

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

| |
|-----------------------------|
| Provided by MassDEP: |
| MassDEP File Number |
| Document Transaction Number |
| Boston |
| City/Town |

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note:
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

| | | |
|------------------------------|-----------------------|--------------|
| 64-66 Gove St | East Boston | 02128 |
| a. Street Address | b. City/Town | c. Zip Code |
| Latitude and Longitude: | 42.371011 | -71.036554 |
| ward 1 | d. Latitude | e. Longitude |
| f. Assessors Map/Plat Number | 3815 | |
| | g. Parcel /Lot Number | |

2. Applicant:

| | |
|--------------------------|------------------|
| Chan Sing | Ming |
| a. First Name | b. Last Name |
| c. Organization | |
| 615 E 7 th St | |
| d. Street Address | |
| South Boston | MA |
| e. City/Town | f. State |
| 860-985-0379 | 02127 |
| h. Phone Number | g. Zip Code |
| i. Fax Number | j. Email Address |

3. Property owner (required if different from applicant): Check if more than one owner

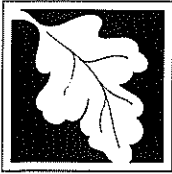
| | |
|-------------------|------------------|
| a. First Name | b. Last Name |
| c. Organization | |
| d. Street Address | |
| e. City/Town | f. State |
| | g. Zip Code |
| h. Phone Number | i. Fax Number |
| | j. Email address |

4. Representative (if any):

| | |
|-------------------------------------|---------------------------|
| Kenneth | Bouffard |
| a. First Name | b. Last Name |
| Civil Environmental Consultants LLC | |
| c. Company | |
| 8 Oak St | |
| d. Street Address | |
| Peabody | ma |
| e. City/Town | f. State |
| 978-531-1191 | 01960 |
| h. Phone Number | g. Zip Code |
| 978-531-5501 | ceclandsurvey@comcast.net |
| i. Fax Number | j. Email address |

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

| | | |
|-------------------|-------------------|-----------------------|
| 1050 | 512.50 | 537.50 |
| a. Total Fee Paid | b. State Fee Paid | c. City/Town Fee Paid |



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A. General Information (continued)

6. General Project Description:

Construction of a 6 Unit Dwelling In a Flood Hazard Zone -AE 10. Site is Approx 1600' from Coastal Bank of Boston Harbor

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

- 1. Single Family Home
- 2. Residential Subdivision
- 3. Commercial/Industrial
- 4. Dock/Pier
- 5. Utilities
- 6. Coastal engineering Structure
- 7. Agriculture (e.g., cranberries, forestry)
- 8. Transportation
- 9. Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

- 1. Yes No If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Suffolk

a. County

54973

c. Book

b. Certificate # (if registered land)

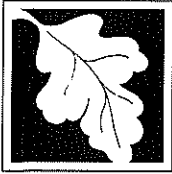
158

d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

- 1. Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
- 2. Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.



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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|--|-----------------------------|-------------------------------|
| a. <input type="checkbox"/> Bank | 1. linear feet | 2. linear feet |
| b. <input type="checkbox"/> Bordering Vegetated Wetland | 1. square feet | 2. square feet |
| c. <input type="checkbox"/> Land Under Waterbodies and Waterways | 1. square feet | 2. square feet |
| | 3. cubic yards dredged | |

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|--|--|-------------------------------|
| d. <input type="checkbox"/> Bordering Land Subject to Flooding | 1. square feet | 2. square feet |
| | 3. cubic feet of flood storage lost | 4. cubic feet replaced |
| e. <input type="checkbox"/> Isolated Land Subject to Flooding | 1. square feet | |
| | 2. cubic feet of flood storage lost | 3. cubic feet replaced |
| f. <input type="checkbox"/> Riverfront Area | 1. Name of Waterway (if available) - specify coastal or inland | |

2. Width of Riverfront Area (check one):

- 25 ft. - Designated Densely Developed Areas only
- 100 ft. - New agricultural projects only
- 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: _____ square feet

4. Proposed alteration of the Riverfront Area:

- a. total square feet _____
- b. square feet within 100 ft. _____
- c. square feet between 100 ft. and 200 ft. _____

5. Has an alternatives analysis been done and is it attached to this NOI? Yes No

6. Was the lot where the activity is proposed created prior to August 1, 1996? Yes No

3. Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f.** above.



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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|---|---|
| a. <input type="checkbox"/> Designated Port Areas | Indicate size under Land Under the Ocean, below | |
| b. <input type="checkbox"/> Land Under the Ocean | 1. square feet | |
| | 2. cubic yards dredged | |
| c. <input type="checkbox"/> Barrier Beach | Indicate size under Coastal Beaches and/or Coastal Dunes below | |
| d. <input type="checkbox"/> Coastal Beaches | 1. square feet | 2. cubic yards beach nourishment |
| e. <input type="checkbox"/> Coastal Dunes | 1. square feet | 2. cubic yards dune nourishment |
| | Size of Proposed Alteration | Proposed Replacement (if any) |
| f. <input type="checkbox"/> Coastal Banks | 1. linear feet | |
| g. <input type="checkbox"/> Rocky Intertidal Shores | 1. square feet | |
| h. <input type="checkbox"/> Salt Marshes | 1. square feet | 2. sq ft restoration, rehab., creation |
| i. <input type="checkbox"/> Land Under Salt Ponds | 1. square feet | |
| | 2. cubic yards dredged | |
| j. <input type="checkbox"/> Land Containing Shellfish | 1. square feet | |
| k. <input type="checkbox"/> Fish Runs | Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above | |
| | 1. cubic yards dredged | |
| | 2280 | |
| | 1. square feet | |
| 4. <input type="checkbox"/> Restoration/Enhancement | If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here. | |
| | a. square feet of BWV | b. square feet of Salt Marsh |
| 5. <input type="checkbox"/> Project Involves Stream Crossings | | |
| | a. number of new stream crossings | b. number of replacement stream crossings |



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C. Other Applicable Standards and Requirements

- This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

- Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

a. Yes No **If yes, include proof of mailing or hand delivery of NOI to:**

Natural Heritage and Endangered Species Program
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

b. Date of map

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); OR complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

c. Submit Supplemental Information for Endangered Species Review*

- Percentage/acreage of property to be altered:

(a) within wetland Resource Area _____
percentage/acreage

(b) outside Resource Area _____
percentage/acreage

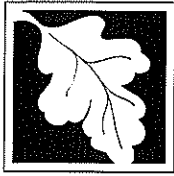
- Assessor's Map or right-of-way plan of site

- Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

(a) Project description (including description of impacts outside of wetland resource area & buffer zone)

Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/>). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



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- (b) Photographs representative of the site

C. Other Applicable Standards and Requirements (cont'd)

- (c) MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/mesa/mesa_fee_schedule.htm). Make check payable to "Commonwealth of Massachusetts - NHESP" and **mail to NHESP** at above address

Projects altering 10 or more acres of land, also submit:

- (d) Vegetation cover type map of site
- (e) Project plans showing Priority & Estimated Habitat boundaries
- (f) OR Check One of the Following
1. Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/mesa/mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)
 2. Separate MESA review ongoing.

| | |
|---------------------|----------------------------|
| a. NHESP Tracking # | b. Date submitted to NHESP |
|---------------------|----------------------------|
 3. Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.
3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?
- a. Not applicable – project is in inland resource area only b. Yes No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

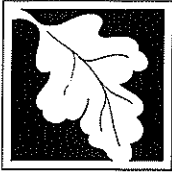
South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: DMF.EnvReview-South@state.ma.us

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.



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C. Other Applicable Standards and Requirements (cont'd)

Online Users:
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?
- a. Yes No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.
- b. ACEC
5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
- a. Yes No
6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?
- a. Yes No
7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?
- a. Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
1. Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
 2. A portion of the site constitutes redevelopment
 3. Proprietary BMPs are included in the Stormwater Management System.
- b. No. Check why the project is exempt:
1. Single-family house
 2. Emergency road repair
 3. Small Residential Subdivision (less than or equal to 4 single-family houses or less than equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

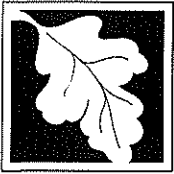
D. Additional Information

- This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)



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- Plans identifying the location of proposed activities (including activities proposed to serve as

D. Additional Information (cont'd)

- Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

- List the titles and dates for all plans and other materials submitted with this NOI.

Conservation Plan

| | | |
|--------------------------------------|-------------------------------------|--------------------------|
| a. Plan Title | Civil Environmental Consultants LLC | Frederick J. Geisel |
| b. Prepared By | 2/26/18 | c. Signed and Stamped by |
| d. Final Revision Date | Site Plan #15-446 | e. Scale |
| f. Additional Plan or Document Title | | g. Date |

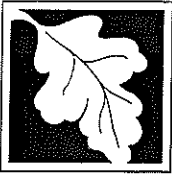
- If there is more than one property owner, please attach a list of these property owners not listed on this form.
- Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.
- Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.
- Attach NOI Wetland Fee Transmittal Form
- Attach Stormwater Report, if needed.

E. Fees

- Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

| | |
|------------------------------------|-----------------------------------|
| 31313 | 2/20/18 |
| 2. Municipal Check Number | 3. Check date |
| 31312 | 2/220/18 |
| 4. State Check Number | 5. Check date |
| Carol | Bouffard |
| 6. Payor name on check: First Name | 7. Payor name on check: Last Name |



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F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

| | |
|---|-------------------|
| 1. Signature of Applicant <i>* [Signature]</i> | 2. Date 2/9/18 |
| 3. Signature of Property Owner (if different) <i>[Signature]</i> | 4. Date 2/9/18 |
| 5. Signature of Representative (if any) <i>[Signature]</i> | 6. Date |

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

NARRATIVE – FEB 25, 2018

64/66 GOVE STREET, E. BOSTON, MA

Background:

The property is located at 64-66 Gove Street in E. Boston, MA. This is a redevelopment site. The total area of property to be redeveloped consists of 2280 sq. ft. of land. The site was previously two separate lots, each containing a multi-family house. The two houses together occupied 1937 sq. ft. of the site. The project proponent proposes to construct a six unit dwelling in a single structure. The project is a full redevelopment of the site.

Soil Conditions

The soils are classified as Udorthents -sandy and Urban land. Two test borings were conducted. The soils are classified as Class B soils, for drainage purposes.

Flood Plain

The project site is within the Special Flood Hazard Areas designated by FEMA, for the 100-yr storm, with a flood elevation of AE-10.

Wetlands

There are no wetland resource areas within 500 feet of the site.

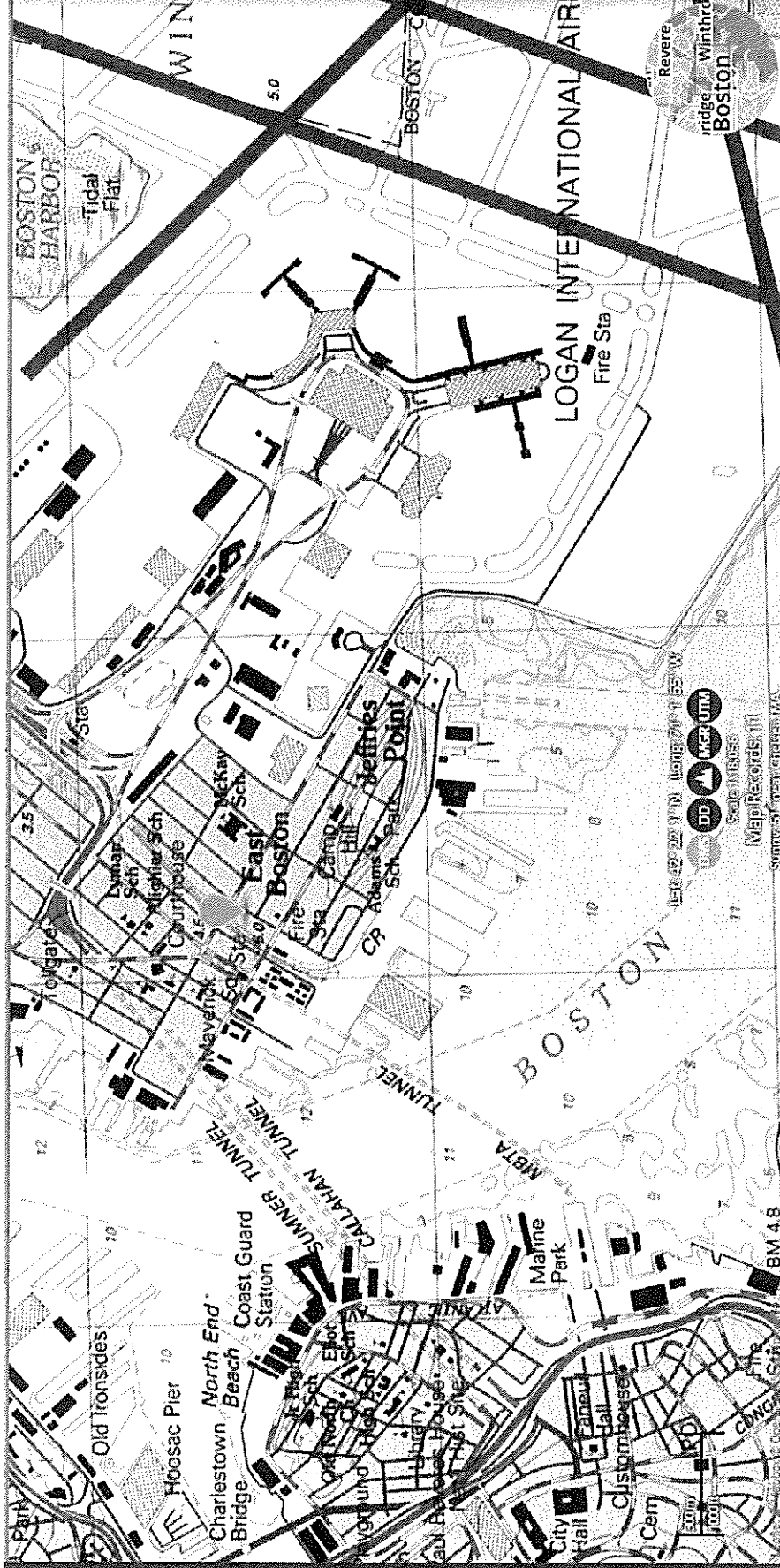
Stormwater Management

As a redevelopment site, the project is required to meet Stormwater Standards to the maximum Extent Practicable. Roof runoff is infiltrated by two Stormtech SC-740 Infiltrators, which hold and infiltrate a 1-inch storm. Based on our analysis and design, the post-development flow rates and volume will be reduced from the pre-development flows for the analyzed frequency storms – 2-yr, 10-yr and 25-yr. Flooding will not be increased for the 100-yr storm. All storm events will be infiltrated by the roof infiltrator systems. All Stormwater Management Standards will be met for the site.

All peak flows from the proposed roof areas will be attenuated by storage and infiltration through infiltration chambers that will store and infiltrate stormwater. These chambers will be as shown on the proposed site plan with the galleries for the building located in adjacent lawn/landscape areas.

Land in the rear will be landscaped with loam and grass, mulch, shrubs, and trees that will all serve to improve the soil conditions to adsorb more rainfall and reduce runoff.

Frederick J. Geisel, PE



CIVIL ENVIRONMENTAL CONSULTANTS LLC
ENGINEERS AND LAND SURVEYORS

8 Oak Street
Peabody, MA 01960
Phone (978) 531-1191
Fax (978) 531-5501
ceclandsurvey@comcast.net

June 6, 2018

Boston Conservation Commission

RE: 64-66 Gove Street East Boston, MA Project Narrative

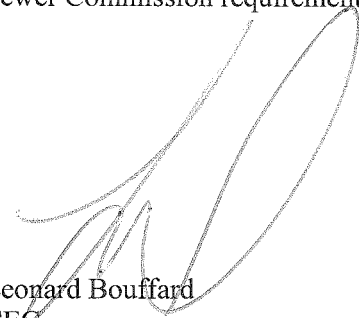
The Locus address lies within the Fema ae 10 zone, and lies approximately 1,700 feet from the nearest resource area.

The Proposed Work at the above referenced address is to construct a 40x44'6" 3 story 6 unit dwelling with a basement on a parcel that contains 2280 square feet.

To mitigate any potential impacts to the adjacent areas, straw wattle will be staked in place around the site perimeter to inhibit any impacts off site. The site is fairly flat and any erosion caused by weather events, will be impeded and contained on site by the placement of the straw wattle at the perimeter. Stormwater will be hindered by the straw wattle from flowing offsite during construction. Also during construction the catch basin in norwood street adjacent to the property will have a silt sack installed to prevent soil erosion into the city drainage system, also, straw wattle will be placed around the catch basin to further prevent infiltration of material to the city drainage system.

Post construction,

A stormwater infiltration basin will have been installed, sized in accordance to the City of Boston Water and Sewer Commission requirements.

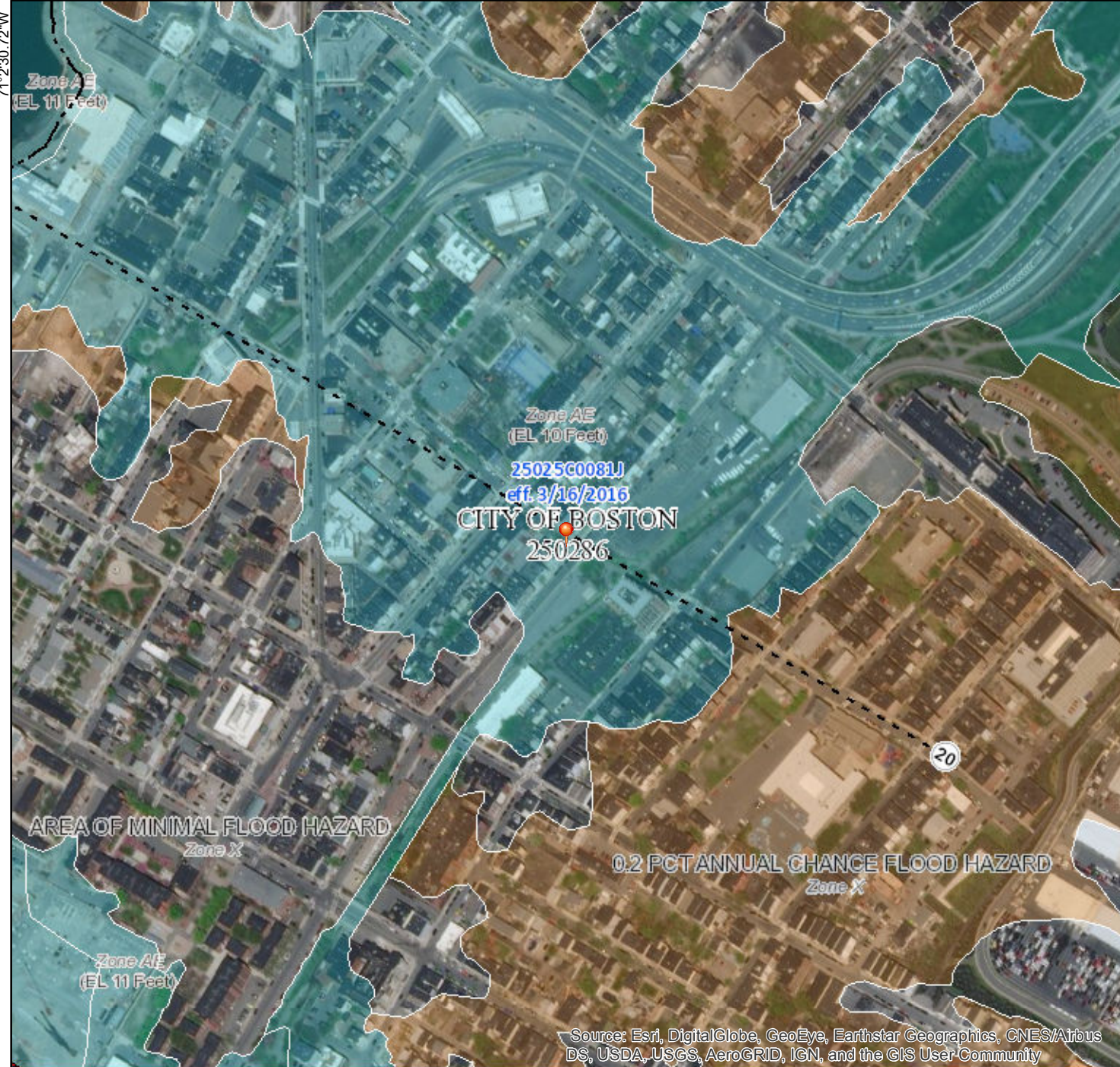


Leonard Bouffard
CEC

National Flood Hazard Layer FIRMette



42°22'29.01"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

| | | |
|----------------------------|--|--|
| SPECIAL FLOOD HAZARD AREAS | | Without Base Flood Elevation (BFE) Zone A, V, A99 |
| | | With BFE or Depth Regulatory Floodway Zone AE, AO, AH, VE, AR |

| | | |
|-----------------------------|--|---|
| OTHER AREAS OF FLOOD HAZARD | | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X |
| | | Future Conditions 1% Annual Chance Flood Hazard Zone X |

| | | |
|-----------------------------|--|--|
| OTHER AREAS OF FLOOD HAZARD | | Area with Reduced Flood Risk due to Levee. See Notes. Zone X |
| | | Area with Flood Risk due to Levee Zone D |

| | | |
|-------------|--|-------------------------------------|
| OTHER AREAS | | Area of Minimal Flood Hazard Zone X |
| | | Effective LOMRs |

| | | |
|--------------------|--|----------------------------------|
| GENERAL STRUCTURES | | Channel, Culvert, or Storm Sewer |
| | | Levee, Dike, or Floodwall |

| | | |
|----------------|--|---|
| OTHER FEATURES | | 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation |
| | | 17.5 Coastal Transect |
| | | Base Flood Elevation Line (BFE) |
| | | Limit of Study |
| | | Jurisdiction Boundary |

| | | |
|------------|--|---------------------------|
| MAP PANELS | | Digital Data Available |
| | | No Digital Data Available |
| | | Unmapped |



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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/6/2018 at 9:30:07 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: base map 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.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 250 500 1,000 1,500 2,000 Feet 1:6,000

42°22'2.43"N

71°1'53.27"W

STORMWATER MANAGEMENT REPORT

FOR

64-66 GOVE STREET

IN

E. BOSTON , MASS

BY

CIVIL ENVIRONMENTAL CONSULTANTS

FEBRUARY 27, 2018



FREDERICK J. GEISEL, PE

STORMWATER MANAGEMENT REPORT – FEB 25, 2018

64/66 GOVE STREET, E. BOSTON, MA

Background:

The property is located at 64-66 Gove Street in E. Boston, MA. This is a redevelopment site. The total area of property to be redeveloped consists of 2280 sq. ft. of land. The site was previously two separate lots, each containing a multi-family house. The two houses together occupied 1937 sq. ft. of the site. The project proponent proposes to construct a six unit dwelling in a single structure. The project is a full redevelopment of the site.

