

Stormwater Management Report

For the Proposed:

O&G Earth Products Showcase

Located at:

**10 Colton Rd
East Lyme, Connecticut**

Prepared for Submission to:

**Town of East Lyme, Connecticut
Planning and Zoning Commission**

March 11, 2021

Prepared for:

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Executive Summary

This report has been prepared in support of a Plan application to the Town of East Lyme by O&G Industries, Inc., for a proposed Materials Sales Yard and Office Northeast to be located at 10 Colton Road, on land formerly occupied by Ryder Truck Rental Inc. The subject property is approximately 2.73 acres and is currently developed with a one-story 10,137 SF building and associated parking and improvements. There are no existing wetlands on or adjacent to the subject property.

The proposed redevelopment includes the expansion of the existing paved area to create space for bins of various earth materials, and the construction of a truck scale, and patio area with flagpole, associated stormwater improvements.

The overall existing drainage onsite will be improved with the use of Best Management Practices (BMPs) for water quality and runoff management through treatment, detention and outlet control. The water quality volume for new impervious areas will be captured and infiltrated into the ground beneath the proposed paved areas.

A HydroCAD model, utilizing TR-55 methodology, was developed to evaluate the existing and proposed drainage conditions of the property. To mitigate the increase in impervious coverage on the site a subsurface detention/infiltration system will be installed with an outlet control structure to provide stormwater runoff rate control. The results of the analysis demonstrate that there will not be an increase in peak stormwater runoff rates for the 2-, 10-, 25-, and 100-year storm events. Water Quality Best Management Practices (BMPs) have been incorporated into the project design to provide a minimum required 80% TSS removal. A hydrodynamic separator will be placed upstream of the underground system to remove sediment particles and floatable debris, and keep them from reaching the underground system.

The proposed stormwater management system is designed to be in compliance with the Town of East Lyme regulations and the 2004 Connecticut Stormwater Quality Manual as well as the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

There are no known drainage rights or drainage easements recorded between the property and contiguous State properties.

Existing Conditions

General Existing Site Conditions

Generally, the topography of the site slopes downward from south to north. A central wooded low area collects runoff from the southern portion of the site and direct runoff towards the east where it sheet flows towards the property line. The remainder of the site pitches to the north where stormwater runoff is discharged via sheet flow towards Interstate 95. A small portion of the site along Colton Road drains to the south towards the street. There is no existing stormwater collection system on site.

The property is approximately 2.73 acres in size. Approximately 1.78 acres of the site is currently developed with a building, pavement, gravel, and improved surfaces. The remaining 0.95 acres of the site is undeveloped wooded and brush areas.

The following is a brief analysis of the existing points of interest as shown on the enclosed Existing Drainage Plan (ED-1), in Appendix E.

Existing Drainage Area 101 (EDA-101): This drainage area covers most the existing parking lot, existing building, and a small grass area along the west side of the property. In the EDA-101 drainage area, the stormwater runoff flows south to north-west along the existing site driveway. Ultimately the runoff sheet flows off the property where it is captured by two catch basins in the Interstate 95 Right-Of-Way.

Existing Drainage Area 201 (EDA-201): This drainage area includes a small wooded area in the south-east front yard area of the site. In the EDA-201 drainage area, the stormwater runoff is sheet flows east onto the neighboring property.

Table 1 below displays the overall size and hydraulic characteristics used to analyze the existing drainage areas.

Table 1 – Pre-Development (Existing Conditions) Drainage Characteristics

Drainage Area	Total Area SF	Composite Curve Number	Imperviousness Cover %	Time of Concentration Minutes
EDA-101	63,685	89	62.5%	5.00
EDA-201	24,916	73	0.0%	5.00

Proposed Conditions

General Proposed Site Conditions

The proposed development includes the expansion of the impervious paved area by approximately 30,000 SF. The proposed paved area will mimic the existing topography of the land and stormwater runoff will be collected in proposed catch basins. The new stormwater collection system will convey collected runoff through in-line hydrodynamic separators sized to removed 80% total suspended solids, then into an underground detention/infiltration system.

The new underground system has been sized to retain and recharge the water quality volume for the improvements while also providing detention for stormwater runoff in order to mitigate the effects of the increase in impervious area and runoff. As a result, the proposed peak rate of runoff has been limited to match predevelopment levels in accordance with applicable standards.

The overall drainage onsite will be improved through the use of Best Management Practices (BMPs) for water quality and runoff management through means of treatment, detention and outlet control.

Proposed Drainage Conditions

For the purposes of the drainage analysis and discussion, as well as to maintain existing drainage patterns to the maximum extent practical, the stormwater runoff points of interest for the proposed conditions analysis are the same as the points of interest analyzed in the existing conditions. The discharge from the proposed stormwater infiltration system will discharge directly to the existing stormwater network of the subject property and the neighboring mall property. The proposed development has been analyzed as one drainage area, which is illustrated on the enclosed Proposed Drainage Plan (PD-1) located in Appendix E. The proposed analysis includes a total of 2.26 acres and is approximately 88.4% impervious. The site stormwater management system will provide the necessary stormwater attenuation do to the increase in impervious surface through the installation of a subsurface detention systems with outlet control as well as stormwater quality improvements compared to the existing system through the utilization of hydrodynamic separators for treatment before entering both the existing drainage network to the maximum extent practical. The BMPs have been designed in accordance with the 2004 Connecticut Stormwater Quality Manual.

The following is a brief analysis of the proposed drainage areas as shown on the enclosed Proposed Drainage Plan (PD-1), in Appendix E.

Proposed Drainage Area 101 (PDA-101): This drainage area consists predominately of paved areas along with small areas of grass along the property boundaries. The runoff is captured in a

catch basin system installed throughout the property where it is piped into the underground stormwater infiltration system in the northwest corner of the property.

Table 2 below displays the overall size and hydraulic characteristics used to analyze the proposed drainage areas.

Table 2 – Post Development Drainage Characteristics

Drainage Area	Total Area SF	Composite Curve Number	Imperviousness Cover %	Time of Concentration Minutes
PDA-101	63,399	94	85.4%	5.00
PDA-201	34,875	96	93.7%	5.00

Stormwater Management

Stormwater Attenuation

A hydrologic analysis to determine peak stormwater discharge rates was performed using the HydroCAD stormwater modeling system computer program, version 10.00 developed by HydroCAD Software Solutions, LLC. Hydrographs for each watershed were developed using the SCS Synthetic Unit Hydrograph Method. Rainfall depths and distribution taken from the NOAA Atlas 14 for Trumbull, Connecticut were used for the calculation of peak flow rates and are listed in Table 3. The drainage areas, or sub-drainage areas as labeled by the program, are depicted by hexagons on the attached drainage diagrams. Pre- and post-development HydroCAD output and details can be found in Appendix B.

**Table 3 – Rainfall Depths per NOAA Atlas 14
Appendix B - 24-hour Rainfall Data**

Return Period	24-hour Rainfall Depth
2-year	3.52"
10-year	5.42"
25-year	6.61"
100-year	8.45"

The results of the analysis can be found in Table 4 below of the 2, 10, 25, and 100-year storm events. With the use of detention structures with outlet control structures the site proposed stormwater management system meets the requirements of the Town of Trumbull Regulations as well as the 2004 Connecticut Stormwater Quality Manual at all discharge design point locations by not increasing peak runoff rates from the proposed developments at the site.

Table 4 – Existing vs Proposed Peak Rates of Runoff

Analysis Point	Peak Flows (CFS)			
	2-YR	10-YR	25-YR	100-YR
EDA-101	5.89	9.75	12.16	15.83
EDA-201	1.17	2.50	3.40	4.83
EDA (TOTAL)	7.06	12.25	15.56	20.66
PDA-101	0.04	2.46	6.16	12.49
PDA (TOTAL)	0.04	2.46	6.16	12.49

In addition to reducing the rate of runoff, the overall volume of stormwater runoff is also being reduced from the site. Table 5 below provides a comparison of the stormwater runoff volumes for the 2, 10, 25, and 100-year storm events.

Table 5 – Existing vs Proposed Runoff Volumes

Year Storm	Volume of Stormwater Runoff (CF)			Volume of Stormwater Runoff (CF)	
	EDA-101	EDA-201	TOTAL	PDA-101	TOTAL
2	12,240	2,396	14,636	23,435	23,435
10	20,909	5,009	25,918	37,374	37,374
25	26,484	6,882	33,367	46,174	46,174
100	35,153	9,888	45,041	59,764	59,764
		TOTAL:	118,962	TOTAL:	166,748

Stormwater Quality

Along with the reduction of peak storm water discharge rates, an important element of the proposed drainage system is to improve the quality of discharge leaving the property. BMPs for stormwater runoff quality have been implemented in this design, refer to Appendix D for details and calculations.

All catch basins in parking and/or paved areas will have a minimum of two-foot deep sumps to collect sediment carried in the runoff. In addition, all catch basin outlets will be fitted with ‘hoods’ which trap floating debris in the individual catch basin so they can be removed during regular maintenance. The lawn and landscaped areas can also provide a secondary level of filtration and infiltration. No quantifiable credit is given to this green space, but it can contribute to water quality.

Hydrodynamic separators will be installed downstream of the stormwater collection networks prior to discharging to the detention systems. This unit has been proven to improve storm water quality. The unit has been designed in an “in-line” configuration, which improves the efficiency and is sized to treat the Water Quality Flow (WQF) per the 2004 Connecticut Stormwater Quality Manual. The “in-line” hydrodynamic separators will provide for 80% total suspended solid removal from collected runoff meeting the Connecticut guidelines and applicable Town of Trumbull regulations. Additionally, the underground detention system will retain and infiltrate at minimum the 1” WQV significantly reducing downstream pollutant load and meeting the Town of East Lyme Municipal Separate Storm Sewer System (MS4) requirements for these systems. Table 6 below is a comparison of the required 1” WQV for the site drainage areas and the respective volumes below the outlet inverts (or lowest orifice) for the detention systems’ outlet control structure (supporting calculations and tables can be found in Appendix D).

Table 6 – 1” Water Quality Volume Required and Provided (MS4)

Contributing Area	1” WQV	
	Required (cf)	Provided (cf)
PDA-101	3,572	11,194

Soil Erosion and Sediment Control

A soil erosion and sediment control plan has been developed to protect the adjacent roadways, storm drainage systems, properties and wetland areas and any adjacent water course from sediment laden surface runoff and erosion.

Sediment control will be accomplished through rapid stabilization and by the installation of mechanical devices, including a temporary gravel construction entrance, silt fence, haybales, and storm drain inlet protection. The proposed construction activities will be in accordance with policies and requirements of the 2002 Connecticut Guidelines for Sedimentation and Erosion Control, as amended as well as the applicable requirements of the Town of East Lyme. Permanent stabilization will occur as quickly as possible with site-specific seeding mixtures and as required by local officials.

Structural practices utilized as part of this development will include:

1. Temporary Construction Entrance

A temporary construction entrance shall be installed at the stone construction entrance of the development. Mud and debris shall be washed from all construction vehicles and equipment before leaving the site. The sediment laden water will be diverted to a proposed sediment basin/trap. Water tanks will be used if public water is unavailable.

2. Silt Fence

Silt fence shall be installed downstream of disturbed areas to filter the sediment laden sheet flow. Haybale backing will be used upstream of wetlands.

3. Inlet Protection

All storm inlets existing and constructed, that could potentially receive sediment laden runoff will have silt sack and/or haybale protection installed until site stabilization is complete.

Conclusion

The stormwater design for the project development meets regulatory requirements and stormwater quality goals. The stormwater BMPs aid in keeping pollutants out of the adjacent roadways and properties and maximize the potential for groundwater recharge as well as attenuating peak flows by detaining stormwater for the most frequent storm events as practical. Stormwater quality is being addressed by water quality structures providing the minimum required 80% TSS removal as required in the CT Stormwater Manual. The proposed stormwater management system will meet the stormwater quality requirements of the State of Connecticut and the Town of East Lyme while improving overall existing site drainage condition.

APPENDIX A

DATA AND MAPPING

Figure 1A: USGS Location Map

Figure 1B: Aerial Location Map

Figure 2: NRCS Soil Survey Map with Hydrologic Soil Group Data

Figure 3: FEMA Federal Insurance Rate Map

Figure 4: NOAA Atlas 14 Storm Data



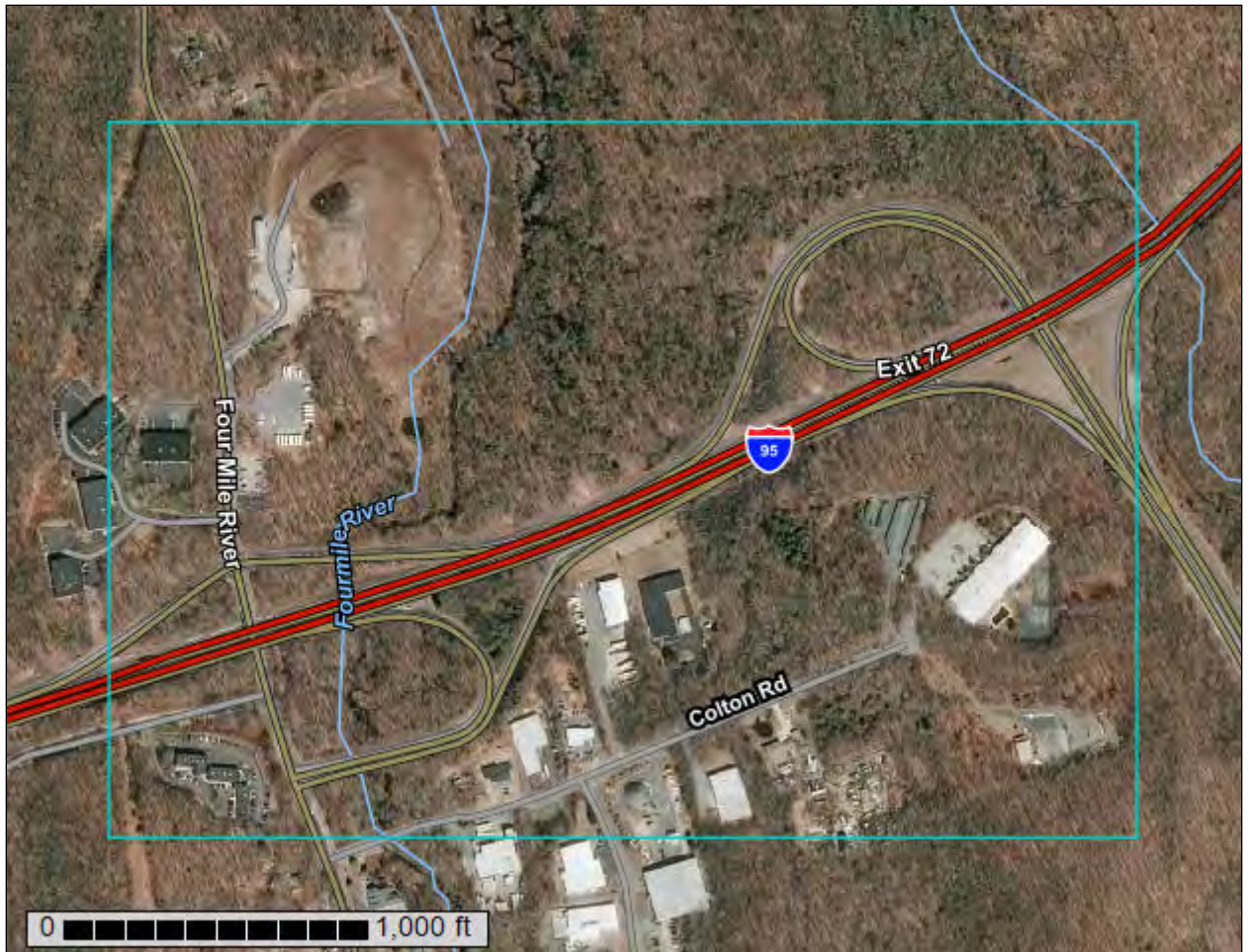
United States
Department of
Agriculture

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



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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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

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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

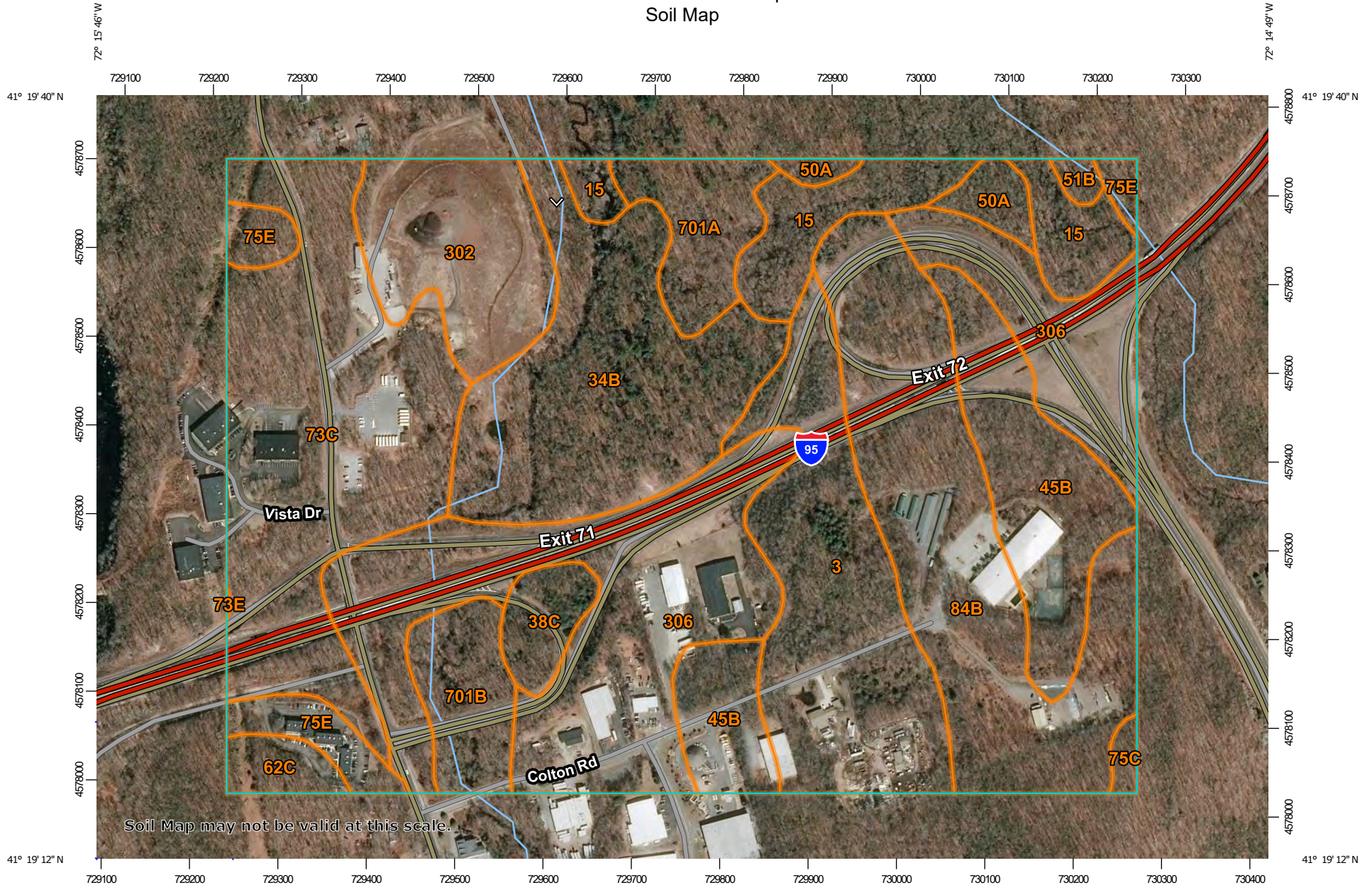
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

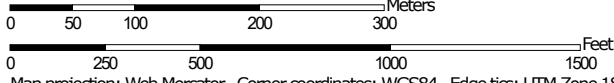
The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.


Map Scale: 1:6,060 if printed on A landscape (11" x 8.5") sheet.



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

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

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

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

Date(s) aerial images were photographed: Mar 20, 2019—Mar 27, 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
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	18.8	10.3%
15	Scarboro muck, 0 to 3 percent slopes	8.9	4.9%
34B	Merrimac fine sandy loam, 3 to 8 percent slopes	20.7	11.3%
38C	Hinckley loamy sand, 3 to 15 percent slopes	2.7	1.5%
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	14.9	8.1%
50A	Sutton fine sandy loam, 0 to 3 percent slopes	2.1	1.2%
51B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	0.5	0.3%
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	1.9	1.0%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	27.9	15.3%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	0.0	0.0%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	0.6	0.3%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	4.3	2.4%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	24.9	13.6%
302	Dumps	10.2	5.6%
306	Udorthents-Urban land complex	33.9	18.5%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	5.2	2.8%
701B	Ninigret fine sandy loam, 3 to 8 percent slopes	5.2	2.8%
Totals for Area of Interest		182.8	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

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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

3—Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2t2qt

Elevation: 0 to 1,480 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

Ridgebury, extremely stony, and similar soils: 40 percent

Leicester, extremely stony, and similar soils: 35 percent

Whitman, extremely stony, and similar soils: 17 percent

Minor components: 8 percent

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

Description of Ridgebury, Extremely Stony

Setting

Landform: Drumlins, depressions, drainageways, hills, ground moraines

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Base slope, head slope

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 6 inches: fine sandy loam

Bw - 6 to 10 inches: sandy loam

Bg - 10 to 19 inches: gravelly sandy loam

Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 15 to 35 inches to densic material

Drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water capacity: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

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Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Description of Leicester, Extremely Stony

Setting

Landform: Ground moraines, depressions, drainageways, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 7 inches: fine sandy loam
Bg - 7 to 18 inches: fine sandy loam
BC - 18 to 24 inches: fine sandy loam
C1 - 24 to 39 inches: gravelly fine sandy loam
C2 - 39 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 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 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B/D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Description of Whitman, Extremely Stony

Setting

Landform: Depressions, drainageways, hills, ground moraines, drumlins
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: peat

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A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam
Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Swansea

Percent of map unit: 2 percent
Landform: Swamps, bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

15—Scarboro muck, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkt
Elevation: 0 to 1,350 feet

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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

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

Description of Scarboro

Setting

Landform: Outwash deltas, depressions, drainageways, outwash terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Sandy glaciofluvial deposits derived from schist and/or gneiss and/or granite

Typical profile

Oa - 0 to 8 inches: muck
A - 8 to 14 inches: mucky fine sandy loam
Cg1 - 14 to 22 inches: sand
Cg2 - 22 to 65 inches: gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 0 to 2 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F144AY031MA - Very Wet Outwash
Hydric soil rating: Yes

Minor Components

Timakwa

Percent of map unit: 10 percent
Landform: Swamps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Walpole

Percent of map unit: 8 percent
Landform: Deltas, outwash terraces, depressions, outwash plains, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Deerfield

Percent of map unit: 2 percent
Landform: Outwash plains, terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

34B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 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: All areas are prime farmland

Map Unit Composition

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

Description of Merrimac

Setting

Landform: Kames, eskers, moraines, outwash terraces, outwash plains
Landform position (two-dimensional): Backslope, footslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

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Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

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

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, outwash plains, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Outwash plains, deltas, dunes, outwash terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Outwash terraces, outwash plains, kames, eskers, stream terraces, moraines

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Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

38C—Hinckley loamy sand, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svmb
Elevation: 0 to 1,290 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: Farmland of statewide importance

Map Unit Composition

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

Description of Hinckley

Setting

Landform: Moraines, outwash terraces, outwash deltas, kame terraces, outwash plains, kames, eskers
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope, summit
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser, tread
Down-slope shape: Convex, linear, concave
Across-slope shape: Linear, convex, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches

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Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Outwash plains, kames, eskers, moraines, outwash terraces
Landform position (two-dimensional): Backslope, footslope, shoulder, toeslope, summit
Landform position (three-dimensional): Side slope, crest, head slope, nose slope, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Eskers, moraines, kame terraces, outwash plains, outwash terraces, outwash deltas, kames
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope, summit
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, riser, tread
Down-slope shape: Convex, concave, linear
Across-slope shape: Concave, linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent
Landform: Outwash deltas, kame terraces, outwash plains, kames, eskers, moraines, outwash terraces
Landform position (two-dimensional): Footslope, backslope, shoulder, toeslope, summit
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser, tread
Down-slope shape: Linear, convex, concave
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent
Landform: Outwash plains, moraines, outwash deltas, outwash terraces, kame terraces
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave

Hydric soil rating: No

45B—Woodbridge fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2ql

Elevation: 0 to 1,470 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: All areas are prime farmland

Map Unit Composition

Woodbridge, fine sandy loam, and similar soils: 82 percent

Minor components: 18 percent

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

Description of Woodbridge, Fine Sandy Loam

Setting

Landform: Hills, drumlins, ground moraines

Landform position (two-dimensional): Backslope, footslope, summit

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam

Bw1 - 7 to 18 inches: fine sandy loam

Bw2 - 18 to 30 inches: fine sandy loam

Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Moderately well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 18 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C/D

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Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton

Percent of map unit: 10 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 8 percent
Landform: Ground moraines, depressions, drainageways, hills
Landform position (two-dimensional): Toeslope, backslope, footslope
Landform position (three-dimensional): Base slope, head slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

50A—Sutton fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2xffg
Elevation: 0 to 1,240 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: All areas are prime farmland

Map Unit Composition

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

Description of Sutton

Setting

Landform: Hills, ridges, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 5 inches: fine sandy loam

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Bw1 - 5 to 17 inches: fine sandy loam

Bw2 - 17 to 25 inches: sandy loam

C1 - 25 to 39 inches: gravelly sandy loam

C2 - 39 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well 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 12 to 27 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water capacity: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: B/D

Ecological site: F144AY008CT - Moist Till Uplands

Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 5 percent

Landform: Hills, ridges, ground moraines

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Crest

Down-slope shape: Linear, convex

Across-slope shape: Convex

Hydric soil rating: No

Leicester

Percent of map unit: 5 percent

Landform: Depressions, drainageways, hills, ground moraines

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave

Hydric soil rating: Yes

Canton

Percent of map unit: 4 percent

Landform: Ridges, moraines, hills

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Whitman

Percent of map unit: 1 percent

Landform: Drumlins, ground moraines, depressions, drainageways, hills

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Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

