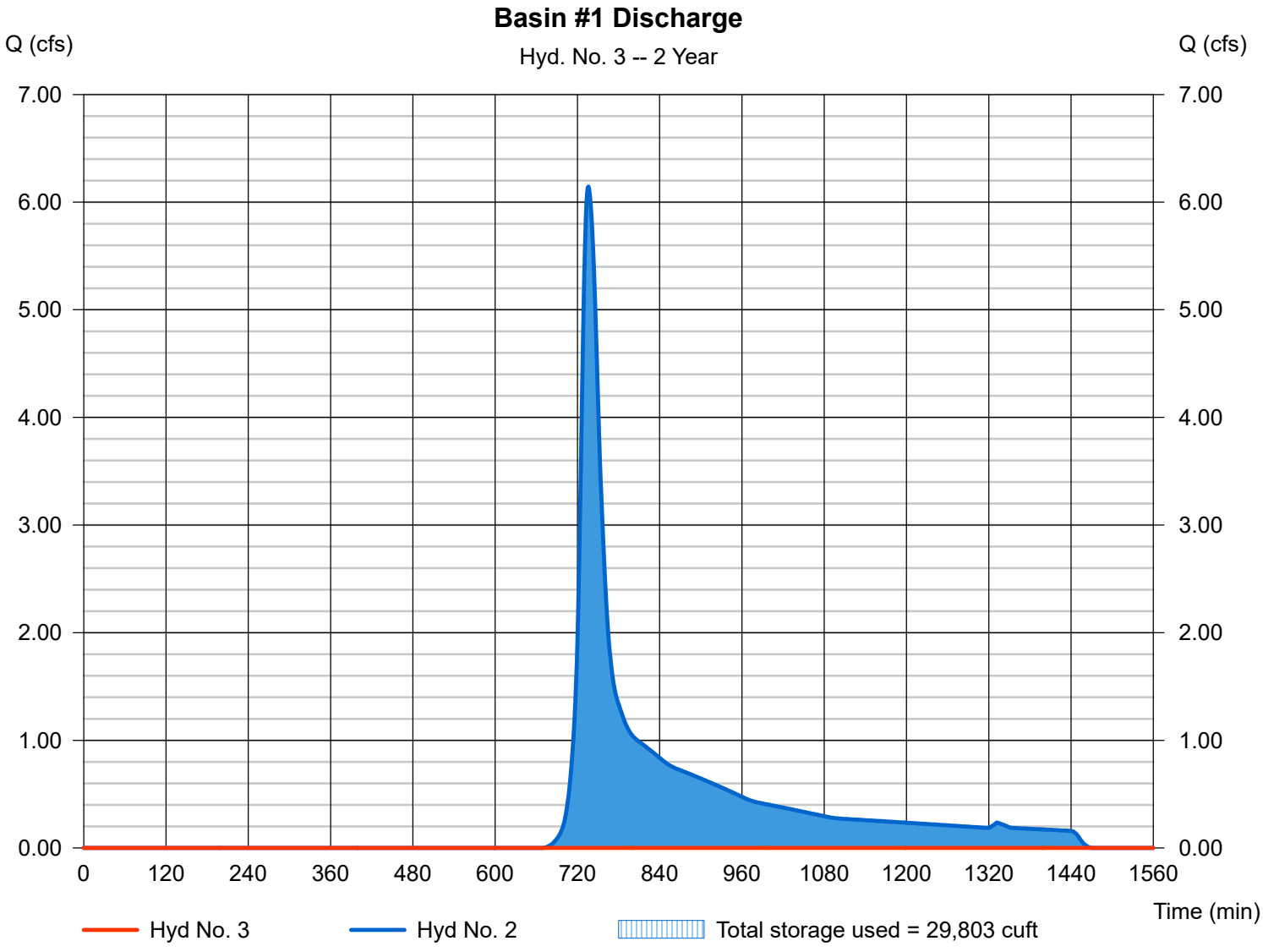
Hydrograph Report

Hyd. No. 3

Basin #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	2 - Watershed #1 - Post Dev.	Max. Elevation	=	394.70 ft
Reservoir name	=	Basin #1	Max. Storage	=	29,803 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Basin #1

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 392.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	392.00	3,831	0	0
1.00	393.00	11,215	7,200	7,200
2.00	394.00	13,626	12,400	19,599
2.50	394.50	14,855	7,117	26,717
3.00	395.00	16,094	7,734	34,451
3.50	395.50	17,353	8,359	42,810
4.00	396.00	18,819	9,040	51,850

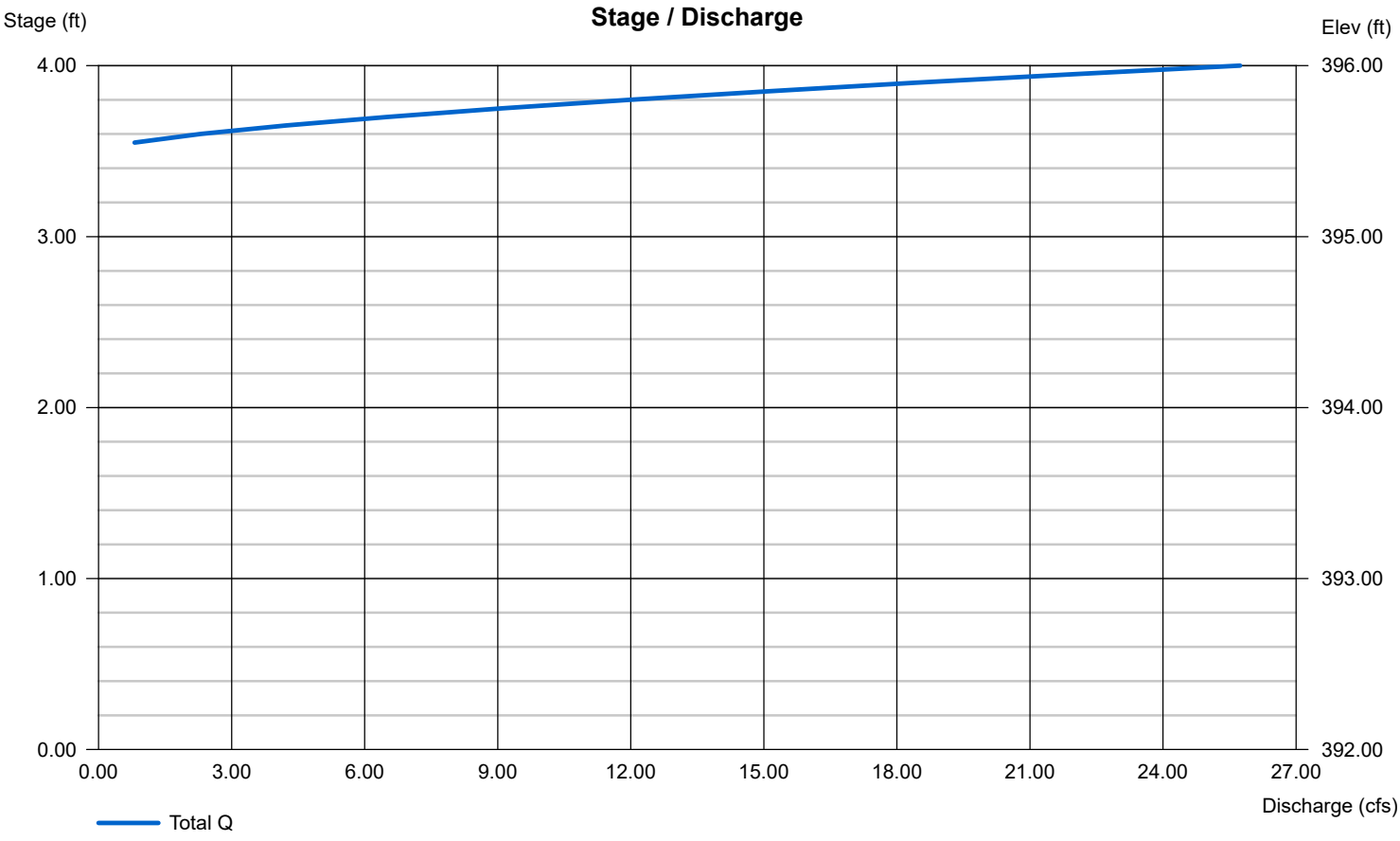
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	Inactive	Inactive	Inactive	Inactive
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 28.00	Inactive	Inactive	Inactive
Crest El. (ft)	= 395.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



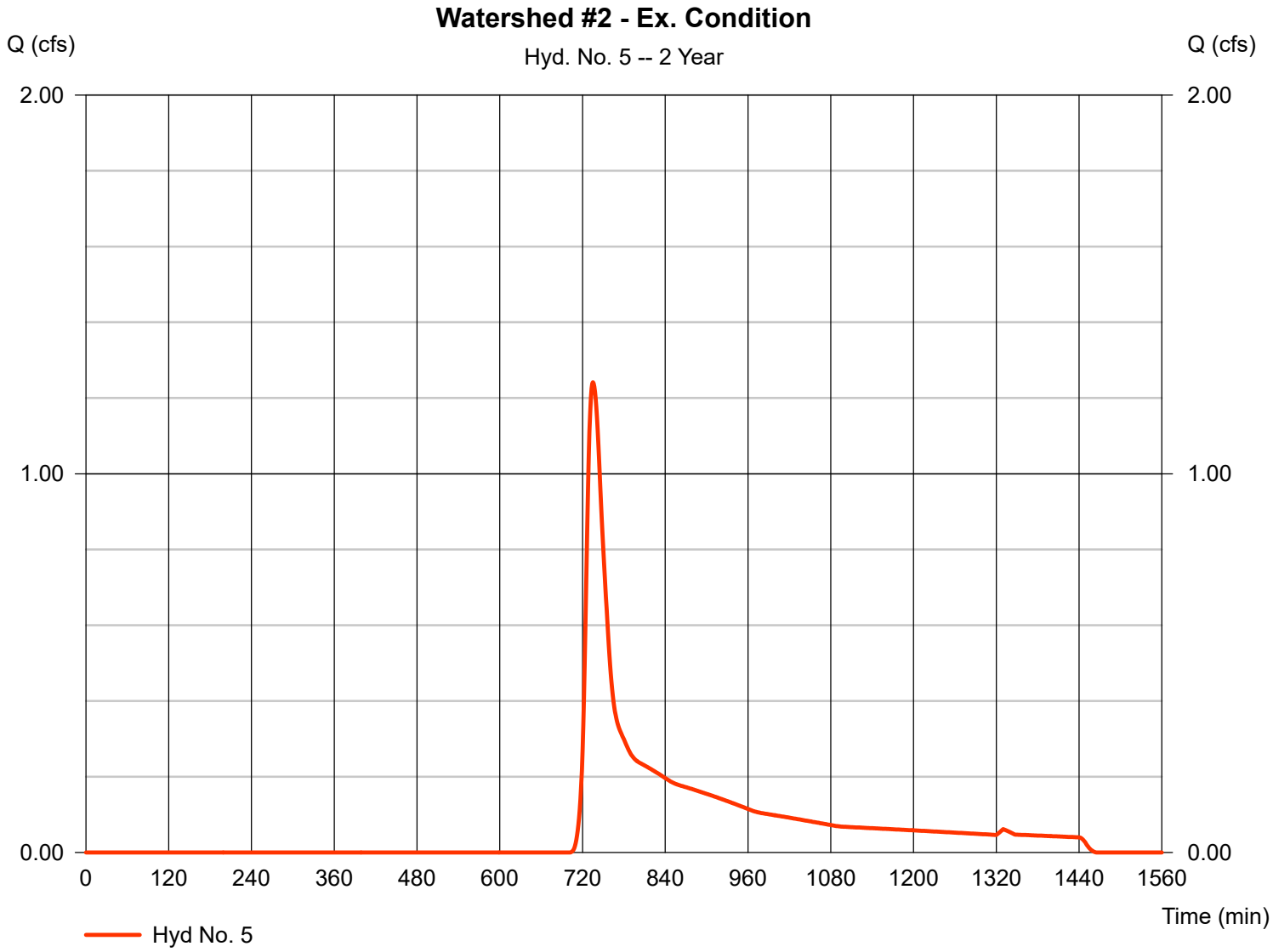
Hydrograph Report

Hyd. No. 5

Watershed #2 - Ex. Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 1.242 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 6,441 cuft
Drainage area	= 2.480 ac	Curve number	= 62*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.70 min
Total precip.	= 3.69 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.120 x 98) + (0.910 x 61) + (1.450 x 60)] / 2.480



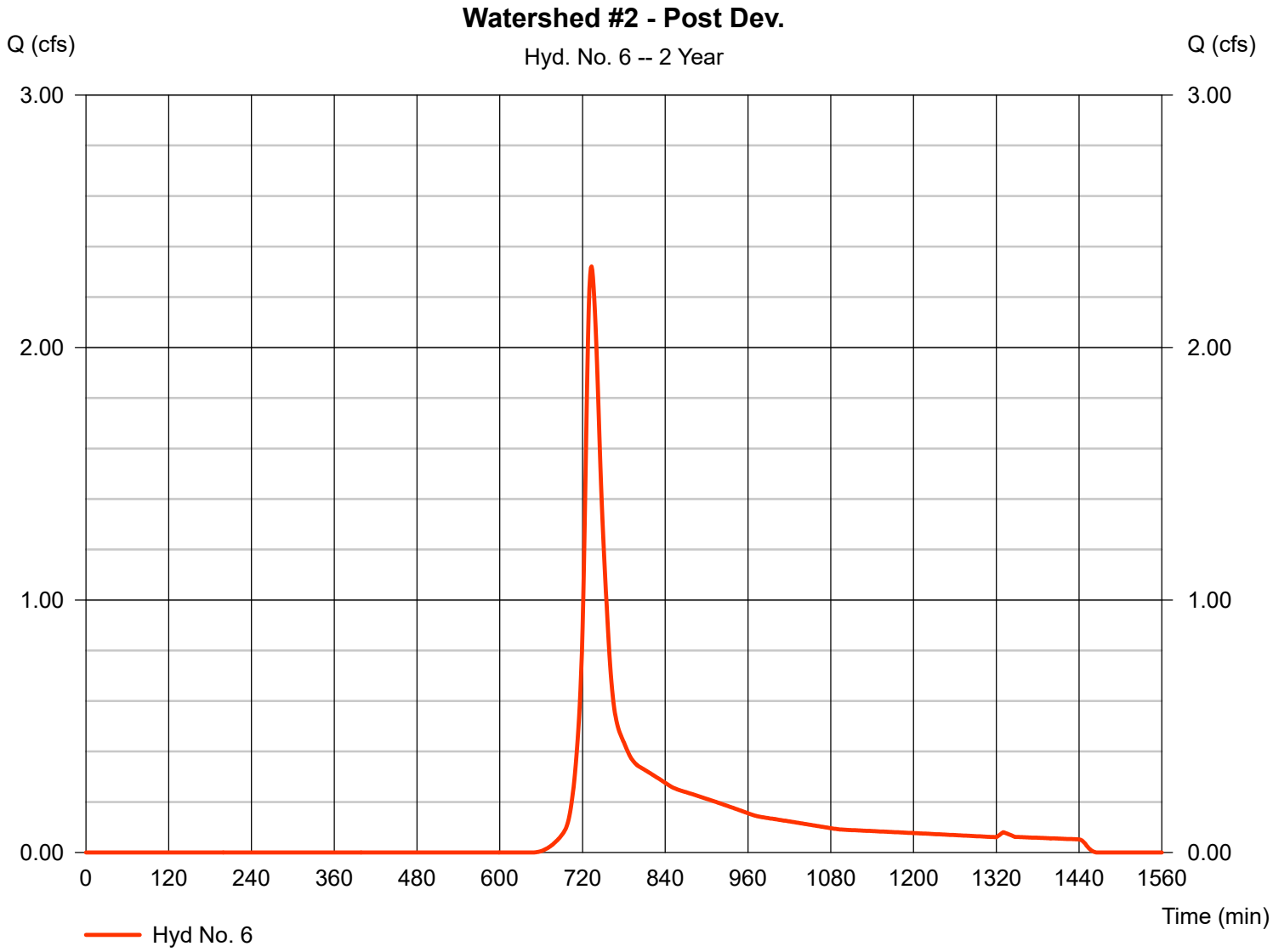
Hydrograph Report

Hyd. No. 6

Watershed #2 - Post Dev.

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.321 cfs
Storm frequency	=	2 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	10,276 cuft
Drainage area	=	2.480 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.70 min
Total precip.	=	3.69 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.340 x 98) + (2.140 x 65)] / 2.480



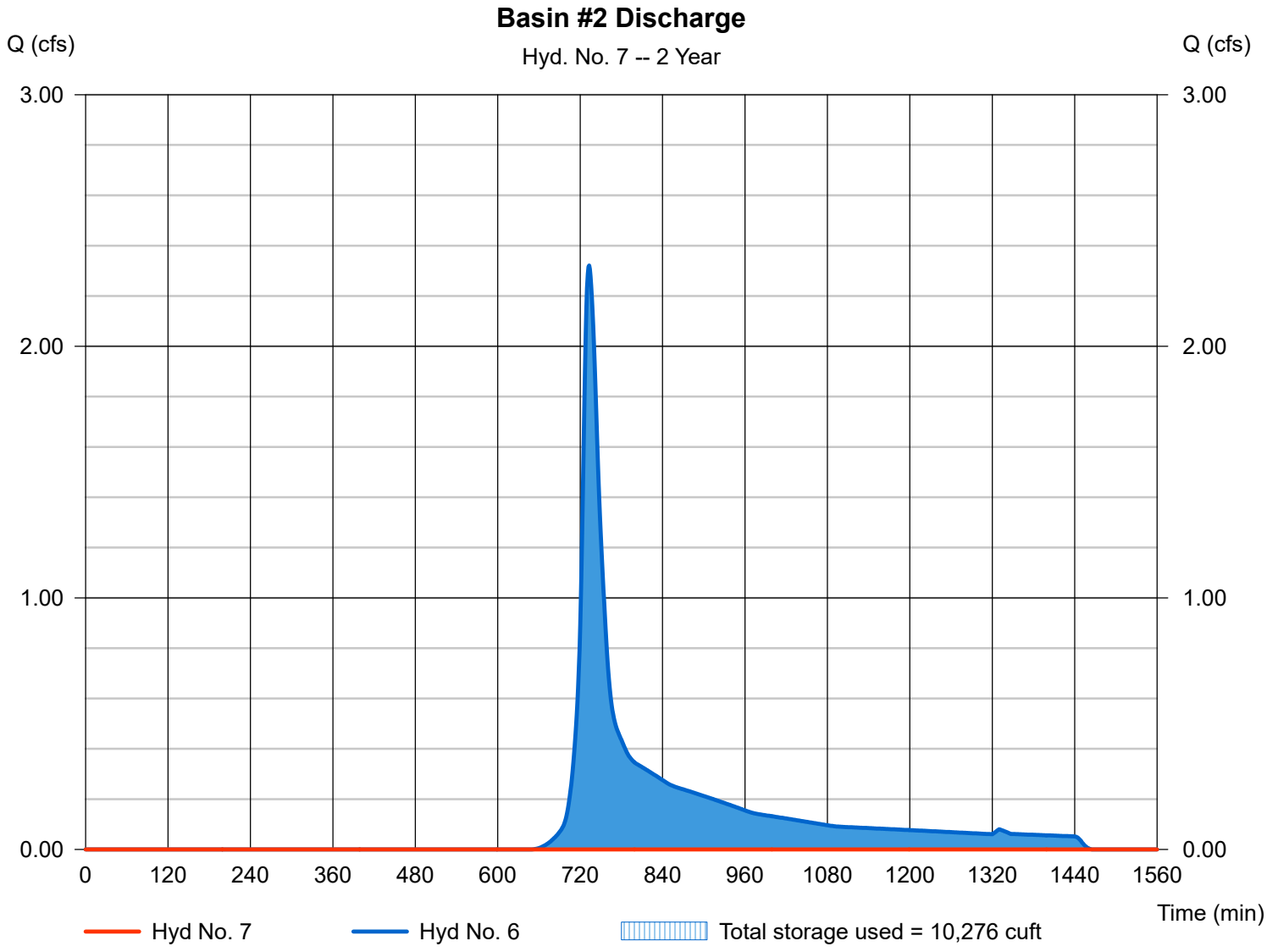
Hydrograph Report

Hyd. No. 7

Basin #2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	6 - Watershed #2 - Post Dev.	Max. Elevation	=	398.39 ft
Reservoir name	=	Basin #2	Max. Storage	=	10,276 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - Basin #2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 396.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	396.00	1,947	0	0
1.00	397.00	3,920	2,876	2,876
2.00	398.00	5,944	4,897	7,773
2.50	398.50	6,977	3,226	10,999
3.00	399.00	8,024	3,747	14,746
3.50	399.50	9,086	4,274	19,020
4.00	400.00	10,161	4,809	23,829

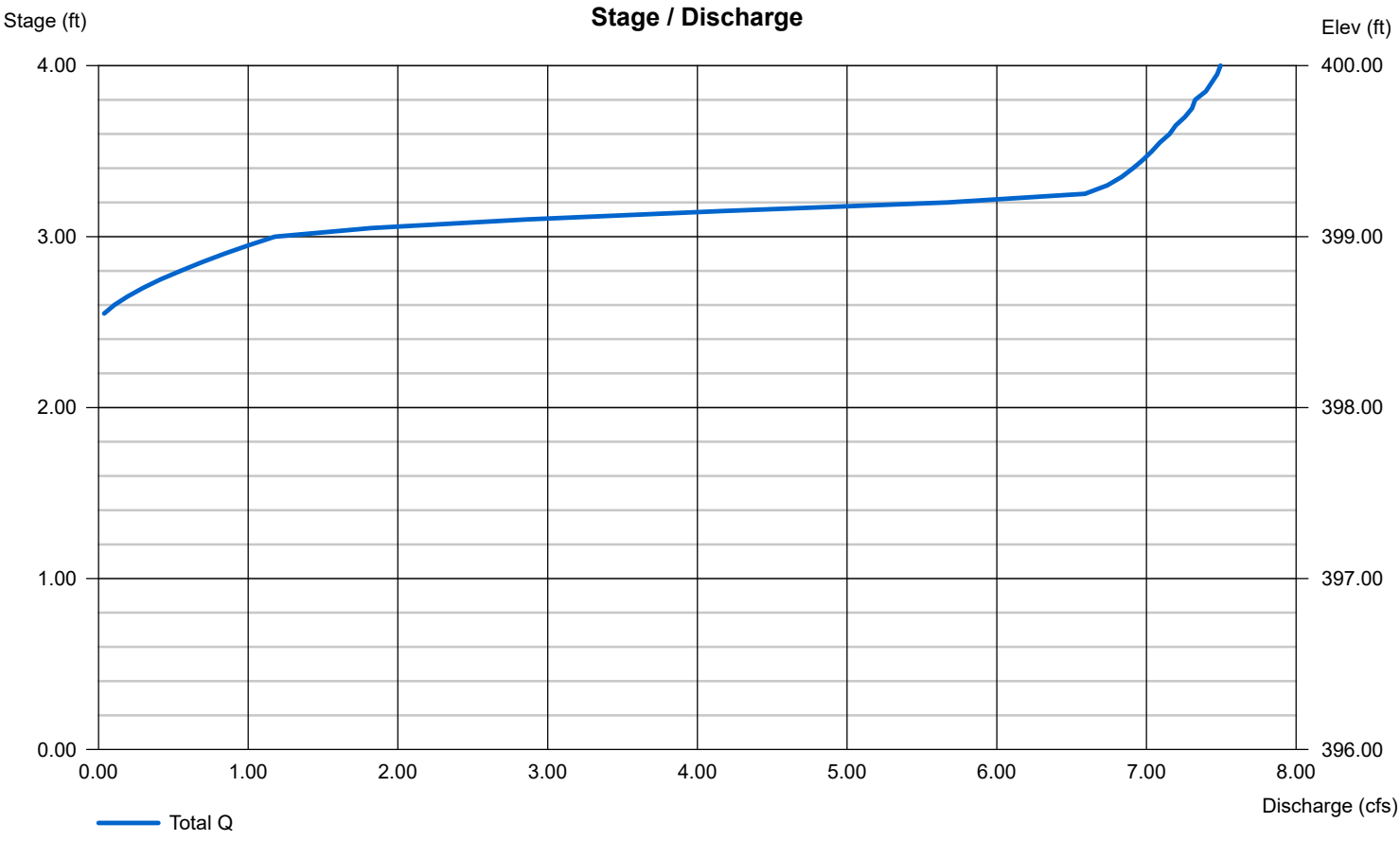
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	Inactive	Inactive	Inactive
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 395.50	0.00	0.00	0.00
Length (ft)	= 35.00	0.00	0.00	0.00
Slope (%)	= 10.00	0.00	0.00	n/a
N-Value	= .012	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.50	1.00	10.00	Inactive
Crest El. (ft)	= 399.00	398.50	399.50	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Riser	Rect	Broad	---
Multi-Stage	= Yes	Yes	Yes	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	11.16	1	735	52,383	------	------	------	Watershed #1 - Ex. Condition
2	SCS Runoff	15.47	1	734	69,469	------	------	------	Watershed #1 - Post Dev.
3	Reservoir	1.601	1	850	26,658	2	395.58	44,192	Basin #1 Discharge
5	SCS Runoff	3.889	1	733	16,966	------	------	------	Watershed #2 - Ex. Condition
6	SCS Runoff	5.543	1	732	23,134	------	------	------	Watershed #2 - Post Dev.
7	Reservoir	0.566	1	835	12,125	6	398.81	13,299	Basin #2 Discharge