Soil Conditions

The soils are classified as Udorthents -sandy and Urban land. Two test borings were conducted. The soils are classified as Class B soils, for drainage purposes.

Flood Plain

The project site is within the Special Flood Hazard Areas designated by FEMA, for the 100-yr storm, with a flood elevation of AE-10.

Wetlands

There are no wetland resource areas within 500 feet of the site.

Stormwater Management

As a redevelopment site, the project is required to meet Stormwater Standards to the maximum Extent Practicable. Roof runoff is infiltrated by two Stormtech SC-740 Infiltrators, which hold and infiltrate a 1-inch storm. Based on our analysis and design, the post-development flow rates and volume will be reduced from the pre-development flows for the analyzed frequency storms – 2-yr, 10-yr and 25-yr. Flooding will not be increased for the 100-yr storm. All storm events will be infiltrated by the roof infiltrator systems. All Stormwater Management Standards will be met for the site.

All peak flows from the proposed roof areas will be attenuated by storage and infiltration through infiltration chambers that will store and infiltrate stormwater. These chambers will be as shown on the proposed site plan with the galleries for the building located in adjacent lawn/landscape areas.

Land in the rear will be landscaped with loam and grass, mulch, shrubs, and trees that will all serve to improve the soil conditions to adsorb more rainfall and reduce runoff.



Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

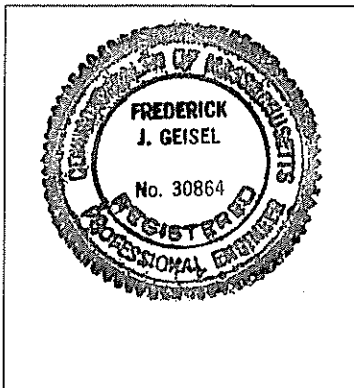
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.


A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



 7/27/18
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
 - Credit 1
 - Credit 2
 - Credit 3
- Use of "country drainage" versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): _____

Standard 1: No New Untreated Discharges

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - Static
 - Simple Dynamic
 - Dynamic Field¹
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - Site is comprised solely of C and D soils and/or bedrock at the land surface
 - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - Solid Waste Landfill pursuant to 310 CMR 19.000
 - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - is within the Zone II or Interim Wellhead Protection Area
 - is near or to other critical areas
 - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - involves runoff from land uses with higher potential pollutant loads.
 - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
 - The ½" or 1" Water Quality Volume or
 - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted *prior* to the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does *not* cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has *not* been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
- Limited Project
 - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - Bike Path and/or Foot Path
 - Redevelopment Project
 - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - Name of the stormwater management system owners;
 - Party responsible for operation and maintenance;
 - Schedule for implementation of routine and non-routine maintenance tasks;
 - Plan showing the location of all stormwater BMPs maintenance access areas;
 - Description and delineation of public safety features;
 - Estimated operation and maintenance budget; and
 - Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

STORMWATER MANAGEMENT STANDARDS

- 1. No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.**

There are no discharges to any waters of the Commonwealth. The project will have overflow to land of clean roof runoff.

- 2. Stormwater management systems shall be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates.**

The runoff from the 2, 10, 25, and 100-year storms will be less than the pre-existing conditions.

- 3. Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures. A recharge rate of 0.6 inches for all impervious surfaces is required.**

All roof runoff will be recharged to the ground, at the rear of the site.

Total roof areas = 1,780 SF

$1,780 \text{ SF} \times 0.6 \text{ in} / 12 \text{ in/ft} = 89 \text{ CF}$ required recharge volume

Recharge volume provided: Roof Infiltrators = 175 CF > 89 CF.

- 4. Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).**

Standard 4 is not applicable.

- 5. For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented.**

Standard 5 is not applicable.

- 6. Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures...**

Standard 6 is not applicable.

- 7. A redevelopment project is required to meet certain Stormwater Management Standards to the maximum extent practicable.**

This project meets the Stormwater management Standards to the maximum extent practicable.

- 8. A plan to control construction related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.**

A full scale sedimentation and pollution prevention plan is not required for a site of this size, more than 100 feet from any resource area. Standard sediment control will be implemented including sediment fencing, construction fencing, and siltation cloth in catch basins adjacent to the site.

- 9. A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.**

Required maintenance practices for all stormwater facilities are included in this document. Owners documents (Condominium Association etc.) will include schedule, responsibilities, and funding for maintenance, repair and replacement as necessary).

- 10. All illicit discharges to the stormwater management system are prohibited.**

Signs prohibiting any dumping will be posted on site, prohibiting any dumping.

PRE & POST DEVELOPMENT STORMWATER FLOWS

64-66 GOVE ST

E. BOSTON, MA

**PROPOSED
FLOWS**

| <u>FREQ. STORM (YR)</u> | <u>PRE DEVEL. EXIST FLOWS (CFS)</u> | <u>ROOF INFILT. (CFS)</u> |
|--|--|--|
| 2YR | 0.15 | 0.13 |
| 10YR | 0.23 | 0.22 |
| 25 YR | 0.30 | 0.29 |
| 100 YR | 0.44 | 0.42 |

EXISTING CONDITIONS- HYDROCAD

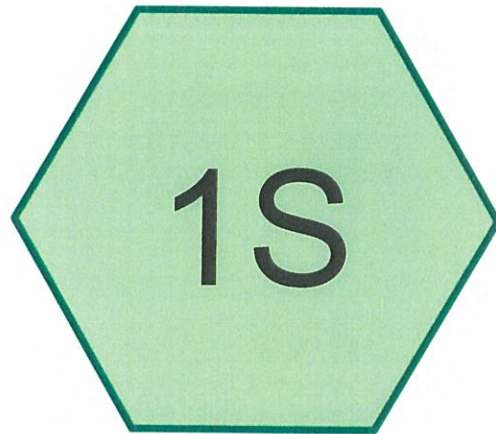


64-66 GOVE



Routing Diagram for 64GOVE

Prepared by Civil Environmental Consultants LLC, Printed 2/26/2018
HydroCAD® 10.00-15 s/n 09048 © 2015 HydroCAD Software Solutions LLC



EXISTING



Routing Diagram for 3367-848 North Bedford Street-East Bridgewater
Prepared by Civil Environmental Consultants LLC, Printed 2/26/2018
HydroCAD® 10.00-15 s/n 09048 © 2015 HydroCAD Software Solutions LLC

64GOVE**Area Listing (selected nodes)**

| Area (acres) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|---------------------------------------|
| 0.007 | 61 | >75% Grass cover, Good, HSG B (1S) |
| 0.045 | 98 | Roofs, HSG B (1S) |
| 0.052 | 93 | TOTAL AREA |

64GOVE

Prepared by Civil Environmental Consultants LLC
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Printed 2/26/2018

Page 3

Soil Listing (selected nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|-----------------|---------------|-------------------------|
| 0.000 | HSG A | |
| 0.052 | HSG B | 1S |
| 0.000 | HSG C | |
| 0.000 | HSG D | |
| 0.000 | Other | |
| 0.052 | | TOTAL AREA |

Summary for Subcatchment 1S: 64-66 GOVE

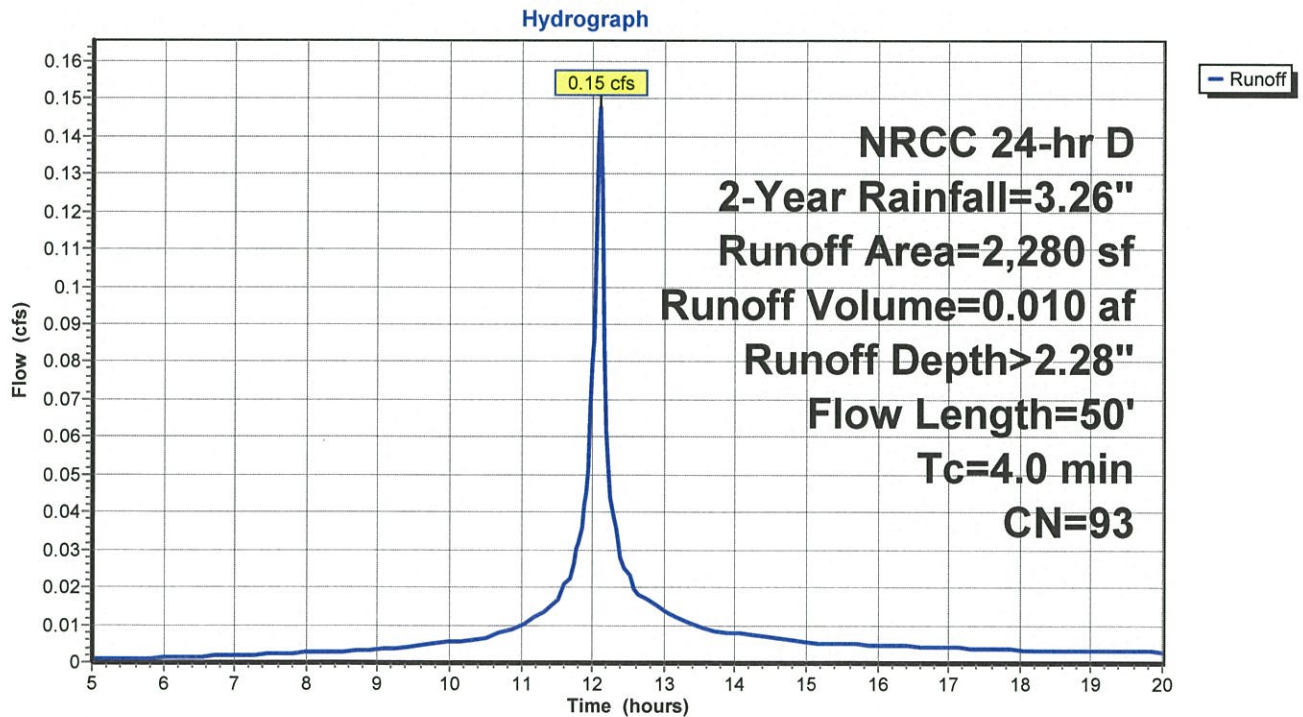
Runoff = 0.15 cfs @ 12.10 hrs, Volume= 0.010 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
NRCC 24-hr D 2-Year Rainfall=3.26"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,963 | 98 | Roofs, HSG B |
| 317 | 61 | >75% Grass cover, Good, HSG B |
| 2,280 | 93 | Weighted Average |
| 317 | | 13.90% Pervious Area |
| 1,963 | | 86.10% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 4.0 | 50 | | 0.21 | | Direct Entry, 64-66 GOVE |

Subcatchment 1S: 64-66 GOVE



Hydrograph for Subcatchment 1S: 64-66 GOVE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) | Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|--------------|------------------|-----------------|--------------|--------------|------------------|-----------------|--------------|
| 5.00 | 0.27 | 0.02 | 0.00 | 12.80 | 2.28 | 1.57 | 0.02 |
| 5.15 | 0.28 | 0.02 | 0.00 | 12.95 | 2.32 | 1.61 | 0.01 |
| 5.30 | 0.29 | 0.02 | 0.00 | 13.10 | 2.36 | 1.65 | 0.01 |
| 5.45 | 0.30 | 0.02 | 0.00 | 13.25 | 2.39 | 1.68 | 0.01 |
| 5.60 | 0.31 | 0.03 | 0.00 | 13.40 | 2.43 | 1.71 | 0.01 |
| 5.75 | 0.32 | 0.03 | 0.00 | 13.55 | 2.45 | 1.74 | 0.01 |
| 5.90 | 0.33 | 0.03 | 0.00 | 13.70 | 2.48 | 1.76 | 0.01 |
| 6.05 | 0.34 | 0.04 | 0.00 | 13.85 | 2.51 | 1.78 | 0.01 |
| 6.20 | 0.35 | 0.04 | 0.00 | 14.00 | 2.53 | 1.81 | 0.01 |
| 6.35 | 0.36 | 0.05 | 0.00 | 14.15 | 2.55 | 1.83 | 0.01 |
| 6.50 | 0.37 | 0.05 | 0.00 | 14.30 | 2.57 | 1.85 | 0.01 |
| 6.65 | 0.38 | 0.05 | 0.00 | 14.45 | 2.59 | 1.87 | 0.01 |
| 6.80 | 0.39 | 0.06 | 0.00 | 14.60 | 2.61 | 1.89 | 0.01 |
| 6.95 | 0.41 | 0.06 | 0.00 | 14.75 | 2.63 | 1.90 | 0.01 |
| 7.10 | 0.42 | 0.07 | 0.00 | 14.90 | 2.65 | 1.92 | 0.01 |
| 7.25 | 0.43 | 0.08 | 0.00 | 15.05 | 2.67 | 1.94 | 0.01 |
| 7.40 | 0.44 | 0.08 | 0.00 | 15.20 | 2.68 | 1.95 | 0.01 |
| 7.55 | 0.46 | 0.09 | 0.00 | 15.35 | 2.70 | 1.97 | 0.01 |
| 7.70 | 0.47 | 0.09 | 0.00 | 15.50 | 2.71 | 1.98 | 0.01 |
| 7.85 | 0.48 | 0.10 | 0.00 | 15.65 | 2.73 | 2.00 | 0.01 |
| 8.00 | 0.50 | 0.11 | 0.00 | 15.80 | 2.74 | 2.01 | 0.00 |
| 8.15 | 0.51 | 0.12 | 0.00 | 15.95 | 2.76 | 2.02 | 0.00 |
| 8.30 | 0.53 | 0.12 | 0.00 | 16.10 | 2.77 | 2.04 | 0.00 |
| 8.45 | 0.54 | 0.13 | 0.00 | 16.25 | 2.79 | 2.05 | 0.00 |
| 8.60 | 0.56 | 0.14 | 0.00 | 16.40 | 2.80 | 2.06 | 0.00 |
| 8.75 | 0.57 | 0.15 | 0.00 | 16.55 | 2.81 | 2.08 | 0.00 |
| 8.90 | 0.59 | 0.16 | 0.00 | 16.70 | 2.83 | 2.09 | 0.00 |
| 9.05 | 0.60 | 0.17 | 0.00 | 16.85 | 2.84 | 2.10 | 0.00 |
| 9.20 | 0.62 | 0.18 | 0.00 | 17.00 | 2.85 | 2.11 | 0.00 |
| 9.35 | 0.64 | 0.19 | 0.00 | 17.15 | 2.86 | 2.12 | 0.00 |
| 9.50 | 0.66 | 0.20 | 0.00 | 17.30 | 2.87 | 2.13 | 0.00 |
| 9.65 | 0.68 | 0.22 | 0.00 | 17.45 | 2.89 | 2.14 | 0.00 |
| 9.80 | 0.70 | 0.23 | 0.01 | 17.60 | 2.90 | 2.16 | 0.00 |
| 9.95 | 0.72 | 0.25 | 0.01 | 17.75 | 2.91 | 2.17 | 0.00 |
| 10.10 | 0.75 | 0.26 | 0.01 | 17.90 | 2.92 | 2.18 | 0.00 |
| 10.25 | 0.77 | 0.28 | 0.01 | 18.05 | 2.93 | 2.18 | 0.00 |
| 10.40 | 0.80 | 0.30 | 0.01 | 18.20 | 2.94 | 2.19 | 0.00 |
| 10.55 | 0.82 | 0.32 | 0.01 | 18.35 | 2.95 | 2.20 | 0.00 |
| 10.70 | 0.85 | 0.34 | 0.01 | 18.50 | 2.96 | 2.21 | 0.00 |
| 10.85 | 0.89 | 0.37 | 0.01 | 18.65 | 2.97 | 2.22 | 0.00 |
| 11.00 | 0.93 | 0.39 | 0.01 | 18.80 | 2.98 | 2.23 | 0.00 |
| 11.15 | 0.97 | 0.43 | 0.01 | 18.95 | 2.99 | 2.24 | 0.00 |
| 11.30 | 1.02 | 0.46 | 0.01 | 19.10 | 3.00 | 2.25 | 0.00 |
| 11.45 | 1.07 | 0.51 | 0.02 | 19.25 | 3.00 | 2.26 | 0.00 |
| 11.60 | 1.14 | 0.56 | 0.02 | 19.40 | 3.01 | 2.27 | 0.00 |
| 11.75 | 1.23 | 0.64 | 0.03 | 19.55 | 3.02 | 2.28 | 0.00 |
| 11.90 | 1.37 | 0.76 | 0.05 | 19.70 | 3.03 | 2.28 | 0.00 |
| 12.05 | 1.72 | 1.06 | 0.11 | 19.85 | 3.04 | 2.29 | 0.00 |
| 12.20 | 1.99 | 1.31 | 0.06 | 20.00 | 3.05 | 2.30 | 0.00 |
| 12.35 | 2.09 | 1.40 | 0.03 | | | | |
| 12.50 | 2.17 | 1.47 | 0.02 | | | | |
| 12.65 | 2.22 | 1.52 | 0.02 | | | | |

Summary for Subcatchment 1S: 64-66 GOVE

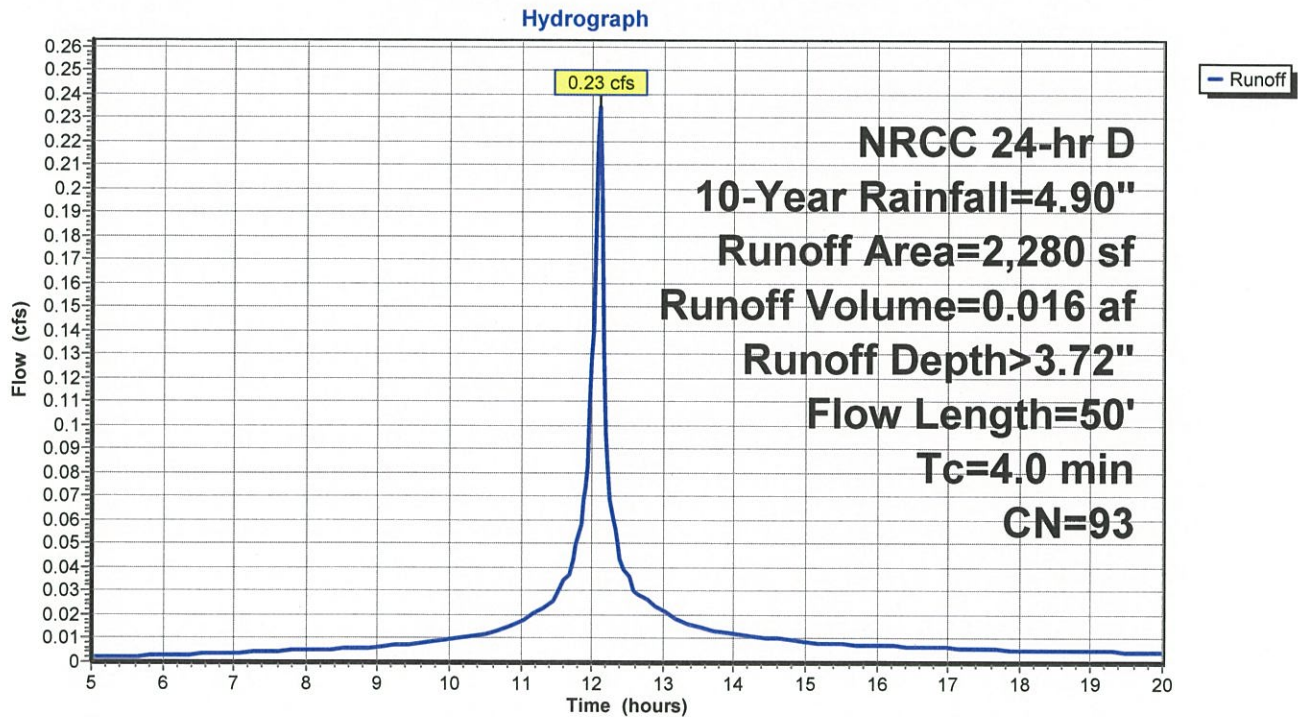
Runoff = 0.23 cfs @ 12.10 hrs, Volume= 0.016 af, Depth> 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
NRCC 24-hr D 10-Year Rainfall=4.90"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,963 | 98 | Roofs, HSG B |
| 317 | 61 | >75% Grass cover, Good, HSG B |
| 2,280 | 93 | Weighted Average |
| 317 | | 13.90% Pervious Area |
| 1,963 | | 86.10% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 4.0 | 50 | | 0.21 | | Direct Entry, 64-66 GOVE |

