RESPONSES OF WINDHAM SOLAR, LLC
TO
CONNECTICUT SITING COUNCIL INTERROGATORIES - SET ONE

On August 10th, 2020, the Connecticut Siting Council ("Council") issued Interrogatories, Set One to Windham Solar, ("Petitioner"), relating to Petition No. 1359A. The Petitioner offers the following responses.

Project Development

1. Identify all permits necessary for construction and operation and what entity will hold the permit(s)?
   RE:
   1.DEEP Stormwater General Permit — Permittee: Benz Solar, LLC
   2.City of Ansonia Demolition Permit — Permittee: Contractor (TBD)
   3.City of Ansonia Building Permit — Permittee: Contractor (TBD)
   4.City of Ansonia Electrical Permit — Permittee: Contractor (TBD)

   City Permits will be obtained by the specific contractors preforming the work on behalf of Benz Solar, LLC.

2. Referring to Petition p. 3, what is the length of the two ZREC agreements with United Illuminating?
   RE:
   15 Years

   Is there an option within the agreement to allow for changes in the total output of the facility based on unforeseen circumstances or resulting from a reduced site footprint?
   RE:
   YES. The Petitioner has considered all questions in the Set One Interrogatories and has revised the project footprint to address specific concerns. A revised set of site plan documents has been prepared and attached to this document as ***Exhibit A – Updated Civil Documents***. The Petitioner is seeking approval for the project footprint associated with these revised documents.

3. If the ZREC agreement is not renewed at the end of the contracts and the solar facility has not reached the end of its lifespan, will the Petitioner decommission the facility or seek other revenue mechanisms for the electricity produced by the facility?
   RE:
   The Petitioner will seek other revenue mechanisms upon ZREC contract expiration.

4. Is the project interconnection required to be reviewed by ISO-NE?
   RE:
   No.

Proposed Site

5. Petition p. 13 and Site Plan Sheet 3 list distances from the solar array to the residences on the east and west sides of the project. No similar information is given for the distances to the residences on the south side of the array, across Benz Street. Please revise the site plan to show this information.

Additionally, referring to p. 13, how many panels and rows would have to be removed to achieve a minimum distance of 100 feet from the solar array to the residences on Benz Street?

RE:

Distances to the residences south of Benz Street have been illustrated on the revised site plan documents. ***Exhibit A – Sheet 3*** The residences range from 153'to 183' to the solar array. No modules would have to be removed to maintain a minimum distance of 100 feet from the solar array to the residences.

6. Petition p. 5 states *the array along with the stormwater facility associated with this work will be located a minimum of 50-feet from the property line*; however, the stormwater basin appears closer to the property line than 50 feet. How many modules would need to be removed to have the stormwater basin a minimum of 50 feet from the property line?

RE:

Both stormwater basins were located to fit best with the existing topography and minimizing overall site grading. The Petitioner reviewed the p. 5 verbiage in the petition and presents the following revision to the language:

"The array along with the stormwater facility associated with this work will be located a minimum of 50-feet from the abutting residences property lines to the east and west of the parcel. Sitework for the stormwater basin parallel with Benz Street occurs up to the property line, Solar Modules along Benz Street are set back a minimum of 75' from the property line."

If the basin were to be set 50' from the property line approximately 420 modules would have to be removed from the project footprint. The Petitioner does not believe that there is any reason to move the basin from its current location. The Petitioner as has revised the stormwater facilities based on additional site investigations associated with these interrogatories. The revised basin designs are proposed in ***Exhibit A – Sheet 6 & 7***.

7. Referring to Petition p. 6, can the existing paved driveway be used for the project?

RE:

The driveway is currently in disrepair and will need to be reconstructed in any scenario. The driveway has been realigned to fit with the interconnection location and the solar facilities current module stringing layout.

8. Referring to p. 14, would the proposed plantings present a shading issue as they mature? If so, would the plantings be trimmed or replaced?

RE:

The proposed plantings will be a green giant arborvitae. They are a fast-growing drought tolerant privacy screening tree. Their mature height is 30-40 feet and 12'-15' in width. The Petitioner doesn't anticipate trimming, pruning or replacement of the screening hedge throughout the life of the project given the proximity of the screening trees to the proposed solar modules, but reserves the right to do so if necessary to avoid shading of the solar modules or potential damage to the modules during storms from potentially falling trees or tree limbs.

9. Referring to Site Plan Sheet 9 (Project Profile), how will the arborvitae along Benz Street be able to screen the solar arrays from the road if they are at a higher elevation?

RE:
The screen hedge interrupts the sight line up the hill, thus screening the modules. An appropriate tree profile of the mature height trees has been inserted into the cross section and a site line from Benz Street has been added to the cross section to represent the screening of the facility from the roadway. ***Exhibit A – Sheet 9***.

Energy Output

10. Does the design of the Project, including the method of interconnection, allow it to serve as a microgrid?
RE:
Not under its current configuration. The Petitioner's interconnection is with the utility grid. With the addition of storage, it should be possible to reconfigure the interconnection in the future to allow for the facility to be part of a microgrid for the surrounding area.

11. Is the Project designed to accommodate a potential battery storage system?
RE:
Not at this time. The facility could be retrofitted with a battery system in the future and the Petitioner would seek regulatory approvals for this change if necessary.

12. Are the string inverters installed so that if one section of the solar array experiences an electrical problem that causes the section to shut down, the other sections of the solar array would still operate and transmit power to the local distribution system?
RE:
Yes. This is the major benefit of string inverters versus larger centralized inverters.

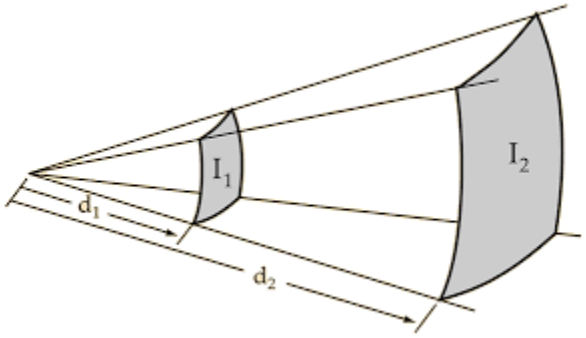
Site Components and Solar Equipment

13. Is the wiring from the panels to the inverters installed on the racking? If wiring is external, how would it be protected from potential damage from weather exposure, vegetation maintenance, or animals?
RE:
Yes, solar string wiring will be installed parallel with the array rows either affixed to the racking or installed in a cable tray. String wiring at the end rows will transition to underground conduit protecting it from vegetation maintenance and animals. All wiring is UV protected. This is a typical method for solar facility wiring install and meets all applicable electrical codes.

14. The solar panels are identified as 430 watts. Is it feasible to use a higher power output rated panel to reduce the project footprint?
RE:
The Petitioner has revised the project footprint utilizing a 450W module with the highest efficiency solar module readily available in the market as of September 2020. This module is slightly larger than the 430W module resulting in an increase to the row spacing from 24' to 25'. The Petitioner is looking for a determination from the Connecticut Siting Council that the solar module envelope illustrated in ***Exhibit A – Sheet 3*** would outline the final limits of the solar racking. This allows for specific site nuances within the array to be addressed during the electrical design element of the facility. The final module layout with racking and electrical design would be presented at the submission of a development and management package if the project is approved by the CSC.

Public Safety

15. Referring to petition p. 12 and Site Plan Sheet 3, what methodology was used to determine that operational noise from the Project inverters/transformers would not exceed Department of Energy and Environmental Protection noise standards at the property boundaries?
RE:
Sec 22a-69-3.5 Requires Class A Receptors to have less than 55dBA at day and 45 dBA at night. Inverters and equipment will be centrally located on the site. String inverters and transformers emit 60dBA at 3 meters from the source. Noise levels change with distance per the inverse square law, see the image and equation below:



$$\frac{I_2}{I_1} = [\frac{d_1}{d_2}]^2$$

Therefore, the reduction of 60dBA at 3 meters (9.8 feet) from the source, to the maximum 55dBA in the daytime is approximately 5 meters (16.4 feet) from the source. All noise emitting equipment on site, is further than (16.4 feet) from the property line. Night time audible noise would only be the transformer and ancillary monitoring equipment such as routers, computers and battery backup devices. At 16.8m (55.1feet) from the source in the evening audible noise would be at or below 45dBA. All equipment that would be energized during the evening is also further than 16.8m (55.1 feet) from the property line.

16. What is the anticipated noise level resulting from ground screw installation?
RE:
The ground screw install process will require a pre-drill of the foundation hole in the soil/rock subsurface. Rockdrills emit between 115-120 dB @ 50 ft. After the ground screw hole is drilled and an auger attachment on bobcat to perform the screw installation. Screw install machines are at 89 dB @ 50 ft. The facility construction will adhere to the requirements set forth in the Ansonia Municipal code of Ordinances outlined in section 17-14(e)(1).

17. Where is the nearest federally-obligated airport?
RE:
Tweed New Haven Airport approximately 15 miles from the site.

Is a glare analysis required to comply with FAA policy?
RE:
Ground mounted solar PV is designed to absorb sunlight, rather than reflect it, thus minimizing the potential impacts of glare. Per the *FAA Technical Guidance for Evaluating Selected Solar Technologies on Airports, November 2010 (updated April 2018)*. Section 1.3.4. states that solar PV is compatible with airport land, and is the best opportunity for airports to install solar energy versus other solar energy producing systems. Solar installations are presently operating at a number of

airports across the country, including megawatt-sized solar facilities covering multiple acres. Given that, the Petitioner is not anticipating a glint and glare analysis will be necessary for siting this facility.

18. Referring to petition p. 7 it states *UI has performed a system impact study for the Facilities and found that the Facilities cannot be connected safely and reliably with no significant upgrades.* What significant interconnection upgrades are required?

RE:

From the system impact study, the possible upgrades for interconnecting the facility and ensuring acceptable voltages and power flows are as follows:

1. *The use of power factor settings on the inverters to absorb volt-ampere reactive power*
2. *The addition of an active network management system*
3. *Installing a load encroachment tripping scheme to this PV interconnection*
4. *Reconfiguring/swapping Feeder 3676 to Ansonia Substation Bus 4*
5. *Upgrading or configuring the Ansonia Substation transformer load tap changing controls to accommodate reverse power flow*

The Petitioner is awaiting the UI final design of their system utility upgrades and is working with the utility on final interconnection design. The facility will be connected to the grid safely and reliably prior to energization with UI.

19. Referring to Site plan Sheet 3, has there been any discussion with the local fire marshal regarding compliance with the CT State Fire Prevention Code, Ground Mounted Photovoltaic System Installations section 11.12.3 in regards to site design clearance requirements around the solar array? If not, when will the Petitioner contact the Fire Marshall?

RE:

The Petitioner has contacted Ansonia Fire Marshall Derek Lundeen on August 24th, 2020 and ultimately received a formal response from Derek on 9-17-20 Exhibit B – Ansonia Fire Marshall Communication. The Petitioner has designed, permitted and constructed several facilities in CT, many of which are currently up and operating today. These operating facilities have similar site layouts (access, panel layout, clearances) as the proposed facilities associated with Petition 1395A. The Petitioner will ensure that the facilities will comply with CT State Fire Prevention Code and will coordinate with the Ansonia fire department the projects final design.

20. Are there any drinking water wells in the vicinity of the site?

RE:

Yes. On site artesian drinking water well located north northeast of residence, and will remain. A second well, located within the proposed array field, was capped in the 1950's because of lack of water pressure during drought times. The capped well location is identified on the revised plans and will remain. No community water supply wells are located within a mile of the subject property.

If so, given that removal of bedrock may be required during site construction, how will adjacent wells be impacted?

RE:

Rock removal would be at the surface of the site, to ensure a rolling terrain for solar module racking. It is not anticipated that removal of bedrock will occur on site, and no impact to adjacent wells would occur during the construction of the facility.

Facility Construction

21. For the proposed electrical equipment concrete pad, would the concrete be pre-cast or poured on site?
    RE:
    Concrete would be poured on site for the equipment pad.

    What other concrete components are proposed at the site?
    RE:
    Foundations for inverter and/or equipment racking within the array field and foundations for fence posts. These foundations would be 8 inch diameter augured holes, backfilled with concrete. A 2" O.D. pipe for unistrut mounting of equipment or perimeter fencing will project from the concrete foundation.

    Where and by what method would cement trucks be cleaned at the site?
    RE:
    A secondary containment concrete wash pit will be created for cement cleaning, specific provisions will be outlined in the projects SWPCP for this process.

22. List the types of construction equipment that would be used at the site.
    RE:
    Site Clearing: Brush Hog (mower), Bobcat with assorted land clearing attachments,
    Site Earthwork/Stormwater Construction: Bobcat, Machine Slice Silt Fence Machine, Excavators, Bulldozers, Rock Trucks, hydroseeding vehicles
    Racking Install: Drill Auger & Ground Screw Drive (both bobcat attachments), Lull, Gator utility vehicles
    Electrical Work: Lull & Gators and other vehicle accessories for wire pulls, Bucket truck for pole work, concrete truck for pad work.

23. Would fuels be stored on site during construction? If so, in what location(s)? Please submit a spill prevention and control plan for the site.
    RE:
    Fuel for construction equipment may be stored on site, depending on the selected contractor, and their preferred method for refueling equipment. A site specific spill prevention, control, and countermeasure (SPCC) plan is required for a site if there is 1,320 gallons or more in aggregate above ground storage. Connecticut does not have standards beyond the federal requirements for (SPCC) plans. The Petitioner does not plan on storing greater than 1,320 gallons in site, therefore a site specific SPCC is not necessary. The SWPCP that will be submitted to DEEP for approval, will have elements of the spill prevention information, and procedures required for spill containment and prevention.

24. Referring to Site Plan Sheet 3, please explain the feasibility of installing a decorative fence/gate along the perimeter of the Project facing Benz Street.
    RE:
    The Petitioner is willing to install a black vinyl coated fence along Benz Street, to soften the viewshed of the facility along the traveled way as the screening hedge grows in.

25. Referring to the fence detail, can the perimeter chain link fence be designed so that a six-inch gap would be present between the fence fabric and ground level to allow for small wildlife movement through the site?
RE:
No, the Petitioner plans to use sheep for vegetative maintenance once the solar facility is operational. A six inch gap would allow for coyotes and other predators to enter the site. Sheep grazing of solar fields is becoming more and more popular, for minimizes mowing pollution, improves the soil on site by maintaining an agricultural use and is generally a smarter use of the land.

26. Referring to Site Plan Sheet 4, a callout box notes *rock outcroppings to be investigated for solar racking constraints.* What issues are in these areas?
RE:
The rock outcroppings create a quick transition in grade, where the continuous racking may have to be broken by several gaps or sections of racking removed all together area. The Petitioner would like the siting council to consider the envelope of the array as the limits of solar panel construction, not the individual tables as represented in the site plan. Each solar racking manufacturer has grade and topographic constraints. Specific electrical and racking design elements will further be investigated at that time of final electrical design and submission of a development and management plan.

Are screw foundations proposed for the entire site or just in these areas?
RE:
Screw foundations are currently proposed for the entire site.

What other methods will be used to overcome racking constraints?
RE:
The following construction and design methods will be explored to address racking constraints:
1. Spot grading, to smooth grade transitions and allow for contiguous racking.
2. Inserting row breaks, to allow for abrupt grade transitions
3. Removal of racking and modules in specific locations

27. Clarify the NOTES on Site Plan Sheets 4 and 5 where it mentions a Siting Council approved Project on January 18, 2018.
RE:
The notes on sheets 4 and 5 are carry over notes from previous projects and do not apply to this application. The revised plan set has removed these notes.

28. Site Plan Sheet 8 photos show boulders and exposed bedrock. Given that a geotechnical survey has not been conducted (Petition p. 4) how will the proposed stormwater swales and basins be installed if shallow or exposed bedrock is encountered?
RE:
The Petitioner has performed 8 test holes throughout the site in the locations of the basins to ensure that they are constructible to the proposed grades. The revised plan set slightly modifies the basins to ensure field constructability and the test hole locations are identified on the plans.

29. What is the recommended soil depth for the selected seed mixes for the solar array, swales, and basins? Please provide the specification sheets or source of the soil depth information. How much topsoil will be imported into the site to ensure seedlings have sufficient soil for root establishment?
RE:
Topsoil will be stripped in locations where grading of the stormwater basins and swales will occur and will be respreads per the construction details in the plans. Topsoil will remain on site undisturbed

in locations where grading will not take place. All disturbed areas associated with the construction on site will be seeded, fertilized and mulched. A topsoil import is not anticipated for construction of the facility at this time.

30. What are the estimated quantities of cut and fill?
RE:
The earthwork calculations presented in ***Exhibit A – Updated Civil Documents*** represent 6,000 CY excavated and 2,500 CY of fill, therefore there is currently 3,500 CY excess material. Depending on the quality of and condition of the excess material, the sitework contractor will determine if the material can be placed on site, or will need to be hauled off.

If there is excess cut, boulder or ledge material, where will this material be disposed of?
RE:
The Petitioner would prefer that excess material remains on site and will be placed within the array field to balance earthwork. The fill material would be installed to maintain existing drainage characteristics. Given the rocky nature of the site, material may need to be crushed and processed on site, which may supersede the cost of removal of material. The Petitioner will explore these field decisions with their earthwork contractor at the time of site grading once the quality of subsurface material is understood. Amendments to plans and the SWPCP may be necessary to ensure appropriate measures are taken for this earthwork balance. All earthwork will occur within the limits of clearing, and no additional clearing will be required to lose excess material on site.

31. How much old fill material, identified on the property by Northstar Environmental Management, will need to be removed prior to the installation of the panel racks?
RE:
The material has been identified as "clean fill, and will not require environmental mediation as identified in the test pit explorations information prepared by NorthStar Environmental Management submitted with the petition. If the old fill material is hindering construction in the current location, it will simply be removed and relocated as excess fill material and likely buried on site.

How much soil is needed to fill in this excavated area?
RE:
Excess soil from the pond and basin excavations may be placed in the area, and will be top soiled to ensure pervious groundcover.

32. Referring to Site plan Sheet 6, where is the rip rap level spreader discharging to?
RE:
The outlet of the level spreader will ultimately discharge to the catch basin on Benz Street. Peak flow rates from the sub watershed are reduced given the installation of the water quality basin.
Is the discharge point on the street line?
RE:
Yes. Prior to the solar development approximately 5 acres of the existing site naturally drains to that catch basin.
Are grades such that basin discharge would flow onto Benz Street?
RE:
Yes. Prior to the solar development approximately 5 acres of the existing site naturally drains to Benz Street.

33. Referring to Site Plan Sheet 10;

a) Invasive Species item #2 states only straw bales should be used, yet the all of site plans include references to hay bales, please clarify.
RE:
Straw bales will only be used on site, and reference to hay bales has been removed from the plans.

b) Sedimentation and Erosion Control Plan – what areas will require stabilization by erosion control blankets (ECB)?
RE:
Areas requiring Erosion Control Blanket hare identified on the landscape plan.
Is it possible to use ECB with natural fiber netting?
RE:
The Petitioner will use a biodegradable product manufactured by North American Green (S150BN) which meets this criteria.

c) Sedimentation and Erosion Control Plan – a drainage narrative prepared by CLA Engineers mentioned. Please provide a copy of the narrative.
RE:
A drainage report has been completed and updated for the project and is attached as ***Exhibit D – Drainage Report***.

d) Sedimentation and Erosion Control Plan – the project is described as not being phased. Explain the rationale for not phasing the project into 2 or 3 smaller clearing and construction phases.
RE:
Construction sequencing has been further identified in ***Exhibit A - Sheet 10*** phasing the site by watershed.

e) Sedimentation and Erosion Control Sequence – provide more detail as to what activities will occur during rough grading. Is the entire site being striped of soil and stockpiled? Where are stumps and other non-suitable materials being disposed of?
RE:
Construction sequencing has been further identified in ***Exhibit A - Sheet 10*** phasing the site by watershed.
Sedimentation and Erosion Control Sequence – when will seeding of the swales and detention basins occur?
RE:
Swales and basins will be seeded and blanketed after grading operations occur.

34. Referring to petition p. 19, project construction is estimated at 5 months. When is the anticipated start date?
RE:
Start date is anticipated during this winter or Spring of 2021, depending on CSC permitting timeline.

What are the typical construction hours and work days of the week?
RE:
7:00am - 6:00pm M-F, and 7:00am – 5:00pm Saturday & Sunday if necessary.

Are these hours/days consistent with City of Ansonia ordinances?
RE:
Ansonia ordinances are 7:00am - 9:00pm 7 days a week for building operations.

35. If the proposed construction schedule has a majority of work occurring during winter months, provide detailed winter work procedures that address construction erosion and sediment control as well as soil stabilization.
RE:
The Petitioner is not anticipating winter conditions sitework for the facility, however, typically winter work procedures will require additional hay mulch and wood chips in areas where groundcover is not established. Specific elements of winter conditions erosion and sediment control measures will be outlined in the projects SWPCP.

36. What effect would runoff from the drip edge of each row of solar panels have on site drainage patterns?
RE:
There is no effect of runoff from the drip edge of a row of solar panels altering site drainage patterns. Solar modules installed in contiguous racking are separated from each other by 1/8" to 1" gaps depending on the racking manufacturer and their module fastening hardware. Utility scale solar modules are 3.25'Wide by 6.5' High, and water drips off of each module individually. There is no "sheet" flow that occurs off drip edge of the modules, where several solar modules collectively act as one flat plane. The Petitioner has attached ***Exhibit C – Array Drip Line Photos*** illustrating what occurs on site beneath the modules during and after construction.

Would channelization below the drip edge be expected?
RE:
No.

If not, why not?
RE:
See ***Exhibit C – Array Drip Line Photos***. The Petitioner has constructed over 15MW of solar in CT on several sites, and has had minimal channelization below the drip edge of the projects during or after construction. Drip line channelization is not the cause of significant erosion on solar sites.

Environmental

37. The Greenhouse Gas (GHG) Assessment in Appendix M of Council Petition No. 1352 compared the life cycle GHG emissions from a solar project to a scenario where the solar project is avoided and an equivalent amount of natural gas-fired electric generation operated for the estimated life of the solar facility. For the proposed project, how would the net GHG emissions (or reduction) over the life of the solar facility and carbon debt payback be affected under this natural gas-fired generation versus proposed solar generation scenario?
RE:
We have reviewed the Exhibit M in Petition No. 1352 and are familiar with that type of analysis conducted by Earth Shift Global ("ESG"). The ESG significantly understates the CO2 benefits. First, the GHG analysis does not account for the supply line effects of natural gas and the methane that is released into the atmosphere which is 80+ times worse than CO2. It also overstates the CO2 impact from the loss of trees. *See, e.g.*, a 2014 New York Times article entitled "To Save the Planet, Don't Plant Trees", written by an assistant professor of atmospheric chemistry at Yale. In cold climates such as parts of the Northeast, planting trees *increases* global warming. *See id*. ("Climate scientists

have calculated the effect of increasing forest cover on surface temperature. Their conclusion is that planting trees in the tropics would lead to cooling, but in colder regions, it would cause warming.") Trees also release VOCs that when combined with car exhaust combine to make ozone. *See, id.* ("In summer, the eastern United States is the world's major hot spot for volatile organic compounds (V.O.C.s) from trees. . . . Chemical reactions involving tree V.O.C.s produce methane and ozone, two powerful greenhouse gases. ") *See*, https://www.nytimes.com/2014/09/20/opinion/to-save-the-planet-dont-plant-trees.html.
The Petitioner conducted a similar GHG review and the results appear on 12 and 13 of the Petition for Declaratory Ruling.

38. Referring to Petition p. 11, was an asbestos and lead-based paint survey conducted for the site buildings that will be demolished?
RE:
Not at this time.

If so, were these materials found?
RE:
N/A.

When would removal of hazardous materials occur?
RE:
Asbestos and Lead based paint survey will be conducted, prior to demolition of the structure, and appropriate measures will be taken to ensure a clean and permitted removal of the structure.

39. Clarify the amount of tree clearing necessary to develop the site. (several different values are provided in the petition narrative and on the site plans).
RE:
10.68 acres of clearing is necessary for the footprint represented in the submission.

40. The Petition Phase I Environmental Analysis and the Wetland Report describe a vernal pool in the northwest portion for the site. Was an analysis of the vernal pool conducted? If so, please submit. If not, why not?
RE:
A vernal pool analysis has been performed and is attached as ***Exhibit E – Vernal Pool Letter***.

41. What is the buffer from the edge of Project site clearing to the edge of the vernal pool? Is this distance consistent with the vernal pool envelope buffers that are recommended within the *2015 U.S. Army Corps of Engineers Vernal Pool Best Management Practices*?
RE:
A 100' buffer has been offset from the vernal pool, no clearing or grubbing is anticipated within the buffer.

42. Provide a diagram that depicts pre and post project development effects on the vernal pool envelope and critical terrestrial habitat. Include the area, in square feet and by percentages) of pre and post construction development effects.
RE:
A diagram has been included in the vernal pool analysis. ***Exhibit E – Vernal Pool Letter***.

43. Referring to the Petition Wetland Report, provide an overlay of the project onto the wetland "sketch map". Include solar arrays, swales fencing, clearing limits and a scale.
RE:
The wetland sketch map should not be viewed for specific accuracy. Please refer to the site plan documents for detailed information about the wetland.

44. How was the Petition Wetland Report "sketch map" flagging information accurately transferred to the Site Plan Sheet 1.1? Was the flagging on Site Plan Sheet 1.1 then used to create the wetland delineation on the other Site Plans?
RE:
The wetland was delineated in the filed by Davison Environmental, with multiple wetland flags. The surveyor Godfrey, Hoffman Hodge, LLC then located the flags in the field and represented the wetland in the ALTA survey. The site plan documents are designed upon the ALTA survey.

45. Referring to the Petition Wetland Report, are the groundwater discharge/seep areas that were identified in the upland areas considered wetlands?
RE:
No, the soils associated with these seepage areas are not poorly drained, very poorly drained, or alluvial, and therefore are not considered wetland.

46. How would site grading and development of the solar field affect the groundwater discharge/seep areas and their function as providing water to the down gradient wetland/vernal pool?
RE:
The groundwater discharge to the vernal pool wetland will not be adversely impacted. The size of the contributing watershed will remain the same, thus the precipitation that contributes to the vernal pool wetland will remain the same. The proposed Stormwater Basin 1, which is located above the vernal pool wetland in elevation. The basin will contain all rain events up to the 10 year storm event without discharge. These events represent most of the rainfall during any year. This basin rings containment will allow stormwater runoff that ponds in the basin to infiltrate into the native soil on the downslope side of the basin and discharge to the vernal pool wetland to maintain the existing hydrology.

47. How will the storm northern stormwater basin affect the adjacent wetland in terms of surface sheet flow that would no longer reach the wetland but instead be captured within the stormwater basin?
RE:
The basin will reduce peak flow rate discharge to the wetlands, for the 2, 10 ,25 ,50 and 100 year storm events. The Petitioner has designed the facility per the requirements outlined by the 2002 Connecticut guidelines for soil erosion and sedimentation control, the 2004 stormwater quality manual and the hydraulic modeling requirements outlined in the draft Appendix I, *Stormwater Management at Solar Array Construction Projects* in accordance with DEEP's proposed revisions.

48. Has the Petitioner designed the site in accordance with DEEP's proposed revisions to the General Permit, including draft Appendix I, *Stormwater Management at Solar Array Construction Projects*? Please explain how the Project would comply.
RE:
The hydraulic modeling and stormwater design of the facility has taken in account the requirements outlined in the draft Appendix I, *Stormwater Management at Solar Array Construction Projects* in accordance with DEEP's proposed revisions.

49. Why was a 50-foot wetland buffer included on the site plans?
What is the 50-foot buffer supposed to represent if the limit of construction is 12.1 feet from the wetland at its closet point, as indicated on Site Plan Sheet 5?
RE:
The 50' buffer was an incorrect representation on the plans. A 100' regulated area offset of the wetland has been illustrated in the revised pans. The basin has been redesigned based on geotechnical field tests, the vernal pool assessment and the additional stormwater requirements based on draft Appendix I. Grading for the basin will occur in the 100' regulated area.

50. DEEP's proposed revisions to the General Permit, including draft Appendix I, *Stormwater Management at Solar Array Construction Projects* specifies a 100 foot buffer between the solar array and wetlands or waters. Given that the proposed solar array is within 100 feet of the wetland, how many panels/rows would have to be removed to create a 100 foot buffer?
RE:
The project footprint has been revised in the area based of the vernal pool assessment and no solar panels are installed within the 100' regulated area from the wetland.

How would this affect the project output?
RE:
The overall project size has been reduced due to these requirements by approximately 900 solar modules.