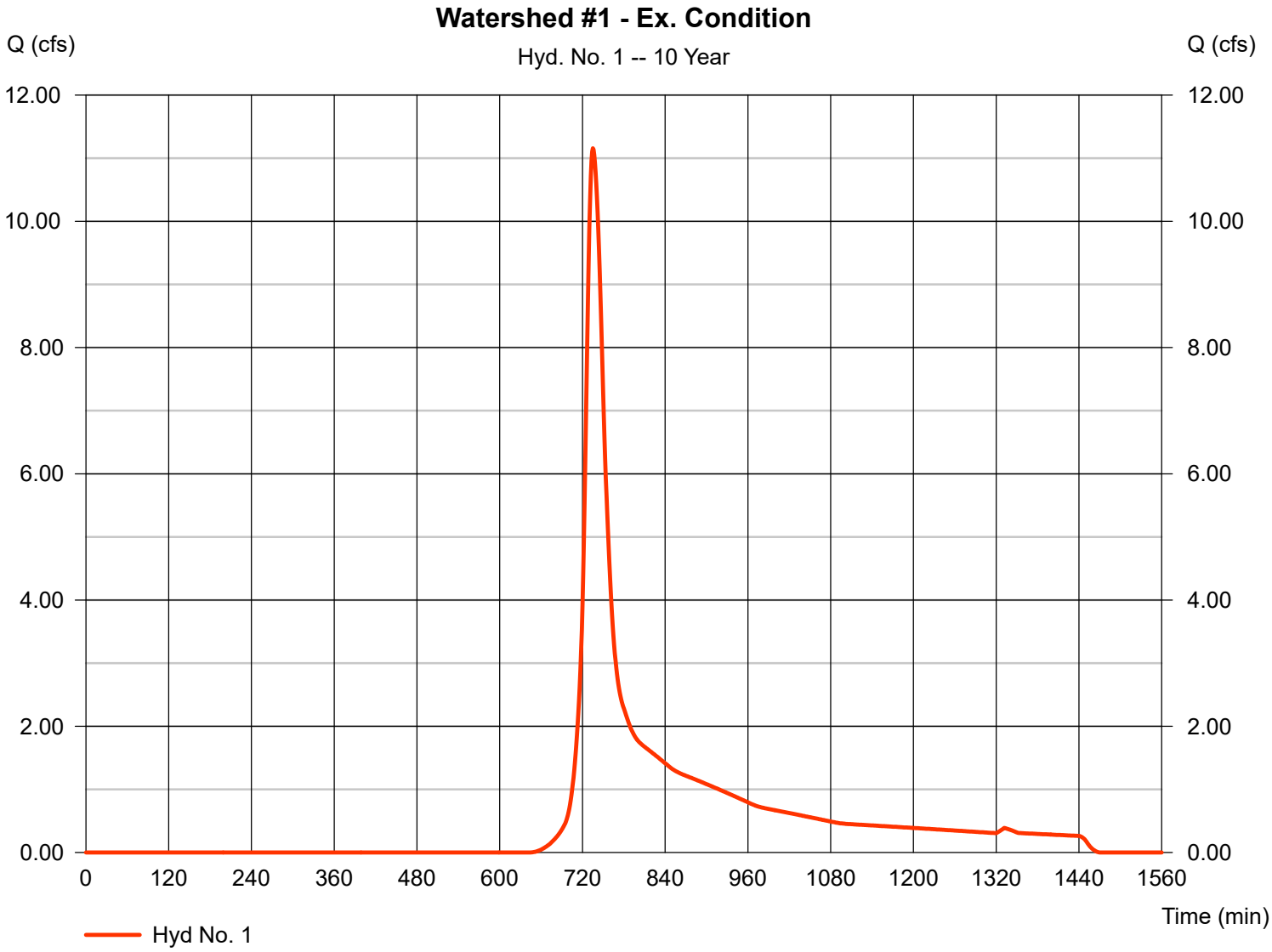
Hydrograph Report

Hyd. No. 1

Watershed #1 - Ex. Condition

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.16 cfs
Storm frequency	=	10 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	52,383 cuft
Drainage area	=	8.100 ac	Curve number	=	61*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.50 min
Total precip.	=	5.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.180 x 98) + (0.960 x 61) + (6.960 x 60)] / 8.100



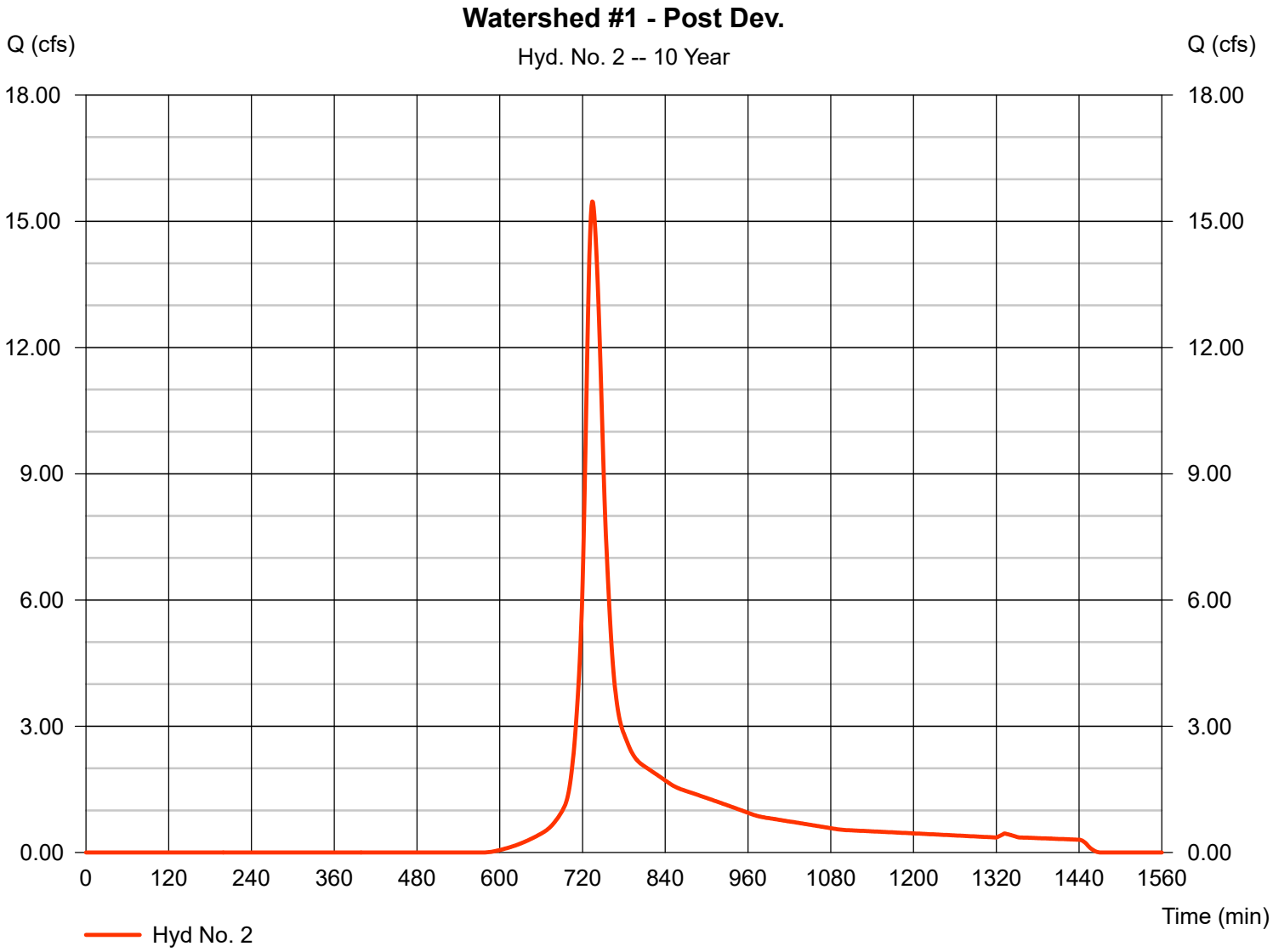
Hydrograph Report

Hyd. No. 2

Watershed #1 - Post Dev.

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.47 cfs
Storm frequency	=	10 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	69,469 cuft
Drainage area	=	8.100 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.50 min
Total precip.	=	5.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.610 x 98) + (1.600 x 74) + (4.430 x 65) + (0.730 x 61) + (0.730 x 60)] / 8.100



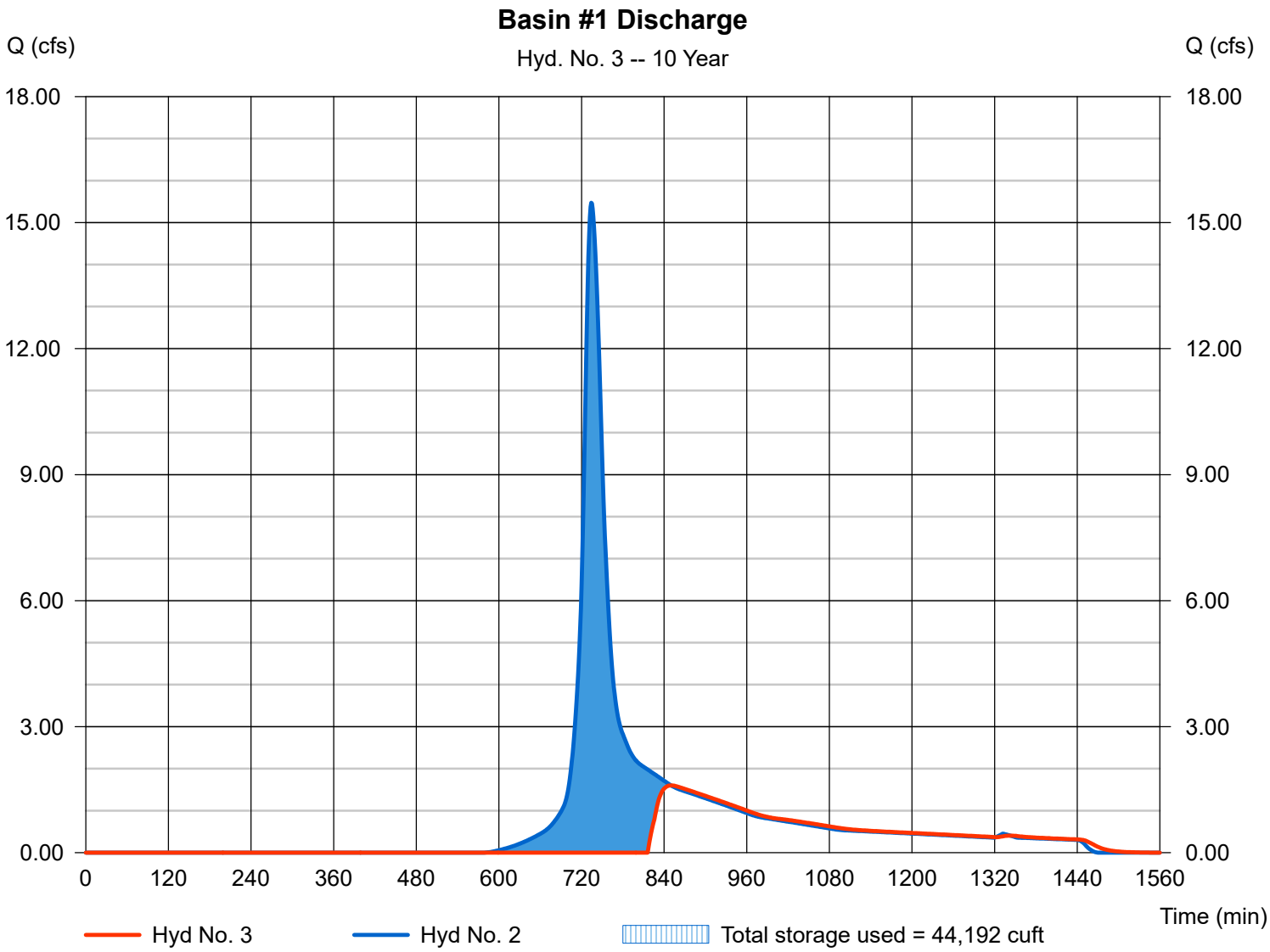
Hydrograph Report

Hyd. No. 3

Basin #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	1.601 cfs
Storm frequency	=	10 yrs	Time to peak	=	850 min
Time interval	=	1 min	Hyd. volume	=	26,658 cuft
Inflow hyd. No.	=	2 - Watershed #1 - Post Dev.	Max. Elevation	=	395.58 ft
Reservoir name	=	Basin #1	Max. Storage	=	44,192 cuft

Storage Indication method used.



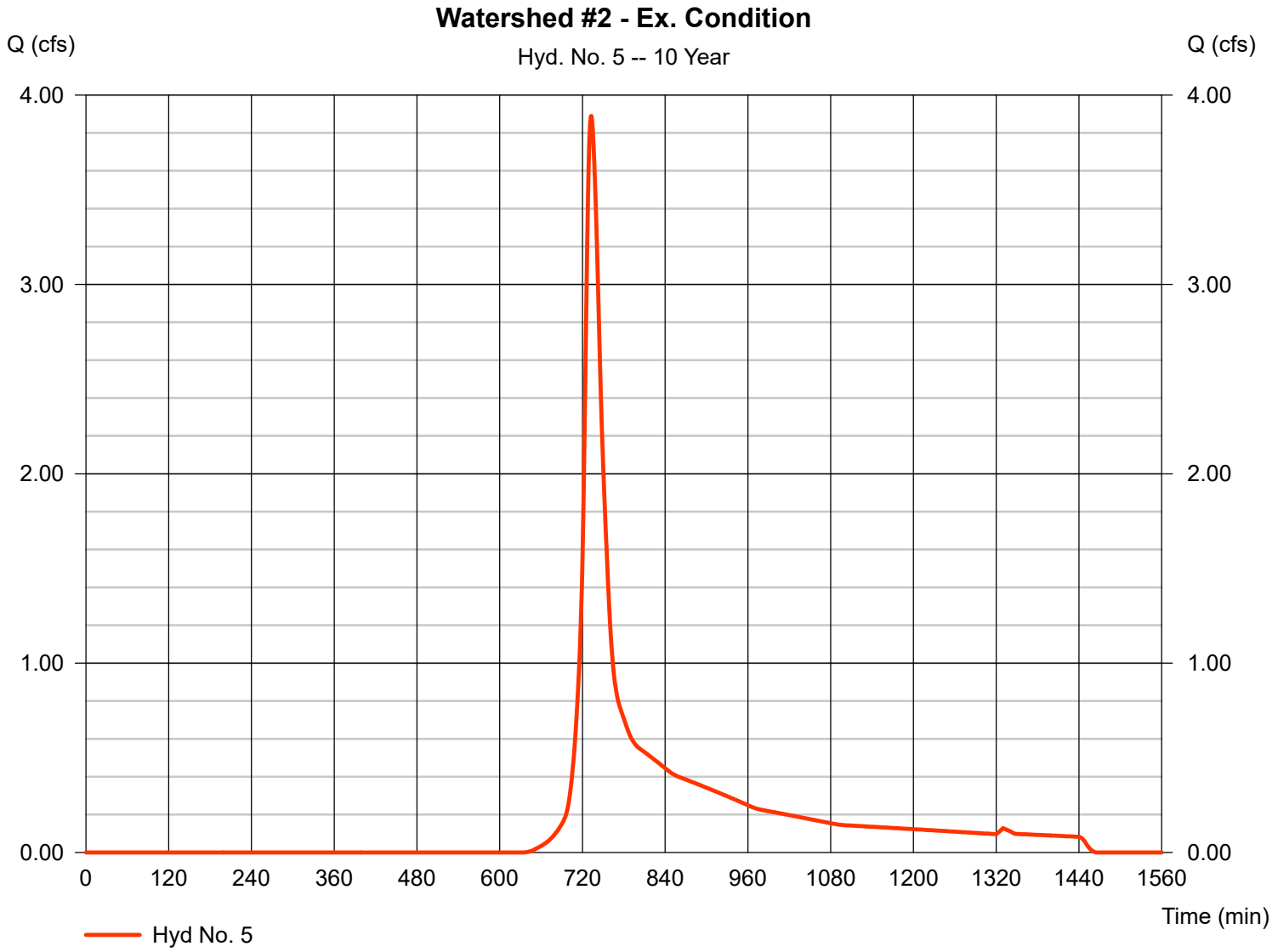
Hydrograph Report

Hyd. No. 5

Watershed #2 - Ex. Condition

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.889 cfs
Storm frequency	=	10 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	16,966 cuft
Drainage area	=	2.480 ac	Curve number	=	62*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.70 min
Total precip.	=	5.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.120 x 98) + (0.910 x 61) + (1.450 x 60)] / 2.480



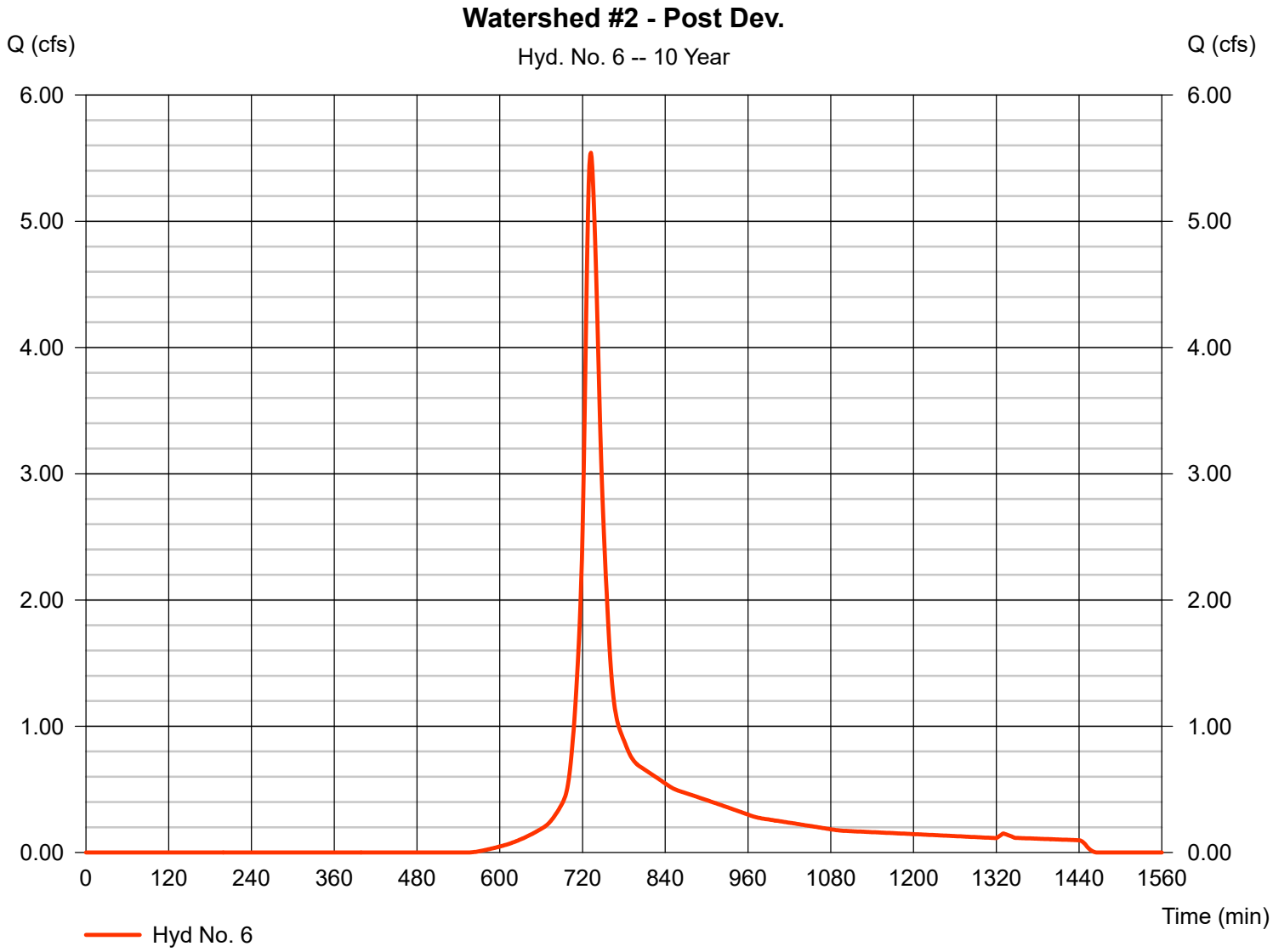
Hydrograph Report

Hyd. No. 6

Watershed #2 - Post Dev.

