**Final Coastal Site Plan**

**PLPZ 2021 00097**

---

**Puckett Residence**

To raise (lift) the existing dwelling, construct a new deck, patio and new related site improvements

<table>
<thead>
<tr>
<th>Location:</th>
<th>47 Edgewater Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone:</td>
<td>R-12</td>
</tr>
<tr>
<td>Flood Zone(s):</td>
<td>AE-15, AE-13</td>
</tr>
<tr>
<td>Parcel Size:</td>
<td>7,270 sq. ft. (to mean high water)*</td>
</tr>
</tbody>
</table>

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### Zoning Statistics

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th>Proposed</th>
<th>Allowed/Required*</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROSS SQ. FT:</td>
<td>1,475.47</td>
<td>2,272.64</td>
<td>2,290.05 sq. ft.</td>
</tr>
<tr>
<td>FAR:</td>
<td>0.202</td>
<td>0.312</td>
<td>0.315</td>
</tr>
<tr>
<td>FRONT SETBACK:</td>
<td>18.7 ft.</td>
<td>18.7 ft.</td>
<td>25 ft.*</td>
</tr>
<tr>
<td>REAR SETBACK:</td>
<td>&gt;55 ft.</td>
<td>+/-55 ft.</td>
<td>25 ft.*</td>
</tr>
<tr>
<td>SIDE YARD SETBACKS:</td>
<td>not provided</td>
<td>5.9 ft. and 8.1 ft. Total of 14 ft.</td>
<td>5 ft. min. Sum of both not less than 15 ft.*</td>
</tr>
<tr>
<td>BUILDING HEIGHT:</td>
<td>not provided</td>
<td>30 ft. ⅛”</td>
<td>35 ft.</td>
</tr>
<tr>
<td># OF STORIES:</td>
<td>not provided</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>GREEN AREA:</td>
<td>not provided</td>
<td>67.5%</td>
<td>55%</td>
</tr>
</tbody>
</table>

* As an undersized lot in the R-12 Zone, the R-7 zone setback requirements apply per Sec. 6-9.

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**STAFF REPORT UPDATE:**

The applicant postponed the application before the first meeting in July to address staff comments. The applicant revised plans on September 1, in an attempt to address outstanding comments and issues. The applicant has revised the height of the rear terrace structure from elevation 10.7 to elevation 8.3. Grading in the rear yard has also been revised. The applicant has provided more details as to the location of the building, and height, as well as providing a coastal buffer planning proposal for the coastline of the property. The applicant has also submitted a flood zone compliance analysis for RACE coastal engineering, how listed the features where the applicant meets FEMA regulations and also performed and wave analysis to determine if any wave impacts could be found to impact adjacent structures. The applicant engineers have found no increase in the related wave action and certifies that there would be not increase in the Base Flood Elevation as a result of the proposed work. Because of the concerns of the design the plans have been reviewed by DPW even though it is being filed as a drainage exemption. The following is an updated staff report.

**APPLICATION SUMMARY**

The applicant is seeking Final Coastal Site Plan approval to make additions to, and raise (lift) the existing residential structure at 47 Edgewater Drive to meet the Base Flood Elevation (BFE) of the FEMA FIRM Maps. In addition to the existing dwelling being
raised and expanded, the applicant is proposing to construct a new, patio, and associated site improvements to accommodate the higher first floor in the Coastal Overlay Zone. The structure is within 100 ft. buffer of coastal resources and is in the AE-15 and AE-13 Flood Zones, and was submitted as an Administrative application for review by Staff but has been referred to the Commission by the Town Planner, post the investigation by the State’s DEEP regarding alleged work/fill in the tidal wetland area (see attached).

ISSUES/RECOMMENDATIONS

1. ZONING- the ZEO has noted that the proposal does not appear to meet zoning. Since the proposed is within non-conforming setback, the proposed height would be limited to 75% of the maximum permitted in the zone. additionally, the covered entry may only project 2 feet into the required yard.

2. ENGINEERING – DPW has reviewed the proposed plans and has concerns. They are asking that the Commission discuss with the applicant:
   a. Eliminating the fill under proposed terrace, allowing flood waters to pass.
   b. Verify elevation of proposed flood vents in main dwelling.

In addition to those items, the DPW has questioned where the existing impervious numbers have come from. They note that the most recent aerial photography shows less impervious area than what is being noted as the existing condition. The issue is with the current driveway which would have needed a highway permit to be expanded and does not have one. If work was done without approvals, it cannot be counted as existing conditions. DPW has also asked that the existing drain line be video inspected prior to permit issuance.

3. COASTAL OVERLAY – as amended by the Commission on November 5, 2020, the Commission may require, where appropriate, a vegetated buffer on properties adjacent to coastal resources. The applicant has provided a coastal buffer/landscaping for the Commission’s consideration. The Commission will need to determine in the subject action meets the intents and purposes of the Coastal Overlay Zone, (Sec. 6-111) and the Flood Hazard Overlay Zone (Sec. 6-139.1) as well as the standard zoning criteria.

DEPARTMENTS COMMENTS

<table>
<thead>
<tr>
<th>ZEO</th>
<th>CONSERVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGINEERING</td>
<td>SEWER</td>
</tr>
<tr>
<td>DEEP</td>
<td></td>
</tr>
</tbody>
</table>

ZONING
The proposed lift and additions to the current dwelling would appear to increase the gross floor area of the dwelling from 1,475.47 sq. ft. to 2,272.64 sq. ft. through additions to the home and expansion on the second floor. The foundation of the home would be expanded/retrofitted to meet the requirements of Section 6-139.1 for fully enclosed spaces within an AE flood zone as flood venting is proposed. The proposed plans would raise the first floor of the existing dwelling to 16 feet where 14 feet would meet the minimum requirements and comply with Section 6-139.1. The grade plan analysis provided notes that the standard grade plan of Sec. 6-134, is lower than the Flood Zone
Grade Plane defined in Sec. 6-139.1(c)(22.1) which permits the applicant to determine their zoning compliance for height and stories from the AE-13 flood zone.

The lot size is 7,270 sq. ft. (above mean high water), is on the north side of Edgewater Drive, and abuts Greenwich Cove to the north. The existing elevations range from 3.4 ft. at the mean high water line, to 10.1 ft. near the front porch of the home. The proposed development would change the grade onsite; all above elevation 7, and predominantly in the area around the foundation of the home and the proposed rear yard patio. The property is located in the R-12 zone but is less than the minimum 12,000 sq. ft. lot area required in the zone. Because the parcel is undersized (7,270 sq. ft.) the applicant may “step down” and utilize the R-7 Zone setbacks per the language of section 6-9.

The ZEO has noted that proposal does not appear to meet zoning. Per Section 6-141(B)(iii), and because the dwelling does not comply with minimum setbacks, the height would be limited to 75% of what is allowed (in this instance 26.25’ from grade plane) The height of the proposed lift would appear to exceed that. Additionally, the proposed covered entry would be permitted to project only 2’ into the required yard but only if the front wall of the dwelling meets the required setbacks. The applicant will need to revise these plans, or demonstrate how they meet the current regulations.

COASTAL RESOURCES AND STRUCTURES:
The property is immediately adjacent to Greenwich Cove at the northern property line. The dwelling is entirely within the AE-13 flood zone with a proposed raised, patio and stairs in the rear yard appears to extend into the AE-15 flood zone. Per the amended language of Sec. 6-111, the standards for applications in the Coastal Overlay zone now contains the requirement to, “(6) Include a naturalized vegetated buffer to protect environmentally sensitive and/or ecologically valuable natural resources such as tidal wetlands, open water, slopes in excess of 25%, coastal bluffs and escarpments, beaches, and dunes. Plantings shall be predominantly native species and salt-tolerant. Where appropriate, the Commission may waive this requirement upon a finding that by virtue of the lot size, use, or relationship to and/or character of the coastal resources, the buffer will have no impact on mitigating adverse impacts.”
The applicant has responded and proposed to supplement the vegetated buffer along the tidal creek coastline with native shrubs and ground cover.

All though not required by the regulations, we note that the AE-15 flood zone is coincidental with FEMA’s Limit of Moderate Wave Action (or “LiMWA”). FEMA strongly recommends that structures within the LiMWA be designed to meet the requirements as if they were with a VE flood zone. The State’s DEEP commented on the proposal and noted no comments and considered the proposal a local matter. Subsequent to the DEEP’s memo, it was brought to the State’s attention by a neighbor to the property, alleging fill and/or disturbance of the tidal wetlands below the coastal jurisdiction line of elevation 5.5. The State looked into the matter and provided a report of their findings. The State did note, “In this area, I did see evidence of tidal wetland vegetation mixed with upland weeds. No work appears to have been completed to the
shoreline structures as they are both in disrepair. However, the shoreline is not that steep and stable. The property owner has no interest in conducting any work to the shoreline at this time. I did find evidence that under the wetland/upland grasses some gravel pea stone has been placed. However, this is not significant enough of an activity for the Department to take action at this time. The property owner has been cautioned that the placement of any material waterward of the CJL requires prior authorization from the Department.” The matter of the upland work was again referred back to Department Staff.

In addition to this, the applicant has had an analysis done by a coastal engineer to determine if wave action may occur as a result of the proposal. The engineer found no issues created by the construction as it related to potential limited wave action. The also certified that the proposed would not raise the base flood elevation of the site or vicinity.

**DRAINAGE**
The proposed action represents less than 1,000 sq. ft. of new impervious area and therefore qualifies as a drainage exemption under the Town’s Stormwater Management standards. An under drained permeable terrace system is proposed to be installed to treat stormwater runoff from the increased and new impervious area. The goal of the design is to guarantee a zero increase in peak flow to all points of concern for the 1-25 year storms. The remaining additions will be disconnected via splash pads. The remainder of the site is designed to continue to maintain existing drainage patterns. Given the limited space and concerns about the affects the structures may have to local flooding issues, the plans have been reviewed by the Town’s DPW for confirmation of their consistency with the Town’s drainage manual, and best practices. DPW has asked for the following to be considered:

a) Eliminating the fill under proposed terrace, allowing flood waters to pass.
b) Verify elevation of proposed flood vents in main dwelling.

Additionally, the width of the current driveway is in question as it does not appear to match the latest data with the Town. It appears that some impervious surface areas being counted as existing, may need to be counted as “new” since the work might not have been permitted. DPW is also asking for the existing drain line to be video inspected prior to issuance of any building permits.

Abutting property owners have raised concerns that this elevated terrace with subsurface detention would possibly lead to stormwater issues on their properties as it would appear to hold water, above the elevation of their adjacent property and foundations. They also have raised concerns that the addition of this raised terrace would divert or direct possible flood waters towards their property, adversely impacting them.

**APPLICABLE REGULATIONS**
Section 6-5, 6-9, 6-13 through 6-15, 6-111, 6-139.1 and 6-205.
ZONING ENFORCEMENT

Project No.  PLPZ20210097  Preliminary  Final  X

Reviewed for Planning and Zoning Commission.

TITLE OF PLAN REVIEWED:  Puckett

LOCATION:  47 Edgewater Drive

PLAN DATE:  

ZONE:  R-12

☐ Ok for Zoning Permit Sign-off with the following revisions:

☒ Resubmit the following prior to Site Plan/ Subdivision approval:

   Per section 6-141(B) iii because the dwelling does not comply with setbacks, the height would be limited to 75% of what is allowed(26.25’) The height with the proposed lift would exceed that. The proposed covered entry would be permitted to project 2’ into the required yard only if the front wall of the dwelling complies with the required setbacks.

☐ The subject site plan/subdivision meets the requirements of the Building Zone Regulations, excluding sections 6-15 and 6-17, and is Ok for Zoning Permit Sign-off.

Reviewed by:  Jodi Couture  Date:  9/23/2021

Note:  These comments do not represent Building Inspection Division approval. Plans subject to review by ZEO at time of building permit application.
DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION

SITE DEVELOPMENT REVIEW

Engineering Project No. 21-5(55)  Department Project No. PLPZ202100097  Submittal Received Date: 9/21/2021

Traffic Review Requested: No  Review Type: Final Site Plan

Submittal Reviewed For: Planning and Zoning

PLAN SET INFORMATION

Plan Title: Development Plan  Project Address: 47 Edgewater Drive

Engineering Firm: Rocco V. D’Andrea, Inc.  Original Plan Date: 3/15/2021  Latest Plan Revision Date: 8/3/2021

DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm: Rocco V. D’Andrea, Inc.  Original Report Date: 8/3/2021  Latest Report Revision Date: ____

Reviews provided by the Engineering Division are for compliance with the Town’s “Roadway Design Manual and Standard Construction Details” and “Drainage Manual” as amended. Reviews are based upon the information and plans provided. Comments pertaining to the Town’s manuals are not all encompassing. Other reviewing entities may provide additional comments regarding consistency with these manuals in accordance with their jurisdictions. Review of sanitary sewer and septic systems are not reviewed by the Engineering Division.

All New Submittals for Commission Meetings must be received by the Engineering Division four weeks before scheduled Commission Meeting.

All Revised Submittals for Commission Meetings must be received by the Engineering Division three weeks before scheduled Commission Meeting.

Reviewed and Approved by: Juan Paredes, P.E. - Civil Engineer II  Date: 09/23/2021

COMMENTS AND CONDITIONS OF APPROVAL: Resubmit Prior to Final Site Plan Approval

The Engineering Division does not procedurally review the site and drainage design for projects that submit a Stormwater Management Standards – Drainage Report Exemption Form SE-100. The review below is done at the request the neighbors to the subject property.

The Engineering Division recommends the Commission/P&Z Staff discuss the following with the applicant:

a) Eliminating the fill under proposed terrace, allowing flood waters to pass.

b) Verify elevation of proposed flood vents in main dwelling.

The following are comments for the site development review:

1. A revised Form SC-107 needs to be submitted.
2. Town of Greenwich GIS data does not match the surveyed geometry of the driveway. No driveway permit appears to have been filed for the expanded driveway; areas beyond the Town of Greenwich GIS data must be accounted into the current application as new impervious surfaces.
   a. A highway permit is required for the legalization of the constructed driveway.
   b. Backing out of vehicles into roads is not recommended.
3. Prior to building permit a video inspection of the existing drain line across the subject property (from the catch basin at the driveway to the outfall) shall be completed and submitted for review.

4. Prior to the Certificate of Occupancy and after all work has been completed on the site, a video inspection of the existing drain line across the subject property (from the catch basin at the driveway to the outfall) shall be completed and submitted for review. If the pipe is damaged, it will need to be repaired as directed by the Town of Greenwich.

5. Prior to the issuance of a Temporary or Final Certificate of Occupancy of Certificate of Occupancy, owner shall submit to the Engineering Division the completed “Grant of the Right to Drain Watershed Area”. Two originals with Schedule A and one mylar of the map shall be submitted for review and signing, once completed the documents will be returned and will need to be filed on the Land Records.

6. The Drainage Summary Report must be revised as follows:
   a. Upon inclusion of the unpermitted impervious surfaces in the front yard; the drainage exemption will likely no longer be applicable, full standards must be met.
   b. Existing impervious will be verified upon resubmission of a stand-alone existing conditions survey sheet and verification of Town of Greenwich GIS data.