51B—Sutton fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2xfff
Elevation: 0 to 1,410 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

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

Description of Sutton, Very Stony

Setting

Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

O_i - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: fine sandy loam
Bw₁ - 7 to 19 inches: fine sandy loam
Bw₂ - 19 to 27 inches: sandy loam
C₁ - 27 to 41 inches: gravelly sandy loam
C₂ - 41 to 62 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (K_{sat}): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 12 to 27 inches
Frequency of flooding: None

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Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water capacity: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B/D

Ecological site: F144AY008CT - Moist Till Uplands

Hydric soil rating: No

Minor Components

Charlton, very stony

Percent of map unit: 7 percent

Landform: Hills, ground moraines, ridges

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Crest, side slope

Down-slope shape: Linear, convex

Across-slope shape: Convex

Hydric soil rating: No

Canton, very stony

Percent of map unit: 4 percent

Landform: Ridges, hills, moraines

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Leicester, very stony

Percent of map unit: 3 percent

Landform: Hills, drainageways, ground moraines, depressions

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave, linear

Across-slope shape: Concave

Hydric soil rating: Yes

Whitman, very stony

Percent of map unit: 1 percent

Landform: Drainageways, hills, ground moraines, drumlins, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

62C—Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2wks7

Elevation: 0 to 1,310 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

Canton, extremely stony, and similar soils: 50 percent

Charlton, extremely stony, and similar soils: 35 percent

Minor components: 15 percent

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

Description of Canton, Extremely Stony

Setting

Landform: Ridges, hills, moraines

Landform position (two-dimensional): Shoulder, backslope, summit

Landform position (three-dimensional): Side slope, crest, nose slope

Down-slope shape: Convex, linear

Across-slope shape: Convex

Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material

A - 2 to 5 inches: fine sandy loam

Bw1 - 5 to 16 inches: fine sandy loam

Bw2 - 16 to 22 inches: gravelly fine sandy loam

2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 15 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification

Drainage class: Well drained

Runoff class: Low

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

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water capacity: Low (about 3.4 inches)

Interpretive groups

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

Description of Charlton, Extremely Stony

Setting

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

Typical profile

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

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

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

Minor Components

Leicester, extremely stony

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

Sutton, extremely stony

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

Chatfield, extremely stony

Percent of map unit: 5 percent
Landform: Hills, ridges
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

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

Custom Soil Resource Report

C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

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

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Chatfield, Very Stony

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Linear, convex

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

Typical profile

O_i - 0 to 1 inches: slightly decomposed plant material

A - 1 to 2 inches: fine sandy loam

B_w - 2 to 30 inches: gravelly fine sandy loam

2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 41 inches to lithic bedrock

Drainage class: Well drained

Runoff class: High

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

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water capacity: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Custom Soil Resource Report

Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Sutton, very stony

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

Rock outcrop

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

Hollis, very stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, very stony

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

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

Map Unit Setting

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

Map Unit Composition

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

Description of Charlton

Setting

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 4 inches: fine sandy loam

Bw1 - 4 to 7 inches: fine sandy loam

Bw2 - 7 to 19 inches: fine sandy loam

Bw3 - 19 to 27 inches: gravelly fine sandy loam

C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 45 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Chatfield

Setting

Landform: Hills, ridges

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material

A - 1 to 6 inches: gravelly fine sandy loam

Bw1 - 6 to 15 inches: gravelly fine sandy loam

Bw2 - 15 to 29 inches: gravelly fine sandy loam

2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Custom Soil Resource Report

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent

Hydric soil rating: No

Sutton

Percent of map unit: 5 percent

Landform: Depressions, drainageways

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Leicester

Percent of map unit: 5 percent

Landform: Depressions, drainageways

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: Yes

Hollis

Percent of map unit: 3 percent

Landform: Hills, ridges

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Unnamed, sandy subsoil

Percent of map unit: 1 percent

Hydric soil rating: No

Unnamed, red parent material

Percent of map unit: 1 percent

Hydric soil rating: No

75C—Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9lqn
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

Hollis and similar soils: 35 percent
Chatfield and similar soils: 30 percent
Rock outcrop: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: 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 9 inches: channery fine sandy loam
Bw2 - 9 to 15 inches: gravelly fine sandy loam
2R - 15 to 80 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

Custom Soil Resource Report

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Description of Chatfield

Setting

Landform: Hills, ridges

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material

A - 1 to 6 inches: gravelly fine sandy loam

Bw1 - 6 to 15 inches: gravelly fine sandy loam

Bw2 - 15 to 29 inches: gravelly fine sandy loam

2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Rock Outcrop

Properties and qualities

Slope: 3 to 15 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

Charlton

Percent of map unit: 7 percent

Landform: Hills

Custom Soil Resource Report

Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sutton

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

Leicester

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

Unnamed, sandy subsoil

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

Brimfield

Percent of map unit: 1 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, red parent material

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

75E—Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 9lqp
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

Hollis and similar soils: 35 percent
Chatfield and similar soils: 30 percent
Rock outcrop: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Landform: Hills, ridges

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: 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 9 inches: channery fine sandy loam

Bw2 - 9 to 15 inches: gravelly fine sandy loam

2R - 15 to 80 inches: bedrock

Properties and qualities

Slope: 15 to 45 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Description of Chatfield

Setting

Landform: Hills, ridges

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material

A - 1 to 6 inches: gravelly fine sandy loam

Bw1 - 6 to 15 inches: gravelly fine sandy loam

Bw2 - 15 to 29 inches: gravelly fine sandy loam

2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Custom Soil Resource Report

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

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

Charlton

Percent of map unit: 7 percent

Landform: Hills

Down-slope shape: Linear

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

Sutton

Percent of map unit: 5 percent

Landform: Drainageways, depressions

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Unnamed, red parent material

Percent of map unit: 1 percent

Hydric soil rating: No

Brimfield

Percent of map unit: 1 percent

Landform: Hills, ridges

Custom Soil Resource Report

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

84B—Paxton and Montauk fine sandy loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2qn
Elevation: 0 to 1,570 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: All areas are prime farmland

Map Unit Composition

Paxton and similar soils: 55 percent
Montauk and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Custom Soil Resource Report

Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Description of Montauk

Setting

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

Typical profile

A - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 14 inches: fine sandy loam
Bw2 - 14 to 25 inches: sandy loam
2Cd1 - 25 to 39 inches: gravelly loamy coarse sand
2Cd2 - 39 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 38 inches to densic material
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 24 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Ridgebury

Percent of map unit: 5 percent
Landform: Hills, ground moraines, depressions, drainageways
Landform position (two-dimensional): Toeslope, backslope, footslope
Landform position (three-dimensional): Base slope, head slope, dip
Down-slope shape: Concave
Across-slope shape: Concave

Custom Soil Resource Report

Hydric soil rating: Yes

Woodbridge

Percent of map unit: 5 percent

Landform: Hills, drumlins, ground moraines

Landform position (two-dimensional): Backslope, footslope, summit

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Charlton

Percent of map unit: 5 percent

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

302—Dumps

Map Unit Setting

National map unit symbol: 9lmb

Elevation: 0 to 1,200 feet

Mean annual precipitation: 37 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

Dumps: 95 percent

Minor components: 5 percent

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

Description of Dumps

Typical profile

C - 0 to 65 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: Unranked

Minor Components

Udorthents

Percent of map unit: 2 percent

Hydric soil rating: No

Unnamed, frequently flooded

Percent of map unit: 1 percent

Custom Soil Resource Report

Landform: Drainageways
Hydric soil rating: Yes

Westbrook

Percent of map unit: 1 percent
Landform: Tidal marshes, salt marshes
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Rock outcrop

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

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

Custom Soil Resource Report

Frequency of ponding: None
Available water capacity: 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
Hydric soil rating: No

Rock outcrop

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

701A—Ninigret fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2y07d
Elevation: 0 to 1,260 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

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

Description of Ninigret

Setting

Landform: Outwash terraces, kames, moraines, outwash plains, kame terraces

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Base slope, tread

Down-slope shape: Linear, convex

Across-slope shape: Concave, 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 8 inches: fine sandy loam

Bw1 - 8 to 16 inches: fine sandy loam

Bw2 - 16 to 26 inches: fine sandy loam

2C - 26 to 65 inches: stratified loamy sand to loamy fine sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 18 to 38 inches to strongly contrasting textural stratification

Drainage class: Moderately 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: About 17 to 39 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C

Ecological site: F144AY026CT - Moist Silty Outwash

Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent

Landform: Moraines, kames, eskers, outwash terraces, outwash plains

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Side slope, crest, tread

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Agawam

Percent of map unit: 5 percent

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

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Side slope, crest, tread

Down-slope shape: Convex

Across-slope shape: Convex

Custom Soil Resource Report

Hydric soil rating: No

Tisbury

Percent of map unit: 3 percent

Landform: Outwash terraces, outwash plains, deltas, valley trains

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

Raypol

Percent of map unit: 2 percent

Landform: Depressions, drainageways

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

701B—Ninigret fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2y07f

Elevation: 0 to 1,260 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

Ninigret and similar soils: 85 percent

Minor components: 15 percent

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

Description of Ninigret

Setting

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

Landform position (two-dimensional): Backslope, footslope, toeslope

Landform position (three-dimensional): Base slope, tread

Down-slope shape: Convex, linear

Across-slope shape: Convex, concave

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 8 inches: fine sandy loam

Bw1 - 8 to 16 inches: fine sandy loam

Bw2 - 16 to 26 inches: fine sandy loam

2C - 26 to 65 inches: stratified loamy sand to loamy fine sand

Properties and qualities

Slope: 3 to 8 percent

Custom Soil Resource Report

Depth to restrictive feature: 18 to 38 inches to strongly contrasting textural stratification

Drainage class: Moderately 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: About 17 to 39 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C

Ecological site: F144AY026CT - Moist Silty Outwash

Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent

Landform: Moraines, outwash terraces, outwash plains, kames, eskers

Landform position (two-dimensional): Backslope, footslope, shoulder, summit, toeslope

Landform position (three-dimensional): Side slope, crest, head slope, nose slope, tread

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Agawam

Percent of map unit: 5 percent

Landform: Outwash terraces, outwash plains, kame terraces, kames, moraines

Landform position (two-dimensional): Backslope, shoulder, footslope, summit, toeslope

Landform position (three-dimensional): Side slope, crest, nose slope, head slope, tread

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Tisbury

Percent of map unit: 3 percent

Landform: Valley trains, outwash plains, deltas, outwash terraces

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

Raypol

Percent of map unit: 2 percent

Landform: Depressions, drainageways

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Custom Soil Resource Report

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Custom Soil Resource Report

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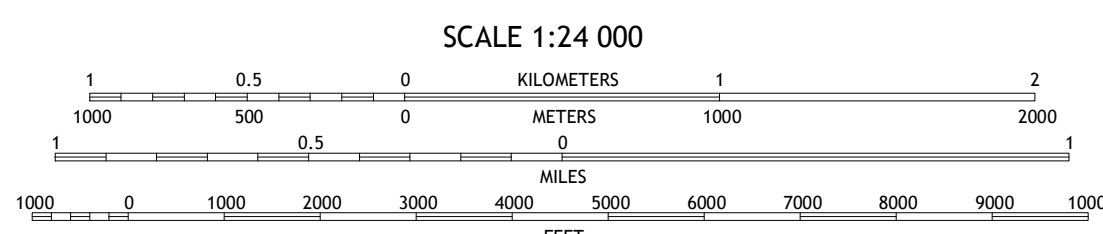
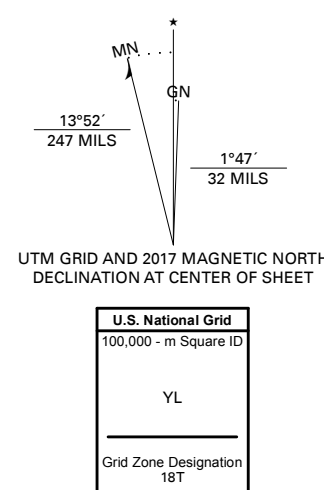
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Produced by the United States Geological Survey

North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84), Projection and
1 000-meter grid/Universal Transverse Mercator, Zone 18T
This map is not a legal document. Boundaries may be
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.

Imagery.....N.A.I.P., July 2016 - September 2016
Roads.....U.S. Census Bureau, 2016
Names.....GNIS, 1979-2017
Hydrography.....National Hydrography Dataset, 2004 - 2018
Contours.....National Elevation Dataset, 2012
Boundaries.....Multiple sources; see metadata file 2016 - 2017
Wetlands.....FWS National Wetlands Inventory 2010

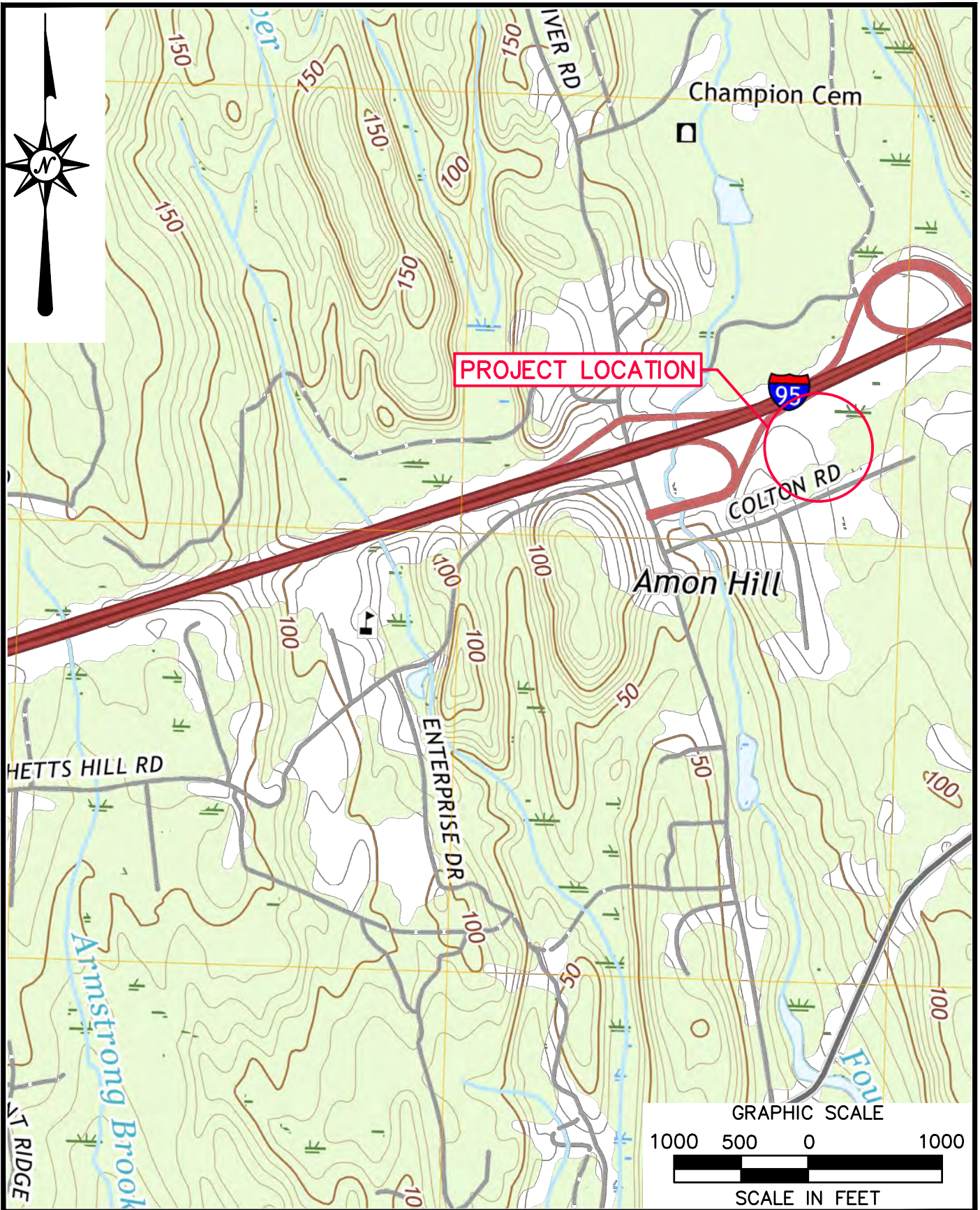


1	2	3
4	5	6
7	8	9

ADJOINING QUADRANGLES

- 1 Deep River
- 2 Palmertown
- 3 East
- 4 Niantic
- 5 Orient
- 6 Plum Island

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



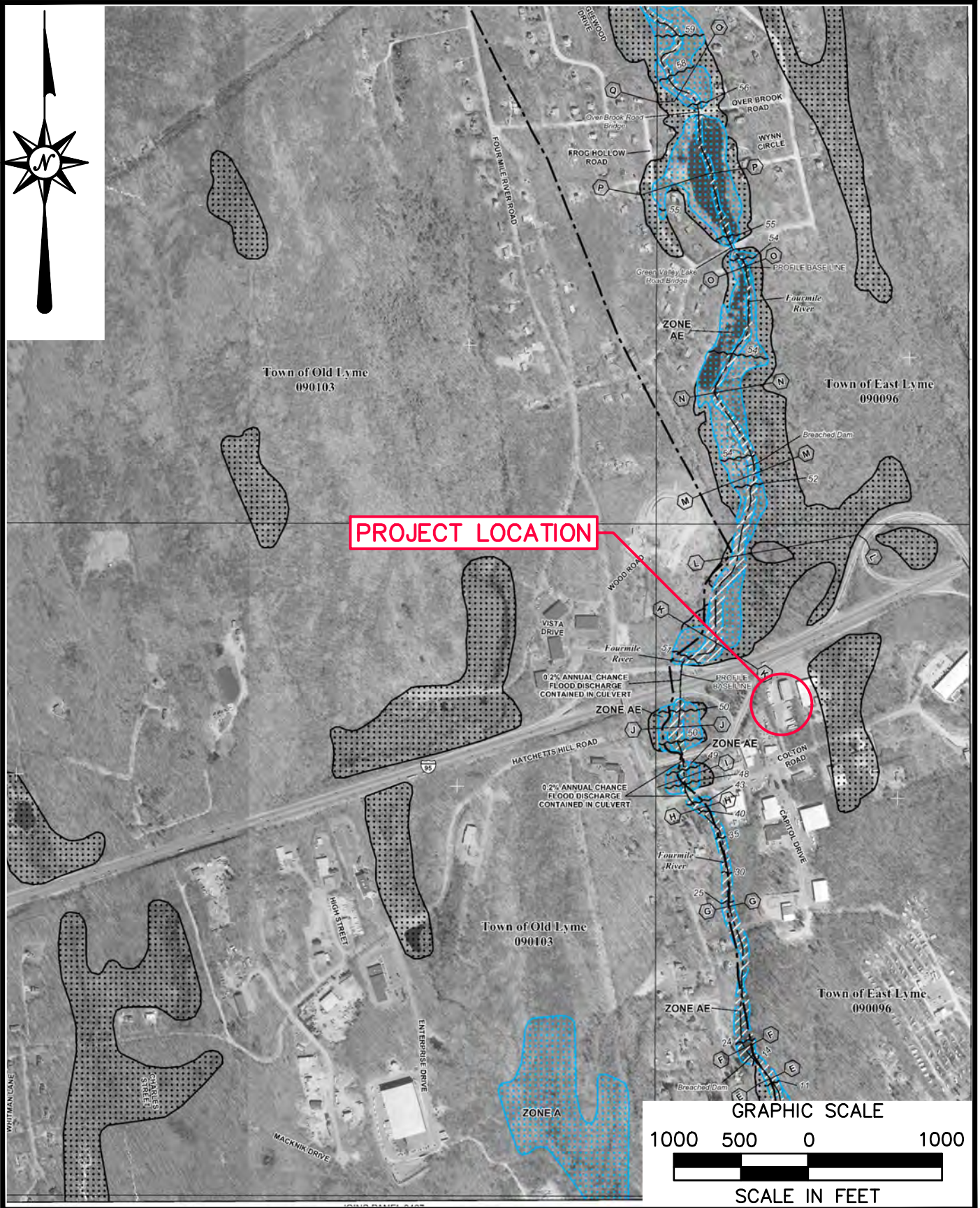
ARCHITECTURE
ENGINEERING
ENVIRONMENTAL
LAND SURVEYING

**EARTH PRODUCTS
SHOWCASE**
10 COLTON ROAD
EAST LYME, CONNECTICUT

Designed
Drawn
Reviewed
Scale
Project No.
Date
CAD File

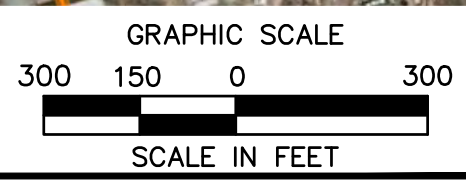
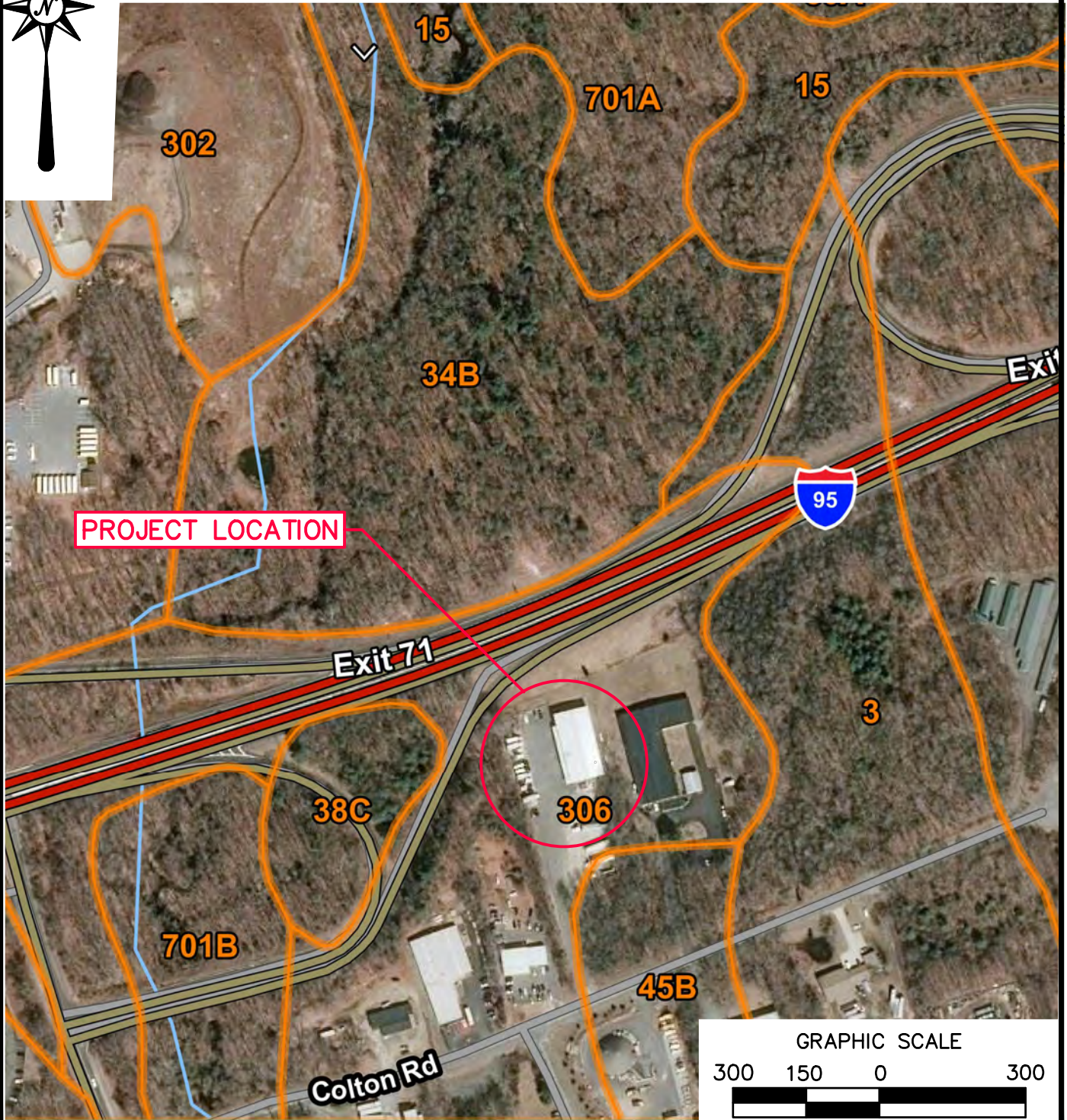
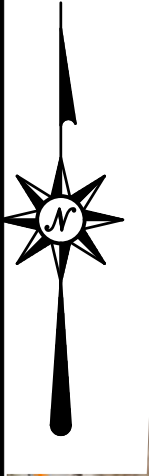
M.A.G.
M.A.G.
1"=1000'
2100074
02/11/2021
EXH210007401-USGS

FIGURE 1
USGS LOCATION MAP



LEGEND

306 - UDORTHENTS-URBAN LAND COMPLEX
 45 B - WOODBRIDGE FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES



**EARTH PRODUCTS
 SHOWCASE**
 10 COLTON ROAD
 EAST LYME, CONNECTICUT

Designed M.A.G.
 Drawn M.A.G.
 Reviewed
 Scale 1"=300'
 Project No. 2100074
 Date 02/11/2021
 CAD File EXH210007403-SOILS

FIGURE 3
 NRCS SOILS MAP

APPENDIX B

HYDROLOGIC ANALYSIS

Pre-Development Hydrological Analysis (2-, 10-, 25- and 100-year storms)

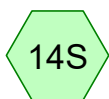
Post-Development Hydrological Analyses (2-, 10-, 25- and 100-year storms)



EDA-101



POI-1



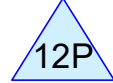
EDA-201



POI-2



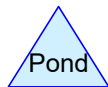
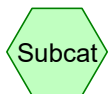
PDA-101



