Proposed Restaurants

Drainage Memorandum

Prepared for:

O'Connell Development Group

800 Kelly Way

Holyoke, MA 01040

SLR #141.21167.00001.0040

July 12, 2023
Revised August 7, 2023

Drainage Memorandum

Proposed Restaurants
Cedar Avenue and Buckland Road
South Windsor, Connecticut
July 12, 2023
Revised August 7, 2023
SLR #141.21167.00001.0040

This Drainage Memorandum has been prepared in support of the Site Plan of Development of new restaurants within Unit 5 of the Evergreen Walk Development. This memorandum meets the requirements of the Town of South Windsor Zoning Regulations, Section 6.6.5 Storm Drainage recognizing the storm drainage infrastructure that has already been built as part of the overall development. The project includes utility infrastructure to support the new restaurants and access drive through the site with considerations for future development of the remainder of the Unit. The main vehicular access to the site will be two-way off Tamarack Avenue with an additional right-in, right-out access onto Cedar Ave.

Figure 1 – Project Area

Table 1 – Stormwater Data

Parcel Size Total	5.779 acres
Soil Characteristics	Hydrologic Soil Group "B" and "C"
Nearest Water body	Intermittent watercourse and Plum Gully Brook
Federal Emergency Management Agency (FEMA)	Zone X
Proposed Impervious Coverage (People's Bank and New Restaurants)	53%
Proposed Land Use	Open space, building, sidewalks, and bituminous parking lot
Stormwater Treatment Practices	-Capturing and treating the design water quality flow (WQF) -Removing at least 80 percent of the average annual total suspended solids (TSS) load
Water Quality Measures	Proprietary stormwater treatment Device - Hydrodynamic Separator

STORMWATER MANAGEMENT APPROACH

Fuss & O'Neill prepared a Stormwater Management Report for the Evergreen Walk development in 2007. In that report, this subject site (Unit 5) is referred to as "LA Fitness (Conceptual Design)". Unit 5 was identified as an area not required to provide stormwater detention. The stormwater management approach for this project follows the design of that prior report. Naturally, no calculations for zero net increase of stormwater have been provided for this site as the prior report demonstrated that there will be no deleterious downstream effects from an increase in stormwater discharge flow.

The stormwater management system has been designed utilizing Best Management Practices (BMPs) to provide water quality management. The primary design goal is to treat the water quality flow (WQF), in accordance with Connecticut Department of Energy & Environmental Protection (CTDEEP) requirements, to provide the removal of total suspended solids and other potential stormwater pollutants prior to discharge to the wetland adjacent vegetated buffer.

Existing drainage patterns will be maintained to the maximum extent practicable, and pollutantreduction provided via a new proprietary stormwater treatment device (hydrodynamic separator [HDS]). The storm drainage collection system will discharge into an off-line HDS then discharge to a "bubble-up level spreader" where flows will spread over a rigid concrete level spreader lip and sheet flow through the stable and heavily vegetated wetland buffer. Sheet flow over land through the CTDEEP "non developable area" is permitted as long as it does not have erosive velocity. The attachments demonstrate the velocities from the WQF and the 10-year design storm event are within permissible ranges.

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, hydraulic grade line calculations, and gutter flow computations. 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 event in accordance with Section II 2.3.3 Design Storm Criteria of the South Windsor Public Improvement Specifications.

WATER QUALITY MANAGEMENT

Stormwater runoff from the parking lot will be directed to the HDS (in an off-line configuration) by conventional catch basin and conveyance pipe network. Due to shallow groundwater (within 3.5 feet of existing grade) encountered during geotechnical investigation, infiltration practices were not considered.

The proposed HDS will filter sediment and other pollutants that may be present in the stormwater runoff from the proposed pavement areas prior to the stormwater flows reaching the level spreader. Refer to the *CDS Guide-Operation, Design, Performance and Maintenance* included as an attachment to this memorandum. The CTDEEP *2004 Stormwater Quality Manual* (Chapter 7) recommends methods for sizing stormwater treatment measures with water quality volume (WQV) computations. The WQV addresses the initial stormwater runoff, also commonly referred to as the "first-flush" runoff. The WQV provides adequate volume to store the runoff associated with the first 1 inch of rainfall, which tends to contain the highest concentration of potential pollutants. The WQF is the peak-flow rate associated with the water quality design storm or WQV. The HDS is in an offline configuration that directs and treats only the WQF into the structure and permits remaining storm events to bypass the structure. Offline configurations are ideal to prevent the resuspension of sediment. Supporting calculations have been included as an attachment to this report.

CONCLUSION

The focus of the stormwater management approach was to provide water quality treatment and maintain existing drainage patterns. Guidance from the original stormwater management report for the overall development site was utilized in the design. The Stormwater Management Design meets the recommendations set forth in the CTDEEP *Stormwater Quality Manual* and the criteria outlined in the Town of South Windsor Zoning Regulations, Section 6.6.5 Storm Drainage.

All supporting documentation is attached to this report.

Attachments

Attachment A – FEMA Firmette Map
Attachment B – Natural Resources Conservation Service (NRCS) Soil Data
Attachment C – Soil Testing
Attachment D – Water Quality Computations
Attachment E – Hydrologic Analysis – Selected pages of Fuss & O'Neill Report (2007)
Attachment F – Storm Drainage Computations

21167.00001.0040.mr2823.drainage memo.docx

ATTACHMENT A

FEMA FIRMETTE MAP

Drainage Memorandum

Proposed Restaurant

Cedar Avenue and Buckland Road

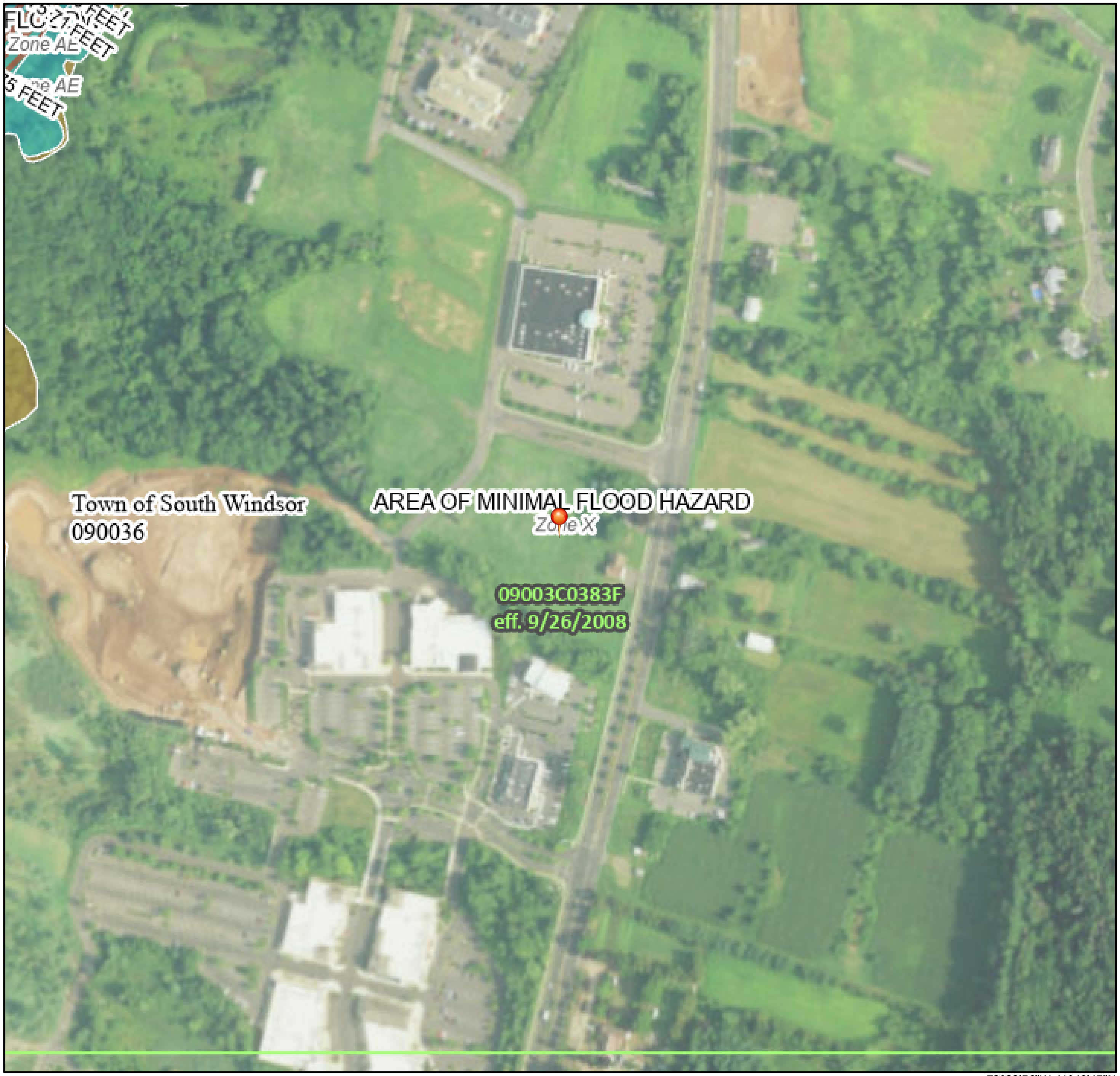
South Windsor, Connecticut

July 12, 2023
Revised August 7, 2023

National Flood Hazard Layer FIRMette

FEMA

72°33'34"W 41°49'11"N



72°32'56"W 41°48'45"N

Feet 0 250 500 1,000 1,500 2,000

1:6,000

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
		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 8/18/2021 at 10:18 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 B

NRCS SOIL DATA

Drainage Memorandum

Proposed Restaurant

Cedar Avenue and Buckland Road

South Windsor, Connecticut

July 12, 2023

Revised August 7, 2023

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

December 3, 2021

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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

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

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

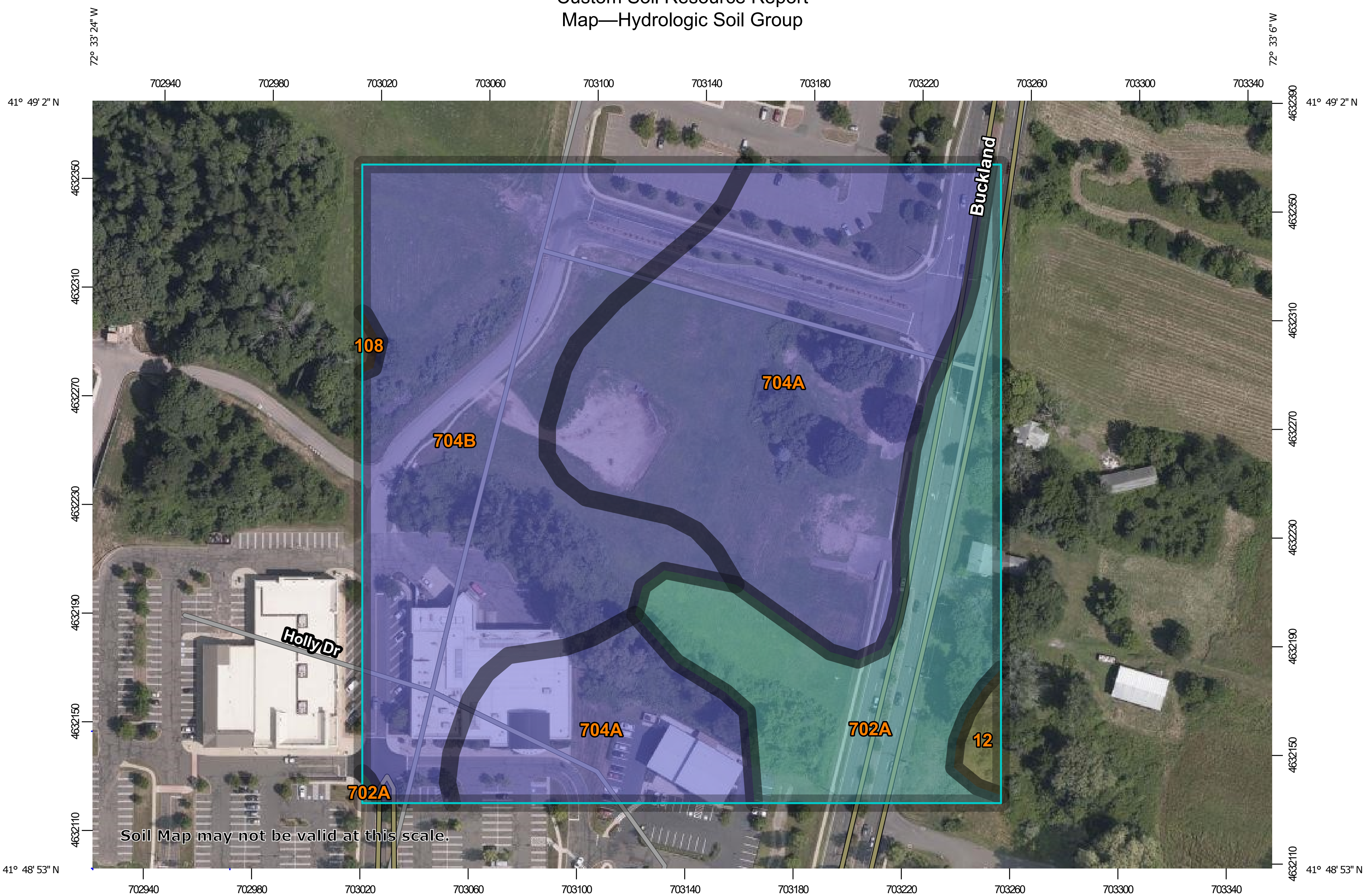
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Map—Hydrologic Soil Group



