CLA Engineers, Inc.

Civil • Structural • Survey

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

May 26, 2021

Steve Broyer
ECOS Energy
222 S 9th St, Suite 1600
Minneapolis, MN 55402
Via Email: steve.broyer@ecosrenewable.com

RE: Benz Street Solar Project
31 Benz Street, Ansonia, CT
CLA-6430
Updated Project Plan & Drainage Report

Mr. Broyer:

CLA Engineers has updated the Project Plans and the Drainage Report based on coordination with the project stakeholders, and comments provided by Neal Williams of Connecticut DEEP. Revisions to the documents are as follows:

1. All site disturbance is located more than 50-feet from the inland wetland boundary. This area will be left as an undisturbed buffer.

2. No solar array is located within 100-feet of the inland wetland boundary.

3. Site grading has been proposed to eliminate the steep slopes on site and allow for a maximum slope of 15%. See plan sheets 4-6.

4. Provisions for rock and ledge management and stabilization are included on plan sheet 10.

5. Additional test pits were performed within Basin #1. Test pit logs are included on plan sheet 4.

6. Permeability tests were run for the soil samples taken from Basin #1 and Basin #2. The permeability was found to be 3.13 ft/day in Basin #1 and 2.32 ft/day in Basin #2. The data is included in the Drainage Report Appendix A.

7. The description and design of Basin #1 and Basin #2 have been coordinated with Robert Russo, C.S.S., from our office.
   A. Basin #1 has been designed as an "extended detention shallow wetlands". The site soil profile and characteristics support this type of basin. A forebay has been included upgrade of the basin that will store more than 10% of the required water quality volume as recommended in the Water Quality Manual for this type of basin. The plan for the basin is included on plan sheet 5, and a narrative is included in the Drainage Report, page 6.
   B. Basin #2 has been designed as an "infiltration basin". The site soil profile and characteristics support this type of basin. A forebay has been included upgrade of

the basin that will store more than 25% of the required water quality volume as recommended in the Water Quality Manual for this type of basin. The plan for the basin is included on plan sheet 6, and a narrative is included in the Drainage Report, page 9.

8. As suggested by DEEP, the construction sequence has been modified to call for the site to be left undisturbed through one growing season after the initial basins, swales, and perimeter erosion and sedimentation controls are installed. This will allow the vegetation to stabilize the site prior to the start of the solar array racking.

Please feel free to call me at our office or email me at khaubert@claengineers.com with any questions, comments, or if you require additional information.

Very truly yours,
CLA Engineers, Inc.

Kyle Haubert, P.E.

Attachments

BENZ STREET SOLAR
CONNECTICUT SITING COUNCIL DOCUMENTS

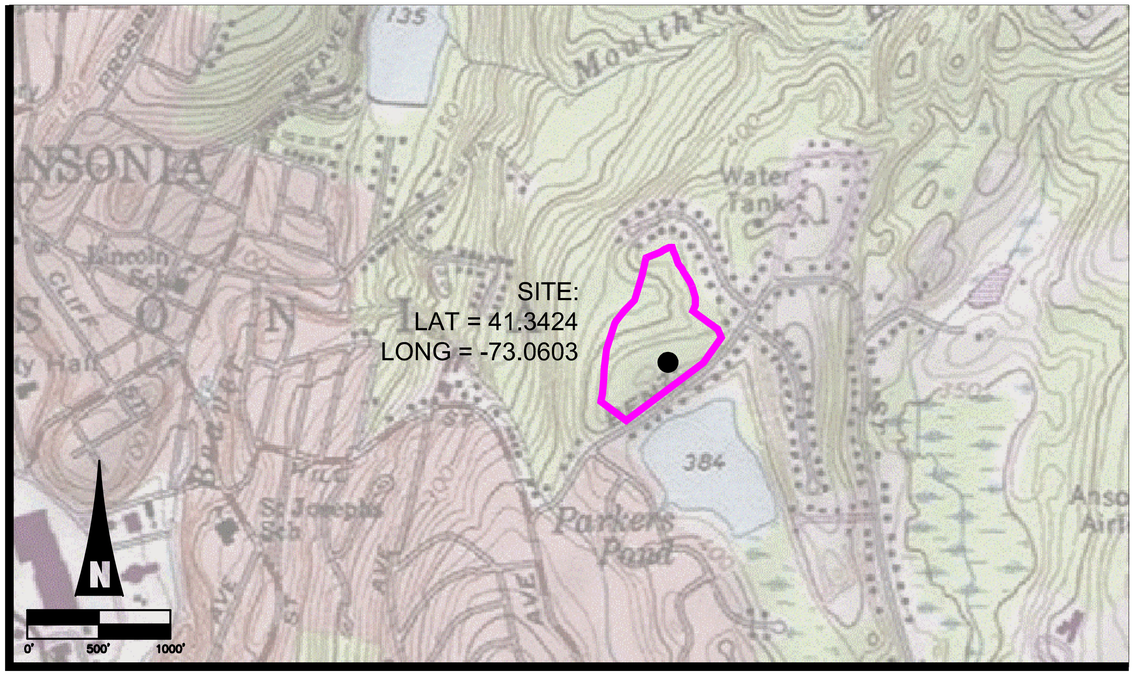
FOR

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
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●	8	5/24/2021	5	SITE GRADING PLAN: BASIN #1
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●	8	5/24/2021	7	LANDSCAPE PLAN
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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
601 S OCEAN BLVD
DELRAY BEACH, FL
33483

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

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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	2/11/20	CSC SUBMISSION

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CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, Connecticut
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STATE OF CONNECTICUT · KYLE J. MAURER · No. 24528 · LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

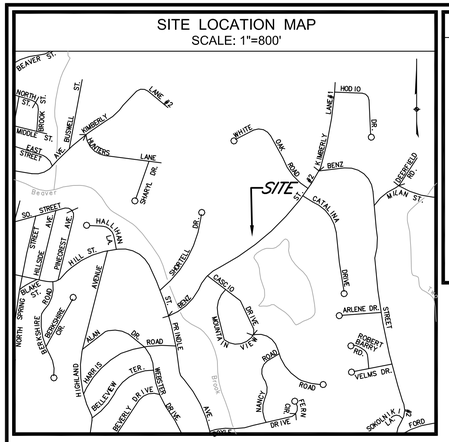
BENZ STREET SOLAR

COVER SHEET

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

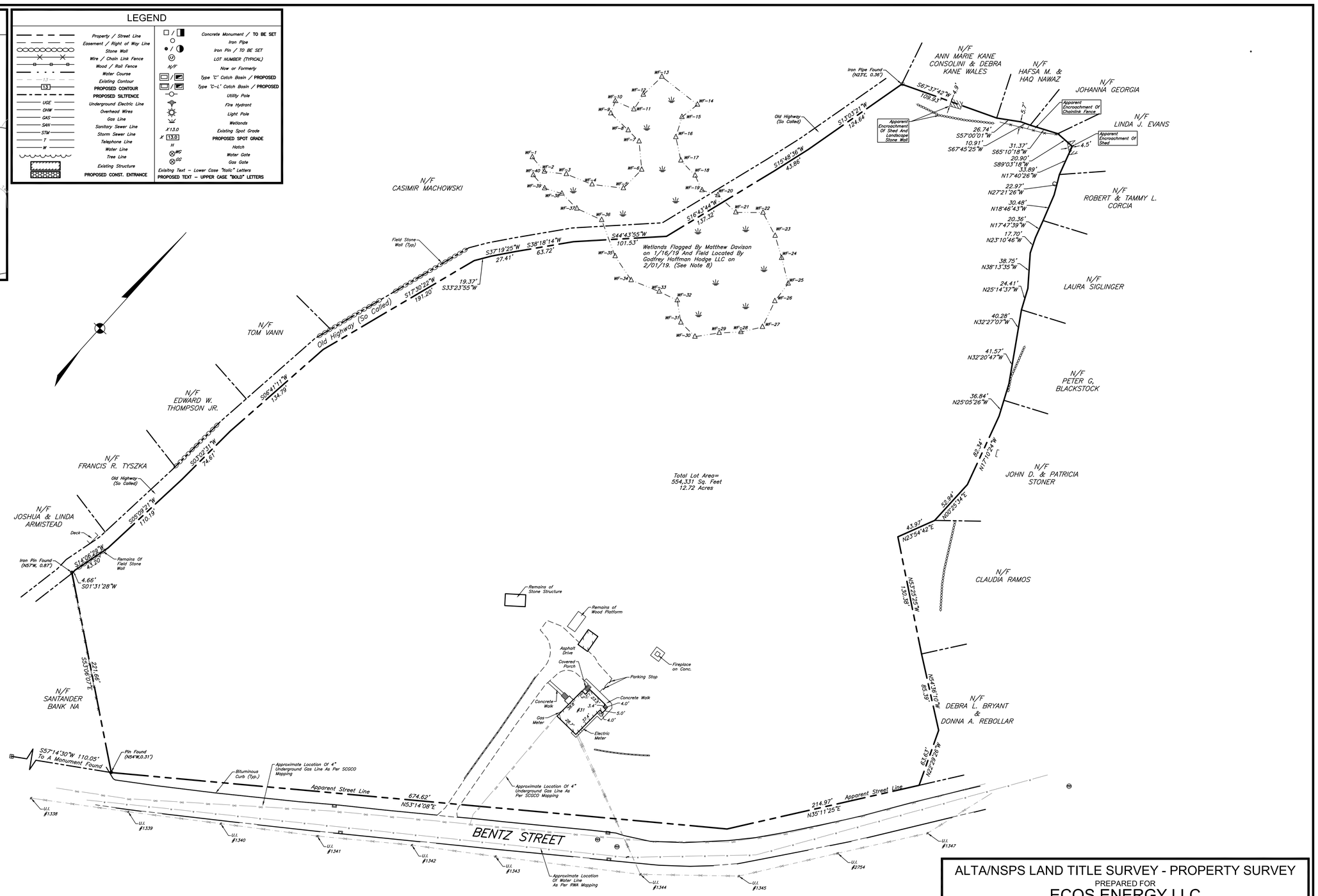
M:\6000\6400\6430 Benz Street Solar\Drawings\+Current\01 COVER SHEET-BENZ.dwg

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 "D-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. 090090C0408J DATED MAY 16, 2017 AND 090090C0406H 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

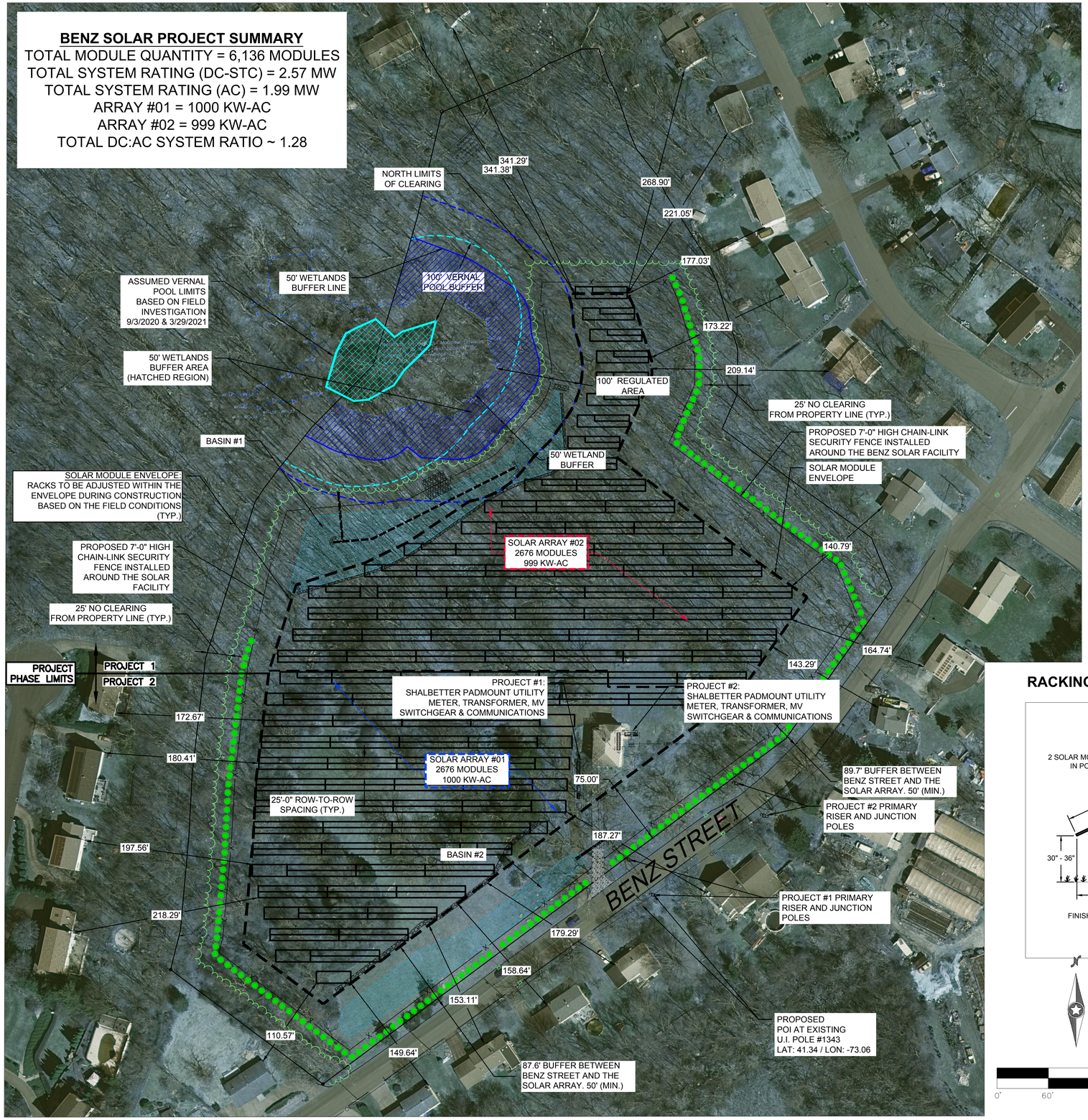
0 25 50 75 100 125

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 QUANTITY = 6,136 MODULES
TOTAL SYSTEM RATING (DC-STC) = 2.57 MW
TOTAL SYSTEM RATING (AC) = 1.99 MW
ARRAY #01 = 1000 KW-AC
ARRAY #02 = 999 KW-AC
TOTAL DC:AC SYSTEM RATIO ~ 1.28



LEGEND:

- EXISTING PROPERTY LINE
- PROPOSED PROJECT FENCE
- PROPOSED GRAVEL ACCESS ROAD
- UMV — PROPOSED AC DISTRIBUTION
- OE — PROPOSED OVERHEAD ELECTRIC
- ARBORVITAE SCREENING TREES
- BASIN OUTLET
- 50' WETLAND BUFFER AREA
- WETLAND DELINEATION LINE
- 24 x 2 SOLAR MODULE BOCK
- 18 x 2 SOLAR MODULE BOCK
- 6 x 2 & 12 x 2 SOLAR MODULE BOCK

PROJECT INFORMATION:

EXISTING ZONING : R
PROPOSED USE : SPECIAL COMMERCIAL

SPECIFIC SITE NOTES:
1. NO LIGHTING PROPOSED WITH THE PROJECT
2. NO AUDIBLE NOISE GREATER THAN THE SITES EXISTING AMBIENT NOISE LEVEL SHALL BE DETECTABLE AT OR BEYOND THE PROPERTY LINE OF THE PROJECT
3. EMERGENCY VEHICULAR & SITE ACCESS TO BE PROVIDED TO ALL LOCAL RESPONDERS (POLICE, FIRE, ETC...)

PROJECT AREAS & IMPACTS:

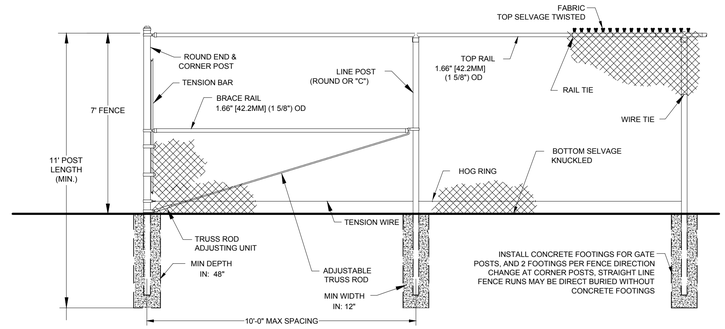
TOTAL SITE AREA = 12.72 ACRES

TOTAL SITE CLEARING = ±9.0 ACRES

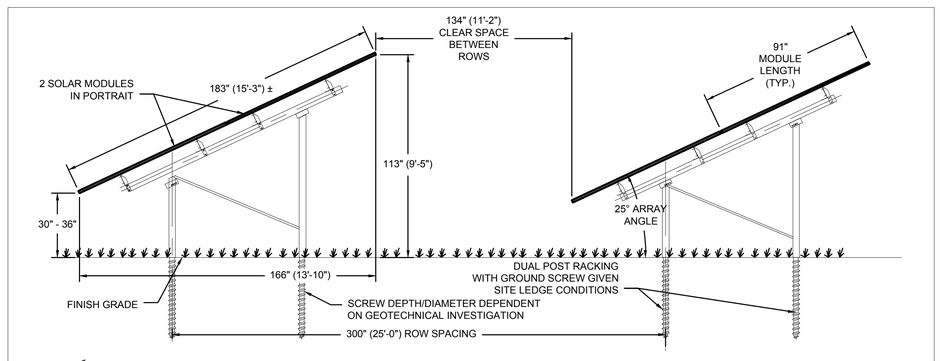
TOTAL ARRAY FOOTPRINT (FENCE LIMITS) = 8.38 ACRES

TOTAL PROPOSED IMPERVIOUS:
GRAVEL ACCESS ROAD, STRUCTURAL POSTS & EQUIPMENT PADS = 0.12 ACRES
SOLAR MODULES EFFECTIVE IMPERVIOUS = 0.65 ACRES

PERIMETER FENCE DETAIL:



RACKING PROFILE DETAIL:



0' 60' 120' 180'

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1	2/11/20	CSC SUBMISSION

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STATE OF CONNECTICUT — STEVEN J. MAUTNER — No. 24329 — LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

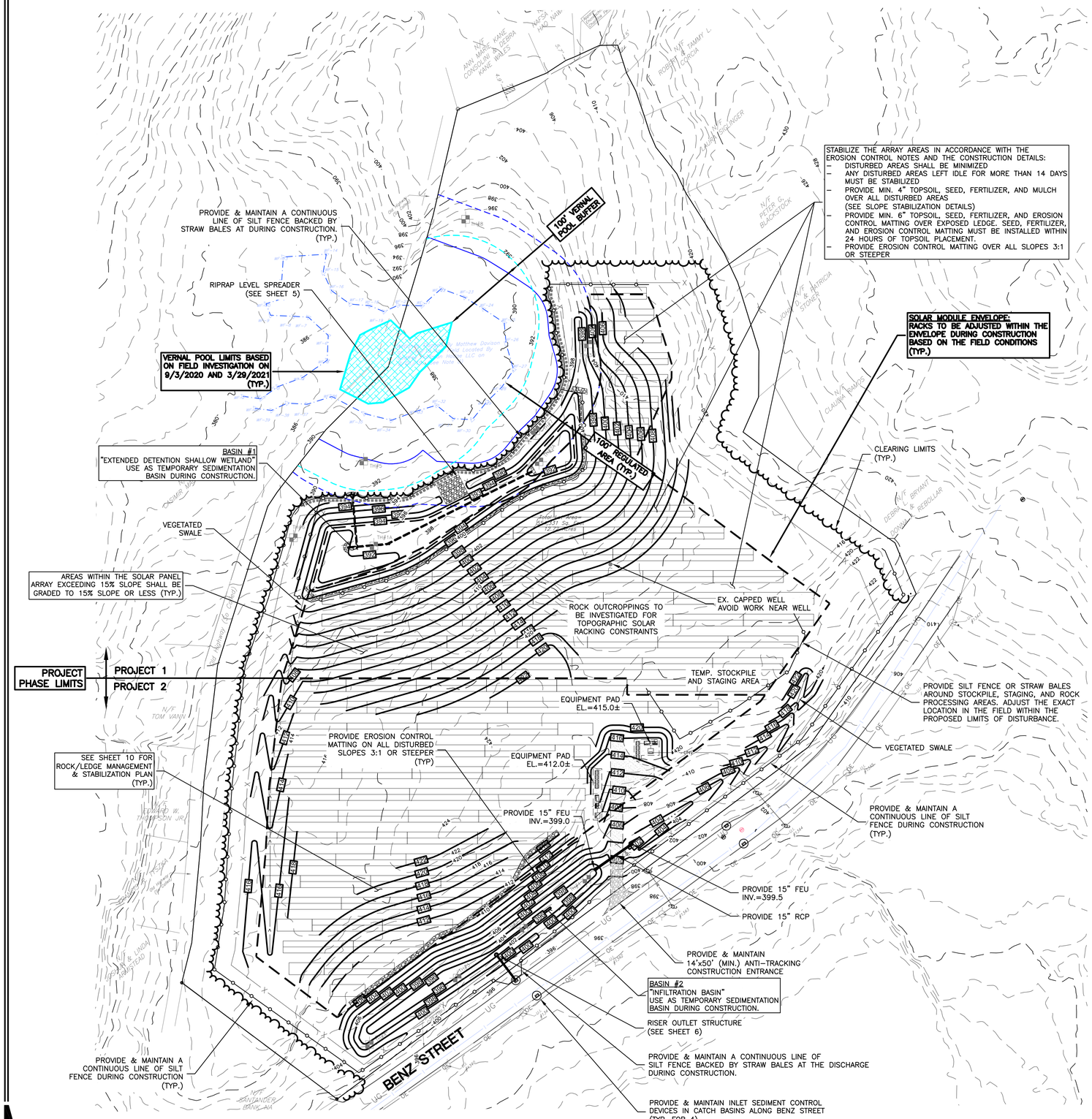
BENZ STREET SOLAR

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"

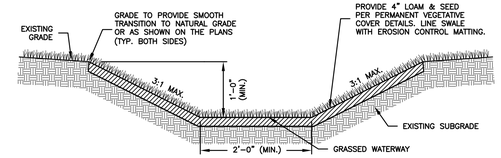
0–9" Topsoil, dark brown sandy loam
9–32" subsoil yellow brown fine sandy loam with boulders
Note: Surface ledge 15 feet to the east.