Subcatchment 1S: 64-66 GOVE



Hydrograph for Subcatchment 1S: 64-66 GOVE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) | Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 5.00 | 0.41 | 0.07 | 0.00 | 12.80 | 3.42 | 2.66 | 0.03 |
| 5.15 | 0.42 | 0.07 | 0.00 | 12.95 | 3.49 | 2.72 | 0.02 |
| 5.30 | 0.44 | 0.08 | 0.00 | 13.10 | 3.55 | 2.78 | 0.02 |
| 5.45 | 0.45 | 0.09 | 0.00 | 13.25 | 3.60 | 2.83 | 0.02 |
| 5.60 | 0.47 | 0.09 | 0.00 | 13.40 | 3.65 | 2.88 | 0.02 |
| 5.75 | 0.48 | 0.10 | 0.00 | 13.55 | 3.69 | 2.92 | 0.01 |
| 5.90 | 0.49 | 0.11 | 0.00 | 13.70 | 3.73 | 2.96 | 0.01 |
| 6.05 | 0.51 | 0.12 | 0.00 | 13.85 | 3.77 | 2.99 | 0.01 |
| 6.20 | 0.53 | 0.12 | 0.00 | 14.00 | 3.80 | 3.03 | 0.01 |
| 6.35 | 0.54 | 0.13 | 0.00 | 14.15 | 3.84 | 3.06 | 0.01 |
| 6.50 | 0.56 | 0.14 | 0.00 | 14.30 | 3.87 | 3.09 | 0.01 |
| 6.65 | 0.57 | 0.15 | 0.00 | 14.45 | 3.90 | 3.12 | 0.01 |
| 6.80 | 0.59 | 0.16 | 0.00 | 14.60 | 3.93 | 3.15 | 0.01 |
| 6.95 | 0.61 | 0.17 | 0.00 | 14.75 | 3.96 | 3.18 | 0.01 |
| 7.10 | 0.63 | 0.19 | 0.00 | 14.90 | 3.98 | 3.20 | 0.01 |
| 7.25 | 0.65 | 0.20 | 0.00 | 15.05 | 4.01 | 3.23 | 0.01 |
| 7.40 | 0.67 | 0.21 | 0.00 | 15.20 | 4.03 | 3.25 | 0.01 |
| 7.55 | 0.69 | 0.22 | 0.00 | 15.35 | 4.06 | 3.27 | 0.01 |
| 7.70 | 0.71 | 0.24 | 0.00 | 15.50 | 4.08 | 3.30 | 0.01 |
| 7.85 | 0.73 | 0.25 | 0.00 | 15.65 | 4.10 | 3.32 | 0.01 |
| 8.00 | 0.75 | 0.26 | 0.01 | 15.80 | 4.12 | 3.34 | 0.01 |
| 8.15 | 0.77 | 0.28 | 0.01 | 15.95 | 4.15 | 3.36 | 0.01 |
| 8.30 | 0.79 | 0.29 | 0.01 | 16.10 | 4.17 | 3.38 | 0.01 |
| 8.45 | 0.81 | 0.31 | 0.01 | 16.25 | 4.19 | 3.40 | 0.01 |
| 8.60 | 0.84 | 0.33 | 0.01 | 16.40 | 4.21 | 3.42 | 0.01 |
| 8.75 | 0.86 | 0.34 | 0.01 | 16.55 | 4.23 | 3.44 | 0.01 |
| 8.90 | 0.88 | 0.36 | 0.01 | 16.70 | 4.25 | 3.46 | 0.01 |
| 9.05 | 0.91 | 0.38 | 0.01 | 16.85 | 4.27 | 3.48 | 0.01 |
| 9.20 | 0.93 | 0.40 | 0.01 | 17.00 | 4.28 | 3.50 | 0.01 |
| 9.35 | 0.96 | 0.42 | 0.01 | 17.15 | 4.30 | 3.51 | 0.01 |
| 9.50 | 0.99 | 0.44 | 0.01 | 17.30 | 4.32 | 3.53 | 0.01 |
| 9.65 | 1.02 | 0.47 | 0.01 | 17.45 | 4.34 | 3.55 | 0.01 |
| 9.80 | 1.05 | 0.49 | 0.01 | 17.60 | 4.35 | 3.56 | 0.01 |
| 9.95 | 1.09 | 0.52 | 0.01 | 17.75 | 4.37 | 3.58 | 0.01 |
| 10.10 | 1.12 | 0.55 | 0.01 | 17.90 | 4.39 | 3.60 | 0.01 |
| 10.25 | 1.16 | 0.58 | 0.01 | 18.05 | 4.40 | 3.61 | 0.01 |
| 10.40 | 1.20 | 0.61 | 0.01 | 18.20 | 4.42 | 3.62 | 0.01 |
| 10.55 | 1.24 | 0.64 | 0.01 | 18.35 | 4.43 | 3.64 | 0.01 |
| 10.70 | 1.28 | 0.68 | 0.01 | 18.50 | 4.44 | 3.65 | 0.01 |
| 10.85 | 1.34 | 0.72 | 0.02 | 18.65 | 4.46 | 3.67 | 0.00 |
| 11.00 | 1.39 | 0.77 | 0.02 | 18.80 | 4.47 | 3.68 | 0.00 |
| 11.15 | 1.46 | 0.83 | 0.02 | 18.95 | 4.49 | 3.70 | 0.00 |
| 11.30 | 1.53 | 0.89 | 0.02 | 19.10 | 4.50 | 3.71 | 0.00 |
| 11.45 | 1.61 | 0.97 | 0.03 | 19.25 | 4.52 | 3.72 | 0.00 |
| 11.60 | 1.72 | 1.06 | 0.03 | 19.40 | 4.53 | 3.74 | 0.00 |
| 11.75 | 1.85 | 1.18 | 0.04 | 19.55 | 4.54 | 3.75 | 0.00 |
| 11.90 | 2.07 | 1.37 | 0.07 | 19.70 | 4.56 | 3.76 | 0.00 |
| 12.05 | 2.59 | 1.87 | 0.18 | 19.85 | 4.57 | 3.78 | 0.00 |
| 12.20 | 2.99 | 2.25 | 0.10 | 20.00 | 4.58 | 3.79 | 0.00 |
| 12.35 | 3.14 | 2.39 | 0.05 | | | | |
| 12.50 | 3.26 | 2.50 | 0.04 | | | | |
| 12.65 | 3.34 | 2.58 | 0.03 | | | | |

Summary for Subcatchment 1S: 64-66 GOVE

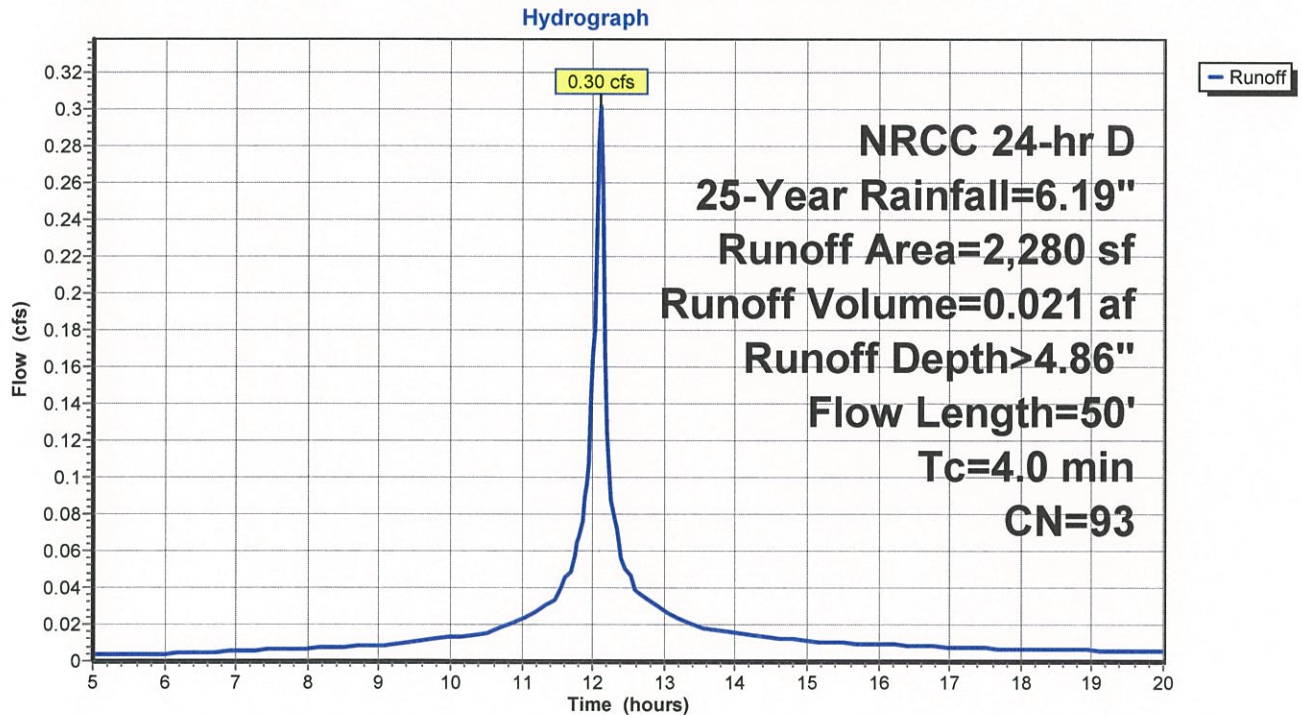
Runoff = 0.30 cfs @ 12.10 hrs, Volume= 0.021 af, Depth> 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
NRCC 24-hr D 25-Year Rainfall=6.19"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,963 | 98 | Roofs, HSG B |
| 317 | 61 | >75% Grass cover, Good, HSG B |
| 2,280 | 93 | Weighted Average |
| 317 | | 13.90% Pervious Area |
| 1,963 | | 86.10% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 4.0 | 50 | | 0.21 | | Direct Entry, 64-66 GOVE |

Subcatchment 1S: 64-66 GOVE



Hydrograph for Subcatchment 1S: 64-66 GOVE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) | Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|--------------|------------------|-----------------|--------------|--------------|------------------|-----------------|--------------|
| 5.00 | 0.51 | 0.12 | 0.00 | 12.80 | 4.32 | 3.53 | 0.03 |
| 5.15 | 0.53 | 0.13 | 0.00 | 12.95 | 4.40 | 3.61 | 0.03 |
| 5.30 | 0.55 | 0.14 | 0.00 | 13.10 | 4.48 | 3.69 | 0.03 |
| 5.45 | 0.57 | 0.15 | 0.00 | 13.25 | 4.55 | 3.75 | 0.02 |
| 5.60 | 0.59 | 0.16 | 0.00 | 13.40 | 4.61 | 3.81 | 0.02 |
| 5.75 | 0.61 | 0.17 | 0.00 | 13.55 | 4.66 | 3.86 | 0.02 |
| 5.90 | 0.63 | 0.18 | 0.00 | 13.70 | 4.71 | 3.91 | 0.02 |
| 6.05 | 0.64 | 0.20 | 0.00 | 13.85 | 4.76 | 3.96 | 0.02 |
| 6.20 | 0.66 | 0.21 | 0.00 | 14.00 | 4.80 | 4.00 | 0.02 |
| 6.35 | 0.68 | 0.22 | 0.00 | 14.15 | 4.85 | 4.05 | 0.01 |
| 6.50 | 0.70 | 0.23 | 0.00 | 14.30 | 4.89 | 4.09 | 0.01 |
| 6.65 | 0.73 | 0.25 | 0.01 | 14.45 | 4.93 | 4.13 | 0.01 |
| 6.80 | 0.75 | 0.26 | 0.01 | 14.60 | 4.96 | 4.16 | 0.01 |
| 6.95 | 0.77 | 0.28 | 0.01 | 14.75 | 5.00 | 4.20 | 0.01 |
| 7.10 | 0.79 | 0.30 | 0.01 | 14.90 | 5.03 | 4.23 | 0.01 |
| 7.25 | 0.82 | 0.31 | 0.01 | 15.05 | 5.06 | 4.26 | 0.01 |
| 7.40 | 0.84 | 0.33 | 0.01 | 15.20 | 5.09 | 4.29 | 0.01 |
| 7.55 | 0.87 | 0.35 | 0.01 | 15.35 | 5.12 | 4.32 | 0.01 |
| 7.70 | 0.89 | 0.37 | 0.01 | 15.50 | 5.15 | 4.35 | 0.01 |
| 7.85 | 0.92 | 0.39 | 0.01 | 15.65 | 5.18 | 4.38 | 0.01 |
| 8.00 | 0.94 | 0.41 | 0.01 | 15.80 | 5.21 | 4.40 | 0.01 |
| 8.15 | 0.97 | 0.43 | 0.01 | 15.95 | 5.24 | 4.43 | 0.01 |
| 8.30 | 1.00 | 0.45 | 0.01 | 16.10 | 5.26 | 4.46 | 0.01 |
| 8.45 | 1.03 | 0.47 | 0.01 | 16.25 | 5.29 | 4.48 | 0.01 |
| 8.60 | 1.06 | 0.49 | 0.01 | 16.40 | 5.32 | 4.51 | 0.01 |
| 8.75 | 1.09 | 0.52 | 0.01 | 16.55 | 5.34 | 4.53 | 0.01 |
| 8.90 | 1.12 | 0.54 | 0.01 | 16.70 | 5.37 | 4.56 | 0.01 |
| 9.05 | 1.15 | 0.57 | 0.01 | 16.85 | 5.39 | 4.58 | 0.01 |
| 9.20 | 1.18 | 0.59 | 0.01 | 17.00 | 5.41 | 4.60 | 0.01 |
| 9.35 | 1.21 | 0.62 | 0.01 | 17.15 | 5.44 | 4.63 | 0.01 |
| 9.50 | 1.25 | 0.65 | 0.01 | 17.30 | 5.46 | 4.65 | 0.01 |
| 9.65 | 1.29 | 0.69 | 0.01 | 17.45 | 5.48 | 4.67 | 0.01 |
| 9.80 | 1.33 | 0.72 | 0.01 | 17.60 | 5.50 | 4.69 | 0.01 |
| 9.95 | 1.37 | 0.76 | 0.01 | 17.75 | 5.52 | 4.71 | 0.01 |
| 10.10 | 1.42 | 0.80 | 0.01 | 17.90 | 5.54 | 4.73 | 0.01 |
| 10.25 | 1.46 | 0.84 | 0.01 | 18.05 | 5.56 | 4.75 | 0.01 |
| 10.40 | 1.51 | 0.88 | 0.01 | 18.20 | 5.58 | 4.77 | 0.01 |
| 10.55 | 1.56 | 0.92 | 0.02 | 18.35 | 5.60 | 4.78 | 0.01 |
| 10.70 | 1.62 | 0.97 | 0.02 | 18.50 | 5.61 | 4.80 | 0.01 |
| 10.85 | 1.69 | 1.03 | 0.02 | 18.65 | 5.63 | 4.82 | 0.01 |
| 11.00 | 1.76 | 1.10 | 0.02 | 18.80 | 5.65 | 4.84 | 0.01 |
| 11.15 | 1.84 | 1.17 | 0.03 | 18.95 | 5.67 | 4.86 | 0.01 |
| 11.30 | 1.93 | 1.25 | 0.03 | 19.10 | 5.69 | 4.87 | 0.01 |
| 11.45 | 2.04 | 1.35 | 0.03 | 19.25 | 5.70 | 4.89 | 0.01 |
| 11.60 | 2.17 | 1.47 | 0.05 | 19.40 | 5.72 | 4.91 | 0.01 |
| 11.75 | 2.34 | 1.63 | 0.06 | 19.55 | 5.74 | 4.93 | 0.01 |
| 11.90 | 2.61 | 1.88 | 0.10 | 19.70 | 5.76 | 4.94 | 0.01 |
| 12.05 | 3.27 | 2.52 | 0.23 | 19.85 | 5.77 | 4.96 | 0.01 |
| 12.20 | 3.78 | 3.01 | 0.12 | 20.00 | 5.79 | 4.98 | 0.01 |
| 12.35 | 3.97 | 3.19 | 0.06 | | | | |
| 12.50 | 4.12 | 3.33 | 0.05 | | | | |
| 12.65 | 4.22 | 3.44 | 0.04 | | | | |

Summary for Subcatchment 1S: 64-66 GOVE

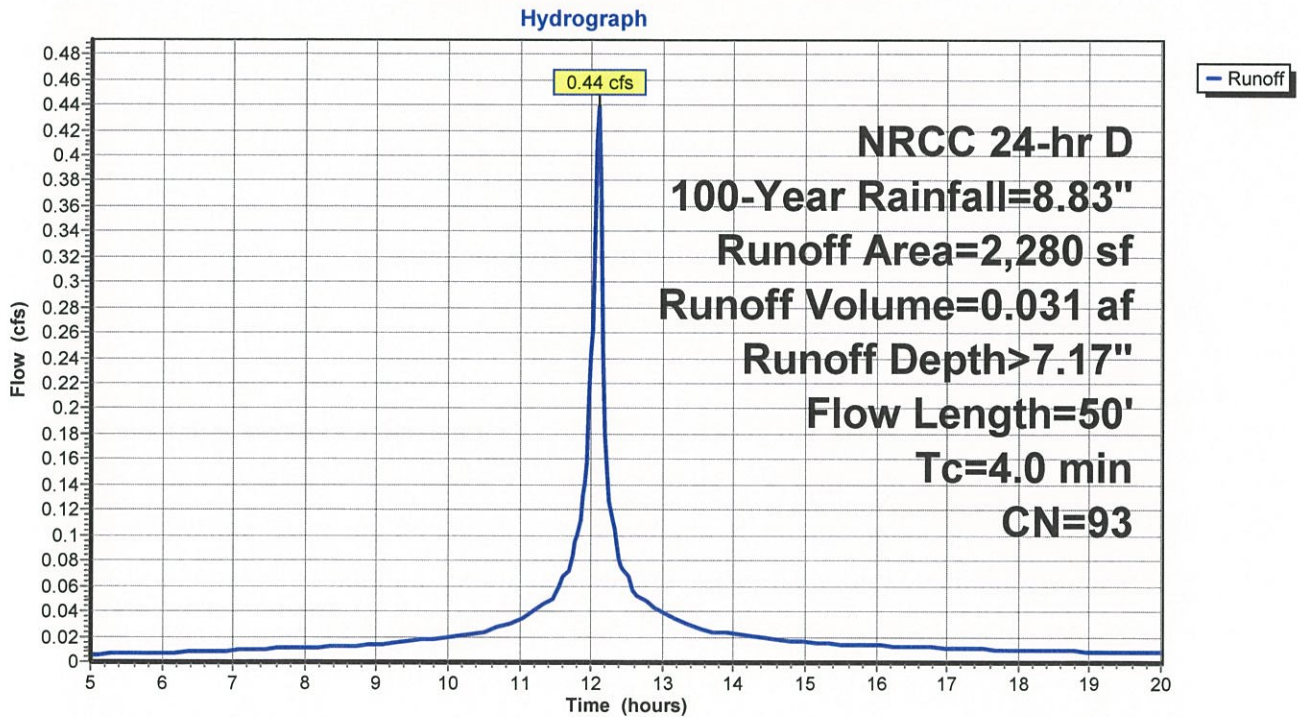
Runoff = 0.44 cfs @ 12.10 hrs, Volume= 0.031 af, Depth> 7.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
NRCC 24-hr D 100-Year Rainfall=8.83"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,963 | 98 | Roofs, HSG B |
| 317 | 61 | >75% Grass cover, Good, HSG B |
| 2,280 | 93 | Weighted Average |
| 317 | | 13.90% Pervious Area |
| 1,963 | | 86.10% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 4.0 | 50 | | 0.21 | | Direct Entry, 64-66 GOVE |

Subcatchment 1S: 64-66 GOVE



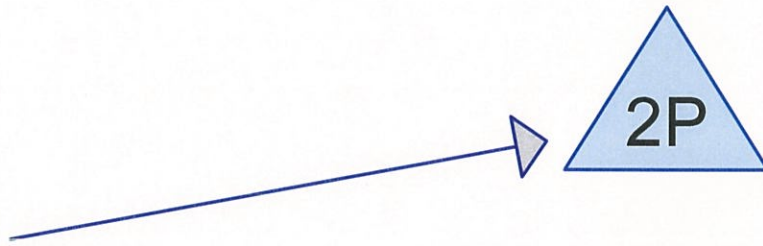
Hydrograph for Subcatchment 1S: 64-66 GOVE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) | Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 5.00 | 0.73 | 0.26 | 0.01 | 12.80 | 6.16 | 5.34 | 0.05 |
| 5.15 | 0.76 | 0.27 | 0.01 | 12.95 | 6.28 | 5.46 | 0.04 |
| 5.30 | 0.79 | 0.29 | 0.01 | 13.10 | 6.39 | 5.57 | 0.04 |
| 5.45 | 0.81 | 0.31 | 0.01 | 13.25 | 6.49 | 5.66 | 0.03 |
| 5.60 | 0.84 | 0.33 | 0.01 | 13.40 | 6.57 | 5.75 | 0.03 |
| 5.75 | 0.86 | 0.35 | 0.01 | 13.55 | 6.65 | 5.82 | 0.03 |
| 5.90 | 0.89 | 0.37 | 0.01 | 13.70 | 6.72 | 5.89 | 0.02 |
| 6.05 | 0.92 | 0.39 | 0.01 | 13.85 | 6.79 | 5.96 | 0.02 |
| 6.20 | 0.95 | 0.41 | 0.01 | 14.00 | 6.85 | 6.02 | 0.02 |
| 6.35 | 0.98 | 0.43 | 0.01 | 14.15 | 6.91 | 6.08 | 0.02 |
| 6.50 | 1.00 | 0.45 | 0.01 | 14.30 | 6.97 | 6.14 | 0.02 |
| 6.65 | 1.04 | 0.48 | 0.01 | 14.45 | 7.03 | 6.20 | 0.02 |
| 6.80 | 1.07 | 0.50 | 0.01 | 14.60 | 7.08 | 6.25 | 0.02 |
| 6.95 | 1.10 | 0.53 | 0.01 | 14.75 | 7.13 | 6.30 | 0.02 |
| 7.10 | 1.13 | 0.55 | 0.01 | 14.90 | 7.18 | 6.35 | 0.02 |
| 7.25 | 1.16 | 0.58 | 0.01 | 15.05 | 7.22 | 6.39 | 0.02 |
| 7.40 | 1.20 | 0.61 | 0.01 | 15.20 | 7.27 | 6.44 | 0.02 |
| 7.55 | 1.23 | 0.64 | 0.01 | 15.35 | 7.31 | 6.48 | 0.01 |
| 7.70 | 1.27 | 0.67 | 0.01 | 15.50 | 7.35 | 6.52 | 0.01 |
| 7.85 | 1.31 | 0.70 | 0.01 | 15.65 | 7.39 | 6.56 | 0.01 |
| 8.00 | 1.35 | 0.73 | 0.01 | 15.80 | 7.43 | 6.60 | 0.01 |
| 8.15 | 1.39 | 0.77 | 0.01 | 15.95 | 7.47 | 6.64 | 0.01 |
| 8.30 | 1.42 | 0.80 | 0.01 | 16.10 | 7.51 | 6.68 | 0.01 |
| 8.45 | 1.47 | 0.84 | 0.01 | 16.25 | 7.55 | 6.71 | 0.01 |
| 8.60 | 1.51 | 0.87 | 0.01 | 16.40 | 7.58 | 6.75 | 0.01 |
| 8.75 | 1.55 | 0.91 | 0.01 | 16.55 | 7.62 | 6.78 | 0.01 |
| 8.90 | 1.59 | 0.95 | 0.01 | 16.70 | 7.65 | 6.82 | 0.01 |
| 9.05 | 1.64 | 0.99 | 0.01 | 16.85 | 7.69 | 6.85 | 0.01 |
| 9.20 | 1.68 | 1.03 | 0.01 | 17.00 | 7.72 | 6.89 | 0.01 |
| 9.35 | 1.73 | 1.07 | 0.02 | 17.15 | 7.75 | 6.92 | 0.01 |
| 9.50 | 1.78 | 1.12 | 0.02 | 17.30 | 7.78 | 6.95 | 0.01 |
| 9.65 | 1.84 | 1.17 | 0.02 | 17.45 | 7.82 | 6.98 | 0.01 |
| 9.80 | 1.90 | 1.22 | 0.02 | 17.60 | 7.85 | 7.01 | 0.01 |
| 9.95 | 1.96 | 1.28 | 0.02 | 17.75 | 7.87 | 7.04 | 0.01 |
| 10.10 | 2.02 | 1.34 | 0.02 | 17.90 | 7.90 | 7.07 | 0.01 |
| 10.25 | 2.09 | 1.40 | 0.02 | 18.05 | 7.93 | 7.09 | 0.01 |
| 10.40 | 2.16 | 1.46 | 0.02 | 18.20 | 7.96 | 7.12 | 0.01 |
| 10.55 | 2.23 | 1.53 | 0.02 | 18.35 | 7.98 | 7.15 | 0.01 |
| 10.70 | 2.31 | 1.60 | 0.03 | 18.50 | 8.01 | 7.17 | 0.01 |
| 10.85 | 2.41 | 1.69 | 0.03 | 18.65 | 8.04 | 7.20 | 0.01 |
| 11.00 | 2.51 | 1.79 | 0.03 | 18.80 | 8.06 | 7.22 | 0.01 |
| 11.15 | 2.63 | 1.90 | 0.04 | 18.95 | 8.09 | 7.25 | 0.01 |
| 11.30 | 2.76 | 2.02 | 0.04 | 19.10 | 8.11 | 7.27 | 0.01 |
| 11.45 | 2.91 | 2.16 | 0.05 | 19.25 | 8.14 | 7.30 | 0.01 |
| 11.60 | 3.09 | 2.34 | 0.07 | 19.40 | 8.16 | 7.32 | 0.01 |
| 11.75 | 3.34 | 2.58 | 0.08 | 19.55 | 8.19 | 7.35 | 0.01 |
| 11.90 | 3.72 | 2.95 | 0.14 | 19.70 | 8.21 | 7.37 | 0.01 |
| 12.05 | 4.67 | 3.87 | 0.33 | 19.85 | 8.24 | 7.40 | 0.01 |
| 12.20 | 5.39 | 4.58 | 0.18 | 20.00 | 8.26 | 7.42 | 0.01 |
| 12.35 | 5.66 | 4.85 | 0.09 | | | | |
| 12.50 | 5.87 | 5.06 | 0.07 | | | | |
| 12.65 | 6.02 | 5.21 | 0.05 | | | | |