Map Scale: 1:1,990 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 25, 50, 100, 150

Feet: 0, 50, 100, 200, 300

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 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 2019

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
12	Raypol silt loam	C/D	0.1	1.0%
108	Saco silt loam	B/D	0.0	0.2%
702A	Tisbury silt loam, 0 to 3 percent slopes	C	2.7	19.4%
704A	Enfield silt loam, 0 to 3 percent slopes	B	6.0	44.0%
704B	Enfield silt loam, 3 to 8 percent slopes	B	4.9	35.5%
Totals for Area of Interest			**13.8**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

SLR

ATTACHMENT C

SOIL TESTING

Drainage Memorandum

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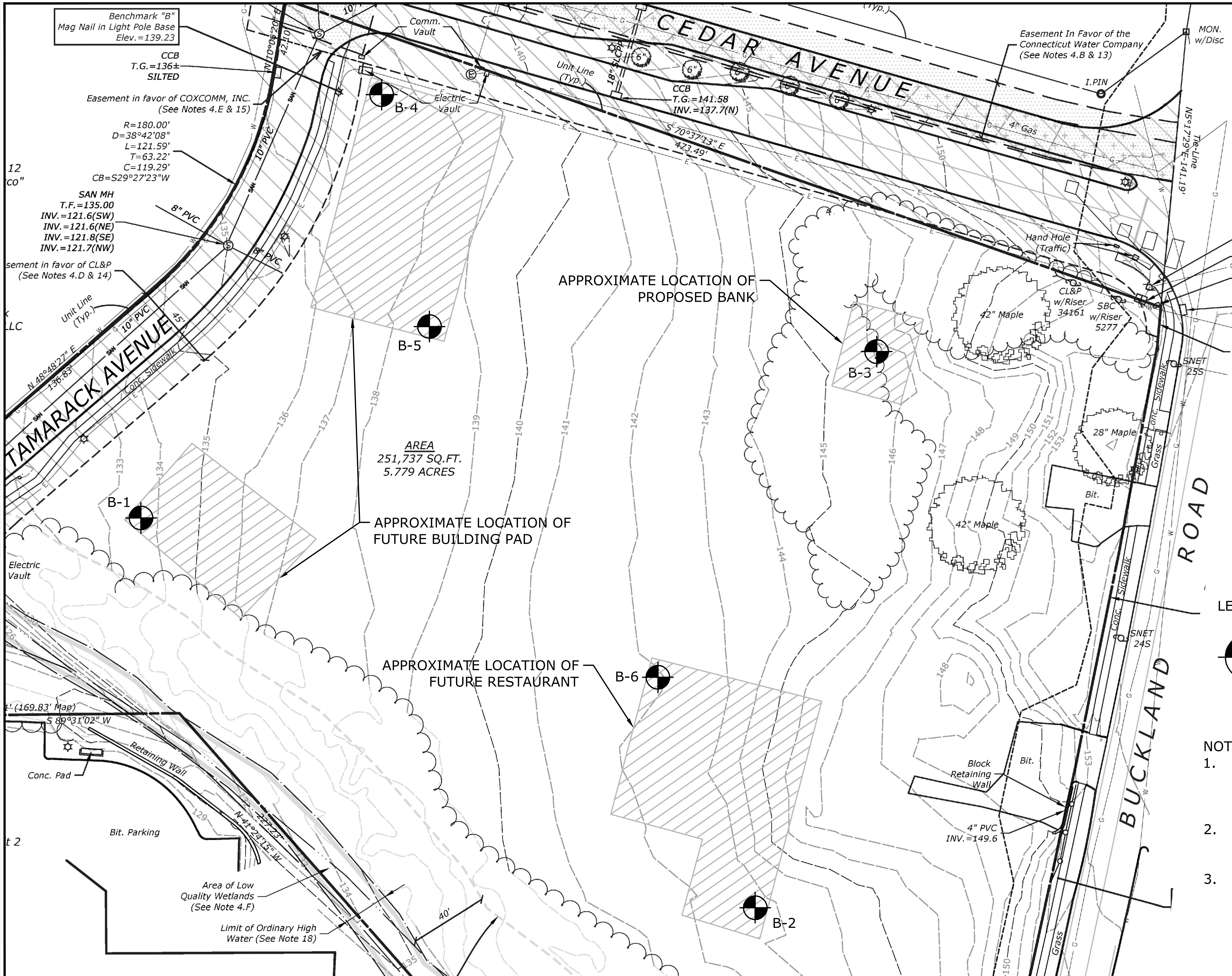

LEGEND:

BORING BY SLR INTERNATIONAL CORPORATION (SLR)

B-1

NOTES:

1. BASEMAP DEVELOPED FROM AN ELECTRONIC FILE BY SLR TITLED "PROPERTY & TOPOGRAPHIC SURVEY" AND DATED 7/22/2021.
2. BORINGS BY SLR WERE PERFORMED BY SITE, LLC ON 7/30/2021.
3. THE LOCATIONS OF THESE BORINGS WERE LOCATED BY SURVEY. THESE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

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CHESHIRE, CT 06410
203.271.1773
SLRCONSULTING.COM

REVISIONS

SUBSURFACE EXPLORATION LOCATION PLAN

PROPOSED BANK AND FUTURE BUILDING PADS

CEDAR AVENUE AND BUCKLAND ROAD SOUTH WINDSOR, CONNECTICUT

RDG	RDG	JWK
DESIGNED	DRAWN	CHECKED

SCALE 1"=50'

DATE AUGUST 4, 2021

PROJECT NO. 141.14899.00004

SHEET NO. FIG. 2

Drawing: \\CTALPHAUS.SLR.LOCAL\MAFS-JOBS\GEOTECH\14899.00004-GT\EXPLORATIONS\SUBSURFACEEXPLORATIONPLAN.DWG Layout Tab:11X17

Plotted by: SNOLAN On this date: Fri, 2021 August 13 - 1:20pm

BORING LOG

SLR International Corporation, Inc.

99 Realty Drive, Cheshire, CT 06410
203.271.1773 | www.slrconsulting.com

PROJECT:	PROPOSED BANK AND FUTURE BUILDING PADS	**BORING NO.:** B-1	**SHEET:** 1 of 1
LOCATION:	CEDAR AVENUE & BUCKLAND ROAD, SOUTH WINDSOR, CT	**CONTRACTOR:** SITE, LLC	
PROJ. NO:	141.14899.00004	**FOREMAN:** J. DEANGELIS	
CLIENT:	ACCUBRANCH	**INSPECTOR:** R. GOWISNOCK	
DATE:	JULY 30, 2021	**GROUND SURFACE ELEVATION:** ±133.6'	

EQUIPMENT:	**AUGER**	**CASING**	**SAMPLER**	**COREBRL.**	**GROUNDWATER DEPTH (FT.)**			**TYPE OF RIG:**
TYPE	HSA	-	SS	-	**DATE**	**TIME**	**WATER DEPTH**	TRACK W/ AUTOMATIC HAMMER
SIZE ID (IN.)	2 1/4	-	1 3/8	-	2021-07-30	7:30 AM	NOT ENCOUNTERED	**RIG MODEL:**
HMR. WT (LB.)	-	-	140	-				CME-55 LCX
HMR. FALL (IN.)	-	-	30	-				

Depth (FT)	SAMPLE NUMBER	RECOVERY (IN)	BLOWS PER 6"	SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	DEPTH (FT.)	STRATUM DESCRIPTION	ELEV. (FT.)	Remark
1	S-1	16	1 2 4 3	S-1: Loose, Top 10": Brown, fine to coarse SAND, some Silt, trace fine Gravel, trace Organics. Bottom 6": Light brown, fine to medium SAND, some Silt, trace Organics.	1.0'	TOPSOIL	132.6'	
2–3	S-2	20	5 10 19 12	S-2: Medium dense, Top 8": Light brown, fine to medium SAND, some Silt. Bottom 12": Reddish brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt.	3.0'	SUBSOIL	130.6'	
4					4.5'	SAND & GRAVEL	129.1'	
5–6	S-3	22	6 10 22 22	S-3: Dense, reddish brown, fine to coarse SAND, some fine to coarse Gravel, little Silt.				
7								
8								
9								
10	S-4	10	30 50/4"	S-4: Very dense, reddish brown, fine to coarse SAND, some fine to coarse Gravel, little Silt.				
11								
12						WEATHERED BEDROCK		
13								
14								
15	S-5	4	50/4"	S-5: Very dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt.				
16								
17								
18								
19					19.8'		113.8'	1
20				Bottom of Exploration ±19.8'				
21								
22								

Remarks: 1. Auger refusal at ±19.8'.

NON-PLASTIC (SPT-N)	PLASTIC (SPT-N)	SAMPLE TYPE	PROPORTIONS
0-4 = VERY LOOSE	0-2 = VERY SOFT	C = ROCK CORE	trace = <10%
4-10 = LOOSE	2-4 = SOFT	S = SPLIT SPOON	little = 10% - 20%
10-30 = MEDIUM DENSE	4-8 = MEDIUM	UP = UNDISTURBED PISTON	some = 20% - 35%
30-50 = DENSE	8-15 = STIFF	UT = UNDISTURBED THINWALL	and = 35% - 50%
50+ = VERY DENSE	15-30 = VERY STIFF		
	30 + = HARD		

BORING LOG

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PROJECT:	PROPOSED BANK AND FUTURE BUILDING PADS	**BORING NO.:** B-2	**SHEET:** 1 of 1
LOCATION:	CEDAR AVENUE & BUCKLAND ROAD, SOUTH WINDSOR, CT	**CONTRACTOR:** SITE, LLC	
PROJ. NO:	141.14899.00004	**FOREMAN:** J. DEANGELIS	
CLIENT:	ACCUBRANCH	**INSPECTOR:** R. GOWISNOCK	
DATE:	JULY 30, 2021	**GROUND SURFACE ELEVATION:** ±142.6'	

EQUIPMENT:	**AUGER**	**CASING**	**SAMPLER**	**COREBRL.**	**GROUNDWATER DEPTH (FT.)**			**TYPE OF RIG:**
TYPE	HSA	-	SS	-	**DATE**	**TIME**	**WATER DEPTH**	TRACK W/ AUTOMATIC HAMMER
SIZE ID (IN.)	2 1/4	-	1 3/8	-	2021-07-30	8:30 AM	±3.3'	**RIG MODEL:**
HMR. WT (LB.)	-	-	140	-				CME-55 LCX
HMR. FALL (IN.)	-	-	30	-				

Depth (FT)	SAMPLE NUMBER	RECOVERY (IN)	BLOWS PER 6"	SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	DEPTH (FT.)	STRATUM DESCRIPTION	ELEV. (FT.)	Remark
1	S-1	19	1, 1, 3, 2	S-1: Loose, Top 7": Brown, fine to coarse SAND, some Silt, trace fine Gravel, trace Organics. Bottom 12": Light brown, fine to medium SAND and SILT, trace Organics.	1.0'	TOPSOIL	141.6'	
2								
3	S-2	18	1, 2, 2, 4	S-2: Loose, Top 12": Light brown, fine to medium SAND and SILT. Bottom 6": Reddish brown, fine to coarse SAND, little Silt.	3.0'	SUBSOIL	139.6'	
					3.3'	G.W.T.	139.3'	
4								
5								
6	S-3	22	8, 12, 12, 9	S-3: Medium dense, reddish brown, fine to coarse SAND, trace Silt.		SAND		
7								
8					8.5'		134.1'	
9								
10								
11	S-4	22	12, 10, 13, 14	S-4: Medium dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt.		GLACIAL TILL		
12								
13					13.5'		129.1'	
14								
15								
16	S-5	7	41, 50/3"	S-5:Very dense, reddish fine to coarse SAND, little fine to coarse Gravel, little Silt.		WEATHERED BEDROCK		
17								
18					18.4'		124.2'	1
19				Bottom of Exploration ±18.4'				
20								
21								
22								

Remarks: 1. Auger refusal at ±18.4'.