CONSTRUCTION NOTES:

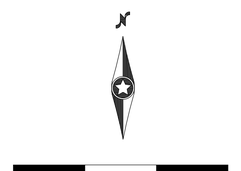
1. THE CONTRACTOR SHALL PERFORM ALL TREE REMOVAL ACTIVITIES ON SITE TO ALLOW FOR SEDIMENT TRAP INSTALLATION, NO GRUBBING IS TO OCCUR DURING TREE REMOVAL, PRIOR TO SEDIMENT TRAP INSTALLATION.
2. ALL SEDIMENT TRAP'S IDENTIFIED ON THE PLAN SHALL BE STAKED BY A REGISTERED SURVEYOR AND INSTALLED PER PLANS 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



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2	4/1/20	REVISED HYDROLOGY
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31 BENZ STREET
ANSONIA, CT 06401

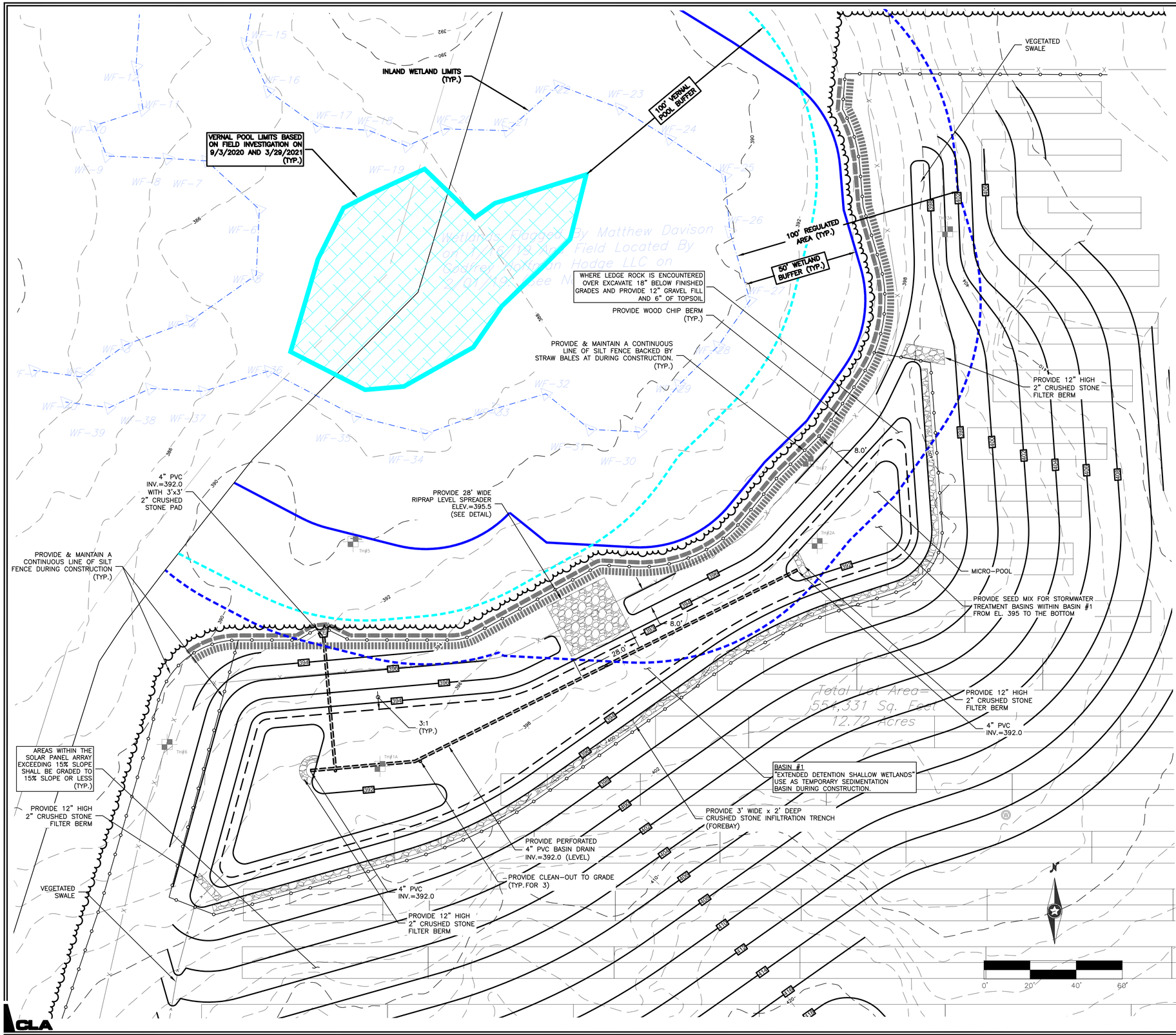
BENZ STREET SOLAR

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

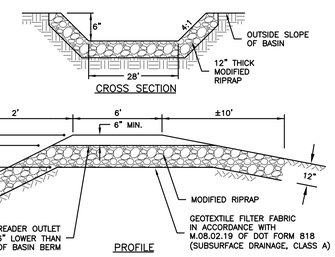
SEE SHEET 7 – LANDSCAPE PLAN FOR SEED MIX SPECIFICATIONS

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:

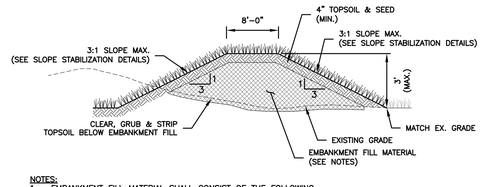
SIEVE	% PASSING
#10	100%
#40	60-80%
#80	5%
#200	0%

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 8" 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

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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

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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

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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.)

10'

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'

Bituminous Curb (Typ.)

U.L. #1342

U.L. #1343

U.L. #1341

U.L. #1340

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

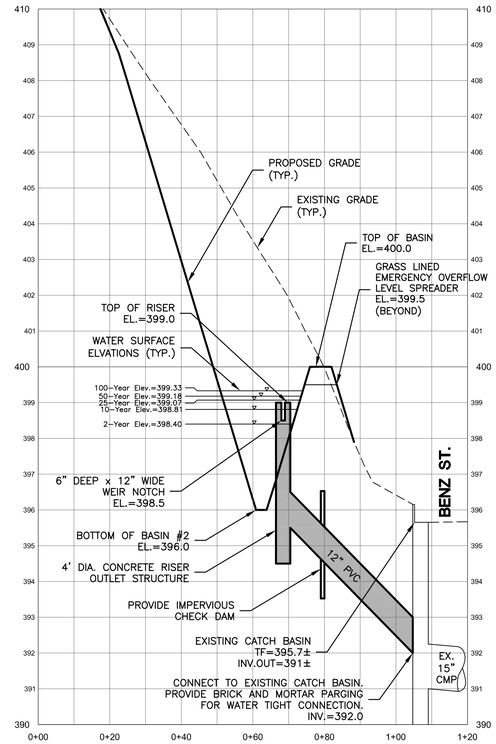
SEE SHEET 7 – LANDSCAPE PLAN FOR SEED MIX SPECIFICATIONS

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
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2	4/1/20	REVISED HYDROLOGY
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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

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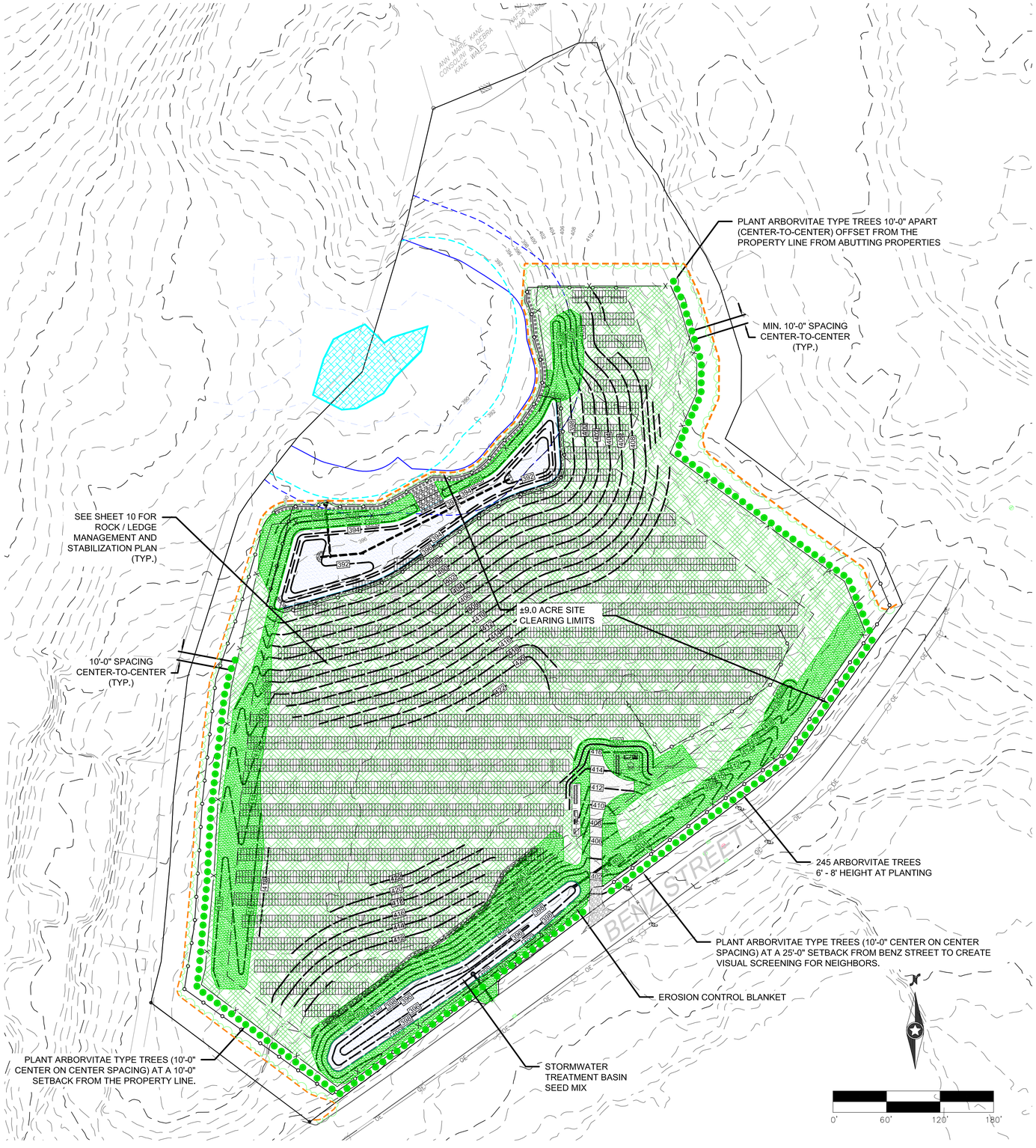

LEGEND:

- 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:

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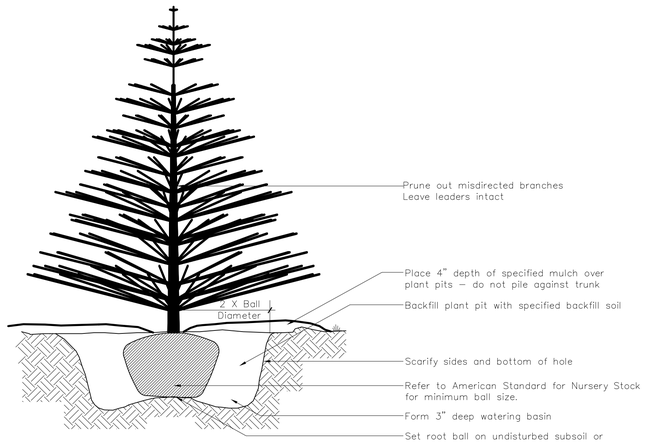
#40	60-80%
#80	5%
#200	0%

DO NOT COMPACT MATERIAL DURING INSTALLATION

ARBORVITAE TREE DETAIL:



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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

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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

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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

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EXHIBIT A: PROJECT CROSS SECTION (NORTHERN SITE VIEW)

(SCALE: 1" = 80')

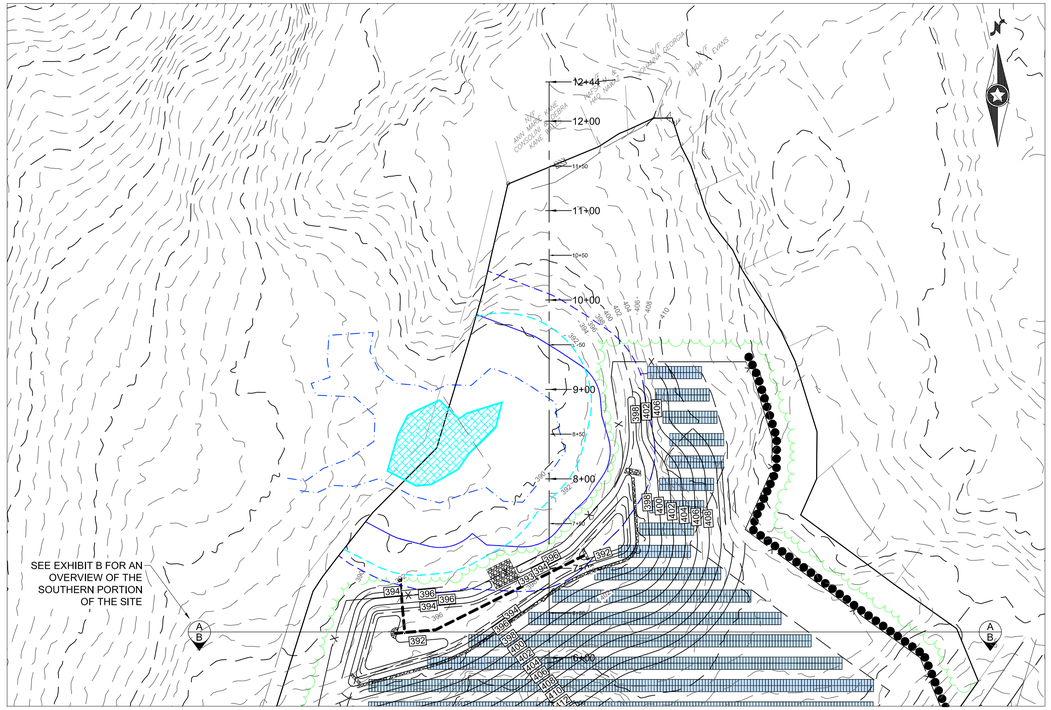
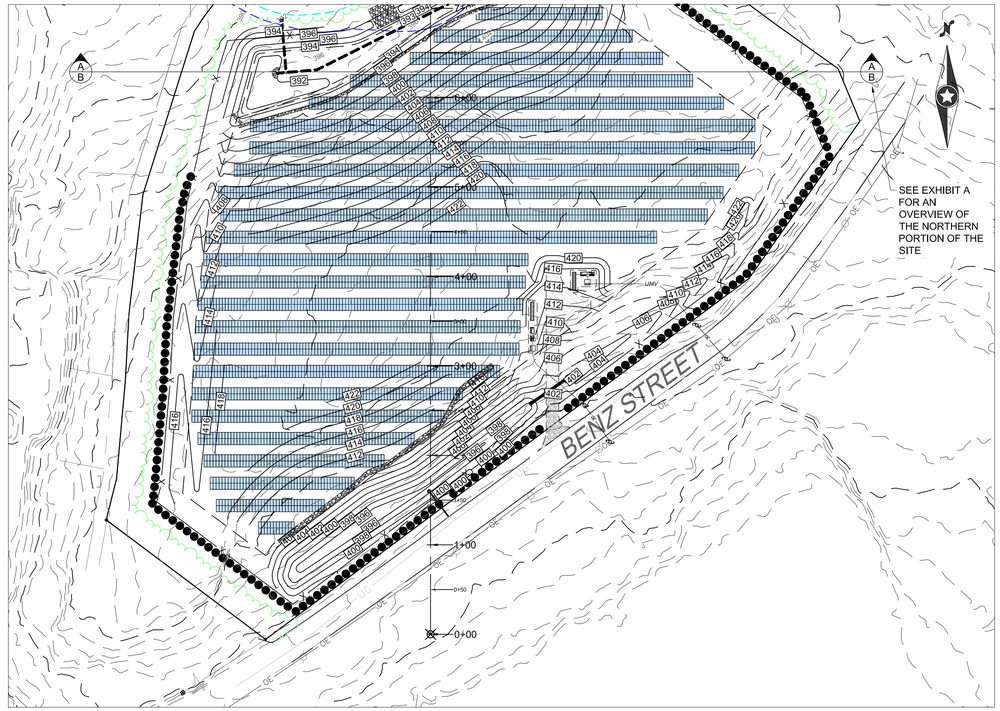
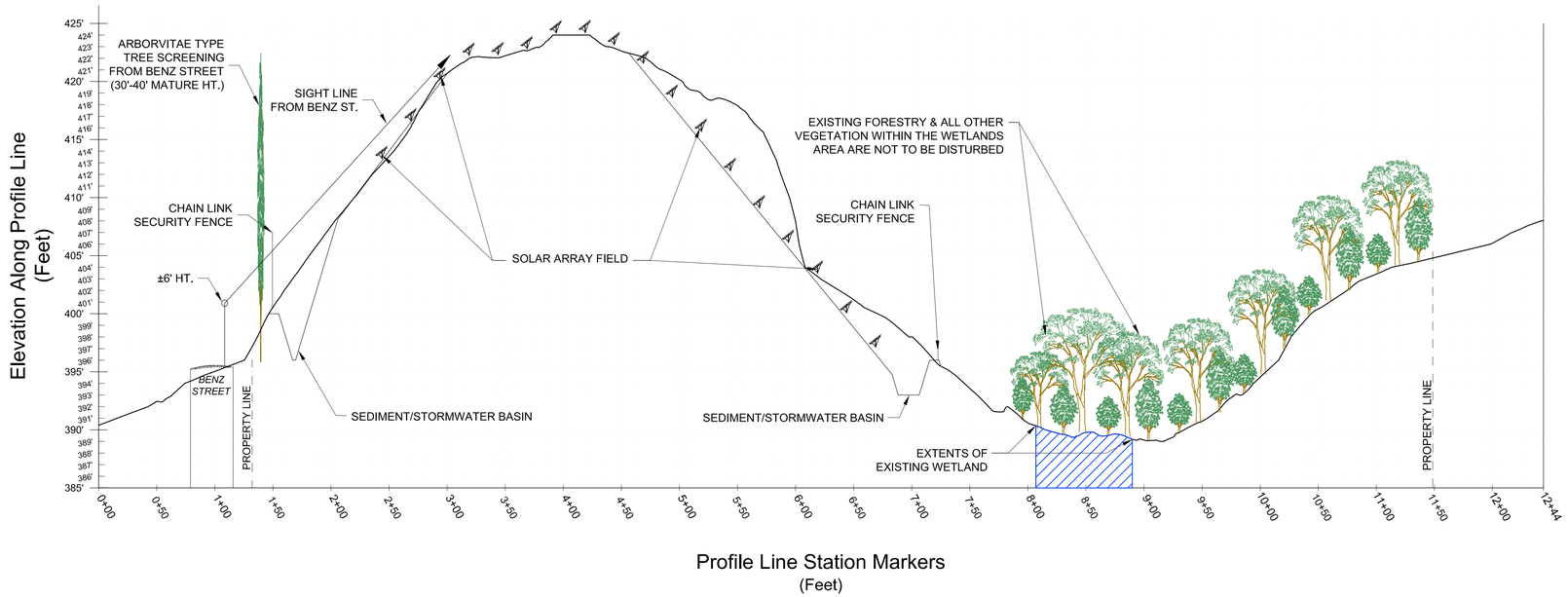


EXHIBIT B: PROJECT CROSS SECTION (SOUTHERN SITE VIEW)

(SCALE: 1" = 80')



PROJECT PROFILE:



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BENZ STREET SOLAR

PROJECT CROSS SECTION

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

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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:
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ECOS ENERGY
222 SOUTH 9TH STREET
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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. BEFORE ANY WORK TAKES PLACE 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. 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.
17. INSTALL THE BASIN DRAIN PERFORATED PIPE AND CRUSHED STONE WITHIN BASIN #1.
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
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

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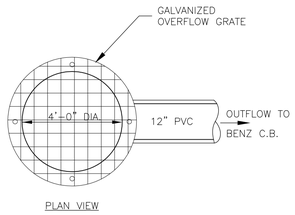
BENZ STREET SOLAR

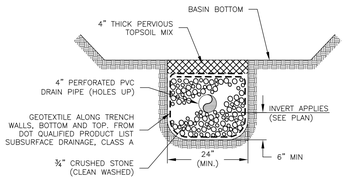
CIVIL NOTES

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

CLA

M:\6000\6440\6430 Benz Street Solar\Drawings\+Current\10 DETAILS & NOTES-BENZ.dwg





BASIN DRAIN DETAIL

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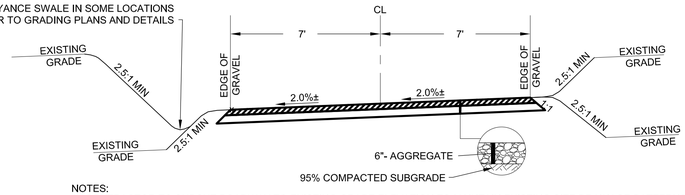

NOTES:
1. CONTRACTOR TO SUBCUT ROADWAY TO EXISTING GRADE ELEVATION TO MAINTAIN EXISTING SITE DRAINAGE PATTERNS WHEREVER POSSIBLE.
2. IN FILL LOCATIONS CONTRACTOR TO GRADE TOE OF SLOPE TO EXISTING GRADE, AND MAINTAIN NATURAL DRAINAGE PATTERNS.
3. IN CUT LOCATIONS CONTRACTOR TO CREATE SWALE ON DOWNSTREAM 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

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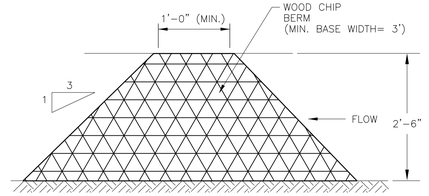

WOOD CHIP BERM

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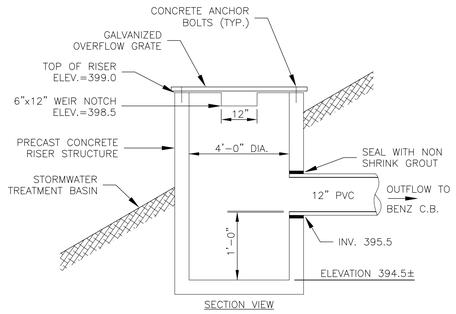

STORMWATER TREATMENT BASIN #2 OUTLET RISER STRUCTURE DETAIL

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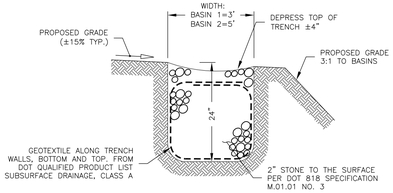

STONE INFILTRATION TRENCH DETAIL

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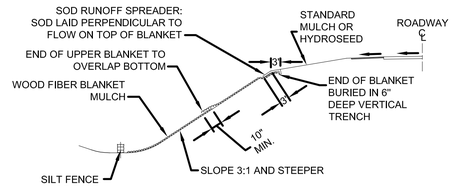


EROSION CONTROL BLANKET INSTALLATION ON AN INSLOPE
(WHEN REQUIRED)

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

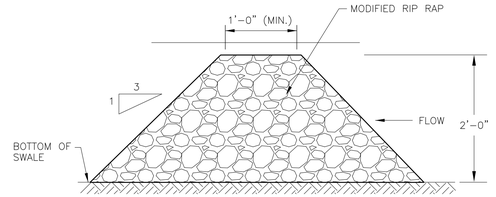
CATEGORY	ACCEPTABLE TYPES
1	STRAW RD 1S, WOOD FIBER RD 1S
2	STRAW 1S, WOOD FIBER 1S
3	STRAW 2S, WOOD FIBER 2S
4	STRAW/COCONUT 2S, WOOD FIBER HV 2S

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



RIP-RAP CHECK DAM

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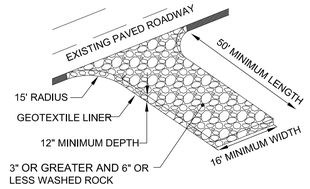
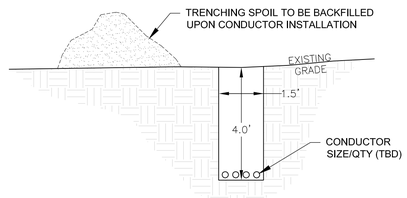


NOTE:

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

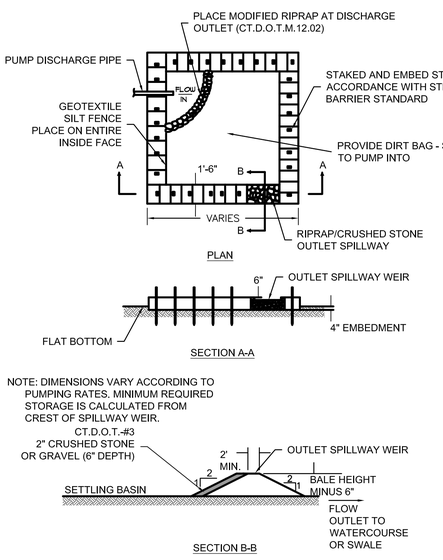
NOT TO SCALE



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

DEWATERING SETTLING BASIN DETAIL

NOT TO SCALE

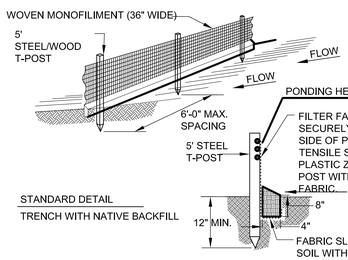
DEWATERING PLAN

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.



