SITE ENGINEERING REPORT

2949 Long Ridge Road
Stamford, CT

Prepared For

Rockrimmon Country Club

Prepared by

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Stamford, CT
(203) 327-0500

Issued on
July 12, 2023

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CT Lic. No. 27812

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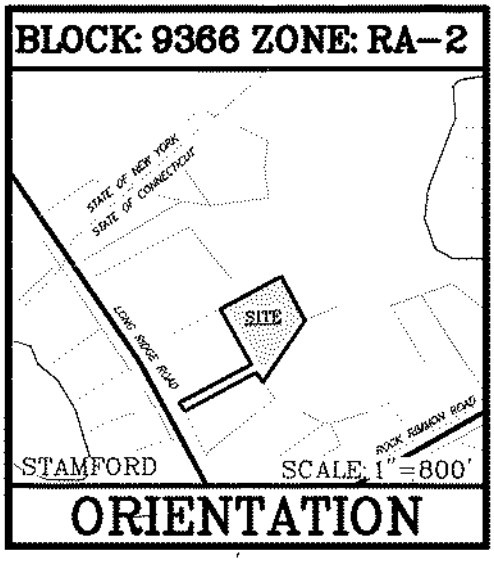
Appendices

Orientation Block



Narrative

Project Description:

The applicant, Rockrimmon Country Club Inc., is proposing to construct a parking lot, a wood deck and pickleball courts on a vacant parcel adjacent to the club. Other improvements include relocation of two existing sheds, walkways, and any associated hardscape & landscaping. The property is about 1.07± acres and is located within the RA-2 zone. Reference is made to site drawings prepared by this office, dated July 12, 2023.

Existing Conditions:

The property is currently undeveloped woods with the exception of two sheds and a fence near the northern property boundary. It is adjacent to a parking lot to the north, tennis courts to the east and residential properties to the west and south. The existing landscape includes woodland trees and brush. The site slopes from the north at elevation 455± to the southeast at elevation 441±. There are flagged wetland soils on the neighboring property to the southeast. The property lies within the drinking water supply watershed but not in a regulatory 100-year floodplain as established by the Federal Emergency Management Agency (FEMA) on "Flood Insurance Rate Maps" (FIRM) for Fairfield County, Community No. 09001C0365G, Panel 365 of 626, effective date June 18, 2010 (Appendix A).

Drainage Patterns & Conveyance Systems

Under existing conditions, runoff generated from the site typically sheet flows to the southeast toward the offsite wetlands. There are no formal drainage systems onsite, however there are within the club parking lots adjacent to the site. There is little to no offsite runoff flowing onto the site. The site is eventually tributary to a system of ponds and streams that tie into the East Branch of the Mianus River. Refer to Appendix B for existing and proposed on-site drainage basin maps.

Soils

The USDA Natural Resources Conservation Service's Websoil Survey indicates the soils on the subject parcel to be Paxton and Montauk soils within Hydrologic Soils Group C. Soil testing was performed on-site to identify any subgrade restrictive soil conditions and to confirm the hydrologic soil classification. A total of six (6) test pits were performed. Mottling was observed in three test pits at depths of 20-42" below grade. Ledge wasn't encountered in any of the six test pits, while water was found in four test pits at depths ranging between 40-96" below grade, with the shallowest water encountered closer to the south. Four saturated hydraulic conductivity tests were conducted in the areas of infiltration to verify that the in-situ soil can adequately infiltrate stormwater. The observed infiltration rates ranged between 13 1/16" and 16 13/16" per hour. Test pit and conductivity test results can be reviewed on site plan sheet SE-5. The location of each test is depicted on the Proposed LID Map (Appendix C).

Proposed Conditions:

The project includes the construction of an asphalt parking lot, four pickleball courts, wooden deck, and associated, landscaped areas, walkways. The two existing sheds will also be relocated to the southwestern corner of the proposed parking lot. The project will result in an increase in impervious area of approximately 25,945± SF.

Methodology & General Design Criteria

All drainage systems have been designed for Type III, 24-hour storm events. The project site is north of the Merritt Parkway and the drainage system therefore has been designed for the 10-year design storm frequency. The 24-hour design storm rainfall amounts, and distributions were obtained from the latest NOAA Atlas 14 Point Precipitation Frequency Estimates and storm distributions (Appendix A).

Project Classification

The proposed development is classified as a new development project with more than ½ an acre of disturbance and directly connected impervious area less than 40%, therefore must comply with Standards 1 through 5 of the Stamford Drainage Manual. To comply with Standard 1, this project must provide full Water Quality Volume (WQV) via non-structural practices or infiltration best management practices (BMP's).

Proposed LID Techniques

Low impact development and site planning techniques were used to the maximum extent practicable given the existing constraints of this site. The site is in an area with limited space for LID practices due to setback requirements from the existing wetlands and conservation area, and due to the steep slopes on-site.

LID techniques include limiting the amount of disturbance around the proposed improvements and minimizing impervious surfaces where possible. The limit of disturbance for the proposed development has been set to allow for the proposed development, while aiming to minimize impact to adjacent trees and vegetation. The section of woods within the Conservation Easement Area and within 50' of wetlands shall remain undisturbed.

Proposed Stormwater Treatment Practices

The design approach chosen to satisfy Standard 1 of the Stamford Drainage Manual is to provide the required water quality volume via a subsurface infiltration. Each system is described in detail below.

Infiltration #1 consists of ninety (90) – 3-foot-tall concrete galleries located underneath the southeastern corner of the proposed parking lot. Stormwater runoff generated from the paved parking lot will be captured and sent through an oil-grit separator before being treated in the subsurface infiltration system which will outlet into a meter structure consisting of a low flow orifice and overflow weir. The meter structure outlets downhill to a riprap splashpad directed toward the neighboring wetlands.

Infiltration #2 consists of twenty-five (25) – 4-foot-tall concrete galleries located underneath the southern pickleball courts. Stormwater runoff generated from the pickleball courts will be captured and treated in the subsurface infiltration system which will outlet into to a second riprap splashpad in the southeast corner.

A summary of the Water Quality required and provided by the stormwater practices is provided below:

Standard 1 (Retention and Treatment) Calculations				
Drainage Area ID	Total Area (SF)	Impervious Area (SF)	Retention Volume Required	Retention Volume Provided
Bypass	18,914	748	N/A	0
Infil #1	19,862	16,628	1,330	3,708
Infil #2	7,956	7,415	589	1,149
TOTAL	**46,732**	**24,791**	**1,919**	**4,857**

Infiltration BMP's have been designed in accordance with the requirements of the Stamford Stormwater Manual.

Hydrologic Analysis of Peak Rates of Runoff

Hydrologic models have been prepared utilizing the SCS Runoff Curve Number Method from NRCS TR-55 to analyze the pre- and post-development rainfall runoff rates and volumes. Watershed areas, curve numbers (CN), and times of concentration (TC) were calculated for each contributing watershed. A curve number of 73 is used for the existing woods and the undisturbed areas under proposed conditions. A curve number of 89 was assigned to the proposed wood deck since there will be a layer of crushed stone below the deck. A time of concentration (TC) of 5 minutes was assumed for both proposed infiltration basins as they are largely impervious with short runoff lengths, and a TC of 17.2 minutes was calculated using HydroCad for the existing and proposed bypass basins. The pre-development drainage basin boundaries and the post-development drainage basin boundaries are shown in Appendix B. The results of the HydroCad model used to analyze the pre- and post-development watershed conditions are presented in Appendix E.

A comparison of the pre- and post-development peak discharge rates is provided in the tables below.

Overall Site Peak Flow Rates			
Storm Event	Existing (cfs)	Proposed (cfs)	Δ (cfs)
1-Year	0.72	0.71	-0.01
2-Year	1.10	1.09	-0.01
5-Year	1.79	1.77	-0.02
10-Year	2.40	2.22	-0.18
25-Year	3.28	2.80	-0.48
50-Year	3.95	3.43	-0.52

Comparison of the peak discharge rates for pre- and post-development watershed conditions demonstrates that the peak rate of runoff from the proposed development will be decreased in all storms studied. Therefore, the proposed development will not adversely impact the downstream or adjacent properties or receiving water bodies.

Compliance with Stormwater Management Standards

The project site will be designed to meet the Stamford Stormwater Management Standards to the maximum extent practicable as summarized below:

Standard 1: Runoff and Pollutant Reduction

A. The runoff and pollutant reduction requirements for this project are to retain the WQV on-site using Non-Structural Practices or Infiltration BMP's. The proposed Stormwater Treatment Practices include two subsurface infiltration systems. See "Proposed LID & Stormwater Treatment Practices" for a detailed description of each system, its required WQV and provided storage volume.
B. Not Applicable. Stormwater systems retain WQV for the site.
C. Land disturbance has been minimized as much as possible. With proper sediment and erosion controls and permanent stabilization of surfaces the development will not result in future site erosion.
D. Noted
E. Grading in the proposed parking lot will be directed toward drains that will be piped to an oil/grit separator and discharge into the infiltration system. See Appendix D for OGS sizing calculations.
F. Steep slopes, although not significant on this project, are avoided/outside the limits of construction.

Standard 2: Peak Flow Control

A. Stream channel protection is not required for this project as the subject development has less than one acre of impervious coverage and it does not discharge directly or indirectly into a water body or watercourse.
B. The proposed stormwater system is designed to adequately pass flows leading to, from and through it up to and including the 10-year design storm event as required in Section 3 of the drainage manual. Refer to the conveyance calculations found in Appendix D.
C. The post-development peak flow rates from the 1-year, 2-year, 5-year, 10-year, 25-year and 50-year, 24-hour storms are controlled to the corresponding pre-development peak discharge rates. Refer to the HydroCAD report found in Appendix E.
D. All proposed structural BMP's are equipped with a high-bypass "emergency outlet" sized to safely pass the post-development peak runoff from the 100-year, 24-hour storm event.
E. Noted.

Standard 3: Construction Erosion and Sediment Control

A. Site plan sheet SE-4 depicts erosion control measures to be implemented to control construction related impacts. Sediment and erosion controls such as silt fencing, stone tracking pads at construction zone entrance/exit points, hay bale & insert catch basin protection, and tree protection are proposed.

Standard 4: Operation and Maintenance

A. A Standard City of Stamford Drainage Maintenance Agreement will be executed with the Environmental Protection Board at time of project close out. A draft maintenance agreement has been prepared and is included in Appendix G.
B. The construction plans include notes describing the long-term maintenance requirements for the site-specific drainage system(s) including routine and non-route inspection and maintenance tasks to be undertaken after construction is completed as well as the schedule for implementing these tasks. This information is found on sheet SE-6.

Standard 5: Stormwater Management Report

A. This document and its associated appendices serve as the required Stormwater Management Report.
B. (See below)

Based on the above information, the proposed improvements are designed in accordance with the City of Stamford Stormwater Drainage Manual and will not adversely impact adjacent or downstream properties or City-owned drainage facilities.

Appendix A

FEMA Flood Insurance Map
USGS Quadrangle Map – Site Vicinity Map
NOAA Atlas 14 Volume 10 – Precipitation Frequency
City of Stamford Rainfall Intensity – Duration Curves
NRCS Websoil Survey

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FEMA

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ff 1

%DVHPS 86 1DWLRQDO 0DS 2UWKRLPDJHU\ DWD UHIHUHQFHG 2FWREHU

/HJHQG

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L:WHRW %DVH)ORRG(OHYDWLRQ %)(
=RQH$ 9 $
L:WK%(RUHPSWK =RQH$ $ 9 $
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$UHDR 8QGHWHUPLQHG)ORRG+D]DUG =RQH'

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/HYHH L'LNH RU)ORRGZDOO

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&RDVWDO 7UDQVHFW
%DVH)ORRG(OHYDWLRQL LQH %)(
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-XULVGLFWLRQ%RXQGDU\
&RDVWDO 7UDQVHFW %DVHOLQH
3URWHFWHG%DVHOLQH
+LJKUHUDSKLF)DWXUH

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1R'LWDO DWD$YDLODEOH
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SRQW VHOHFWHGE WKHXHU DQGGRHV QRW UHSUH
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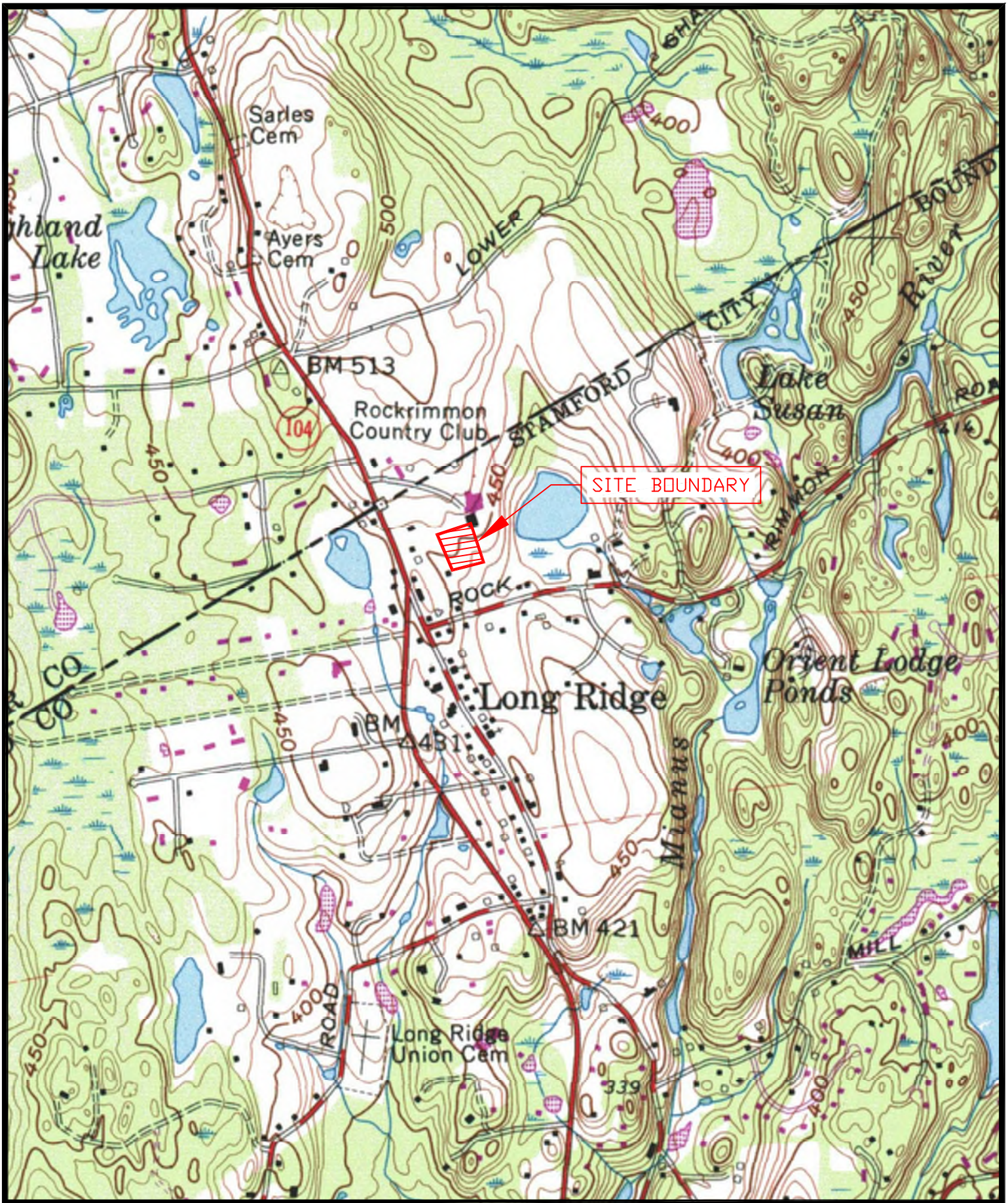

USGS MAP – 2949 LONG RIDGE ROAD

Redniss & Mead
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COMM. NO.:	DATE:
4043	07/10/2023
	SCALE: 1"=1000'

