

Summer Hill

Civil Engineers & Land Surveyors, P.C.



BY: MJO DATE: 1-5-24 SUBJECT: 33 Kenyon Road Waterford, Connecticut SHEET No.: 1 OF 3
CHECKED: LJM DATE: 1-5-24 Stormwater Management Narrative and Design Computations PROJECT No.: 23-20

1. Narrative

The planned project consists of the construction of a 3,760 square foot synagogue building and a 190 square foot storage building, and associated driveway, parking area, sidewalk, stormwater wetland, building utility services, exterior lighting, fencing, signage and landscaping.

The project site land parcel is located in the Thames River subregional drainage basin (HUC 3000) and locally drains to the east to an immediately adjacent inland wetland approximately 20 acres in area. The wetlands outlet watercourse crosses Vauxhall Street Extension to the east and joins Great Swamp Brook which flows southeasterly and enters the northern end of Brandegee Lake approximately 2,000 feet east of the project site.

A single family residence was formerly located in the southern portion of the project site. The residence has been removed and the only impervious land cover surface remaining on the site is a small area of the former driveway apron.

The impervious surface land coverage associated with the planned redevelopment project is 28,438 square feet or 25% of the sites land area.

The total area of disturbance associated with the projects construction activities is approximately 1.6 acres.

A planned stormwater wetland and the site grading in combination comprise the stormwater management system for the planned redevelopment of the site and provide the required measures to address the stormwater quality and groundwater recharge guidance contained in the Connecticut Stormwater Quality Manual.

The grading of the site has been developed to direct surface water runoff from the turnaround, the main parking area located to the south of the building, the sidewalks along the west side of the building and the main parking area, and a small portion of the sites access driveway to the stormwater wetland. The stormwater wetland has been sized to temporarily store a rainfall depth of 3.7 inches over these areas which is almost twice the computed water quality volume for the redeveloped site.

Stormwater runoff generated from less frequent, greater depth rainfall events in excess of this temporary storage volume will flow over a two-foot width vegetated berm and four horizontal to one vertical slope on the downgradient side of the stormwater wetland and be directed to the inland wetland to the east. The southern third of the stormwater wetland berm length directs stormwater runoff to the immediately adjacent inland wetland and the remaining northern portion directs stormwater runoff over relative flat, heavily vegetated ground surface cover areas before entering the inland wetland.

Stormwater runoff from the parking area located to the north of the building, the driveway to the waste and recycling receptacles area, the receptacles pad, the terrace and sidewalk to the north of the building, and the main building and storage building roof areas will be directed to new lawn areas adjacent to the parking area and buildings and the existing heavily vegetated ground surface cover areas. The northern parking area, waste and recycling receptacles area and driveway, and storage building are located a minimum of 50 feet from the inland wetland to the east.

The site access driveway grading has been developed to direct stormwater runoff from the driveway to the relatively flat sloped heavily vegetated ground surface cover areas between the driveway and the inland wetland to the east. The major portion of the access driveway is located a minimum of 50 feet from the inland wetland.

The attenuation of peak discharges of stormwater runoff from the redeveloped site is not required for this project due to the relative size of the redeveloped site and its impervious surface land cover area of 0.65 acres as compared to the approximate 20 acre inland wetland to the east of the site that the project site drains to.

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2. Water quality volume for the developed site computed using the CT Stormwater Quality Manual equation

$WQV = 1.0 \text{ in}(R)(A)/12$, where:

WQV, Water Quality Volume (Ac-ft)

R, Volumetric Runoff Coefficient = $0.05 + 0.009(I)$

I, Percent impervious cover

A, Site area (Ac.)

$I = 25.0\%$

$R = 0.05 + 0.009(25.0) = 0.275$

$A = 112,209 \text{ ft}^2 = 2.58 \text{ Ac.}$

$WQV = 1 \text{ in}(R)(A)/12 = (1 \text{ in})(0.275)(2.58)/12 = 0.0591 \text{ Ac-ft} = 2,575 \text{ ft}^3$

3. Groundwater recharge volume for the developed site computed using the CT Stormwater Quality Manual equation

$GRV = D(A)(I)/12$, where:

GRV, Groundwater Recharge Volume (Ac-ft)

D, Depth of runoff to be recharged (in)

A, Site area (Ac.)

I, Net increase in percent of impervious cover

For Hydrologic Soil Group C soil types, $D = 0.10 \text{ in}$

$A = 112,209 \text{ ft}^2 = 2.58 \text{ Ac.}$

$I \text{ (Existing)} = 0 \text{ ft}^2$

$I \text{ (Proposed)} = 28,438 \text{ ft}^2 / 112,209 \text{ ft}^2 = 0.25$

Net increase in impervious surface coverage = $0.25 - 0.00 = 0.25$

$GRV = (0.10)(2.58)(0.25)/12 = 0.0054 = 235 \text{ ft}^3$

4. Stormwater wetland storage volume

Elevation ft	Area ft ²	Average Area ft ²	Stage-Storage		
			Incremental Volume ft ³	Cumulative Volume ft ³	Cumulative Volume Ac-ft
137	1,342	1,342	0	0	0
138	1,840	1,591	1,591	1,591	0.0365
139	2,363	2,102	2,102	3,693	0.0848
139.5	2,633	2,498	1,249	4,942	0.1134

5. Test pit logs

Test pits excavated on 11-14-23 and logged by Michael J. Ott, P.E.

TP 1

0" – 10" Topsoil

10" – 22" Grey very fine sand and silt

22" – 36" Orange brown very fine sand, trace silt

Groundwater observed @ 32"

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TP 2

0" – 12" Topsoil
12" – 25" Grey very fine sand and silt
25" – 36" Orange brown very fine sand, trace silt
Groundwater observed @ 24"

TP 3

0" – 12" Topsoil
12" – 30" Grey very fine sand and silt
30" – 37" Orange brown very fine sand, trace silt
Groundwater observed @ 30"