STANDARD DETAIL

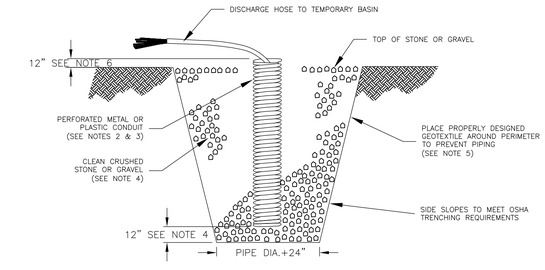
TRENCH WITH NATIVE BACKFILL

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

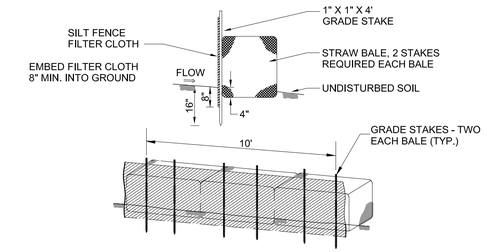
NOT TO SCALE



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.

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

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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

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:
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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

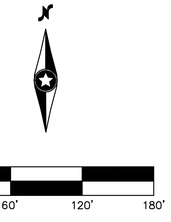
The invert of the lowest outlet structure for stormwater treatment basin #2 is elevation 398.5 at the invert elevation of the 12"x6" weir notch of the riser structure. The storage volume below this elevation is 10,999 CF which exceeds the required Water Quality Volume.

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



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

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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

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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.

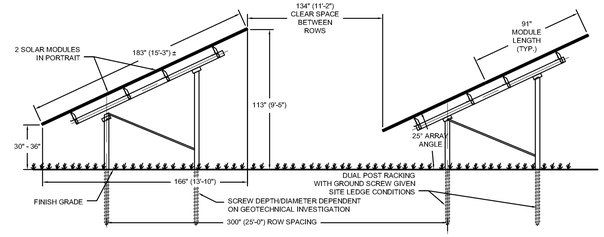
BENZ STREET

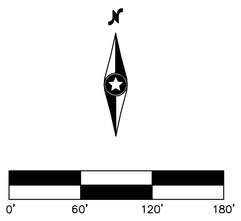
BASIN #2

BASIN #2 DISCHARGE

EXISTING CATCH BASIN

RACKING PROFILE DETAIL:





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3	4/16/2021	Misc. Updates & Revisions
2	3/22/2021	Misc. Updates & Revisions
1	9/17/2020	Misc. Updates & Revisions

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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

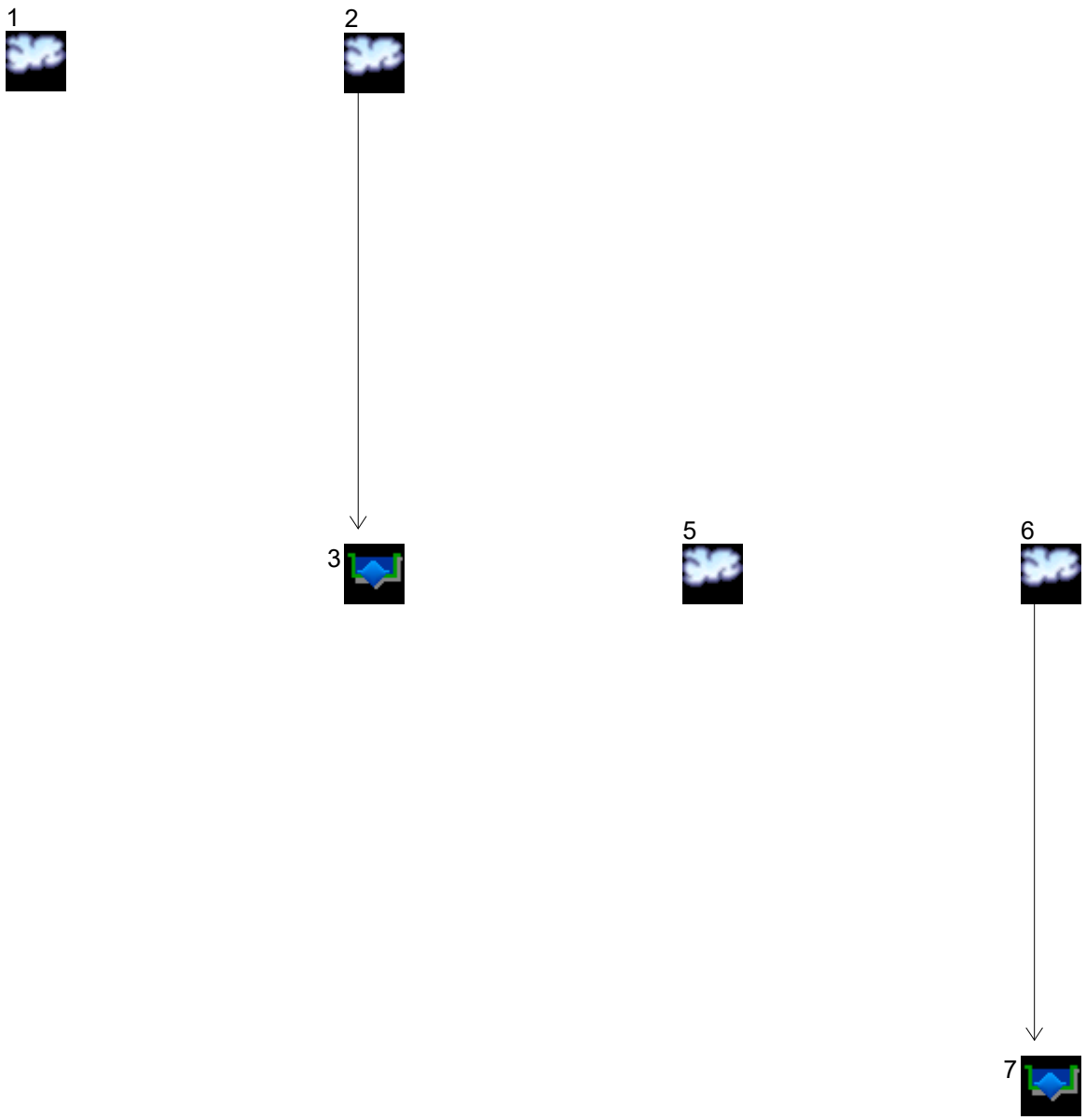
Hydraflow Table of Contents

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

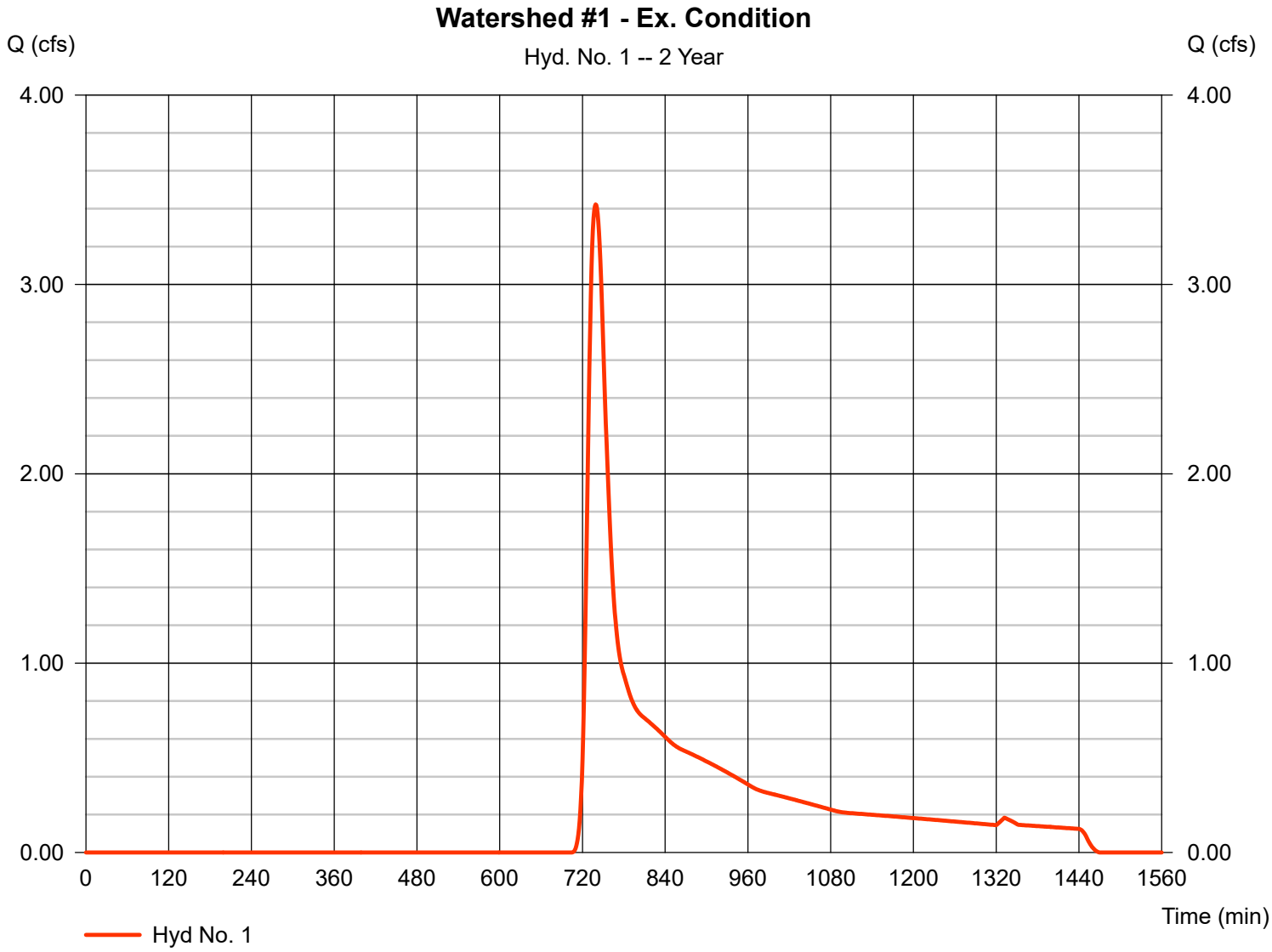
Hydrograph Report

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



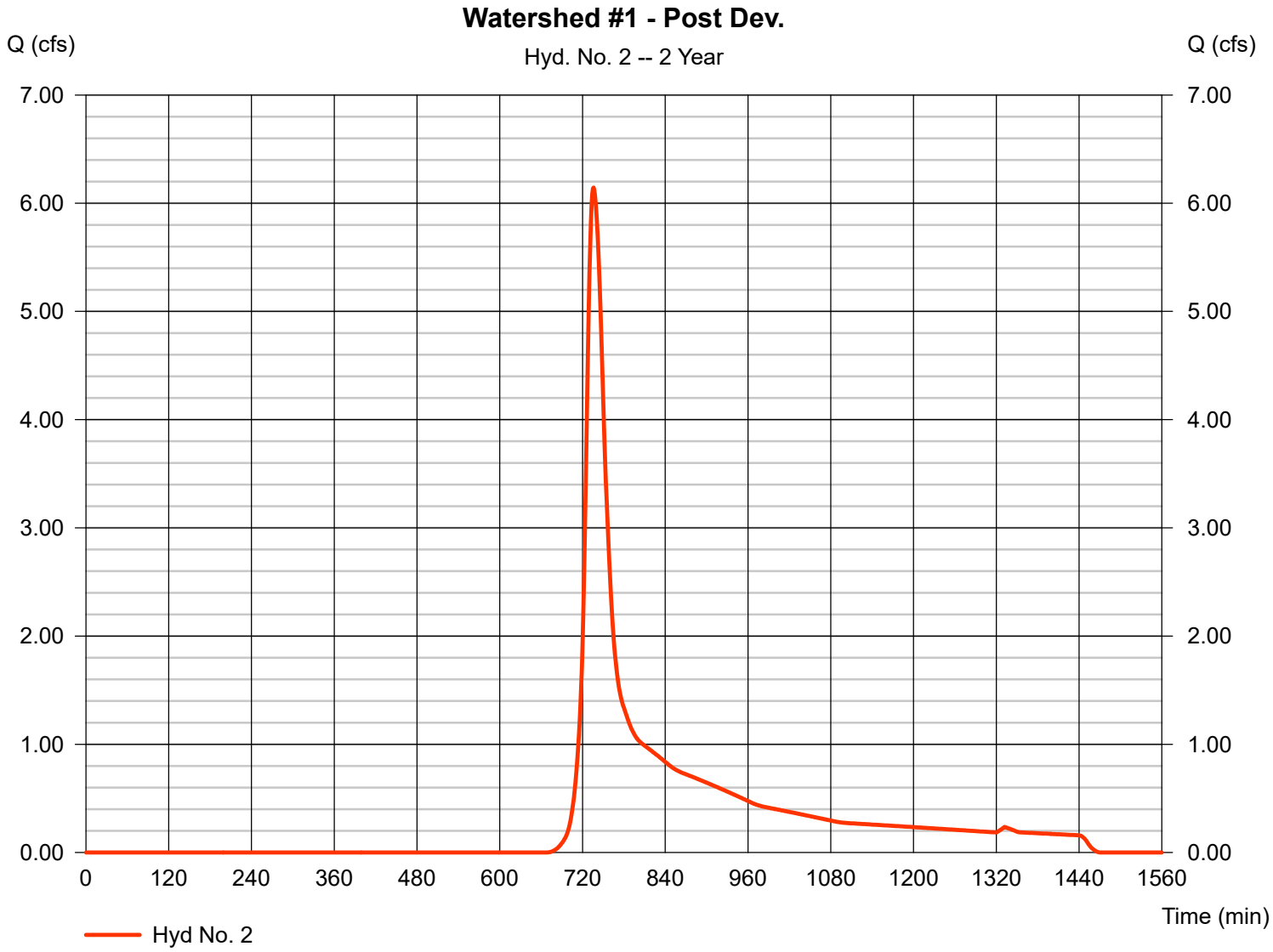
Hydrograph Report

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



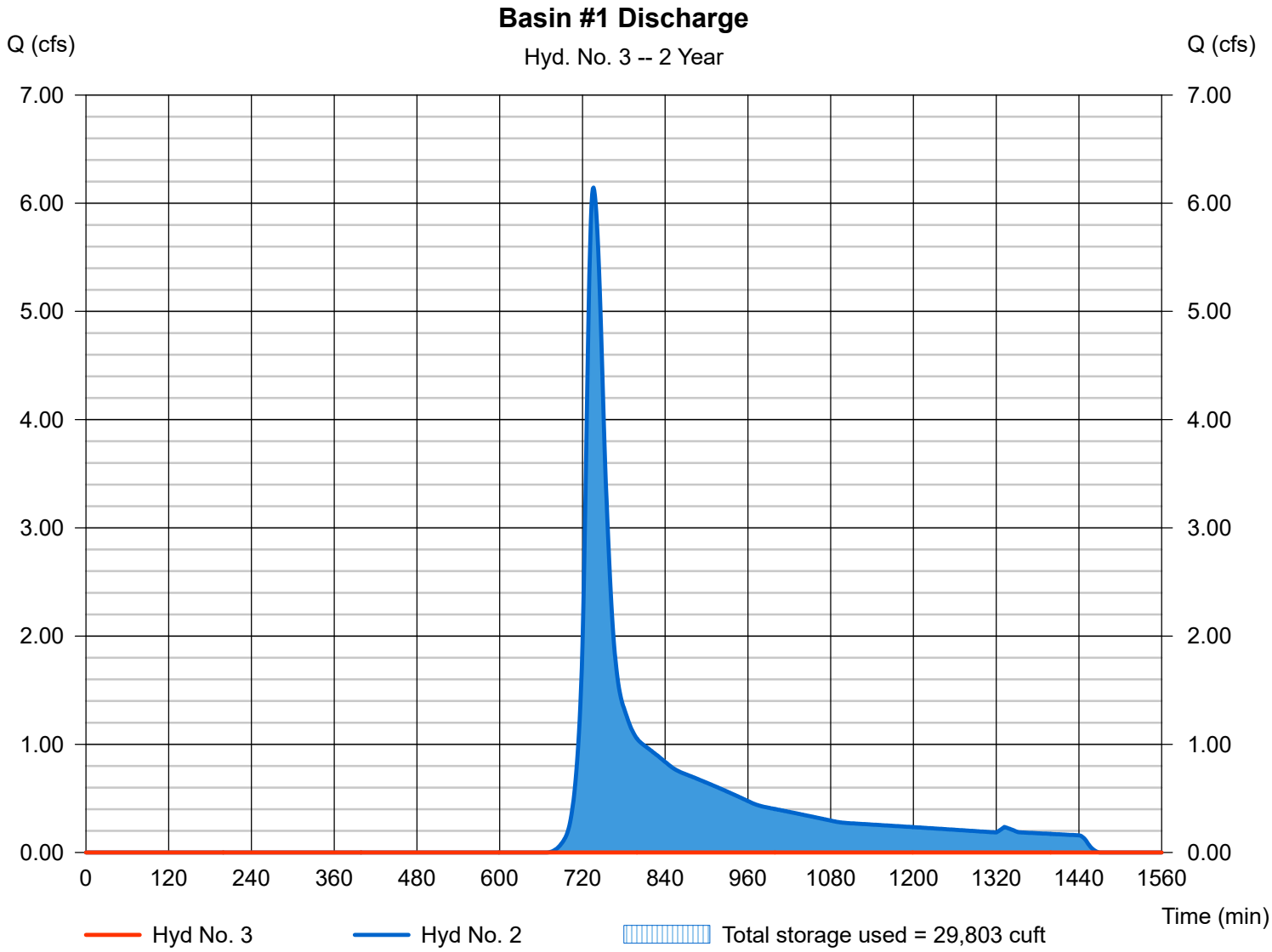
Hydrograph Report

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

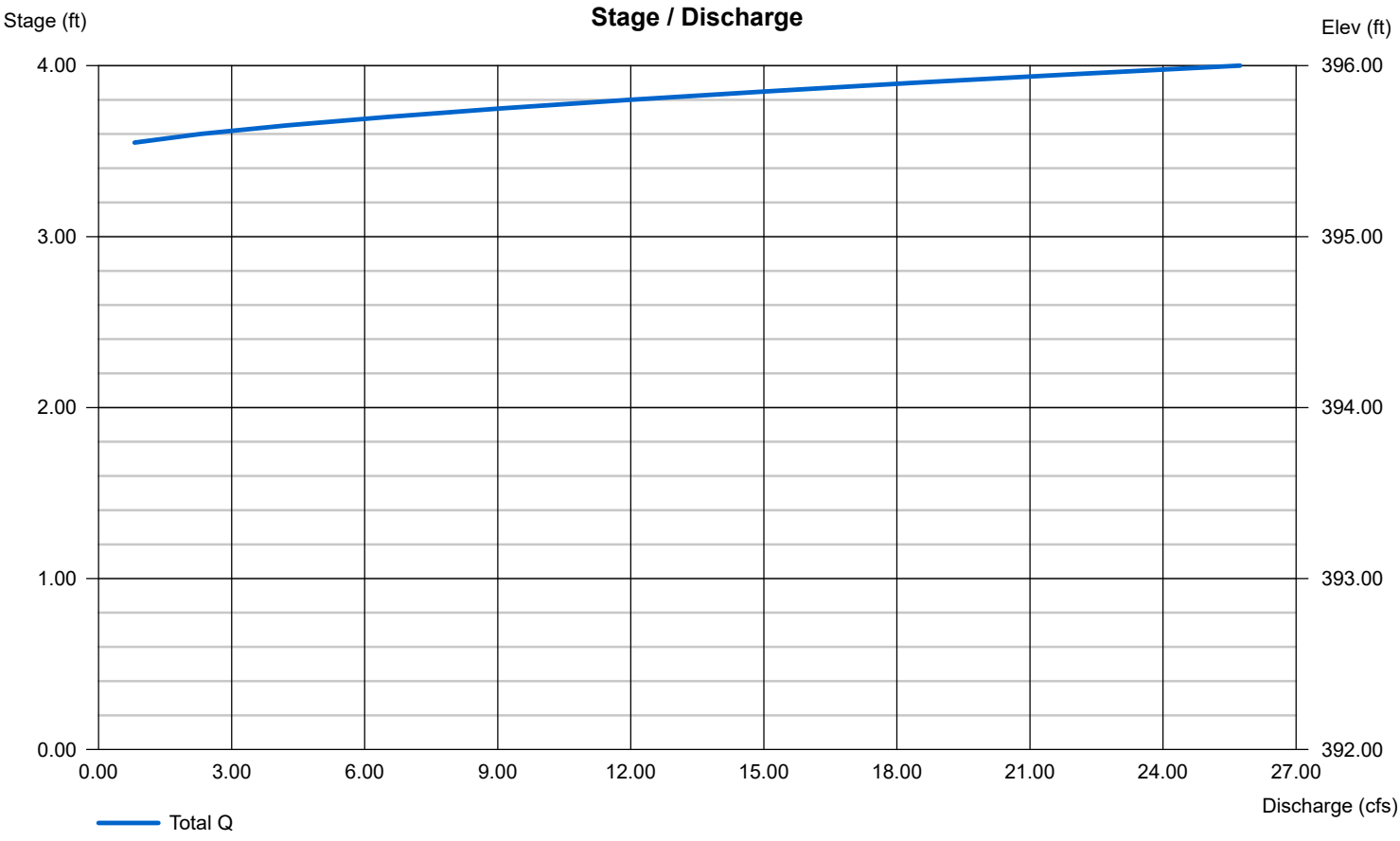
Culvert / Orifice Structures

	[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).