CALS

NOAA Atlas 14, Volume 10, Version 3
Location name: Stamford, Connecticut, USA*
Latitude: 41.1601°, Longitude: -73.5967°
Elevation: 459.32 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	**0.360** (0.274-0.464)	**0.420** (0.319-0.542)	**0.518** (0.392-0.670)	**0.600** (0.452-0.779)	**0.712** (0.521-0.952)	**0.797** (0.573-1.08)	**0.885** (0.619-1.23)	**0.980** (0.655-1.39)	**1.11** (0.719-1.62)	**1.22** (0.770-1.79)
10-min	**0.509** (0.387-0.657)	**0.595** (0.452-0.768)	**0.734** (0.556-0.950)	**0.849** (0.640-1.10)	**1.01** (0.739-1.35)	**1.13** (0.812-1.53)	**1.25** (0.877-1.75)	**1.39** (0.930-1.97)	**1.58** (1.02-2.29)	**1.72** (1.09-2.54)
15-min	**0.599** (0.456-0.773)	**0.699** (0.532-0.903)	**0.863** (0.654-1.12)	**0.999** (0.753-1.30)	**1.19** (0.869-1.59)	**1.33** (0.954-1.80)	**1.48** (1.03-2.05)	**1.63** (1.09-2.31)	**1.85** (1.20-2.69)	**2.03** (1.28-2.99)
30-min	**0.849** (0.646-1.10)	**0.988** (0.751-1.27)	**1.21** (0.920-1.57)	**1.40** (1.06-1.82)	**1.66** (1.22-2.22)	**1.86** (1.33-2.52)	**2.06** (1.44-2.86)	**2.27** (1.52-3.22)	**2.56** (1.66-3.72)	**2.78** (1.76-4.11)
60-min	**1.10** (0.836-1.42)	**1.28** (0.969-1.65)	**1.57** (1.19-2.03)	**1.80** (1.36-2.35)	**2.13** (1.56-2.85)	**2.39** (1.71-3.23)	**2.64** (1.84-3.66)	**2.91** (1.95-4.12)	**3.26** (2.11-4.74)	**3.54** (2.24-5.22)
2-hr	**1.43** (1.09-1.83)	**1.67** (1.27-2.14)	**2.06** (1.57-2.65)	**2.38** (1.81-3.08)	**2.83** (2.08-3.76)	**3.17** (2.29-4.27)	**3.52** (2.47-4.86)	**3.90** (2.62-5.48)	**4.41** (2.86-6.37)	**4.82** (3.06-7.06)
3-hr	**1.65** (1.26-2.10)	**1.93** (1.48-2.47)	**2.40** (1.83-3.07)	**2.79** (2.12-3.58)	**3.32** (2.45-4.39)	**3.72** (2.70-5.00)	**4.14** (2.92-5.71)	**4.59** (3.09-6.44)	**5.23** (3.40-7.51)	**5.73** (3.65-8.37)
6-hr	**2.08** (1.60-2.63)	**2.45** (1.89-3.11)	**3.07** (2.36-3.91)	**3.59** (2.74-4.58)	**4.29** (3.19-5.66)	**4.82** (3.52-6.45)	**5.38** (3.82-7.39)	**6.00** (4.05-8.36)	**6.88** (4.49-9.83)	**7.60** (4.85-11.0)
12-hr	**2.56** (1.99-3.22)	**3.05** (2.37-3.84)	**3.85** (2.98-4.87)	**4.52** (3.48-5.73)	**5.44** (4.06-7.12)	**6.12** (4.49-8.15)	**6.85** (4.89-9.38)	**7.67** (5.20-10.6)	**8.86** (5.80-12.6)	**9.84** (6.30-14.2)
24-hr	**3.01** (2.35-3.76)	**3.63** (2.83-4.54)	**4.64** (3.61-5.82)	**5.48** (4.24-6.91)	**6.64** (4.99-8.66)	**7.50** (5.54-9.95)	**8.42** (6.07-11.5)	**9.50** (6.46-13.1)	**11.1** (7.28-15.6)	**12.4** (7.97-17.8)
2-day	**3.39** (2.66-4.21)	**4.14** (3.25-5.15)	**5.37** (4.21-6.70)	**6.40** (4.98-8.01)	**7.81** (5.91-10.1)	**8.85** (6.58-11.7)	**9.98** (7.25-13.6)	**11.3** (7.74-15.5)	**13.4** (8.82-18.8)	**15.2** (9.76-21.5)
3-day	**3.66** (2.89-4.53)	**4.49** (3.54-5.56)	**5.84** (4.59-7.25)	**6.96** (5.43-8.67)	**8.50** (6.46-11.0)	**9.64** (7.19-12.7)	**10.9** (7.93-14.8)	**12.4** (8.46-16.8)	**14.6** (9.66-20.5)	**16.6** (10.7-23.5)
4-day	**3.92** (3.10-4.84)	**4.79** (3.79-5.92)	**6.22** (4.89-7.70)	**7.40** (5.79-9.20)	**9.02** (6.87-11.6)	**10.2** (7.65-13.4)	**11.5** (8.42-15.6)	**13.1** (8.98-17.8)	**15.5** (10.2-21.6)	**17.6** (11.3-24.8)
7-day	**4.68** (3.72-5.74)	**5.63** (4.47-6.92)	**7.19** (5.69-8.85)	**8.48** (6.68-10.5)	**10.3** (7.84-13.1)	**11.6** (8.69-15.1)	**13.0** (9.51-17.5)	**14.7** (10.1-19.8)	**17.2** (11.4-23.9)	**19.4** (12.6-27.2)
10-day	**5.42** (4.32-6.63)	**6.43** (5.12-7.87)	**8.07** (6.41-9.90)	**9.44** (7.45-11.6)	**11.3** (8.67-14.4)	**12.7** (9.56-16.5)	**14.2** (10.4-19.0)	**16.0** (11.0-21.5)	**18.5** (12.3-25.5)	**20.7** (13.4-28.9)
20-day	**7.65** (6.14-9.30)	**8.79** (7.04-10.7)	**10.6** (8.50-13.0)	**12.2** (9.67-14.9)	**14.3** (11.0-18.0)	**15.9** (11.9-20.3)	**17.6** (12.8-23.0)	**19.3** (13.4-25.8)	**21.8** (14.5-29.8)	**23.8** (15.5-33.0)
30-day	**9.50** (7.65-11.5)	**10.7** (8.62-13.0)	**12.7** (10.2-15.4)	**14.4** (11.5-17.5)	**16.7** (12.8-20.8)	**18.4** (13.9-23.3)	**20.2** (14.7-26.2)	**22.0** (15.3-29.2)	**24.4** (16.3-33.2)	**26.2** (17.1-36.2)
45-day	**11.8** (9.50-14.2)	**13.1** (10.6-15.8)	**15.3** (12.3-18.4)	**17.1** (13.6-20.7)	**19.5** (15.1-24.3)	**21.5** (16.2-27.0)	**23.4** (17.0-30.0)	**25.2** (17.6-33.3)	**27.6** (18.5-37.4)	**29.3** (19.1-40.3)
60-day	**13.6** (11.0-16.4)	**15.1** (12.2-18.1)	**17.4** (14.0-20.9)	**19.3** (15.5-23.3)	**21.9** (17.0-27.1)	**24.0** (18.1-30.1)	**26.0** (18.9-33.2)	**27.9** (19.5-36.7)	**30.3** (20.3-40.9)	**31.9** (20.9-43.9)

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

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

Please refer to NOAA Atlas 14 document for more information.

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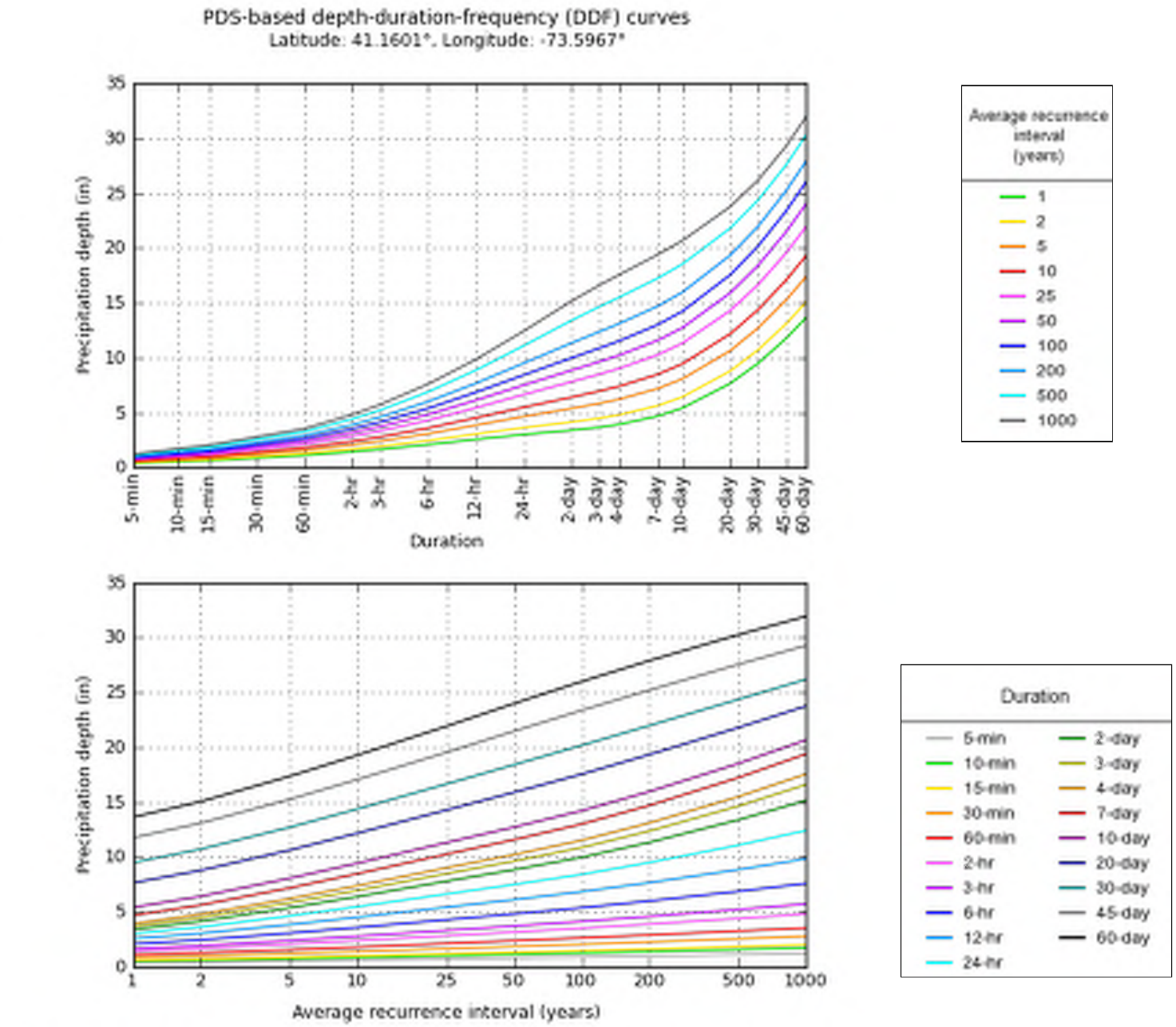
PF graphical



NOAA Atlas 14, Volume 10, Version 3 Created (GMT): Mon Nov 28 20:53:39 2022

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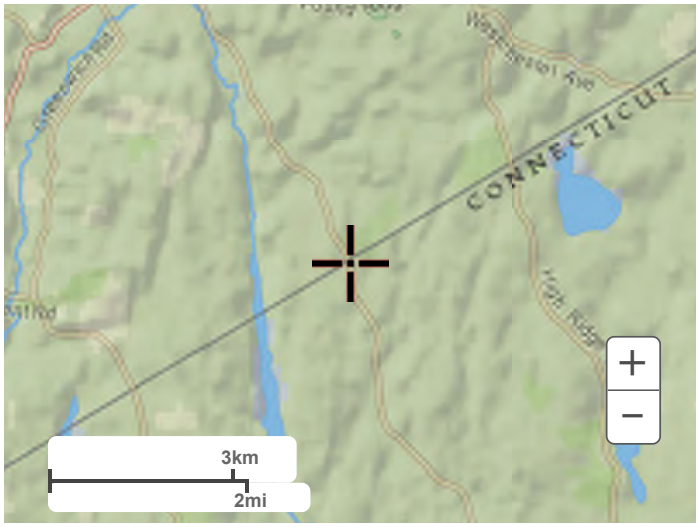
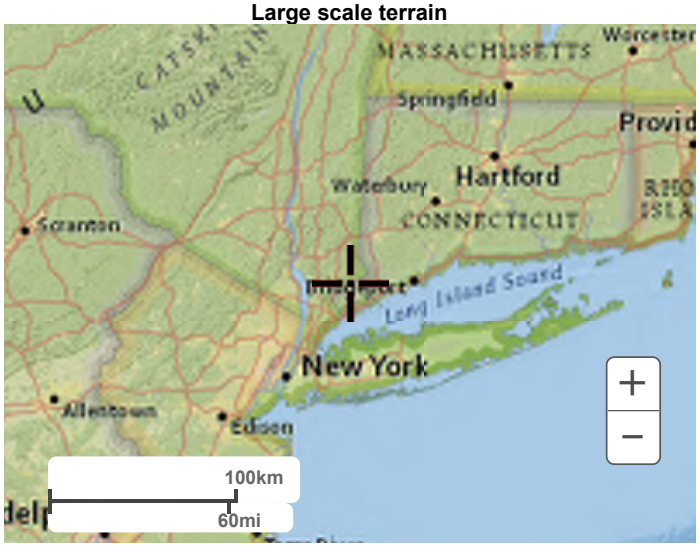
Maps & aerials

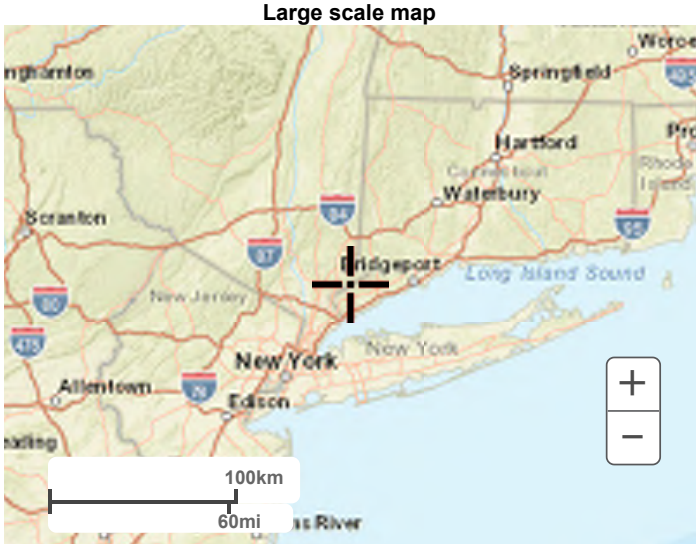
Small scale terrain



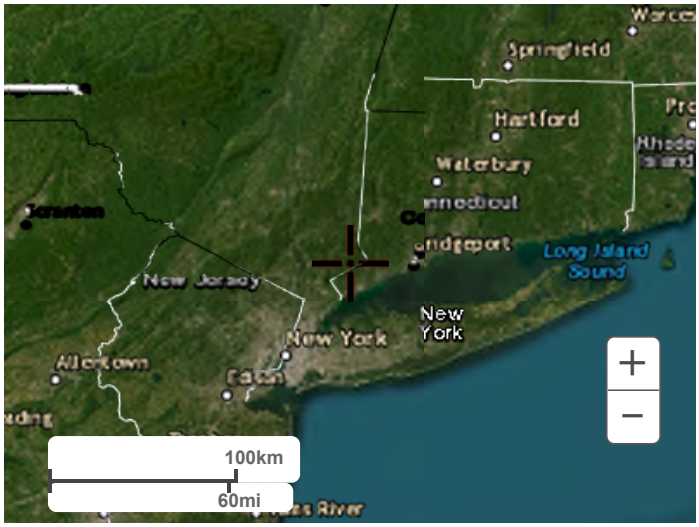
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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

Disclaimer

JAY FAIN & ASSOCIATES, LLC
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Jay Fain
Principal
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2000 Post Road
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Fairfield, CT 06824
203 254-3156
jfassociates@optonline.net

SOILS MAPPING & WETLAND/WATERCOURSE DELINEATION REPORT ROCKRIMMON COUNTRY CLUB 2949 LONG RIDGE RD, STAMFORD, CT

PROPERTY LOCATION AND DESCRIPTION:

LAND USE: **Golf Course** ACRES: **Partial Site 1.0±**

ADDRESS: **Rockrimmon Country Club**
2949 Long Ridge Rd.
Stamford, CT 06903

REPORT COMPLETED FOR:

NAME: **Rockrimmon Country Club**
c/o Ara Daglian

MAILING ADDRESS: 2949 Long Ridge Rd.
Stamford, CT 06903

WETLANDS/WATERCOURSE JURISDICTION

The Inland Wetlands and Watercourses Act (Connecticut General Statutes §22a-38) define inland wetlands as "land, including submerged land, which consists of any soil types designated as poorly drained, very poorly drained, alluvial, and floodplain." Water courses are defined in the act as "rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private, which are contained within, flow through or border upon the state or any portion thereof."

MAPPING AND DELINEATION METHODOLOGY

Soils analysis, as described in this report, is intended as an inventory and evaluation of the existing soil characteristics on the subject property. A first order soil survey in accordance with the principles and practices noted in the USDA publication *Soil Survey Manual* was completed at the site. Soil units mapped in the field correspond with those in the USDA publication *Soil Survey of Fairfield County, Connecticut*.

Wetland identification was based on the presence of poorly drained, very poorly drained, alluvial, or floodplain soils and submerged land (e.g. a pond). These and other soil types were identified by observation of soil morphology (soil texture, color, structure, etc.). To observe the morphology of the property's soils, numerous two-foot deep test pits and/or hand borings were completed throughout the site. Transects were located perpendicular to and at representative points along the perceived boundaries of the wetland areas identified on the property. Soil morphologies were observed at soil sampling points along the transects. Sampling began well outside the bounds of the wetland and continued towards it until inland wetland soils were observed. This point on each transect was marked (flagged) with an orange surveyor's tape labeled "Wetland Boundary". The complete boundary of every wetland area is located along the lines that connect these sequentially numbered boundary points.

Intermittent watercourses were delineated by a defined permanent channel and bank and the occurrence of two or more of the following characteristics: A) evidence of scour or deposits of recent alluvium or detritus, B) the presence of standing or flowing water for a duration longer than a particular storm incident, and C) the presence of hydrophytic vegetation. Surveyor's tape, which was labeled "Wetland Boundary" and sequentially numbered, was placed at critical points to demarcate the boundary of each delineated watercourse.

The wetland and watercourse boundaries are subject to change until adopted by local or state regulatory agencies.

DATE AND CONDITIONS AT TIME OF INSPECTION

DATE: September 26, 2022 INSPECTED BY: Jay Fain

WEATHER: Warm, Cloudy

SOIL MOISTURE CONDITIONS: ☐ DRY ☒ MOIST ☐ WET FROST DEPTH: N/A SNOW DEPTH: N/A

CERTIFICATION
JAY FAIN, PRINCIPAL, SOIL SCIENTIST

WETLAND/WATERCOURSE IDENTIFIED

FLAG NUMBERS	WETLAND TYPE	SOIL TYPE	COMMENTS
-	No Wetlands No Watercourses	-	-

SOIL MAP UNITS

Each soil map unit that was identified on the property represents a specific area on the landscape and consists of one or more soils for which the unit is named. Other soils (inclusions that are generally too small to be delineated separately) may account for 10 to 15 percent of the map unit. The mapped units are identified in the following table by name and symbol and typical characteristics (parent material, drainage class, high water table, depth to bedrock, and slope) of each unit are provided. These are generally the primary characteristics to be considered in land use planning and management. A narrative that defines each characteristic and describes their land use implications follows the table. Complete descriptions of each soil map unit can be found in the *Soil Survey of Fairfield County, Connecticut* (1981).

UPLAND SOILS

SOIL		PARENT MATERIAL	SLOPE %	DRAINAGE CLASS	HIGH WATER TABLE			DEPTH TO BEDROCK (in)
SYM.	NAME				DEPTH (ft)	KIND	MOS.	
-	-	-	-	-	-	-	-	-

WETLAND SOILS

SOIL		PARENT MATERIAL	SLOPE %	DRAINAGE CLASS	HIGH WATER TABLE			DEPTH TO BEDROCK (in)
SYM.	NAME				DEPTH (ft)	KIND	MOS.	
-	-	-	-	-	-	-	-	-

SOIL CHARACTERISTICS: DEFINITIONS AND LAND USE IMPLICATIONS

PARENT MATERIAL: Parent material is the unconsolidated organic and mineral material in which soil forms. Soil inherits characteristics, such as mineralogy and texture, from its parent material. Glacial till is unsorted, nonstratified glacial drift consisting of clay, silt, sand and boulders transported and deposited by glacial ice. Glacial outwash consists of gravel, sand and silt, which is commonly stratified, deposited by glacial melt water. Alluvium is material such as sand, silt or clay deposited on land by streams. Organic deposits consist of decomposed plant and animal parts.

