

**Stormwater Management Report  
Solar Farm  
200 Sullivan Avenue  
South Windsor, Connecticut**

Prepared by:

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21 Jeffrey Drive  
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**October 3, 2022**



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## **Introduction**

SolBid, Inc., is proposing an expansion to their solar farm on 200 Sullivan Ave and R002 Rye Street, South Windsor, Connecticut ( $\pm 17$ -acre combined parcel). The property is referenced with the GIS PIN's: 87300200 and 7860R002. The proposed development includes an additional solar array area and surrounding fence. The current agricultural field will be planted with grass for the entire enclosed area.

## **Pre- and Post-Development Site Conditions**

The existing site is utilized as an agricultural field. No wetlands (Jim McManus, JMM Wetland Consulting Services, LLC, 8/14/2019) were found on the Rye Street parcel, where the field will be located. The NRCS Soil Survey indicates the soil on site to primarily be Hydrologic Soil Group B, 'Moderately well drained.' Refer to **Appendix B** for the NRCS Soil Map & Data. The test pit data (included in **Appendix C**) indicates that the ground water is a minimum of four feet below grade. Based on this observation and relatively flat existing site topography, we expect that infiltration occurs without concentrated flows off-site.

The proposed development changes  $\pm 1.03$  acres from agricultural field to solar surface / impervious and  $\pm 1.53$  acres from agricultural field to grass. Note that the entire area of  $\pm 2.56$  acres will be planted with grass that will include area under the solar panels.

Final design objectives for water quality and stormwater management were based on CT DEEP 2020 guidelines regarding solar arrays dated January 8<sup>th</sup>, 2022. The solar array and all impervious surfaces were considered for determining water quality requirements for the site. HydroCAD computer modeling software was utilized to quantify the change in peak rate of stormwater runoff generated for the area of change for the 2-, 10-, 25-, 50- and 100-year storm events, considering a change from farm area to grass, and one step drop for the hydraulic soil group as recommended in the DEEP guidelines. The Natural Resources Conservation Service's TR-55 Manual was followed in predicting the peak rates of runoff and volumes. See **Appendix A** for the Pre and Post Development Condition HydroCAD reports. The Drainage Area Map for the site can be found in **Appendix E**.

## **Analysis of Results**

The following table contains the data generated from the HydroCAD software:

| Area            |      | 2 year | 10 year | 25 year | 50 year | 100 year |
|-----------------|------|--------|---------|---------|---------|----------|
| Solar Farm Area | Pre  | 3.25   | 7.14    | 9.72    | 11.62   | 13.74    |
|                 | Post | 2.40   | 5.99    | 8.45    | 10.30   | 12.39    |

As seen in the table above, we expect the area effected by the subject project will result in peak rates in the proposed condition that are less than the peak rates of the existing condition for 2-, 10-, 25-, 50- and 100-year design storms.

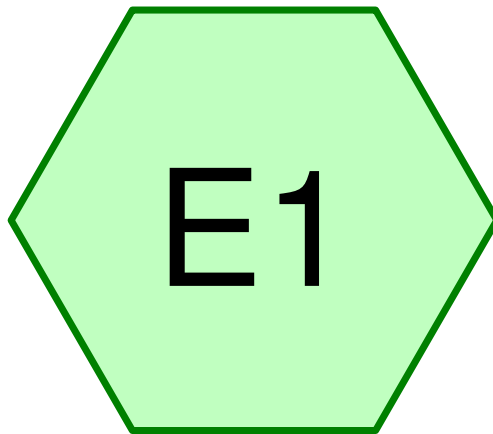
## **Water Quality**

The proposed water quality basin was sized to treat a 1” rain event as recommended in the 2004 Connecticut Stormwater Quality Manual. The proposed forebay was sized to store over 10% of this water quality volume as recommended by the 2004 Connecticut Stormwater Quality Manual. Water Quality Volume calculations and basin stage storage tables are included as **Appendix F** of this report.

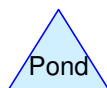
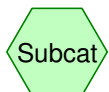
## **Conclusion**

Our calculations indicate a lower flow rate which in turn indicates that the proposed condition will function in the same manner as the current condition, without concentrated flow off-site.

**APPENDIX A**  
**Pre- and Post-Development Drainage HydroCAD Report**



# Existing Conditions



**Routing Diagram for 2829.S Solar - Drainage**

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## 2829.S Solar - Drainage

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Existing Conditions

Type III 24-hr 2-yr Rainfall=3.14"

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Page 2

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

### Subcatchment E1: Existing Conditions

Runoff Area=109,088 sf 0.00% Impervious Runoff Depth=1.29"

Tc=10.0 min CN=79 Runoff=3.25 cfs 0.270 af

**Total Runoff Area = 2.504 ac Runoff Volume = 0.270 af Average Runoff Depth = 1.29"**

**100.00% Pervious = 2.504 ac 0.00% Impervious = 0.000 ac**

## 2829.S Solar - Drainage

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Existing Conditions

Type III 24-hr 10-yr Rainfall=4.98"

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Page 3

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

### Subcatchment E1: Existing Conditions

Runoff Area=109,088 sf 0.00% Impervious Runoff Depth=2.78"

Tc=10.0 min CN=79 Runoff=7.14 cfs 0.581 af

**Total Runoff Area = 2.504 ac Runoff Volume = 0.581 af Average Runoff Depth = 2.78"**

**100.00% Pervious = 2.504 ac 0.00% Impervious = 0.000 ac**

## 2829.S Solar - Drainage

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Existing Conditions

Type III 24-hr 25-yr Rainfall=6.13"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

### Subcatchment E1: Existing Conditions

Runoff Area=109,088 sf 0.00% Impervious Runoff Depth=3.80"

Tc=10.0 min CN=79 Runoff=9.72 cfs 0.792 af

**Total Runoff Area = 2.504 ac Runoff Volume = 0.792 af Average Runoff Depth = 3.80"**

**100.00% Pervious = 2.504 ac 0.00% Impervious = 0.000 ac**

## 2829.S Solar - Drainage

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Existing Conditions

Type III 24-hr 50-yr Rainfall=6.97"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

### Subcatchment E1: Existing Conditions

Runoff Area=109,088 sf 0.00% Impervious Runoff Depth=4.56"

Tc=10.0 min CN=79 Runoff=11.62 cfs 0.951 af

**Total Runoff Area = 2.504 ac Runoff Volume = 0.951 af Average Runoff Depth = 4.56"**

**100.00% Pervious = 2.504 ac 0.00% Impervious = 0.000 ac**

## 2829.S Solar - Drainage

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Existing Conditions

Type III 24-hr 100-yr Rainfall=7.90"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

### Subcatchment E1: Existing Conditions

Runoff Area=109,088 sf 0.00% Impervious Runoff Depth=5.41"

Tc=10.0 min CN=79 Runoff=13.74 cfs 1.130 af

**Total Runoff Area = 2.504 ac Runoff Volume = 1.130 af Average Runoff Depth = 5.41"**

**100.00% Pervious = 2.504 ac 0.00% Impervious = 0.000 ac**

## 2829.S Solar - Drainage

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Existing Conditions  
Type III 24-hr 2-yr Rainfall=3.14"

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### Summary for Subcatchment E1: Existing Conditions

Runoff = 3.25 cfs @ 12.14 hrs, Volume= 0.270 af, Depth= 1.29"