7. The construction plan set needs to be revised as follows:
   a. Existing Conditions Survey Sheet
      i. A stand-alone survey map must be submitted.
      ii. Show existing drainage line from Edgewater Drive along the western property line to its outfall.
      iii. Show utilities and easements.
   b. Site Plan Sheets
      i. Show deep test pit and saturated hydraulic conductivity test locations for all proposed BMPs.
   c. Low Impact Development Plan Sheet:
      i. Depict the site’s soil type and associated Hydrologic Soil Groups (HSG).
      ii. Show deep test pit and saturated hydraulic conductivity test locations (include circular influence zone for each test).
      iii. Each deep test pit (2,500 SF) and the saturated hydraulic conductivity test (500 SF) for the proposed BMP’s need to include the required circular influence zone.
      iv. Show structural and non-structural (e.g., source controls) BMPs.
      v. Show each area of impervious surfaces directed to a BMP with a callout specifying which BMP receives runoff.
      vi. Show areas of disconnected roofs.
      vii. Show areas of amended soils.
      viii. Show existing and proposed topography at contour intervals of two feet for the property and Right-of-Way. If possible, include contours ten feet beyond the property limits for neighboring parcels.
      ix. Show topography flatter than 2% with additional spot elevations and contour intervals of one foot.
      x. Show existing and proposed spot elevations throughout the property and Right-of-Way.
   d. Building/House Section or Elevation Sheet
      i. Show all elevations to the deepest footings (if any) on section/elevation.

8. The Operations and Maintenance Plan Report must be a separate document and include the following:
   b. Exhibit A: Long-term Maintenance Plan that prescribes those activities that must be carried out to maintain compliance with this Declaration. A maintenance log form must also be included. A draft must be completed prior to Final Site Plan Approval. The final version must be submitted with the request for Certificate of Occupancy.
   c. Exhibit B: Improvement Location Survey showing a location of the Property and an accurate location of each stormwater management practice affected by this Declaration. This must be submitted prior to the issuance of the Certificate of Occupancy.
d. The Maintenance Declaration will need to be filed on the Town of Greenwich Land Records prior to a Certificate of Occupancy. A review of the documents above must be completed before filing on the Town of Greenwich Land Records.

**Standard Conditions for Each Submittal**

1. The Engineering Division will no longer keep any records for the submittals. All records for the submittal shall be obtained from the Town of Greenwich Department/Division that has taken in applications and/or submittals. These documents are maintained within each office (e.g., P&Z, IWWA, and DPW Building and Highway Divisions).
2. All revisions to the reports and plans must follow the requirements in the Town of Greenwich Drainage Manual February 2014 as amended.
3. All revisions must be accompanied by a point-by-point written response to the Engineering Division’s comments.

**Standard Conditions of Approval**

1. The Operations and Maintenance Plan Report must include the following for the Certificate of Occupancy:
   b. The final completed Exhibit A, and B
   c. The Maintenance Declaration needs to be filed on the Town of Greenwich Land Records prior to a Certificate of Occupancy. A review of the documents above must be completed before filing on the Town of Greenwich Land Records.
2. The Town of Greenwich – Standard Construction Notes for Site and Subdivision Plans are conditions that must be met.
3. All requests for a Temporary Certificate of Occupancy (T.C.O.) or a Certificate of Occupancy (C.O.) shall be submitted one month before the T.C.O. or C.O. is required.
4. The submittal for a Temporary or Final Certificate of Occupancy must include the following:
   c. Field Inspection Record (All required photos) – Form SC-106 – Sealed and Signed by a Connecticut Licensed Professional Engineer.
   d. Bioretention Soil Testing Certification Sign-Off (as applicable with the bioretention soil gradation test and the phosphorous test for the mixed soil) – Form SC-104 – Sealed and Signed by a Connecticut Licensed Professional Engineer.
   h. A Letter discussing all the work that remains to be completed (Only for a Temporary Certificate of Occupancy Submittal).
Bianca,

We have reviewed the above-referenced coastal site plan review application for consistency with Connecticut Coastal Management Act policies and have no comments for the Planning & Zoning Commission’s consideration. Please let me know if you have any questions or if you need any additional information.

John Gaucher  
Environmental Analyst III  
Land & Water Resources Division  
Bureau of Water Protection and Land Reuse  
79 Elm Street  
Hartford, CT 06106

Phone 860.424.3660  
Fax 860.424.4054
Thank you,

_Bianca Dygert_

_Planner II_

Town of Greenwich
Land Use - Planning & Zoning
101 Field Point Road
Greenwich, CT 06830-6463
Ph. (203) 622-7894
Office Fax. (203) 622-3795
Direct Fax. (203) 861-6113
_Bianca.Dygert@greenwichct.org_

_www.greenwichct.gov_

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August 3, 2021

Town of Greenwich
Planning and Zoning
101 Field Point Road
Greenwich, CT 06830

Attention: Ms. Katie DeLuca

Reference: 47 Edgewater Drive
Old Greenwich, CT
RACE Project No. 2021085

Dear Ms. DeLuca:

RACE COASTAL ENGINEERING (“RACE”) has been retained by Jeff and Romina Puckett to review the proposed site improvements at 47 Edgewater Drive for compliance with flood zone requirements that the proposed work not result in an increase in the Base Flood Elevation (BFE) at the site or on adjacent properties, in compliance with FEMA guidelines, and the Town of Greenwich Section 6-139.1. The proposed improvements are shown on the drawing titled, “Residential Development,” prepared for Jeffrey L. Puckett and Romina Puckett by Rocco V. D’Andrea, Inc and dated August 3, 2021.

The proposed improvements which include grading, retaining walls, terrace, and planters are to be located in the Coastal AE Zone with Base Flood Elevation (BFE) of +15’ NAVD 88 and improvements to the dwelling and porch that will be located in the AE Zone with a BFE of +13’ NAVD 88. The plans show that the dwelling will have a first floor of EL. +16’, three feet above the BFE.

To document that the proposed improvements would not adversely impact the FEMA Base Flood Elevation or cause increased flood impacts to adjacent properties, RACE performed the following analyses of the potential flooding impacts of the proposed improvements:

1. A wave crest analysis of existing and proposed site conditions.
2. A wave runup analysis of existing and proposed site conditions.
3. A wave reflection analysis of existing and proposed site conditions.

RACE employed the USACE’s Automated Coastal Engineering System’s (ACES) Windspeed Adjustment and Wave Growth application to calculate the wave heights on the site. Equations in FEMA’s Coastal Construction Manual (2011) were used to determine the maximum wave crest at the site. The analysis showed the proposed work does not increase the wave crest elevation on the site or adjacent properties.

Wave runup was analyzed for the existing and proposed conditions as well using ACES’s Wave Runup and Overtopping on Impermeable Structures Application. The analysis demonstrated that there would be no increase in wave runup elevations on the site or adjacent properties.

The ACES Combined Reflection and Diffraction by a Vertical Wedge application was used to analyze wave reflection. An incident wave traveling perpendicular to shore was analyzed. The reflection analysis showed the BFE will not be increased at the site or adjacent sites due to reflected waves.
Based on our review, it is the professional opinion of RACE that the proposed site improvements will not create adverse impacts with respect to flooding at the site or on adjacent properties. RACE certifies that the proposed work will:

1. Not increase wave crest elevations on the site or adjacent properties.
2. Not increase wave runup elevations on the site or adjacent properties.
3. Not increase wave crest elevations on the site or adjacent properties due to reflected waves.

As such, RACE certifies that there will not be an increase in the BFE site due to the proposed work. It is anticipated that this document is acceptable for your records. If you have any questions, please do not hesitate to contact the undersigned at 203-377-0663.

Very truly yours,

RACE COASTAL ENGINEERING

[Signature]

Jill Pietropaolo, PE
Senior Coastal Engineer/Project Manager
PE No. 31773
Mr. Patrick LaRow  
Deputy Director  
Planning & Zoning  
Town of Greenwich  
101 Field Point Road  
Greenwich, CT 06830

RE: PLPZ 2021 00097  
47 Edgewater Drive

Dear Pat:

As an amendment to the above referenced application, the applicants have prepared the following responses to the concerns raised by the neighbors:

1. Expansion #1: Architectural plans have been amended to ensure that the project is pursued as of right and does not compound the non-conforming side yard setback issue.
2. Expansion #2: The French doors to this space are existing and the stairs are being added to reach backyard grade. The use is ancillary to the single-family dwelling use and should not be at issue. This does not rise to the level of a special permit home office use because no non-resident persons shall be employed at the property.
3. Drainage and Grading ("D&G") #1: Tax records are not controlling. The impermeability calculations will be certified by RVDI.
4. D&G #2: A vegetative buffer has been proposed in accordance with the Town regulations. The project has been designed to the Town Drainage Manual Standards and does not need to direct water in any one location as long as water flow is not directed in a way to increase adverse impacts to surrounding properties.
5. D&G #3: The project complies with Town Drainage Manual Standards. The Commission is barred from making determinations on aesthetic matters.
6. D&G #4: See below responses to the subsection questions.
   a. Question A: Per RVDI, the proposed structure is designed to meet the peak runoff attenuation requirement for the 1-25 year storms. Swales only provide partial attenuation which would require an additional stormwater control structure. The system as currently designed is integrated with the proposed terrace and is not intrusive.
b. Question B: The height of the building and relation to the flood zone is shown on architectural sheet A-5. The building will have a height of 30’ 0.25” from flood zone grade plane.

c. Question C: These are standard single-family dwelling uses and do not pertain to CAM review issues. The property owner would comply with any applicable regulations as part of these uses.

d. Question D: The Commission is barred from making determinations on aesthetic matters. The terrace will be lower than the current deck, which should mitigate sound.

e. Question E: Per RVDI, The currently proposed outlets for the terrace underdrain are on either side of the terrace stairs.

7. D&G #5: Noted.

8. Ending Questions:
   a. Question 1: Per RVDI, any excavated soil is to be removed from the site once grading is complete. The elevation would not be raised above what is proposed so as to avoid adverse impacts to the surrounding properties.
   b. Question 2: The property owner will review options to include a lattice to screen AC units.

Please let us know if there are any other issues that you would like us to address. Thank you for your assistance in this matter.

Very Truly Yours,

John J. Heagney
DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA) CERTIFICATION
PRE-CONSTRUCTION

Property Address: 47 Edgewater Drive  Tax Account No.: 06-1941/S
Building Permit No.: __________________________

PLANS & DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm: Rocco V. D'Andrea, Inc.

Design Plans Date: 8/3/2021  Drainage Report Date: 8/3/2021

PROPERTY INFORMATION FOR DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA)

<table>
<thead>
<tr>
<th>Description</th>
<th>Existing Conditions</th>
<th>Proposed Conditions</th>
<th>Disconnected Conditions</th>
<th>Directly Connected Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Impervious Area Under Existing Conditions (SF)¹</td>
<td>1,696.00</td>
<td>2,536.00</td>
<td>1,672.00</td>
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<tr>
<td>Total Impervious Area Under Proposed Conditions (SF)¹</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total Disconnected Impervious Area Under Proposed Conditions (SF)²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Directly Connected Impervious Area Under Proposed Conditions (SF)³</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Impervious surfaces include but are not limited to roofs (including green roofs), buildings, houses, walks, patios, walls, tennis/sport courts (all surface types must be counted), landscape ponds, pools, paved streets/drives/parking areas constructed with concrete, asphalt, compacted dirt, gravel, or permeable pavements.

² All impervious surfaces that are directed to stormwater BMPs that meet the water quality volume (WQV) standard will be considered disconnected impervious cover. Acceptable stormwater BMPs are Bioretention (infiltrating/filtering), Constructed Stormwater Wetlands, Extended Dry Detention Basins (infiltration required), Gravel Wetlands, Constructed Wet Stormwater Ponds, Sand/Organic Filters (sand filters, tree filters, stormwater planters, etc.), Infiltration Systems (drywells, Culverts, etc.), Permeable Pavement Areas (infiltrating/filtering), Green Roofs, and Disconnected Impervious Area (must meet all the standards under Simple Disconnection on page 44 and 45 of the Drainage Manual).

³ Subtract the Total Disconnected Impervious Area Under Proposed Conditions (SF) from the Total Impervious Area Under Proposed Conditions (SF).

Engineer's Signature: __________________________  Date: 8-3-21

Engineer’s Seal

Form SC-107  February 2021
DRAINAGE SUMMARY STATEMENT

For

47 Edgewater Drive
Greenwich, Connecticut

Prepared For

Jeffrey and Romina Puckett

August 3, 2021

[Signature]

Leonard C. D'Andrea, PE
CT License No. 14869

20BK_DSR_01
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<td></td>
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</table>
Project Summary

The client is proposing to redevelop 47 Edgewater Drive in Greenwich, CT. The lot is located on the north side of Edgewater Drive, at the intersection with Heusted Drive. The property lies within the “R-12” Zone and has a total area of 7,270 square feet.

Currently the parcel supports a dwelling, asphalt driveway, a wooden deck, and various walkways and hardscapes. The site gently slopes from a high point located at the dwelling.

The proposed development will alter the amount of impervious cover on the site from 1,696 square feet to 2,606 square feet (+910). The proposed development results in less than 1,000 sq. ft. of new impervious coverage, thus the improvements are conditionally exempt from the Town of Greenwich stormwater management standards (refer to Appendix A for Exemption forms).

An under drained permeable terrace system will be installed to treat stormwater runoff from the new impervious area, and to ensure a zero increase in peak flow to all points of concert for the 1-25 year design storms. The remaining additions will be disconnected via splash pads. The proposed mitigation measures have been designed to meet the criteria specified per the Conditional Exemption for projects increasing impervious coverage between 500 and 1,000 square feet (Refer to calculations in Appendix C). The remainder of the site will continue to maintain existing drainage patterns.

For a depiction of the site and the proposed development, refer to a set of plans prepared by Rocco V. D’Andrea, Inc. entitled “Final Site Plan Review Set”.

Conclusion

The proposed increase in impervious coverage is less than 1,000 sq. ft., thus the improvements are conditionally exempt from the Town of Greenwich stormwater management standards (refer to Appendix A for Exemption forms). The proposed mitigation measures will help to reduce the effects of site disturbance and new impervious surfaces within the onsite watersheds and points of concern. Therefore, it is our opinion that the proposed design will result in an improved property that will not cause any adverse impacts to the neighboring properties or the Town of Greenwich roadway drainage system.
Exhibits “A” & “B”

Watershed Maps
Existing & Proposed Conditions
Exhibit “C”

USDA Soil Delineation Map
**MAP LEGEND**

<table>
<thead>
<tr>
<th>Area of Interest (AOI)</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils</td>
<td>C/D</td>
</tr>
<tr>
<td></td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>Not rated or not available</td>
</tr>
</tbody>
</table>

**Soil Rating Polygons**

<table>
<thead>
<tr>
<th>Soil Rating Polygons</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A/D</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>B/D</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>C/D</td>
</tr>
<tr>
<td></td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>Not rated or not available</td>
</tr>
</tbody>
</table>

**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: [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 Date: Version 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Jul 21, 2014—Aug 27, 2014

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

<table>
<thead>
<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Rating</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>99</td>
<td>Westbrook mucky peat, low salt</td>
<td>A/D</td>
<td>0.1</td>
<td>24.7%</td>
</tr>
<tr>
<td>250B</td>
<td>Sutton-Urban land complex, 0 to 8 percent slopes</td>
<td>B/D</td>
<td>0.2</td>
<td>75.3%</td>
</tr>
<tr>
<td></td>
<td>Totals for Area of Interest</td>
<td></td>
<td>0.2</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

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.
Exhibit “D”

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/29/2013 at 12:00 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Town of Greenwich
Exemption Forms
STORMWATER MANAGEMENT STANDARDS – DRAINAGE REPORT EXEMPTION

Project Name: Residential Improvements

Project Address: 47 Edgewater Drive, Old Greenwich

Project Lot Number(s): 21

Property Owner(s): Jeffrey and Romina Puckett

Tax Account Number(s): 06-1941/S Zone(s): R-12 Lot Area: 7,270 S.F.