A soil's texture affects the ease of digging, filling and compacting and the permeability of a soil. Generally sand and gravel soils, such as outwash soils, have higher permeability rates than most glacial till soils. Soil permeability affects the cost to design and construct subsurface sanitary disposal facilities and, if too slow or too fast, may preclude their use. Outwash soils are generally excellent sources of natural aggregates (sand and gravel) suitable for commercial use, such as construction subbase material. Organic layers in soils can cause movement of structural footings. Compacted glacial till layers make excavating more difficult and may preclude the use of subsurface sanitary disposal systems or increase their design and construction costs if fill material is required.

SLOPE: Generally soils with steeper slopes increase construction costs, increase the potential for erosion and sedimentation impacts, and reduce the feasibility of locating subsurface sanitary disposal facilities.

DRAINAGE CLASS: Drainage class refers to the frequency and duration of periods of soil saturation or partial saturation during soil formation. Seven classes of natural drainage classes exist. They range from excessively drained, where water is removed from the soil very rapidly, to very poorly drained, where water is removed so slowly that free water remains at or near the soil surface during most of the growing season. Soil drainage affects the type and growth of plants found in an area. When landscaping or gardening, drainage class information can be used to assure that proposed plants are adapted to existing drainage conditions or that necessary alterations to drainage conditions (irrigation or drainage systems) are provided to assure plant survival.

HIGH WATER TABLE: High water table is the highest level of a saturated zone in the soil in most years. The water table can affect when shallow excavations can be made; the ease of the excavations, construction, and grading; and the supporting capacity of the soil. Shallow water tables may preclude the use of subsurface sanitary disposal systems or increase design and construction costs if fill material is required.

DEPTH TO BEDROCK: The depth to bedrock refers to the depth to fixed rock. Bedrock depth affects the ease and cost of construction, such as digging, filling, compacting and planting. Shallow depth bedrock may preclude the use of subsurface sanitary disposal systems or increase design and construction costs if fill material is required.

RA-2 Zone

ORIENTATION

Wetlands Sketch Map
— No On-site Wetlands
JFA 9/24/22

PLOT PLAN
PREPARED FOR
ROCK RIMMON COUNTRY CLUB
STAMFORD, CONNECTICUT

SCALE IN FEET

Connecticut Portion

This survey and map has been prepared in accordance with Section 20-300b-1 thru 20-300b-20 of the Regulation of Connecticut State Agencies—"Minimum Standards for Surveys and Maps in the State of Connecticut" as endorsed by the Connecticut Association of Land Surveyors, Inc. It is a "IMPROVEMENT LOCATION SURVEY" based on a "RESURVEY" conforming to Horizontal Accuracy Class "A-2" and intended to be used for Compliance and Noncompliance with Existing Requirements.

To my knowledge and belief this plan is substantially correct as noted hereon.

BY:

FOR: EDWARD J. FRATTAROLI, INC.
Land Surveyors | Engineers | Land Planners
STAMFORD, CONNECTICUT OCT. ____ 2022

This Document and Copies Thereof are Valid only if they bear the signature and embossed seal of the designated licensed professional. Unauthorized alterations render any declaration hereon null and void.

NOTES:

1. Elevations based on (NAVD 88).
2. Underground utility, structure and facility locations depicted and noted hereon have been compiled, in part, from record mapping supplied by the respective utility companies or governmental agencies, from parol testimony and from other sources. These locations must be considered as approximate in nature. Additionally, other such features may exist on the site, the existence of which are unknown to Edward J. Frattaroli, Inc. The size, location and existence of all such features must be field determined and verified by the appropriate authorities prior to construction.
3. The contractor shall notify all public utility companies by calling Call-Before-You-Dig at 1-800-922-4455 at least 48 hours prior to crossing their lines.

Refer To:
Lot No. 1
Map No. 11477 S.L.R.

Area = 1.002 Acres

Scale: 1" = 20'

Soil Map—State of Connecticut
(Rockrimmon CC - Propoed Parking Area)

Map Scale: 1:2,220 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

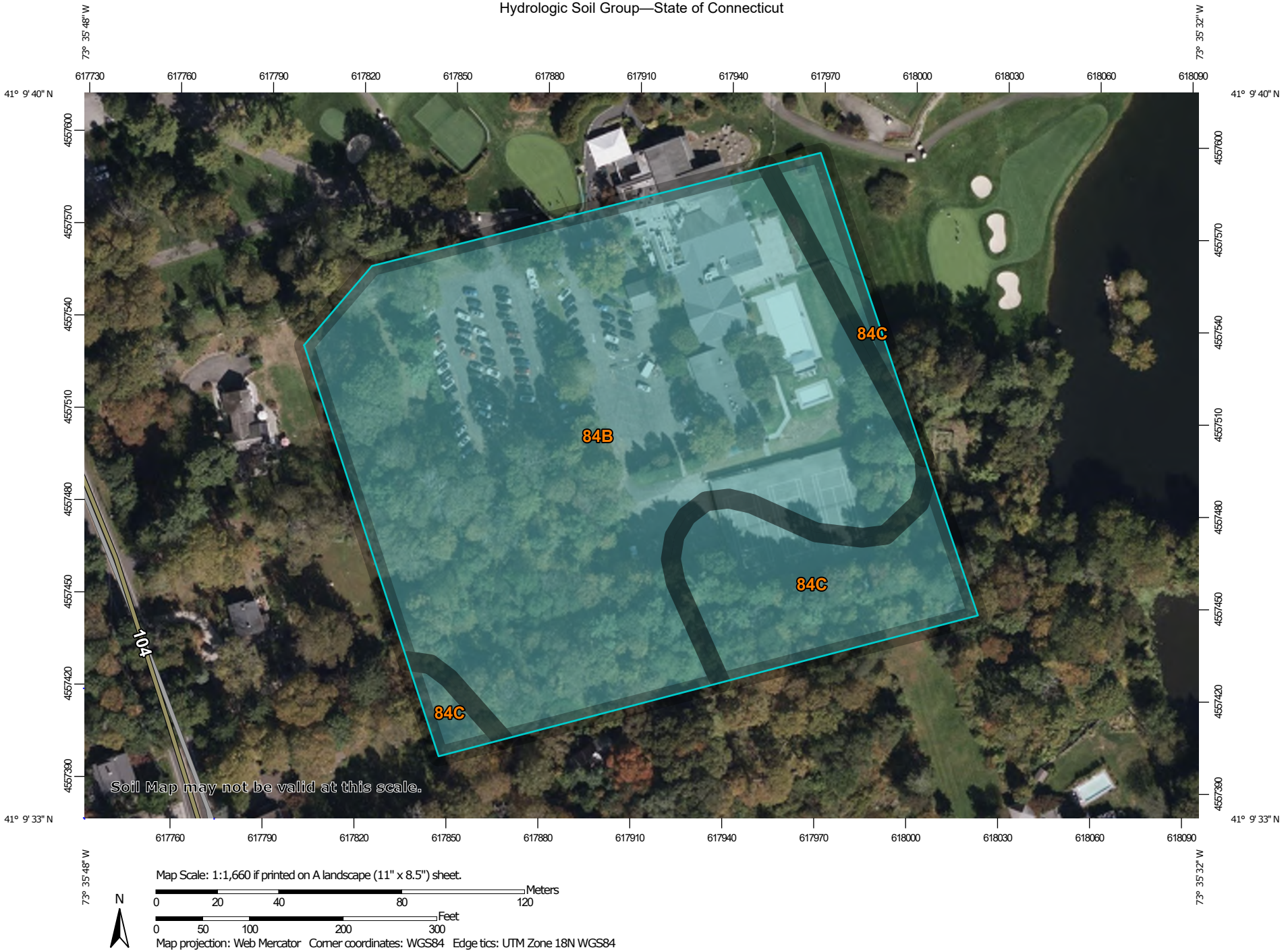
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 4, 2020—Oct 31, 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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Ridgebury fine sandy loam, 0 to 3 percent slopes	1.6	6.8%
18	Catden and Freetown soils, 0 to 2 percent slopes	0.1	0.3%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	9.8	41.6%
84C	Paxton and Montauk fine sandy loams, 8 to 15 percent slopes	8.3	35.1%
W	Water	3.8	16.2%
Totals for Area of Interest		**23.6**	**100.0%**



Map Scale: 1:1,660 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

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 22, Sep 12, 2022

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

Date(s) aerial images were photographed: Oct 4, 2020—Oct 31, 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
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	C	5.7	81.1%
84C	Paxton and Montauk fine sandy loams, 8 to 15 percent slopes	C	1.3	18.9%
Totals for Area of Interest			**7.1**	**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

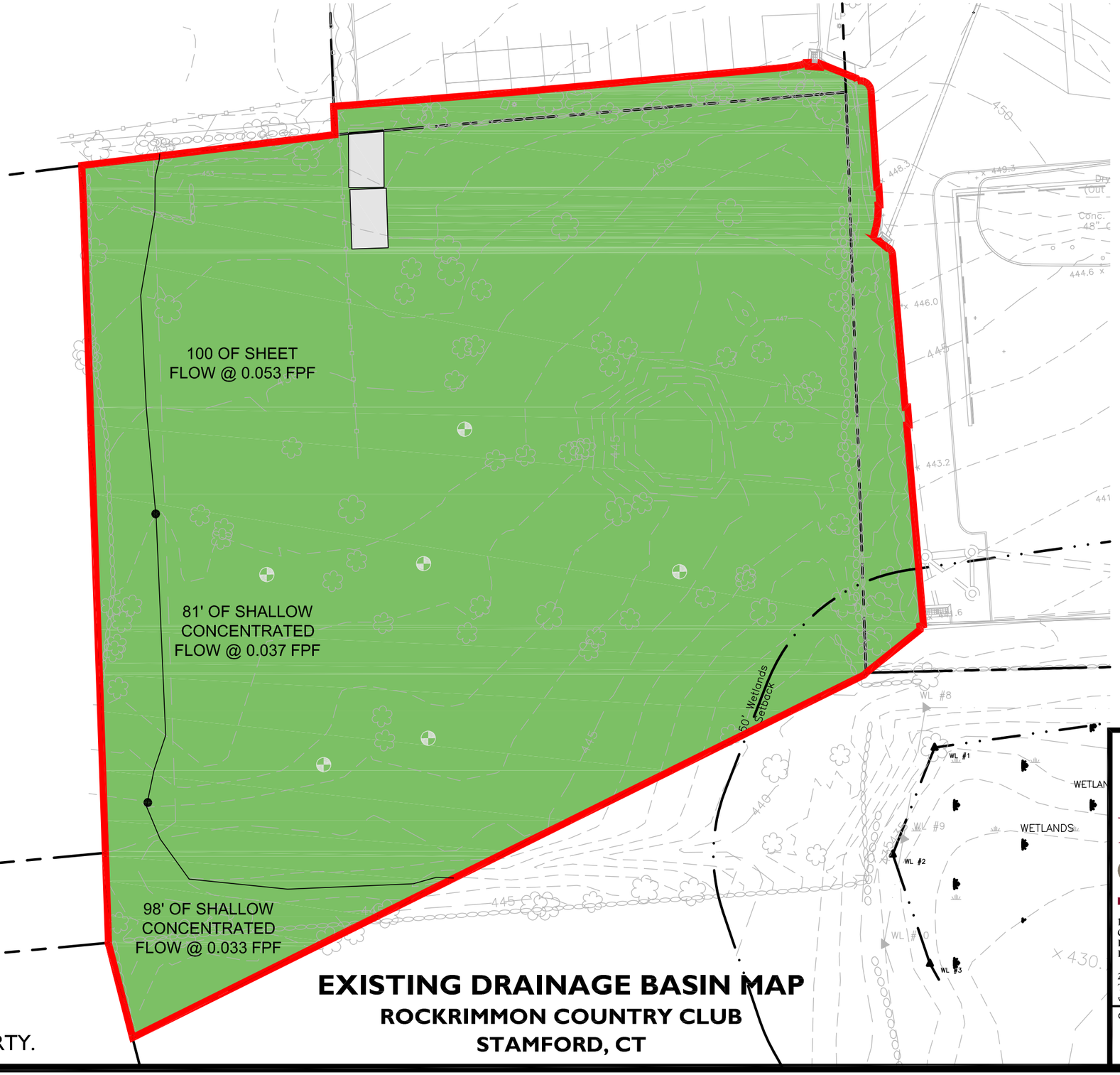
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix B

Existing On-Site Drainage Basin Map
Proposed On-Site Drainage Basin Maps



LEGEND

SURFACE CONDITIONS	
WOODS	Drainage Basin Boundary
IMPERVIOUS	Flow Length Segments (Time of Concentration)

DRAINAGE BASIN SUMMARY TABLE			
BASIN	**CN**	**SIZE (SF.)**	**TC (MIN.)**
EXISTING BASIN	73	46,732	17.20

NOTE: TYPE C SOILS COVER ENTIRE PROPERTY.

EXISTING DRAINAGE BASIN MAP

ROCKRIMMON COUNTRY CLUB

STAMFORD, CT

REDNISS & MEAD

LAND SURVEYING
CIVIL ENGINEERING
PLANNING & ZONING CONSULTING
PERMITTING

22 First Street | Stamford, CT 06905
Tel: 203.327.0500 | Fax: 203.357.1118
www.rednissmead.com

COMM. NO.:	DATE:
4043	07/12/2023
	SCALE: 1"=30'

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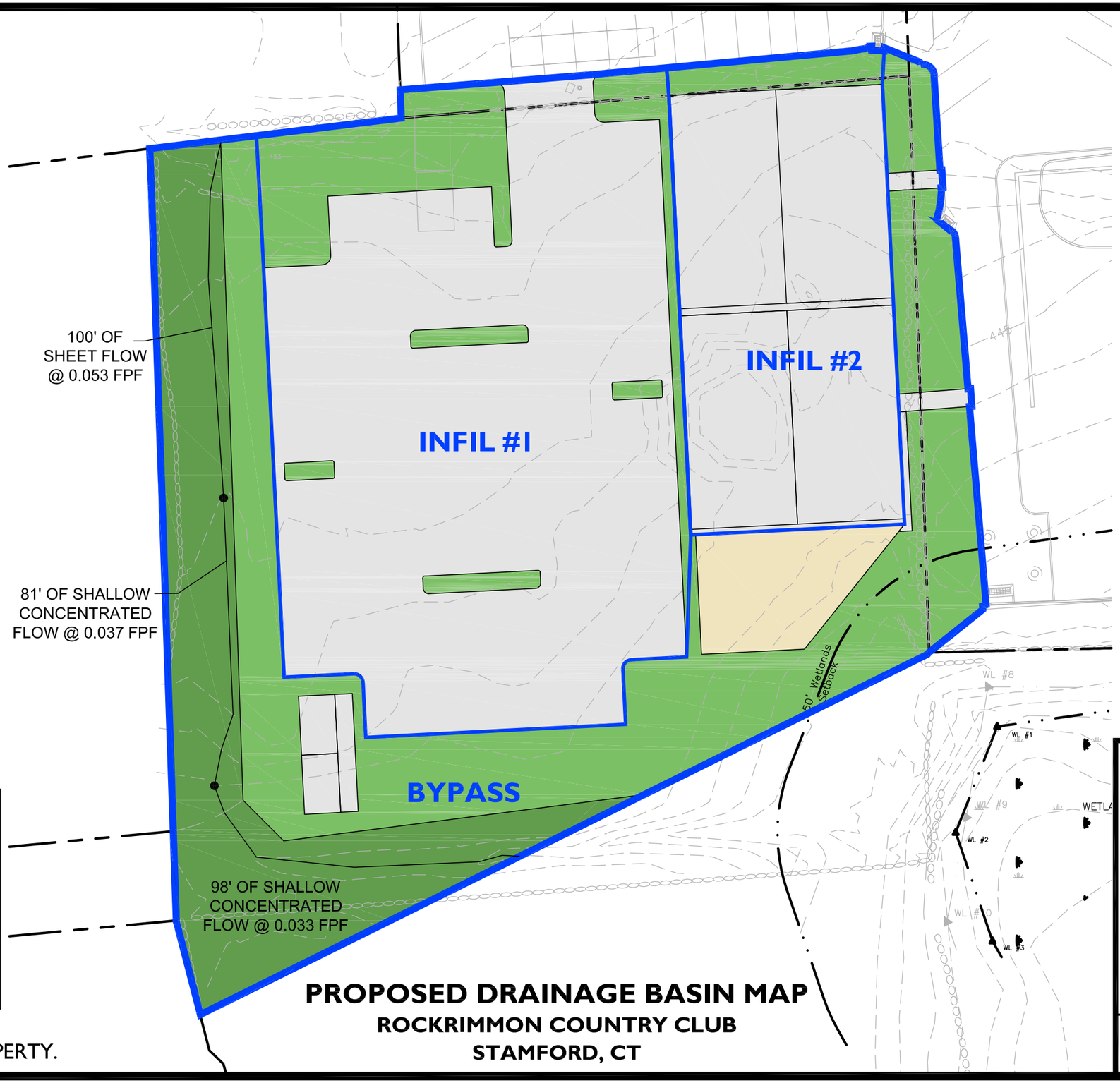

LEGEND

SURFACE CONDITIONS	
WOODS	Drainage Basin Boundary
LAWN	
IMPERVIOUS	Flow Length Segments (Time of Concentration)
GRAVEL	

DRAINAGE BASIN SUMMARY TABLE

BASIN	CN	SIZE (SF.)	TC (MIN.)
INFIL #1	94	19,862	5.0
INFIL #2	96	7,956	5.0
BYPASS	76	18,914	17.20

NOTE: TYPE C SOILS COVER ENTIRE PROPERTY.

