OLD TOWNE COMMONS

Drainage Report

Prepared for:

Kensett Square, LLC
200 Old Towne Road
Cheshire, Connecticut 06410

141.13868.00009

July 28, 2021

Drainage Report

Old Towne Commons
166-168 and 200 South Main Street
Cheshire, Connecticut
July 28, 2021
141.13868.00009

This Drainage Report has been prepared in support of the proposed Old Towne Commons multifamily residential development located on South Main Street in the town of Cheshire, Connecticut. The proposed development will include the construction of three new buildings, new parking areas, and new sidewalks. The site consists of the combination of three parcels: 200 Old Towne Road, 166-168 South Main Street, and 29 Wallingford Road. The existing stormwater management area on site will be eliminated and will be replaced with a new underground detention system.

Figure 1 – #29, 166-168, and 200 Parcels

Table 1 – Stormwater Data

Parcel Size Total	3.00 acres
Existing Impervious Area (Watershed Area)	1.23 acres
Proposed Impervious Area (Watershed Area)	1.59 acres
Soil Types (Hydrologic Soil Group)	“B,” "C," and "D"
Existing Land Use	Woods, open space, gravel, building, concrete sidewalks, and bituminous roadway and parking
Proposed Land Use	Woods, open space, building, concrete sidewalks, and bituminous roadway and parking
Design Storm for Stormwater Management	No increases in peak rates of runoff for the 10-, 25-, 50-, and 100-year storms, CTDEEP Water Quality Flow
Water Quality Measures	2-foot-sump catch basins, hydrodynamic separator, underground detention system
Design Storm for Storm Drainage	10-year storm
Federal Emergency Management Agency Special Flood Hazard Areas	Area of Minimal Flood Hazard (Zone X)
Connecticut Department of Energy & Environmental Protection Aquifer Protection Areas	Not applicable

STORMWATER MANAGEMENT APPROACH

The stormwater management system for this site has been designed utilizing Best Management Practices (BMPs) to provide water quality management while attenuating the proposed peak-flow rates from the development. The design goal is to provide water quality treatment in accordance with the Connecticut Department of Energy & Environmental Protection (CTDEEP) requirements for Water Quality Flow (WQF) and to prevent increases in the predevelopment runoff rates from the project site. Existing drainage patterns will be maintained to the maximum extent practicable, and a new stormwater treatment train proposes catch basins with 2-foot sumps (4-foot where noted), a hydrodynamic separator, a riprap energy dissipator, and a level spreader outlet.

The proposed underground detention system will be installed in the southeastern portion of the site under the new parking area for the proposed seven-unit building, with the intent to control the postdevelopment peak discharges from the site. The detention system will be fitted with an outlet control structure in the form of a weir wall with hydraulic openings that will be installed inside a standard manhole structure. The outlet pipe from the underground detention system will outlet downslope to a riprap level spreader, which will release stormwater in a quiescent manner toward the eastern property boundary of the site.

The computer program entitled *Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2019* by Autodesk, Inc., Version 2018.3, was used for designing the proposed storm drainage collection system.

Storm drainage computations performed include pipe capacity and hydraulic grade line calculations. The contributing watershed to each individual catch basin inlet was delineated to determine the drainage area and land coverage. These values were used to determine the stormwater runoff to each inlet using the Rational Method. The rainfall intensities for the site were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 10, Precipitation Frequency Data Server (PFDS). The proposed storm drainage system is designed to provide adequate capacity to convey the 10-year storm. The outlet pipe from the underground detention system was adequately sized to convey the 100-year discharge from the systems.

WATER QUALITY MANAGEMENT

Stormwater runoff from the proposed development will be collected by a subsurface pipe and catch basin drainage system. The proposed drainage system will include catch basins with 2-foot sumps (4-foot where noted) to trap sediment and debris.

A hydrodynamic separator, such as a *Cascade*® device manufactured by Contech Engineered Solutions, will be installed in the proposed storm drainage system prior to discharging stormwater runoff into the proposed underground detention system. This unit will further remove suspended solids before discharging downgradient, which will in turn remove other pollutants that tend to attach to the suspended solids and effectively remove other debris and floatables that may be present in stormwater runoff. The hydrodynamic separator has been designed to meet criteria recommended by the CTDEEP *2004 Stormwater Quality Manual*. The device was designed based on the determined WQF, which is the peak-flow rate associated with the Water Quality Volume (WQV) and sized based on the manufacturer's specifications.

The level spreader discharge system was designed to release stormwater from the underground detention system and will also help improve water quality. The design calls for a level stone berm as an overflow outlet, which will be set against a precast concrete curb. The stone level spreader was designed to gradually release stormwater in a quiescent manner as sheet flow rather than a concentrated point discharge that results from typical storm pipe outlets or flared end sections.

HYDROLOGIC ANALYSIS

A hydrologic analysis was conducted to analyze the predevelopment and postdevelopment peak-flow rates from the site. One analysis point consisting of two existing subwatersheds was chosen based on the fact that it receives all the stormwater runoff from the site. Analysis Point A represents the combination of the area that drains to the existing onsite detention basin and the rest of the site area, which combine to an ultimate discharge to the eastern property boundary. The total combined watershed area delineated is approximately 2.6 acres under both existing and proposed conditions.

The method of predicting the surface water runoff rates utilized in this analysis was a computer program entitled *Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2019* by Autodesk, Inc., Version 2020. The *Hydrographs* program is a computer model that utilizes the methodologies set forth in the *Technical Release No. 55* (TR-55) manual and *Technical Release No. 20* (TR-20) computer model, originally developed by the United States Department of Agriculture – Natural Resources Conservation Service

(USDA-NRCS). The *Hydrographs* computer modeling program is primarily used for conducting hydrology studies such as this one.

The *Hydrographs* computer program forecasts the rate of surface water runoff based upon several factors. The input data includes information on land use, hydrologic soil type, vegetation, contributing watershed area, time of concentration, rainfall data, storage volumes, and the hydraulic capacity of structures. The computer model predicts the amount of runoff as a function of time, with the ability to include the attenuation effect due to dams, lakes, large wetlands, floodplains, and stormwater management basins. The input data for rainfalls with statistical recurrence frequencies of 10, 25, 50, and 100 years was obtained from the NOAA Atlas 14, Volume 10 database. The corresponding rainfall totals are listed below.

Storm Frequency	Rainfall (inches)
10-year	5.43
25-year	6.65
50-year	7.55
100-year	8.53

Land use for the site under existing and proposed conditions was determined from field survey, town topographic maps, and aerial photogrammetry. Land use types used in the analysis included woods, grassed or open space, gravel, building, and impervious (paved) cover. Soil types in the watershed were determined from the CTDEEP Geographic Information System (GIS) database of the USDA-NRCS soil survey for New Haven County, Connecticut. For the analysis, the site was determined to contain hydrologic soil types “B,” "C," and "D" as classified by USDA-NRCS. Composite runoff Curve Numbers (CN) for each subwatershed were calculated based on the different land use and soil types. The time of concentration (Tc) was estimated for each subwatershed using the TR-55 methodology and was computed by summing all travel times through the watershed as sheet flow, shallow concentrated flow, and channel flow.

The existing conditions were modeled with the *Hydrographs* program to determine the peak-flow rates for the various storm events at each analysis point. A revised model was developed incorporating the proposed site conditions and the underground detention system. The flows obtained with the revised model were then compared to the results of the existing conditions model. Peak-flow rates from the project site were controlled by the storage volume provided within the proposed underground detention system, which consists of several rows of 60-inch watertight corrugated metal pipes (CMP). The water surface elevation within the underground system has been controlled not to exceed the top of the pipes during the 100-year storm event. All *Hydrographs* input computations and model results are included in the Appendix of this report. The following peak rates of runoff were obtained from the hydrology results:

Analysis Point A – Eastern Property Boundary				
	Peak Runoff Rate (cubic feet per second)			
Storm Frequency (years)	**10**	**25**	**50**	**100**
Existing Conditions	5.0	8.3	11.7	15.0
Proposed Conditions	5.0	6.5	9.8	14.1

Existing Detention Basin 110*				
	Water Surface Elevation (feet)			
Storm Frequency (years)	**10**	**25**	**50**	**100**
Existing Conditions	88.7	89.1	89.2	89.3

***Top of Berm Elevation = 89.5 feet**

Proposed Underground Detention System 110**				
	Water Surface Elevation (feet)			
Storm Frequency (years)	**10**	**25**	**50**	**100**
Proposed Conditions	92.8	93.8	94.2	94.5

****Top of Elevation of Pipe = 94.5 feet**

CONCLUSION

The results of the hydrologic analysis demonstrate that there will be no increases in peak-flow rates from the proposed development. This was achieved for the storm events modeled through a planned stormwater management system with detention provided in the proposed underground detention system. The proposed development will also introduce a new stormwater treatment train consisting of several water quality measures such as catch basins with 2-foot sumps (4-foot where noted), a hydrodynamic separator, a riprap energy dissipator, and a level spreader outlet.

The hydrodynamic separator will pretreat stormwater runoff generated from the proposed impervious surfaces prior to it entering the receiving underground detention system. A *Cascade* unit, manufactured by Contech Engineered Solutions, was selected and sized based on the contributing WQF, which is the peak-flow rate associated with the WQV.

All supporting documentation and stormwater-related computations are attached to this report along with the *Hydraflow Hydrographs* model results for stormwater management and *Hydraflow Storm Sewers* model results for the proposed storm drainage system. Illustrative watershed maps for both existing and proposed conditions are also attached to this report.

Attachments

Attachment A – United States Geological Survey Location Map
Attachment B – Federal Emergency Management Agency Flood Insurance Rate Map
Attachment C – Natural Resources Conservation Service Hydrologic Soil Group Map
Attachment D – Storm Drainage Computations
Attachment E – Water Quality Computations
Attachment F – Hydrologic Analysis – Input Computations
Attachment G – Hydrologic Analysis – Computer Model Results
Attachment H – Watershed Maps

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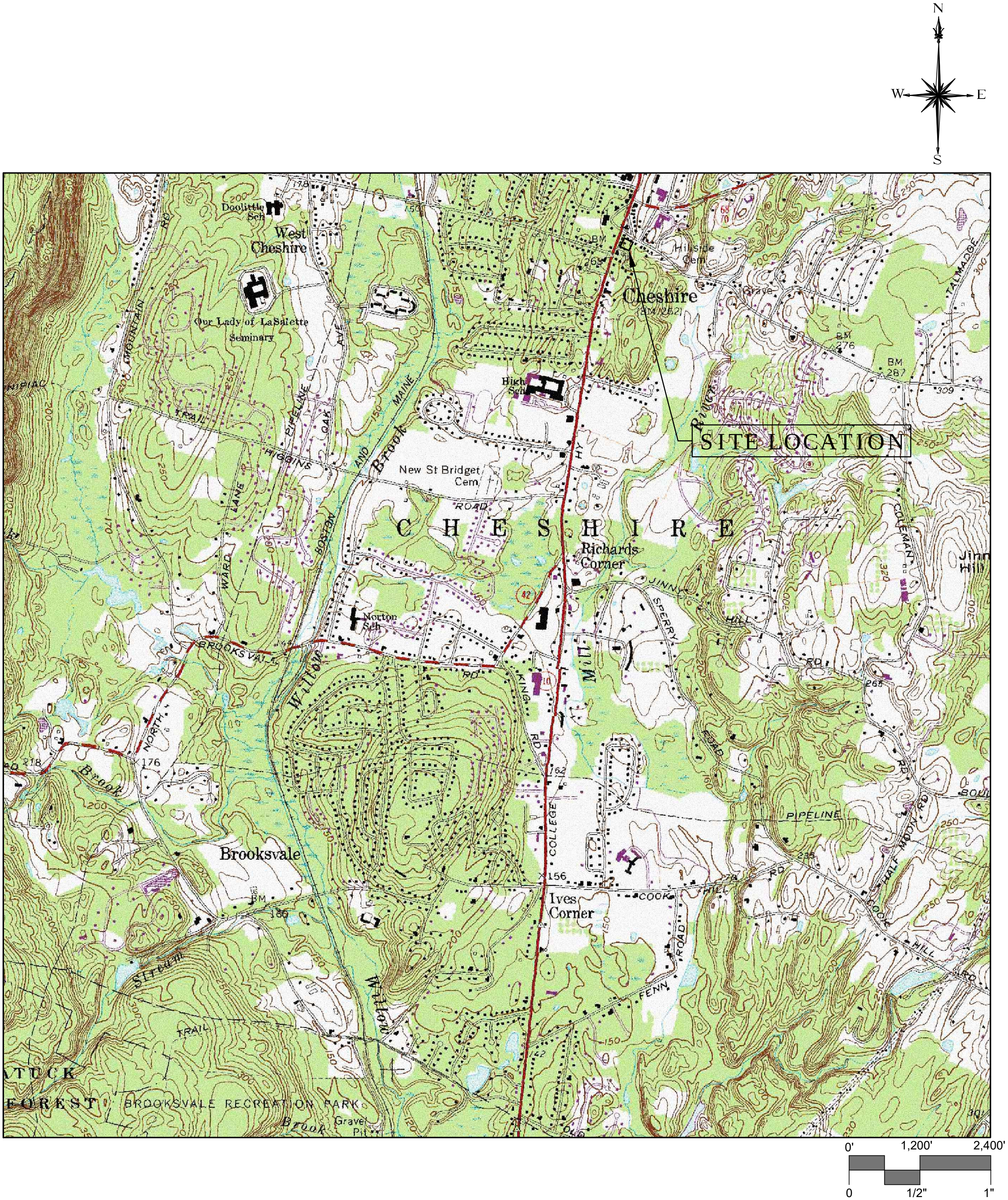
ATTACHMENT A

UNITED STATES GEOLOGICAL SURVEY LOCATION MAP



USGS QUADRANGLE MAP, QUAD NO. 80

OLD TOWNE COMMONS

166-168 & 200 SOUTH MAIN STREET
CHESHIRE, CONNECTICUT

PROJECT PHASE:

REV: ---

SLR

99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
SLRCONSULTING.COM

DATE	JULY 16, 2021
SCALE	1"=2,400'
PROJ. NO.	3868-09

DESIGNED	DRAWN	CHECKED
---	MCB	---

DRAWING NAME:

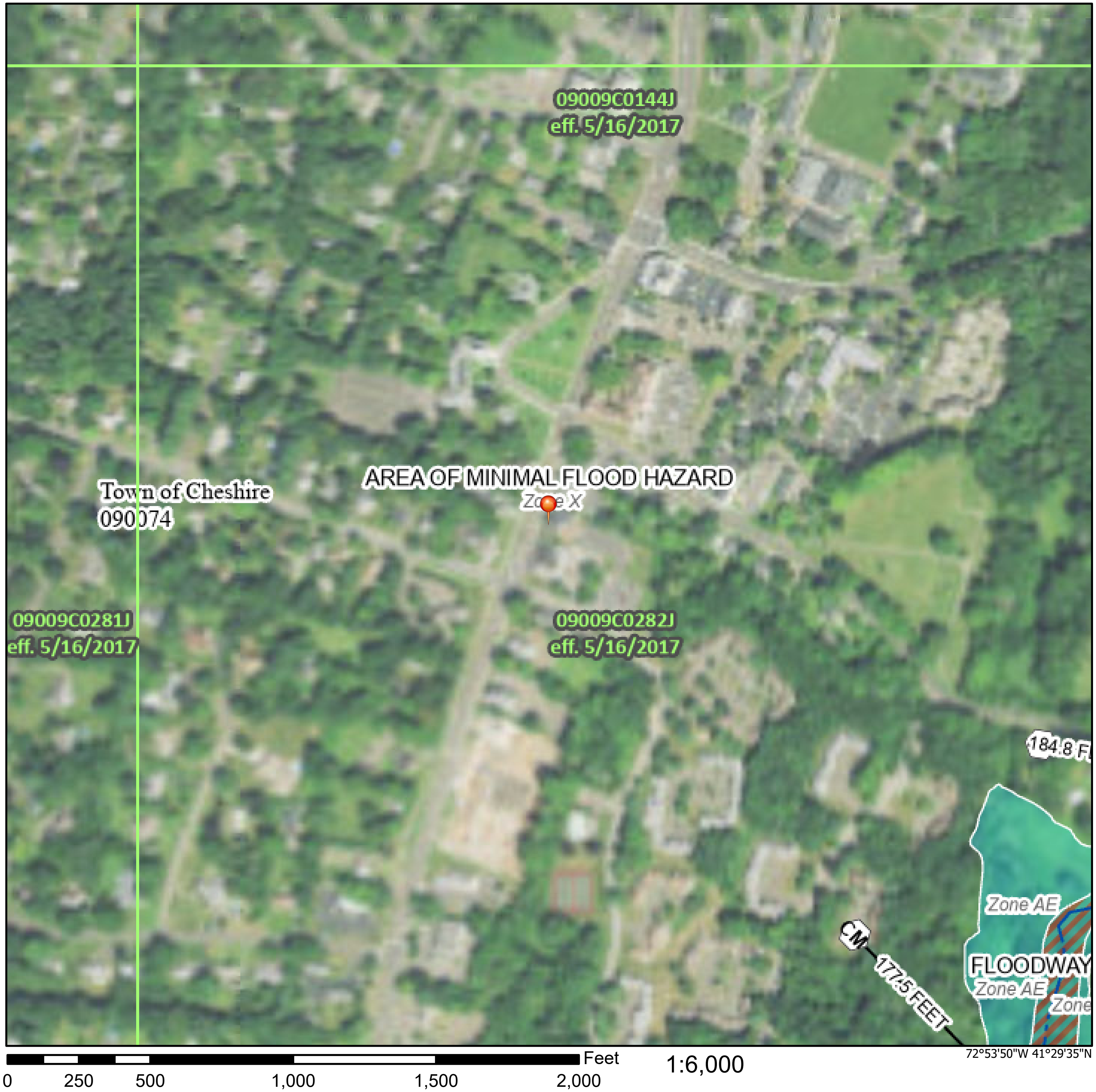
LOC

ATTACHMENT B

FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP

National Flood Hazard Layer FIRMette

72°54'27"W 41°30'2"N



1:6,000

72°53'50"W 41°29'35"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	🟦	Without Base Flood Elevation (BFE) *Zone A, V, A99*
		With BFE or Depth *Zone AE, AO, AH, VE, AR*
	▨	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	🟧	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	▨	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	▨	Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
	▨	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN	Area of Minimal Flood Hazard *Zone X*
	□	Effective LOMRs
	🟧	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	- — - -	Channel, Culvert, or Storm Sewer
	ıııııı	Levee, Dike, or Floodwall
OTHER FEATURES	B 20.2 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation
	8 — — —	Coastal Transect
	〰 513 〰	Base Flood Elevation Line (BFE)
	━	Limit of Study
	━	Jurisdiction Boundary
	--- ---	Coastal Transect Baseline
	- —	Profile Baseline
	—	Hydrographic Feature
MAP PANELS	□	Digital Data Available
	⬚	No Digital Data Available
	☒	Unmapped