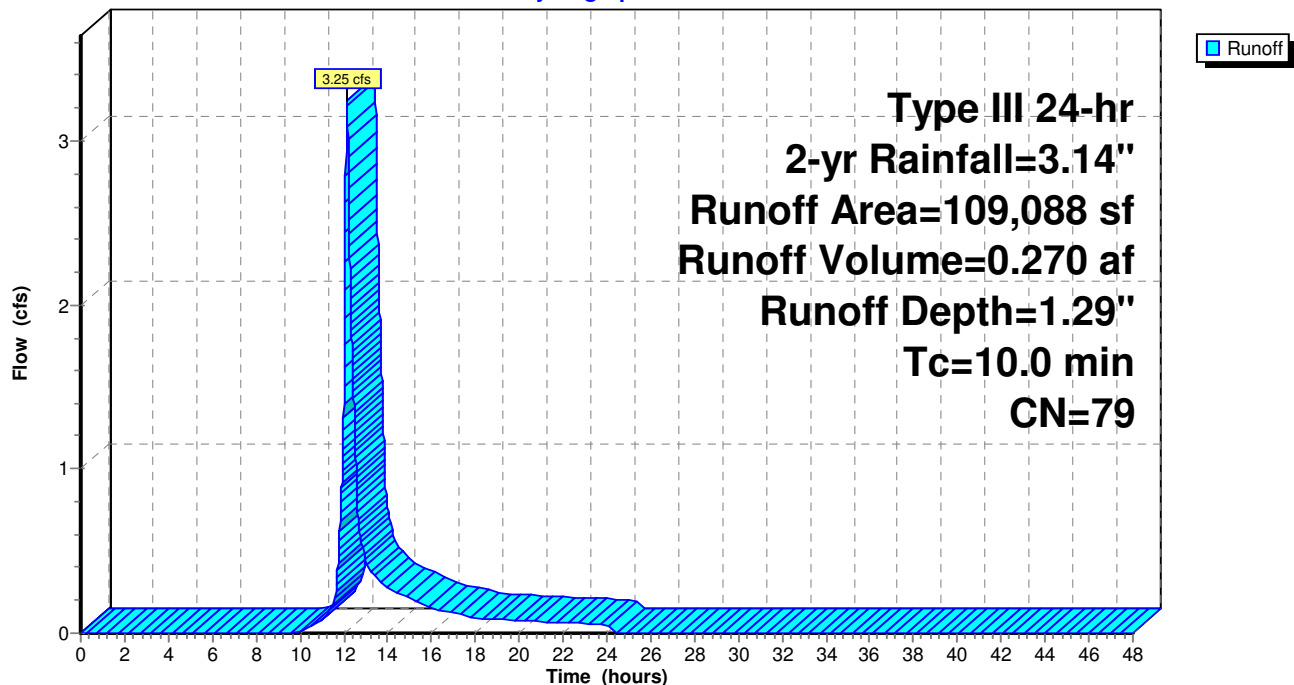
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 100,697   | 80 | Row crops, SR + CR, Poor, HSG B |
| 4,166     | 80 | Row crops, SR + CR, Poor, HSG B |
| 4,225     | 61 | >75% Grass cover, Good, HSG B   |
| 109,088   | 79 | Weighted Average                |
| 109,088   |    | 100.00% Pervious Area           |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description           |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------|
| 10.0        |                  |                  |                      |                   | Direct Entry, minimum |

### Subcatchment E1: Existing Conditions

Hydrograph



## 2829.S Solar - Drainage

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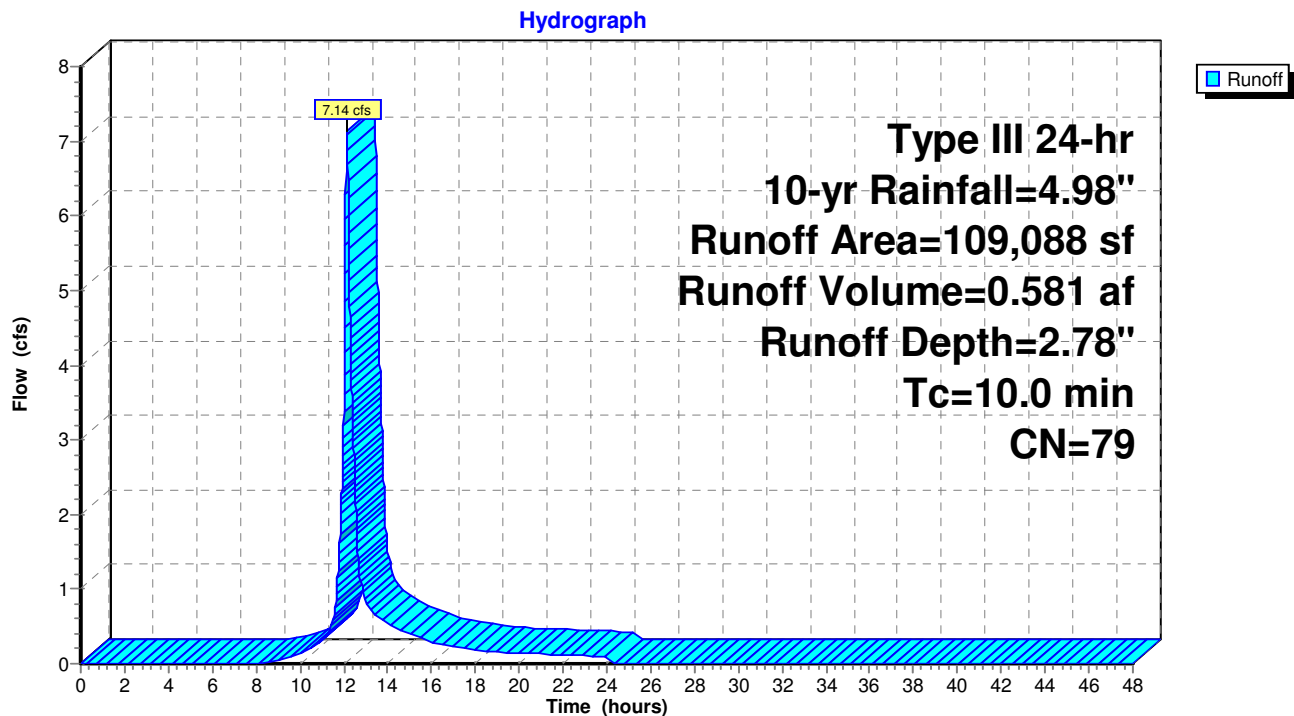
Existing Conditions

Type III 24-hr 10-yr Rainfall=4.98"

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### Subcatchment E1: Existing Conditions



## 2829.S Solar - Drainage

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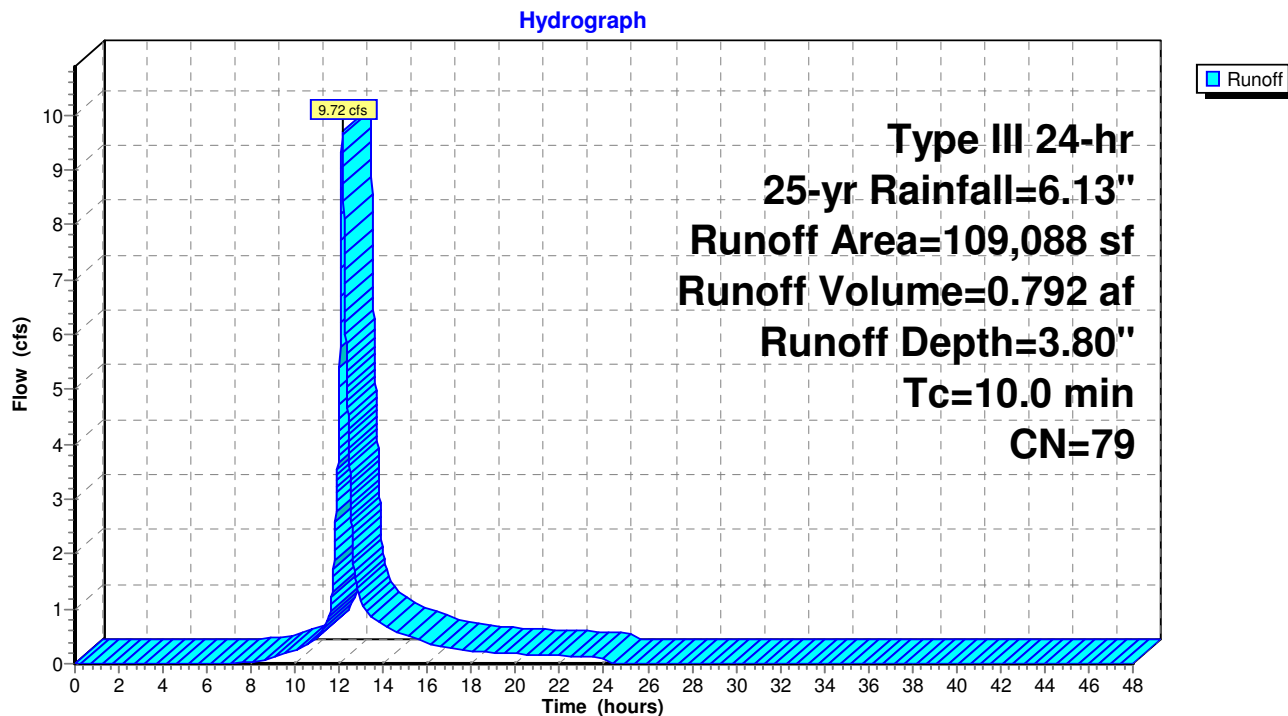
Existing Conditions

Type III 24-hr 25-yr Rainfall=6.13"

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### Subcatchment E1: Existing Conditions