PROPOSED DRAINAGE BASIN MAP

ROCKRIMMON COUNTRY CLUB

STAMFORD, CT

REDNISS & MEAD
LAND SURVEYING
CIVIL ENGINEERING
PLANNING & ZONING CONSULTING
PERMITTING
22 First Street | Stamford, CT 06905
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www.rednissmead.com

COMM. NO.:	DATE:
4043	07/12/2023
	SCALE: 1"=30'

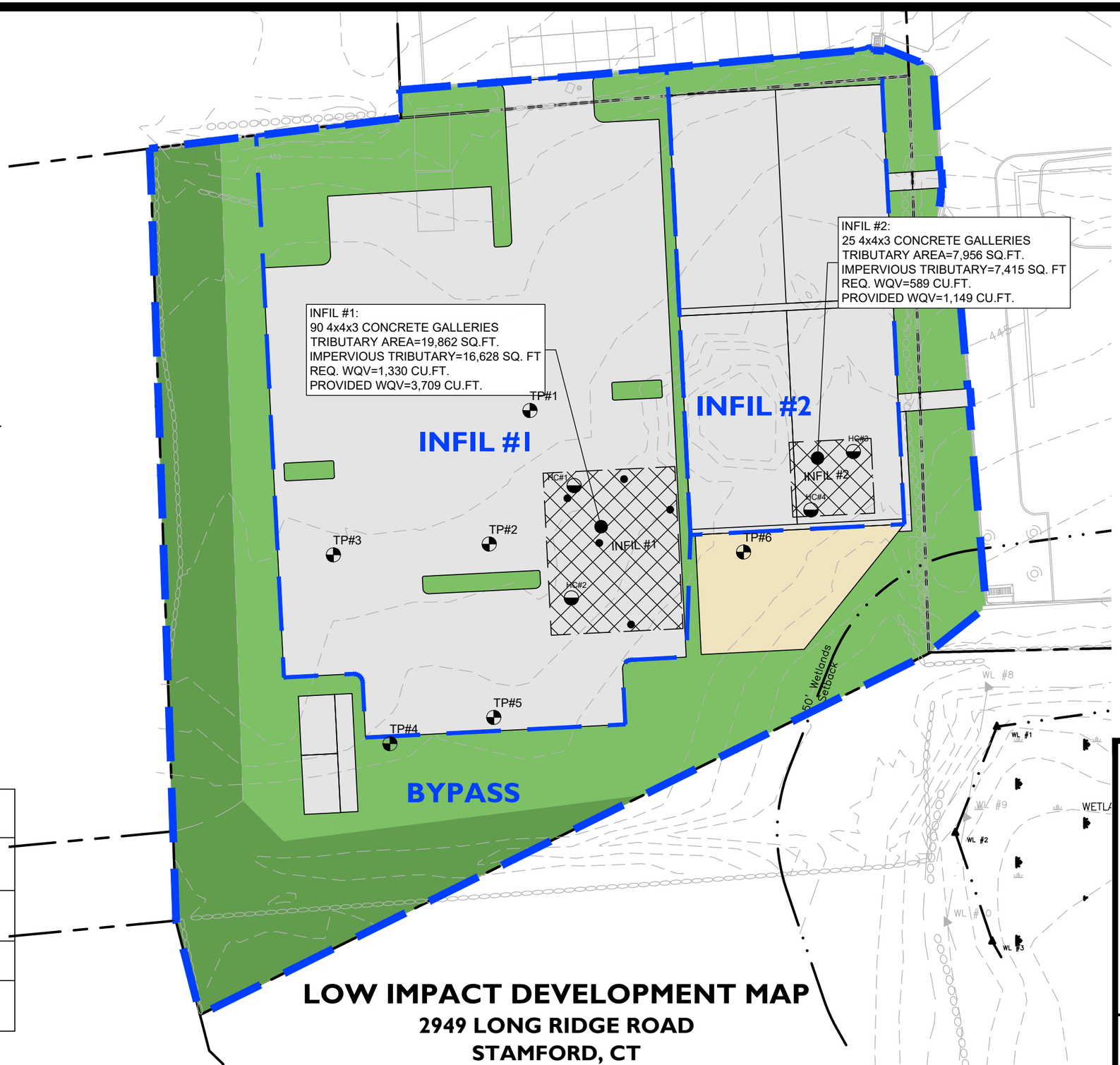
Appendix C

LID Review Map

LEGEND

SURFACE CONDITIONS	
WOODS	Drainage Basin Boundary
LAWN	
IMPERVIOUS	TEST PIT LOCATION TP#
GRAVEL	HC TEST LOCATION HC#

LID SUMMARY TABLE			
TOTAL SITE AREA	46,732 SF	TOTAL DISTURBED AREA	38,783 SF
PRE-DEVELOPMENT IMPERVIOUS	320 SF	POST-DEVELOPMENT IMPERVIOUS	26,265 SF
TOTAL SITE REQ. WQV	2,165 CF	TOTAL PROVIDED WQV	4,858 CF
PRE-DEVELOPMENT DCIA	0 SF	POST-DEVELOPMENT DCIA	0 SF



LOW IMPACT DEVELOPMENT MAP
2949 LONG RIDGE ROAD
STAMFORD, CT

REDNISS & MEAD
LAND SURVEYING
CIVIL ENGINEERING
PLANNING & ZONING CONSULTING
PERMITTING
22 First Street | Stamford, CT 06905
Tel: 203.327.0500 | Fax: 203.357.1118
www.rednissmead.com

COMM. NO.:	DATE:
4043	07/12/2023
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Appendix D

Water Quality Volume Calculations
BMP Volume Calculations
72-Hour Drawdown Calculations
Conveyance Calculations

Water Quality Volume Calculations

Project: *RockRimmon Country Club*	**Project #:** *4043*	**Date:** *7/12/2023*
Location: *2949 Long Ridge Road*	**By:** *AS*	**Checked:** *BDH*

Infil. Basin #1

Area=	0.456	acres
Impervious Area=	0.382	acres
I=	0.837	[a]
R=	0.803	[b]
WQV=	0.031	ac. ft. [c]

WQV=	**1329.86 ft.^{3}**
WQV PROVIDED=	**3708.50 ft.^{3}**

[a] I=Percent Impervious Coverage

[b] R=0.05+0.009(I); Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

[c] WQV=(1"xRxA)/12; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

REDNISS & MEAD

Water Quality Volume Calculations

Project: *RockRimmon Country Club*	**Project #:** *4043*	**Date:** *7/12/2023*
Location: *2949 Long Ridge Road*	**By:** *AS*	**Checked:** *BDH*

Infil. Basin #2

Area=	0.183	acres
Impervious Area=	0.170	acres
I=	0.932	[a]
R=	0.889	[b]
WQV=	0.014	ac. ft. [c]

WQV=	**589.28 ft.^{3}**
WQV PROVIDED=	**1149.00 ft.^{3}**

[a] I=Percent Impervious Coverage

[b] R=0.05+0.009(I); Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

[c] WQV=(1"xRxA)/12; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

Stage-Area-Storage for Pond 1P: Conc. Galleries

Elevation (feet)	Storage (cubic-feet)
442.60	0
442.65	34
442.70	67
442.75	101
442.80	135
442.85	168
442.90	202
442.95	236
443.00	269
443.05	303
443.10	337
443.15	401
443.20	466
443.25	531
443.30	595
443.35	660
443.40	725
443.45	789
443.50	854
443.55	918
443.60	982
443.65	1,047
443.70	1,111
443.75	1,175
443.80	1,239
443.85	1,304
443.90	1,368
443.95	1,432
444.00	1,496
444.05	1,560
444.10	1,624
444.15	1,688
444.20	1,752
444.25	1,815
444.30	1,879
444.35	1,943
444.40	2,007
444.45	2,070
444.50	2,134
444.55	2,198
444.60	2,261
444.65	2,325
444.70	2,388
444.75	2,452
444.80	2,515
444.85	2,578
444.90	2,642
444.95	2,705
445.00	2,768
445.05	2,831
445.10	2,894
445.15	2,957
445.20	3,020
445.25	3,083
445.30	3,146
445.35	3,209
445.40	3,272
445.45	3,335
445.50	3,398
445.55	3,461
445.60	3,523
445.65	3,532
445.70	3,540
445.75	3,548
445.80	3,557
445.85	3,565
445.90	3,574
445.95	3,582
446.00	3,591
446.05	3,599
446.10	3,608
446.15	3,641
446.20	3,675
446.25	3,709
446.30	3,742
446.35	3,776
446.40	3,810
446.45	3,843
446.50	3,877
446.55	3,911
446.60	**3,944**

Stage-Area-Storage for Pond 2P: Conc. Galleries

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
440.70	0	443.30	889	445.90	1,612
440.75	11	443.35	908	445.95	1,622
440.80	21	443.40	926	446.00	1,633
440.85	31	443.45	945	446.05	1,643
440.90	42	443.50	963	446.10	1,654
440.95	53	443.55	982	446.15	1,664
441.00	63	443.60	1,001	446.20	**1,675**
441.05	74	443.65	1,019		
441.10	84	443.70	1,038		
441.15	94	443.75	1,056		
441.20	105	443.80	1,075		
441.25	123	443.85	1,093		
441.30	141	443.90	1,112		
441.35	159	443.95	1,130		
441.40	178	444.00	1,149		
441.45	196	444.05	1,167		
441.50	215	444.10	1,186		
441.55	234	444.15	1,204		
441.60	253	444.20	1,223		
441.65	271	444.25	1,241		
441.70	290	444.30	1,260		
441.75	309	444.35	1,278		
441.80	328	444.40	1,297		
441.85	347	444.45	1,315		
441.90	365	444.50	1,334		
441.95	384	444.55	1,352		
442.00	403	444.60	1,370		
442.05	422	444.65	1,389		
442.10	441	444.70	1,407		
442.15	459	444.75	1,426		
442.20	478	444.80	1,438		
442.25	497	444.85	1,441		
442.30	516	444.90	1,445		
442.35	534	444.95	1,448		
442.40	553	445.00	1,451		
442.45	572	445.05	1,455		
442.50	591	445.10	1,458		
442.55	609	445.15	1,461		
442.60	628	445.20	1,465		
442.65	647	445.25	1,475		
442.70	665	445.30	1,486		
442.75	684	445.35	1,496		
442.80	703	445.40	1,507		
442.85	721	445.45	1,517		
442.90	740	445.50	1,528		
442.95	759	445.55	1,538		
443.00	777	445.60	1,549		
443.05	796	445.65	1,559		
443.10	815	445.70	1,570		
443.15	833	445.75	1,580		
443.20	852	445.80	1,591		
443.25	870	445.85	1,601		

72-Hour Draw Down Calculations

Project: *Rock Rimmon Country Club*	**Project #:** *4043*	**Date:** *7/12/2023*
Location: *2949 Long Ridge Road, Stamford*	**By:** *AS*	**Checked:** *BDH*

INFIL#1

Infiltration System		
Surface Area of Infiltration System (SA)	1,684	ft^2
Volume of Storage of Infiltration System (VS)	3,709	ft^3
Infiltration Rate (IR)	13.06	in/hr^c
Theoretical Water Column Height	26.44	in^a
Time of Draw Down	**2.02**	**hr^b**

[a] Theoretical Water Column Height (WCH) = VS/SA*12

[b] Time of Draw Down = WCH/IR

[c] Infiltration Rate (IR) is taken from on-site saturated hydraulic conductivity testing. (HC#2)

REDNISS & MEAD

72-Hour Draw Down Calculations

Project: *Rock Rimmon Country Club*	**Project #:** *4043*	**Date:** *7/12/2023*
Location: *2949 Long Ridge Road, Stamford*	**By:** *AS*	**Checked:** *BDH*

INFIL#2

Infiltration System		
Surface Area of Infiltration System (SA)	525	ft^2
Volume of Storage of Infiltration System (VS)	1,149	ft^3
Infiltration Rate (IR)	13.50	in/hr[c]
Theoretical Water Column Height	26.26	in[a]
Time of Draw Down	**1.95**	**hr**[b]

[a] Theoretical Water Column Height (WCH) = VS/SA*12

[b] Time of Draw Down = WCH/IR

[c] Infiltration Rate (IR) is taken from on-site saturated hydraulic conductivity testing. (HC#3)

REDNISS & MEAD

HYDRAULIC DATA FOR RATIONAL METHOD

Project: *Rock Rimmon Country Club*	**Project #:** *4043*	**Date:** *7/12/2023*
Location: *2949 Long Ridge Road*	**By:** *AS*	**Checked:** *BDH*

10 Year Storm

Page 1 of 3

Pipe From CB#1 To OGS#1

Basin Description				Drainage Path						
Acres	C	Description	AC	Length (ft)	ΔH	Slope (%)	Description	Time (min)	10yr. Rainfall Intensity (in/hr)	Q = ACI (cfs)
0.177	0.95	Impervious	0.168							
0.004	0.30	Pervious	0.001							
0.181		**Total**	**0.169**					**5**	**6.6**	**1.12**

Q in system (cfs)	Pipe Size (in)	Pipe Length (ft)	Roughness coefficient	Material	Slope (ft/ft)	Q_{full} (cfs)	Q_{system} / Q_{full} (%)	Velocity (ft/s)
1.12	8	69	0.010	PVC	0.010	1.58	71.0%	3.20

Pipe From CB#2 To OGS#1

Basin Description				Drainage Path						
Acres	C	Description	AC	Length (ft)	ΔH	Slope (%)	Description	Time (min)	10yr. Rainfall Intensity (in/hr)	Q = ACI (cfs)
0.388	0.95	Impervious	0.369							
0.032	0.30	Pervious	0.010							
0.420		**Total**	**0.378**					**5**	**6.6**	**2.77**

Q in system (cfs)	Pipe Size (in)	Pipe Length (ft)	Roughness coefficient	Material	Slope (ft/ft)	Q_{full} (cfs)	Q_{system} / Q_{full} (%)	Velocity (ft/s)
2.77	12	29	0.010	PVC	0.010	4.64	59.6%	3.52

	Basin Description				Drainage Path						
	Acres	C	Description	AC	Length (ft)	ΔH	Slope (%)	Description	Time (min)	10yr. Rainfall Intensity (in/hr)	Q = ACI (cfs)
Pipe From OGS#1 To Infil#1	0.565	0.95	Impervious	0.537							
	0.036	0.30	Pervious	0.011							
	0.601		**Total**	**0.547**					**5**	**6.6**	**3.96**

Q in system (cfs)	Pipe Size (in)	Pipe Length (ft)	Roughness coefficient	Material	Slope (ft/ft)	Q_{full} (cfs)	Q_{system} / Q_{full} (%)	Velocity (ft/s)	Note
3.96	12	3	0.010	PVC	0.010	4.64	85.3%	5.04	Note: Flow Q in System = Outlet of Inf#1 System during 25-Year Storm

	Basin Description				Drainage Path						
	Acres	C	Description	AC	Length (ft)	ΔH	Slope (%)	Description	Time (min)	100yr. Rainfall Intensity (in/hr)	Q = ACI (cfs)
Pipe From MMH#1 To Rip-Rap		0.95	Impervious								
		0.30	Pervious								
			Total								

Q in system (cfs)	Pipe Size (in)	Pipe Length (ft)	Roughness coefficient	Material	Slope (ft/ft)	Q_{full} (cfs)	Q_{system} / Q_{full} (%)	Velocity (ft/s)	Note
2.00	15	18	0.010	PVC	0.010	8.42	23.8%	1.63	Note: Flow Q in System = Outlet of Inf#1 System during 100-Year Storm

	Basin Description				Drainage Path						
	Acres	C	Description	AC	Length (ft)	ΔH	Slope (%)	Description	Time (min)	100yr. Rainfall Intensity (in/hr)	Q = ACI (cfs)
Pipe From INFIL#2 To Rip-Rap		0.95	Impervious								
		0.30	Pervious								
			Total								

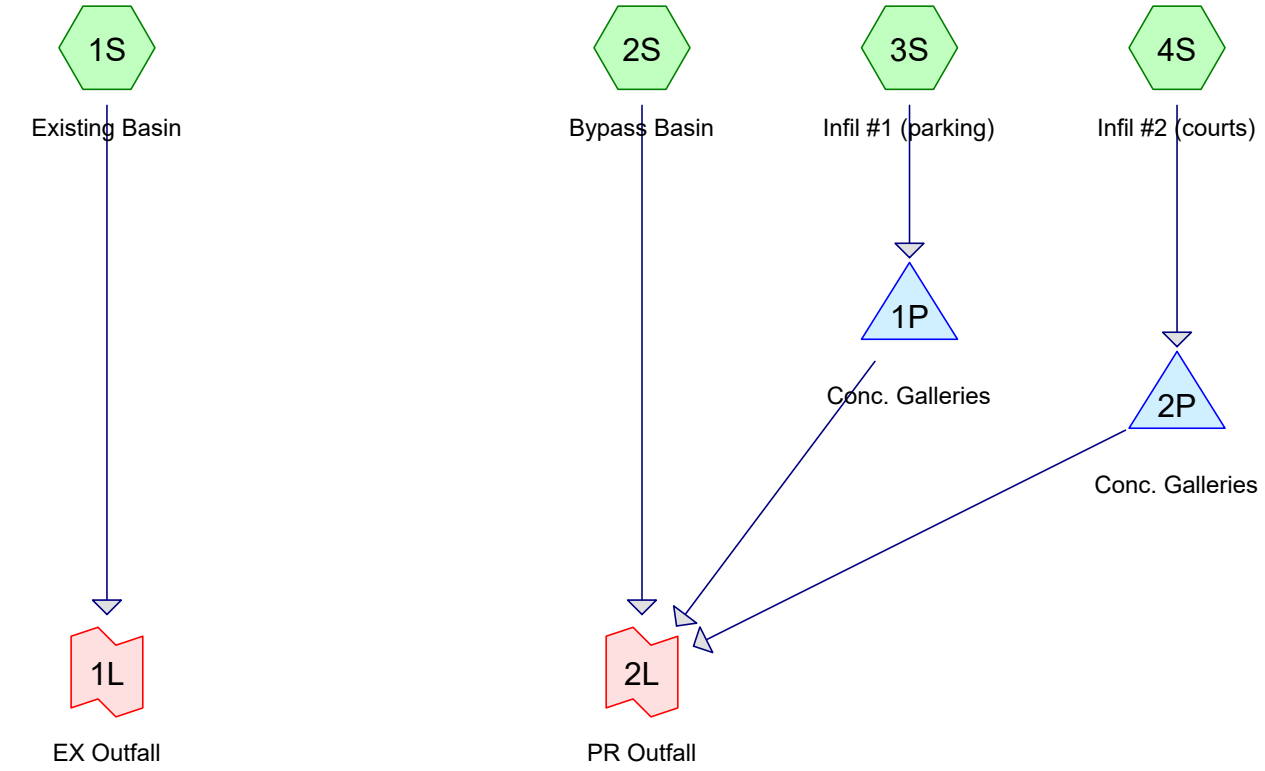
Q in system (cfs)	Pipe Size (in)	Pipe Length (ft)	Roughness coefficient	Material	Slope (ft/ft)	Q_{full} (cfs)	Q_{system} / Q_{full} (%)	Velocity (ft/s)	Note: Flow Q in System = Outlet of Infi1#2 System during 100-Year Storm
1.37	8	16	0.010	PVC	0.010	1.58	87.0%	3.92	

Appendix E

HydroCAD Report

Existing Conditions

Proposed Conditions



Subcat Reach Pond Link

Routing Diagram for 4043 Hydrocad 2023-04-18
Prepared by Redniss & Mead, Inc, Printed 6/30/2023

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Basin Runoff Area=46,732 sf 0.68% Impervious Runoff Depth>0.87"
Flow Length=279' Tc=17.2 min CN=73.17 Runoff=0.72 cfs 3,380 cf