PROPOSED CONDITIONS - HYDROCAD



64-66
GOVE-PROPOSED



ROOF INFILTRATION



64GOVE

Prepared by Civil Environmental Consultants LLC
HydroCAD® 10.00-15 s/n 09048 © 2015 HydroCAD Software Solutions LLC

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Page 2

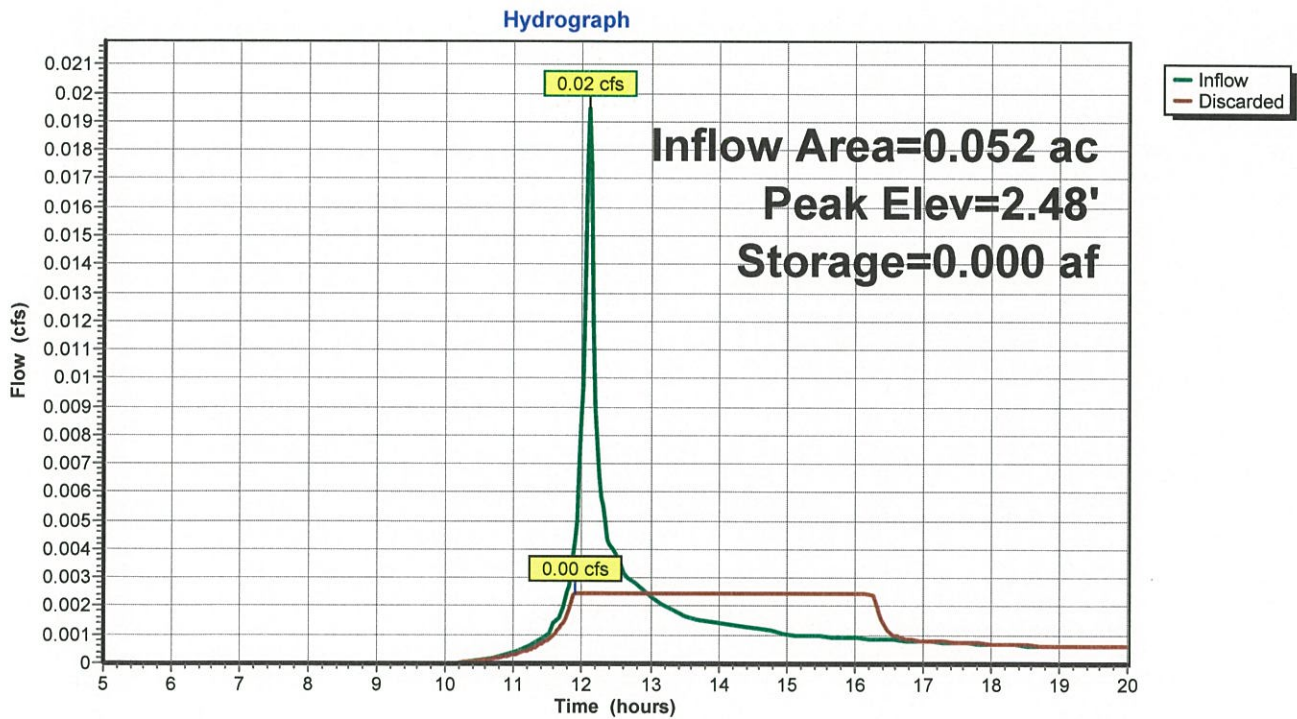
Area Listing (selected nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|---------------------------------------|
| 0.011 | 61 | >75% Grass cover, Good, HSG B (3S) |
| 0.041 | 98 | Roofs, HSG B (3S) |
| 0.052 | 90 | TOTAL AREA |

64GOVE**Soil Listing (selected nodes)**

| Area (acres) | Soil Group | Subcatchment Numbers |
|-----------------|---------------|-------------------------|
| 0.000 | HSG A | |
| 0.052 | HSG B | 3S |
| 0.000 | HSG C | |
| 0.000 | HSG D | |
| 0.000 | Other | |
| 0.052 | | TOTAL AREA |

Pond 2P: ROOF INFILTRATION



64GOVE

NRCC 24-hr D Rainfall=1.00"

Prepared by Civil Environmental Consultants LLC

Printed 2/26/2018

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Summary for Pond 2P: ROOF INFILTRATION

Inflow Area = 0.052 ac, 78.07% Impervious, Inflow Depth > 0.28"
 Inflow = 0.02 cfs @ 12.11 hrs, Volume= 0.001 af
 Outflow = 0.00 cfs @ 11.90 hrs, Volume= 0.001 af, Atten= 87%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 11.90 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
 Peak Elev= 2.48' @ 12.95 hrs Surf.Area= 0.002 ac Storage= 0.000 af

Plug-Flow detention time= 51.5 min calculated for 0.001 af (99% of inflow)
 Center-of-Mass det. time= 49.6 min (879.8 - 830.2)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|---|
| #1A | 2.00' | 0.002 af | 6.25'W x 16.68'L x 3.50'H Field A 0.008 af Overall - 0.002 af Embedded = 0.006 af x 30.0% Voids |
| #2A | 2.50' | 0.002 af | ADS_StormTech SC-740 x 2 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 1 rows |
| | | 0.004 af | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|--------|---|
| #1 | Discarded | 2.00' | 1.020 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.00 cfs @ 11.90 hrs HW=2.04' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

64GOVE

Pipe Listing (selected nodes)

| Line# | Node Number | In-Invert (feet) | Out-Invert (feet) | Length (feet) | Slope (ft/ft) | n | Diam/Width (inches) | Height (inches) | Inside-Fill (inches) |
|-------|-------------|------------------|-------------------|---------------|---------------|-------|---------------------|-----------------|----------------------|
| 1 | 2P | 3.00 | 2.50 | 40.0 | 0.0125 | 0.010 | 6.0 | 0.0 | 0.0 |

Summary for Subcatchment 3S: 64-66 GOVE-PROPOSED

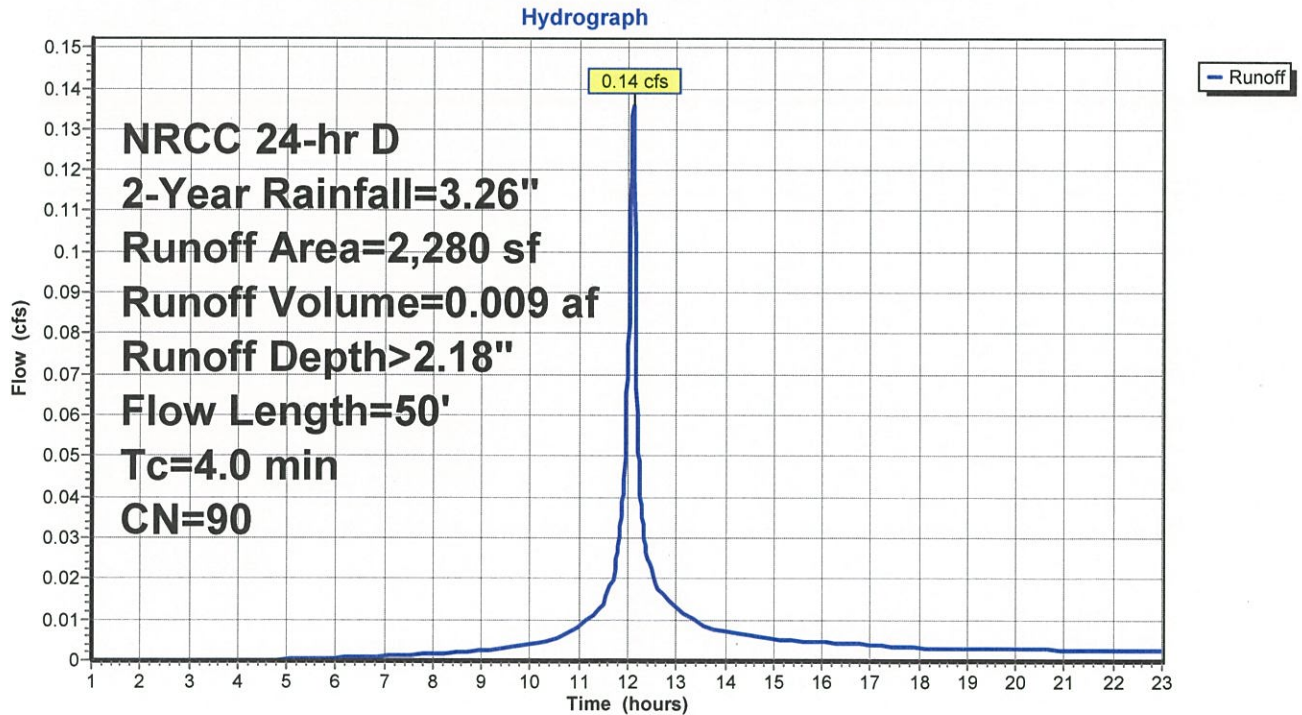
Runoff = 0.14 cfs @ 12.11 hrs, Volume= 0.009 af, Depth> 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-23.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.26"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,780 | 98 | Roofs, HSG B |
| 500 | 61 | >75% Grass cover, Good, HSG B |
| 2,280 | 90 | Weighted Average |
| 500 | | 21.93% Pervious Area |
| 1,780 | | 78.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 4.0 | 50 | | 0.21 | | Direct Entry, 64-66 GOVE |

Subcatchment 3S: 64-66 GOVE-PROPOSED



Hydrograph for Subcatchment 3S: 64-66 GOVE-PROPOSED

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 1.00 | 0.05 | 0.00 | 0.00 |
| 1.50 | 0.07 | 0.00 | 0.00 |
| 2.00 | 0.10 | 0.00 | 0.00 |
| 2.50 | 0.12 | 0.00 | 0.00 |
| 3.00 | 0.15 | 0.00 | 0.00 |
| 3.50 | 0.18 | 0.00 | 0.00 |
| 4.00 | 0.21 | 0.00 | 0.00 |
| 4.50 | 0.24 | 0.00 | 0.00 |
| 5.00 | 0.27 | 0.00 | 0.00 |
| 5.50 | 0.30 | 0.01 | 0.00 |
| 6.00 | 0.34 | 0.01 | 0.00 |
| 6.50 | 0.37 | 0.02 | 0.00 |
| 7.00 | 0.41 | 0.03 | 0.00 |
| 7.50 | 0.45 | 0.04 | 0.00 |
| 8.00 | 0.50 | 0.05 | 0.00 |
| 8.50 | 0.55 | 0.07 | 0.00 |
| 9.00 | 0.60 | 0.10 | 0.00 |
| 9.50 | 0.66 | 0.12 | 0.00 |
| 10.00 | 0.73 | 0.16 | 0.00 |
| 10.50 | 0.81 | 0.21 | 0.01 |
| 11.00 | 0.93 | 0.27 | 0.01 |
| 11.50 | 1.09 | 0.38 | 0.01 |
| 12.00 | 1.56 | 0.73 | 0.07 |
| 12.50 | 2.17 | 1.24 | 0.02 |
| 13.00 | 2.33 | 1.38 | 0.01 |
| 13.50 | 2.45 | 1.48 | 0.01 |
| 14.00 | 2.53 | 1.56 | 0.01 |
| 14.50 | 2.60 | 1.62 | 0.01 |
| 15.00 | 2.66 | 1.68 | 0.01 |
| 15.50 | 2.71 | 1.72 | 0.00 |
| 16.00 | 2.76 | 1.77 | 0.00 |
| 16.50 | 2.81 | 1.81 | 0.00 |
| 17.00 | 2.85 | 1.85 | 0.00 |
| 17.50 | 2.89 | 1.88 | 0.00 |
| 18.00 | 2.92 | 1.91 | 0.00 |
| 18.50 | 2.96 | 1.94 | 0.00 |
| 19.00 | 2.99 | 1.97 | 0.00 |
| 19.50 | 3.02 | 2.00 | 0.00 |
| 20.00 | 3.05 | 2.03 | 0.00 |
| 20.50 | 3.08 | 2.06 | 0.00 |
| 21.00 | 3.11 | 2.08 | 0.00 |
| 21.50 | 3.14 | 2.11 | 0.00 |
| 22.00 | 3.16 | 2.13 | 0.00 |
| 22.50 | 3.19 | 2.16 | 0.00 |
| 23.00 | 3.21 | 2.18 | 0.00 |

Summary for Pond 2P: ROOF INFILTRATION

Inflow Area = 0.052 ac, 78.07% Impervious, Inflow Depth > 2.18" for 2-Year event
 Inflow = 0.14 cfs @ 12.11 hrs, Volume= 0.009 af
 Outflow = 0.13 cfs @ 12.13 hrs, Volume= 0.008 af, Atten= 2%, Lag= 0.7 min
 Discarded = 0.00 cfs @ 9.09 hrs, Volume= 0.003 af
 Primary = 0.13 cfs @ 12.13 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 1.00-23.00 hrs, dt= 0.01 hrs
 Peak Elev= 3.22' @ 12.13 hrs Surf.Area= 0.002 ac Storage= 0.001 af

Plug-Flow detention time= 80.3 min calculated for 0.008 af (88% of inflow)
 Center-of-Mass det. time= 23.1 min (831.9 - 808.8)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|---|
| #1A | 2.00' | 0.002 af | 6.25'W x 16.68'L x 3.50'H Field A 0.008 af Overall - 0.002 af Embedded = 0.006 af x 30.0% Voids |
| #2A | 2.50' | 0.002 af | ADS_StormTech SC-740 x 2 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 1 rows |
| | | 0.004 af | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|--------|--|
| #1 | Discarded | 2.00' | 1.020 in/hr Exfiltration over Surface area |
| #2 | Primary | 3.00' | 6.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 3.00' / 2.50' S= 0.0125 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf |

Discarded OutFlow Max=0.00 cfs @ 9.09 hrs HW=2.04' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.13 cfs @ 12.13 hrs HW=3.22' (Free Discharge)
 ↑2=Culvert (Inlet Controls 0.13 cfs @ 1.58 fps)

Pond 2P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

Row Length Adjustment= +0.44' x 6.45 sf x 1 rows

2 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 14.68' Row Length +12.0" End Stone x 2 = 16.68' Base Length

1 Rows x 51.0" Wide + 12.0" Side Stone x 2 = 6.25' Base Width

6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

2 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 1 Rows = 94.7 cf Chamber Storage

364.9 cf Field - 94.7 cf Chambers = 270.2 cf Stone x 30.0% Voids = 81.0 cf Stone Storage

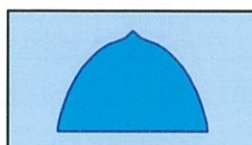
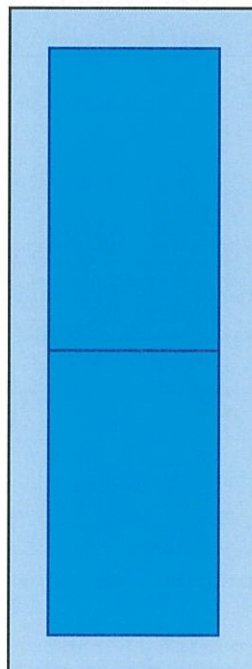
Chamber Storage + Stone Storage = 175.8 cf = 0.004 af

Overall Storage Efficiency = 48.2%

2 Chambers

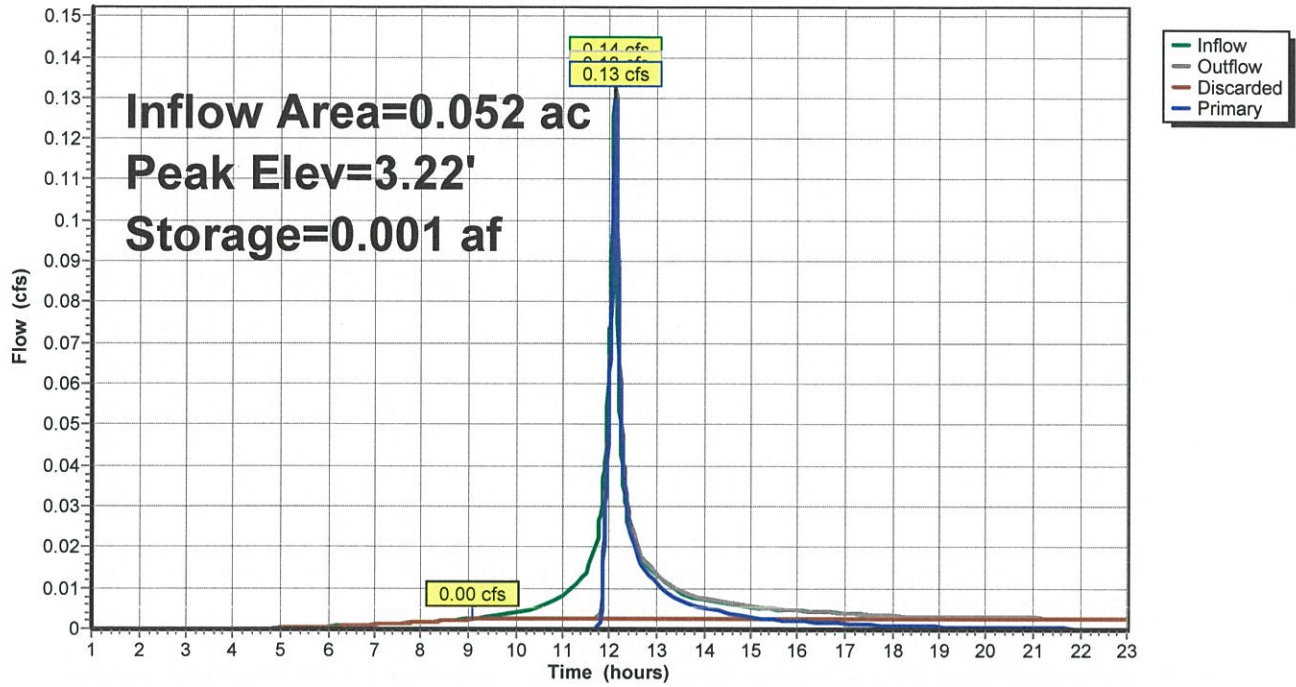
13.5 cy Field

10.0 cy Stone



Pond 2P: ROOF INFILTRATION

Hydrograph



Hydrograph for Pond 2P: ROOF INFILTRATION

| Time (hours) | Inflow (cfs) | Storage (acre-feet) | Elevation (feet) | Outflow (cfs) | Discarded (cfs) | Primary (cfs) |
|--------------|--------------|---------------------|------------------|---------------|-----------------|---------------|
| 1.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 1.50 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 2.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 3.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 3.50 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 4.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 4.50 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 5.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 5.50 | 0.00 | 0.000 | 2.01 | 0.00 | 0.00 | 0.00 |
| 6.00 | 0.00 | 0.000 | 2.01 | 0.00 | 0.00 | 0.00 |
| 6.50 | 0.00 | 0.000 | 2.01 | 0.00 | 0.00 | 0.00 |
| 7.00 | 0.00 | 0.000 | 2.01 | 0.00 | 0.00 | 0.00 |
| 7.50 | 0.00 | 0.000 | 2.02 | 0.00 | 0.00 | 0.00 |
| 8.00 | 0.00 | 0.000 | 2.02 | 0.00 | 0.00 | 0.00 |
| 8.50 | 0.00 | 0.000 | 2.03 | 0.00 | 0.00 | 0.00 |
| 9.00 | 0.00 | 0.000 | 2.03 | 0.00 | 0.00 | 0.00 |
| 9.50 | 0.00 | 0.000 | 2.06 | 0.00 | 0.00 | 0.00 |
| 10.00 | 0.00 | 0.000 | 2.13 | 0.00 | 0.00 | 0.00 |
| 10.50 | 0.01 | 0.000 | 2.26 | 0.00 | 0.00 | 0.00 |
| 11.00 | 0.01 | 0.000 | 2.50 | 0.00 | 0.00 | 0.00 |
| 11.50 | 0.01 | 0.001 | 2.72 | 0.00 | 0.00 | 0.00 |
| 12.00 | 0.07 | 0.001 | 3.15 | 0.07 | 0.00 | 0.06 |
| 12.50 | 0.02 | 0.001 | 3.08 | 0.02 | 0.00 | 0.02 |
| 13.00 | 0.01 | 0.001 | 3.06 | 0.01 | 0.00 | 0.01 |
| 13.50 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 14.00 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 14.50 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 15.00 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 15.50 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 16.00 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 16.50 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 17.00 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 17.50 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 18.00 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 18.50 | 0.00 | 0.001 | 3.01 | 0.00 | 0.00 | 0.00 |
| 19.00 | 0.00 | 0.001 | 3.01 | 0.00 | 0.00 | 0.00 |
| 19.50 | 0.00 | 0.001 | 3.01 | 0.00 | 0.00 | 0.00 |
| 20.00 | 0.00 | 0.001 | 3.01 | 0.00 | 0.00 | 0.00 |
| 20.50 | 0.00 | 0.001 | 3.01 | 0.00 | 0.00 | 0.00 |
| 21.00 | 0.00 | 0.001 | 3.01 | 0.00 | 0.00 | 0.00 |
| 21.50 | 0.00 | 0.001 | 3.01 | 0.00 | 0.00 | 0.00 |
| 22.00 | 0.00 | 0.001 | 3.00 | 0.00 | 0.00 | 0.00 |
| 22.50 | 0.00 | 0.001 | 3.00 | 0.00 | 0.00 | 0.00 |
| 23.00 | 0.00 | 0.001 | 3.00 | 0.00 | 0.00 | 0.00 |