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.543 cfs
Storm frequency	=	10 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	23,134 cuft
Drainage area	=	2.480 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.70 min
Total precip.	=	5.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.340 x 98) + (2.140 x 65)] / 2.480



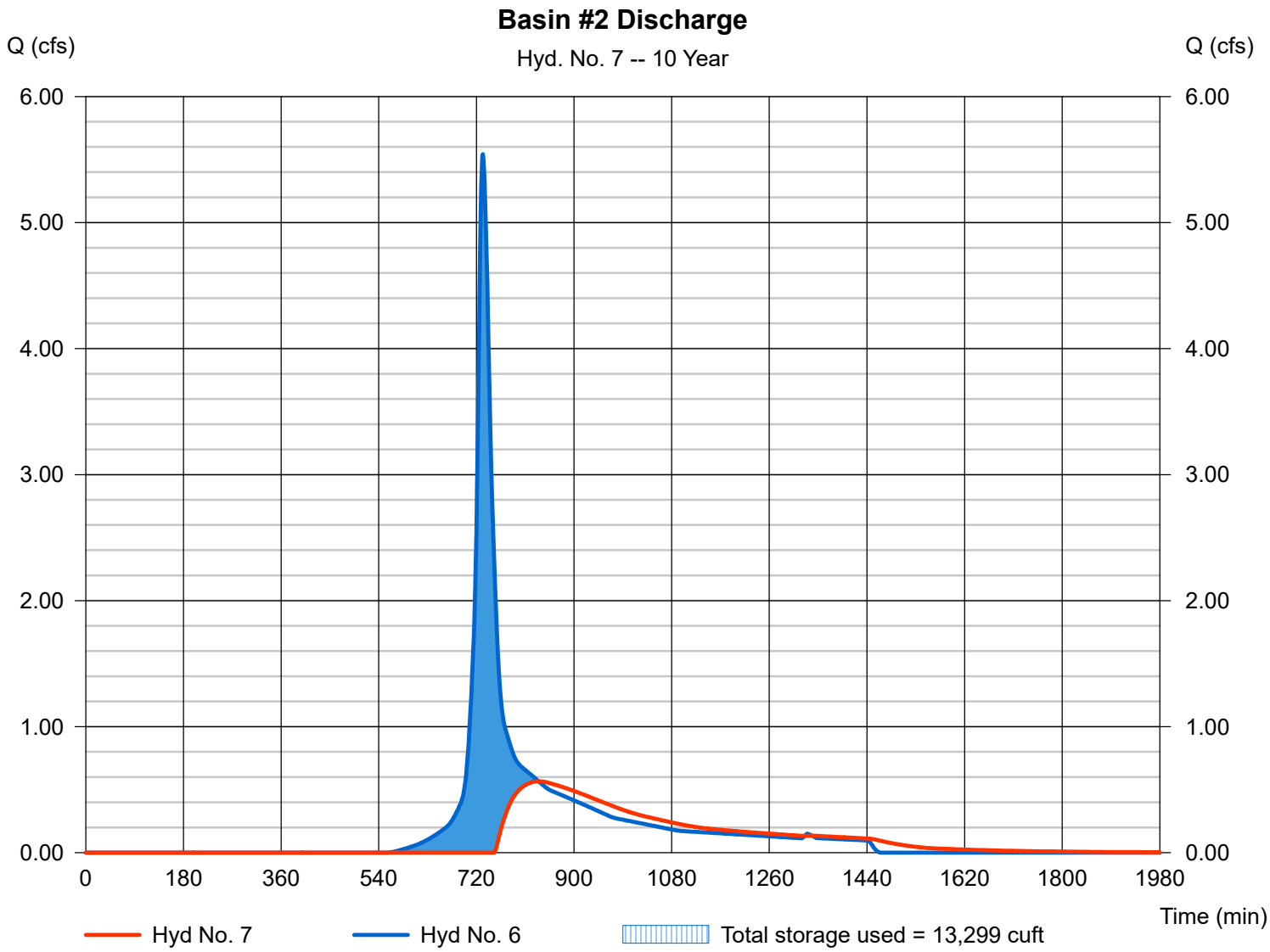
Hydrograph Report

Hyd. No. 7

Basin #2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	0.566 cfs
Storm frequency	=	10 yrs	Time to peak	=	835 min
Time interval	=	1 min	Hyd. volume	=	12,125 cuft
Inflow hyd. No.	=	6 - Watershed #2 - Post Dev.	Max. Elevation	=	398.81 ft
Reservoir name	=	Basin #2	Max. Storage	=	13,299 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	16.97	1	735	77,120	------	------	------	Watershed #1 - Ex. Condition
2	SCS Runoff	22.03	1	734	97,659	------	------	------	Watershed #1 - Post Dev.
3	Reservoir	7.229	1	761	54,848	2	395.71	46,677	Basin #1 Discharge
5	SCS Runoff	5.861	1	732	24,797	------	------	------	Watershed #2 - Ex. Condition
6	SCS Runoff	7.762	1	732	32,150	------	------	------	Watershed #2 - Post Dev.
7	Reservoir	2.319	1	758	21,141	6	399.07	15,377	Basin #2 Discharge

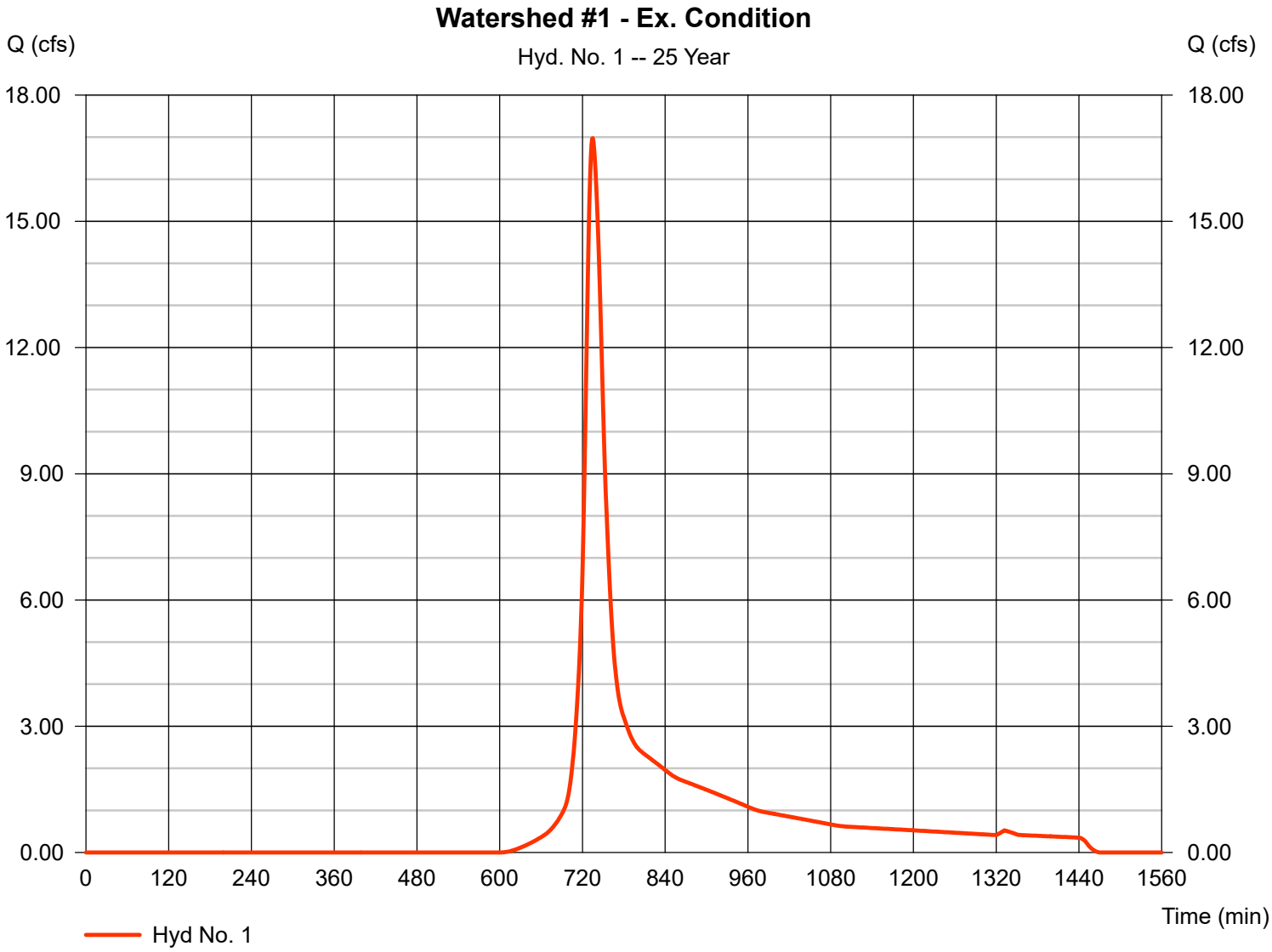
Hydrograph Report

Hyd. No. 1

Watershed #1 - Ex. Condition

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.97 cfs
Storm frequency	=	25 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	77,120 cuft
Drainage area	=	8.100 ac	Curve number	=	61*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.50 min
Total precip.	=	6.89 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.180 x 98) + (0.960 x 61) + (6.960 x 60)] / 8.100



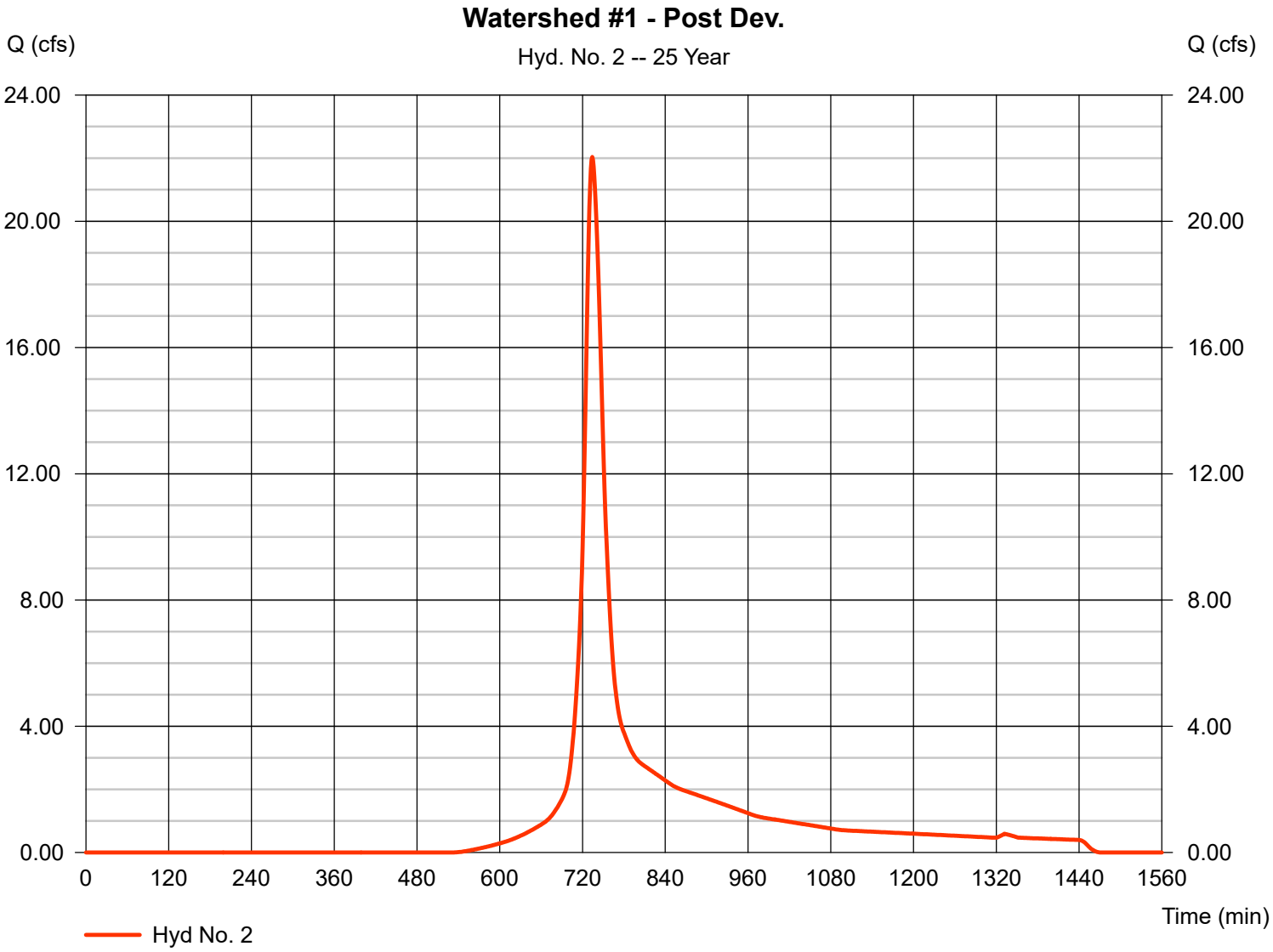
Hydrograph Report

Hyd. No. 2

Watershed #1 - Post Dev.

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.03 cfs
Storm frequency	=	25 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	97,659 cuft
Drainage area	=	8.100 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.50 min
Total precip.	=	6.89 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.610 x 98) + (1.600 x 74) + (4.430 x 65) + (0.730 x 61) + (0.730 x 60)] / 8.100



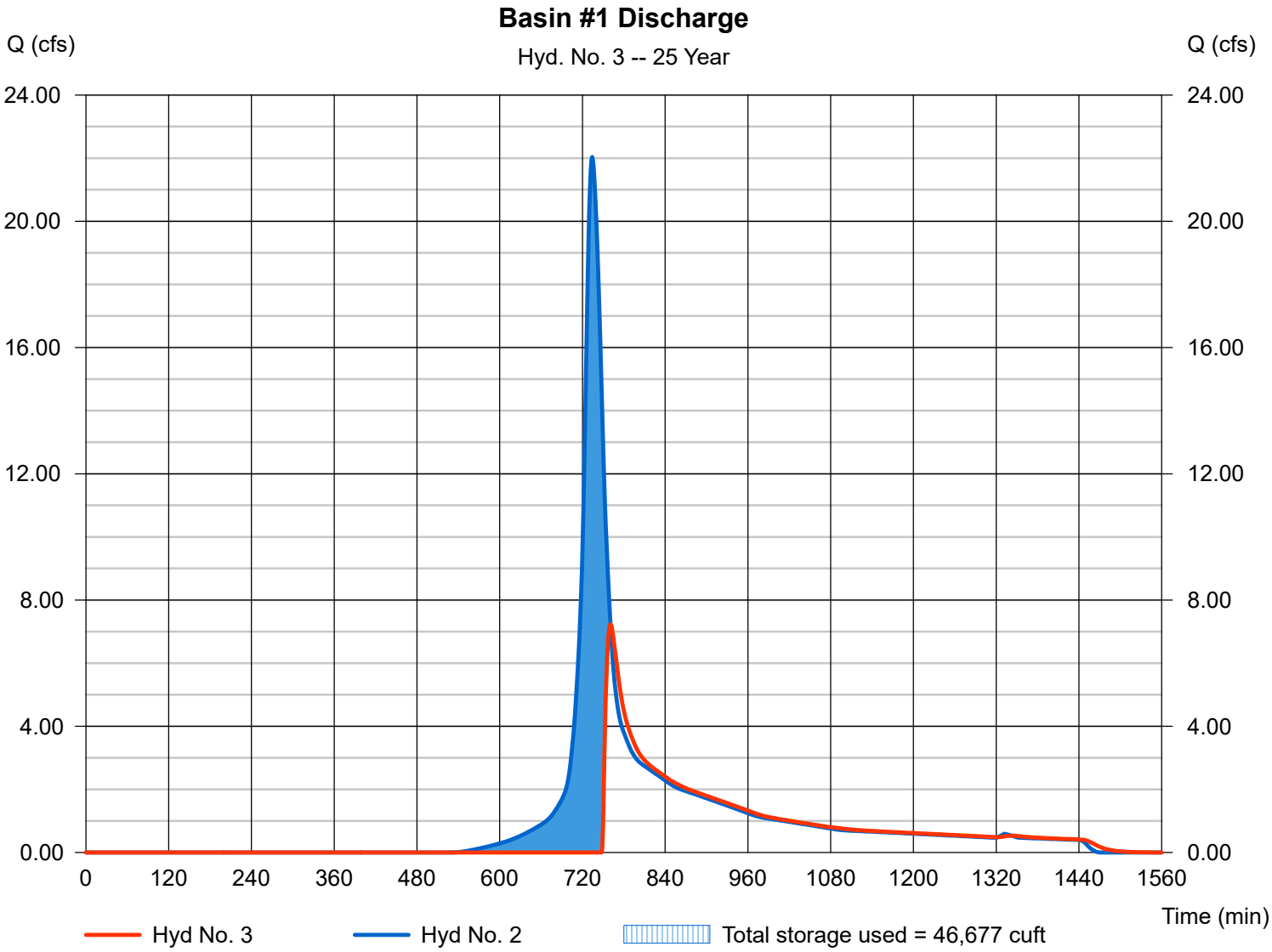
Hydrograph Report

Hyd. No. 3

Basin #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	7.229 cfs
Storm frequency	=	25 yrs	Time to peak	=	761 min
Time interval	=	1 min	Hyd. volume	=	54,848 cuft
Inflow hyd. No.	=	2 - Watershed #1 - Post Dev.	Max. Elevation	=	395.71 ft
Reservoir name	=	Basin #1	Max. Storage	=	46,677 cuft

Storage Indication method used.



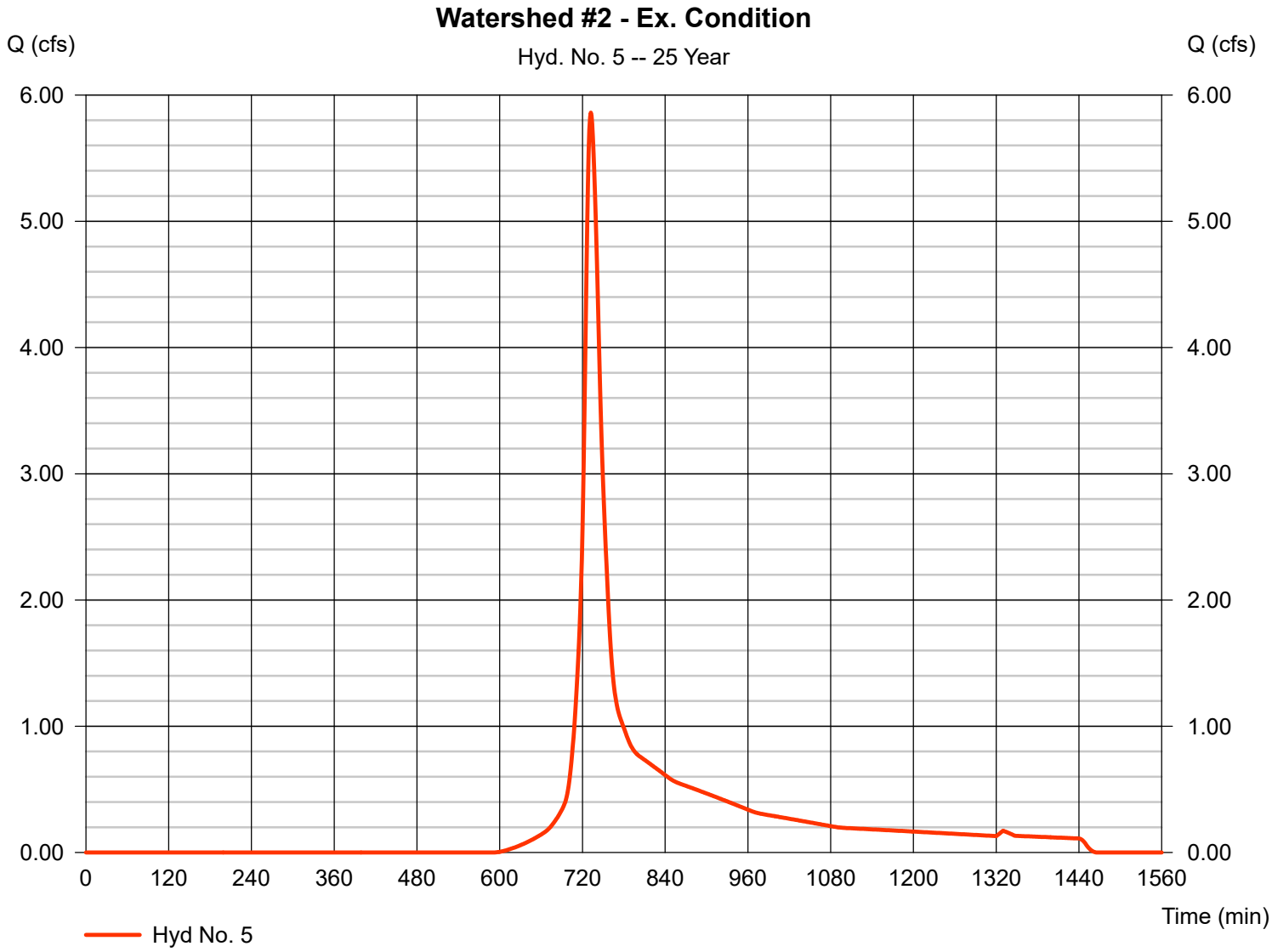
Hydrograph Report

Hyd. No. 5

Watershed #2 - Ex. Condition

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.861 cfs
Storm frequency	=	25 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	24,797 cuft
Drainage area	=	2.480 ac	Curve number	=	62*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.70 min
Total precip.	=	6.89 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.120 x 98) + (0.910 x 61) + (1.450 x 60)] / 2.480



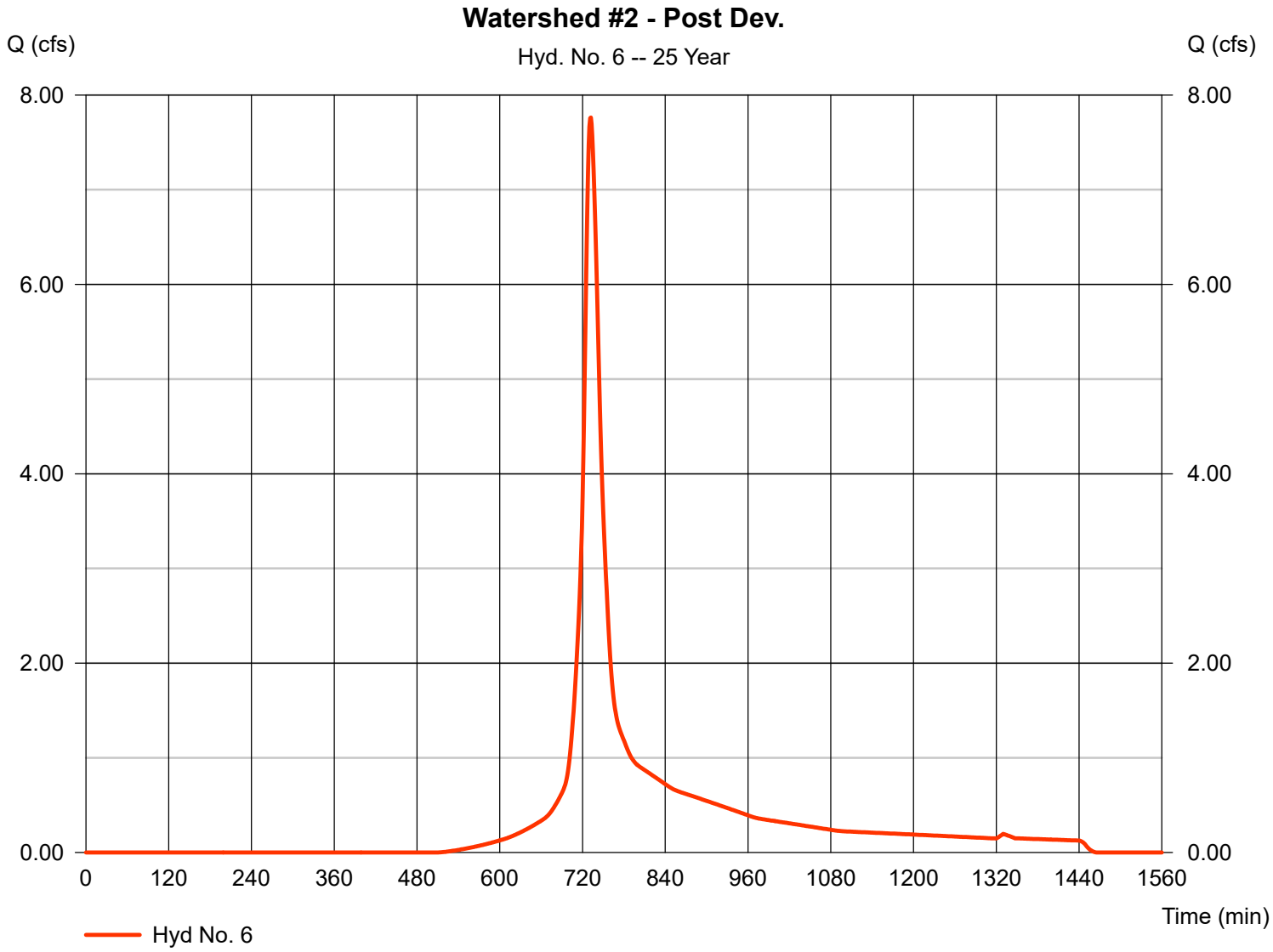
Hydrograph Report

Hyd. No. 6

Watershed #2 - Post Dev.