CHAMBERS



POI-1



Routing Diagram for C-DAT-2100074

Prepared by BL Companies, Printed 3/11/2021

HydroCAD® 10.00-21 s/n 01334 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.257	69	50-75% Grass cover, Fair, HSG B (15S)
0.006	79	50-75% Grass cover, Fair, HSG C (15S)
0.548	74	>75% Grass cover, Good, HSG C (13S)
1.761	98	Paved parking (15S)
0.684	98	Paved parking, HSG B (13S)
0.230	98	Roofs, HSG B (13S)
0.233	98	Unconnected roofs, HSG B (15S)
0.572	73	Woods, Fair, HSG C (14S)
4.290	90	TOTAL AREA

Summary for Subcatchment 13S: EDA-101

Runoff = 0.73 cfs @ 11.97 hrs, Volume= 0.035 af, Depth> 0.28"

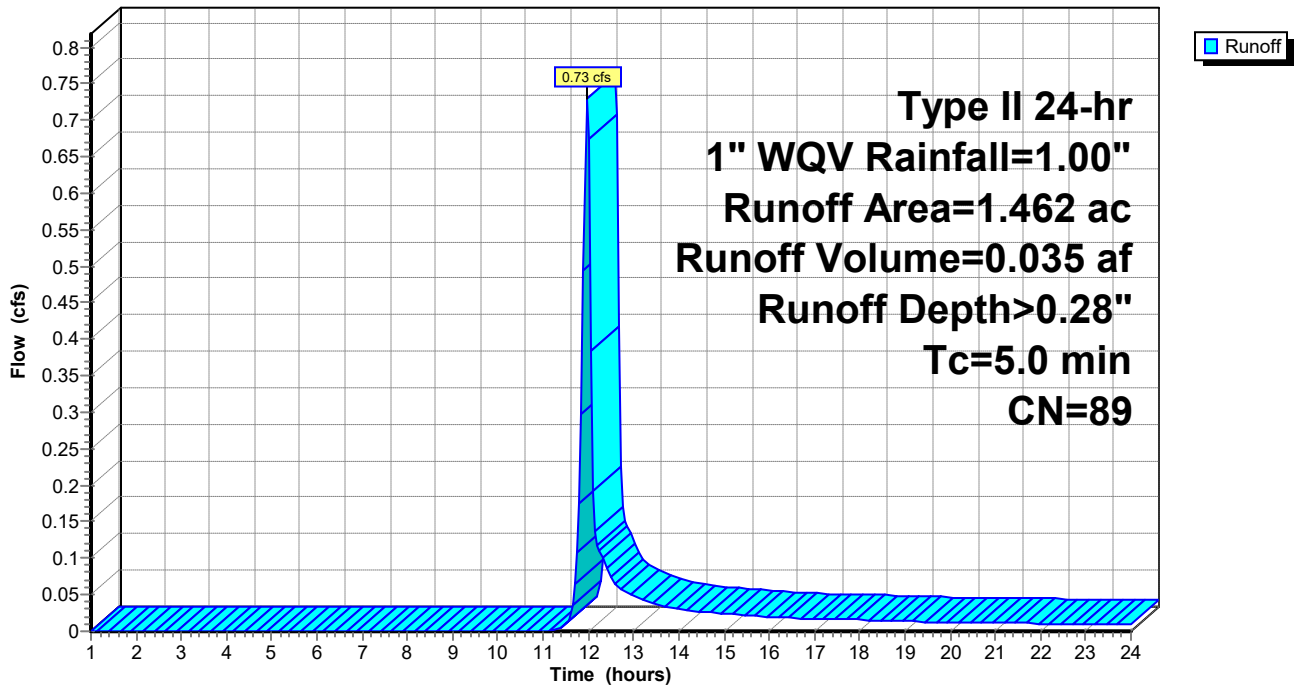
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1" WQV Rainfall=1.00"

Area (ac)	CN	Description
0.230	98	Roofs, HSG B
0.684	98	Paved parking, HSG B
0.548	74	>75% Grass cover, Good, HSG C
1.462	89	Weighted Average
0.548		37.48% Pervious Area
0.914		62.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, AB

Subcatchment 13S: EDA-101

Hydrograph



Summary for Subcatchment 14S: EDA-201

Runoff = 0.00 cfs @ 15.17 hrs, Volume= 0.001 af, Depth> 0.02"

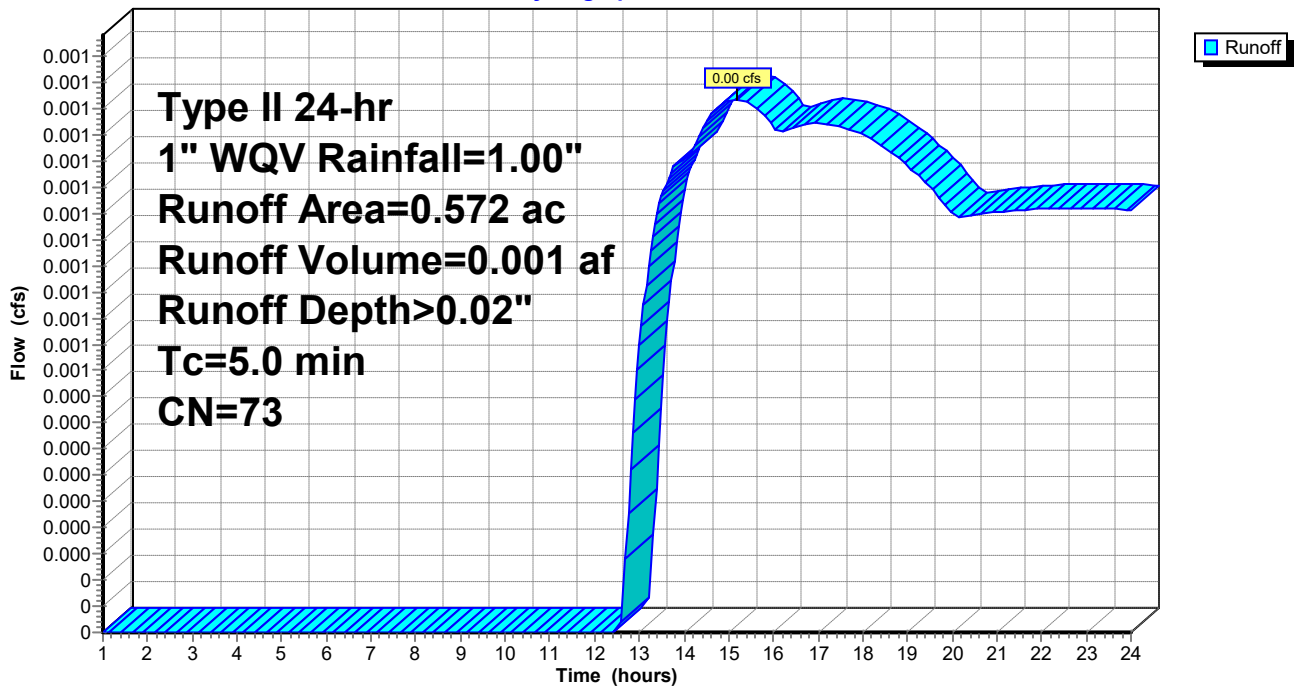
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1" WQV Rainfall=1.00"

Area (ac)	CN	Description
0.572	73	Woods, Fair, HSG C
0.572		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, AB

Subcatchment 14S: EDA-201

Hydrograph



Summary for Subcatchment 15S: PDA-101

Runoff = 2.27 cfs @ 11.96 hrs, Volume= 0.106 af, Depth> 0.56"

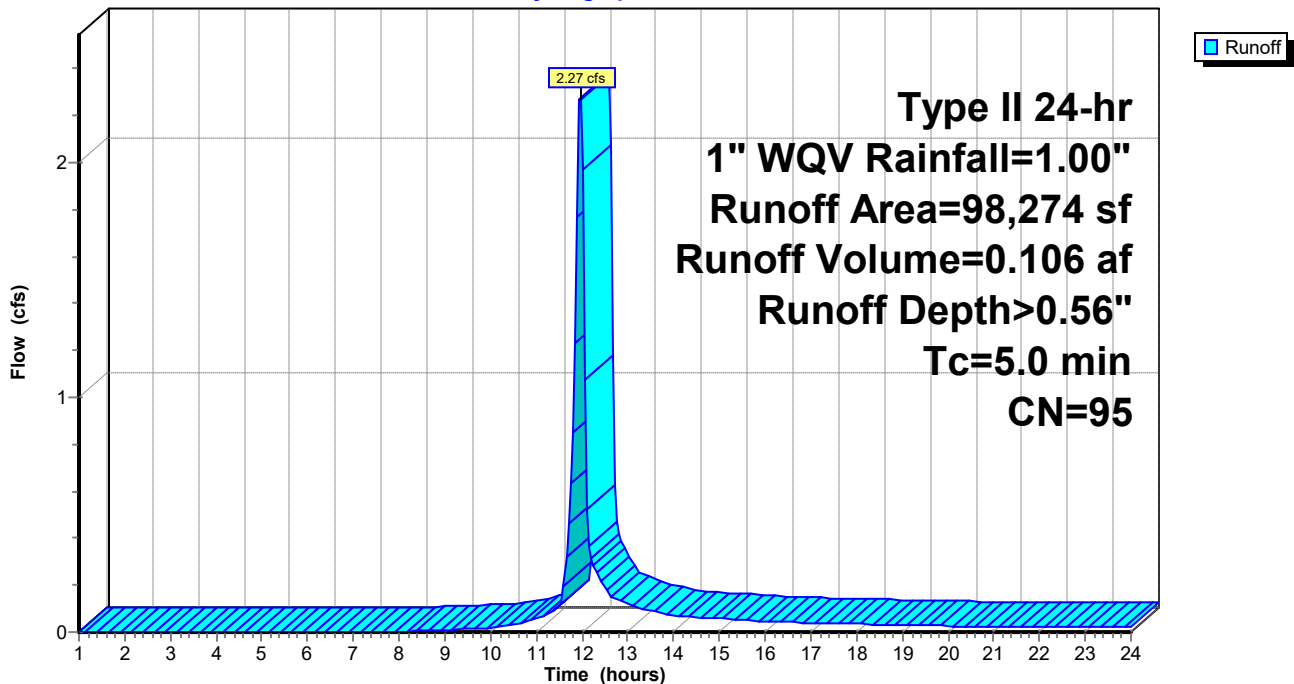
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
11,178	69	50-75% Grass cover, Fair, HSG B
10,137	98	Unconnected roofs, HSG B
* 76,691	98	Paved parking
268	79	50-75% Grass cover, Fair, HSG C
98,274	95	Weighted Average
11,446		11.65% Pervious Area
86,828		88.35% Impervious Area
10,137		11.67% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 15S: PDA-101

Hydrograph



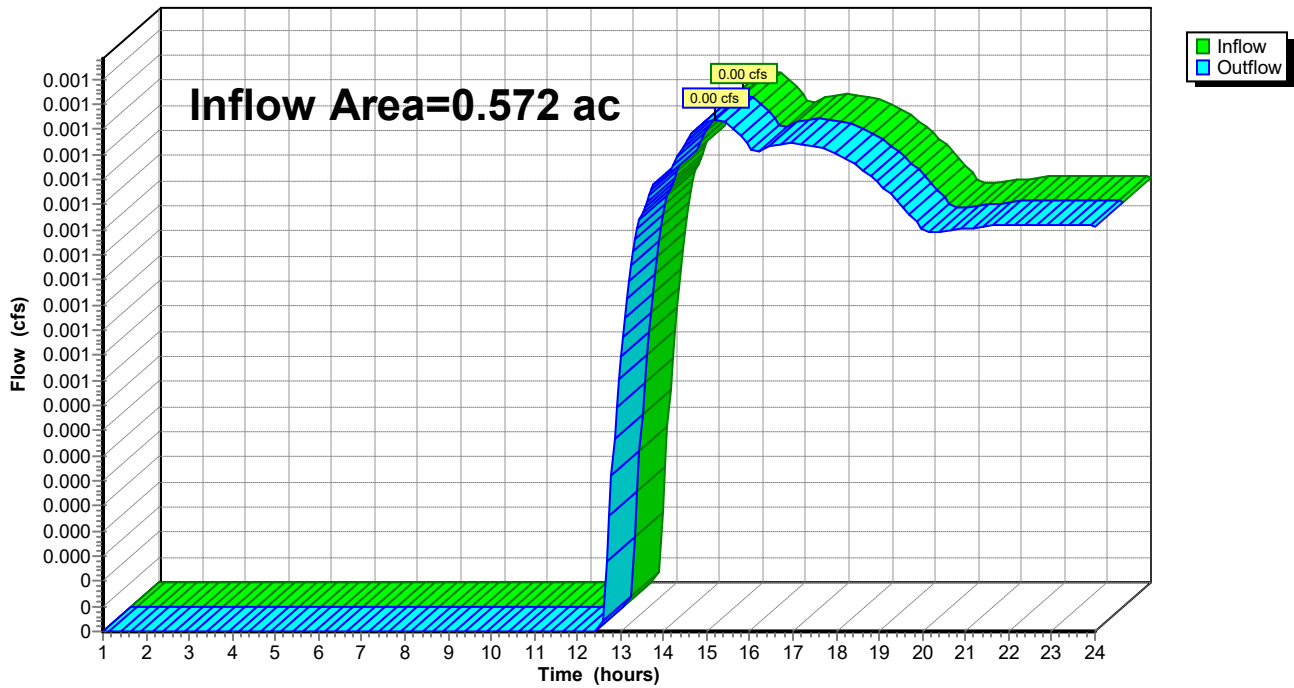
Summary for Reach 13R: POI-2

Inflow Area = 0.572 ac, 0.00% Impervious, Inflow Depth > 0.02" for 1" WQV event
Inflow = 0.00 cfs @ 15.17 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 15.17 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 13R: POI-2

Hydrograph



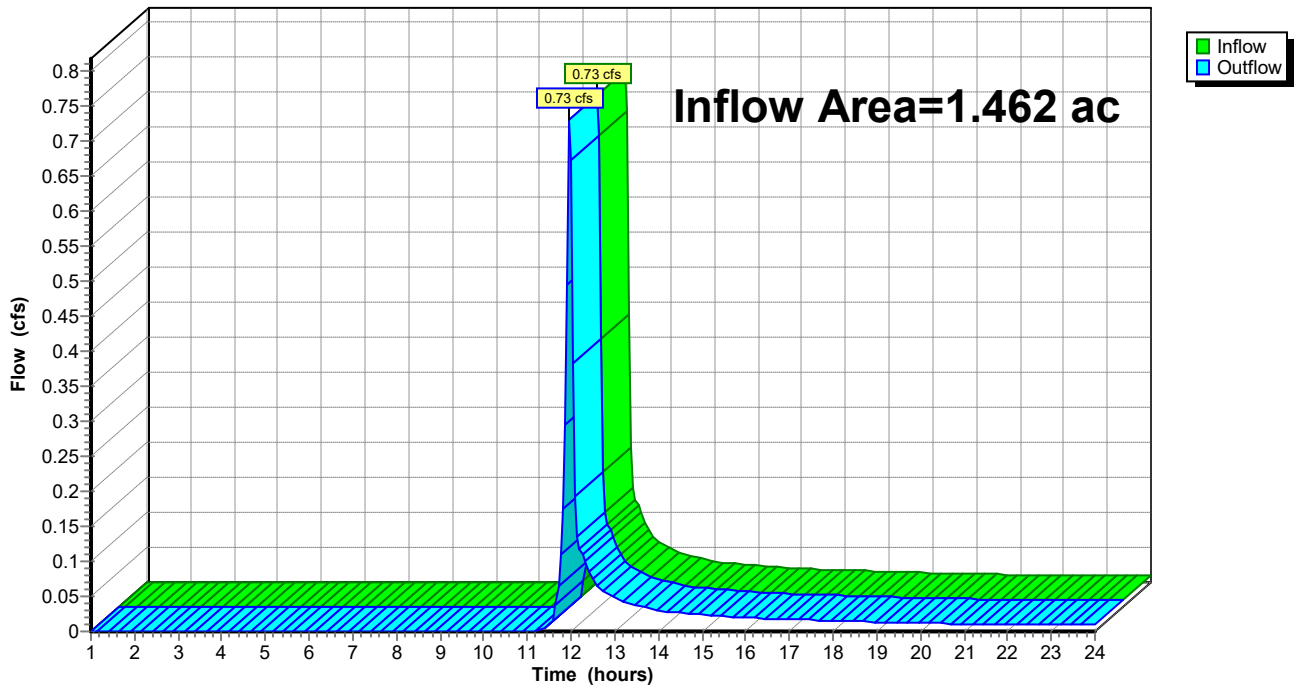
Summary for Reach 15R: POI-1

Inflow Area = 1.462 ac, 62.52% Impervious, Inflow Depth > 0.28" for 1" WQV event
Inflow = 0.73 cfs @ 11.97 hrs, Volume= 0.035 af
Outflow = 0.73 cfs @ 11.97 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 15R: POI-1

Hydrograph



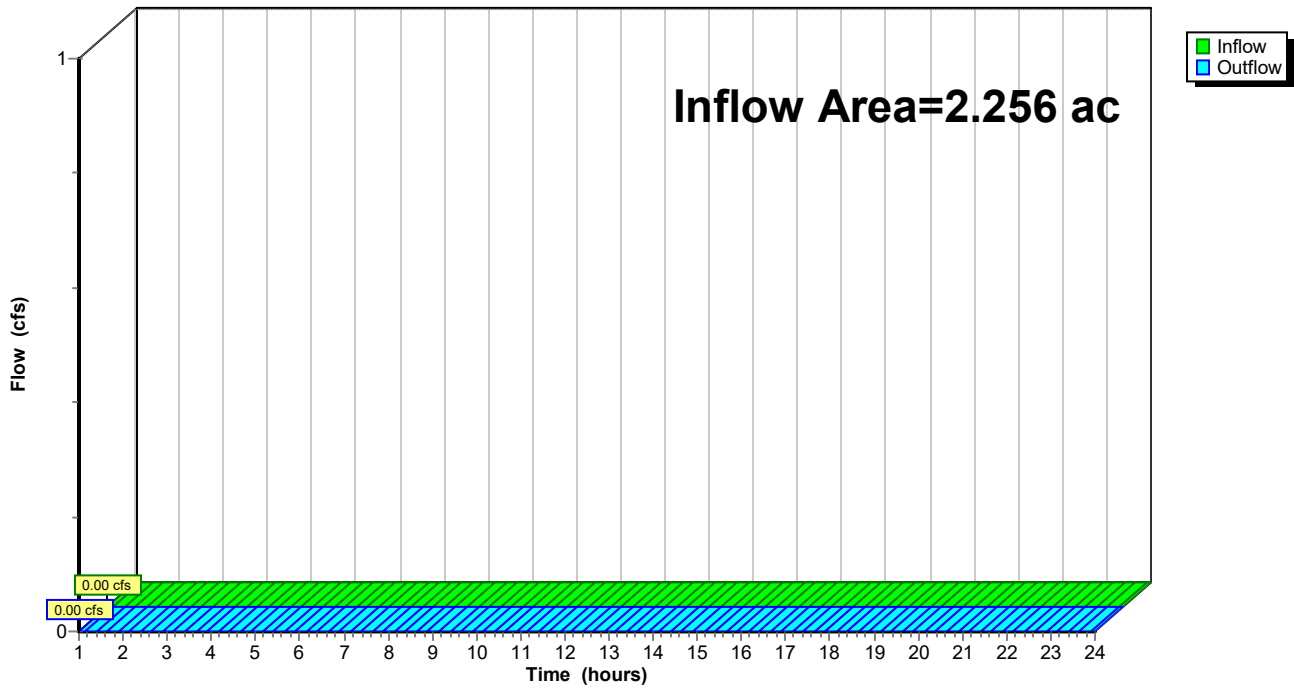
Summary for Reach 17R: POI-1

Inflow Area = 2.256 ac, 88.35% Impervious, Inflow Depth = 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 17R: POI-1

Hydrograph



Summary for Pond 12P: CHAMBERS

Inflow Area = 2.256 ac, 88.35% Impervious, Inflow Depth > 0.56" for 1" WQV event
 Inflow = 2.27 cfs @ 11.96 hrs, Volume= 0.106 af
 Outflow = 0.32 cfs @ 11.75 hrs, Volume= 0.106 af, Atten= 86%, Lag= 0.0 min
 Discarded = 0.32 cfs @ 11.75 hrs, Volume= 0.106 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 63.82' @ 12.20 hrs Surf.Area= 0.242 ac Storage= 0.035 af

Plug-Flow detention time= 33.8 min calculated for 0.106 af (100% of inflow)
 Center-of-Mass det. time= 32.4 min (851.9 - 819.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.45'	0.199 af	54.67"W x 192.50"L x 3.54'H Field A 0.856 af Overall - 0.358 af Embedded = 0.497 af x 40.0% Voids
#2A	63.95'	0.358 af	Cultec R-330XLHD x 297 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 11 rows
		0.557 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	63.45'	1.300 in/hr Exfiltration over Surface area
#2	Primary	65.00'	15.0" Round Culvert L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.85' S= 0.0054 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Secondary	65.00'	15.0" Round Culvert L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.85' S= 0.0065 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Tertiary	65.30'	12.0" Round Culvert L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.30' / 65.15' S= 0.0060 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.32 cfs @ 11.75 hrs HW=63.49' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=63.45' (Free Discharge)
↑2=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=63.45' (Free Discharge)
↑3=Culvert (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 1.00 hrs HW=63.45' (Free Discharge)
↑4=Culvert (Controls 0.00 cfs)

Pond 12P: CHAMBERS - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 11 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

27 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 190.50' Row Length +12.0" End Stone x 2 = 192.50' Base Length

11 Rows x 52.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 54.67' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

297 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 11 Rows = 15,613.6 cf Chamber Storage

37,270.1 cf Field - 15,613.6 cf Chambers = 21,656.6 cf Stone x 40.0% Voids = 8,662.6 cf Stone Storage

Chamber Storage + Stone Storage = 24,276.2 cf = 0.557 af

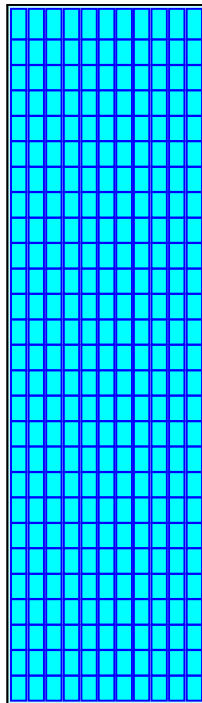
Overall Storage Efficiency = 65.1%

Overall System Size = 192.50' x 54.67' x 3.54'

297 Chambers

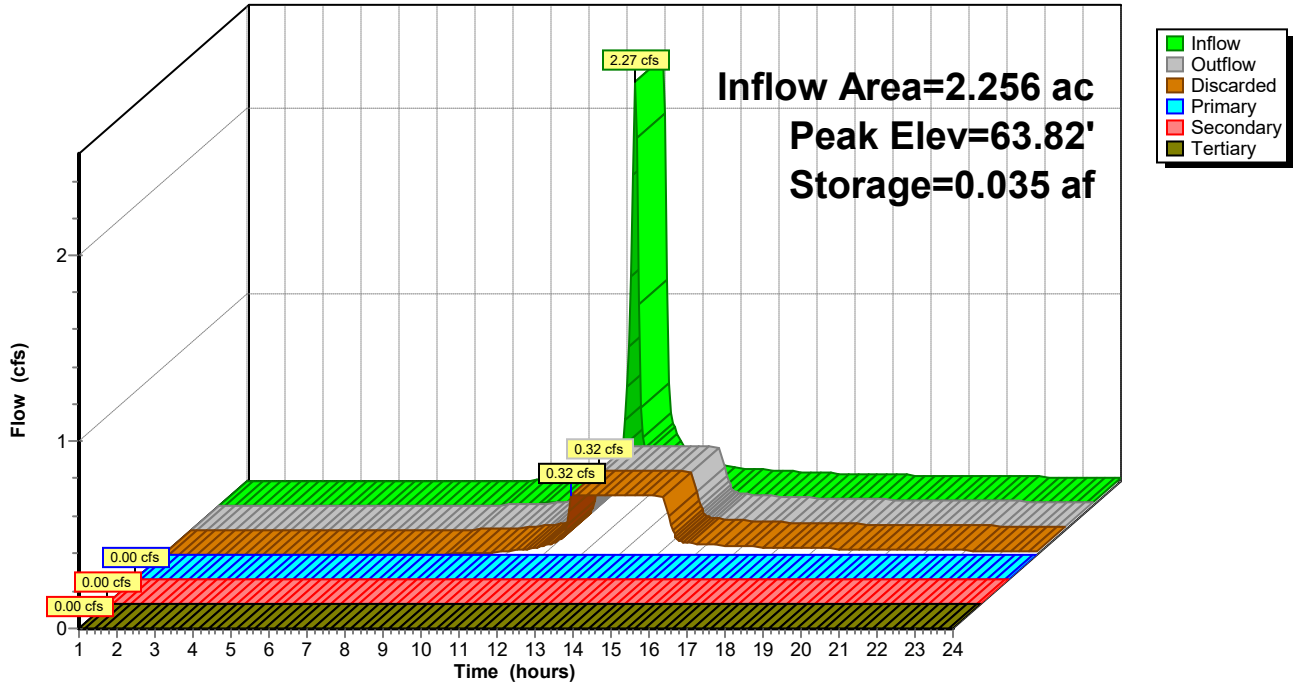
1,380.4 cy Field

802.1 cy Stone



Pond 12P: CHAMBERS

Hydrograph



Summary for Subcatchment 13S: EDA-101

Runoff = 5.89 cfs @ 11.95 hrs, Volume= 0.281 af, Depth> 2.31"