1. Check all that apply to the proposed project:

☑ This is a new development or redevelopment project,

☑ The project will result in an increased amount of stormwater runoff and/or water pollutants flowing from a parcel of land (prior to the application of stormwater Best Management Practices),

☐ The project will alter the drainage characteristics of a parcel of land (prior to the application of stormwater Best Management Practices).

Categorical Exemptions:

2. Does the proposed project meet one of the following categorical exemptions? Check all that apply:

☐ Normal maintenance and improvement of land in agricultural use (as defined by Connecticut General Statutes), provided such activity conforms to acceptable management practices for pollution control approved by the Connecticut Department of Energy and Environmental Protection and the Greenwich Inland Wetlands and Watercourses Commission. This exemption does not apply to construction activities that are not directly related to the farming or agricultural operation.

☐ Routine maintenance of existing landscaping, gardens (excluding structural modifications to stormwater BMPs including rain gardens) or lawn areas including those maintained by the Town of Greenwich Parks and Recreation Department and Board of Education.

☐ Resurfacing of an existing impervious area on a non-residential lot such as repaving an existing parking lot or drive with no increase in impervious cover.

☐ Routine maintenance to existing town roads that is performed to maintain the original width, line, grade, hydraulic capacity, or original purpose of the roadway.

☐ Customary cemetery management.

☐ Emergency repairs to any stormwater management facility or practice that poses a threat to public health or safety, or as deemed necessary by the approving authority.

☐ Any emergency activity that is immediately necessary for the protection of life, property, or the environment, as determined by the approving authority.

☐ Repair of an existing septic system.

☐ Construction of utilities (gas, water, electric, telephone, etc.), other than drainage, which will not permanently alter terrain, ground cover, or drainage patterns.

☐ Repair or replacement of an existing roof of a single-family dwelling.

☐ Construction of a second (or higher) floor addition on an existing building.

☐ Construction of a maximum 12 foot x 12 foot shed. The construction must include the installation of a 1 foot wide x 1 foot deep crushed stone trench along the sides of the shed that discharge the roof runoff.

☐ The repair of an existing wood, composite, or plastic deck with no proposed enlargement of the deck surface.
Town of Greenwich
Department of Public Works - Engineering Division
Town Hall - 101 Field Point Road, Greenwich, CT 06836-2540
Phone 203-622-7767 - Fax 203-622-7747

☐ The reconstruction or construction of a wood, composite, or plastic deck with the decking boards spaced at least 3/16 of an inch and a pervious surface below the deck. The pervious area below the deck must have the soil tilled 12 to 16 inches and finished with grass seed, sod, or crushed stone. The minimum depth for the crushed stone is 4 inches. A site plan showing the proposed location of the deck and construction details for the deck must be submitted.

☐ The construction of any fence that will not alter existing terrain or drainage patterns.

If so, the Greenwich Stormwater Management Standards shall not apply, and submittal of a Stormwater Management Report is not required. However, application of the standards is still strongly encouraged.

OWNERS’ CERTIFICATION

Owners’ Name Jeffrey and Romina Puckett

Street Address 47 Edgewater Drive

City Old Greenwich State CT Zip 06870

Phone ___________________________ FAX ___________________________

Owners’ Signature ___________________________ Date ________________

CONTRACTOR’S CERTIFICATION

Company Name ___________________________

Street Address ___________________________ City ___________________________ State ___ Zip ______

Phone ___________________________ FAX ___________________________

Contractor’s Signature ___________________________ Date ________________
4. For projects adding between 500 and 1,000 square feet of impervious surfaces:
The project design, including the proposed drainage design, if any, will not have an adverse effect on offsite properties or offsite drainage infrastructure, as certified by a professional engineer.
At least one of the following measures shall be implemented on the project site to help mitigate the effects of site disturbance and new impervious surfaces within its on site watershed and point of concern:

☐ Disconnection of roof down spouts that meet the Simple Disconnection standards in the Town of Greenwich Drainage Manual February 2012 as amended
☐ A zero increase in peak flow to all points of concern for the 1, 2, 5, 10, and 25-year design storms
☐ The runoff volume from the new impervious surfaces shall be infiltrated for the 10-year design storm
☐ Constructing a bioretention area for the Water Quality Volume of the contributing watershed of the project area. The design standards in the Town of Greenwich Drainage Manual February 2012 as amended must be met
☐ Creating a buffer with a length greater than or equal to the length of the project area and a minimum width of 10 feet planted as a meadow
☐ Restoring a riparian buffer (may require IWWA permit)

At least one of the following measures shall be implemented on the project site using LID or conventional stormwater BMPs to help mitigate the effects of site disturbance and new impervious surfaces:

☐ A zero increase in peak flow to all points of concern for the 1, 2, 5, 10, and 25-year design storms
☐ The runoff volume from the new impervious surfaces shall be infiltrated for the 10-year design storm

For projects that meet the above criteria, the project proponent shall submit Pages 1, 2, 4, 5, and 8 of this exemption request form and all computations and any additional drainage documents (Soil Evaluation Test Results, Watershed Maps, Etc.), in lieu of a Stormwater Management Report. The application of the Greenwich Stormwater Management Standards is still strongly encouraged.

For projects that meet the above criteria, the project proponent needs to submit construction plans as required on the Checklist for Projects Submitting a Stormwater Management Standards – Drainage Report Exemption – Form CL-101.

For projects that meet the above criteria, the project proponent needs to submit the items on the Checklist for Operations and Maintenance Plan Report – Form CL-104.

For projects that meet the above criteria, the project proponent needs to submit the Certificate of Occupancy documents on the Checklist for Projects Submitting a Stormwater Management Standards – Drainage Report Exemption – Form CL-101.

Residential teardowns are not exempt unless the project meets the Conditional Residential Teardown Exemption Requirements.

Commercial teardowns are not exempt.

PROFESSIONAL ENGINEER

Company Name  Rocco V. D'Andrea, Inc.

Street Address  6 Neil Lane  City  Riverside  State  CT  Zip  06878

Phone  203-637-1779  FAX  203-637-1770

Professional Engineer's Name  Leonard C. D'Andrea
Town of Greenwich
Department of Public Works - Engineering Division
Town Hall - 101 Field Point Road, Greenwich, CT 06836-2540
Phone 203-622-7767 - Fax 203-622-7747

PROFESSIONAL – EXEMPTION CERTIFICATION

I hereby declare that the proposed project will add the following amount of impervious surfaces to the project site (check the box that applies):

☐ 0 to 500 square feet (conditionally exempt with Professional Engineer's Certification)
☐ 500 to 1,000 square feet (conditionally exempt with Professional Engineer's Certification)

It is my professional opinion that the project design, including the proposed drainage system, if any, will not have an adverse effect on offsite properties or offsite drainage infrastructure.

I further declare that at least one of the following measures shall be implemented on the project site to help mitigate the effects of site disturbance and new impervious cover for 0 to 1,000 square feet (check all that apply):

☐ Disconnection of roof down spouts that meet the Simple Disconnection standards in the Town of Greenwich Drainage Manual February 2012 as amended
☐ A zero increase in peak flow to all points of concern for the 1, 2, 5, 10, and 25-year design storms
☐ The runoff volume from the new impervious surfaces shall be infiltrated for the 10-year design storm
☐ Constructing a bioretention area for the Water Quality Volume of the contributing watershed of the project area. The design standards in the Town of Greenwich Drainage Manual February 2012 as amended must be met
☐ Creating a buffer with a length greater than or equal to the length of the project area and a minimum width of 10 feet planted as a meadow
☐ Restoring a riparian buffer (may require IWWA permit)

I further declare that at least one of the following measures shall be implemented on the project site to help mitigate the effects of site disturbance and new impervious cover for 500 to 1,000 square feet (check all that apply)

☐ A zero increase in peak flow to all points of concern for the 1, 2, 5, 10, and 25-year design storms
☐ The runoff volume from the new impervious surfaces shall be infiltrated for the 10-year design storm

Professional Engineer's Signature: [Signature]

Date: 3-9-21

[Professional Engineer's Seal]
IMPERVIOUS AREA WORKSHEET

This worksheet shall be used to quantify impervious surfaces\(^1\) associated with existing and proposed construction on your site. Please complete columns 1, 2, and 3 below listing the first floor or ground level square footage of each existing or proposed structure or site amenity. Each point of concern shall use a separate worksheet.

<table>
<thead>
<tr>
<th>POINT OF CONCERN</th>
<th>(1) Existing Conditions Impervious Surfaces (sq ft)</th>
<th>(2) Proposed Conditions Impervious Surfaces (sq ft)</th>
<th>(3) Proposed New Impervious Surfaces (sq ft) [Column 2 minus column 1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>House/Buildings</td>
<td>876</td>
<td>1726</td>
<td>850</td>
</tr>
<tr>
<td>Driveways</td>
<td>284</td>
<td>284</td>
<td>0</td>
</tr>
<tr>
<td>Sidewalks/Paths</td>
<td>475</td>
<td>171</td>
<td>-304</td>
</tr>
<tr>
<td>Swimming Pool</td>
<td>0</td>
<td>0</td>
<td>-304</td>
</tr>
<tr>
<td>Patios</td>
<td>61</td>
<td>355</td>
<td>294</td>
</tr>
<tr>
<td>Tennis Court/Sport Court</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTALS:</td>
<td>1696</td>
<td>2536</td>
<td>840</td>
</tr>
</tbody>
</table>

\(^1\) Refer to the glossary in the Town of Greenwich Drainage Manual for a definition of “impervious surface.”
Appendix “B”

HydroCAD
Summary Table
### Table 1: Comparison of Existing and Proposed Peak Flow Rates for all Points of Concern

<table>
<thead>
<tr>
<th>POC</th>
<th>1 Year Storm</th>
<th>2 Year Storm</th>
<th>5 Year Storm</th>
<th>10 Year Storm</th>
<th>25 Year Storm</th>
<th>50 Year Storm</th>
<th>100 year Storm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>q&lt;sub&gt;e&lt;/sub&gt; (ft&lt;sup&gt;3&lt;/sup&gt;/s)</td>
<td>q&lt;sub&gt;p&lt;/sub&gt; (ft&lt;sup&gt;3&lt;/sup&gt;/s)</td>
<td>Δq (ft&lt;sup&gt;3&lt;/sup&gt;/s)</td>
<td>%Δq</td>
<td>q&lt;sub&gt;e&lt;/sub&gt; (ft&lt;sup&gt;3&lt;/sup&gt;/s)</td>
<td>q&lt;sub&gt;p&lt;/sub&gt; (ft&lt;sup&gt;3&lt;/sup&gt;/s)</td>
<td>Δq (ft&lt;sup&gt;3&lt;/sup&gt;/s)</td>
</tr>
<tr>
<td>A</td>
<td>0.08</td>
<td>0.08</td>
<td>0.00</td>
<td>0%</td>
<td>0.10</td>
<td>0.10</td>
<td>0.00</td>
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<tr>
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<td>0.19</td>
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<td>-5%</td>
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<td>0.23</td>
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<tr>
<td>B</td>
<td>0.31</td>
<td>0.31</td>
<td>0.00</td>
<td>0%</td>
<td>0.31</td>
<td>0.31</td>
<td>0.00</td>
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</tbody>
</table>

### Table 2: Comparison of Existing and Proposed Runoff Volumes for all Points of Concern

<table>
<thead>
<tr>
<th>POC</th>
<th>1 Year Storm</th>
<th>2 Year Storm</th>
<th>5 Year Storm</th>
<th>10 Year Storm</th>
<th>25 Year Storm</th>
<th>50 Year Storm</th>
<th>100 Year Storm</th>
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<tbody>
<tr>
<td></td>
<td>v&lt;sub&gt;e&lt;/sub&gt; (c.f.)</td>
<td>v&lt;sub&gt;p&lt;/sub&gt; (c.f.)</td>
<td>Δv (c.f.)</td>
<td>%Δv (c.f.)</td>
<td>v&lt;sub&gt;e&lt;/sub&gt; (c.f.)</td>
<td>v&lt;sub&gt;p&lt;/sub&gt; (c.f.)</td>
<td>Δv (c.f.)</td>
</tr>
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<td>0</td>
<td>0%</td>
<td>297</td>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>624</td>
<td>571</td>
<td>-53</td>
<td>-8%</td>
<td>816</td>
<td>762</td>
<td>-54</td>
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<tr>
<td>B</td>
<td>808</td>
<td>808</td>
<td>0</td>
<td>0%</td>
<td>995</td>
<td>995</td>
<td>0</td>
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</table>
Appendix “C”

Runoff Volume & Retention System Design Calculations
Project ID: 20BK_Appendix_C_Drainage_Calcs 01.xlsx

<table>
<thead>
<tr>
<th>Groundwater Recharge Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site Information</strong></td>
</tr>
<tr>
<td>Existing Impervious Cover</td>
</tr>
<tr>
<td>Proposed Impervious Cover</td>
</tr>
<tr>
<td>Net Increase</td>
</tr>
</tbody>
</table>

GRV = F x I

Where:
- GRV = Groundwater recharge volume
- F = Target depth factor
- I = Net increase in impervious area

GRV = 7.0 ft³

Runoff Reduction Volume: POC A

1-Year Storm Runoff Data at POC

| Pre-development runoff volume | = 239 ft³ |
| Post-development runoff volume | = 239 ft³ |

RRV = V_{post} - V_{pre}

Where:
- RRV = Runoff reduction volume
- V_{pre} = 1-year pre-development runoff volume
- V_{post} = 1-year post-development runoff volume (No BMPs)

RRV = 0 ft³

Runoff Reduction Volume: POC B

1-Year Storm Runoff Data at POC

| Pre-development runoff volume | = 624 ft³ |
| Post-development runoff volume | = 733 ft³ |

RRV = V_{post} - V_{pre}

Where:
- RRV = Runoff reduction volume
- V_{pre} = 1-year pre-development runoff volume
- V_{post} = 1-year post-development runoff volume (No BMPs)

RRV = 109 ft³
### Water Quality Volume: 1S

**Watershed Data**
- Watershed Area (A) = 1,513 ft²
- Impervious Cover = 864 ft²
- Pervious Cover = 649 ft²
- % Impervious = 57.1%
- % Pervious = 42.9%
- Impervious Coefficient = 0.95
- Pervious Coefficient = 0.20
- Runoff Coefficient (R) = 0.63

\[ WQV = (1/12) \times R \times A \]

*Where:
- \( R = \) Runoff Coefficient (R)
- \( A = \) Watershed Area (A)*

\[ WQV = 79.2 \text{ ft}^3 \]

*Free release to POC A, no collection media provided.