51. Please submit photographic site documentation with notations linked to the site plans or a detailed aerial image that identifies the locations of site-specific and representative site features. The submission should include photographs of the site from public road(s) or publicly accessible area(s) as well as Site-specific locations depicting site features including, but not necessarily limited to, the following locations as applicable:

For each photo, please indicate the photo viewpoint direction and stake or flag the locations of site-specific and representative site features. Site-specific and representative site features include, but are not limited to, as applicable:

1. wetlands, watercourses and vernal pools;
2. forest/forest edge areas;
3. agricultural soil areas;
4. sloping terrain;
5. proposed stormwater control features;
6. nearest residences;
7. Site access and interior access road(s);
8. utility pads/electrical interconnection(s);
9. clearing limits/property lines;
10. mitigation areas; and
11. any other noteworthy features relative to the Project.

A photolog graphic must accompany the submission, using a site plan or a detailed aerial image, depicting each numbered photograph for reference. For each photo, indicate the photo location number and viewpoint direction, and clearly identify the locations of site-specific and representative site features show (e.g., physical staking/flagging or other means of marking the subject area).

The submission shall be delivered electronically in a legible portable document format (PDF) with a maximum file size of <20MB. If necessary, multiple files may be submitted and clearly marked in terms of sequence.

RE:

A proposed site plan with pin locations where filed site photos were taken has been provide as ***Exhibit F – Existing Site Photos***.

Facility Maintenance

52. What is the anticipated frequency of clearing in areas outside of the solar array perimeter fence and how would clearing be accomplished if stumps are to remain?

    RE:

    The site will be cleared outside of the fence line, and the stumps will be removed 25' outside of the proposed fence line for the planting of the screening hedge.

53. Would pesticides or herbicides be used at the site? If so, specify anticipated products and use.

    RE:

    No.

54. Would the Petitioner remove snow that accumulates on the panels? If so, at what storm snowfall depth? Describe snow removal methods.

    RE:

    No, the efforts to do so are too costly, and our energy production modeling considers lost revenue due to snow cover.

55. Describe the type and frequency of anticipated vegetation management for the site. Include areas inside and outside of the perimeter fence, as well as detention basins and swales.

    RE:

    The Petitioner plans to use sheep for vegetative management inside the perimeter fence. Outside the fence would be mowed as needed. Perimeter landscaping will be monitored with a greater frequency for the first two years to ensure that the screening hedge becomes established and the plans are hardy. Detention basins and swales will be monitored bi-yearly to ensure the stormwater facilities are operating as designed.

56. Would the installed solar panels require regular cleaning or other, similar, maintenance? If so, describe cleaning procedures including substances used. Would this maintenance activity have any impacts to water quality

    RE:

    Panels may require washing periodically, annually or bi-annually, depending on soiling and neighboring activities. Module washing consists of de-ionized water, and a pressure washer. No water quality impacts are anticipated.

57. What is the inspection frequency for the permanent detention basins and swales? How will sediment be removed and transported from these features? Where would accumulated sediment be disposed of?

    RE:

    A typical monitoring schedule of the facility is outlined below:

Monthly:

1. Inspect the site vegetation growth, and establish a grazing and/or mowing schedule keeping vegetation between 6" and 24".
2. Inspect detention basins, swales and the project area for wind-blown trash and debris.
3. Inspect the gravel roadway for washout locations or potential erosion issues.

Bi-Annually (April and October):

1. Inspect vegetation during both the growing and non-growing seasons to ensure proper detention basin seed establishment.
2. Inspect detention basin for excess sediment, sediment can be excavated by hand or mechanical methods. Sediment may be hauled off site, or spread on site and seeded.
3. Inspect steep roadway slopes and embankments to identify potential erosion problems. Replant bare areas or areas with sparse growth with the project specific seed mix.
4. Inspect perimeter landscaping screening, to ensure ongoing establishment of new plantings.

58. Referring to the Decommissioning Plan, is the intent to remove the swale/ detention basins to restore pre-construction hydrological conditions?

RE:

The Petitioner would not restore the grades to the site, for at the end of the 15 year contract the Petitioner will attempt to continue the solar use. If grading activities were to occur, appropriate permitting steps would take place at the local or state level.

EXHIBIT A

BENZ STREET SOLAR
CONNECTICUT SITING COUNCIL DOCUMENTS

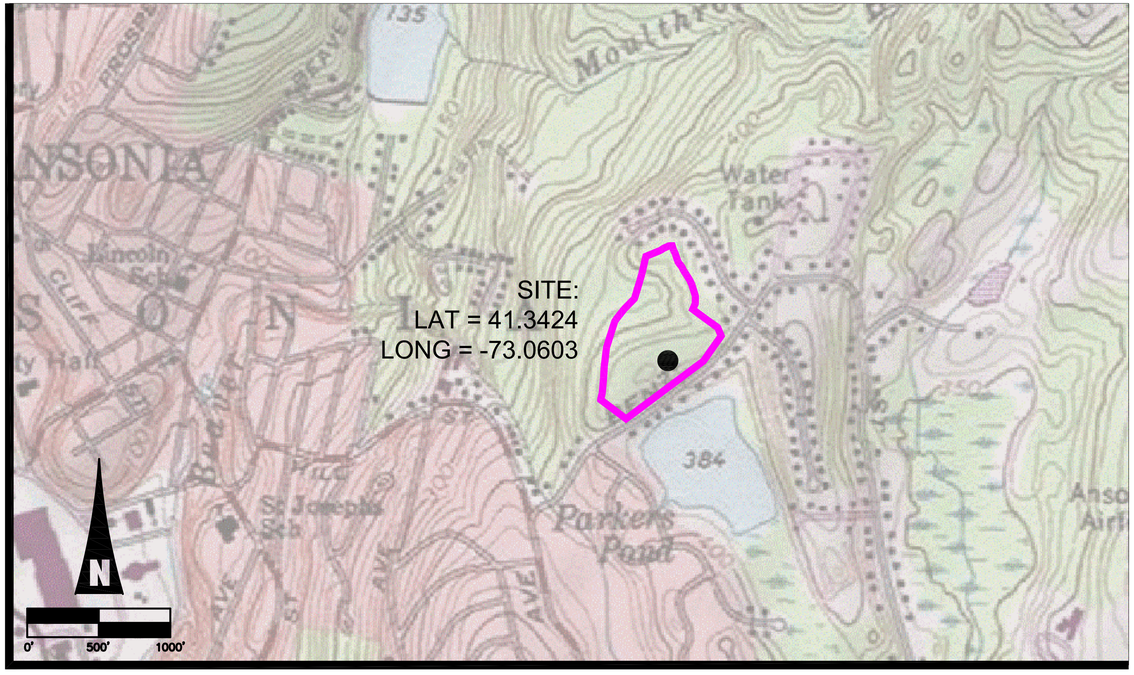
FOR

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

IN

ANSONIA, CONNECTICUT

LOCATION MAP



SHEET INDEX

●	5	9/17/2020	1	COVER SHEET
●	-	2/04/2019	2	ALTA SURVEY (BY GODFREY HOFFMAN HODGE, LLC)
●	5	9/17/2020	3	SITE PLAN
●	5	9/17/2020	4	GRADING AND EROSION CONTROL PLAN
●	5	9/17/2020	5	SITE GRADING PLAN: BASIN #1
●	5	9/17/2020	6	SITE GRADING PLAN: BASIN #2
●	5	9/17/2020	7	LANDSCAPE PLAN
●	5	9/17/2020	8	KEY OBSERVATION POINTS
●	5	9/17/2020	9	PROJECT CROSS SECTION
●	5	9/17/2020	10	CIVIL NOTES
●	5	9/17/2020	11	CIVIL DETAILS

DRAWING INDEX LEGEND

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

○	-	X/XX/202X	X	SHEET TITLE

CONTACT INFO:

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

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

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

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

No.	Date	Revision
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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317 Main Street Norwich, Connecticut
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STATE OF CONNECTICUT · KYLE L. MACBETH · No. 24239 · LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

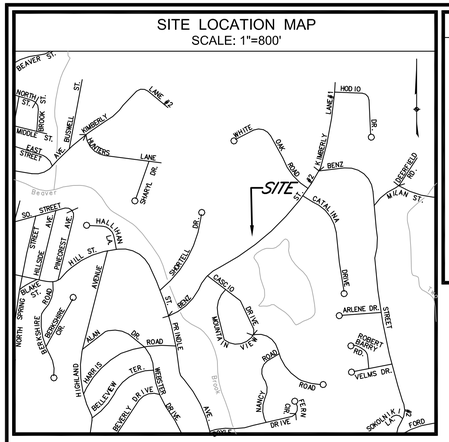
COVER SHEET

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

CLA

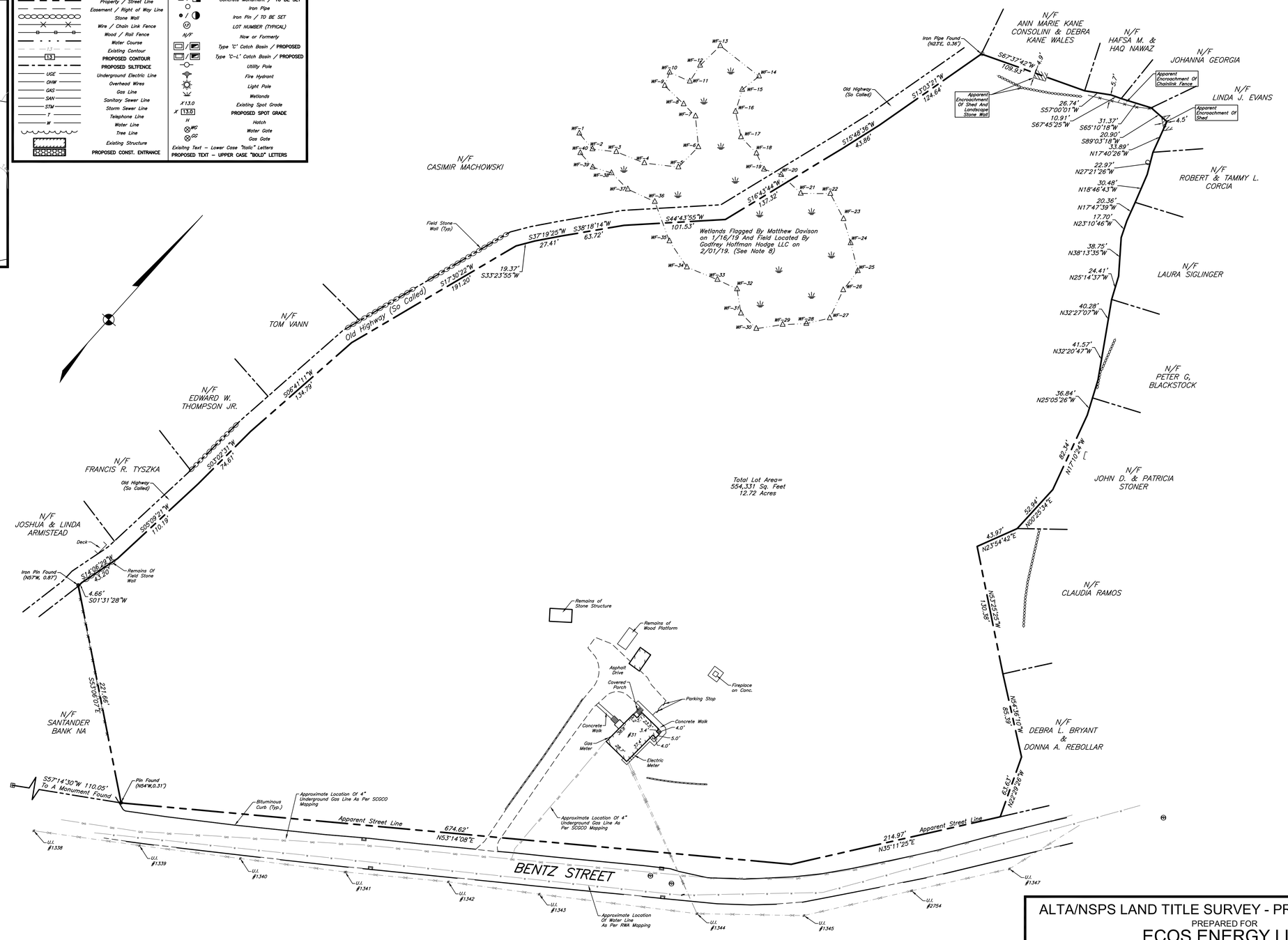
M:\6000\6400\6430 Benz Street Solar\Drawings\01 COVER SHEET-BENZ.dwg

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

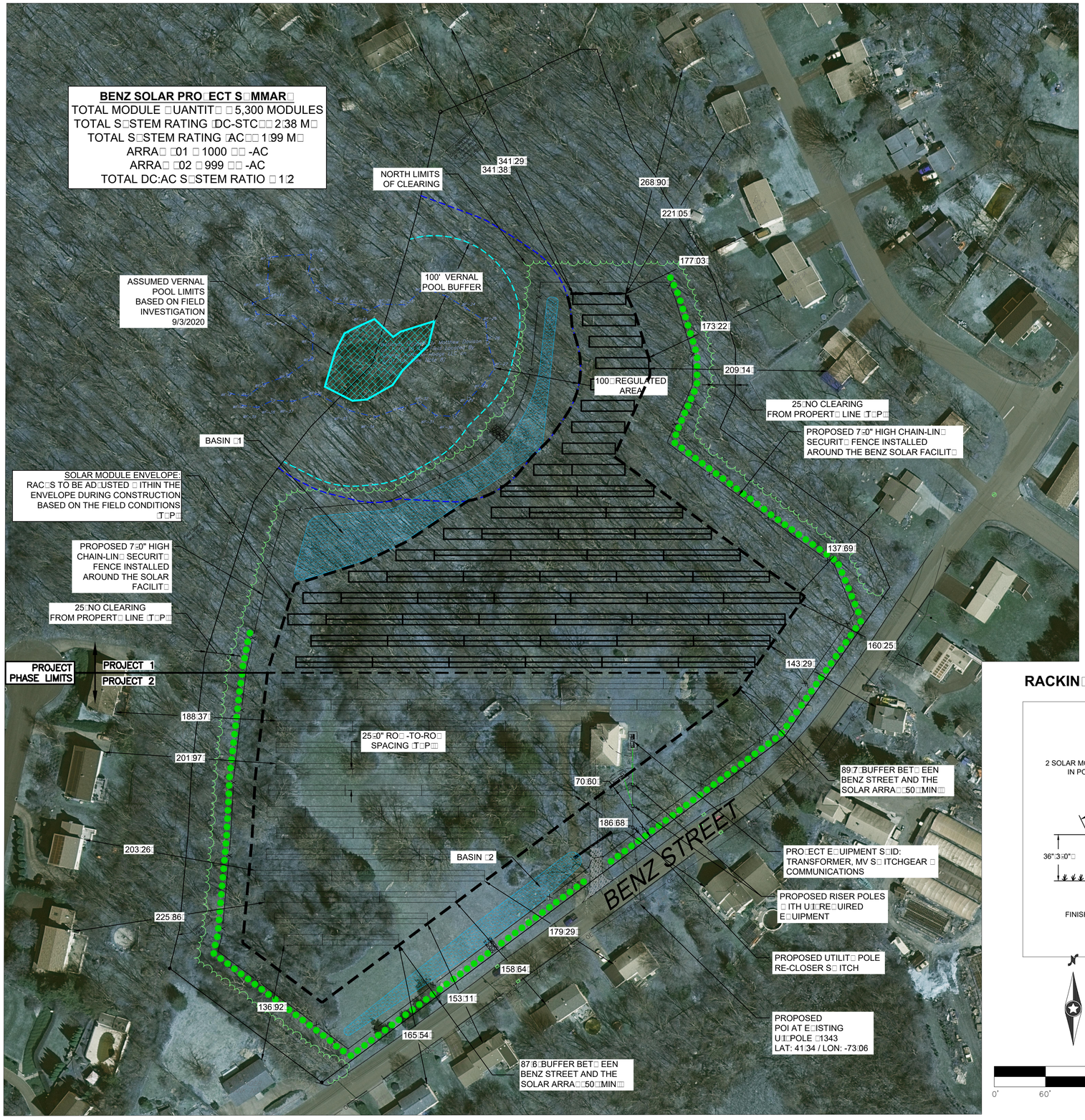
ECOS ENERGY LLC

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



LEGEND

- EXISTING PROPERTY LINE
- PROPOSED PROJECT FENCE
- PROPOSED GRAVEL ACCESS ROAD
- UMV — PROPOSED AC DISTRIBUTION
- OE — PROPOSED OVERHEAD ELECTRIC
- 100' WETLAND REGULATED AREA LIMIT
- WETLAND DELINEATION LINE
- 26 2.2 SOLAR MODULE BOCK
- 13 2.2 SOLAR MODULE BOCK
- ARBORVITAE SCREENING TREES
- BASIN OUTLET

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

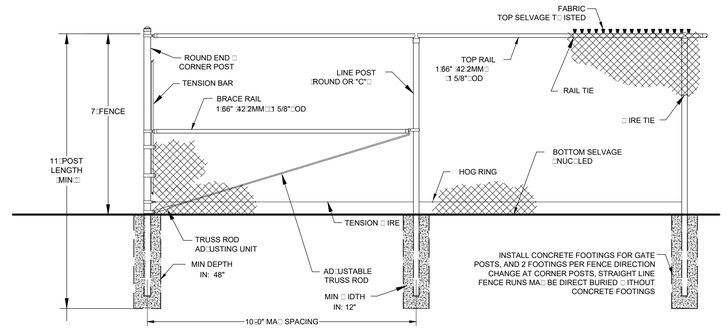
TOTAL SITE AREA - 12.72 ACRES

TOTAL SITE CLEARING - 10.68 ACRES

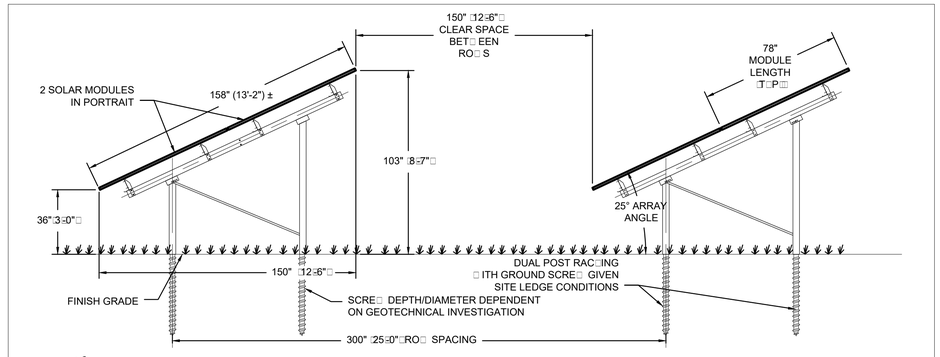
TOTAL ARRAY FOOTPRINT (FENCE LIMITS) - 11.35 ACRES

TOTAL PROPOSED IMPERVIOUS:
GRAVEL ACCESS ROAD, STRUCTURAL POSTS & EQUIPMENT PADS
SITE TOTAL - 0.17 ACRES

PERIMETER FENCE DETAIL



RACKING PROFILE DETAIL



0' 60' 120' 180'

No.	Date	Revision
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. MAURER — No. 24225 — 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

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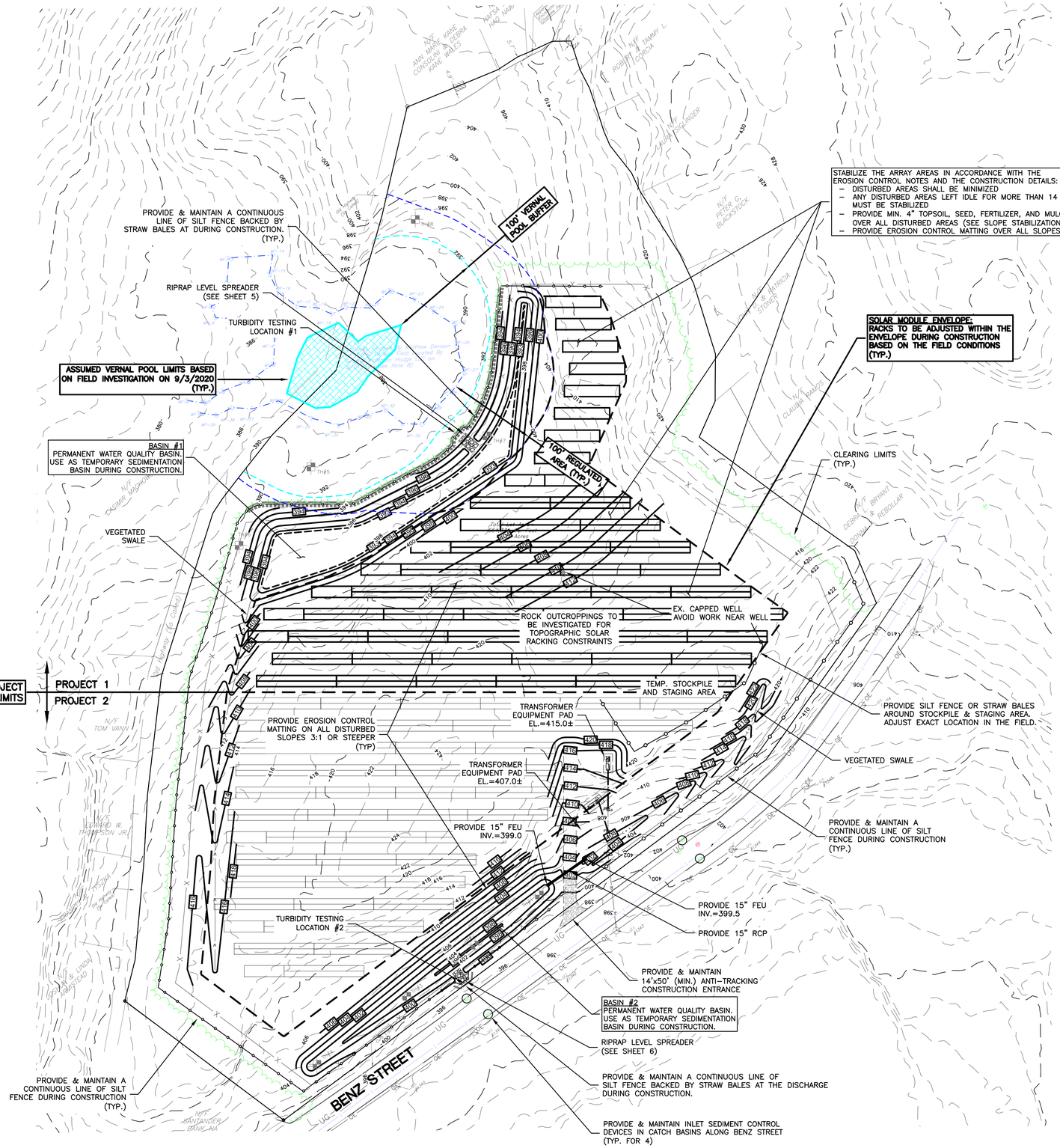


LEGEND:

- EXISTING PROPERTY LINE
- PROPOSED FENCE
- PROPOSED GRAVEL ACCESS ROAD
- PROPOSED UNDERGROUND MV CABLE
- PROPOSED OVERHEAD ELECTRIC
- EXISTING CONTOUR
- PROPOSED CONTOUR
- 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

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"

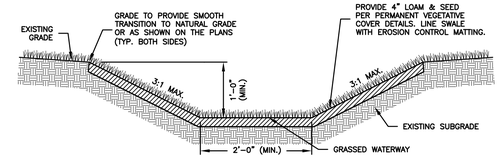
0–8" Topsoil, Dark Brown fine sandy loam
8–34" Red brown fine sandy loam
37+" Red brown loamy sand with boulders and gray brown mottles

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

0' 60' 120' 180'

No.	Date	Revision
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
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STATE OF CONNECTICUT · KYLE J. MAHER · No. 24328 · LICENSED PROFESSIONAL ENGINEER

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

GRADING AND EROSION CONTROL PLAN

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

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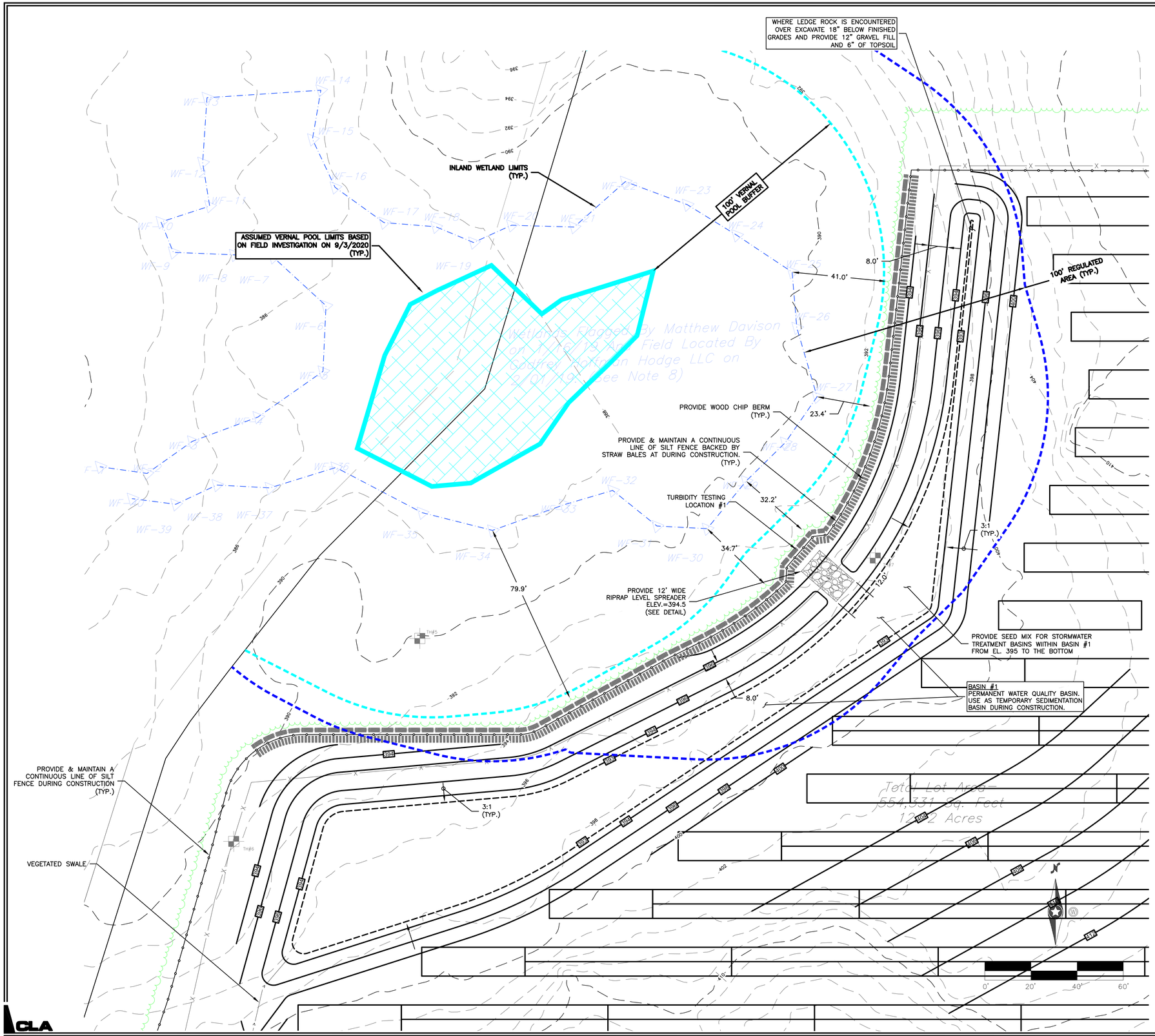
CLA



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
- WETLAND DELINEATION LINE & AREA
- RIP-RAP BASIN OUTLET

SEED MIX FOR STORMWATER TREATMENT BASIN

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.)

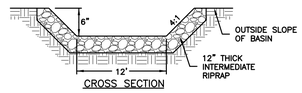
SPECIES *: SWITCHGRASS (PANICUM VIRGATUM), VIRGINIA WILD RYE (ELYMUS VIRGINICUS), CREEPING RED FESCUE (FESTUCA RUBRA), FOX SEDGE (CAREX VULPINOIDEA), CREEPING BENTGRASS (AGROSTIS STOLONIFERA), SOFT RUSH (JUNCUS EFFUSUS), NEW ENGLAND ASTER (ASTER NOVAE-ANGLIAE), GRASS-LEAVED GOLDENROD (EUTHAMIA GRAMINIFOLIA), 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).

PERVIOUS TOPSOIL MIX FOR STORMWATER TREATMENT BASINS

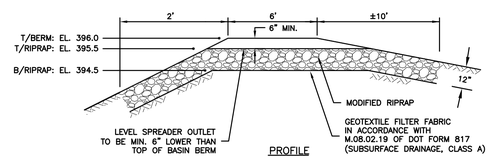
THE FOLLOWING PERVIOUS TOPSOIL MIX SHALL BE USED IN THE STORMWATER TREATMENT BASINS. THE MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF ARTICLE M.13.01.1 OF DOT FORM 817 WITH THE FOLLOWING GRADATION:

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

DO NOT COMPACT MATERIAL DURING INSTALLATION



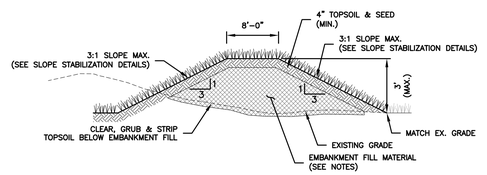
CROSS SECTION



PROFILE

STORMWATER TREATMENT BASIN #1 OUTLET DETAIL

NOT TO SCALE



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

STORMWATER TREATMENT BASIN EMBANKMENT FILL SECTION DETAIL

NOT TO SCALE

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STATE OF CONNECTICUT KYLE T. MAURER No. 24329 PROFESSIONAL ENGINEER LICENSED

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

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

VEGETATED SWALE (SEE SHEET 4)

PITCH ACCESS DRIVE (TYP.)