## 2829.S Solar - Drainage

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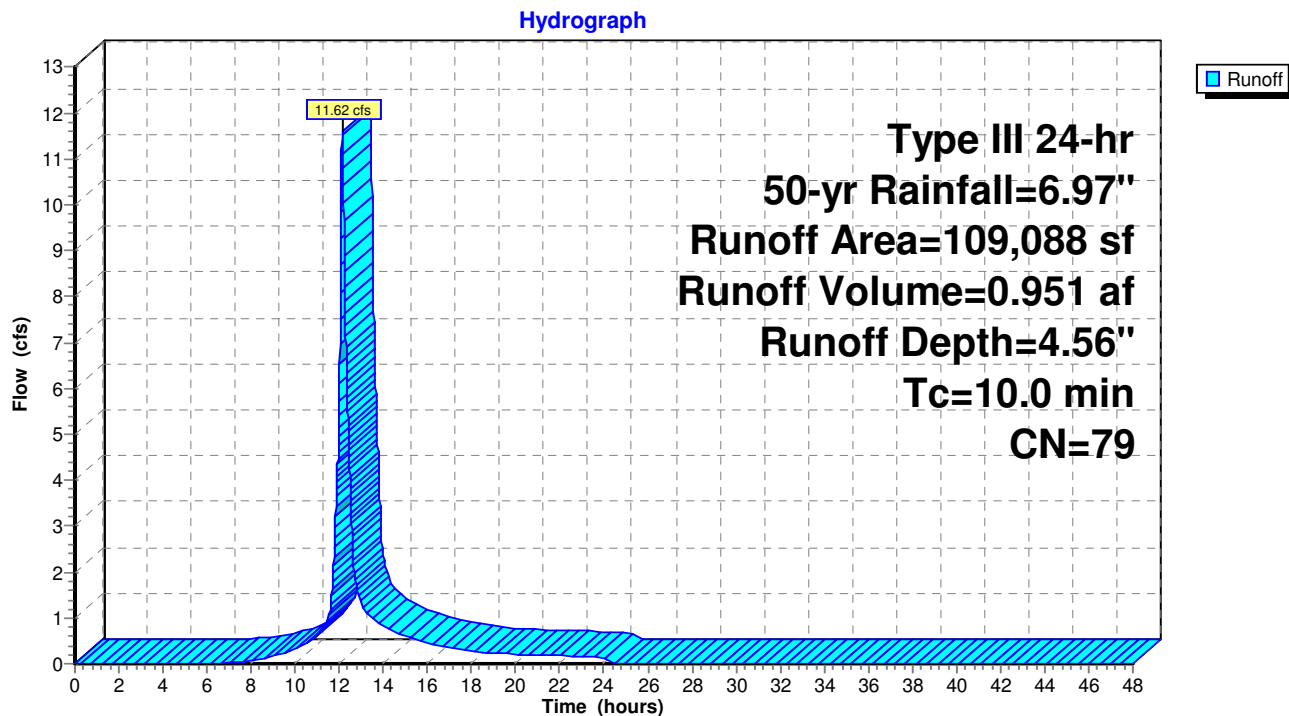
Existing Conditions

Type III 24-hr 50-yr Rainfall=6.97"

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### Subcatchment E1: Existing Conditions



## 2829.S Solar - Drainage

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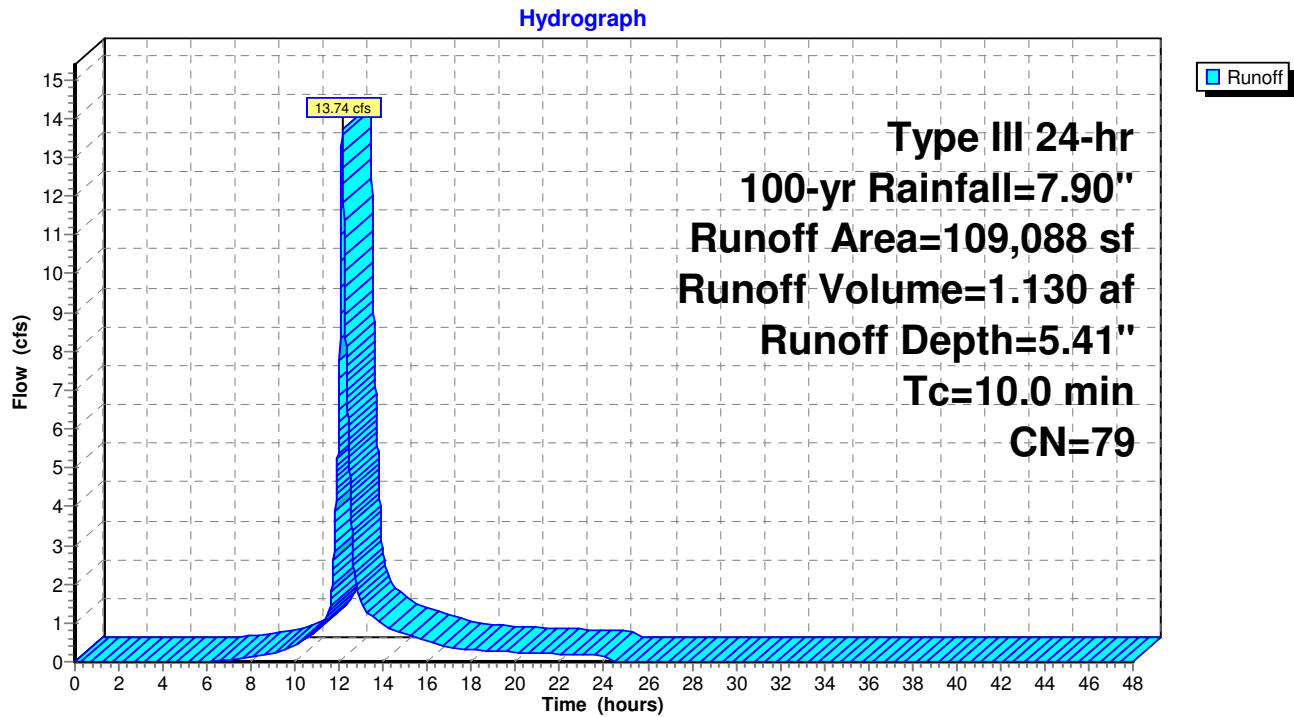
Existing Conditions

Type III 24-hr 100-yr Rainfall=7.90"

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### Subcatchment E1: Existing Conditions



**APPENDIX B**  
**NRCS Soil Map & Data**

# Custom Soil Resource Report Soil Map



Map Scale: 1:1,510 if printed on A landscape (11" x 8.5") sheet.

0 20 40 80 120 Meters

0 50 100 200 300 Feet

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

# Custom Soil Resource Report

## 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 22, Sep 12, 2022

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

Date(s) aerial images were photographed: Aug 24, 2019—Oct 24, 2019

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 |
|------------------------------------|-----------------------------------------------|--------------|----------------|
| 13                                 | Walpole sandy loam, 0 to 3 percent slopes     | 0.1          | 1.3%           |
| 23A                                | Sudbury sandy loam, 0 to 5 percent slopes     | 5.6          | 88.9%          |
| 29A                                | Agawam fine sandy loam, 0 to 3 percent slopes | 0.3          | 5.0%           |
| 306                                | Udorthents-Urban land complex                 | 0.3          | 4.7%           |
| <b>Totals for Area of Interest</b> |                                               | <b>6.3</b>   | <b>100.0%</b>  |

## 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

### 13—Walpole sandy loam, 0 to 3 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2svkl

*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 250 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Walpole and similar soils:* 80 percent

*Minor components:* 20 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Walpole

##### Setting

*Landform:* Depressions, outwash plains, outwash terraces, depressions, deltas

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Tread, dip, talf

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Parent material:* Sandy glaciofluvial deposits derived from igneous, metamorphic and sedimentary rock

##### Typical profile

*Oe - 0 to 1 inches:* mucky peat

*A - 1 to 7 inches:* sandy loam

*Bg - 7 to 21 inches:* sandy loam

*BC - 21 to 25 inches:* gravelly sandy loam

*C - 25 to 65 inches:* very gravelly sand

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Poorly drained

*Runoff class:* Very high

*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:* About 0 to 4 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water supply, 0 to 60 inches:* Moderate (about 6.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4w

*Hydrologic Soil Group:* B/D

*Ecological site:* F144AY028MA - Wet Outwash

*Hydric soil rating:* Yes

## Minor Components

### Sudbury

*Percent of map unit:* 10 percent  
*Landform:* Outwash plains, deltas, terraces  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Tread, dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### Scarboro

*Percent of map unit:* 10 percent  
*Landform:* Outwash plains, deltas, outwash terraces  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread, dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

## 23A—Sudbury sandy loam, 0 to 5 percent slopes

### Map Unit Setting

*National map unit symbol:* 9lkv  
*Elevation:* 0 to 1,200 feet  
*Mean annual precipitation:* 43 to 54 inches  
*Mean annual air temperature:* 45 to 55 degrees F  
*Frost-free period:* 140 to 185 days  
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Sudbury and similar soils:* 80 percent  
*Minor components:* 20 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Sudbury

#### Setting

*Landform:* Terraces, outwash plains  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Parent material:* Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

#### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 5 inches:* sandy loam  
*Bw1 - 5 to 17 inches:* gravelly sandy loam  
*Bw2 - 17 to 25 inches:* sandy loam  
*2C - 25 to 60 inches:* stratified gravel to sand

**Properties and qualities**

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Moderately well drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* About 18 to 36 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Low (about 4.2 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* B  
*Ecological site:* F144AY027MA - Moist Sandy Outwash  
*Hydric soil rating:* No

**Minor Components**

**Merrimac**

*Percent of map unit:* 5 percent  
*Landform:* Terraces, outwash plains, kames  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Ninigret**

*Percent of map unit:* 5 percent  
*Landform:* Terraces, outwash plains  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

**Agawam**

*Percent of map unit:* 5 percent  
*Landform:* Terraces, outwash plains  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Tisbury**

*Percent of map unit:* 3 percent  
*Landform:* Terraces, outwash plains  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Walpole**

*Percent of map unit:* 2 percent  
*Landform:* Drainageways on terraces, depressions on terraces  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

## 29A—Agawam fine sandy loam, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 2tyqw

*Elevation:* 0 to 1,040 feet

*Mean annual precipitation:* 36 to 71 inches

*Mean annual air temperature:* 39 to 55 degrees F

*Frost-free period:* 140 to 250 days

*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Agawam and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Agawam

#### Setting

*Landform:* Moraines, kames, kame terraces, outwash plains, outwash terraces

*Landform position (two-dimensional):* Summit, shoulder, backslope, footslope

*Landform position (three-dimensional):* Crest, side slope, riser, tread, rise, dip

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

#### Typical profile

*Ap - 0 to 11 inches:* fine sandy loam

*Bw1 - 11 to 16 inches:* fine sandy loam

*Bw2 - 16 to 26 inches:* fine sandy loam

*2C1 - 26 to 39 inches:* loamy fine sand

*2C2 - 39 to 55 inches:* loamy fine sand

*2C3 - 55 to 65 inches:* loamy sand

#### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* 15 to 35 inches to strongly contrasting textural stratification

*Drainage class:* Well drained

*Runoff class:* Very low

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.14 to 14.17 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water supply, 0 to 60 inches:* Low (about 3.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

## Custom Soil Resource Report

*Land capability classification (nonirrigated): 2s*

*Hydrologic Soil Group: B*

*Ecological site: F145XY008MA - Dry Outwash*

*Hydric soil rating: No*

### Minor Components

#### Ninigret

*Percent of map unit: 5 percent*

*Landform: Terraces*

*Down-slope shape: Linear*

*Across-slope shape: Concave*

*Hydric soil rating: No*

#### Windsor

*Percent of map unit: 4 percent*

*Landform: Dunes, deltas, outwash terraces, outwash plains*

*Landform position (three-dimensional): Tread, riser*

*Down-slope shape: Convex, linear*

*Across-slope shape: Convex, linear*

*Hydric soil rating: No*

#### Hinckley

*Percent of map unit: 3 percent*

*Landform: Deltas, kames, eskers, outwash plains*

*Landform position (two-dimensional): Summit, shoulder, backslope*

*Landform position (three-dimensional): Head slope, nose slope, crest, side slope, rise*

*Down-slope shape: Convex*

*Across-slope shape: Convex, linear*

*Hydric soil rating: No*

#### Walpole

*Percent of map unit: 3 percent*

*Landform: Deltas, depressions, outwash terraces, depressions, outwash plains*

*Landform position (two-dimensional): Toeslope*

*Landform position (three-dimensional): Tread, talf, dip*

*Down-slope shape: Concave*

*Across-slope shape: Concave*

*Hydric soil rating: Yes*

## 306—Udorthents-Urban land complex

### Map Unit Setting

*National map unit symbol: 9lmg*

*Elevation: 0 to 2,000 feet*

*Mean annual precipitation: 43 to 56 inches*

*Mean annual air temperature: 45 to 55 degrees F*

*Frost-free period: 120 to 185 days*

*Farmland classification: Not prime farmland*

**Map Unit Composition**

*Udorthents and similar soils: 50 percent*

*Urban land: 35 percent*

*Minor components: 15 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Udorthents**

**Setting**

*Down-slope shape: Convex*

*Across-slope shape: Linear*

*Parent material: Drift*

**Typical profile**

*A - 0 to 5 inches: loam*

*C1 - 5 to 21 inches: gravelly loam*

*C2 - 21 to 80 inches: very gravelly sandy loam*

**Properties and qualities**

*Slope: 0 to 25 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Well drained*

*Runoff class: Medium*

*Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)*

*Depth to water table: About 54 to 72 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)*

**Interpretive groups**

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 3e*

*Hydrologic Soil Group: B*

*Hydric soil rating: No*

**Description of Urban Land**

**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*

**Minor Components**

**Unnamed, undisturbed soils**

*Percent of map unit: 8 percent*

*Hydric soil rating: No*

**Udorthents, wet substratum**

*Percent of map unit: 5 percent*

*Down-slope shape: Convex*

*Across-slope shape: Linear*

## Custom Soil Resource Report

*Hydric soil rating:* No

### **Rock outcrop**

*Percent of map unit:* 2 percent

*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

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.

## Custom Soil Resource Report

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



Soil Map may not be valid at this scale.

Map Scale: 1:1,510 if printed on A landscape (11" x 8.5") sheet.

0 20 40 80 120 Meters

0 50 100 200 300 Feet

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

## Custom Soil Resource Report

### 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 22, Sep 12, 2022

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

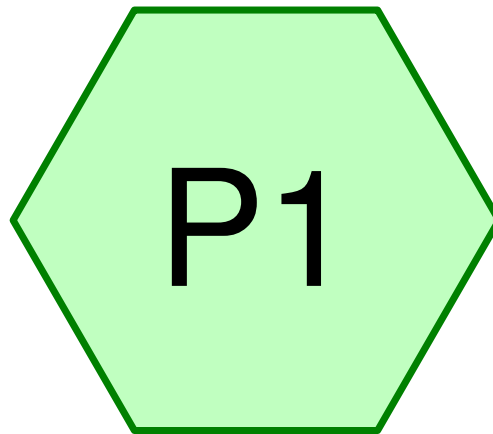
Date(s) aerial images were photographed: Aug 24, 2019—Oct 24, 2019

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.

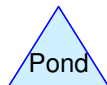
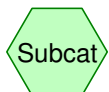
**Table—Hydrologic Soil Group**

| Map unit symbol                    | Map unit name                                 | Rating | Acres in AOI | Percent of AOI |
|------------------------------------|-----------------------------------------------|--------|--------------|----------------|
| 13                                 | Walpole sandy loam, 0 to 3 percent slopes     | B/D    | 0.1          | 1.3%           |
| 23A                                | Sudbury sandy loam, 0 to 5 percent slopes     | B      | 5.6          | 88.9%          |
| 29A                                | Agawam fine sandy loam, 0 to 3 percent slopes | B      | 0.3          | 5.0%           |
| 306                                | Udorthents-Urban land complex                 | B      | 0.3          | 4.7%           |
| <b>Totals for Area of Interest</b> |                                               |        | <b>6.3</b>   | <b>100.0%</b>  |

**Rating Options—Hydrologic Soil Group***Aggregation Method: Dominant Condition**Component Percent Cutoff: None Specified**Tie-break Rule: Higher*



# Proposed Conditions



## Routing Diagram for 2829.S Solar - Drainage

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## 2829.S Solar - Drainage

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Proposed Conditions

Type III 24-hr 2-yr Rainfall=3.14"

Printed 10/3/2022

Page 2

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment P1: Proposed Conditions**    Runoff Area=109,088 sf    0.04% Impervious    Runoff Depth=1.00"  
Tc=10.0 min    CN=74    Runoff=2.40 cfs    0.208 af

**Total Runoff Area = 2.504 ac    Runoff Volume = 0.208 af    Average Runoff Depth = 1.00"**  
**99.96% Pervious = 2.503 ac    0.04% Impervious = 0.001 ac**

## 2829.S Solar - Drainage

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Proposed Conditions

Type III 24-hr 10-yr Rainfall=4.98"

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Page 3

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment P1: Proposed Conditions**    Runoff Area=109,088 sf    0.04% Impervious    Runoff Depth=2.35"  
Tc=10.0 min    CN=74    Runoff=5.99 cfs    0.490 af

**Total Runoff Area = 2.504 ac    Runoff Volume = 0.490 af    Average Runoff Depth = 2.35"**  
**99.96% Pervious = 2.503 ac    0.04% Impervious = 0.001 ac**

## 2829.S Solar - Drainage

Prepared by Design Professionals Inc.

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Proposed Conditions

Type III 24-hr 25-yr Rainfall=6.13"

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Page 4

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment P1: Proposed Conditions**    Runoff Area=109,088 sf    0.04% Impervious    Runoff Depth=3.29"  
Tc=10.0 min    CN=74    Runoff=8.45 cfs    0.688 af

**Total Runoff Area = 2.504 ac    Runoff Volume = 0.688 af    Average Runoff Depth = 3.29"**  
**99.96% Pervious = 2.503 ac    0.04% Impervious = 0.001 ac**

## 2829.S Solar - Drainage

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Proposed Conditions

Type III 24-hr 50-yr Rainfall=6.97"

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Page 5

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment P1: Proposed Conditions**    Runoff Area=109,088 sf    0.04% Impervious    Runoff Depth=4.02"  
Tc=10.0 min    CN=74    Runoff=10.30 cfs    0.838 af

**Total Runoff Area = 2.504 ac    Runoff Volume = 0.838 af    Average Runoff Depth = 4.02"**  
**99.96% Pervious = 2.503 ac    0.04% Impervious = 0.001 ac**

## 2829.S Solar - Drainage

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Proposed Conditions

Type III 24-hr 100-yr Rainfall=7.90"

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Page 6

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment P1: Proposed Conditions**    Runoff Area=109,088 sf    0.04% Impervious    Runoff Depth=4.84"  
Tc=10.0 min    CN=74    Runoff=12.39 cfs    1.009 af

**Total Runoff Area = 2.504 ac    Runoff Volume = 1.009 af    Average Runoff Depth = 4.84"**  
**99.96% Pervious = 2.503 ac    0.04% Impervious = 0.001 ac**

## 2829.S Solar - Drainage

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Proposed Conditions

Type III 24-hr 2-yr Rainfall=3.14"

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### Summary for Subcatchment P1: Proposed Conditions

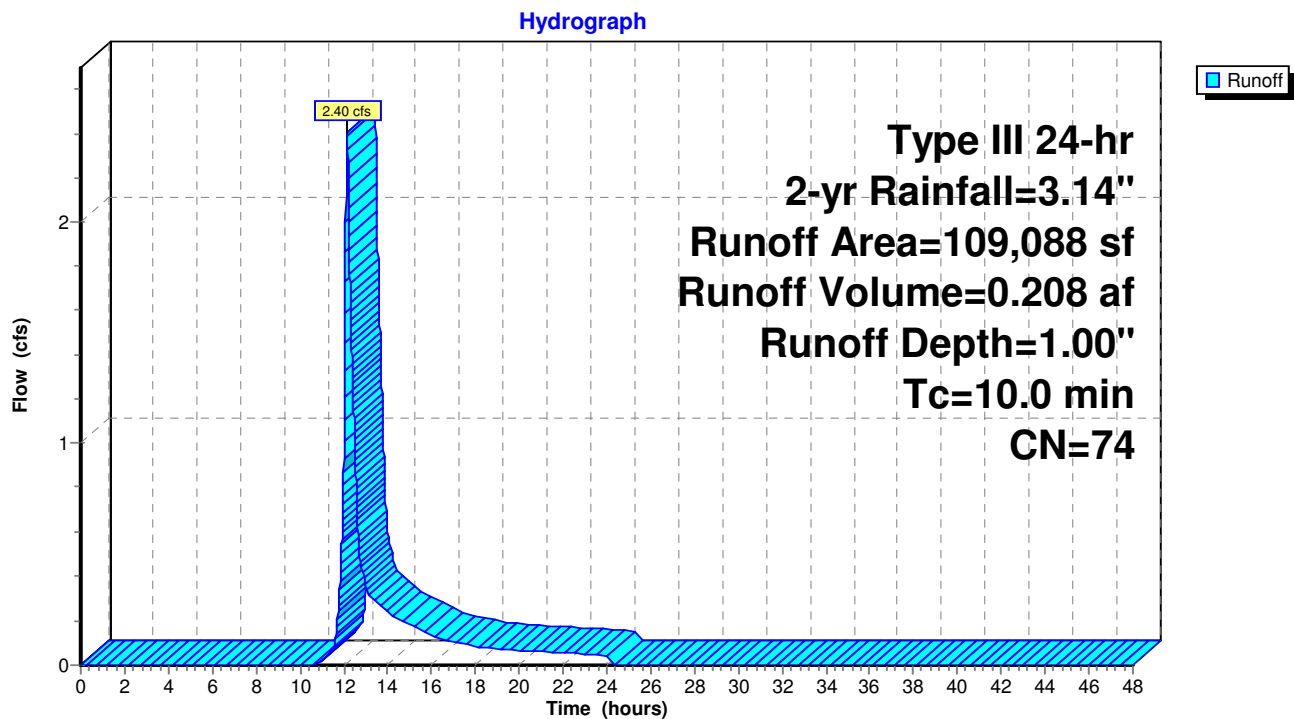
Runoff = 2.40 cfs @ 12.15 hrs, Volume= 0.208 af, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

|   | Area (sf) | CN | Description                   |
|---|-----------|----|-------------------------------|
|   | 109,048   | 74 | >75% Grass cover, Good, HSG C |
| * | 40        | 98 | IMPERVIOUS                    |
|   | 109,088   | 74 | Weighted Average              |
|   | 109,048   |    | 99.96% Pervious Area          |
|   | 40        |    | 0.04% Impervious Area         |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                 |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------|
| 10.0        |                  |                  |                      |                   | Direct Entry, Minimum Paved |

### Subcatchment P1: Proposed Conditions



## 2829.S Solar - Drainage

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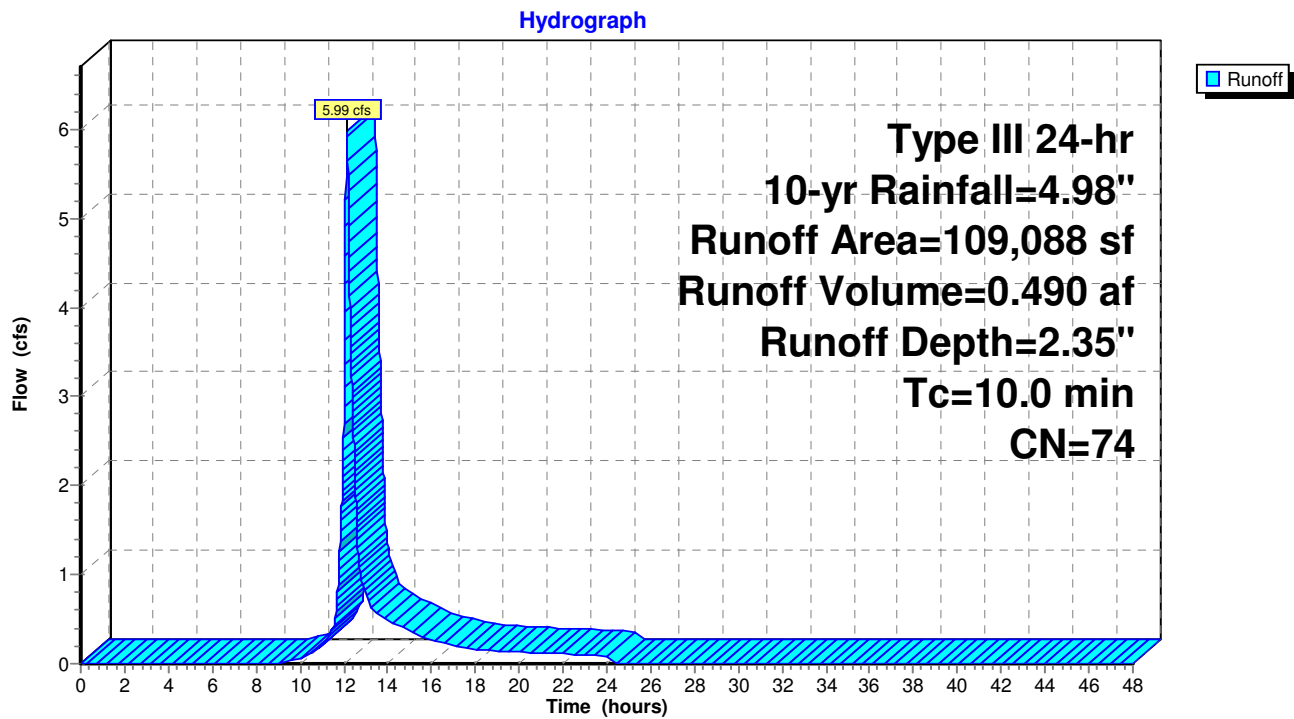
Proposed Conditions

Type III 24-hr 10-yr Rainfall=4.98"

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### Subcatchment P1: Proposed Conditions