### Water Quality Volume: 2S

**Watershed Data**
- Watershed Area (A) = 4,777 ft²
- Impervious Cover = 1,057 ft²
- Pervious Cover = 3,720 ft²
- % Impervious = 22.1%
- % Pervious = 77.9%
- Impervious Coefficient = 0.95
- Pervious Coefficient = 0.20
- Runoff Coefficient (R) = 0.37

\[ WQV = (1/12) \times R \times A \]

*Where:
- \( R = \) Runoff Coefficient (R)
- \( A = \) Watershed Area (A)*

\[ WQV = 145.7 \text{ ft}^3 \]

*Directed to splash pads; simple disconnection.

### Water Quality Volume: 3S

**Watershed Data**
- Watershed Area (A) = 980 ft²
- Impervious Cover = 615 ft²
- Pervious Cover = 365 ft²
- % Impervious = 62.8%
- % Pervious = 37.2%
- Impervious Coefficient = 0.95
- Pervious Coefficient = 0.20
- Runoff Coefficient (R) = 0.67

\[ WQV = (1/12) \times R \times A \]

*Where:
- \( R = \) Runoff Coefficient (R)
- \( A = \) Watershed Area (A)*

\[ WQV = 54.8 \text{ ft}^3 \]

*Directed to gravel patio.*
Proposed BMP’s:
To meet the requirements of Stormwater Management Standards 4 (Runoff Volume Reduction and Groundwater Recharge), 5 (Peak Flow Control), and 6 (Pollutant Reduction) of Section 3 of the Town of Greenwich Drainage Manual, we are proposing the following structural BMP systems:

Retention System #1: Gravel Patio  LID: Yes
Retention System #1 will consist of a porous gravel patio and was designed to filter runoff from 3S and provide LID water quality treatment and infiltration.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Total Water Quality Storage Volume</td>
<td>= 175 ft³</td>
</tr>
<tr>
<td>1-Year Runoff Reduction Volume</td>
<td>= 162 ft³</td>
</tr>
<tr>
<td>Total WQV Received</td>
<td>= 54.8 ft³</td>
</tr>
</tbody>
</table>
TSS Removal Rates:
Stormwater BMPs shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

Treatment Train #1: Porous Patio
\[
R = A + B - \frac{[(A*B)/100]}{}
\]

Where:
- \( R \) = Total TSS Removal Rate
- \( A \) = TSS Removal Rate for Retention System #1 = 80 %
- \( B \) = TSS Removal Rate for Retention System #2 = 0 %

\[
R = 80 \% \quad \text{TSS Requirement Satisfied}
\]
BMP Drawdown Calculations:
Infiltration structures must be able to drain fully within 72 hours.

Retention System #1: Gravel Patio
\[ t_{\text{drawdown}} = \frac{DV}{kA} \]

Where:
- DV = Design Volume = 162 ft\(^3\)
- k = Infiltration Rate = 0.09 inches/hr
- A = Bottom Area = 364 ft\(^2\)

\[ t_{\text{drawdown}} = 59.3 \text{ hours} \]

Drawdown Requirement Satisfied
### Drainage Calculations Summary:

#### Groundwater Recharge Volume Check:

<table>
<thead>
<tr>
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<th>Value</th>
<th>Note</th>
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</thead>
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<tr>
<td>Groundwater Recharge Volume Required</td>
<td>7.0 ft³</td>
<td></td>
</tr>
<tr>
<td>Total 1-Year Storage Provided On Site</td>
<td>162 ft³</td>
<td>GRV Satisfied</td>
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</tbody>
</table>

#### Point of Concern: A

<table>
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<tr>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Runoff Reduction Volume Required at POC</td>
<td>0 ft³</td>
<td></td>
</tr>
<tr>
<td>1-Year Storage Provided at POC</td>
<td>0 ft³</td>
<td>RRV Satisfied</td>
</tr>
<tr>
<td>Water Quality Volume Required at POC</td>
<td>0 ft³</td>
<td></td>
</tr>
<tr>
<td>Required 60% LID Volume</td>
<td>0.0 ft³</td>
<td></td>
</tr>
<tr>
<td>Total Storage Provided at POC</td>
<td>0 ft³</td>
<td>WQV Satisfied</td>
</tr>
<tr>
<td>LID Storage Provided at POC</td>
<td>0.0 ft³</td>
<td>LID Satisfied</td>
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#### Point of Concern: B

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<td>Runoff Reduction Volume Required at POC</td>
<td>109 ft³</td>
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<td>1-Year Storage Provided at POC</td>
<td>162 ft³</td>
<td>RRV Satisfied</td>
</tr>
<tr>
<td>Water Quality Volume Required at POC</td>
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<td></td>
</tr>
<tr>
<td>Required 60% LID Volume</td>
<td>0.0 ft³</td>
<td></td>
</tr>
<tr>
<td>Total Storage Provided at POC</td>
<td>0 ft³</td>
<td>WQV Satisfied</td>
</tr>
<tr>
<td>LID Storage Provided at POC</td>
<td>0.0 ft³</td>
<td>LID Satisfied</td>
</tr>
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</table>
Appendix "D"

HydroCAD Analysis –
Existing Conditions
47 Edgewater Drive EX 0

1S
Front Lawn & Roof

3L
POC A (Edgewater Drive)

2S
Rear Lawn & Roof

4L
POC B (Greenwich Cove)

Area Listing (all nodes)

<table>
<thead>
<tr>
<th>Area (sq-ft)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,574</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D (1S, 2S)</td>
</tr>
<tr>
<td>284</td>
<td>98</td>
<td>Paved parking, HSG D (1S)</td>
</tr>
<tr>
<td>876</td>
<td>98</td>
<td>Roofs, HSG D (1S, 2S)</td>
</tr>
<tr>
<td>536</td>
<td>98</td>
<td>Unconnected pavement, HSG D (1S, 2S)</td>
</tr>
<tr>
<td>7,270</td>
<td>84</td>
<td>TOTAL AREA</td>
</tr>
</tbody>
</table>
Summary for Subcatchment 15: Front Lawn & Roof

Runoff = 0.21 cfs @ 12.07 hrs, Volume= 660 cf, Depth= 5.24" 
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs 
Type III 24-hr 25-Year Rainfall=6.40" 

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>649</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>409</td>
<td>98</td>
<td>Roofs, HSG D</td>
</tr>
<tr>
<td>284</td>
<td>98</td>
<td>Paved parking, HSG D</td>
</tr>
<tr>
<td>171</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
</tr>
<tr>
<td>1.513</td>
<td>90</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>649</td>
<td>90</td>
<td>42.85% Pervious Area</td>
</tr>
<tr>
<td>864</td>
<td>90</td>
<td>57.11% Impervious Area</td>
</tr>
<tr>
<td>171</td>
<td>90</td>
<td>19.79% Unconnected</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>7.2</td>
<td>95</td>
<td>0.0358</td>
<td>0.22</td>
<td></td>
<td>Sheet Flow, Lawn</td>
</tr>
</tbody>
</table>

| Sheet Flow, Lawn |
| Grass: Short | n= 0.150 | P= 3.40" |

Subcatchment 15: Front Lawn & Roof

Hydrograph

Type III 24-hr 25-Year Rainfall=6.40" 
Runoff Area=1,513 sf 
Runoff Volume=660 cf 
Runoff Depth=5.24" 
Tc=5.0 min 
CN=90

Summary for Subcatchment 25: Rear Lawn & Roof

Runoff = 0.64 cfs @ 12.10 hrs, Volume= 2,090 cf, Depth= 4.36" 
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs 
Type III 24-hr 25-Year Rainfall=6.40" 

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Adj</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,925</td>
<td>86</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>467</td>
<td>98</td>
<td>80</td>
<td>Roofs, HSG D</td>
</tr>
<tr>
<td>305</td>
<td>98</td>
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<td>Paved parking, HSG D</td>
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<td>98</td>
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<td>Unconnected pavement, HSG D</td>
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<tr>
<td>5,757</td>
<td>83</td>
<td>82</td>
<td>Weighted Average, UI Adjusted</td>
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<tr>
<td>4,925</td>
<td>86</td>
<td>85.55% Pervious Area</td>
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<td>832</td>
<td>86</td>
<td>14.45% Impervious Area</td>
<td></td>
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<tr>
<td>305</td>
<td>86</td>
<td>43.87% Unconnected</td>
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</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<tbody>
<tr>
<td>7.2</td>
<td>95</td>
<td>0.0358</td>
<td>0.22</td>
<td></td>
<td>Sheet Flow, Lawn</td>
</tr>
</tbody>
</table>

| Sheet Flow, Lawn |
| Grass: Short | n= 0.150 | P= 3.40" |

Subcatchment 25: Rear Lawn & Roof

Hydrograph

Type III 24-hr 25-Year Rainfall=6.40" 
Runoff Area=5,757 sf 
Runoff Volume=2,090 cf 
Runoff Depth=4.36" 
Flow Length=95' 
Slope=0.0358 '/' 
Tc=7.2 min 
UI Adjusted CN=82
Summary for Subcatchment 1S: Front Lawn & Roof

Runoff = 0.08 cfs @ 12.07 hrs, Volume = 239 cf, Depth = 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-36.00 hrs, dt=0.01 hrs
Type III 24-hr 1-Year Rainfall = 2.90"

<table>
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<th>Description</th>
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<td>493</td>
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<tr>
<td>171</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
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</tbody>
</table>

Sum of CN = 90

Weighted Average = 649

5.75% Pervious Area

5.71% Impervious Area

19.79% Unconnected

To Length Slope Velocity Capacity Description
5.0 0.0358 0.22 Sheet Flow, Lawn
Grass: Short n = 0.150 P2 = 3.40"

Summary for Subcatchment 2S: Rear Lawn & Roof

Runoff = 0.19 cfs @ 12.11 hrs, Volume = 624 cf, Depth = 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-36.00 hrs, dt=0.01 hrs
Type III 24-hr 1-Year Rainfall = 2.90"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,925</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>467</td>
<td>98</td>
<td>Roofs, HSG D</td>
</tr>
<tr>
<td>0</td>
<td>98</td>
<td>Paved parking, HSG D</td>
</tr>
<tr>
<td>365</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
</tr>
</tbody>
</table>

Sum of CN = 82

Weighted Average = 4,925

85.55% Pervious Area

14.45% Impervious Area

43.87% Unconnected

To Length Slope Capacity Description
7.2 95 0.0358 0.22 Sheet Flow, Lawn
Grass: Short n = 0.150 P2 = 3.40"

Summary for Link 3L: POC A (Edgewater Drive)

Inflow Area = 1,513 sf, 57.11% Impervious, inflow Depth = 1.89" for 1-Year event
Inflow = 0.08 cfs @ 12.07 hrs, Volume = 239 cf
Primary = 0.08 cfs @ 12.07 hrs, Volume = 239 cf, Attenuation = 0%, Lag = 0.0 min
Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs
Summary for Link 4L: POC B (Greenwich Cove)

Inflow Area = 5,757 sf, 14.45% impervious, Inflow Depth = 1.30" for 1-Year event
Inflow = 0.19 cfs @ 12.11 hrs, Volume = 624 cf
Primary = 0.19 cfs @ 12.11 hrs, Volume = 624 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Summary for Subcatchment 1S: Front Lawn & Roof

Runoff = 0.10 cfs @ 12.07 hrs, Volume= 297 cf, Depth= 2.35" 
Runoff by SCS TR-20 method, Uh=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.40" 

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
<th>Tc</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<td>0.0358</td>
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<td>Sheet Flow, Lawn</td>
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<td>Roofs, HSG D</td>
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<td>Paved parking, HSG D</td>
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<tr>
<td>171</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
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<td>1,513</td>
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<td>42.89% Pervious Area</td>
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<tr>
<td>864</td>
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<td></td>
</tr>
<tr>
<td>171</td>
<td>19.79% Unconnected</td>
<td></td>
<td></td>
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<td></td>
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</table>

Summary for Subcatchment 2S: Rear Lawn & Roof

Runoff = 0.25 cfs @ 12.11 hrs, Volume= 816 cf, Depth= 1.70" 
Runoff by SCS TR-20 method, Uh=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.40" 

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Adj</th>
<th>Description</th>
<th>Tc</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
<td>7.2</td>
<td>95</td>
<td>0.0358</td>
<td>0.22</td>
<td>Sheet Flow, Lawn</td>
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<td></td>
</tr>
<tr>
<td>467</td>
<td>98</td>
<td>Roofs, HSG D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grass; Short</td>
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<tr>
<td>0</td>
<td>98</td>
<td>Paved parking, HSG D</td>
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<td></td>
<td></td>
<td></td>
<td>n= 0.150 P2= 3.40&quot;</td>
<td></td>
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</tr>
<tr>
<td>365</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5,757</td>
<td>83</td>
<td>62 Weighted Average, U/Adjusted</td>
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<td></td>
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</tr>
<tr>
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<tr>
<td>832</td>
<td>14.45% Impervious Area</td>
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<tr>
<td>365</td>
<td>43.87% Unconnected</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summary for Link 4L: POC B (Greenwich Cove)

Inflow Area = 5,757 sf, 14.45% Impervious, Inflow Depth = 1.70" for 2-Year event 
Inflow = 0.25 cfs @ 12.11 hrs, Volume= 816 cf, Attenu= 0%, Lag= 0.0 min 
Primary = 0.25 cfs @ 12.11 hrs, Volume= 816 cf, Attenu= 0%, Lag= 0.0 min 
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs 

Summary for Link 3L: POC A (Edgewater Drive)

Inflow Area = 1,513 sf, 57.11% Impervious, Inflow Depth = 2.35" for 2-Year event 
Inflow = 0.10 cfs @ 12.07 hrs, Volume= 297 cf 
Primary = 0.10 cfs @ 12.07 hrs, Volume= 297 cf, Attenu= 0%, Lag= 0.0 min 
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Subcatchment 1S: Front Lawn & Roof
Runoff Area=1,513 sf, 57.11% Impervious
Runoff Depth=3.20”
Tc=9.0 min  CN=90  Runoff=0.13 cfs  404 cf

Subcatchment 2S: Rear Lawn & Roof
Runoff Area=5,757 sf, 14.45% Impervious
Runoff Depth=2.46”
Flow Length=95’  Slope=0.03587’  Tc=7.2 min  UI Adjusted CN=82  Runoff=0.37 cfs  1,181 cf

Link 3L: POC A (Edgewater Drive)
Inflow=0.13 cfs  404 cf
Primary=0.13 cfs  404 cf

Link 4L: POC B (Greenwich Cove)
Inflow=0.37 cfs  1,181 cf
Primary=0.37 cfs  1,181 cf