Summary for Subcatchment 3S: 64-66 GOVE-PROPOSED

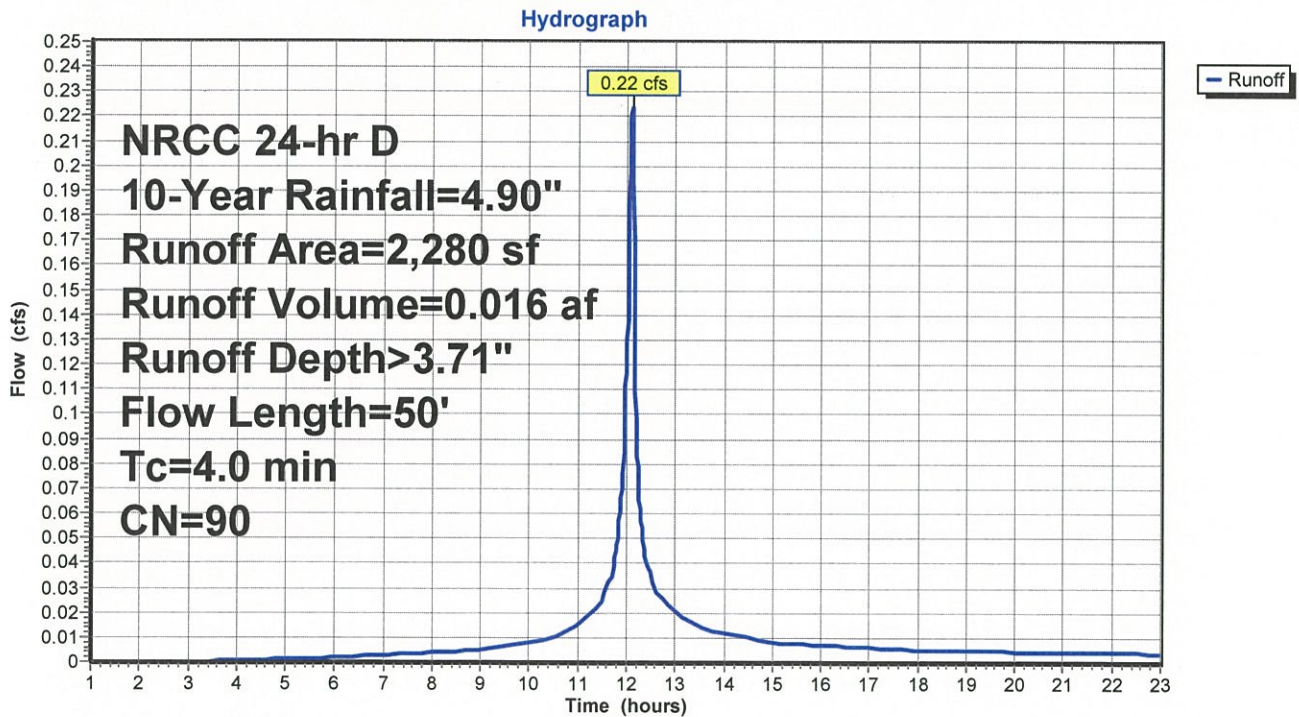
Runoff = 0.22 cfs @ 12.11 hrs, Volume= 0.016 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-23.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=4.90"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,780 | 98 | Roofs, HSG B |
| 500 | 61 | >75% Grass cover, Good, HSG B |
| 2,280 | 90 | Weighted Average |
| 500 | | 21.93% Pervious Area |
| 1,780 | | 78.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 4.0 | 50 | | 0.21 | | Direct Entry, 64-66 GOVE |

Subcatchment 3S: 64-66 GOVE-PROPOSED



Hydrograph for Subcatchment 3S: 64-66 GOVE-PROPOSED

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 1.00 | 0.07 | 0.00 | 0.00 |
| 1.50 | 0.11 | 0.00 | 0.00 |
| 2.00 | 0.15 | 0.00 | 0.00 |
| 2.50 | 0.19 | 0.00 | 0.00 |
| 3.00 | 0.23 | 0.00 | 0.00 |
| 3.50 | 0.27 | 0.00 | 0.00 |
| 4.00 | 0.32 | 0.01 | 0.00 |
| 4.50 | 0.36 | 0.02 | 0.00 |
| 5.00 | 0.41 | 0.03 | 0.00 |
| 5.50 | 0.46 | 0.04 | 0.00 |
| 6.00 | 0.50 | 0.06 | 0.00 |
| 6.50 | 0.56 | 0.08 | 0.00 |
| 7.00 | 0.62 | 0.10 | 0.00 |
| 7.50 | 0.68 | 0.13 | 0.00 |
| 8.00 | 0.75 | 0.17 | 0.00 |
| 8.50 | 0.82 | 0.21 | 0.00 |
| 9.00 | 0.90 | 0.26 | 0.01 |
| 9.50 | 0.99 | 0.31 | 0.01 |
| 10.00 | 1.10 | 0.39 | 0.01 |
| 10.50 | 1.22 | 0.47 | 0.01 |
| 11.00 | 1.39 | 0.60 | 0.02 |
| 11.50 | 1.64 | 0.80 | 0.02 |
| 12.00 | 2.35 | 1.40 | 0.12 |
| 12.50 | 3.26 | 2.22 | 0.04 |
| 13.00 | 3.51 | 2.46 | 0.02 |
| 13.50 | 3.68 | 2.61 | 0.01 |
| 14.00 | 3.80 | 2.73 | 0.01 |
| 14.50 | 3.91 | 2.83 | 0.01 |
| 15.00 | 4.00 | 2.92 | 0.01 |
| 15.50 | 4.08 | 2.99 | 0.01 |
| 16.00 | 4.15 | 3.06 | 0.01 |
| 16.50 | 4.22 | 3.13 | 0.01 |
| 17.00 | 4.28 | 3.19 | 0.01 |
| 17.50 | 4.34 | 3.25 | 0.01 |
| 18.00 | 4.40 | 3.30 | 0.01 |
| 18.50 | 4.44 | 3.34 | 0.00 |
| 19.00 | 4.49 | 3.39 | 0.00 |
| 19.50 | 4.54 | 3.43 | 0.00 |
| 20.00 | 4.58 | 3.48 | 0.00 |
| 20.50 | 4.63 | 3.52 | 0.00 |
| 21.00 | 4.67 | 3.56 | 0.00 |
| 21.50 | 4.71 | 3.60 | 0.00 |
| 22.00 | 4.75 | 3.64 | 0.00 |
| 22.50 | 4.79 | 3.68 | 0.00 |
| 23.00 | 4.83 | 3.71 | 0.00 |

Summary for Pond 2P: ROOF INFILTRATION

Inflow Area = 0.052 ac, 78.07% Impervious, Inflow Depth > 3.71" for 10-Year event
 Inflow = 0.22 cfs @ 12.11 hrs, Volume= 0.016 af
 Outflow = 0.22 cfs @ 12.12 hrs, Volume= 0.015 af, Atten= 2%, Lag= 0.6 min
 Discarded = 0.00 cfs @ 6.76 hrs, Volume= 0.004 af
 Primary = 0.22 cfs @ 12.12 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 1.00-23.00 hrs, dt= 0.01 hrs
 Peak Elev= 3.29' @ 12.12 hrs Surf.Area= 0.002 ac Storage= 0.002 af

Plug-Flow detention time= 56.8 min calculated for 0.015 af (93% of inflow)
 Center-of-Mass det. time= 18.9 min (809.3 - 790.4)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|---|
| #1A | 2.00' | 0.002 af | 6.25'W x 16.68'L x 3.50'H Field A 0.008 af Overall - 0.002 af Embedded = 0.006 af x 30.0% Voids |
| #2A | 2.50' | 0.002 af | ADS_StormTech SC-740 x 2 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 1 rows |
| | | 0.004 af | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|--------|--|
| #1 | Discarded | 2.00' | 1.020 in/hr Exfiltration over Surface area |
| #2 | Primary | 3.00' | 6.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 3.00' / 2.50' S= 0.0125 ' /' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf |

Discarded OutFlow Max=0.00 cfs @ 6.76 hrs HW=2.04' (Free Discharge)
 ↗1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.22 cfs @ 12.12 hrs HW=3.29' (Free Discharge)
 ↗2=Culvert (Inlet Controls 0.22 cfs @ 1.83 fps)

Pond 2P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

Row Length Adjustment= +0.44' x 6.45 sf x 1 rows

2 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 14.68' Row Length +12.0" End Stone x 2 = 16.68' Base Length

1 Rows x 51.0" Wide + 12.0" Side Stone x 2 = 6.25' Base Width

6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

2 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 1 Rows = 94.7 cf Chamber Storage

364.9 cf Field - 94.7 cf Chambers = 270.2 cf Stone x 30.0% Voids = 81.0 cf Stone Storage

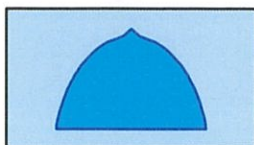
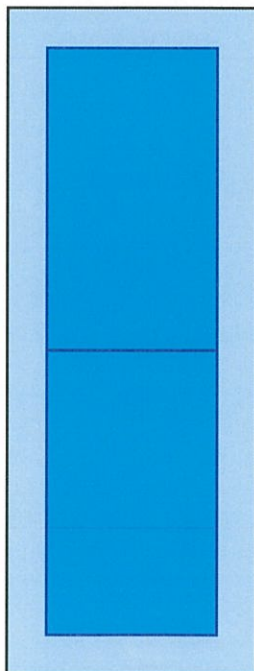
Chamber Storage + Stone Storage = 175.8 cf = 0.004 af

Overall Storage Efficiency = 48.2%

2 Chambers

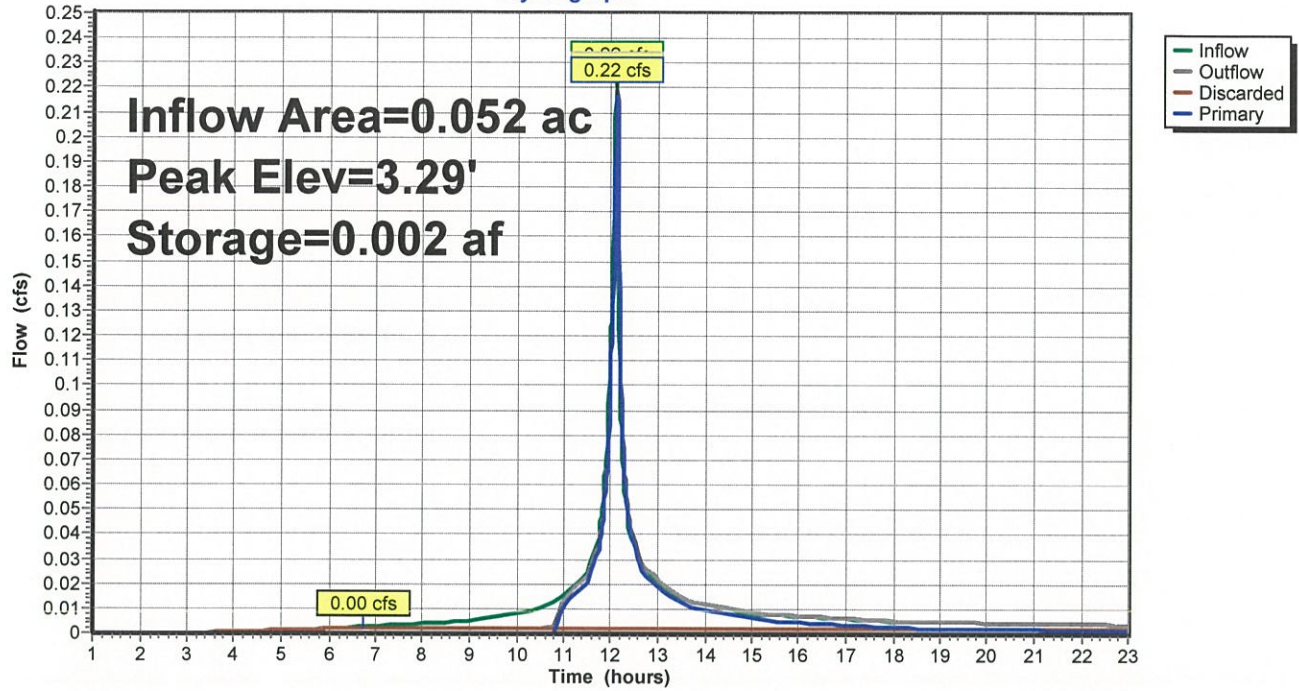
13.5 cy Field

10.0 cy Stone



Pond 2P: ROOF INFILTRATION

Hydrograph



Hydrograph for Pond 2P: ROOF INFILTRATION

| Time (hours) | Inflow (cfs) | Storage (acre-feet) | Elevation (feet) | Outflow (cfs) | Discarded (cfs) | Primary (cfs) |
|-----------------|-----------------|------------------------|---------------------|------------------|--------------------|------------------|
| 1.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 1.50 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 2.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 3.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 3.50 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 4.00 | 0.00 | 0.000 | 2.01 | 0.00 | 0.00 | 0.00 |
| 4.50 | 0.00 | 0.000 | 2.01 | 0.00 | 0.00 | 0.00 |
| 5.00 | 0.00 | 0.000 | 2.02 | 0.00 | 0.00 | 0.00 |
| 5.50 | 0.00 | 0.000 | 2.02 | 0.00 | 0.00 | 0.00 |
| 6.00 | 0.00 | 0.000 | 2.03 | 0.00 | 0.00 | 0.00 |
| 6.50 | 0.00 | 0.000 | 2.03 | 0.00 | 0.00 | 0.00 |
| 7.00 | 0.00 | 0.000 | 2.04 | 0.00 | 0.00 | 0.00 |
| 7.50 | 0.00 | 0.000 | 2.08 | 0.00 | 0.00 | 0.00 |
| 8.00 | 0.00 | 0.000 | 2.15 | 0.00 | 0.00 | 0.00 |
| 8.50 | 0.00 | 0.000 | 2.25 | 0.00 | 0.00 | 0.00 |
| 9.00 | 0.01 | 0.000 | 2.39 | 0.00 | 0.00 | 0.00 |
| 9.50 | 0.01 | 0.000 | 2.54 | 0.00 | 0.00 | 0.00 |
| 10.00 | 0.01 | 0.001 | 2.67 | 0.00 | 0.00 | 0.00 |
| 10.50 | 0.01 | 0.001 | 2.84 | 0.00 | 0.00 | 0.00 |
| 11.00 | 0.02 | 0.001 | 3.06 | 0.01 | 0.00 | 0.01 |
| 11.50 | 0.02 | 0.001 | 3.08 | 0.02 | 0.00 | 0.02 |
| 12.00 | 0.12 | 0.001 | 3.20 | 0.12 | 0.00 | 0.11 |
| 12.50 | 0.04 | 0.001 | 3.11 | 0.04 | 0.00 | 0.04 |
| 13.00 | 0.02 | 0.001 | 3.08 | 0.02 | 0.00 | 0.02 |
| 13.50 | 0.01 | 0.001 | 3.06 | 0.01 | 0.00 | 0.01 |
| 14.00 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 14.50 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 15.00 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 15.50 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 16.00 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.00 |
| 16.50 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 17.00 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 17.50 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 18.00 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 18.50 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 19.00 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 19.50 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 20.00 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 20.50 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 21.00 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 21.50 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 22.00 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 22.50 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |
| 23.00 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |

Summary for Subcatchment 3S: 64-66 GOVE-PROPOSED

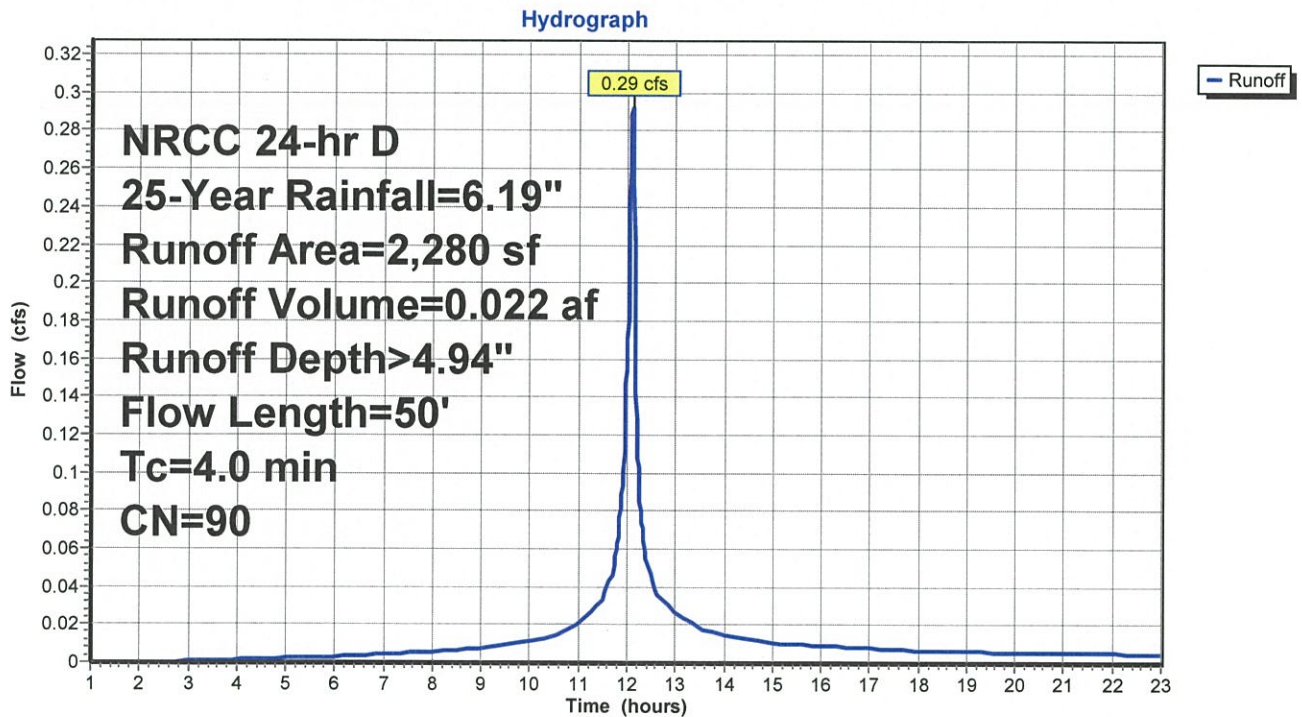
Runoff = 0.29 cfs @ 12.11 hrs, Volume= 0.022 af, Depth> 4.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-23.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-Year Rainfall=6.19"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,780 | 98 | Roofs, HSG B |
| 500 | 61 | >75% Grass cover, Good, HSG B |
| 2,280 | 90 | Weighted Average |
| 500 | | 21.93% Pervious Area |
| 1,780 | | 78.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 4.0 | 50 | | 0.21 | | Direct Entry, 64-66 GOVE |

Subcatchment 3S: 64-66 GOVE-PROPOSED



Hydrograph for Subcatchment 3S: 64-66 GOVE-PROPOSED

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 1.00 | 0.09 | 0.00 | 0.00 |
| 1.50 | 0.14 | 0.00 | 0.00 |
| 2.00 | 0.19 | 0.00 | 0.00 |
| 2.50 | 0.24 | 0.00 | 0.00 |
| 3.00 | 0.29 | 0.00 | 0.00 |
| 3.50 | 0.34 | 0.01 | 0.00 |
| 4.00 | 0.40 | 0.02 | 0.00 |
| 4.50 | 0.46 | 0.04 | 0.00 |
| 5.00 | 0.51 | 0.06 | 0.00 |
| 5.50 | 0.58 | 0.09 | 0.00 |
| 6.00 | 0.64 | 0.11 | 0.00 |
| 6.50 | 0.70 | 0.15 | 0.00 |
| 7.00 | 0.78 | 0.19 | 0.00 |
| 7.50 | 0.86 | 0.23 | 0.01 |
| 8.00 | 0.94 | 0.28 | 0.01 |
| 8.50 | 1.04 | 0.34 | 0.01 |
| 9.00 | 1.14 | 0.41 | 0.01 |
| 9.50 | 1.25 | 0.49 | 0.01 |
| 10.00 | 1.39 | 0.60 | 0.01 |
| 10.50 | 1.55 | 0.72 | 0.01 |
| 11.00 | 1.76 | 0.89 | 0.02 |
| 11.50 | 2.07 | 1.16 | 0.03 |
| 12.00 | 2.97 | 1.95 | 0.16 |
| 12.50 | 4.12 | 3.03 | 0.05 |
| 13.00 | 4.43 | 3.33 | 0.03 |
| 13.50 | 4.64 | 3.53 | 0.02 |
| 14.00 | 4.80 | 3.69 | 0.02 |
| 14.50 | 4.94 | 3.82 | 0.01 |
| 15.00 | 5.05 | 3.93 | 0.01 |
| 15.50 | 5.15 | 4.02 | 0.01 |
| 16.00 | 5.25 | 4.11 | 0.01 |
| 16.50 | 5.33 | 4.20 | 0.01 |
| 17.00 | 5.41 | 4.28 | 0.01 |
| 17.50 | 5.49 | 4.35 | 0.01 |
| 18.00 | 5.55 | 4.41 | 0.01 |
| 18.50 | 5.61 | 4.47 | 0.01 |
| 19.00 | 5.68 | 4.53 | 0.01 |
| 19.50 | 5.73 | 4.59 | 0.01 |
| 20.00 | 5.79 | 4.64 | 0.01 |
| 20.50 | 5.85 | 4.70 | 0.01 |
| 21.00 | 5.90 | 4.75 | 0.01 |
| 21.50 | 5.95 | 4.80 | 0.01 |
| 22.00 | 6.00 | 4.85 | 0.01 |
| 22.50 | 6.05 | 4.90 | 0.00 |
| 23.00 | 6.10 | 4.94 | 0.00 |