N

📍 The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/8/2021 at 10:30 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

ATTACHMENT C

NATURAL RESOURCES CONSERVATION SERVICE HYDROLOGIC SOIL GROUP MAP

Drainage Report

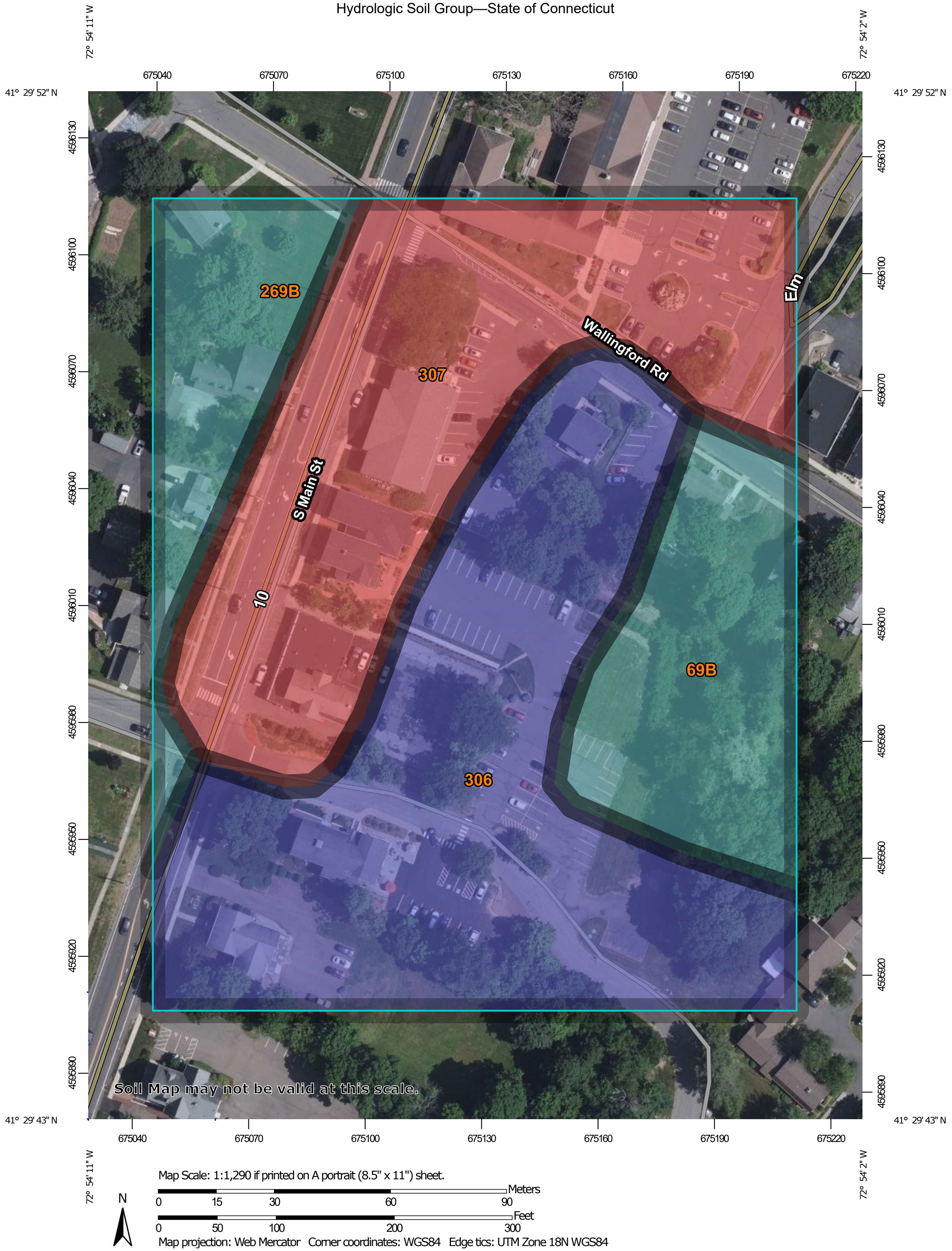
Old Towne Commons

166-168 and 200 South Main Street

Cheshire, Connecticut

July 28, 2021

Hydrologic Soil Group—State of Connecticut



Map Scale: 1:1,290 if printed on A portrait (8.5" x 11") 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 Rating Polygons

▢ A
▢ A/D
▢ B
▢ B/D
▢ C
▢ C/D
▢ D
▢ Not rated or not available

Soil Rating Lines

〰 A
〰 A/D
〰 B
〰 B/D
〰 C
〰 C/D
〰 D
〰 Not rated or not available

Soil Rating Points

■ A
■ A/D
■ B
■ B/D
■ C
■ C/D
■ D
▣ Not rated or not available

Water Features

〰 Streams and Canals

Transportation

┼┼┼ Rails
〰 Interstate Highways
〰 US Routes
〰 Major Roads
〰 Local Roads

Background

■ Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

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

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

Date(s) aerial images were photographed: Jun 8, 2020—Jun 12, 2020

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
69B	Yalesville fine sandy loam, 3 to 8 percent slopes	C	1.3	15.0%
269B	Yalesville-Urban land complex, 3 to 8 percent slopes	C	0.9	10.4%
306	Udorthents-Urban land complex	B	3.5	40.9%
307	Urban land	D	2.9	33.7%
Totals for Area of Interest			**8.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

ATTACHMENT D

STORM DRAINAGE COMPUTATIONS

Rational Method Individual Basin Calculations

Project: Old Towne Commons

Location: Cheshire, CT

By: MCB

Date: 7/22/21

Checked:

Date:

Basin Name	Impervious Area C=0.90 (sf)	Grassed Area C=0.3 (sf)	Wooded Area C=0.2 (sf)	Total Area (sf)	Total Area (ac)	Weighted C	Tc to Inlet (min)
System 100							
CCB 2	5,692	848	0	6,540	0.15	0.82	5.0
System 110							
CCB 5	5,334	1,416	0	6,750	0.15	0.77	5.0
CCB 6	3,951	1,740	0	5,691	0.13	0.72	5.0
CCB 7	11,136	2,706	0	13,842	0.32	0.78	5.0
YD 8	10,778	2,657	0	13,435	0.31	0.78	5.0
CCB 9	6,003	963	0	6,966	0.16	0.82	5.0
EXCB A	6,488	2,713	0	9,201	0.21	0.72	5.0
EXCB B	7,548	3,492	0	11,040	0.25	0.71	5.0

Rational Method Roof Drain System Calculations

Project: Old Towne Commons
By: MCB
Date: 7/22/21
Location: Cheshire, CT
Checked:
Date:

Total Roof Runoff to Proposed Storm Drainage System (In Hydraflow Model)

	ROOF TO CCB 2	ROOF TO CCB 5	ROOF TO CCB 9	ROOF TO EXCB A	ROOF TO LVL SPREADER	ROOF TO LVL SPREADER (100)	ROOF TO SPLASH PAD
C	0.90	0.90	0.90	0.90	0.90	0.90	0.90
I	7.51	7.51	7.51	7.51	7.51	11.60	7.51
A	0.07	0.03	0.04	0.03	0.03	0.06	0.06
Q	0.47	0.20	0.27	0.20	0.20	0.63	0.41

NOAA Atlas 14, Volume 10, Version 3
Location name: Cheshire, Connecticut, USA*
Latitude: 41.4967°, Longitude: -72.9023°
Elevation: 261.04 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	**2**	**5**	**10**	**25**	**50**	**100**	**200**	**500**	**1000**
5-min	**4.09** (3.20-5.14)	**4.96** (3.86-6.22)	**6.36** (4.94-8.02)	**7.51** (5.81-9.53)	**9.11** (6.82-12.1)	**10.3** (7.55-14.1)	**11.6** (8.23-16.4)	**13.0** (8.75-18.9)	**15.0** (9.73-22.7)	**16.7** (10.5-25.8)
10-min	**2.90** (2.27-3.64)	**3.51** (2.74-4.40)	**4.50** (3.50-5.67)	**5.32** (4.11-6.75)	**6.45** (4.82-8.59)	**7.30** (5.36-9.97)	**8.20** (5.83-11.6)	**9.20** (6.19-13.4)	**10.6** (6.89-16.1)	**11.8** (7.46-18.3)
15-min	**2.28** (1.78-2.86)	**2.75** (2.15-3.46)	**3.53** (2.74-4.45)	**4.17** (3.22-5.30)	**5.06** (3.78-6.74)	**5.73** (4.20-7.82)	**6.43** (4.58-9.13)	**7.21** (4.86-10.5)	**8.34** (5.40-12.6)	**9.25** (5.86-14.3)
30-min	**1.57** (1.23-1.97)	**1.89** (1.48-2.38)	**2.42** (1.88-3.05)	**2.86** (2.21-3.62)	**3.46** (2.59-4.61)	**3.91** (2.87-5.33)	**4.38** (3.12-6.23)	**4.92** (3.31-7.17)	**5.69** (3.68-8.61)	**6.32** (4.00-9.78)
60-min	**1.00** (0.784-1.26)	**1.21** (0.941-1.52)	**1.54** (1.20-1.94)	**1.81** (1.40-2.30)	**2.19** (1.64-2.92)	**2.48** (1.82-3.38)	**2.77** (1.98-3.94)	**3.11** (2.10-4.54)	**3.60** (2.33-5.46)	**4.00** (2.53-6.20)
2-hr	**0.660** (0.519-0.822)	**0.788** (0.618-0.983)	**0.996** (0.780-1.25)	**1.17** (0.910-1.47)	**1.41** (1.06-1.86)	**1.59** (1.17-2.15)	**1.77** (1.27-2.50)	**1.99** (1.34-2.88)	**2.29** (1.49-3.45)	**2.54** (1.61-3.91)
3-hr	**0.511** (0.403-0.634)	**0.609** (0.480-0.757)	**0.770** (0.604-0.960)	**0.902** (0.705-1.13)	**1.09** (0.821-1.43)	**1.22** (0.905-1.65)	**1.37** (0.982-1.93)	**1.53** (1.04-2.21)	**1.77** (1.15-2.65)	**1.97** (1.25-3.01)
6-hr	**0.325** (0.259-0.401)	**0.389** (0.309-0.481)	**0.495** (0.391-0.613)	**0.582** (0.457-0.726)	**0.702** (0.534-0.921)	**0.792** (0.590-1.06)	**0.887** (0.641-1.24)	**0.997** (0.679-1.43)	**1.16** (0.758-1.73)	**1.29** (0.825-1.97)
12-hr	**0.200** (0.160-0.244)	**0.242** (0.193-0.296)	**0.311** (0.247-0.382)	**0.368** (0.291-0.456)	**0.447** (0.342-0.583)	**0.505** (0.379-0.677)	**0.568** (0.415-0.795)	**0.643** (0.439-0.917)	**0.756** (0.496-1.12)	**0.851** (0.545-1.29)
24-hr	**0.118** (0.095-0.143)	**0.145** (0.117-0.177)	**0.190** (0.152-0.232)	**0.226** (0.180-0.279)	**0.277** (0.214-0.361)	**0.315** (0.238-0.421)	**0.355** (0.262-0.498)	**0.406** (0.278-0.576)	**0.485** (0.319-0.714)	**0.553** (0.355-0.831)
2-day	**0.066** (0.054-0.080)	**0.083** (0.067-0.101)	**0.111** (0.089-0.134)	**0.133** (0.107-0.163)	**0.164** (0.128-0.213)	**0.187** (0.143-0.250)	**0.212** (0.158-0.298)	**0.245** (0.168-0.345)	**0.297** (0.196-0.435)	**0.343** (0.221-0.512)
3-day	**0.048** (0.039-0.058)	**0.060** (0.049-0.073)	**0.080** (0.065-0.097)	**0.097** (0.078-0.118)	**0.120** (0.094-0.155)	**0.137** (0.105-0.182)	**0.155** (0.116-0.218)	**0.180** (0.124-0.252)	**0.218** (0.144-0.319)	**0.253** (0.163-0.376)
4-day	**0.039** (0.032-0.046)	**0.049** (0.040-0.058)	**0.065** (0.052-0.078)	**0.078** (0.063-0.094)	**0.096** (0.075-0.124)	**0.109** (0.084-0.145)	**0.124** (0.093-0.174)	**0.144** (0.099-0.201)	**0.175** (0.116-0.254)	**0.202** (0.130-0.300)
7-day	**0.026** (0.022-0.031)	**0.033** (0.027-0.039)	**0.043** (0.035-0.051)	**0.051** (0.042-0.062)	**0.063** (0.049-0.080)	**0.071** (0.055-0.094)	**0.081** (0.061-0.112)	**0.093** (0.064-0.129)	**0.112** (0.074-0.162)	**0.128** (0.083-0.189)
10-day	**0.021** (0.018-0.025)	**0.026** (0.021-0.031)	**0.034** (0.028-0.040)	**0.040** (0.032-0.048)	**0.048** (0.038-0.061)	**0.055** (0.042-0.071)	**0.062** (0.046-0.084)	**0.070** (0.049-0.097)	**0.084** (0.056-0.120)	**0.095** (0.062-0.140)
20-day	**0.015** (0.013-0.018)	**0.018** (0.015-0.021)	**0.022** (0.018-0.026)	**0.025** (0.021-0.030)	**0.030** (0.024-0.037)	**0.033** (0.026-0.043)	**0.037** (0.027-0.049)	**0.041** (0.029-0.056)	**0.047** (0.031-0.067)	**0.052** (0.034-0.076)
30-day	**0.013** (0.011-0.015)	**0.014** (0.012-0.017)	**0.017** (0.014-0.020)	**0.020** (0.016-0.023)	**0.023** (0.018-0.028)	**0.025** (0.019-0.032)	**0.028** (0.020-0.036)	**0.030** (0.021-0.041)	**0.034** (0.023-0.048)	**0.037** (0.024-0.054)
45-day	**0.011** (0.009-0.013)	**0.012** (0.010-0.014)	**0.014** (0.011-0.016)	**0.015** (0.013-0.018)	**0.017** (0.014-0.022)	**0.019** (0.015-0.024)	**0.021** (0.015-0.027)	**0.022** (0.016-0.031)	**0.025** (0.017-0.035)	**0.026** (0.017-0.038)
60-day	**0.009** (0.008-0.011)	**0.010** (0.009-0.012)	**0.012** (0.010-0.014)	**0.013** (0.011-0.015)	**0.015** (0.012-0.018)	**0.016** (0.012-0.020)	**0.017** (0.013-0.022)	**0.018** (0.013-0.025)	**0.020** (0.013-0.028)	**0.021** (0.014-0.030)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