NON-PLASTIC (SPT-N)	PLASTIC (SPT-N)	SAMPLE TYPE	PROPORTIONS
0-4 = VERY LOOSE	0-2 = VERY SOFT	C = ROCK CORE	trace = <10%
4-10 = LOOSE	2-4 = SOFT	S = SPLIT SPOON	little = 10% - 20%
10-30 = MEDIUM DENSE	4-8 = MEDIUM	UP = UNDISTURBED PISTON	some = 20% - 35%
30-50 = DENSE	8-15 = STIFF	UT = UNDISTURBED THINWALL	and = 35% - 50%
50+ = VERY DENSE	15-30 = VERY STIFF		
	30 + = HARD		

BORING LOG

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PROJECT:	PROPOSED BANK AND FUTURE BUILDING PADS	**BORING NO.:** B-3	**SHEET:** 1 of 1
LOCATION:	CEDAR AVENUE & BUCKLAND ROAD, SOUTH WINDSOR, CT	**CONTRACTOR:** SITE, LLC	
PROJ. NO:	141.14899.00004	**FOREMAN:** J. DEANGELIS	
CLIENT:	ACCUBRANCH	**INSPECTOR:** R. GOWISNOCK	
DATE:	JULY 30, 2021	**GROUND SURFACE ELEVATION:** ±146.1'	

EQUIPMENT:	**AUGER**	**CASING**	**SAMPLER**	**COREBRL.**	**GROUNDWATER DEPTH (FT.)**			**TYPE OF RIG:**
TYPE	HSA	-	SS	-	**DATE**	**TIME**	**WATER DEPTH**	TRACK W/ AUTOMATIC HAMMER
SIZE ID (IN.)	2 1/4	-	1 3/8	-	2021-07-30	9:30 AM	±5.1'	**RIG MODEL:**
HMR. WT (LB.)	-	-	140	-				CME-55 LCX
HMR. FALL (IN.)	-	-	30	-				

Depth (FT)	SAMPLE NUMBER	RECOVERY (IN)	BLOWS PER 6"	SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	DEPTH (FT.)	STRATUM DESCRIPTION	ELEV. (FT.)	Remark
	S-1	19	1	S-1: Loose, Top 7": Dark brown, fine to meduim SAND, some Silt, trace fine Gravel, trace Organics.		TOPSOIL		
1			2	Bottom 12": Light brown, fine to medium SAND, some Silt, trace Organics.	1.0'		145.1'	
			2					
2			3			SUBSOIL		
	S-2	22	2	S-2: Loose, Top 12": Reddish brown, fine to medium SAND, some Silt.				
3			3	Bottom 10": Reddish brown, fine to coarse SAND, little Silt.	3.0'		143.1'	
			4					
4			9			SAND		
					4.5'		141.6'	
5					5.1'	G.W.T. ▼	141.0'	
	S-3	18	6	S-3: Medium dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt.				
6			9					
			15					
7			30					
8								
9						GLACIAL TILL		
10	S-4	21	15	S-4: Very dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt.				
11			25					
			27					
12			42					
13					13.5'		132.6'	
14								
15	S-5	22	25	S-5: Very dense, reddish brown, fine to medium SAND and SILT, trace fine Gravel.				
16			38					
			45					
17			46			WEATHERED BEDROCK		
18								
19								
20	S-6	3	50/3"	S-6: Very dense, reddish brown, fine to coarse SAND,little fine to coarse Gravel, little Silt.	20.3'		125.8'	
21				Bottom of Exploration ±20.3'				
22								

Remarks: ±

NON-PLASTIC (SPT-N)	PLASTIC (SPT-N)	SAMPLE TYPE	PROPORTIONS
0-4 = VERY LOOSE	0-2 = VERY SOFT	C = ROCK CORE	trace = <10%
4-10 = LOOSE	2-4 = SOFT	S = SPLIT SPOON	little = 10% - 20%
10-30 = MEDIUM DENSE	4-8 = MEDIUM	UP = UNDISTURBED PISTON	some = 20% - 35%
30-50 = DENSE	8-15 = STIFF	UT = UNDISTURBED THINWALL	and = 35% - 50%
50+ = VERY DENSE	15-30 = VERY STIFF		
	30 + = HARD		

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PROJECT:	PROPOSED BANK AND FUTURE BUILDING PADS	**BORING NO.:** B-4	**SHEET:** 1 of 1
LOCATION:	CEDAR AVENUE & BUCKLAND ROAD, SOUTH WINDSOR, CT	**CONTRACTOR:** SITE, LLC	
PROJ. NO:	141.14899.00004	**FOREMAN:** J. DEANGELIS	
CLIENT:	ACCUBRANCH	**INSPECTOR:** R. GOWISNOCK	
DATE:	JULY 30, 2021	**GROUND SURFACE ELEVATION:** ±137.8'	

EQUIPMENT:	AUGER	CASING	SAMPLER	COREBRL.	GROUNDWATER DEPTH (FT.)			TYPE OF RIG:
TYPE	HSA	-	SS	-	DATE	TIME	WATER DEPTH	TRACK W/ AUTOMATIC HAMMER
SIZE ID (IN.)	2 1/4	-	1 3/8	-	2021-07-30	10:30 AM	NOT ENCOUNTERED	RIG MODEL:
HMR. WT (LB.)	-	-	140	-				CME-55 LCX
HMR. FALL (IN.)	-	-	30	-				

Depth (FT)	SAMPLE NUMBER	RECOVERY (IN)	BLOWS PER 6"	SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	DEPTH (FT.)	STRATUM DESCRIPTION	ELEV. (FT.)	Remark
	S-1	14	1	S-1: Loose, Top 8": Brown, fine to coarse SAND, little Silt, trace fine Gravel, trace Organics.		TOPSOIL		
1			2	Bottom 6": Reddish brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt.	1.0'		136.8'	
			6			FILL		
2			11		2.0'		135.8'	
	S-2	20	8	S-2: Medium dense, light brown, fine to medium SAND, some Silt.				
3			8			SUBSOIL		
			6					
4			6					
					4.5'		133.3'	
5								
	S-3	18	11	S-3: Medium dense, Top 12": Reddish brown, fine to coarse SAND, trace fine Gravel, trace Silt.		SAND		
6			15	Botttom 6": Reddish brown, fine to medium SAND and SILT.				
			12		6.5'		131.3'	
7			8			SAND & SILT		
8					8.5'		129.3'	
9								
10								
	S-4	22	8	S-4: Medium dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt.				
11			8			GLACIALTILL		
			14					
12			30					
13					13.5'		124.3'	
14								
15	S-5	3	50/4"	S-5: Very dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt.		WEATHERED BEDROCK		
16								
17								
18					18.5'		119.3'	1
19				Bottom of Exploration ±18.5'				
20								
21								
22								

Remarks: 1. Auger refusal at ±18.5'.

NON-PLASTIC (SPT-N)	PLASTIC (SPT-N)	SAMPLE TYPE	PROPORTIONS
0-4 = VERY LOOSE	0-2 = VERY SOFT	C = ROCK CORE	trace = <10%
4-10 = LOOSE	2-4 = SOFT	S = SPLIT SPOON	little = 10% - 20%
10-30 = MEDIUM DENSE	4-8 = MEDIUM	UP = UNDISTURBED PISTON	some = 20% - 35%
30-50 = DENSE	8-15 = STIFF	UT = UNDISTURBED THINWALL	and = 35% - 50%
50+ = VERY DENSE	15-30 = VERY STIFF		
	30 + = HARD		

BORING LOG

SLR International Corporation, Inc.
99 Realty Drive, Cheshire, CT 06410
203.271.1773 | www.slrconsulting.com

PROJECT:	PROPOSED BANK AND FUTURE BUILDING PADS	**BORING NO.:** B-5	**SHEET:** 1 of 1
LOCATION:	CEDAR AVENUE & BUCKLAND ROAD, SOUTH WINDSOR, CT	**CONTRACTOR:** SITE, LLC	
PROJ. NO:	141.14899.00004	**FOREMAN:** J. DEANGELIS	
CLIENT:	ACCUBRANCH	**INSPECTOR:** R. GOWISNOCK	
DATE:	JULY 30, 2021	**GROUND SURFACE ELEVATION:** ±138.3'	

EQUIPMENT:	**AUGER**	**CASING**	**SAMPLER**	**COREBRL.**	**GROUNDWATER DEPTH (FT.)**			**TYPE OF RIG:**
TYPE	HSA	-	SS	-	**DATE**	**TIME**	**WATER DEPTH**	TRACK W/ AUTOMATIC HAMMER
SIZE ID (IN.)	2 1/4	-	1 3/8	-	2021-07-30	11:30 AM	±15.3'	**RIG MODEL:**
HMR. WT (LB.)	-	-	140	-				CME-55 LCX
HMR. FALL (IN.)	-	-	30	-				

Depth (FT)	SAMPLE NUMBER	RECOVERY (IN)	BLOWS PER 6"	SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	DEPTH (FT.)	STRATUM DESCRIPTION	ELEV. (FT.)	Remark
	S-1	16	1	S-1: Loose, Top 8": Brown, fine to coarse SAND, little Silt, trace fine Gravel, trace Organics.		TOPSOIL		
1			2	Bottom 8": Light brown, fine to medium SAND, some Silt, trace Organics.	1.0'		137.3'	
			6					
2			5					
	S-2	22	4	S-2: Medium dense, Top 16": Light brown, fine to medium SAND, some Silt.		SUBSOIL		
3			6	Bottom 6": Reddish brown, fine to coarse SAND, little Silt.				
			8		3.5'		134.8'	
4			12					
5						SAND & SILT		
	S-3	20	6	S-3: Loose, Top 6": Reddish brown, fine to medium SAND and SILT.	5.5'		132.8'	
6			4	Bottom 14": Reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt.				
			5					
7			7			GLACIAL TILL		
8					8.5'		129.8'	
9								
10	S-4	4	50/5"	S-4: Very dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt.				
11								
12						WEATHERED BEDROCK		
13								
14								
15	S-5	4	50/5"	S-5: Very dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt.	15.4'	G.W.T. ▼	122.9'	
16				Bottom of Exploration ±15.4'				
17								
18								
19								
20								
21								
22								

Remarks: ±

NON-PLASTIC (SPT-N)	PLASTIC (SPT-N)	SAMPLE TYPE	PROPORTIONS
0-4 = VERY LOOSE	0-2 = VERY SOFT	C = ROCK CORE	trace = <10%
4-10 = LOOSE	2-4 = SOFT	S = SPLIT SPOON	little = 10% - 20%
10-30 = MEDIUM DENSE	4-8 = MEDIUM	UP = UNDISTURBED PISTON	some = 20% - 35%
30-50 = DENSE	8-15 = STIFF	UT = UNDISTURBED THINWALL	and = 35% - 50%
50+ = VERY DENSE	15-30 = VERY STIFF		
	30 + = HARD		

BORING LOG

SLR International Corporation, Inc. 99 Realty Drive, Cheshire, CT 06410 203.271.1773 | www.slrconsulting.com			
PROJECT: PROPOSED BANK AND FUTURE BUILDING PADS	BORING NO.: B-6	SHEET: 1 of 1	
LOCATION: CEDAR AVENUE & BUCKLAND ROAD, SOUTH WINDSOR, CT	CONTRACTOR: SITE, LLC		
PROJ. NO: 141.14899.00004	FOREMAN: J. DEANGELIS		
CLIENT: ACCUBRANCH	INSPECTOR: R. GOWISNOCK		
DATE: JULY 30, 2021	GROUND SURFACE ELEVATION: ±141.9'		

EQUIPMENT:	AUGER	CASING	SAMPLER	COREBRL.	GROUNDWATER DEPTH (FT.)			TYPE OF RIG:
TYPE	HSA	-	SS	-	DATE	TIME	WATER DEPTH	TRACK W/ AUTOMATIC HAMMER
SIZE ID (IN.)	2 1/4	-	1 3/8	-	2021-07-30	1:00 PM	±3.5'	RIG MODEL:
HMR. WT (LB.)	-	-	140	-				CME-55 LCX
HMR. FALL (IN.)	-	-	30	-				

Depth (FT)	SAMPLE NUMBER	RECOVERY (IN)	BLOWS PER 6"	SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	DEPTH (FT.)	STRATUM DESCRIPTION	ELEV. (FT.)	Remark
1	S-1	14	1 2 1 1	S-1: Very loose, Top 8": Dark brown, fine to medium SAND, little Silt, trace fine Gravel, trace Organics. Bottom 6": Light brown, fine to medium SAND, some Silt, trace Organics.	1.0'	TOPSOIL	140.9'	
2–3	S-2	20	1 2 4 9	S-2: Loose, Top 14": Light brown, fine to medium SAND, some Silt. Bottom 6": Reddish brown, fine to coarse SAND, little Silt.	3.5'	SUBSOIL G.W.T.	138.4'	
4								
5–6	S-3	20	9 11 8 7	S-3: Medium dense, Top 14": Reddish brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt. Bottom 6": Reddish brown, fine to medium SAND and SILT.	6.5'	SAND	135.4'	
7–9					8.5'	SAND & SILT	133.4'	
10–11	S-4	18	6 6 10 10	S-4: Medium dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt.				
12–14						GLACIAL TILL		
15	S-5	7	38 50/1"	S-5: Very dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt.				
16–17					17.4'		124.5'	1
18–22				Bottom of Exploration ±17.4'				

Remarks: 1. Auger refusal at ±17.4'.