Subcatchment2S: Bypass Basin Runoff Area=18,914 sf 3.95% Impervious Runoff Depth>1.00"
Flow Length=279' Tc=17.2 min CN=75.74 Runoff=0.35 cfs 1,581 cf

Subcatchment3S: Infil #1 (parking) Runoff Area=19,862 sf 83.72% Impervious Runoff Depth>2.37"
Tc=5.0 min CN=94.09 Runoff=1.26 cfs 3,918 cf

Subcatchment4S: Infil #2 (courts) Runoff Area=7,956 sf 93.20% Impervious Runoff Depth>2.60"
Tc=5.0 min CN=96.37 Runoff=0.54 cfs 1,723 cf

Pond 1P: Conc. Galleries Peak Elev=444.02' Storage=1,522 cf Inflow=1.26 cfs 3,918 cf
Outflow=0.36 cfs 3,489 cf

Pond 2P: Conc. Galleries Peak Elev=444.10' Storage=1,184 cf Inflow=0.54 cfs 1,723 cf
8.0" Round Culvert n=0.012 L=16.0' S=0.0625 '/' Outflow=0.04 cfs 567 cf

Link 1L: EX Outfall Inflow=0.72 cfs 3,380 cf
Primary=0.72 cfs 3,380 cf

Link 2L: PR Outfall Inflow=0.71 cfs 5,637 cf
Primary=0.71 cfs 5,637 cf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Basin Runoff Area=46,732 sf 0.68% Impervious Runoff Depth>1.27"
Flow Length=279' Tc=17.2 min CN=73.17 Runoff=1.10 cfs 4,957 cf

Subcatchment2S: Bypass Basin Runoff Area=18,914 sf 3.95% Impervious Runoff Depth>1.44"
Flow Length=279' Tc=17.2 min CN=75.74 Runoff=0.51 cfs 2,265 cf

Subcatchment3S: Infil #1 (parking) Runoff Area=19,862 sf 83.72% Impervious Runoff Depth>2.97"
Tc=5.0 min CN=94.09 Runoff=1.56 cfs 4,915 cf

Subcatchment4S: Infil #2 (courts) Runoff Area=7,956 sf 93.20% Impervious Runoff Depth>3.21"
Tc=5.0 min CN=96.37 Runoff=0.65 cfs 2,129 cf

Pond 1P: Conc. Galleries Peak Elev=444.28' Storage=1,850 cf Inflow=1.56 cfs 4,915 cf
Outflow=0.42 cfs 4,477 cf

Pond 2P: Conc. Galleries Peak Elev=444.22' Storage=1,231 cf Inflow=0.65 cfs 2,129 cf
8.0" Round Culvert n=0.012 L=16.0' S=0.0625 '/' Outflow=0.20 cfs 972 cf

Link 1L: EX Outfall Inflow=1.10 cfs 4,957 cf
Primary=1.10 cfs 4,957 cf

Link 2L: PR Outfall Inflow=1.09 cfs 7,714 cf
Primary=1.09 cfs 7,714 cf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Basin Runoff Area=46,732 sf 0.68% Impervious Runoff Depth>2.01"
Flow Length=279' Tc=17.2 min CN=73.17 Runoff=1.79 cfs 7,817 cf

Subcatchment2S: Bypass Basin Runoff Area=18,914 sf 3.95% Impervious Runoff Depth>2.21"
Flow Length=279' Tc=17.2 min CN=75.74 Runoff=0.80 cfs 3,488 cf

Subcatchment3S: Infil #1 (parking) Runoff Area=19,862 sf 83.72% Impervious Runoff Depth>3.96"
Tc=5.0 min CN=94.09 Runoff=2.05 cfs 6,555 cf

Subcatchment4S: Infil #2 (courts) Runoff Area=7,956 sf 93.20% Impervious Runoff Depth>4.21"
Tc=5.0 min CN=96.37 Runoff=0.85 cfs 2,794 cf

Pond 1P: Conc. Galleries Peak Elev=444.71' Storage=2,400 cf Inflow=2.05 cfs 6,555 cf
Outflow=0.50 cfs 6,101 cf

Pond 2P: Conc. Galleries Peak Elev=444.42' Storage=1,302 cf Inflow=0.85 cfs 2,794 cf
8.0" Round Culvert n=0.012 L=16.0' S=0.0625 '/' Outflow=0.63 cfs 1,633 cf

Link 1L: EX Outfall Inflow=1.79 cfs 7,817 cf
Primary=1.79 cfs 7,817 cf

Link 2L: PR Outfall Inflow=1.77 cfs 11,222 cf
Primary=1.77 cfs 11,222 cf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Basin Runoff Area=46,732 sf 0.68% Impervious Runoff Depth>2.67"
Flow Length=279' Tc=17.2 min CN=73.17 Runoff=2.40 cfs 10,390 cf

Subcatchment2S: Bypass Basin Runoff Area=18,914 sf 3.95% Impervious Runoff Depth>2.90"
Flow Length=279' Tc=17.2 min CN=75.74 Runoff=1.06 cfs 4,574 cf

Subcatchment3S: Infil #1 (parking) Runoff Area=19,862 sf 83.72% Impervious Runoff Depth>4.79"
Tc=5.0 min CN=94.09 Runoff=2.45 cfs 7,927 cf

Subcatchment4S: Infil #2 (courts) Runoff Area=7,956 sf 93.20% Impervious Runoff Depth>5.05"
Tc=5.0 min CN=96.37 Runoff=1.00 cfs 3,347 cf

Pond 1P: Conc. Galleries Peak Elev=445.08' Storage=2,874 cf Inflow=2.45 cfs 7,927 cf
Outflow=0.57 cfs 7,462 cf

Pond 2P: Conc. Galleries Peak Elev=444.52' Storage=1,342 cf Inflow=1.00 cfs 3,347 cf
8.0" Round Culvert n=0.012 L=16.0' S=0.0625 '/' Outflow=0.90 cfs 2,185 cf

Link 1L: EX Outfall Inflow=2.40 cfs 10,390 cf
Primary=2.40 cfs 10,390 cf

Link 2L: PR Outfall Inflow=2.22 cfs 14,221 cf
Primary=2.22 cfs 14,221 cf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Basin Runoff Area=46,732 sf 0.68% Impervious Runoff Depth>3.63"
Flow Length=279' Tc=17.2 min CN=73.17 Runoff=3.28 cfs 14,143 cf

Subcatchment2S: Bypass Basin Runoff Area=18,914 sf 3.95% Impervious Runoff Depth>3.90"
Flow Length=279' Tc=17.2 min CN=75.74 Runoff=1.43 cfs 6,144 cf

Subcatchment3S: Infil #1 (parking) Runoff Area=19,862 sf 83.72% Impervious Runoff Depth>5.94"
Tc=5.0 min CN=94.09 Runoff=3.00 cfs 9,828 cf

Subcatchment4S: Infil #2 (courts) Runoff Area=7,956 sf 93.20% Impervious Runoff Depth>6.20"
Tc=5.0 min CN=96.37 Runoff=1.22 cfs 4,113 cf

Pond 1P: Conc. Galleries Peak Elev=445.75' Storage=3,549 cf Inflow=3.00 cfs 9,828 cf
Outflow=0.66 cfs 9,350 cf

Pond 2P: Conc. Galleries Peak Elev=444.61' Storage=1,374 cf Inflow=1.22 cfs 4,113 cf
8.0" Round Culvert n=0.012 L=16.0' S=0.0625 '/' Outflow=1.11 cfs 2,948 cf

Link 1L: EX Outfall Inflow=3.28 cfs 14,143 cf
Primary=3.28 cfs 14,143 cf

Link 2L: PR Outfall Inflow=2.80 cfs 18,443 cf
Primary=2.80 cfs 18,443 cf

Summary for Subcatchment 1S: Existing Basin

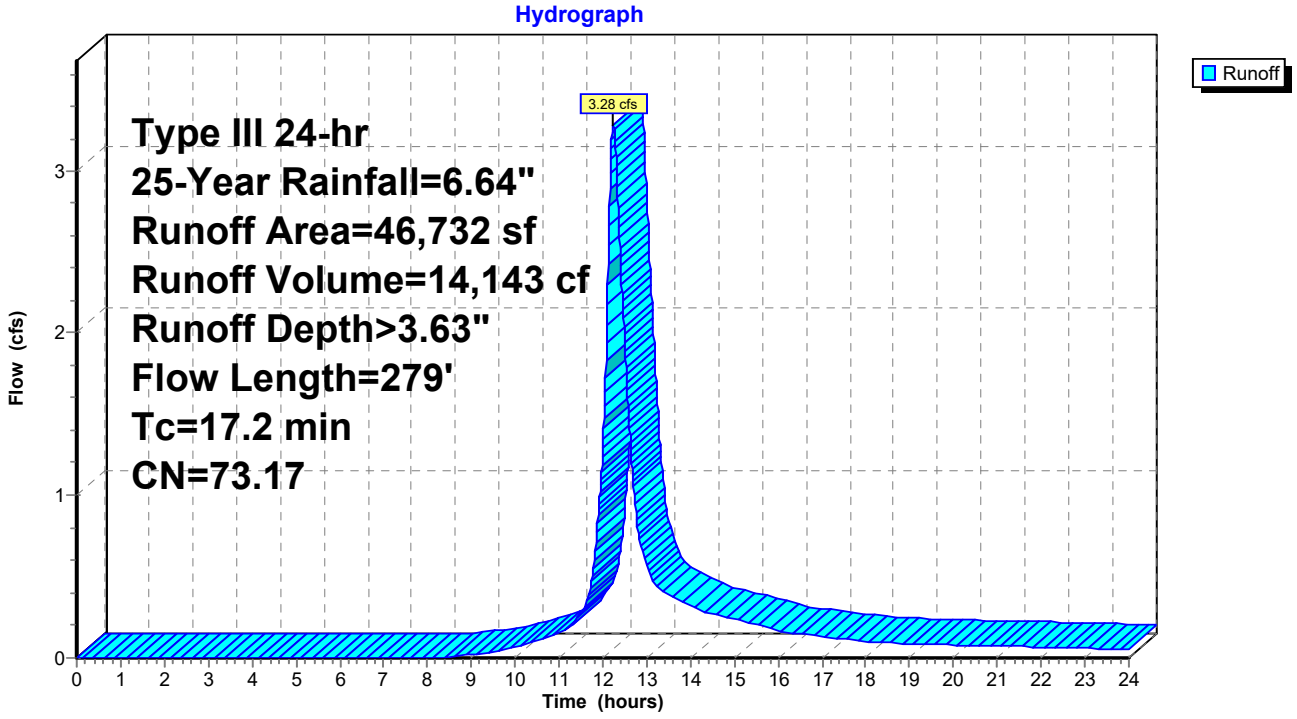
Runoff = 3.28 cfs @ 12.24 hrs, Volume= 14,143 cf, Depth> 3.63"
Routed to Link 1L : EX Outfall

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.64"

Area (sf)	CN	Description
320	98.00	Paved parking, HSG C
46,412	73.00	Woods, Fair, HSG C
46,732	73.17	Weighted Average
46,412		99.32% Pervious Area
320		0.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0530	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.45"
1.4	81	0.0370	0.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	98	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.2	279	Total			

Subcatchment 1S: Existing Basin



Summary for Subcatchment 2S: Bypass Basin

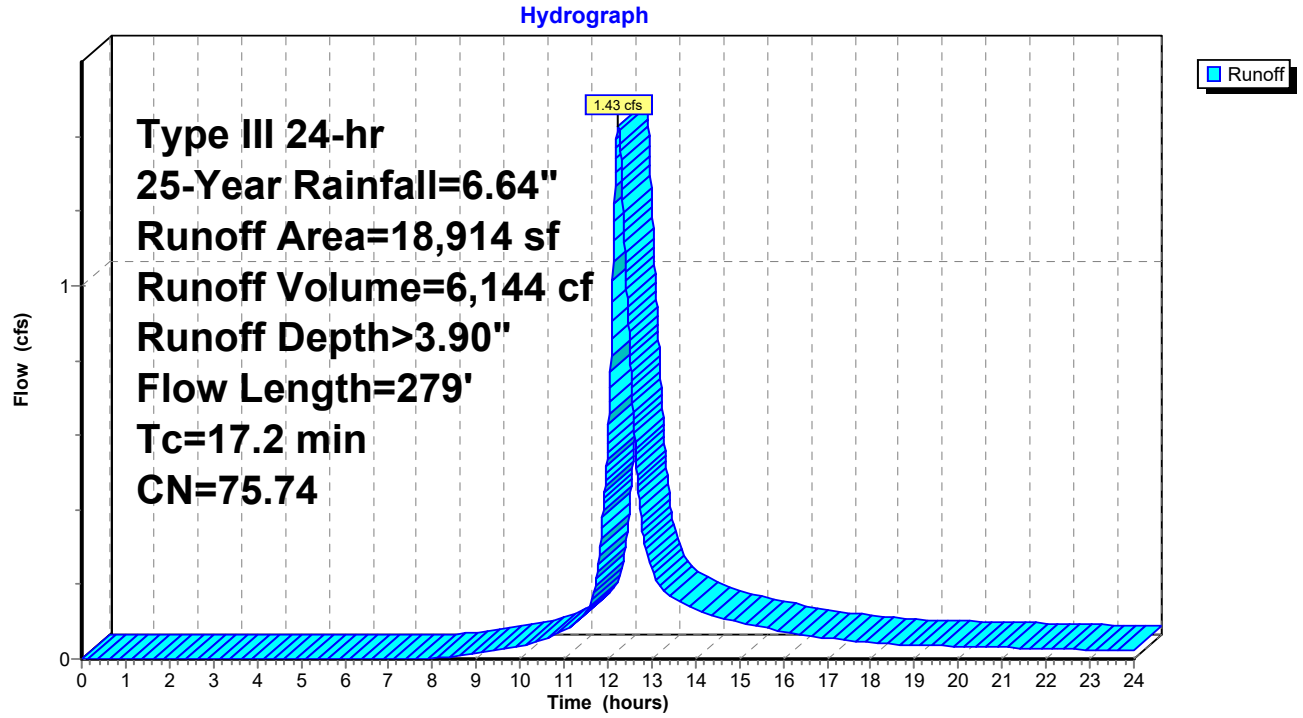
Runoff = 1.43 cfs @ 12.23 hrs, Volume= 6,144 cf, Depth> 3.90"
Routed to Link 2L : PR Outfall

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.64"

Area (sf)	CN	Description
748	98.00	Paved parking, HSG C
1,474	89.00	Gravel roads, HSG C
9,609	74.00	>75% Grass cover, Good, HSG C
7,083	73.00	Woods, Fair, HSG C
18,914	75.74	Weighted Average
18,166		96.05% Pervious Area
748		3.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0530	0.12		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.45"
1.4	81	0.0370	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
1.8	98	0.0330	0.91		**Shallow Concentrated Flow, Sheet 2** Woodland Kv= 5.0 fps
17.2	279	Total			

Subcatchment 2S: Bypass Basin



Summary for Subcatchment 3S: Infil #1 (parking)

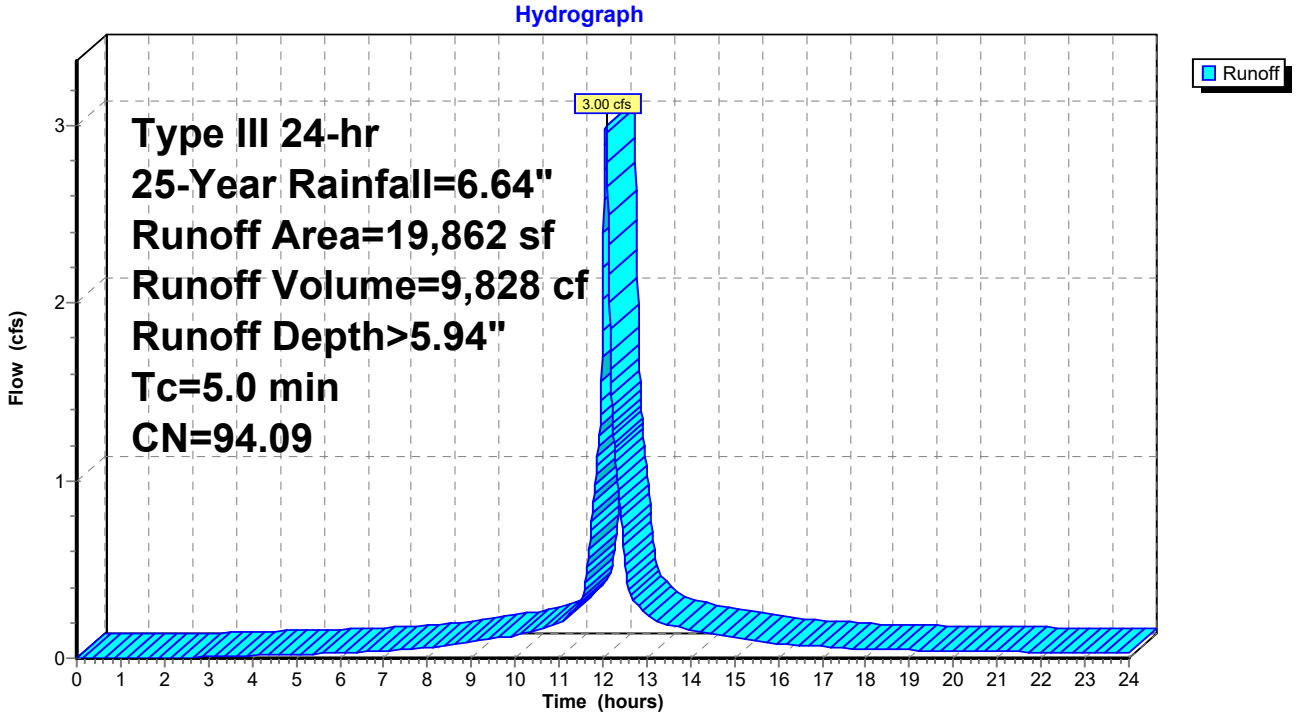
Runoff = 3.00 cfs @ 12.07 hrs, Volume= 9,828 cf, Depth> 5.94"
Routed to Pond 1P : Conc. Galleries

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.64"

Area (sf)	CN	Description
16,628	98.00	Paved parking, HSG C
3,234	74.00	>75% Grass cover, Good, HSG C
19,862	94.09	Weighted Average
3,234		16.28% Pervious Area
16,628		83.72% Impervious Area

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

Subcatchment 3S: Infil #1 (parking)



Summary for Subcatchment 4S: Infil #2 (courts)

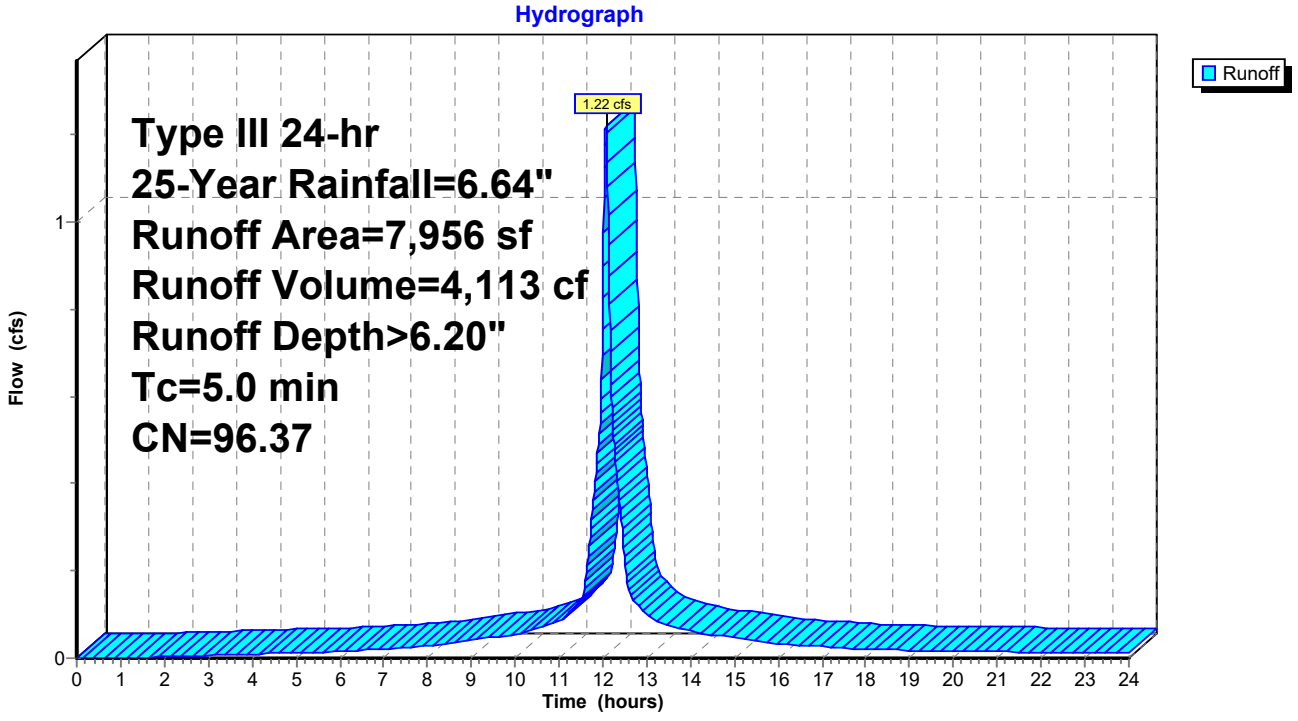
Runoff = 1.22 cfs @ 12.07 hrs, Volume= 4,113 cf, Depth> 6.20"
Routed to Pond 2P : Conc. Galleries

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.64"

Area (sf)	CN	Description
7,415	98.00	Paved parking, HSG C
541	74.00	>75% Grass cover, Good, HSG C
7,956	96.37	Weighted Average
541		6.80% Pervious Area
7,415		93.20% Impervious Area

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

Subcatchment 4S: Infil #2 (courts)



Summary for Pond 1P: Conc. Galleries

Inflow Area = 19,862 sf, 83.72% Impervious, Inflow Depth > 5.94" for 25-Year event
Inflow = 3.00 cfs @ 12.07 hrs, Volume= 9,828 cf
Outflow = 0.66 cfs @ 12.46 hrs, Volume= 9,350 cf, Atten= 78%, Lag= 23.5 min
Primary = 0.66 cfs @ 12.46 hrs, Volume= 9,350 cf
Routed to Link 2L : PR Outfall

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 445.75' @ 12.46 hrs Surf.Area= 1,684 sf Storage= 3,549 cf

Plug-Flow detention time= 95.6 min calculated for 9,346 cf (95% of inflow)
Center-of-Mass det. time= 67.8 min (831.8 - 764.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	442.60'	1,137 cf	**45.50'W x 37.00'L x 4.00'H Field A** 6,734 cf Overall - 3,891 cf Embedded = 2,843 cf x 40.0% Voids
#2A	443.10'	2,807 cf	**Concrete Galley 4x4x3** x 90 Inside #1 Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf 90 Chambers in 10 Rows
		3,944 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 3	446.25'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Device 3	443.10'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	442.60'	**15.0" Round Culvert** L= 44.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 442.60' / 442.50' S= 0.0023 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.66 cfs @ 12.46 hrs HW=445.75' (Free Discharge)
└**3=Culvert** (Passes 0.66 cfs of 9.67 cfs potential flow)
  ├**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**2=Orifice/Grate** (Orifice Controls 0.66 cfs @ 7.59 fps)

Pond 1P: Conc. Galleries - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x3 (Concrete Galley, Shea LE-EGLPH, LE-CGLPH or equivalent)
Inside= 42.0"W x 30.0"H => 8.91 sf x 3.50'L = 31.2 cf
Outside= 48.0"W x 36.0"H => 10.81 sf x 4.00'L = 43.2 cf

48.0" Wide + 6.0" Spacing = 54.0" C-C Row Spacing

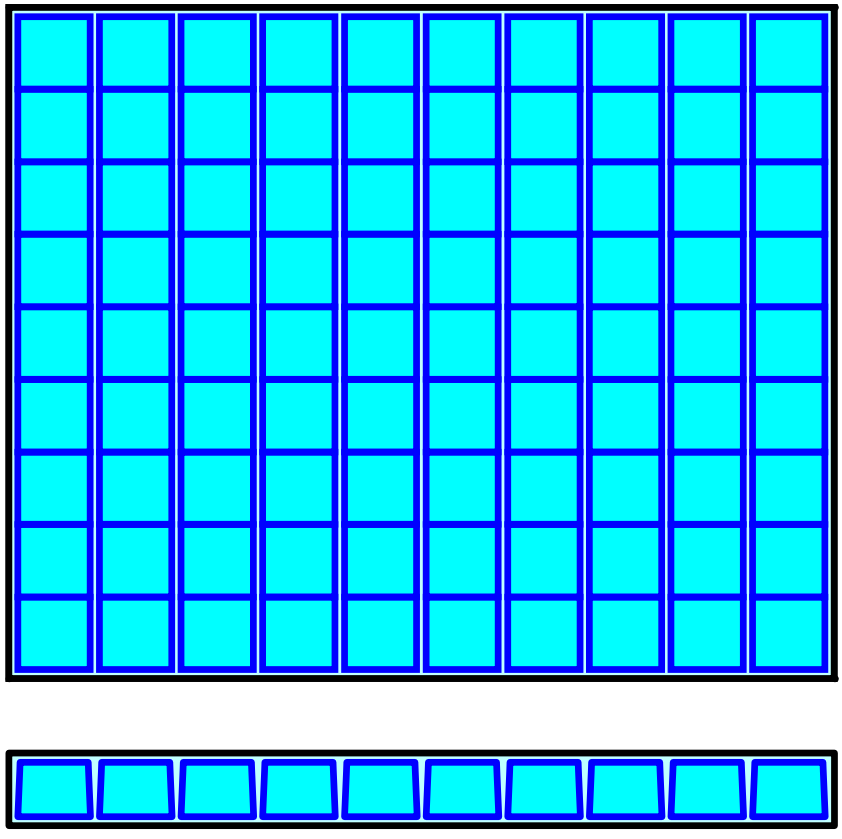
9 Chambers/Row x 4.00' Long = 36.00' Row Length +6.0" End Stone x 2 = 37.00' Base Length
10 Rows x 48.0" Wide + 6.0" Spacing x 9 + 6.0" Side Stone x 2 = 45.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

90 Chambers x 31.2 cf = 2,807.2 cf Chamber Storage
90 Chambers x 43.2 cf = 3,891.2 cf Displacement

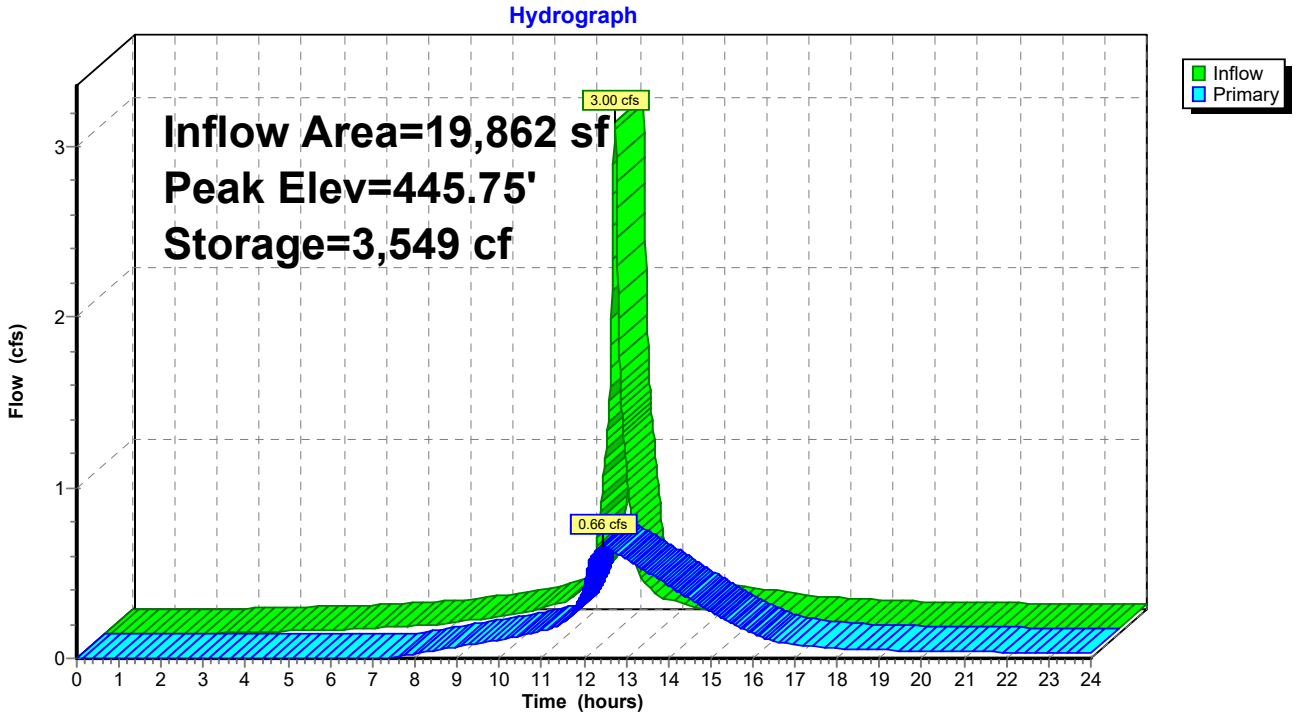
6,734.0 cf Field - 3,891.2 cf Chambers = 2,842.8 cf Stone x 40.0% Voids = 1,137.1 cf Stone Storage

Chamber Storage + Stone Storage = 3,944.4 cf = 0.091 af
Overall Storage Efficiency = 58.6%
Overall System Size = 37.00' x 45.50' x 4.00'

90 Chambers
249.4 cy Field
105.3 cy Stone



Pond 1P: Conc. Galleries



Stage-Area-Storage for Pond 1P: Conc. Galleries

Elevation (feet)	Storage (cubic-feet)
442.60	0
442.65	34
442.70	67
442.75	101
442.80	135
442.85	168
442.90	202
442.95	236
443.00	269
443.05	303
443.10	337
443.15	401
443.20	466
443.25	531
443.30	595
443.35	660
443.40	725
443.45	789
443.50	854
443.55	918
443.60	982
443.65	1,047
443.70	1,111
443.75	1,175
443.80	1,239
443.85	1,304
443.90	1,368
443.95	1,432
444.00	1,496
444.05	1,560
444.10	1,624
444.15	1,688
444.20	1,752
444.25	1,815
444.30	1,879
444.35	1,943
444.40	2,007
444.45	2,070
444.50	2,134
444.55	2,198
444.60	2,261
444.65	2,325
444.70	2,388
444.75	2,452
444.80	2,515
444.85	2,578
444.90	2,642
444.95	2,705
445.00	2,768
445.05	2,831
445.10	2,894
445.15	2,957
445.20	3,020
445.25	3,083
445.30	3,146
445.35	3,209
445.40	3,272
445.45	3,335
445.50	3,398
445.55	3,461
445.60	3,523
445.65	3,532
445.70	3,540
445.75	3,548
445.80	3,557
445.85	3,565
445.90	3,574
445.95	3,582
446.00	3,591
446.05	3,599
446.10	3,608
446.15	3,641
446.20	3,675
446.25	3,709
446.30	3,742
446.35	3,776
446.40	3,810
446.45	3,843
446.50	3,877
446.55	3,911
446.60	**3,944**

Summary for Pond 2P: Conc. Galleries

Inflow Area = 7,956 sf, 93.20% Impervious, Inflow Depth > 6.20" for 25-Year event
Inflow = 1.22 cfs @ 12.07 hrs, Volume= 4,113 cf
Outflow = 1.11 cfs @ 12.10 hrs, Volume= 2,948 cf, Atten= 9%, Lag= 2.1 min
Primary = 1.11 cfs @ 12.10 hrs, Volume= 2,948 cf
Routed to Link 2L : PR Outfall

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 444.61' @ 12.10 hrs Surf.Area= 525 sf Storage= 1,374 cf

Plug-Flow detention time= 173.2 min calculated for 2,947 cf (72% of inflow)
Center-of-Mass det. time= 82.2 min (834.8 - 752.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	440.70'	566 cf	**25.00'W x 21.00'L x 5.50'H Field A** 2,888 cf Overall - 1,472 cf Embedded = 1,416 cf x 40.0% Voids
#2A	441.20'	1,109 cf	**Concrete Galley 4x4x4** x 25 Inside #1 Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf 25 Chambers in 5 Rows
		1,675 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	444.00'	**8.0" Round Culvert** L= 16.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 444.00' / 443.00' S= 0.0625 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.11 cfs @ 12.10 hrs HW=444.61' (Free Discharge)
1=Culvert (Inlet Controls 1.11 cfs @ 3.32 fps)

Pond 2P: Conc. Galleries - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4 (Concrete Galley, UCPI 4x4x4 Galley or equivalent)
Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf
Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf

52.8" Wide + 6.0" Spacing = 58.8" C-C Row Spacing

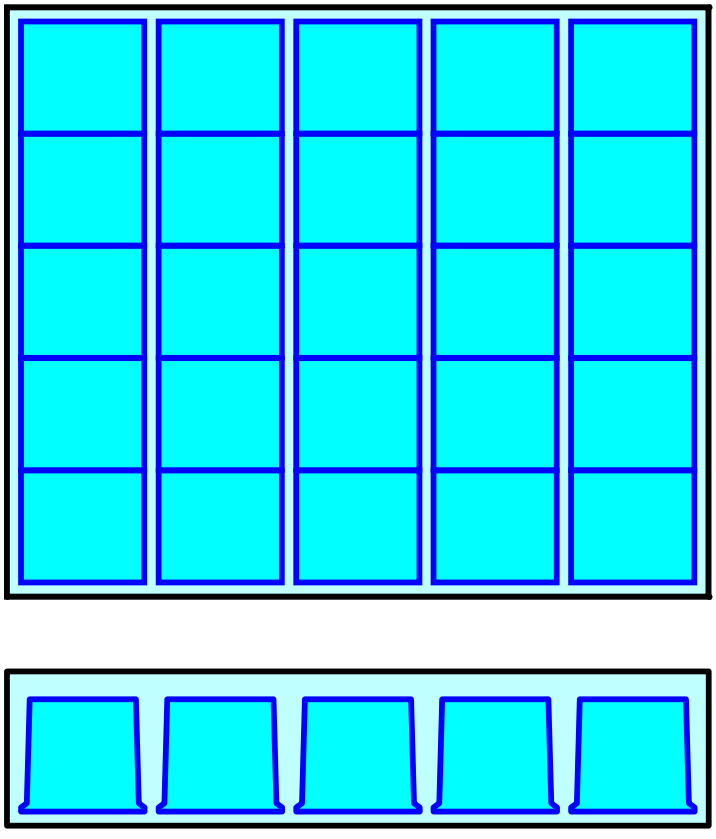
5 Chambers/Row x 4.00' Long = 20.00' Row Length +6.0" End Stone x 2 = 21.00' Base Length
5 Rows x 52.8" Wide + 6.0" Spacing x 4 + 6.0" Side Stone x 2 = 25.00' Base Width
6.0" Stone Base + 48.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

25 Chambers x 44.3 cf = 1,108.6 cf Chamber Storage
25 Chambers x 58.9 cf = 1,471.9 cf Displacement

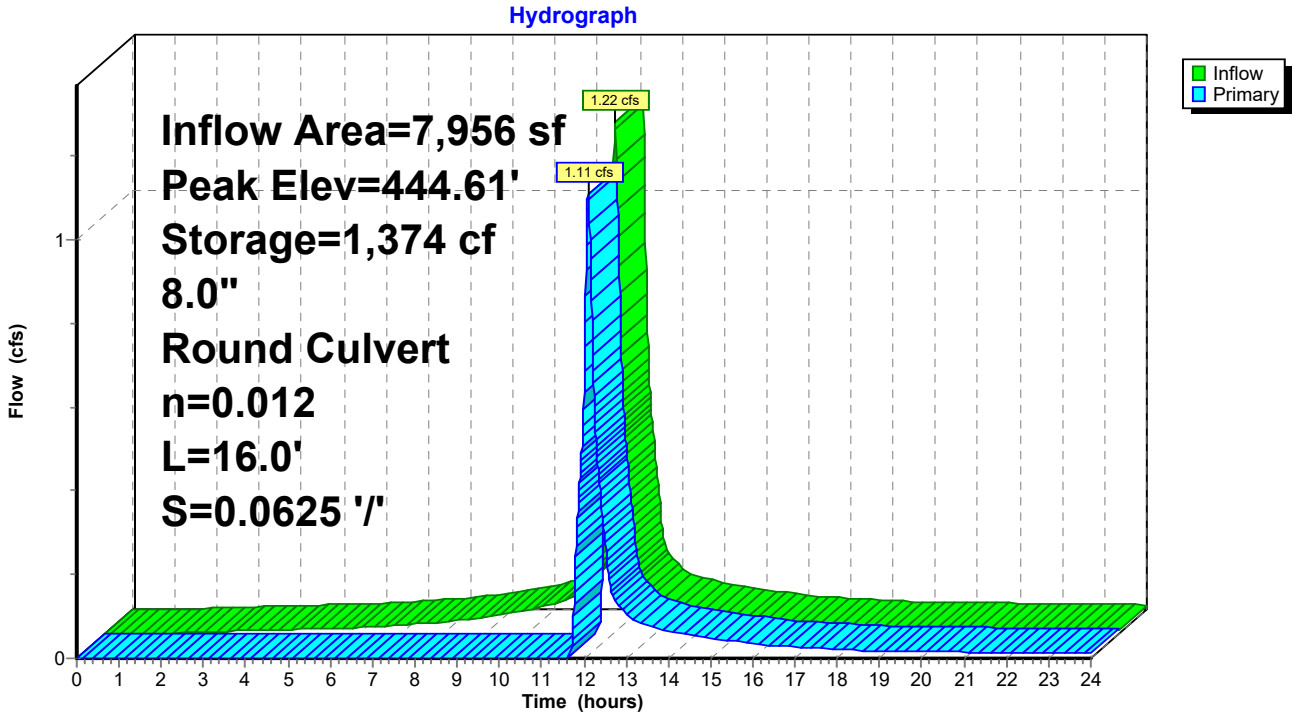
2,887.5 cf Field - 1,471.9 cf Chambers = 1,415.6 cf Stone x 40.0% Voids = 566.2 cf Stone Storage