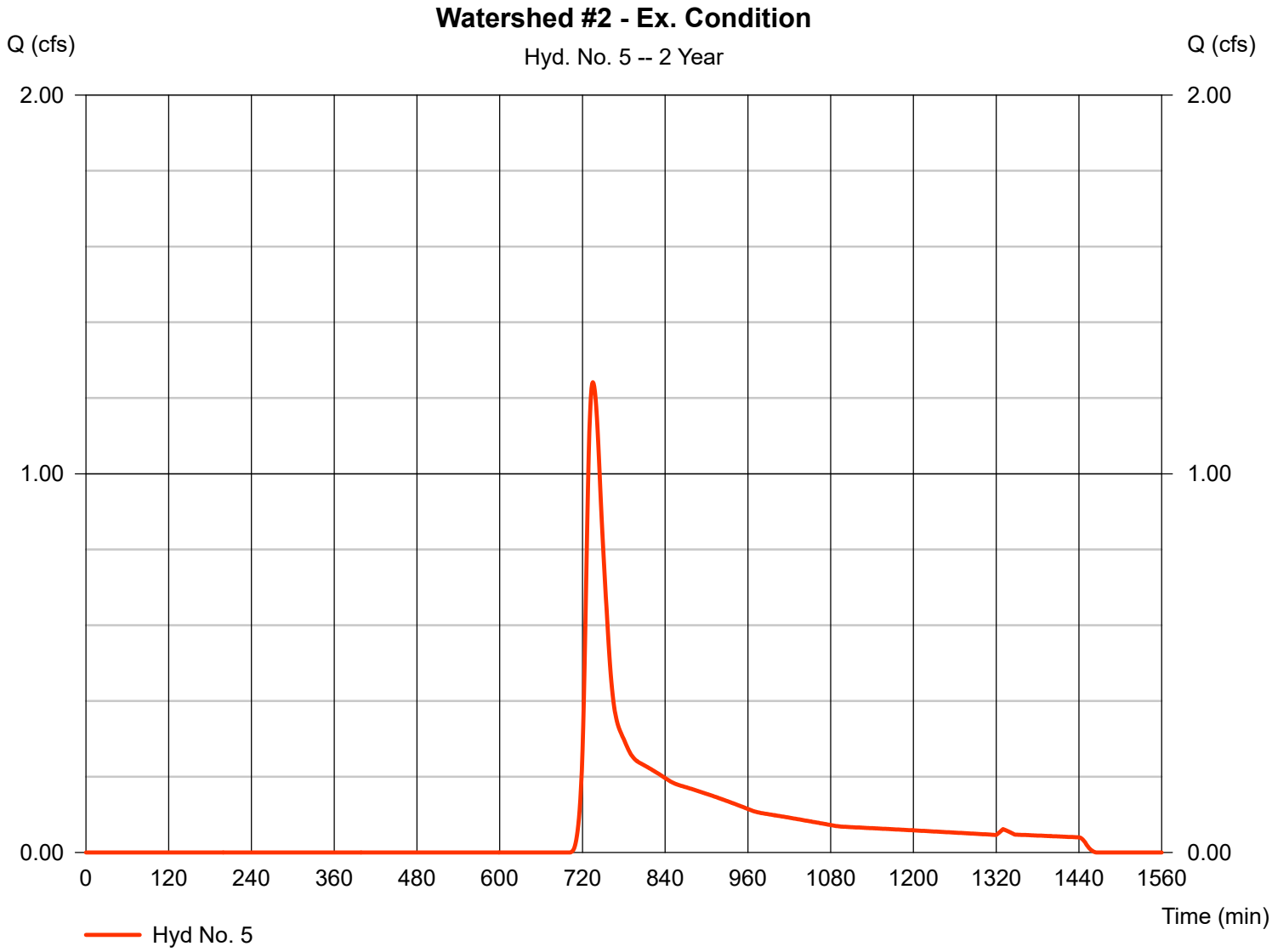
Hydrograph Report

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



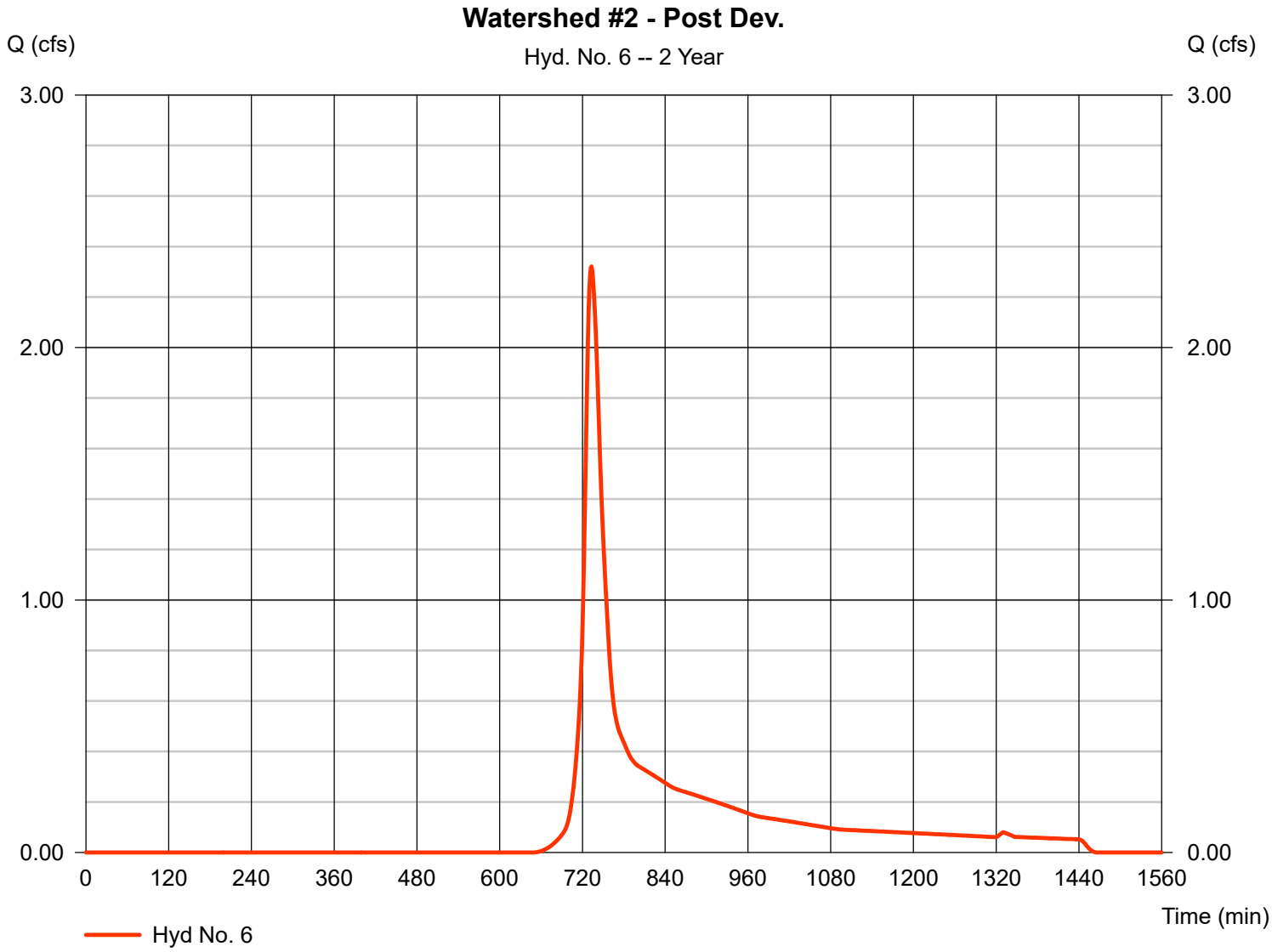
Hydrograph Report

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



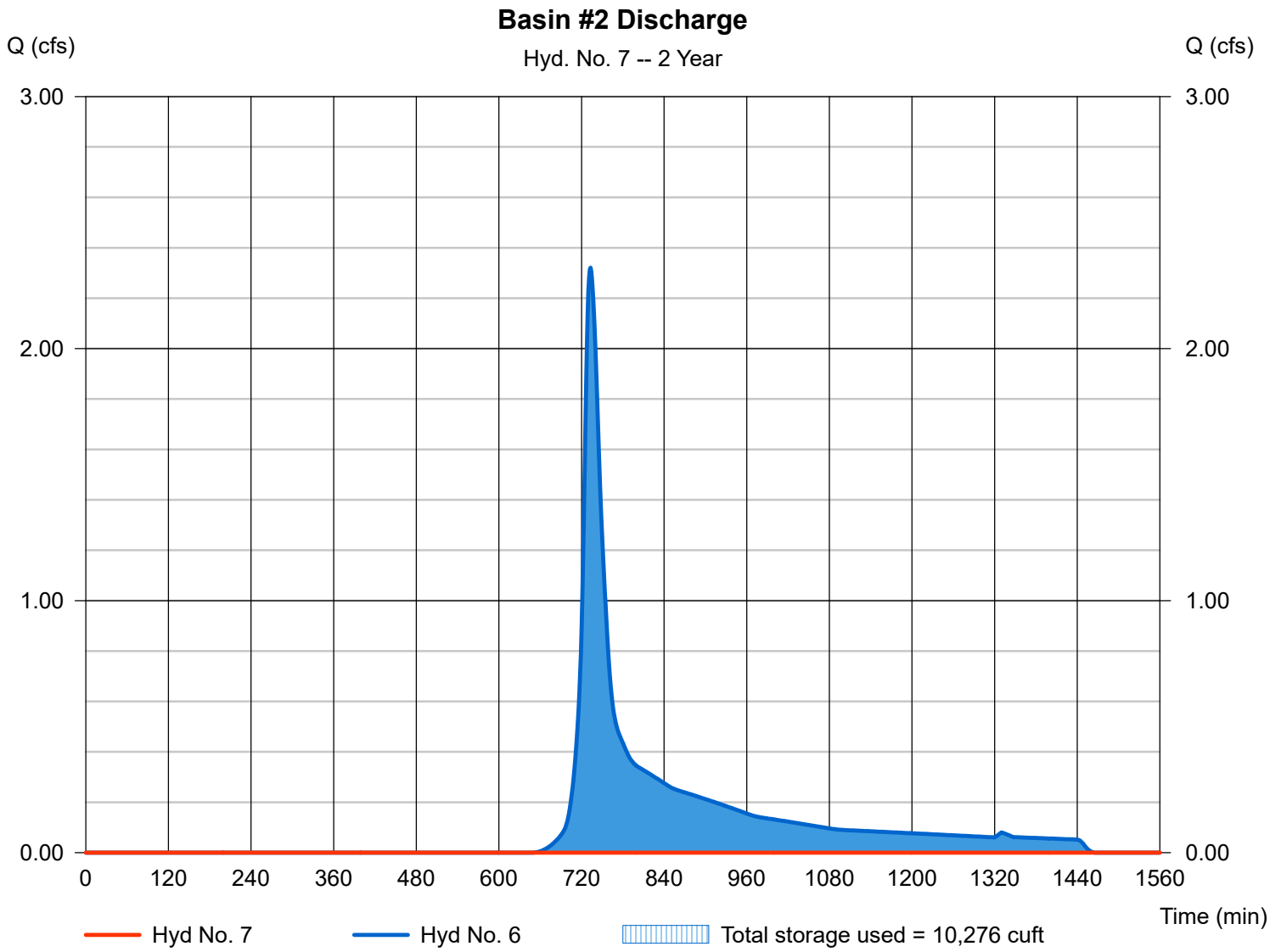
Hydrograph Report

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

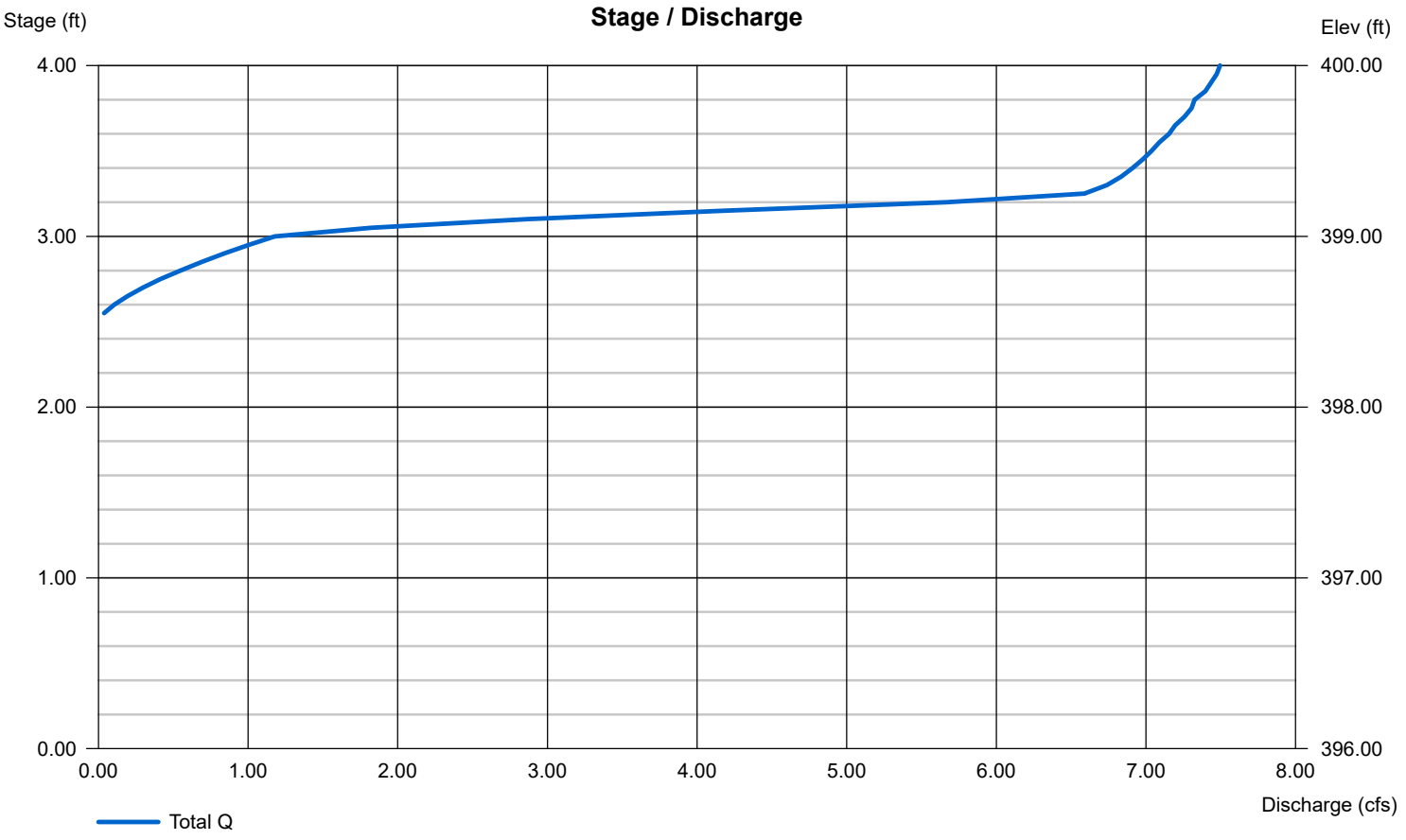
Weir Structures

	[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

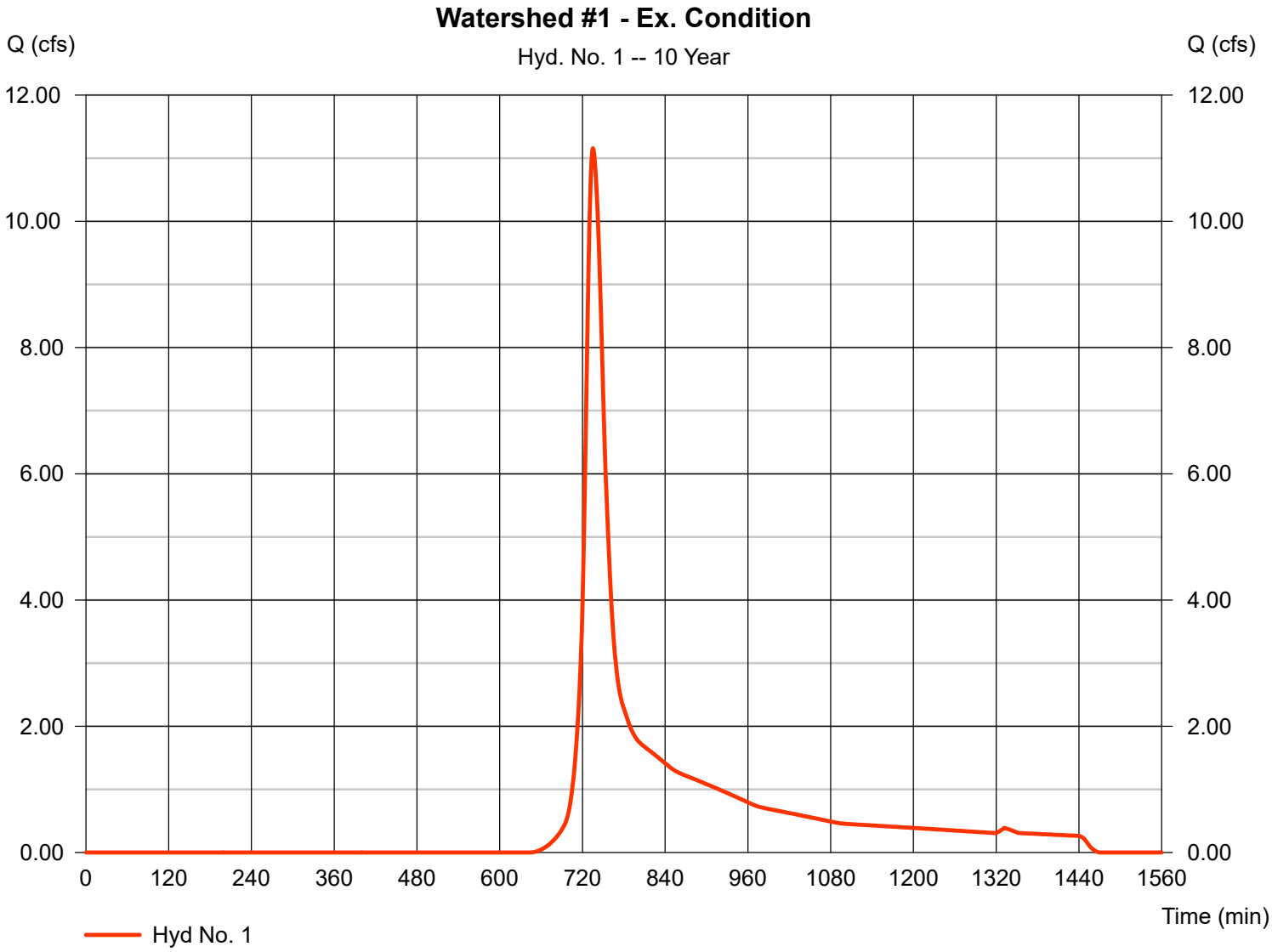
Hydrograph Report

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



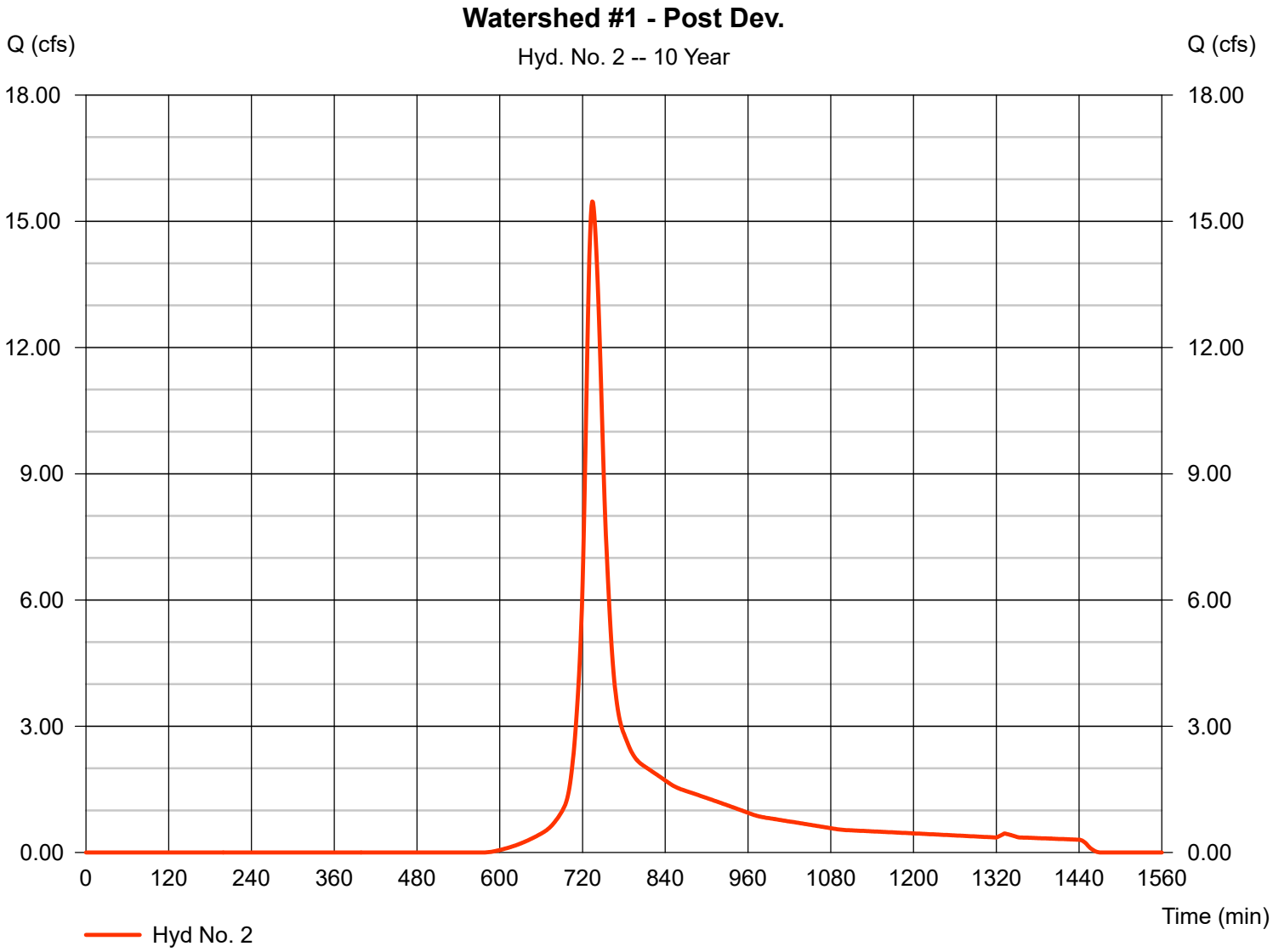
Hydrograph Report

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



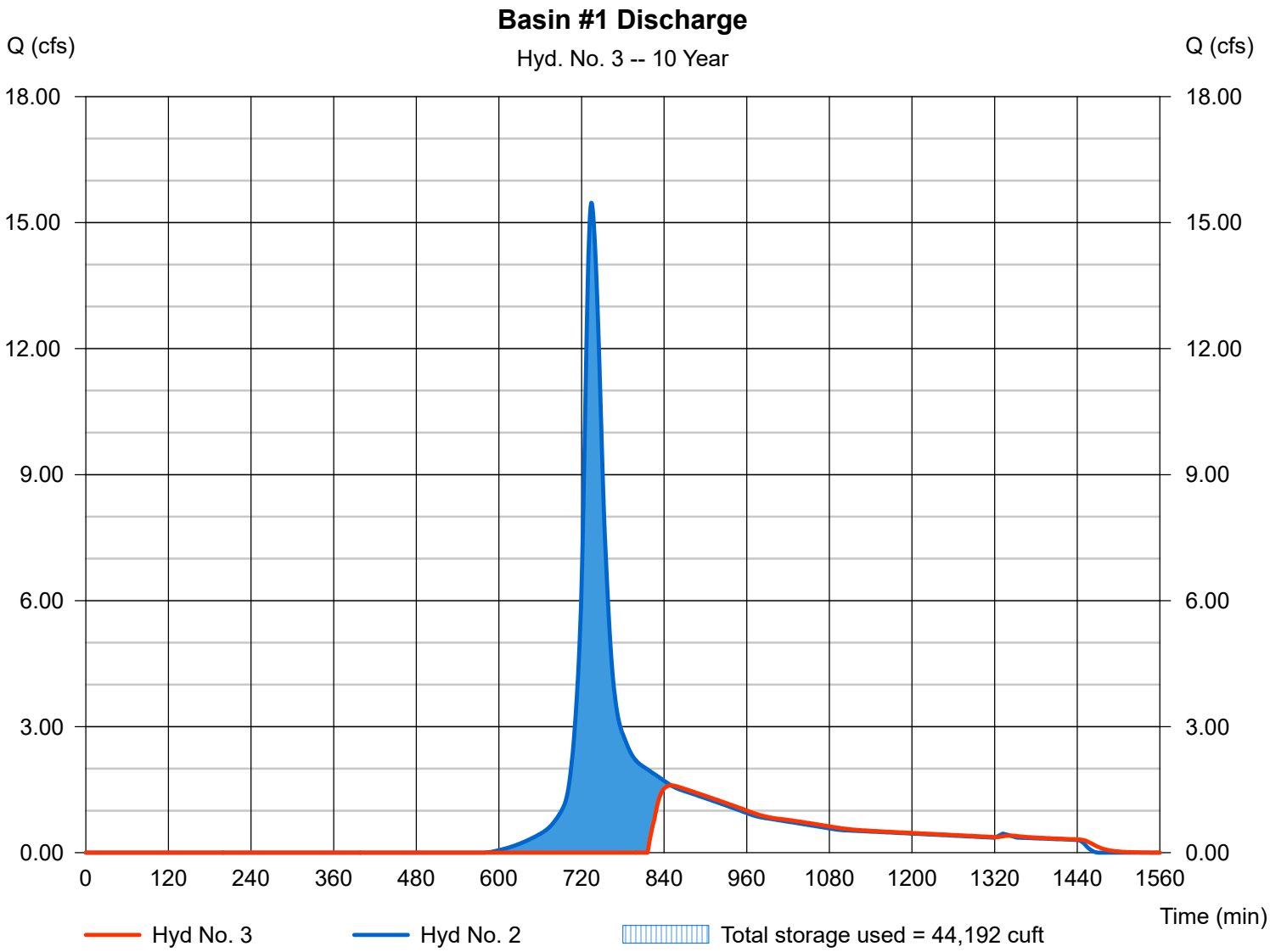
Hydrograph Report

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.