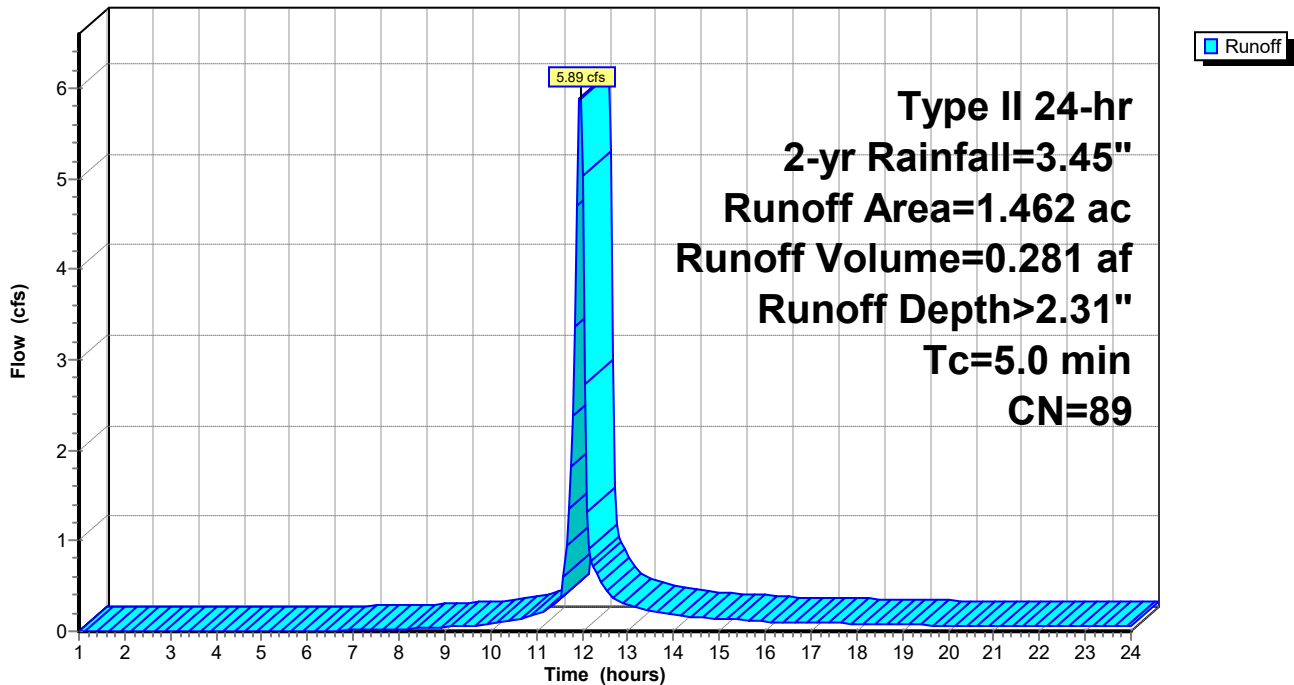
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2-yr Rainfall=3.45"

Area (ac)	CN	Description
0.230	98	Roofs, HSG B
0.684	98	Paved parking, HSG B
0.548	74	>75% Grass cover, Good, HSG C
1.462	89	Weighted Average
0.548		37.48% Pervious Area
0.914		62.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, AB

Subcatchment 13S: EDA-101

Hydrograph



Summary for Subcatchment 14S: EDA-201

Runoff = 1.17 cfs @ 11.96 hrs, Volume= 0.055 af, Depth> 1.14"

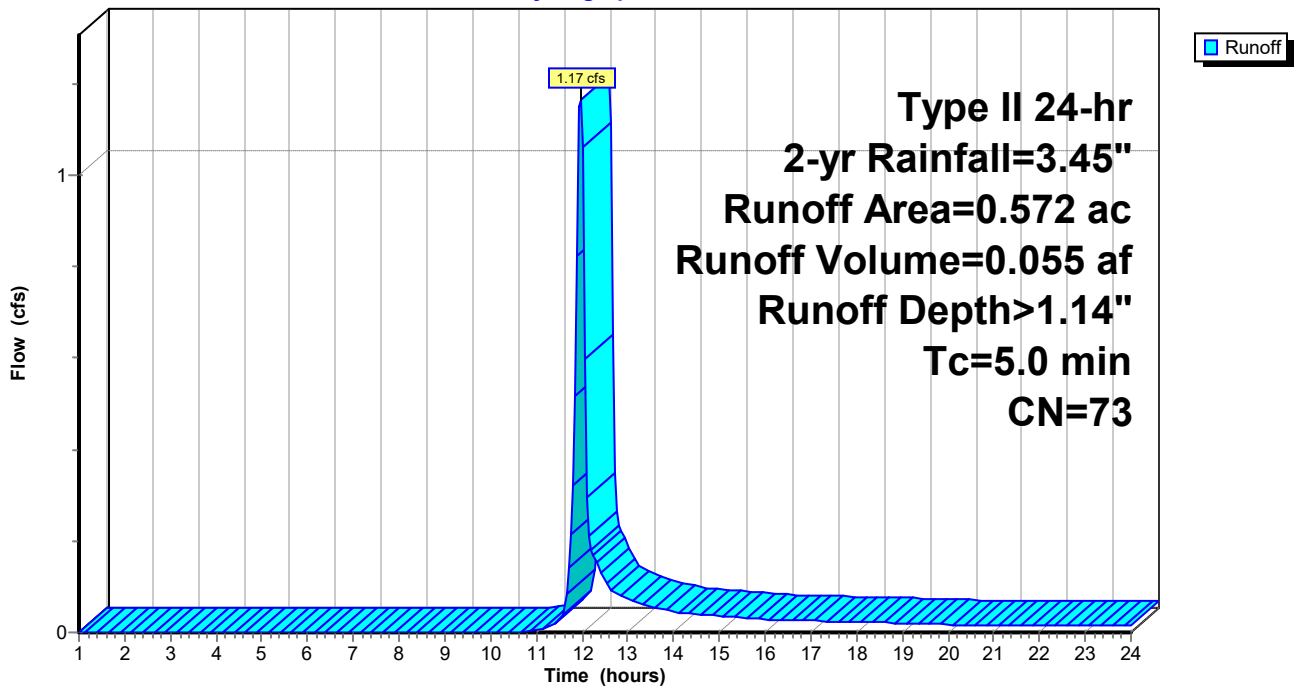
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.45"

Area (ac)	CN	Description
0.572	73	Woods, Fair, HSG C
0.572		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, AB

Subcatchment 14S: EDA-201

Hydrograph



Summary for Subcatchment 15S: PDA-101

Runoff = 10.64 cfs @ 11.95 hrs, Volume= 0.543 af, Depth> 2.89"

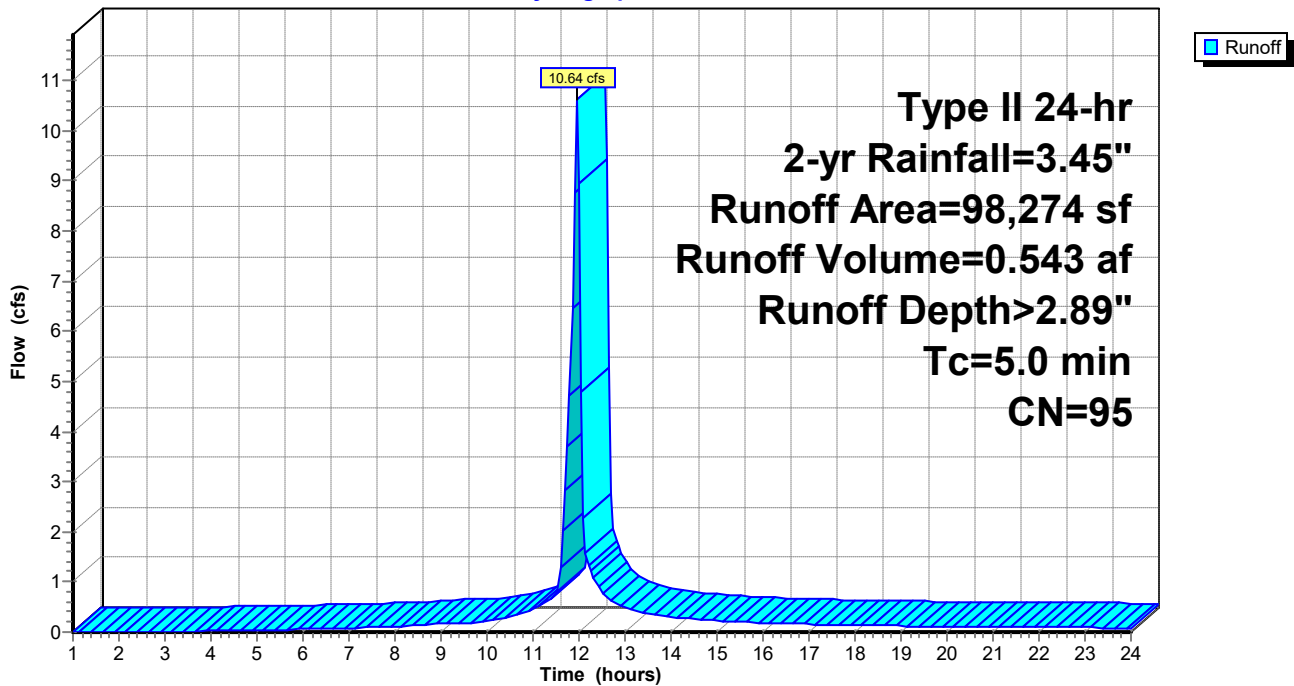
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2-yr Rainfall=3.45"

Area (sf)	CN	Description
11,178	69	50-75% Grass cover, Fair, HSG B
10,137	98	Unconnected roofs, HSG B
* 76,691	98	Paved parking
268	79	50-75% Grass cover, Fair, HSG C
98,274	95	Weighted Average
11,446		11.65% Pervious Area
86,828		88.35% Impervious Area
10,137		11.67% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 15S: PDA-101

Hydrograph



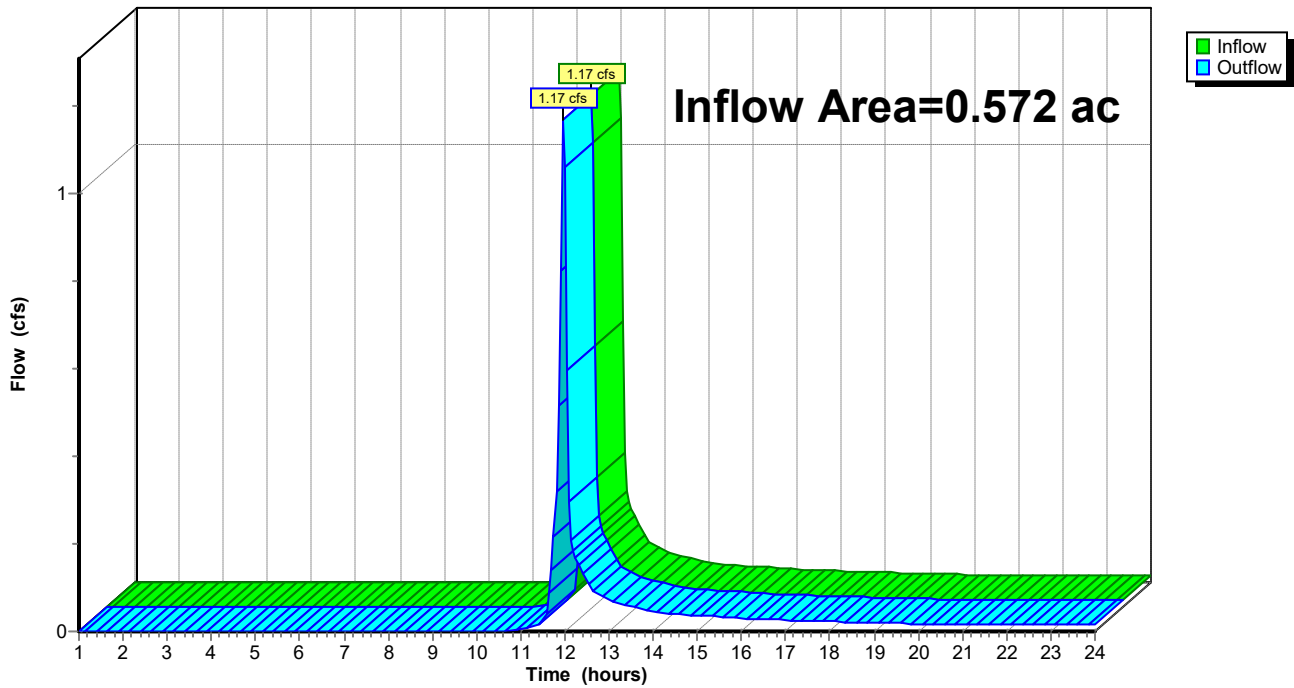
Summary for Reach 13R: POI-2

Inflow Area = 0.572 ac, 0.00% Impervious, Inflow Depth > 1.14" for 2-yr event
Inflow = 1.17 cfs @ 11.96 hrs, Volume= 0.055 af
Outflow = 1.17 cfs @ 11.96 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 13R: POI-2

Hydrograph



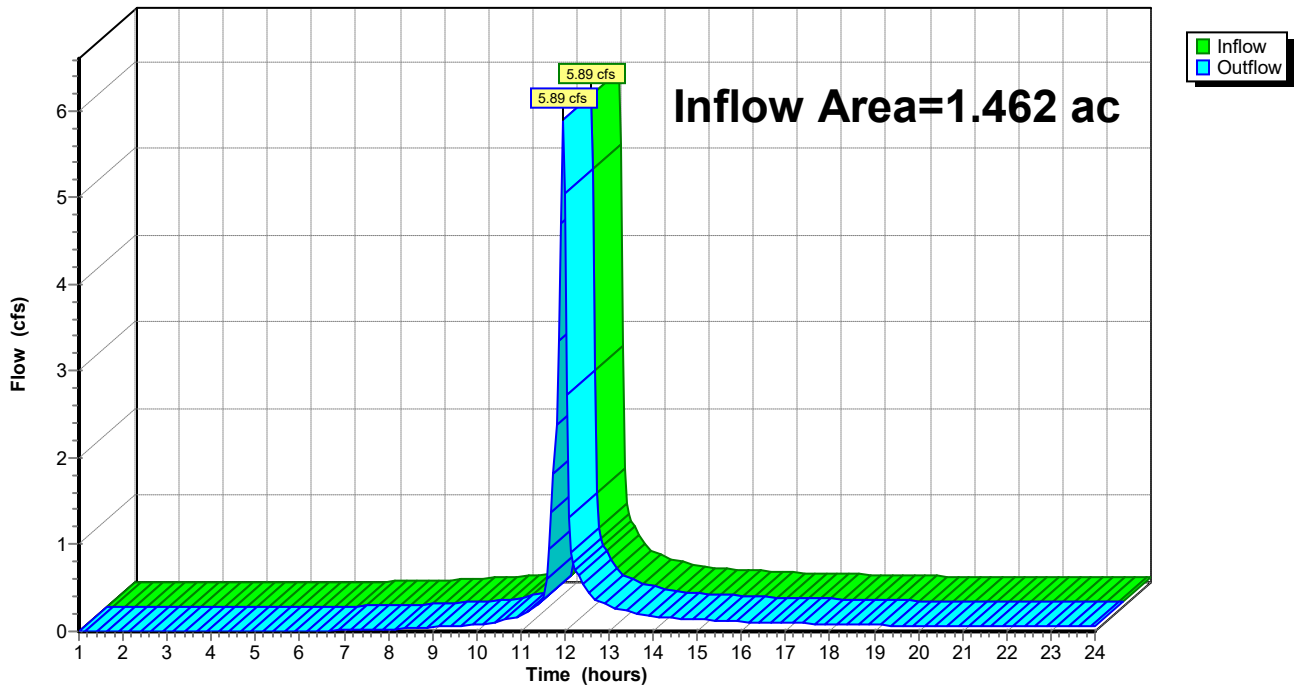
Summary for Reach 15R: POI-1

Inflow Area = 1.462 ac, 62.52% Impervious, Inflow Depth > 2.31" for 2-yr event
Inflow = 5.89 cfs @ 11.95 hrs, Volume= 0.281 af
Outflow = 5.89 cfs @ 11.95 hrs, Volume= 0.281 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 15R: POI-1

Hydrograph



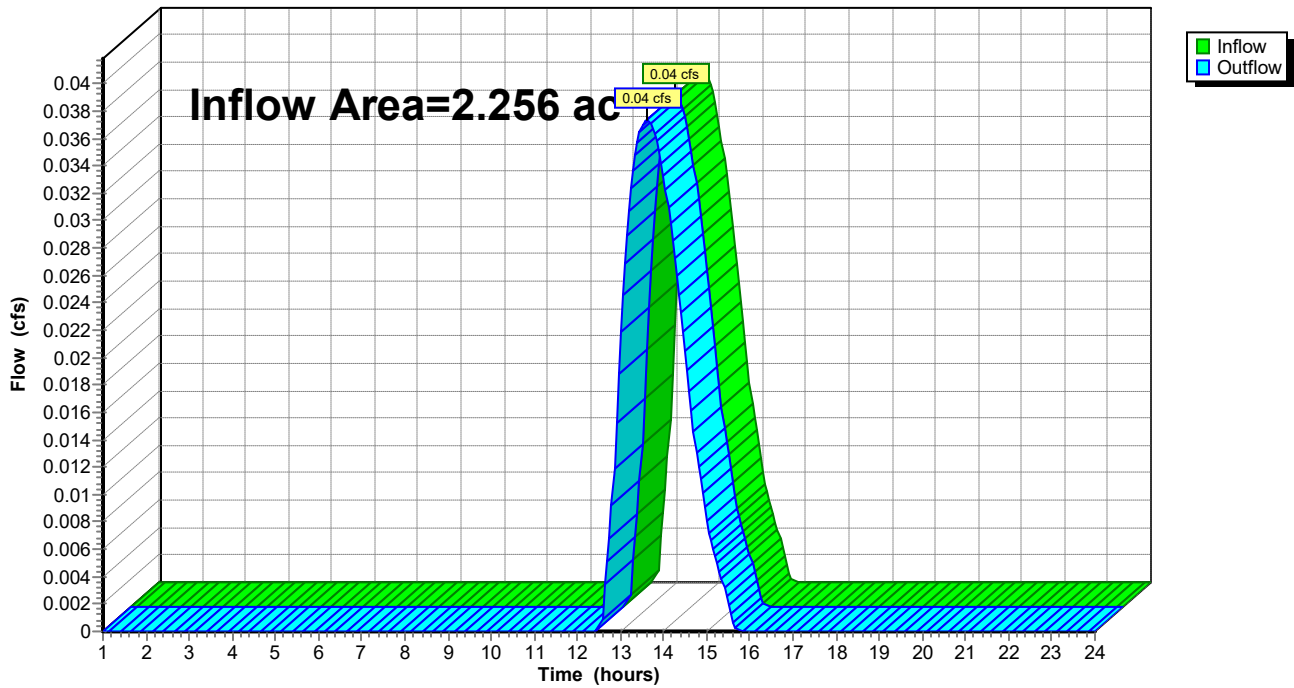
Summary for Reach 17R: POI-1

Inflow Area = 2.256 ac, 88.35% Impervious, Inflow Depth = 0.03" for 2-yr event
Inflow = 0.04 cfs @ 13.61 hrs, Volume= 0.005 af
Outflow = 0.04 cfs @ 13.61 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 17R: POI-1

Hydrograph



Summary for Pond 12P: CHAMBERS

Inflow Area = 2.256 ac, 88.35% Impervious, Inflow Depth > 2.89" for 2-yr event
 Inflow = 10.64 cfs @ 11.95 hrs, Volume= 0.543 af
 Outflow = 0.35 cfs @ 13.61 hrs, Volume= 0.414 af, Atten= 97%, Lag= 99.7 min
 Discarded = 0.32 cfs @ 10.70 hrs, Volume= 0.409 af
 Primary = 0.02 cfs @ 13.61 hrs, Volume= 0.002 af
 Secondary = 0.02 cfs @ 13.61 hrs, Volume= 0.003 af
 Tertiary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 65.07' @ 13.61 hrs Surf.Area= 0.242 ac Storage= 0.279 af

Plug-Flow detention time= 274.3 min calculated for 0.413 af (76% of inflow)
 Center-of-Mass det. time= 188.6 min (962.5 - 773.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.45'	0.199 af	54.67"W x 192.50"L x 3.54'H Field A 0.856 af Overall - 0.358 af Embedded = 0.497 af x 40.0% Voids
#2A	63.95'	0.358 af	Cultec R-330XLHD x 297 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 11 rows
		0.557 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	63.45'	1.300 in/hr Exfiltration over Surface area
#2	Primary	65.00'	15.0" Round Culvert L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.85' S= 0.0054 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Secondary	65.00'	15.0" Round Culvert L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.85' S= 0.0065 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Tertiary	65.30'	12.0" Round Culvert L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.30' / 65.15' S= 0.0060 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.79 sf

C-DAT-2100074

Prepared by BL Companies

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Type II 24-hr 2-yr Rainfall=3.45"

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Page 20

Discarded OutFlow Max=0.32 cfs @ 10.70 hrs HW=63.49' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=0.02 cfs @ 13.61 hrs HW=65.07' (Free Discharge)

↑2=Culvert (Barrel Controls 0.02 cfs @ 0.94 fps)

Secondary OutFlow Max=0.02 cfs @ 13.61 hrs HW=65.07' (Free Discharge)

↑3=Culvert (Barrel Controls 0.02 cfs @ 1.02 fps)

Tertiary OutFlow Max=0.00 cfs @ 1.00 hrs HW=63.45' (Free Discharge)

↑4=Culvert (Controls 0.00 cfs)

Pond 12P: CHAMBERS - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 11 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

27 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 190.50' Row Length +12.0" End Stone x 2 = 192.50' Base Length

11 Rows x 52.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 54.67' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

297 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 11 Rows = 15,613.6 cf Chamber Storage

37,270.1 cf Field - 15,613.6 cf Chambers = 21,656.6 cf Stone x 40.0% Voids = 8,662.6 cf Stone Storage

Chamber Storage + Stone Storage = 24,276.2 cf = 0.557 af

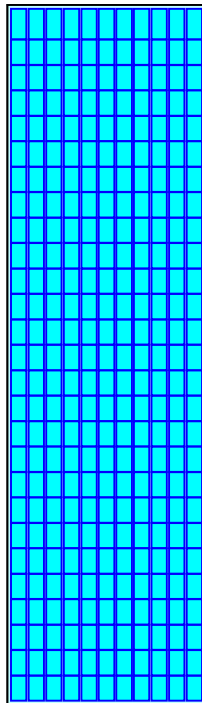
Overall Storage Efficiency = 65.1%

Overall System Size = 192.50' x 54.67' x 3.54'

297 Chambers

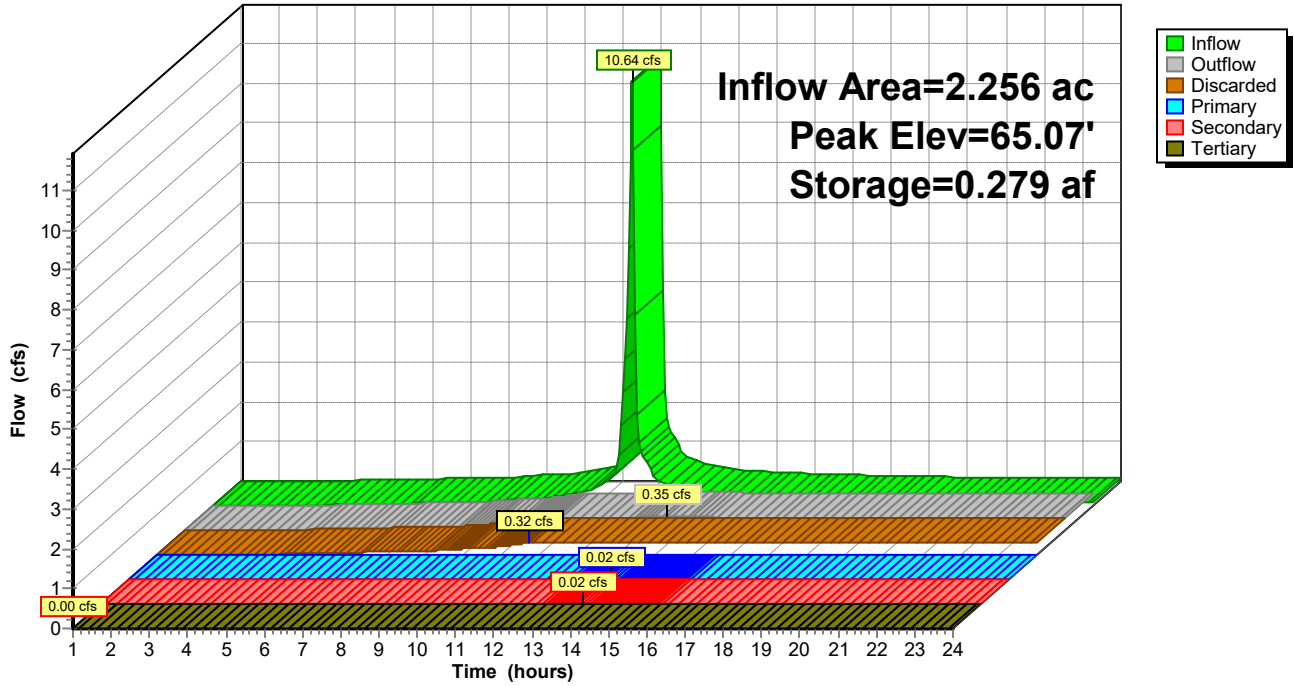
1,380.4 cy Field

802.1 cy Stone



Pond 12P: CHAMBERS

Hydrograph



Summary for Subcatchment 13S: EDA-101

Runoff = 9.75 cfs @ 11.95 hrs, Volume= 0.480 af, Depth> 3.94"