Summary for Pond 2P: ROOF INFILTRATION

Inflow Area = 0.052 ac, 78.07% Impervious, Inflow Depth > 4.94" for 25-Year event
 Inflow = 0.29 cfs @ 12.11 hrs, Volume= 0.022 af
 Outflow = 0.29 cfs @ 12.12 hrs, Volume= 0.020 af, Atten= 2%, Lag= 0.6 min
 Discarded = 0.00 cfs @ 5.33 hrs, Volume= 0.004 af
 Primary = 0.29 cfs @ 12.12 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 1.00-23.00 hrs, dt= 0.01 hrs
 Peak Elev= 3.34' @ 12.12 hrs Surf.Area= 0.002 ac Storage= 0.002 af

Plug-Flow detention time= 48.0 min calculated for 0.020 af (94% of inflow)
 Center-of-Mass det. time= 18.0 min (798.9 - 780.8)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|---|
| #1A | 2.00' | 0.002 af | 6.25'W x 16.68'L x 3.50'H Field A 0.008 af Overall - 0.002 af Embedded = 0.006 af x 30.0% Voids |
| #2A | 2.50' | 0.002 af | ADS_StormTech SC-740 x 2 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 1 rows |
| | | 0.004 af | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|--------|--|
| #1 | Discarded | 2.00' | 1.020 in/hr Exfiltration over Surface area |
| #2 | Primary | 3.00' | 6.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 3.00' / 2.50' S= 0.0125 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf |

Discarded OutFlow Max=0.00 cfs @ 5.33 hrs HW=2.04' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.29 cfs @ 12.12 hrs HW=3.34' (Free Discharge)
 ↑2=Culvert (Inlet Controls 0.29 cfs @ 1.99 fps)

Pond 2P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

Row Length Adjustment= +0.44' x 6.45 sf x 1 rows

2 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 14.68' Row Length +12.0" End Stone x 2 = 16.68' Base Length

1 Rows x 51.0" Wide + 12.0" Side Stone x 2 = 6.25' Base Width

6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

2 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 1 Rows = 94.7 cf Chamber Storage

364.9 cf Field - 94.7 cf Chambers = 270.2 cf Stone x 30.0% Voids = 81.0 cf Stone Storage

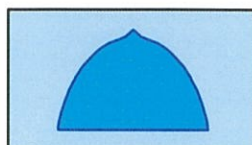
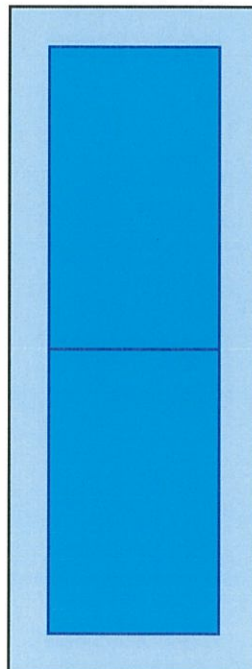
Chamber Storage + Stone Storage = 175.8 cf = 0.004 af

Overall Storage Efficiency = 48.2%

2 Chambers

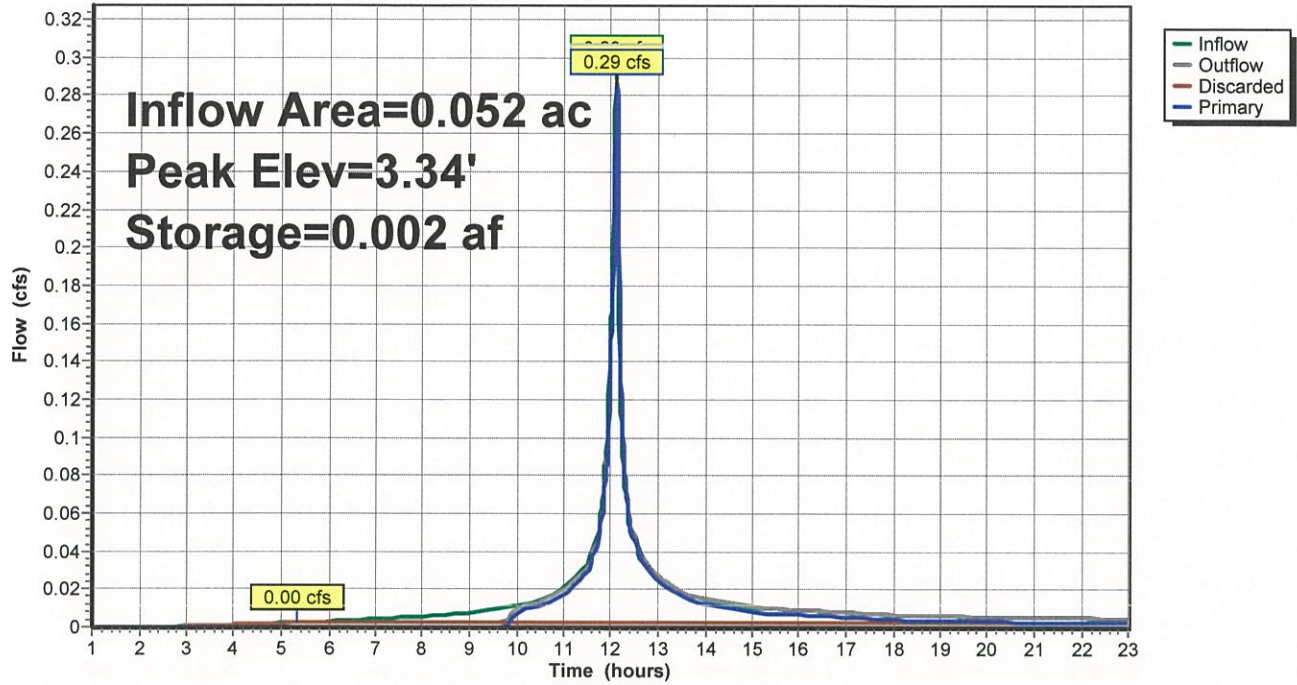
13.5 cy Field

10.0 cy Stone



Pond 2P: ROOF INFILTRATION

Hydrograph



Hydrograph for Pond 2P: ROOF INFILTRATION

| Time (hours) | Inflow (cfs) | Storage (acre-feet) | Elevation (feet) | Outflow (cfs) | Discarded (cfs) | Primary (cfs) |
|-----------------|-----------------|------------------------|---------------------|------------------|--------------------|------------------|
| 1.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 1.50 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 2.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 3.00 | 0.00 | 0.000 | 2.01 | 0.00 | 0.00 | 0.00 |
| 3.50 | 0.00 | 0.000 | 2.01 | 0.00 | 0.00 | 0.00 |
| 4.00 | 0.00 | 0.000 | 2.02 | 0.00 | 0.00 | 0.00 |
| 4.50 | 0.00 | 0.000 | 2.03 | 0.00 | 0.00 | 0.00 |
| 5.00 | 0.00 | 0.000 | 2.03 | 0.00 | 0.00 | 0.00 |
| 5.50 | 0.00 | 0.000 | 2.04 | 0.00 | 0.00 | 0.00 |
| 6.00 | 0.00 | 0.000 | 2.06 | 0.00 | 0.00 | 0.00 |
| 6.50 | 0.00 | 0.000 | 2.12 | 0.00 | 0.00 | 0.00 |
| 7.00 | 0.00 | 0.000 | 2.21 | 0.00 | 0.00 | 0.00 |
| 7.50 | 0.01 | 0.000 | 2.34 | 0.00 | 0.00 | 0.00 |
| 8.00 | 0.01 | 0.000 | 2.51 | 0.00 | 0.00 | 0.00 |
| 8.50 | 0.01 | 0.001 | 2.61 | 0.00 | 0.00 | 0.00 |
| 9.00 | 0.01 | 0.001 | 2.73 | 0.00 | 0.00 | 0.00 |
| 9.50 | 0.01 | 0.001 | 2.88 | 0.00 | 0.00 | 0.00 |
| 10.00 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 10.50 | 0.01 | 0.001 | 3.06 | 0.01 | 0.00 | 0.01 |
| 11.00 | 0.02 | 0.001 | 3.07 | 0.02 | 0.00 | 0.02 |
| 11.50 | 0.03 | 0.001 | 3.10 | 0.03 | 0.00 | 0.03 |
| 12.00 | 0.16 | 0.002 | 3.24 | 0.15 | 0.00 | 0.15 |
| 12.50 | 0.05 | 0.001 | 3.12 | 0.05 | 0.00 | 0.05 |
| 13.00 | 0.03 | 0.001 | 3.09 | 0.03 | 0.00 | 0.03 |
| 13.50 | 0.02 | 0.001 | 3.07 | 0.02 | 0.00 | 0.02 |
| 14.00 | 0.02 | 0.001 | 3.06 | 0.02 | 0.00 | 0.01 |
| 14.50 | 0.01 | 0.001 | 3.06 | 0.01 | 0.00 | 0.01 |
| 15.00 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 15.50 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 16.00 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 16.50 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 17.00 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 17.50 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.00 |
| 18.00 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 18.50 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 19.00 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 19.50 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 20.00 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 20.50 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 21.00 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 21.50 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |
| 22.00 | 0.01 | 0.001 | 3.02 | 0.01 | 0.00 | 0.00 |
| 22.50 | 0.00 | 0.001 | 3.02 | 0.01 | 0.00 | 0.00 |
| 23.00 | 0.00 | 0.001 | 3.02 | 0.00 | 0.00 | 0.00 |

Summary for Subcatchment 3S: 64-66 GOVE-PROPOSED

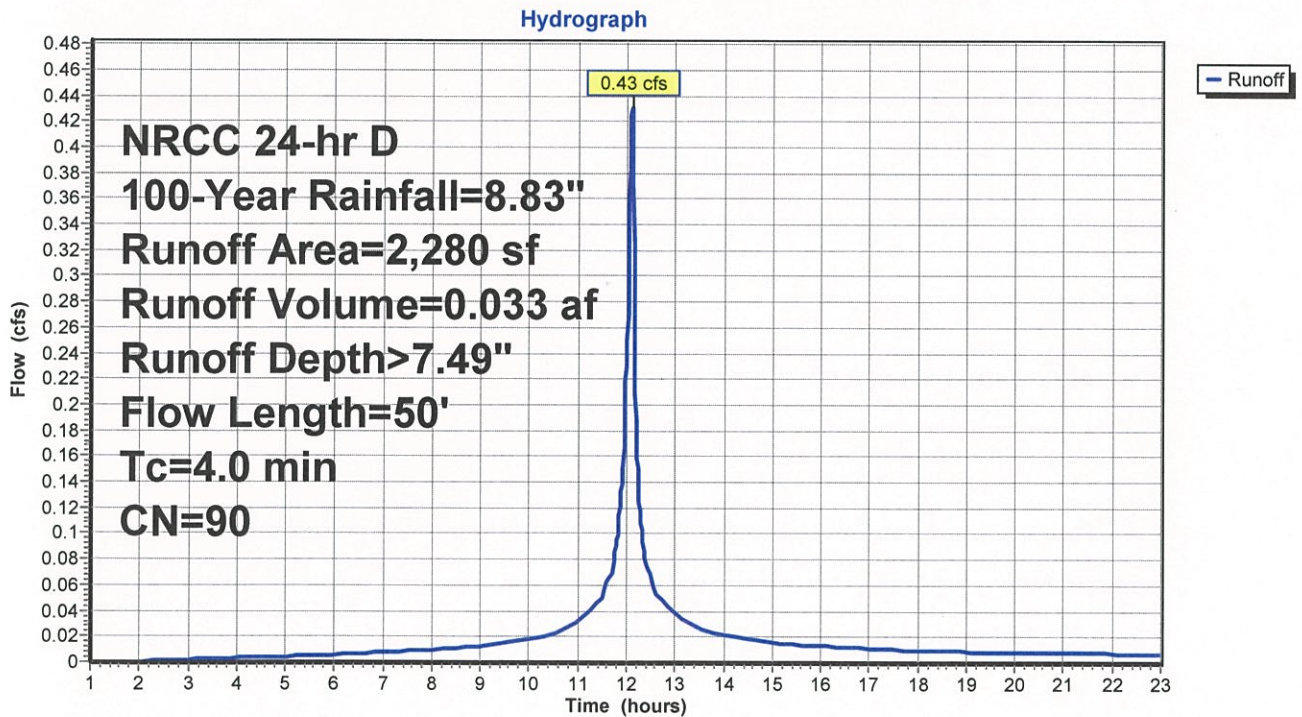
Runoff = 0.43 cfs @ 12.11 hrs, Volume= 0.033 af, Depth> 7.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-23.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=8.83"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,780 | 98 | Roofs, HSG B |
| 500 | 61 | >75% Grass cover, Good, HSG B |
| 2,280 | 90 | Weighted Average |
| 500 | | 21.93% Pervious Area |
| 1,780 | | 78.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 4.0 | 50 | | 0.21 | | Direct Entry, 64-66 GOVE |

Subcatchment 3S: 64-66 GOVE-PROPOSED



Hydrograph for Subcatchment 3S: 64-66 GOVE-PROPOSED

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 1.00 | 0.13 | 0.00 | 0.00 |
| 1.50 | 0.20 | 0.00 | 0.00 |
| 2.00 | 0.27 | 0.00 | 0.00 |
| 2.50 | 0.34 | 0.01 | 0.00 |
| 3.00 | 0.41 | 0.03 | 0.00 |
| 3.50 | 0.49 | 0.05 | 0.00 |
| 4.00 | 0.57 | 0.08 | 0.00 |
| 4.50 | 0.65 | 0.12 | 0.00 |
| 5.00 | 0.73 | 0.16 | 0.00 |
| 5.50 | 0.82 | 0.21 | 0.01 |
| 6.00 | 0.91 | 0.26 | 0.01 |
| 6.50 | 1.00 | 0.32 | 0.01 |
| 7.00 | 1.11 | 0.39 | 0.01 |
| 7.50 | 1.22 | 0.47 | 0.01 |
| 8.00 | 1.35 | 0.57 | 0.01 |
| 8.50 | 1.48 | 0.67 | 0.01 |
| 9.00 | 1.62 | 0.78 | 0.01 |
| 9.50 | 1.78 | 0.91 | 0.02 |
| 10.00 | 1.98 | 1.08 | 0.02 |
| 10.50 | 2.21 | 1.27 | 0.02 |
| 11.00 | 2.51 | 1.54 | 0.03 |
| 11.50 | 2.96 | 1.95 | 0.05 |
| 12.00 | 4.23 | 3.14 | 0.24 |
| 12.50 | 5.87 | 4.72 | 0.07 |
| 13.00 | 6.32 | 5.16 | 0.04 |
| 13.50 | 6.62 | 5.46 | 0.03 |
| 14.00 | 6.85 | 5.68 | 0.02 |
| 14.50 | 7.05 | 5.87 | 0.02 |
| 15.00 | 7.21 | 6.03 | 0.02 |
| 15.50 | 7.35 | 6.17 | 0.01 |
| 16.00 | 7.48 | 6.30 | 0.01 |
| 16.50 | 7.61 | 6.42 | 0.01 |
| 17.00 | 7.72 | 6.53 | 0.01 |
| 17.50 | 7.83 | 6.63 | 0.01 |
| 18.00 | 7.92 | 6.73 | 0.01 |
| 18.50 | 8.01 | 6.81 | 0.01 |
| 19.00 | 8.10 | 6.90 | 0.01 |
| 19.50 | 8.18 | 6.98 | 0.01 |
| 20.00 | 8.26 | 7.06 | 0.01 |
| 20.50 | 8.34 | 7.14 | 0.01 |
| 21.00 | 8.42 | 7.22 | 0.01 |
| 21.50 | 8.49 | 7.29 | 0.01 |
| 22.00 | 8.56 | 7.36 | 0.01 |
| 22.50 | 8.63 | 7.43 | 0.01 |
| 23.00 | 8.70 | 7.50 | 0.01 |

Summary for Pond 2P: ROOF INFILTRATION

Inflow Area = 0.052 ac, 78.07% Impervious, Inflow Depth > 7.49" for 100-Year event
 Inflow = 0.43 cfs @ 12.11 hrs, Volume= 0.033 af
 Outflow = 0.42 cfs @ 12.12 hrs, Volume= 0.031 af, Atten= 2%, Lag= 0.6 min
 Discarded = 0.00 cfs @ 3.39 hrs, Volume= 0.004 af
 Primary = 0.42 cfs @ 12.12 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 1.00-23.00 hrs, dt= 0.01 hrs
 Peak Elev= 3.45' @ 12.12 hrs Surf.Area= 0.002 ac Storage= 0.002 af

Plug-Flow detention time= 37.6 min calculated for 0.031 af (96% of inflow)
 Center-of-Mass det. time= 16.5 min (784.3 - 767.7)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|---|
| #1A | 2.00' | 0.002 af | 6.25'W x 16.68'L x 3.50'H Field A 0.008 af Overall - 0.002 af Embedded = 0.006 af x 30.0% Voids |
| #2A | 2.50' | 0.002 af | ADS_StormTech SC-740 x 2 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 1 rows |
| | | 0.004 af | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|--------|--|
| #1 | Discarded | 2.00' | 1.020 in/hr Exfiltration over Surface area |
| #2 | Primary | 3.00' | 6.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 3.00' / 2.50' S= 0.0125 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf |

Discarded OutFlow Max=0.00 cfs @ 3.39 hrs HW=2.04' (Free Discharge)
 ↳1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.42 cfs @ 12.12 hrs HW=3.45' (Free Discharge)
 ↳2=Culvert (Inlet Controls 0.42 cfs @ 2.28 fps)

Pond 2P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

Row Length Adjustment= +0.44' x 6.45 sf x 1 rows

2 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 14.68' Row Length +12.0" End Stone x 2 = 16.68' Base Length

1 Rows x 51.0" Wide + 12.0" Side Stone x 2 = 6.25' Base Width

6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

2 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 1 Rows = 94.7 cf Chamber Storage

364.9 cf Field - 94.7 cf Chambers = 270.2 cf Stone x 30.0% Voids = 81.0 cf Stone Storage

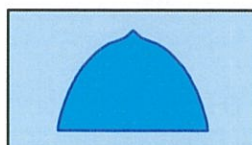
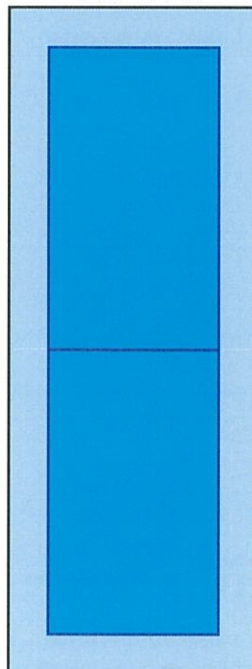
Chamber Storage + Stone Storage = 175.8 cf = 0.004 af

Overall Storage Efficiency = 48.2%

2 Chambers

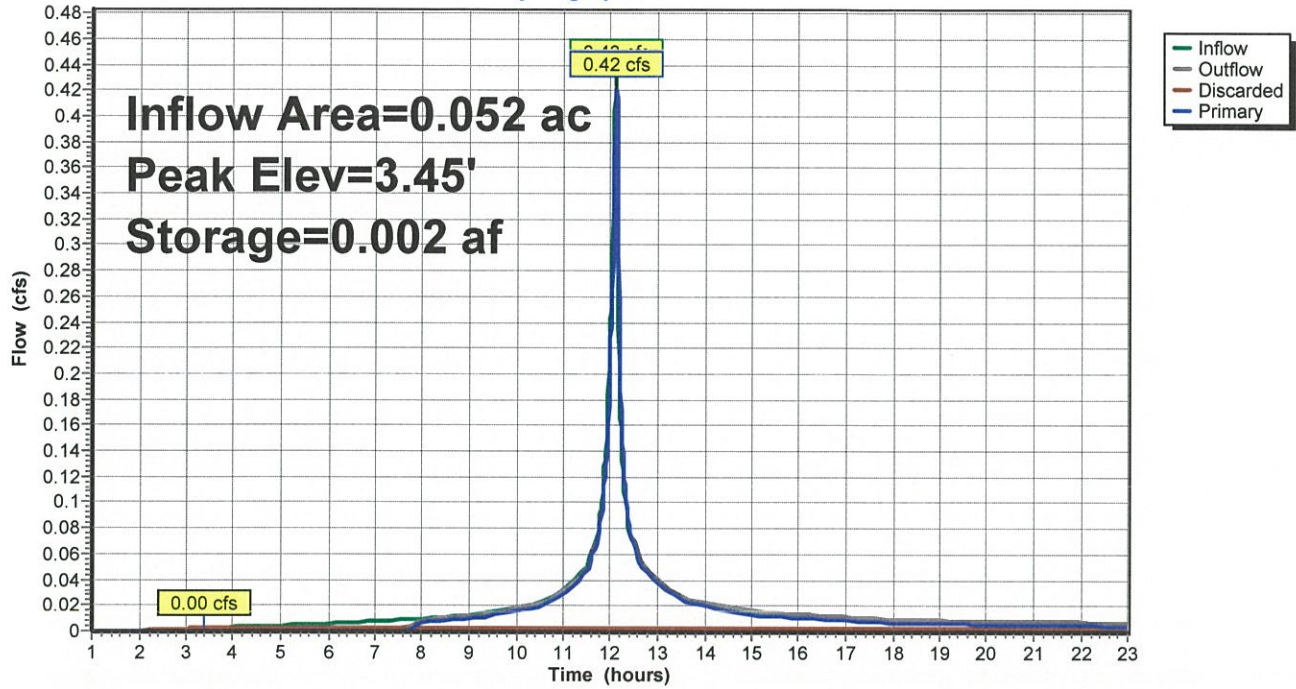
13.5 cy Field

10.0 cy Stone



Pond 2P: ROOF INFILTRATION

Hydrograph



Hydrograph for Pond 2P: ROOF INFILTRATION

| Time (hours) | Inflow (cfs) | Storage (acre-feet) | Elevation (feet) | Outflow (cfs) | Discarded (cfs) | Primary (cfs) |
|--------------|--------------|---------------------|------------------|---------------|-----------------|---------------|
| 1.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 1.50 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 2.00 | 0.00 | 0.000 | 2.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.00 | 0.000 | 2.02 | 0.00 | 0.00 | 0.00 |
| 3.00 | 0.00 | 0.000 | 2.03 | 0.00 | 0.00 | 0.00 |
| 3.50 | 0.00 | 0.000 | 2.04 | 0.00 | 0.00 | 0.00 |
| 4.00 | 0.00 | 0.000 | 2.08 | 0.00 | 0.00 | 0.00 |
| 4.50 | 0.00 | 0.000 | 2.15 | 0.00 | 0.00 | 0.00 |
| 5.00 | 0.00 | 0.000 | 2.27 | 0.00 | 0.00 | 0.00 |
| 5.50 | 0.01 | 0.000 | 2.41 | 0.00 | 0.00 | 0.00 |
| 6.00 | 0.01 | 0.000 | 2.54 | 0.00 | 0.00 | 0.00 |
| 6.50 | 0.01 | 0.001 | 2.64 | 0.00 | 0.00 | 0.00 |
| 7.00 | 0.01 | 0.001 | 2.77 | 0.00 | 0.00 | 0.00 |
| 7.50 | 0.01 | 0.001 | 2.92 | 0.00 | 0.00 | 0.00 |
| 8.00 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 8.50 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 9.00 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 9.50 | 0.02 | 0.001 | 3.06 | 0.02 | 0.00 | 0.01 |
| 10.00 | 0.02 | 0.001 | 3.07 | 0.02 | 0.00 | 0.02 |
| 10.50 | 0.02 | 0.001 | 3.08 | 0.02 | 0.00 | 0.02 |
| 11.00 | 0.03 | 0.001 | 3.10 | 0.03 | 0.00 | 0.03 |
| 11.50 | 0.05 | 0.001 | 3.12 | 0.05 | 0.00 | 0.05 |
| 12.00 | 0.24 | 0.002 | 3.30 | 0.23 | 0.00 | 0.23 |
| 12.50 | 0.07 | 0.001 | 3.15 | 0.07 | 0.00 | 0.07 |
| 13.00 | 0.04 | 0.001 | 3.11 | 0.04 | 0.00 | 0.04 |
| 13.50 | 0.03 | 0.001 | 3.09 | 0.03 | 0.00 | 0.03 |
| 14.00 | 0.02 | 0.001 | 3.08 | 0.02 | 0.00 | 0.02 |
| 14.50 | 0.02 | 0.001 | 3.07 | 0.02 | 0.00 | 0.02 |
| 15.00 | 0.02 | 0.001 | 3.06 | 0.02 | 0.00 | 0.01 |
| 15.50 | 0.01 | 0.001 | 3.06 | 0.01 | 0.00 | 0.01 |
| 16.00 | 0.01 | 0.001 | 3.06 | 0.01 | 0.00 | 0.01 |
| 16.50 | 0.01 | 0.001 | 3.06 | 0.01 | 0.00 | 0.01 |
| 17.00 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 17.50 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 18.00 | 0.01 | 0.001 | 3.05 | 0.01 | 0.00 | 0.01 |
| 18.50 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 19.00 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 19.50 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 20.00 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 20.50 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 21.00 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 21.50 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 22.00 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.01 |
| 22.50 | 0.01 | 0.001 | 3.04 | 0.01 | 0.00 | 0.00 |
| 23.00 | 0.01 | 0.001 | 3.03 | 0.01 | 0.00 | 0.00 |