NON-PLASTIC (SPT-N)	PLASTIC (SPT-N)	SAMPLE TYPE	PROPORTIONS
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30-50 = DENSE	8-15 = STIFF	UT = UNDISTURBED THINWALL	and = 35% - 50%
50+ = VERY DENSE	15-30 = VERY STIFF		
	30 + = HARD		

ATTACHMENT D

WATER QUALITY COMPUTATIONS

Drainage Memorandum

Proposed Restaurant

Cedar Avenue and Buckland Road

South Windsor, Connecticut

July 12, 2023
Revised August 7, 2023

	SLR Consulting	Project	**21167.00001**
	COMPUTATION SHEET - WATER QUALITY FLOW (WQF)	Made By:	MCB
Subject:	**Proposed Restaurants**	Date:	7/12/2023
		Chkd by:	
		Date:	

CDS Unit								
Contributing Basins			Imperv. Area (acres)	Total Area (acres)				
Total			2.62	3.82				
Table 4.1: WQV = (P)(R_v)(A)/12 =				0.212	acre-feet			
Where:								
I = % of Impervious Cover =				69%				
R_v = volumetric runoff coeff. 0.05 + 0.009(I) =				0.667				
P = design precipitation (1.0" for water quality storm) =					1	inch		
A = site area (acres) =				3.82	acres =	0.0060	miles^2	
Q = runoff depth (in watershed inches) = [WQV(acrefeet)]*[12(inches/foot)]/drainage area (acres)								
			Q =	0.667				
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) =		2.8	cfs			**CDS 2025-5 Flow = 3.2 cfs -> OK**		

CDS Guide
Operation, Design, Performance and Maintenance

CDS®

Using patented continuous deflective separation technology, the CDS system screens, separates and traps debris, sediment, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, and minimize the re-suspension and release of previously trapped pollutants. Inline units can treat up to 6 cfs, and internally bypass flows in excess of 50 cfs (1416 L/s). Available precast or cast-in-place, offline units can treat flows from 1 to 300 cfs (28.3 to 8495 L/s). The pollutant removal capacity of the CDS system has been proven in lab and field testing.

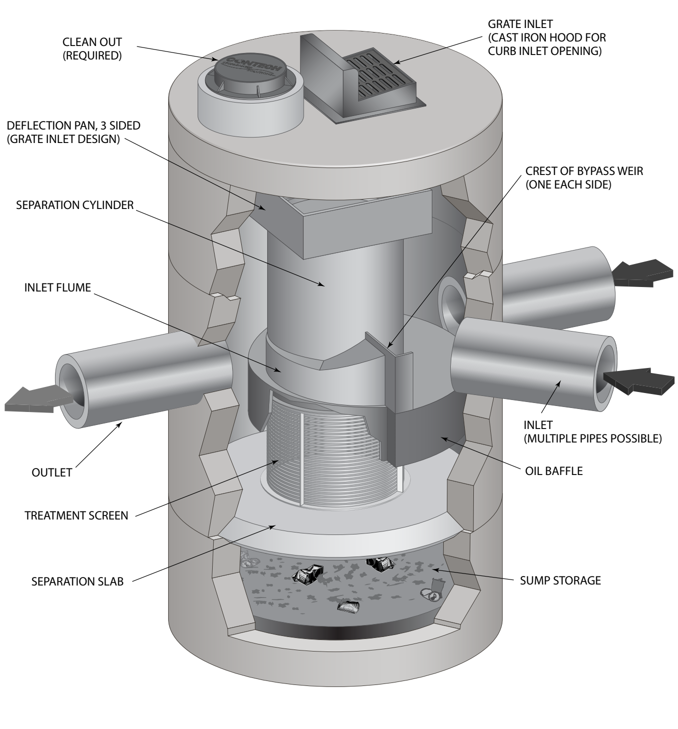
Operation Overview

Stormwater enters the diversion chamber where the diversion weir guides the flow into the unit's separation chamber and pollutants are removed from the flow. All flows up to the system's treatment design capacity enter the separation chamber and are treated.

Swirl concentration and screen deflection force floatables and solids to the center of the separation chamber where 100% of floatables and neutrally buoyant debris larger than the screen apertures are trapped.

Stormwater then moves through the separation screen, under the oil baffle and exits the system. The separation screen remains clog free due to continuous deflection.

During the flow events exceeding the treatment design capacity, the diversion weir bypasses excessive flows around the separation chamber, so captured pollutants are retained in the separation cylinder.



Design Basics

There are three primary methods of sizing a CDS system. The Water Quality Flow Rate Method determines which model size provides the desired removal efficiency at a given flow rate for a defined particle size. The Rational Rainfall Method™ or the and Probabilistic Method is used when a specific removal efficiency of the net annual sediment load is required.

Typically in the Unites States, CDS systems are designed to achieve an 80% annual solids load reduction based on lab generated performance curves for a gradation with an average particle size (d50) of 125 microns (μm). For some regulatory environments, CDS systems can also be designed to achieve an 80% annual solids load reduction based on an average particle size (d50) of 75 microns (μm) or 50 microns (μm).

Water Quality Flow Rate Method

In some cases, regulations require that a specific treatment rate, often referred to as the water quality design flow (WQQ), be treated. This WQQ represents the peak flow rate from either an event with a specific recurrence interval, e.g. the six-month storm, or a water quality depth, e.g. 1/2-inch (13 mm) of rainfall.

The CDS is designed to treat all flows up to the WQQ. At influent rates higher than the WQQ, the diversion weir will direct most flow exceeding the WQQ around the separation chamber. This allows removal efficiency to remain relatively constant in the separation chamber and eliminates the risk of washout during bypass flows regardless of influent flow rates.

Treatment flow rates are defined as the rate at which the CDS will remove a specific gradation of sediment at a specific removal efficiency. Therefore the treatment flow rate is variable, based on the gradation and removal efficiency specified by the design engineer.

Rational Rainfall Method™

Differences in local climate, topography and scale make every site hydraulically unique. It is important to take these factors into consideration when estimating the long-term performance of any stormwater treatment system. The Rational Rainfall Method combines site-specific information with laboratory generated performance data, and local historical precipitation records to estimate removal efficiencies as accurately as possible.

Short duration rain gauge records from across the United States and Canada were analyzed to determine the percent of the total annual rainfall that fell at a range of intensities. US stations' depths were totaled every 15 minutes, or hourly, and recorded in 0.01-inch increments. Depths were recorded hourly with 1-mm resolution at Canadian stations. One trend was consistent at all sites; the vast majority of precipitation fell at low intensities and high intensity storms contributed relatively little to the total annual depth.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Rainfall Method. Since most sites are relatively small and highly impervious, the Rational Rainfall Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS system are determined. Performance efficiency curve determined from full scale laboratory tests on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Probabilistic Rational Method

The Probabilistic Rational Method is a sizing program Contech developed to estimate a net annual sediment load reduction for a particular CDS model based on site size, site runoff coefficient, regional rainfall intensity distribution, and anticipated pollutant characteristics.

The Probabilistic Method is an extension of the Rational Method used to estimate peak discharge rates generated by storm events of varying statistical return frequencies (e.g. 2-year storm event). Under the Rational Method, an adjustment factor is used to adjust the runoff coefficient estimated for the 10-year event, correlating a known hydrologic parameter with the target storm event. The rainfall intensities vary depending on the return frequency of the storm event under consideration. In general, these two frequency dependent parameters (rainfall intensity and runoff coefficient) increase as the return frequency increases while the drainage area remains constant.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Method. Since most sites are relatively small and highly impervious, the Rational Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS are determined. Performance efficiency curve on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Treatment Flow Rate

The inlet throat area is sized to ensure that the WQQ passes through the separation chamber at a water surface elevation equal to the crest of the diversion weir. The diversion weir bypasses excessive flows around the separation chamber, thus preventing re-suspension or re-entrainment of previously captured particles.

Hydraulic Capacity

The hydraulic capacity of a CDS system is determined by the length and height of the diversion weir and by the maximum allowable head in the system. Typical configurations allow hydraulic capacities of up to ten times the treatment flow rate. The crest of the diversion weir may be lowered and the inlet throat may be widened to increase the capacity of the system at a given water surface elevation. The unit is designed to meet project specific hydraulic requirements.

Performance

Full-Scale Laboratory Test Results

A full-scale CDS system (Model CDS2020-5B) was tested at the facility of University of Florida, Gainesville, FL. This CDS unit was evaluated under controlled laboratory conditions of influent flow rate and addition of sediment.

Two different gradations of silica sand material (UF Sediment & OK-110) were used in the CDS performance evaluation. The particle size distributions (PSDs) of the test materials were analyzed using standard method "Gradation ASTM D-422 "Standard Test Method for Particle-Size Analysis of Soils" by a certified laboratory.

UF Sediment is a mixture of three different products produced by the U.S. Silica Company: "Sil-Co-Sil 106", "#1 DRY" and "20/40 Oil Frac". Particle size distribution analysis shows that the UF Sediment has a very fine gradation (d50 = 20 to 30 μm) covering a wide size range (Coefficient of Uniformity, C averaged at 10.6). In comparison with the hypothetical TSS gradation specified in the NJDEP (New Jersey Department of Environmental Protection) and NJCAT (New Jersey Corporation for Advanced Technology) protocol for lab testing, the UF Sediment covers a similar range of particle size but with a finer d50 (d50 for NJDEP is approximately 50 μm) (NJDEP, 2003).

The OK-110 silica sand is a commercial product of U.S. Silica Sand. The particle size distribution analysis of this material, also included in Figure 1, shows that 99.9% of the OK-110 sand is finer than 250 microns, with a mean particle size (d50) of 106 microns. The PSDs for the test material are shown in Figure 1.

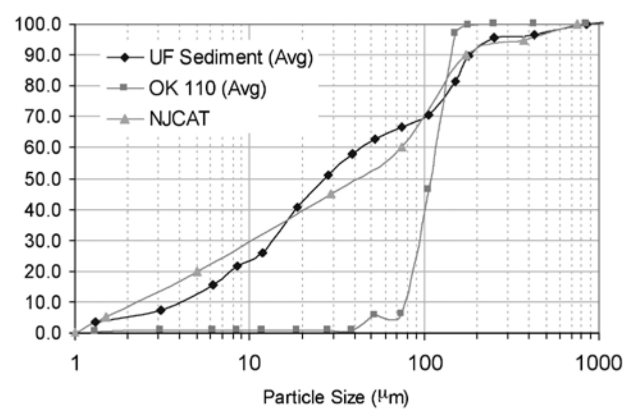


Figure 1. Particle size distributions

Tests were conducted to quantify the performance of a specific CDS unit (1.1 cfs (31.3-L/s) design capacity) at various flow rates, ranging from 1% up to 125% of the treatment design capacity of the unit, using the 2400 micron screen. All tests were conducted with controlled influent concentrations of approximately 200 mg/L. Effluent samples were taken at equal time intervals across the entire duration of each test run. These samples were then processed with a Dekaport Cone sample splitter to obtain representative sub-samples for Suspended Sediment Concentration (SSC) testing using ASTM D3977-97 "Standard Test Methods for Determining Sediment Concentration in Water Samples", and particle size distribution analysis.

Results and Modeling

Based on the data from the University of Florida, a performance model was developed for the CDS system. A regression analysis was used to develop a fitting curve representative of the scattered data points at various design flow rates. This model, which demonstrated good agreement with the laboratory data, can then be used to predict CDS system performance with respect to SSC removal for any particle size gradation, assuming the particles are inorganic sandy-silt. Figure 2 shows CDS predictive performance for two typical particle size gradations (NJCAT gradation and OK-110 sand) as a function of operating rate.