10% (TYP.)

R=35'

14.0'

70.6'

VEGETATED SWALE (SEE SHEET 4)

PROVIDE 15" RCP

PROVIDE 15" FEU INV.=399.0

PROVIDE 15" FEU INV.=399.5

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

3:1 (TYP.)

PROVIDE 10' WIDE RIPRAP LEVEL SPREADER ELEV.=399.5

10'

BENZ STREET

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

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

TURBIDITY TESTING LOCATION #2

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

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

Bituminous Curb (Typ.)

U.I. #1343

U.I. #1342

U.I. #1341

U.I. #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
- WETLAND DELINEATION LINE & AREA
- RIP-RAP BASIN OUTLET

SEED MIX FOR STORMWATER TREATMENT BASIN

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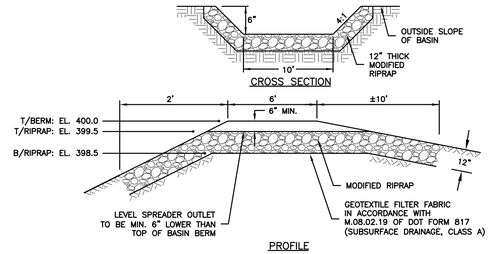

STORMWATER TREATMENT BASIN #2 OUTLET DETAIL

NOT TO SCALE

No.	Date	Revision
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
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2	4/1/20	REVISED HYDROLOGY
1	2/11/20	CSC SUBMISSION

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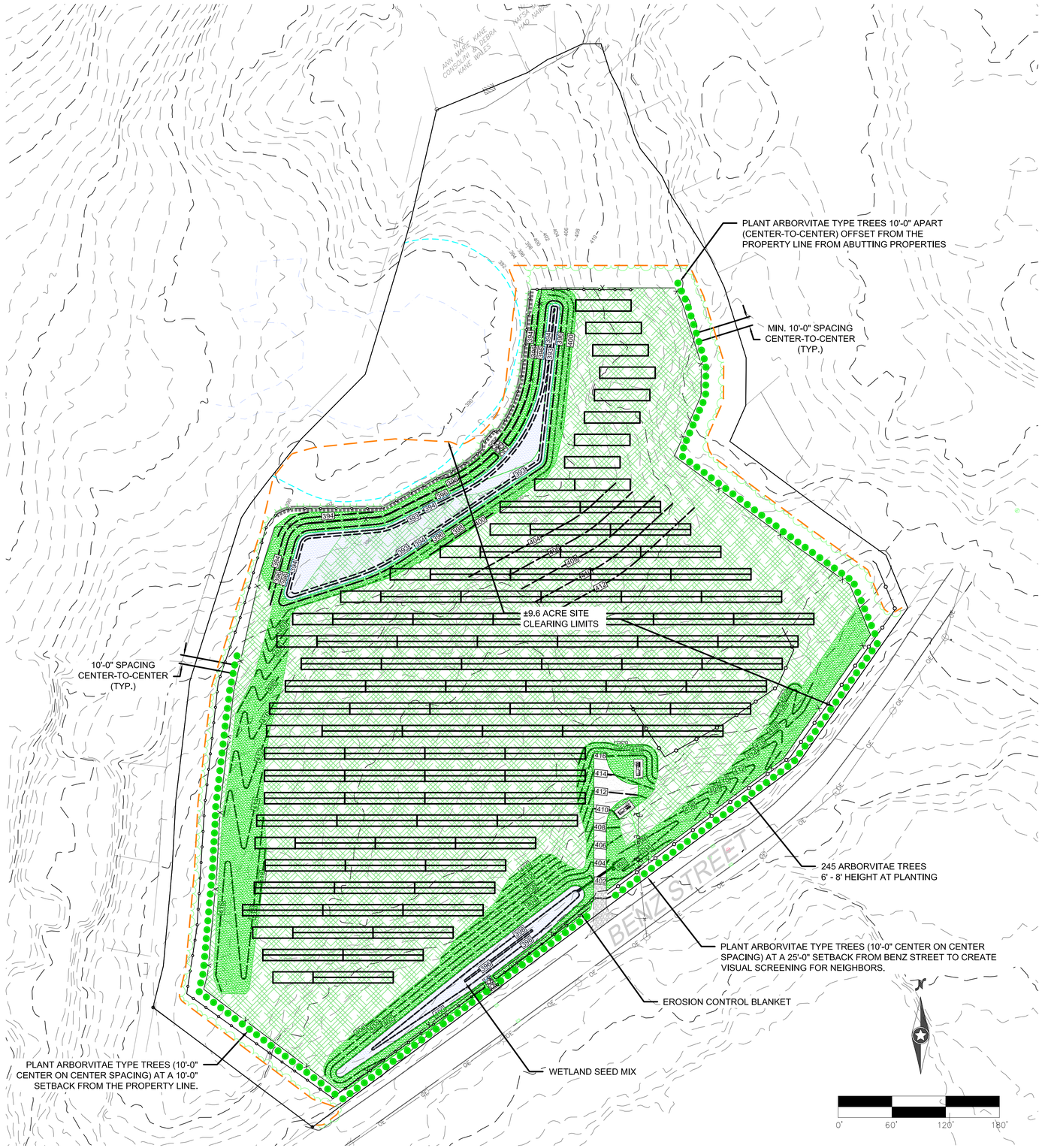
31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

GRADING PLAN : BASIN #2

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

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



LEGEND:

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

SEED LEGEND:

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

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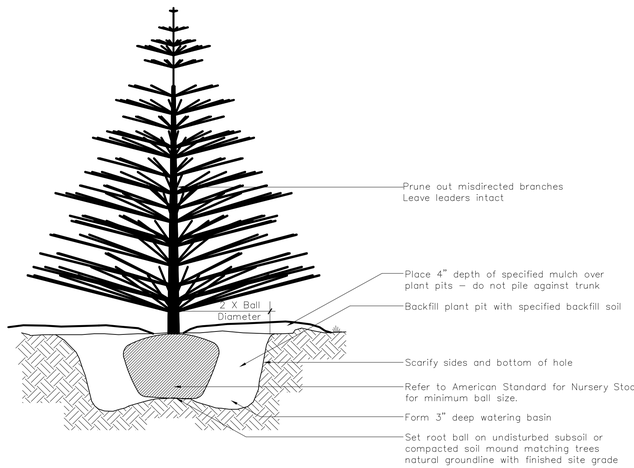
SEEDING NOTES:

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

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

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

CLA

□OP 4 - MIDDLE OF SITE LOO□ING EAST

□OP 5 - EASTERN MIDDLE OF SITE LOO□ING SOUTH

□OP 6 - SOUTH □ EST OF SITE LOO□ING EAST

□OP 3 - NORTHERN SITE, LOO□ING SOUTH-EAST

□OP 2 - BENZ STREET LOO□ING NORTH

□OP 1 - SOUTH OF BENZ STREET LOO□ING NORTH-□ EST

No.	Date	Revision
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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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M:\6000\6400\6430 Benz Street Solar\Drawings\08 KOP PLAN BENZ.dwg

EXHIBIT A: PROJECT CROSS SECTION (NORTHERN SITE VIEW)

(SCALE: 1" = 80')

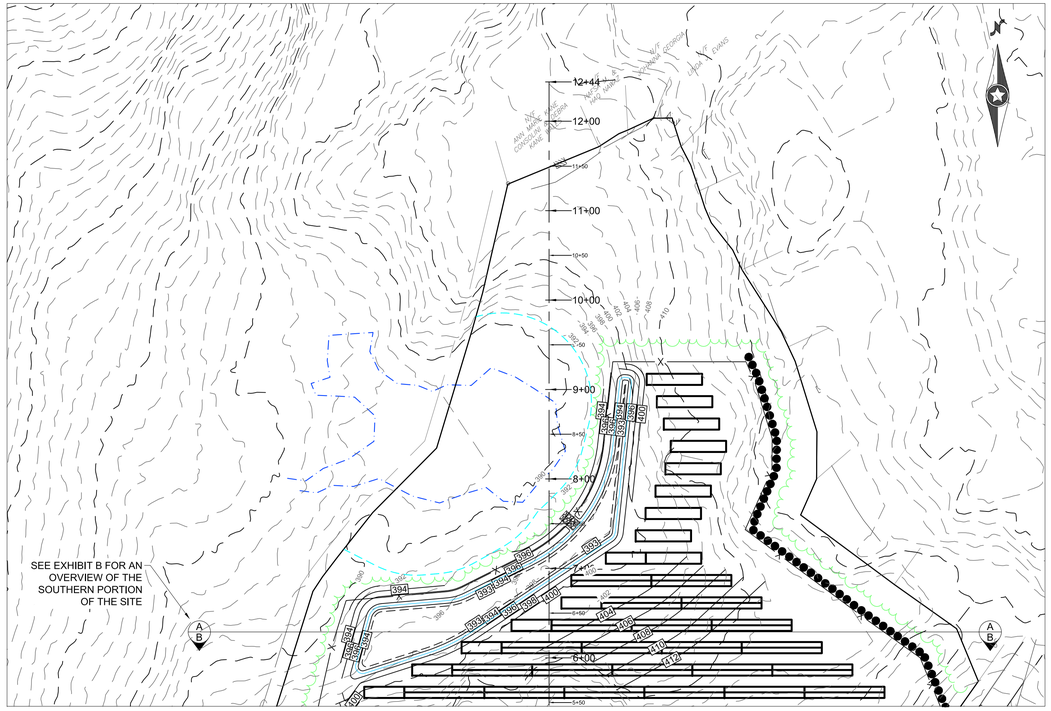
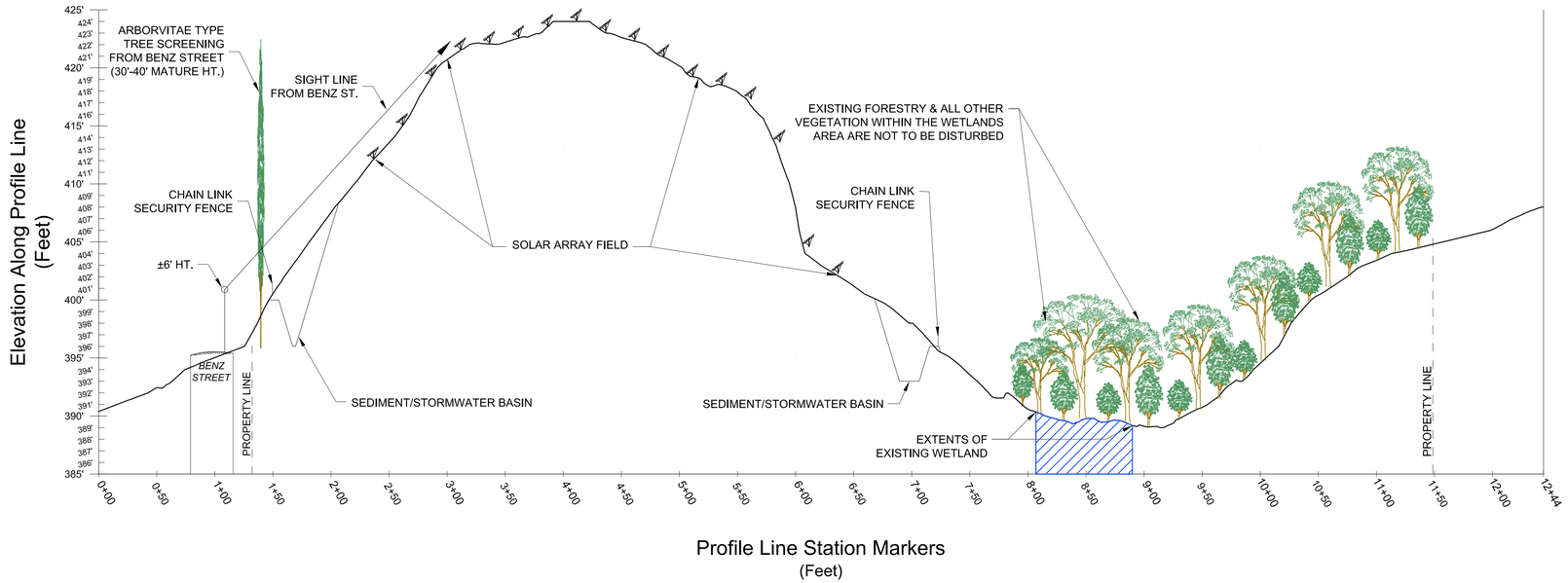


EXHIBIT B: PROJECT CROSS SECTION (SOUTHERN SITE VIEW)

(SCALE: 1" = 80')

PROJECT PROFILE:



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31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

PROJECT CROSS SECTION

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

M:\6000\6400\6430 Benz Street Solar\Drawings\09 X-SEC PLAN-BENZ.dwg

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 ROB HELLSTROM LAND SURVEYING AND FLAGGED BY HIGHLANDS SOILS. THE GENERAL CONTRACTOR SHALL VERIFY THAT ALL WETLAND PERMITS HAVE BEEN SUBMITTED AND APPROVED PRIOR TO CONSTRUCTION COMMENCING.
7. ELECTRICAL COLLECTION SYSTEM SHOWN ON THE PLAN SHALL BE CONSIDERED PRELIMINARY. CONTRACTOR SHALL REFER TO FINAL ELECTRICAL DESIGN PLANS FOR ACTUAL DESIGN LOCATIONS.

STORMWATER POLLUTION PREVENTION PLAN (SWPCP):

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

SLOPE STABILIZATION:

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

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

1. PLACEMENT OF RIP-RAP

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

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

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

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

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

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

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

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

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

   FOR MAT USE MIRAFI MIRAMAT TM8 OR EQUIVALENT.

INVASIVE SPECIES:

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

SEDIMENTATION AND EROSION CONTROL PLAN

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

EROSION AND SEDIMENTATION CONTROL / CONSTRUCTION SEQUENCE

1. BEFORE ANY WORK TAKES PLACE CONTACT CALL BEFORE YOU DIG AT 811 TO MARK EXISTING UTILITIES.
2. NOTIFY THE TOWN OF START OF CONSTRUCTION A MINIMUM OF 48 HOURS IN ADVANCE.
3. HAVE LICENSED SURVEYOR STAKE OUT THE CLEARING LIMITS.
4. CUT TREES BUT DO NOT GRUB.
5. INSTALL CONSTRUCTION ENTRANCE AND PERIMETER EROSION AND SEDIMENTATION CONTROLS AND HAVE INSPECTED BY SITE INSPECTOR.
6. MAINTAIN E&S MEASURES AND PROVIDE REPORTS TO TOWN AND CTDEEP THROUGHOUT CONSTRUCTION

THE SITE SHALL BE CONSTRUCTED IN 2 PHASES BASED ON THE LIMITS DELINEATED ON THE PLANS.

PROJECT #1

1. EXCAVATE AND STABILIZE BASIN #1 TO BE USED AS A TEMPORARY SEDIMENTATION BASIN DURING CONSTRUCTION. INSTALL STRAW BALES, SILT FENCE AND WOOD CHIP BERM AS CALLED FOR ON THE PLANS. INSTALL TEMPORARY VEGETATED SWALES. HAVE E&S MEASURES INSPECTED BY THE SITE INSPECTOR. PROVIDE ADDITIONAL E&S MEASURES AS REQUIRED BY THE INSPECTOR.
2. CONTINUOUSLY MONITOR AND MAINTAIN THE E&S MEASURES THROUGHOUT CONSTRUCTION.
3. GRUB THE PHASE 1 WORK AREA. LIMIT THE THE DISTURBED AREAS. ANY DISTURBED AREA LEFT IDLE FOR MORE THAN 14 DAYS SHALL BE STABILIZED.
4. ANY DEWATERING WILL BE MONITORED BY A QUALIFIED ENVIRONMENTAL PROFESSIONAL TO MAINTAIN SUITABLE QUALITY OF DISCHARGE FROM THE DEWATERING AND TO ENSURE REMOVAL OF ACCUMULATED SEDIMENTS AT APPROPRIATE INTERVALS. SEDIMENTS WILL BE DISPOSED OF AT AN APPROPRIATE ON-SITE LOCATION. DEWATERING WILL DISCHARGE INTO TEMPORARY SEDIMENT TRAPS.
5. ROUGH GRADE SITE.
6. INSTALL CHAIN LINK FENCE AROUND PHASE 1 PERIMETER.
7. INSTALL SOLAR PANELS, HYDROSEED OR SEED AND MULCH AROUND PANELS AND 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.
8. 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.
9. 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.
10. OVERSEED DISTURBED SOILS WHEN ALL PHASE 1 SOLAR PANEL INSTALLATION IS COMPLETE.
11. CLEAN SEDIMENTS BASIN #1 AND GRADE AND RE-SEED FOR USE AS STORMWATER BASINS WHEN SITE INSPECTOR DEEMS SOILS ARE STABILIZED.

PROJECT #2

1. EXCAVATE AND STABILIZE BASIN #2 TO BE USED AS A TEMPORARY SEDIMENTATION BASIN DURING CONSTRUCTION. INSTALL STRAW BALES, SILT FENCE AND WOOD CHIP BERM AS CALLED FOR ON THE PLANS. INSTALL TEMPORARY VEGETATED SWALES. HAVE E&S MEASURES INSPECTED BY THE SITE INSPECTOR. PROVIDE ADDITIONAL E&S MEASURES AS REQUIRED BY THE INSPECTOR.
2. CONTINUOUSLY MONITOR AND MAINTAIN THE E&S MEASURES THROUGHOUT CONSTRUCTION.
3. GRUB THE PHASE 2 WORK AREA. LIMIT THE THE DISTURBED AREAS. ANY DISTURBED AREA LEFT IDLE FOR MORE THAN 14 DAYS SHALL BE STABILIZED.
4. ANY DEWATERING WILL BE MONITORED BY A QUALIFIED ENVIRONMENTAL PROFESSIONAL TO MAINTAIN SUITABLE QUALITY OF DISCHARGE FROM THE DEWATERING AND TO ENSURE REMOVAL OF ACCUMULATED SEDIMENTS AT APPROPRIATE INTERVALS. SEDIMENTS WILL BE DISPOSED OF AT AN APPROPRIATE ON-SITE LOCATION. DEWATERING WILL DISCHARGE INTO TEMPORARY SEDIMENT TRAPS.
5. ROUGH GRADE SITE.
6. INSTALL CHAIN LINK FENCE AROUND PHASE 2 PERIMETER.
7. INSTALL SOLAR PANELS, HYDROSEED OR SEED AND MULCH AROUND PANELS AND 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.
8. 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.
9. 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.
10. OVERSEED DISTURBED SOILS WHEN ALL PHASE 1 SOLAR PANEL INSTALLATION IS COMPLETE.
11. CLEAN SEDIMENTS BASIN #2 AND GRADE AND RE-SEED FOR USE AS STORMWATER BASINS WHEN SITE INSPECTOR DEEMS SOILS ARE STABILIZED.
12. INSTALL ALL PERIMETER PLANTINGS

No.	Date	Revision
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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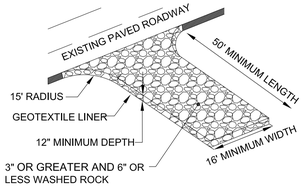
BENZ STREET SOLAR

CIVIL NOTES

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

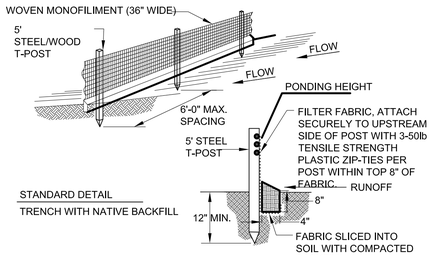


NOTE:

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

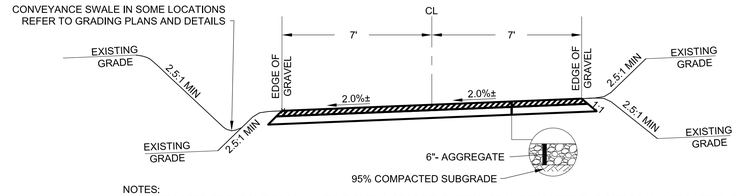


NOTE:

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

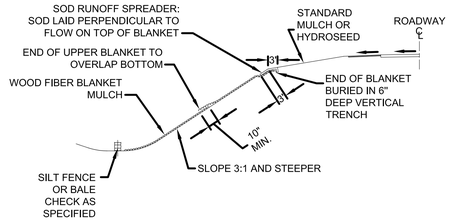
NOT TO SCALE



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

ACCESS ROAD DETAIL

NOT TO SCALE



EROSION CONTROL BLANKET INSTALLATION ON AN INSLOPE (WHEN REQUIRED)

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

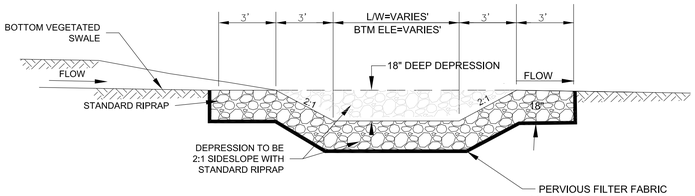
CATEGORY	ACCEPTABLE TYPES
1	STRAW RD 1S, WOOD FIBER RD 1S
2	STRAW 1S, WOOD FIBER 1S
3	STRAW 2S, WOOD FIBER 2S
4	STRAW/COCONUT 2S, WOOD FIBER HV 2S

THE LETTERING DESIGNATION SHALL BE DEFINED AS FOLLOWS:

1S - NETTING ON ONE SIDE
RD - RAPIDLY DEGRADABLE
2S - NETTING ON TWO SIDES
HV - HIGH VELOCITY

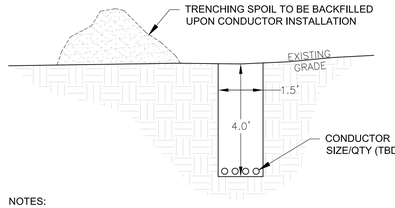
EROSION CONTROL BLANKET

NOT TO SCALE



RIP-RAP SPLASH PAD

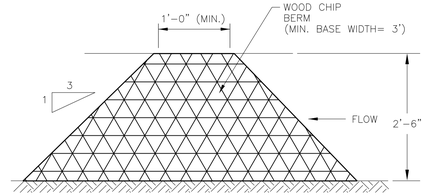
NOT TO SCALE



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.

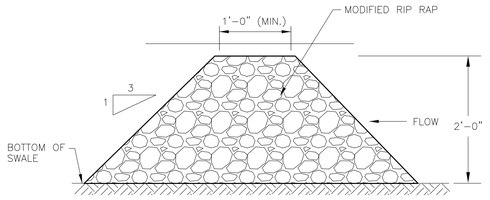
TRENCHING DETAIL

NOT TO SCALE



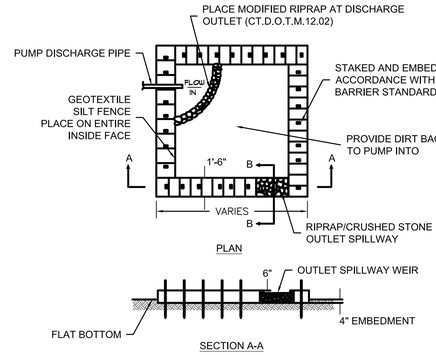
WOOD CHIP BERM

NOT TO SCALE

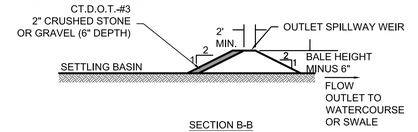


RIP-RAP CHECK DAM

NOT TO SCALE



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



DEWATERING SETTLING BASIN DETAIL

NOT TO SCALE

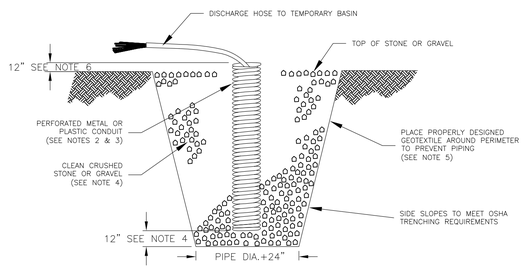
DEWATERING PLAN

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

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

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

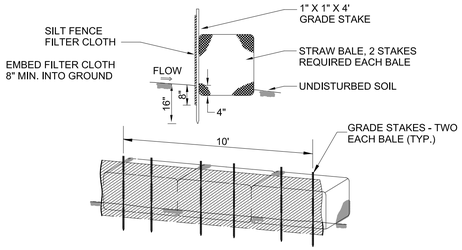
C. THE DISCHARGE FROM THE DEWATERING ENCLOSURE WILL BE MONITORED AND ADDITIONAL MEASURES EMPLOYED IF NECESSARY.



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 ½" 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
5	9/17/20	MISC. UPDATES AND REVISIONS PER CSC
4	7/24/20	MISC. UPDATES AND REVISIONS
3	5/22/20	2 MW CSC SUBMISSION
2	4/1/20	REVISED HYDROLOGY
1	2/11/20	CSC SUBMISSION

CLA Engineers, Inc.
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(860) 886-1966 Fax (860) 886-9165

STATE OF CONNECTICUT KYLE T. MAYBERRY No. 24329 LICENSED 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

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

EXHIBIT B

Steve Broyer

From: Darrick Lundeen <dlundeen@ansoniact.org>
Sent: Friday, September 18, 2020 6:54 AM
To: Steve Broyer
Subject: Re: CSC Petition 1395A

Thank you for the information. I look forward to working with you on this project.

If you have any questions or concerns, please do not hesitate to contact me.

Darrick

On Thu, Sep 17, 2020 at 2:15 PM Steve Broyer <steve.broyer@ecosrenewable.com> wrote:

> Thanks for the response Derek, and glad my latest e-mail reached you.
>
> A better description of the facility and the site:
>
> The house will be demolished on site. For the facility, there will be no building or manned structures on site, simply pad mounted transformers, switchgear and inverters, all in NEMA rated outdoor enclosures by the hammerhead. Within the slolar array the will be DC combiner boxes (think of residential breaker boxes). With approximately 16 locations within the array field. We typically install these at the end of a solar row, or midpoint in a row. Our sites typically provide a 15' level surface around the perimeter of the array for vehicular traffic for O&M, but not a full gravel surface. That would be a first for any of the solar projects we've developed and constructed in CT.
>
> All of our sites do have a knock box, with codes given to local fire, police and emergency responders.
>
> If approved by the CSC, we can coordinate plan review as we move towards building permit documents and we will have at that time, more detailed information about the electrical facility and equipment locations.
>
> We also prepare an Operations and Maintenance manual for the facility, with points of contact, and protocol with shutting down the system, etc. We also have given tours of many of our facilities to local fire and emergency responders, and can do that with your team if the project comes to fruition.
>
> Again, If you want to review the full petition, I've provided the link to the CSC website.
>
> https://portal.ct.gov/CSC/3_Petitions/Petition-Nos-1391-1400/Petition-No-1395A-Windham-Solar_Ansonia

I will mention in my response to the CSC interrogatories that we have been in contact, and I believe that we can address any of your concerns during the more detailed design process if the project moves towards construction.

Have a good day,

Steve

From: Darrick Lundeen <dlundeen@ansoniact.org>
Sent: Thursday, September 17, 2020 6:55 AM
To: Steve Broyer <steve.broyer@ecosrenewable.com>
Subject: Re: CSC Petition 1395A

Good Morning Steve,

Your email that I received this morning was the first one I have gotten from you. All the previous ones were attached to it, however, I never received the previous ones.

If you follow the Connecticut Fire Prevention Code, Connecticut Fire Safety Code, and Nation Electric Code as they relate to the installation, I will have no issues. My only concern is access to the site in case of a brush fire or a fire in one of the units. Is there driveway access out to the farthest units or is the only driveway to the equipment building? The attached photo does not appear to show any. If there is locked gate access to the solar panels, I would request that a Knox Box (knoxbox.com) be installed on a pole or post near the gate with keys to any security locks. In case of emergency personnel can enter the property without having to cut any locks, which would allow the gate to be resecured after the incident.

I would appreciate it if the contractor or operator can provide emergency response training/operations for fire department personnel. Basically, the layout of the units, operating near and around the photocells, what to do if one catches fire. If there is an issue, whoever is in charge of the operation would be contacted immediately, but should something need to be done immediately, personnel should know the emergency procedures. If the area presents an extreme hazard, going over the go/no go areas and the whys would be extremely helpful. It will also give our personnel the information they need to make decisions about how best to handle a situation and in turn keep them from doing something that may make things worse.