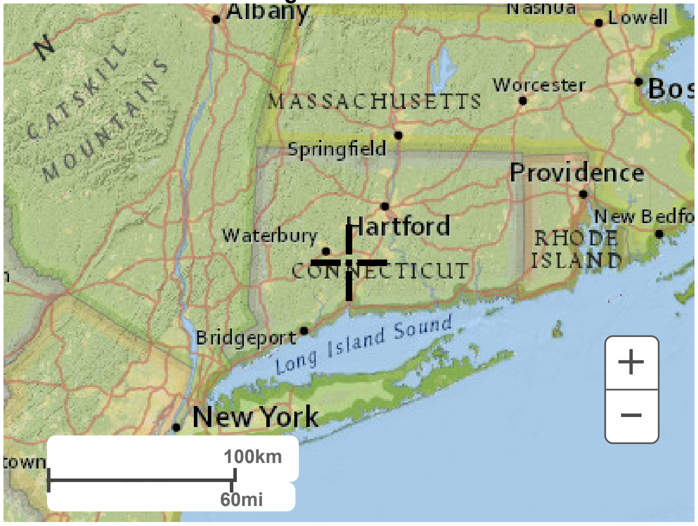
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

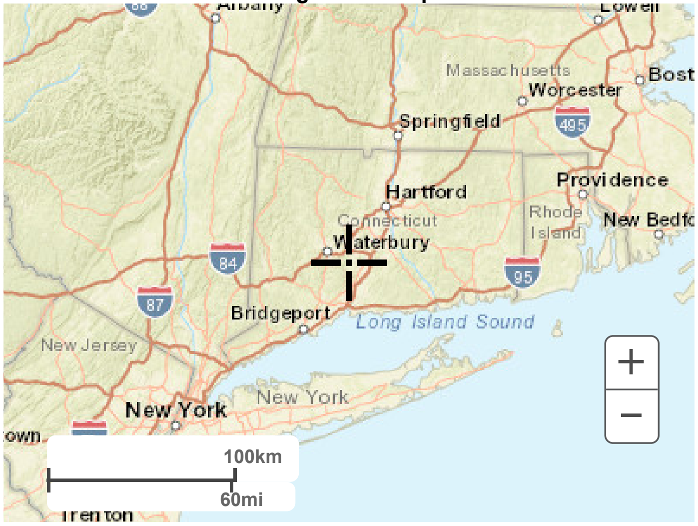
Back to Top

PF graphical

Large scale terrain



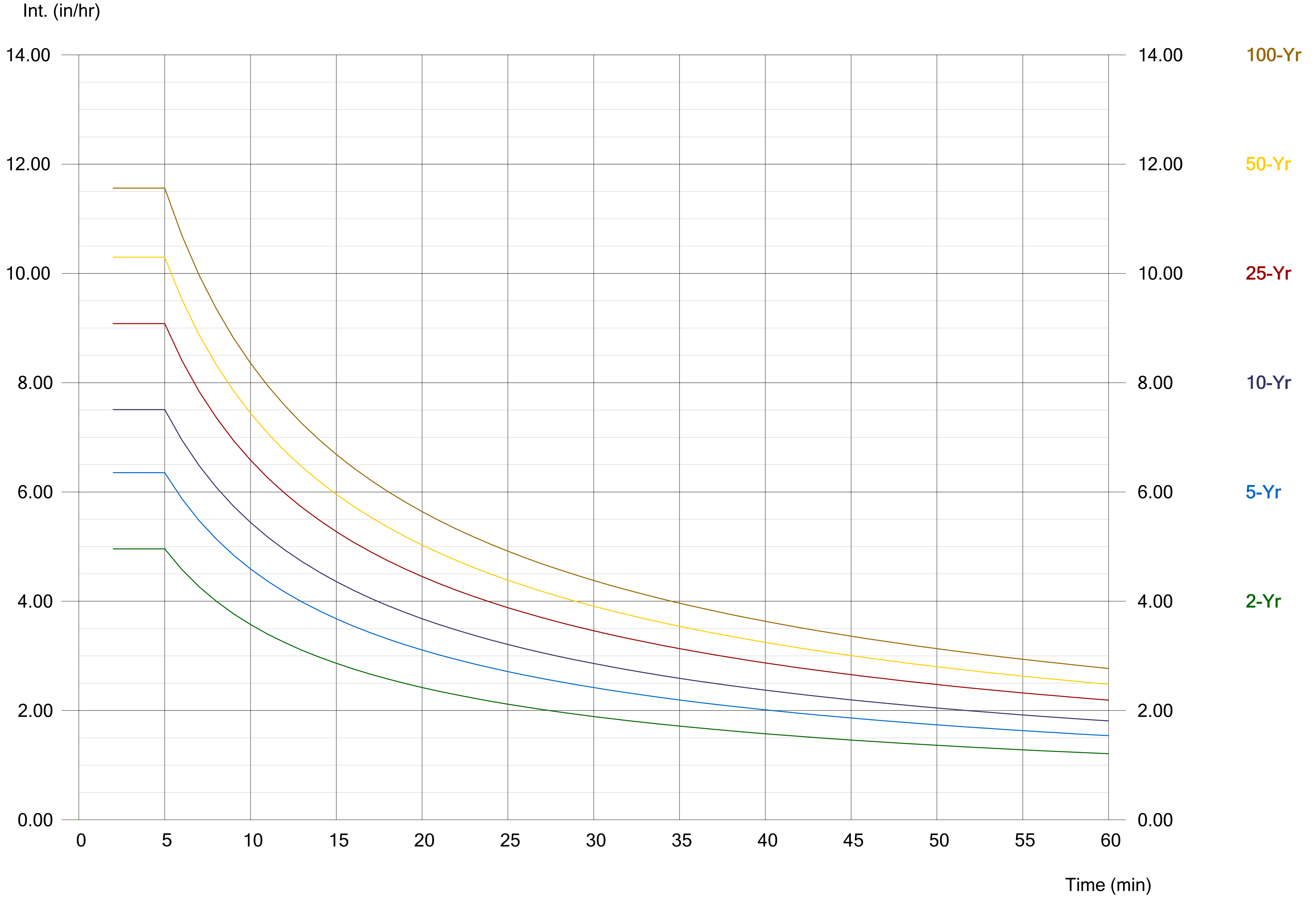
Large scale map



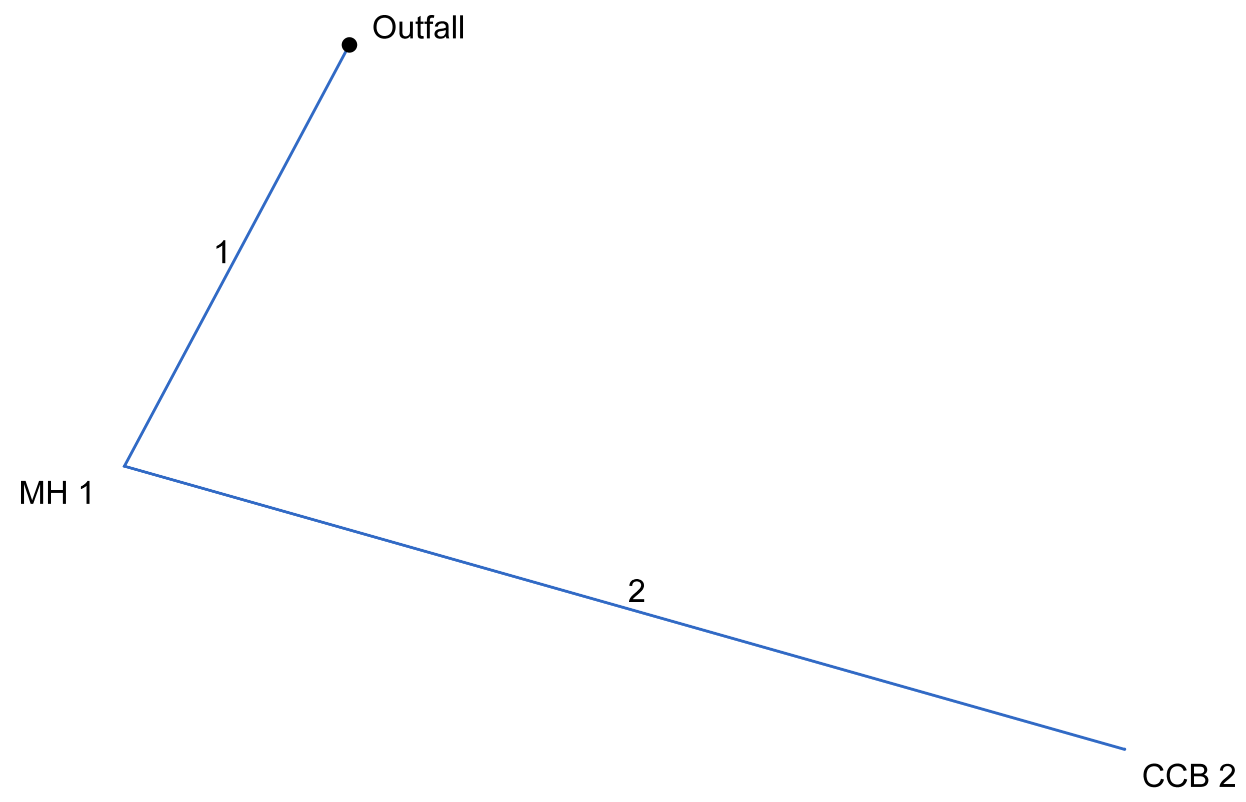
Large scale aerial

Storm Sewer IDF Curves

IDF file: Cheshire.IDF



Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: System 100.stm	Number of lines: 2	Date: 7/22/2021

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	6.000	117.967	MH	0.00	0.00	0.00	0.0	84.30	1.67	84.40	18	Cir	0.012	1.00	88.40	OUTLET - MH 1
2	1	13.000	-102.066	Comb	0.47	0.15	0.82	5.0	84.40	0.77	84.50	12	Cir	0.012	1.00	87.60	MH 1 - CCB 2

Project File: System 100.stm	Number of lines: 2	Date: 7/22/2021

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	6.000	0.00	0.15	0.00	0.00	0.12	0.0	5.1	7.4	1.38	14.69	0.79	18	1.67	84.30	84.40	85.80	85.80	85.80	88.40	OUTLET - MH 1
2	1	13.000	0.15	0.15	0.82	0.12	0.12	5.0	5.0	7.5	1.39	3.38	1.77	12	0.77	84.40	84.50	85.81	85.83	88.40	87.60	MH 1 - CCB 2

Project File: System 100.stm

Number of lines: 2

Run Date: 7/22/2021

NOTES:Intensity = 36.37 / (Inlet time + 3.90) ^ 0.72; Return period =Yrs. 10 ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
1	18	1.38	84.30	85.80	1.50	1.77	0.78	0.01	85.81	0.015	6.000	84.40	85.80	1.40	1.72	0.81	0.01	85.81	0.013	0.014	0.001	1.00	0.01
2	12	1.39	84.40	85.81	1.00	0.79	1.77	0.05	85.86	0.131	13.000	84.50	85.83	1.00	0.79	1.77	0.05	85.88	0.130	0.130	0.017	1.00	0.05

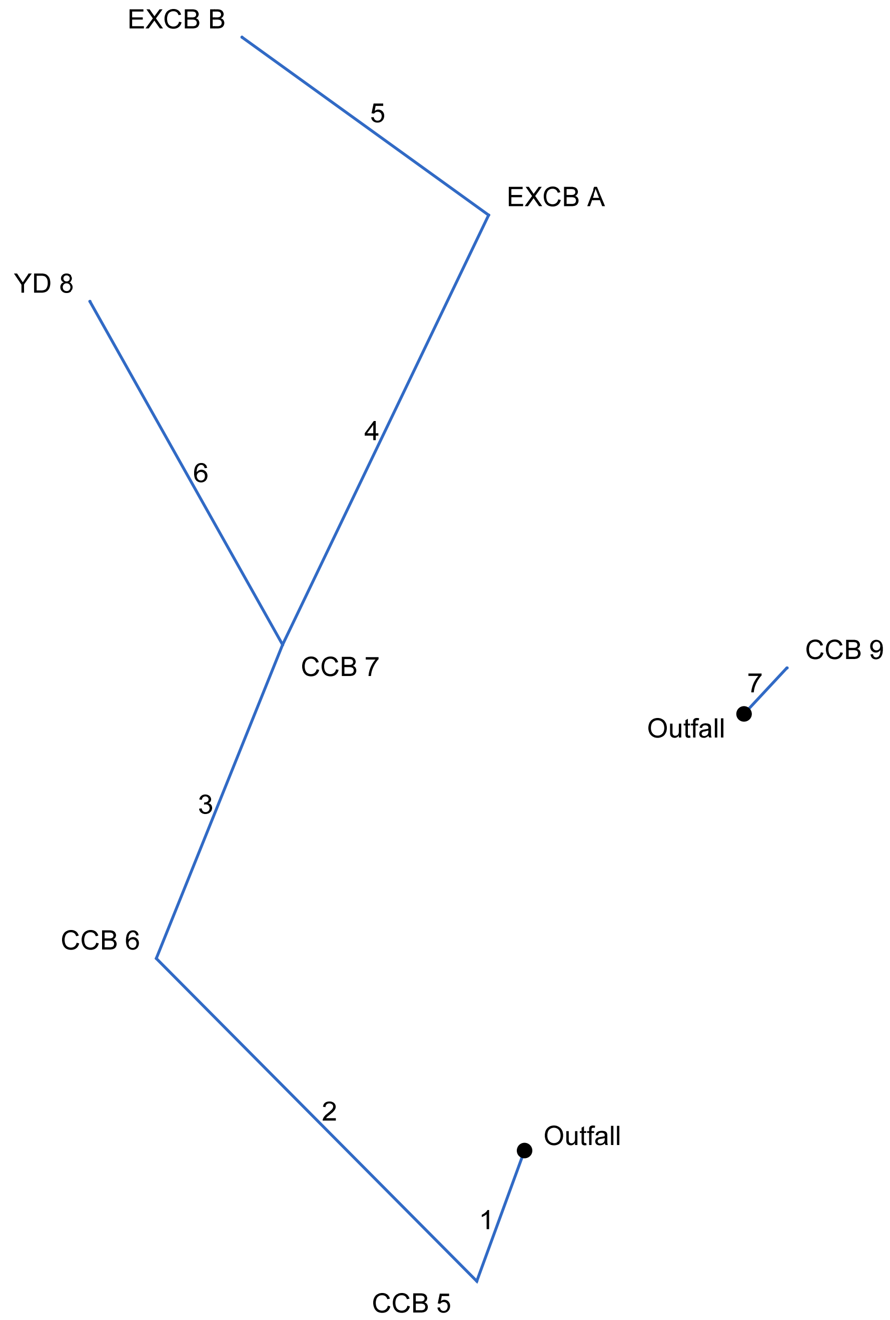
Project File: System 100.stm

Number of lines: 2

Run Date: 7/22/2021

; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: System 110.stm	Number of lines: 7	Date: 8/19/2021

Storm Sewers v12.00

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	26.000	106.474	Comb	0.20	0.15	0.77	5.0	92.00	1.92	92.50	15	Cir	0.012	1.50	96.00	UG 110 - CCB 5
2	1	79.000	124.799	Comb	0.00	0.13	0.72	5.0	92.50	2.78	94.70	15	Cir	0.012	1.30	98.70	CCB 5 - CCB 6
3	2	63.000	56.753	Comb	0.00	0.32	0.78	5.0	94.70	0.79	95.20	15	Cir	0.012	1.08	98.70	CCB 6 - CCB 7
4	3	88.000	3.131	Comb	0.20	0.21	0.72	5.0	95.20	0.68	95.80	15	Cir	0.012	1.42	99.43	CCB 7 - EXCB A
5	4	51.000	-69.388	Comb	0.00	0.25	0.71	5.0	95.90	1.76	96.80	15	Cir	0.012	1.00	100.25	EXCB A - EXCB B
6	3	72.000	-42.402	DrGrt	0.00	0.31	0.78	5.0	95.20	4.86	98.70	12	Cir	0.012	1.00	102.20	CCB 7 - YD 8
7	End	11.000	-52.999	Comb	0.27	0.16	0.82	5.0	93.00	4.55	93.50	12	Cir	0.012	1.00	97.00	UG 110 - CCB 9