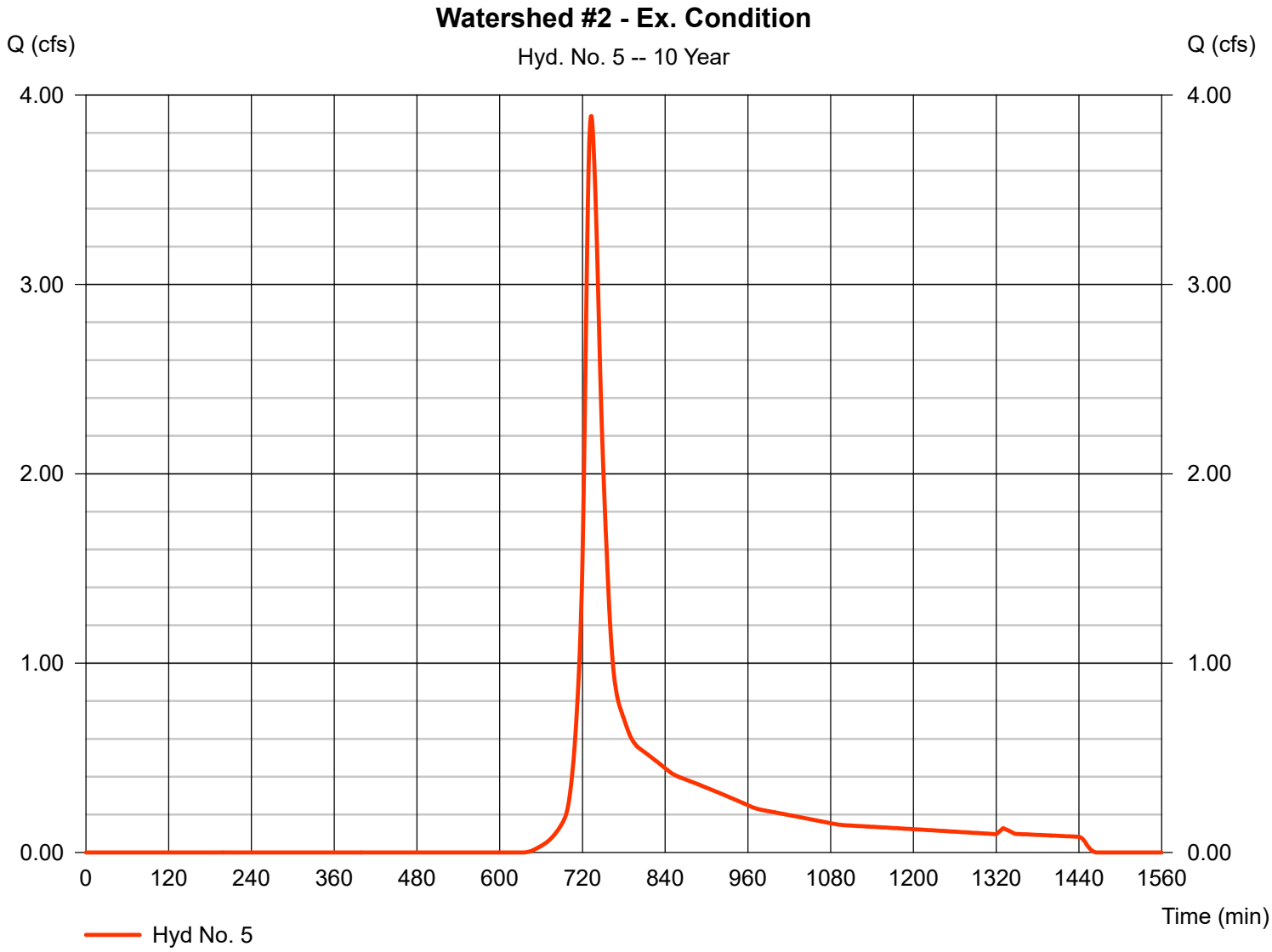
Hydrograph Report

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



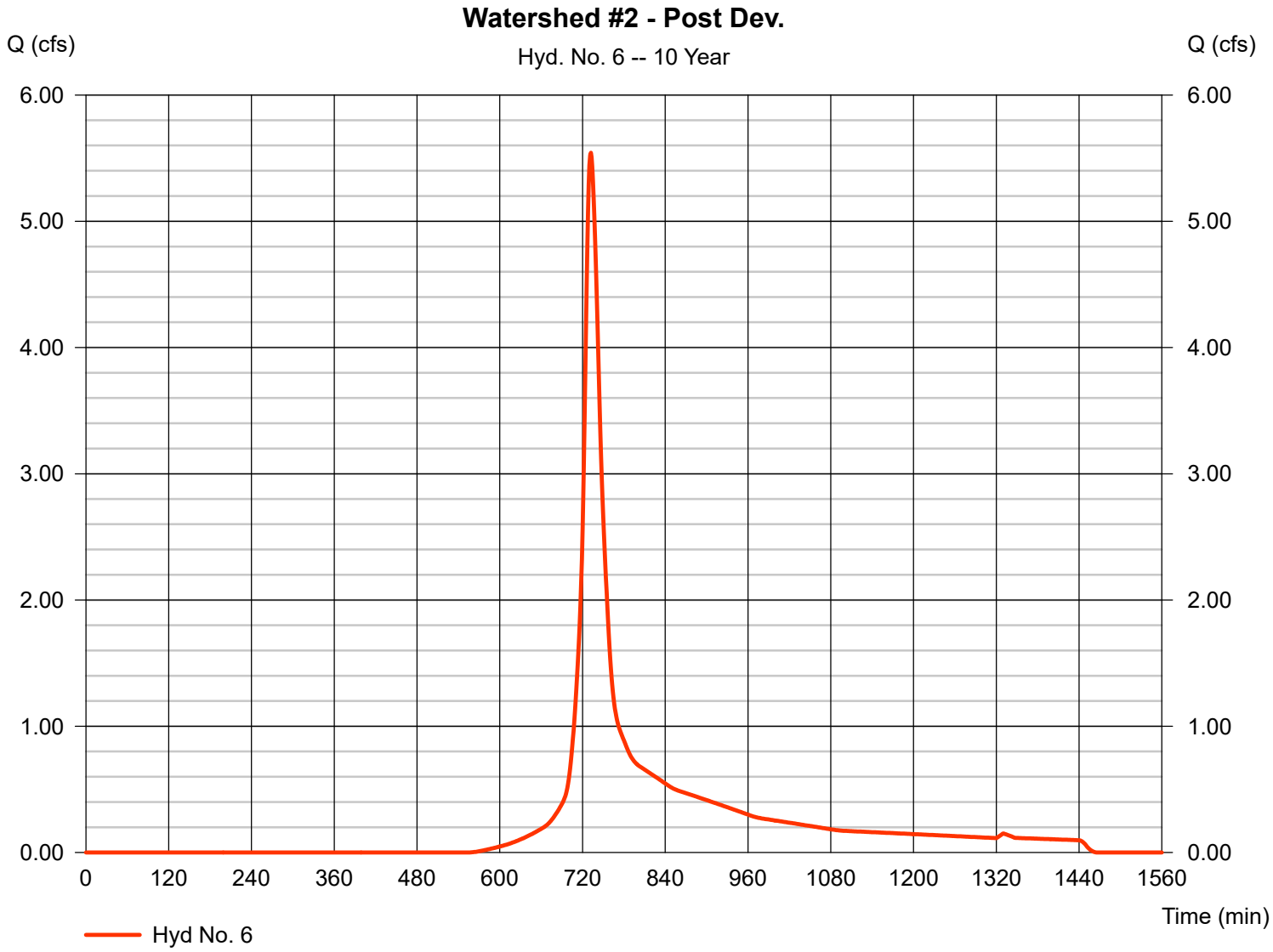
Hydrograph Report

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



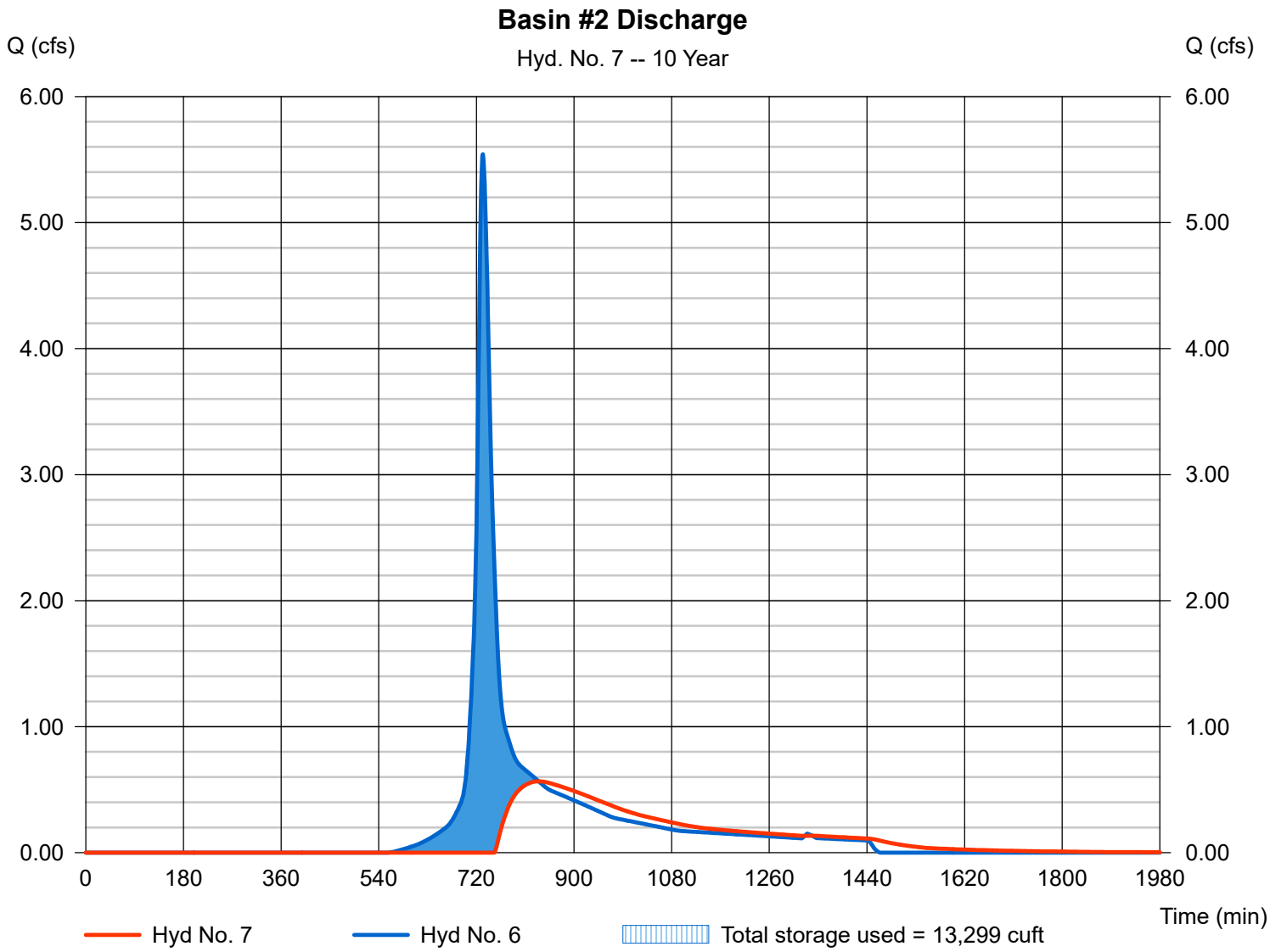
Hydrograph Report

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

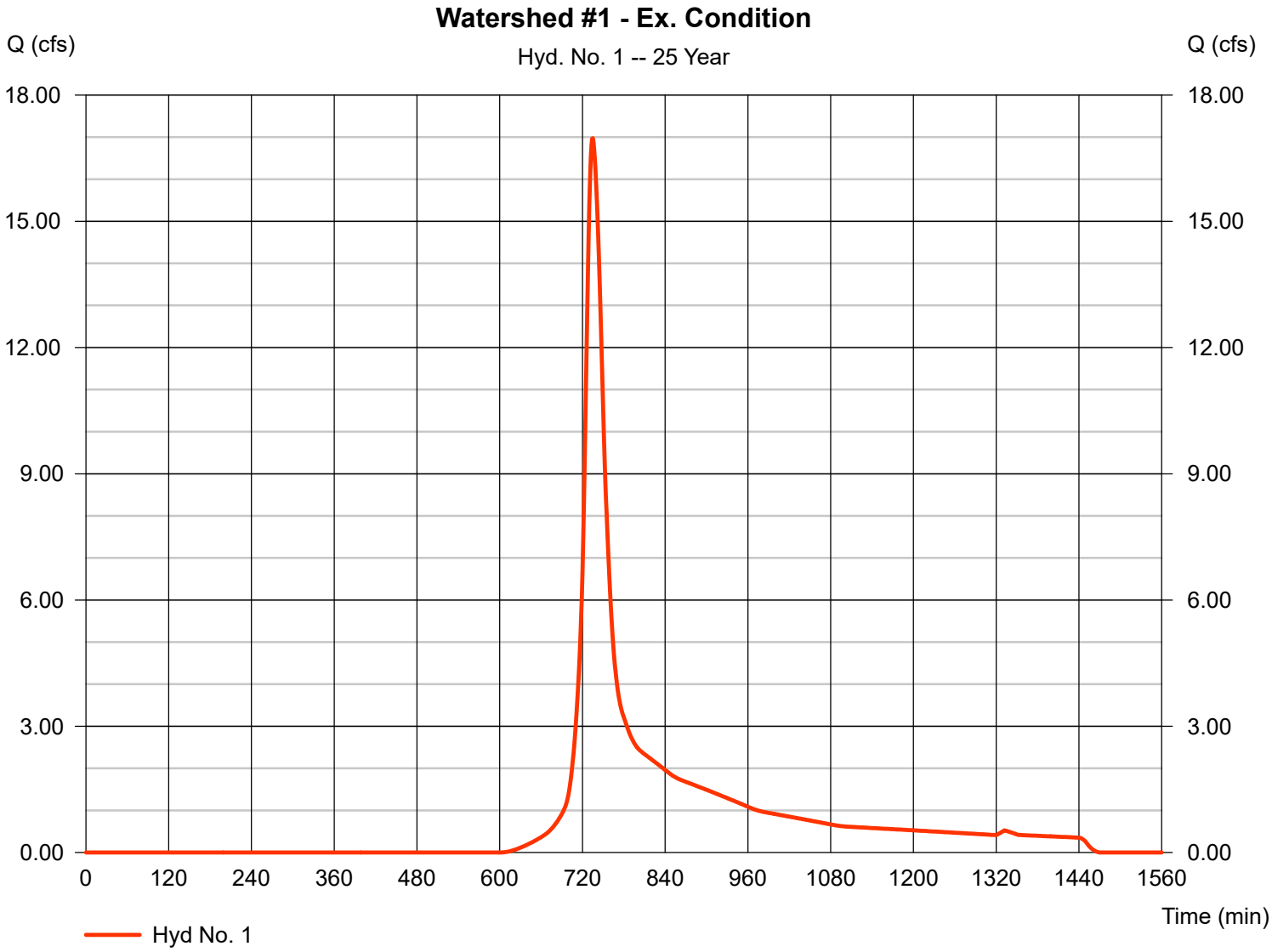
Hydrograph Report

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

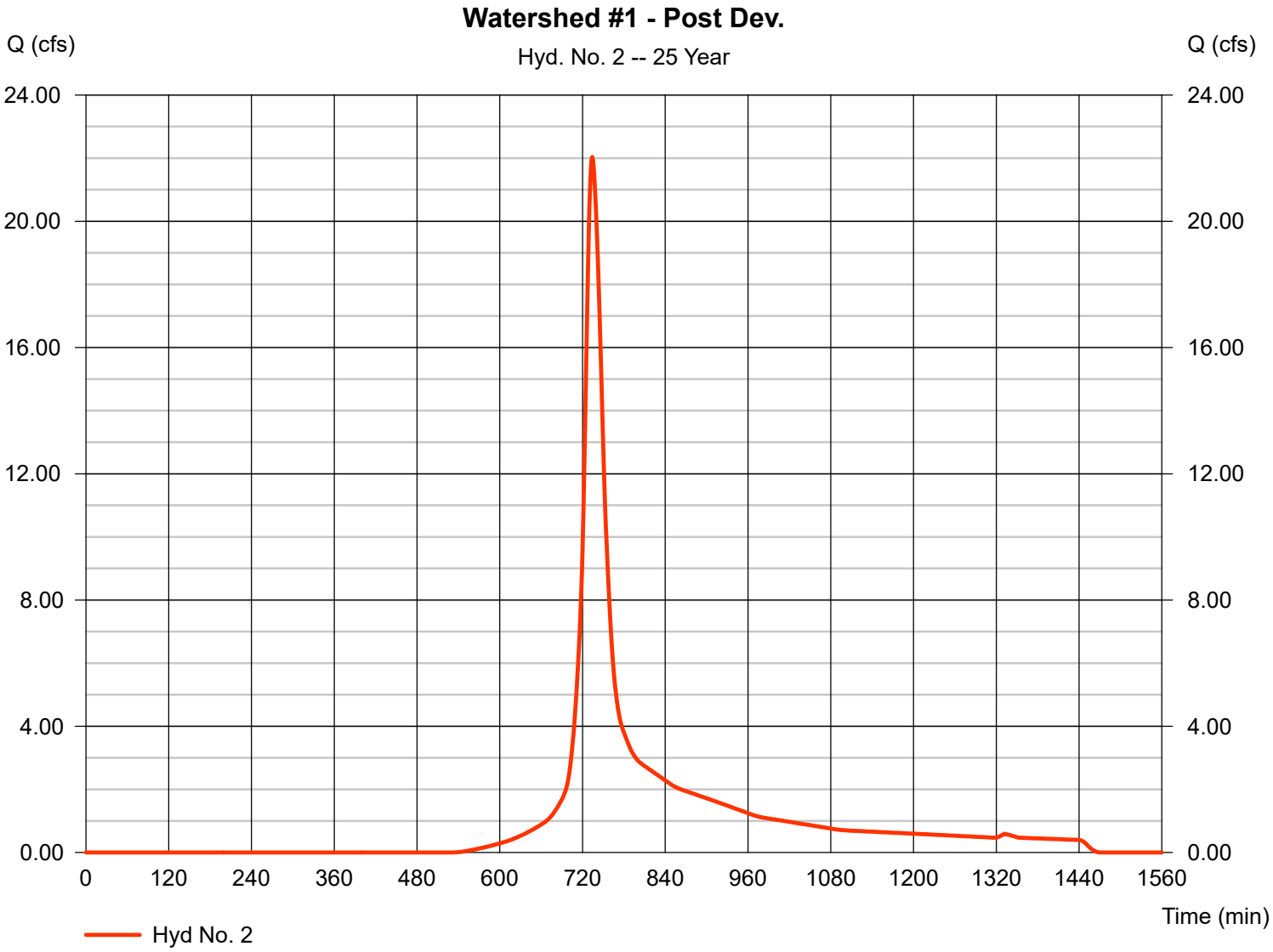
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, May 25, 2021

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



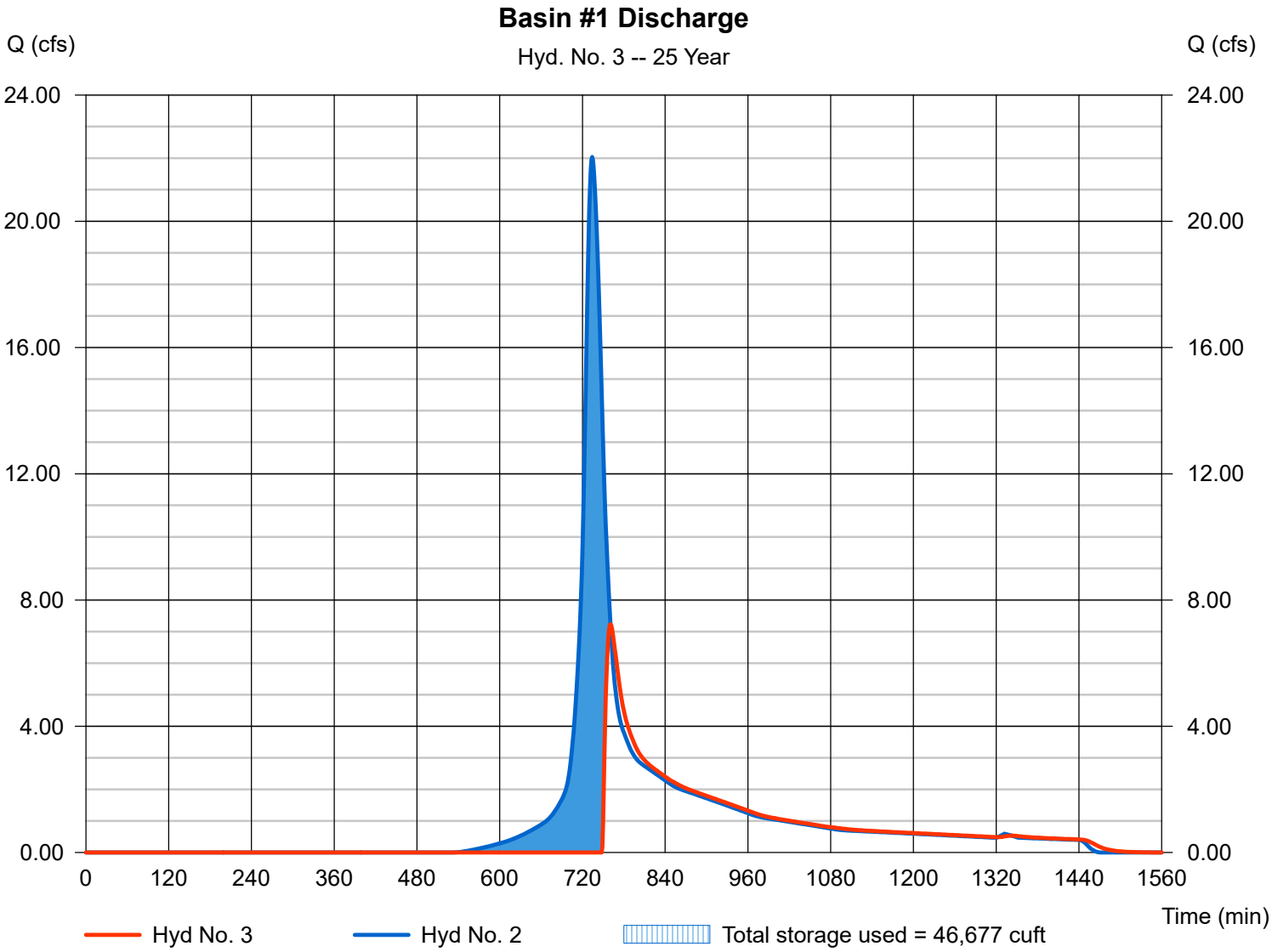
Hydrograph Report

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.