Summary for Subcatchment 1S: Front Lawn & Roof
Runoff = 0.13 cfs @ 12.07 hrs, Volume= 404 cf, Depth= 3.20”

Summary for Subcatchment 2S: Rear Lawn & Roof
Runoff = 0.37 cfs @ 12.10 hrs, Volume= 1,181 cf, Depth= 2.46”

Summary for Link 3L: POC A (Edgewater Drive)
Inflow Area = 1,513 sf, 57.11% Impervious, Inflow Depth = 3.20” for 5-Year event
Inflow = 0.13 cfs @ 12.07 hrs, Volume= 404 cf
Primary = 0.13 cfs @ 12.07 hrs, Volume= 404 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Summary for Link 4L: POC B (Greenwich Cove)

Inflow Area = 5,757 sf, 14.45% Impervious, Inflow Depth = 2.46" for 5-Year event
Inflow = 0.37 cfs @ 12.10 hrs, Volume = 1,181 cf
Primary = 0.37 cfs @ 12.10 hrs, Volume = 1,181 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Star-Ind method - Pond routing by Dyn-Star-Ind method

Subcatchment 1S: Front Lawn & Roof
Runoff Area=1,513 sf 57.11% Impervious Runoff Depth=3.97" Tc=5.0 min CN=90 Runoff=0.16 cfs 501 cf
Flow Length=95' Slope=0.0358 '/' Tc=7.2 min Ul Adjusted CN=82 Runoff=0.47 cfs 1,520 cf

Link 3L: POC A (Edgewater Drive)
Inflow=0.16 cfs 501 cf
Primary=0.16 cfs 501 cf

Link 4L: POC B (Greenwich Cove)
Inflow=0.47 cfs 1,520 cf
Primary=0.47 cfs 1,520 cf
Summary for Subcatchment 1S: Front Lawn & Roof

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 501 cf, Depth= 3.97"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall= 5.10"  

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>649</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>409</td>
<td>98</td>
<td>Roofs, HSG D</td>
</tr>
<tr>
<td>284</td>
<td>98</td>
<td>Paved parking, HSG D</td>
</tr>
<tr>
<td>171</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
</tr>
<tr>
<td>1,513</td>
<td>90</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>649</td>
<td>42.89% Pervious Area</td>
<td></td>
</tr>
<tr>
<td>864</td>
<td>57.11% Impervious Area</td>
<td></td>
</tr>
<tr>
<td>171</td>
<td>19.79% Unconnected</td>
<td></td>
</tr>
</tbody>
</table>

Tc: 5.0  
Length: Direct Entry,  
Slope:  
Velocity:  
Capacity:  
Description:  

Summary for Subcatchment 2S: Rear Lawn & Roof

Runoff = 0.47 cfs @ 12.10 hrs, Volume= 1,520 cf, Depth= 3.17"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall= 5.10"  

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Adj</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,925</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
<td></td>
</tr>
<tr>
<td>467</td>
<td>98</td>
<td>Roofs, HSG D</td>
<td></td>
</tr>
<tr>
<td>365</td>
<td>98</td>
<td>Paved parking, HSG D</td>
<td></td>
</tr>
<tr>
<td>5,757</td>
<td>82</td>
<td>Weighted Average, UI Adjusted</td>
<td></td>
</tr>
<tr>
<td>4,925</td>
<td>85.55% Pervious Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>832</td>
<td>14.45% Impervious Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>365</td>
<td>43.87% Unconnected</td>
<td></td>
<td></td>
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</table>

Tc: 7.2  
Length:  
Slope: 0.0358  
Velocity: 0.22  
Capacity:  
Description: Sheet Flow, Lawn  
Grass: Short  
n = 0.150  
P2= 3.40"  

Summary for Link 3L: POC A (Edgewater Drive)

Inflow Area = 1,513 sf, 57.11% Impervious, Inflow Depth = 3.97" for 10-Year event  
Inflow = 0.16 cfs @ 12.07 hrs, Volume= 501 cf  
Primary = 0.16 cfs @ 12.07 hrs, Volume= 501 cf, Atten= 0%, Lag= 0.0 min  
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Summary for Subcatchment 1S: Front Lawn & Roof

Runoff = 0.21 cfs @ 12.07 hrs, Volume= 660 cf, Depth= 5.24"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.40"  

<table>
<thead>
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<th>Area (sf)</th>
<th>CN</th>
<th>Adj</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,513</td>
<td>90</td>
<td></td>
<td>Weighted Average</td>
</tr>
<tr>
<td>649</td>
<td>90</td>
<td></td>
<td>42.69% Pervious Area</td>
</tr>
<tr>
<td>264</td>
<td>90</td>
<td></td>
<td>57.11% Impervious Area</td>
</tr>
<tr>
<td>171</td>
<td>90</td>
<td></td>
<td>19.70% Unconnected</td>
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</table>

Tc (min) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
<table>
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<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>0.0358</td>
<td>0.22</td>
<td></td>
<td>Direct Entry,</td>
</tr>
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Summary for Subcatchment 2S: Rear Lawn & Roof

Runoff = 0.64 cfs @ 12.10 hrs, Volume= 2,090 cf, Depth= 4.36"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.40"  

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Adj</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,925</td>
<td>80</td>
<td></td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>467</td>
<td>90</td>
<td></td>
<td>Roofs, HSG D</td>
</tr>
<tr>
<td>0</td>
<td>90</td>
<td></td>
<td>Paved parking, HSG D</td>
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<tr>
<td>386</td>
<td>90</td>
<td></td>
<td>Unconnected pavement, HSG D</td>
</tr>
<tr>
<td>5,757</td>
<td>83</td>
<td>62</td>
<td>Weighted Average, Ul Adjusted</td>
</tr>
<tr>
<td>4,925</td>
<td>80</td>
<td></td>
<td>85.55% Pervious Area</td>
</tr>
<tr>
<td>832</td>
<td>90</td>
<td></td>
<td>14.45% Impervious Area</td>
</tr>
<tr>
<td>386</td>
<td>90</td>
<td></td>
<td>43.87% Unconnected</td>
</tr>
</tbody>
</table>

Tc (min) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2</td>
<td>0.0358</td>
<td>0.22</td>
<td></td>
<td>Sheet Flow, Lawn Grass: Short n= 0.150 P2= 3.40&quot;</td>
</tr>
</tbody>
</table>

Summary for Link 3L: POC A (Edgewater Drive)

Inflow = 1,513 sf, 57.11% Impervious, Inflow Depth = 5.24" for 25-Year event  
Inflow = 0.21 cfs @ 12.07 hrs, Volume= 660 cf  
Primary = 0.21 cfs @ 12.07 hrs, Volume= 660 cf, Att= 0%, Lag= 0.0 min  
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Summary for Link 4L: POC B (Greenwich Cove)

Inflow Area = 5,757 sf, 14.45% Impervious, Inflow Depth = 4.36" for 25-Year event
Inflow = 0.64 cfs @ 12.10 hrs, Volume = 2,090 cf
Primary = 0.64 cfs @ 12.10 hrs, Volume = 2,090 cf, Alter= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Subcatchment 1S: Front Lawn & Roof
Runoff Area= 1,513 sf, 57.11% Impervious Runoff Depth= 6.41"
Tc= 5.0 min CN= 90 Runoff= 0.25 cfs 808 cf

Subcatchment 2S: Rear Lawn & Roof
Runoff Area= 5,757 sf, 14.45% Impervious Runoff Depth= 5.48"
Flow Length= 95' Slope= 0.0358' T= 7.2 min UI Adjusted CN= 82 Runoff= 0.80 cfs 2,629 cf

Link 3L: POC A (Edgewater Drive)
Inflow= 0.25 cfs 808 cf
Primary= 0.25 cfs 808 cf

Link 4L: POC B (Greenwich Cove)
Inflow= 0.80 cfs 2,629 cf
Primary= 0.80 cfs 2,629 cf
Summary for Subcatchment 1S: Front Lawn & Roof

Runoff = 0.25 cfs @ 12.07 hrs, Volume = 808 cf, Depth = 6.41"  
Runoff by SCS TR-20 method, Uh=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=7.60"  

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>649</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>409</td>
<td>98</td>
<td>Roofs, HSG D</td>
</tr>
<tr>
<td>284</td>
<td>98</td>
<td>Paved parking, HSG D</td>
</tr>
<tr>
<td>171</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
</tr>
</tbody>
</table>

1,513 90 Weighted Average
649 42.89% Pervious Area
864 57.11% Impervious Area
171 19.79% Unconnected

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

5,0

Summary for Subcatchment 2S: Rear Lawn & Roof

Runoff = 0.80 cfs @ 12.10 hrs, Volume = 2.629 cf, Depth = 5.46"  
Runoff by SCS TR-20 method, Uh=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=7.60"  

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Adj</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,925</td>
<td>80</td>
<td></td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>467</td>
<td>98</td>
<td></td>
<td>Roofs, HSG D</td>
</tr>
<tr>
<td>0</td>
<td>98</td>
<td></td>
<td>Paved parking, HSG D</td>
</tr>
<tr>
<td>365</td>
<td>98</td>
<td></td>
<td>Unconnected pavement, HSG D</td>
</tr>
</tbody>
</table>

5,757 83 82 Weighted Average, Uh Adjusted
4,925 85.55% Pervious Area
365 37.87% Impervious Area
365 43.87% Unconnected

Tc Length Slope Velocity Capacity Description  
(min) (feet) (ft/ft) (ft/sec) (ft/sec) Sheet Flow, Lawn  
Grass: Short n = 0.150 P2 = 3.40"

Summary for Link 3L: POC A (Edgewater Drive)

Inflow Area = 1,513 sf, 57.11% impervious, Inflow Depth = 6.41" for 50-Year event  
Inflow = 0.25 cfs @ 12.07 hrs, Volume = 808 cf  
Primary = 0.25 cfs @ 12.07 hrs, Volume = 808 cf, Atten = 0%, Lag = 0.0 min  
Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs
Summary for Subcatchment 1S: Front Lawn & Roof

Runoff = 0.31 cfs @ 12.07 hrs, Volume = 995 cf, Depth = 7.89".

Runoff by SCS TR-20 method, Uh=SCS, Weighted-CN, Type III 24-hr 100-Year Rainfall=9.10".

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>649</td>
<td>60</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
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<tr>
<td>409</td>
<td>98</td>
<td>Roofs, HSG D</td>
</tr>
<tr>
<td>284</td>
<td>98</td>
<td>Paved parking, HSG D</td>
</tr>
<tr>
<td>171</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
</tr>
<tr>
<td>1,513</td>
<td>90</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>649</td>
<td>93</td>
<td>42.89% Pervious Area</td>
</tr>
<tr>
<td>864</td>
<td>93</td>
<td>57.11% Impervious Area</td>
</tr>
<tr>
<td>171</td>
<td>93</td>
<td>19.79% Unconnected pavement</td>
</tr>
</tbody>
</table>

Tc = 7.2 min, UI Adjusted CN = 82, Runoff = 1.00 cfs, 3.315 cf.

Summary for Subcatchment 2S: Rear Lawn & Roof

Runoff = 1.00 cfs @ 12.10 hrs, Volume = 3,315 cf, Depth = 6.91".

Runoff by SCS TR-20 method, Uh=SCS, Weighted-CN, Type III 24-hr 100-Year Rainfall=9.10".

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,925</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>467</td>
<td>98</td>
<td>Roofs, HSG D</td>
</tr>
<tr>
<td>0</td>
<td>98</td>
<td>Paved parking, HSG D</td>
</tr>
<tr>
<td>365</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
</tr>
<tr>
<td>5,757</td>
<td>83</td>
<td>Weighted Average, UI Adjusted</td>
</tr>
<tr>
<td>4,925</td>
<td>83</td>
<td>85.55% Pervious Area</td>
</tr>
<tr>
<td>835</td>
<td>98</td>
<td>14.45% Impervious Area</td>
</tr>
<tr>
<td>365</td>
<td>98</td>
<td>43.87% Unconnected pavement</td>
</tr>
</tbody>
</table>

Tc = 7.2 min, UI Adjusted CN = 82, Runoff = 1.00 cfs, 3.315 cf.

Summary for Link 3L: POC A (Edgewater Drive)

Inflow Area = 1,513 sf, 57.11% Impervious, Inflow Depth = 7.89" for 100-Year event.

Inflow = 0.31 cfs @ 12.07 hrs, Volume = 995 cf.

Primary inflow = 0.31 cfs @ 12.07 hrs, Volume = 995 cf, Atten = 0%, Lag = 0 min.

Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs.
Summary for Link 4L: POC B (Greenwich Cove)

Inflow Area = 5,757 sf, 14.45% Impervious, Inflow Depth = 6.91" for 100-Year event
Inflow = 1.00 cfs @ 12.10 hrs, Volume = 3,315 cf
Primary = 1.00 cfs @ 12.10 hrs, Volume = 3,315 cf, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs
Appendix “E”

HydroCAD Analysis – Proposed Conditions
47 Edgewater Drive PRO 01

1S
Front Lawn & Roof

3S
Patio

2S
Rear Lawn & Roof

5L
POC A (Edgewater Drive)

4P
Gravel Patio

6L
POC B (Greenwich Cove)

Area Listing (all nodes)

<table>
<thead>
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<th>Area (sq ft)</th>
<th>CN</th>
<th>Description</th>
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<tbody>
<tr>
<td>4734</td>
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<td>&gt;75% Grass cover, Good, HSG D (1S, 2S, 3S)</td>
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<tr>
<td>264</td>
<td>98</td>
<td>Paved parking, HSG D (1S)</td>
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<tr>
<td>1726</td>
<td>98</td>
<td>Roofs, HSG D (1S, 2S, 3S)</td>
</tr>
<tr>
<td>526</td>
<td>98</td>
<td>Unconnected pavement, HSG D (1S, 3S)</td>
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<tr>
<td>7279</td>
<td>86</td>
<td>TOTAL AREA</td>
</tr>
</tbody>
</table>
Summary for Subcatchment 1S: Front Lawn & Roof

Runoff = 0.21 cfs @ 12.07 hrs, Volume= 660 cf, Depth= 5.24"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40".

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
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<tbody>
<tr>
<td>649</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>409</td>
<td>98</td>
<td>Roofs, HSG D</td>
</tr>
<tr>
<td>284</td>
<td>98</td>
<td>Paved parking, HSG D</td>
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<tr>
<td>171</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
</tr>
<tr>
<td>1,513</td>
<td>90</td>
<td>Weighted Average</td>
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<tr>
<td>649</td>
<td></td>
<td>42.89% Pervious Area</td>
</tr>
<tr>
<td>864</td>
<td></td>
<td>57.11% Impervious Area</td>
</tr>
<tr>
<td>171</td>
<td></td>
<td>19.79% Unconnected</td>
</tr>
</tbody>
</table>

Tc: 5.0 min

Direct Entry.

Subcatchment 1S: Front Lawn & Roof

Type III 24-hr 25-Year Rainfall=6.40"
Runoff Area=1,513 sf
Runoff Volume=660 cf
Runoff Depth=5.24"
Tc=5.0 min
CN=90

Summary for Subcatchment 2S: Rear Lawn & Roof

Runoff = 0.55 cfs @ 12.10 hrs, Volume= 1,820 cf, Depth= 4.57"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40".