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.762 cfs
Storm frequency	=	25 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	32,150 cuft
Drainage area	=	2.480 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.70 min
Total precip.	=	6.89 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.340 x 98) + (2.140 x 65)] / 2.480



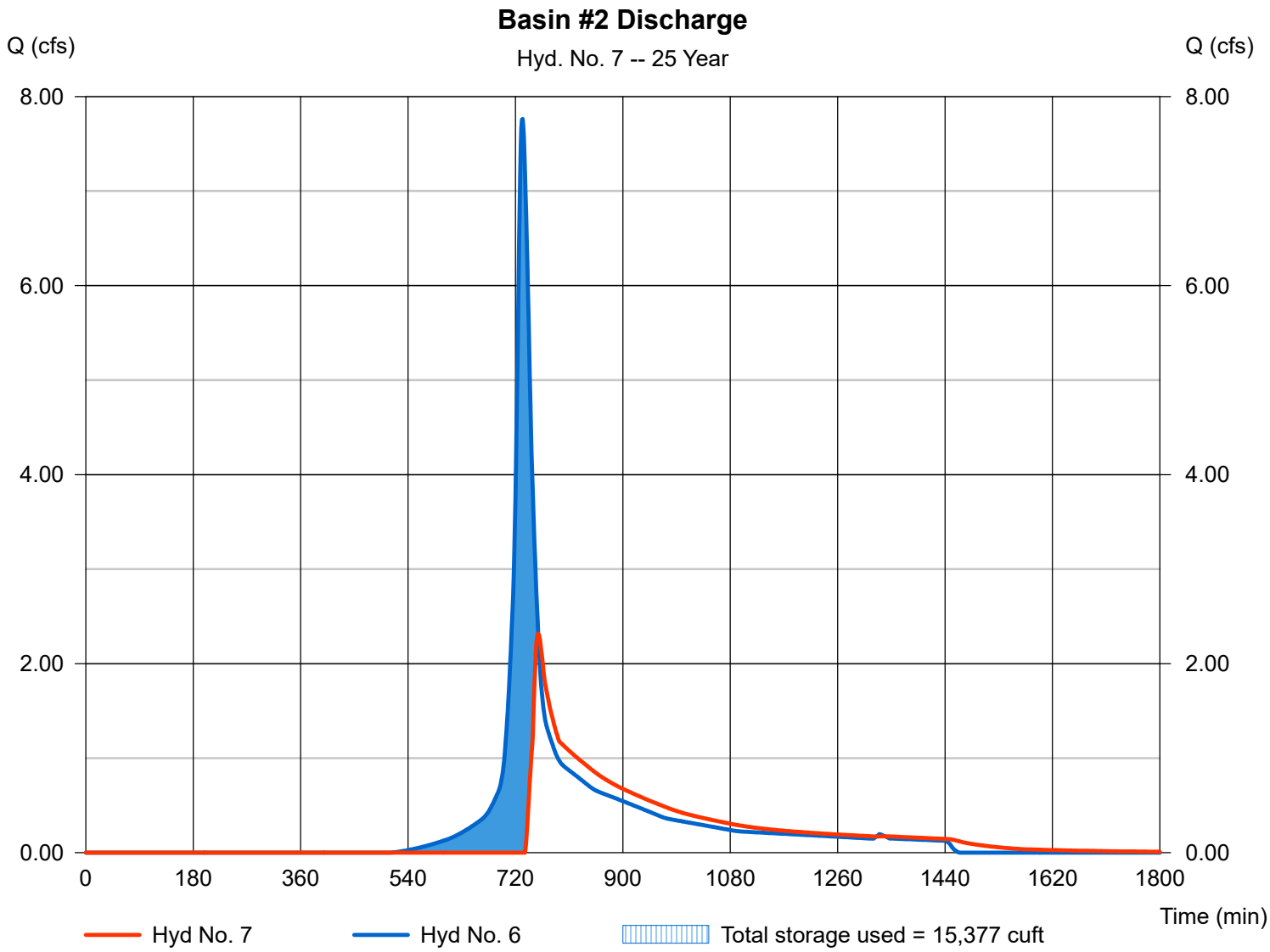
Hydrograph Report

Hyd. No. 7

Basin #2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	2.319 cfs
Storm frequency	=	25 yrs	Time to peak	=	758 min
Time interval	=	1 min	Hyd. volume	=	21,141 cuft
Inflow hyd. No.	=	6 - Watershed #2 - Post Dev.	Max. Elevation	=	399.07 ft
Reservoir name	=	Basin #2	Max. Storage	=	15,377 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	21.59	1	734	96,822	------	------	------	Watershed #1 - Ex. Condition
2	SCS Runoff	27.09	1	734	119,607	------	------	------	Watershed #1 - Post Dev.
3	Reservoir	15.77	1	750	76,796	2	395.86	49,327	Basin #1 Discharge
5	SCS Runoff	7.412	1	732	31,012	------	------	------	Watershed #2 - Ex. Condition
6	SCS Runoff	9.465	1	731	39,130	------	------	------	Watershed #2 - Post Dev.
7	Reservoir	5.141	1	747	28,120	6	399.18	16,305	Basin #2 Discharge

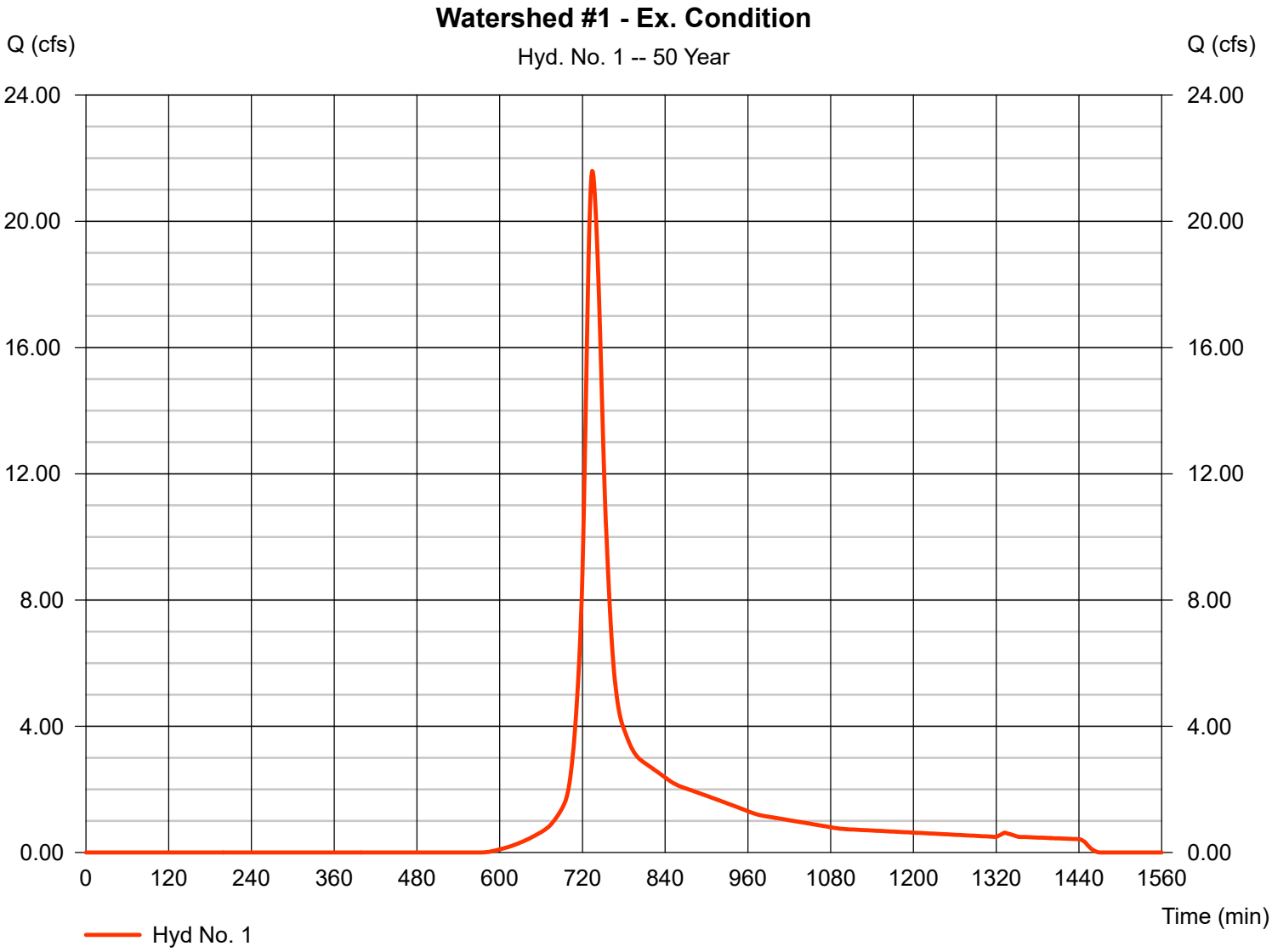
Hydrograph Report

Hyd. No. 1

Watershed #1 - Ex. Condition

Hydrograph type	= SCS Runoff	Peak discharge	= 21.59 cfs
Storm frequency	= 50 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 96,822 cuft
Drainage area	= 8.100 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 19.50 min
Total precip.	= 7.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.180 x 98) + (0.960 x 61) + (6.960 x 60)] / 8.100



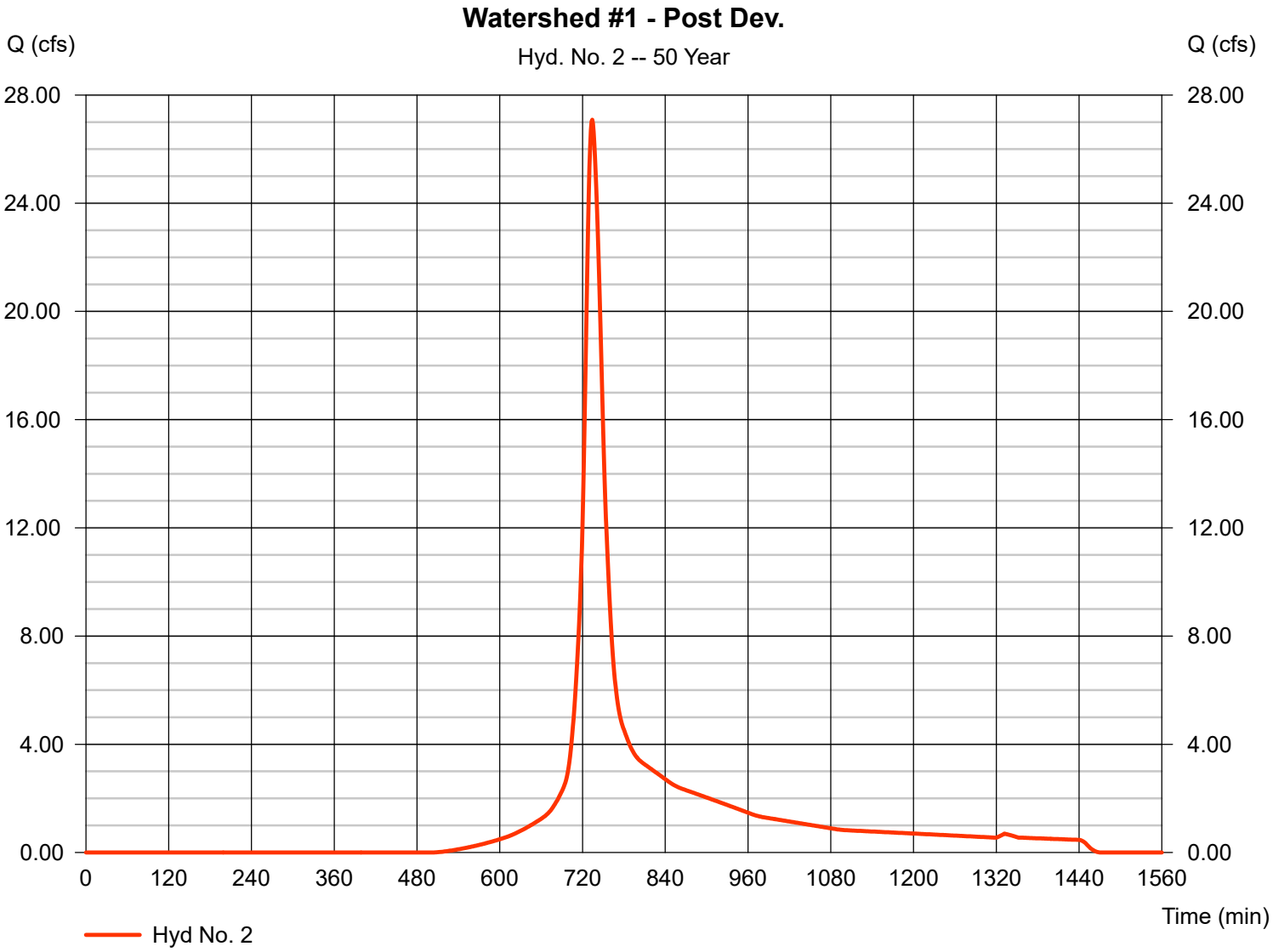
Hydrograph Report

Hyd. No. 2

Watershed #1 - Post Dev.

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.09 cfs
Storm frequency	=	50 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	119,607 cuft
Drainage area	=	8.100 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.50 min
Total precip.	=	7.80 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.610 x 98) + (1.600 x 74) + (4.430 x 65) + (0.730 x 61) + (0.730 x 60)] / 8.100



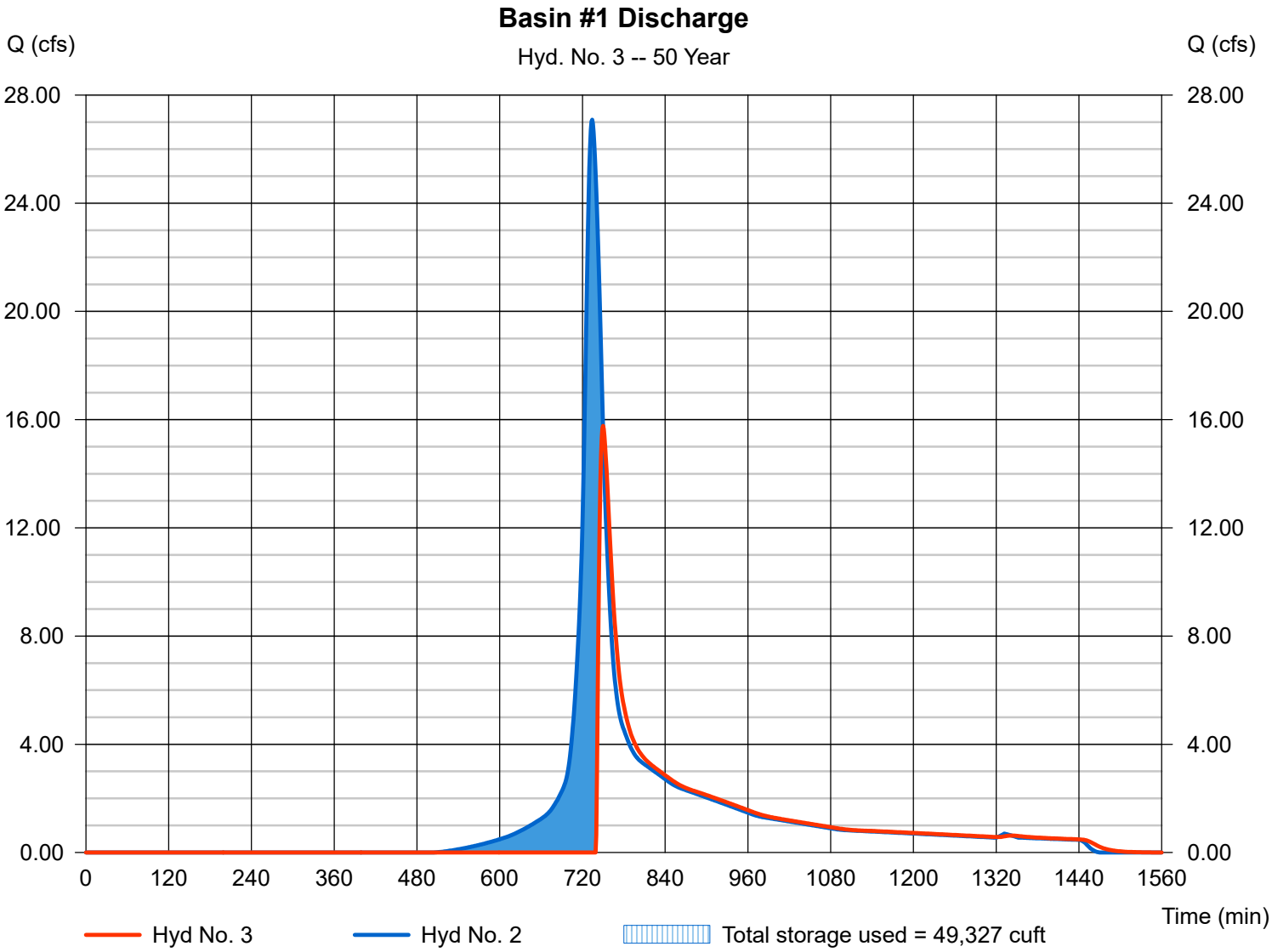
Hydrograph Report

Hyd. No. 3

Basin #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	15.77 cfs
Storm frequency	=	50 yrs	Time to peak	=	750 min
Time interval	=	1 min	Hyd. volume	=	76,796 cuft
Inflow hyd. No.	=	2 - Watershed #1 - Post Dev.	Max. Elevation	=	395.86 ft
Reservoir name	=	Basin #1	Max. Storage	=	49,327 cuft

Storage Indication method used.



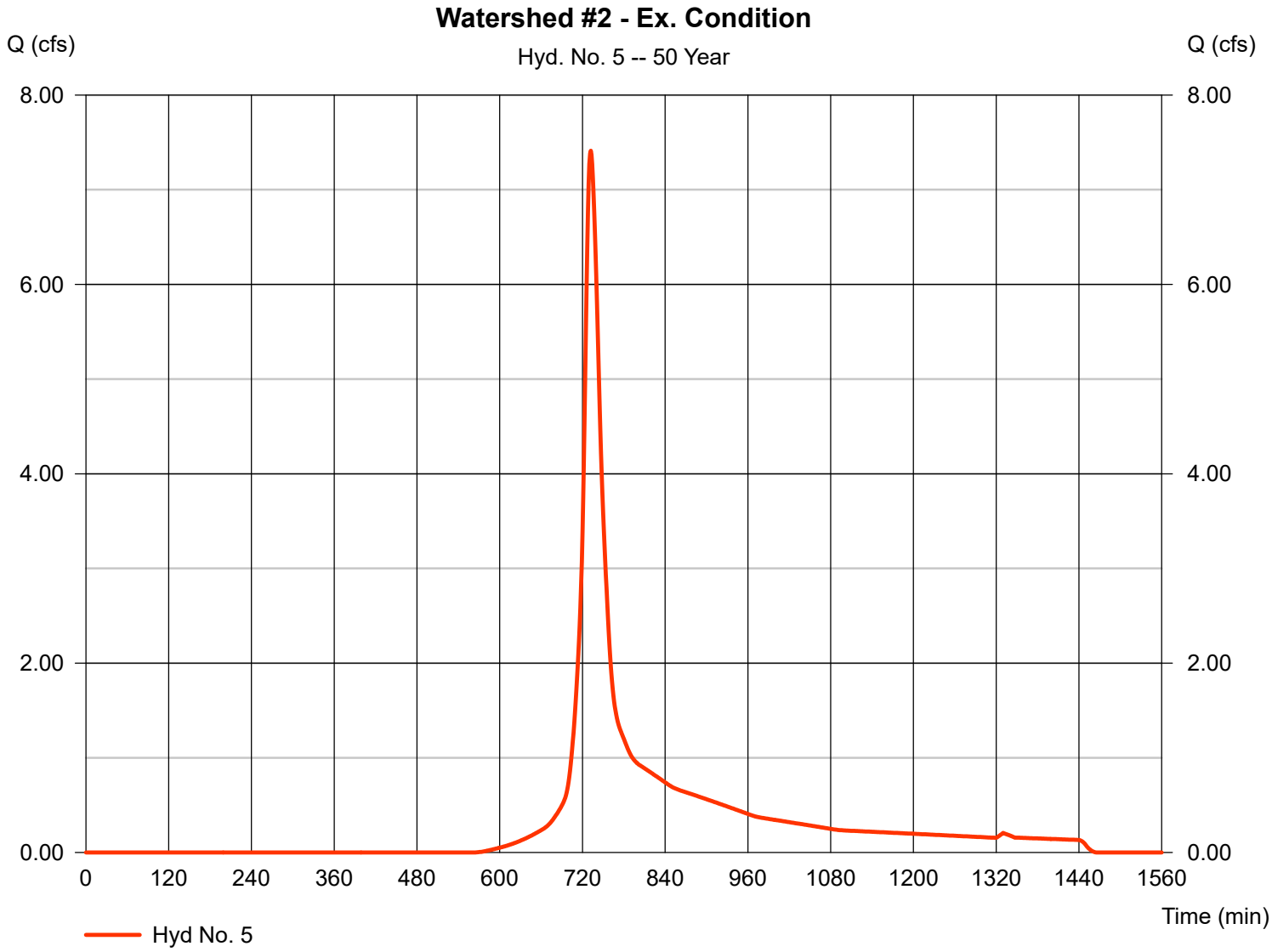
Hydrograph Report

Hyd. No. 5

Watershed #2 - Ex. Condition

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.412 cfs
Storm frequency	=	50 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	31,012 cuft
Drainage area	=	2.480 ac	Curve number	=	62*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.70 min
Total precip.	=	7.80 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.120 x 98) + (0.910 x 61) + (1.450 x 60)] / 2.480



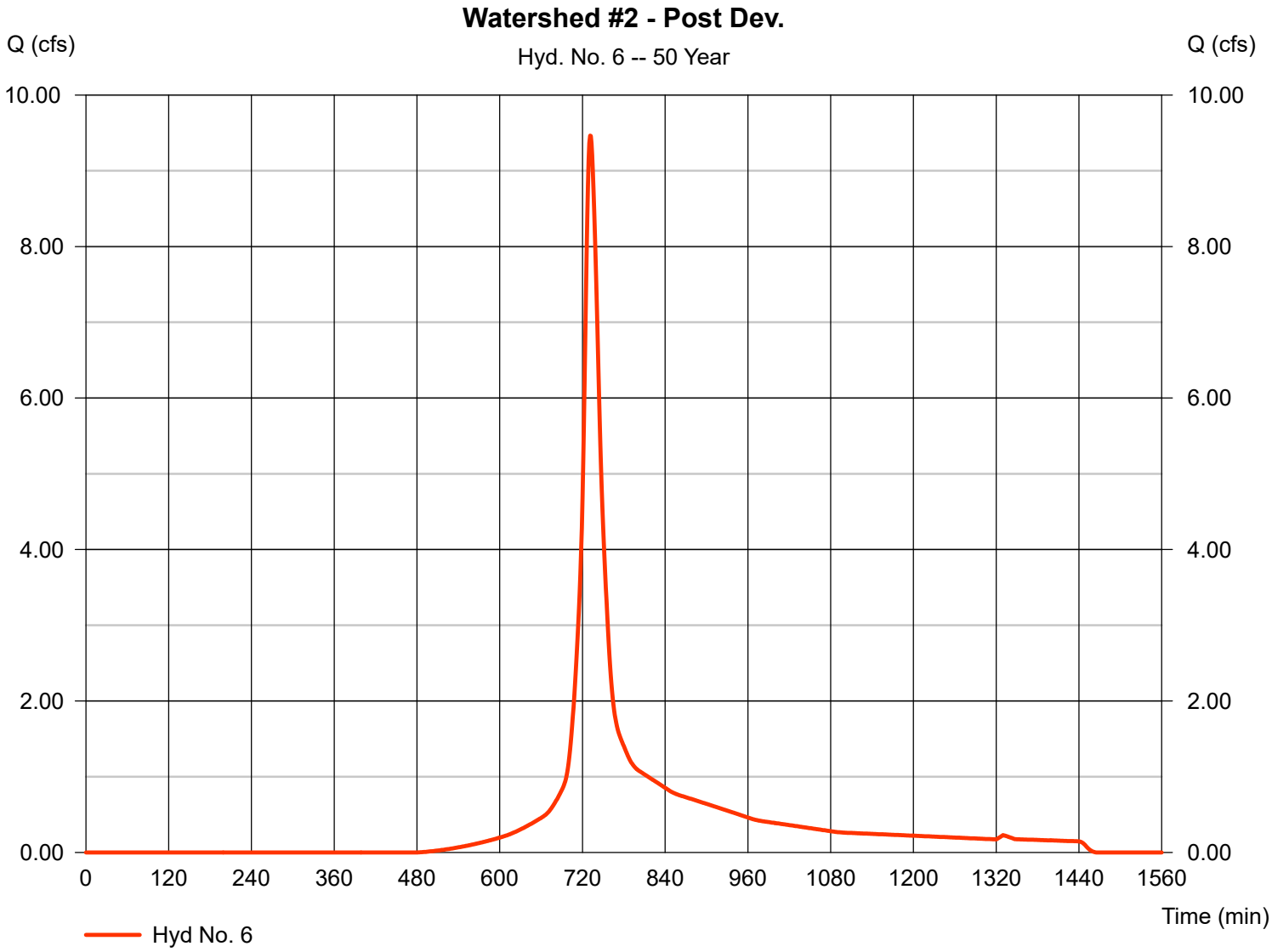
Hydrograph Report

Hyd. No. 6

Watershed #2 - Post Dev.