Chamber Storage + Stone Storage = 1,674.9 cf = 0.038 af
Overall Storage Efficiency = 58.0%
Overall System Size = 21.00' x 25.00' x 5.50'

25 Chambers
106.9 cy Field
52.4 cy Stone



Pond 2P: Conc. Galleries



Stage-Area-Storage for Pond 2P: Conc. Galleries

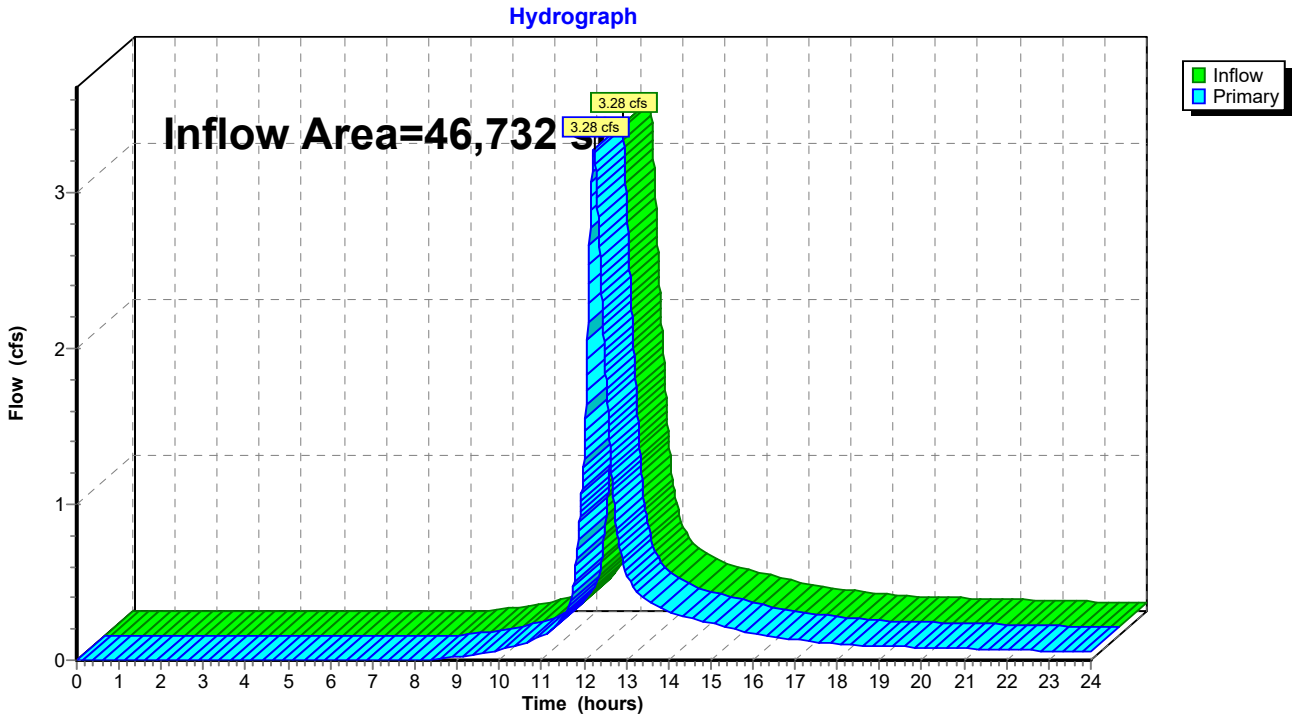
Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
440.70	0	443.30	889	445.90	1,612
440.75	11	443.35	908	445.95	1,622
440.80	21	443.40	926	446.00	1,633
440.85	31	443.45	945	446.05	1,643
440.90	42	443.50	963	446.10	1,654
440.95	53	443.55	982	446.15	1,664
441.00	63	443.60	1,001	446.20	**1,675**
441.05	74	443.65	1,019		
441.10	84	443.70	1,038		
441.15	94	443.75	1,056		
441.20	105	443.80	1,075		
441.25	123	443.85	1,093		
441.30	141	443.90	1,112		
441.35	159	443.95	1,130		
441.40	178	444.00	1,149		
441.45	196	444.05	1,167		
441.50	215	444.10	1,186		
441.55	234	444.15	1,204		
441.60	253	444.20	1,223		
441.65	271	444.25	1,241		
441.70	290	444.30	1,260		
441.75	309	444.35	1,278		
441.80	328	444.40	1,297		
441.85	347	444.45	1,315		
441.90	365	444.50	1,334		
441.95	384	444.55	1,352		
442.00	403	444.60	1,370		
442.05	422	444.65	1,389		
442.10	441	444.70	1,407		
442.15	459	444.75	1,426		
442.20	478	444.80	1,438		
442.25	497	444.85	1,441		
442.30	516	444.90	1,445		
442.35	534	444.95	1,448		
442.40	553	445.00	1,451		
442.45	572	445.05	1,455		
442.50	591	445.10	1,458		
442.55	609	445.15	1,461		
442.60	628	445.20	1,465		
442.65	647	445.25	1,475		
442.70	665	445.30	1,486		
442.75	684	445.35	1,496		
442.80	703	445.40	1,507		
442.85	721	445.45	1,517		
442.90	740	445.50	1,528		
442.95	759	445.55	1,538		
443.00	777	445.60	1,549		
443.05	796	445.65	1,559		
443.10	815	445.70	1,570		
443.15	833	445.75	1,580		
443.20	852	445.80	1,591		
443.25	870	445.85	1,601		

Summary for Link 1L: EX Outfall

Inflow Area = 46,732 sf, 0.68% Impervious, Inflow Depth > 3.63" for 25-Year event
Inflow = 3.28 cfs @ 12.24 hrs, Volume= 14,143 cf
Primary = 3.28 cfs @ 12.24 hrs, Volume= 14,143 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 1L: EX Outfall

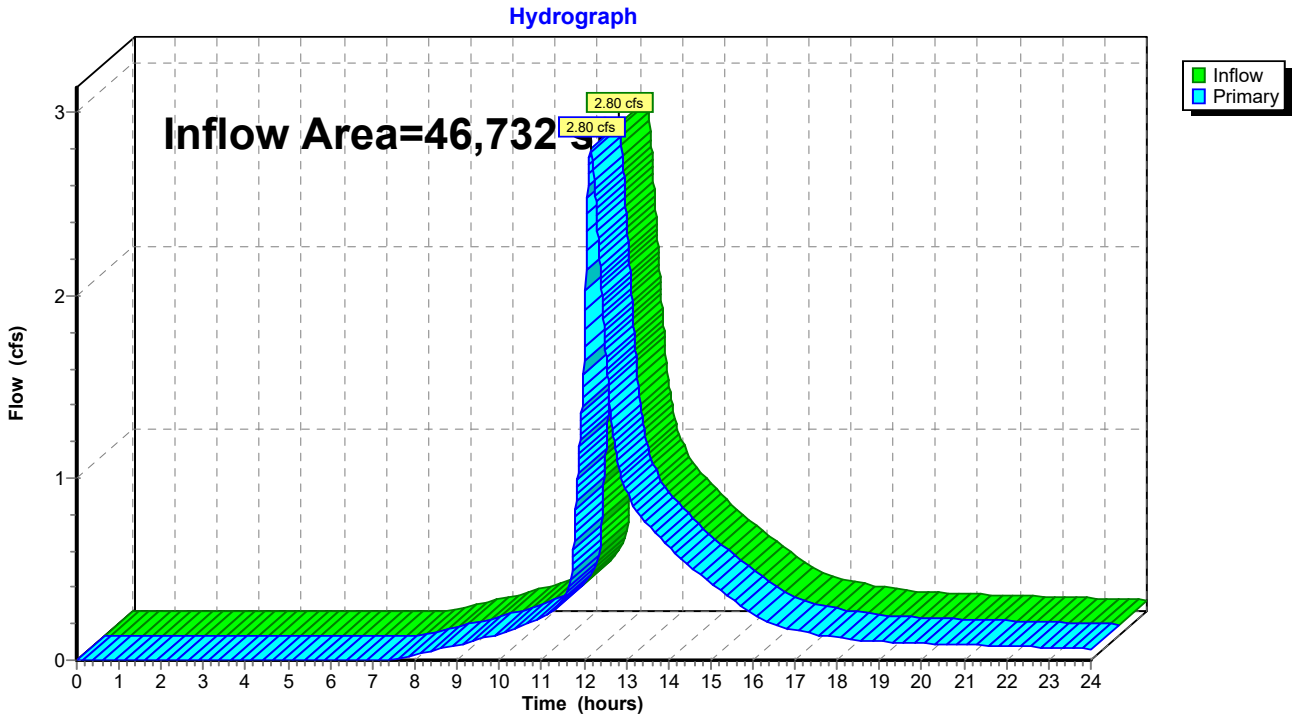


Summary for Link 2L: PR Outfall

Inflow Area = 46,732 sf, 53.05% Impervious, Inflow Depth > 4.74" for 25-Year event
Inflow = 2.80 cfs @ 12.16 hrs, Volume= 18,443 cf
Primary = 2.80 cfs @ 12.16 hrs, Volume= 18,443 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 2L: PR Outfall



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Basin Runoff Area=46,732 sf 0.68% Impervious Runoff Depth>4.37"
Flow Length=279' Tc=17.2 min CN=73.17 Runoff=3.95 cfs 17,033 cf

Subcatchment2S: Bypass Basin Runoff Area=18,914 sf 3.95% Impervious Runoff Depth>4.66"
Flow Length=279' Tc=17.2 min CN=75.74 Runoff=1.70 cfs 7,347 cf

Subcatchment3S: Infil #1 (parking) Runoff Area=19,862 sf 83.72% Impervious Runoff Depth>6.79"
Tc=5.0 min CN=94.09 Runoff=3.41 cfs 11,241 cf

Subcatchment4S: Infil #2 (courts) Runoff Area=7,956 sf 93.20% Impervious Runoff Depth>7.06"
Tc=5.0 min CN=96.37 Runoff=1.38 cfs 4,682 cf

Pond 1P: Conc. Galleries Peak Elev=446.37' Storage=3,791 cf Inflow=3.41 cfs 11,241 cf
Outflow=1.22 cfs 10,753 cf

Pond 2P: Conc. Galleries Peak Elev=444.68' Storage=1,399 cf Inflow=1.38 cfs 4,682 cf
8.0" Round Culvert n=0.012 L=16.0' S=0.0625 '/' Outflow=1.24 cfs 3,514 cf

Link 1L: EX Outfall Inflow=3.95 cfs 17,033 cf
Primary=3.95 cfs 17,033 cf

Link 2L: PR Outfall Inflow=3.43 cfs 21,614 cf
Primary=3.43 cfs 21,614 cf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Basin Runoff Area=46,732 sf 0.68% Impervious Runoff Depth>5.19"
Flow Length=279' Tc=17.2 min CN=73.17 Runoff=4.68 cfs 20,201 cf

Subcatchment2S: Bypass Basin Runoff Area=18,914 sf 3.95% Impervious Runoff Depth>5.49"
Flow Length=279' Tc=17.2 min CN=75.74 Runoff=2.00 cfs 8,659 cf

Subcatchment3S: Infil #1 (parking) Runoff Area=19,862 sf 83.72% Impervious Runoff Depth>7.71"
Tc=5.0 min CN=94.09 Runoff=3.84 cfs 12,754 cf

Subcatchment4S: Infil #2 (courts) Runoff Area=7,956 sf 93.20% Impervious Runoff Depth>7.98"
Tc=5.0 min CN=96.37 Runoff=1.56 cfs 5,290 cf

Pond 1P: Conc. Galleries Peak Elev=446.48' Storage=3,864 cf Inflow=3.84 cfs 12,754 cf
Outflow=2.00 cfs 12,257 cf

Pond 2P: Conc. Galleries Peak Elev=444.76' Storage=1,429 cf Inflow=1.56 cfs 5,290 cf
8.0" Round Culvert n=0.012 L=16.0' S=0.0625 '/' Outflow=1.37 cfs 4,121 cf

Link 1L: EX Outfall Inflow=4.68 cfs 20,201 cf
Primary=4.68 cfs 20,201 cf

Link 2L: PR Outfall Inflow=5.02 cfs 25,037 cf
Primary=5.02 cfs 25,037 cf

Appendix F

DCIA Tracking Spreadsheet

Directly Connected Impervious Area Tracking Worksheet
City of Stamford Drainage Manual

Note to user: complete all cells of this color *only*

Part 1: General Information	
Project Name	Rockrimmon Country Club
Project Address	2949 Long Ridge Road
Project Applicant	Rockrimmon Country Club, Inc.
Date of Submittal	12-Jul-23
Tax Account Number	001-9366

Part 2: Project Details		
1. What type of development is this? (choose from dropdown)	New Development	
2. What is the total area of the project site?	46,732	ft^2
3. What is the total area of land disturbance for this project?	38,783	ft^2
4. Does project site drain to High Quality Waters, a Direct Waterfront, or within 500 ft. of Tidal Wetlands? (Yes/No)	No	
5. What is the current ***DCIA*** for the site?	0	ft^2
6. Will the proposed development increase ***DCIA*** (without consideration of proposed stormwater management)? (Yes/No)	No	
7. What is the proposed-development ***total impervious area*** for the site?	26,265	ft^2

Part 3: Water Quality Target Total		
Does Standard 1 apply based on information above?	Yes	
Water Quality Volume (WQV)	2164.6	ft^3
Standard 1 requirement	Retain WQV on-site	
Required retention volume	2164.6	ft^3
Provided retention volume for proposed development	4,857.5	ft^3

Part 4: Proposed DCIA Tracking		
Pre-development ***total impervious area***	320	ft^2
Current ***DCIA***	0	ft^2
Proposed-development ***total impervious area***	26,265	ft^2
Proposed-development ***DCIA*** (after stormwater management)	0	ft^2
Net change in ***DCIA*** from pre-development to proposed-development	0	ft^2

Part 5: Post-Development (As-Built Certified) DCIA Tracking		
Post-development (per as-built) ***total impervious area***		ft^2
Post-development (per as-built) ***DCIA*** (after stormwater management)		ft^2
Net change in ***DCIA*** from pre-development to post-development		ft^2

Certification Statement

I hereby certify that the information contained in this worksheet is true and correct.

Engineer's Signature _____ Date ***7/12/2023*** Engineer's Seal _____

Appendix G

Operation and Maintenance Agreement

Block _____

AGREEMENT COVENANT

AGREEMENT made this _____ by and between Rockrimmon Country Club, Inc. _____ and the **CITY OF STAMFORD,** a municipal corporation lying within the County of Fairfield and State of Connecticut, acting herein by its duly authorized Mayor, Caroline Simmons (hereinafter referred to as the "City"), and the **ENVIRONMENTAL PROTECTION BOARD OF THE CITY OF STAMFORD,** acting herein by its duly authorized Chairman, Gary H. Stone (hereinafter referred to as the "EPB").

WITNESSETH:

WHEREAS, OWNER has commenced the planning and construction of a parking lot, pickleball courts, and associated hardscape & landscaping improvements _____ on a parcel of land owned by them and as more particularly described on Schedule "A", attached hereto and made a part hereof (the "Property").

WHEREAS, certain drainage facilities ("Drainage Facilities"), including but not limited to infiltration systems _____ as more particularly described on Schedule "B" attached (the "Construction Plans") shall be installed in connection with the aforesaid construction and in accordance with the Construction Plans and Zoning Permit _____ issued therefore, (the "Permit") and;

WHEREAS, OWNER, the CITY and EPB share a joint concern that the Drainage Facilities be maintained in a functioning condition so as to avoid pollution of surface and groundwaters, flooding and/or improper drainage.

NOW, THEREFORE, in consideration of ten dollars and other good and valuable consideration receipt of which is hereby acknowledged by the OWNER, it is hereby agreed as follows:

1) OWNER shall clean the drainage facilities or cause such facilities to be cleaned by periodic removal of accumulated sediment and debris in a good and workman-like manner, at least two (2) times during every twelve (12) month period, which times shall be in the period between April and June and between October and December and more often as the City may determine to be necessary.

2) OWNER shall sweep, or cause to be swept, garage facilities, driveways and roadway surfaces located on the Property at least once per calendar quarter.

3) OWNER shall utilize only sand or calcium chloride in connection with the de-icing of areas within the Property meaning and intending that road salt (Sodium Chloride) shall not be used for said purpose.

4) OWNER shall repair or replace any defects or defective drainage facilities so as to maintain the drainage facilities, at all times, in a fully functional capacity.

5) OWNER shall file as-built drainage plans with the EPB immediately upon the completion of work. Said plans shall be prepared by a professional engineer/surveyor registered in the State of Connecticut.

6) OWNER grants the CITY and/or EPB, its agents, and employees, the right to enter the Property at all reasonable times upon twenty-four (24) hours notice to the OWNER for the purpose of inspecting the Property to determine if OWNER is complying with the requirements hereunder. A representative of the Owner shall have the right to accompany the City and/or EPB on their inspection of the Property.