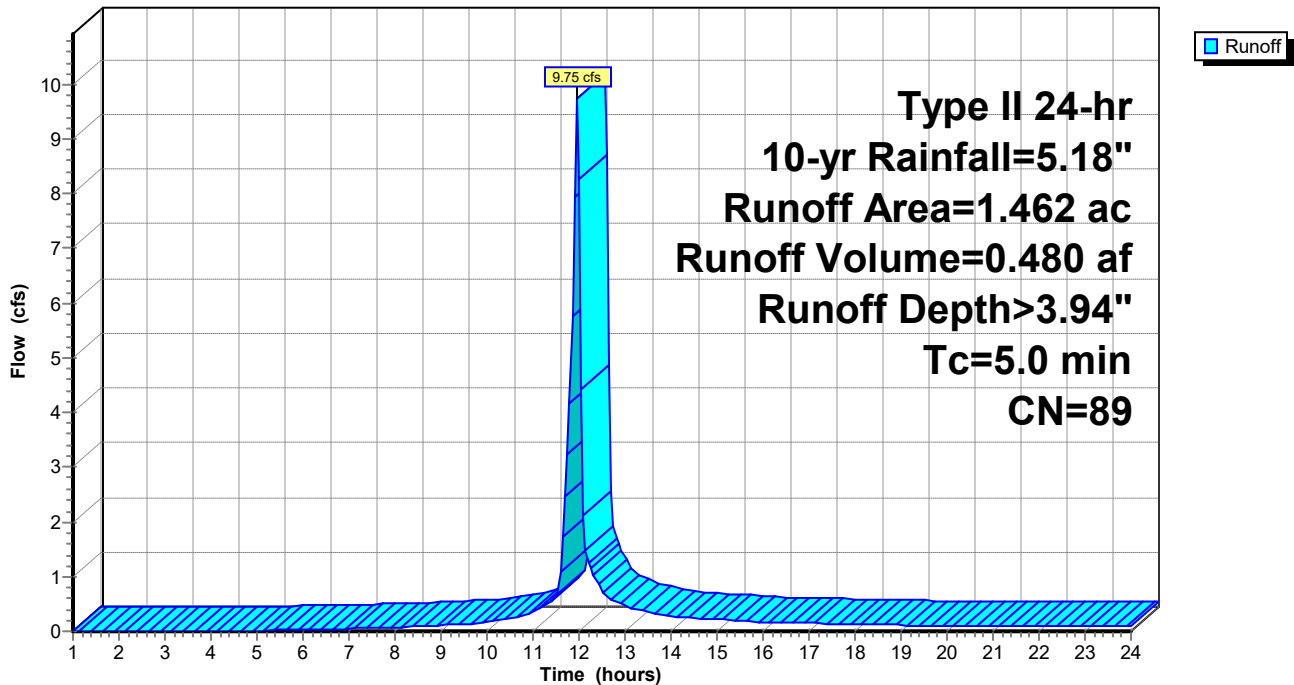
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 10-yr Rainfall=5.18"

Area (ac)	CN	Description
0.230	98	Roofs, HSG B
0.684	98	Paved parking, HSG B
0.548	74	>75% Grass cover, Good, HSG C
1.462	89	Weighted Average
0.548		37.48% Pervious Area
0.914		62.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, AB

Subcatchment 13S: EDA-101

Hydrograph



Summary for Subcatchment 14S: EDA-201

Runoff = 2.50 cfs @ 11.96 hrs, Volume= 0.115 af, Depth> 2.42"

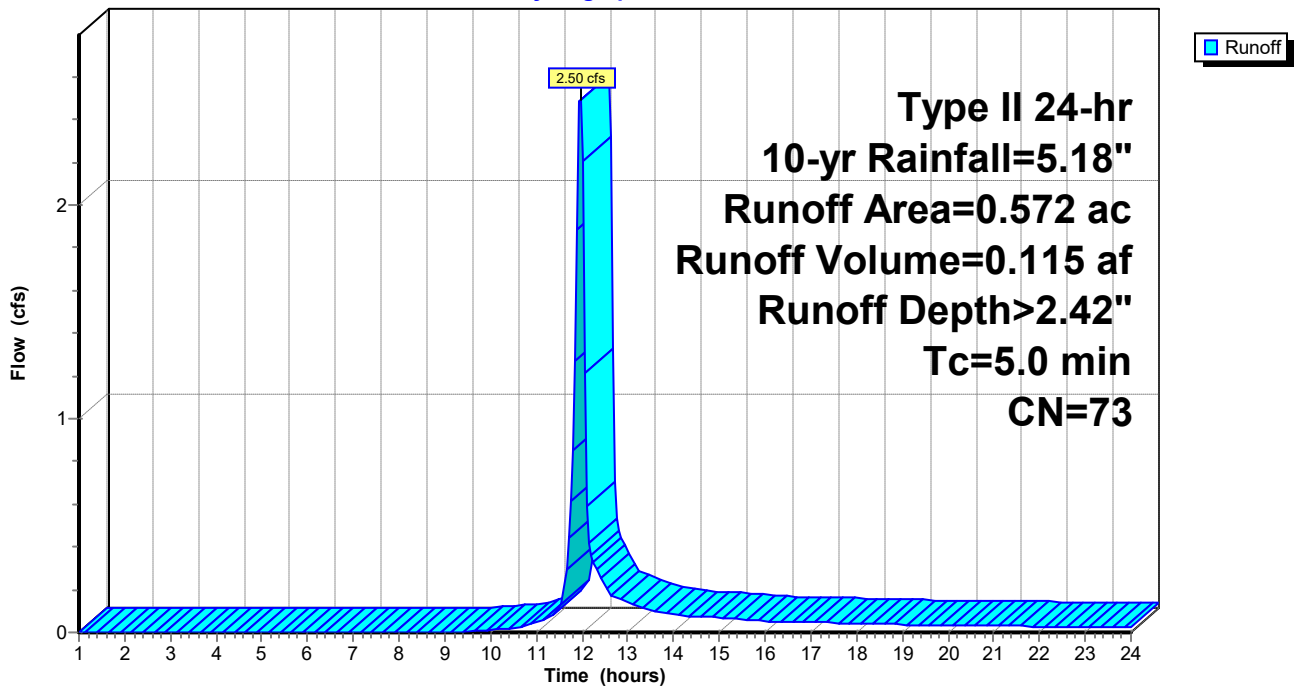
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.18"

Area (ac)	CN	Description
0.572	73	Woods, Fair, HSG C
0.572		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, AB

Subcatchment 14S: EDA-201

Hydrograph



Summary for Subcatchment 15S: PDA-101

Runoff = 16.43 cfs @ 11.95 hrs, Volume= 0.864 af, Depth> 4.59"

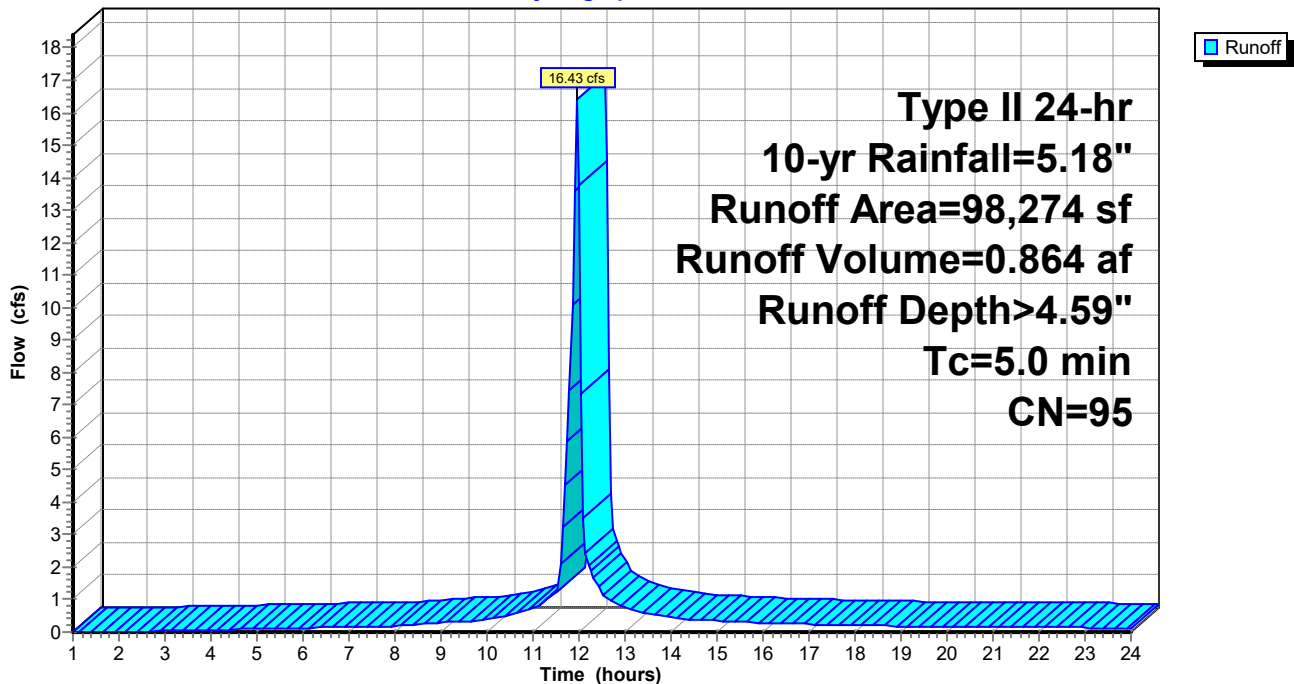
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 10-yr Rainfall=5.18"

Area (sf)	CN	Description
11,178	69	50-75% Grass cover, Fair, HSG B
10,137	98	Unconnected roofs, HSG B
* 76,691	98	Paved parking
268	79	50-75% Grass cover, Fair, HSG C
98,274	95	Weighted Average
11,446		11.65% Pervious Area
86,828		88.35% Impervious Area
10,137		11.67% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 15S: PDA-101

Hydrograph



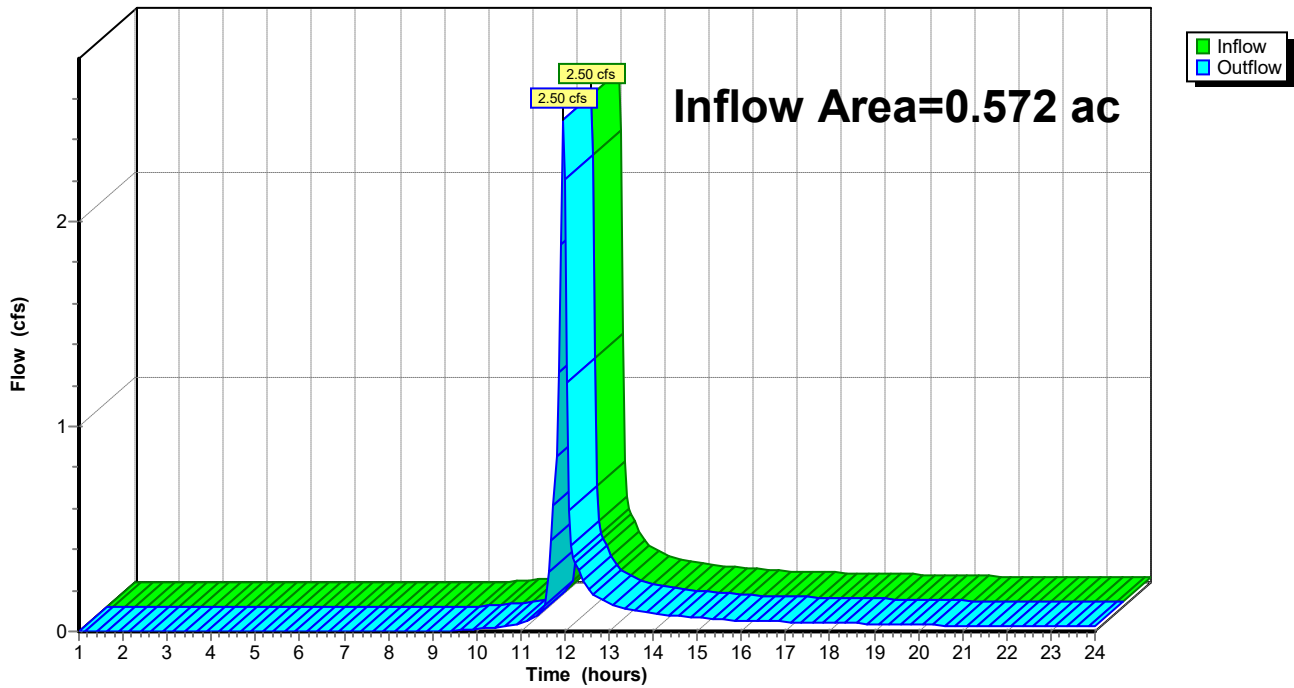
Summary for Reach 13R: POI-2

Inflow Area = 0.572 ac, 0.00% Impervious, Inflow Depth > 2.42" for 10-yr event
Inflow = 2.50 cfs @ 11.96 hrs, Volume= 0.115 af
Outflow = 2.50 cfs @ 11.96 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 13R: POI-2

Hydrograph



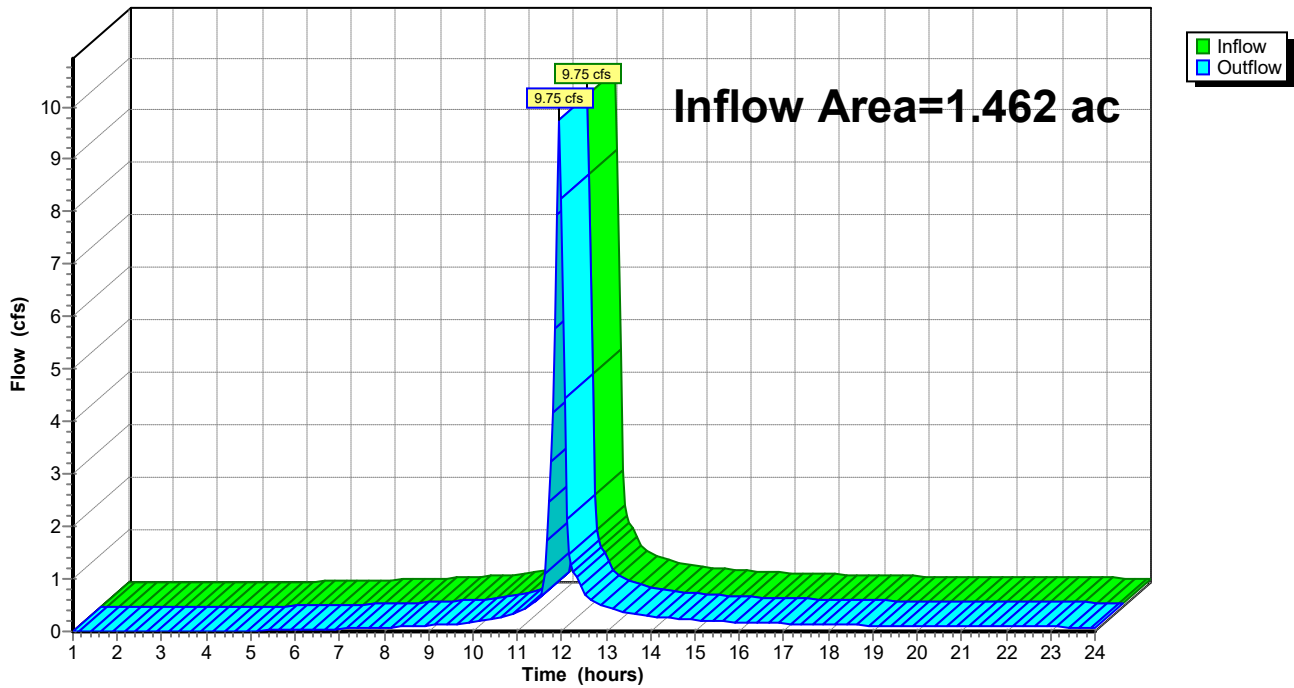
Summary for Reach 15R: POI-1

Inflow Area = 1.462 ac, 62.52% Impervious, Inflow Depth > 3.94" for 10-yr event
Inflow = 9.75 cfs @ 11.95 hrs, Volume= 0.480 af
Outflow = 9.75 cfs @ 11.95 hrs, Volume= 0.480 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 15R: POI-1

Hydrograph



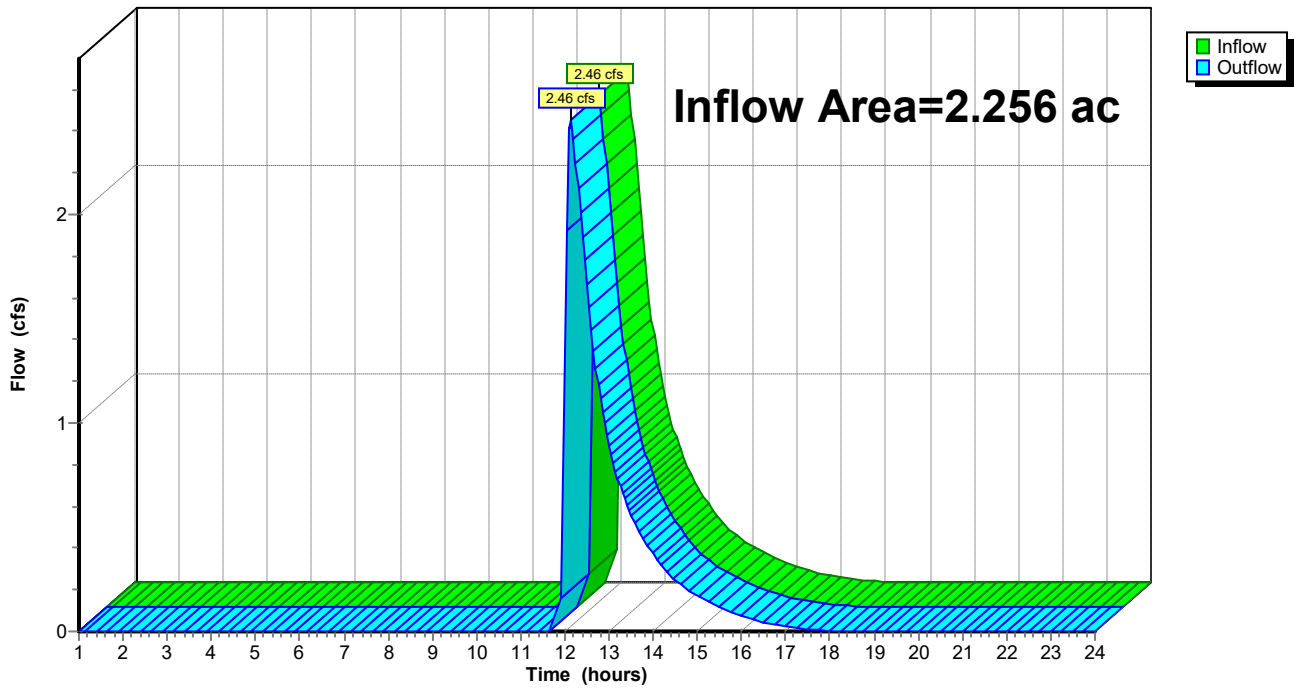
Summary for Reach 17R: POI-1

Inflow Area = 2.256 ac, 88.35% Impervious, Inflow Depth = 1.17" for 10-yr event
Inflow = 2.46 cfs @ 12.14 hrs, Volume= 0.221 af
Outflow = 2.46 cfs @ 12.14 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 17R: POI-1

Hydrograph



Summary for Pond 12P: CHAMBERS

Inflow Area = 2.256 ac, 88.35% Impervious, Inflow Depth > 4.59" for 10-yr event
 Inflow = 16.43 cfs @ 11.95 hrs, Volume= 0.864 af
 Outflow = 2.78 cfs @ 12.14 hrs, Volume= 0.677 af, Atten= 83%, Lag= 11.3 min
 Discarded = 0.32 cfs @ 9.70 hrs, Volume= 0.456 af
 Primary = 1.10 cfs @ 12.14 hrs, Volume= 0.104 af
 Secondary = 1.13 cfs @ 12.14 hrs, Volume= 0.108 af
 Tertiary = 0.22 cfs @ 12.14 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 65.61' @ 12.14 hrs Surf.Area= 0.242 ac Storage= 0.381 af

Plug-Flow detention time= 188.5 min calculated for 0.675 af (78% of inflow)
 Center-of-Mass det. time= 106.6 min (868.9 - 762.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.45'	0.199 af	54.67"W x 192.50"L x 3.54'H Field A 0.856 af Overall - 0.358 af Embedded = 0.497 af x 40.0% Voids
#2A	63.95'	0.358 af	Cultec R-330XLHD x 297 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 11 rows
		0.557 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	63.45'	1.300 in/hr Exfiltration over Surface area
#2	Primary	65.00'	15.0" Round Culvert L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.85' S= 0.0054 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Secondary	65.00'	15.0" Round Culvert L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.85' S= 0.0065 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Tertiary	65.30'	12.0" Round Culvert L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.30' / 65.15' S= 0.0060 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.32 cfs @ 9.70 hrs HW=63.49' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=1.10 cfs @ 12.14 hrs HW=65.61' (Free Discharge)

↑2=Culvert (Barrel Controls 1.10 cfs @ 2.71 fps)

Secondary OutFlow Max=1.13 cfs @ 12.14 hrs HW=65.61' (Free Discharge)

↑3=Culvert (Barrel Controls 1.13 cfs @ 2.78 fps)

Tertiary OutFlow Max=0.22 cfs @ 12.14 hrs HW=65.61' (Free Discharge)

↑4=Culvert (Barrel Controls 0.22 cfs @ 1.61 fps)

Pond 12P: CHAMBERS - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 11 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

27 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 190.50' Row Length +12.0" End Stone x 2 = 192.50' Base Length

11 Rows x 52.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 54.67' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

297 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 11 Rows = 15,613.6 cf Chamber Storage

37,270.1 cf Field - 15,613.6 cf Chambers = 21,656.6 cf Stone x 40.0% Voids = 8,662.6 cf Stone Storage

Chamber Storage + Stone Storage = 24,276.2 cf = 0.557 af

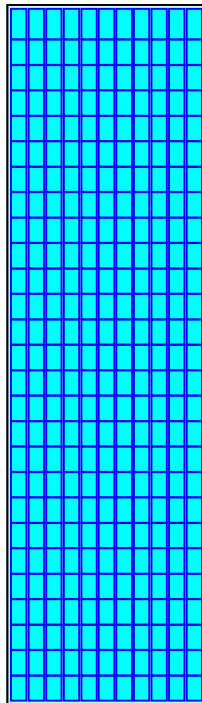
Overall Storage Efficiency = 65.1%

Overall System Size = 192.50' x 54.67' x 3.54'

297 Chambers

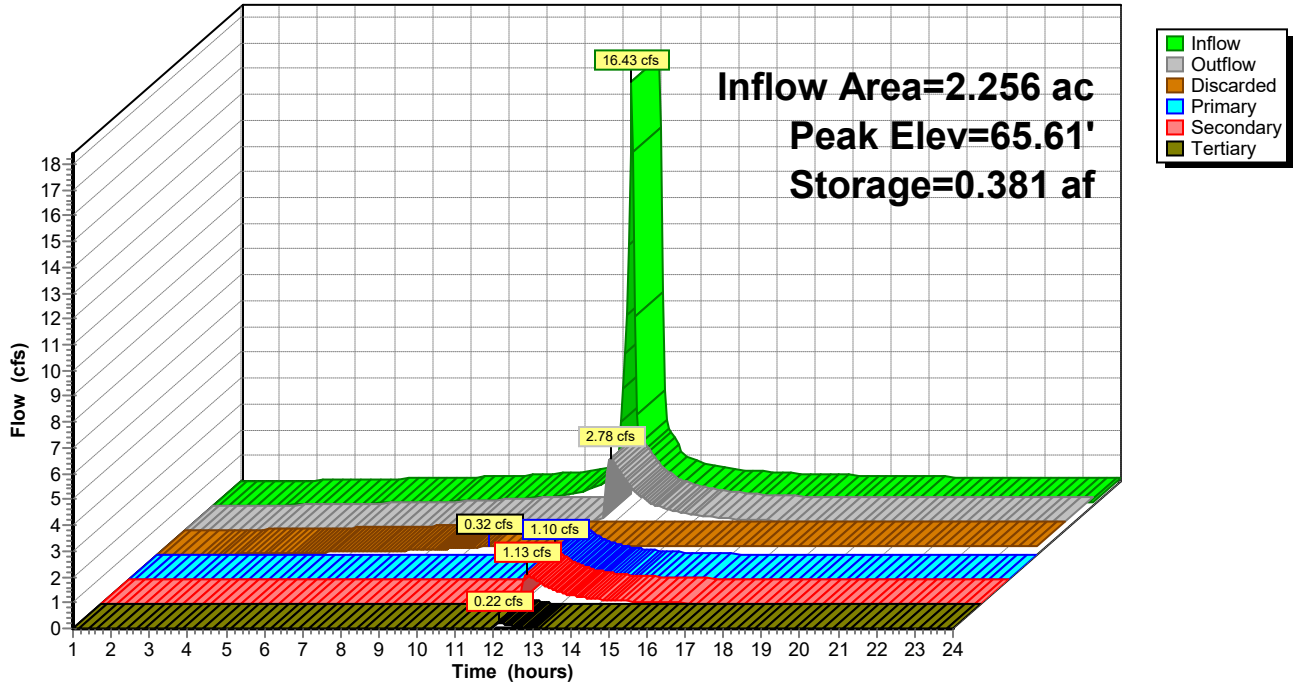
1,380.4 cy Field

802.1 cy Stone



Pond 12P: CHAMBERS

Hydrograph



Summary for Subcatchment 13S: EDA-101

Runoff = 12.16 cfs @ 11.95 hrs, Volume= 0.608 af, Depth> 4.99"

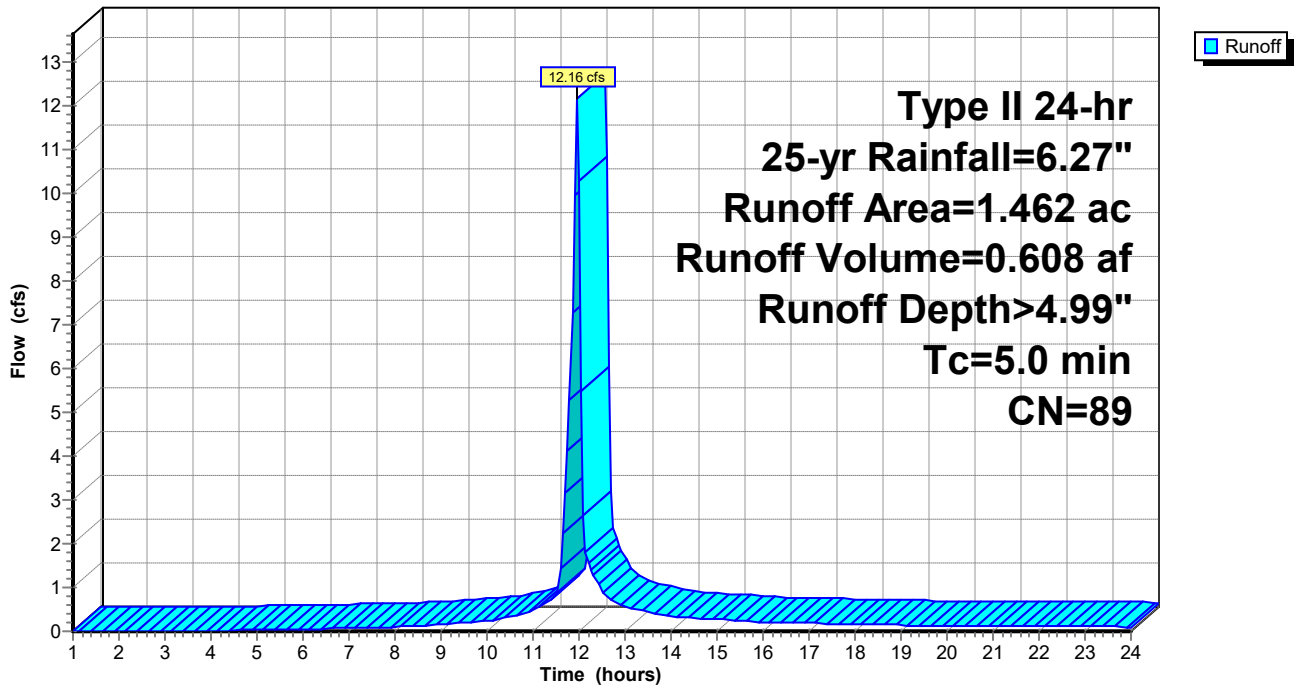
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 25-yr Rainfall=6.27"