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.465 cfs
Storm frequency	=	50 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	39,130 cuft
Drainage area	=	2.480 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.70 min
Total precip.	=	7.80 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.340 x 98) + (2.140 x 65)] / 2.480



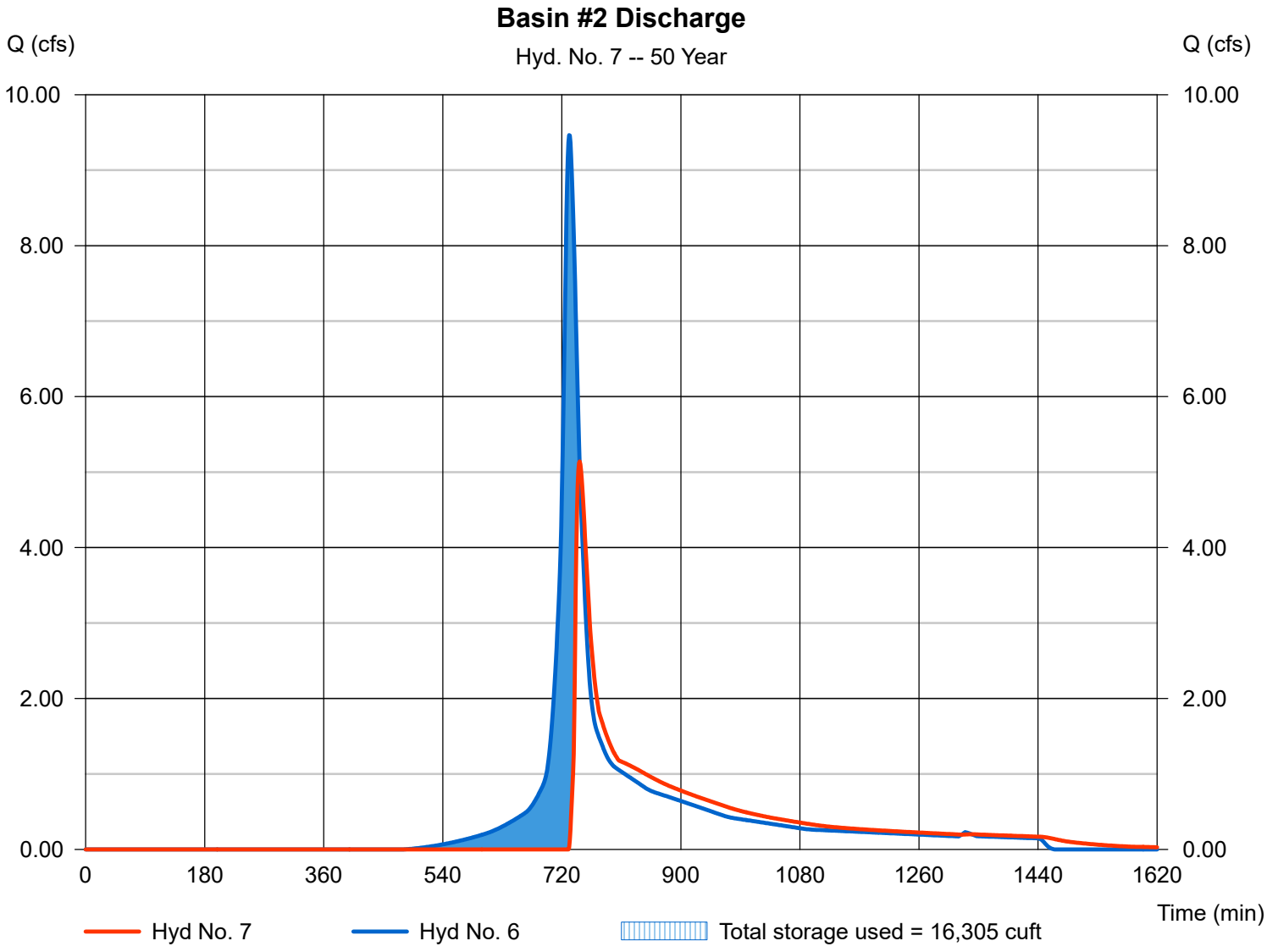
Hydrograph Report

Hyd. No. 7

Basin #2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	5.141 cfs
Storm frequency	=	50 yrs	Time to peak	=	747 min
Time interval	=	1 min	Hyd. volume	=	28,120 cuft
Inflow hyd. No.	=	6 - Watershed #2 - Post Dev.	Max. Elevation	=	399.18 ft
Reservoir name	=	Basin #2	Max. Storage	=	16,305 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	26.84	1	734	119,305	------	------	------	Watershed #1 - Ex. Condition
2	SCS Runoff	32.71	1	734	144,276	------	------	------	Watershed #1 - Post Dev.
3	Reservoir	24.95	1	745	101,465	2	395.99	51,661	Basin #1 Discharge
5	SCS Runoff	9.164	1	732	38,087	------	------	------	Watershed #2 - Ex. Condition
6	SCS Runoff	11.36	1	731	46,945	------	------	------	Watershed #2 - Post Dev.
7	Reservoir	6.811	1	745	35,936	6	399.34	17,628	Basin #2 Discharge

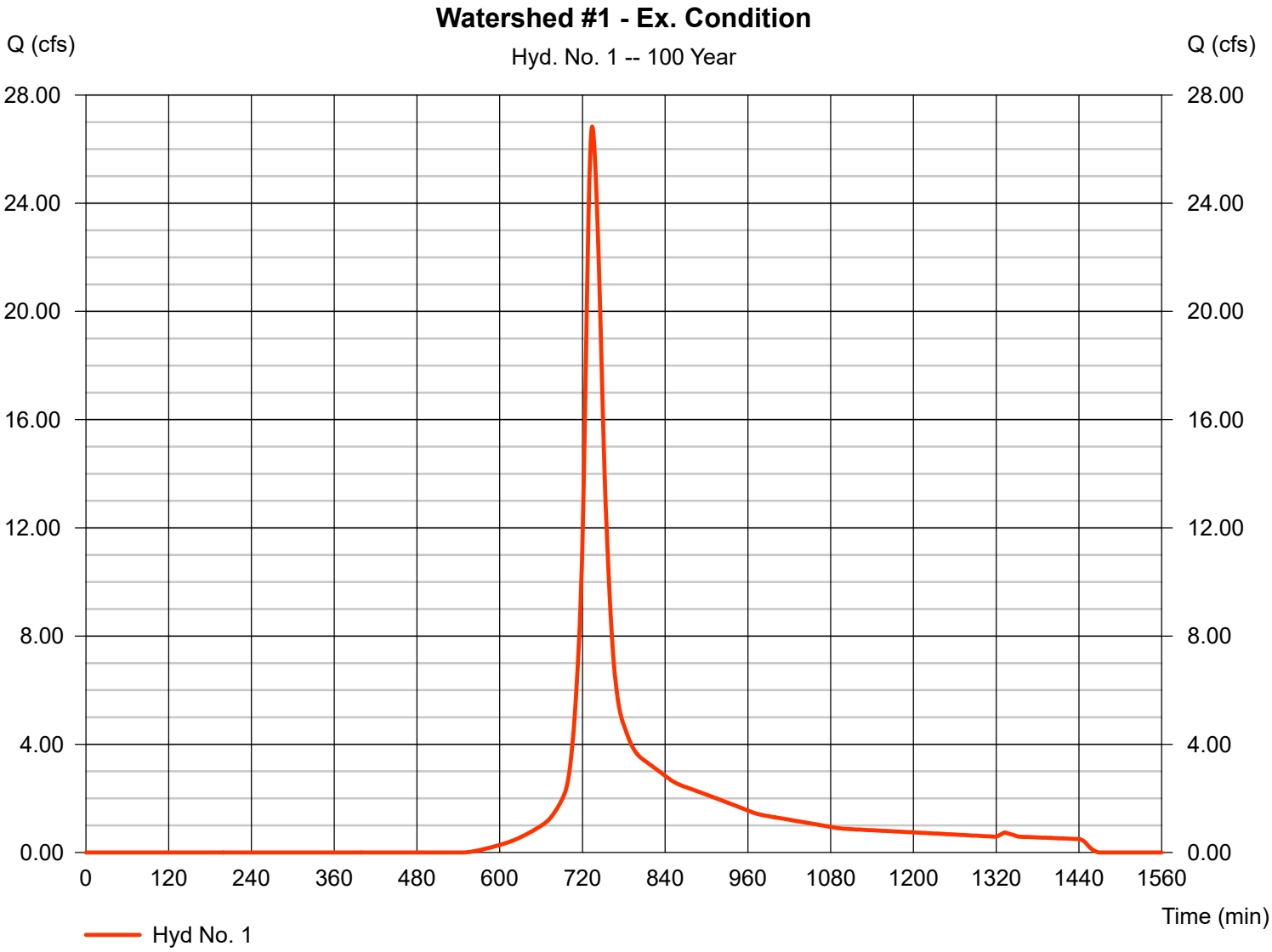
Hydrograph Report

Hyd. No. 1

Watershed #1 - Ex. Condition

Hydrograph type	=	SCS Runoff	Peak discharge	=	26.84 cfs
Storm frequency	=	100 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	119,305 cuft
Drainage area	=	8.100 ac	Curve number	=	61*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.50 min
Total precip.	=	8.79 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.180 x 98) + (0.960 x 61) + (6.960 x 60)] / 8.100



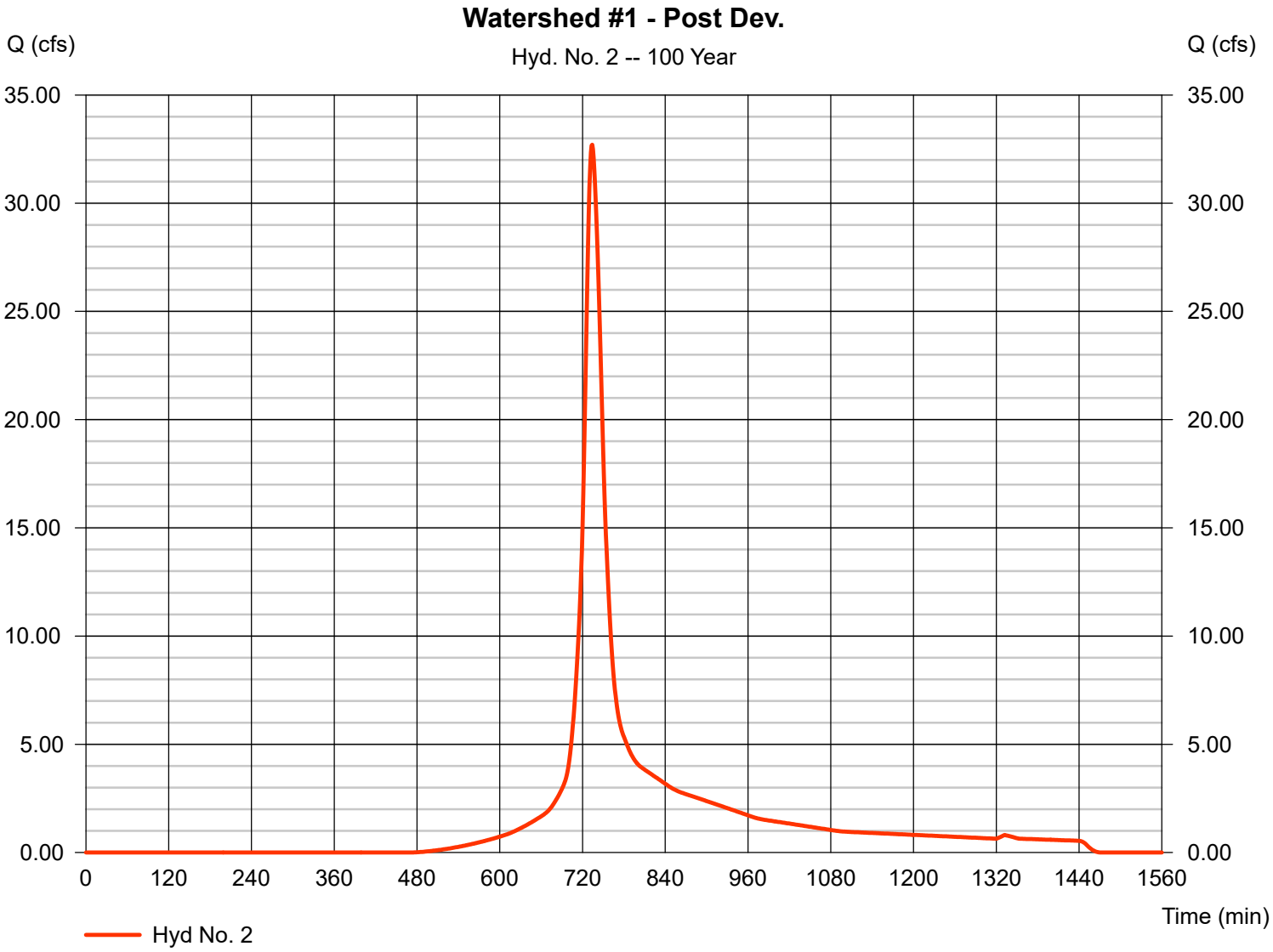
Hydrograph Report

Hyd. No. 2

Watershed #1 - Post Dev.

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.71 cfs
Storm frequency	=	100 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	144,276 cuft
Drainage area	=	8.100 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	19.50 min
Total precip.	=	8.79 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.610 x 98) + (1.600 x 74) + (4.430 x 65) + (0.730 x 61) + (0.730 x 60)] / 8.100



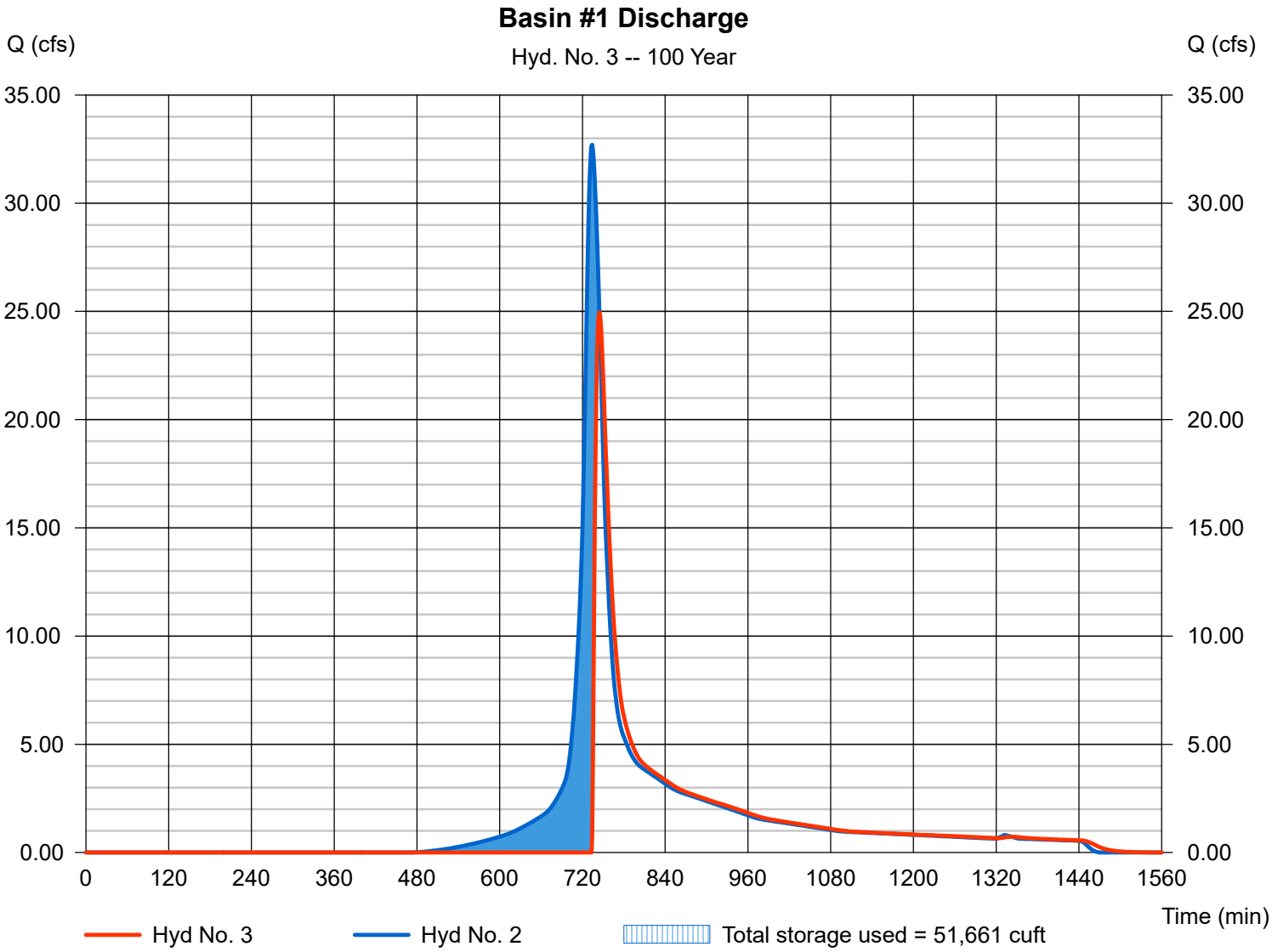
Hydrograph Report

Hyd. No. 3

Basin #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	24.95 cfs
Storm frequency	=	100 yrs	Time to peak	=	745 min
Time interval	=	1 min	Hyd. volume	=	101,465 cuft
Inflow hyd. No.	=	2 - Watershed #1 - Post Dev.	Max. Elevation	=	395.99 ft
Reservoir name	=	Basin #1	Max. Storage	=	51,661 cuft

Storage Indication method used.