Should you have any questions or concerns, please feel free to contact me.

Respectfully,

On Wed, Sep 16, 2020 at 11:15 PM Steve Broyer <steve.broyer@ecosrenewable.com> wrote:

> Derek-
>
> Have you had a chance to review the attached plan, I'm in the process of submitting a response to the CSC and any input you may have will be helpful.
>
> Roadway:
>
> 12' Wide
>
> 45' Radius T hammer head turn around at major utility equipment pad(s) and inverters (we've typically used this on all our CT projects)
>
> All fire susceptible equipment is centrally located at this turn around.
>
> Max Driveway Slope 10%
>
> Feel free to contact me with any questions.
>
> Thank you,
>
> Steve
>
> ---
>
> From: Steve Broyer
> Sent: Tuesday, September 1, 2020 4:49 PM
> To: dlundeen@ansoniact.org
> Subject: RE: CSC Petition 1395A
>
> Derek-

I'm writing to inquire if you have had a chance to review the information submitted below, and have any comments relating to the project.

Thank you,

Steve

From: Steve Broyer
Sent: Tuesday, August 25, 2020 9:34 AM
To: dlundeen@ansoniact.org
Subject: RE: CSC Petition 1395A

Derek-

Apologies for the incorrect attachment, which was the cover sheet of the plan set. I have attached the appropriate site plan for the project.

Steve

From: Steve Broyer
Sent: Monday, August 24, 2020 3:13 PM
To: dlundeen@ansoniact.org
Subject: CSC Petition 1395A

Derek-

Hello, I'm Steve Broyer with Ecos Energy. Ecos Energy is utility scale solar developer currently working on entitling a project with the Connecticut Siting Council in Ansonia, CT. You may be aware of the project. If not, I've attached a basic site plan, and below is a link to the pertinent documents associated with the full petition.

https://portal.ct.gov/CSC/3_Petitions/Petition-Nos-1391-1400/Petition-No-1395A-Windham-Solar_Ansonia

Ecos Energy, has designed permitted and constructed several facilities in CT, many of which are currently up and operating today. These operating facilities have similar site layouts (access, panel layout, clearances) as the proposed facilities associated with Petition 1395A. A couple weeks ago the CSC has issued interrogatory questions associated with this petition, and inquired if we had contacted local fire marshal for input.

The states solar fire code addresses ground mounted systems with the following requirements.

11.12.3 Ground-Mounted Photovoltaic System Installations. Ground-mounted photovoltaic systems shall be installed in accordance with 11.12.3.1 through 11.12.3.3.

11.12.3.1* Clearances. A clear area of 10 ft (3048 mm) around ground-mounted photovoltaic installations shall be provided.

11.12.3.2* Noncombustible Base. A gravel base or other non-combustible base acceptable to the AHJ shall be installed and maintained under and around the installation.

11.12.3.3* Security Barriers. Fencing, skirting, or other suitable security barriers shall be installed when required by the AHJ.

Ultimately I'm reaching out to determine if you have any concerns relating to access, clearances, security etc. Feel free to contact me directly with any questions you may have.

Thank you,

Steve

Steve Broyer

Direct: (612) 326-1500

Mobile: (612) 770-4645

steve.broyer@ecosrenewable.com

Ecos Energy | www.ecosrenewable.com

222 S 9th St, Suite 1600

Minneapolis, MN 55402

--

Darrick Lundeen

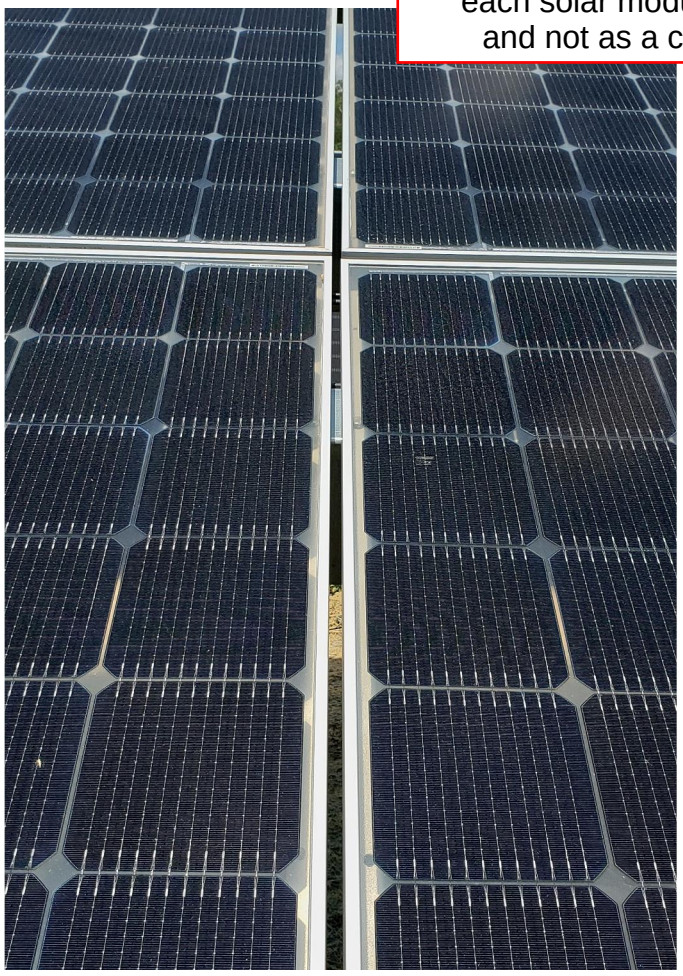
Fire Marshal

City of Ansonia
Office (203)734-3525

--
Darrick Lundeen
Fire Marshal
City of Ansonia
Office (203)734-3525

EXHIBIT C

Modules are separated approximately 1/4" which allows for water to drip from each solar module independently, and not as a continuous plane.



Photos of drip lines of solar modules on contiguous slopes with recently sprayed tackifier and hydro seed. Drip line rutting or erosion is minimal.

Array with groundcover establishment.

EXHIBIT D

DRAINAGE REPORT

Benz Street Solar

31 Benz Street
Ansonia, Connecticut

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

Revised: September 17, 2020
July 24, 2020

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

Kyle Haubert, P.E.

BENZ STREET SOLAR SITE
31 BENZ STREET
ANSONIA, CT

The existing site 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. CLA Engineers is providing the design and calculations for the stabilization of the site.

PROPOSED HYDRAULICS

The attached Figures 1 and 2 show the existing conditions and the post development site conditions for the site. 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.

COEFFICIENT OF RUNOFF

The Coefficient of Runoff values were determined based on ConnDOT Drainage Manual. Weighted runoff coefficients were determined based on the existing and post development land uses. The weighted runoff coefficients are included in the calculations and were based on the following:

Existing Conditions

Drainage Manual Table 6-4 designates the runoff coefficient for unimproved areas as a range of 0.10-0.30. Table 6-3 of the Drainage Manual outlines a range of coefficients of runoff based on slope 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. Land slopes range from approximately 1.5% to 30%. This hydrologic soil group and slope narrows the coefficient of runoff range to 0.12-0.24. Based on the existing wooded land cover and rocky terrain a runoff coefficient of 0.20 was used for the existing conditions.

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 12'-6" and the clear spacing between the panels is 12'-6". Therefore there is no effective impervious area from the solar panel arrays.

The effective impervious area for each watershed is as follows:

Watershed #1: There is no effective impervious area from the arrays
There are no access drives of pads within this watershed

Watershed #2: There is no effective impervious area from the arrays
Access Drive & Pads = 4,720 SF = 0.11 Acres

Drainage Manual Table 6-5 designates the runoff coefficient for various impervious surfaces that range from 0.70-0.95. For the purposes of the calculations, a runoff coefficient of 0.95 was used.

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 3 times per year. Table 6-4 of the Drainage Manual designates the runoff coefficient for parks, cemeteries as a range of 0.10-0.25, which in our opinion is a comparable land cover. A cemetery is also similar, having mowed grass, and heavy equipment that travels over and compacts the surrounding soils. Based on these factors a runoff coefficient of 0.25 was used for the post development conditions. This runoff coefficient is also consistent with the range of coefficients outlined in Table 6-3 of the Drainage Manual when the hydrologic soil group is increased from the existing B to C for post development for steep slopes as recommended by the CTDEEP "Guidance Regarding Solar Arrays" document dated January 8, 2020.

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

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. The calculations for each storm are attached. 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.

Table 1

As a conservative measure in the calculations infiltration into the surrounding soil within the stormwater treatment basins was not deducted.

	Peak Flow Rate (CFS)				
Watershed #1	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Condition (Hyd #1) :	4.939	7.332	8.827	9.954	11.100
Post Development (Hyd #3) :	0.000	0.000	0.571	2.267	3.816
Change :	-4.939	-7.332	-8.256	-7.687	-7.284

	Peak Flow Rate (CFS)				
Watershed #2	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Cond. (Hyd #5) :	1.458	2.164	2.605	2.938	3.277
Post Development (Hyd #7) :	0.000	0.000	0.461	1.198	1.869
Change :	-1.458	-2.164	-2.144	-1.740	-1.408

WATERSHED #1

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 4,879 CF:

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

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 lower basin above elevation 394.5, the bottom of the riprap level spreader. The minimum volume equals the sediment storage volume. The available dry storage volume in Basin #1 is 24,464 CF which exceeds the required 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 17,592 CF of storage below this elevation which exceeds the required 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 42,057 CF which exceeds the required total storage volume.

There is no proposed discharge for the 10-year storm from stormwater treatment basin #1 as shown in Table 1 therefore the minimum residence storage time will be met.

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. The attached plan entitled Solar Module Effective Impervious Exhibit shows how the impervious area was calculated.

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 "Guidance Regarding Solar Arrays" document dated January 8, 2020. The calculations show that a WQV of 8,625 CF is required as shown in the table below.

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.) :	2.19	
I =	27.0%	
R =	0.293	
Required WQV =	0.198	Ac.-Ft
	8,625	CF
WQV Provided :	**17,592**	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 17,592 CF which exceeds the required Water Quality Volume.

SUMMARY OF STORMWATER TREATMENT BASIN #1 VOLUMES

During Construction	Required	Provided
Wet Storage Volume	9,758 CF	17,592 CF
Dry Storage Volume	4,879 CF	24,464 CF
Total Storage Volume	14,637 CF	42,057 CF

Post Construction	Required	Provided
Water Quality Volume	8,625 CF	17,592 CF

WATERSHED #2

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 required is 8,973 CF:

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 bottom of the riprap level spreader outlet of the basin. 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 8,287 CF of dry storage available in the basin.

The wet storage volume is the volume in the basin that is located below bottom of the riprap level spreader 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 4,622 CF of storage available below the basin discharge.

There is no proposed discharge for the 10-year storm from stormwater treatment basin #2 as shown in Table 1 therefore the minimum residence storage time will be met.

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 "Guidance Regarding Solar Arrays" document dated January 8, 2020. There are 2,606 LF of 12'-0" wide panels in the watershed. This equates to 0.72 acres of impervious area plus 0.11 acres of drive and pads. The calculations show that a WQV of 3,161.7 CF is required as shown in the table below.

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.) :	0.83	
I =	33.5%	
R =	0.351	
Required WQV =	0.073	Ac.-Ft
	3,161.7	CF
WQV Provided :	**4,622**	CF

The invert of the lowest outlet structure for stormwater treatment basin #2 is elevation 398.5 at the bottom of the riprap level spreader. The storage volume below this elevation is 4,922 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	4,622 CF
Dry Storage Volume	4,486.5 CF	8,287 CF
Total Storage Volume	8,973 CF	12,909 CF

Post Construction	Required	Provided
Water Quality Volume	3,161.7 CF	4,622 CF

FIGURES

N

0' 60' 120' 180'

No.	DATE	REVISION
1	9/17/2020	Misc. Updates & Revisions

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(860) 886-1966 Fax (860) 886-9165

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

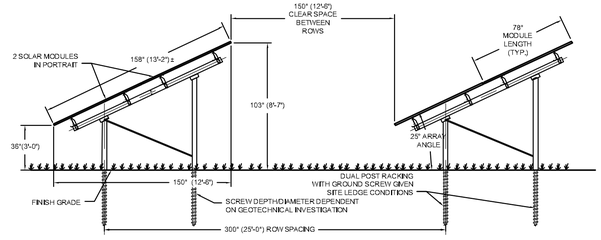
WATERSHEDS:
EXISTING CONDITIONS

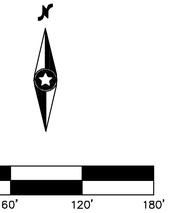
Project No. CLA-6430
Proj. Engineer K.J.H.
Date: 7/24/2020
Figure No. 1

CLA

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

RACKING PROFILE DETAIL:





No.	DATE	REVISION
1	9/17/2020	Misc. Updates & Revisions

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317 Main Street Norwich, CT 06360
(860) 886-1966 Fax (860) 886-9165

31 BENZ STREET
ANSONIA, CT 06401

BENZ STREET SOLAR

WATERSHEDS:
POST DEVELOPMENT CONDITIONS

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

CLA

M:\6000\6400\6430 Benz Street Solar\Drawings\04 HYDROLOGY BENZ.dwg

CALCULATIONS:

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

Hydraflow Table of Contents

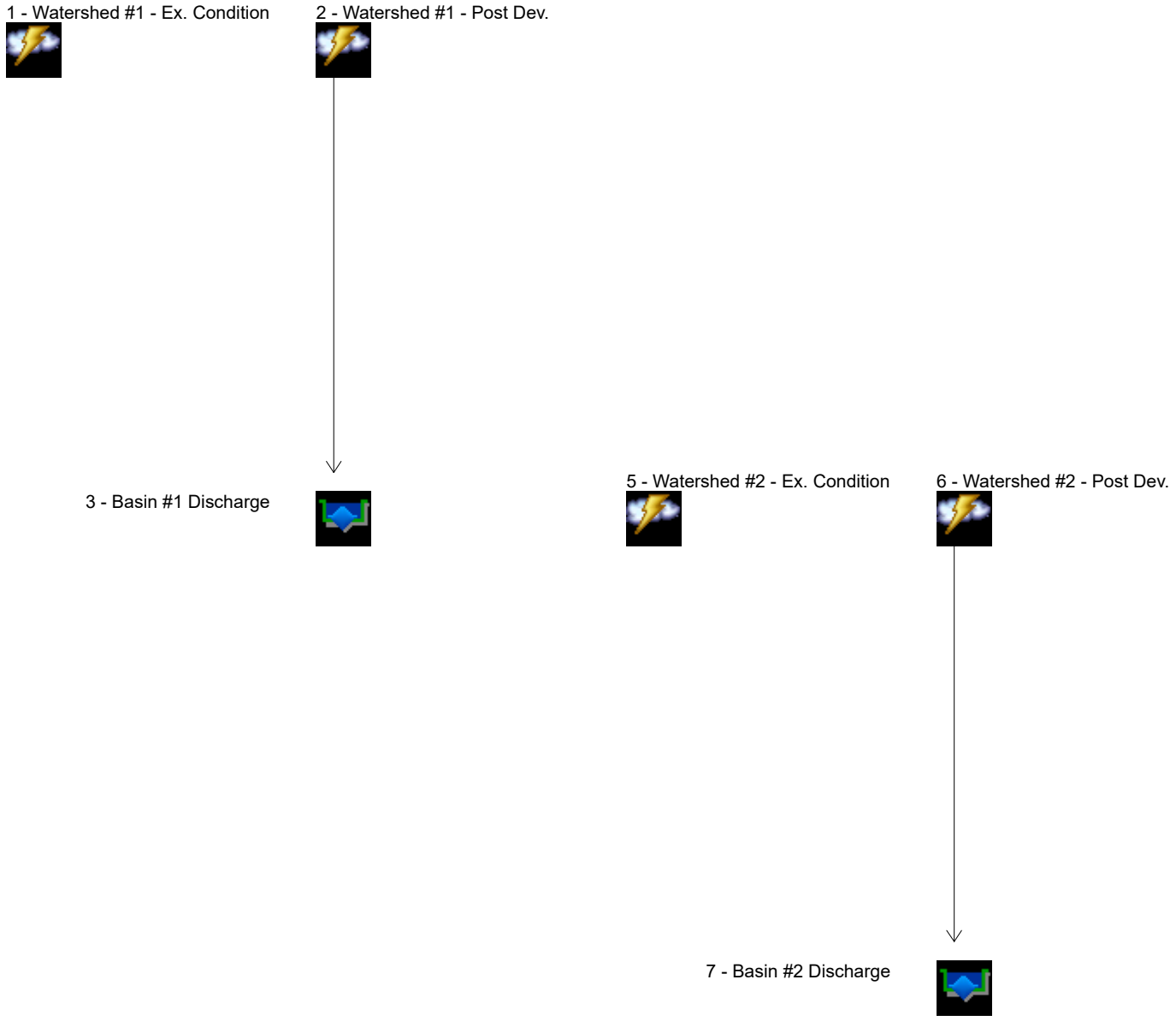
6430 Benz REV.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Thursday, Sep 17, 2020

100 - Year

Watershed Model Schematic

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



Legend

Hyd.	Origin	Description
1	Rational	Watershed #1 - Ex. Condition
2	Rational	Watershed #1 - Post Dev.
3	Reservoir	Basin #1 Discharge
5	Rational	Watershed #2 - Ex. Condition
6	Rational	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	Rational	------	-------	4.939	-------	-------	7.332	8.827	9.954	11.10	Watershed #1 - Ex. Condition
2	Rational	------	-------	6.174	-------	-------	9.165	11.03	12.44	13.88	Watershed #1 - Post Dev.
3	Reservoir	2	-------	0.000	-------	-------	0.000	0.571	2.267	3.816	Basin #1 Discharge
5	Rational	------	-------	1.458	-------	-------	2.164	2.605	2.938	3.277	Watershed #2 - Ex. Condition
6	Rational	------	-------	2.509	-------	-------	3.723	4.482	5.050	5.641	Watershed #2 - Post Dev.
7	Reservoir	6	-------	0.000	-------	-------	0.000	0.461	1.198	1.869	Basin #2 Discharge

Hydrograph Summary Report

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

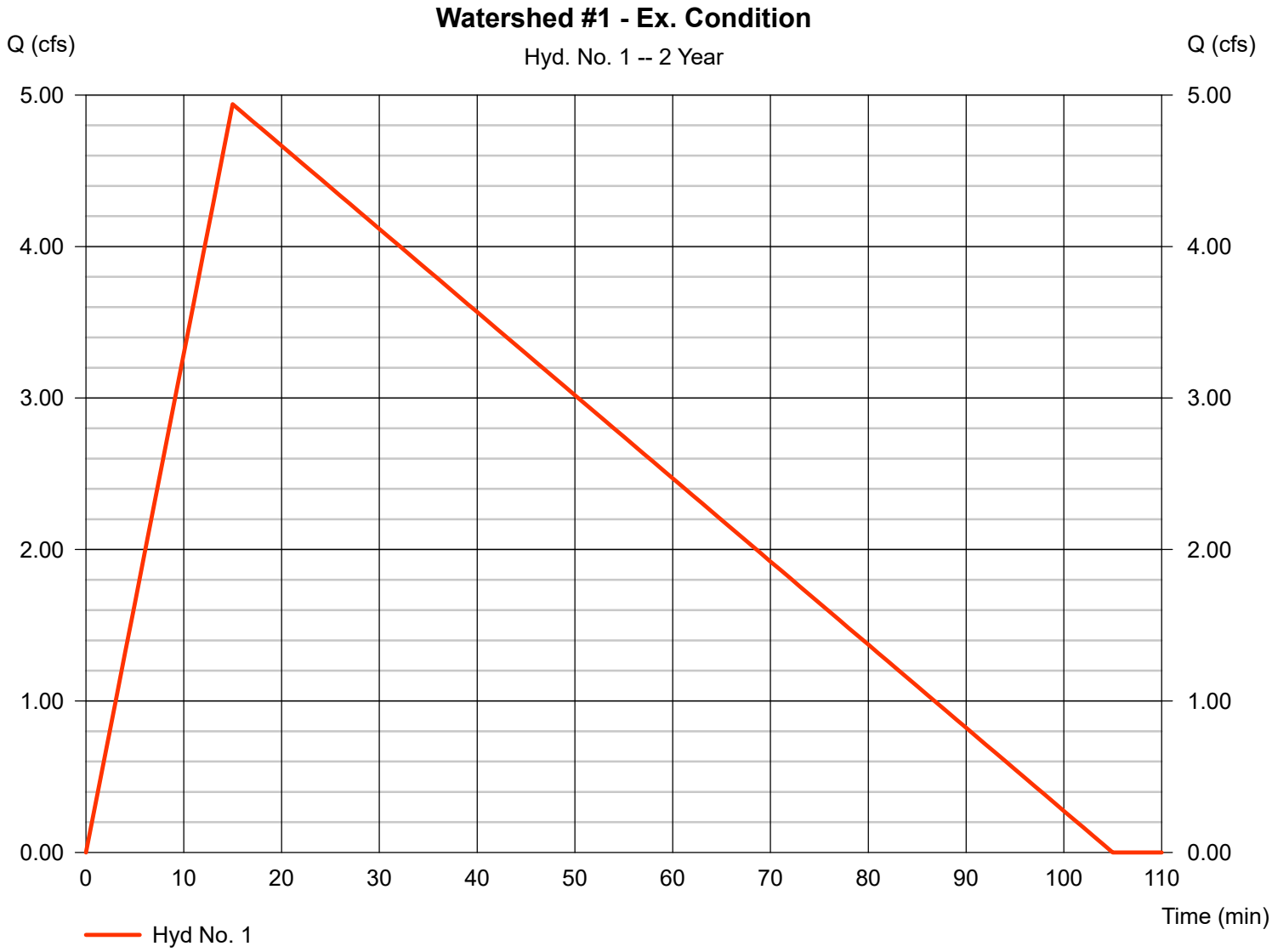
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	4.939	1	15	15,559	------	------	------	Watershed #1 - Ex. Condition
2	Rational	6.174	1	15	19,449	------	------	------	Watershed #1 - Post Dev.
3	Reservoir	0.000	1	n/a	0	2	394.63	19,449	Basin #1 Discharge
5	Rational	1.458	1	16	4,898	------	------	------	Watershed #2 - Ex. Condition
6	Rational	2.509	1	11	5,797	------	------	------	Watershed #2 - Post Dev.
7	Reservoir	0.000	1	n/a	0	6	398.76	5,797	Basin #2 Discharge

Hydrograph Report

Hyd. No. 1

Watershed #1 - Ex. Condition

Hydrograph type	=	Rational	Peak discharge	=	4.939 cfs
Storm frequency	=	2 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	15,559 cuft
Drainage area	=	8.100 ac	Runoff coeff.	=	0.2
Intensity	=	3.049 in/hr	Tc by TR55	=	15.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6



TR55 Tc Worksheet

Hyd. No. 1

Watershed #1 - Ex. Condition

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.400		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.44		0.00		0.00		
Land slope (%)	=	6.00		0.00		0.00		
Travel Time (min)	**=**	**13.35**	**+**	**0.00**	**+**	**0.00**	**=**	**13.35**
Shallow Concentrated Flow								
Flow length (ft)	=	410.00		20.00		0.00		
Watercourse slope (%)	=	5.80		0.50		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	3.89		1.14		0.00		
Travel Time (min)	**=**	**1.76**	**+**	**0.29**	**+**	**0.00**	**=**	**2.05**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 15.00 min

Hydrograph Report

Hyd. No. 2

Watershed #1 - Post Dev.

Hydrograph type	=	Rational	Peak discharge	=	6.174 cfs
Storm frequency	=	2 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	19,449 cuft
Drainage area	=	8.100 ac	Runoff coeff.	=	0.25
Intensity	=	3.049 in/hr	Tc by TR55	=	15.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6

TR55 Tc Worksheet

Hyd. No. 2

Watershed #1 - Post Dev.

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.400		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.44		0.00		0.00		
Land slope (%)	=	6.00		0.00		0.00		
Travel Time (min)	**=**	**13.35**	**+**	**0.00**	**+**	**0.00**	**=**	**13.35**
Shallow Concentrated Flow								
Flow length (ft)	=	410.00		20.00		0.00		
Watercourse slope (%)	=	5.80		0.50		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	3.89		1.14		0.00		
Travel Time (min)	**=**	**1.76**	**+**	**0.29**	**+**	**0.00**	**=**	**2.05**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 15.00 min

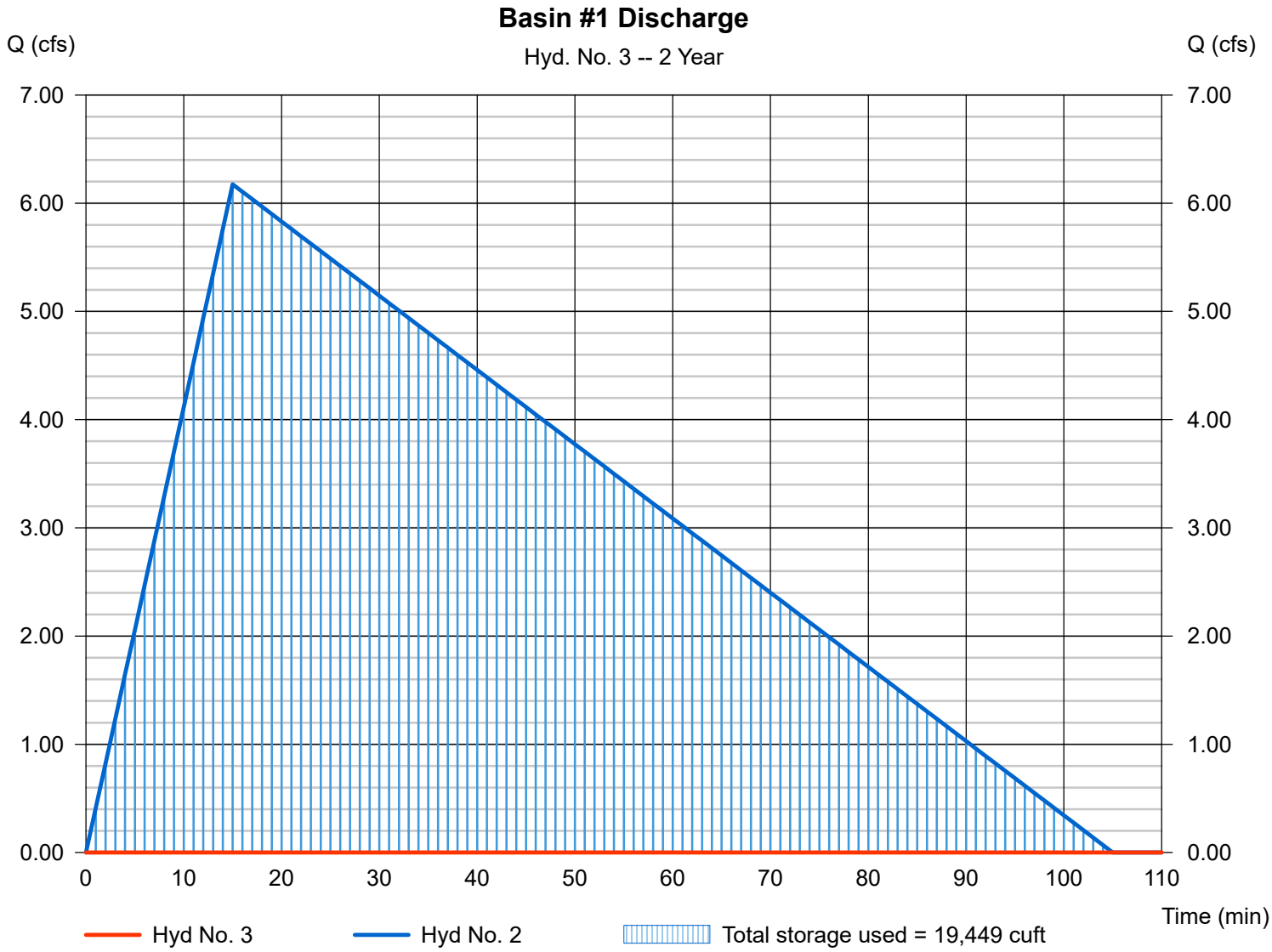
Hydrograph Report

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	=	394.63 ft
Reservoir name	=	Basin #1	Max. Storage	=	19,449 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 = 393.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	393.00	9,509	0	0
1.00	394.00	12,500	10,969	10,969
1.50	394.50	14,009	6,623	17,592
2.00	395.00	15,532	7,381	24,974
2.50	395.50	17,069	8,146	33,120
3.00	396.00	18,694	8,937	42,057

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)	= 12.00	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 Wet area)			
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).

Stage / Storage / Discharge Table

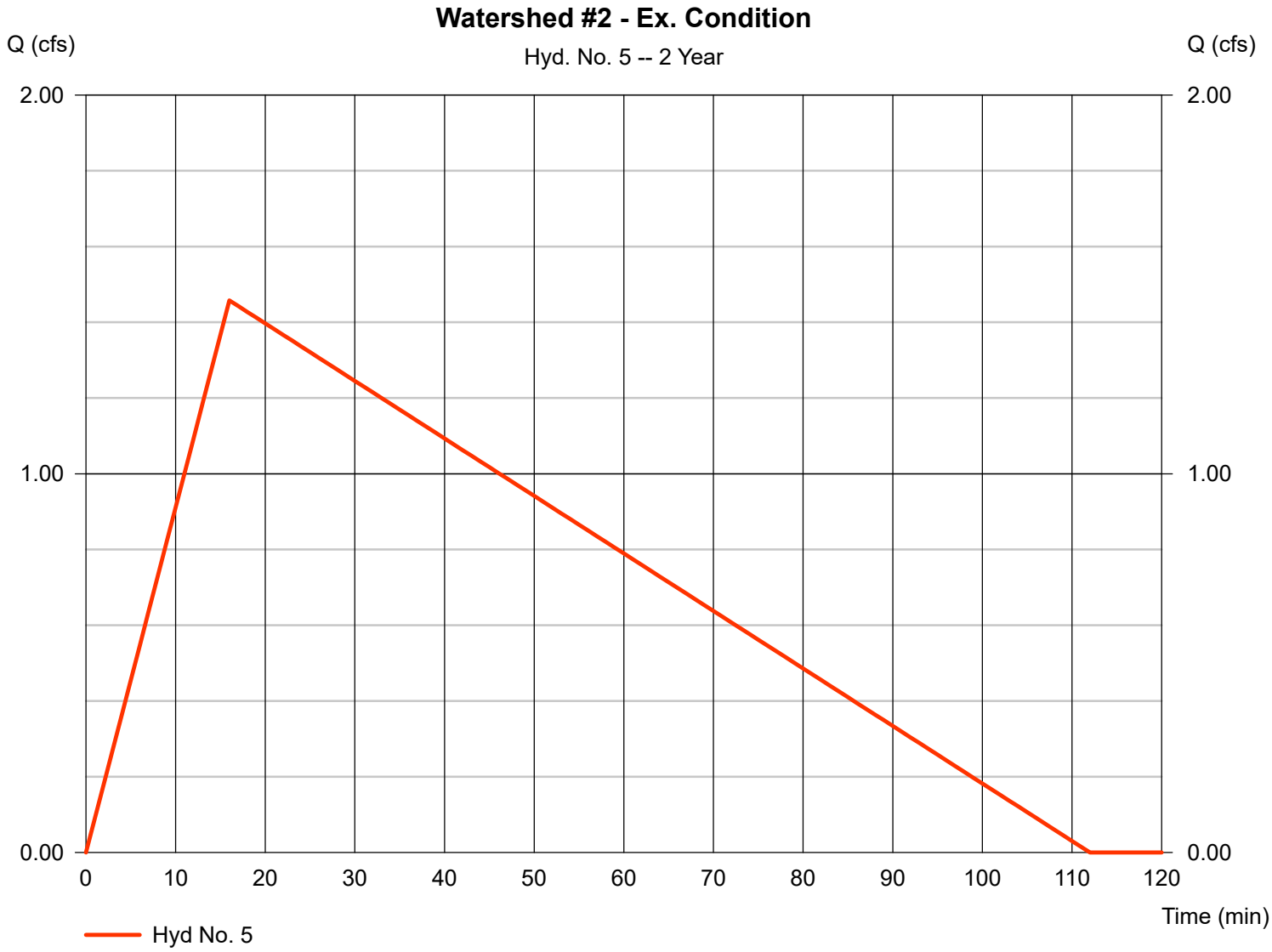
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	393.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.00	10,969	394.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.50	17,592	394.50	---	---	---	---	0.00	---	---	---	---	---	0.000
2.00	24,974	395.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.50	33,120	395.50	---	---	---	---	0.00	---	---	---	---	---	0.000
3.00	42,057	396.00	---	---	---	---	11.03	---	---	---	---	---	11.03

Hydrograph Report

Hyd. No. 5

Watershed #2 - Ex. Condition

Hydrograph type	=	Rational	Peak discharge	=	1.458 cfs
Storm frequency	=	2 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	4,898 cuft
Drainage area	=	2.480 ac	Runoff coeff.	=	0.2
Intensity	=	2.939 in/hr	Tc by TR55	=	16.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6



TR55 Tc Worksheet

Hyd. No. 5

Watershed #2 - Ex. Condition

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.400		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.44		0.00		0.00		
Land slope (%)	=	5.00		0.00		0.00		
Travel Time (min)	**=**	**14.36**	**+**	**0.00**	**+**	**0.00**	**=**	**14.36**
Shallow Concentrated Flow								
Flow length (ft)	=	135.00		110.00		0.00		
Watercourse slope (%)	=	16.00		1.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	6.45		2.03		0.00		
Travel Time (min)	**=**	**0.35**	**+**	**0.90**	**+**	**0.00**	**=**	**1.25**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 16.00 min

Hydrograph Report

Hyd. No. 6

Watershed #2 - Post Dev.

Hydrograph type	=	Rational	Peak discharge	=	2.509 cfs
Storm frequency	=	2 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	5,797 cuft
Drainage area	=	2.480 ac	Runoff coeff.	=	0.28*
Intensity	=	3.614 in/hr	Tc by TR55	=	11.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6

* Composite (Area/C) = [(2.370 x 0.25) + (0.110 x 0.95)] / 2.480

TR55 Tc Worksheet

Hyd. No. 6

Watershed #2 - Post Dev.

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.44		0.00		0.00		
Land slope (%)	=	5.00		0.00		0.00		
Travel Time (min)	**=**	**9.54**	**+**	**0.00**	**+**	**0.00**	**=**	**9.54**
Shallow Concentrated Flow								
Flow length (ft)	=	95.00		125.00		0.00		
Watercourse slope (%)	=	25.00		1.00		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	8.07		1.61		0.00		
Travel Time (min)	**=**	**0.20**	**+**	**1.29**	**+**	**0.00**	**=**	**1.49**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 11.00 min

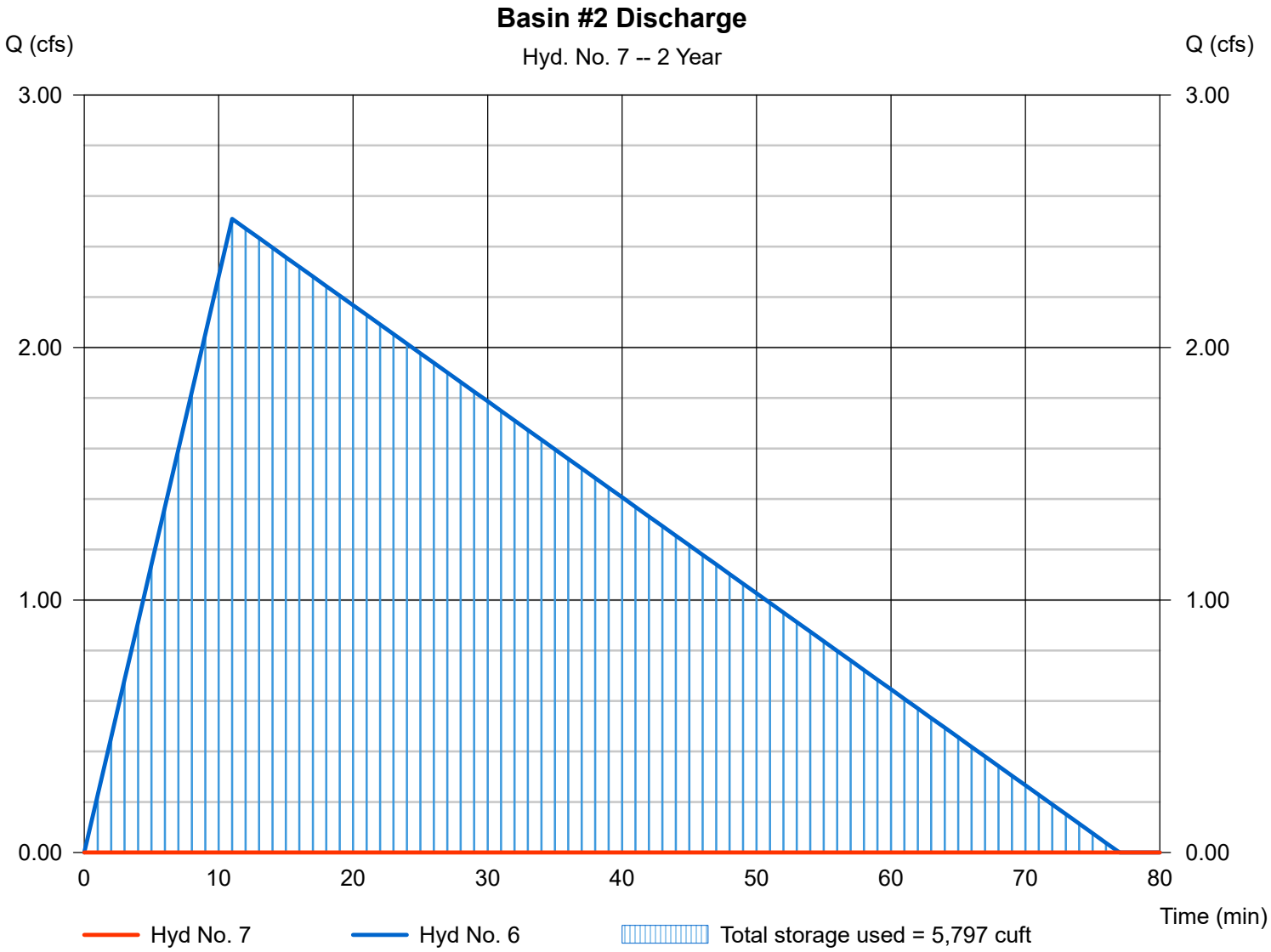
Hydrograph Report

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	=	398.76 ft
Reservoir name	=	Basin #2	Max. Storage	=	5,797 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	189	0	0
1.00	397.00	1,400	701	701
2.00	398.00	3,046	2,170	2,871
2.50	398.50	3,979	1,751	4,622
3.00	399.00	4,979	2,235	6,857
3.50	399.50	6,045	2,751	9,608
4.00	400.00	7,177	3,301	12,909

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
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)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 399.50	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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	396.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.00	701	397.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.00	2,871	398.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.50	4,622	398.50	---	---	---	---	0.00	---	---	---	---	---	0.000
3.00	6,857	399.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.50	9,608	399.50	---	---	---	---	0.00	---	---	---	---	---	0.000
4.00	12,909	400.00	---	---	---	---	9.19	---	---	---	---	---	9.192

Hydrograph Summary Report

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

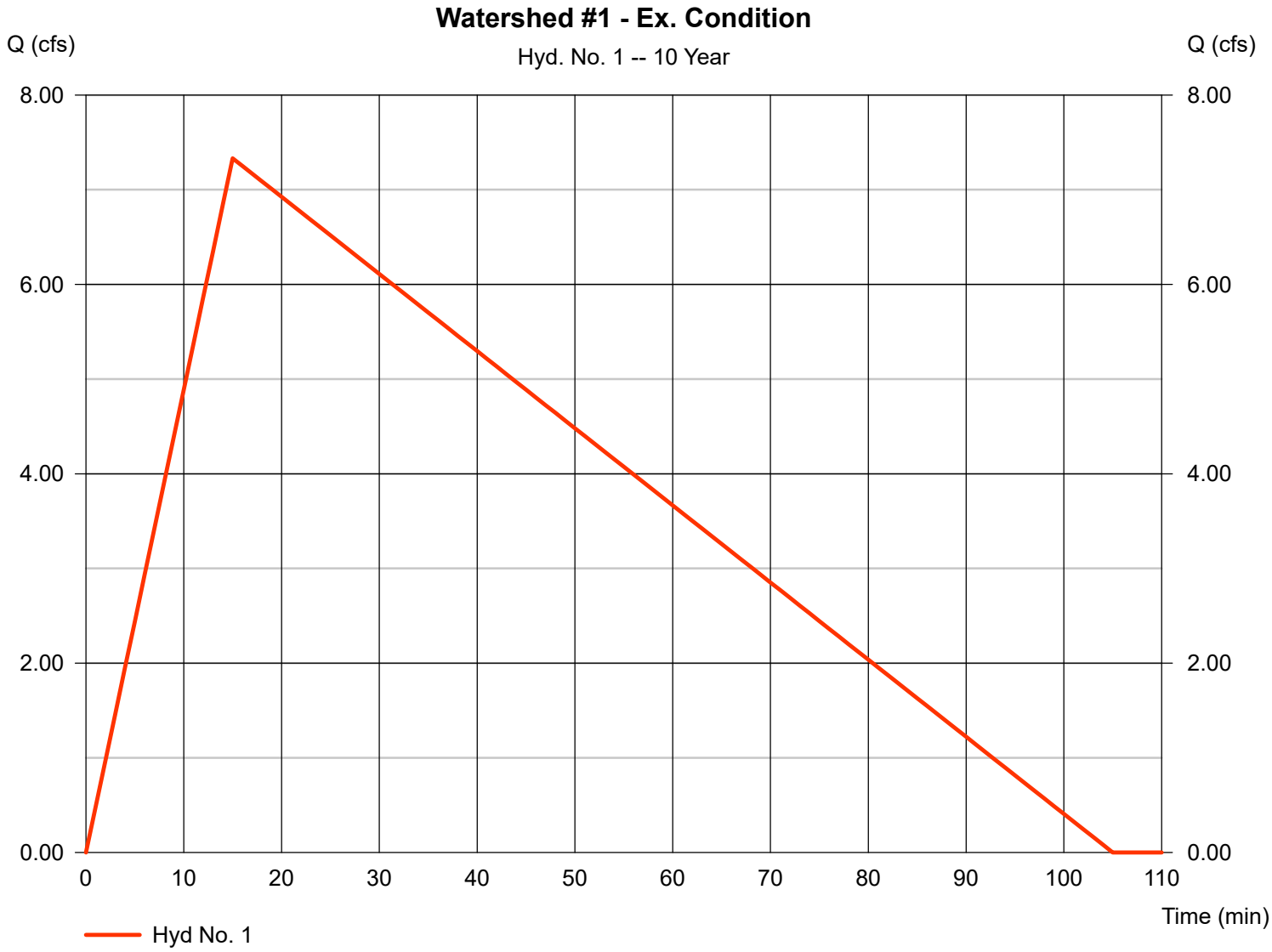
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	7.332	1	15	23,097	------	------	------	Watershed #1 - Ex. Condition
2	Rational	9.165	1	15	28,871	------	------	------	Watershed #1 - Post Dev.
3	Reservoir	0.000	1	n/a	0	2	395.24	28,871	Basin #1 Discharge
5	Rational	2.164	1	16	7,271	------	------	------	Watershed #2 - Ex. Condition
6	Rational	3.723	1	11	8,600	------	------	------	Watershed #2 - Post Dev.
7	Reservoir	0.000	1	n/a	0	6	399.32	8,600	Basin #2 Discharge

Hydrograph Report

Hyd. No. 1

Watershed #1 - Ex. Condition

Hydrograph type	=	Rational	Peak discharge	=	7.332 cfs
Storm frequency	=	10 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	23,097 cuft
Drainage area	=	8.100 ac	Runoff coeff.	=	0.2
Intensity	=	4.526 in/hr	Tc by TR55	=	15.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6



Hydrograph Report

Hyd. No. 2

Watershed #1 - Post Dev.

Hydrograph type	=	Rational	Peak discharge	=	9.165 cfs
Storm frequency	=	10 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	28,871 cuft
Drainage area	=	8.100 ac	Runoff coeff.	=	0.25
Intensity	=	4.526 in/hr	Tc by TR55	=	15.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6

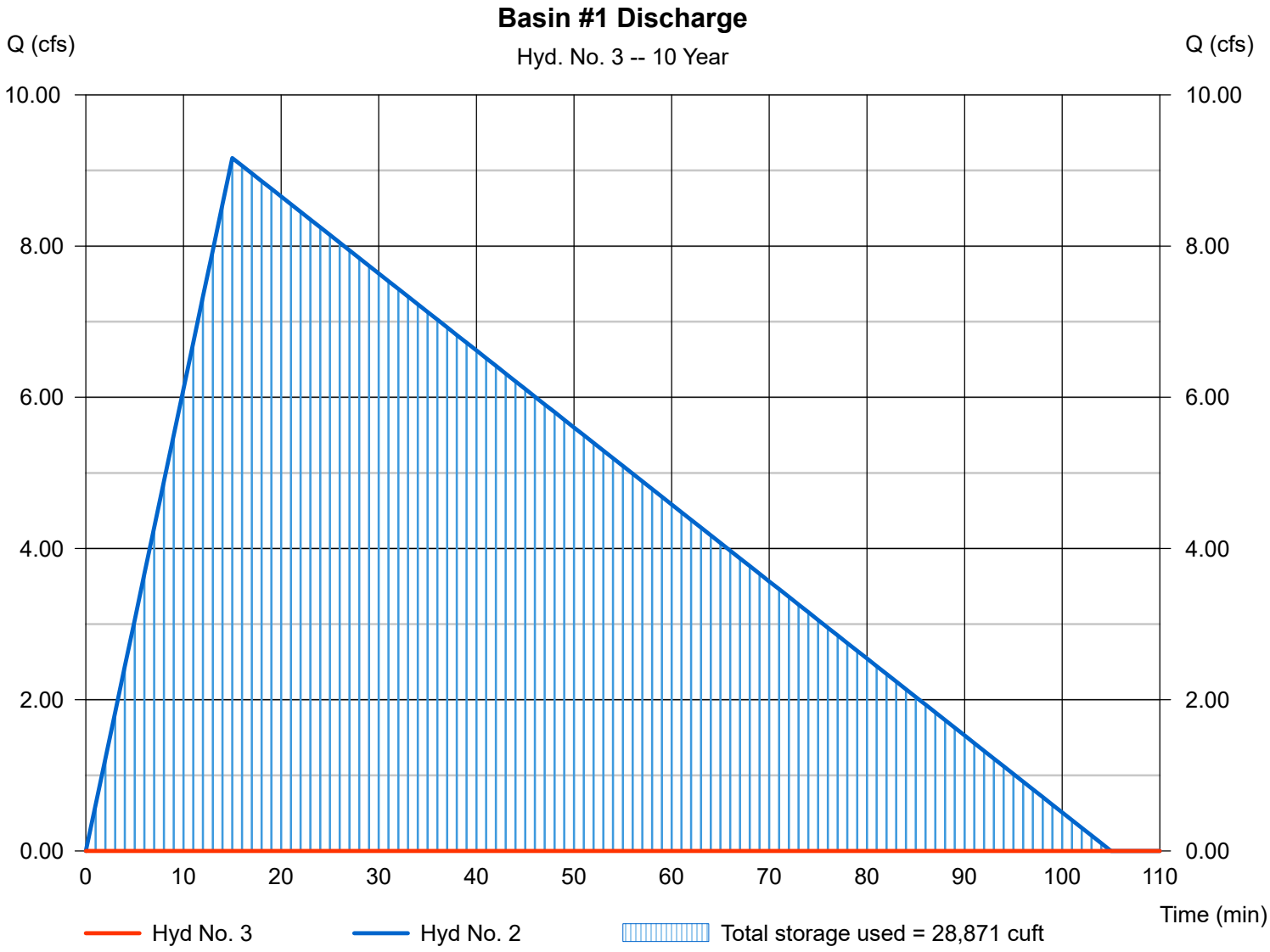
Hydrograph Report

Hyd. No. 3

Basin #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	2 - Watershed #1 - Post Dev.	Max. Elevation	=	395.24 ft
Reservoir name	=	Basin #1	Max. Storage	=	28,871 cuft

Storage Indication method used.

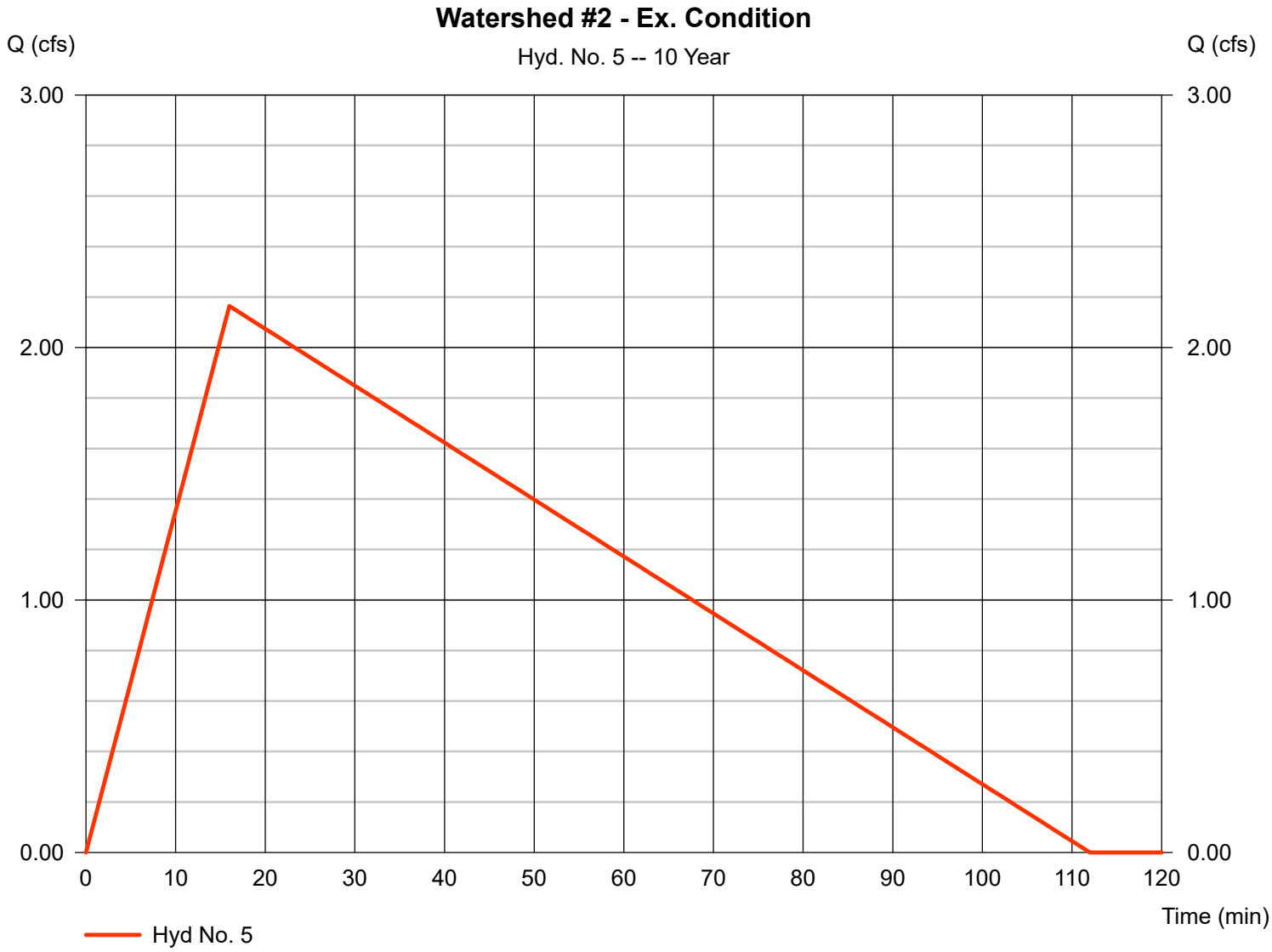


Hydrograph Report

Hyd. No. 5

Watershed #2 - Ex. Condition

Hydrograph type	=	Rational	Peak discharge	=	2.164 cfs
Storm frequency	=	10 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	7,271 cuft
Drainage area	=	2.480 ac	Runoff coeff.	=	0.2
Intensity	=	4.363 in/hr	Tc by TR55	=	16.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6



Hydrograph Report

Hyd. No. 6

Watershed #2 - Post Dev.

Hydrograph type	=	Rational	Peak discharge	=	3.723 cfs
Storm frequency	=	10 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	8,600 cuft
Drainage area	=	2.480 ac	Runoff coeff.	=	0.28*
Intensity	=	5.362 in/hr	Tc by TR55	=	11.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6

* Composite (Area/C) = [(2.370 x 0.25) + (0.110 x 0.95)] / 2.480

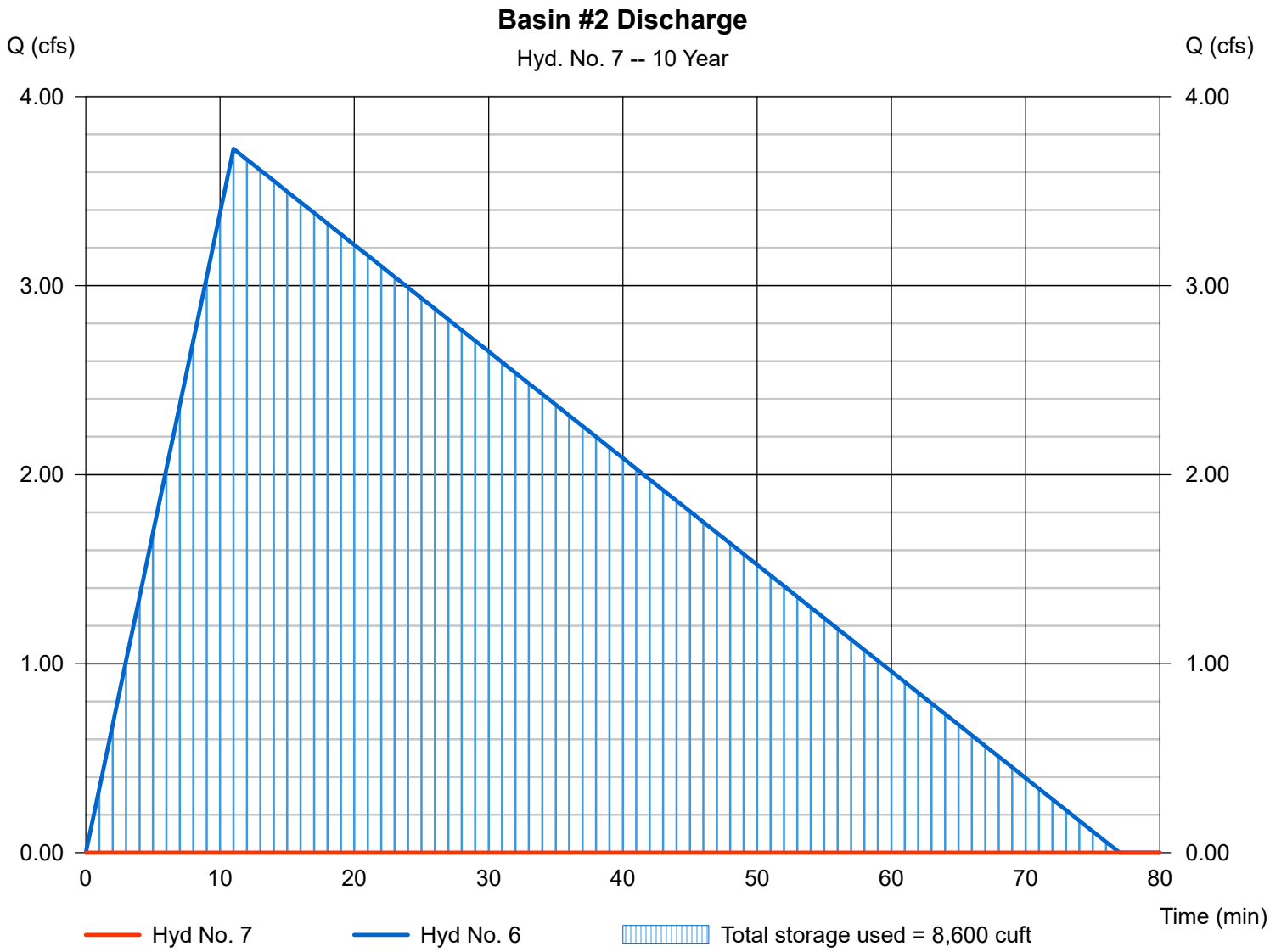
Hydrograph Report

Hyd. No. 7

Basin #2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	6 - Watershed #2 - Post Dev.	Max. Elevation	=	399.32 ft
Reservoir name	=	Basin #2	Max. Storage	=	8,600 cuft

Storage Indication method used.



Hydrograph Summary Report

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

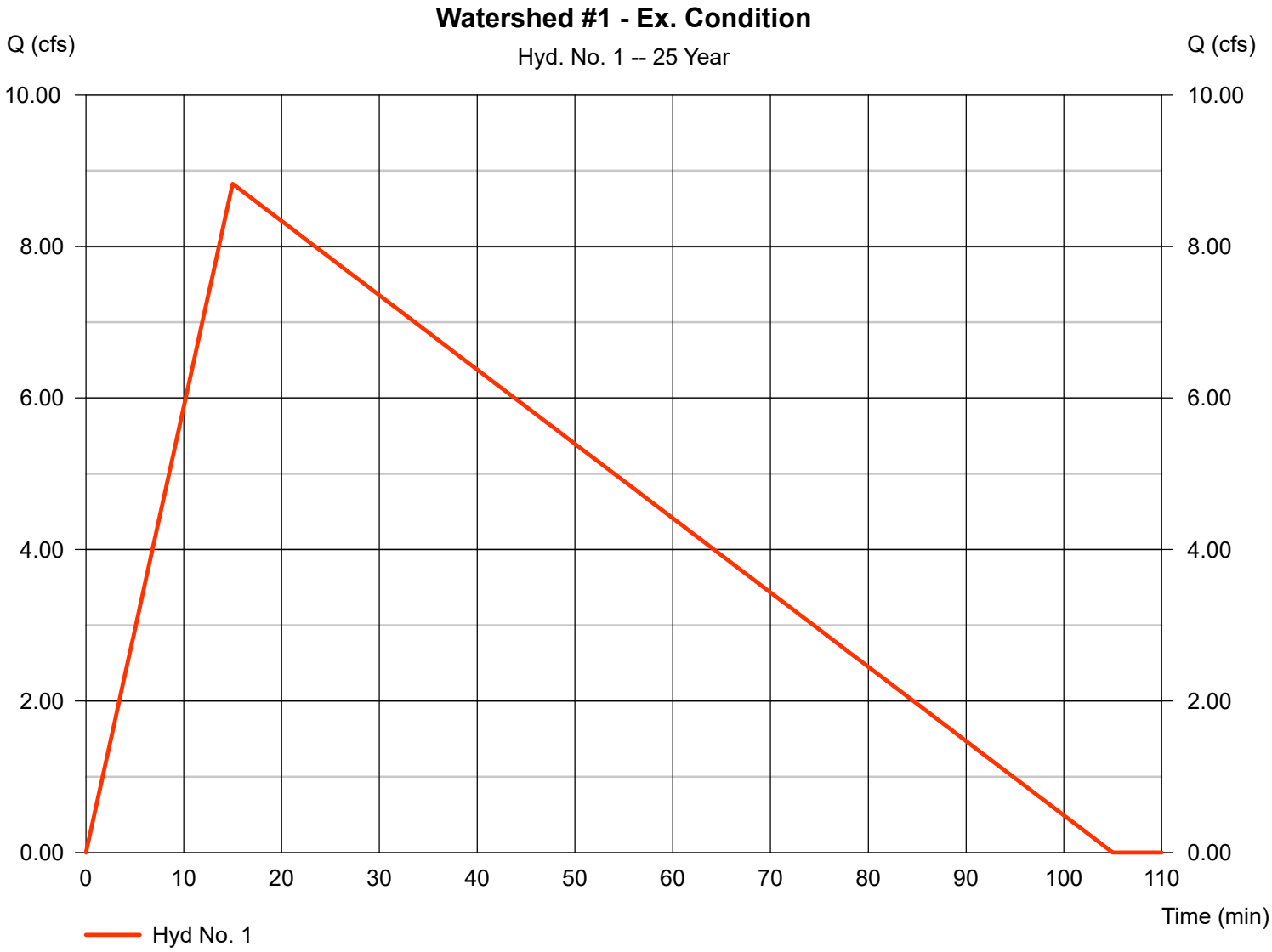
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	8.827	1	15	27,805	------	------	------	Watershed #1 - Ex. Condition
2	Rational	11.03	1	15	34,756	------	------	------	Watershed #1 - Post Dev.
3	Reservoir	0.571	1	100	1,634	2	395.57	34,326	Basin #1 Discharge
5	Rational	2.605	1	16	8,754	------	------	------	Watershed #2 - Ex. Condition
6	Rational	4.482	1	11	10,353	------	------	------	Watershed #2 - Post Dev.
7	Reservoir	0.461	1	70	744	6	399.57	10,044	Basin #2 Discharge

Hydrograph Report

Hyd. No. 1

Watershed #1 - Ex. Condition

Hydrograph type	=	Rational	Peak discharge	=	8.827 cfs
Storm frequency	=	25 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	27,805 cuft
Drainage area	=	8.100 ac	Runoff coeff.	=	0.2
Intensity	=	5.449 in/hr	Tc by TR55	=	15.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6



Hydrograph Report

Hyd. No. 2

Watershed #1 - Post Dev.

Hydrograph type	=	Rational	Peak discharge	=	11.03 cfs
Storm frequency	=	25 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	34,756 cuft
Drainage area	=	8.100 ac	Runoff coeff.	=	0.25
Intensity	=	5.449 in/hr	Tc by TR55	=	15.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6

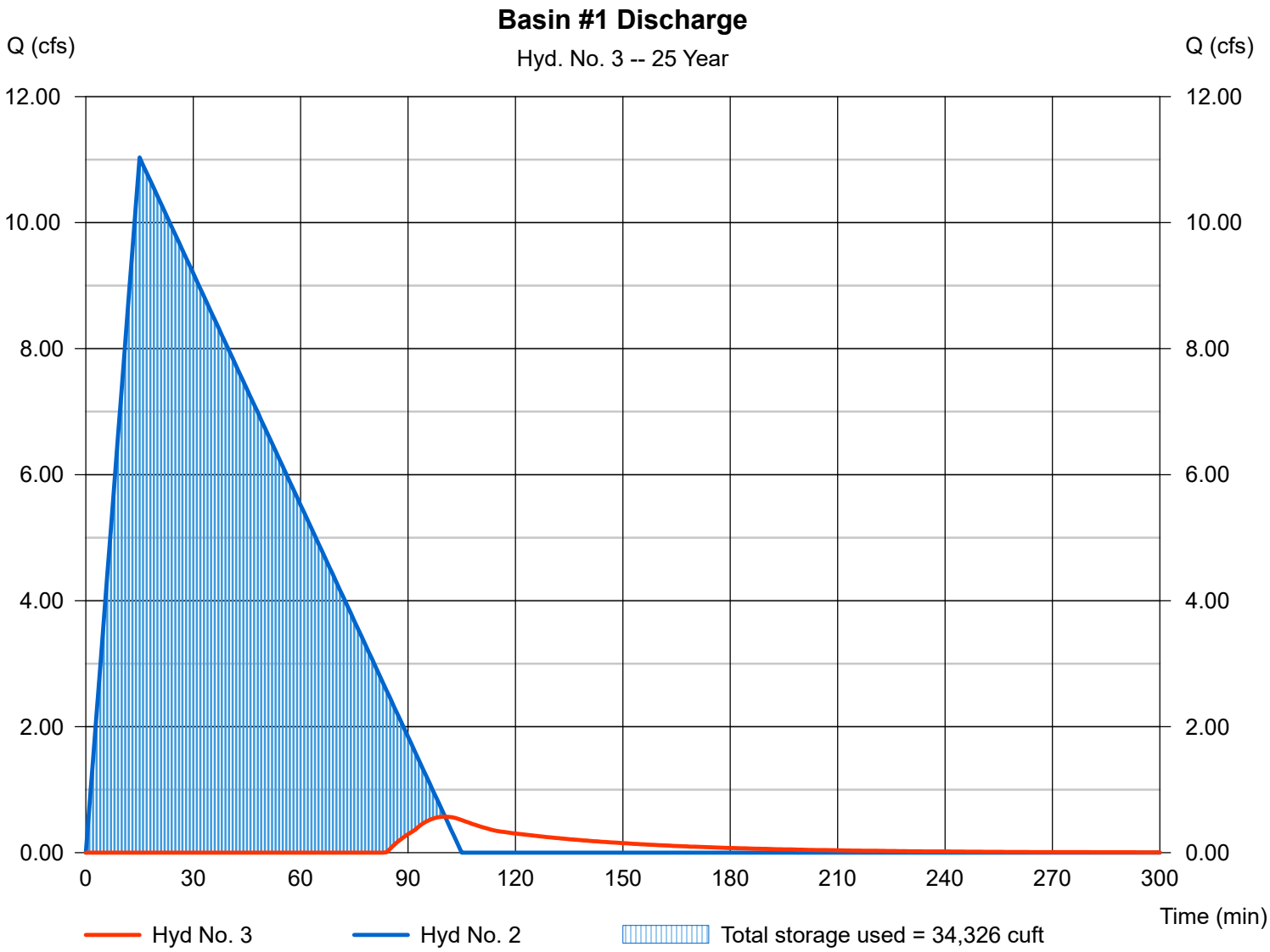
Hydrograph Report

Hyd. No. 3

Basin #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	0.571 cfs
Storm frequency	=	25 yrs	Time to peak	=	100 min
Time interval	=	1 min	Hyd. volume	=	1,634 cuft
Inflow hyd. No.	=	2 - Watershed #1 - Post Dev.	Max. Elevation	=	395.57 ft
Reservoir name	=	Basin #1	Max. Storage	=	34,326 cuft

Storage Indication method used.

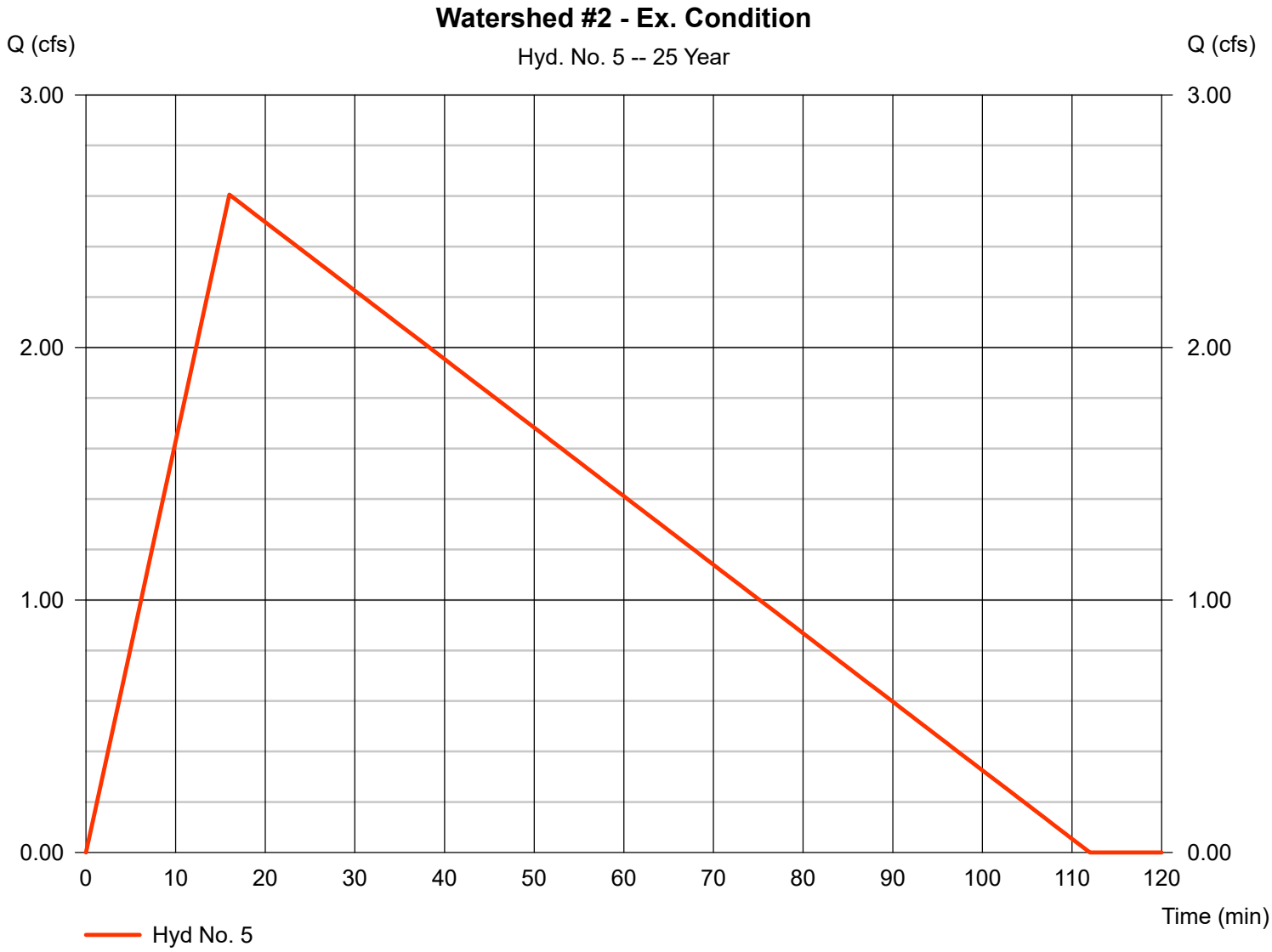


Hydrograph Report

Hyd. No. 5

Watershed #2 - Ex. Condition

Hydrograph type	=	Rational	Peak discharge	=	2.605 cfs
Storm frequency	=	25 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	8,754 cuft
Drainage area	=	2.480 ac	Runoff coeff.	=	0.2
Intensity	=	5.253 in/hr	Tc by TR55	=	16.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6



Hydrograph Report

Hyd. No. 6

Watershed #2 - Post Dev.

Hydrograph type	=	Rational	Peak discharge	=	4.482 cfs
Storm frequency	=	25 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	10,353 cuft
Drainage area	=	2.480 ac	Runoff coeff.	=	0.28*
Intensity	=	6.454 in/hr	Tc by TR55	=	11.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6

* Composite (Area/C) = [(2.370 x 0.25) + (0.110 x 0.95)] / 2.480

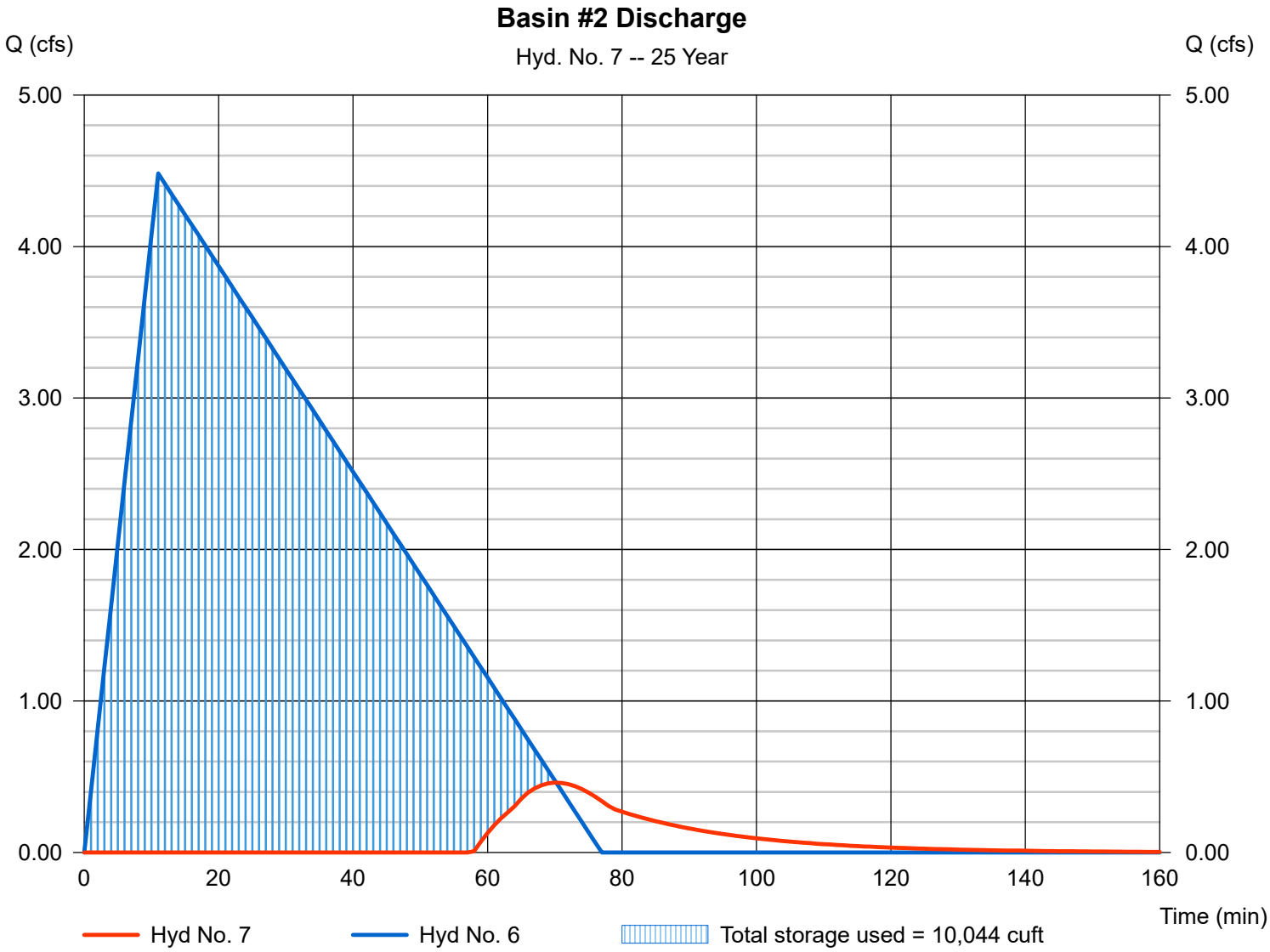
Hydrograph Report

Hyd. No. 7

Basin #2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	0.461 cfs
Storm frequency	=	25 yrs	Time to peak	=	70 min
Time interval	=	1 min	Hyd. volume	=	744 cuft
Inflow hyd. No.	=	6 - Watershed #2 - Post Dev.	Max. Elevation	=	399.57 ft
Reservoir name	=	Basin #2	Max. Storage	=	10,044 cuft

Storage Indication method used.



Hydrograph Summary Report

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

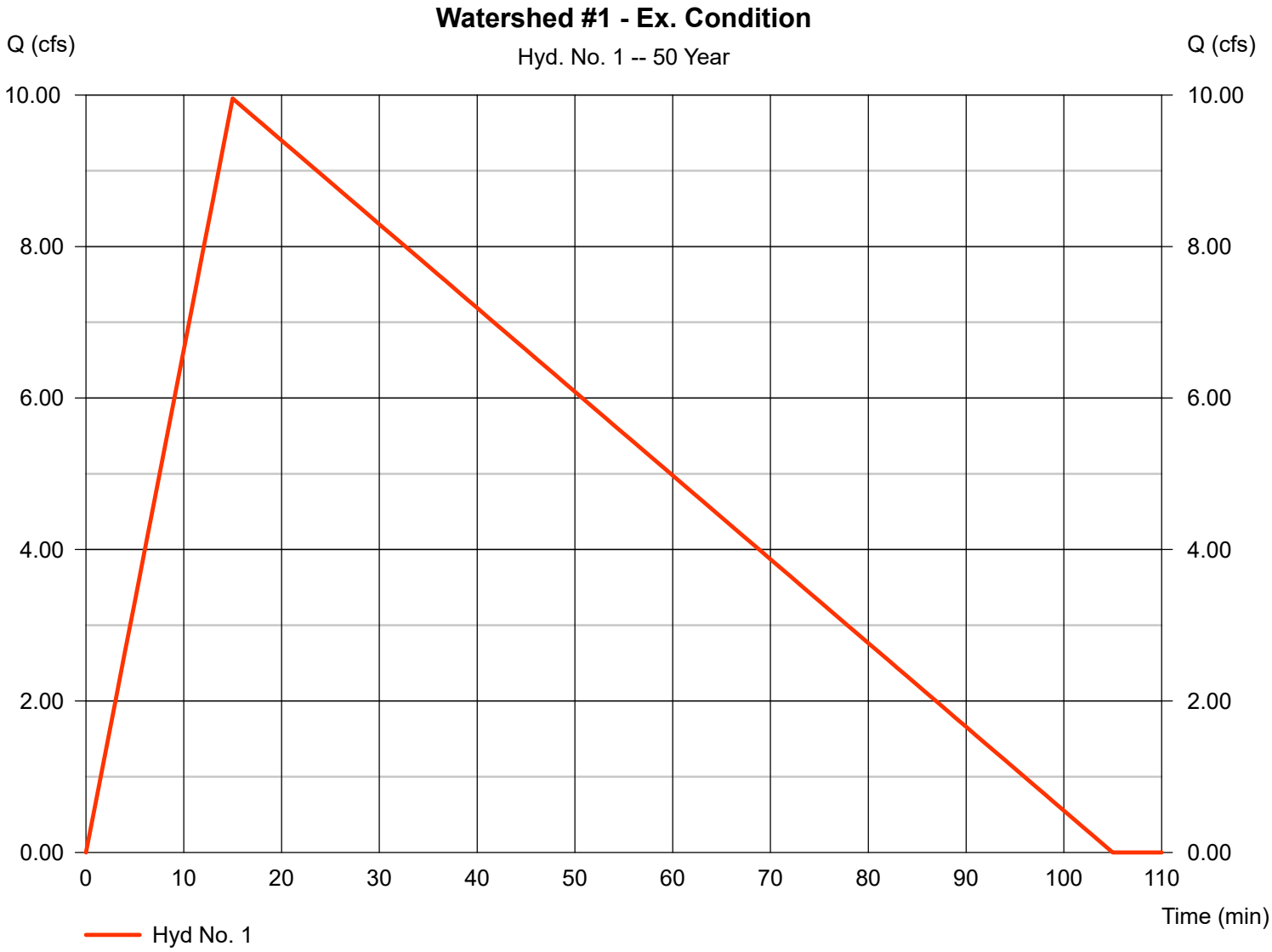
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	9.954	1	15	31,354	------	------	------	Watershed #1 - Ex. Condition
2	Rational	12.44	1	15	39,192	------	------	------	Watershed #1 - Post Dev.
3	Reservoir	2.267	1	89	6,069	2	395.67	36,217	Basin #1 Discharge
5	Rational	2.938	1	16	9,872	------	------	------	Watershed #2 - Ex. Condition
6	Rational	5.050	1	11	11,666	------	------	------	Watershed #2 - Post Dev.
7	Reservoir	1.198	1	61	2,057	6	399.63	10,449	Basin #2 Discharge

Hydrograph Report

Hyd. No. 1

Watershed #1 - Ex. Condition

Hydrograph type	=	Rational	Peak discharge	=	9.954 cfs
Storm frequency	=	50 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	31,354 cuft
Drainage area	=	8.100 ac	Runoff coeff.	=	0.2
Intensity	=	6.144 in/hr	Tc by TR55	=	15.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6



Hydrograph Report

Hyd. No. 2

Watershed #1 - Post Dev.

Hydrograph type	=	Rational	Peak discharge	=	12.44 cfs
Storm frequency	=	50 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	39,192 cuft
Drainage area	=	8.100 ac	Runoff coeff.	=	0.25
Intensity	=	6.144 in/hr	Tc by TR55	=	15.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6

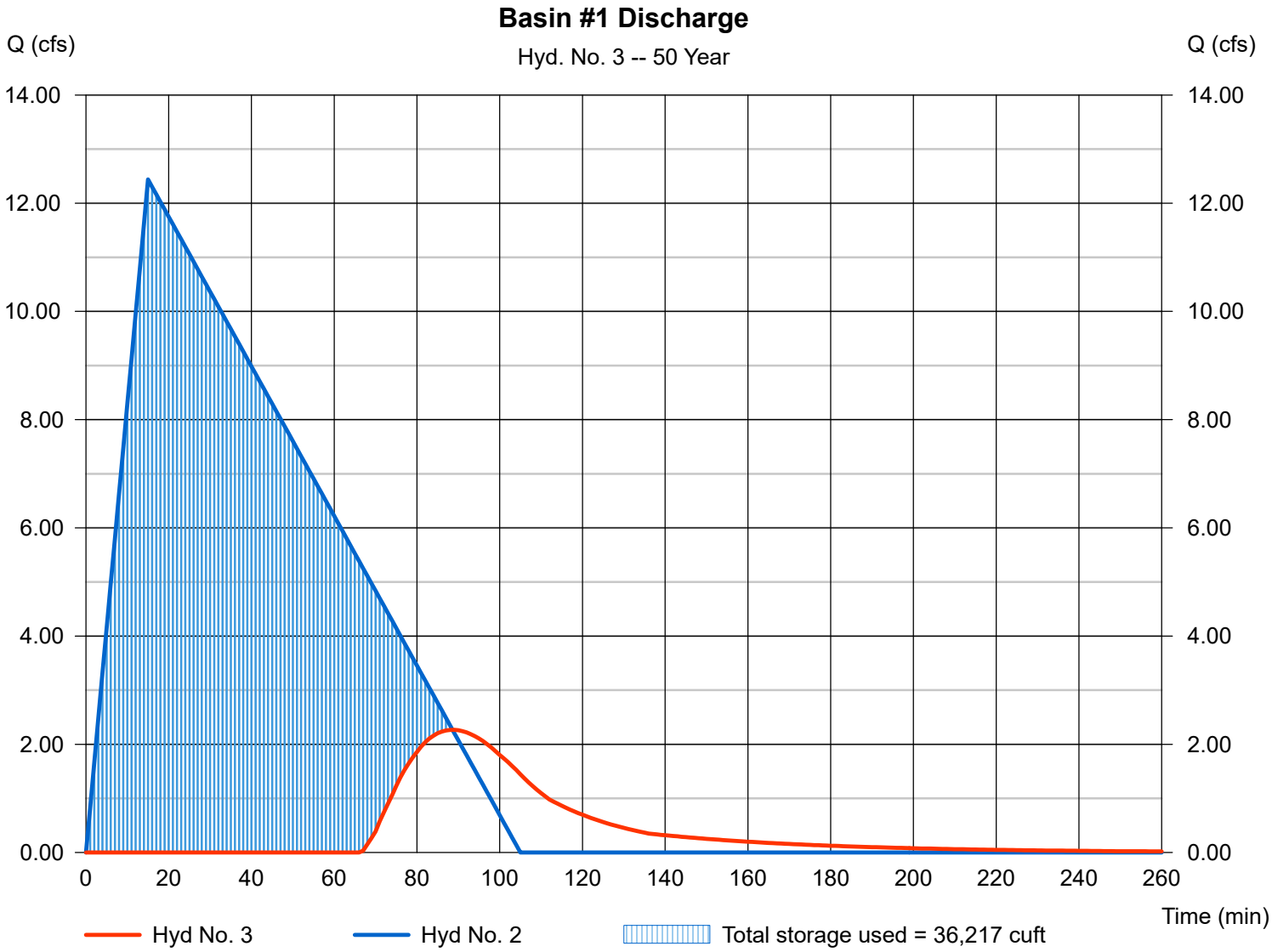
Hydrograph Report

Hyd. No. 3

Basin #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	2.267 cfs
Storm frequency	=	50 yrs	Time to peak	=	89 min
Time interval	=	1 min	Hyd. volume	=	6,069 cuft
Inflow hyd. No.	=	2 - Watershed #1 - Post Dev.	Max. Elevation	=	395.67 ft
Reservoir name	=	Basin #1	Max. Storage	=	36,217 cuft

Storage Indication method used.

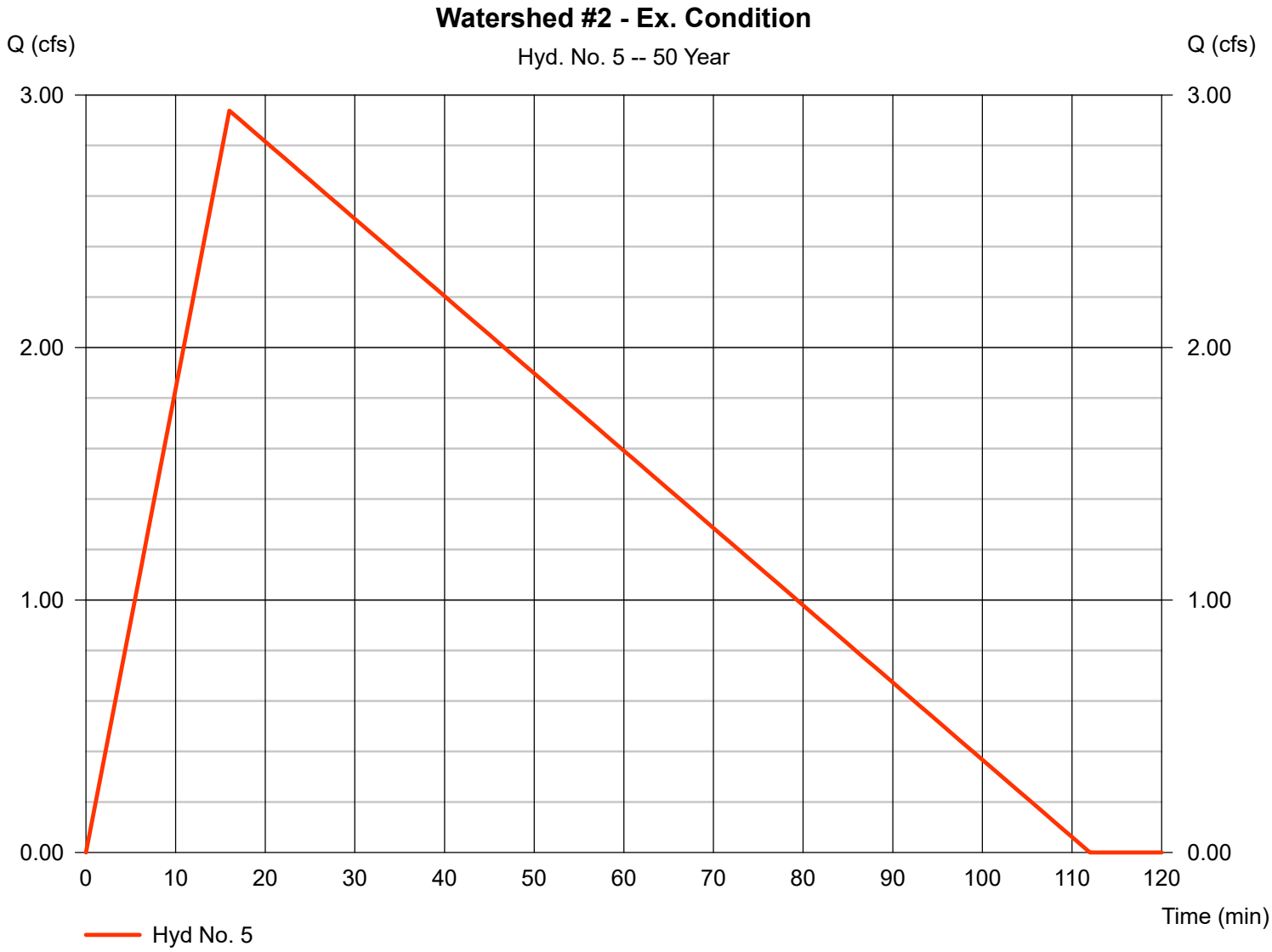


Hydrograph Report

Hyd. No. 5

Watershed #2 - Ex. Condition

Hydrograph type	=	Rational	Peak discharge	=	2.938 cfs
Storm frequency	=	50 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	9,872 cuft
Drainage area	=	2.480 ac	Runoff coeff.	=	0.2
Intensity	=	5.924 in/hr	Tc by TR55	=	16.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6



Hydrograph Report

Hyd. No. 6

Watershed #2 - Post Dev.

Hydrograph type	=	Rational	Peak discharge	=	5.050 cfs
Storm frequency	=	50 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	11,666 cuft
Drainage area	=	2.480 ac	Runoff coeff.	=	0.28*
Intensity	=	7.273 in/hr	Tc by TR55	=	11.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6

* Composite (Area/C) = [(2.370 x 0.25) + (0.110 x 0.95)] / 2.480

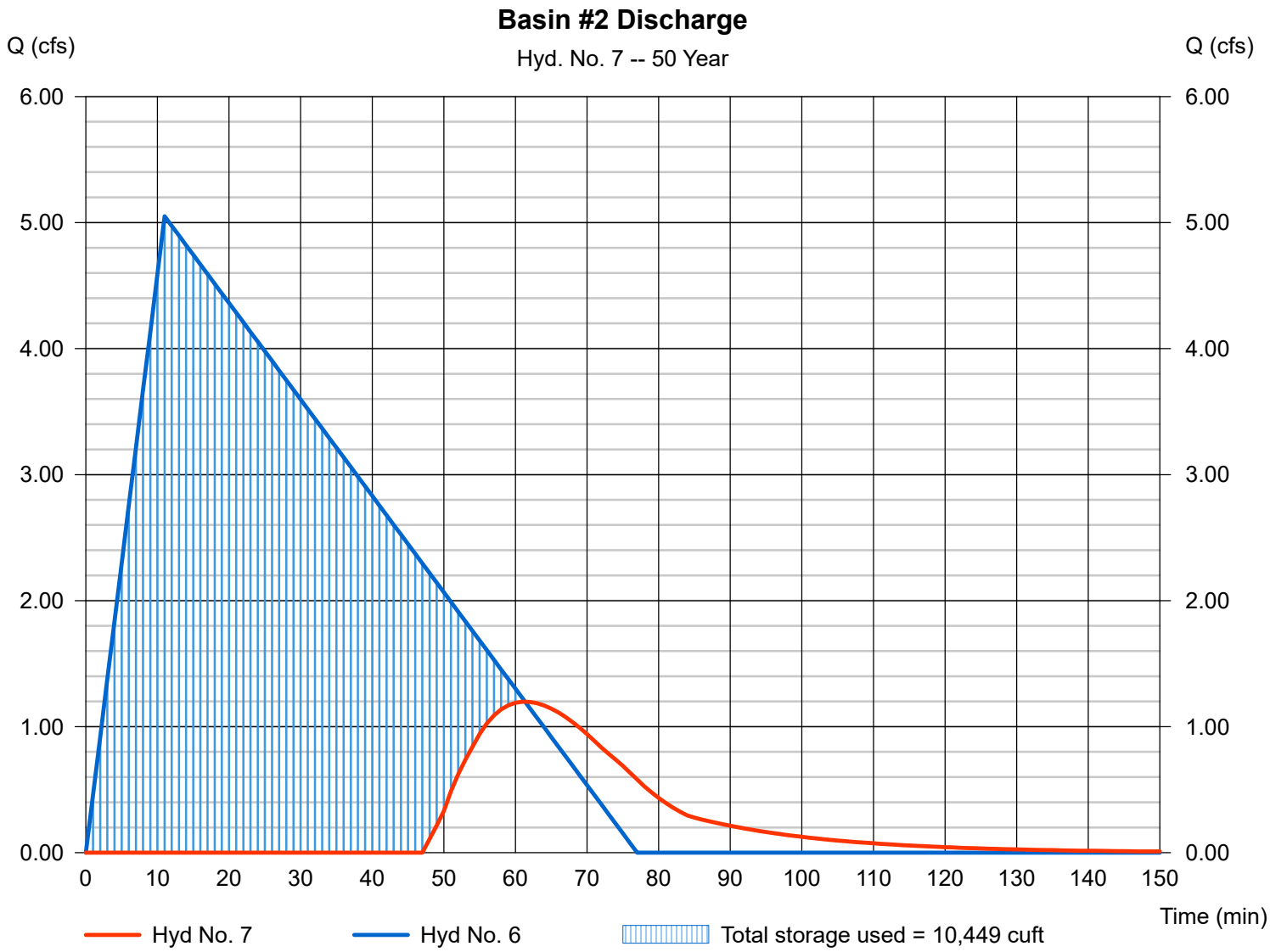
Hydrograph Report

Hyd. No. 7

Basin #2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	1.198 cfs
Storm frequency	=	50 yrs	Time to peak	=	61 min
Time interval	=	1 min	Hyd. volume	=	2,057 cuft
Inflow hyd. No.	=	6 - Watershed #2 - Post Dev.	Max. Elevation	=	399.63 ft
Reservoir name	=	Basin #2	Max. Storage	=	10,449 cuft

Storage Indication method used.



Hydrograph Summary Report

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

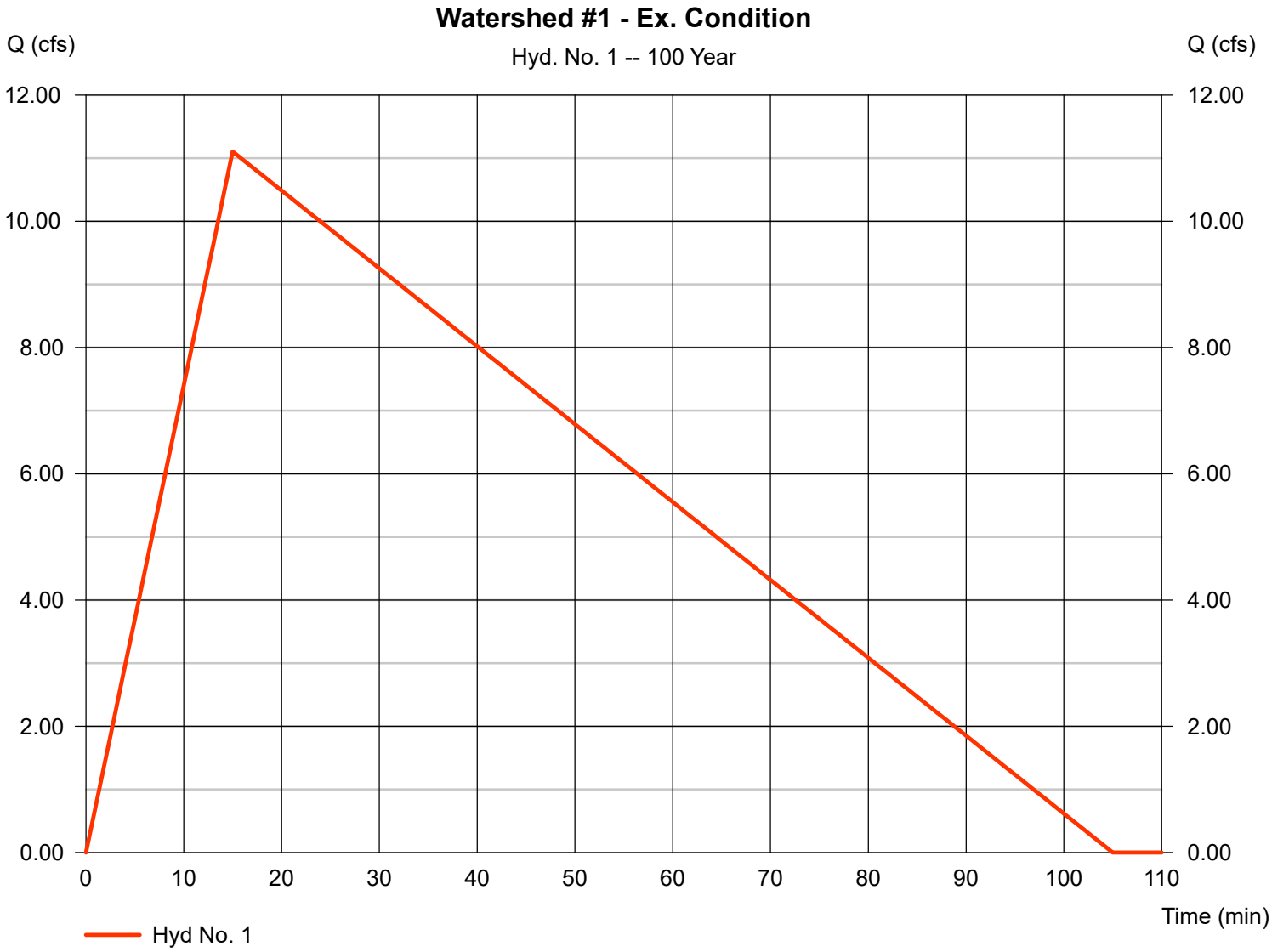
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	11.10	1	15	34,976	------	------	------	Watershed #1 - Ex. Condition
2	Rational	13.88	1	15	43,721	------	------	------	Watershed #1 - Post Dev.
3	Reservoir	3.816	1	80	10,598	2	395.75	37,522	Basin #1 Discharge
5	Rational	3.277	1	16	11,011	------	------	------	Watershed #2 - Ex. Condition
6	Rational	5.641	1	11	13,031	------	------	------	Watershed #2 - Post Dev.
7	Reservoir	1.869	1	55	3,421	6	399.67	10,744	Basin #2 Discharge

Hydrograph Report

Hyd. No. 1

Watershed #1 - Ex. Condition

Hydrograph type	=	Rational	Peak discharge	=	11.10 cfs
Storm frequency	=	100 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	34,976 cuft
Drainage area	=	8.100 ac	Runoff coeff.	=	0.2
Intensity	=	6.854 in/hr	Tc by TR55	=	15.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6



Hydrograph Report

Hyd. No. 2

Watershed #1 - Post Dev.

Hydrograph type	=	Rational	Peak discharge	=	13.88 cfs
Storm frequency	=	100 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	43,721 cuft
Drainage area	=	8.100 ac	Runoff coeff.	=	0.25
Intensity	=	6.854 in/hr	Tc by TR55	=	15.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6

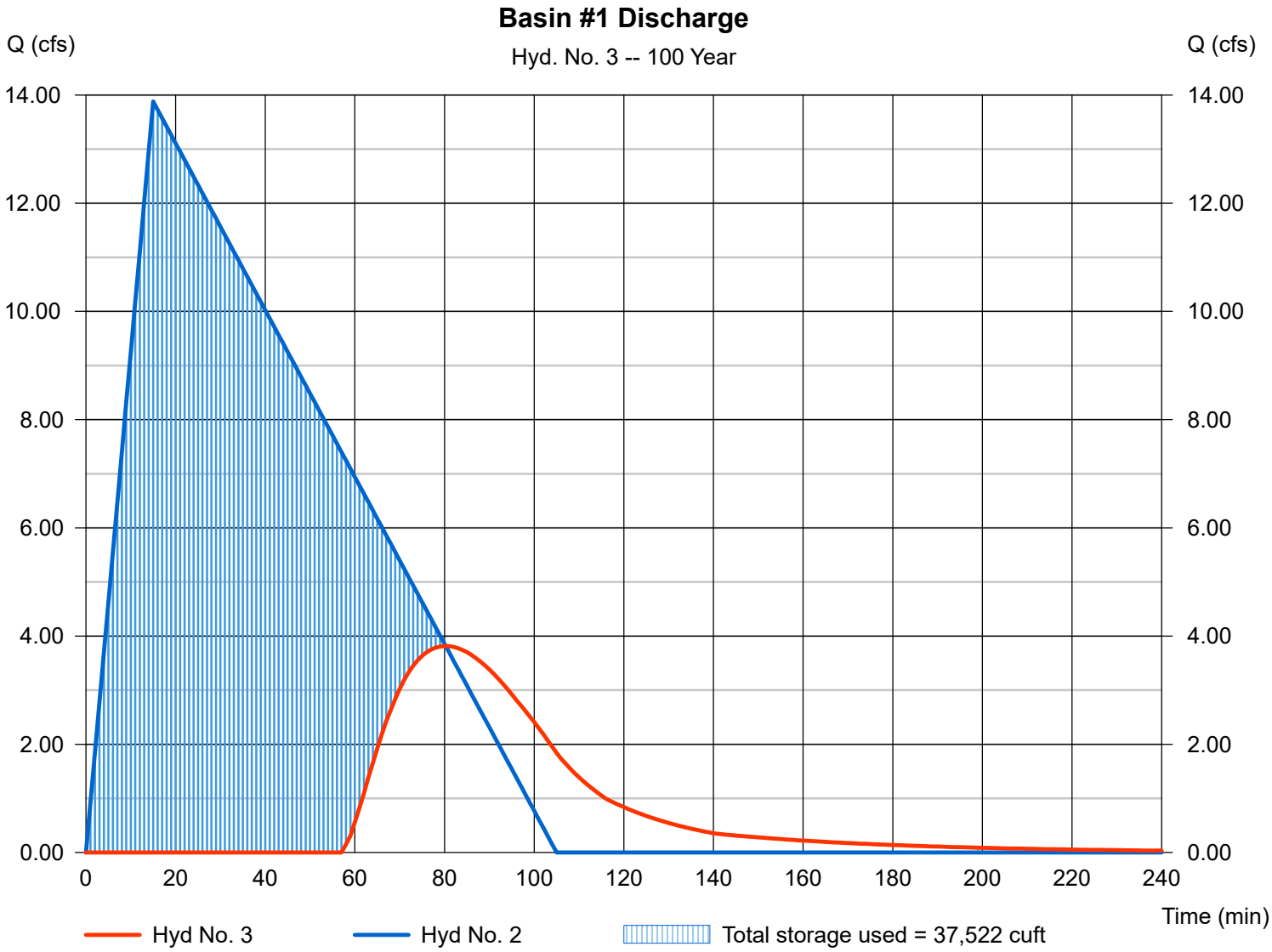
Hydrograph Report

Hyd. No. 3

Basin #1 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	3.816 cfs
Storm frequency	=	100 yrs	Time to peak	=	80 min
Time interval	=	1 min	Hyd. volume	=	10,598 cuft
Inflow hyd. No.	=	2 - Watershed #1 - Post Dev.	Max. Elevation	=	395.75 ft
Reservoir name	=	Basin #1	Max. Storage	=	37,522 cuft

Storage Indication method used.

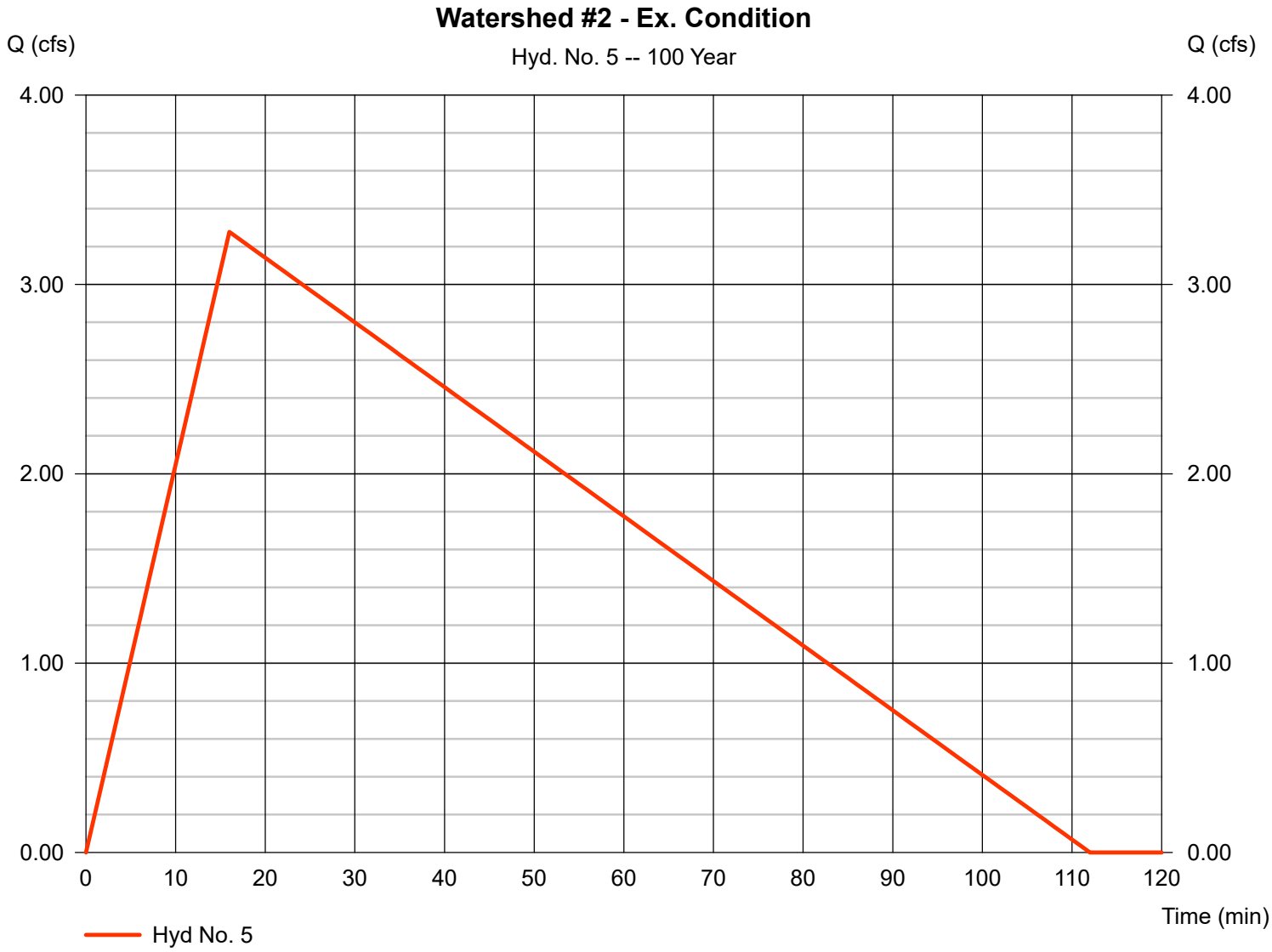


Hydrograph Report

Hyd. No. 5

Watershed #2 - Ex. Condition

Hydrograph type	=	Rational	Peak discharge	=	3.277 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	11,011 cuft
Drainage area	=	2.480 ac	Runoff coeff.	=	0.2
Intensity	=	6.607 in/hr	Tc by TR55	=	16.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6



Hydrograph Report

Hyd. No. 6

Watershed #2 - Post Dev.

Hydrograph type	=	Rational	Peak discharge	=	5.641 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	13,031 cuft
Drainage area	=	2.480 ac	Runoff coeff.	=	0.28*
Intensity	=	8.123 in/hr	Tc by TR55	=	11.00 min
IDF Curve	=	NOAA Atlas 14.IDF	Asc/Rec limb fact	=	1/6

* Composite (Area/C) = [(2.370 x 0.25) + (0.110 x 0.95)] / 2.480

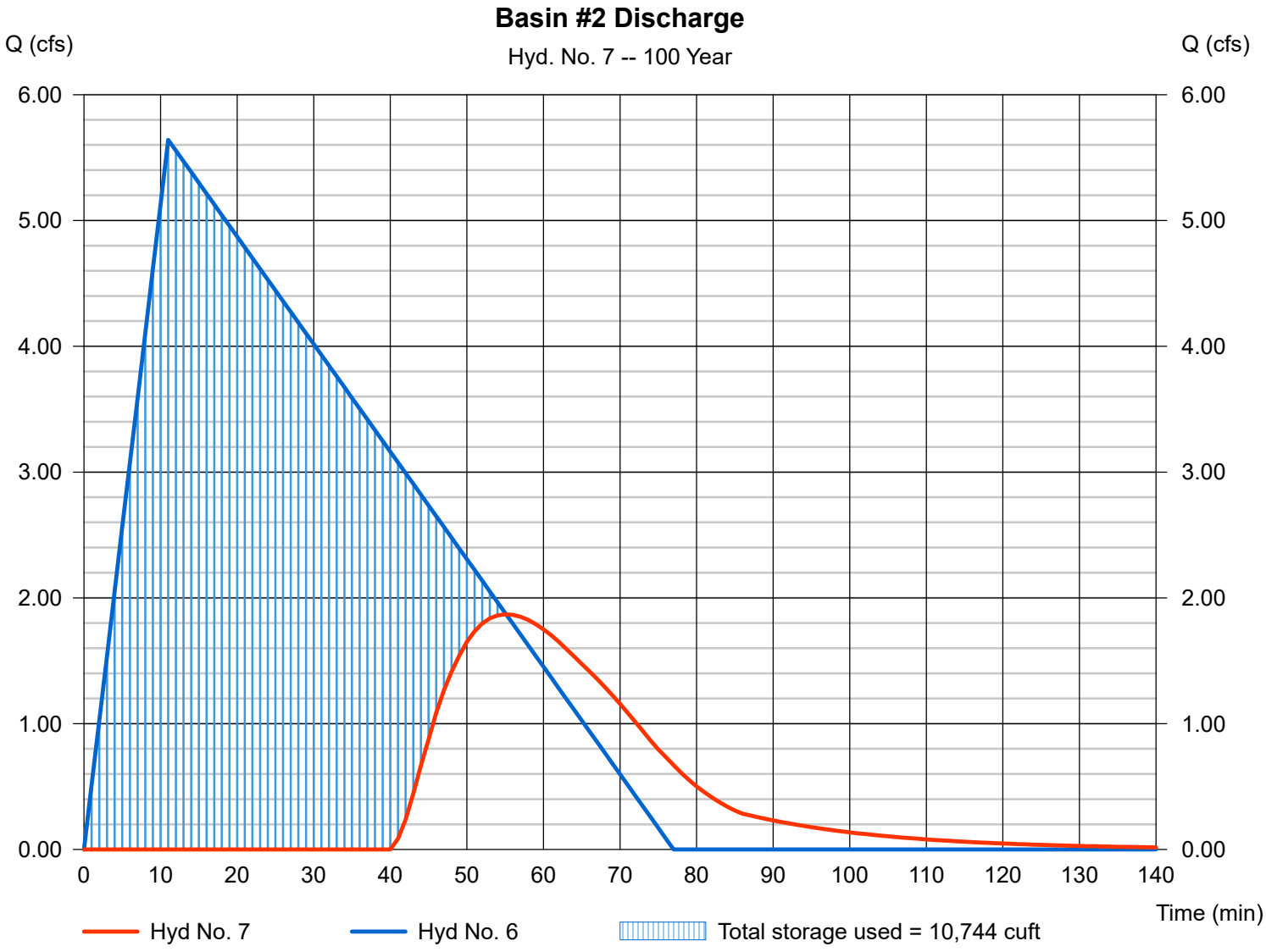
Hydrograph Report

Hyd. No. 7

Basin #2 Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	1.869 cfs
Storm frequency	=	100 yrs	Time to peak	=	55 min
Time interval	=	1 min	Hyd. volume	=	3,421 cuft
Inflow hyd. No.	=	6 - Watershed #2 - Post Dev.	Max. Elevation	=	399.67 ft
Reservoir name	=	Basin #2	Max. Storage	=	10,744 cuft

Storage Indication method used.



APPENDIX A

Support Information

The final element to be factored into the determination of runoff coefficients is the land slope. As the slope of the drainage basin increases, the selected C value should also increase. This is caused by the fact that as the slope of the drainage area increases, the velocity of overland and channel flow will increase allowing less opportunity for water to infiltrate the ground surface. Thus, more of the rainfall will become runoff from the drainage area.

In summary, it should be reiterated that in assigning a value to the runoff coefficient for use in the rational method, the engineer must rely heavily on experience and judgement.

Table 6-3 Recommended Coefficient Of Runoff For Pervious Surfaces By Selected Hydrologic Soil Groupings And Slope Ranges

Slope	A	B	C	D
Flat (0 - 1%)	0.04-0.09	0.07-0.12	0.11-0.16	0.15-0.20
Average (2 - 6%)	0.09-0.14	0.12-0.17	0.16-0.21	0.20-0.25
Steep (Over 6%)	0.13-0.18	0.18-0.24	0.23-0.31	0.28-0.38

Source: Storm Drainage Design Manual, Erie and Niagara Counties Regional Planning Board.