Project File: System 110.stm

Number of lines: 7

Date: 8/19/2021

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	26.000	0.15	1.37	0.77	0.12	1.03	5.0	6.1	6.9	7.48	9.70	7.66	15	1.92	92.00	92.50	92.82	93.59	97.30	96.00	UG 110 - CCB 5
2	1	79.000	0.13	1.22	0.72	0.09	0.91	5.0	5.9	7.0	6.59	11.67	5.95	15	2.78	92.50	94.70	93.59	95.73	96.00	98.70	CCB 5 - CCB 6
3	2	63.000	0.32	1.09	0.78	0.25	0.82	5.0	5.7	7.1	6.01	6.23	5.66	15	0.79	94.70	95.20	95.73	96.19	98.70	98.70	CCB 6 - CCB 7
4	3	88.000	0.21	0.46	0.72	0.15	0.33	5.0	5.3	7.3	2.61	5.78	3.29	15	0.68	95.20	95.80	96.19	96.45	98.70	99.43	CCB 7 - EXCB A
5	4	51.000	0.25	0.25	0.71	0.18	0.18	5.0	5.0	7.5	1.33	9.29	2.94	15	1.76	95.90	96.80	96.45	97.26	99.43	100.25	EXCB A - EXCB B
6	3	72.000	0.31	0.31	0.78	0.24	0.24	5.0	5.0	7.5	1.82	8.51	3.11	12	4.86	95.20	98.70	96.19	99.27	98.70	102.20	CCB 7 - YD 8
7	End	11.000	0.16	0.16	0.82	0.13	0.13	5.0	5.0	7.5	1.26	8.23	5.50	12	4.55	93.00	93.50	93.26	93.97	97.70	97.00	UG 110 - CCB 9

Project File: System 110.stm

Number of lines: 7

Run Date: 8/19/2021

NOTES:Intensity = 36.37 / (Inlet time + 3.90) ^ 0.72; Return period =Yrs. 10 ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
1	15	7.48	92.00	92.82	0.82	0.86	8.72	0.68	93.50	0.000	26.000	92.50	93.59	1.09**	1.13	6.60	0.68	94.27	0.000	0.000	n/a	1.50	n/a
2	15	6.59	92.50	93.59	1.09	1.08	5.81	0.57	94.16	0.000	79.000	94.70	95.73 j	1.03**	1.08	6.08	0.57	96.31	0.000	0.000	n/a	1.30	n/a
3	15	6.01	94.70	95.73	1.03	1.04	5.55	0.52	96.25	0.000	63.000	95.20	96.19 j	0.99**	1.04	5.77	0.52	96.71	0.000	0.000	n/a	1.08	n/a
4	15	2.61	95.20	96.19	0.99	0.64	2.50	0.26	96.45	0.000	88.000	95.80	96.45 j	0.65**	0.64	4.07	0.26	96.71	0.000	0.000	n/a	1.42	n/a
5	15	1.33	95.90	96.45	0.55	0.40	2.58	0.17	96.62	0.000	51.000	96.80	97.26 j	0.46**	0.40	3.29	0.17	97.42	0.000	0.000	n/a	1.00	n/a
6	12	1.82	95.20	96.19	0.99	0.47	2.32	0.24	96.43	0.000	72.000	98.70	99.27 j	0.57**	0.47	3.90	0.24	99.51	0.000	0.000	n/a	1.00	n/a
7	12	1.26	93.00	93.26	0.26*	0.17	7.57	0.18	93.45	0.000	11.000	93.50	93.97	0.47**	0.37	3.44	0.18	94.16	0.000	0.000	n/a	1.00	n/a

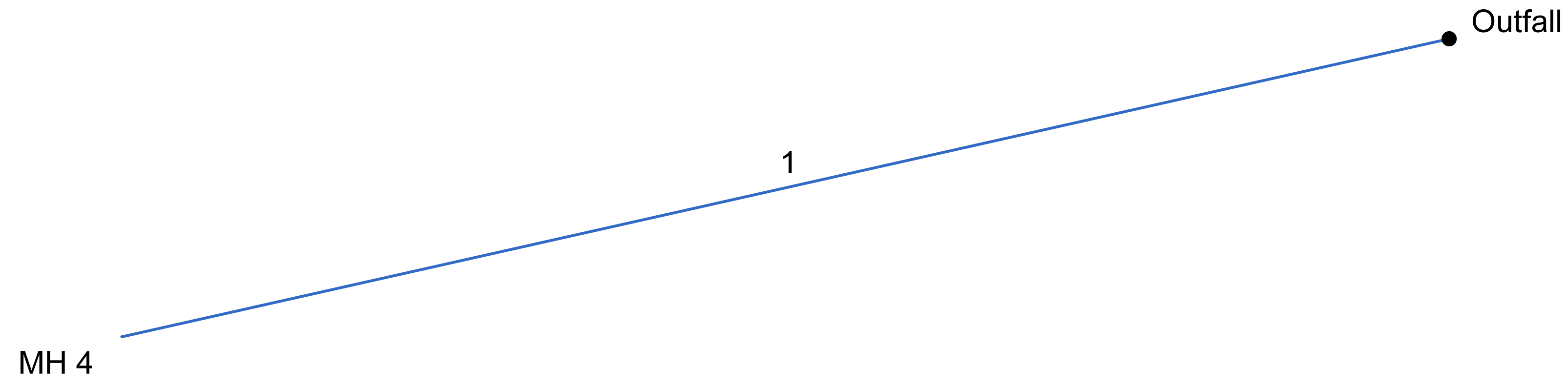
Project File: System 110.stm

Number of lines: 7

Run Date: 8/19/2021

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: Outlet 110.stm	Number of lines: 1	Date: 7/22/2021

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	51.000	167.204	MH	9.02	0.00	0.00	0.0	89.00	0.98	89.50	24	Cir	0.012	1.00	97.90	FES 3 - MH 4

Project File: Outlet 110.stm

Number of lines: 1

Date: 7/22/2021

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	51.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	9.02	24.26	3.21	24	0.98	89.00	89.50	91.00	91.01	91.00	97.90	FES 3 - MH 4

Project File: Outlet 110.stm	Number of lines: 1	Run Date: 7/22/2021

NOTES:Intensity = 55.49 / (Inlet time + 3.80) ^ 0.72; Return period =Yrs. 100 ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
1	24	9.02	89.00	91.00	2.00	3.14	2.87	0.13	91.13	0.136	51.000	89.50	91.01	1.51	2.54	3.55	0.20	91.20	0.161	0.148	0.076	1.00	0.20

Project File: Outlet 110.stm

Number of lines: 1

Run Date: 7/22/2021

; c = cir e = ellip b = box

Channel Report

6-IN HDPE 0.5%

Circular

Diameter (ft) = 0.50

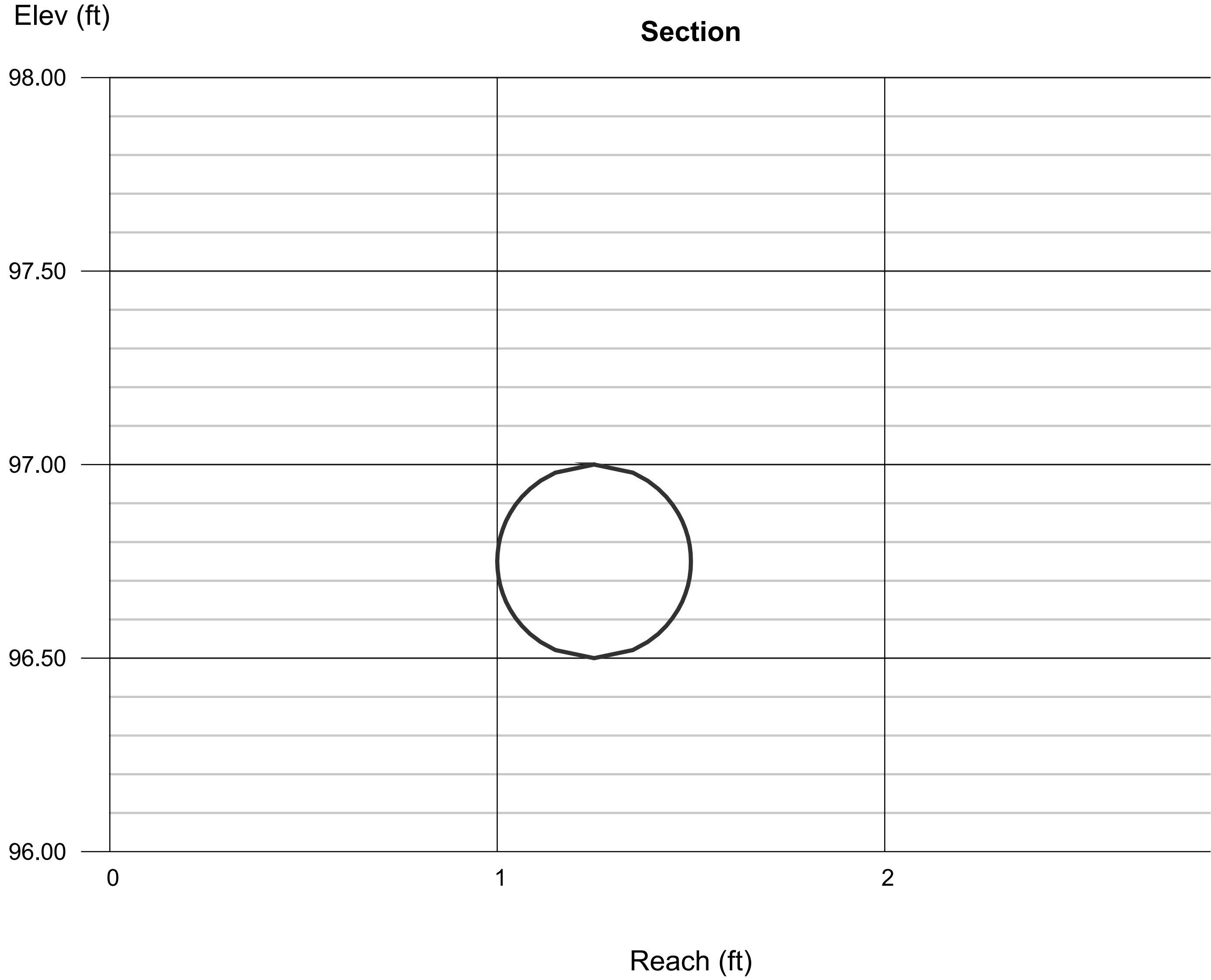
Invert Elev (ft) = 96.50
Slope (%) = 0.50
N-Value = 0.012

Calculations

Compute by: Q vs Depth
No. Increments = 10

Highlighted

Depth (ft) = 0.50
Q (cfs) = 0.430
Area (sqft) = 0.20
Velocity (ft/s) = 2.19
Wetted Perim (ft) = 1.57
Crit Depth, Yc (ft) = 0.34
Top Width (ft) = 0.00
EGL (ft) = 0.57



Channel Report

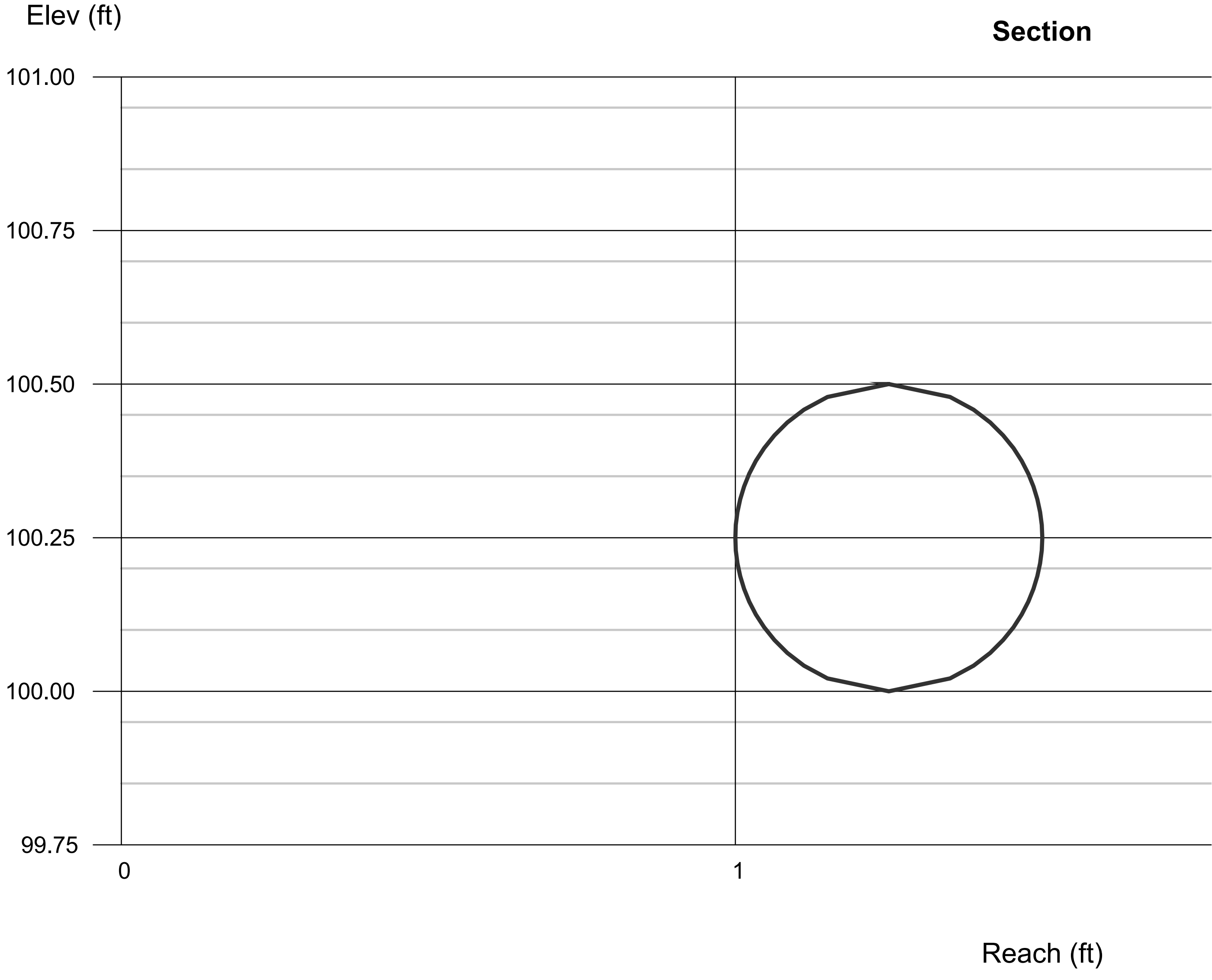
6-IN HDPE 0.75%

Circular
Diameter (ft) = 0.50

Invert Elev (ft) = 100.00
Slope (%) = 0.75
N-Value = 0.012

Calculations
Compute by: Q vs Depth
No. Increments = 10

Highlighted
Depth (ft) = 0.50
Q (cfs) = 0.526
Area (sqft) = 0.20
Velocity (ft/s) = 2.68
Wetted Perim (ft) = 1.57
Crit Depth, Yc (ft) = 0.37
Top Width (ft) = 0.00
EGL (ft) = 0.61



Outlet Protection Calculations

Project:	Old Towne Commons	By:	MCB	Date:	07/22/21
Location:	Cheshire, CT	Checked:		Date:	
Outlet I.D.	**ROOF SPLASH PAD**				

*Based on Connecticut DOT Drainage Manual, Section 11.13

Description:

ROOF SPLASH PAD

Design Criteria (10-yr Storm Event):

Q (cfs) =	0.41	R_p (ft)=	0.50
D (in) =	6	S_p (ft) =	0.50
V (fps) =	2.19	Tw (ft)=	0.5

Q= Flow rate at discharge point in cubic feet per second (cfs)

D= Outlet pipe diameter (in)

V= Flow velocity at discharge point (ft/s)

R_p= Maximum inside pipe rise (ft)

S_p= inside diametere for circular sections of maximum inside pipe span for non-circular sections (ft)

T_w= Tailwater depth (ft)

Based on **Table 11-13.1** use Type 'B' ---> TW≥ 0.5 Rp

Rip Rap Stone Size:

Velocity	Rip Rap Specification	D_{50} Stone Size
0-8 fps	Modified	5 inches

Preformed Scour Hole Dimensions:

$F(ft)=0.5(R_p)$ = n/a

$C(ft)=3.0(S_p)+6.0(F)$ = n/a

$B(ft)=2.0(S_p)+6.0(F)$ = n/a

Rip Rap Splash Pad Dimensions:

L_a	=	10	ft
W1 = 3.0(S_p) min.	=	2	ft
W2 = 3.0(Sp)+0.4(La) min.	=	6	ft
d (Depth of Stone)	=	12	inches