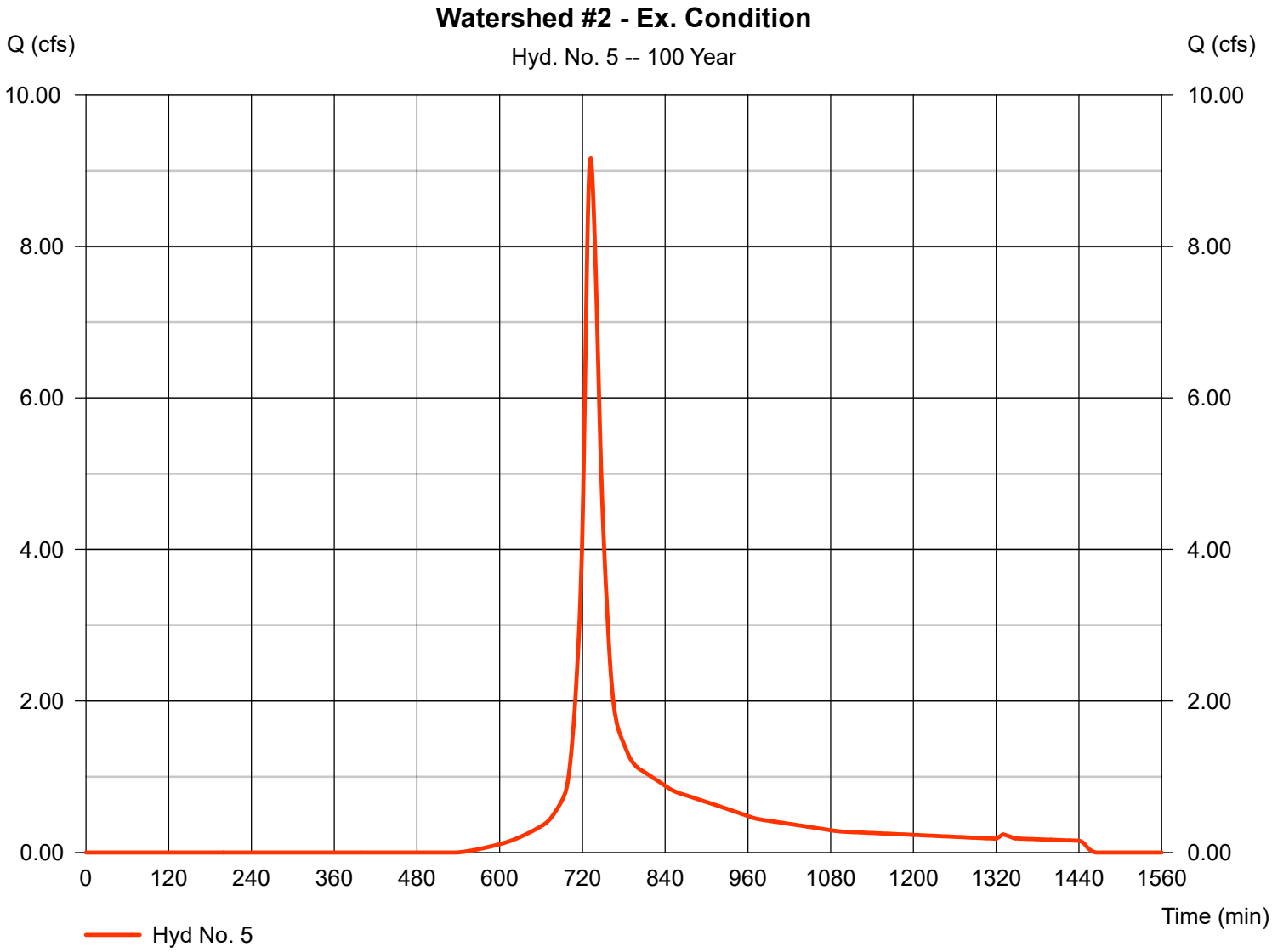
Hydrograph Report

Hyd. No. 5

Watershed #2 - Ex. Condition

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.164 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	38,087 cuft
Drainage area	=	2.480 ac	Curve number	=	62*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.70 min
Total precip.	=	8.79 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.120 x 98) + (0.910 x 61) + (1.450 x 60)] / 2.480



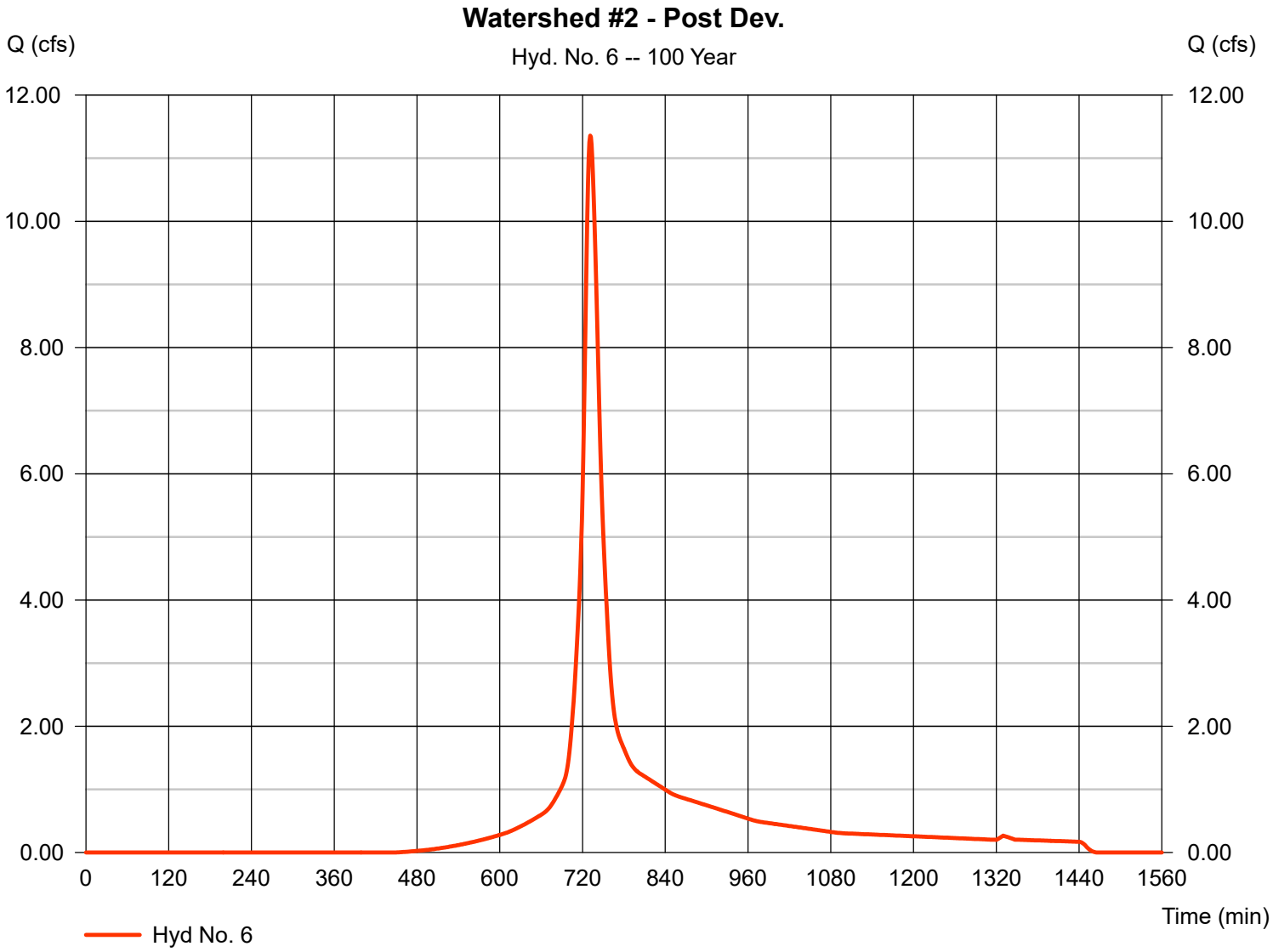
Hydrograph Report

Hyd. No. 6

Watershed #2 - Post Dev.

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	46,945 cuft
Drainage area	=	2.480 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.70 min
Total precip.	=	8.79 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.340 x 98) + (2.140 x 65)] / 2.480



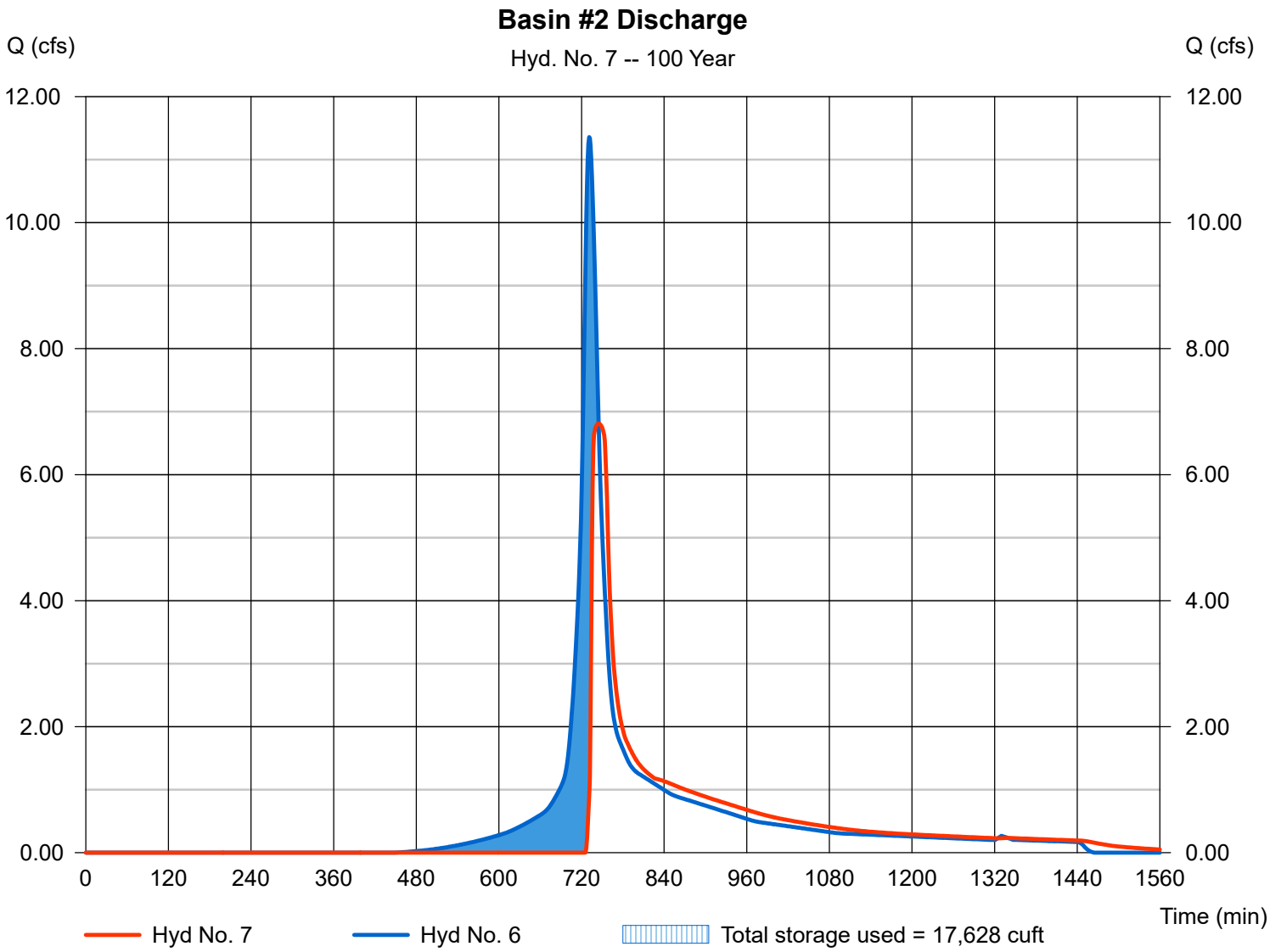
Hydrograph Report

Hyd. No. 7

Basin #2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	6.811 cfs
Storm frequency	=	100 yrs	Time to peak	=	745 min
Time interval	=	1 min	Hyd. volume	=	35,936 cuft
Inflow hyd. No.	=	6 - Watershed #2 - Post Dev.	Max. Elevation	=	399.34 ft
Reservoir name	=	Basin #2	Max. Storage	=	17,628 cuft

Storage Indication method used.



APPENDIX A

Support Information

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

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: 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.

NOAA Atlas 14, Volume 10, Version 3
Location name: Ansonia, Connecticut, USA*
Latitude: 41.3429°, Longitude: -73.0604°
Elevation: 420.54 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.365 (0.286-0.463)	0.436 (0.341-0.553)	0.552 (0.430-0.701)	0.647 (0.502-0.829)	0.779 (0.585-1.04)	0.879 (0.645-1.20)	0.983 (0.700-1.39)	1.10 (0.741-1.59)	1.26 (0.819-1.89)	1.40 (0.884-2.14)
10-min	0.518 (0.406-0.656)	0.618 (0.484-0.784)	0.782 (0.610-0.996)	0.917 (0.712-1.17)	1.10 (0.828-1.48)	1.25 (0.915-1.70)	1.39 (0.992-1.97)	1.56 (1.05-2.25)	1.79 (1.16-2.68)	1.98 (1.25-3.03)
15-min	0.609 (0.477-0.772)	0.727 (0.569-0.922)	0.920 (0.717-1.17)	1.08 (0.837-1.38)	1.30 (0.975-1.74)	1.47 (1.08-2.00)	1.64 (1.17-2.32)	1.83 (1.24-2.65)	2.10 (1.37-3.16)	2.33 (1.47-3.56)
30-min	0.841 (0.659-1.07)	1.00 (0.787-1.27)	1.27 (0.992-1.62)	1.49 (1.16-1.91)	1.80 (1.35-2.40)	2.03 (1.49-2.77)	2.27 (1.62-3.21)	2.53 (1.71-3.67)	2.91 (1.89-4.37)	3.22 (2.04-4.93)
60-min	1.07 (0.842-1.36)	1.28 (1.00-1.63)	1.62 (1.27-2.07)	1.91 (1.48-2.44)	2.30 (1.72-3.07)	2.59 (1.90-3.53)	2.90 (2.06-4.10)	3.24 (2.19-4.69)	3.72 (2.41-5.58)	4.12 (2.60-6.30)
2-hr	1.39 (1.09-1.75)	1.64 (1.30-2.07)	2.06 (1.62-2.61)	2.41 (1.88-3.07)	2.89 (2.18-3.84)	3.25 (2.40-4.41)	3.63 (2.60-5.11)	4.06 (2.75-5.84)	4.68 (3.05-6.97)	5.19 (3.30-7.90)
3-hr	1.60 (1.27-2.01)	1.90 (1.50-2.38)	2.38 (1.87-2.99)	2.77 (2.17-3.51)	3.32 (2.52-4.40)	3.73 (2.77-5.05)	4.16 (3.00-5.85)	4.66 (3.16-6.68)	5.39 (3.51-8.00)	5.99 (3.81-9.07)
6-hr	2.04 (1.63-2.55)	2.42 (1.93-3.02)	3.05 (2.42-3.81)	3.56 (2.81-4.48)	4.27 (3.26-5.62)	4.80 (3.58-6.46)	5.36 (3.88-7.50)	6.02 (4.10-8.57)	6.97 (4.56-10.3)	7.77 (4.96-11.7)
12-hr	2.56 (2.05-3.17)	3.06 (2.46-3.80)	3.89 (3.11-4.84)	4.57 (3.63-5.72)	5.52 (4.23-7.22)	6.22 (4.67-8.32)	6.97 (5.08-9.69)	7.84 (5.37-11.1)	9.13 (5.99-13.4)	10.2 (6.53-15.3)
24-hr	3.04 (2.45-3.73)	3.69 (2.98-4.54)	4.77 (3.83-5.89)	5.66 (4.52-7.03)	6.89 (5.32-8.98)	7.80 (5.90-10.4)	8.79 (6.45-12.2)	9.96 (6.84-14.0)	11.7 (7.72-17.1)	13.2 (8.50-19.7)
2-day	3.43 (2.78-4.18)	4.24 (3.45-5.19)	5.58 (4.52-6.85)	6.70 (5.38-8.26)	8.23 (6.40-10.7)	9.35 (7.13-12.4)	10.6 (7.86-14.7)	12.1 (8.35-16.9)	14.5 (9.58-21.0)	16.6 (10.7-24.5)
3-day	3.72 (3.04-4.53)	4.63 (3.77-5.63)	6.10 (4.95-7.45)	7.33 (5.91-9.00)	9.01 (7.04-11.7)	10.3 (7.85-13.6)	11.6 (8.65-16.1)	13.3 (9.19-18.6)	16.0 (10.6-23.1)	18.3 (11.8-26.9)
4-day	4.00 (3.27-4.85)	4.95 (4.05-6.01)	6.51 (5.30-7.93)	7.81 (6.32-9.56)	9.59 (7.51-12.4)	10.9 (8.36-14.4)	12.3 (9.21-17.0)	14.1 (9.77-19.6)	16.9 (11.2-24.3)	19.4 (12.5-28.4)
7-day	4.77 (3.93-5.75)	5.81 (4.77-7.01)	7.50 (6.14-9.09)	8.91 (7.24-10.9)	10.8 (8.52-13.9)	12.3 (9.43-16.1)	13.8 (10.3-18.9)	15.7 (10.9-21.7)	18.6 (12.4-26.6)	21.1 (13.7-30.7)
10-day	5.52 (4.55-6.63)	6.60 (5.44-7.94)	8.37 (6.88-10.1)	9.85 (8.03-11.9)	11.9 (9.34-15.1)	13.4 (10.3-17.4)	15.0 (11.2-20.3)	16.9 (11.8-23.2)	19.8 (13.2-28.2)	22.2 (14.4-32.3)
20-day	7.75 (6.44-9.25)	8.93 (7.41-10.7)	10.9 (8.98-13.0)	12.5 (10.2-15.0)	14.7 (11.6-18.4)	16.3 (12.6-21.0)	18.1 (13.4-24.0)	20.0 (14.0-27.3)	22.8 (15.2-32.2)	25.0 (16.3-36.1)
30-day	9.59 (8.00-11.4)	10.8 (9.02-12.9)	12.9 (10.7-15.3)	14.5 (12.0-17.4)	16.8 (13.3-21.0)	18.6 (14.4-23.7)	20.4 (15.1-26.8)	22.3 (15.7-30.3)	24.9 (16.7-35.0)	27.0 (17.6-38.8)
45-day	11.8 (9.92-14.0)	13.1 (11.0-15.6)	15.2 (12.7-18.1)	17.0 (14.1-20.3)	19.4 (15.4-24.0)	21.2 (16.4-26.8)	23.1 (17.1-30.1)	24.9 (17.6-33.7)	27.4 (18.4-38.3)	29.2 (19.1-41.7)
60-day	13.7 (11.5-16.2)	15.0 (12.6-17.8)	17.2 (14.4-20.4)	19.0 (15.7-22.6)	21.4 (17.1-26.4)	23.3 (18.1-29.3)	25.2 (18.7-32.6)	27.0 (19.1-36.3)	29.3 (19.7-40.7)	30.9 (20.2-44.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

NOAA Atlas 14, Volume 10, Version 3
Location name: Ansonia, Connecticut, USA*
Latitude: 41.3429°, Longitude: -73.0604°
Elevation: 420.54 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.38 (3.43-5.56)	5.23 (4.09-6.64)	6.62 (5.16-8.41)	7.76 (6.02-9.95)	9.35 (7.02-12.5)	10.5 (7.74-14.4)	11.8 (8.40-16.7)	13.2 (8.89-19.1)	15.2 (9.83-22.7)	16.8 (10.6-25.6)
10-min	3.11 (2.44-3.94)	3.71 (2.90-4.70)	4.69 (3.66-5.98)	5.50 (4.27-7.04)	6.62 (4.97-8.85)	7.47 (5.49-10.2)	8.35 (5.95-11.8)	9.34 (6.30-13.5)	10.7 (6.96-16.1)	11.9 (7.51-18.2)
15-min	2.44 (1.91-3.09)	2.91 (2.28-3.69)	3.68 (2.87-4.68)	4.32 (3.35-5.52)	5.20 (3.90-6.94)	5.86 (4.30-7.99)	6.55 (4.67-9.27)	7.32 (4.94-10.6)	8.42 (5.46-12.6)	9.31 (5.89-14.2)
30-min	1.68 (1.32-2.13)	2.01 (1.57-2.55)	2.54 (1.98-3.24)	2.99 (2.32-3.82)	3.60 (2.70-4.80)	4.06 (2.98-5.53)	4.53 (3.23-6.41)	5.07 (3.42-7.34)	5.83 (3.78-8.74)	6.44 (4.08-9.86)
60-min	1.07 (0.842-1.36)	1.28 (1.00-1.63)	1.62 (1.27-2.07)	1.91 (1.48-2.44)	2.30 (1.72-3.07)	2.59 (1.90-3.53)	2.90 (2.06-4.10)	3.24 (2.19-4.69)	3.72 (2.41-5.58)	4.12 (2.60-6.30)
2-hr	0.694 (0.547-0.873)	0.822 (0.648-1.04)	1.03 (0.810-1.30)	1.21 (0.942-1.53)	1.44 (1.09-1.92)	1.62 (1.20-2.21)	1.81 (1.30-2.56)	2.03 (1.37-2.92)	2.34 (1.52-3.49)	2.60 (1.65-3.95)
3-hr	0.534 (0.423-0.670)	0.632 (0.500-0.793)	0.791 (0.624-0.997)	0.923 (0.724-1.17)	1.11 (0.838-1.46)	1.24 (0.921-1.68)	1.39 (0.998-1.95)	1.55 (1.05-2.23)	1.79 (1.17-2.66)	2.00 (1.27-3.02)
6-hr	0.341 (0.272-0.425)	0.405 (0.322-0.505)	0.509 (0.403-0.636)	0.595 (0.469-0.748)	0.713 (0.544-0.938)	0.802 (0.598-1.08)	0.896 (0.649-1.25)	1.00 (0.685-1.43)	1.16 (0.762-1.72)	1.30 (0.828-1.95)
12-hr	0.212 (0.170-0.263)	0.254 (0.204-0.315)	0.323 (0.258-0.401)	0.380 (0.301-0.475)	0.458 (0.351-0.599)	0.516 (0.388-0.691)	0.579 (0.421-0.805)	0.651 (0.445-0.921)	0.758 (0.497-1.11)	0.847 (0.542-1.27)
24-hr	0.126 (0.102-0.155)	0.154 (0.124-0.189)	0.199 (0.160-0.245)	0.236 (0.188-0.293)	0.287 (0.222-0.374)	0.325 (0.246-0.433)	0.366 (0.269-0.508)	0.415 (0.285-0.584)	0.489 (0.322-0.712)	0.552 (0.354-0.819)
2-day	0.071 (0.058-0.087)	0.088 (0.072-0.108)	0.116 (0.094-0.143)	0.139 (0.112-0.172)	0.171 (0.133-0.222)	0.195 (0.149-0.259)	0.220 (0.164-0.307)	0.252 (0.174-0.353)	0.302 (0.200-0.438)	0.346 (0.223-0.510)
3-day	0.052 (0.042-0.063)	0.064 (0.052-0.078)	0.085 (0.069-0.104)	0.102 (0.082-0.125)	0.125 (0.098-0.162)	0.142 (0.109-0.189)	0.161 (0.120-0.224)	0.185 (0.128-0.258)	0.222 (0.147-0.320)	0.255 (0.164-0.374)
4-day	0.042 (0.034-0.051)	0.052 (0.042-0.063)	0.068 (0.055-0.083)	0.081 (0.066-0.100)	0.100 (0.078-0.129)	0.114 (0.087-0.150)	0.129 (0.096-0.178)	0.147 (0.102-0.204)	0.176 (0.117-0.254)	0.202 (0.130-0.296)
7-day	0.028 (0.023-0.034)	0.035 (0.028-0.042)	0.045 (0.037-0.054)	0.053 (0.043-0.065)	0.065 (0.051-0.083)	0.073 (0.056-0.096)	0.082 (0.061-0.112)	0.094 (0.065-0.129)	0.111 (0.074-0.158)	0.126 (0.081-0.183)
10-day	0.023 (0.019-0.028)	0.028 (0.023-0.033)	0.035 (0.029-0.042)	0.041 (0.033-0.050)	0.049 (0.039-0.063)	0.056 (0.043-0.073)	0.062 (0.047-0.085)	0.070 (0.049-0.097)	0.082 (0.055-0.117)	0.093 (0.060-0.134)
20-day	0.016 (0.013-0.019)	0.019 (0.015-0.022)	0.023 (0.019-0.027)	0.026 (0.021-0.031)	0.031 (0.024-0.038)	0.034 (0.026-0.044)	0.038 (0.028-0.050)	0.042 (0.029-0.057)	0.047 (0.032-0.067)	0.052 (0.034-0.075)
30-day	0.013 (0.011-0.016)	0.015 (0.013-0.018)	0.018 (0.015-0.021)	0.020 (0.017-0.024)	0.023 (0.019-0.029)	0.026 (0.020-0.033)	0.028 (0.021-0.037)	0.031 (0.022-0.042)	0.035 (0.023-0.049)	0.038 (0.024-0.054)
45-day	0.011 (0.009-0.013)	0.012 (0.010-0.014)	0.014 (0.012-0.017)	0.016 (0.013-0.019)	0.018 (0.014-0.022)	0.020 (0.015-0.025)	0.021 (0.016-0.028)	0.023 (0.016-0.031)	0.025 (0.017-0.035)	0.027 (0.018-0.039)
60-day	0.010 (0.008-0.011)	0.010 (0.009-0.012)	0.012 (0.010-0.014)	0.013 (0.011-0.016)	0.015 (0.012-0.018)	0.016 (0.013-0.020)	0.018 (0.013-0.023)	0.019 (0.013-0.025)	0.020 (0.014-0.028)	0.021 (0.014-0.031)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