**STORMWATER
TREATMENT &
FACILITIES
OPERATION &
MAINTENANCE**

APPENDIX

LONG TERM POLLUTION PREVENTION PLAN

- Good housekeeping practices will be standard operating procedures in order to maintain occupancy requirements including regular scheduled cleaning and maintenance
- Requirements for routine inspection and maintenance of stormwater BMP's are included in the O & M section of this report.
- No hazardous chemicals or petroleum products will be stored on site.
- A professional lawn and yard maintenance company will be hired for all exterior maintenance.
- No herbicides, high nitrogen fertilizers, or pesticides will be stored or used on the premises.
- Sanitary waste will be handled by connection to the municipal sewer.
- Trash removal will be by private hauler.
- Only non-toxic Calcium Chloride or similar snow melt materials will be used on parking lots and walks. Sand use will be professionally applied only as necessary under icy conditions.
- An Operation and Maintenance Manual and Pollution Prevention Plan will be prepared and made part of the training for all personnel (employees and contractors) who will have responsibility O & M and Pollution Prevention.
- A list of emergency contacts will be included in the O & M and Pollution Prevention Manual.

O & M

FACILITY

- MOW LAWNS (1)
- TRIM TREES & SHRUBS (1)
- INSPECT INFILTRATORS
- CLEAN SEDIMENT FROM INFILTRATORS (2)

SCHEDULE

WEEKLY IN SEASON

SPRING & FALL

APRIL & NOVEMBER

AS NECESSARY - WITH
SEDIMENT OR DEBRIS
BUILD-UP

RESPONSIBILITY

LANDSCAPE
MAINTENANCE CO.

LANDSCAPE
MAINTENANCE CO.

VACUUM PUMPING CO.

VACUUM PUMPING CO.

(1) LAWN CLIPPINGS TO
BE MULCHED & LEFT
ON LAWN TO
REDUCE NEED FOR
FERTILIZER EXCESS
GRASS AND TREE &
SHRUB CLIPPINGS
TO BE DISPOSED OF
AT A COMPOST
FACILITY

(2) INFILTRATOR
SEDIMENT TO BE
DISPOSED OF AT A
LANDFILL

(3) ADSORBED OIL TO
BE DISPOSED OF BY
A LIQUID WASTE
HAULER

STORMTECH SC-740

INFILTRATORS

Provide an access port, man-way, and observation well to enable inspection of water levels within the system. Make the observation well pipe visible at grade (i.e., not buried).

Maintenance

Because subsurface structures are installed underground, they are extremely difficult to maintain. Inspect inlets at least twice a year. Remove any debris that might clog the system. Include mosquito controls in the Operation and Maintenance Plan.



FEMA

NATIONAL FLOOD INSURANCE PROGRAM

ELEVATION CERTIFICATE

AND

INSTRUCTIONS

2015 EDITION

National Flood Hazard Layer FIRMette



Legend

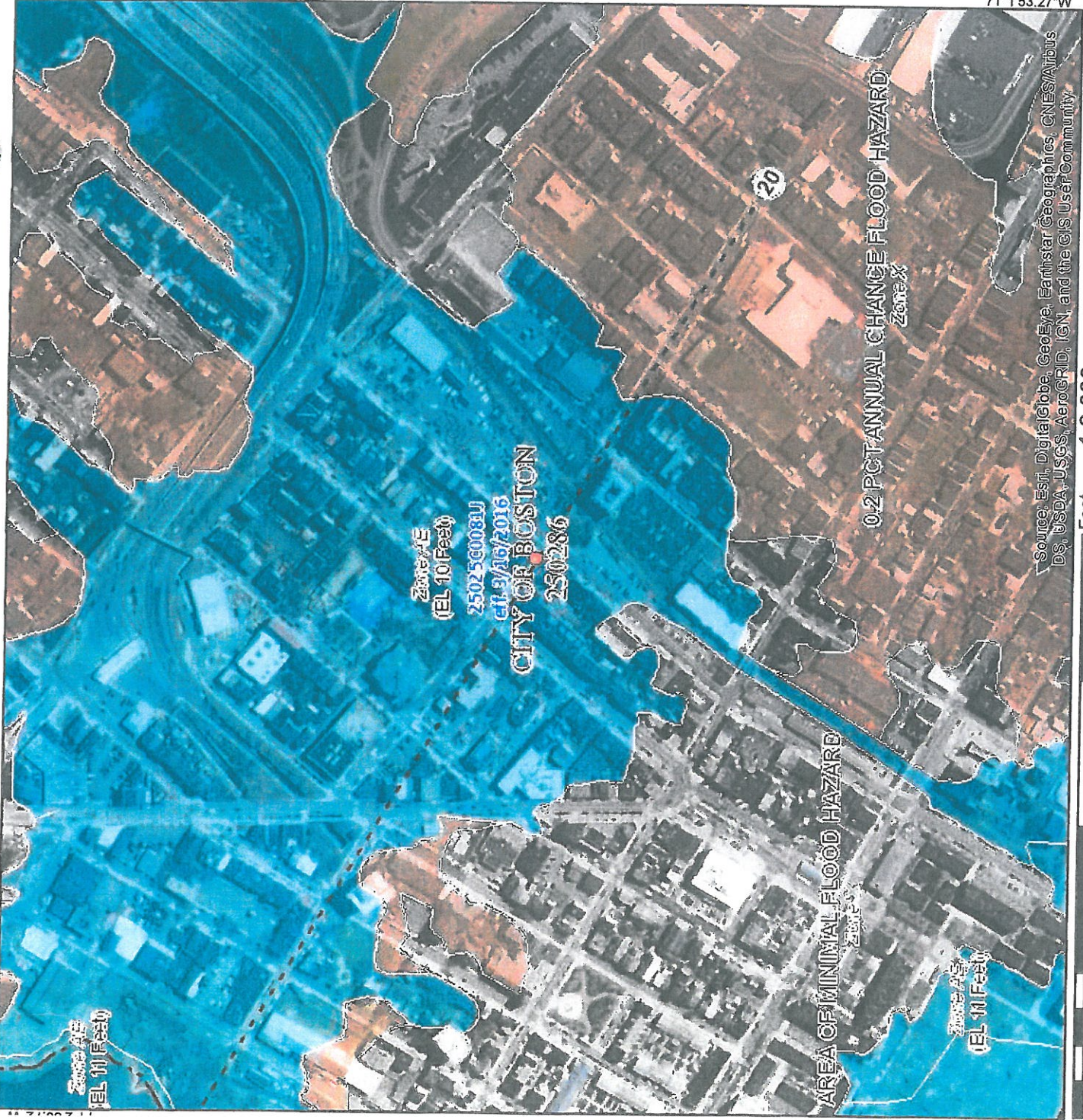
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- SPECIAL FLOOD HAZARD AREAS**
 - Without Base Flood Elevation (BFE) Zone A, V, A99
 - With BFE or Depth
 - Regulatory Floodway Zone AE, AO, AH, VE, AI
- OTHER AREAS OF FLOOD HAZARD**
 - 0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with draining areas of less than one square mile Zone .
 - Future Conditions 1% Annual Chance Flood Hazard Zone X
 - Area with Reduced Flood Risk due to Levee, See Notes, Zone X
 - Area with Flood Risk due to Levee Zone D
- OTHER AREAS**
 - Area of Minimal Flood Hazard Zone X
 - Effective LOMRS
 - Area of Undetermined Flood Hazard Zone
- GENERAL STRUCTURES**
 - Channel, Culvert, or Storm Sewer
 - Levee, Dike, or Floodwall
- OTHER FEATURES**
 - Cross Sections with 1% Annual Chance Water Surface Elevation
 - 20.2
 - 17.5
 - Coastal Transect
 - Base Flood Elevation Line (BFE)
 - Limit of Study
 - Jurisdiction Boundary
 - Coastal Transect Baseline
 - Profile Baseline
 - Hydrographic Feature
- MAP PANELS**
 - Digital Data Available
 - No Digital Data Available
 - Unmapped

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/9/2018 at 9:15:02 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: base map 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.



71°1'53.27"W
42°22'2.43"N
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 250 500 1,000 1,500 2,000 Feet 1:6,000

ELEVATION CERTIFICATE

Important: Follow the instructions on pages 1-9.

Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.

| SECTION A – PROPERTY INFORMATION | | | | | | FOR INSURANCE COMPANY USE |
|---|-----------------|-----------------------------------|--|-------------------------|--|---------------------------|
| A1. Building Owner's Name CHAN SING MING | | | | | Policy Number: | |
| A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 64-66 GOVE ST | | | | | Company NAIC Number: | |
| City E. BOSTON | | State Massachusetts | | ZIP Code 02128 | | |
| A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) TAX PARCEL # 0103815000, 0103814000 | | | | | | |
| A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>RESIDENTIAL</u> | | | | | | |
| A5. Latitude/Longitude: Lat. <u>42.371013</u> Long. <u>-71.037586</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983 | | | | | | |
| A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance. | | | | | | |
| A7. Building Diagram Number <u>1B</u> | | | | | | |
| A8. For a building with a crawlspace or enclosure(s): | | | | | | |
| a) Square footage of crawlspace or enclosure(s) _____ sq ft | | | | | | |
| b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____ | | | | | | |
| c) Total net area of flood openings in A8.b _____ sq in | | | | | | |
| d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No | | | | | | |
| A9. For a building with an attached garage: | | | | | | |
| a) Square footage of attached garage _____ sq ft | | | | | | |
| b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade _____ | | | | | | |
| c) Total net area of flood openings in A9.b _____ sq in | | | | | | |
| d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No | | | | | | |
| SECTION B – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION | | | | | | |
| B1. NFIP Community Name & Community Number CITY OF BOSTON 250286 | | | B2. County Name SUFFOLK | | B3. State Massachusetts | |
| B4. Map/Panel Number 0081 | B5. Suffix J | B6. FIRM Index Date 03-16-2016 | B7. FIRM Panel Effective/ Revised Date 03-16-2916 | B8. Flood Zone(s) AE | B9. Base Flood Elevation(s) (Zone AO, use Base Flood Depth) 10 | |
| B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9: <input type="checkbox"/> FIS Profile <input checked="" type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____ | | | | | | |
| B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input checked="" type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____ | | | | | | |
| B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA | | | | | | |

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expiration Date: November 30, 2018

| | | | |
|--|------------------------|-------------------|----------------------------------|
| IMPORTANT: In these spaces, copy the corresponding information from Section A. | | | FOR INSURANCE COMPANY USE |
| Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 64-66 GOVE ST | | | Policy Number: |
| City E. BOSTON | State Massachusetts | ZIP Code 02128 | Company NAIC Number |

SECTION C – BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: Construction Drawings* Building Under Construction* Finished Construction

*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1–A30, AE, AH, A (with BFE), VE, V1–V30, V (with BFE), AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO. Complete Items C2.a–h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.

Benchmark Utilized: BOSTON SMH 8.04 NAVD88 Vertical Datum: NAVD88

Indicate elevation datum used for the elevations in items a) through h) below.

NGVD 1929 NAVD 1988 Other/Source: _____

Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

- | | | | | |
|---|-----------------|------|--|---------------------------------|
| a) Top of bottom floor (including basement, crawlspace, or enclosure floor) | <u>17.5 BCB</u> | 11.0 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |
| b) Top of the next higher floor | <u>28.5 BCB</u> | 22.0 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |
| c) Bottom of the lowest horizontal structural member (V Zones only) | _____ | | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| d) Attached garage (top of slab) | _____ | | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments) | <u>17.5 BCB</u> | 11.0 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |
| f) Lowest adjacent (finished) grade next to building (LAG) | <u>12.3 BCB</u> | 5.8 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |
| g) Highest adjacent (finished) grade next to building (HAG) | <u>15.2 BCB</u> | 8.7 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |
| h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support | <u>13.0 BCB</u> | 6.5 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

Were latitude and longitude in Section A provided by a licensed land surveyor? Yes No Check here if attachments.

Certifier's Name
FREDERICK J GEISEL

License Number
30864

Title
PROFESSIONAL CIVIL ENGINEER


Company Name
CIVIL ENVIRONMENTAL CONSULTANTS, LLC

Address
8 OAK STREET

City
PEABODY

State
Massachusetts

ZIP Code
01960

Signature


Date
09-18-2016

Telephone
(978) 531-1181

Ext.



Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments (including type of equipment and location, per C2(e), if applicable)

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expiration Date: November 30, 2018

| | | | |
|--|------------------------|-------------------|----------------------------------|
| IMPORTANT: In these spaces, copy the corresponding information from Section A. | | | FOR INSURANCE COMPANY USE |
| Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 64-66 GOVE ST | | | Policy Number: |
| City E. BOSTON | State Massachusetts | ZIP Code 02128 | Company NAIC Number |

**SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED)
FOR ZONE AO AND ZONE A (WITHOUT BFE)**

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ feet meters above or below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ feet meters above or below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 1–2 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ feet meters above or below the HAG.
- E3. Attached garage (top of slab) is _____ feet meters above or below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ feet meters above or below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? Yes No Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner or Owner's Authorized Representative's Name _____

| | | | |
|-----------|------|-----------|----------|
| Address | City | State | ZIP Code |
| Signature | Date | Telephone | |

Comments

Check here if attachments.

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expiration Date: November 30, 2018

| | | | |
|--|------------------------|-------------------|----------------------------------|
| IMPORTANT: In these spaces, copy the corresponding information from Section A. | | | FOR INSURANCE COMPANY USE |
| Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 64-66 GOVE ST | | | Policy Number: |
| City E. BOSTON | State Massachusetts | ZIP Code 02128 | Company NAIC Number |

SECTION G – COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. The following information (Items G4–G10) is provided for community floodplain management purposes.

| | | |
|-------------------|------------------------|---|
| G4. Permit Number | G5. Date Permit Issued | G6. Date Certificate of Compliance/Occupancy Issued |
|-------------------|------------------------|---|

- G7. This permit has been issued for: New Construction Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: _____ feet meters Datum _____
- G9. BFE or (in Zone AO) depth of flooding at the building site: _____ feet meters Datum _____
- G10. Community's design flood elevation: _____ feet meters Datum _____

| | |
|-----------------------|-------|
| Local Official's Name | Title |
|-----------------------|-------|

| | |
|----------------|-----------|
| Community Name | Telephone |
|----------------|-----------|

| | |
|-----------|------|
| Signature | Date |
|-----------|------|

Comments (including type of equipment and location, per C2(e), if applicable)

Check here if attachments.

Boston Planning & Development Agency Climate Resiliency Report Summary



Submitted: 09/18/2018 11:41:37

A.1 - Project Information

| | | | |
|----------------------------|--|---------------------------------|--|
| Project Name: | 64-66 GOVE ST | | |
| Project Address: | 64-66 GOVE ST | | |
| Filing Type: | Construction / Certificate of Occupancy (post construction completion) | | |
| Filing Contact: | KENNETH BOUFFARD | CIVIL ENVIRONMENTAL CONSULTANTS | ceclandsurvey@comcast.net 978-531-1191 |
| Is MEPA approval required? | No | MEPA date: | |

A.2 - Project Team

| | |
|--------------------------|------------------------------------|
| Owner / Developer: | CHAN SING MING |
| Architect: | FRANK P PITTS, ARCHITECT OF RECORD |
| Engineer: | FREDERICK J GEISEL, PE |
| Sustainability / LEED: | N/A |
| Permitting: | CIVIL ENVIRONMENTAL CONSULTANTS |
| Construction Management: | |

A.3 - Project Description and Design Conditions

| | |
|---|--------------------------------------|
| List the principal Building Uses: | MULTI FAMILY RESIDENTIAL |
| List the First Floor Uses: | HANDICAP ACCESSIBLE UNITS, UTILITIES |
| List any Critical Site Infrastructure and or Building Uses: | N/A |

Site and Building:

| | | | |
|--|------|--|------|
| Site Area (SF): | 2280 | Building Area (SF): | 1780 |
| Building Height (Ft): | 35 | Building Height (Stories): | 3 |
| Existing Site Elevation – Low (Ft BCB): | 11.5 | Existing Site Elevation – High (Ft BCB): | 15.2 |
| Proposed Site Elevation – Low (Ft BCB): | 12.3 | Proposed Site Elevation – High (Ft BCB): | 15.2 |
| Proposed First Floor Elevation (Ft BCB): | 17.5 | Below grade spaces/levels (#): | 0 |

Article 37 Green Building:

| | | | |
|-------------------------------|-----|---------------------|----|
| LEED Version - Rating System: | N/A | LEED Certification: | No |
|-------------------------------|-----|---------------------|----|

Boston Planning & Development Agency Climate Resiliency Report Summary



Proposed LEED rating: [REDACTED]

Proposed LEED point score (Pts.): [REDACTED]

Building Envelope:

When reporting R values, differentiate between R discontinuous and R continuous. For example, use "R13" to show R13 discontinuous and use R10c.i. to show R10 continuous. When reporting U value, report total assembly U value including supports and structural elements.

| | | | |
|--|-------|---------------------------------|-----------|
| Roof: | N/A | Exposed Floor: | N/A |
| Foundation Wall: | N/A | Slab Edge (at or below grade): | N/A |
| Vertical Above-grade Assemblies (%'s are of total vertical area and together should total 100%): | | | |
| Area of Opaque Curtain Wall & Spandrel Assembly: | N/A | Wall & Spandrel Assembly Value: | 0.3 |
| Area of Framed & Insulated / Standard Wall: | 5,467 | Wall Value: | 30 |
| Area of Vision Window: | 14.4% | Window Glazing Assembly Value: | 0.3 |
| | | Window Glazing SHGC: | 0.41-0.60 |
| Area of Doors: | 21.0% | Door Assembly Value: | 0.3 |

Energy Loads and Performance

For this filing – describe how energy loads & performance were determined

UNDETERMINED AT THIS TIME

| | | | |
|--|------------|---|------------|
| Annual Electric (kWh): | [REDACTED] | Peak Electric (kW): | [REDACTED] |
| Annual Heating (MMbtu/hr): | [REDACTED] | Peak Heating (MMbtu): | [REDACTED] |
| Annual Cooling (Tons/hr): | [REDACTED] | Peak Cooling (Tons): | [REDACTED] |
| Energy Use - Below ASHRAE 90.1 - 2013 (%): | [REDACTED] | Have the local utilities reviewed the building energy performance?: | [REDACTED] |
| Energy Use - Below Mass. Code (%): | [REDACTED] | Energy Use Intensity (kBtu/SF): | [REDACTED] |

Back-up / Emergency Power System

| | | | |
|------------------------------------|------------|------------------------|------------|
| Electrical Generation Output (kW): | [REDACTED] | Number of Power Units: | [REDACTED] |
| System Type (kW): | [REDACTED] | Fuel Source: | [REDACTED] |

Emergency and Critical System Loads (in the event of a service interruption)

| | | | |
|----------------|------------|---------------------|------------|
| Electric (kW): | [REDACTED] | Heating (MMbtu/hr): | [REDACTED] |
| | | Cooling (Tons/hr): | [REDACTED] |

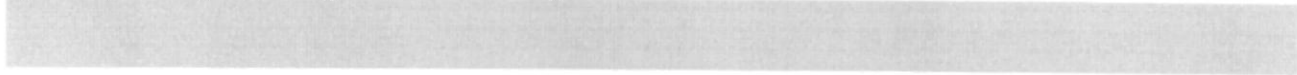
B – Greenhouse Gas Reduction and Net Zero / Net Positive Carbon Building Performance

Reducing greenhouse gas emissions is critical to avoiding more extreme climate change conditions. To achieve the City’s goal of carbon-neutrality by 2050 the performance of new buildings will need to progressively improve to carbon net zero and net positive.