Level Spreader Design

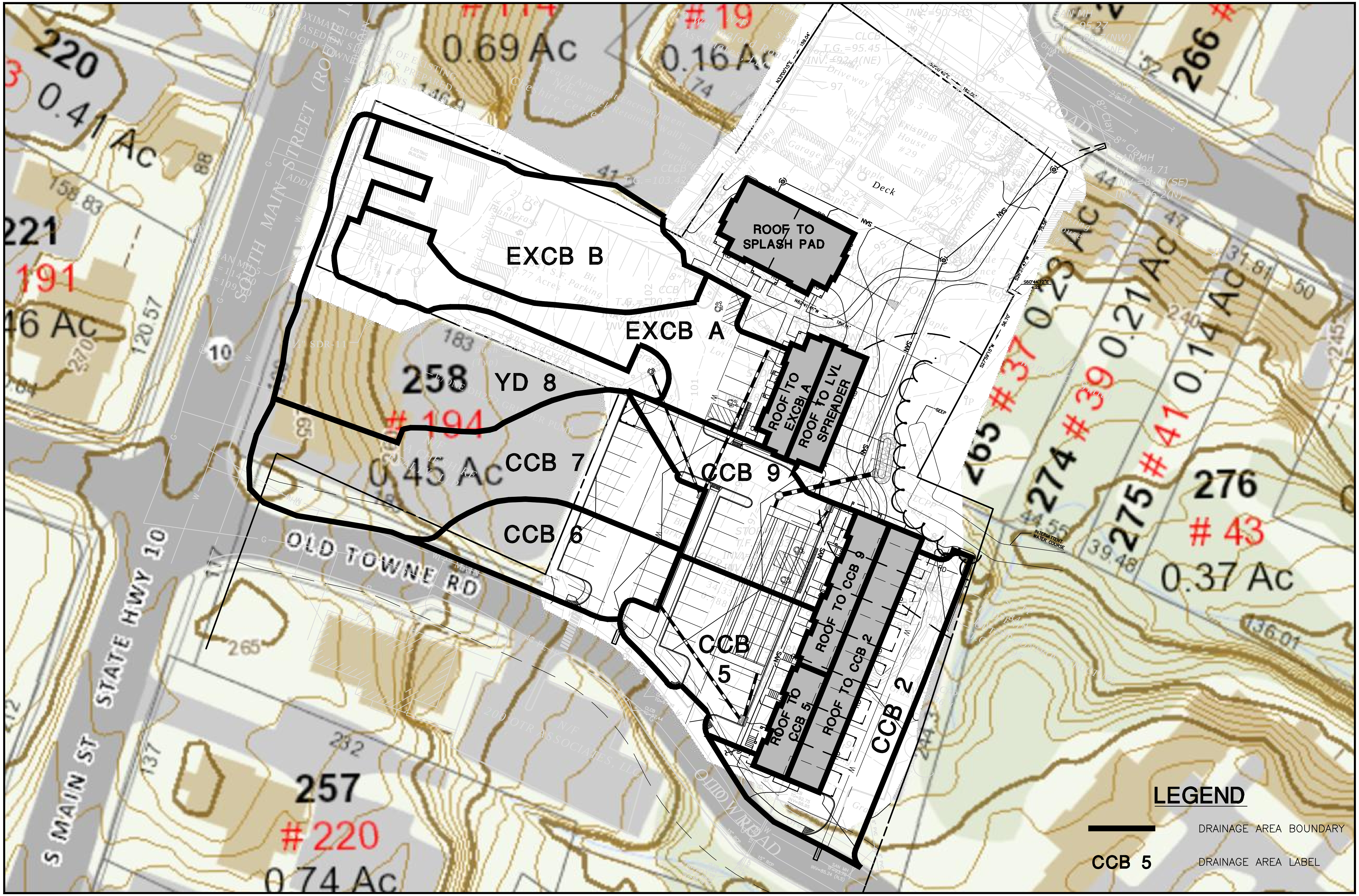
Level Spreader 110

Broad Crest Elevation (ft)	89.00
Length (ft)	**30**
Discharge Coefficient	3.2
Elevation Increment	0.05
Q-100 year (cfs)	9.65 (DET 110 Discharge+Roof Discharge)

Elevation (Feet)	Weir Discharge (cfs)	Area (sf)	Velocity (fps)
89.00	0.00	0.00	0.00
89.05	1.07	1.50	0.72
89.10	3.04	3.00	1.01
89.15	5.58	4.50	1.24
89.20	8.59	6.00	1.43
89.22	9.65	6.49	1.49
89.25	12.00	7.50	1.60
89.30	15.77	9.00	1.75
89.35	19.88	10.50	1.89
89.40	24.29	12.00	2.02
89.45	28.98	13.50	2.15
89.50	33.94	15.00	2.26

Drawing: W:\CADDESIGN\3868-09-DE\CAD\CURRENT\OTC-CBAREAS06.DWG Layout Tab:CB

Plotted by: MBERARDI On this date: Tue, 2021 July 27 – 11:10am



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REVISIONS

DRAINAGE AREA MAP - STORM DRAINAGE SYSTEM

OLD TOWNE COMMONS

166-168 & 200 SOUTH MAIN STREET
CHESHIRE, CONNECTICUT

DESIGNED	DRAWN	CHECKED
MCB	MCB	FAB

SCALE 1"=50'

DATE JULY 28, 2021

PROJECT NO. 3868-09

SHEET NO. CB

ATTACHMENT E

WATER QUALITY COMPUTATIONS

Drainage Report

Old Towne Commons

166-168 and 200 South Main Street

Cheshire, Connecticut

July 28, 2021

	SLR Consulting	Project	**3868-09**
	COMPUTATION SHEET - WATER QUALITY FLOW (WQF)	Made By:	MCB
Subject:	**Old Towne Commons**	Date:	7/16/2021
		Chkd by:	
		Date:	

CDS Unit - CCB 5

Contributing Basins			Imperv. Area (acres)	Total Area (acres)
Total			1.10	1.47

Table 4.1: WQV = (P)(R_v)(A)/12 = 0.089 acre-feet

Where:

I = % of Impervious Cover = 75%

R_v = volumetric runoff coeff. 0.05 + 0.009(I) = 0.723

P = design precipitation (1.0" for water quality storm) = 1 inch

A = site area (acres) = 1.47 acres = 0.0023 miles^2

Q = runoff depth (in watershed inches) = [WQV(acrefeet)]*[12(inches/foot)]/drainage area (acres)

Q = 0.723

CN = 1000 / [10+ 5P + 10Q -10(Q^2 + 1.25QP)$^{0.5}$] = 97

Where:

Q = runoff depth (in watershed inches)

t_c = 0.1 hours

Type III Rainfall Distribution:

From Table 4-1, Ia = 0.062 Ia/P = 0.062

(TR-55)

From Exhibit 4-III, q_u = 700 csm/in.

(TR-55)

WQF = (qu)(A)(Q) = 1.16 cfs **Cascade CS-4 Flow = 2.0 cfs -> OK**

CCB 5

2. Compute the time of concentration (t_c) based on the methods described in Chapter 3 of TR-55. A minimum value of 0.167 hours (10 minutes) should be used. For sheet flow, the flow path should not be longer than 300 feet.

3. Using the computed CN, t_c, and drainage area (A) in acres, compute the peak discharge for the water quality storm (i.e., the water quality flow [WQF]), based on the procedures described in Chapter 4 of TR-55.

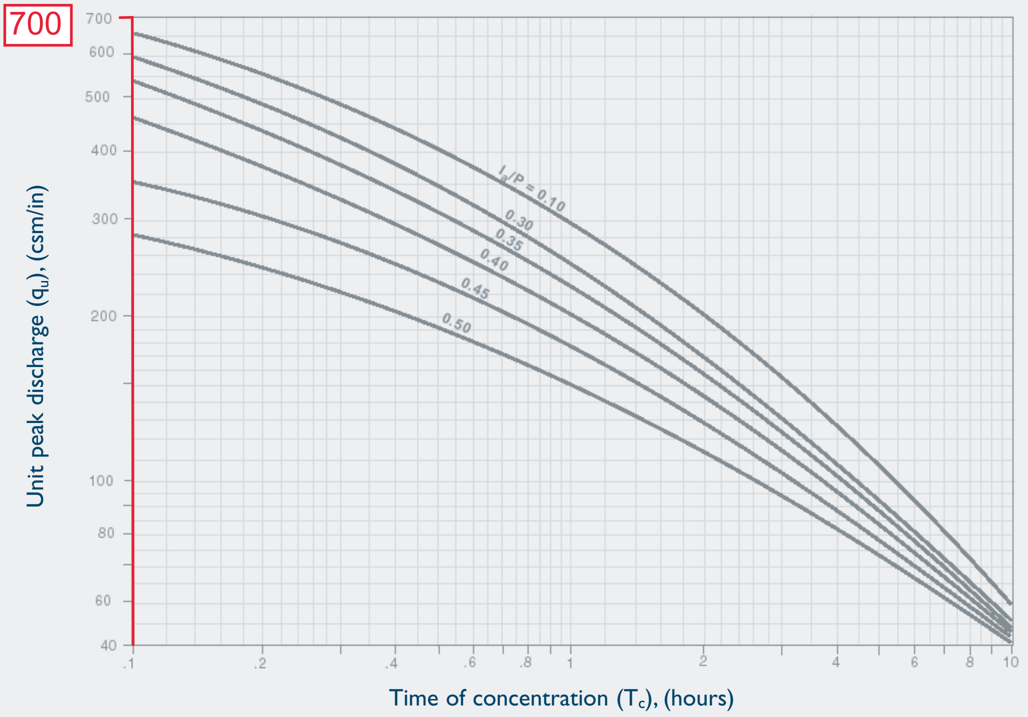
   - *Read initial abstraction (I_a) from Table 4-1 in Chapter 4 of TR-55 (reproduced below); compute I_a/P*

Table 4-1 I_a values for runoff curve numbers

Curve number	I_a (in)	Curve number	I_a (in)	Curve number	I_a (in)	Curve number	I_a (in)
40	3.000	55	1.636	70	0.857	85	0.353
41	2.878	56	1.571	71	0.817	86	0.326
42	2.762	57	1.509	72	0.778	87	0.299
43	2.651	58	1.448	73	0.740	88	0.273
44	2.545	59	1.390	74	0.703	89	0.247
45	2.444	60	1.333	75	0.667	90	0.222
46	2.348	61	1.279	76	0.632	91	0.198
47	2.255	62	1.226	77	0.597	92	0.174
48	2.167	63	1.175	78	0.564	93	0.151
49	2.082	64	1.125	79	0.532	94	0.128
50	2.000	65	1.077	80	0.500	95	0.105
51	1.922	66	1.030	81	0.469	96	0.083
52	1.846	67	0.985	82	0.439	97	0.062
53	1.774	68	0.941	83	0.410	98	0.041
54	1.704	69	0.899	84	0.381		

   - *Read the unit peak discharge (q_u) from Exhibit 4-III in Chapter 4 of TR-55 (reproduced below) for appropriate t_c*

Exhibit 4-III Unit peak discharge (q_u) for NRCS (SCS) type III rainfall distribution



Product Flow Rates

CASCADE

Model	Treatment Rate (cfs)	Sediment Capacity[1] (CF)
CS-4	2.00	19
CS-5	3.50	29
CS-6	5.60	42
CS-8	12.00	75
CS-10	18.00	118

CDS

Model	Treatment Rate[2] (cfs)	Sediment Capacity[1] (CF)
1515-3	1.00	14
2015-4	1.40	25
2015-5	1.40	39
2015-6	1.40	57
2020-5	2.20	39
2020-6	2.20	57
2025-5	3.20	39
2025-6	3.20	57
3020-6	3.90	57
3025-6	5.00	57
3030-6	5.70	57
3035-6	6.50	57
4030-8	7.50	151
4040-8	9.50	151

VORTECHS

Model	Treatment Rate (cfs)	Sediment Capacity[3] (CF)
1000	1.60	16
2000	2.80	32
3000	4.50	49
4000	6.00	65
5000	8.50	86
7000	11.00	108
9000	14.00	130
11000	17.5	151
16000	25	192

STORMCEPTOR STC

Model	Treatment Rate (cfs)	Sediment Capacity[1] (CF)
STC 450i	0.40	46
STC 900	0.89	89
STC 2400	1.58	205
STC 4800	2.47	543
STC 7200	3.56	839
STC 11000	4.94	1086
STC 16000	7.12	1677

1 *Additional sediment storage capacity available – Check with your local representative for information.*

2 *Treatment Capacity is based on laboratory testing using OK-110 (average D50 particle size of approximately 100 microns) and a 2400 micron screen.*

3 *Maintenance recommended when sediment depth has accumulated to within 12-18 inches of the dry weather water surface elevation.*

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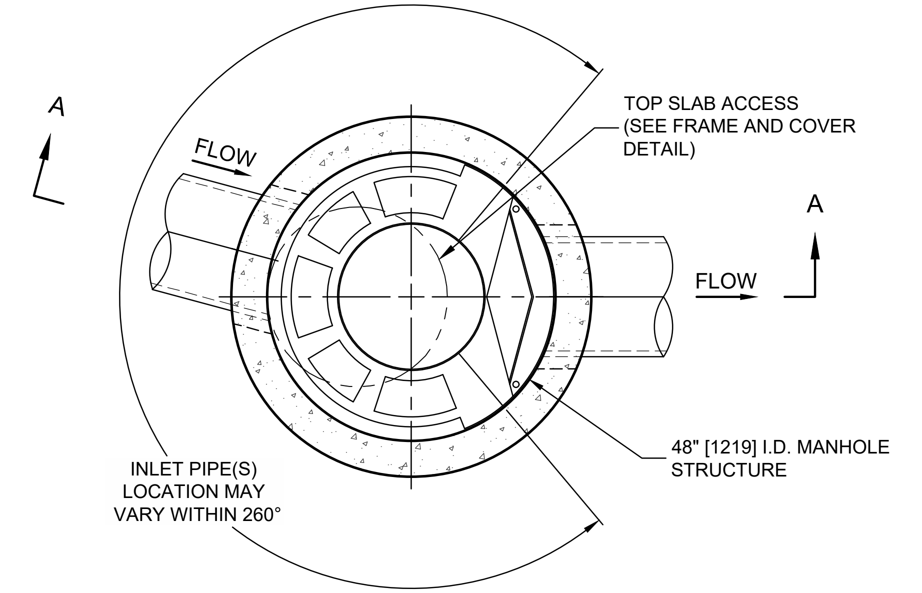
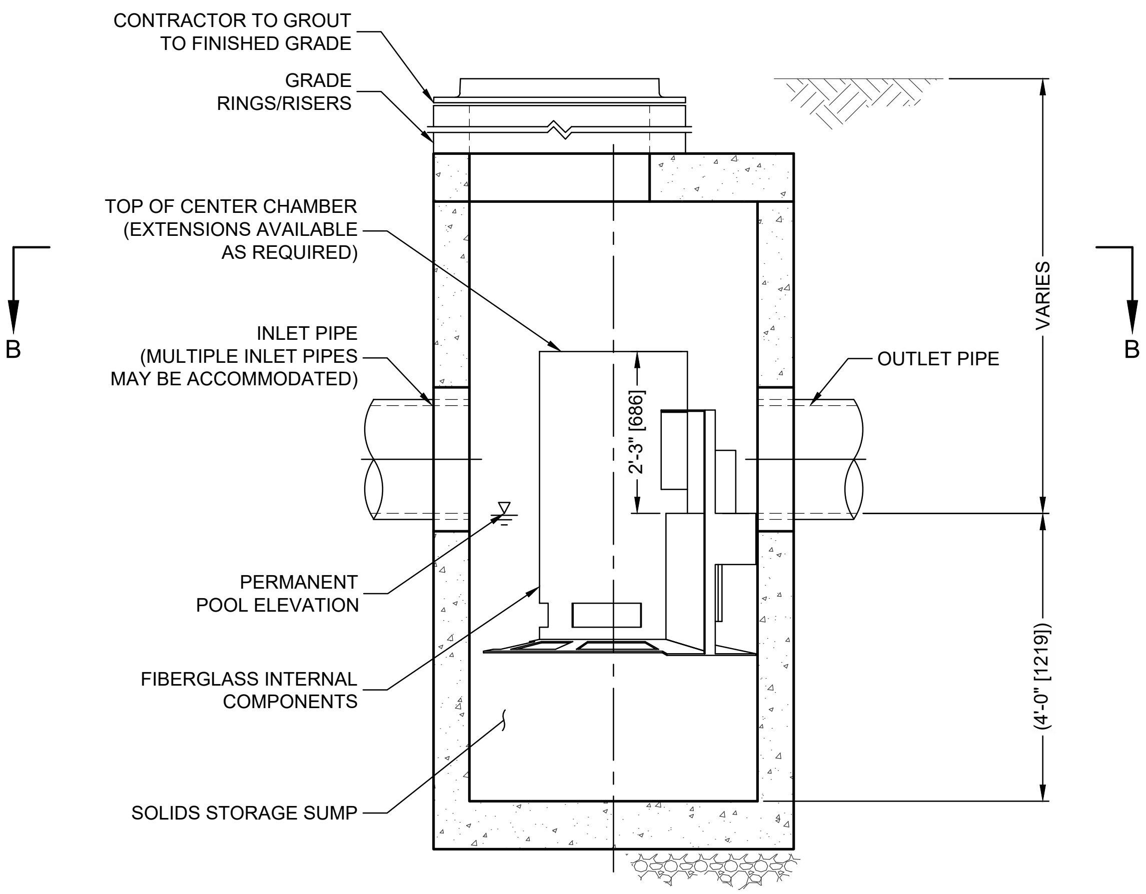
Revision 10/19



PLAN VIEW B-B
NOT TO SCALE



ELEVATION A-A
NOT TO SCALE

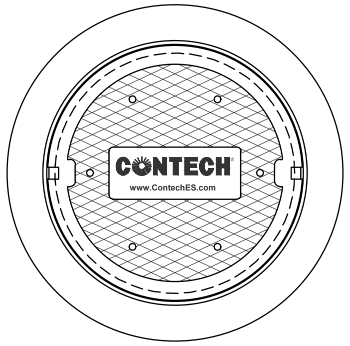
CASCADE
separator™

I:\COMMON\CAD\TREATMENT\21 CASCADE\40 STANDARD DRAWINGS\DWG\CS-4-DTL.DWG 1/22/2019 9:34 AM

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-4 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (cfs [L/s])			
PEAK FLOW RATE (cfs [L/s])			
RETURN PERIOD OF PEAK FLOW (yrs)			
RIM ELEVATION			
PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			

NOTES / SPECIAL REQUIREMENTS:

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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CS-4
CASCADE SEPARATOR
STANDARD DETAIL

Cascade Separator™ Inspection and Maintenance Guide

CASCADE
separator™

Maintenance

The Cascade Separator™ system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

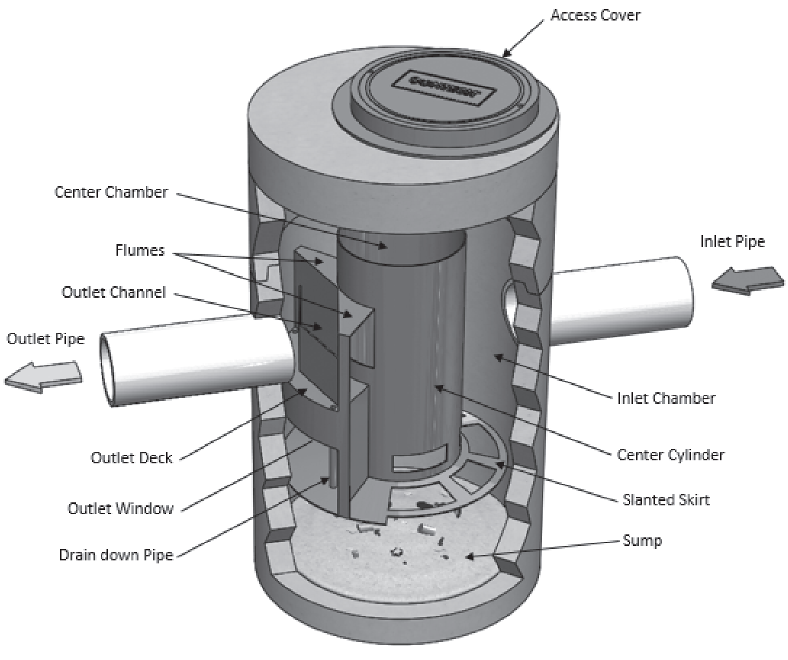
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator™ Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y³	m³
CS-4	4	1.2	1.5	0.5	0.7	0.5
CS-5	5	1.3	1.5	0.5	1.1	0.8
CS-6	6	1.8	1.5	0.5	1.6	1.2
CS-8	8	2.4	1.5	0.5	2.8	2.1
CS-10	10	3.0	1.5	0.5	4.4	3.3
CS-12	12	3.6	1.5	0.5	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.

A Cascade Separator unit can be easily cleaned in less than 30 minutes.

A vacuum truck excavates pollutants from the systems.

Cascade Separator™ Inspection & Maintenance Log

Cascade Model:

Location:

Date	Depth Below Invert to Top of Sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

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ATTACHMENT F

HYDROLOGIC ANALYSIS – INPUT COMPUTATIONS

Drainage Report

Old Towne Commons

166-168 and 200 South Main Street

Cheshire, Connecticut

July 28, 2021

Worksheet 2: Runoff curve number and runoff

Project: Old Towne Commons By: MCB Date: 07/16/21
Location: Cheshire, Connecticut Checked: Date:
Circle one: [✓ Present] Developed Watershed: WS 10 - Existing Conditions

1.) Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Value [1.]			Area	Product of CN x Area
		Table 2-2	Figure 2-3	Figure 2-4	[✓ Acres] Sq. Ft. %	
B Soil	Woods - Good Condition	55			0.01	0.67
B Soil	Open Space - Good Condition	61			0.22	13.25
B Soil	Gravel	85			0.01	0.46
C Soil	Woods - Good Condition	70			0.15	10.82
C Soil	Open Space - Good Condition	74			0.46	33.93
N/A	Building	98			0.03	3.32
N/A	Paved/Impervious	98			0.13	12.33
				Totals =	1.01	74.78

(0.00157 sq mi)

[1.] Use only one CN value source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = $\frac{74.78}{1.01}$ Use CN = $\boxed{74}$

Worksheet 2: Runoff curve number and runoff

Project: Old Towne Commons By: MCB Date: 07/16/21
Location: Cheshire, Connecticut Checked: Date:
Circle one: [✓ ***Present***] Developed Watershed: WS 11 - Existing Conditions

1.) Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	**Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)**	**CN Value [1]**			**Area** [✓ **Acres**] Sq. Ft. %	**Product of CN x Area**
		Table 2-2	**Figure 2-3**	**Figure 2-4**		
B Soil	Open Space - Good Condition	61			0.28	16.79
B Soil	Gravel	85			0.002	0.13
C Soil	Open Space - Good Condition	74			0.10	7.33
D Soil	Open Space - Good Condition	80			0.14	11.46
N/A	Building	98			0.19	18.35
N/A	Paved/Impervious	98			0.88	85.79
				Totals =	1.58	139.85

(0.00247 sq mi)

[1] Use only one CN value source per line.

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{139.85}{1.58}$$

Use CN = **88**

Worksheet 2: Runoff curve number and runoff

Project: Old Towne Commons
By: MCB
Date: 07/16/21
Location: Cheshire, Connecticut
Checked:
Date:
Circle one: Present [✓ Developed]
Watershed: WS 10 - Proposed Conditions

1.) Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Value [1]			Area [✓ Acres] Sq. Ft. %	Product of CN x Area
		Table 2-2	Figure 2-3	Figure 2-4		
B Soil	Woods - Good Condition	55			0.003	0.15
B Soil	Open Space - Good Condition	61			0.13	7.72
B Soil	Gravel	85			0.01	0.46
C Soil	Woods - Good Condition	70			0.06	4.38
C Soil	Open Space - Good Condition	74			0.41	30.02
N/A	Building	98			0.20	19.59
N/A	Paved/Impervious	98			0.11	11.09
				Totals =	0.92	73.41

(0.00143 sq mi)

[1] Use only one CN value source per line.

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{73.41}{0.92} \quad \text{Use CN} = \boxed{80}$$

SLR

Worksheet 2: Runoff curve number and runoff

Project: Old Towne Commons
By: MCB
Date: 07/16/21
Location: Cheshire, Connecticut
Checked:
Date:
Circle one: Present [✓ ***Developed***]
Watershed: WS 11 - Proposed Conditions

1.) Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Value [1]			Area	Product of CN x Area
		Table 2-2	Figure 2-3	Figure 2-4	[✓ Acres] Sq. Ft. %	
B Soil	Open Space - Good Condition	61			0.22	13.71
C Soil	Open Space - Good Condition	74			0.02	1.72
D Soil	Open Space - Good Condition	80			0.14	11.46
N/A	Building	98			0.29	28.01
N/A	Paved/Impervious	98			0.99	97.05
				Totals =	1.67	151.95
					(0.00261	sq mi)

[1] Use only one CN value source per line.

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{151.95}{1.67} \qquad \text{Use CN} = \boxed{91}$$

SLR

Time of Concentration (T_c) or Travel Time (T_t) Worksheet

Project: Old Towne Commons
By: MCB
Date: 07/16/21
Location: Cheshire, CT
Checked:
Date:
Circle one: [✓ Present] Developed
Watershed: WS - 10 Existing Conditions
Circle one: [✓ T_c] T_t
Subwatershed:

Sheet flow (applicable to T_c only)

Segment ID		**A-B**		
1. Surface description (Table 3-1)		GRASS		
2. Manning's roughness coeff. for sheet flow, n (Table 3-1)		0.240		
3. Flow Length, L (< 300ft)	ft.	100.0		
4. Two-year 24-hr rainfall, P_2	in.	3.48		
5. Land slope, s	ft./ft.	0.035		
6. $T_t = \dfrac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,(s^{0.4})}$	hr.	0.182	=	0.182

Shallow concentrated flow (assume hyd. radius = depth of flow)

Segment ID		**B-C**		**C-D**						
7. Surface description		GRASS		WOODS						
8. Manning's roughness coeff., n		0.080		0.100						
9. Paved or unpaved		UNPVD		UNPVD						
10. Depth of flow, d (default values: d=.4 unpaved, d=.2 paved)	ft.	0.40		0.40						
11. Flow Length, L	ft.	93.0		22.0						
12. Watercourse slope, s	ft./ft.	0.081		0.045						
13. Average velocity, $V = \dfrac{1.49}{n}(d^{2/3})(s^{1/2})$	fps.	2.88		1.72						
14. $T_t = \dfrac{L}{3600 * V}$	hr.	0.009	+	0.004	+		+		=	0.013

Channel flow

Segment ID										
15. Channel Bottom width, b	ft.									
16. Horizontal side slope component, z (z horiz:1 vert)	ft.									
17. Depth of flow, d	ft.									
18. Cross sectional flow area, A (assume trapazoidal)	$ft.^2$									
19. Wetted perimeter, P_w	ft.									
20. Hydraulic Radius, $R = \dfrac{A}{P_w}$	ft.									
21. Channel slope, s	ft./ft.									
22. Manning's roughness coeff., n										
23. $V = \dfrac{1.49}{n}(R^{2/3})(s^{1/2})$	fps.									
24. Flow length, L	ft.									
25. $T_t = \dfrac{L}{3600 * V}$	hr.						+		=	0.000
26. Watershed or subarea T_c or T_t (add T_t in steps 6, 14 & 25)								hr.		0.195

Time of Concentration (T_c) or Travel Time (T_t) Worksheet

Project: Old Towne Commons
By: MCB
Date: 07/16/21
Location: Cheshire, CT
Checked:
Date:
Circle one: [✓ Present] Developed
Watershed: WS - 11 Existing Conditions
Circle one: [✓ T_c] T_t
Subwatershed:

Sheet flow (applicable to T_c only)

Segment ID		**A-B**		
1. Surface description (Table 3-1)		GRASS		
2. Manning's roughness coeff. for sheet flow, n (Table 3-1)		0.240		
3. Flow Length, L (< 300ft)	ft.	27.0		
4. Two-year 24-hr rainfall, P_2	in.	3.48		
5. Land slope, s	ft./ft.	0.037		
6. $T_t = \frac{0.007(nL)^{0.8}}{P_2^{0.5}(s^{0.4})}$	hr.	0.063	=	0.063

Shallow concentrated flow (assume hyd. radius = depth of flow)

Segment ID		**B-C**		**C-D**						
7. Surface description		BIT		GRASS						
8. Manning's roughness coeff., n		0.015		0.080						
9. Paved or unpaved		PVD		UNPVD						
10. Depth of flow, d (default values: d=.4 unpaved, d=.2 paved)	ft.	0.20		0.40						
11. Flow Length, L	ft.	65.0		6.0						
12. Watercourse slope, s	ft./ft.	0.046		0.167						
13. Average velocity, $V = \frac{1.49}{n}(d^{2/3})(s^{1/2})$	fps.	7.29		4.13						
14. $T_t = \frac{L}{3600 * V}$	hr.	0.002	+	0.000	+		+		=	0.003

Channel flow

Segment ID										
15. Channel Bottom width, b	ft.									
16. Horizontal side slope component, z (z horiz:1 vert)	ft.									
17. Depth of flow, d	ft.									
18. Cross sectional flow area, A (assume trapazoidal)	ft.^{2}									
19. Wetted perimeter, P_w	ft.									
20. Hydraulic Radius, $R = \frac{A}{P_w}$	ft.									
21. Channel slope, s	ft./ft.									
22. Manning's roughness coeff., n										
23. $V = \frac{1.49}{n}(R^{2/3})(s^{1/2})$	fps.									
24. Flow length, L	ft.									
25. $T_t = \frac{L}{3600 * V}$	hr.						+		=	0.000

26. Watershed or subarea T_c or T_t (add T_t in steps 6, 14 & 25) hr. ~~0.065~~

TC MIN = 5 MIN.

Time of Concentration (T_c) or Travel Time (T_t) Worksheet

Project: Old Towne Commons
By: MCB
Date: 07/16/21
Location: Cheshire, CT
Checked:
Date:
Circle one: Present [✓ ***Developed***]
Watershed: WS - 10 Proposed Conditions
Circle one: [✓ T_c] T_t
Subwatershed:

Sheet flow (applicable to T_c only)

	Segment ID	**A-B**		
1. Surface description (Table 3-1)		GRASS		
2. Manning's roughness coeff. for sheet flow, n (Table 3-1)		0.240		
3. Flow Length, L (< 300ft)	ft.	100.0		
4. Two-year 24-hr rainfall, P_2	in.	3.48		
5. Land slope, s	ft./ft.	0.030		
6. $T_t = \frac{0.007(nL)^{0.8}}{P_2^{0.5}(s^{0.4})}$	hr.	0.194	=	0.194

Shallow concentrated flow (assume hyd. radius = depth of flow)

	Segment ID	**B-C**		**C-D**		**D-E**			
7. Surface description		GRASS		BIT		GRASS			
8. Manning's roughness coeff., n		0.080		0.015		0.080			
9. Paved or unpaved		UNPVD		PVD		UNPVD			
10. Depth of flow, d (default values: d=.4 unpaved, d=.2 paved)	ft.	0.40		0.20		0.40			
11. Flow Length, L	ft.	64.0		5.0		36.0			
12. Watercourse slope, s	ft./ft.	0.078		0.056		0.056			
13. Average velocity, $V = \frac{1.49}{n}(d^{2/3})(s^{1/2})$	fps.	2.82		8.04		2.39			
14. $T_t = \frac{L}{3600 * V}$	hr.	0.006	+	0.000	+	0.004	+		= 0.011

Channel flow

	Segment ID						
15. Channel Bottom width, b	ft.						
16. Horizontal side slope component, z (z horiz:1 vert)	ft.						
17. Depth of flow, d	ft.						
18. Cross sectional flow area, A (assume trapazoidal)	ft.^{2}						
19. Wetted perimeter, P_w	ft.						
20. Hydraulic Radius, $R = \frac{A}{P_w}$	ft.						
21. Channel slope, s	ft./ft.						
22. Manning's roughness coeff., n							
23. $V = \frac{1.49}{n}(R^{2/3})(s^{1/2})$	fps.						
24. Flow length, L	ft.						
25. $T_t = \frac{L}{3600 * V}$	hr.				+		= 0.000

26. Watershed or subarea T_c or T_t (add T_t in steps 6, 14 & 25) hr. 0.205

Time of Concentration (T_c) or Travel Time (T_t) Worksheet

Project: Old Towne Commons
By: MCB
Date: 07/16/21
Location: Cheshire, CT
Checked:
Date:
Circle one: Present [✓ ***Developed***]
Watershed: WS - 11 Proposed Conditions
Circle one: [✓ T_c] T_t
Subwatershed:

Sheet flow (applicable to T_c only)

Segment ID		**A-B**		
1. Surface description (Table 3-1)		GRASS		
2. Manning's roughness coeff. for sheet flow, n (Table 3-1)		0.240		
3. Flow Length, L (< 300ft)	ft.	16.0		
4. Two-year 24-hr rainfall, P_2	in.	3.48		
5. Land slope, s	ft./ft.	0.031		
6. $T_t = \dfrac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,(s^{0.4})}$	hr.	0.044	=	0.044

Shallow concentrated flow (assume hyd. radius = depth of flow)

Segment ID		**B-C**		**C-D**		**D-E**				
7. Surface description		BIT		GRASS		BIT				
8. Manning's roughness coeff., n		0.015		0.080		0.015				
9. Paved or unpaved		PVD		UNPVD		PVD				
10. Depth of flow, d (default values: d=.4 unpaved, d=.2 paved)	ft.	0.20		0.40		0.20				
11. Flow Length, L	ft.	171.0		10.0		73.0				
12. Watercourse slope, s	ft./ft.	0.053		0.100		0.051				
13. Average velocity, $V = \dfrac{1.49}{n}(d^{2/3})(s^{1/2})$	fps.	7.82		3.20		7.67				
14. $T_t = \dfrac{L}{3600 * V}$	hr.	0.006	+	0.001	+	0.003	+		=	0.010

Channel flow

Segment ID		**E-F**								
15. Channel Bottom width, b	ft.	15" HDPE								
16. Horizontal side slope component, z (z horiz:1 vert)	ft.	--								
17. Depth of flow, d	ft.	FULL								
18. Cross sectional flow area, A (assume trapazoidal)	ft.^{2}	1.23								
19. Wetted perimeter, P_w	ft.	3.93								
20. Hydraulic Radius, $R = \dfrac{A}{P_w}$	ft.	0.31								
21. Channel slope, s	ft./ft.	0.024								
22. Manning's roughness coeff., n		0.012								
23. $V = \dfrac{1.49}{n}(R^{2/3})(s^{1/2})$	fps.	8.87								
24. Flow length, L	ft.	110.0								
25. $T_t = \dfrac{L}{3600 * V}$	hr.	0.003					+		=	0.003
26. Watershed or subarea T_c or T_t (add T_t in steps 6, 14 & 25)								hr.		~~0.057~~

TC MIN = 5 MIN.

NOAA Atlas 14, Volume 10, Version 3
Location name: Cheshire, Connecticut, USA*
Latitude: 41.4967°, Longitude: -72.9023°
Elevation: 261.04 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.341** (0.267-0.428)	**0.413** (0.322-0.518)	**0.530** (0.412-0.668)	**0.626** (0.484-0.794)	**0.759** (0.568-1.01)	**0.859** (0.629-1.17)	**0.964** (0.686-1.37)	**1.08** (0.729-1.58)	**1.25** (0.811-1.90)	**1.39** (0.878-2.15)
10-min	**0.484** (0.378-0.607)	**0.585** (0.456-0.734)	**0.750** (0.583-0.945)	**0.887** (0.685-1.13)	**1.08** (0.804-1.43)	**1.22** (0.893-1.66)	**1.37** (0.972-1.94)	**1.53** (1.03-2.23)	**1.77** (1.15-2.69)	**1.97** (1.24-3.05)
15-min	**0.569** (0.444-0.714)	**0.688** (0.537-0.864)	**0.882** (0.686-1.11)	**1.04** (0.806-1.32)	**1.26** (0.946-1.69)	**1.43** (1.05-1.95)	**1.61** (1.14-2.28)	**1.80** (1.22-2.63)	**2.08** (1.35-3.16)	**2.31** (1.46-3.58)
30-min	**0.786** (0.614-0.987)	**0.947** (0.739-1.19)	**1.21** (0.941-1.53)	**1.43** (1.10-1.81)	**1.73** (1.29-2.30)	**1.95** (1.43-2.67)	**2.19** (1.56-3.11)	**2.46** (1.66-3.58)	**2.84** (1.84-4.31)	**3.16** (2.00-4.89)
60-min	**1.00** (0.784-1.26)	**1.21** (0.941-1.52)	**1.54** (1.20-1.94)	**1.81** (1.40-2.30)	**2.19** (1.64-2.92)	**2.48** (1.82-3.38)	**2.77** (1.98-3.94)	**3.11** (2.10-4.54)	**3.60** (2.33-5.46)	**4.00** (2.53-6.20)
2-hr	**1.32** (1.04-1.65)	**1.58** (1.24-1.97)	**1.99** (1.56-2.50)	**2.34** (1.82-2.95)	**2.81** (2.12-3.72)	**3.17** (2.34-4.30)	**3.55** (2.54-5.01)	**3.97** (2.69-5.75)	**4.58** (2.98-6.90)	**5.09** (3.23-7.83)
3-hr	**1.53** (1.21-1.91)	**1.83** (1.44-2.27)	**2.31** (1.82-2.88)	**2.71** (2.12-3.40)	**3.26** (2.46-4.30)	**3.67** (2.72-4.96)	**4.11** (2.95-5.78)	**4.60** (3.12-6.64)	**5.32** (3.47-7.97)	**5.90** (3.75-9.05)
6-hr	**1.95** (1.55-2.40)	**2.33** (1.85-2.88)	**2.96** (2.34-3.67)	**3.48** (2.74-4.35)	**4.20** (3.20-5.51)	**4.74** (3.53-6.37)	**5.31** (3.84-7.45)	**5.97** (4.07-8.56)	**6.94** (4.54-10.3)	**7.75** (4.94-11.8)
12-hr	**2.40** (1.92-2.94)	**2.91** (2.33-3.57)	**3.74** (2.98-4.61)	**4.43** (3.51-5.49)	**5.38** (4.12-7.03)	**6.09** (4.57-8.15)	**6.84** (4.99-9.58)	**7.75** (5.29-11.0)	**9.11** (5.97-13.5)	**10.3** (6.56-15.5)
24-hr	**2.83** (2.28-3.44)	**3.48** (2.80-4.24)	**4.55** (3.65-5.56)	**5.43** (4.33-6.69)	**6.65** (5.14-8.66)	**7.55** (5.72-10.1)	**8.53** (6.29-12.0)	**9.75** (6.68-13.8)	**11.6** (7.65-17.1)	**13.3** (8.51-19.9)
2-day	**3.19** (2.59-3.86)	**3.99** (3.24-4.83)	**5.31** (4.28-6.44)	**6.39** (5.13-7.81)	**7.89** (6.14-10.2)	**8.98** (6.86-12.0)	**10.2** (7.60-14.3)	**11.8** (8.09-16.6)	**14.3** (9.40-20.9)	**16.5** (10.6-24.6)
3-day	**3.47** (2.82-4.17)	**4.35** (3.54-5.24)	**5.79** (4.69-7.01)	**6.99** (5.63-8.51)	**8.64** (6.75-11.2)	**9.85** (7.55-13.1)	**11.2** (8.38-15.7)	**12.9** (8.91-18.1)	**15.7** (10.4-22.9)	**18.2** (11.7-27.1)
4-day	**3.72** (3.04-4.46)	**4.66** (3.80-5.60)	**6.20** (5.03-7.47)	**7.47** (6.03-9.07)	**9.23** (7.23-11.9)	**10.5** (8.07-13.9)	**11.9** (8.95-16.7)	**13.8** (9.51-19.3)	**16.8** (11.1-24.4)	**19.4** (12.5-28.8)
7-day	**4.43** (3.64-5.29)	**5.48** (4.49-6.54)	**7.19** (5.87-8.62)	**8.61** (6.99-10.4)	**10.6** (8.30-13.5)	**12.0** (9.24-15.8)	**13.6** (10.2-18.8)	**15.6** (10.8-21.7)	**18.8** (12.5-27.1)	**21.6** (14.0-31.8)
10-day	**5.14** (4.24-6.12)	**6.25** (5.14-7.44)	**8.05** (6.60-9.62)	**9.55** (7.78-11.5)	**11.6** (9.14-14.8)	**13.1** (10.1-17.1)	**14.8** (11.1-20.2)	**16.8** (11.7-23.3)	**20.0** (13.3-28.9)	**22.8** (14.8-33.6)
20-day	**7.37** (6.12-8.70)	**8.55** (7.09-10.1)	**10.5** (8.65-12.4)	**12.1** (9.90-14.4)	**14.3** (11.3-17.9)	**15.9** (12.3-20.5)	**17.7** (13.2-23.7)	**19.7** (13.8-27.0)	**22.6** (15.1-32.3)	**25.0** (16.3-36.5)
30-day	**9.23** (7.69-10.9)	**10.4** (8.69-12.3)	**12.4** (10.3-14.7)	**14.1** (11.6-16.7)	**16.3** (12.9-20.3)	**18.1** (13.9-23.0)	**19.8** (14.7-26.2)	**21.8** (15.3-29.7)	**24.4** (16.4-34.7)	**26.5** (17.3-38.5)
45-day	**11.5** (9.65-13.5)	**12.8** (10.7-15.0)	**14.8** (12.4-17.5)	**16.5** (13.7-19.6)	**18.9** (15.0-23.3)	**20.7** (16.0-26.1)	**22.5** (16.7-29.3)	**24.3** (17.1-33.0)	**26.6** (17.9-37.7)	**28.4** (18.5-41.2)
60-day	**13.4** (11.3-15.7)	**14.7** (12.4-17.2)	**16.8** (14.1-19.8)	**18.6** (15.4-22.0)	**21.0** (16.7-25.8)	**22.9** (17.7-28.7)	**24.7** (18.3-32.0)	**26.5** (18.7-35.8)	**28.6** (19.3-40.3)	**30.2** (19.7-43.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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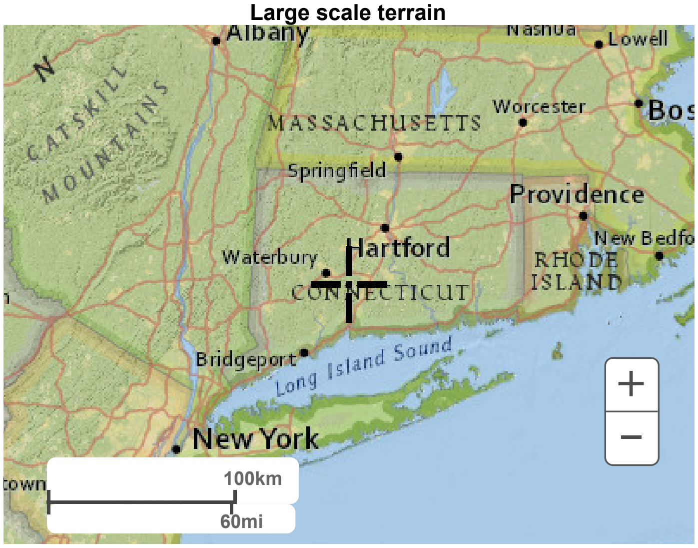
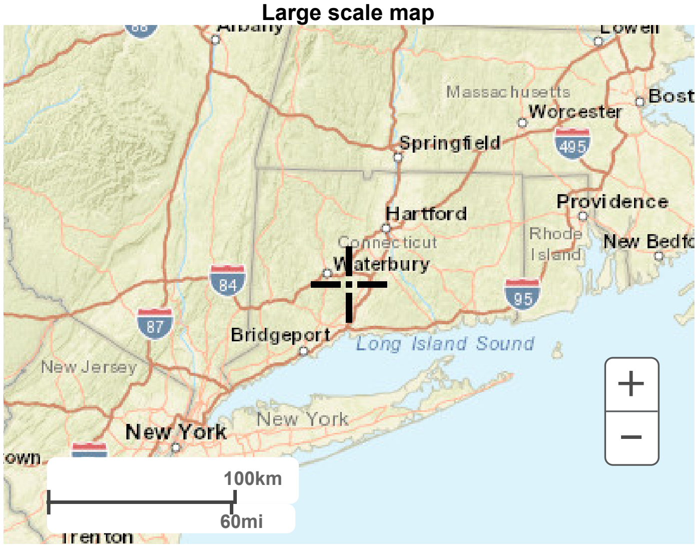
PF graphical

Large scale terrain



Large scale map



Large scale aerial

ATTACHMENT G

HYDROLOGIC ANALYSIS – COMPUTER MODEL RESULTS

Drainage Report

Old Towne Commons

166-168 and 200 South Main Street

Cheshire, Connecticut

July 28, 2021

Hydrographs Peak Flowrate Summary (cfs)

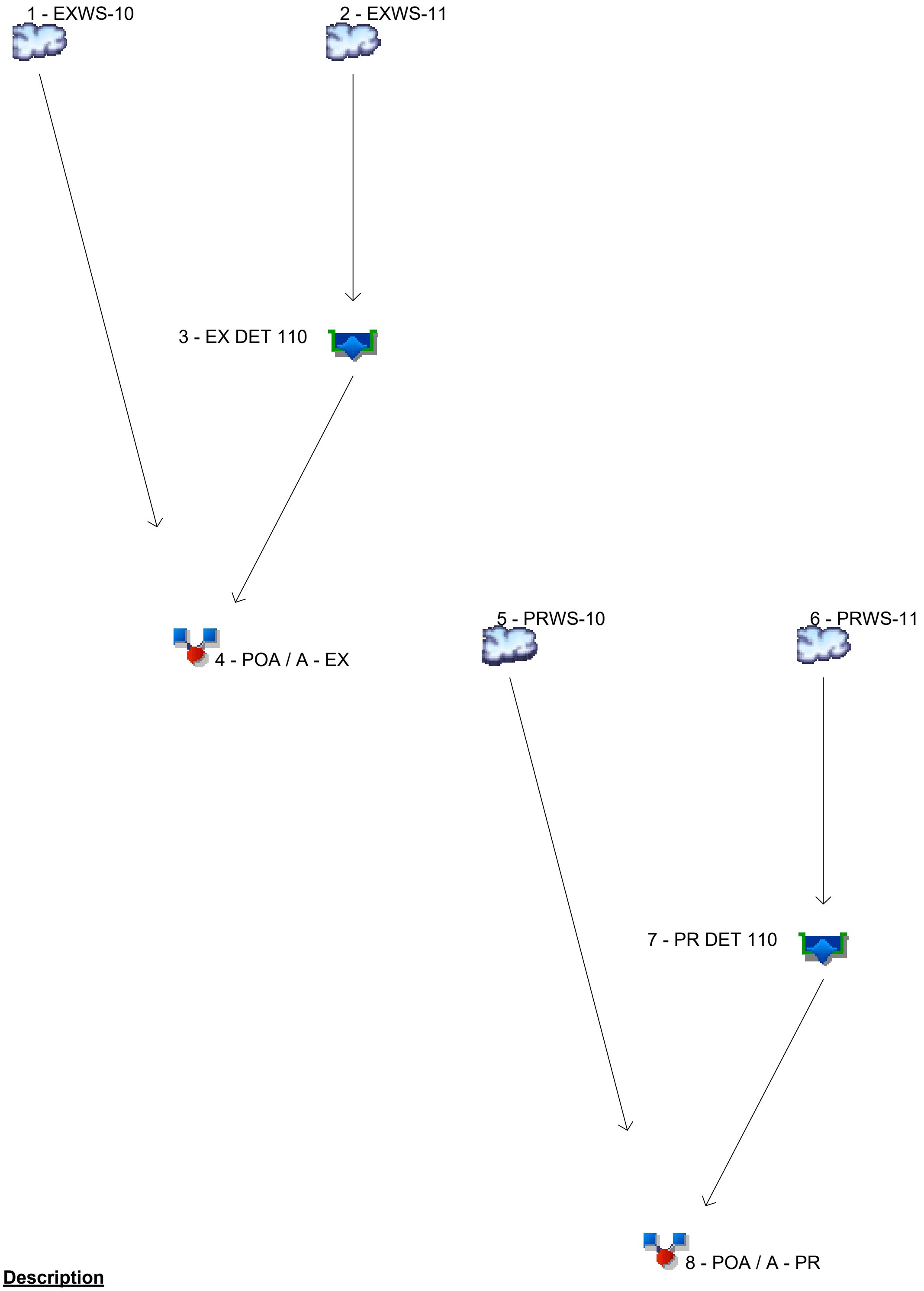
Existing vs. Proposed

Storm Event	**10yr**		**25yr**		**50yr**		**100yr**	
	Exist	**Prop**	**Exist**	**Prop**	**Exist**	**Prop**	**Exist**	**Prop**
Analysis Point A	5.0	5.0	8.3	6.5	11.7	9.8	15.0	14.1
EX DET 110 W.S. Elev. (ft) Top Elev. of Basin = 89.5 ft.	88.7	-	89.1	-	89.2	-	89.3	-
PR DET 110 W.S. Elev. (ft) Top Elev. of Pipe = 94.5 ft	-	92.8	-	93.8	-	94.2	-	94.5

Analysis Point	**Description**
A	Eastern Property Boundary

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	EXWS-10
2	SCS Runoff	EXWS-11
3	Reservoir	EX DET 110
4	Combine	POA / A - EX
5	SCS Runoff	PRWS-10
6	SCS Runoff	PRWS-11
7	Reservoir	PR DET 110
8	Combine	POA / A - PR

Project: OTC-Model01.gpw

Friday, 07 / 9 / 2021

Hydraflow Table of Contents

OTC-Model01.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Friday, 07 / 9 / 2021

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	-------	-------	-------	-------	2.520	3.485	4.215	5.018	EXWS-10
2	SCS Runoff	------	-------	-------	-------	-------	6.379	8.105	9.371	10.74	EXWS-11
3	Reservoir	2	-------	-------	-------	-------	2.626	4.960	7.431	9.997	EX DET 110
4	Combine	1, 3	-------	-------	-------	-------	4.980	8.294	11.65	15.02	POA / A - EX
5	SCS Runoff	------	-------	-------	-------	-------	2.775	3.689	4.368	5.109	PRWS-10
6	SCS Runoff	------	-------	-------	-------	-------	7.116	8.919	10.24	11.67	PRWS-11
7	Reservoir	6	-------	-------	-------	-------	2.555	3.223	5.830	9.020	PR DET 110
8	Combine	5, 7	-------	-------	-------	-------	4.970	6.498	9.782	14.13	POA / A - PR