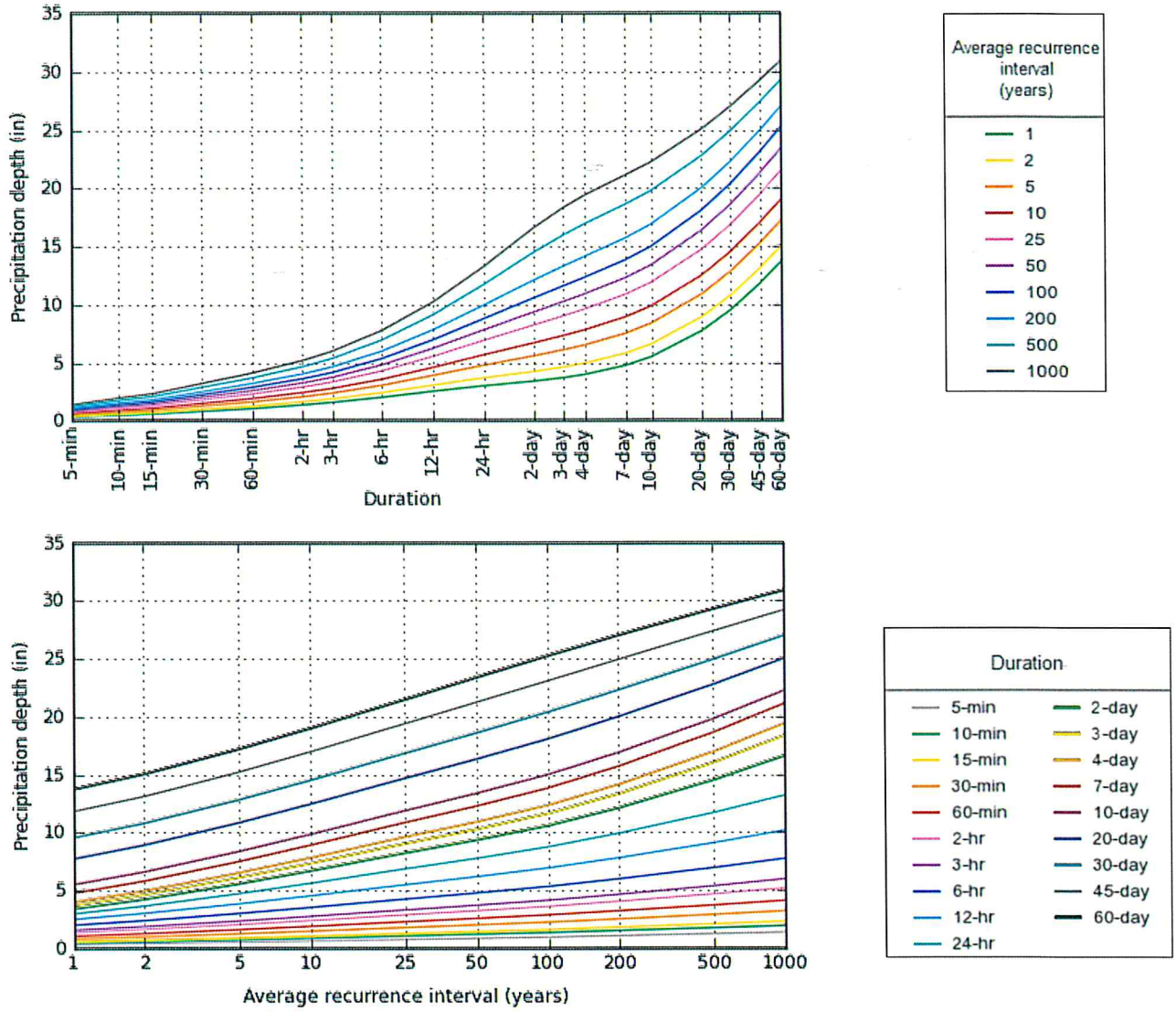
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 41.3429°, Longitude: -73.0604°



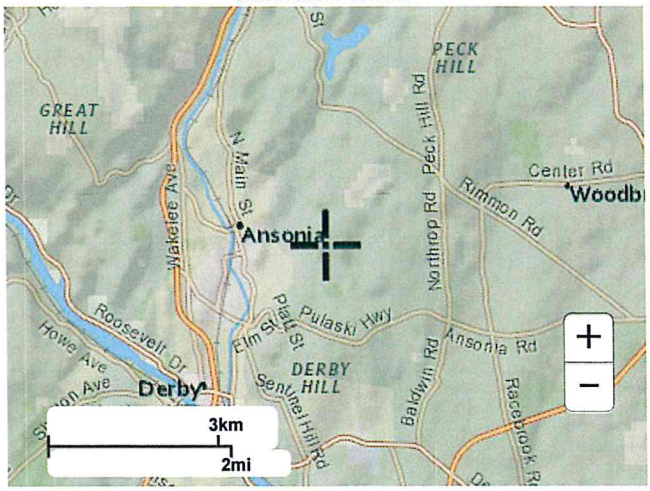
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Wed May 19 15:56:41 2021

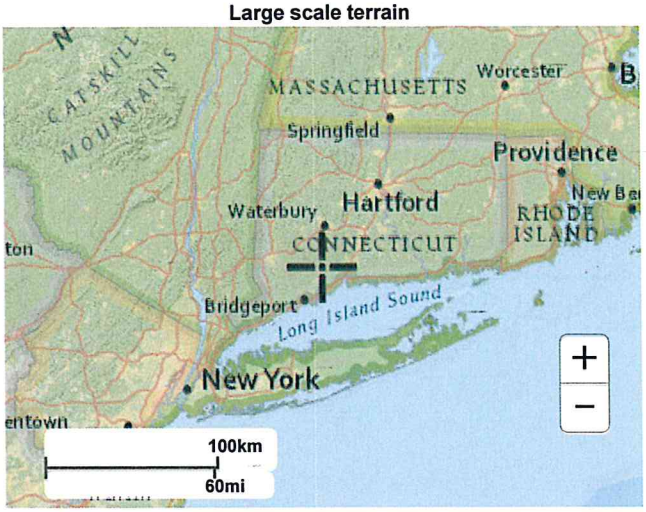
Back to Top

Maps & aerials

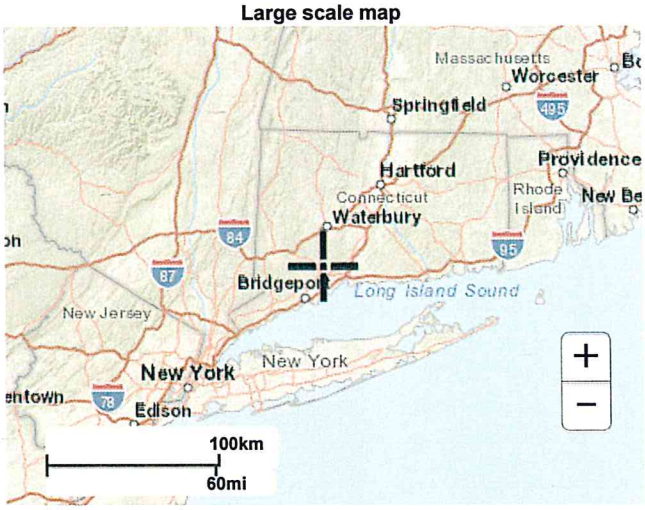
Small scale terrain



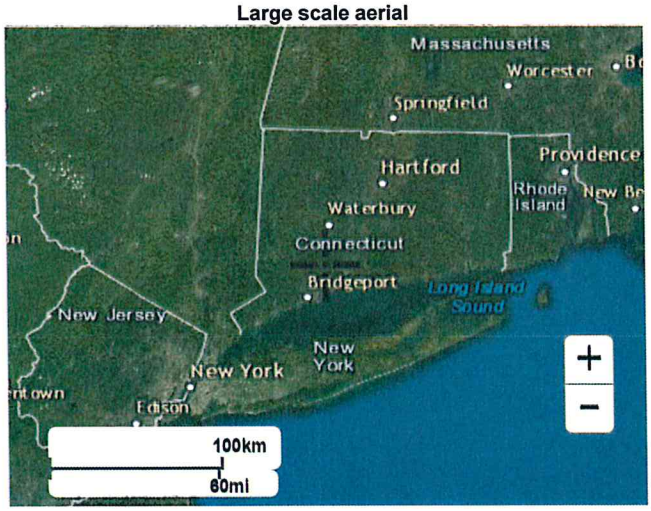
Large scale terrain



Large scale map



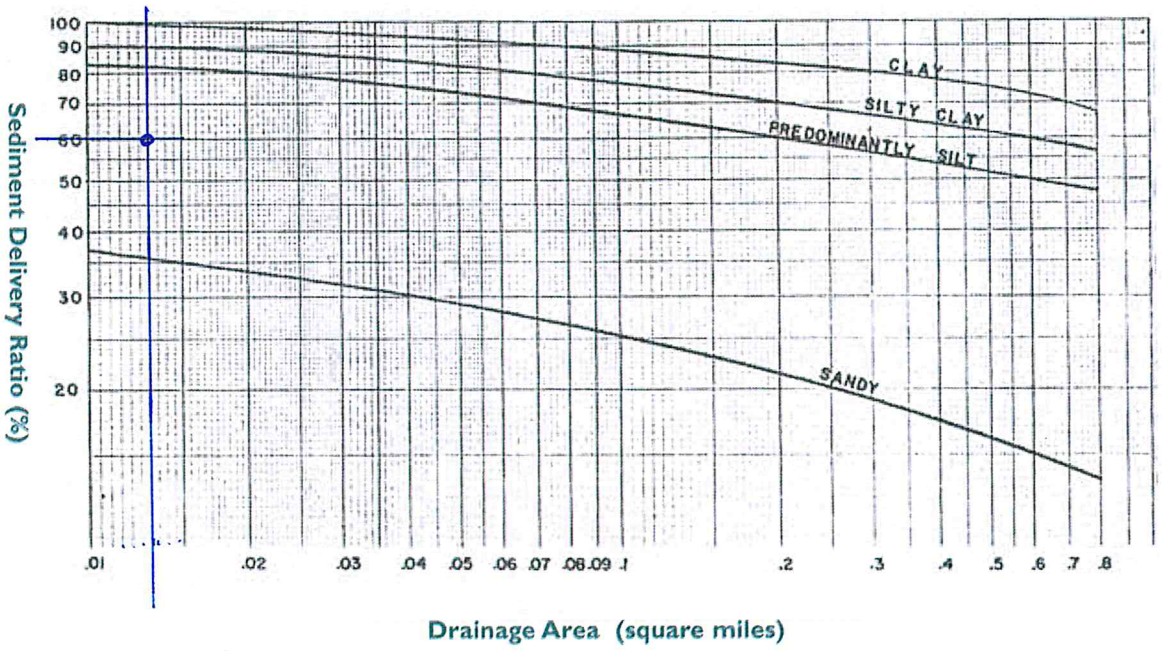
Large scale aerial



Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

BASIN #1

A = 8.33 Ac = 0.013 Mi^2

CHARLTON - CHATFIELD COMPLEX IS GENERALLY FINE SANDY LOAM

CLA Engineers, Inc.

Civil • Structural • Survey

317 MAIN STREET • NORWICH, CT 06360 • (860) 886-1966 • (860) 886-9165 FAX

Permeability of Soils using Compaction Permeameter

Date: 6/11/2020
Project: Benz Street Solar
CLA Project #: 6430
Source: Ansonia, Ct.
Material: On-site material (Test Pit)
Specification: Compacted to 92.4 lbs/cu ft

Sample TH #1: Reddish brown very fine very silty sand

Permeability: 8.202 x 10-4 cm/sec or 2.32 ft/day

Thomas Cummings 11 JUN 20
PE No. 9606

CLA Engineers, Inc.

□i□□ • Str□□t□ra□ • S□r□e□

317 MAIN STREET • NORWICH, CT 06360 • (860) 886-1966 • (860) 886-9165 FAX

Permeability of Soils using Compaction Permeameter

Date: 5/5/2021
Project: Benz Street Solar
CLA Project #: 6430
Source: Ansonia, Ct.
Material: On-site material (Test Pit)
Specification: Compacted to 100 lbs/cu ft

Sample: Brown fine silty sand

Permeability: 1.11 x 10-3 cm/sec or 3.13 ft/day

_____

Thomas Cummings
PE No. 9606

APPENDIX B

Soil Resource Report

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 State of Connecticut

Benz Solar, Ansonia, CT

June 25, 2020

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

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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.

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,220 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

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
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 19, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 27, 2014—Jul 22, 2014

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
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	10.7	63.9%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	4.9	29.2%
260B	Charlton-Urban land complex, 3 to 8 percent slopes	0.5	2.8%
273C	Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes	0.7	4.0%
275E	Urban land-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	0.0	0.0%
Totals for Area of Interest		**16.8**	**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.

State of Connecticut

73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2w698
Elevation: 0 to 1,550 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton, very stony, and similar soils: 50 percent
Chatfield, very stony, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Very Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

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

Description of Chatfield, Very Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

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

Minor Components

Sutton, very stony

Percent of map unit: 5 percent
Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

Hollis, very stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, very stony

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

73E—Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 9lql
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 45 percent
Chatfield and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 7 inches: fine sandy loam
Bw2 - 7 to 19 inches: fine sandy loam
Bw3 - 19 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 45 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Chatfield

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear

Across-slope shape: Concave
Hydric soil rating: Yes

Sutton

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hollis

Percent of map unit: 3 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, sandy subsoil

Percent of map unit: 1 percent
Hydric soil rating: No

Unnamed, red parent material

Percent of map unit: 1 percent
Hydric soil rating: No

260B—Charlton-Urban land complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2xff7
Elevation: 0 to 1,020 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 40 percent
Urban land: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Ridges, hills, ground moraines
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex

Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw - 7 to 22 inches: gravelly fine sandy loam
C - 22 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

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

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Chatfield

Percent of map unit: 10 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton

Percent of map unit: 5 percent
Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Udorthents

Percent of map unit: 5 percent
Landform: Ridges
Landform position (three-dimensional): Tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

273C—Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9llm
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 35 percent
Charlton and similar soils: 25 percent
Chatfield and similar soils: 15 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills, ridges

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 7 inches: fine sandy loam
Bw2 - 7 to 19 inches: fine sandy loam
Bw3 - 19 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Chatfield

Setting

Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam

2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Hollis

Percent of map unit: 8 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Sutton

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Udorthents

Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: No

275E—Urban land-Chatfield-Rock outcrop complex, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 9llq
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 35 percent
Chatfield and similar soils: 25 percent
Rock outcrop: 15 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills, ridges

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Description of Chatfield

Setting

Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Rock Outcrop

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hollis

Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Udorthents

Percent of map unit: 5 percent

Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Sutton

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (Benz Solar)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

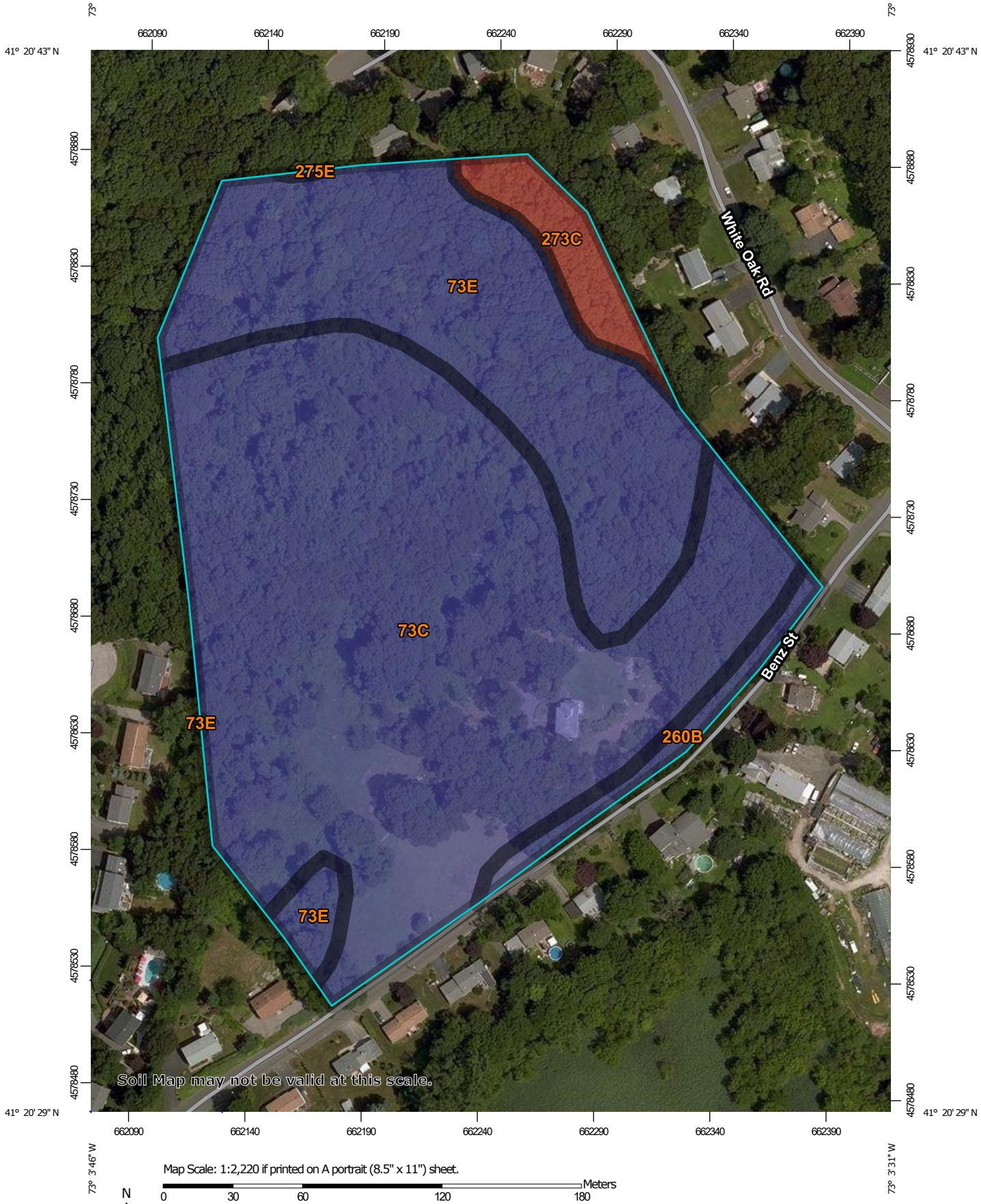
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map—Hydrologic Soil Group (Benz Solar)



Map Scale: 1:2,220 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 19, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 27, 2014—Jul 22, 2014

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.

Table—Hydrologic Soil Group (Benz Solar)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	10.7	63.9%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	B	4.9	29.2%
260B	Charlton-Urban land complex, 3 to 8 percent slopes	B	0.5	2.8%
273C	Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes	D	0.7	4.0%
275E	Urban land-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	D	0.0	0.0%
Totals for Area of Interest			**16.8**	**100.0%**

Rating Options—Hydrologic Soil Group (Benz Solar)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Attachment K

SWPCP Plan Checklist

□ro□e□t □ _____ Re□ie□er□ _____

Re□ie□ □ee □ _____ □a□□ent Re□ei□ed□ ☐ □□□ _____

Site □isit□s□ Date□ _____ Date□ _____ Date□ _____

Tra□□in□ and Mi□estones□

_____

_____

_____

_____

_____

_____

_____

STORMWATER POLLUTION CONTROL PLAN (SWPCP) REVIEW

GENERAL PERMIT FOR DISCHARGE OF STORMWATER AND DEWATERING WASTEWATERS ASSOCIATED WITH CONSTRUCTION ACTIVITIES

(DEEP-WPED-GP-015)

Registrant Information

Re□istered B□siness □a□e□ Benz Solar LLC
□onta□t □erson□ Steve Broyer □□one□ 612-326-1500

Site Information

Site □a□e□ Benz Street Solar Project
□ro□e□t T□□e□ Solar Energy Development
□□□ber o□□ots□a□res□ 12.5 Acres
Address□31 Benz Street
□it□To□n□Ansonia State□ CT Zi□ □ode□ 060

List Plans, Calculations and Reports Provided by the Registrant

Registration Information

Part I: Registration Type

☒ T□e o□re□istration □ie□o□a□□a□□ro□abe□o□a□□e□e□ □t□re□re□istration□ne□ re□istration□

Part II: Fee information

☒ Indi□ation o□□ee □a□□ ent

Part III: Registrant information

☒ □a□ e□address□□□one and □onta□t □erson □or re□istrant
☐ Registrant's Secretary of State ID # (if applicable)
☐ Bi□in□ □onta□t na□e□address and □□one □i□di□erent □ro□ re□istrant□
☐ □ri□ar□ □onta□t □erson □i□di□erent □ro□ re□istrant□□it□ a□□□onta□t in□or□ation
☐ □ro□ert□o□ner and □onta□t in□or□ation □i□di□erent □ro□ re□istrant□
☐ Developer's name and contact information (if different □ro□ re□istrant□
☐ □enera□□ontra□tor and □onta□t in□or□ation □i□di□erent □ro□ re□istrant□
☒ □a□ e o□□ons□tants□□□o assisted in re□istration and□or S□ □□□ and □onta□t in□or□ation
☒ Si□nat□res o□□ontra□tors□s□b□ontra□tors

Part IV: Site information

☒ Site na□ e and □o□ation
☒ Des□ri□tion o□t□e □ro□e□t
☒ D□ration o□□onstr□□tion a□ti□ities
☒ □or□ a□□or□in□ □o□rs on□site
☐ Minin□ o□eration deter□ination
☐ Sanitar□or □o□bined se□er dis□□ar□e deter□ination
☐ □edera□□□re□o□nized Indian □ands deter□ination
☐ □oasta□Bo□ndar□deter□ination
☒ □ndan□ered or T□reatened S□e□ies deter□ination
☐ □ i□d and S□eni□Ri□ers deter□ination
☐ A□□i□er □rote□tion Area deter□ination
☒ Identi□ied t□at □onstr□□tion a□ti□ities are in a□□ordan□e □it□ t□e □□□□ □onne□ti□□t □□ide□ines □or Soi□ □rosion and Sedi□ ent □ontro□t□e □ ide□ines□
☒ □istori□and□or Ar□□eo□o□i□a□Reso□r□e deter□ination
☒ □onser□ation or □reser□ation restri□tion deter□ination

Part V: Stormwater Discharge information

☒ Stor□ □ater Dis□□ar□e In□or□ation Tab□e 1 □o□ □□eted
☒ Stor□ □ater Dis□□ar□e In□or□ation Tab□e □ □o□ □□eted
☒ I□ □aired □aters □ro□isions i□a□□i□ab□e□

Part VI: Pollution Control Plan information

☐ S□ □□□ s□b□ission stat□s

Part VII: Registrant Certification

☒ □erti□i□ation si□ned b□re□istrant or re□re□istrant

Part VIII: PE/LA Certification

☒ Desi□n □erti□i□ation si□ned b□ i□ensed □□ or □A □□□ere a□□ro□riate□

Part IX: Third Party Qualified Professional Certification

☐ Re□ie□ □erti□i□ation b□ □onser□ation Distri□t or □ □a□i□ied □ro□essiona□

Part X: Supporting Documents

☒ Atta□□□ ent A□□S□S □ □ad □a□ i□s□b□ittin□ □a□er re□istration□
☒ Atta□□□ ent B□Do□□□ entation re□ated to □oasta□□onsisten□□Re□ie□ i□a□□i□ab□e□
☒ Atta□□□ ent □□T□reatened and □ndan□ered S□e□ies □or□ i□a□□i□ab□e□and additiona□in□or□ation □s□□□ as a □o□□o□a □DDB □a□□
☒ Atta□□□ ent D□□onser□ation or □reser□ation Restri□tion In□or□ation i□a□□i□ab□e□
☒ Atta□□□ ent □□□on□e□e□troni□S□ □□□ i□a□□i□ab□e□