## 2829.S Solar - Drainage

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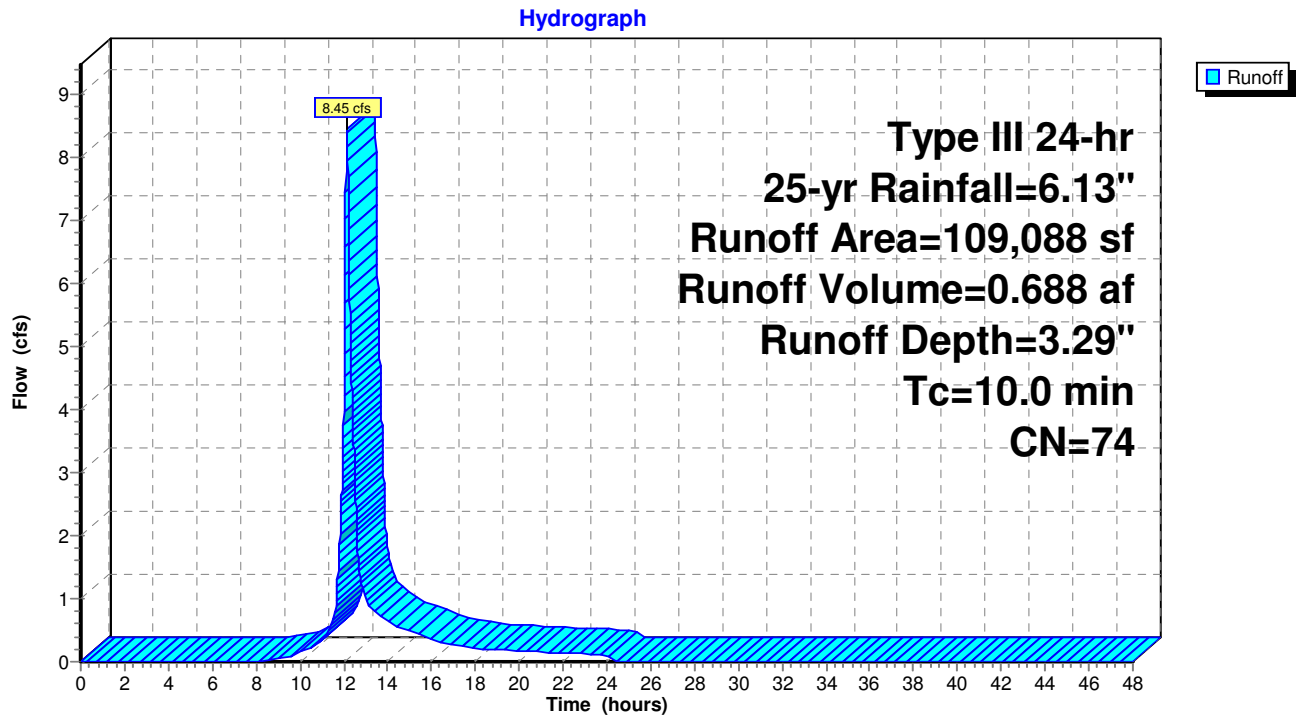
Proposed Conditions

Type III 24-hr 25-yr Rainfall=6.13"

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### Subcatchment P1: Proposed Conditions



## 2829.S Solar - Drainage

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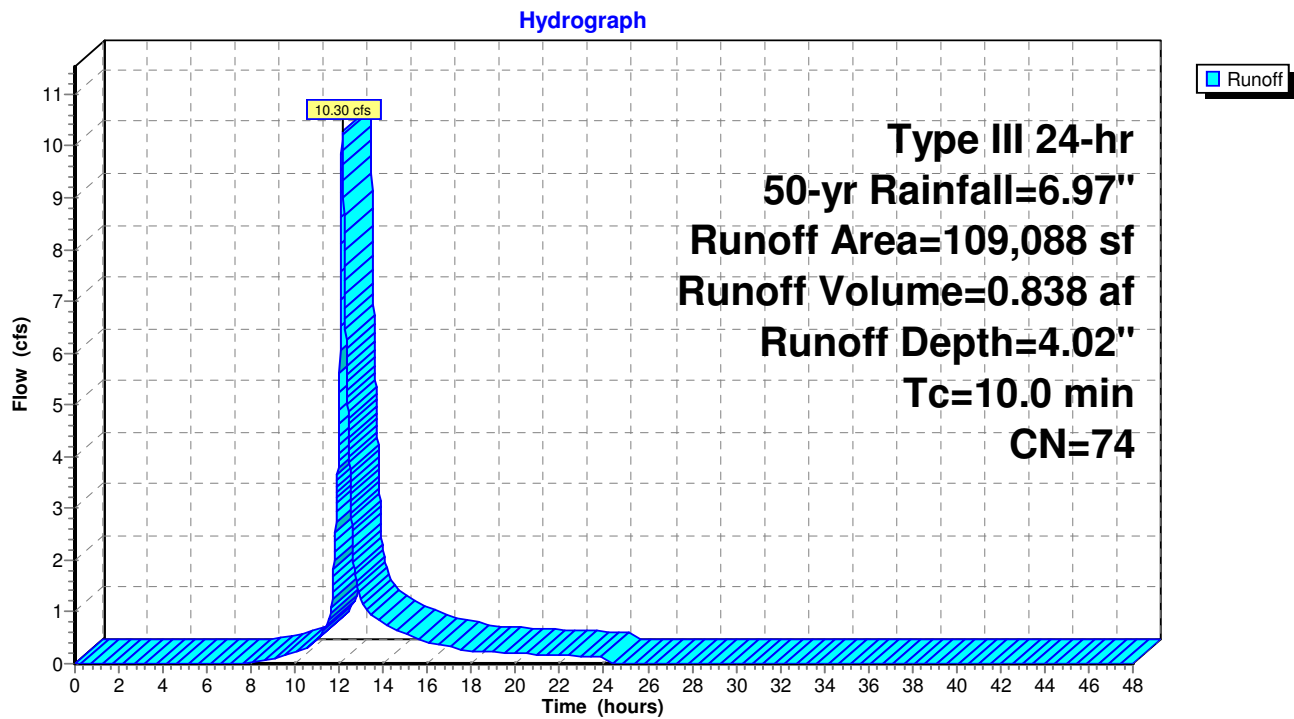
Proposed Conditions

Type III 24-hr 50-yr Rainfall=6.97"

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Page 10

### Subcatchment P1: Proposed Conditions



## 2829.S Solar - Drainage

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Proposed Conditions

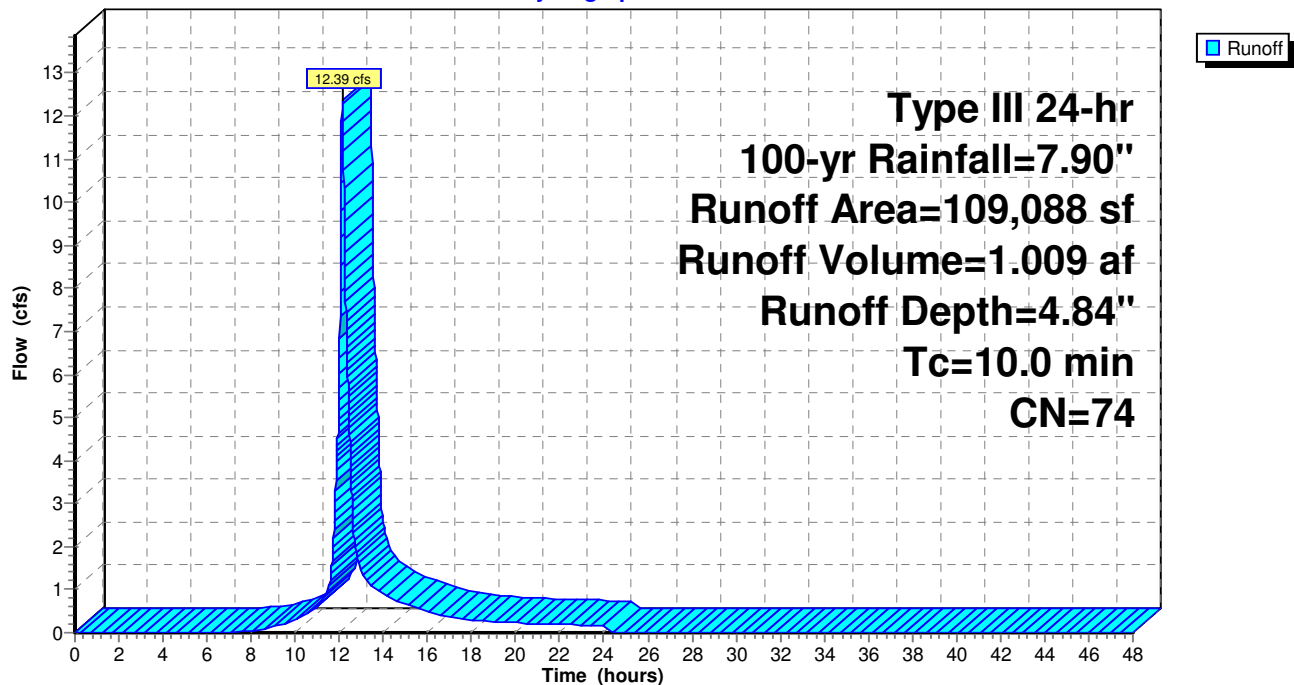
Type III 24-hr 100-yr Rainfall=7.90"

Printed 10/3/2022

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### Subcatchment P1: Proposed Conditions

Hydrograph

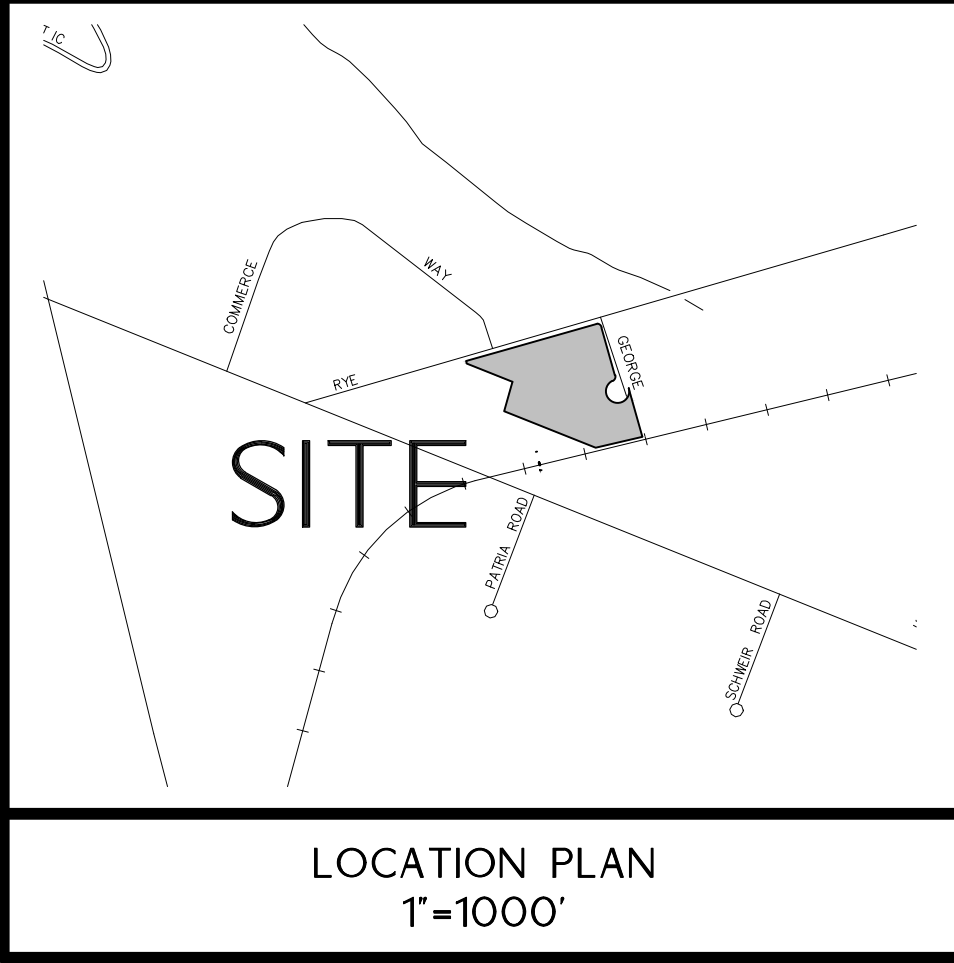
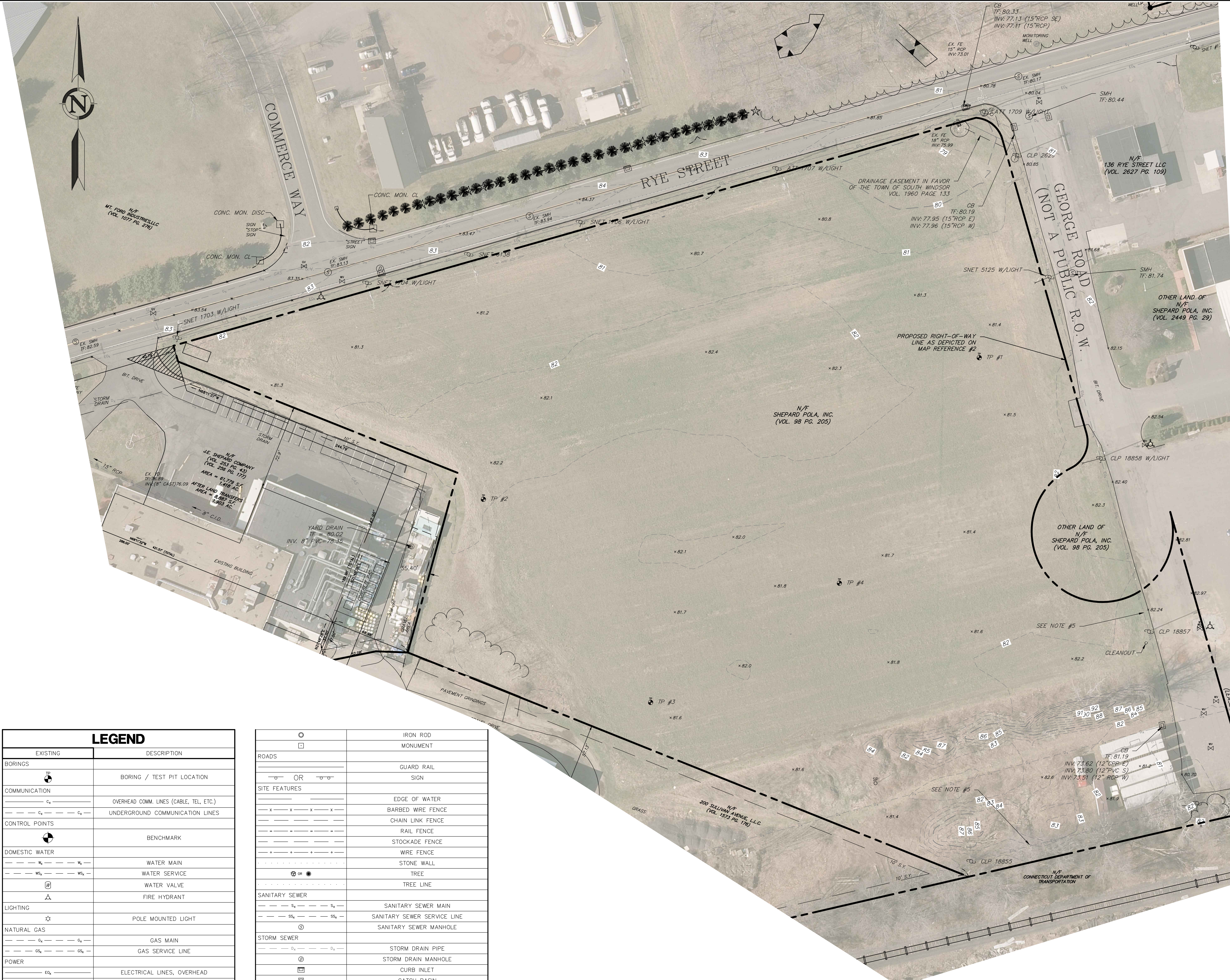


## **APPENDIX C**

### **Test Pit Logs**

| LEGEND         |                                         |
|----------------|-----------------------------------------|
| EXISTING       | DESCRIPTION                             |
| BORINGS        |                                         |
|                | BORING / TEST PIT LOCATION              |
| COMMUNICATION  |                                         |
|                | OVERHEAD COMM. LINES (CABLE, TEL, ETC.) |
|                | UNDERGROUND COMMUNICATION LINES         |
| CONTROL POINTS |                                         |
|                | BENCHMARK                               |
| DOMESTIC WATER |                                         |
|                | WATER MAIN                              |
|                | WATER SERVICE                           |
|                | WATER VALVE                             |
|                | FIRE HYDRANT                            |
| LIGHTING       |                                         |
|                | POLE MOUNTED LIGHT                      |
| NATURAL GAS    |                                         |
|                | GAS MAIN                                |
|                | GAS SERVICE LINE                        |
| POWER          |                                         |
|                | ELECTRICAL LINES, OVERHEAD              |
|                | ELECTRICAL LINES, UNDERGROUND           |
|                | UTILITY POLE                            |
| PROPERTY       |                                         |
|                | PROPERTY LINE                           |
|                | EASEMENT LINE                           |
|                | IRON PIPE                               |

|                |                             |
|----------------|-----------------------------|
|                | IRON ROD                    |
|                | MONUMENT                    |
| ROADS          |                             |
|                | GUARD RAIL                  |
|                | SIGN                        |
| SITE FEATURES  |                             |
|                | EDGE OF WATER               |
|                | BARBED WIRE FENCE           |
|                | CHAIN LINK FENCE            |
|                | RAIL FENCE                  |
|                | STOCKADE FENCE              |
|                | WIRE FENCE                  |
|                | STONE WALL                  |
|                | TREE                        |
|                | TREE LINE                   |
| SANITARY SEWER |                             |
|                | SANITARY SEWER MAIN         |
|                | SANITARY SEWER SERVICE LINE |
|                | SANITARY SEWER MANHOLE      |
| STORM SEWER    |                             |
|                | STORM DRAIN PIPE            |
|                | STORM DRAIN MANHOLE         |
|                | CURB INLET                  |
|                | CATCH BASIN                 |
| TOPOGRAPHY     |                             |
|                | CONTOUR                     |
|                | SPOT ELEVATION              |
| WETLANDS       |                             |
|                | WETLANDS LINE               |



- NOTES:
- PROPERTY IS IN THE I ZONE.
  - PROPOSED SOLAR PORTION OF PARCEL CONTAINS 314,471± SQUARE FEET OR 7.219 ACRES.
  - HORIZONTAL DATUM IS BASED ON NAD83. VERTICAL DATUM IS BASED ON NAVD88.
  - PROPERTY DOES NOT FALL WITHIN THE LIMITS OF A FLOOD HAZARD ZONE AS DEPICTED ON: "FIRM FLOOD INSURANCE RATE MAP NUMBER 09003C0377F TOWN OF SOUTH WINDSOR CONNECTICUT HARTFORD COUNTY COMMUNITY NUMBER 090036 EFFECTIVE DATE: 9/26/2008 FEDERAL EMERGENCY MANAGEMENT AGENCY FEDERAL INSURANCE ADMINISTRATION.
  - PROPERTY SUBJECT TO POLE LINE EASEMENT IN FAVOR OF CONNECTICUT LIGHT & POWER COMPANY FOR EXISTING POLES, WIRES & GUY ANCHORS. SEE VOL. 81 PAGE 257.
  - UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS DEPICTED AND NOTED HEREON HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING SUPPLIED BY THE RESPECTIVE UTILITY COMPANIES OR GOVERNMENTAL AGENCIES, FROM PAROL TESTIMONY AND FROM OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE, THE EXISTENCE OF WHICH ARE UNKNOWN TO DESIGN PROFESSIONALS, INC. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION.
  - CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" FOR UNDERGROUND UTILITY MARKING AT LEAST TWO FULL WORKING DAYS PRIOR TO START OF CONSTRUCTION: 1-800-922-4455 OR WWW.CBYD.COM.
- MAP REFERENCES:
- IMPROVEMENT LOCATION SURVEY-RECORD PREPARED FOR: 200 SULLIVAN AVENUE, LLC 200 SULLIVAN AVENUE SOUTH WINDSOR, CONNECTICUT SHEET 2 OF 6 DATE: 9/16/09 REVISED TO 01/07/2019 BY DESIGN PROFESSIONALS, INC.
  - PLOT PLAN PROPOSED INDUSTRIAL PARK PROPERTY OF SHEPARD-POLA, INC. RYE STREET SOUTH WINDSOR, CONNECTICUT DATE: 2-29-87 SCALE 1"=40' BY MORTON S. FINE & ASSOCIATES.

21 JEFFREY DRIVE  
P.O. BOX 1107  
SOUTH WINDSOR, CT 06074  
860-291-8755 - T  
860-291-8757 - F  
www.designprofessionals.com

**design**  
**Professionals**  
CIVIL & TRAFFIC ENGINEERS / PLANNERS / SURVEYORS  
GIS ANALYSTS / LANDSCAPE ARCHITECTS

PREPARED FOR:

SoBid, Inc.  
One Boston Place, #2600  
Boston, MA 02108

PROJECT NO.  
DATE  
DESIGN BY  
CHECKED BY  
SCALE

06/09/19  
RMB/DH  
SFC

NO.

DATE

REVISIONS

BY

TEST PIT  
LOCATION MAP

SCALE: 0' 20' 40' 80'  
1"=40'

SHEET  
**T-1**

**SHEPARD POLA  
INC**

0002 RYE STREET  
SOUTH WINDSOR, CONNECTICUT

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DPI Project #2829  
NuWay Tobacco Solar Fields  
R002 Rye Street  
South Windsor CT 06074

#### DEEP TEST PIT RESULTS

The following deep test pits were witnessed by  
Daniel Jameson, E.I.T. of Design Professionals, Inc. on 07/25/19

##### TEST PIT #1

|           |                             |
|-----------|-----------------------------|
| 0" – 12"  | TOP SOIL                    |
| 12" – 24" | YELLOW BROWN M-F LOAMY SAND |
| 24" – 65" | TAN M-F SAND                |

STABLE TRENCH, NO MOTTLING, WATER @ 48"

##### TEST PIT #2

|           |                             |
|-----------|-----------------------------|
| 0" – 12"  | TOP SOIL                    |
| 12" – 20" | YELLOW BROWN M-F LOAMY SAND |
| 20" – 66" | TAN M-F SAND                |

STABLE TRENCH, NO MOTTLING, WATER @ 56"

##### TEST PIT #3

|           |                             |
|-----------|-----------------------------|
| 0" – 12"  | TOP SOIL                    |
| 12" – 18" | YELLOW BROWN M-F LOAMY SAND |
| 18" – 90" | TAN M-F SAND                |

STABLE TRENCH, NO MOTTLING, WATER @ 84"

##### TEST PIT #4

|           |                             |
|-----------|-----------------------------|
| 0" – 12"  | TOP SOIL                    |
| 12" – 25" | YELLOW BROWN M-F LOAMY SAND |
| 25" – 85" | TAN M-F SAND                |

STABLE TRENCH, NO MOTTLING, WATER @ 70"

**APPENDIX D**  
**Water Quality Volume and Pond Stage Storage**

**200 Sullivan Ave – DPI Project No.:2829.S**

October 03, 2022

**Water Quality Volume Calculations**

Per 2004 Connecticut Stormwater Quality Manual, Section 7.4.1:

Areas for Calculation: On Site to Forebay (P3)

|              |        |
|--------------|--------|
|              | P1     |
| Impervious   | 1.03   |
| Pervious     | 1.53   |
| Total Area   | 2.56   |
| % Impervious | 41.36% |

Water Quality Volume (WQV) = (1") (R)(A)/12, where:

R = unitless volumetric runoff coefficient =  $0.05 + 0.009(I)$ , where:

I = percent impervious cover of drainage area = 40.23%

$R = 0.05 + 0.009(I)$

$R = 0.05 + 0.009(40.23)$

$R = \underline{0.412}$

A = drainage area in acres = 2.56 acres

$WQV = (1'')(R)(A \text{ acres})/12 \text{ inches per foot}$

$WQV = (1'')(0.412)(2.56 \text{ acres})/12 \text{ inches per foot}$

**$WQV = \underline{0.09} \text{ acre-feet required} = 3,920.4 \text{ cft}$**

**Proposed BMP**

The proposed water quality basin will provide **4,250 cft** below its spillway @ Elev. 79.30. The water quality basin will provide more than 100% of the water quality volume. The water quality basin stage storage report is included as a part of this appendix.

| WQB STAGE STORAGE TABLE |                   |                   |                                   |                                    |                                 |                                  |
|-------------------------|-------------------|-------------------|-----------------------------------|------------------------------------|---------------------------------|----------------------------------|
| ELEV                    | AREA<br>(sq. ft.) | DEPT<br>H<br>(ft) | AVG END<br>INC. VOL.<br>(cu. ft.) | AVG END<br>TOTAL VOL.<br>(cu. ft.) | CONIC<br>INC. VOL.<br>(cu. ft.) | CONIC<br>TOTAL VOL.<br>(cu. ft.) |
| 78.00                   | 2,054.09          | N/A               | N/A                               | 0.00                               | N/A                             | 0.00                             |
| 79.00                   | 4,014.80          | 1.00              | 3034.44                           | 3034.44                            | 2980.20                         | 2980.20                          |
| 79.30                   | 4,606.43          | 0.30              | 1293.18                           | 4327.63                            | 1292.17                         | 4272.37                          |

**APPENDIX E**  
**Drainage Area Map**