7) If, after an inspection is made pursuant to Paragraph Six (6) hereof, the CITY and/or EPB determines that the owner has failed to comply with the aforesaid undertakings, then the CITY and/or EPB shall give written notice of said determination to the then OWNER of the Property which notice shall also specify the said failure. Said notice shall be sent by registered or certified mail to the last known address of said Owner. If the Owner disputes the claim, he shall give written notice thereof to City and/or EPB within ten (10) days of receipt of said notice, and the EPB shall hold a hearing as promptly as possible to decide the merits of the disputed claim. If the claim is not disputed within said ten (10) days, the OWNER shall have thirty (30) days from the receipt of said notice to correct said failure, unless it is impossible to cure said defect within said time, in which case, the necessary repairs shall be immediately commenced and diligently pursued to completion within a reasonable time.

8) If the said failure is not remedied within the time frame herein stated, the CITY and/or EPB may proceed to cure the same and charge the actual cost thereof to the OWNER of the Property.

9) OWNER agrees to reimburse the CITY and/or EPB for reasonable legal fees and court costs if it becomes necessary for the CITY and/or EPB to sue for reimbursement of sums expended by the CITY and/or EPB in performance of OWNER'S obligation.

10) OWNER agrees and covenants to indemnify and save harmless the CITY and the EPB against any and all claims, suits, actions or judgments arising out of the delay in the performance of any of their obligations pursuant to this Agreement.

11) OWNER agrees that this covenant and restriction shall apply to and run with the land. It shall be binding on all future owners, administrators, executors, successors and assigns.

12) The OWNER hereby represents to the CITY and EPB that he/she is the owner, in fee simple, of all of the property described in "Schedule A" attached hereto and made a part hereof.

13) OWNER agrees that this Agreement and restrictive covenant upon execution of the same, shall be recorded on the land records at the OWNER'S expense at the time that a permit is issued for the Property herein and while the OWNER is in title.

14) OWNER agrees not to assert the invalidity of this document.

15) OWNER agrees that nothing herein shall be construed to be a limitation upon the right of the EPB to assert and enforce any rights it may have under federal, state or City statute, ordinance or regulation.

16) This agreement shall be governed by the laws of the State of Connecticut.

IN WITNESS WHEREOF, the said parties hereto have hereunto set their hands and seals, the day and year first above written.

WITNESSED:

_____ **THE CITY OF STAMFORD**

_____ BY: _____
Caroline Simmons
Its duly authorized Mayor

_____ **THE ENVIRONMENTAL PROTECTION BOARD**

_____ BY: _____
Gary H. Stone
Its duly authorized Chairman

_____ **OWNER**

BY: _____

_____
(Owner's Name)

(Acknowledgement on the Following Page)

STATE OF CONNECTICUT}
} ss: STAMFORD Date: _____
COUNTY OF FAIRFIELD }

Personally appeared Caroline Simmons, Mayor of the City of Stamford, signer and sealer of the foregoing Instrument, and acknowledged the same to be his free act and deed and the free act and deed of said City, before me.

_____
Commissioner of the Superior
Court or Notary Public

STATE OF CONNECTICUT}
} ss: STAMFORD Date: _____
COUNTY OF FAIRFIELD }

Personally appeared Gary H. Stone, Chairman of the Environmental Protection Board of the City of Stamford, signer and sealer of the foregoing Instrument, and acknowledged the same to be his free act and deed and the free act and deed of said Commission, before me.

_____
Commissioner of the Superior Court
or Notary Public

STATE OF CONNECTICUT}
} ss: STAMFORD Date: _____
COUNTY OF FAIRFIELD }

Personally appeared_____signer and sealer of the foregoing instrument, and acknowledged the same to be_____free act and deed, before me.

_____
Commissioner of the Superior Court
or Notary Public

SCHEDULE "A"

SCHEDULE "B"

Appendix H

Checklist for Stormwater Management Report

City of Stamford
Engineering Bureau
888 Washington Boulevard, 7th Floor Stamford, CT 06901
Phone 203-977-4189

CHECKLISTS

Project Name: Rockrimmon Country Club

Project Address 2949 Long Ridge Road

Property Owner(s) Rockrimmon Country Club, Inc.

Tax Account Number(s) 001-9366

Engineer's Signature _____ Date: 07/12/2023

All checklists must be completed and submitted. Provide a brief explanation for any items not provided. Check boxes as completed or N/A as not applicable.

✔	**Existing Conditions Plan**
✔	**Stormwater Management Report**
✔	**Stormwater Management Plan / Construction Plan**
	Certificate of Occupancy

Checklist for Existing Conditions Plan

I. General Information

✔	Site address
✔	Orientation, block, zone, City, street name
✔	Applicant name and legal address
✔	Surveyor name, address, contact information
✔	North arrow, bar scale, horizontal and vertical datum
✔	24" x 36" sheet size unless otherwise approved
✔	Existing conditions survey shall be prepared in accordance with the Minimum Standards for Surveys and Maps in the State of Connecticut. The class of survey shall be A-2 and T-2 and shall be represented as such on the map. The base map shall be sealed and signed by a Professional Land Surveyor licensed in the State of Connecticut.
✔	Drawing scale shall be set at 1" = 20' or 1" = 40' when possible

City of Stamford
Engineering Bureau
888 Washington Boulevard, 7th Floor Stamford, CT 06901
Phone 203-977-4189

II. Existing Conditions Plan Elements

✔	Show and label all property boundaries with linear bearing / distances and curve information
✔	Required zoning setbacks
✔	Show and label monument information
✔	Show and label at least one permanent benchmark on the parcel with northing, easting and elevation
✔	Label adjacent property ownership information
✔	Existing contours based on NAVD 88 (no exceptions) at 2 foot contour interval or 1 foot contour interval when slope is flatter than 2 percent at a minimum of 20 ft. beyond the property boundaries of the subject parcel
✔	Show spot elevations at low points, high points, and where topography is flatter than 2 percent
✔	All buildings and structures (label current use and finished floor elevations)
✔	All pavement, parking, driveways, property access points
✔	All roadways, streets, and rights-of-way. Label streets as public or private with street name
✔	All patios, decks, walkways, sidewalks, curb ramps (both adjacent to and opposite and existing roadways or intersections)
✔	Show and label (size, material, inverts) all existing utilities (overhead and underground) within the right-of-way and the project site (label ownership) including but not limited to water, gas and electrical services, wells, storm sewers, sanitary sewers and subsurface sewerage disposal systems.
✔	Show and label existing conveyance systems (swales, ditches, storm drains) including dimensions, elevations, sizes, slopes, and direction of flow
✔	Show and label boundaries of all easements, both public and private, with type, owner, and width
✔	Show and label all other existing features and improvements (e.g. light poles, mature trees of 8" (dbh) diameter or greater, vegetation, walls with top and bottom elevations, fences, pavement markings)

III. Resource Areas

	✔	Show and label limits of inland wetlands, tidal wetlands and any associated setbacks.
	✔	Show and label existing natural site features including tree canopy, outcroppings, permanent and intermittent watercourses, waterbodies, streams
N/A		Show and label limits of floodplain and floodway along with FIRM references (Community Number, Panel, Suffix, and Date) including any effective Letters of Map Revision/Amendment, zone designation and elevation.
	✔	Show and label any Conservation Easement Areas
N/A		Show and label Connecticut Coastal Jurisdiction Line (CJL)
N/A		Show and label existing steep slopes (25% and greater)

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Checklist for Stormwater Management Report

I. Project Report

A. Applicant / Site Information

✔	Applicant name, legal address, contact information (email & phone)
✔	Engineers name, legal address, contact information (email & phone)
✔	Site address and legal description
✔	Current / proposed zoning and land use
✔	Site vicinity map (8.5" x 11")

B. Project Description and Purpose

✔	Project description including proposed project elements and anticipated construction schedule

C. Existing Conditions Description

✔	Site area, ground cover, vegetation, features (roads, buildings, utilities, etc.)
✔	Site topography, slopes, drainage patterns, conveyances systems (swales, storm drains, etc.), stormwater discharge locations
	Receiving waterbody information including stormwater impairments and TMDL information (See the most recent State of Connecticut Integrated Water Quality Report)
✔	Site soils information including soil types, hydrologic soil group, bedrock / outcroppings, groundwater elevation, significant geologic features
✔	Provide NRCS Soils Mapping
✔	Resource protection areas (wetlands, streams, lakes, etc.), buffers, floodplains, floodways

D. Summary of Applicable General Design Criteria

✔	Methodology, design storm frequency
✔	Hydrologic design criteria
✔	Hydraulic design criteria
N/A	Flood hazard areas

N/A	**Applying under "Lite" Stormwater Management: Skip to Section I** (Refer to Flow Chart on page vii of the City of Stamford Stormwater Drainage Manual)

E. Project Type in Accordance with Standard 1 Definitions

✔	Area of disturbance, receiving waterbody classification (High Quality, Tidal Wetlands, Direct Waterfront)
✔	Project type (development, redevelopment, linear development)
✔	Pollutant reduction standard per flowchart Section 2.4

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F. Summary of LID Site Constraints

N/A		Description of sensitive areas for protection
	✔	Mature tree inventory, which shall include 8-inch (dbh) diameter trees or greater
N/A		Steep slopes
	✔	Ledge and bedrock depth
	✔	Seasonal high groundwater elevation
	✔	Pollutant hotspots
	✔	Summary of infiltration rates

G. Summary of Proposed Stormwater Treatment Practices

✔	Proposed LID controls (i.e. minimize impervious, minimize DCIA, minimize disturbance, increase time of concentrations, other LID controls and strategies)
✔	Location, size, types
✔	Design criteria and references
✔	Stormwater treatment practice, drainage area characteristics / details

H. Summary of Compliance with Standards 1

✔	Required pollutant reduction criteria
✔	Provided pollutant reduction (WQV) by stormwater treatment practice
✔	Summary of compliance with Standard 1

I. Summary of Compliance with Standards 2, 3, and 4

✔	Description of proposed stormwater management system
✔	Pre-development site hydrology with delineation of each watershed area and sub-basin
✔	Post-development site hydrology with delineation of each watershed area and sub-basin
✔	Comparison table of pre- and post-development hydrology, peak flow, volume, and percent difference
✔	Summary table of watershed areas and sub-basin areas, time of concentration and runoff coefficients
✔	Summary table demonstrating the 2-year, 24-hour post development peak flow rate is less than or equal to the lowest of either: - The pre-development 1-year, 24-hour storm peak flow rate - 50 percent of the pre-development 2-year, 24-hour storm peak flow rate
✔	Conveyance protection, emergency outlet sizing
N/A	Hydraulic grade line summary and tail water elevation used in analysis
✔	Construction erosion and sediment control description, Standard 3
✔	Operation and Maintenance, maintenance tasks and schedule on construction plans per Standard 4

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J. Summary of Compliance with Applicable Drainage Facility Design Requirements

✔	Description of applicable design requirements and compliance
✔	Description of proposed drainage facilities and compliance

K. Stormwater Management Report

✔	Signed and stamped by professional engineer licensed in the State of Connecticut
✔	Drainage impact statement in accordance with Standard 5B.

II. Supporting Calculations (as appendix to Project Report)

N/A		**Applying under "Lite" Stormwater Management: Skip to Section N**

L. Water Quality Volume / Water Quality Flow Calculations

✔	Calculations demonstrating the total Water Quality Volume generated by the post-development site and the required retention/treatment volume per Standard 1 in cubic feet.
✔	Calculations demonstrating the total Water Quality Volume retained/treated by each stormwater treatment practice and the total Water Quality Volume generated by the post-development contributing drainage area to each stormwater treatment practice

M. Stormwater Treatment Practice Sizing Calculations

✔	Calculations demonstrating how each stormwater treatment practice has been designed and sized in accordance with the Structural Stormwater BMP Design references in Appendix B. Calculations will vary by stormwater treatment practice, but a minimum, applicants shall provide calculations in accordance with design criteria from the Connecticut Stormwater Quality Manual.

N. Hydrologic and Hydraulic Design Calculations

N/A		Stream channel protection, Standard 2A
	✔	Conveyance protection, Standard 2B
	✔	Peak flow control (1-year, 2-year, 5-year, 10-year, 25-year, and 50-year storms), Standard 2C
N/A		Inlet analysis
N/A		Gutter flow (Site by site basis as requested by Engineering Bureau)
	✔	Storm sewers and culverts (velocities, capacity, hydraulics)
N/A		Hydraulic grade line required when pipe is flowing at full capacity o Provide existing and proposed summary table o Provide existing and proposed mapping, label structures
	✔	Detention facilities (outlet structure, stage/storage, freeboard)
	✔	Emergency outlet sizing, safely pass the 100 year storm, Standard 2D
	✔	Outlet protection calculations, based on conveyance protection (i.e. riprap, energy dissipater)

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O. Hydrologic and Hydraulic Model, Existing and Proposed

✔	Drainage routing diagram
✔	Summary
✔	Storage pond input

P. Downstream analysis (Site by site basis as required by the Engineering Bureau)

N/A		Downstream analysis, Standard 2E

III. Supporting Mapping (as appendix to Project Report)

Q. Pre-Development Drainage Basin Area Mapping

✔	11" x 17" or 8.5" x 11" sheet size
✔	Topography, drainage patterns, drainage area boundaries and sub basins, flow paths, times of concentration
✔	Locations of existing stormwater discharges
✔	Perennial and intermittent streams, wetlands, and floodplain / floodways
✔	NRCS soil types, locations, boring locations, infiltration testing locations
✔	Vegetation and groundcover
✔	Existing roads, buildings, driveways, parking areas, walks, patios, pools and other impervious surfaces, decks and other structures
✔	Location, size, type of existing structural stormwater controls, facilities and conveyance systems

R. Post-Development Drainage Basin Area Mapping

✔	11" x 17" or 8.5" x 11" sheet size
✔	Topography, drainage patterns, drainage area boundaries and sub basins, flow paths, times of concentration
✔	Locations of proposed stormwater discharges
✔	Perennial and intermittent streams, wetlands, and floodplain / floodways
✔	NRCS soil types, locations, boring locations, infiltration testing locations
✔	Vegetation, ground cover and proposed limits of clearing/disturbance
✔	Proposed, roads, buildings, driveways, parking areas, walks, patios, pools and other impervious surfaces, decks and other structures
✔	Location, size, type of proposed structural stormwater controls, facilities and conveyance systems

IV. DCIA Tracking Worksheet (as appendix to Project Report)

✔	DCIA Tracking Worksheet (Use form found in Appendix E)

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V. Proposed LID Review Map

N/A		**Applying under "Lite" Stormwater Management - Proposed LID Review Map NOT required.**

A. General

✔	Site address
✔	Applicant name, legal address, contact information
✔	Engineers name, address, contact information
✔	North arrow, bar scale, horizontal and vertical datum
✔	Drawing scale shall be set at 1"=20' or 1"=40' when possible
✔	Signed and stamped by a Licensed Professional Engineer in the State of Connecticut
✔	11" x 17" or 24" x 36" sheet size unless otherwise approved
✔	Existing and proposed contours based on NAVD 88 at 2 foot contour interval or 1 foot contour interval when slope is flatter than 2 percent
✔	Locations of existing stormwater discharges
✔	Roads, buildings, driveways, parking areas, walks, patios, pools and other impervious surfaces, and decks and other structures
✔	Location, size, ownership of stormwater conveyance systems (swales, pipes, etc.)

B. LID Constraints:

✔	Boring / test pit locations
✔	Infiltration testing locations and results
✔	Vegetation and proposed limits of clearing / disturbance
✔	NRCS soils mapping
N/A	Steep slopes
N/A	Surface waters / Perennial and intermittent streams
✔	Resource protection areas and buffers, wetlands, floodplain / floodways
✔	Existing vegetation and mature trees, which shall include 8-inch (dbh) diameter trees or greater
✔	Poor soils (HSG C & D)
✔	Shallow bedrock / ledge
✔	Seasonal high groundwater elevation
N/A	Other site constraints (e.g. brownfield caps)

C. Proposed Stormwater Treatment Measures:

✔	Location, size, type, limits, and WQV provided by each proposed stormwater treatment practices
✔	Drainage area to each proposed stormwater treatment practice (total area, impervious area, WQV)

D. Site Summary Table:

✔	Total site area, disturbed area, pre- and post-development impervious areas
✔	Required pollutant reduction volume (retention or detention)
✔	Provided pollutant reduction volume (retention or detention)

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Checklist for Stormwater Management Plan / Construction Plans

A. General

✔	Site orientation, address and legal description
✔	Applicant name, legal address, contact information
✔	Engineers name, address, contact information
✔	North arrow, bar scale, horizontal and vertical datum
✔	Drawing scale shall be set at 1"=20' or 1"=40' when possible
✔	Stamped by a Licensed Professional Engineer in the State of Connecticut
✔	24" x 36" sheet size unless otherwise approved

B. Site Development Plans

✔	City of Stamford Standard Notes
✔	As required by the Drainage Maintenance Agreement, provide a written narrative describing the nature of the proposed development activity and the program for operation and maintenance of drainage facilities and control measures throughout the life of the project.
✔	Existing and proposed contours based on NAVD 88 at 2 foot contour interval or 1 foot contour interval when slope is flatter than 2 percent
✔	All required spot elevations to clearly depict positive pitch
✔	Top and bottom elevation of all walls
✔	Roads, buildings, driveways, parking areas, walks, patios, pools and other impervious surfaces, and decks and other structures
✔	All utilities and easements
✔	Location, size, maintenance access, type of proposed structural stormwater controls and facilities with elevations and inverts
✔	Location, size, maintenance access, type of proposed non-structural stormwater controls and facilities with elevations and inverts
✔	Location, size, type of proposed stormwater infrastructure, inlets, manholes, infiltration and detentions systems, control structures with elevations and inverts
✔	Location, size, ownership of stormwater conveyance systems (swales, pipes, etc.) with elevations and inverts
N/A	Identify roof leaders, curtain drains and foundation drains with elevations and inverts
✔	Proposed water quality treatment systems, size and model type
✔	Final stabilization measures which may include slope stabilization

C. Erosion and Sedimentation Control Plan

✔	Phasing and schedule
✔	Construction access and staging and stock pile areas
✔	Operation and maintenance of erosion and sedimentation controls
✔	Tree protection
✔	Downstream protection such as location of silt fencing
✔	Limit of disturbance
✔	Construction fencing

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D. Construction Details

✔	Standard City of Stamford details
✔	Infiltration system details
✔	Control structure details
✔	Water quality treatment details
✔	Infiltration testing results

Checklist for Certificate of Occupancy

	Final Improvement Location Survey
	Stormwater Management Certification Form
	Final DCIA Tracking Worksheet
	Standard City of Stamford Drainage Maintenance Agreement (Agreement Covenant)

Other Certifications at the discretion of the Engineering Bureau and/or EPB

	Wall Certification
	Landscape Certification
	Landscape Maintenance Agreement
	Waiver Covering Storm Sewer Connection
	Waiver Covering Granite Block, Depressed Curb, and Driveway Aprons
	Flood Certification