CONTENTS OF THE STORMWATER POLLUTION CONTROL PLAN (SWPCP)

Soil Erosion and Sediment (E&S) Controls

Site des□ri□tion narrati□e□

- ☒ Des□ribed t□e nat□re o□ t□e □onstr□□tion a□ti□ities
- ☒ □ro□ided tota□ site a□rea□e
- ☒ □ro□ided dist□rbed a□rea□e
- ☒ □sti□ated a□era□e r□no□□oe□i□ient a□ter □onstr□□tion
- ☒ Identi□ied i□ □ ediate and □ti□ate re□ei□in□ □aters□o□a□□dis□□ar□es a□t□orized b□ □er□it
- ☒ Identi□ied ot□er □er□its and□or □ans re□□ired
- ☒ Identi□ied e□tent o□in□and□tida□□and □res□tida□□et□ands

Site □a□□

- ☒ □□istin□ and □□anned draina□e □atterns
- ☒ □□istin□ and □□anned e□e□ations and s□□□es
- ☒ □o□ation o□str□□t□ra□and non□str□□t□ra□□ontro□s
- ☒ Des□ri□tion and □a□o□e□istin□ soi□s
- ☒ □o□ation o□o□t□a□□s□□ro□osed □or □onitorin□
- ☒ □i□ its o□soi□dist□rban□e
- ☒ □o□ation o□s□r□a□e □aters□i□ □aired □aters□□aters with TMDL's
- ☒ □□istin□ □e□etation
- ☒ □o□ations o□□□S □ontro□s
- ☒ □o□ation o□stabi□ization □ra□ti□es
- ☒ □o□ation o□□ost□□onstr□□tion re□□e□etation
- ☒ □o□ation o□□ti□ities□roads and str□□t□res
- ☒ □o□ation o□s□r□a□e □ater□in□□□din□ in□and □et□ands□□res□□tida□□et□ands and tida□□et□ands
- ☒ □o□ations o□dis□□ar□es to s□r□a□e □aters □□re□□d□rin□□and □ost□□onstr□□tion□
- ☒ □o□ations and □ro□isions □or □aste dis□osa□
- ☒ □o□ations and □ro□isions □or □as□o□t areas
- ☒ □o□ations and □ro□isions □or i□ □aired □aters
- ☐ □i□ its o□□□MA □ood□ains and □ood□a□s
- ☐ □T □oasta□reso□r□e i□ its
- ☐ □T strea□ en□roa□□□ent □ines
- ☐ □o□ation o□an□ □□b□□drin□in□ □ater s□□□□□areas or □aters□eds

□onstr□□tion se□□en□in□□

- ☒ Identi□ied se□□en□e o□□ a□or □onstr□□tion a□ti□ities and □o□da□s □or ea□□ se□□en□e
- ☒ □sti□ated start and □o□ □□etion ti□es □or ea□□ □□ase
- ☒ A□oidan□e o□dist□rban□es o□er □a□res at one ti□e□□ere □ossib□e
- ☒ Identi□ied i□ its o□dist□rban□e in□□din□ ea□□ □□ase

□ontro□Meas□res□

- ☒ □rosion and sedi□ ent □ontro□□ eas□res
- ☒ □ro□ided dra□in□s and s□e□i□ations □or ea□□ □eas□re
- ☒ Identi□ied stabi□ization □ra□ti□es □or dist□rbed areas
- ☒ Identi□ied stabi□ization □ra□ti□es □or sto□□□i□es
- ☒ Identi□ied □eas□res to □reser□e e□istin□ □e□etation
- ☒ □ro□ided detai□s o□□□anned □e□etation□seed □i□es and □□antin□ dates
- ☒ □ro□ided detai□s □or s□ort□ter□ and □on□□ter□ stabi□ization and□or □e□etation o□dist□rbed areas
- ☒ Identi□ied □ra□ti□es □or non□□e□etati□e □on□□ter□ and □inter stabi□ization
- ☐ □ro□ided □or s□□e ben□□es □or a□□s□□es e□□eedin□ 1□ □eet □ei□□t and s□□es □3□1 or
- ☐ □ro□ided s□□e stabi□it□ ana□□sis □or en□ineered s□□e stabi□ization □eas□res
- ☒ □ro□ided narrati□e and dra□in□s □or str□□t□ra□di□ersion and stora□e □eas□res
- ☒ Sedi□ ent tra□s □ro□ided □or draina□e areas o□□ to □a□res
- ☒ Te□ □orar□sedi□ ent basin □ro□ided □or draina□e areas □□a□res
- ☒ Des□ribed □aintenan□e □or □□S □ontro□and stabi□ization □eas□res
- ☒ □arrati□e□dra□in□s and □a□□□ations o□□ontro□□ eas□res □or de□aterin□ □aste□aters
- ☒ Des□ri□tion o□e□ er□en□□ □ro□ed□res □□or □oodin□□et□□□
- ☒ R□no□□Red□□tion and □o□ I□ □a□t De□e□o□□ ent □□ID□In□or□ation □s□e□i□ □ eas□res □or r□n□o□□red□□tion and □ID □eas□res□□

□ontro□Meas□res □□□ontin□ed□

- ☒ T□e □o□ation o□t□e strea□ s□□ood□ains a□□ et□ands□ri□arian b□□ers□s□o□es 3□1 and stee□er□and □e□etation identi□ied □or □reser□ation
- ☒ □at□ra□draina□e □atterns and □an□□ade draina□e □eat□res
- ☐ □o□ation o□areas □it□ soi□s s□itab□ □or in□□tration and areas a□□ro□riate □or □ID □eas□res
- ☐ □o□ation o□a□areas □ns□itab□ or □east s□itab□ □or in□□tration □or t□e sitin□ o□de□e□o□□ent
- ☒ □o□ation o□a□□ost□□onstr□□tion stor□ □ater □ana□e□ent □eas□res□r□no□□red□□tion □ra□ti□es□and □ID desi□n □eas□res de□e□o□ed □□rs□ant to s□bse□tion □b□□□□□□□□i□
- ☐ Identi□□ation o□areas ina□□ro□riate □or t□e in□□tration d□e to □otentia□□or □ro□nd□ater □o□□tion
- ☒ A narrati□e des□ribin□ t□e nat□re□□□r□ose□i□ □□e□ entation□and □on□□ter□ □aintenan□e o□□ost□ □onstr□□tion □eas□res□r□no□□red□□tion □ra□ti□es and □ID desi□n □eas□res
- ☐ □a□□□ations □or □eas□res de□e□o□ed □□rs□ant to Se□tion □b□□□□□□□□i□stratin□ t□e retention o□t□e □ater □□a□t□□o□□□e or □a□□t□e □ater □□a□t□□o□□□e
- ☐ A narrati□e des□ribin□ an□site □onstraints t□at □re□ent retention o□t□e a□□ro□riate □o□□□e s□e□i□ied in Se□tion □b□□□□□□□□i□
- ☐ □a□□□ations s□o□in□ t□e □ro□osed e□e□ti□e i□ □er□o□s □o□er □or t□e site and□□ □ere ne□essar□or a□□ro□riate □or □eas□res de□e□o□ed □or □inear □ro□e□ts □□rs□ant to Se□tion □b□□□□□□□□i□ea□□ o□t□a□□ draina□e area

Ot□er □eas□res□

- ☒ Des□ri□tion o□□ eas□res to □ana□e □onstr□□tion □aste □ateria□s
- ☒ Des□ri□tion o□o□□site sedi□ent tra□□in□ and d□st □ontro□
- ☒ □arrati□e □o□ation□and dra□in□s o□□as□o□t areas
- ☒ Des□ri□tion o□□ aintenan□e □ra□ti□es □or □as□o□t areas
- ☒ Indi□ated □eanin□ o□□ost□□onstr□□tion stor□ □ater str□□t□res □rior to ter□ination ins□e□tion
- ☒ Indi□ated re□ o□a□o□sit□en□e □rior to □□in□ ter□ination noti□e
- ☒ Des□ri□tion and □o□ation o□□□e□i□a□and □etro□□ □rod□□t stora□e □ontain□ent and □ontro□s
- ☒ □arrati□e des□ribin□ ro□tine ins□e□tion □ro□ed□res
- ☒ Des□ri□tion o□□□a□□□ations o□ins□e□tion □ersonne□o□t□e □er□ittee
- ☒ □arrati□e des□ribin□ □onitorin□ □ro□ed□res□in□□din□ □re□□en□□and □et□odo□o□□
- ☒ □ist o□a□□ontra□tor and s□b□ontra□tors
- ☒ Des□ri□tion o□□ndan□ered S□e□ies □eas□res□i□ne□essar□
- ☐ Des□ri□tion o□A□□i□er □rote□tion □ro□isions□i□ne□essar□
- ☐ Des□ri□tion o□□ro□isions o□□oasta□Site □an a□□ro□a□□i□ne□essar□
- ☒ Dis□□ssion o□ar□□eo□o□i□a□or □istori□ □reser□ation iss□es on site□i□ne□essar□
- ☐ Des□ri□tion o□a□ti□ities s□b□□t to t□e □ i□ □ S□eni□ Ri□ers A□t□i□ne□essar□

I□ □aired □aters □ontro□s □□ □ere a□□i□ab□e□□

- ☐ □arrati□e and □an se□□en□in□ to ens□re no □ore t□an 3 a□res □on□□rrent dist□rban□e

AND

- ☐ Identi□ied stabi□ization □ra□ti□es □it□in 3 da□s □or te□ □orar□s□s□ension o□a□ti□it□□**OR**
- ☐ Des□ri□tion and □a□□□ations s□o□in□ retention o□□□□ear□□□□□o□r stor□ □**OR**
- ☐ □o□ □ian□e □it□ □ □A and□or ot□er □eas□res o□an e□istin□ TMD□

Additiona□□□S In□or□ation□

- ☐ See attached reviewer's comments page
- ☐ Re□ie□er □ro□ided additiona□in□or□ation to Re□istrant□re□orts□□□oto□ra□□s□desi□ns□et□□

Post-construction Stormwater Controls

S□o□ on site m a p:

- ☒ Indi□ated retention standards □or rede□e□o□□ent or ot□er de□e□o□□ent
- ☒ Draina□e □atterns and s□o□es a□ter □radin□
- ☐ □o□ation o□□ID and r□no□□red□□tion □eas□res
- ☒ □o□ation o□ot□er str□□t□ra□sedi□entation/□oatab□es treat□ent □eas□res
- ☐ □o□ation o□□e□o□it□dissi□ation □eas□res
- ☒ □ro□ided dra□in□s and s□e□i□□ations o□ea□□stor□ □ater str□□t□re□□ eas□re

□arrati□e o□□ost-□onstr□□tion □ontro□s:

- ☒ Des□ri□tion o□□ontro□□ eas□res □or □ost-□onstr□□tion stor□ □ater dis□□ar□e
- ☒ □on□□ter□ □aintenan□e □an □or □eanin□ o□□ost-□onstr□□tion stor□ □ater str□□t□res

Additiona□Stor□ □ater Mana□e□ent In□or□ation:

- ☐ See attached reviewer's comments page
- ☐ Re□ie□er □ro□ided additiona□in□or□ation to Re□istrant: re□orts, □□oto□ra□□s, desi□ns, et□.

Supporting Documents (as needed):

- ☐ □a□□□ations s□□□ortin□t□e desi□n o□sedi□ent and □oatab□es re□o□a□□ontro□s □□rs□ant to Se□tion 5□b)(2)(□) ii□b)
- ☐ □a□□□ations s□□□ortin□t□e desi□n o□□e□o□it□dissi□ation □ontro□s □□rs□ant to Se□tion 5□b)(2)(□) ii)(□)
- ☐ □ro□ided borin□ □o□s, test □it □o□s, soi□re□orts, et□.
- ☐ □ro□ided □□dra□i□ a□□□ations □or e□istin□ and □lanned □□dro□o□□
- ☐ □ro□ided □a□□□ations □or □ID and r□no□□red□□tion □eas□res (WQV or ½ WQV retention)
- ☐ □ro□ided en□ineerin□ □a□□□ations □or an□en□ineered □ontro□□ eas□res
- ☐ □re- and □ost-□onstr□□tion □ea□ □o□ □a□□□ations
- ☐ 1 in□□ o□rain□a□□retained onsite i□□it□in 500 □eet o□a non-□res□tida□□et□and
- ☐ □ro□ide a □ost-□onstr□□tion a□era□e r□no□□oe□i□ient
- ☐ O□□site e□□e□t o□□o□ and □o□□e
- ☐ □ro□nd□ater □o□ esti□ates
- ☐ Ins□e□tion □or□s and □□e□□ist
- ☐ □ontra□tor □erti□i□ation State□ent □in□□din□ indi□id□a□ot de□e□o□ers)
- ☐ De□onstration o□□o□ □ian□e □it□ TMD□, □□ere a□□i□ab□e
- ☐ □an Si□nat□re

IDENTIFIED SOIL EROSION AND SEDIMENT CONTROL MEASURES IN SITE PLANS

Function	Measure	Phase/Sheet	Engineered Design	Calculations Provided	Reviewer Comments
□rote□t □e□etation	Tree □rote□tion		□o		
□reser□e □ □onser□e soi□	To□soi□in□		□o		
	□and □radin□		□ossib□□		
	S□r□a□e Ro□□□enin□		□o		
	D□st □ontro□		□o		
□e□etati□e soi□□o□er	Te□ □orar□Seedin□		□o		
	□er□anent Seedin□		□o		
	Soddin□		□o		
	□ands□a□e □□antin□		□o		
□on□i□□in□ soi□ □rote□tion	Te□ □orar□Soi□ □rote□tion		□o		
	M□□□□ □or Seed		□o		
	□ands□a□e M□□□□		□o		
	Te□ □orar□ □rosion □ontro□B□an□et		□o		
	□er□anent T□r□Rein□□ Mats		□es		
	Stone S□o□e □rote□tion		□o		
Stabi□ization str□□t□res	Retainin□ □ a□s		□es		
	Ri□ra□		□es		
	□abions		□es		
	□er□anent S□o□e Drain		□es		
	□□anne□□rade Stabi□ization Str□□t□re		□es		
	Te□ □orar□ □ined □□□te		□es		
	Te□ □orar□ □i□e S□o□e Drain		□es		
Draina□e□a□s □ □ater□o□rses	□e□etated □ ater□a□		□ossib□□		
	Te□ □orar□ □ined □□anne□		□o		
	□er□anent □ined □ ater□a□		□es		
	Te□ □orar□Strea□ □rossin□		□o		
Di□ersions	Te□ □orar□ □i□Ber□		□o		
	□ ater Bar		□o		
	Te□ □orar□Di□ersion		□ossib□□		
	□er□anent Di□ersion		□es		
S□bs□r□a□e drain	S□bs□r□a□e Drain		□es		

IDENTIFIED SOIL EROSION AND SEDIMENT CONTROL MEASURES IN SITE PLANS (CONTINUED)

Detention str□□t□res	Detention Basin		□es		
□ner□□dissi□ators	□e□e□S□reader		□es		
	O□t□et □rote□tion		□es		
	Stone Ch□eck Da□		□ossib□□		
Sedi□ent i□ □o□nd□ents, barriers & □lters	Te□ □orar□Sedi□ent Basin		□es		
	Te□ □orar□Sedi□ent Tra□		□o		
	Hay Ba□e Barrier		□o		
	□eote□ti□e Si□t □en□e		□o		
	T□rbidit□ □□rtain		□o		
	□e□etati□e □i□ter		□o		
Tire tra□□ed soi□s	□onstr□□tion □ntran□e		□o		
De□aterin□	Pump Inta□e and O□t□et □rote□tion		□o		
	Pump Sett□in□ Basin		□o		
	□ortab□e Sedi□ent Tan□		□o		
	De□aterin□ o□□art□ Materia□s		□ossib□□		

ADDITIONAL COMMENTS FOR E&S CONTROL MEASURES:

IDENTIFIED STORMWATER CONTROL MEASURES IN SITE PLANS

Primary Treatment Practices	Phase/Sheet	Engineered Design	Calculations Provided	Low Impact Development
Mi□ro□oo□e□tended detention				
□ et □ond				
□ et e□tended detention □ond				
M□ti□e □ond s□ste□				
□o□□et □ond				
S□a□o□ □et□and				
□□tended detention □et□and				
□ond□□et□and s□ste□				
□ra□e□□et□and				
In□□tration Tren□□				
In□□tration Basin				
In□□tration □ar□in□ Is□and				
S□r□a□e sand □□ter				
□nder□ro□nd sand □□ter				
□eri□eter sand □□ter				
Or□ani□ □□ter				
Tree bo□ □□ter				
Bioretention□rain□arden				
□reen Roo□				
Dr□s□a□es				
□ et s□a□es				
Secondary Treatment Practices				
Dr□detention □ond				
□nder□ro□nd detention □a□□ities				
Dee□s□□ □ □at□□basins				
Oi□□arti□□e se□arators				
Dr□ □e□s				
□er□eab□e □a□e□ent□□a□ers				
□e□etated □□ter stri□s				
□rass draina□e □□anne□s				
Other/Innovative/Emerging Technology				
□at□□basin inserts				
□□drod□na□i□se□arators				
Media □□ters				
□nder□ro□nd □□tration s□ste□s				
A□□□ in□e□tions				
Rain□a□□ar□estin□□isterns				

STORMWATER MANAGEMENT AND TREATMENT PRACTICES

T□e □enera□□er□it □ro□ides □oa□s □or t□e □ost□□onstr□□tion stor□ □ater □ana□e□ent to □ontro□dis□□ar□es o□stor□ □ater □o□□tants□ So□e □eas□res □a□not re□□ire a□o□t□e □o□o□in□in□or□ation□

Stormwater Control Measure: _____

□a□e in □ans _____ □ra□ti□e _____ □o□ation _____

(Complete this sheet for each post-construction stormwater measure)			
Discharge Calculations provided:			
1□ □ ater □□a□it□ □o□□e □□ □ □□□ □ □a□□t□			
□□ □ ater □□a□it□ □□o□ □□ □ □□□ □ □□s□			
3□ □ro□nd□ater Re□□ar□e □o□□e □□R□□□ □a□□t□			
□□ R□no□□□a□t□re □o□□e □R□□□□ □a□□t□ □on□□re□□ired □or non□□res□tida□dis□□ar□es□			
□□□ro□ided □ea□Dis□□ar□e Rates □or t□e □o□o□in□stor□ e□ents□			
Stor□ □□ent	□re□De□e□o□□ent □□s□	□ost□De□e□o□□ent □□s□	□□an□e □□□□s□
□□ □r			
□□ear			
1□□ear			
□□□ear			
1□□□ear			
□□□□ear			
T□is stor□ □ater □eas□re □or as □art o□a dis□□ar□e treat□ent train□□eets t□e □oa□s o□t□e □enera□□er□it□ □ □es □ □o □o□ □ents□			

ADDITIONAL COMMENTS FOR STORMWATER TREATMENT PRACTICES:

Site Inspection Worksheet for E&S and Stormwater Control Measures

□ro□e□t □□_____ □□ans Dated _____ □ast Re□ised _____

Distri□t□ _____ Re□ie□er□ _____□□□□□□□□□□□□□□□□□□□□□□□

□o□ation□ _____

□ro□e□t Des□ri□tion□ _____

□onta□t □erson □or t□e Site□

□a□ e□ _____ □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□o□ □an□□ _____ □□one□ _____

Site □isit Date□ _____

□ eat□er □onditions□ _____

□□oto□ra□□s ta□en	☐ □es	☐ □o
□onta□ted Res□onsib□e □art□	☐ □es	☐ □o
Ins□e□tion s□b□itted to □T D□□	☐ □es	☐ □o
Ins□e□tion s□b□itted to □er□ittee	☐ □es	☐ □o

□o□ □ents□

Connecticut Department of
Energy & Environmental Protection
Bureau of Materials Management & Compliance Assurance
Water Permitting & Enforcement Division

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, issued 8/21/13, effective 10/1/13
Stormwater Monitoring Report

SITE INFORMATION

□er□ittee□ _____

Mai□in□ Address□ _____

B□siness □□one□ _____ e□t□ _____ □a□□ _____

□onta□t □erson□ _____ Tit□e□ _____

Site □a□e□ _____

Site Address□ _____

Re□ei□in□ □ ater □na□e□basin□□ _____

Stor□ □ater □er□it □o□ □S□ _____

SAMPLING INFORMATION (Submit a separate form for each outfall)

O□t□a□□Desi□nation□ _____ Date□Ti□e □o□e□ted□ _____

O□t□a□□o□ation□s□□at□on or □a□ in□□□ _____

□erson □o□e□tin□Sa□ □e□ _____

Stor□ Ma□nit□de in□□es□□ _____ Stor□ D□ration □□o□rs□□ _____

Size o□Dist□rbed Area at an□ti□e□ _____

MONITORING RESULTS

Sample #	Parameter	Method	Results (units)	Laboratory (if applicable)
1	T□rbidit□			
□	T□rbidit□			
3	T□rbidit□			
□	T□rbidit□			

□ro□ide an atta□□□ent i□□ ore t□an □ sa□ □es □ere ta□en □or t□is o□t□a□□□ A□□ □

STATEMENT OF ACKNOWLEDGMENT

I □erti□□ t□at t□e data re□orted on t□is do□□□ ent □ere □re□ared □nder □ □direction or s□□er□ision in a□□ordan□e □it□ t□e □enera□□er□ it □or t□e Dis□□ar□e o□Stor□ □ater and De□aterin□ □ aste□aters □ro□ □onstr□□tion A□ti□ities□ T□e in□or□ation s□b□itted is□to t□e best o□ □ □□no□□ed□e and be□ie□□tr□e a□□□rate and □o□ □□ete□

A□t□orized O□□i□a□□ _____

Si□nat□re□ _____ Date□ _____

□ease send □o□ □□eted □or□ to□

D□□ARTM□□T O□ □□□R□ □ □□□IRO□M□□TA□ □ROT□□TIO□
B□R□A□ O□ MAT□RIA□S MA□A□ □M□□T A□D □OM□□IA□□□ ASS□RA□□□
□□ □□M STR□□T
□ART□ORD□□T □□1□□□1□□
ATT□□ □□A□ □ I□□IAMS

Attachment L

Training Documentation

Stormwater Pollution Prevention Training Log

Project Name:

Project Location:

Instructor's Name(s):

Instructor's Title(s):

Course Location:

Date of Course:

Course Length(hours):

Stormwater Training Topic: ***(check as appropriate)***

- ❑ **Sediment and Erosion Controls**
- ❑ **Emergency Procedures**
- ❑ **Stabilization Controls**
- ❑ **Inspections/Corrective Actions**
- ❑ **Pollution Prevention Measures**
- ❑ **Stormwater Runoff Sampling**

Specific Training Objective(s):

_____

_____

_____

_____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Attachment M

Inspection and Maintenance Forms

Site Inspection Worksheet for E&S and Stormwater Control Measures

Project #: _____ Plans Dated _____ Last Revised _____

District: _____ Reviewer: _____

Location: _____

Project Description: _____

Contact Person for the Site:

Name: _____ _____

Company: _____ Phone: _____

Site Visit Date: _____

Weather conditions: _____

Photographs taken	☐ Yes	☐ No
Contacted Responsible Party	☐ Yes	☐ No
Inspection submitted to CT DEP	☐ Yes	☐ No
Inspection submitted to Permittee	☐ Yes	☐ No

Comments: