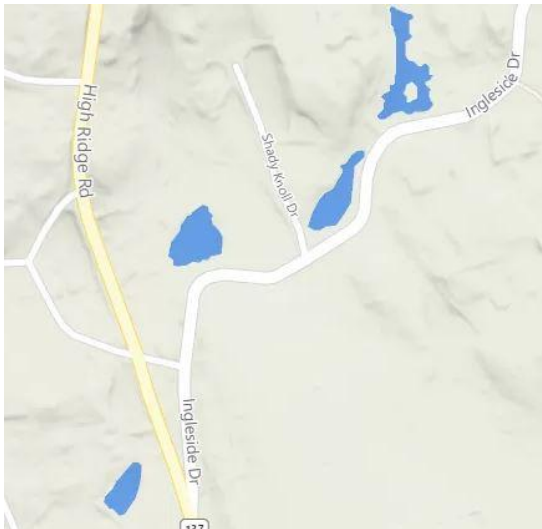


DRAINAGE REPORT PREPARED FOR EXISTING AND PROPOSED SITE CONDITIONS

LOCATED AT: 25 SHADY KNOLL DRIVE
STAMFORD, CONNECTICUT

FCE # 1891

September 23, 2022 Revised to August 14, 2024



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NARRATIVE:

The subject of this report is a 3.625 acre parcel located at 25 Shady Knoll Drive in Stamford. The property is currently zoned RA2. The purpose of this report is to determine the existing and proposed runoffs resulting from the proposed site improvements.

EXISTING CONDITIONS:

The subject parcel is located at the east side of Shady Knoll Drive, approximately 200 feet from its intersection with Ingleside Drive. The lot currently contains a single family residence with associated driveway, patio and walks. The lot contains three watersheds. One slopes moderately to steeply down to the pond from either side, one slopes moderately down to the road from the interior of the property to a pair of catchbasins in the road, and another slopes from the interior of the property to a more southerly pair of catchbasins in the road. The drainage pattern follows the terrain as described. The property does not directly discharge to an impaired waterbody per the State of Connecticut's most recent Integrated Water Quality Report, List of Impaired Waters, Appendix B-1.

Existing soils at this location, as identified in the NRCS Soil Survey of Fairfield County, Connecticut, consist of a combination of Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes, which has a Hydrologic classification of "D", and Paxton and Montauk fine sandy loams, 8 to 15 percent slopes, which has a Hydrologic classification of "C".

For the purposes of this analysis a Hydrologic classification of "C" was used.

The existing runoff from a 50-Year rainfall event in Basin 1 is 7.14 c.f.s.

The existing runoff from a 50-Year rainfall event in Basin 2 is 5.20 c.f.s.

PROPOSED CONDITIONS:

The proposal for this property is to construct additions to the residence.

The proposed runoff from a 50-Year rainfall event in Basin 1 is 7.14 c.f.s.

The proposed runoff from a 50-Year rainfall event in Basin 2 is 5.20 c.f.s.

There is no activity proposed in Basin3, and therefore no change in runoff.

The runoff resulting from the proposed improvements will be routed to an underground retention system sized to temporarily store the increased runoff before draining into the surrounding soils.

The disturbed areas will be protected with a silt fence on the downgrade elevations, properly backed up. A mud anti tracking pad will be placed on the construction entrance, and the roadway swept clean as necessary.

COMPUTATIONS:

The following computations of the existing and proposed conditions runoff flows were derived from the HydroCAD computer software. HydroCAD follows the NRCS TR-20 procedure for computing stormwater runoff. Computations were performed for a 1-year storm event, which has a 100% chance of occurring in any given 12 month period, through a 100-year storm event, which has a 1% chance of occurring in any given 12 month period.

Existing Conditions (Basin 1):

House	1,938	s.f.	CN 98
Patio	661	s.f.	CN 98
Walk	137	s.f.	CN 98
Pool	211	s.f.	CN 98
Water	37,765	s.f.	CN 1
Lawn	54,779	s.f.	CN 79
Total	95,491	s.f.	

Weighted CN = 49

Proposed Conditions (Basin 1):

House	2,453	s.f.	CN 98
Walk	137	s.f.	CN 98
Pool	211	s.f.	CN 98
Shed	99	s.f.	CN 98
Water	37,765	s.f.	CN 1
Lawn	54,826	s.f.	CN 79
Total	95,491	s.f.	

Weighted CN = 49

Existing Conditions (Basin 2):

House	2,200	s.f.	CN 98
Driveway	1,398	s.f.	CN 98
Walk	155	s.f.	CN 98
Pool	234	s.f.	CN 98
Lawn	50,402	s.f.	CN 79
Total	54,389	s.f.	

Weighted CN = **80**

Proposed Conditions (Basin 2):

House	2,878	s.f.	CN 98
Driveway	864	s.f.	CN 98
Walks	155	s.f.	CN 98
Pool	234	s.f.	CN 98
Lawn	50,258	s.f.	CN 79
Total	54,389	s.f.	

Weighted CN = **80**

Groundwater Recharge Volume (GWV) Basin 2:

Impervious area = 23.1 %

WQV = $(0.2579 * 0.235 \text{ ac}) / 12 = 0.00505541 \text{ ac-ft} = 220.0 \text{ ft}^3$

GWQ = $220.0 * 0.1 = 22.0 \text{ ft}^3$

Basin 2

Surface Area of Infiltration System	102 ft ²
Volume of Infiltration Storage	118 ft ³
Infiltration Rate	1.19 in/hr
Theoretical Water Column Height	13.88 in.
Time of Drawdown	11.67 hrs.

SUMMARY:

Basin 1

	100 Year	50 Year	25Yr.	10Yr.	5Yr.	2Yr.	1Yr.
Existing Runoff :	8.31 c.f.s.	7.14 c.f.s.	6.04	4.60	3.54	2.35	1.66
Proposed Runoff :	8.31 c.f.s.	7.14 c.f.s.	6.05	4.60	3.55	2.35	1.67
% +/-	0	0	+0.2	0	+0.3	0	+0.6

Basin 2

	100 Year	50 Year	25Yr.	10Yr.	5Yr.	2Yr.	1Yr.
Existing Runoff :	6.05 c.f.s.	5.20 c.f.s.	4.41	3.37	2.62	1.75	1.25
Proposed Runoff :	6.04 c.f.s.	5.20 c.f.s.	4.41	3.37	2.62	1.75	1.26
Runoff Retained:	0.06 c.f.s.	0.05 c.f.s.	0.04	0.04	0.03	0.02	0.02
Areas Bypassing Retention							
Plus overflow:	6.05 c.f.s.	5.19 c.f.s.	4.39	3.35	2.61	1.74	1.25
% +/-	0	-0.2	-0.5	-0.6	-0.4	-0.6	0

<u>Basin</u>	<u>Area</u>	<u>Slope</u>	<u>Reach/Length</u>	<u>CN</u>	<u>Tc</u>
1	95,491 s.f.	0.082	139'	79	6.8
2	54,389 s.f.	0.043	308'	79	17.2
3	8,016 s.f.	0.035	312'	79	

CONCLUSIONS:

The runoff resulting from the proposed site improvements will be retained in an on-site retention system. In Basin 1, the proposed activity reduces the runoff for the 1 through 100 Year rainfall events as the table above illustrates.

This net peak runoff during a 50 Year (2%) rainfall event in Basin1 is maintained at its current peak of 7.14 c.f.s. While three of the rainfall events show a minimal increase in net

runoff, the pond is adequate to absorb the minimal increases for those rainfall events. There is a 47 square foot reduction in impervious surfaces in Basin 1.

There is no activity proposed in Basin 3.

The runoff resulting from the proposed site improvements will be retained in an on-site retention system. In Basin 2, the runoff from a portion of the house roof will be routed to 2 units of Cultec R-150XLHD retention chambers. The stormwater runoff is further mitigated on-site.

This system will decrease the net peak run-off during a 50 Year (2%) rainfall event in Basin 2 to 5.19 c.f.s. from its current peak of 5.20 c.f.s.

The bottom of the Cultecs will be at elevation 342.1 while the bottom of the stone bed will be at elevation 341.6. A restrictive layer (ledge) was found at an elevation of 340.1. The volume of the voids in the stone bed is not counted in the retention capacity of the system.

The high level overflow for the retention system is a grate over the Cultecs at grade. While located in Basin 3, there is no overflow from the Cultecs and do not increase the runoff in Basin 3.

The 6" PVC roof leaders routed to the retention system each have a minimum capacity of 0.66 c.f.s., greater than the maximum flow of 0.05 c.f.s. runoff routed through them at the peak of a 50 Year rainfall event.

The proposed retention system provides a total of 118 ft³ of storage, which will be adequate to maintain the net runoff during a 50 Year rainfall event, and will provide groundwater recharge.

The retention system empties completely in 11.67 hours after a 50 Year rainfall event.

The existing impervious surfaces are isolated from the City's infrastructure, with the exception of the driveway in Basin 2. The runoff from the remainder of the surfaces disperse onto the side and rear pervious lawn areas, and a vegetated area, following the existing terrain to the rear (south), over a length of approximately 70 feet. As such, they do not connect to any part of the City's drainage infrastructure, and are not included in the DCIA totals. There are no proposed impervious surfaces that connect to the City infrastructure.

The maximum peak net runoff from the proposed conditions in Basin 2 do not increase compared to the peak runoff from the existing conditions for each of the rainfall events from the 1 Year to the 100 Year rainfall events, as the table above illustrates.

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.