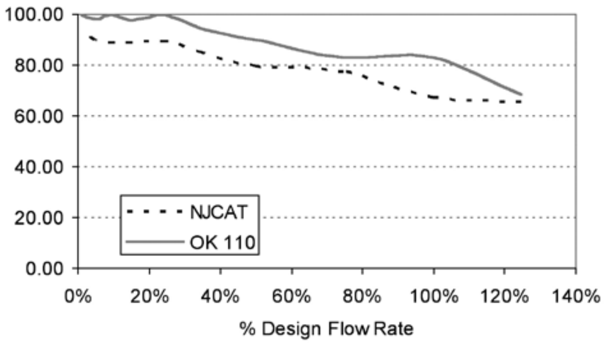


Figure 2. CDS stormwater treatment predictive performance for various particle gradations as a function of operating rate.

Many regulatory jurisdictions set a performance standard for hydrodynamic devices by stating that the devices shall be capable of achieving an 80% removal efficiency for particles having a mean particle size (d50) of 125 microns (e.g. Washington State Department of Ecology — WASDOE - 2008). The model can be used to calculate the expected performance of such a PSD (shown in Figure 3). The model indicates (Figure 4) that the CDS system with 2400 micron screen achieves approximately 80% removal at the design (100%) flow rate, for this particle size distribution (d50 = 125 μm).

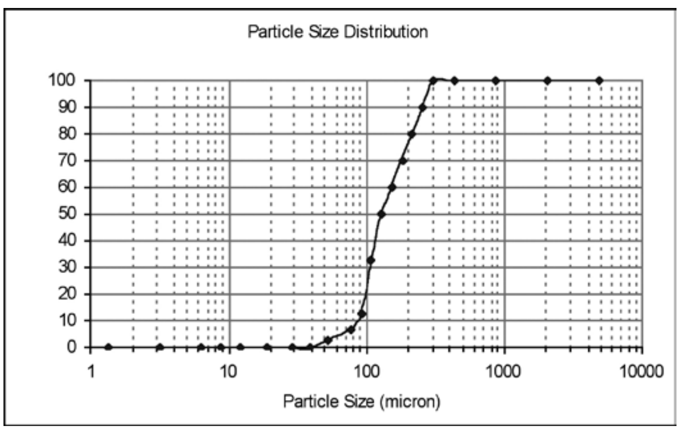


Figure 3. WASDOE PSD

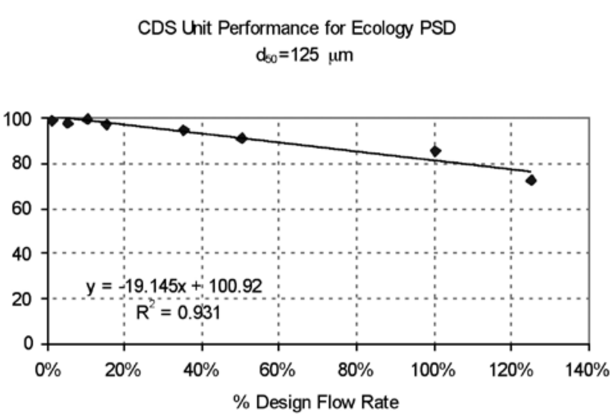


Figure 4. Modeled performance for WASDOE PSD.

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber 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 (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. 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.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down 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. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems 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 covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

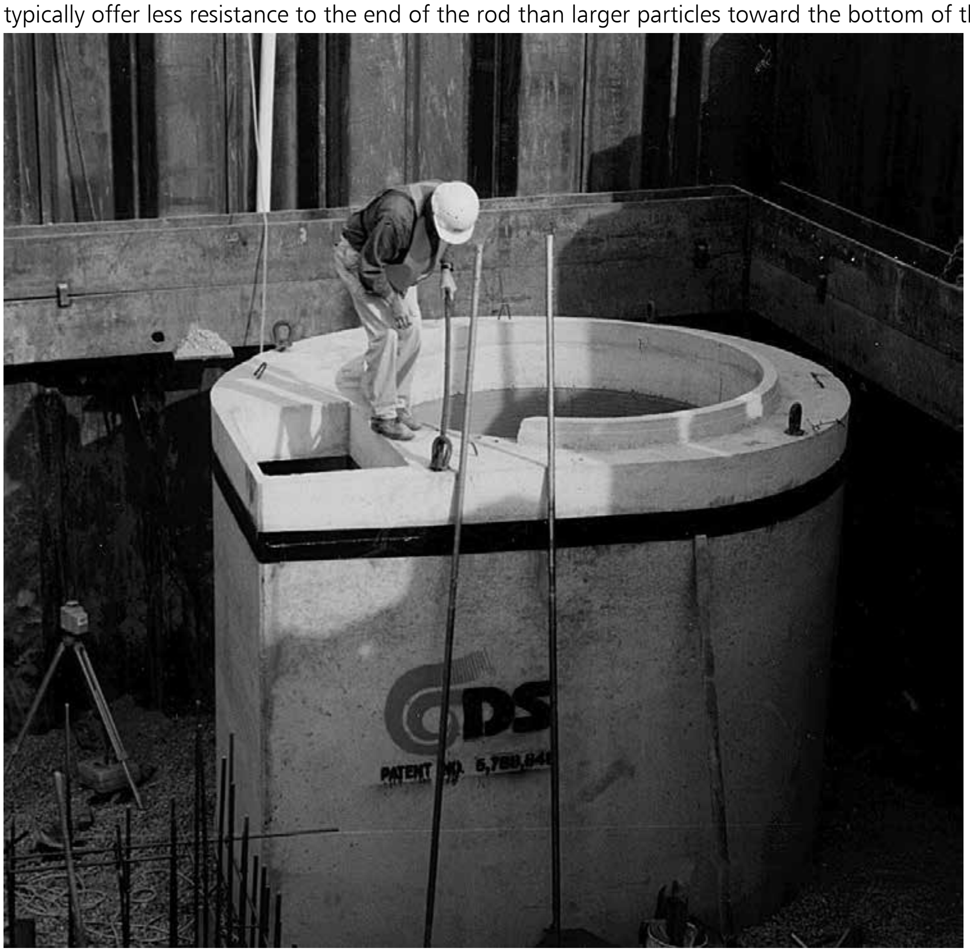
In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should 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. The screen should be cleaned 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 also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y³	m³
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Note: To avoid underestimating the volume of sediment in the chamber, carefully lower the measuring device to the top of the sediment pile. Finer silty particles at the top of the pile may be more difficult to feel with a measuring stick. These finer particles typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.



CDS Inspection & Maintenance Log

CDS Model: ______________________ Location: ______________________

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **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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cds_manual 3/17 PDF

ATTACHMENT E

HYDROLOGIC ANALYSIS – SELECTED PAGES FROM FUSS & O'NEILL REPORT

Drainage Memorandum

Proposed Restaurant

Cedar Avenue and Buckland Road

South Windsor, Connecticut

July 12, 2023
Revised August 7, 2023

Stormwater Management Report
Evergreen Walk

State Traffic Commission Drainage Report
Buckland Road

South Windsor, CT

June 12, 2007
Revised July 27, 2007

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146 Hartford Road
Manchester, CT 06040

STORMWATER MANAGEMENT REPORT
EVERGREEN WALK
BUCKLAND ROAD

SOUTH WINDSOR, CONNECTICUT

TABLE OF CONTENTS

SECTION **PAGE**

1.0 EXECUTIVE SUMMARY

This stormwater management report has been prepared in support of the Evergreen Walk General Development Plan based on the plan entitled, "Preliminary Plan of Development, PPD-1, dated 6/5/07 by FLB Architecture & Planning, Inc.". The total area of the development is 240 acres located on the west side of Buckland Road extending from Smith Street north to Deming Street.

Some of the property has been developed. The following projects have been constructed or are approved for construction: The Shops at Evergreen Walk (constructed), the L.L. Bean area (under construction), L.A. Fitness (constructed), ECHN (constructed), and ECHN II (approved for construction). Conceptual design of additional office and retail spaces, a hotel, and a mixed use development has been completed for the remaining parcels depicted in the General Plan of Development.

Evergreen Walk drains to Plum Gulley Brook which subsequently, crosses under Clark Street in South Windsor. Plum Gulley Brook terminates at Vinton's Mill Pond. The discharge from this pond crosses under CT-RT-30 and discharges into the Podunk River. The watershed analysis design point is the culvert under Route 30 and incorporates the subwatersheds which contribute to this design point.

Existing (pre-development) and proposed (post-development) hydrologic conditions for the site were evaluated. Without a proposed stormwater management system, the addition of impervious surface area resulting from development would cause an increase in peak runoff flow rates from the site to the Route 30 design point.

A stormwater management program has been designed to address the increase in peak runoff, while maintaining existing drainage patterns. Stormwater runoff from developed portions of the site (the constructed and future developments, associated access, and parking lots) will be collected in catch basins that discharge into multiple existing and proposed detention basins located throughout the property. Portions of runoff are discharged into rain gardens, which will infiltrate initial runoff volumes into surrounding soils. Larger runoff volumes will overflow into the storm drainage system and flow into the detention basins. The detention basins will discharge into Plum Gulley Brook. Peak rates of runoff from the 2, 10, 25 and 100-year design storms into the receiving drainage systems will be less than the pre-development peak flow rates. As a result, development depicted by the Evergreen Walk Master Development Plan will not adversely impact the state drainage facility at Route 30.

The storm sewer capacity analysis has been provided in this report for the constructed and approved project units on the Evergreen Walk property. The conceptual design of the remaining parcels does not include storm sewer sizing.

2.0 INTRODUCTION

Evergreen Walk, LLC proposes to construct Evergreen Walk in accordance with the Master Development Plan at Buckland Road, South Windsor, Connecticut. A site location map is presented as Figure 1.

This report was prepared to evaluate existing hydrologic conditions and the proposed stormwater management system for the developed site, including the effects of the development on receiving drainage systems. The report presents design calculations for the constructed or approved for construction stormwater collection and conveyance system, and the design calculations and analyses of existing and proposed detention basins.

3.0 EXISTING CONDITIONS

The Podunk River drainage area encompasses over 7,000 acres at the Route 30 design point, which includes approximately 2,700 acres of Plum Gulley Brook drainage area (Watershed Map, Figure 2). A large percentage of the drainage area is comprised of residential area, while the remainder is forest and farmland. Approximately half of the area has Natural Resources Conservation Service (NRCS, formerly SCS) soil type B. The Podunk River drainage area has some areas of type C soil, and both the Plum Gulley Brook and Podunk River drainage areas have small amounts of type A and D soils (Soil Maps, Figure 3). The project's location on FEMA mapping is depicted in Figure 4.

The majority of Evergreen Walk is currently large areas of meadow and forested areas around the edges of the fields. The Shops at Evergreen Walk, a portion of the Expo Design Center (now being constructed for L.L. Bean), L.A. Fitness, ECHN, and ECHN II are constructed or currently under construction and have been included as existing conditions for stormwater modeling. The area drains from higher points in the east to Plum Gulley Brook to the west.

A hydrologic analysis of the Podunk River Watershed is included in Appendix A (existing conditions) and Appendix B (proposed conditions).

4.0 PROPOSED CONDITIONS

The proposed Master Development Plan includes projects already constructed or approved for construction such as The Shops at Evergreen Walk, the L.L. Bean area, L.A. Fitness, ECHN, and ECHN II. Conceptual design of additional office and retail spaces, a hotel, and a mixed use development has been completed for the remaining parcels depicted in the General Plan of Development. The development includes access drives, parking facilities, and utilities.

Detention basins No. 1, 4, and 8 have been constructed at Evergreen Walk. Detention basin 7 has been approved for construction. Detention basin 2 has been proposed as the final basin for the General Plan of Development. Based on the attached analyses of downstream conditions at the property line, at Plum Gulley Brook at Clark Street and at the Podunk River at Route 30, it will be necessary to detain stormwater runoff from the proposed site due to the timing of the hydrograph peaks for developed conditions. Stormwater runoff will be collected in catch basins with 4 foot sumps and trap hoods and will be discharged into the detention basins. The capacity of the detention basins and their outlet structures are designed for development in accordance with the Evergreen Walk General Plan without increasing the peak flows of the Podunk River at Route 30.

The storm sewer systems have been designed to convey the 25-year storm in accordance with the Town of South Windsor regulations. Pipes will be corrugated plastic pipe with a minimum slope of 0.5%. The method used to size the pipes is described below. The storm sewer systems for the future developments described in the Master Development Plan will adhere to the same design criteria above.

The design point for the hydrologic analyses is Podunk River at the Route 30 crossing. The analyses indicate that following development of Evergreen Walk in accordance with the General Plan of Development, peak flow rates at the design point will not increase for the storms analyzed.

5.0 METHODS

5.1 Storm Sewer System

The storm sewer system was sized using the StormCAD computer model (Storm Sewer Sizing, Appendix C). Input information for the model was derived using Rational Formula methods based on the drainage areas depicted in the drainage area maps in Appendix C. Times of concentration for paved areas were assumed to be the minimum allowable time of 5 minutes. The StormCAD output indicates that all of the proposed pipes will have adequate capacity.

5.2 Podunk River Watershed Analysis

Haestad Method's Pondpack computer program was used to model the Plum Gulley Brook and Podunk River watersheds. The analyses for existing and proposed conditions on the Podunk River at Route 30 for the Evergreen Walk Master Development Plan are included as Appendix A and Appendix B respectively. The Pondpack program is based on NRCS TR-20 calculation methods. The methods described in the NRCS TR-55 manual were used to calculate the input data for this model. Times of concentration were calculated using the TR-55 methods for sheet and shallow concentrated flows.

6.0 PODUNK RIVER WATERSHED ANALYSIS

6.1 Assumptions in the Model

Storage and outfall information for Vinton's Millpond were entered into the current version of the model and there is no adverse impact from the proposed development.

Channel storage in Plum Gulley Brook and the Podunk River are negligible. As can be seen on the drainage area map, the Podunk River passes through swampy areas which could attenuate flood flow. The Muskingum channel routing option was used to model the potential effect of this storage, which was found to have no effect on flow. In order to simplify the model, the channel storage was removed from the model in subsequent runs.

Curve Numbers (CNs) of 50 were arbitrarily assigned to the Plum Gulley Brook and Podunk River drainage areas. Originally, CNs of 64 and 65, respectively, were calculated for these areas based on land use and soil type, but yielded a 100 year discharge of 6,500 cfs, compared to the FEMA flow of 2,580 cfs for a similar watershed on the Podunk River. Although the CNs for these areas may be artificially low, they remain constant during evaluation of existing and proposed conditions, and have no impact on evaluating how stormwater should be managed at the Evergreen Walk site. For this model, the time of concentration is the more critical variable, as the timing of peak flows determines the extent of the proposed effects on the existing conditions more than the CN.

The times of concentrations for both the Plum Gulley Brook and Podunk River watersheds were measured from the most hydraulically remote point of the watersheds to the points at which the streams concentrate. The paths of the times of concentrations are labeled "Tc", and can be found on the USGS Watershed Map (Figure 2). The travel times of the receiving streams were modeled using Modified Puls routing. The streams were modeled with 50:1 side slopes, which represent the relatively mild slopes of the overbank areas which flood flows would pass over. The channel routing remains constant between existing and proposed conditions and does not have a large impact on the results.

7.0 SUMMARY

The pre-development peak discharges are taken from the PondPack Model, Podunk River Watershed to Vinton's Pond at Route 30 – Existing Conditions in Appendix A. The post-development peak discharges are taken from the PondPack Model Full Build Analysis of Podunk River Watershed to Vinton's Pond at Route 30 – Proposed Conditions in Appendix B. Pre and post-development flow rates for the Podunk River at the Route 30 crossing will be:

Frequency (yrs)	Existing Discharge (CFS)	Proposed Discharge (CFS)	Change (CFS)
2	122.62	122.5	-0.12
10	578.82	573.99	-4.83
25	991.80	983.75	-8.05
100	2061.37	1974.61	-86.76

Development in accordance with the Evergreen Walk Master Development Plan will not increase peak flow rates or adversely impact the state drainage facility at Route 30.

LAND USE TABLE

LAND AREA WITHIN			
- THE 'BUCKLAND ROAD GATEWAY DEVELOPMENT ZONE'		229.9 AC.	
- THE 'RURAL RESIDENTIAL ZONE'		13.1 AC.	
OVERALL PROPERTY		243 AC.	

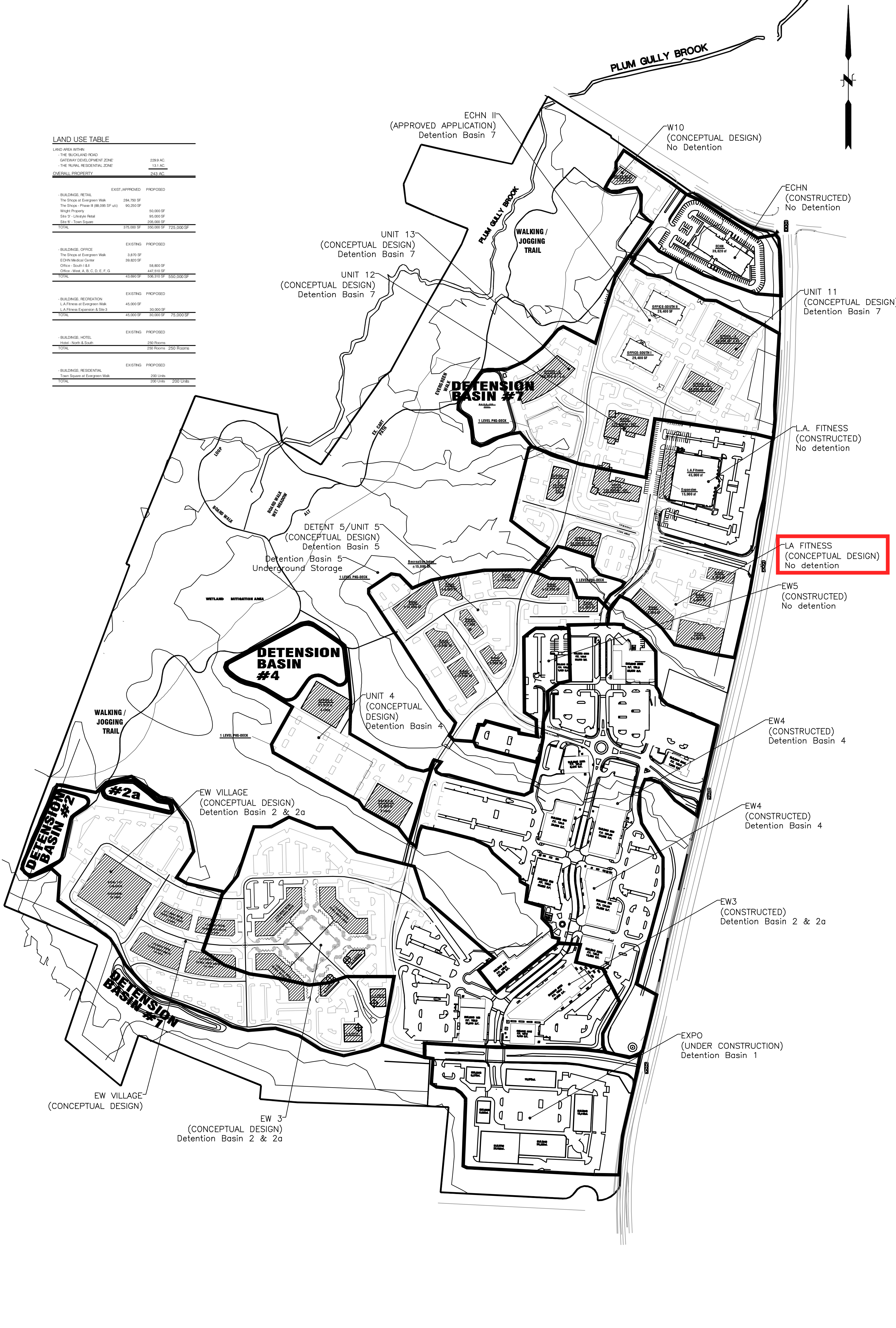
	EXIST./APPROVED	PROPOSED	
- BUILDINGS, RETAIL			
The Shops at Evergreen Walk	284,750 SF		
The Shops - Phase III (88,095 SF u/c)	90,250 SF		
Wright Property		50,000 SF	
Site '3' - Lifestyle Retail		95,000 SF	
Site '6' - Town Square		205,000 SF	
TOTAL	375,000 SF	350,000 SF	725,000 SF

	EXISTING	PROPOSED	
- BUILDINGS, OFFICE			
The Shops at Evergreen Walk	3,870 SF		
ECHN Medical Center	39,820 SF		
Office - South I & II		58,800 SF	
Office - West, A, B, C, D, E, F, G		447,510 SF	
TOTAL	43,690 SF	506,310 SF	550,000 SF

	EXISTING	PROPOSED	
- BUILDINGS, RECREATION			
L.A.Fitness at Evergreen Walk	45,000 SF		
L.A.Fitness Expansion & Site 3		30,000 SF	
TOTAL	45,000 SF	30,000 SF	75,000 SF

	EXISTING	PROPOSED	
- BUILDINGS, HOTEL			
Hotel - North & South		250 Rooms	
TOTAL		250 Rooms	250 Rooms

	EXISTING	PROPOSED	
- BUILDINGS, RESIDENTIAL			
Town Square at Evergreen Walk		200 Units	
TOTAL		200 Units	200 Units



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SCALE:
HORZ.: 1" = 400'
VERT.:
DATUM:
HORZ.:
VERT.:
0 200 400
GRAPHIC SCALE

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EVERGREEN WALK, LLC
PROPOSED WATERSHED AREAS
EVERGREEN WALK MASTER DEVELOPMENT PLAN
SOUTH WINDSOR CONNECTICUT

PROJ. No.: 2000 481 A30
DATE: 6/8/2007
DRA-1

ATTACHMENT F

STORM DRAINAGE COMPUTATIONS

Drainage Memorandum

Proposed Restaurant

Cedar Avenue and Buckland Road

South Windsor, Connecticut

July 12, 2023

Revised August 7, 2023

Rational Method Roof Drain System Calculations

Project: Proposed Restaurants
By: MCB
Date: 7/12/23
Location: South Windsor, CT
Checked:
Date:

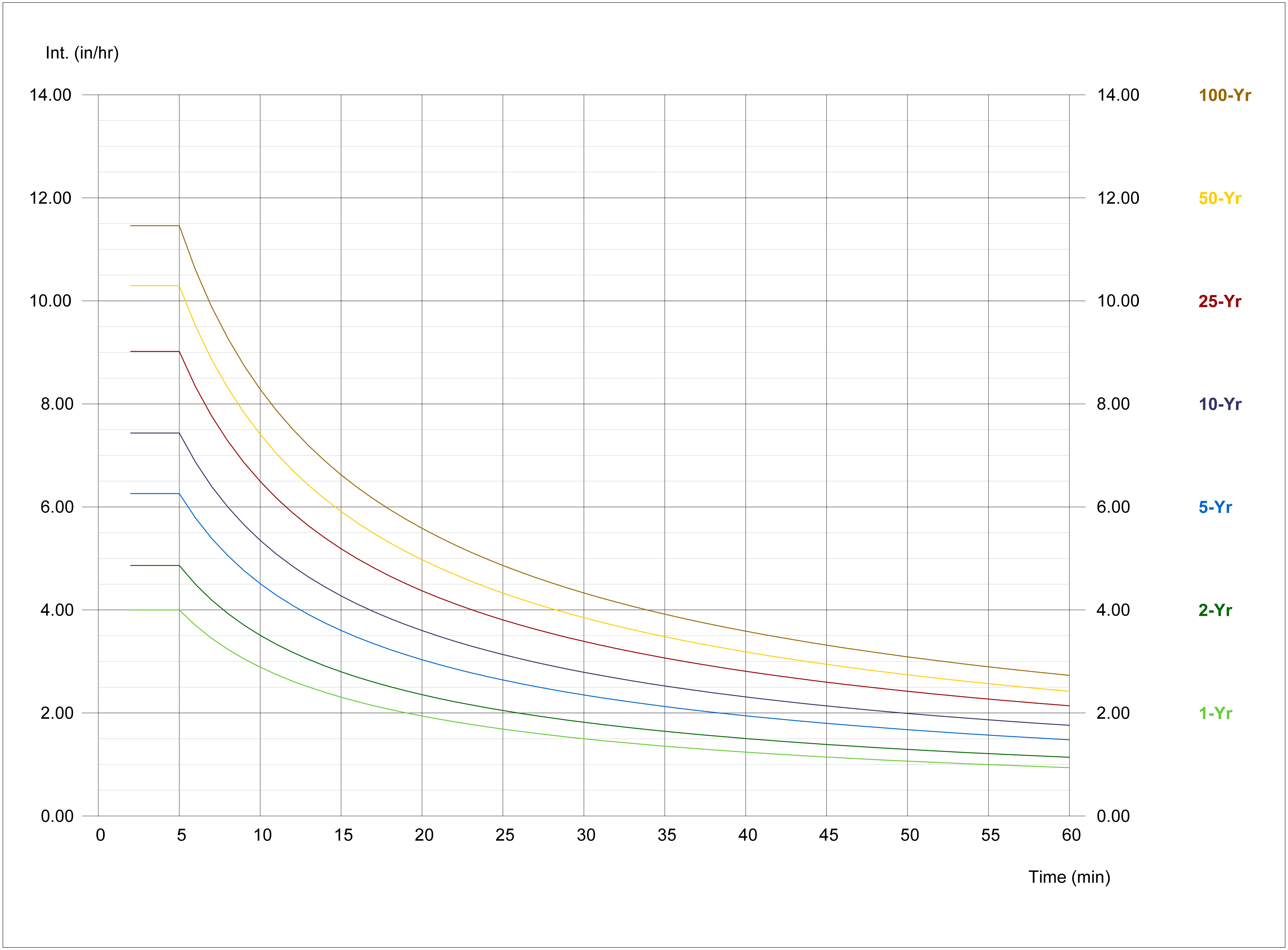
Total Roof Runoff to Proposed Storm Drainage System (In Hydraflow Model)

	BLDG TO CCB 9	BLDG TO CCB 11	BLDG TO CCB 19	Existing System			
C	0.90	0.90	0.90	0.65			
I	7.44	7.44	7.44	7.44			
A	0.11	0.05	0.08	0.79			
Q	0.72	0.36	0.52	3.82			

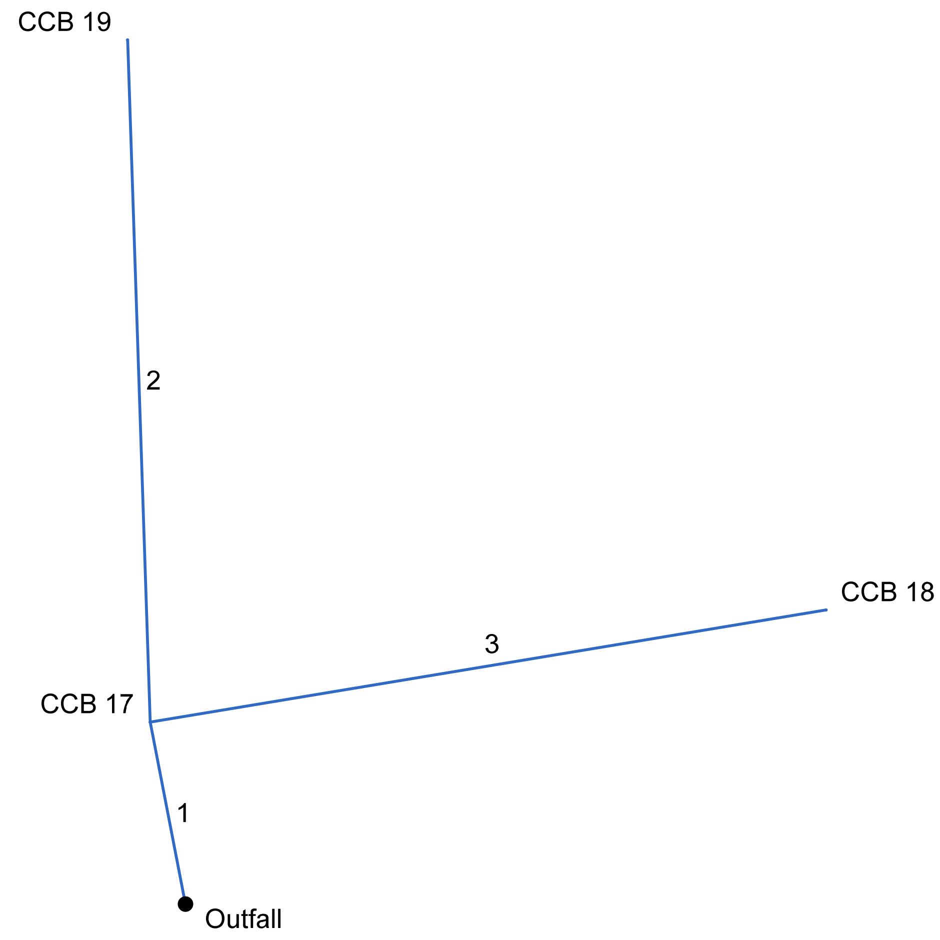
SLR

Storm Sewer IDF Curves

IDF file: South Windsor.IDF



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



Project File: Storm100-02.stm	Number of lines: 3	Date: 7/12/2023

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	31.000	-101.079	Comb	0.00	0.11	0.83	5.0	134.00	2.90	134.90	12	Cir	0.012	1.50	139.60	EX CCB-CCB 17
2	1	114.000	9.198	Comb	0.52	0.18	0.68	5.0	134.90	0.53	135.50	12	Cir	0.012	1.00	138.80	CCB 17-CCB 19
3	1	114.000	91.635	Comb	0.00	0.22	0.77	5.0	134.90	1.67	136.80	12	Cir	0.012	1.00	140.10	CCB 17-CCB 18

Project File: Storm100-02.stm	Number of lines: 3	Date: 7/12/2023

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		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	31.000	0.11	0.51	0.83	0.09	0.38	5.0	5.7	7.0	3.21	6.57	4.53	12	2.90	134.00	134.90	135.25	135.67	0.00	139.60	EX CCB-CCB 17
2	1	114.000	0.18	0.18	0.68	0.12	0.12	5.0	5.0	7.4	1.43	2.80	2.90	12	0.53	134.90	135.50	135.67	136.01	139.60	138.80	CCB 17-CCB 19
3	1	114.000	0.22	0.22	0.77	0.17	0.17	5.0	5.0	7.4	1.26	4.98	2.69	12	1.67	134.90	136.80	135.67	137.27	139.60	140.10	CCB 17-CCB 18

Project File: Storm100-02.stm | Number of lines: 3 | Run Date: 7/12/2023

NOTES:Intensity = 35.57 / (Inlet time + 3.70) ^ 0.72; Return period =Yrs. 10 ; c = cir e = ellip b = box

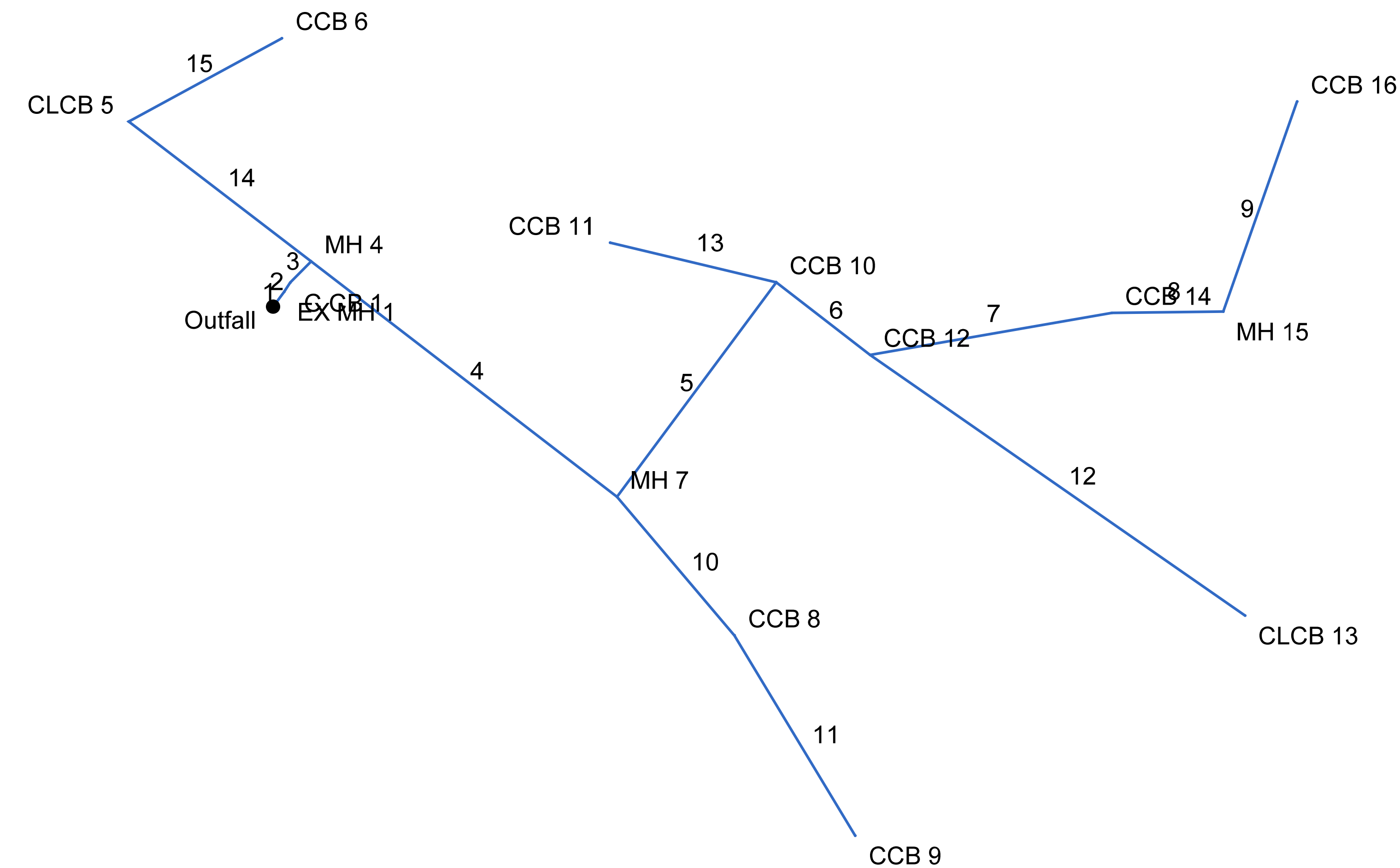
Hydraulic Grade Line Computations

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	12	3.21	134.00	135.25	1.00	0.65	4.09	0.26	135.51	0.693	31.000	134.90	135.67 j	0.77**	0.65	4.97	0.38	136.05	0.792	0.743	n/a	1.50	n/a
2	12	1.43	134.90	135.67	0.77	0.40	2.21	0.08	135.74	0.157	114.000	135.50	136.01	0.51**	0.40	3.59	0.20	136.21	0.528	0.343	n/a	1.00	0.20
3	12	1.26	134.90	135.67	0.77	0.37	1.95	0.18	135.85	0.000	114.000	136.80	137.27 j	0.47**	0.37	3.44	0.18	137.46	0.000	0.000	n/a	1.00	0.18

Project File: Storm100-02.stm | Number of lines: 3 | Run Date: 7/12/2023

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

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



Project File: Storm100.stm	Number of lines: 15	Date: 7/12/2023

Storm Sewers v2023.00

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	5.000	-53.628	MH	0.00	0.00	0.00	0.0	132.20	2.00	132.30	24	Cir	0.012	0.15	136.32	OUTFALL-EX MH 1
2	1	3.000	-2.634	Comb	0.00	0.21	0.78	5.0	132.30	3.33	132.40	24	Cir	0.012	0.50	136.82	EX MH 1-C CB 1
3	2	8.000	10.747	MH	7.03	0.00	0.00	0.0	132.40	1.25	132.50	24	Cir	0.012	1.00	136.50	C CB 1- MH 4
4	3	104.000	83.154	MH	0.00	0.00	0.00	0.0	132.50	0.96	133.50	18	Cir	0.012	1.00	139.00	MH 4-MH 7
5	4	72.000	-91.128	Comb	0.00	0.20	0.69	5.0	133.50	0.56	133.90	18	Cir	0.012	2.25	138.00	MH 7-CCB 10
6	5	32.000	91.128	Comb	0.00	0.14	0.82	5.0	133.90	8.13	136.50	12	Cir	0.012	1.17	143.20	CCB 10-CCB 12
7	6	66.000	-47.483	Comb	0.00	0.35	0.68	5.0	136.50	2.58	138.20	12	Cir	0.012	0.50	143.00	CCB 12-CCB 14
8	7	30.000	9.092	MH	0.00	0.00	0.00	0.0	139.50	1.00	139.80	12	Cir	0.012	0.95	143.90	CCB 14-MH 15
9	8	60.000	-69.818	Comb	0.00	0.17	0.67	5.0	139.80	1.83	140.90	12	Cir	0.012	1.00	144.20	MH 15-CCB 16
10	4	49.000	12.063	Comb	0.00	0.13	0.70	5.0	133.50	8.16	137.50	12	Cir	0.012	0.50	142.90	MH 7-CCB 8
11	10	63.000	9.294	Comb	0.72	0.14	0.76	5.0	137.50	4.44	140.30	12	Cir	0.012	1.00	143.60	CCB 8-CCB 9
12	6	123.000	-2.769	Grate	0.00	0.56	0.61	5.0	136.50	3.41	140.70	12	Cir	0.012	1.00	144.00	CCB 12-CLCB 13
13	5	46.000	-113.099	Comb	0.52	0.06	0.68	5.0	133.90	0.65	134.20	12	Cir	0.012	1.00	137.50	CCB 10-CCB 11
14	3	62.000	-96.990	Grate	0.00	0.18	0.80	5.0	132.50	0.65	132.90	12	Cir	0.012	1.50	135.50	MH 4-CLCB 5
15	14	47.000	114.028	Comb	0.00	0.16	0.79	5.0	132.90	0.64	133.20	12	Cir	0.012	1.00	136.50	CLCB 5-CCB 6

Project File: Storm100.stm	Number of lines: 15	Date: 7/12/2023

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	5.000	0.00	2.30	0.00	0.00	1.62	0.0	6.4	6.7	19.08	34.65	6.12	24	2.00	132.20	132.30	134.20	134.21	0.00	136.32	OUTFALL-EX MH
2	1	3.000	0.21	2.30	0.78	0.16	1.62	5.0	6.4	6.7	19.09	44.73	6.64	24	3.33	132.30	132.40	134.30	133.97	136.32	136.82	EX MH 1-C CB 1
3	2	8.000	0.00	2.09	0.00	0.00	1.45	0.0	6.4	6.7	18.01	27.40	6.90	24	1.25	132.40	132.50	133.97	134.03	136.82	136.50	C CB 1- MH 4
4	3	104.000	0.00	1.75	0.00	0.00	1.18	0.0	6.1	6.8	9.34	11.16	5.78	18	0.96	132.50	133.50	134.03	134.68	136.50	139.00	MH 4-MH 7
5	4	72.000	0.20	1.48	0.69	0.14	0.99	5.0	5.8	7.0	7.39	8.48	5.24	18	0.56	133.50	133.90	134.68	134.96	139.00	138.00	MH 7-CCB 10
6	5	32.000	0.14	1.22	0.82	0.11	0.81	5.0	5.8	7.0	5.66	11.00	7.28	12	8.13	133.90	136.50	136.03	137.44	138.00	143.20	CCB 10-CCB 12
7	6	66.000	0.35	0.52	0.68	0.24	0.35	5.0	5.5	7.2	2.52	6.19	3.86	12	2.58	136.50	138.20	137.44	138.88	143.20	143.00	CCB 12-CCB 14
8	7	30.000	0.00	0.17	0.00	0.00	0.11	0.0	5.3	7.2	0.82	3.86	3.46	12	1.00	139.50	139.80	139.81	140.18	143.00	143.90	CCB 14-MH 15
9	8	60.000	0.17	0.17	0.67	0.11	0.11	5.0	5.0	7.4	0.85	5.22	3.07	12	1.83	139.80	140.90	140.18	141.28	143.90	144.20	MH 15-CCB 16
10	4	49.000	0.13	0.27	0.70	0.09	0.20	5.0	5.3	7.2	2.15	11.02	3.45	12	8.16	133.50	137.50	134.68	138.13	139.00	142.90	MH 7-CCB 8
11	10	63.000	0.14	0.14	0.76	0.11	0.11	5.0	5.0	7.4	1.51	8.13	3.29	12	4.44	137.50	140.30	138.13	140.82	142.90	143.60	CCB 8-CCB 9
12	6	123.000	0.56	0.56	0.61	0.34	0.34	5.0	5.0	7.4	2.54	7.13	3.88	12	3.41	136.50	140.70	137.44	141.38	143.20	144.00	CCB 12-CLCB 13
13	5	46.000	0.06	0.06	0.68	0.04	0.04	5.0	5.0	7.4	0.82	3.12	1.05	12	0.65	133.90	134.20	136.03	136.05	138.00	137.50	CCB 10-CCB 11
14	3	62.000	0.18	0.34	0.80	0.14	0.27	5.0	5.7	7.1	1.91	3.10	2.43	12	0.65	132.50	132.90	134.03	134.18	136.50	135.50	MH 4-CLCB 5
15	14	47.000	0.16	0.16	0.79	0.13	0.13	5.0	5.0	7.4	0.94	3.08	1.20	12	0.64	132.90	133.20	134.32	134.34	135.50	136.50	CLCB 5-CCB 6

Project File: Storm100.stm | Number of lines: 15 | Run Date: 7/12/2023

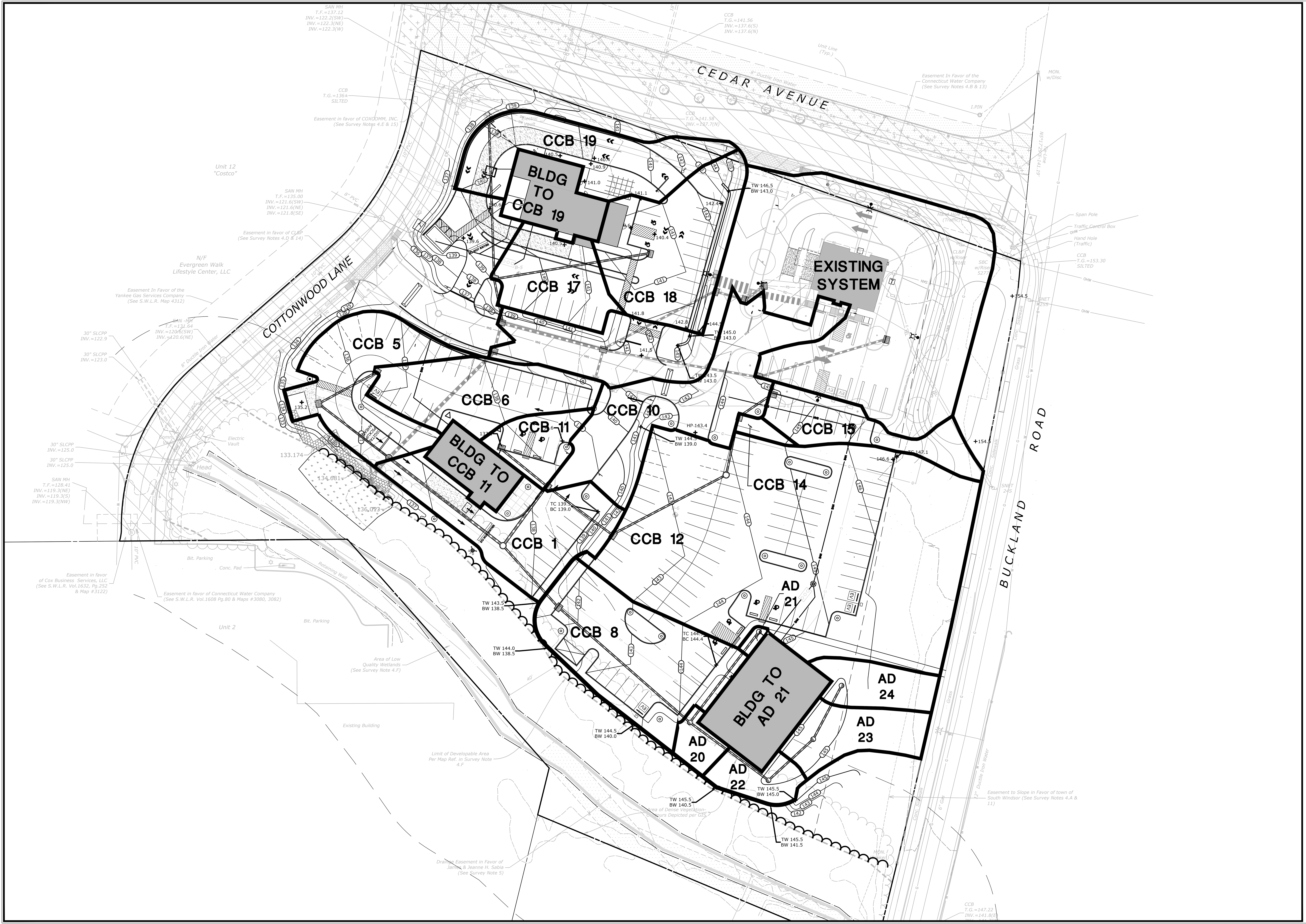
NOTES:Intensity = 35.57 / (Inlet time + 3.70) ^ 0.72; Return period =Yrs. 10 ; c = cir e = ellip b = box

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	19.08	132.20	134.20	2.00	3.14	6.08	0.57	134.77	0.607	5.000	132.30	134.21	1.91	3.09	6.17	0.59	134.80	0.526	0.567	0.028	0.15	0.09
2	24	19.09	132.30	134.30	2.00	2.65	6.08	0.81	135.11	0.000	3.000	132.40	133.97	1.57**	2.65	7.21	0.81	134.78	0.000	0.000	n/a	0.50	n/a
3	24	18.01	132.40	133.97	1.57	2.57	6.80	0.76	134.73	0.000	8.000	132.50	134.03	1.53**	2.57	6.99	0.76	134.79	0.000	0.000	n/a	1.00	n/a
4	18	9.34	132.50	134.03	1.50	1.49	5.29	0.43	134.46	0.675	104.000	133.50	134.68 j	1.18**	1.49	6.26	0.61	135.29	0.730	0.702	n/a	1.00	n/a
5	18	7.39	133.50	134.68	1.18	1.49	4.95	0.38	135.06	0.457	72.000	133.90	134.96	1.06	1.34	5.52	0.47	135.44	0.584	0.520	0.375	2.25	1.07
6	12	5.66	133.90	136.03	1.00	0.77	7.20	0.81	136.84	2.151	32.000	136.50	137.44 j	0.94**	0.77	7.36	0.84	138.29	1.859	2.005	n/a	1.17	0.99
7	12	2.52	136.50	137.44	0.94	0.57	3.28	0.31	137.75	0.000	66.000	138.20	138.88 j	0.68**	0.57	4.43	0.31	139.18	0.000	0.000	n/a	0.50	n/a
8	12	0.82	139.50	139.81	0.31*	0.21	3.91	0.14	139.96	0.000	30.000	139.80	140.18	0.38**	0.27	3.02	0.14	140.32	0.000	0.000	n/a	0.95	0.13
9	12	0.85	139.80	140.18	0.38	0.27	3.10	0.14	140.32	0.000	60.000	140.90	141.28	0.38**	0.28	3.04	0.14	141.43	0.000	0.000	n/a	1.00	n/a
10	12	2.15	133.50	134.68	1.00	0.52	2.74	0.12	134.80	0.311	49.000	137.50	138.13 j	0.63**	0.52	4.16	0.27	138.39	0.605	0.458	n/a	0.50	0.13
11	12	1.51	137.50	138.13	0.63	0.41	2.92	0.21	138.33	0.000	63.000	140.30	140.82 j	0.52**	0.41	3.66	0.21	141.03	0.000	0.000	n/a	1.00	0.21
12	12	2.54	136.50	137.44	0.94	0.57	3.31	0.31	137.75	0.000	123.000	140.70	141.38 j	0.68**	0.57	4.45	0.31	141.69	0.000	0.000	n/a	1.00	n/a
13	12	0.82	133.90	136.03	1.00	0.79	1.05	0.02	136.05	0.046	46.000	134.20	136.05	1.00	0.79	1.05	0.02	136.07	0.046	0.046	0.021	1.00	0.02
14	12	1.91	132.50	134.03	1.00	0.79	2.43	0.09	134.12	0.244	62.000	132.90	134.18	1.00	0.79	2.43	0.09	134.27	0.244	0.244	0.152	1.50	0.14
15	12	0.94	132.90	134.32	1.00	0.79	1.20	0.02	134.34	0.059	47.000	133.20	134.34	1.00	0.79	1.20	0.02	134.37	0.059	0.059	0.028	1.00	0.02

Project File: Storm100.stm	Number of lines: 15	Run Date: 7/12/2023

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



SLR
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
SLRCONSULTING.COM

DESCRIPTION	DATE	BY
P&Z SUBMISSION	08/07/2023	MCB

DRAINAGE AREA MAP - STORM DRAINAGE SYSTEM

PROPOSED RESTAURANTS

CEDAR AVENUE AND BUCKLAND AVENUE
SOUTH WINDSOR, CONNECTICUT

MCB	MCB	TD
DESIGNED	DRAWN	CHECKED

SCALE: 1"=30'

DATE: JULY 12, 2023

PROJECT NO.: 21167.00001

SHEET NO.: 1 OF 1

SHEET NAME: CB