B.1 – GHG Emissions - Design Conditions

For this filing - Annual Building GHG Emissions (Tons): 

For this filing - describe how building energy performance has been integrated into project planning, design, and engineering and any supporting analysis or modeling:



Describe building specific passive energy efficiency measures including orientation, massing, building envelop, and systems:



Describe building specific active energy efficiency measures including high performance equipment, controls, fixtures, and systems:



Describe building specific load reduction strategies including on-site renewable energy, clean energy, and storage systems:



Describe any area or district scale emission reduction strategies including renewable energy, central energy plants, distributed energy systems, and smart grid infrastructure:



Describe any energy efficiency assistance or support provided or to be provided to the project:



B.2 - GHG Reduction - Adaptation Strategies

Describe how the building and its systems will evolve to further reduce GHG emissions and achieve annual carbon net zero and net positive performance (e.g. added efficiency measures, renewable energy, energy storage, etc.) and the timeline for meeting that goal (by 2050):

[Redacted]

C - Extreme Heat Events

Annual average temperature in Boston increased by about 2° F in the past hundred years and will continue to rise due to climate change. By the end of the century, the average annual temperature could be 56° (compared to 46° now) and the number of days above 90° (currently about 10 a year) could rise to 90.

C.1 – Extreme Heat - Design Conditions

Temperature Range - Low (Deg.): [Redacted]

Temperature Range - High (Deg.): [Redacted]

Annual Heating Degree Days: [Redacted]

Annual Cooling Degree Days: [Redacted]

What Extreme Heat Event characteristics will be / have been used for project planning

Days - Above 90° (#): [Redacted]

Days - Above 100° (#): [Redacted]

Number of Heatwaves / Year (#): [Redacted]

Average Duration of Heatwave (Days): [Redacted]

Describe all building and site measures to reduce heat-island effect at the site and in the surrounding area:

[Redacted]

C.2 - Extreme Heat – Adaptation Strategies

Describe how the building and its systems will be adapted to efficiently manage future higher average temperatures, higher extreme temperatures, additional annual heatwaves, and longer heatwaves:

[Redacted]

Describe all mechanical and non-mechanical strategies that will support building functionality and use during extended interruptions of utility services and infrastructure including proposed and future adaptations:

[Redacted]

D - Extreme Precipitation Events

From 1958 to 2010, there was a 70 percent increase in the amount of precipitation that fell on the days with the heaviest precipitation. Currently, the 10-Year, 24-Hour Design Storm precipitation level is 5.25". There is a significant probability that

this will increase to at least 6” by the end of the century. Additionally, fewer, larger storms are likely to be accompanied by more frequent droughts.

D.1 – Extreme Precipitation - Design Conditions

What is the project design precipitation level? (In. / 24 Hours) **8.83 in/24 HOURS**

Describe all building and site measures for reducing storm water run-off:

INFILTRATION OF ROOF RUNOFF (1-YR STORM)

D.2 - Extreme Precipitation - Adaptation Strategies

Describe how site and building systems will be adapted to efficiently accommodate future more significant rain events (e.g. rainwater harvesting, on-site storm water retention, bio swales, green roofs):

ON-SITE STORMWATER RETENTION

E – Sea Level Rise and Storms

Under any plausible greenhouse gas emissions scenario, the sea level in Boston will continue to rise throughout the century. This will increase the number of buildings in Boston susceptible to coastal flooding and the likely frequency of flooding for those already in the floodplain.

Is any portion of the site in a FEMA Special Flood Hazard Area? **Yes**

What Zone: **AE**

What is the current FEMA SFHA Zone Base Flood Elevation for the site (Ft BCB)? **16.5 BCB**

Is any portion of the site in the BPDA Sea Level Rise Flood Hazard Area (see [SLR-FHA online map](#))? **Yes**

If you answered YES to either of the above questions, please complete the following questions. Otherwise you have completed the questionnaire; thank you!

E.1 – Sea Level Rise and Storms – Design Conditions

Proposed projects should identify immediate and future adaptation strategies for managing the flooding scenario represented by the Sea Level Rise Flood Hazard Area (SLR-FHA), which includes 3.2’ of sea level rise above 2013 tide levels, an additional 2.5” to account for subsidence, and the 1% Annual Chance Flood. After using the SLR-FHA to identify a project’s Sea Level Rise Base Flood Elevation, proponents should calculate the Sea Level Rise Design Flood Elevation by

adding 12” of freeboard for buildings, and 24” of freeboard for critical facilities and infrastructure and any ground floor residential units.

| | | | |
|--|----------|--|------|
| What is the Sea Level Rise - Base Flood Elevation for the site (Ft BCB)? | 19.3 BCB | | |
| What is the Sea Level Rise - Design Flood Elevation for the site (Ft BCB)? | 19.3 BCB | First Floor Elevation (Ft BCB): | 17.5 |
| What are the Site Elevations at Building (Ft BCB)? | 14.5 | What is the Accessible Route Elevation (Ft BCB)? | 14.5 |

Describe site design strategies for adapting to sea level rise including building access during flood events, elevated site areas, hard and soft barriers, wave / velocity breaks, storm water systems, utility services, etc.:

REGIONAL SOLUTIONS REQUIRED

Describe how the proposed Building Design Flood Elevation will be achieved including dry / wet flood proofing, critical systems protection, utility service protection, temporary flood barriers, waste and drain water back flow prevention, etc.:

1st FL. BUILDING ELEV. - 1-FT ABOVE FEMA 100-YR FLOOD EL. USE BACKFLOW PREVENTOR ON SEWER

Describe how occupants might shelter in place during a flooding event including any emergency power, water, and waste water provisions and the expected availability of any such measures:

SHELTER IN PLACE ON 2nd FLOOR

Describe any strategies that would support rapid recovery after a weather event:

USE MOLD AND ROT RESISTENT BUILDING MATERIALS

E.2 – Sea Level Rise and Storms – Adaptation Strategies

Describe future site design and or infrastructure adaptation strategies for responding to sea level rise including future elevating of site areas and access routes, barriers, wave / velocity breaks, storm water systems, utility services, etc.:

REGIONAL SOLUTIONS REQUIRED

Describe future building adaptation strategies for raising the Sea Level Rise Design Flood Elevation and further protecting critical systems, including permanent and temporary measures:

REGIONAL SOLUTIONS REQUIRED

Thank you for completing the Boston Climate Change Checklist!

For questions or comments about this checklist or Climate Change best practices, please contact:
John.Dalzell@boston.gov

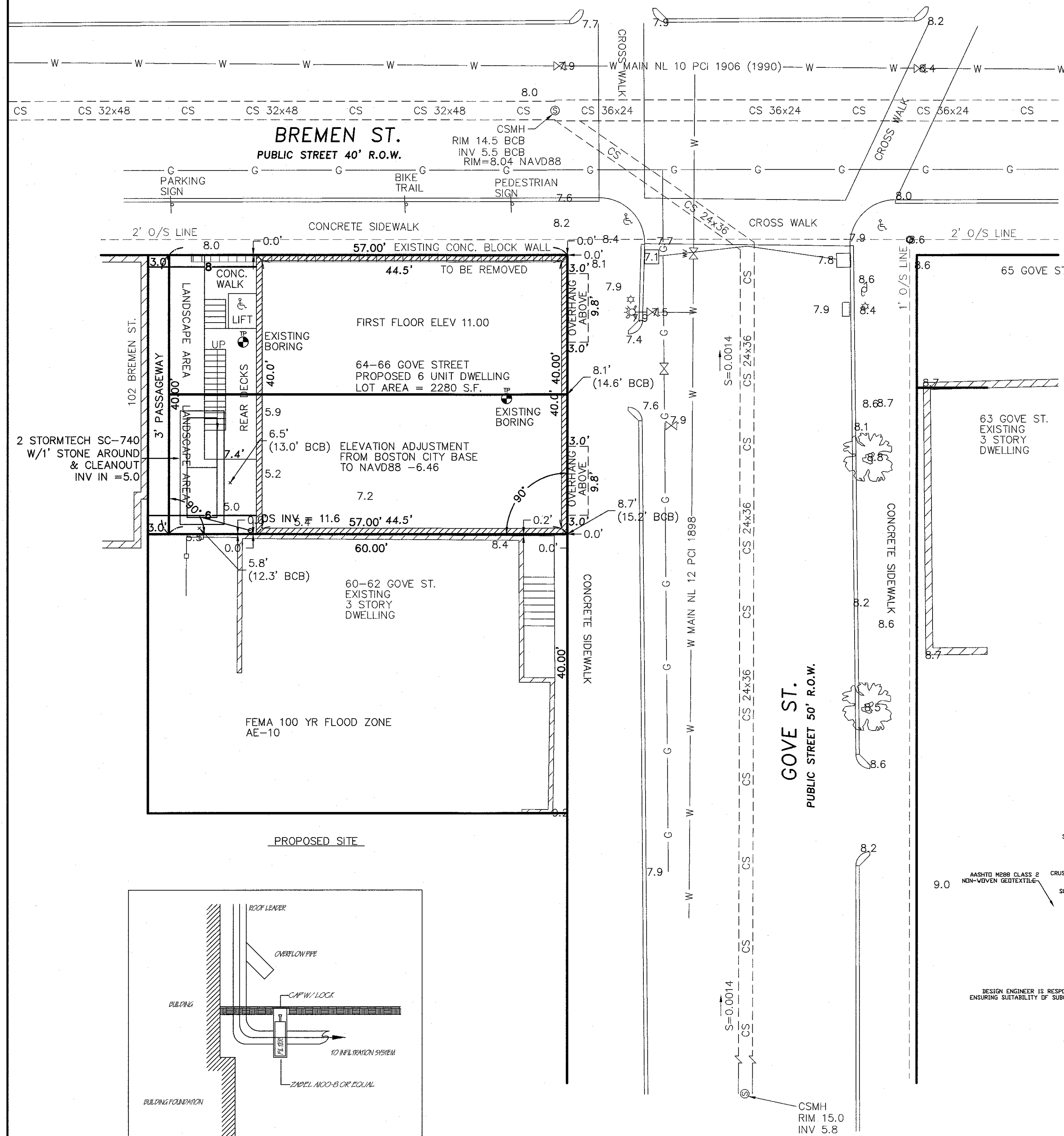
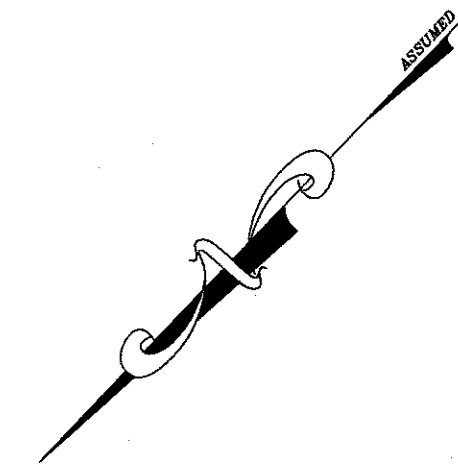
DRAINAGE CALCULATIONS

ROOF AREA = 1870 S.F.

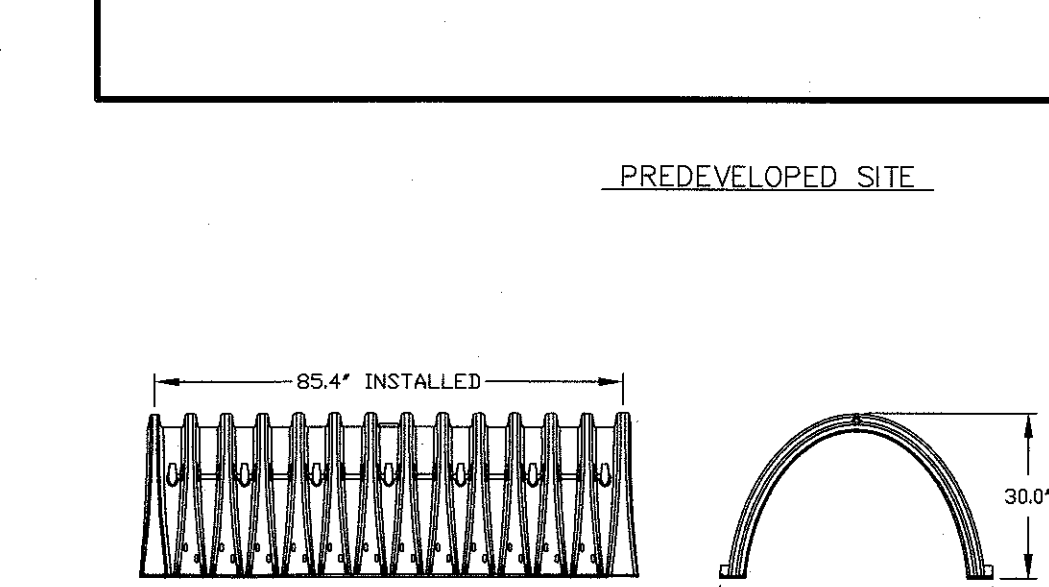
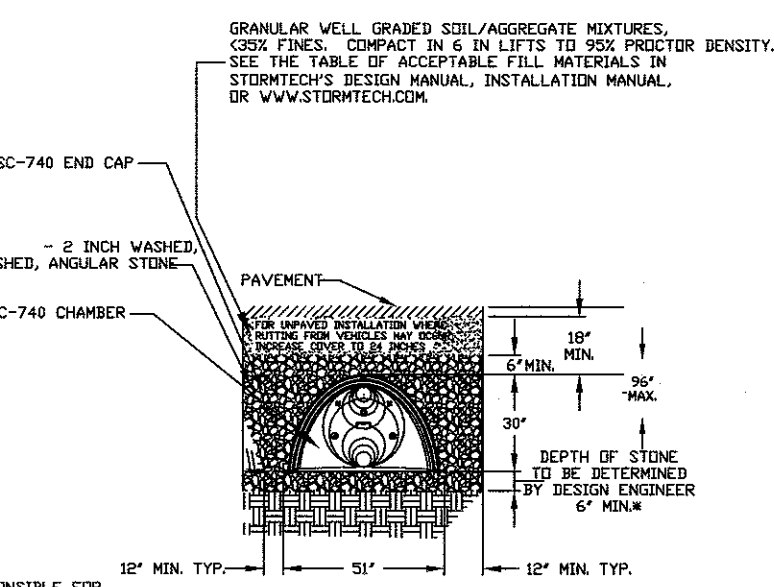
INFILTRATE (STORE) 1" OF RUNOFF
 1/12 (1870 S.F.) = 156 CU. FT.

USE (2) STORMTECH SC-740 LEACH CHAMBERS - SEE DETAIL
 45.9 CU. FT. WITH 1 FT. CRUSHED STONE AROUND EACH
 45.9 CU. FT. x 2 = 91.8 CU. FT. CHAMBER VOLUME

VOLUME COMPUTATION EXTERIOR CRUSHED STONE
 16.24 FT x 3.5 FT. x 6.25 FT. = 355.3 CU. FT.
 355.3 CU. FT. - 91.8 CU. FT. (CHAMBER VOLUME) = 263.5 CU. FT.
 263.5 CU. FT. x 0.3 (VOIDS) = 79.1 CU. FT. VOLUME VOIDS STORAGE
 91.8 CU. FT. CHAMBER VOLUME + 79.1 CU. FT. VOIDS = 170.9 CU. FT.
 170.9 CU. FT. TOTAL STORAGE > 156 CU. FT. RUNOFF CALCULATION



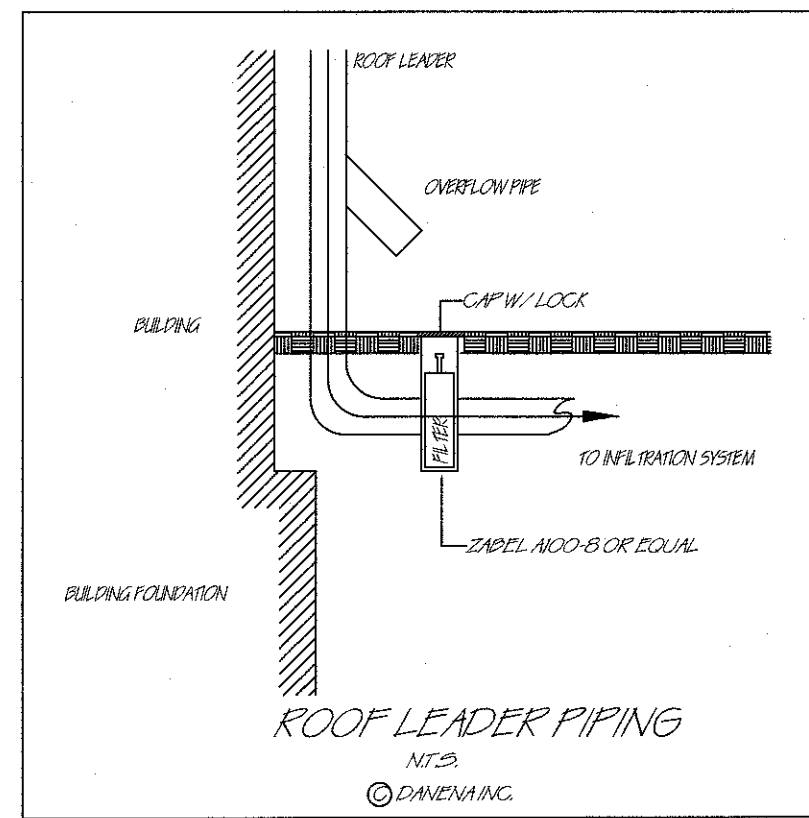
NOTE: ALL ELEVATIONS SHOWN ARE NAVD88 UNLESS OTHERWISE NOTED



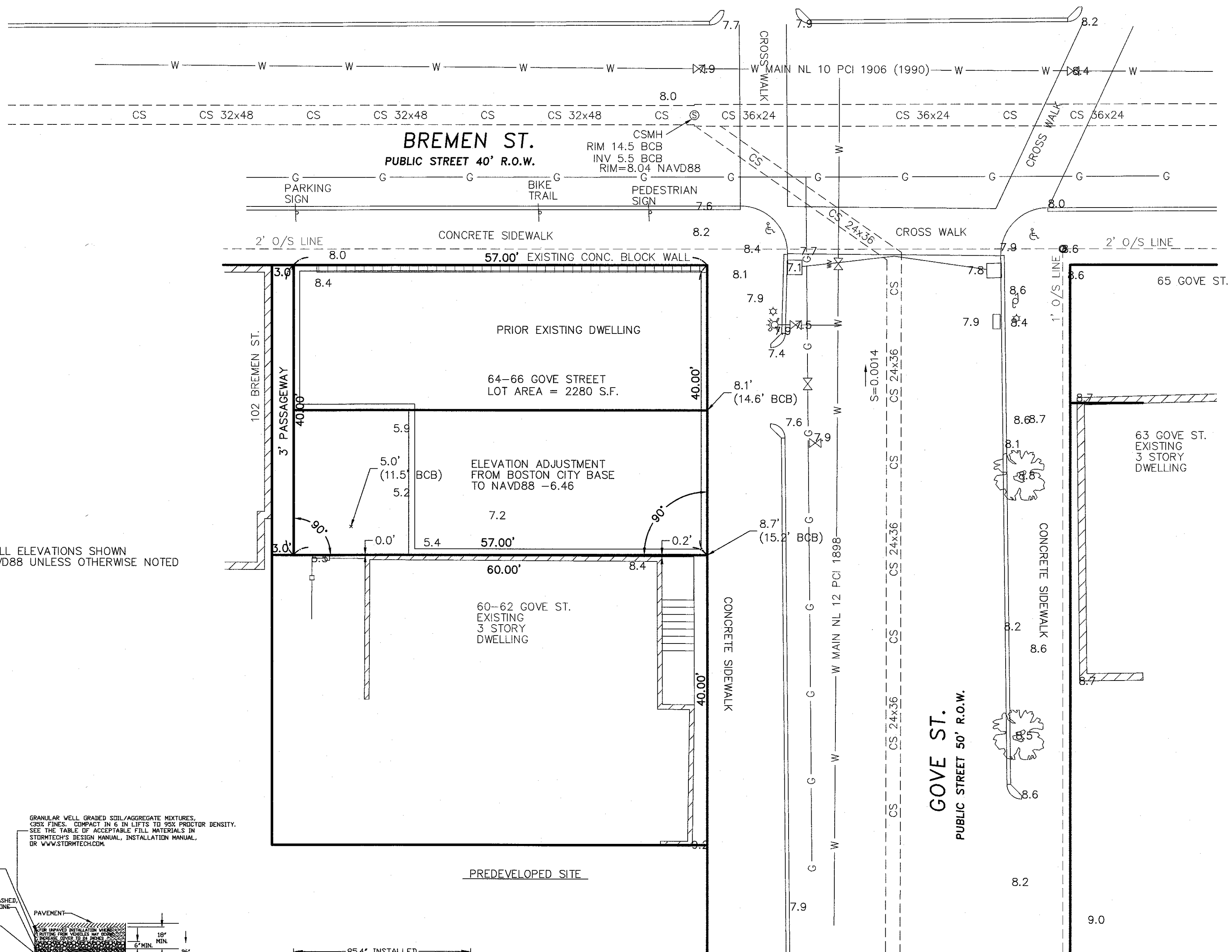
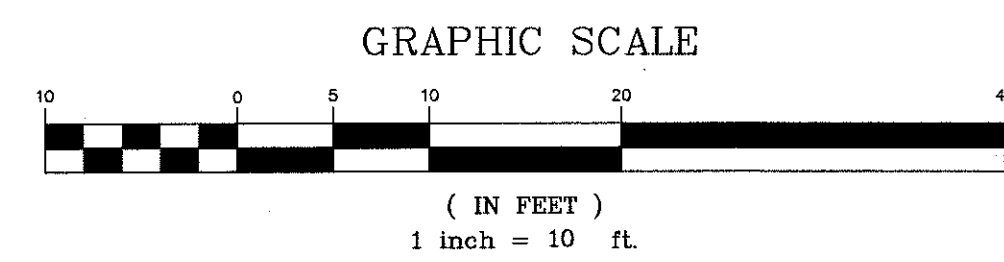
STORMTECH SC-740 CHAMBER

NOMINAL CHAMBER SPECIFICATIONS

| | |
|---------------------------------|-----------------------|
| SIZE (W x H x INSTALLED LENGTH) | 51.0" x 30.0" x 85.4" |
| CHAMBER STORAGE | 45.9 CUBIC FEET |
| MINIMUM INSTALLED STORAGE | 74.9 CUBIC FEET |
| WEIGHT | 75 LBS. |



ROOF DOWNSPOUT DETAIL



CONSERVATION PLAN
64-66 GOVE ST.
EAST BOSTON, MA
FOR
CHAN SING MING

CIVIL ENVIRONMENTAL CONSULTANTS
 8 OAK STREET PEABODY, MA 01960 978-531-1191

SHEET NO: 1 OF 1

DATE: 2/27/2018 JOB: 3516
 REV: 7/19/18, 8/30/18, 9/10/2018
 DRAWN BY: L.J.B.