Area (ac)	CN	Description
0.230	98	Roofs, HSG B
0.684	98	Paved parking, HSG B
0.548	74	>75% Grass cover, Good, HSG C
1.462	89	Weighted Average
0.548		37.48% Pervious Area
0.914		62.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, AB

Subcatchment 13S: EDA-101

Hydrograph



Summary for Subcatchment 14S: EDA-201

Runoff = 3.40 cfs @ 11.96 hrs, Volume= 0.158 af, Depth> 3.31"

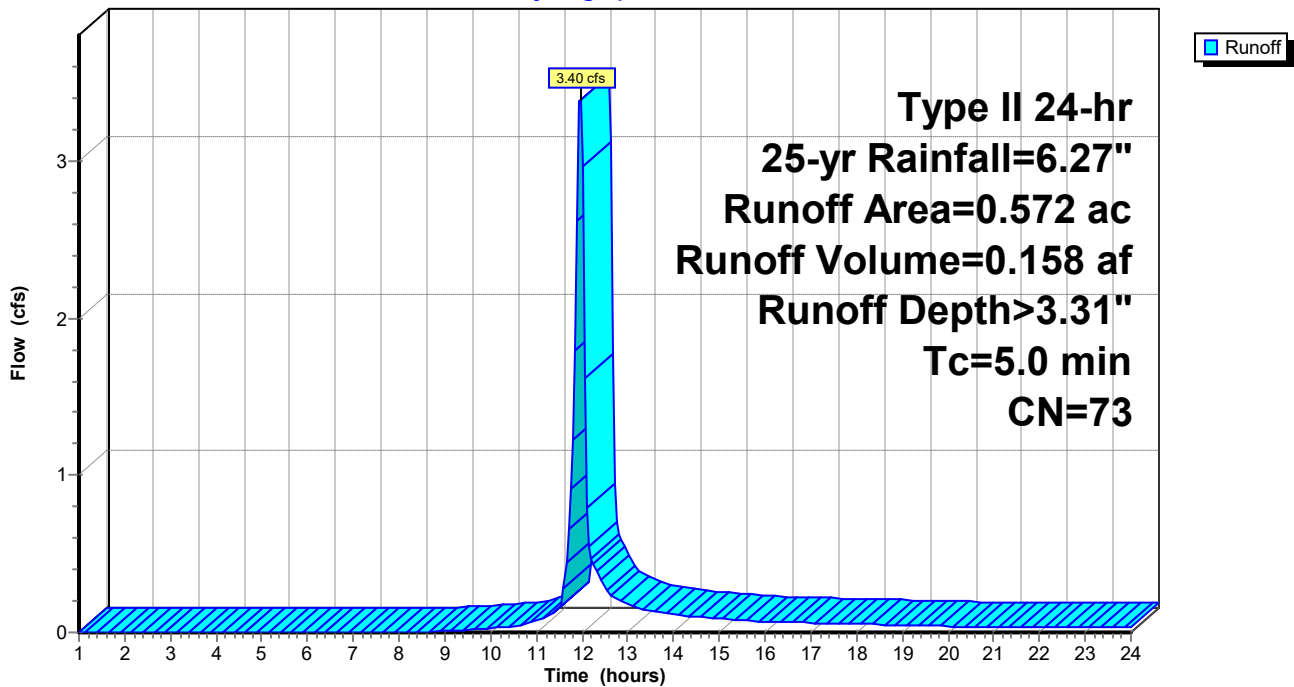
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.27"

Area (ac)	CN	Description
0.572	73	Woods, Fair, HSG C
0.572		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, AB

Subcatchment 14S: EDA-201

Hydrograph



Summary for Subcatchment 15S: PDA-101

Runoff = 20.05 cfs @ 11.95 hrs, Volume= 1.067 af, Depth> 5.68"

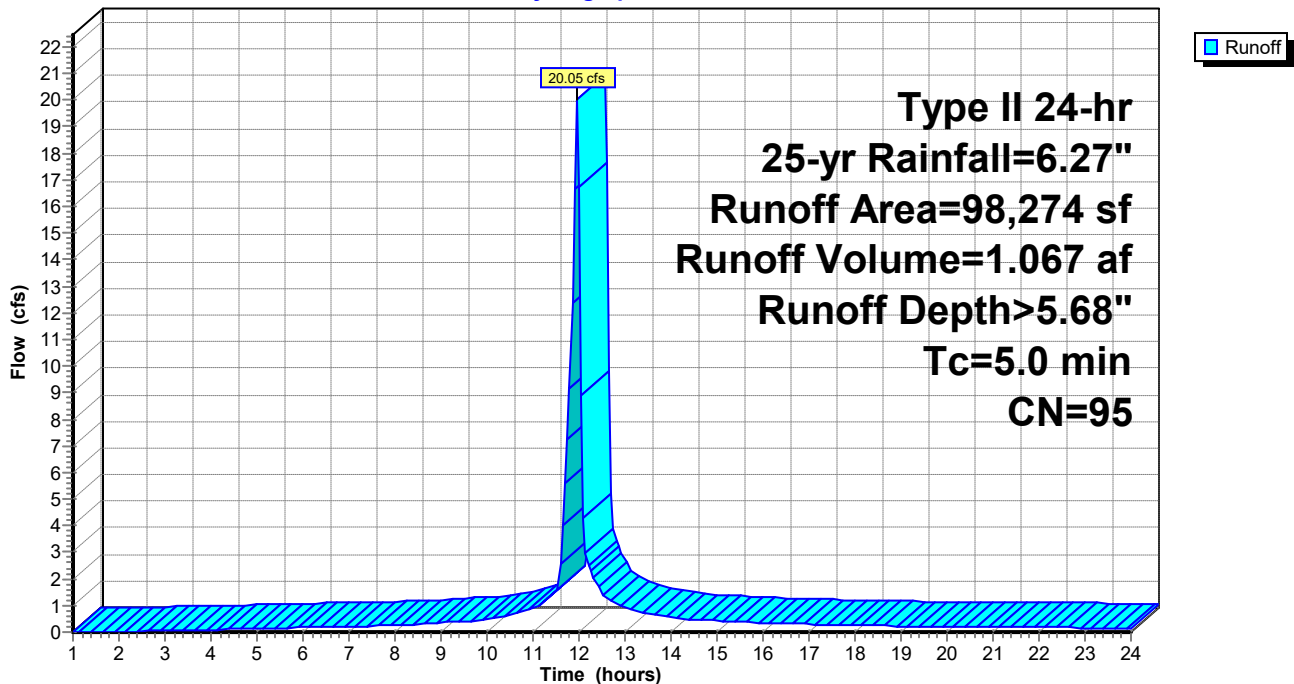
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 25-yr Rainfall=6.27"

Area (sf)	CN	Description
11,178	69	50-75% Grass cover, Fair, HSG B
10,137	98	Unconnected roofs, HSG B
* 76,691	98	Paved parking
268	79	50-75% Grass cover, Fair, HSG C
98,274	95	Weighted Average
11,446		11.65% Pervious Area
86,828		88.35% Impervious Area
10,137		11.67% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 15S: PDA-101

Hydrograph



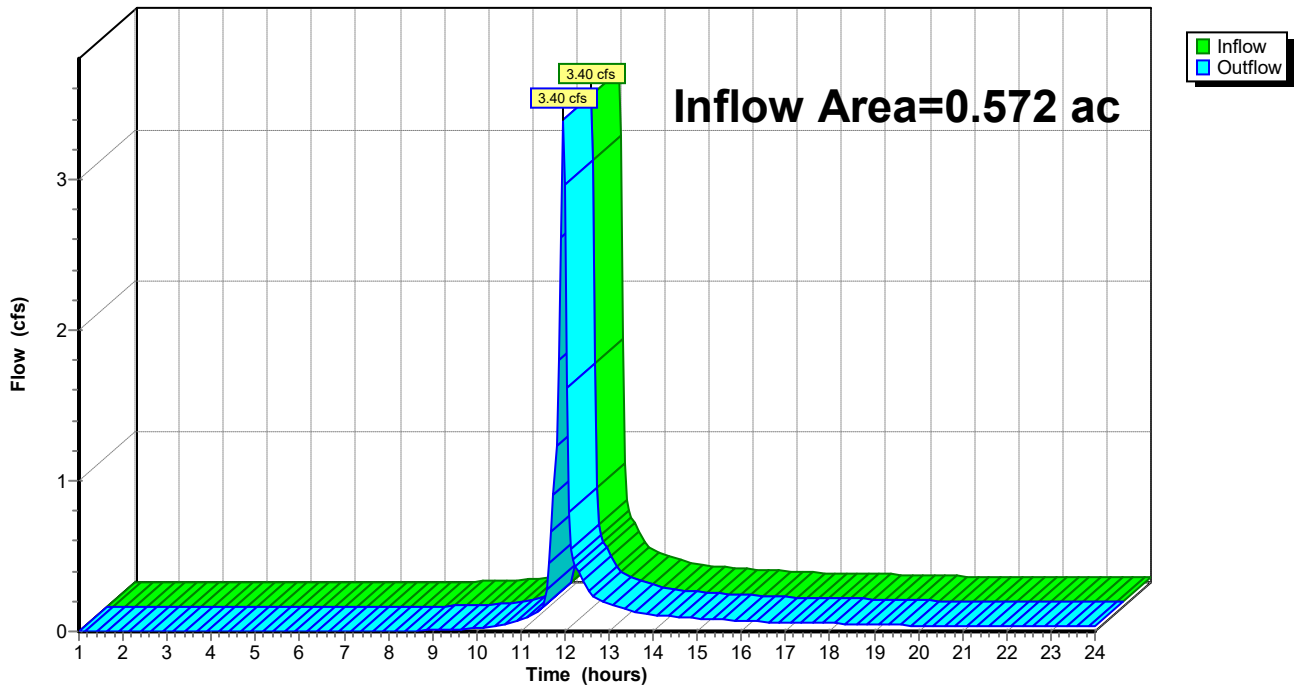
Summary for Reach 13R: POI-2

Inflow Area = 0.572 ac, 0.00% Impervious, Inflow Depth > 3.31" for 25-yr event
Inflow = 3.40 cfs @ 11.96 hrs, Volume= 0.158 af
Outflow = 3.40 cfs @ 11.96 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 13R: POI-2

Hydrograph



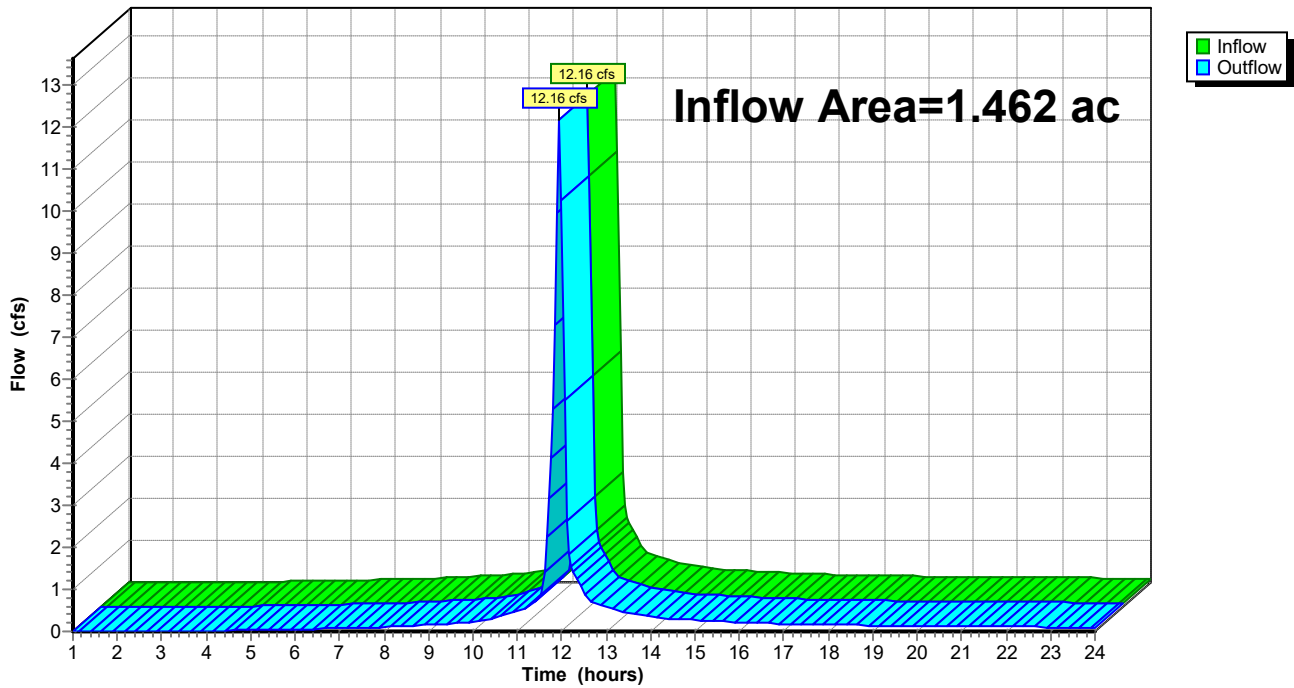
Summary for Reach 15R: POI-1

Inflow Area = 1.462 ac, 62.52% Impervious, Inflow Depth > 4.99" for 25-yr event
Inflow = 12.16 cfs @ 11.95 hrs, Volume= 0.608 af
Outflow = 12.16 cfs @ 11.95 hrs, Volume= 0.608 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 15R: POI-1

Hydrograph



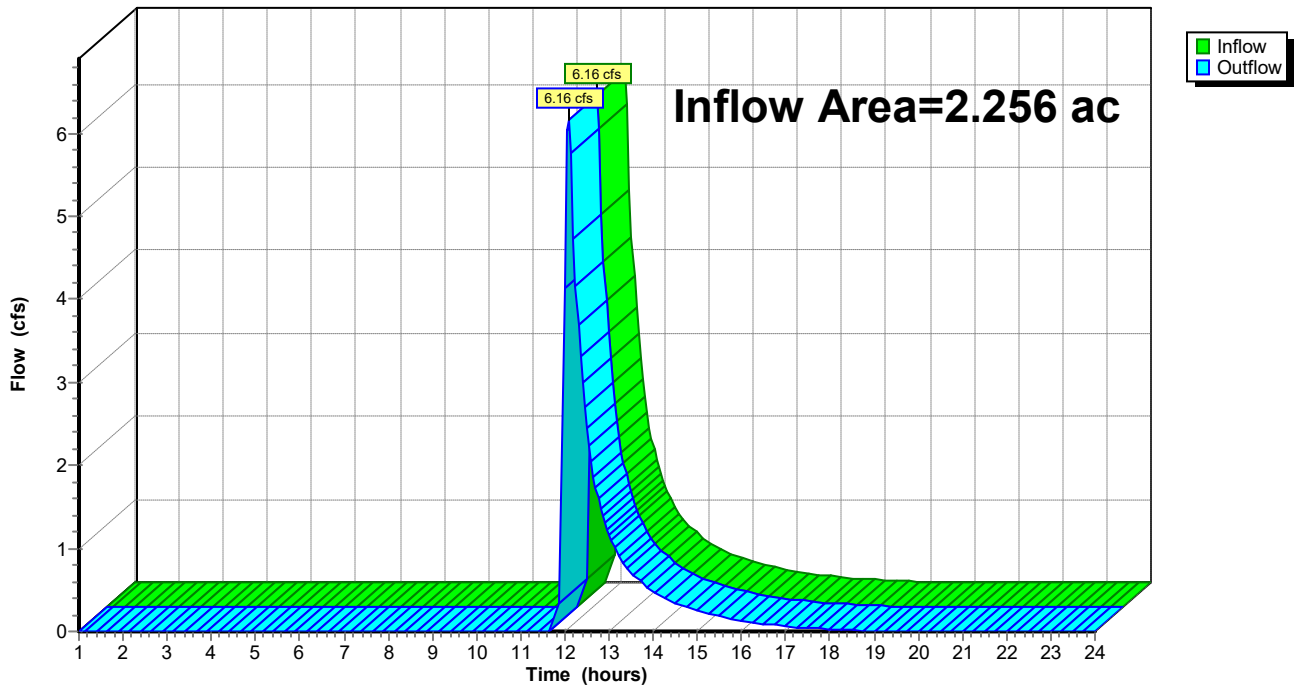
Summary for Reach 17R: POI-1

Inflow Area = 2.256 ac, 88.35% Impervious, Inflow Depth = 2.00" for 25-yr event
Inflow = 6.16 cfs @ 12.08 hrs, Volume= 0.376 af
Outflow = 6.16 cfs @ 12.08 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 17R: POI-1

Hydrograph



Summary for Pond 12P: CHAMBERS

Inflow Area = 2.256 ac, 88.35% Impervious, Inflow Depth > 5.68" for 25-yr event
 Inflow = 20.05 cfs @ 11.95 hrs, Volume= 1.067 af
 Outflow = 6.48 cfs @ 12.08 hrs, Volume= 0.856 af, Atten= 68%, Lag= 7.7 min
 Discarded = 0.32 cfs @ 8.75 hrs, Volume= 0.480 af
 Primary = 2.53 cfs @ 12.08 hrs, Volume= 0.170 af
 Secondary = 2.58 cfs @ 12.08 hrs, Volume= 0.176 af
 Tertiary = 1.06 cfs @ 12.08 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 66.00' @ 12.08 hrs Surf.Area= 0.242 ac Storage= 0.447 af

Plug-Flow detention time= 158.7 min calculated for 0.856 af (80% of inflow)
 Center-of-Mass det. time= 79.4 min (836.8 - 757.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.45'	0.199 af	54.67"W x 192.50"L x 3.54'H Field A 0.856 af Overall - 0.358 af Embedded = 0.497 af x 40.0% Voids
#2A	63.95'	0.358 af	Cultec R-330XLHD x 297 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 11 rows
		0.557 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	63.45'	1.300 in/hr Exfiltration over Surface area
#2	Primary	65.00'	15.0" Round Culvert L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.85' S= 0.0054 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Secondary	65.00'	15.0" Round Culvert L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.85' S= 0.0065 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Tertiary	65.30'	12.0" Round Culvert L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.30' / 65.15' S= 0.0060 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.32 cfs @ 8.75 hrs HW=63.49' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=2.50 cfs @ 12.08 hrs HW=65.99' (Free Discharge)

↑2=Culvert (Barrel Controls 2.50 cfs @ 3.28 fps)

Secondary OutFlow Max=2.54 cfs @ 12.08 hrs HW=65.99' (Free Discharge)

↑3=Culvert (Barrel Controls 2.54 cfs @ 3.34 fps)

Tertiary OutFlow Max=1.03 cfs @ 12.08 hrs HW=65.99' (Free Discharge)

↑4=Culvert (Barrel Controls 1.03 cfs @ 2.51 fps)

Pond 12P: CHAMBERS - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 11 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

27 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 190.50' Row Length +12.0" End Stone x 2 = 192.50' Base Length

11 Rows x 52.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 54.67' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

297 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 11 Rows = 15,613.6 cf Chamber Storage

37,270.1 cf Field - 15,613.6 cf Chambers = 21,656.6 cf Stone x 40.0% Voids = 8,662.6 cf Stone Storage

Chamber Storage + Stone Storage = 24,276.2 cf = 0.557 af

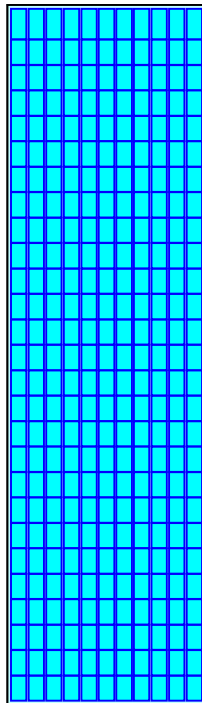
Overall Storage Efficiency = 65.1%

Overall System Size = 192.50' x 54.67' x 3.54'

297 Chambers

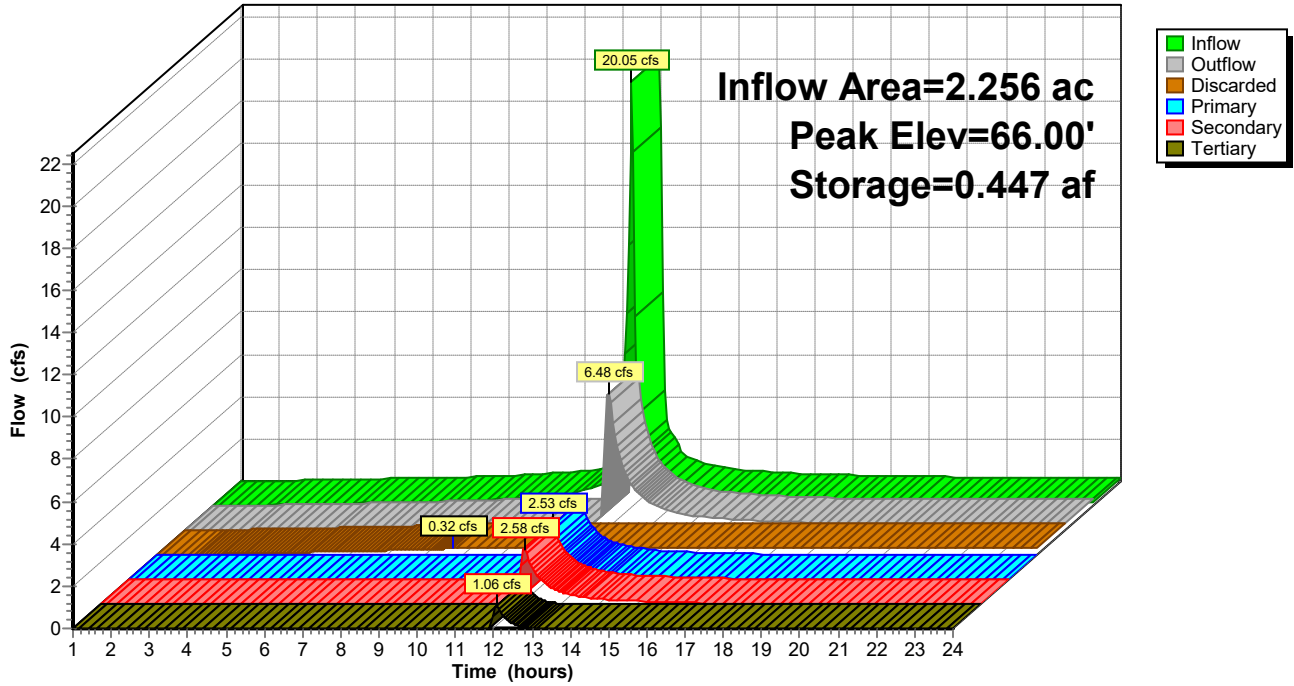
1,380.4 cy Field

802.1 cy Stone



Pond 12P: CHAMBERS

Hydrograph



Summary for Subcatchment 13S: EDA-101

Runoff = 15.83 cfs @ 11.95 hrs, Volume= 0.807 af, Depth> 6.62"

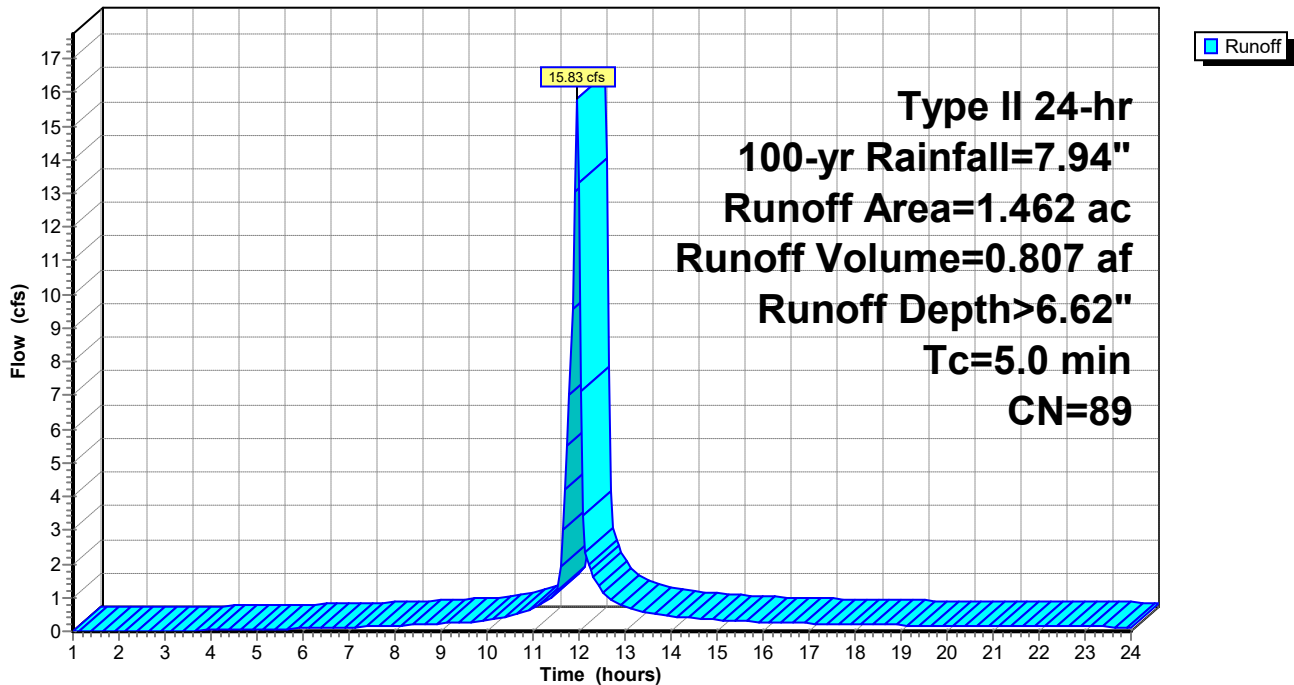
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-yr Rainfall=7.94"