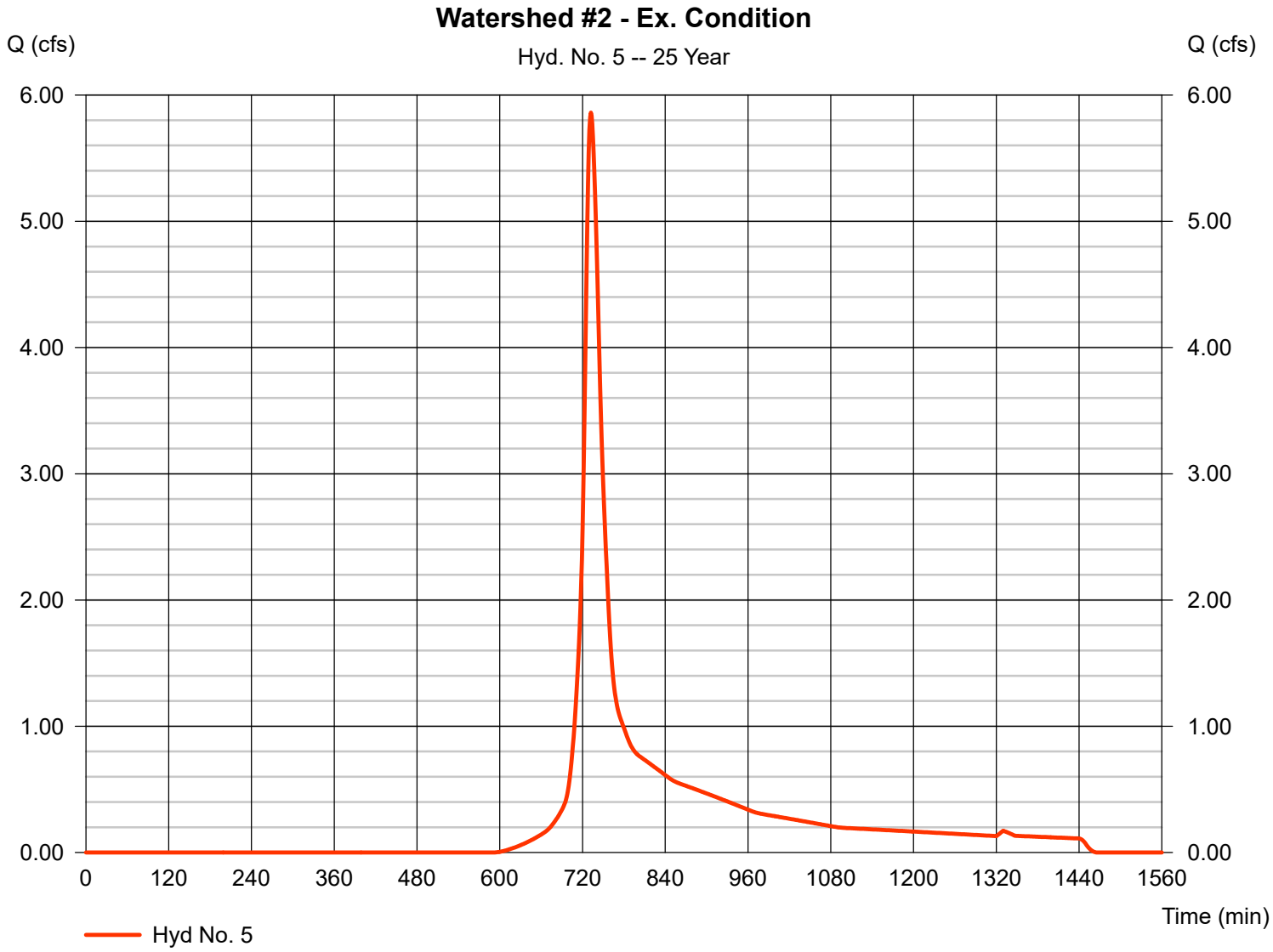
Hydrograph Report

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



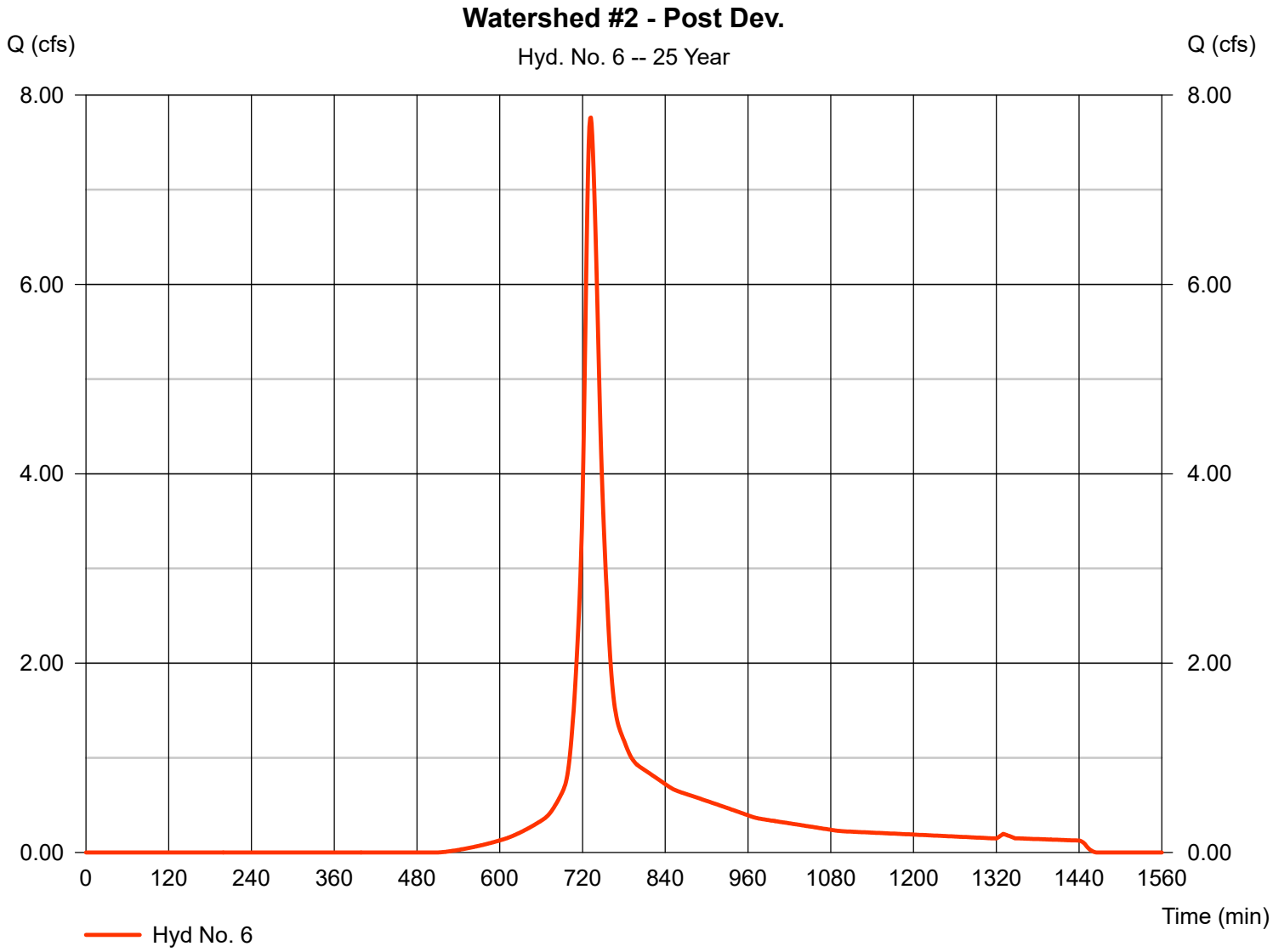
Hydrograph Report

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



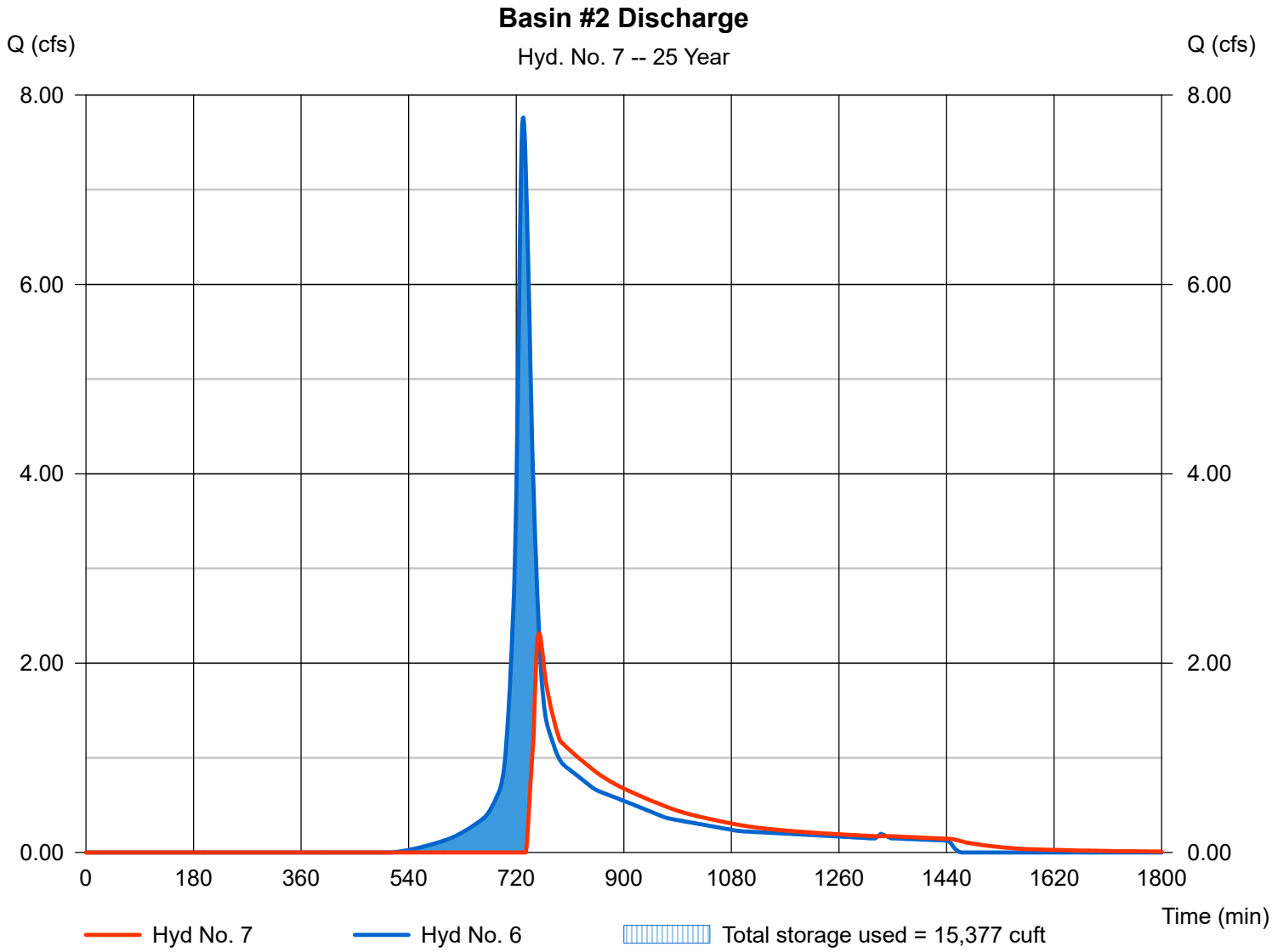
Hydrograph Report

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

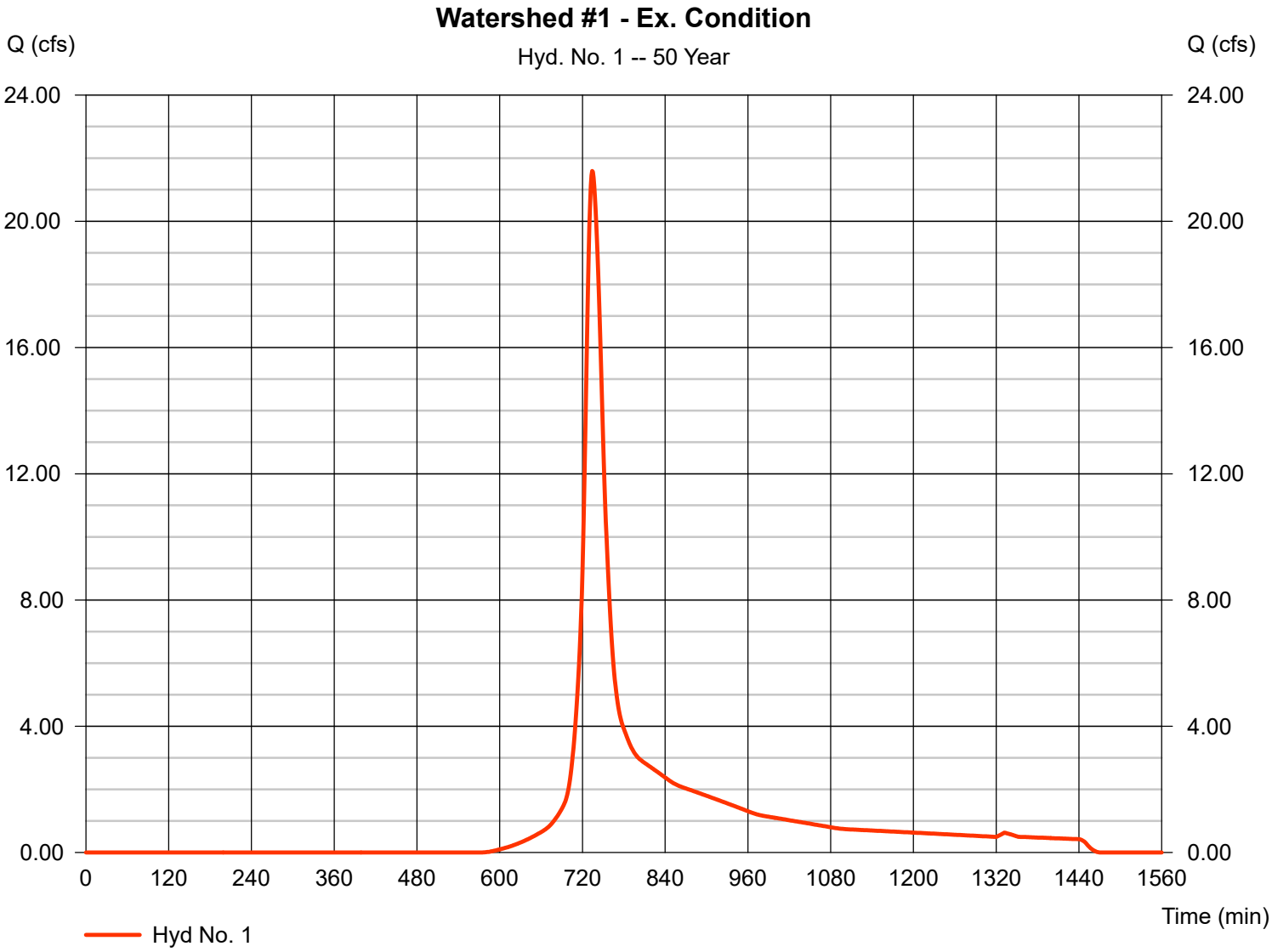
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, May 25, 2021

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



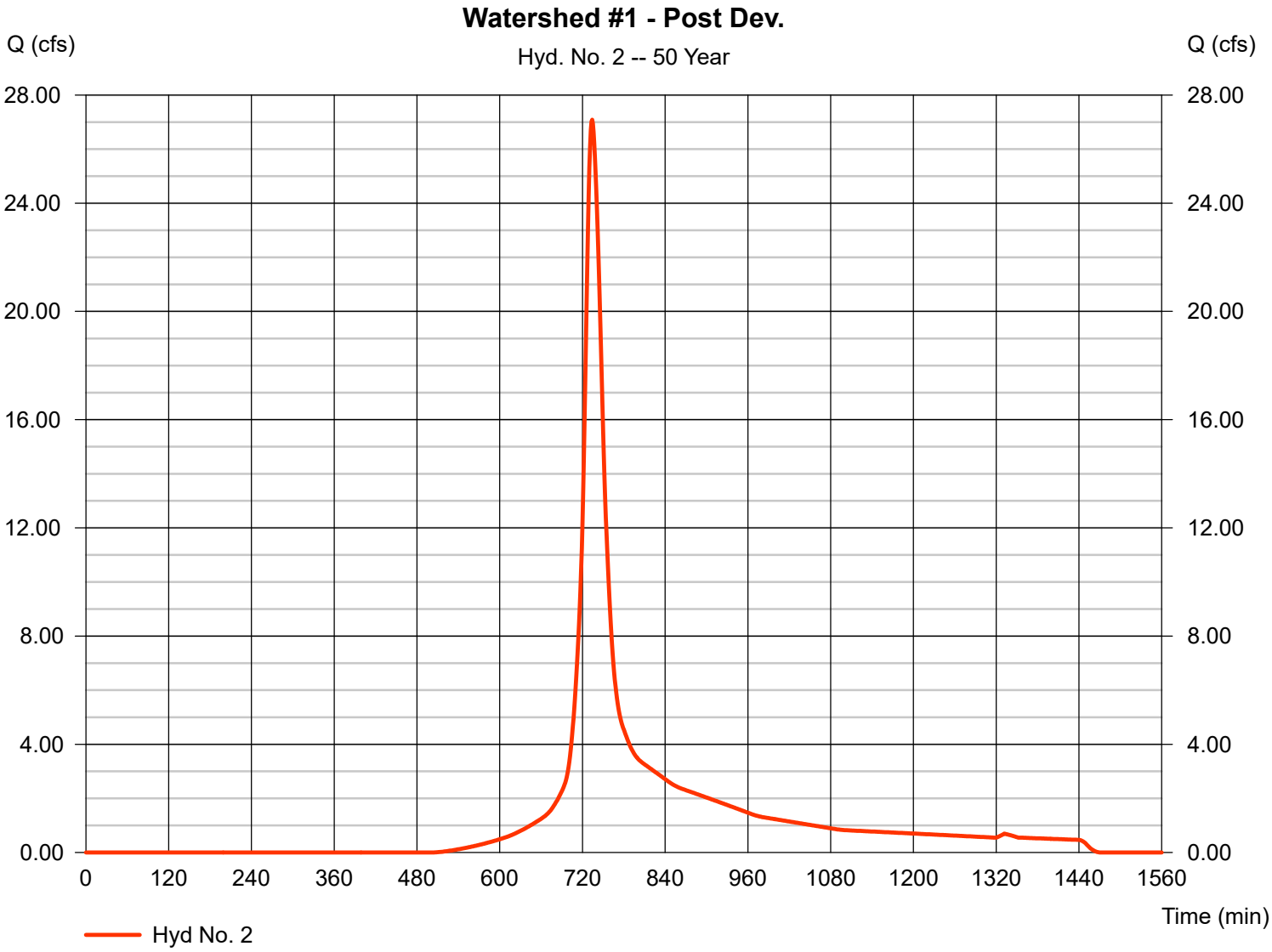
Hydrograph Report

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



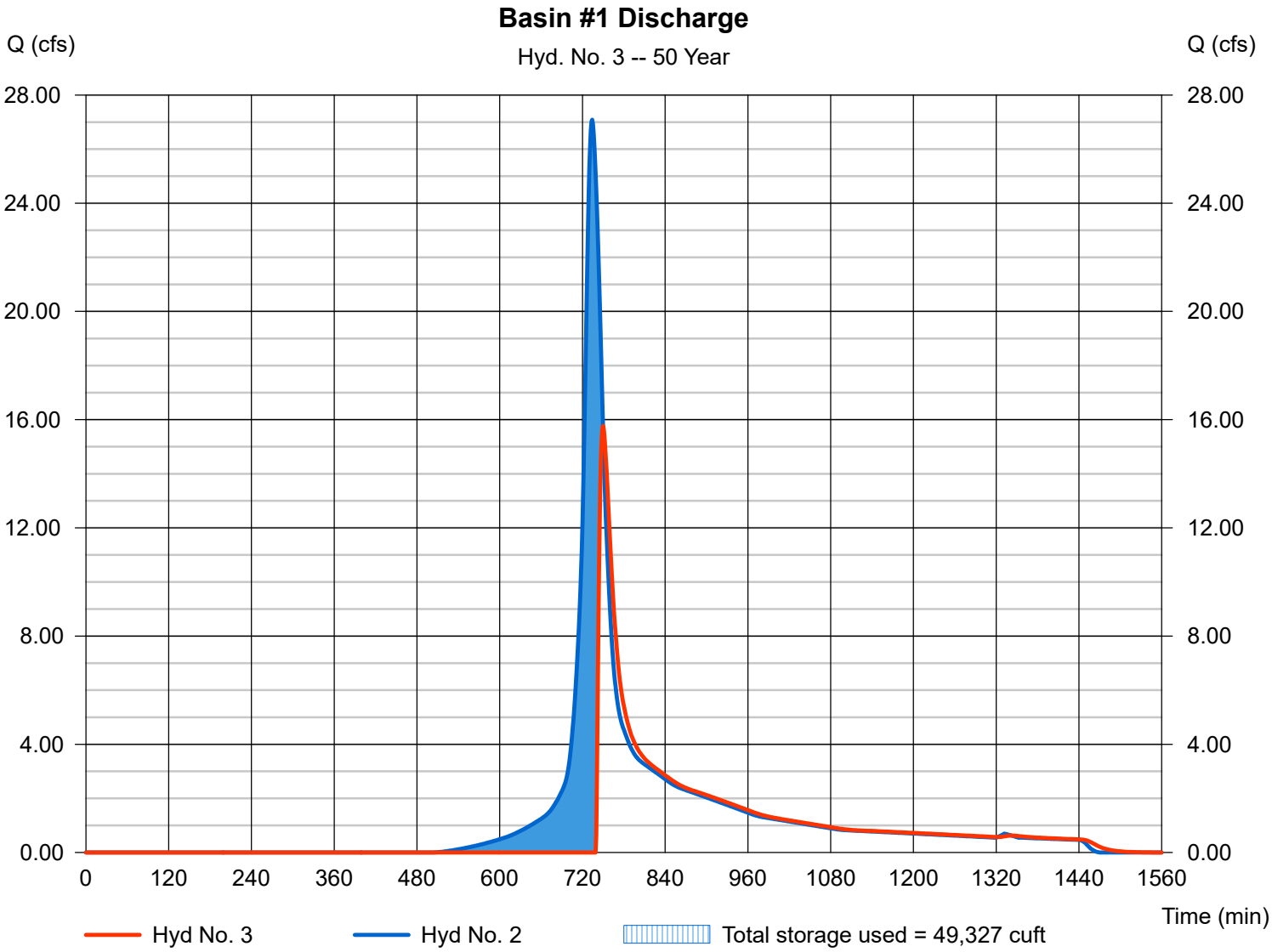
Hydrograph Report

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.