<table>
<thead>
<tr>
<th>Area (sf)</th>
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<th>Description</th>
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<tbody>
<tr>
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<tr>
<td>1,057</td>
<td>98</td>
<td>Roofs, HSG D</td>
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<tr>
<td>0</td>
<td>98</td>
<td>Paved parking, HSG D</td>
</tr>
<tr>
<td>0</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
</tr>
<tr>
<td>4,777</td>
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<td>Weighted Average</td>
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<tr>
<td>3,720</td>
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<td>77.67% Pervious Area</td>
</tr>
<tr>
<td>1,057</td>
<td></td>
<td>22.33% Impervious Area</td>
</tr>
</tbody>
</table>

Tc: 5.0 min

Sheet Flow, Lawn
Grass: Short n = 0.150 P2= 3.40"
Summary for Subcatchment 3S: Patio

Runoff = 0.14 cfs @ 12.07 hrs, Volume= 437 cf, Depth= 5.35”

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

**Area (sf) CN Description**
- 365 80 >75% Grass cover, Good, HSG D
- 260 98 Roofs, HSG D
- 0 98 Paved parking, HSG D
- 355 98 Unconnected pavement, HSG D
- 980 91 Weighted Average

**615 37.24% Pervious Area**
- 62.76% Impervious Area
- 57.72% Unconnected

**Tc= 5.00 min**

Direct Entry.

Subcatchment 3S: Patio

**Type III 24-hr 25-Year Rainfall=6.40”**

Runoff Area=980 sf
Runoff Volume=437 cf
Runoff Depth=5.35”

Tc=5.0 min
CN=91

---

Summary for Pond 4P: Gravel Patio

Inflow Area = 980 sf, 62.76% Impervious, Inflow Depth = 5.35” for 25-Year event
Inflow = 0.14 cfs @ 12.07 hrs, Volume= 437 cf
Outflow = 0.10 cfs @ 12.14 hrs, Volume= 262 cf, Atten= 30%, Lag= 4.4 min
Primary = 0.10 cfs @ 12.14 hrs, Volume= 262 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 7.35” @ 12.14 hrs Surf.Area= 364 sf Storage= 196 cf

Plug-Flow detention time = 203.5 min calculated for 262 cf (60% of inflow)
Center-of-Mass det. time= 99.9 min (780.0 - 778.1 )

**Volume Invert Avail Storage Storage Description**

| #1  | 6.00” | 218 cf | No. 2 Stone (Prismatic) Listed below (Recalc) |
| #2  | 7.50” | 33 cf  | No. 57 Stone (Prismatic) Listed below (Recalc) |
| #3  | 7.80” | 18 cf  | Pea Stone/Pavers (Prismatic) Listed below (Recalc) |

269 cf Total Available Storage

**Elevation Surf.Area Inc.Store Cum.Store**

<table>
<thead>
<tr>
<th>(feet)</th>
<th>(sq-ft)</th>
<th>(cubic-feet)</th>
<th>(cubic-feet)</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>6.00</td>
<td>364</td>
<td>526</td>
<td>526</td>
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<tr>
<td>7.50</td>
<td>364</td>
<td>105</td>
<td>105</td>
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<tr>
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</tr>
<tr>
<td>8.30</td>
<td>364</td>
<td>182</td>
<td>182</td>
</tr>
</tbody>
</table>

**Device Routing Invert Outlet Devices**

| #1 Primary | 7.20” | 4.0” Round 4” Culvert X.200 L= 6.0” Ke= 0.500 Inlet / Outlet Invert= 7.20” / 7.10” S= 0.0167” Cc= 0.900 r= 0.011 PVC, smooth interior, Flow Area= 0.09 sf |

Primary Outflow Max=0.10 cfs @ 12.14 hrs HHW=7.35” TWI=0.00” (Dynamic Tailwater) T=4” Culvert (Inlet Controls 0.10 cfs @ 1.30 fps)
Summary for Link 5L: POC A (Edgewater Drive)

Inflow Area = 1,513 sf, 57.11\% Impervious, Inflow Depth = 5.24" for 25-Year event
Inflow = 0.21 cfs @ 12.07 hrs, Volume = 660 cf
Primary = 0.21 cfs @ 12.07 hrs, Volume = 660 cf, Atten= 0\%, Lag= 0.0 min

Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt= 0.01 hrs
Summary for Link 6L: POC B (Greenwich Cove)

- Inflow Area = 5,757 sf, 29.04% Impervious, Inflow Depth = 4.34" for 25-Year event
- Inflow = 0.63 cfs @ 12.12 hrs, Volume = 2.082 cf
- Primary = 0.63 cfs @ 12.12 hrs, Volume = 2.082 cf, Attenuation %, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs
20BK_Appendix_E_PRO_01_Greenwich
Prepared by RVDI
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Printed 8/3/2021

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Time span=0.00-36.00 hrs, cff=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method  -  Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Front Lawn & Roof
Runoff Area=1.513 sf  57.11% Impervious  Runoff Depth=1.89'
Tc=6.0 min  CN=80  Runoff=0.06 cfs 239 cf

Subcatchment 2S: Rear Lawn & Roof
Runoff Area=4.777 sf  22.13% Impervious  Runoff Depth=1.43'
Flow Length=95'  Slope=0.0358'  Tc=7.2 min  CN=84  Runoff=0.18 cfs 571 cf

Subcatchment 3S: Patio
Runoff Area=880 sf  62.76% Impervious  Runoff Depth=1.98'
Tc=5.0 min  CN=51  Runoff=0.05 cfs 162 cf

Pond 4P: Gravel Patio
Peak Elev=7.11'  Storage=162 cf  Inflow=0.05 cfs 162 cf
4.0' Round Culvert x 2.00 n=0.011 L=6.0' S=0.0167'  Outflow=0.00 cfs 0 cf

Link 5L: POC A (Edgewater Drive)
Inflow=0.08 cfs 239 cf
Primary=0.08 cfs 239 cf

Link 6L: POC B (Greenwich Cove)
Inflow=0.18 cfs 571 cf
Primary=0.18 cfs 571 cf

20BK_Appendix_E_PRO_01_Greenwich
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Summary for Subcatchment 1S: Front Lawn & Roof
Runoff = 0.08 cfs @ 12.07 hrs, Volume= 239 cf, Depth= 1.89'
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.90'

Area (sf)  CN  Description
640 80  >75% Grass cover, Good, HSG D
409 98  Roofs, HSG D
284 98  Paved parking, HSG D
171 98  Unconnected pavement, HSG D

1,513 90  Weighted Average
640 42.89% Pervious Area
864 57.11% Impervious Area
171 19.79% Unconnected

Tc (min)  Length (feet)  Slope  Velocity (ft/sec)  Capacity (cfs)  Description
5.0 400 0.0358 0.22  Sheet Flow, Lawn

Direct Entry,

Summary for Subcatchment 2S: Rear Lawn & Roof
Runoff = 0.18 cfs @ 12.11 hrs, Volume= 571 cf, Depth= 1.43'
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.90'

Area (sf)  CN  Description
3,720 80  >75% Grass cover, Good, HSG D
1,057 98  Roofs, HSG D
0 98  Paved parking, HSG D
0 98  Unconnected pavement, HSG D

4,777 84  Weighted Average
3,720 77.87% Pervious Area
1,057 22.13% Impervious Area

Tc (min)  Length (feet)  Slope  Velocity (ft/sec)  Capacity (cfs)  Description
7.2 95 0.0358 0.22  Sheet Flow, Lawn

Grass: Short  n=0.150  P2= 3.40'

Summary for Subcatchment 3S: Patio
Runoff = 0.05 cfs @ 12.07 hrs, Volume= 162 cf, Depth= 1.98'
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.90'
### Summary for Pond 4P: Gravel Patio

**Inflow Area =** 980 sf, 62.76% Imperious, Inflow Depth = 1.98" for 1-Year event

**Inflow** = 0.05 cfs @ 12.07 hrs, Volume = 162 cf

**Outflow** = 0.00 cfs @ 0.00 hrs, Volume = 0 cf, Attenuation: 100%, Lag: 0.0 min

Routing by Dyn-Stor-Ind method, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs

### Summary for Link 5L: POC A (Edgewater Drive)

- **Inflow Area** = 5,153 sf, 57.11% Imperious, Inflow Depth = 1.89" for 1-Year event
- **Inflow** = 0.08 cfs @ 12.07 hrs, Volume = 239 cf
- **Primary** = 0.08 cfs @ 12.07 hrs, Volume = 239 cf, Attenuation: 0%, Lag: 0.0 min

Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs

### Summary for Link 6L: POC B (Greenwich Cove)

- **Inflow Area** = 5,757 sf, 29.04% Imperious, Inflow Depth = 1.19" for 1-Year event
- **Inflow** = 0.18 cfs @ 12.11 hrs, Volume = 571 cf
- **Primary** = 0.18 cfs @ 12.11 hrs, Volume = 571 cf, Attenuation: 0%, Lag: 0.0 min

Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs
Time span = 0.00-36.00 hrs, dt = 0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Star-Ind method - Pond routing by Dyn-Star-Ind method

Subcatchment 1S: Front Lawn & Roof
Runoff Area = 1,513 sf, 57.11% Impervious, Runoff Depth = 2.35" Tc = 5.0 min, CN = 80
Runoff = 0.10 cfs, 297 cf

Subcatchment 2S: Rear Lawn & Roof
Runoff Area = 4,777 sf, 22.13% Impervious, Runoff Depth = 1.85" Flow Length = 95", Slope = 0.0358", Tc = 7.2 min, CN = 84
Runoff = 0.23 cfs, 737 cf

Subcatchment 3S: Patio
Runoff Area = 980 sf, 62.76% Impervious, Runoff Depth = 2.45" Tc = 5.0 min, CN = 91
Runoff = 0.07 cfs, 200 cf

Pond 4P: Gravel Patio
Peak Elev = 7.22", Storage = 177 cf, Inflow = 0.07 cfs, 200 cf
4" Round Culvert x 2.00 n = 0.011 L = 6.0 S = 0.0167" Outflow = 0.00 cfs, 25 cf

Link 5L: POC A (Edgewater Drive)
Inflow = 0.10 cfs, 297 cf Primary = 0.10 cfs, 297 cf

Link 6L: POC B (Greenwich Cove)
Inflow = 0.23 cfs, 762 cf Primary = 0.23 cfs, 762 cf

Summary for Subcatchment 1S: Front Lawn & Roof
Runoff = 0.10 cfs @ 12.07 hrs, Volume = 297 cf, Depth = 2.35" Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs Type III 24-hr 2-Year Rainfall = 3.40"

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<th>Description</th>
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<td>80</td>
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<tr>
<td>284</td>
<td>98</td>
<td>Paved parking, HSG D</td>
</tr>
<tr>
<td>171</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
</tr>
</tbody>
</table>

1,513 90 Weighted Average
649 42.89% Pervious Area
864 57.11% Impervious Area
171 19.79% Unconnected

To (min) Length (feet) Slope (ft/ft) Velocity (ft/sec) Capacity (cfs) Description
5.0

Direct Entry,

Summary for Subcatchment 2S: Rear Lawn & Roof
Runoff = 0.23 cfs @ 12.10 hrs, Volume = 737 cf, Depth = 1.85"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs Type III 24-hr 2-Year Rainfall = 3.40"

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<thead>
<tr>
<th>Area (sf)</th>
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<th>Description</th>
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<td>3,720</td>
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<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>1,057</td>
<td>98</td>
<td>Roofs, HSG D</td>
</tr>
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</table>
| 3,720    | 77.87% Pervious Area
| 1,057    | 22.13% Impervious Area

To (min) Length (feet) Slope (ft/ft) Velocity (ft/sec) Capacity (cfs) Description
7.2

Sheet Flow, Lawn Grass: Short n = 0.150 P2 = 3.40"

Summary for Subcatchment 3S: Patio
Runoff = 0.07 cfs @ 12.07 hrs, Volume = 200 cf, Depth = 2.45" Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs Type III 24-hr 2-Year Rainfall = 3.40"
Summary for Pond 4P: Gravel Patio

Inflow Area = 880 sq ft, 62.76% impervious, Inflow Depth = 2.45" for 2-Year event
Inflow = 0.07 cfs @ 12.07 hrs, Volume = 203 cfs
Outflow = 0.00 cfs @ 17.78 hrs, Volume = 25 cfs, Atten=98%, Lag=342.7 min
Primary = 0.00 cfs @ 17.78 hrs, Volume = 25 cfs

Routing by Dyn-Stor-Ind method, Time Span=0.00-36.00 hrs, dt=0.01 hrs
Peak Elev=7.22' @ 17.78 hrs Surf.Area=364 sf Storage=177 cf

Plug-Flow detention time=640.1 min calculated for 25 cf (13% of inflow)
Center-of-Mass det. time=434.7 min (1,234.0 - 799.3 )

Volume Invert Avail Storage Storage Description
#1 6.00' 218 cf No 2 Stone (Prismatic) Listed below (Recalc) 546 cf Overall x 40.0% Voids
#2 7.50' 33 cf No 57 Stone (Prismatic) Listed below (Recalc) 103 cf Overall x 30.0% Voids
#3 7.80' 18 cf Pea Stone/Pavers (Prismatic) Listed below (Recalc) 182 cf Overall x 10.0% Voids

269 cf Total Available Storage

Elevation Surf.Area Inc.Store Cum.Store
(feet) (sq-ft) (cubic-feet) (cubic-feet)
6.00 364 0 0
7.50 364 546 546

Elevation Surf.Area Inc.Store Cum.Store
(feet) (sq-ft) (cubic-feet) (cubic-feet)
7.50 364 0 0
7.80 364 109 109
8.30 364 162 162

Summary for Link 5L: POC A (Edgewater Drive)

Inflow Area = 1513 sf, 57.11% impervious, Inflow Depth = 2.35" for 2-Year event
Inflow = 0.10 cfs @ 12.07 hrs, Volume = 297 cf
Primary = 0.10 cfs @ 12.07 hrs, Volume = 297 cf, Atten=0%, Lag=0.0 min
Primary outflow = Inflow, Time Span=0.00-36.00 hrs, dt=0.01 hrs

Summary for Link 6L: POC B (Greenwich Cove)

Inflow Area = 5757 sf, 29.04% impervious, Inflow Depth = 1.59" for 2-Year event
Inflow = 0.23 cfs @ 12.10 hrs, Volume = 762 cf
Primary = 0.23 cfs @ 12.10 hrs, Volume = 762 cf, Atten=0%, Lag=0.0 min
Primary outflow = Inflow, Time Span=0.00-36.00 hrs, dt=0.01 hrs
Summary for Subcatchment 15: Front Lawn & Roof

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 404 cf, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, d= 0.01 hrs
Type III 24-hr 5-Year Rainfall=4.30"

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<td>&gt;75% Grass cover, Good, HSG D</td>
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<tr>
<td>409</td>
<td>98</td>
<td>Roofs, HSG D</td>
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<tr>
<td>284</td>
<td>98</td>
<td>Paved parking, HSG D</td>
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<td>98</td>
<td>Unconnected pavement, HSG D</td>
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<td>Direct Entry,</td>
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Summary for Subcatchment 25: Rear Lawn & Roof