Area (ac)	CN	Description
0.230	98	Roofs, HSG B
0.684	98	Paved parking, HSG B
0.548	74	>75% Grass cover, Good, HSG C
1.462	89	Weighted Average
0.548		37.48% Pervious Area
0.914		62.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, AB

Subcatchment 13S: EDA-101

Hydrograph



Summary for Subcatchment 14S: EDA-201

Runoff = 4.83 cfs @ 11.96 hrs, Volume= 0.227 af, Depth> 4.75"

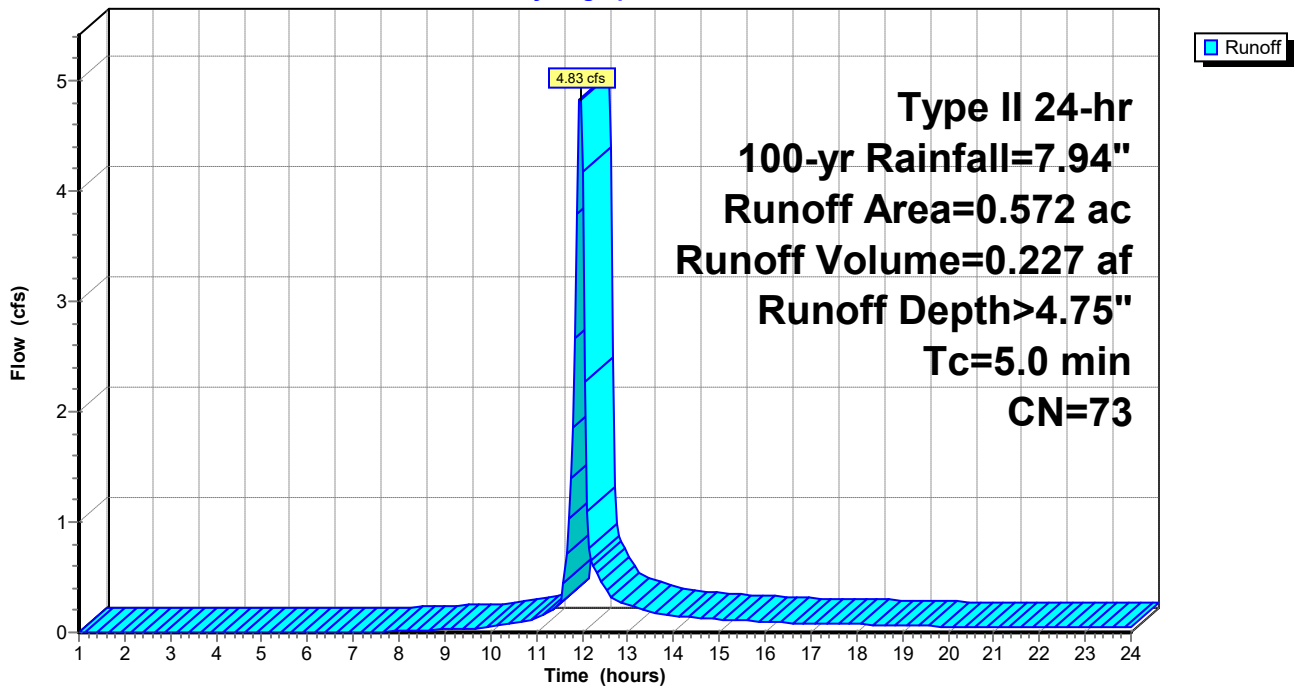
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-yr Rainfall=7.94"

Area (ac)	CN	Description
0.572	73	Woods, Fair, HSG C
0.572		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, AB

Subcatchment 14S: EDA-201

Hydrograph



Summary for Subcatchment 15S: PDA-101

Runoff = 25.57 cfs @ 11.95 hrs, Volume= 1.379 af, Depth> 7.34"

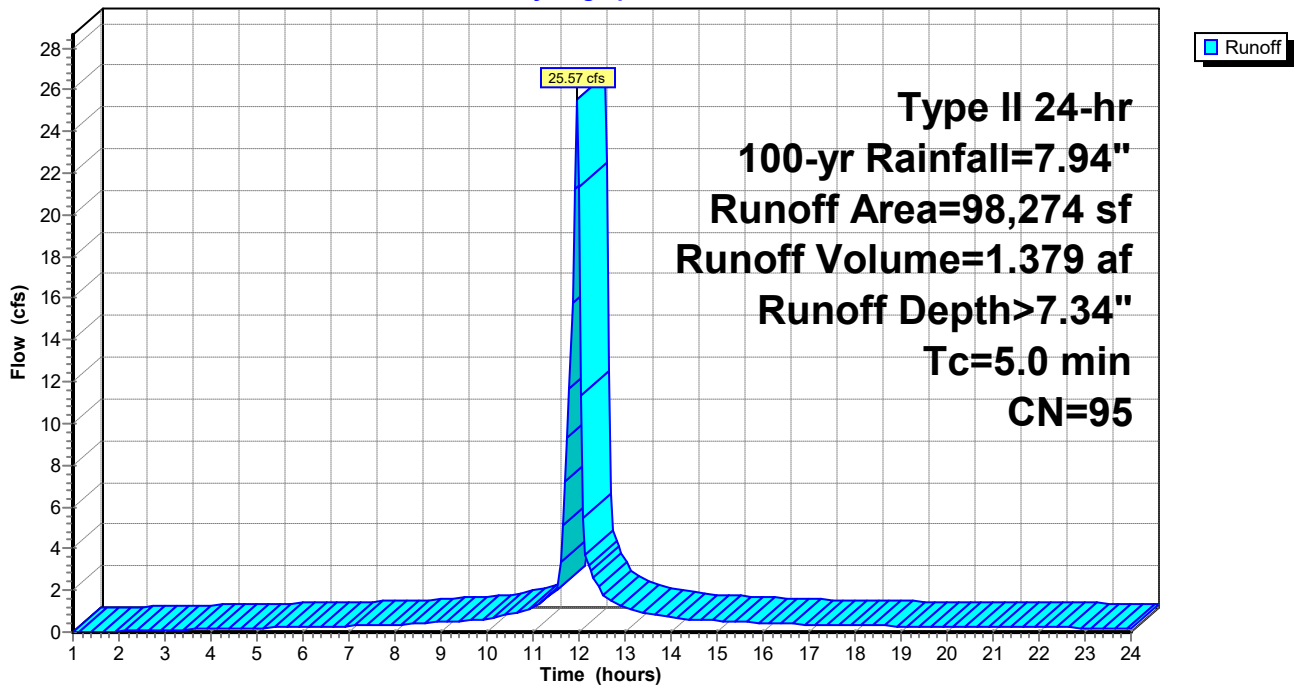
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-yr Rainfall=7.94"

Area (sf)	CN	Description
11,178	69	50-75% Grass cover, Fair, HSG B
10,137	98	Unconnected roofs, HSG B
* 76,691	98	Paved parking
268	79	50-75% Grass cover, Fair, HSG C
98,274	95	Weighted Average
11,446		11.65% Pervious Area
86,828		88.35% Impervious Area
10,137		11.67% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 15S: PDA-101

Hydrograph



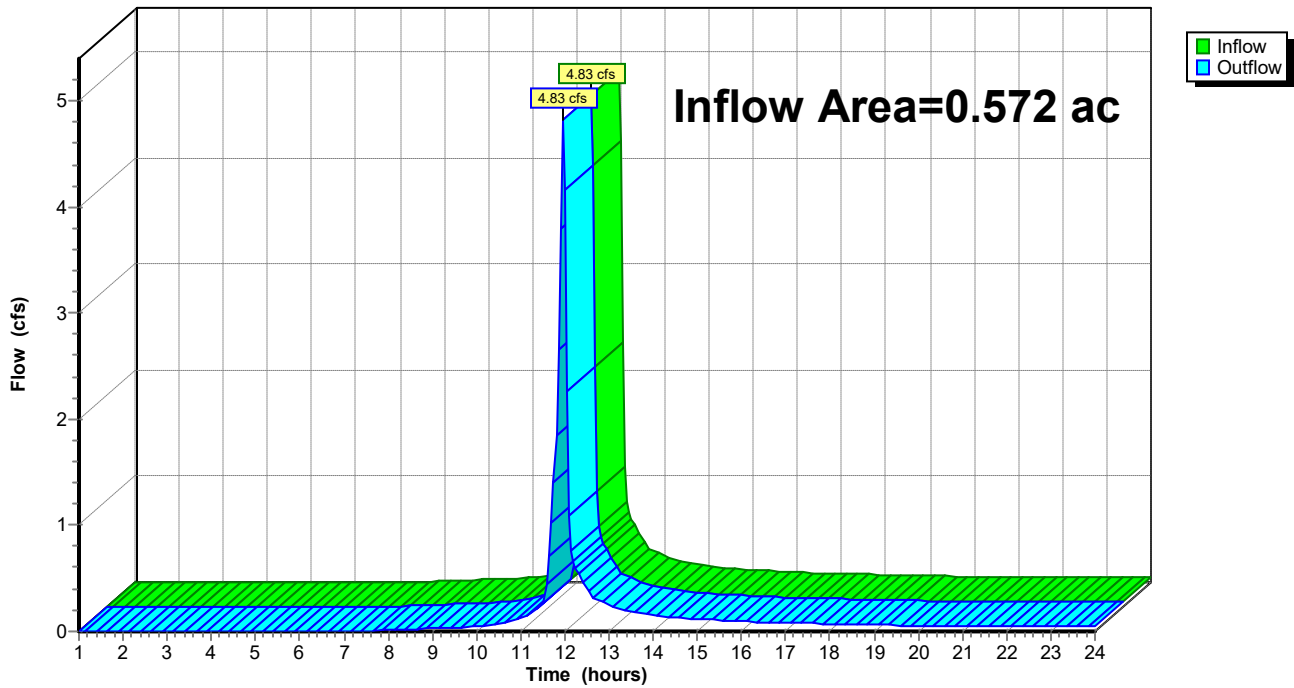
Summary for Reach 13R: POI-2

Inflow Area = 0.572 ac, 0.00% Impervious, Inflow Depth > 4.75" for 100-yr event
Inflow = 4.83 cfs @ 11.96 hrs, Volume= 0.227 af
Outflow = 4.83 cfs @ 11.96 hrs, Volume= 0.227 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 13R: POI-2

Hydrograph



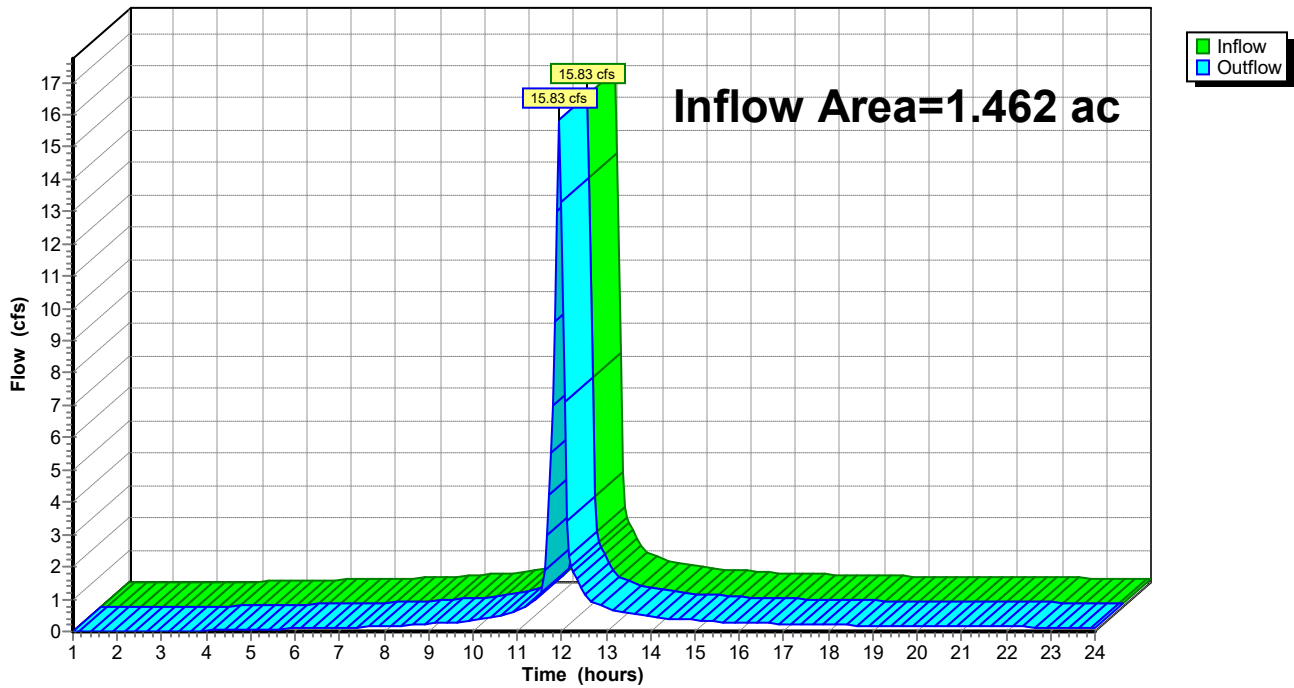
Summary for Reach 15R: POI-1

Inflow Area = 1.462 ac, 62.52% Impervious, Inflow Depth > 6.62" for 100-yr event
Inflow = 15.83 cfs @ 11.95 hrs, Volume= 0.807 af
Outflow = 15.83 cfs @ 11.95 hrs, Volume= 0.807 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 15R: POI-1

Hydrograph



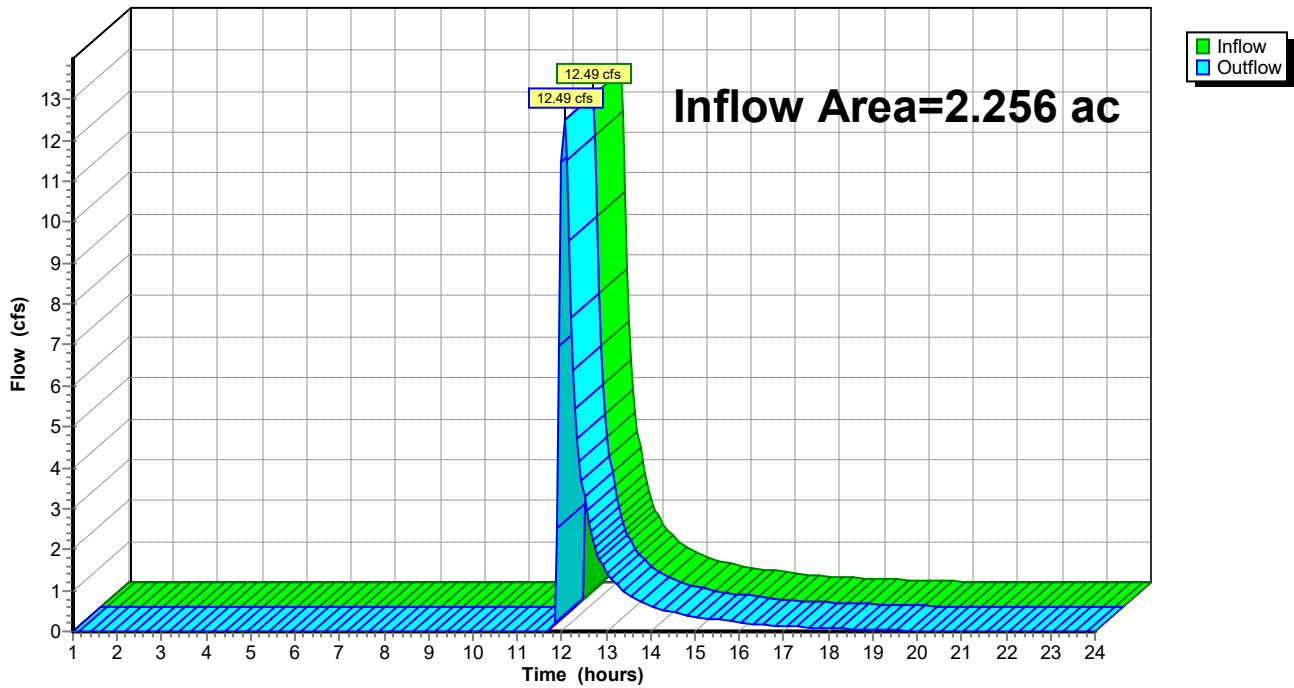
Summary for Reach 17R: POI-1

Inflow Area = 2.256 ac, 88.35% Impervious, Inflow Depth = 3.34" for 100-yr event
Inflow = 12.49 cfs @ 12.05 hrs, Volume= 0.628 af
Outflow = 12.49 cfs @ 12.05 hrs, Volume= 0.628 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Reach 17R: POI-1

Hydrograph



Summary for Pond 12P: CHAMBERS

Inflow Area = 2.256 ac, 88.35% Impervious, Inflow Depth > 7.34" for 100-yr event
 Inflow = 25.57 cfs @ 11.95 hrs, Volume= 1.379 af
 Outflow = 12.81 cfs @ 12.05 hrs, Volume= 1.140 af, Atten= 50%, Lag= 6.0 min
 Discarded = 0.32 cfs @ 7.75 hrs, Volume= 0.512 af
 Primary = 4.93 cfs @ 12.05 hrs, Volume= 0.273 af
 Secondary = 4.93 cfs @ 12.05 hrs, Volume= 0.280 af
 Tertiary = 2.64 cfs @ 12.05 hrs, Volume= 0.076 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 66.74' @ 12.05 hrs Surf.Area= 0.242 ac Storage= 0.533 af

Plug-Flow detention time= 130.6 min calculated for 1.140 af (83% of inflow)
 Center-of-Mass det. time= 56.3 min (808.3 - 752.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.45'	0.199 af	54.67"W x 192.50"L x 3.54'H Field A 0.856 af Overall - 0.358 af Embedded = 0.497 af x 40.0% Voids
#2A	63.95'	0.358 af	Cultec R-330XLHD x 297 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 11 rows
		0.557 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	63.45'	1.300 in/hr Exfiltration over Surface area
#2	Primary	65.00'	15.0" Round Culvert L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.85' S= 0.0054 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Secondary	65.00'	15.0" Round Culvert L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.85' S= 0.0065 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Tertiary	65.30'	12.0" Round Culvert L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.30' / 65.15' S= 0.0060 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.32 cfs @ 7.75 hrs HW=63.49' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=4.92 cfs @ 12.05 hrs HW=66.74' (Free Discharge)

↑**2=Culvert** (Inlet Controls 4.92 cfs @ 4.01 fps)

Secondary OutFlow Max=4.92 cfs @ 12.05 hrs HW=66.74' (Free Discharge)

↑**3=Culvert** (Inlet Controls 4.92 cfs @ 4.01 fps)

Tertiary OutFlow Max=2.64 cfs @ 12.05 hrs HW=66.74' (Free Discharge)

↑**4=Culvert** (Barrel Controls 2.64 cfs @ 3.36 fps)

Pond 12P: CHAMBERS - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 11 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

27 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 190.50' Row Length +12.0" End Stone x 2 = 192.50' Base Length

11 Rows x 52.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 54.67' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

297 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 11 Rows = 15,613.6 cf Chamber Storage

37,270.1 cf Field - 15,613.6 cf Chambers = 21,656.6 cf Stone x 40.0% Voids = 8,662.6 cf Stone Storage

Chamber Storage + Stone Storage = 24,276.2 cf = 0.557 af

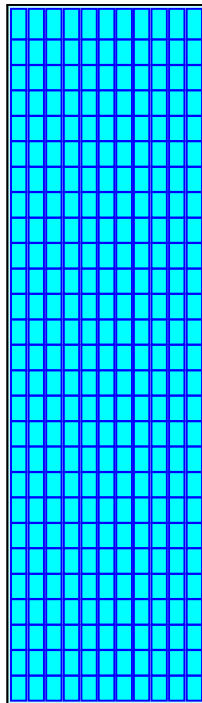
Overall Storage Efficiency = 65.1%

Overall System Size = 192.50' x 54.67' x 3.54'

297 Chambers

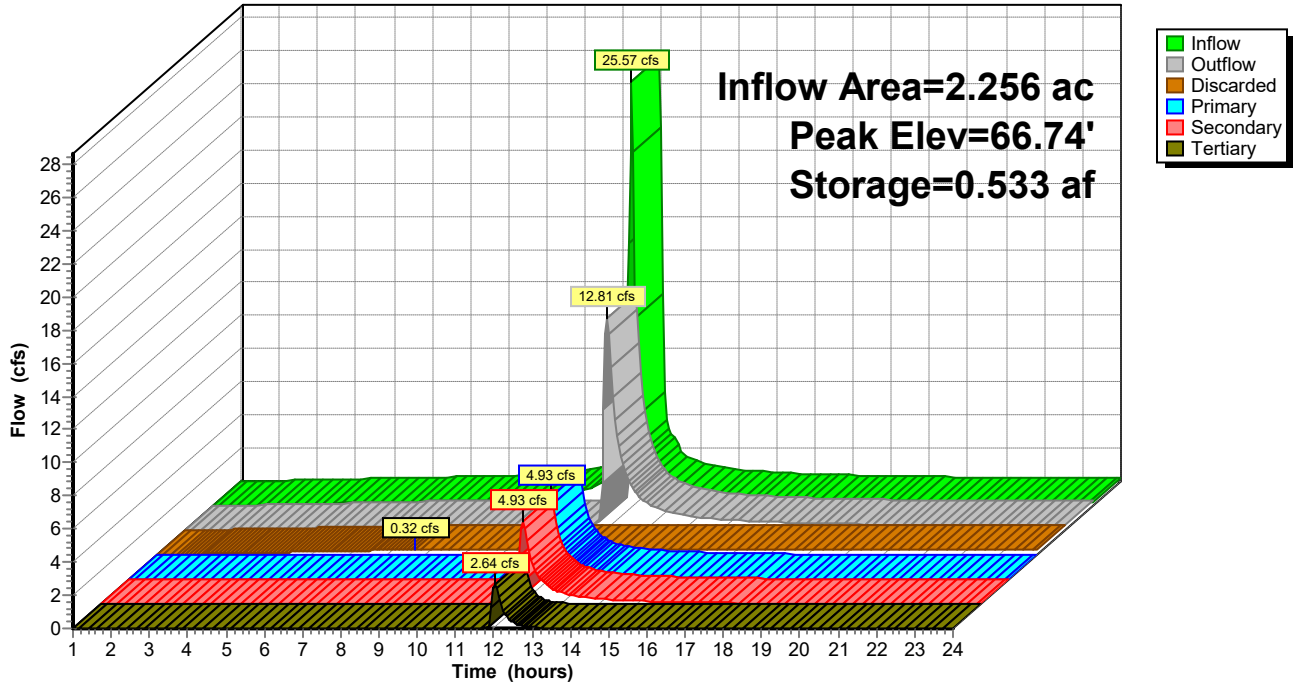
1,380.4 cy Field

802.1 cy Stone



Pond 12P: CHAMBERS

Hydrograph



APPENDIX C

WATER QUALITY CALCULATIONS

Water Quality Volume and Water Quality Flow Calculations

Water Quality Volume (WQV) & Water Quality Flow (WQF) PDA-201

PROJECT Proposed Development
 DATE 3/1/2021
 ADDRESS 10 Colton Drive

WATER QUALITY VOLUME (WQV) CALCULATION

Area (A) = 98274.00 square feet
 Area (A) = 2.26 acres
 Area (A) = 0.00353 square miles
 Design Precipitation (P) = 1 inch
 % Impervious Cover (I) = 88%
 Volumetric Runoff Coefficient (R) = 0.058

WQV =	0.080	ac-ft
	3477.99	cu-ft

WATER QUALITY FLOW (WQF) CALCULATION

RUNOFF CURVE NUMBER (CN)

Runoff Depth (Q) = 0.425 inches
 CN = 92 Figure 2-1 (SWQM)

TIME OF CONCENTRATION (T_c), 10 minute minimum

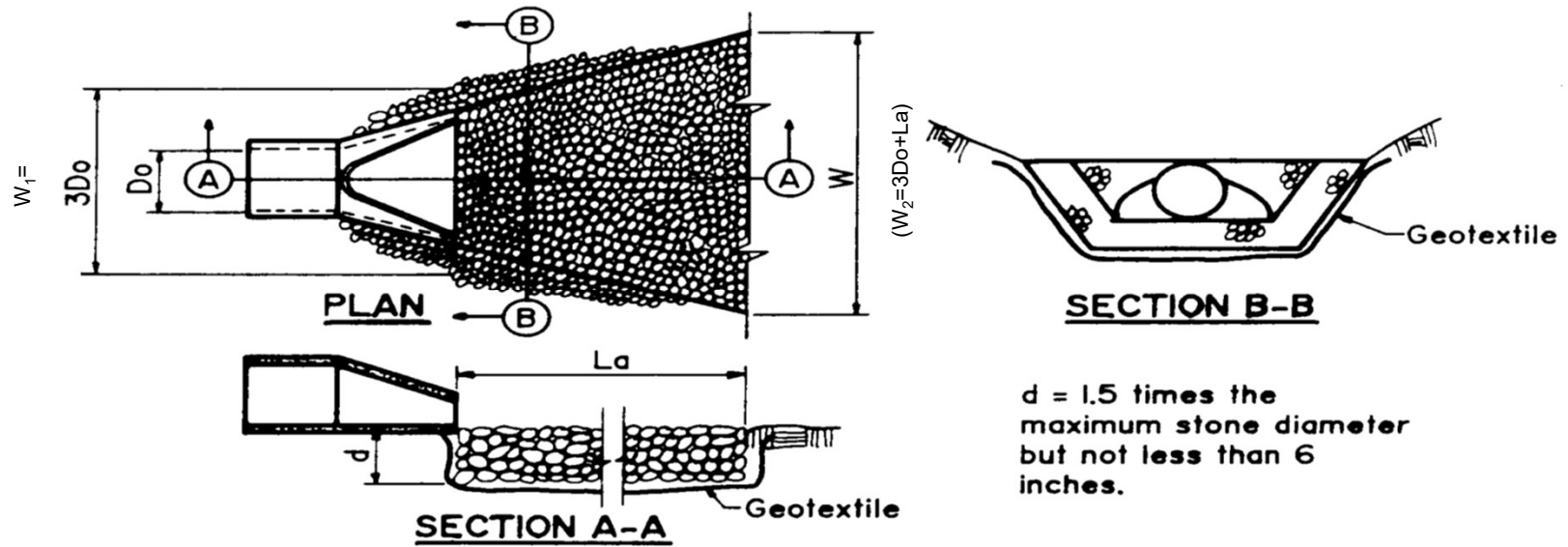
T_c = 5 min
 T_c = 0.08 hours

Initial Abstraction (I_a) = 0.174 Table 4-1 (SWQM)
 I_a/P Calculation = 0.174
 Unit Peak Discharge (q_u) = 630 Exhibit 4-111 (SWQM)

WQF =	0.94	cfs
--------------	-------------	------------

Riprap Apron Outlet Protection (Minimum Tailwater Condition)

PROJECT NAME:	10 Colton Road		
LOCATION:	10 Colton Road, East Lyme, CT 06333		
PREPARED BY:	E.B.	DATE:	2/27/2021
LAST REVISED BY:		DATE:	



OUTLET NO.	PIPE DIA. Sp (ft.)	Q (CFS)	La (ft)	W ₁ (ft.)	W ₂ (ft)	T _w	INV.	2 Year Storm Elev.
O-1	1.3	3.30	14	3.8	17.8	0.02	64.75	
O-2	1.3	3.30	14	3.8	17.8	0.02	64.75	
O-3	1.0	1.75	11	3.0	14.0	0.02	64.75	

The design Q used shall be the 25-year storm discharge rate. A 15" diameter pipe flowing at 3.30 cfs was used to design rip rap apron. Outlet protection design per 2002 Connecticut Guideline for Soil Erosion and Sediment Control.