Table 6-4 Recommended Coefficient Of Runoff Values For Various Selected Land Uses

Description of Area		Runoff Coefficients
Business: Downtown areas		0.70-0.95
Neighborhood areas		0.50-0.70
Residential:	Single-family areas	0.30-0.50
	Multi units, detached	0.40-0.60
	Multi units, attached	0.60-0.75
	Suburban	0.25-0.40
Residential (0.5 ha (1.2 ac) lots or more)		0.30-0.45
Apartment dwelling areas		0.50-0.70
Industrial:	Light areas	0.50-0.80
	Heavy areas	0.60-0.90
Parks, cemeteries		0.10-0.25
Playgrounds		0.20-0.40
Railroad yard areas		0.20-0.40
Unimproved areas		0.10-0.30

Table 6-5 Coefficients For Composite Runoff Analysis

Surface		Runoff Coefficients
Street:	Asphalt	0.70-0.95
	Concrete	0.80-0.95
Drives and walks		0.75-0.85
Roofs		0.75-0.95

NOAA Atlas 14, Volume 10, Version 3
Location name: Ansonia, Connecticut, USA*
Latitude: 41.3435°, Longitude: -73.0611°
Elevation: 408.25 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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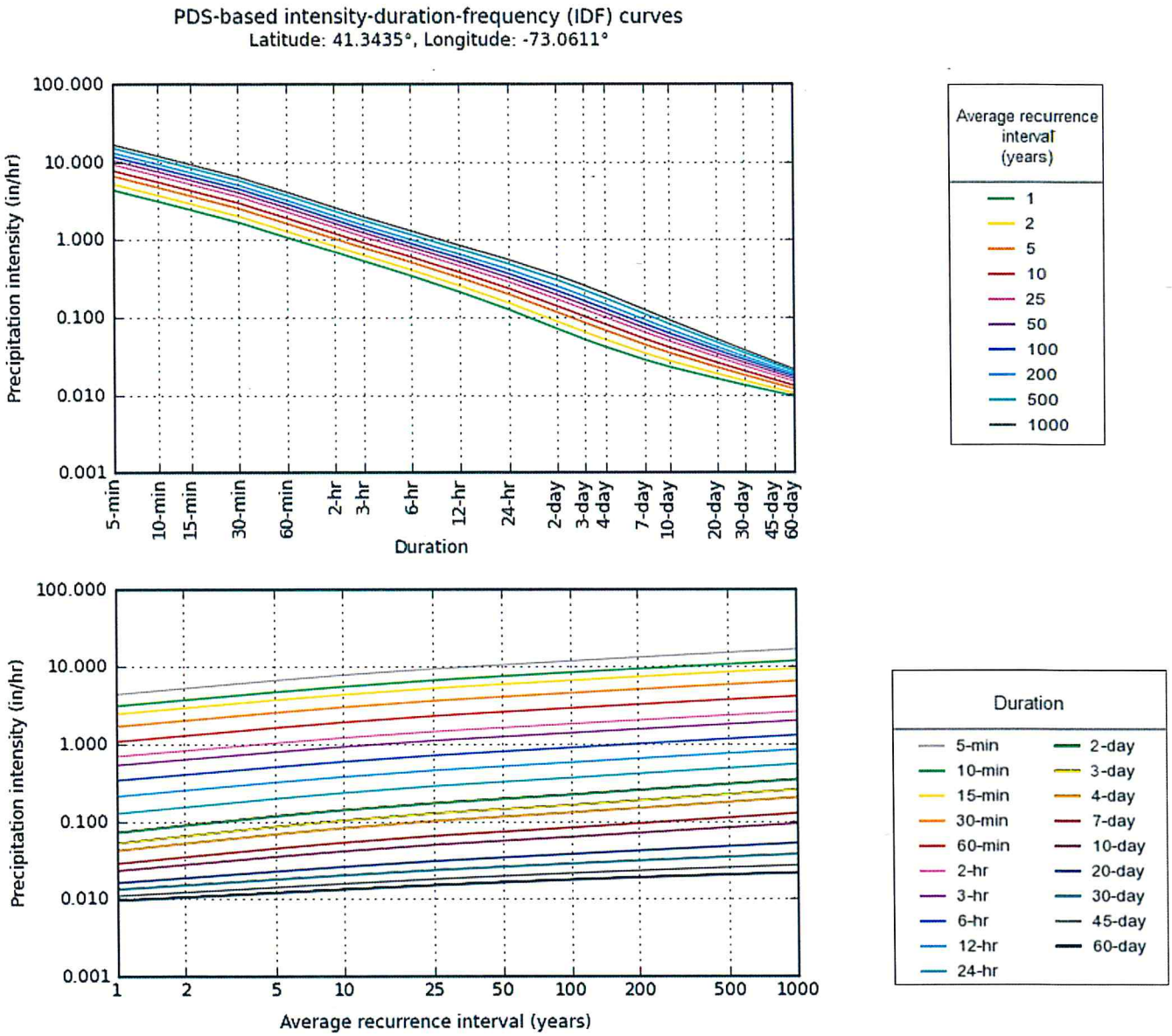
PF graphical



NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Mon Apr 13 16:44:30 2020

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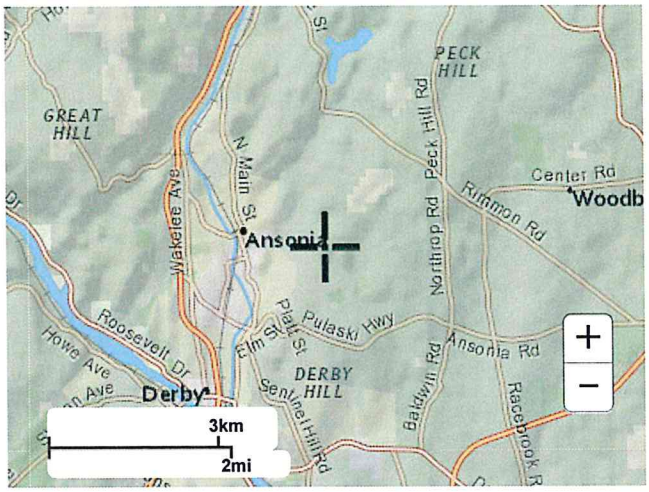
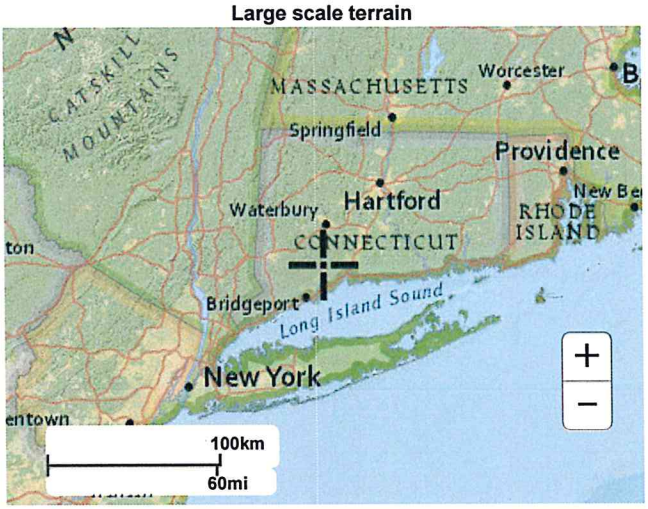
Maps & aerials

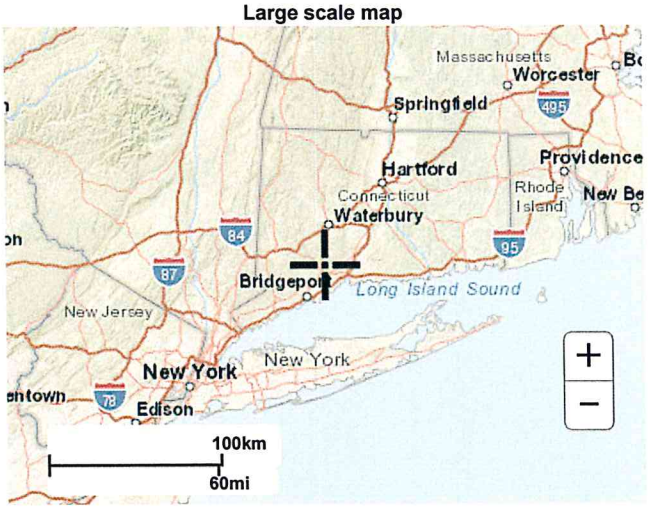
Small scale terrain



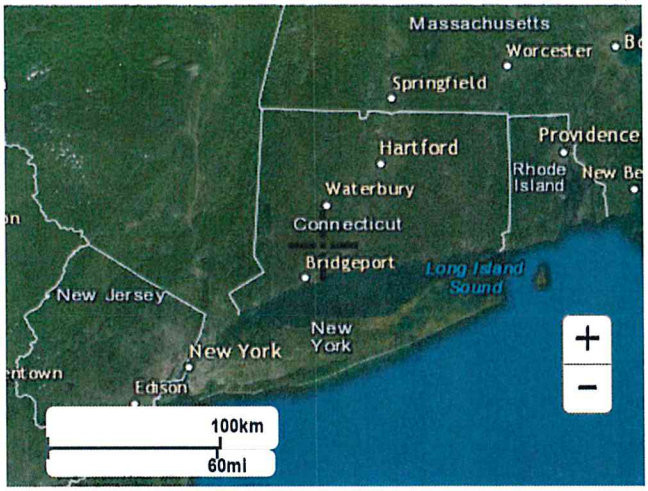
Large scale terrain



Large scale map



Large scale aerial



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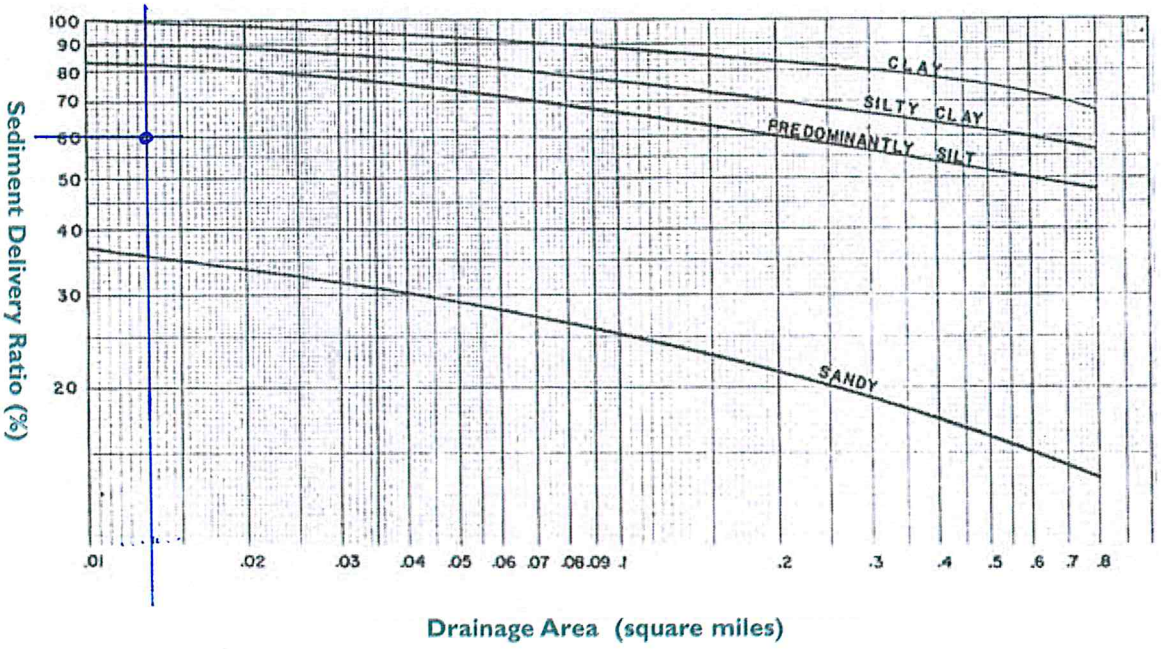
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

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

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.

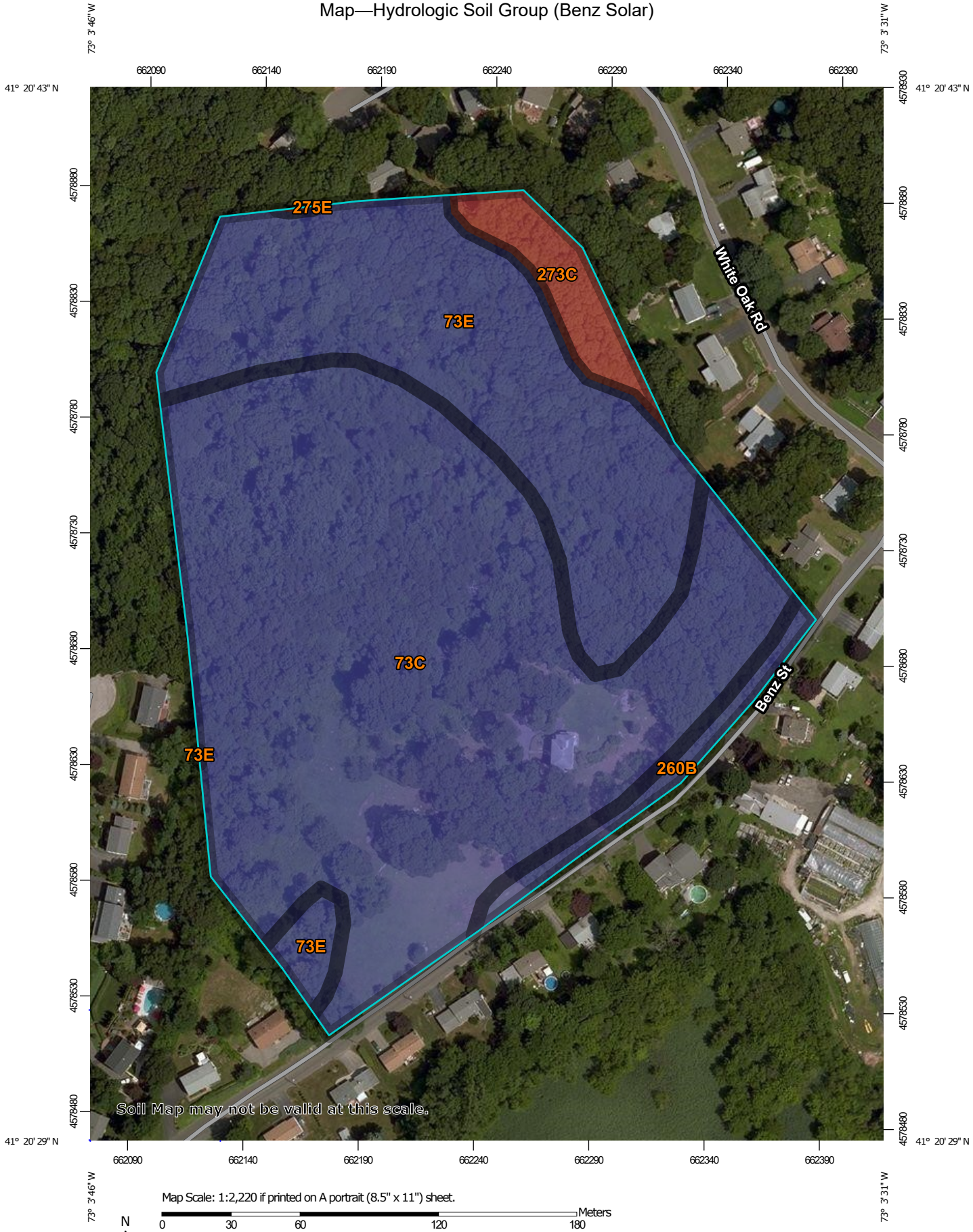
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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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EXHIBIT E

CLA Engineers, Inc.
Civil • Structural • Survey
317 MAIN STREET • NORWICH, CT 06360 • (860) 886-1966 • (860) 886-9165 FAX

September 16, 2020

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

RE: Vernal Pool Management Plan
CLA #6340

Dear Steve:

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

POTENTIAL VERNAL POOL HABITAT

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

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

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

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

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

POTENTIAL VERNAL POOL IMPACTS

This information is based on the attached Figure 1.

VERNAL POOL DEPRESSION #2

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

VERNAL POOL ENVELOPE (VPE)

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

As designed there is no activity proposed within the VPE.

VERNAL POOL CRITICAL TERRRESTRIAL HABITAT (CTH)

Existing Critical Terrestrial Habitat: 46.9 acres

Wooded	31.7 ac.,	67.6% of CTH
Developed area:	15.2ac	34.2% of CTH
(Impervious	4.7 ac.,	10.0% of CTH)

Proposed Critical Terrestrial Habitat (Post Development): 46.9 acres

Wooded/Wetland:	22.4 ac.,	47.8 % of CTH
Developed area:	24.5 ac.,	52.2 % of CTH
(Impervious:	5.0 ac.,	10.7% of CTH)[1]

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

Best Management Practices and Recommendations

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

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

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

Erosion and Sedimentation Control

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

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

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

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

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

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

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

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

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

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

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

Very truly yours,

Robert C Russo

Robert C. Russo.
Soil Scientist

APPENDIX

DAVISON ENVIRONMENTAL

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

January 17, 2019

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

RE: Wetland Delineation, 31 Benz Street, Ansonia

Mr. Hoffman,

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

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

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

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

Wetland Soil Types

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

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

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

Upland Soil Types

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

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

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

Respectfully submitted,

Matthew Davison, PWS, PSS, CPESC, CT Forester

Enclosures: Wetland Photographs
Wetland Delineation Sketch Map
NRCS Soil Mapping

Photo 1: View of delineated wetland facing north

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


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

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

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

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

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

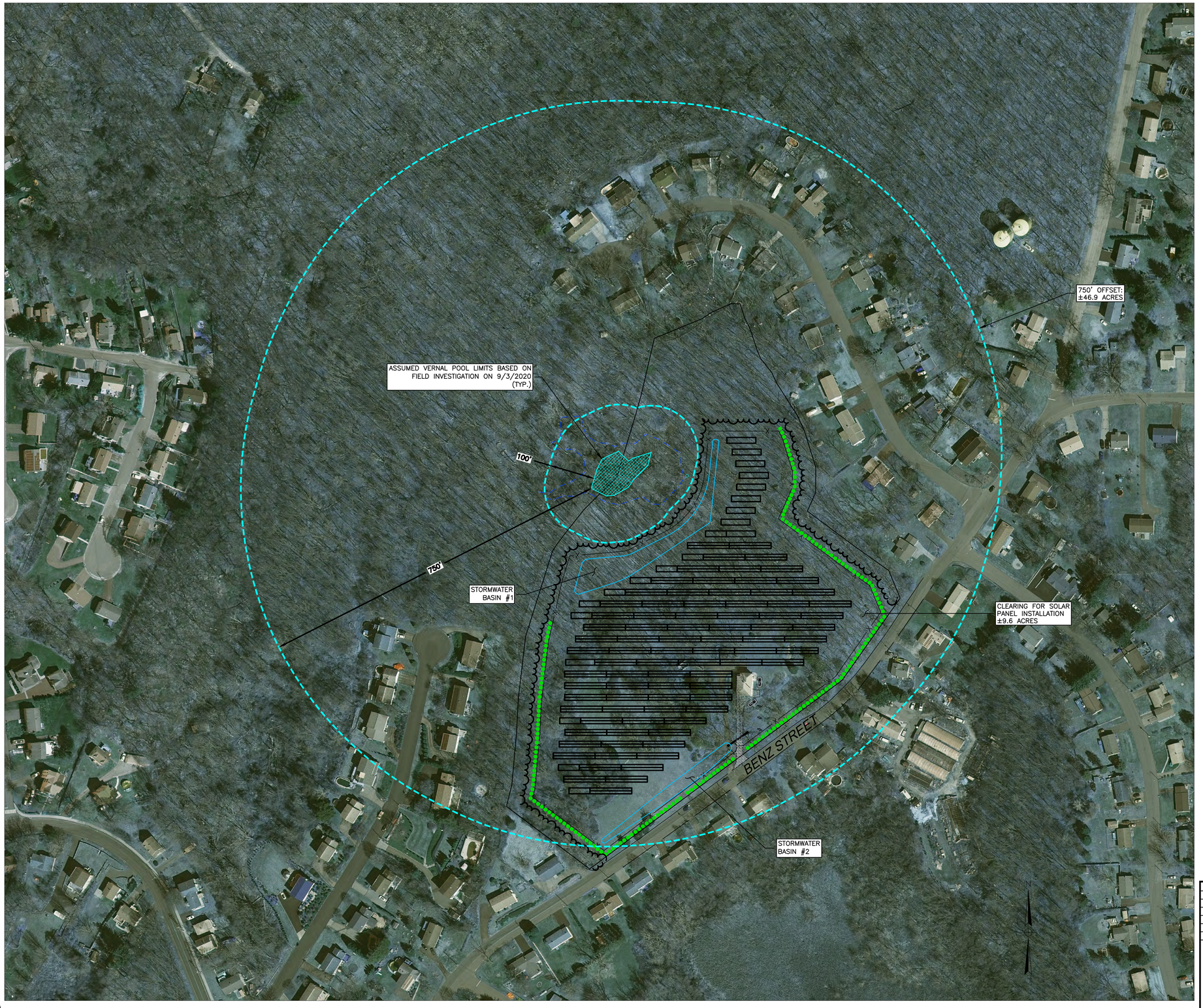
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

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

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

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



100' 0 100' 200'

SCALE: 1"=100'

CLA

Areas within the Critical Terrestrial Habitat

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

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

No.	DATE	REVISION

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

31 Benz Street
Ansonia, Connecticut 06401

BENZ STREET SOLAR

Vernal Pool
Critical Terrestrial Habitat

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

EXHIBIT F

ecos ENERGY
222 SOUTH 9TH STREET
SUITE 1600
MINNEAPOLIS, MN 55402

REVISION LOG:

09/22/20 - CSC IR1 RESPONSES

-

-

-

-

N

0' 60' 120'

BENZ STREET SOLAR
31 BENZ STREET
ANSONIA, CT 06401

SITE PHOTO PLACEMARK MAP

Sheet:
1 of 1

NORTH VIEW

WEST VIEW

EAST VIEW

PLACEMARK 1

WEST VIEW

EAST VIEW

SOUTH VIEW

PLACEMARK 2

PLACEMARK 3 - NORTH VIEW

PLACEMARK 4 - WEST VIEW

PLACEMARK 5

PLACEMARK 6

PLACEMARK 7 - WEST VIEW

PLACEMARK 9 - NORTH VIEW

PLACEMARK 8 - WEST VIEW

PLACEMARK 10

NORTH VIEW

SOUTH VIEW

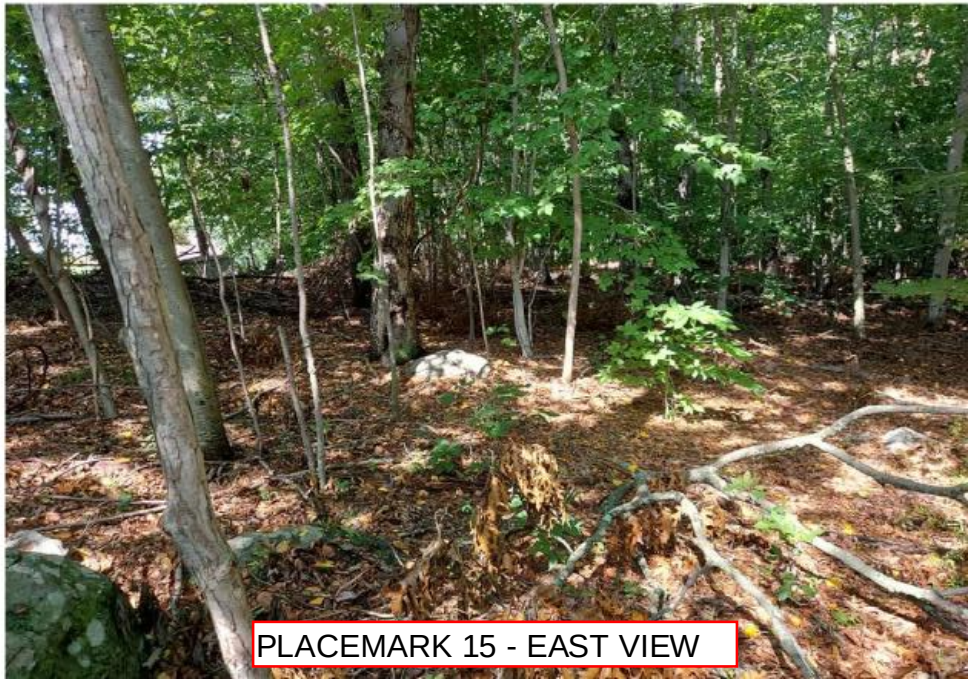
PLACEMARK 11

PLACEMARK 12

PLACEMARK 13

PLACEMARK 14 - EAST VIEW

PLACEMARK 15 - WEST VIEW



PLACEMARK 15 - EAST VIEW

PLACEMARK 16

PLACEMARK 17

PLACEMARK 18


NORTH VIEW


WEST VIEW


EAST VIEW


SOUTH VIEW

PLACEMARK 19


NORTH VIEW


WEST VIEW


EAST VIEW


SOUTH VIEW

PLACEMARK 20


NORTH VIEW


WEST VIEW


EAST VIEW


SOUTH VIEW

PLACEMARK 18


NORTH VIEW


EAST VIEW


WEST VIEW


NORTH VIEW

PLACEMARK 22


NORTH VIEW


EAST VIEW


WEST VIEW


SOUTH VIEW

PLACEMARK 23


NORTH VIEW


EAST VIEW


WEST VIEW


SOUTH VIEW

PLACEMARK 24

PLACEMARK 25 - NORTH VIEW

PLACEMARK 27 - NORTHEAST VIEW

PLACEMARK 27 - SOUTHWEST VIEW

PLACEMARK 26 - NORTH VIEW

PLACEMARK 28

PLACEMARK 29

PLACEMARK 30


NORTH VIEW


EAST VIEW


WEST VIEW


SOUTH VIEW

PLACEMARK 31


NORTH VIEW


EAST VIEW


WEST VIEW


SOUTH VIEW

PLACEMARK 32

PLACEMARK 33 - NORTH VIEW

PLACEMARK 34 - NORTH VIEW


NORTH VIEW


EAST VIEW


WEST VIEW


SOUTH VIEW

PLACEMARK 35


NORTH VIEW


EAST VIEW


WEST VIEW


SOUTH VIEW

PLACEMARK 36

SOUTHWEST VIEW

SOUTHEAST VIEW

PLACEMARK 36

PLACEMARK 37 - EAST VIEW

PLACEMARK 37 - NORTH VIEW

PLACEMARK 38 - EAST VIEW

PLACEMARK 37 - WEST VIEW


WEST VIEW


NORTH VIEW


SOUTH VIEW


EAST VIEW

PLACEMARK 39

NORTH VIEW

EAST VIEW

WEST VIEW

SOUTH VIEW

PLACEMARK 40

NORTH VIEW

PLACEMARK 41


NORTH VIEW


EAST VIEW


WEST VIEW


SOUTH VIEW

PLACEMARK 42

NORTH VIEW

PLACEMARK 43


NORTH VIEW


EAST VIEW


WEST VIEW


SOUTH VIEW

PLACEMARK 42

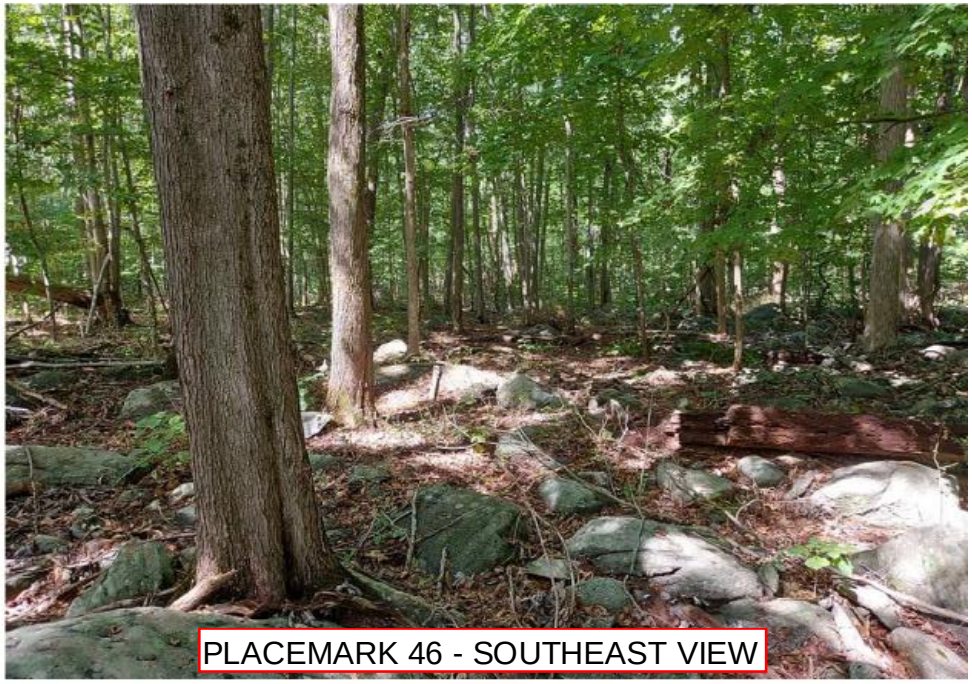
PLACEMARK 45 - SOUTH VIEW

PLACEMARK 46 - SOUTH VIEW

PLACEMARK 47 - WELL

PLACEMARK 46 - NORTH VIEW

PLACEMARK 46 - WEST VIEW



PLACEMARK 46 - SOUTHEAST VIEW

PLACEMARK 46 - EAST VIEW

PLACEMARK 46 - NORTHWEST VIEW

PLACEMARK 48

NORTH VIEW

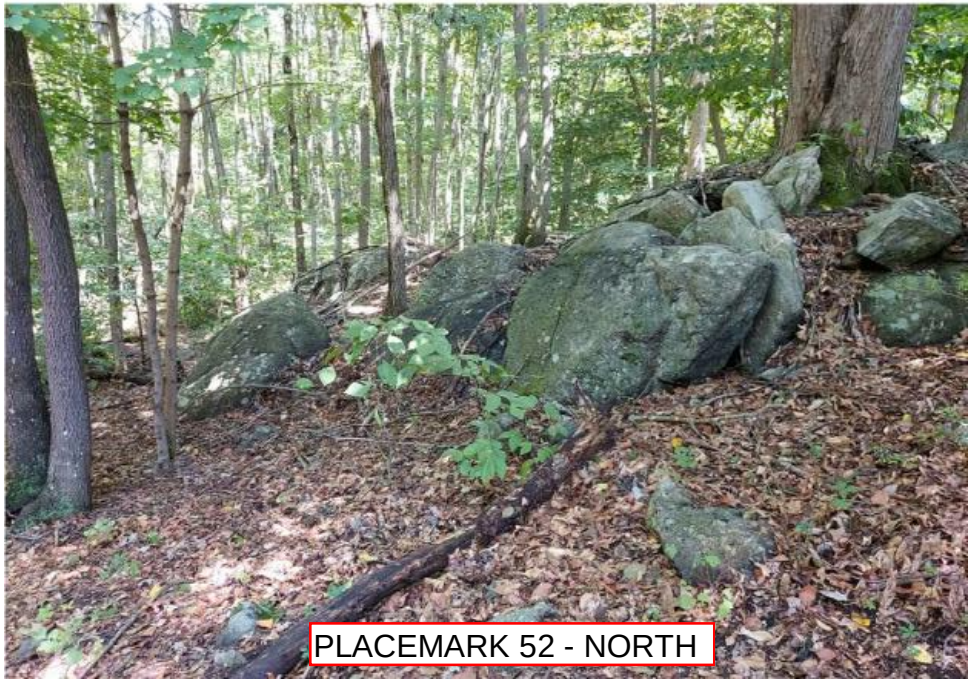
EAST VIEW

WEST VIEW

SOUTH VIEW

PLACEMARK 49

PLACEMARK 50 - NORTH VIEW



PLACEMARK 52 - NORTH

PLACEMARK 51