Runoff = 0.32 cfs @ 12.10 hrs, Volume= 1,050 cf, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, d= 0.01 hrs
Type III 24-hr 5-Year Rainfall=4.30"

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<th>Area (sf)</th>
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<tr>
<td>0</td>
<td>98</td>
<td>Unconnected pavement, HSG D</td>
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<tr>
<td>1,057</td>
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<th>To (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
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<td>Grass: Short n= 0.150 P2= 3.40&quot;</td>
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</tbody>
</table>

Summary for Subcatchment 33: Patio

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 270 cf, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, d= 0.01 hrs
Type III 24-hr 5-Year Rainfall=4.30"
20BK_Appendix_E_PRO_01_Greenwich  
Type III 24-hr 5-Year Rainfall=4.30"  
Prepared by RVDI  
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Area (sf) | CN | Description  
---|---|---  
365 | 80 | >75% Grass cover, Good, HSG D  
260 | 98 | Roofs, HSG D  
0 | 98 | Paved parking, HSG D  
355 | 98 | Unconnected pavement, HSG D  

980 | 91 | Weighted Average  
365 | 37.24% Pervious Area  
615 | 62.76% Impervious Area  
355 | 57.72% Unconnected  

To (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description | 
---|---|---|---|---|---  
5.0 | | | | | Direct Entry,  

**Summary for Pond 4P: Gravel Patio**  
Inflow Area = 980 sf, 62.76% Impervious, Inflow Depth = 3.31" for 5-Year event  
Inflow = 0.09 cfs @ 12.07 hrs, Volume= 270 cfs  
Outflow = 0.01 cfs @ 13.05 hrs, Volume= 95 cfs, Atten= 92%, Lag= 56.6 min  
Primary = 0.01 cfs @ 13.05 hrs, Volume= 95 cfs  
Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Peak Elevation= 7.24" @ 13.05 hrs  
Surf.Area= 364 sf, Storage= 180 cfs  
Plug-Flow detention time= 336.2 min calculated for 95 c (35% of inflow)  
Center-of-Massa det. time= 202.6 min (993.5 - 791.0)  

**Volume | Invert | Available Storage | Storage Description**  
---|---|---|---  
#1 | 6.00" | 218 cfs | No. 2 Stone (Prismatic) Listed below (Recalc)  
| | | | 546 cfs Overall x 40.0% Voids  
#2 | 7.50" | 33 cfs | No. 57 Stone (Prismatic) Listed below (Recalc)  
| | | | 109 cfs Overall x 30.0% Voids  
#3 | 7.80" | 18 cfs | Pea Stone/Pavers (Prismatic) Listed below (Recalc)  
| | | | 182 cfs Overall x 10.0% Voids  

269 cfs Total Available Storage  

---|---|---|---  
5.00 | 364 | 0 | 0  
7.50 | 364 | 546 | 546  

---|---|---|---  
7.50 | 364 | 0 | 0  
7.80 | 364 | 109 | 109  

---|---|---|---  
7.80 | 364 | 0 | 0  
8.30 | 364 | 182 | 182  

---

20BK_Appendix_E_PRO_01_Greenwich  
Type III 24-hr 5-Year Rainfall=4.30"  
Prepared by RVDI  
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Device | Routing | Invert | Outlet Devices  
---|---|---|---  
#1 | Primary | 7.20" Round 4" Culvert X 2.00 L= 6.0" Kp= 0.500  
Inlet / Outlet Invert= 7.25 / 7.10 S= 0.0167 ft Cc= 0.900  
n= 0.011 PVC, smooth interior, Flow Area= 0.09 sf  

Primary OutFlow Max=0.01 cfs @ 13.05 hrs HH=7.24' TV=0.00' (Dynamic Tailwater)  
6"-4" Culvert (Inlet Control) 0.01 cfs @ 0.66 fps  

**Summary for Link 5L: POC A (Edgewater Drive)**  
Inflow Area = 1,516 sf, 57.11% Impervious, Inflow Depth = 3.30" for 5-Year event  
Inflow = 0.13 cfs @ 12.07 hrs, Volume= 404 cfs  
Primary = 0.13 cfs @ 12.07 hrs, Volume= 404 cfs, Atten= 0%, Lag= 0.0 min  
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  

**Summary for Link 6L: POC B (Greenwich Cove)**  
Inflow Area = 5,757 sf, 29.04% Impervious, Inflow Depth = 2.39" for 5-Year event  
Inflow = 0.32 cfs @ 12.10 hrs, Volume= 1,145 cfs  
Primary = 0.32 cfs @ 12.10 hrs, Volume= 1,145 cfs, Atten= 0%, Lag= 0.0 min  
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  

---
### Summary for Subcatchment 1S: Front Lawn & Roof

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 501 cf, Depth= 3.97"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.10"

<table>
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<td>Paved parking, HSG D</td>
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<td>1,513</td>
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<td>Weighted Average</td>
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<td>649</td>
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<td>42.89% Pervious Area</td>
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<tr>
<td>864</td>
<td>57.11% Impervious Area</td>
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<tr>
<td>171</td>
<td>19.79% Unconnected</td>
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</tbody>
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Tc: 5.0  
Velocity: 0.0358 ft/sec  
Capacity: 1.497 cfs  
Flow: Direct Entry

### Summary for Subcatchment 2S: Rear Lawn & Roof

Runoff = 0.41 cfs @ 12.10 hrs, Volume= 1,336 cf, Depth= 3.36"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.10"

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<tr>
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<td>98</td>
<td>Roofs, HSG D</td>
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<td>98</td>
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<tr>
<td>3,720</td>
<td>77.87% Pervious Area</td>
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<tr>
<td>1,057</td>
<td>22.13% Impervious Area</td>
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Tc: 7.2  
Velocity: 0.0358 ft/sec  
Capacity: 1.497 cfs  
Flow: Sheet Flow, Lawn  
Grass: Short n = 0.150, P2= 3.40*
Summary for Pond 4P: Gravel Pato

Inflow Area = 980 sf, 67.76% Impervious, Inflow Depth = 4.08" for 10-Year event
Inflow = 0.11 cfs @ 12.07 hrs, Volume= 333 cf
Outflow = 0.03 cfs @ 12.38 hrs, Volume= 156 cf, Atten= 70%, Lag= 18.7 min
Primary = 0.03 cfs @ 12.38 hrs, Volume= 156 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, delt= 0.01 hrs
Peak Elevation= 7.28" @ 12.38 hrs Surf.Area= 364 sf Storage= 187 cf

Plug-Flow detention time= 256.3 min calculated for 158 cf (48% of inflow)
Center-of-Mass det. time= 139.2 min (924.4 - 785.3)

Volume  Invert  Avail Storage  Storage Description
#1 6.00' 218 cf No. 2 Stone (Prismatic) Listed below (Recalc)
 546 cf Overall x 40.0% Voids
#2 7.50' 33 cf No. 57 Stone (Prismatic) Listed below (Recalc)
 108 cf Overall x 30.0% Voids
#3 7.80' 18 cf Pea Stone/Pavers (Prismatic) Listed below (Recalc)
 182 cf Overall x 10.0% Voids

Total Available Storage

6.00 364 0 0
7.50 364 546 546
7.75 364 0 0
7.80 364 109 109
8.30 364 0 0
8.80 364 0 0
9.00 364 0 0
Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyx-Stor-Ind method - Pond routing by Dyx-Stor-Ind method

Subcatchment 15: Front Lawn & Roof
Runoff Area=1,513 sf  57.11% Impervious  Runoff Depth=5.24"
Tc=0.8 min  CN=90  Runoff=0.21 cfs 660 cf

Subcatchment 25: Rear Lawn & Roof
Runoff Area=4,777 sf  22.13% Impervious  Runoff Depth=4.57"
Flow Length=55'  Slope=0.0067"  Tc=7.2 min  CN=84  Runoff=0.56 cfs 1,820 cf

Subcatchment 35: Patio
Runoff Area=480 sf  62.76% Impervious  Runoff Depth=5.35"
Tc=0.9 min  CN=91  Runoff=0.14 cfs 437 cf

Pond 4P: Gravel Patio
Peak Elev=7.35' Storage=198 cf inflow=0.14 cfs 437 cf
Round Culvert x 2.00 n=0.011 L=6.0' S=0.0167" Outflow=0.10 cfs 262 cf

Link 5L: POC A (Edgewater Drive)
inflow=0.21 cfs 600 cf
Primary=0.21 cfs 600 cf

Link 6L: POC B (Greenwich Cove)
inflow=0.63 cfs 2,082 cf
Primary=0.63 cfs 2,082 cf

Summary for Subcatchment 15: Front Lawn & Roof
Runoff = 0.21 cfs @ 12.07 hrs, Volume= 660 cf, Depth= 5.24"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt=0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"

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Tc (min)  Length (feet)  Slope  Velocity (ft/sec)  Capacity (cfs)  Description
5.0       600               0.22  0.22          0.22          Direct Entry,

Summary for Subcatchment 25: Rear Lawn & Roof
Runoff = 0.55 cfs @ 12.10 hrs, Volume= 1,820 cf, Depth= 4.57"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt=0.01 hrs
Type III 24-hr 25-Year Rainfall=8.40"

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Tc (min)  Length (feet)  Slope  Velocity (ft/sec)  Capacity (cfs)  Description
7.2       95               0.22  0.22          0.22          Sheet Flow, Lawn
Grass: Short n=0.150 P2= 3.40*

Summary for Subcatchment 35: Patio
Runoff = 0.14 cfs @ 12.07 hrs, Volume= 437 cf, Depth= 5.35"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt=0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"
20BK_Appendix_E_PRO_01_Greenwich

Summary for Pond 4P: Gravel Patio

Inflow Area = 980 sf, 62.76% Impervious, inflow Depth = 5.35" for 25-Year event
Inflow = 0.10 cfs @ 12.14 hrs, Volume= 262 cf, Atten= 0%, Lag= 0.0 min
Routing by Dyn-Stor-Ind method, Time Span= 0.00-16.00 hrs, dt= 0.1 hrs
Plug-Flow detention time= 203.5 min calculated for 262 cf (60% of inflow)

Volume Invert Avail Storage Storage Description
#1 6.00' 218 cf No. 2 Stone (Prismatic) Listed below (Recalc)
#2 7.50' 33 cf No. 57 Stone (Prismatic) Listed below (Recalc)
#3 8.00' 18 cf Pea Stone/Pavers (Prismatic) Listed below (Recalc)

Total Available Storage = 269 cf

Elevation Surf Area Inc Store Cum Store
(foot) (sq-ft) (cubic-feet) (cubic-feet)
6.00 364 0 0
7.50 364 0 0
8.00 364 109 109

Summary for Link 5L: POC A (Edgewater Drive)

Inflow Area = 1,513 sf, 57.11% Impervious, Inflow Depth = 5.24" for 25-Year event
Inflow = 0.21 cfs @ 12.07 hrs, Volume= 660 cf, Atten= 0%, Lag= 0.0 min
Primary outflow = inflow, Time Span= 0.00-36.00 hrs, dt= 0.1 hrs

Summary for Link 6L: POC B (Greenwich Cove)

Inflow Area = 5,757 sf, 29.04% Impervious, Inflow Depth = 4.34" for 25-Year event
Inflow = 0.63 cfs @ 12.12 hrs, Volume= 2,082 cf, Atten= 0%, Lag= 0.0 min
Primary outflow = inflow, Time Span= 0.00-36.00 hrs, dt= 0.1 hrs
Summary for Subcatchment 1S: Front Lawn & Roof

Runoff = 0.25 cfs @ 12.07 hrs, Volume= 808 cf, Depth= 6.41”

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=7.60”

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Tc (min)  | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) |
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Summary for Subcatchment 2S: Rear Lawn & Roof

Runoff = 0.69 cfs @ 12.10 hrs, Volume= 2,274 cf, Depth= 5.71”

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=7.60”

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Tc (min)  | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) |
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Grass: Short n= 0.150 P2= 3.40”

Summary for Subcatchment 3S: Patio

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 533 cf, Depth= 6.53”

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=7.60”
20BK_Appendix_E_PRO_01_Greenwich

Type III 24-hr 50-Year Rainfall = 7.60"  
Prepared by RVDI
HydroCAD® 10.00-25 s/n 06481 © 2019 HydroCAD Software Solutions LLC

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Area (sf) | CN | Description
---|---|---
365 | 80 | >75% Grass cover, Good, HSG D
260 | 98 | Roofs, HSG D
0 | 98 | Paved parking, HSG D
355 | 98 | Unconstrained pavement, HSG D
980 | 91 | Weighted Average
365 | 37.24% Pervious Area
615 | 62.76% Impervious Area
355 | 57.72% Unconnected

Tc | Length | Slope | Velocity | Capacity | Description
---|---|---|---|---|---
5.0 | (min) | (feet) | (ft/ft) | (ft/sec) | (cfs)

Direct Entry,

Summary for Pond 4P: Gravel Patio

inflow Area = 980 sf, 62.76% Impervious, Inflow Depth = 6.53" for 50-Year event
Inflow = 0.17 cfs @ 12.07 hrs, Volume= 533 cfs
Outflow = 0.15 cfs @ 12.10 hrs, Volume= 356 cfs, Attenuation 8%, Lag= 2.0 min
Primary = 0.15 cfs @ 12.10 hrs, Volume= 356 cfs

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elevation= 7.39' @ 12.10 hrs
Surf.Area= 364 sf, Storage= 203 cfs
Plug-Flow detention time= 180.2 min calculated for 356 cfs (67% of inflow)
Center-of-Mass det. time= 64.5 min (567.6 - 773.1)

Volume | Invert | Avail Storage | Storage Description
---|---|---|---
#1 | 6.00' | 218 cfs | No. 2 Stone (Prismatic) Listed below (Recalc)
546 cfs Overall x 40.0% Voids
#2 | 7.50' | 33 cfs | No. 57 Stone (Prismatic) Listed below (Recalc)
109 cfs Overall x 30.0% Voids
#3 | 7.80' | 18 cfs | Pea Stone/Pavers (Prismatic) Listed below (Recalc)
182 cfs Overall x 10.0% Voids

---|---|---|---|---
6.00 | 364 | 0 | 0 | 364
7.50 | 364 | 546 | 546 | 364
7.50 | 364 | 0 | 0 | 364
7.80 | 364 | 109 | 109 | 364
8.30 | 364 | 182 | 182 | 364

Primary Outflow Max=0.15 cfs @ 12.10 hrs HW=7.39' TW=0.00' (Dynamic Tailwater)
=14 Beer 4" Culvert (Barrel Controls 0.15 cfs @ 2.10 fps)

Summary for Link 5L: POC A (Edgewater Drive)

Inflow Area = 1,513 sf, 57.11% Impervious, Inflow Depth = 6.41" for 50-Year event
Inflow = 0.25 cfs @ 12.07 hrs, Volume= 808 cfs
Primary = 0.25 cfs @ 12.07 hrs, Volume= 808 cfs, Attenuation 0%, Lag= 0.0 min
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Link 6L: POC B (Greenwich Cove)