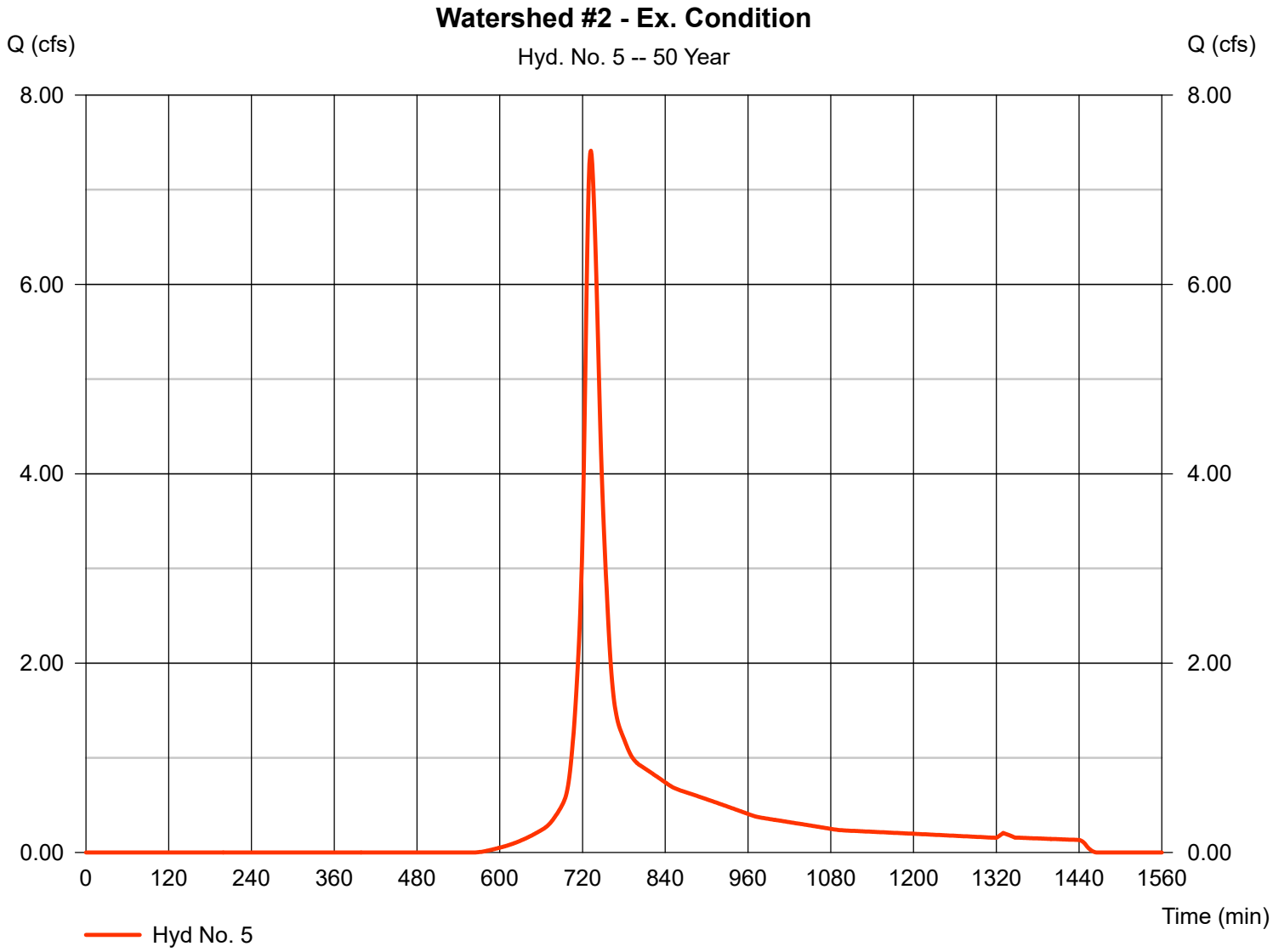
Hydrograph Report

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



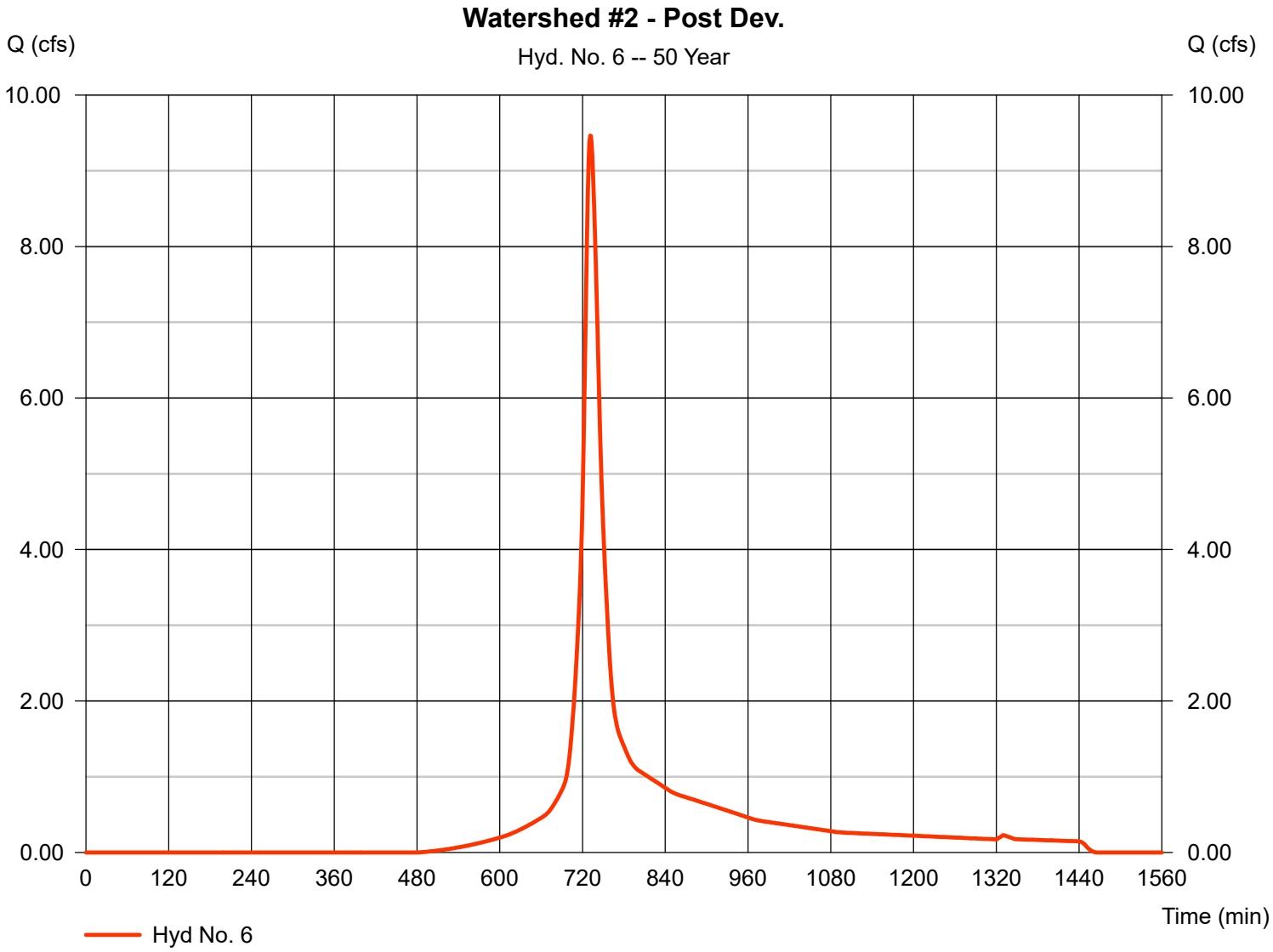
Hydrograph Report

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



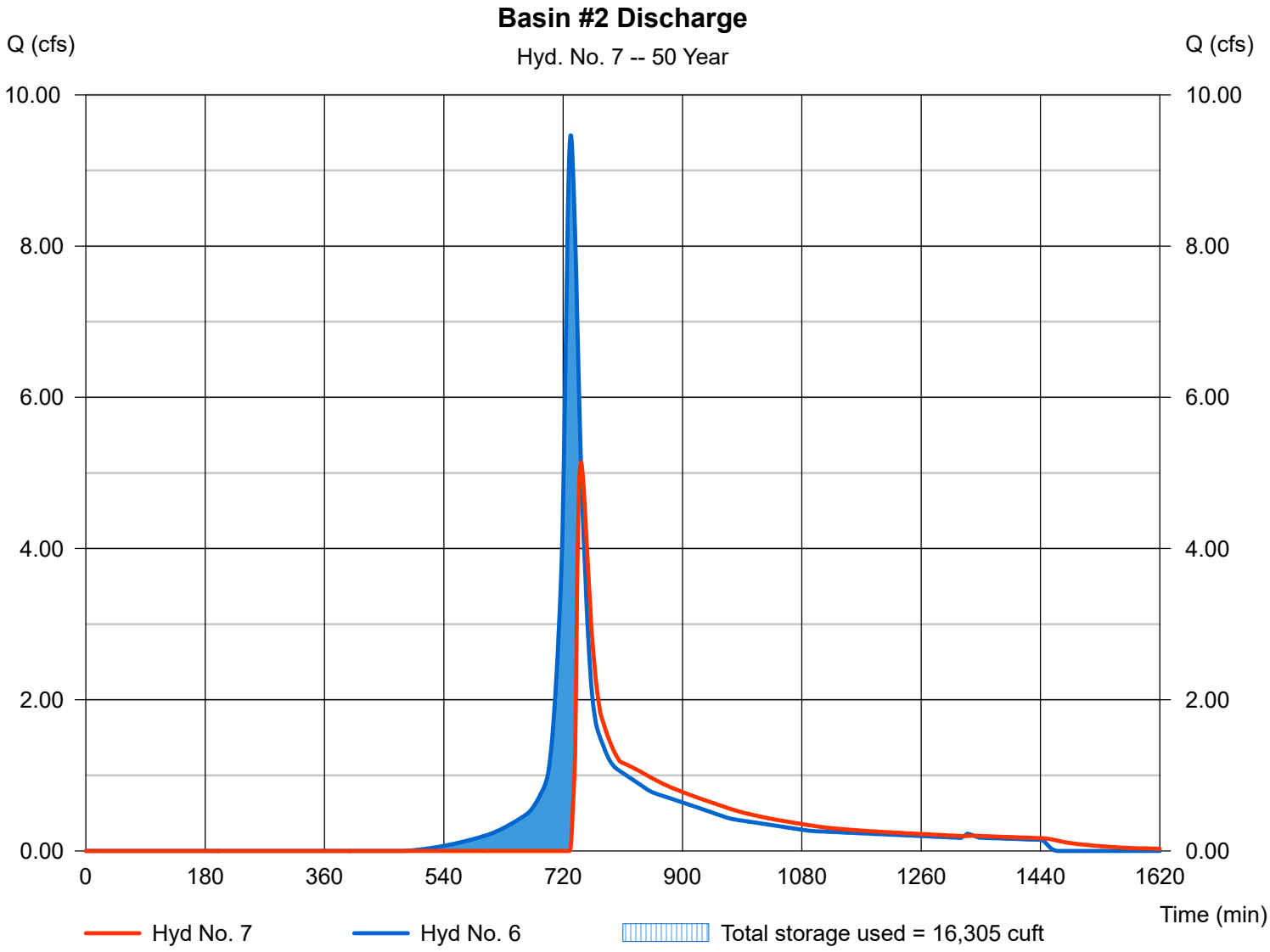
Hydrograph Report

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

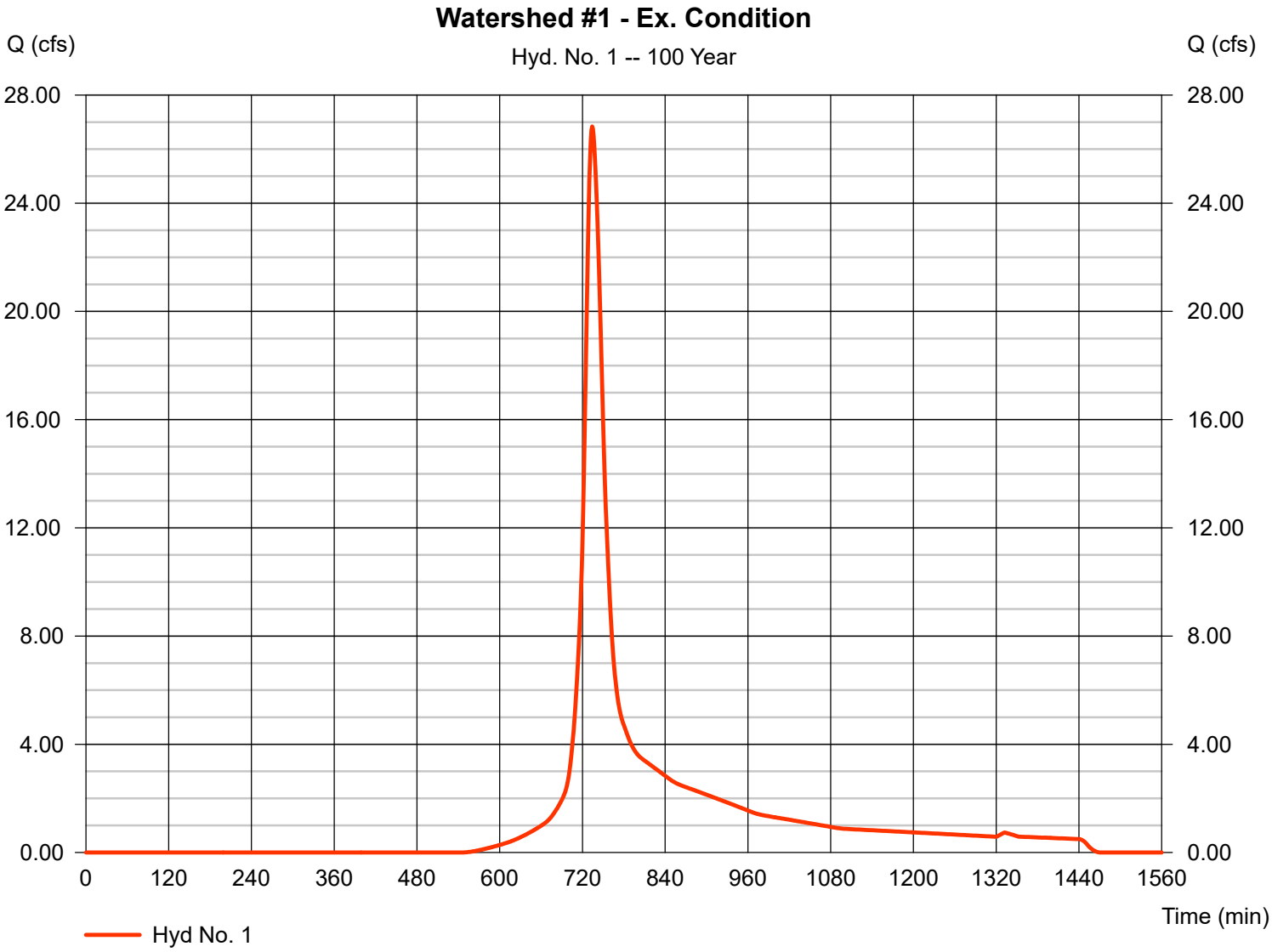
Hydrograph Report

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



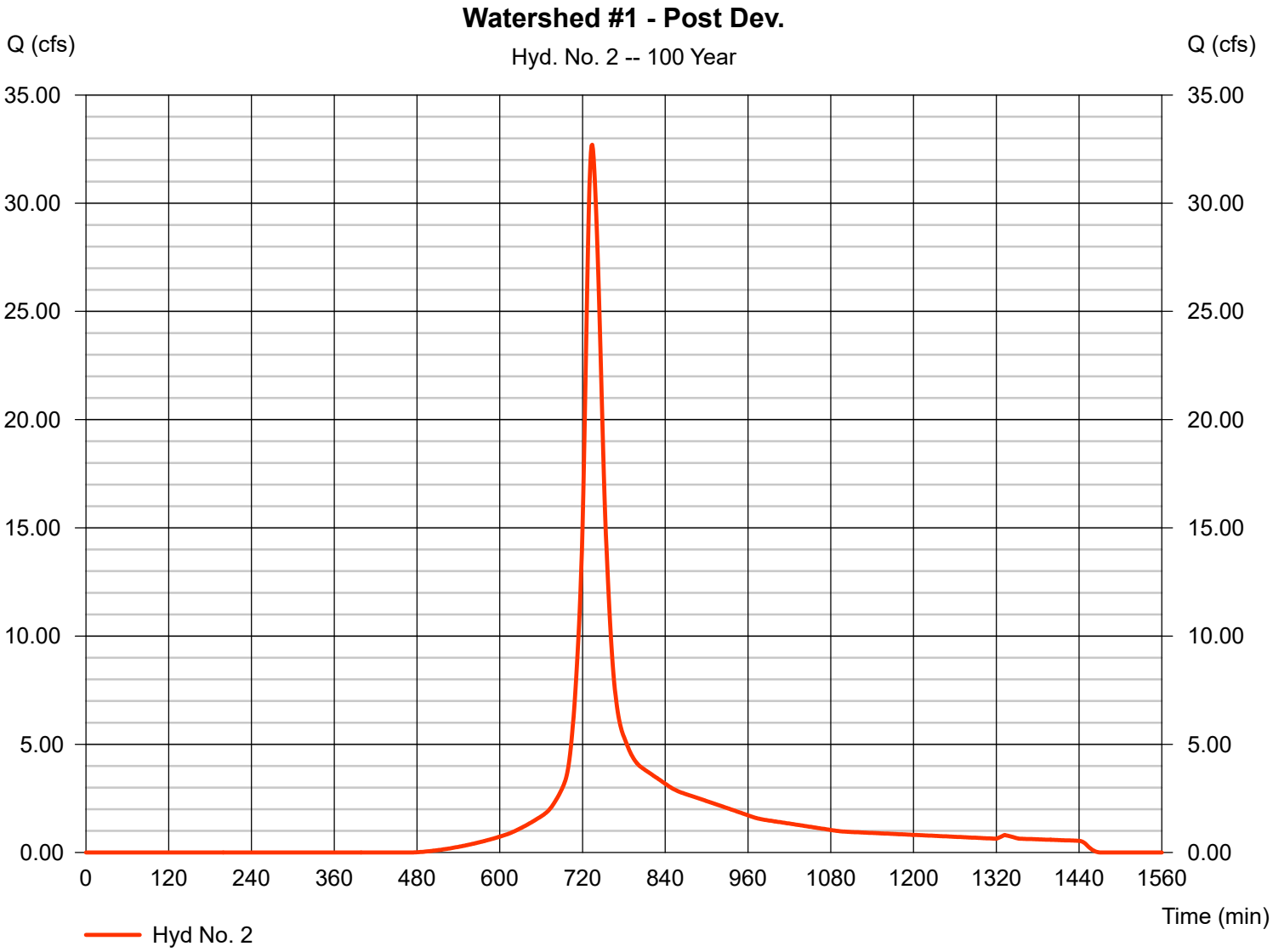
Hydrograph Report

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



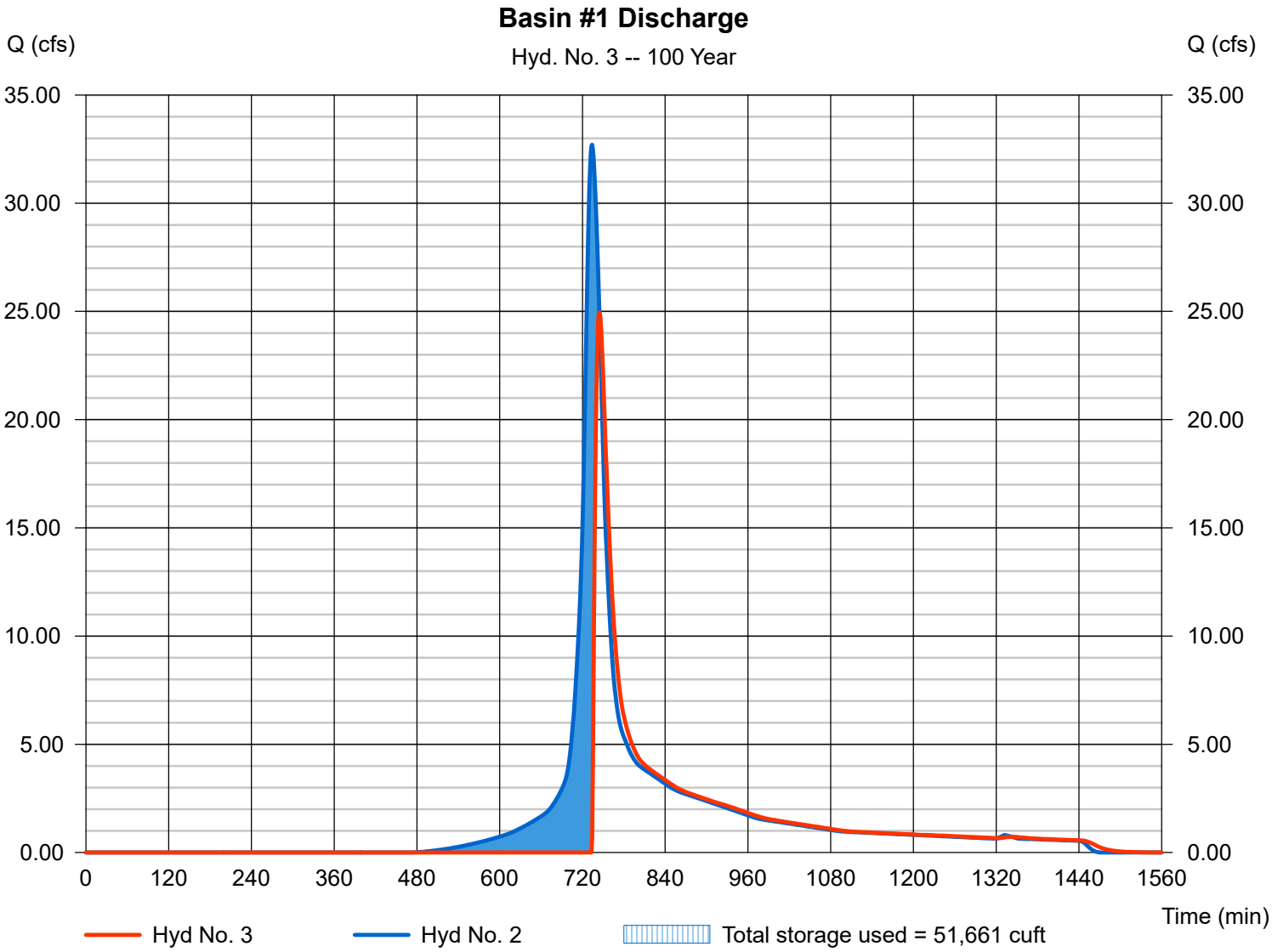
Hydrograph Report

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.