APPENDIX D

DRAINAGE MAPS

ED-1 – Existing Drainage Area Mapping

PD-1 – Proposed Drainage Area Mapping

EXISTING HYDROLOGY INFORMATION

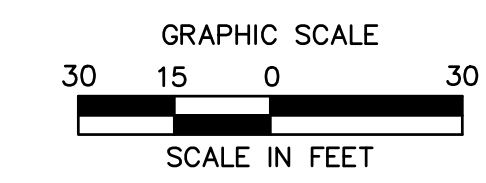
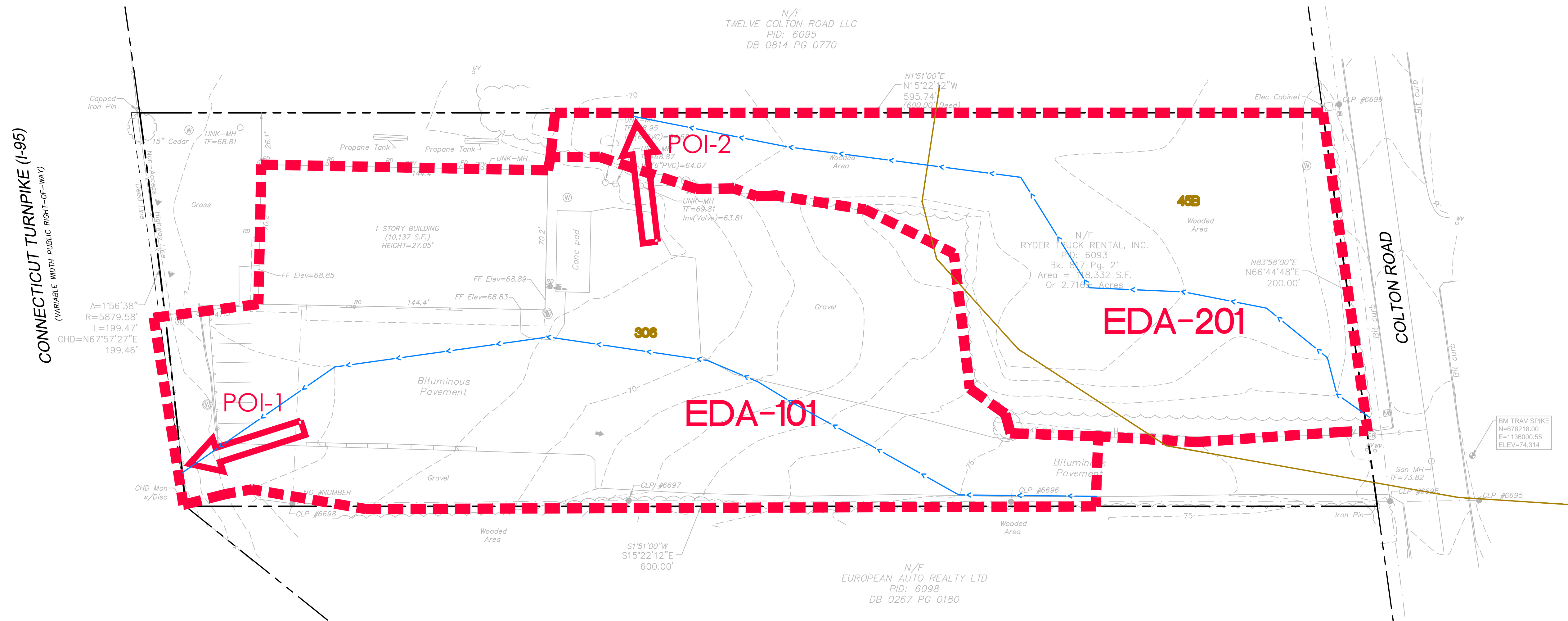
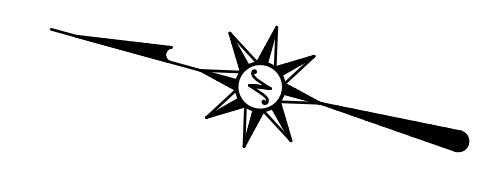
DRAINAGE AREA	TOTAL AREA (S.F.)	IMPERVIOUS AREA (S.F.)	PERVIOUS AREA (S.F.)	PERCENT IMPERVIOUS (%)	CN	TIME OF CONCENTRATIONS (MIN.)
EDA-101	63,685	39,814	23,871	62.5%	89	5.0
EDA-201	24,916	0	24,916	0.0%	73	5.0

LEGEND

- PROPERTY LINE
- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW PATH
- SOIL TYPE BOUNDARY
- SOIL TYPE DESIGNATION

SOIL TYPES

- 4B** WOODBRIDGE FINE SANDY LOAM (HSG C)
- 306** UDORTHERTS--URBAN LAND COMPLEX (HSG B)



REVISIONS	Date	By
No. 1	03/11/2021	

Designed	CDG
Drawn	EB
Reviewed	
Scale	1"=30'
Project No.	2100074
Date	02/11/2021
CAD File:	ED210007401

Sheet No.

EXISTING DRAINAGE PLAN

ED-1

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PROPOSED HYDROLOGY INFORMATION

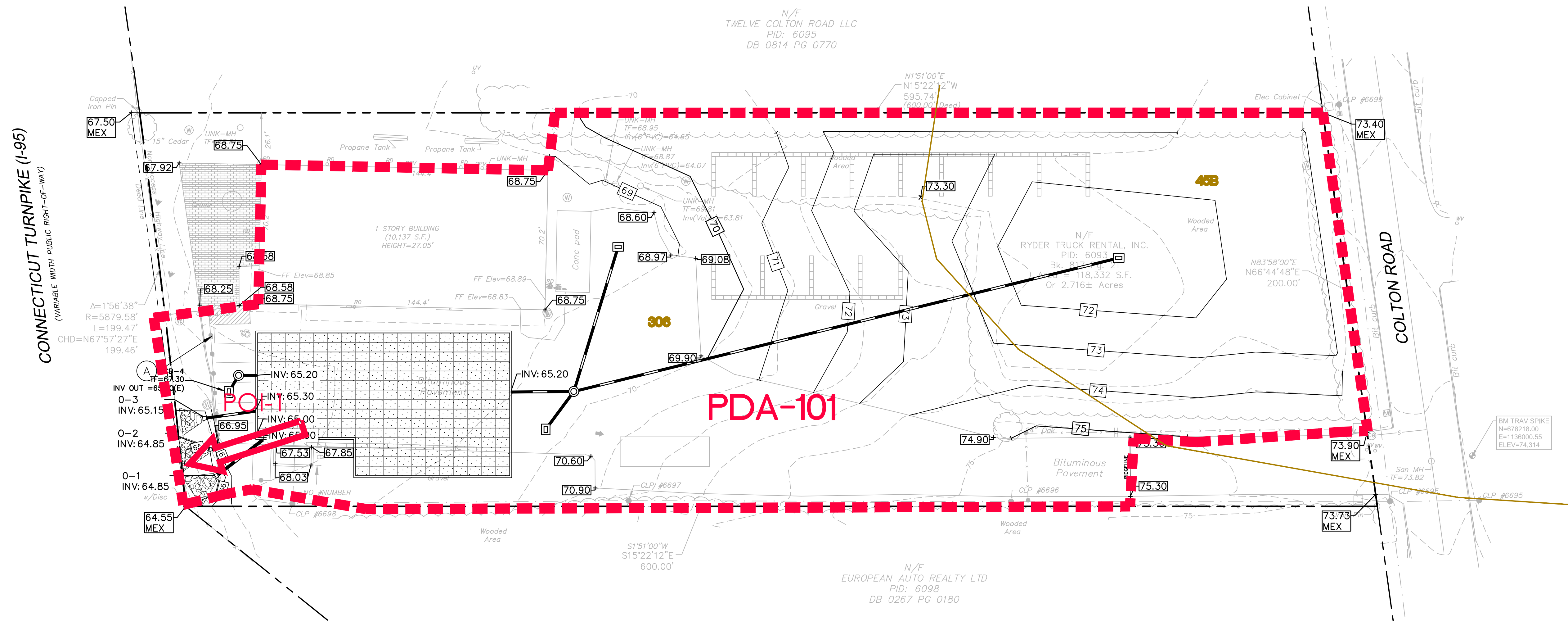
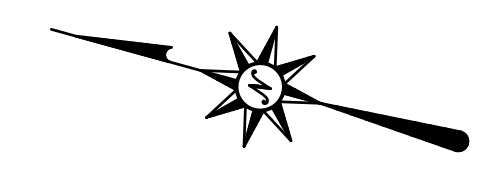
DRAINAGE AREA	TOTAL AREA (S.F.)	IMPERVIOUS AREA (S.F.)	PERVIOUS AREA (S.F.)	PERCENT IMPERVIOUS (%)	CN	TIME OF CONCENTRATIONS (MIN.)
PDA-101	98,274	86,874	11,400	88.4%	92	5.0

LEGEND

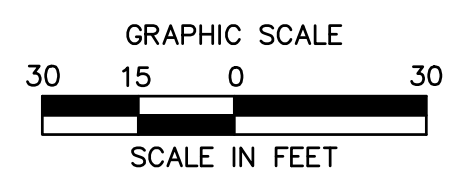
- PROPERTY LINE
- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW PATH
- SOIL TYPE BOUNDARY
- SOIL TYPE DESIGNATION

SOIL TYPES

- 45B** WOODBRIDGE FINE SANDY LOAM (HSG C)
- 306** UDORTHENTS-URBAN LAND COMPLEX (HSG B)



REFER TO SHEET GN-1 FOR
SITEWORK GENERAL NOTES



355 Research Parkway
Meriden, CT 06450
(203) 630-1406
(203) 630-2615 Fax



EARTH PRODUCTS SHOWCASE
10 COLTON ROAD
EAST LYME, CONNECTICUT

REVISIONS
Desc. REVISION TO EAST LYME PLANNING & ZONING DEPARTMENT
Date 03/11/2021
No. 1

Designed CDG
Drawn EB
Reviewed
Scale 1"=30'
Project No. 2100074
Date 02/11/2021
CAD File: PD210007401

PROPOSED DRAINAGE PLAN

Sheet No.

PD-1

3/11/2021, 10:00 AM, C:\WORK\210007401\DWG\210007401.DWG, E:\30434.DWG

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Sheet ID: 210210007401; XREF: 210007401; XREF: 210007401; XREF: 210007401

APPENDIX E

**STORMWATER SYSTEM
OPERATION AND MAINTENANCE MANUAL**

Appendix F:

**Stormwater System
Operations and Maintenance Plan**

For the Proposed:
O&G Earth Products Showcase

Located at:
**10 Colton Rd
East Lyme, Connecticut**

Prepared for Submission to:
**Town of Trumbull, Connecticut
Planning and Zoning Commission**

March 1, 2021

Prepared for:
**O&G Building Group
O&G Industries, Inc.**
112 Wall Street
Torrington, CT 06790

Prepared by:



BL Companies
355 Research Parkway
Meriden, Connecticut 06450
Phone: (203) 630-1406
Fax: (203) 630-2615

BL Project Number: 2100074

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General Overview

The subject property is approximately 2.73 acres and is currently developed with a one-story 10,137 SF building and associated parking and improvements. There are no existing wetlands near the subject property. The proposed redevelopment includes the expansion of the existing paved area to create space for bins of various earth materials, and the construction of a truck scale, and patio area with flagpole, associated stormwater improvements. A stormwater management system is proposed for peak flow attenuation and stormwater treatment. The intent of the proposed site drainage is to mimic existing drainage patterns to the maximum extent practical. The site stormwater system will provide stormwater detention and quality improvements through deep sump catch basins with hoods, hydrodynamic separators, and a subsurface detention system. These measures will treat the stormwater quality flow through structural means to provide water quality treatment in conformance with the State of Connecticut Water Quality Manual.

The following Operations and Maintenance Plan was prepared specifically for this proposed development in the Town of East Lyme, Connecticut. The Plan was developed to satisfy the requirements of the Connecticut Department of Energy and Environmental Protection's 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

Purpose & Goals

The purpose of this Manual is to ensure that the stormwater management components are operated in accordance with all approvals and permits. The primary goal is to inform all the property managers about how the system operates and what maintenance items are necessary to protect downstream wetlands and watercourses. The secondary goal is to provide a practical, efficient means of maintenance planning and record keeping verifying permit compliance.

Responsible Parties

The Property Owner will be responsible for implementing the Plan on the property.

Maintenance inspections shall be performed by a qualified professional.

Some utilities located on the site will be owned and maintained by various utility companies in accordance with their standards. The property owner may maintain the service connections.

List of Permits & Special Conditions

The project will receive several permits, which may contain special conditions that require compliance by the property owner and maintenance contractors. These permits may include the following:

- Town of Trumbull Permits –Site Plan Special Permit and Building Permit

- State of Connecticut – Encroachment Permit, OSTA Approval, CTDEEP Stormwater Discharge Construction General Permit

Maintenance Logs and Checklists

The property owner will keep a record of all maintenance procedures performed, date of inspection/ cleanings, etc. Copies of inspection reports and maintenance records shall be kept on-site.

Forms

The following forms will be developed for annual maintenance. Copies of the forms will be kept on-site as part of the Storm Water Management Plan.

- Annual Checklist
- Monthly Checklist
- Catch Basin Inspection Log

Employee Training

The property owner will have an employee-training program, with annual up-dates, to ensure that the qualified employees charged with maintaining the buildings and grounds do so in accordance with the approved permit conditions. All employees that have maintenance duties will be adequately informed of their responsibilities.

Spill Control

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and clean-up:

- Manufacturer's recommended methods for spill clean-up will be clearly posted and site personnel will be made aware of the procedures and the location of the information and clean-up supplies.
- Materials and equipment necessary for spill clean-up will be kept in the material storage area on-site. Equipment and materials will include but not be limited to: absorbent booms or mats, brooms, dust pans, mops, rags, gloves, goggles, sand, and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned immediately after discovery.
- The spill area will be kept well-ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with hazardous substance.
- Spills of toxic or hazardous material, regardless of size, will be reported to the appropriate State or local government agency.

- If a spill occurs, this plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean the spill if there is another one. A description of the spill, the cause, and the remediation measures will also be included.

A spill report shall be prepared by the property owner following each occurrence. The spill report shall present a description of the release, including quantity and type of material, date of spill, circumstances leading to the release, location of spill, response actions and personnel, documentation of notifications and corrective measures implemented to prevent reoccurrence.

The property owner shall identify an appropriately qualified and trained site employee involved with day-to-day site operations to be the spill prevention and clean-up coordinator. The name(s) of responsible spill personnel shall be posted on-site. Each employee shall be instructed that all spills are to be reported to the spill prevention and clean-up coordinator.

Storm Water Management

System Components

The storm water management system has several components that are shown on the Grading and Drainage Plan (GD-1), that perform various functions in treating storm water runoff.

Catch Basins and Manholes

The property owner is responsible for cleaning the catch basins and manholes on the property. A Connecticut Licensed hauler shall clean the sumps and dispose of removed sand legally. The road sand may be reused for winter sanding but may not be stored on-site. As part of the hauling contract, the hauler shall notify the property owner in writing where the material is being disposed.

Each catch basin shall be inspected every four months, with one inspection occurring during the month of April. Any debris occurring within one foot from the bottom of each sump shall be removed by Vacuum "Vactor" type of maintenance equipment.

During the inspection of each of the catch basin sumps, the hoods (where provided) on each of the outlet pipes shall also be observed. In the event that a hood is damaged or off the hanger, it shall be reset or repaired.

Detention Pond Area

The detention pond area shall be checked for and cleaned of trash, excessive sediment, other debris and erosion. A detailed maintenance logbook shall be kept with information including, but not be limited to, the date of inspection, record of grit depth, condition of vegetation, observation of any floatables, and date of cleaning performed.

For the first year of operation following construction, inspect the detention area each month for the months of June, July, August and September, and once every six months thereafter. After the first year of operation, the detention area shall be inspected a minimum of two times yearly with one inspection occurring in the month of April. Any accumulations found to be occurring within one foot of the inlet/outlet pipes shall be removed from the detention area and properly disposed off-site. Also, any floating material discovered during inspections shall be removed from the basin.

A detailed maintenance logbook shall be kept for the detention area. Information is to include, but not be limited to, the date of inspection, condition of the inlet pipe(s), condition of outlet control pipes, observation of any floatables, and date of cleaning performed.

Regular inspection/maintenance for the detention area must include:

- removing debris and excess sediment
- checking that the storm inlet into the basin is clear and functioning properly,
- checking that the outlet control pipe is clear and the outlet is functioning properly,
- checking that the emergency spillway is clear and functioning properly,
- mowing the crest of the basin for maintenance access
- removing invasive plant species from of the basin
- checking slopes for any dips or settlement that might indicate seepage

Hydrodynamic Separators (or approved equal)

The hydrodynamic separator manholes will be cleaned periodically during construction, and at the end of construction once the landscaped areas are fully stabilized.

For the first year of operation following construction, inspect each manhole once each month for the months of January, February, March and April, and once every four months thereafter. A graduated measuring device (stadia rod) shall be inserted into each grit chamber and measurements of any accumulations shall be recorded. Any debris, which has accumulated to within one foot of the water surface inside the grit chamber portion of each tank, shall be removed by vacuum "Vactor" type of equipment.

After the first year of operation, each manhole shall be inspected at a minimum, three times yearly with one inspection occurring in the month of April in the same manner as described above for the first season of operation. Any accumulations found to be occurring within one foot of the water surface shall be removed from the manhole and properly disposed off-site. Also, any floating material discovered during inspections shall be removed from the tank.

A detailed maintenance logbook shall be kept for each manhole. Information is to include, but not be limited to, the date of inspection, record of grit depth, condition of baffles, observation of any floatable, and date of cleaning performed.

Underground Detention Systems

The underground detention systems shall be inspected every six months in the months of April and October. Each of the inspection manholes provided shall be opened and visually checked from the surface. Observation of grit inside of the detention system shall be noted and any deposits found to be 2 inches or more, as measured from the invert of pipe, shall be cleaned and removed. The underground detention system qualifies as a Confined Space under OSHA regulations, and any maintenance involving entry into the pipes should comply with OSHA Confined Space Entry Regulations.

Site Maintenance

Parking Lots

Parking lots and sidewalks shall be swept as necessary by the property owner to clean trash and other debris. The property owner will sweep parking lots on the property in the spring to remove winter accumulations of road sand.

Landscaping

The management company retained by the property owner will maintain landscaped areas. Normally the landscaping maintenance will consist of pruning, mulching, planting, mowing lawns, raking leaves, etc. Use of fertilizers and pesticides will be controlled and limited to minimal amounts necessary for healthy landscape maintenance.

The lawn areas, once established, will be maintained at a typical height of 3 ½". This will allow the grass to be maintained with minimal impact from weeds and/or pests. The low-maintenance areas will be maintained as a meadow or allowed to revert to natural conditions. Topsoil, brush, leaves, clippings, woodchips, mulch, equipment, and other material shall be stored off site.

Outdoor Storage

There will be no outdoor storage of hazardous chemicals, de-icing agents, fertilizer, pesticides, or herbicides anywhere around the buildings.

Deicing and Snow Removal & Storage

The use of clean sand may be used to aid traction in conjunction with salt and/or chemicals for deicing, snow melting and other related winter weather management. Snow shall be shoveled and plowed from sidewalk and parking areas as soon as practical during and after winter storms. Sand accumulation shall be removed from the site at the end of the winter season or appropriate time when seasonal snow has melted. Alternative deicing methods must be submitted prior to use onsite for review to the Town of Trumbull for approval.

MAINTENANCE SCHEDULE

During the First Year of Operation:		
Task:	Completion Date:	Manager's Initials:
JANUARY:		
Employee Training Program with Spill Program		
*Subsurface Detention Systems		
FEBRUARY:		
* Subsurface Detention Systems		
MARCH:		
* Subsurface/Surface Detention Systems		
APRIL:		
*Catch Basin/Yard Drain		
* Subsurface/Surface Detention Systems		
*Sanitary Inspection		
Shrub Fertilization		
Lawn Limbing (if necessary)		
AUGUST:		
*Catch Basin/Yard Drain		
* Subsurface/Surface Detention Systems		
OCTOBER:		
* Subsurface/Surface Detention Systems		
Tree and Lawn Fertilization		
DECEMBER:		
*Catch Basin/Yard Drain		
* Subsurface Detention Systems		

*NOTE: Use appropriate worksheet found in this plan to conduct the inspection.

After the First Year of Operation:		
FOR YEAR _____		
Task:	Completion Date:	Manager's Initials:
JANUARY:		
Employee Training Program with Spill Program		
APRIL:		
*Catch Basin/Yard Drain		
* Subsurface/Surface Detention Systems		
*Sanitary Inspection		
Shrub Fertilization		
Lawn Limbing (if necessary)		
AUGUST:		
*Catch Basin/Yard Drain		
OCTOBER:		
* Subsurface/Surface Detention Systems		
Tree and Lawn Fertilization		
DECEMBER:		
*Catch Basin/Yard Drain		

*NOTE: Use appropriate worksheet found in this plan to conduct the inspection.

	Fair	Poor	Yes	No	Yes	No		
	Excellent							
	Fair	Poor	Yes	No	Yes	No		
	Excellent							
	Fair	Poor	Yes	No	Yes	No		
	Excellent							
	Fair	Poor	Yes	No	Yes	No		
	Excellent							
	Fair	Poor	Yes	No	Yes	No		
	Excellent							
	Fair	Poor	Yes	No	Yes	No		
	Excellent							
	Fair	Poor	Yes	No	Yes	No		
	Excellent							
	Fair	Poor	Yes	No	Yes	No		
	Excellent							
	Fair	Poor	Yes	No	Yes	No		
	Excellent							

On-site Procedures for Inspection and Maintenance of Catch Basin Inserts

- Secure traffic and pedestrian traffic with cones, barrels, etc.
- Clean surface area around each catch basin
- Remove grates and set aside
- Clean grates, remove litter and debris that may be trapped within the grate
- Remove by vacator hose the debris that has been trapped in the trough area. Dispose of in accordance with local, state and federal regulatory agency requirements. Most debris that is captured in the trough or sump area will fall into the non-hazardous waste category.
- Visually inspect and check the condition of the trough area.
- Replace grate and lockdown as needed.
- Un-secure traffic control area.
- Complete service report and submit to facility owner.

APPENDIX F

GEOTECHNICAL REPORTS

Test Pit and Infiltration Testing Results



INFILTRATION TEST DATA

Infiltration test taken on March 9, 2021

By:

Joseph Sojka

Infiltration Test for Test Hole #1			
Pit Depth = 48"			
Elapsed Time (Min.)	Depth (in.)	Change in Depth (in.)	Rate (min/inch)
0	0.00		
		2.50	4.00
10	2.50		
		2.00	5.00
20	4.50		
		2.13	4.71
30	6.63		
		2.00	10.00
40	6.50		
		2.00	10.00
50	8.63		
Infil rate =		6.74 min/in	

Hole Presoaked Prior to Test (1:30 pm - 2:00 pm)



INFILTRATION TEST DATA

Infiltration test taken on March 9, 2021

By: Joseph Sojka

Infiltration Test for Test Hole #2			
Pit Depth = 60"			
Elapsed Time (Min.)	Depth (in.)	Change in Depth (in.)	Rate (min/inch)
0	0.00		
		1.50	20.00
30	1.50		
		0.88	34.29
60	2.38		
		0.63	48.00
90	3.00		
		0.38	80.00
120	3.38		
Infil rate =		45.57 min/in	

Hole Presoaked Prior to Test (10:00 am - 10:30 am)*

* Pre-soak of percolation test resulted in less than a 2-inch drop in water level so measurements were taken every two minutes.