Inflow Area = 5,757 sf, 29.04% Impervious, Inflow Depth = 5.49" for 50-Year event
Inflow = 0.84 cfs @ 12.10 hrs, Volume= 2,632 cfs
Primary = 0.84 cfs @ 12.10 hrs, Volume= 2,632 cfs, Attenuation 0%, Lag= 0.0 min
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Front Lawn & Roof
Runoff Area=1,513 sf, 57.11% Impervious Runoff Depth=7.89" Tc=5.0 min CN=90 Runoff=0.31 cfs 995 cf

Subcatchment 2S: Rear Lawn & Roof
Runoff Area=4,777 sf, 22.13% Impervious Runoff Depth=7.16" Flow Length=96" Slope=0.0358' Tc=7.2 min CN=84 Runoff=0.25 cfs 2,849 cf

Subcatchment 3S: Patio
Runoff Area=980 sf, 62.76% Impervious Runoff Depth=8.01" Tc=5.0 min CN=91 Runoff=0.20 cfs 654 cf

Pond 4P: Gravel Patio
Peak Elev=7.42" Storage=207 cf Inflow=0.20 cfs 654 cf
4.0" Round Culvert x 2.00 n=0.011 L=6.0' S=0.0167' Outflow=0.19 cfs 479 cf

Link 5L: POC A (Edgewater Drive)
Inflow=0.31 cfs 995 cf Primary=0.31 cfs 995 cf

Link 6L: POC B (Greenwich Cove)
Inflow=1.04 cfs 3,328 cf Primary=1.04 cfs 3,328 cf

Summary for Subcatchment 1S: Front Lawn & Roof
Runoff = 0.31 cfs @ 12.07 hrs, Volume= 995 cf, Depth= 7.89"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.10"

Area (sf) CN Description
649 80 >75% Grass cover, Good, HSG D
409 98 Roofs, HSG D
294 98 Paved parking, HSG D
171 96 Unconnected pavement, HSG D

1,513 90 Weighted Average
649 42.86% Pervious Area
864 57.11% Impervious Area
171 19.79% Unconnected

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

Summary for Subcatchment 2S: Rear Lawn & Roof
Runoff = 0.25 cfs @ 12.10 hrs, Volume= 2,849 cf, Depth= 7.16"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.10"

Area (sf) CN Description
3,720 80 >75% Grass cover, Good, HSG D
1,057 98 Roofs, HSG D
0 98 Paved parking, HSG D
0 96 Unconnected pavement, HSG D

4,777 84 Weighted Average
3,720 77.87% Pervious Area
1,057 22.13% Impervious Area

To Length Slope Velocity Capacity Description
(min) (feet) (ft/ft) (ft/sec) (cfs)
7.2 95 0.0338 0.22 Sheet Flow, Lawn
Grass: Short n= 0.150 P2= 3.40"

Summary for Subcatchment 3S: Patio
Runoff = 0.20 cfs @ 12.07 hrs, Volume= 654 cf, Depth= 8.01"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.10"
Summary for Pond 4P: Gravel Patio

Inflow Area = 980.00 sf, 62.76% Impervious, Inflow Depth = 8.01" for 100-Year event
Inflow = 0.20 cfs @ 12.07 hrs, Volume = 654 cf
Outflow = 0.19 cfs @ 12.10 hrs, Volume = 479 cf
Primary = 0.19 cfs @ 12.10 hrs, Volume = 479 cf

Routing by Dyn-Stor-Ind method, Time Span = 0.00-36.00 hrs, dt = 0.01 hrs
Peak Elevation = 7.42" @ 12.10 hrs
Surf Area = 364 sq sf, Storage = 207 cu ft
Plug-Flow detention time = 161.8 min calculated for 479 cf (73% of inflow)
Center-of-Mass det. time = 74.5 min (842.6 - 768.1)

Volume Invert Avail Storage Storage Description
#1 6.00' 218 cf No. 2 Stone (Prismatic) Listed below (Recalc)
   546 cf Overall x 40.0% Voids
#2 7.50' 33 cf No. 57 Stone (Prismatic) Listed below (Recalc)
   108 cf Overall x 30.0% Voids
#3 7.80' 18 cf Pea Stone/Pavers (Prismatic) Listed below (Recalc)
   162 cf Overall x 10.0% Voids

269 cf Total Available Storage

Elevation Surf Area Inc. Store Cum. Store (feet) (sq ft) (cubic-feet) (cubic-feet)
6.00 364 0 0
7.50 364 546 546

Elevation Surf Area Inc. Store Cum. Store (feet) (sq ft) (cubic-feet) (cubic-feet)
7.50 364 0 0
7.80 364 109 109

Elevation Surf Area Inc. Store Cum. Store (feet) (sq ft) (cubic-feet) (cubic-feet)
8.00 364 0 0
8.30 364 182 182
## Stage-Area-Storage for Pond 4P: Gravel Patio

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Appendix “F”

Pipe
Conveyance Calculations
The following is a summary of the computations performed to design the proposed storm drainage system drain sizes. The proposed watershed flows were taken from the results of the HydroCAD storm drainage analysis performed on the site. Refer to Appendix “E” for HydroCAD model input data, computations, and results. Refer to Exhibit “B” for a depiction of the proposed on-site watershed areas. HydroCAD runoff computations are based on the 25-year design storm frequency event. Culvert conveyance computations are based on the Manning’s Equation.

### Watershed Analysis Results

<table>
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<tr>
<th>Drainage Area</th>
<th>Area (S.F.)</th>
<th>Impervious Area (S.F.)</th>
<th>CN</th>
<th>25-Year Peak Flow Rate (cfs)</th>
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<td>1S</td>
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### Culvert Capacity Summary Table

Maximum pipe capacities were calculated using the Manning equation for full flow conditions. The proposed pipe information, 25-year peak design flows, and corresponding maximum capacities are summarized in the following table. Refer to the Development Plan for pipe and structure locations. All pipes have been sized to convey the flow rates for at least the 25-year design storm frequency event.

<table>
<thead>
<tr>
<th>Pipe #</th>
<th>Diameter (inches)</th>
<th>Roughness (n)</th>
<th>Slope (%)</th>
<th>Contributing Watershed</th>
<th>25-Year Peak Design Flow (cfs)</th>
<th>Max Capacity (cfs)</th>
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</thead>
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<tr>
<td>1</td>
<td>4</td>
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<td>1.7%</td>
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**B.F.E. 13.00'**

**MAX HEIGHT 46.00'**

**G.P. 11.00'**

**RIGHT ELEVATION**

**LEFT ELEVATION**

**WINDOW SCHEDULE**

<table>
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<tr>
<th>SFC</th>
<th>MM</th>
<th>MFG</th>
<th>RO. SIZE</th>
<th>QTY.</th>
<th>OPERATION</th>
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</table>

**FRENCH DOOR SCHEDULE**

**RIGHT ELEVATION**

**LEFT ELEVATION**

**NEW/EXISTING F.F. 16.00+/-(ARCH'L EL.: 100'-0")**

**47 EDGEWATER DRIVE**

Old Greenwich, Connecticut

**RICHARDSON STRUCTURAL ENGINEERS**

Woodbury, Connecticut

**DESIGNED AND REVIEWED FOR STRUCTURE ONLY**

**P: (203) 263-4262    E: Ostructural1@aol.com**

**ADDITION & ALTERATIONS FOR**

**56 Thomson Road**

Bethlehem, Connecticut 06751

**AJF Designs**

P: (203) 266-7757    E: glennandallen@gmail.com
GENERAL NOTES
1. UNLESS NOTED OTHERWISE, EXISTING AND ALL OTHER PROPOSED CONDITIONS INFORMATION TAKEN FROM A DRAWING PREPARED BY ROCCO V. DIABRELLA, INC.
2. PROPOSED WETLAND & BUFFER HABITAT ENHANCEMENT INFORMATION PROVIDED BY WILLIAM KENNY ASSOCIATES LLC.

PLANT LIST

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<th>SYM.</th>
<th>QTY.</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
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<td>ROSA CAROLINA</td>
<td>CAROLINA ROSE</td>
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<td>PROPOSED NATIVE GROUNDCOVERS</td>
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<td>LITTLE BLOOMER</td>
<td>QUART CONTAINER</td>
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<td>VK</td>
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<td>SAMOSA AMBULATUM</td>
<td>LOBULAR BLUEBERRY</td>
<td>1 GAL CONTAINER</td>
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<tr>
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<td>TOTAL</td>
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SHRUB PLANTING DETAIL

- PRUNE AS DIRECTED BY L.A.
- TOP OF ROOTBALL 1" ABOVE GRADE.
- 2" SHREDDED BARK MULCH.
- KEEP TOP OF ROOTBALL.
- CREATE SOIL SAUCER WITH TOPSOIL.
- 1-2" MINIMUM.
- EXCAVATION AT BASE TO BE SAME AS ROOTBALL DIAMETER. TOP OF PIT TO BE AT LEAST IN WIDTH OF THE ROOTBALL. BACKFILL WITH EXCAVATED MATERIAL.
- UNDISTURBED SUBGRADE.

GROUNDCOVER PLANTING DETAIL

- PLANT MATERIAL TO BE BARE ROOT OR CONTAINERS. SEE PLANT LIST ON PLANTING PLAN.
- 3" MULCH LAYER
- 8" PLANTING SOIL MIX.
- SCARIFY EXISTING (4") SOIL BLEND WITH PLANTING MIX 1 TO 1 AND COMPACT.

WETLAND & BUFFER PLANTING PLAN

PREPARED FOR:
JEFFREY L. & ROMINA PUCKETT
LOCATION:
47 EDGEWATER DRIVE
GREENWICH, CONNECTICUT
DATE: 6/30/11
SCALE: AS NOTED
REF NO: 4965

WILLIAM KENNY ASSOCIATES
LANDSCAPE ARCHITECTURE • ECOLOGICAL SERVICES
1999 Bronson Road Fairfield CT 06824
203 366 0581 www.wkassociates.net
LaRow, Patrick

From: Patrick Linskey <patrick.linskey@gmail.com>
Sent: Tuesday, September 21, 2021 10:43 AM
To: Alban, Margarita; DeLuca, Katie; LaRow, Patrick
Cc: Sesto, Patricia; Siebert, Amy; Barbara; Jan Linskey
Subject: Amended Comments: PLLPZ 2021 00097 PUCKETT 47 EDGEWATER DRIVE OLD GREENWICH CT 06870
Attachments: 47 9.28.21 Comment - Ashe, Linskey.docx

[EXTERNAL]

All --

We are abutting neighbors to 47 Edgewater Drive - Barbara Ashe, 49 and Patrick & Janet Linskey 45.

Attached are amended comments to the powerpoint document we sent you on April 27.

We would like to present a brief summary of our position during the upcoming hearing.

Thank you

Barbara Ashe
49 Edgewater Drive

Patrick & Janet Linskey
45 Edgewater Drive

CAUTION: This email originated from outside the Town email system. Do not click links or open attachments unless you have verified the sender and know the content is safe.
Addendum to April 27, 2021 Comments

On April 27, we submitted our joint initial comments regarding drainage issues that we have with this application; stormwater displacement and shedding directly unto our properties. These are final comments, questions, and suggestions for your consideration. We hope these documents will guide you during your decision process.

ZONING

The application’s continuation and expansion of non-conforming R-12/R-7 front and side yard step-down setbacks was highlighted by the ZEO in the P&Z staff report. The building’s addition is a substantial improvement and expands the use of the building. Two expansions challenge the continuation of the grandfathered R-7 step-down setbacks because the application’s site plan transforms it into a larger structure on a lot that continues its non-conforming status.

1. Expansion #1: This 2-story addition is the first expansion of the building and, compounding the non-conforming side yard setback issue highlighted by staff, a west side staircase is included that will be 5’ from 49’s property line and in front of the kitchen window. We request its removal from the plan.

2. Expansion #2: The plans describe an office with powder room accessed by a second front yard staircase. Currently, the space is an attached room positioned on a pier/beam footing. These rooms do not appear in the “Remodeling and Modernization” section of the tax card printed 01/11/2021 though they are described in a note in the Architectural Drawings – Foundation Plan. The application integrates what had been a seasonal sunporch with a pier/beam footing into the new foundation and is an expansion of the house. This space could, in future, be used as a professional office. We request removal of this front office staircase from the plan as it is a diminishment of the neighborhood’s residential character.
DRAINAGE AND GRADING

1. The 47 property contains approximately 820 sq. ft. of paved driveway, stone sidewalks and front patio that do not appear in the “Remodeling and Modernization” section of the tax card. In addition, the current 112 sq. ft. post/beam footing cited above is permeable and is incorporated in the expanded foundation’s impermeable slab. We believe these questionable impermeability calculation factors obviate a waiver of the Town Drainage Manual’s stormwater management standards.

2. The P&Z staff report cites the need for vegetative buffer in the rear yard and we request that a swale is also installed to detain water on the 47 property. This will ensure the stormwater flow exits directly to the tidal marsh down the homeowner’s property, protecting 45’s yard from the runoff from 47’s higher elevation to the lower elevation of 45.

3. The proposed stormwater mitigation solution is meant to resolve the permeability deficit on this property. It straddles the FEMA AE 13 and 15 zones on the property bordering a saltwater marsh and watercourse. This is an industrial device topped with an elevated terrace on a small residential property with no screening for the abutting neighbors. The Town Drainage Manual is an inadequate tool when applied to such small residential properties and unfairly justifies convenient solutions such as this one. There must be a more effective and less intrusive impermeability mitigation solution than that which is proposed.

4. We have these points focusing on the proposed stormwater mitigation structure:
   a. Can swales be substituted for the entire structure, and/or can an additional stormwater control structure be located under the driveway or the new addition, reducing the visible mass, containment volume and hydrostatic impact of the proposed backyard structure?
Greenwich Planning & Zoning Commission Meeting: 9.28.21
47 Edgewater Application Comments: Barbara Ashe, 49 Edgewater; Patrick & Janet Linskey, 45 Edgewater

b. What is the elevation of the proposed structure from the ground at its highest point (including planters) as opposed to the elevation from mean high tide?
c. Will the proposed elevated terrace be a passive space, or will there be electric lights and grilling equipment?
d. What landscaping is proposed to screen its industrial appearance and to dampen noise from the stone structure? We request landscaping on both sides to provide screening for the surrounding neighbors.
e. Should a version of the stormwater structure be allowed, we request that its drainpipe be moved to the center of the tank and is not positioned close to the 45 property as shown in the plan.

5. DPW should be aware that the application documents show the Town catch basin in the driveway but not the drainpipe that runs along 47’s property line draining into the tidal marsh and freshwater creek. During Sandy we saw stormwater bubbling up from this catch basin. The previous 49 owner erected a stone wall inside her property line to prevent damage to the pipe. This Town drainage pipe should be located and protected from damage during construction.

We’ve saved these for last because they are probably the easiest to deal with:

1. We request that any excavated soil in the “temporary stockpile area” shown in the plan is removed from the site and not spread over the property and increase its elevation.
2. And the easiest of all is that we request screening of the two second floor AC units.

Thank-you for your review.