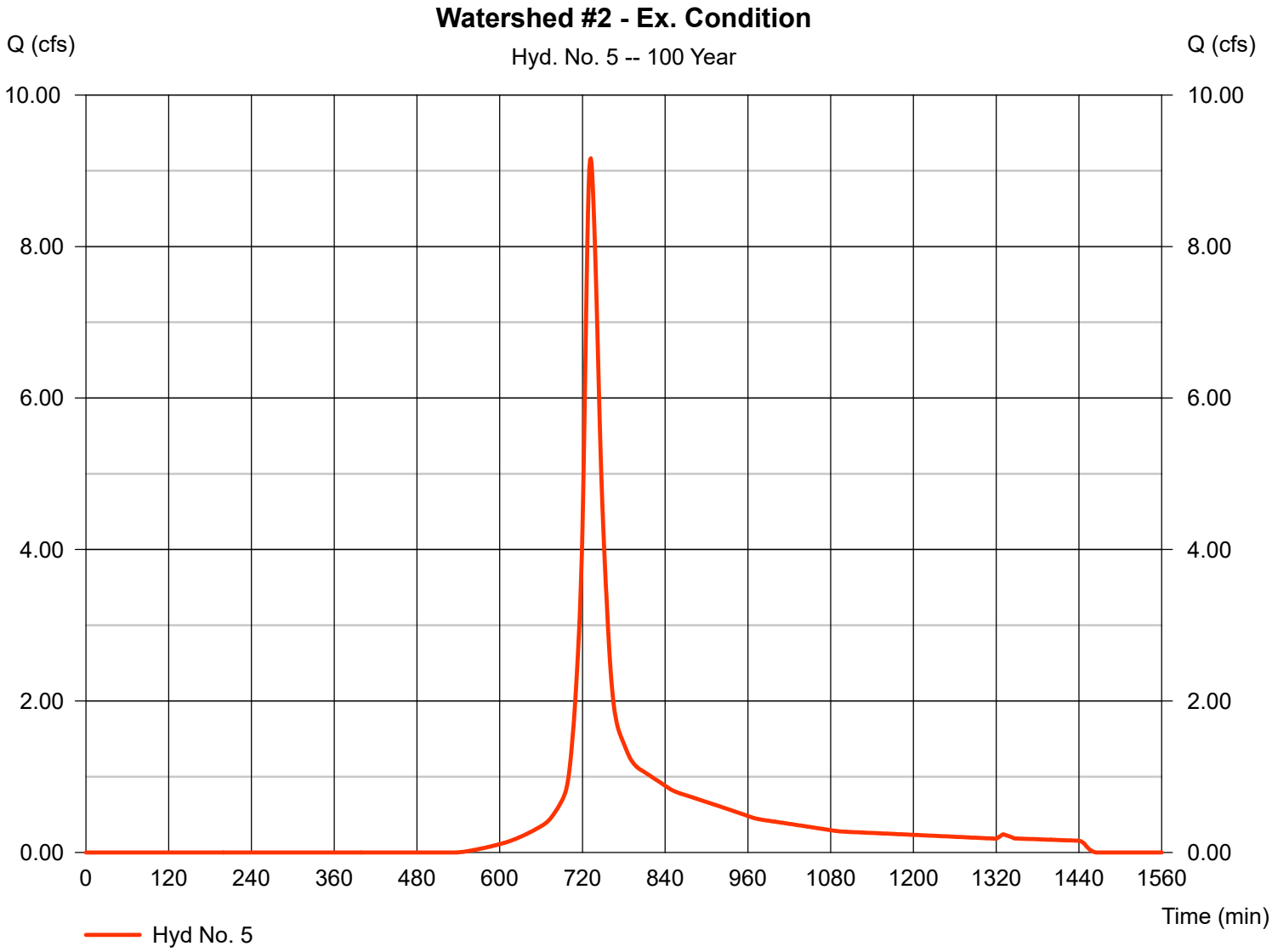
Hydrograph Report

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



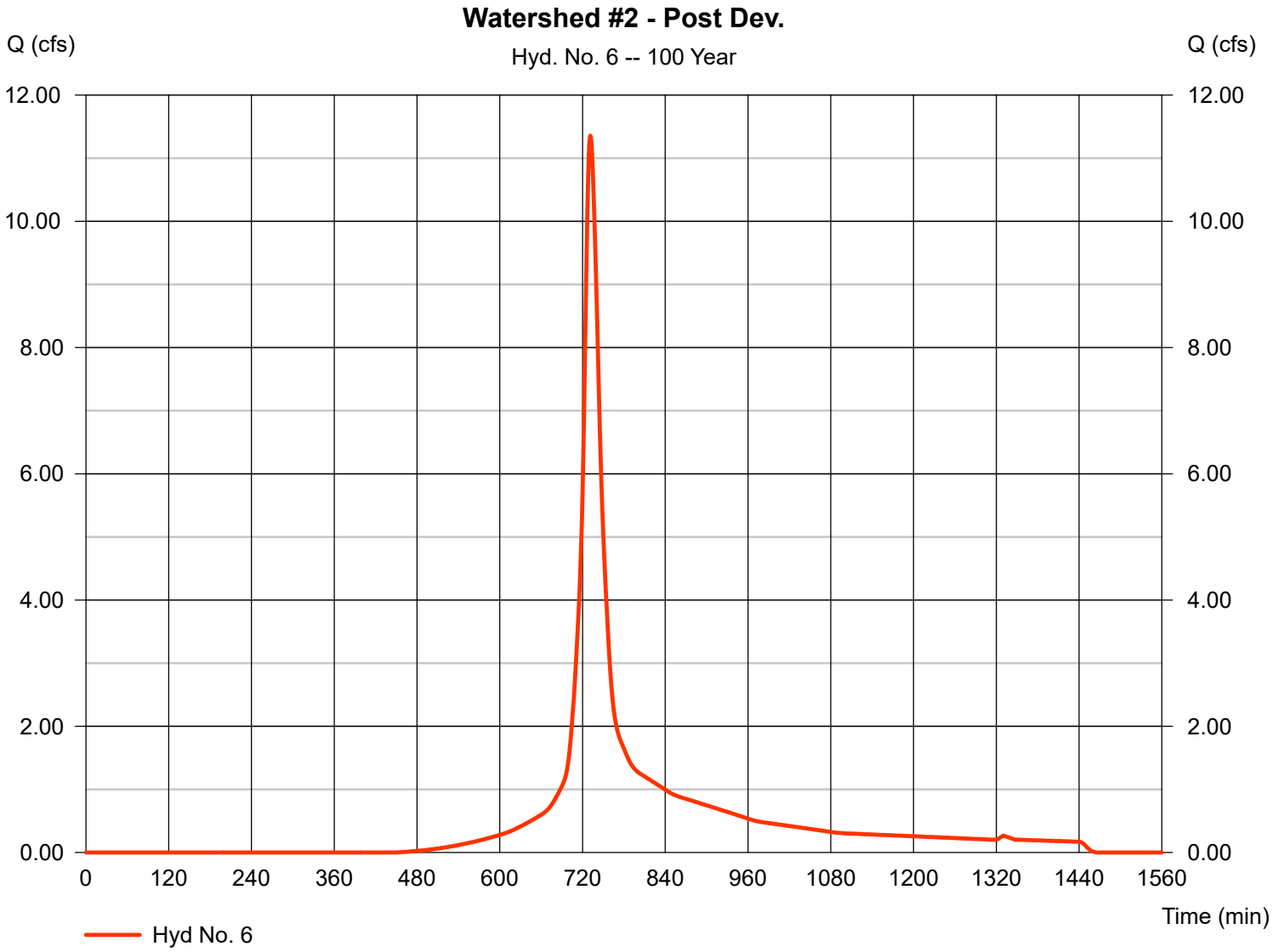
Hydrograph Report

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



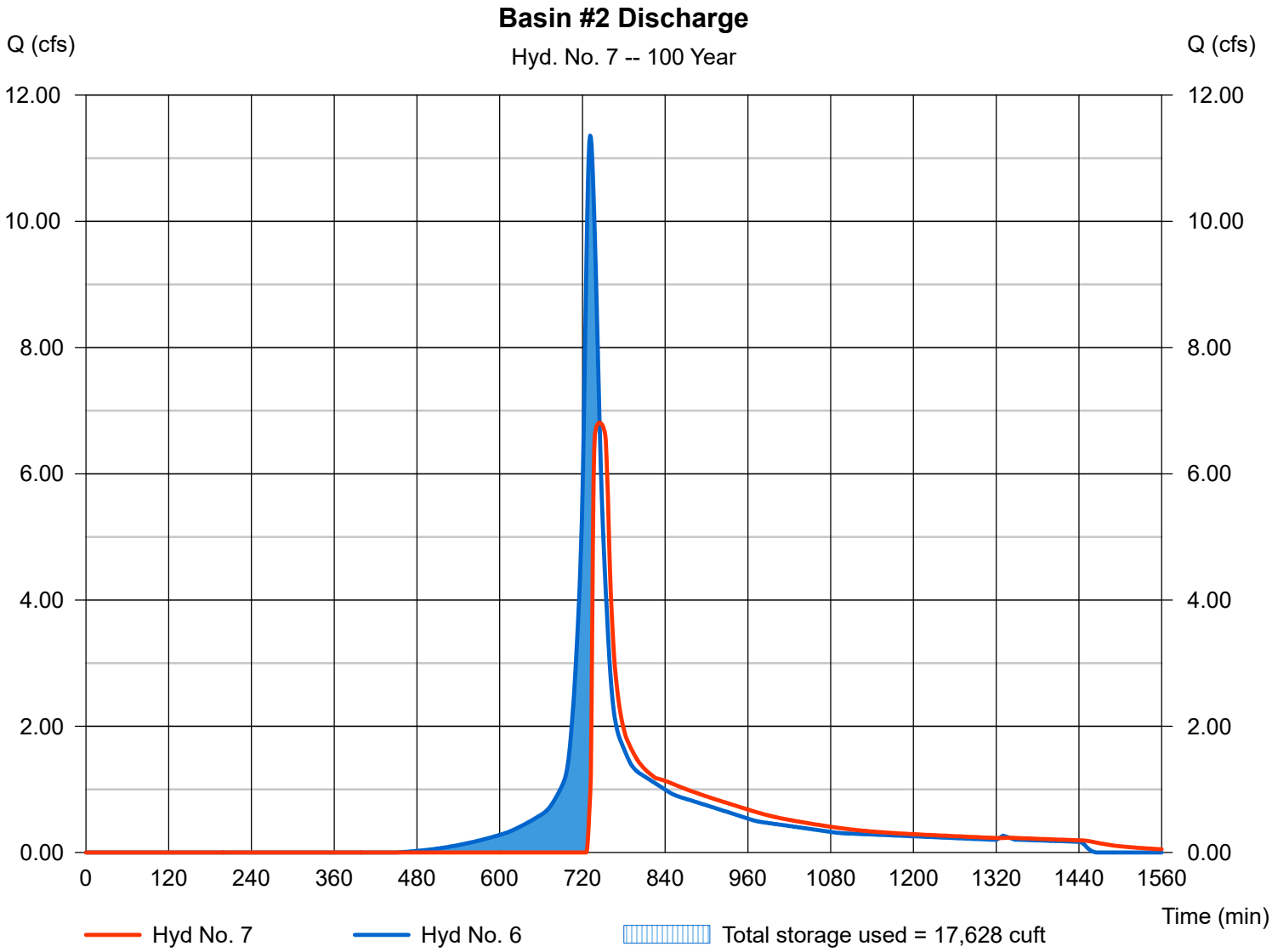
Hydrograph Report

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.

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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.

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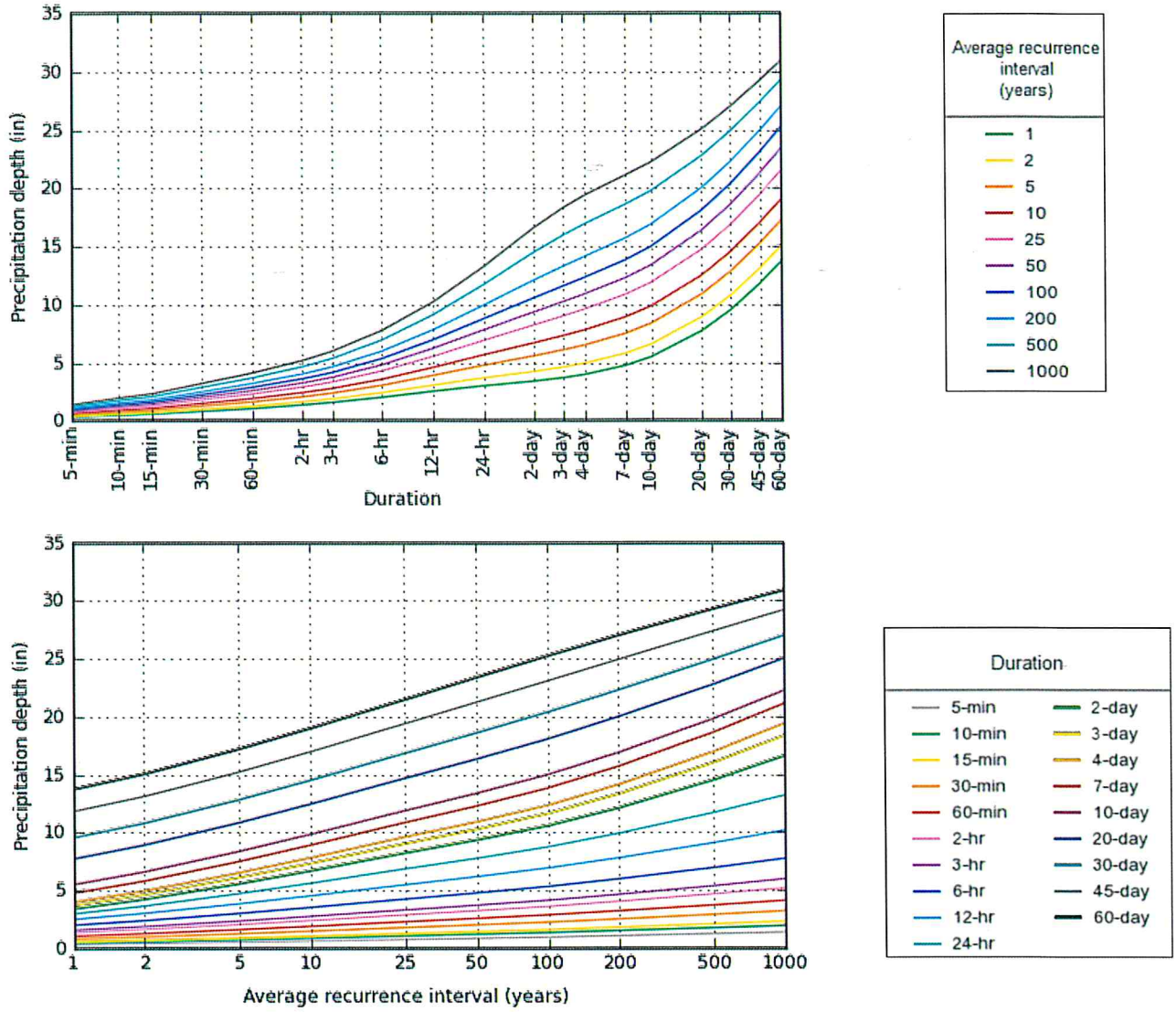
PF graphical

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

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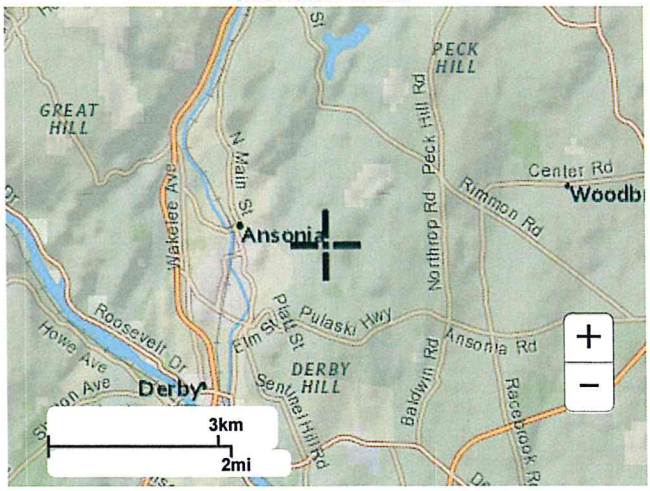
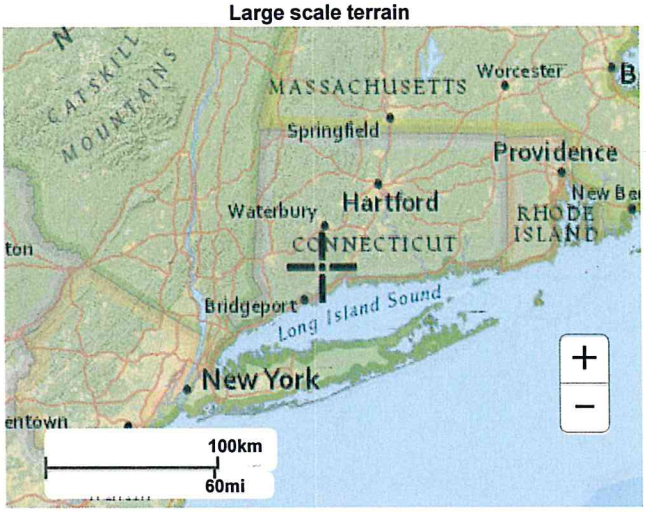
Maps & aerials

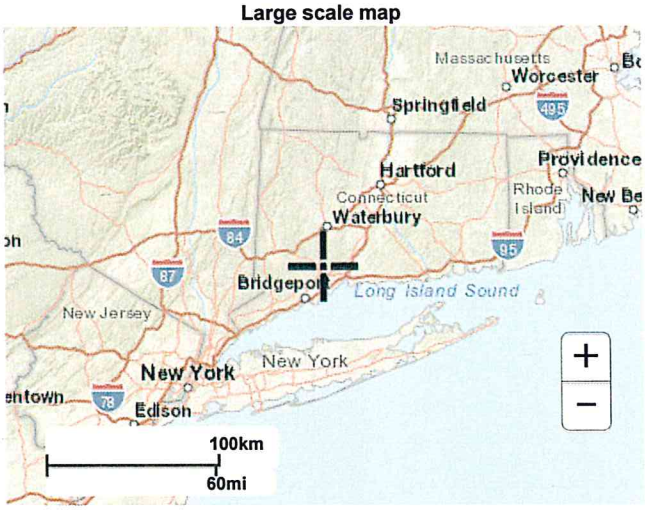
Small scale terrain



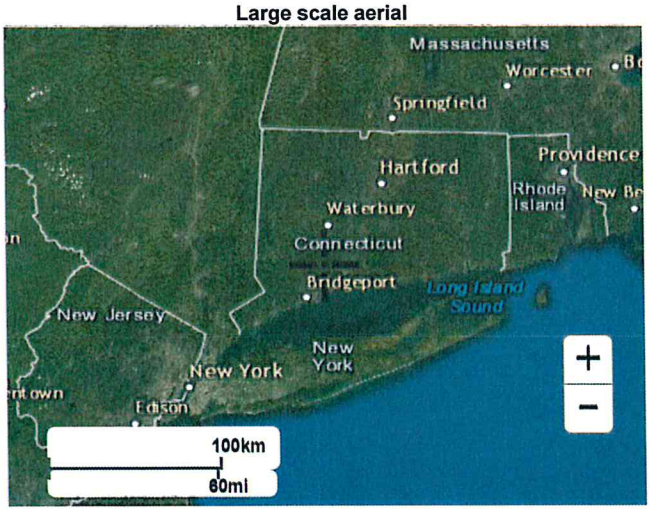
Large scale terrain



Large scale map



Large scale aerial



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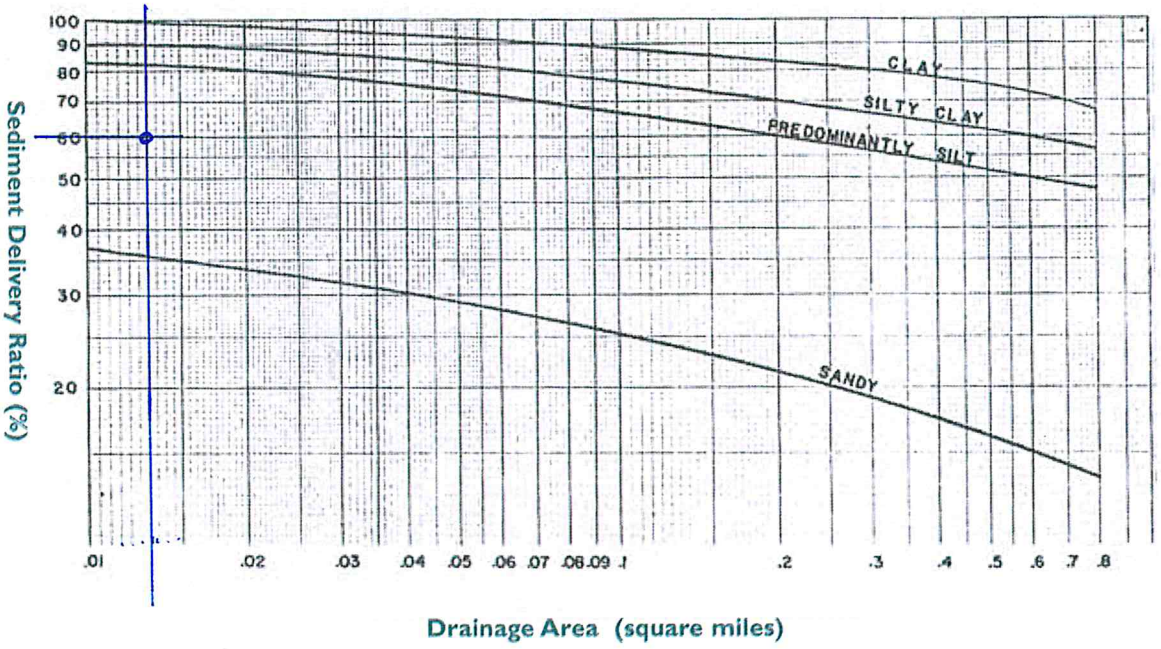
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

BASIN #1

A = 8.33 Ac = 0.013 Mi²

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

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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.

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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.

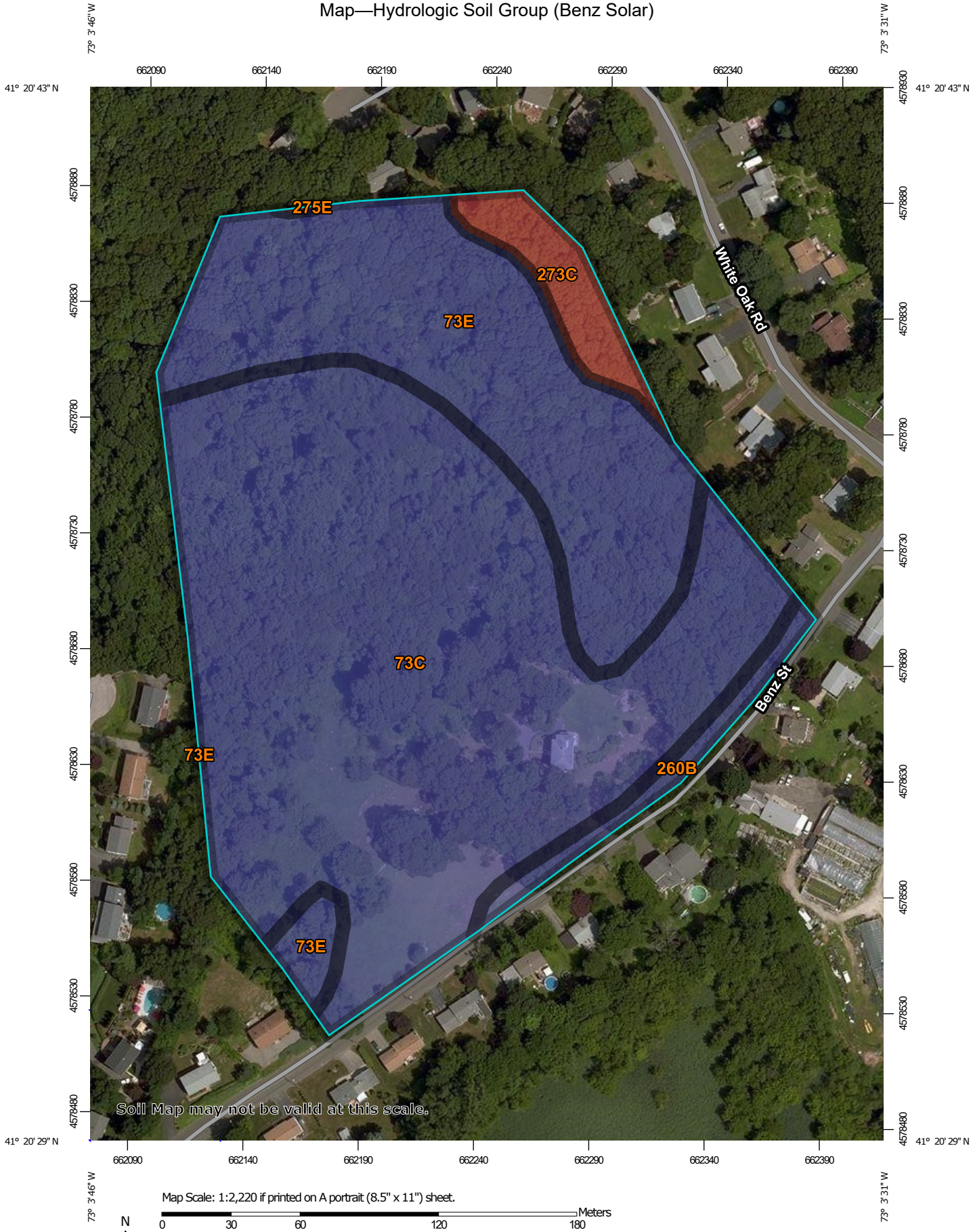
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Custom Soil Resource Report
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

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