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.520	3	729	9,942	------	------	------	EXWS-10
2	SCS Runoff	6.379	3	726	21,931	------	------	------	EXWS-11
3	Reservoir	2.626	3	738	20,687	2	88.68	5,814	EX DET 110
4	Combine	4.980	3	732	30,629	1, 3	------	------	POA / A - EX
5	SCS Runoff	2.775	3	729	10,924	------	------	------	PRWS-10
6	SCS Runoff	7.116	3	726	25,009	------	------	------	PRWS-11
7	Reservoir	2.555	3	741	25,004	6	92.82	6,208	PR DET 110
8	Combine	4.970	3	732	35,928	5, 7	------	------	POA / A - PR

OTC-Model01.gpw	Return Period: 10 Year	Friday, 07 / 9 / 2021

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.485	3	729	13,707	------	------	------	EXWS-10
2	SCS Runoff	8.105	3	726	28,250	------	------	------	EXWS-11
3	Reservoir	4.960	3	732	27,005	2	89.08	6,843	EX DET 110
4	Combine	8.294	3	732	40,712	1, 3	------	------	POA / A - EX
5	SCS Runoff	3.689	3	729	14,603	------	------	------	PRWS-10
6	SCS Runoff	8.919	3	726	31,796	------	------	------	PRWS-11
7	Reservoir	3.223	3	741	31,791	6	93.77	7,996	PR DET 110
8	Combine	6.498	3	732	46,393	5, 7	------	------	POA / A - PR

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.215	3	729	16,591	------	------	------	EXWS-10
2	SCS Runoff	9.371	3	726	32,954	------	------	------	EXWS-11
3	Reservoir	7.431	3	729	31,710	2	89.18	7,091	EX DET 110
4	Combine	11.65	3	729	48,301	1, 3	------	------	POA / A - EX
5	SCS Runoff	4.368	3	729	17,381	------	------	------	PRWS-10
6	SCS Runoff	10.24	3	726	36,830	------	------	------	PRWS-11
7	Reservoir	5.830	3	735	36,825	6	94.20	8,494	PR DET 110
8	Combine	9.782	3	732	54,206	5, 7	------	------	POA / A - PR

OTC-Model01.gpw	Return Period: 50 Year	Friday, 07 / 9 / 2021

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	5.018	3	729	19,806	------	------	------	EXWS-10
2	SCS Runoff	10.74	3	726	38,106	------	------	------	EXWS-11
3	Reservoir	9.997	3	729	36,861	2	89.26	7,312	EX DET 110
4	Combine	15.02	3	729	56,668	1, 3	------	------	POA / A - EX
5	SCS Runoff	5.109	3	729	20,450	------	------	------	PRWS-10
6	SCS Runoff	11.67	3	726	42,329	------	------	------	PRWS-11
7	Reservoir	9.020	3	729	42,325	6	94.45	8,712	PR DET 110
8	Combine	14.13	3	729	62,775	5, 7	------	------	POA / A - PR

OTC-Model01.gpw	Return Period: 100 Year	Friday, 07 / 9 / 2021

Pond Report

Pond No. 1 - EX DET 110

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 85.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	85.00	128	0.000	0.000
1.00	86.00	1,045	0.012	0.012
2.00	87.00	1,917	0.033	0.045
3.00	88.00	2,315	0.049	0.094
4.00	89.00	2,778	0.058	0.152
4.50	89.50	3,024	0.033	0.185

Culvert / Orifice Structures

		[A]	[B]	[C]	[PrfRsr]
Rise (in)	=	18.00	6.00	0.00	0.00
Span (in)	=	18.00	6.00	0.00	0.00
No. Barrels	=	1	2	0	0
Invert El. (ft)	=	84.80	86.50	0.00	0.00
Length (ft)	=	26.00	0.00	0.00	0.00
Slope (%)	=	1.90	0.00	0.00	n/a
N-Value	=	.013	.013	.013	n/a
Orifice Coeff.	=	0.60	0.60	0.60	0.60
Multi-Stage	=	n/a	Yes	No	No

Weir Structures

		[A]	[B]	[C]	[D]
Crest Len (ft)	=	14.00	0.00	0.00	0.00
Crest El. (ft)	=	88.95	0.00	0.00	0.00
Weir Coeff.	=	3.33	3.33	3.33	3.33
Weir Type	=	1	---	---	---
Multi-Stage	=	Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	85.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
1.00	0.012	86.00	0.22 ic	0.00	---	---	0.00	---	---	---	---	---	0.000
2.00	0.045	87.00	0.97 ic	0.95 ic	---	---	0.00	---	---	---	---	---	0.945
3.00	0.094	88.00	2.11 ic	2.11 ic	---	---	0.00	---	---	---	---	---	2.114
4.00	0.152	89.00	3.36 ic	2.84 ic	---	---	0.52	---	---	---	---	---	3.357
4.50	0.185	89.50	16.38 ic	0.93 ic	---	---	15.45 s	---	---	---	---	---	16.38

Pond Report

Pond No. 2 - PR DET 110

Pond Data

UG Chambers -Invert elev. = 89.50 ft, Rise x Span = 5.00 x 5.00 ft, Barrel Len = 90.00 ft, No. Barrels = 5, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	89.50	n/a	0.000	0.000
0.50	90.00	n/a	0.011	0.011
1.00	90.50	n/a	0.018	0.029
1.50	91.00	n/a	0.022	0.051
2.00	91.50	n/a	0.025	0.076
2.50	92.00	n/a	0.026	0.101
3.00	92.50	n/a	0.026	0.127
3.50	93.00	n/a	0.025	0.152
4.00	93.50	n/a	0.022	0.174
4.50	94.00	n/a	0.018	0.192
5.00	94.50	n/a	0.011	0.203

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	5.00	5.00	0.00
Span (in)	= 24.00	5.00	5.00	0.00
No. Barrels	= 1	2	1	0
Invert El. (ft)	= 89.50	89.50	92.20	0.00
Length (ft)	= 55.00	0.00	0.00	0.00
Slope (%)	= 0.91	0.00	0.00	n/a
N-Value	= .012	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 93.80	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	89.50	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.50	0.011	90.00	0.60 ic	0.58 ic	0.00	---	0.00	---	---	---	---	---	0.581
1.00	0.029	90.50	1.01 ic	1.01 ic	0.00	---	0.00	---	---	---	---	---	1.012
1.50	0.051	91.00	1.34 ic	1.34 ic	0.00	---	0.00	---	---	---	---	---	1.336
2.00	0.076	91.50	1.64 ic	1.60 ic	0.00	---	0.00	---	---	---	---	---	1.598
2.50	0.101	92.00	1.83 ic	1.83 ic	0.00	---	0.00	---	---	---	---	---	1.830
3.00	0.127	92.50	2.28 ic	2.03 ic	0.20 ic	---	0.00	---	---	---	---	---	2.225
3.50	0.152	93.00	2.71 ic	2.20 ic	0.50 ic	---	0.00	---	---	---	---	---	2.709
4.00	0.174	93.50	3.06 ic	2.37 ic	0.69 ic	---	0.00	---	---	---	---	---	3.059
4.50	0.192	94.00	4.58 ic	2.49 ic	0.83 ic	---	1.19	---	---	---	---	---	4.509
5.00	0.203	94.50	11.21 oc	2.41 ic	0.95 ic	---	7.80	---	---	---	---	---	11.16

ATTACHMENT H

WATERSHED MAPS

Drainage Report

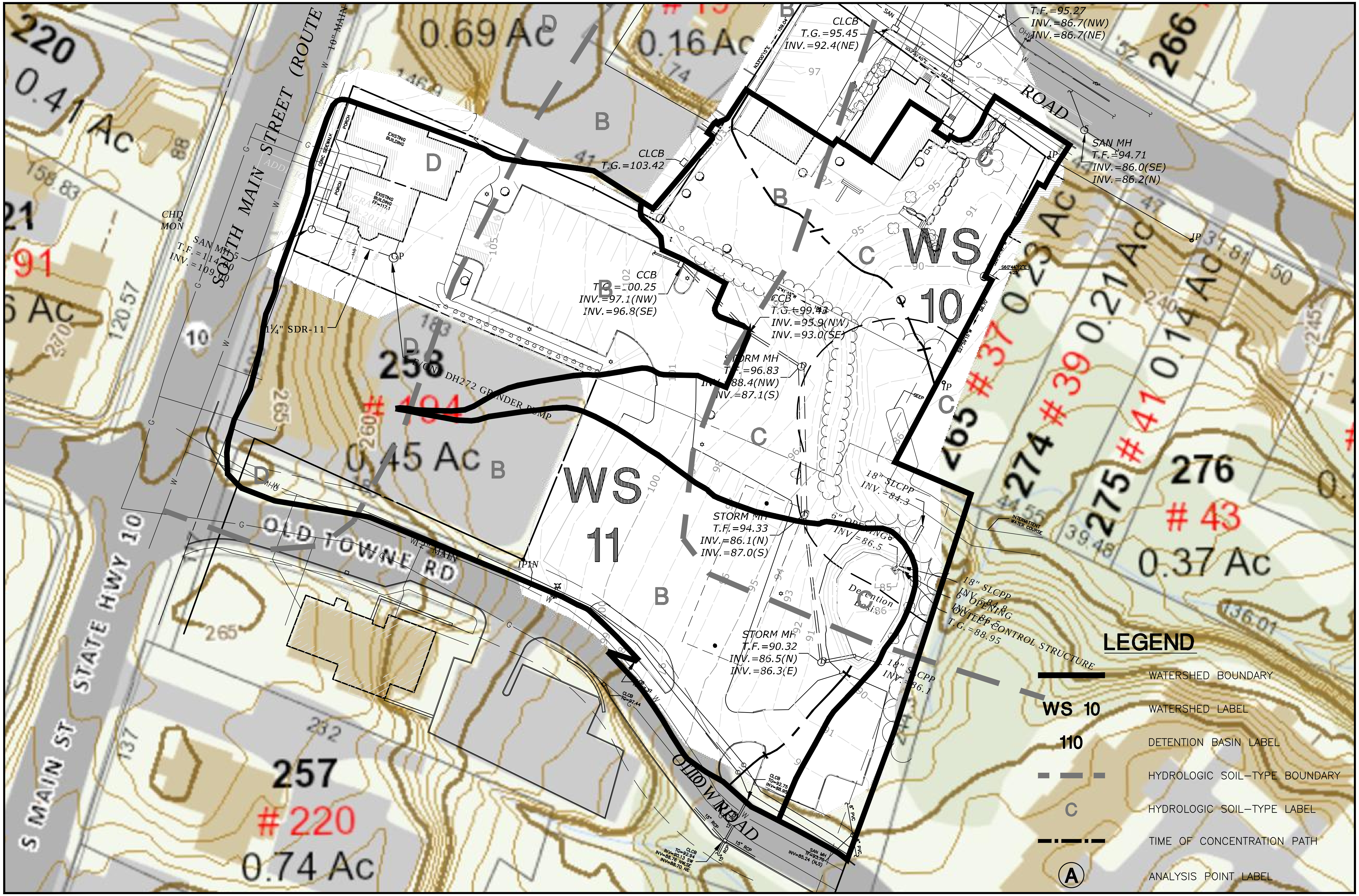
Old Towne Commons

166-168 and 200 South Main Street

Cheshire, Connecticut

July 28, 2021

Drawing: W:\CADDESIGN\3868-09-DE\CAD\CURRENT\OTC-HYDRO06.DWG Layout Tab:EXWS



LEGEND

▬	WATERSHED BOUNDARY
WS 10	WATERSHED LABEL
110	DETENTION BASIN LABEL
— —	HYDROLOGIC SOIL–TYPE BOUNDARY
C	HYDROLOGIC SOIL–TYPE LABEL
—·—·—	TIME OF CONCENTRATION PATH
Ⓐ	ANALYSIS POINT LABEL

SLR
99 REALTY DRIVE
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203.271.1773
SLRCONSULTING.COM

REVISIONS

WATERSHED MAP - EXISTING CONDITIONS

OLD TOWNE COMMONS

166-168 & 200 SOUTH MAIN STREET
CHESHIRE, CONNECTICUT

MCB DESIGNED	MCB DRAWN	FAB CHECKED

SCALE 1"=50'

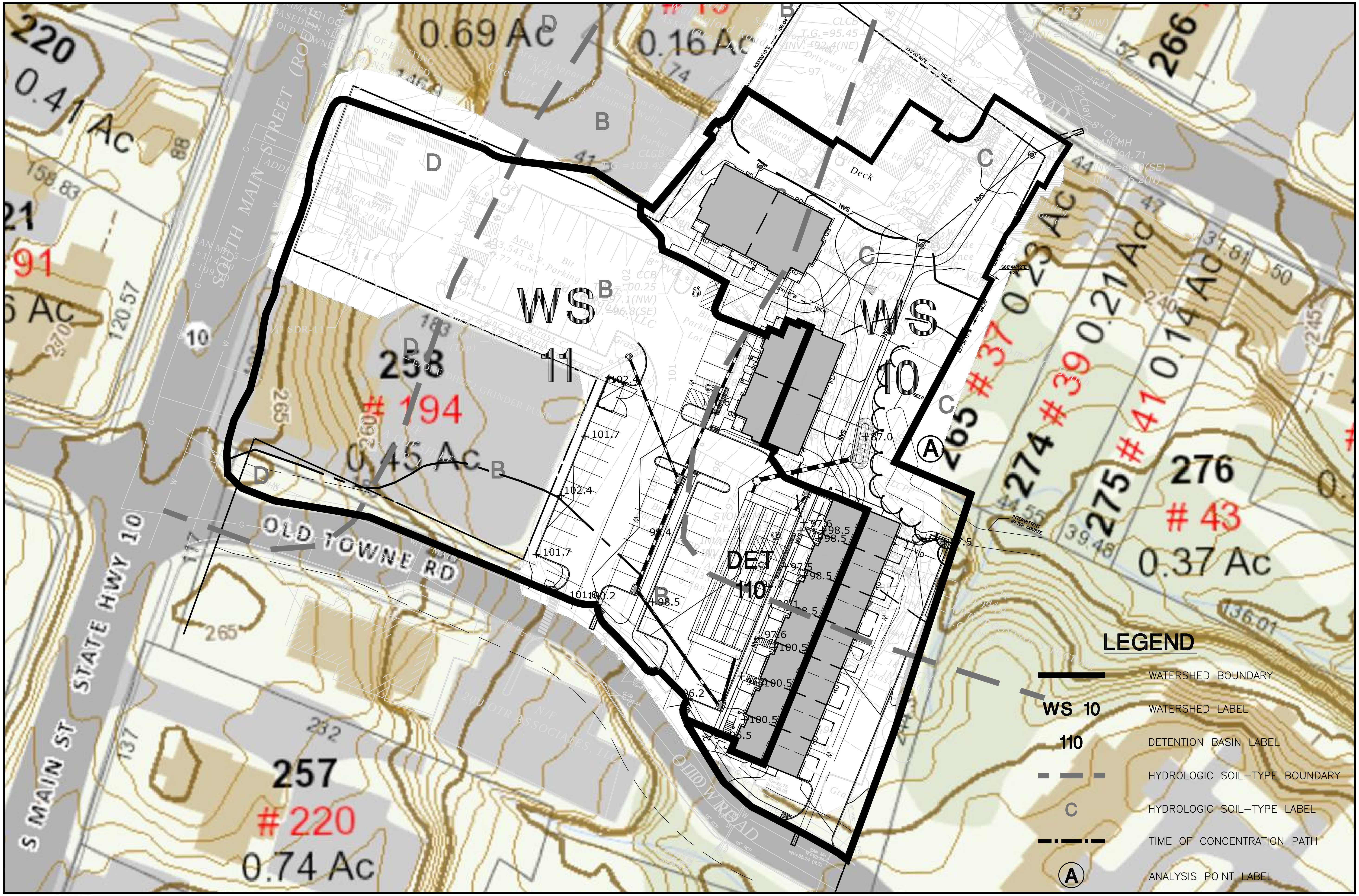
DATE JULY 28, 2021

PROJECT NO. 3868-09

SHEET NO. **EXWS**

Plotted by: MBERARDI On this date: Thu, 2021 July 22 - 2:07pm

Drawing: W:\CADDESIGN\3868-09-DE\CAD\CURRENT\OTC-HYDRO06.DWG Layout Tab:PRWS



N
W E
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SLR

99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
SLRCONSULTING.COM

REVISIONS

WATERSHED MAP - PROPOSED CONDITIONS

OLD TOWNE COMMONS

166-168 & 200 SOUTH MAIN STREET
CHESHIRE, CONNECTICUT

MCB DESIGNED	MCB DRAWN	FAB CHECKED

SCALE 1"=50'

DATE JULY 28, 2021

PROJECT NO. 3868-09

SHEET NO. **PRWS**

Plotted by: MBERARDI On this date: Tue, 2021 July 27 - 11:15am